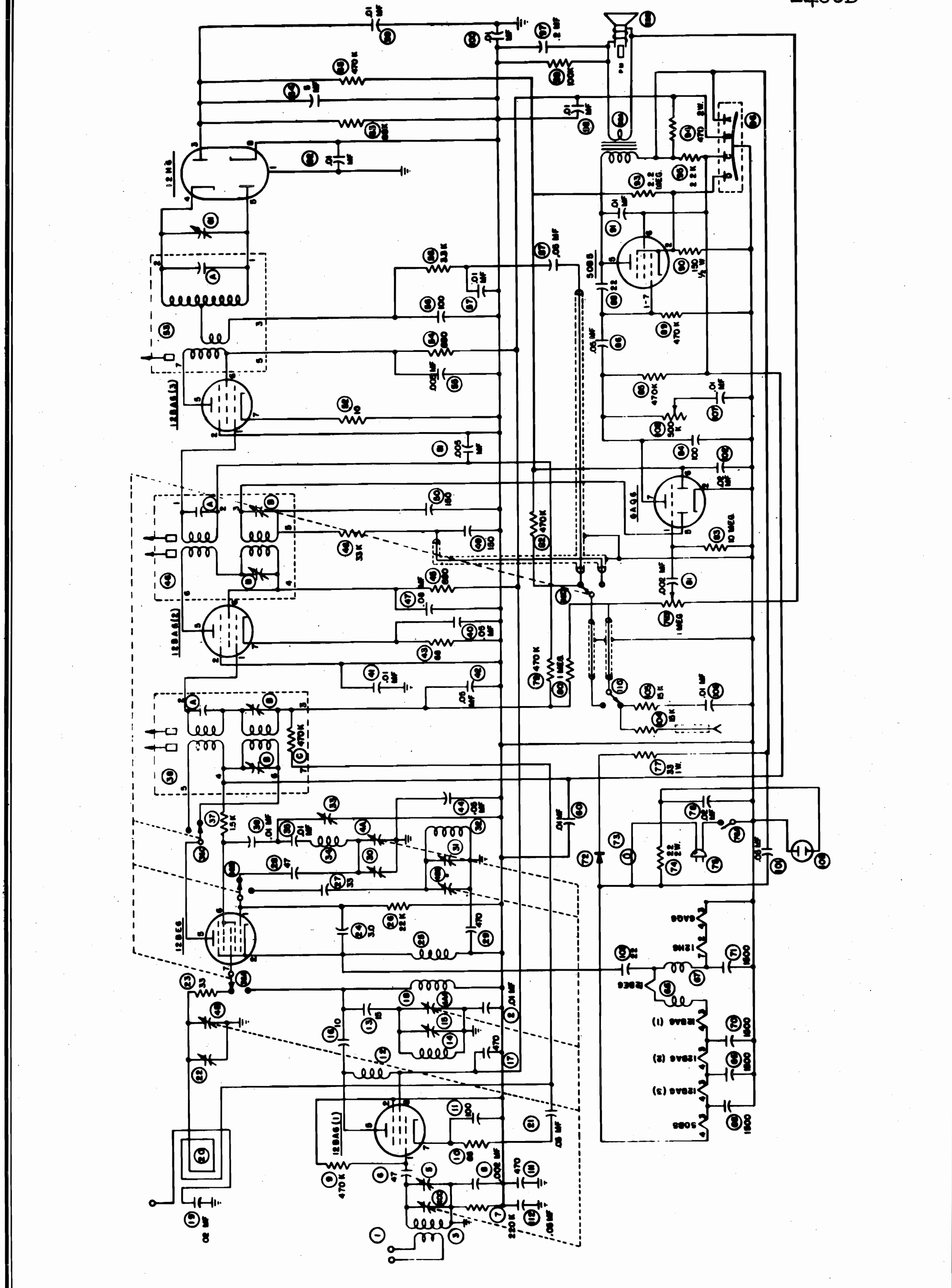
PHILHARMONIC RADIO CORP.

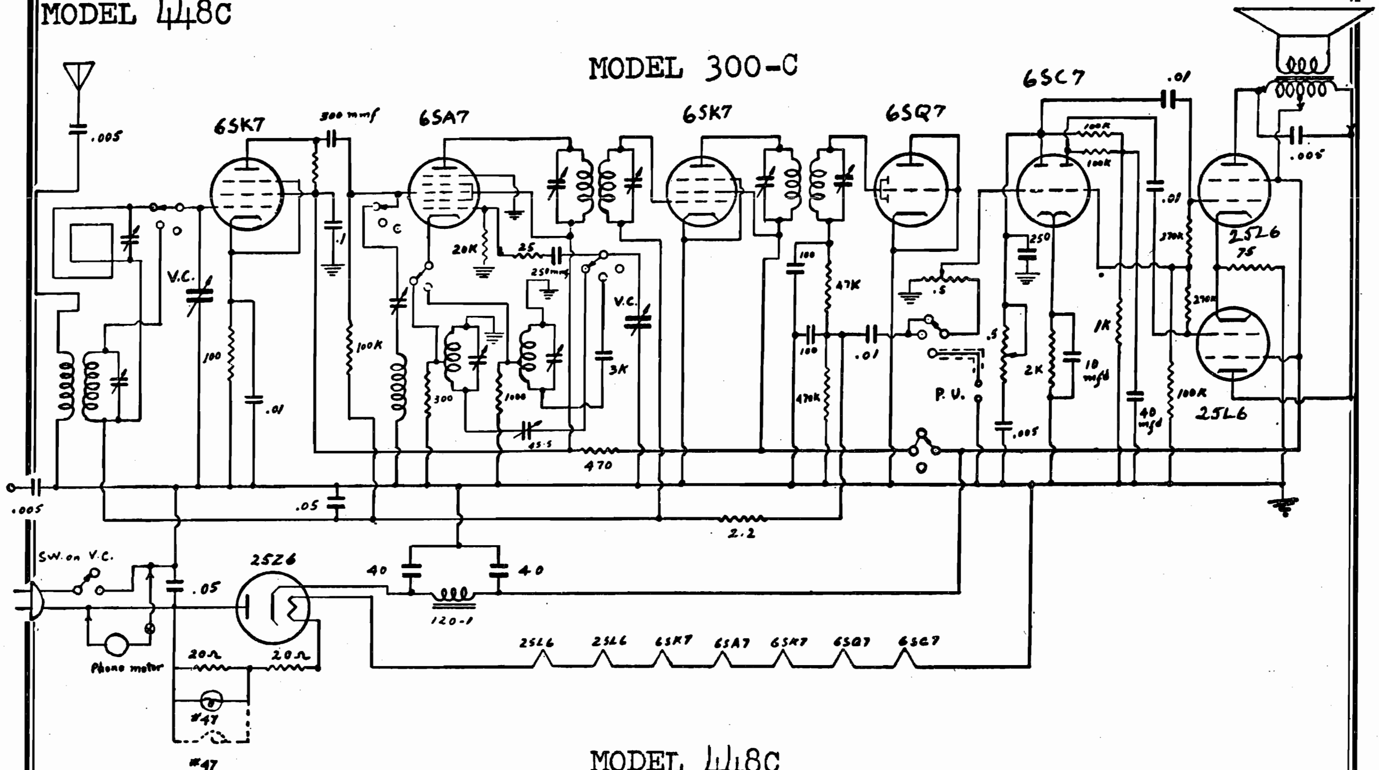
MODELS 248C, 248CB



MODEL 300-C
MODEL 448C

PHILHARMONIC RADIO CORP.

MODEL 300-C



MODEL 448C

TYPE: Twelve-tube FM-AM superheterodyne.

FREQUENCY RANGES: FM, 88-108 Mc.
AM, 540-1600 Kc.

INTERMEDIATE FREQUENCIES: FM, 10.7 Mc. AM, 456 Kc.

POWER SOURCE: 105-125 volts, 60 cycles.

POWER CONSUMPTION:
Radio, 80 watts.
Radio and Phonograph, 102 watts.

INSTALLATION.

ANTENNAS.— For AM operation, the loop antenna attached to the rear of the chassis is generally the most satisfactory. However, terminals marked **A** and G are provided on the loop for the connection of an external antenna and ground, which may be used if desired.

For the reception of local FM stations, a folded-dipole antenna is provided in the cabinet. If reception of other than strictly local FM stations is desired, a good external FM antenna should be installed and connected with a 300-ohm balanced line to the input terminals on the rear of the chassis next to the phonograph input jack 124. The internal dipole must be disconnected when using the external antenna, and vice-versa.

POWER CONNECTIONS.— Connect the power cord to an alternating-current supply of 105-125 volts, 60 cycles. Be sure that the phonograph-motor cord is plugged into receptacle 121, the speaker plug 123 into receptacle 122, and the phonograph-pickup cord into phonograph jack 124.

CONTROLS.— The control knobs on the front panel perform the following functions. The numbers are from left to right.

1. Power switch and volume control.
2. Tone control. Clockwise rotation gives more high-frequency response.
3. Selector switch. Left position, **AM** radio; center, FM radio; right, phonograph.
4. Tuning control.

OPERATION.

RADIO.— Start the set by turning the volume control clockwise about one-third of the way.

Set the selector switch on **AM** or **FM** as desired.

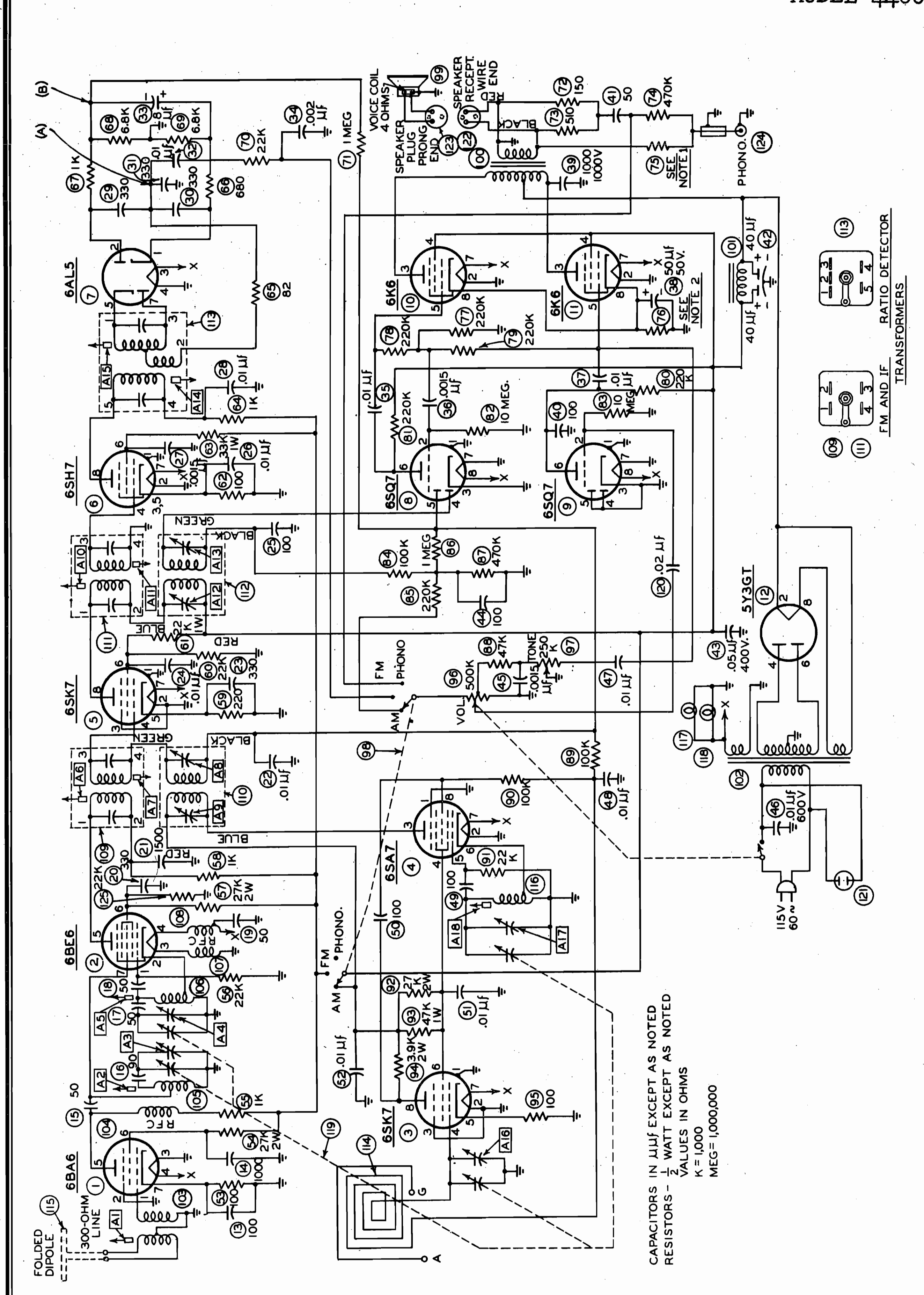
Turn the tuning control until the pointer indicates the frequency of the desired station. When the station comes in, slowly rotate the knob back and forth and determine the exact center position, where the background noise disappears or is sharply reduced, and the signal comes in clearly with the greatest volume. This is the correct tuning position, and careful adjustment is required, especially on FM, if the full rich-tone capability of the receiver is to be realized. A strong **FM** station may also be received, with considerable distortion, at positions slightly above and below the correct center position. This condition is quite normal.

Adjust the tone control for the most pleasing operation.

PHONOGRAPH.— Set the selector switch on the right-hand position. Operate the record changer in accordance with the accompanying instructions.

PHILHARMONIC RADIO CORP.

MODEL 448C



MODEL 448C

PHILHARMONIC RADIO CORP.

ALIGNMENT PROCEDURE
Read Carefully before Attempting Alignment

A-M ALIGNMENT

1. TUNING CAPACITOR fully meshed. Adjust dial pointer to reference dot at the low-frequency end of the scale.
2. VOLUME CONTROL maximum clockwise.
3. TONE CONTROL maximum clockwise.
4. SELECTOR SWITCH on AM (left-hand position).
5. SIGNAL GENERATOR.— Use standard A-M Signal Generator with approximately 30 per cent modulation at 400 cycles.
6. SIGNAL-GENERATOR COUPLING.-Low side grounded to chassis. High side connected through 0.01 mfd capacitor to coupling point.
7. LOOP COUPLING.— For loop coupling, use a Standard Signal Injection Loop according to specifications. If a standard loop is not available, make a loop with 5 or 6 turns of insulated wire, close-wound on a 3" to 4" diam form. Place the loop coaxially with and at least 10 inches back of the receiver loop. Connect to the signal generator through a resistor of from 100 to 400 ohms.
8. RECEIVER OUTPUT.

   (A) Use a d-c electronic voltmeter similar to the VoltOhmyst, low side to chassis, high side to AVC terminal of loop.

   (B) Use a rectifier-type a-c voltmeter or a standard output meter across the speaker voice coil.

	SIGNAL GENERATOR			RECEIVER	RECEIVER OUTPUT		ADJUST	REMARKS
	FREQ, KC	APPROX. SIGNAL LEVEL	COUPLE TO	DIAL SETTING	(A) AVC VOLTS INCREASE	(B) VOICE COIL, WATTS		
1.	455	800 uv	Pin 8, 6SA7	Near 600	-0.6	2.0	A-12, A-13, A-8, A-9	Adjust for maximum watts or AVC. Check for smooth round-top selectivity curve.
2.	1600	400 uv/m	Loop	1600 (Capacitor wide open)	-0.6	2.0	A-17, A-16	Adjust for maximum output.
3.	1400	400 uv/m	Loop	Near 1400	-0.6	2.0	A-16	Tune to signal and adjust A-16 for maximum output.
4.	600	400uv/m	Loop	Near 600	-0.6	2.0	A-18	Rock tuning control and simultaneously adjust A-18 for maximum output.
5.	Repeat steps 2, 3, and 4 in order until no further improvement can be made.							

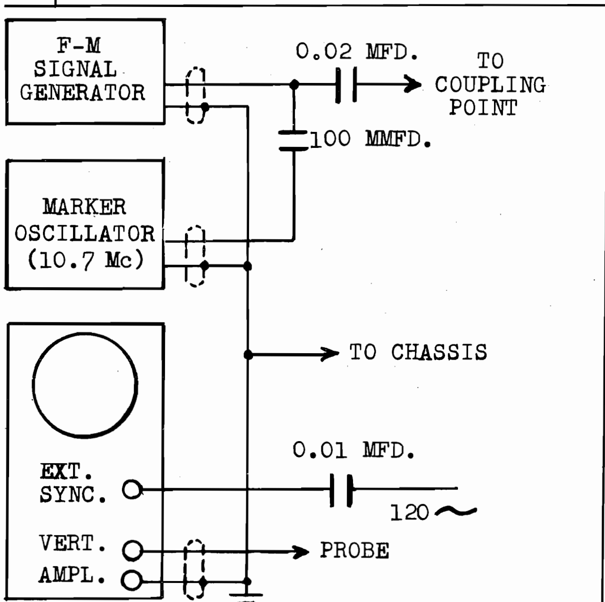


DIAGRAM I. F-M I-F ALIGNMENT.

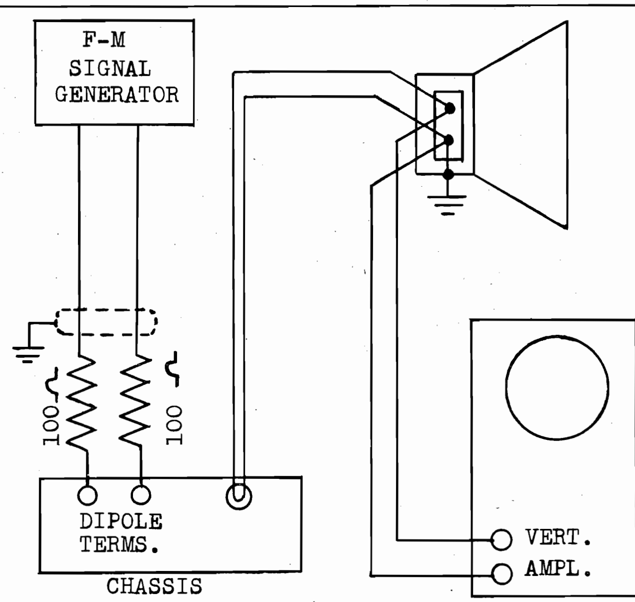


DIAGRAM II. F-M R-F ALIGNMENT.

PHILHARMONIC RADIO CORP.

MODEL 448C

F-M ALIGNMENT
Using Frequency-Modulated Signal Generator and Oscilloscope

ALIGNMENT OF I-F STAGES

GENERAL.— When the designated F-M signal from the signal generator is applied to the I-F amplifier or ratio detector, the output at point (A) viewed on an oscilloscope with a 60-cycle linear horizontal sweep is represented by pattern A. Pattern B shows the output at point (B) with the 8 mfd capacitor 33 disconnected. Patterns more useful for alignment purposes are obtained by operating the horizontal linear sweep of the scope at twice the modulation frequency or 120 cycles per second. This gives a double trace on each pattern, one trace representing the increasing-frequency half of the modulation cycle and the other representing decreasing frequencies, patterns I and V. When properly aligned, the two traces of pattern V coincide.

CENTER-FREQUENCY MARKER.— An additional requirement for proper alignment is that the signal generator must operate at the correct center frequency. The 10.7 Mc signal of the marker oscillator is used to check the center frequency. As the F-M signal sweeps its band, it produces a beat frequency with the marker signal, which decreases as the center point is approached and increases on the other side of center. These markers are shown properly centered in patterns II and VI. Because of the amplitude rejection of the ratio detector, it is difficult to determine the center point of the markers in pattern II, but they can readily be located by temporarily shorting terminals 1 and 2 or 2 and 3 of ratio-detector transformer 113. The resulting effect is shown in patterns III and IV. It is advisable to remove the marker signal when adjusting for coincidence of patterns or straightness of crossover lines, but checks should be made with the marker to make sure that the signal generator has not drifted from the correct center frequency. Pattern VII shows the effect when the signal generator is off center. The markers may be entirely separated or partially overlap. To correct this condition, readjust the center frequency of the signal generator until the markers come together and the combined marker length is a minimum, as in pattern VIII. Then realign to give pattern V or VI.

PROCEDURE

F-M SIGNAL GENERATOR, center frequency 10.7 Mc/sec, 225 Kc deviation, 450 Kc total sweep, at 60 cycles/sec. Use only enough output for satisfactory wave forms.

MARKER OSCILLATOR, 10.7 Mc/sec fixed, crystal-controlled or accurately calibrated. Use no more output than necessary. Excessive amplitude will distort the patterns.

COUPLING OF SIGNAL GENERATOR AND MARKER OSCILLATOR.— See Diagram I. Low side to chassis. Combined output through 0.002 mfd to coupling point.

OSCILLOSCOPE.— Vertical amplifier at maximum gain. Linear horizontal sweep synchronized at 120 cycles per second by ripple voltage from pin 2 of rectifier 5Y3GT of the receiver. Do not use internal Y-signal synchronization. This will result in off-center alignment.

SELECTOR SWITCH on FM (center position).

VOLUME AND TONE CONTROLS, maximum clockwise.

HOOKUP, as in Diagram I.

NOTE. Unless receiver is seriously misaligned, omit steps 1 and 2.

	SIGNAL GENERATOR		RADIO DIAL	OSCILLOSCOPE		ADJUST	REMARKS
	CENTER FREQ.	COUPLING POINT		VERTICAL INPUT	PATTERN NO.		
1	10.7 Mc	Pin 4 6SH7	Near 90 Mc. Tune off stations.	High side to point (A). Low side to chassis.	I, II III, IV	A-14 A-15 alternately	Adjust for maximum amplitude, symmetry, and straightness of crossover, as in patterns I and II. Verify position of center-frequency marker as in patterns III and IV.
2	10.7 Mc	Pin 7 6BE6	Near 90 Mc. Tune off stations.	High side to point (B). Low side to chassis.	V, VI	A-11 A-10 A-7 A-6 A-14	Disconnect 8 mfd capacitor 33 from point (B). Adjust for maximum amplitude, symmetry, and coincidence, as in pattern V, maintaining markers in center as in pattern VI.
3	10.7 Mc	Pin 7 6BE6	Near 90 Mc. Tune off stations.	High side to point (A). Low side to chassis.	I, II	A-6 A-7 A-10 A-11 A-14 A-15	Reconnect capacitor 33 to point (B). Recheck adjustments for maximum amplitude, symmetry and straightness of crossover, as in patterns I and II. Check marker positions as in patterns III, IV.

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PHILHARMONIC RADIO CORP.

F-M ALIGNMENT (Continued)

Alignment of R-F Section

HOOKUP, as in Diagram II.

SELECTOR SWITCH on FM.

VOLUME AND TONE CONTROLS, maximum clockwise.

F-M SIGNAL GENERATOR, 50 Kc deviation, 100 Kc total sweep at any rate from 60 to 400 cycles per second.

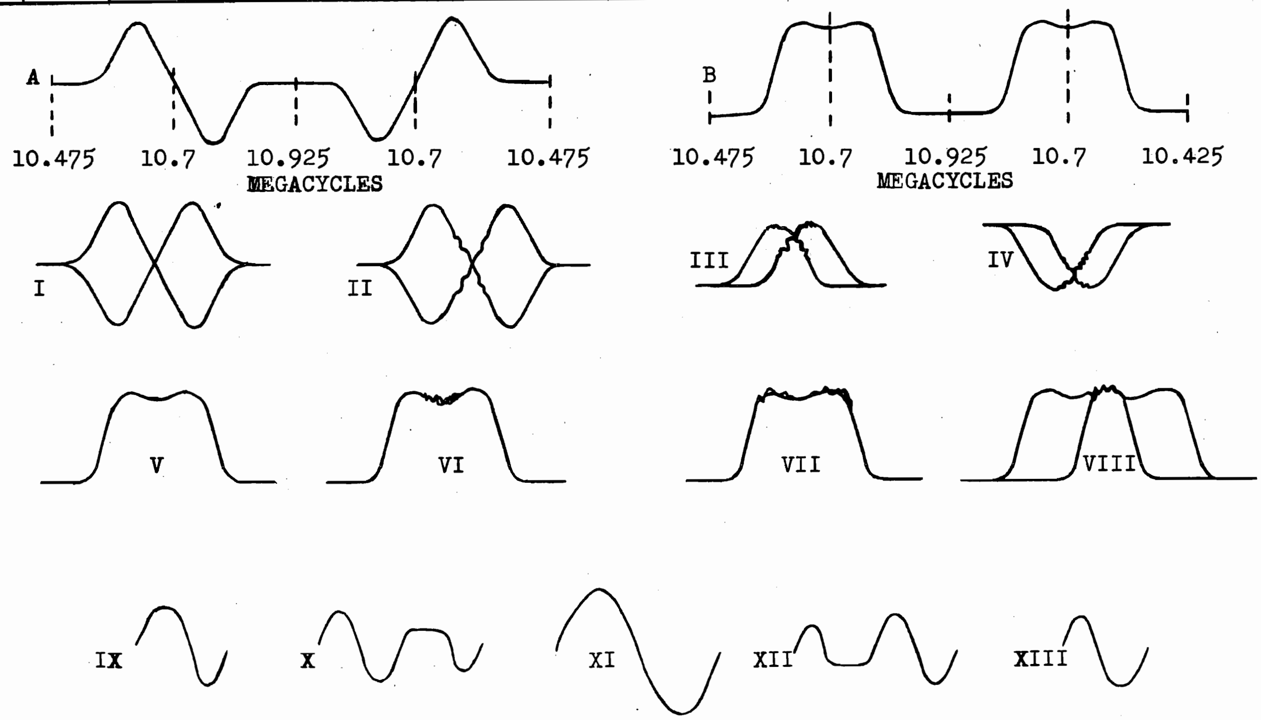
OSCILLOSCOPE.— Adjust horizontal sweep to the modulation frequency of the signal generator and lock it into step with the internal (Y-signal) synchronizing control.

TUNING.— Patterns IX through XIII are wave forms that will show on the oscilloscope as the tuning control is tuned through the F-M signal. Pattern XI represents the correct tuning position; the pattern is a pure sine wave of greater amplitude than the side patterns. Patterns IX and XIII represent the two side positions where the signal is also received, but distorted and with less amplitude.

CAUTION

When aligning, do not confuse the correct position, Pattern XI, with either side position, Patterns IX and XIII. When tuned correctly, a slight movement of the tuning control to either side will give the highly distorted double-frequency patterns X and XII.

	SIGNAL GENERATOR		RADIO DIAL	ADJUST	TO GIVE SCOPE PATTERN	REMARKS
	FREQ.	DEVIATION				
4	108 Mc	50 Kc	108 (Capacitor open)	A-4 (A-3 tight)	XI	Tighten A-3, then adjust A-4 to produce Pattern XI. If two positions of A-4 are found giving the same amplitude of Pattern XI, use the one of higher frequency (A-4 backed out).
5	87.8 Mc	50 Kc	Capacitor closed.	A-5 (A-3 tight)	XI	Adjust to produce Pattern XI. Repeat steps 4 and 5 until no further adjustment is necessary.
6	105 Mc	50 Kc	Near 105	A-3	XI	Rock tuning control and simultaneously adjust A-3 for maximum amplitude of Pattern XI.
7	90 Mc	50 Kc	Near 90	A-2	XI	Rock tuning control and simultaneously adjust A-2 for maximum amplitude of Pattern XI. Repeat steps 6 and 7 until there is no further improvement.
8	100 Mc	50 Kc	Near 100	A-1	XI	Tune to pattern XI. Adjust A-1 for maximum amplitude.



OSCILLOSCOPE PATTERNS

PHILHARMONIC RADIO CORP.

MODEL 448C

F-M ALIGNMENT. MILLER-RESISTOR METHOD

Using An Unmodulated Signal Generator and D-C Electronic Voltmeter.

GENERAL.— For this receiver, the Miller-resistor method, which takes its name from Dr. John M. Miller, is the most satisfactory of the alignment procedures which do not require the use of an F-M signal generator. With this method, resistance loading is applied to all the secondary circuits in the amplifier while the primary circuits are tuned to the desired center frequency. Then the primary circuits are loaded with the proper resistors while the secondary circuits are tuned.

The resistor across the primary reduces the Q of the transformer sufficiently to produce a single-peak response curve so that the secondary can be tuned to frequency. Its removal does not detune the secondary circuit appreciably. A similar effect is produced when the resistor is across the secondary, permitting accurate tuning of the primary. Small half-watt carbon resistors must be used with the shortest possible leads, to avoid over-all regeneration. Solder-tack the resistor across the transformer terminals.

SELECTOR SWITCH, on F-M (center position).

VOLUME AND TONE CONTROLS, maximum clockwise.

SIGNAL GENERATOR, unmodulated, accurately calibrated. Ranges 10 to 11 Mc and 87.5 to 108 Mc. Output adjustable from 100 to 100,000 microvolts. Connect low side to chassis, for steps 1-5.

OUTPUT INDICATOR.— D-C electronic voltmeter, preferably zero center, with input resistance of at least one megohm on low range, which should not exceed five volts full scale.

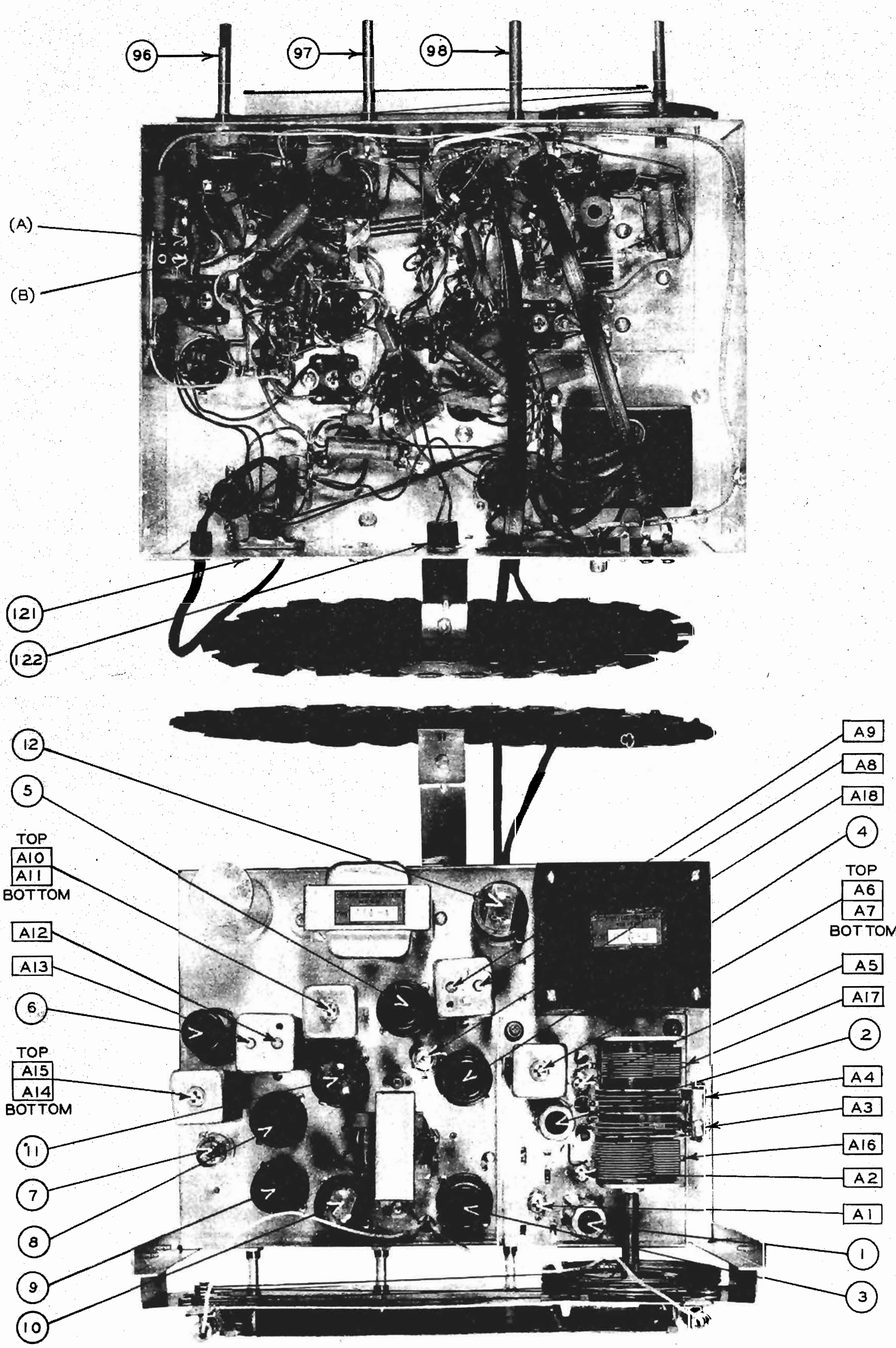
OUTPUT METER CONNECTIONS.— Probe to point (A), ratio-detector output, zero volts to chassis when correctly adjusted. Probe to point (B), F-M AVC source, reading the increase in negative voltage above the value obtained when no signal is applied. The reading with no signal is caused by the diode and amplifier-tube contact potentials, and will usually be about -0.5 to -0.7 volts.

	SIGNAL GENERATOR		RADIO DIAL.	VTVM TO POINT	MILLER RESISTORS		ADJUST	REMARKS
	FREQ, Mc	COUPLING	TUNE OFF STATIONS		OHMS	ACROSS		
1	10.7	0.002 mfd to pin 4 6SH7	Near 90 Mc	(B)	6800	1 and 3 of 113	A-14	Adjust for maximum deflection.
2	10.7	"	"	(A)	"	"	A-15	Adjust for zero deflection, between points of sharp polarity reversal. If approach to zero is slow with no reversal, turn A-15 in opposite direction.
3	10.7	0.002 mfd to pin 7 6BE6	"	(B)	6800 6800	3 and 4 of 111 3 and 4 of 109	A-10 A-6	Adjust for maximum deflection.
4	10.7	"	"	(B)	22000 22000	1 and 2 of 111 1 and 2 of 109	A-11 A-7	Adjust for maximum deflection.
5	10.7	"	"	(B)	None	--	--	Move input signal from 10 Mc through 11.5 Mc. Response curve should be flat-topped, symmetrical, and centered at 10.7 Mc. If not, repeat steps 1, 2, 3, 4 carefully.
6	108	See Remarks	108 Mc (Capacitor open)	(B)	None	--	A-4 (A-3 tight)	Signal generator across F-M dipole input terminals with 100-ohm 1/2-watt carbon resistor in each side. Tighten A-3, then adjust A-4 for maximum deflection. See note 1.
7	87.8	"	Near 88 Mc (Capacitor closed)	(B)	--	--	A-5	Adjust for maximum deflection. Repeat steps 6 and 7 until no change in adjustment is required.
8	105	"	Near 105 Mc	(B)	--	--	A-3	Rock tuning control and adjust A-3 for maximum deflection.
9	90	"	Near 90 Mc	(B)	--	--	A-2	Rock tuning control and adjust A-2 for maximum deflection. Repeat 8 and 9.
10	100	"	Near 100 Mc	(B)	--	--	A-1	Rock tuning control and adjust A-1 for maximum deflection.

NOTE 1. If two peaks are found, use position with A-4 backed out (higher frequency).

MODEL 448C

PHILHARMONIC RADIO CORP.



PHILHARMONIC RADIO CORP.

MODEL 448C

PARTS LIST

TUBES

No.	Type	Function
1	6BA6	R-F Amplifier (FM)
2	6BE6	Pentagrid Converter (FM)
3	6SK7	R-F Amplifier (AM)
4	6SA7	Pentagrid Converter (AM)
5	6SK7	First I-F Amplifier (AM-FM)
6	6SH7	Second I-F Amplifier (FM)
7	6AL5	Ratio Detector (FM)
8	6SQ7	Detector-Phase Inverter
9	6SQ7	First Audio Amplifier
10	6K6	Power Amplifier
11	6K6	Power Amplifier
12	5Y3GT	Full-Wave Rectifier

CAPACITORS

No.	Part	uf	uuf	Volts	
13	CD-1071-22		100	500	Mica
14	CD-1085-20		1000	300	Mica
15	CD-1254-2		50	500	Ceramic
16	CD-1107-100		90	500	Ceramic
17	CD-1106-110		50	500	Ceramic
18	CD-1254-2		50	500	Ceramic
19	CD-1254-2		50	500	Ceramic
20	CD-1259-40		330	350	Ceramic
21	CD-1259-49		1500	350	Ceramic
22	CD-1227-8	.01		400	Paper
23	CD-1259-40		330	350	Ceramic
24	CD-1227-8	.01		400	Paper
25	CD-1071-22		100	500	Mica
26	CD-1227-8	.01		400	Paper
27	CD-1227-2	.0015		400	Paper
28	CD-1227-8	.01		400	Paper
29	CD-1259-40		330	350	Ceramic
30	CD-1259-40		330	350	Ceramic
31	CD-1259-40		330	350	Ceramic
32	CD-1227-8	.01		400	Paper
33	CD-1252	8		100	Electr.
34	CD-1227-3	.002		400	Paper
35	CD-1227-8	.01		400	Paper
36	CD-1227-2	.0015		400	Paper
37	CD-1227-8	.01		400	Paper
38	CD-1246	50		50	Electr.
39	CD-1283		1000	1000	Mica
40	CD-1071-22		100	500	Mica
41	CD-1254-2		50	500	Mica
42	CD-1248	40-40		450	Electr.
43	CD-1227-13	.05		400	Paper
44	CD-1071-22		100	500	Mica
45	CD-1227-2	.0015		400	Paper
46	CD-1265-15	.01		600	Paper
47	CD-1227-8	.01		400	Paper
48	CD-1227-8	.01		400	Paper
49	CD-1071-22		100	500	Mica
50	CD-1071-22		100	500	Mica
51	CD-1227-8	.01		400	Paper
52	CD-1227-8	.01		400	Paper
120	CD-1227-10	.02		400	Paper

RESISTORS, FIXED. K = 1000.

No.	Part	Ohms	Watts
53	RE-1139-104	100	1/2
54	RE-1046-276	27K	2
55	RE-1139-105	1K	1/2
56	RE-1139-226	22K	1/2
57	RE-1046-276	27K	2
58	RE-1139-105	1K	1/2
59	RE-1147-224	220	1/2
60	RE-1139-226	22K	1/2
61	RE-1168-226	22K	1
62	RE-1139-104	100	1/2
63	RE-1168-336	33K	1

RESISTOR, FIXED. - Continued

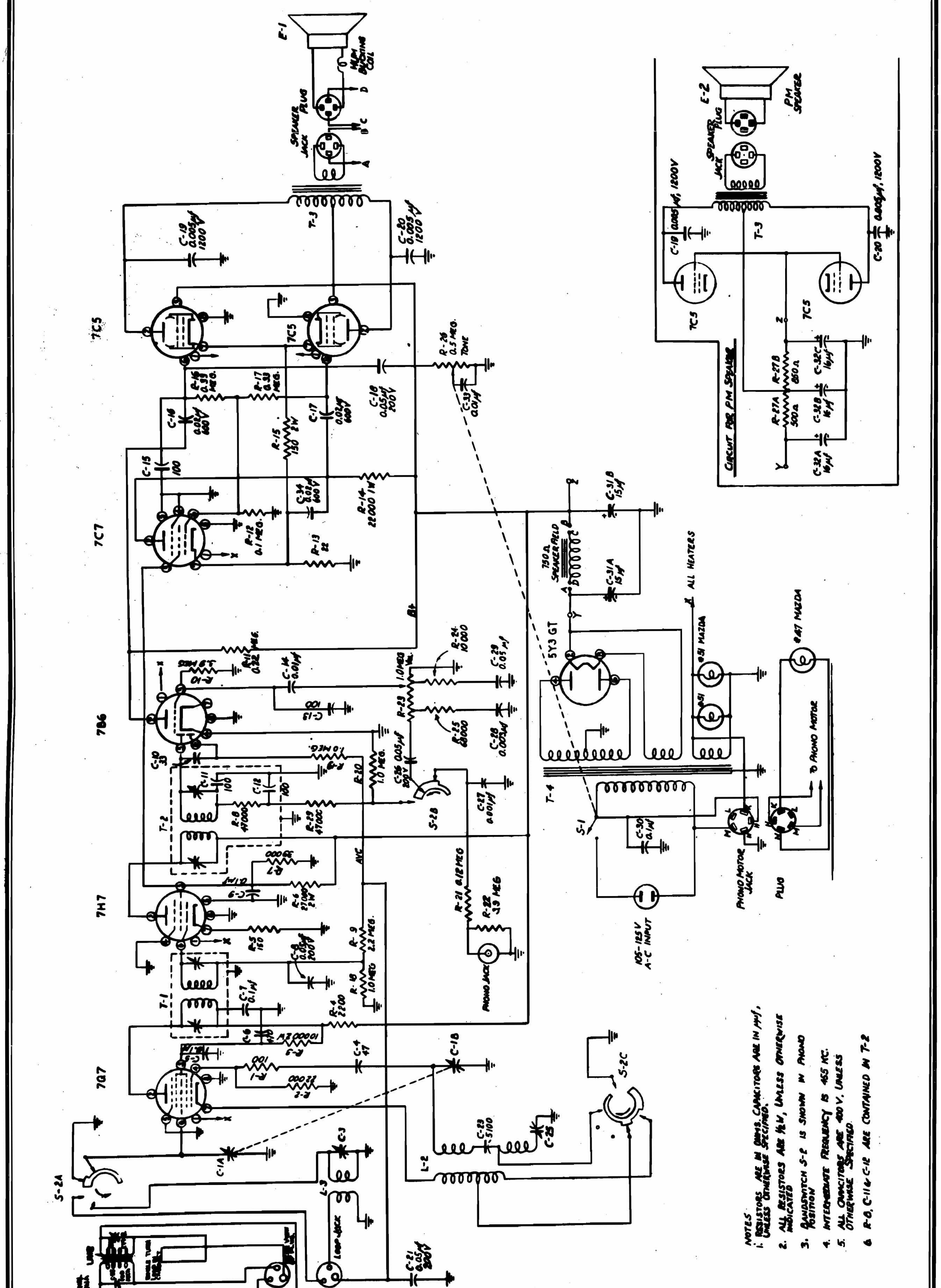
No.	Part	Ohms	Watts
64	RE-1139-105	1K	1/2
65	RE-1062-823	82	1/2
66	RE-1130-684	680	1/2
67	RE-1139-105	1K	1/2
68	RE-1015-685	6.8K	1/2
69	RE-1015-685	6.8K	1/2
70	RE-1139-226	22K	1/2
71	RE-1139-108	1 meg.	1/2
72	RE-1139-154	150	1/2
73	RE-1139-514	510	1/2
74	RE-1166-477	470K	1/2
75*	See Note.	470K or 1.5 meg.	1/2
76*	See Note.	680, 2 w. or 470, 1w.	Note
77	RE-1139-227	220K	1/2
78	RE-1139-227	220K	1/2
79	RE-1139-227	220K	1/2
80	RE-1139-227	220K	1/2
81	RE-1139-227	220K	1/2
82	RE-1139-109	10 meg.	1/2
83	RE-1139-109	10 meg.	1/2
84	RE-1166-107	100K	1/2
85	RE-1139-227	220K	1/2
86	RE-1139-108	1 meg.	1/2
87	RE-1166-477	470K	1/2
88	RE-1166-476	47K	1/2
89	RE-1166-107	100K	1/2
90	RE-1166-107	100K	1/2
91	RE-1139-226	22K	1/2
92	RE-1046-276	27K	2
93	RE-1153-476	47K	1
94	RE-1046-395	3.9K	2
95	RE-1139-104	100	1/2

MISCELLANEOUS

No.	Part	Name
96	RE-1181	Volume Control and Switch, 500K
97	RE-1182	Tone Control, 250K
98	SW-1069	Switch, AM-FM-Phono
99	SK-1020	Speaker
100	TR-1075	Transformer, P.P. Output
101	CK-1040	Choke, Filter
102*	See Note.	
103	TR-1064	Transformer, Antenna (FM)
104	CK-1043	R-F Choke
105	CI-1057	R-F Coil (FM)
106	CI-1058	Oscillator Coil (FM)
107	CK-1043	R-F Choke
108	CK-1043	R-F Choke
109	TR-1065	Transformer, First I-F (FM)
110	TR-1052	Transformer, First I-F (AM)
111	TR-1065	Transformer, Second I-F (FM)
112	TR-1051	Transformer, Second I-F (AM)
113	TR-1066	Transformer, Ratio Detector (FM
114	AT-1019	Antenna, Loop (AM)
115	AS-3599	Antenna (FM), Folded Dipole
116	CI-1059	Oscillator Coil (AM)
117	LA-1014-32	Pilot Light, Mazda 47
118	LA-1014-32	Pilot Light, Mazda 47
119	CD-W7000	Capacitor, Variable Tuning
121	SO-1059	Phono-Motor AC Receptacle
122	SO-1069	Speaker Receptacle
123	PL-1068	Speaker Plug
124	CC-1113	Phono Input Jack

PHILLIPS PETROLEUM CO.

MODEL 3-70A



MODEL 3-70A PHILLIPS PETROLEUM CO.

Alignment: No attempt should be made to realign this receiver until it has been determined that a poor tube, or some local condition is not responsible for faulty reception. The Signal Generator may be connected through a 0.01 mf capacitor (used as a dummy antenna) to the lug on R. F. section (A) of tuning capacitor. Connect ground clip of generator directly to chassis. Align the I. F. trimmers to 455 K.C., using least possible input from the Signal Generator to avoid developing A.V.C. voltage which would make the tuning adjustments very broad. An output meter may be clipped across the voice coil lugs.

To align broadcast R. F. trimmers, remove the 0.01 mf capacitor and connect the Signal Generator leads to two or three turns of heavy wire, forming a self-supporting loop of about 7 or 8 inches diameter placed about a foot away from the receiver's loop antenna. Again, use the least possible input from the Signal Generator. With the tuning plates completely out of mesh and the pointer at the extreme right end of travel, adjust the broadcast oscillator trimmer, on the under side of the chassis, to 1650 K.C. With tuning capacitor fully meshed adjust the padder on the chassis deck to 535 K.C. Readjust both Signal Generator and tuning capacitor to 1550 K.C. and adjust the R. F. trimmer on the loop for maximum response.

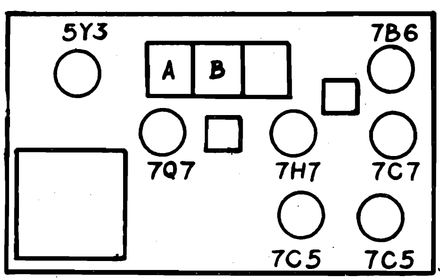
To align the short wave band connect the Signal Generator through a 0.01 mf capacitor and a 400 ohm resistor in series (used as a dummy antenna) to the antenna connection on the loop antenna. With the tuning capacitor plates completely out of mesh, and pointer at the extreme right end of travel, adjust the short wave oscillator trimmer (on the under side of the chassis) to 18.25 magacycles. Readjust both Signal Generator and tuning capacitor to 16 megacycles and adjust short wave antenna coil trimmer for maximum response. With tuning capacitor fully meshed, the receiver should tune to 5.75 megacycles, however no adjustment is required at this point.

For checking purposes five marks are engraved on the front of the dial plate. These represent, in order, the pointer position with the capacitor plates fully meshed and the pointer settings for 600 kc, 8 mc, 16 mc, and 1550 kc.

Pushbuttons: To set pushbuttons remove pushbutton knobs. This will expose a set screw on the shaft of each pushbutton. Starting at one end push a pushbutton down and loosen its set screw. Set the bandswitch to the broadcast position. Hold the pushbutton down and tune the manual tuning control to the station to which the pushbutton is to be set. Still holding the pushbutton down tighten its set screw. The pushbutton may now be released and its knob replaced. It will now select the station to which it was set. The other pushbuttons may be set in a similar manner.

REPLACEMENT PARTS LIST

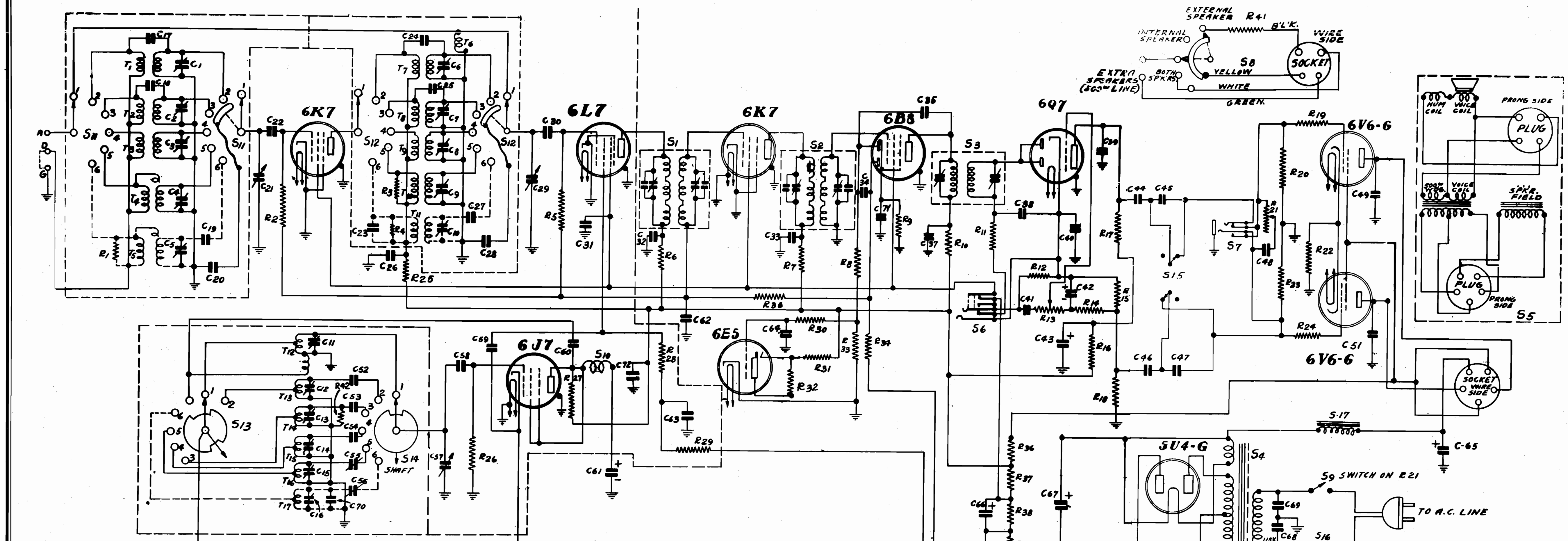
Circuit Symbol	Part Number	Item	Description
C-1 A & B	CV-9	Capacitor	Variable 2-gang, Push-button
C-2	CT1-1	Capacitor	Trimmer 1.5—15 MMF
C-3	CT1-2	Capacitor	Trimmer 2.2—40 MMF
C-22	CT1-2	Capacitor	Trimmer 2.2—40 MMF
C-23	CT1-2	Capacitor	Trimmer 2.2—40 MMF
C-25	CX2-1	Capacitor	Padder
E-1	EH-9	Speaker	10″ Electrodynamic
E-2	EH-14	Speaker	10″ P.M.
L-1	LL-9	Loop Antenna	
L-2	LO-4	Oscillator Coil Assembly	Broadcast & S.W. Osc. Coils
L-3	LR-4	S.W. Antenna Coil	
R-23	RP8-105	Potentiometer	1 Meg. with 2 taps, Volume Control
R-26	RP5-2	Potentiometer	0.5 Meg. with switch, Tone Control
R-27 A & B	RW3-1	Resistor	Wirewound 1350 Ohms 17 watt tapped at 500 Ohms
S-2 A, B & C	SR-9	Bandswitch	
T-1	TM2-4	Transformer	I. F. Input
T-2	TM2-5	Transformer	I. F. Output
T-3	TA-8	Transformer	Push-pull speaker output
T-4	TP-9	Transformer	Power



TUBE LOCATION

PILOT RADIO CORP.

MODELS G-508, G-509



MISC. FOR G-508 - G-509		
S1	73071	1ST. I.F. TRANS. ASS'Y.
S2	73071	2ND I.F. TRANS. ASS'Y.
S3	73072-B	3RD. I.F. TRANS. ASS'Y.
S4	79596	PWR. TRANS. ASS'Y. UNIV. 50-60~
S4	79630	PWR. TRANS. ASS'Y. 220-240V. 25~
S5	40839	10" A.C. SPEAKER
S6	79179	PHONO JACK
S7	72198	HEADPHONE JACK
S8	79210	EXTRA SPKR. SWITCH ASS'Y.
S9		SWITCH ON R21
S10	73073	R.F. CHOKE
S11	79192 (G-508)	ANT. SEC. BAND SWITCH
S12		DET. SEC. BAND SWITCH
S13	79193 (G-509)	OSC. CATHODE SEC. BAND SWITCH
S14		OSC. GRID SEC. BAND SWITCH
S15	79359-B	BASS ACCENTUATOR SWITCH ASS'Y.
S16	70053-E	3 AMP. FUSE
S-5	40845	12" SPEAKER
S-17	79858	3H. 100-OHMS FILTER CHOKE
R.F. COILS FOR MODEL G-509		
T1	73074	ANT. COIL ASS'Y. FOR BAND 2
T2 T4	73077	ANT. COIL ASS'Y. FOR BANDS 3 & 5
T3 T5	73080	ANT. COIL ASS'Y. FOR BANDS 4 & 6
T6 T7	73075	DET. COIL ASS'Y. FOR BANDS 1 & 2
T8 T10	73078	DET. COIL ASS'Y. FOR BANDS 3 & 5
T9 T11	73081	DET. COIL ASS'Y. FOR BANDS 4 & 6
T12 T13	73076	OSC. COIL ASS'Y. FOR BANDS 1 & 2
T14 T16	73079	OSC. COIL ASS'Y. FOR BANDS 3 & 5
T15 T17	73082	OSC. COIL ASS'Y. FOR BANDS 4 & 6

R.F. COILS FOR MODEL G-508 SAME AS FOR G-509 EXCEPT FOR BAND 6 WICH DROPS OUT; COILS FOR BD. 4 ARE		
T3	73083	ANT. COIL ASS'Y. FOR BAND 4
T9	73084	DET. COIL ASS'Y. FOR BAND 4
T15	73085	OSC. COIL ASS'Y. FOR BAND 4

CONDENSERS FOR MODEL G-508		
C1 C2 C3 C4	72226	TRIMMER STRIP ASS'Y.
C6 C7 C8 C9	72226	TRIMMER STRIP ASS'Y.
C11 C12 C13 C14 C15	72227	TRIMMER STRIP ASS'Y.
C17 C24	27737-0	10 MMFD. MICA
C18 C25 C35 C34	27736-0	25 MMFD. MICA
C20 C28	22055-A	.01 MFD. 600V. PAPER
C21 C29 C57	72146	10-450 MMFD. VAR. COND.
C22 C30	27701-0	250-MMFD. MICA
C26 C32 C33 C37 C44 C60	22055-AC	.02 MFD. 600V. PAPER
C31	22055-Z	.02 MFD. 400V. PAPER
C58 C38 C40	28016-0	100-MMFD. MICA
C39	28016-0	100-MMFD. MICA
C41	22055-I	.05 MFD. 200V. PAPER
C42	22481	10 MFD. 25 V. TUBULAR ELEC.
C43	85028	4-MFD. 450V. ELEC.
C61		4-MFD. 450V. ELEC.
C65		8-MFD. 450V. ELEC.
C66		8-MFD. 250V. ELEC.
C45 C47	22055-AT	.002-MFD. 200V. PAPER
C46 C64 C62	22055-H	.02-MFD. 200V. PAPER
C48	22055-W	.01-MFD. 400V. PAPER
C49 C51	22055-AA	.005-MFD. 1600V. PAPER
C52	28106-W	3250-MMFD. MICA
C53	27747-W	2670-MMFD. MICA
C54	27748-W	1300-MMFD. MICA
C55	71503-D	300-700 MMFD. PADDER
C68 C69	78503	.01-.01-MFD. 1000V. PAPER (SHIELDED)
C67	85030	20-MFD. 475V. ELEC.
C63 C71	22055-M	.1-MFD. 200V. PAPER
C59	27723-0	50-MMFD. MICA
C-72	22055-AB	.1-MFD. 600V. PAPER

CONDENSERS FOR MODEL G-509 SAME AS G-508 EXCEPT FOLLOWING		
C1 C2 C3 C4 C5	72227	TRIMMER STRIP ASS'Y.
C6 C7 C8 C9 C10	72227	TRIMMER STRIP ASS'Y.
C11 C12 C13 C14 C15 C16	79191	TRIMMER STRIP ASS'Y.
C19 C27	22055-A	.01-MFD. 600V. PAPER
C23	28105-0	150-MMFD. MICA
C56 C55	71577-J	50-175 & 250-500 MMFD. DUAL PADDER
C70	27736-0	25-MMFD. MICA

RESISTORS FOR MODEL G-508		
R2 R5	72213	500,000 OHMS 1/4 WATT I.R.C.
R3	13019	2,000 OHMS 1/4 WATT I.R.C.
R6 R7 R10 R25	13028	1000 OHMS 1/4 WATT CARBON
R8 R33 R34 R32 R35 R30	13001	1 MEGOHM 1/4 WATT CARBON
R9	13131	600 OHMS 1/4 WATT CARBON
R28	13148	30,000 OHMS 1/4 WATT CARBON
R12 R14 R20 R23	13171	250,000 OHMS 1/4 WATT CARBON
R13	79171	750,000 OHMS VOLUME CONTROL
R15	13195	2,500 OHMS 1/4 WATT CARBON
R16 R31	13074	20,000 OHMS 1/4 WATT CARBON
R17 R18 R11	13164	50,000 OHMS 1/4 WATT CARBON
R19 R24	13115	400 OHMS 1/4 WATT CARBON
R26	72207	50,000 OHMS 1/4 WATT I.R.C.
R27	72219	10,000- OHMS 1 WATT I.R.C.
R29	13116	12,000 OHMS 1/4 WATT CARBON
R36 R37 R38	83031	380-OHMS-3060-OHMS-2360 OHMS
R39 R40		19-OHMS-10 OHMS WIRE WOUND VOL. DIVIDER
R41	83025	10-OHMS 20 WATTS WIRE WOUND
R21	79518	750,000 OHM TONE CONTROL & SWITCH
R22	85033	300 OHMS 3 WATTS WIRE WOUND
R42	13147	300,000-OHMS 1/4 WATT CARBON

RESISTORS FOR MODEL G-509 SAME AS G-508 EXCEPT FOLLOWING		
R1	72211	5000 OHMS 1/4 WATT I.R.C.
R4	72216	2000 OHMS 1/4 WATT I.R.C.

NOTE: ADDITIONAL WIRING FOR MODEL G-509 SHOWN IN DOTTED LINES.

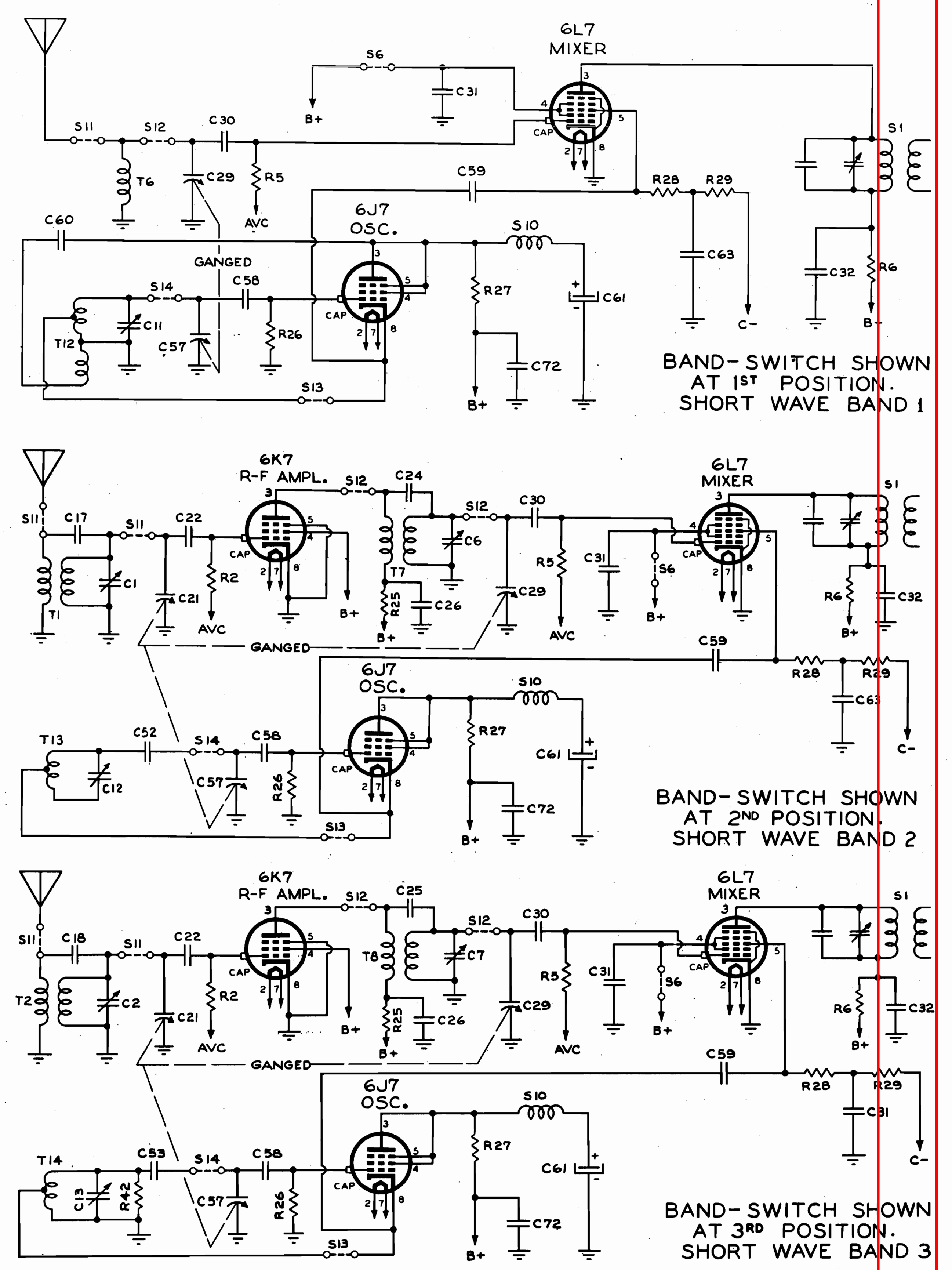
INTERMEDIATE FREQUENCY—456 KC.

ALIGNING FREQUENCY

B.C.(B_5)	600 to 1500 KC.
B_1	69 MC.
B_2	23 MC.
B_3	11 MC.
B_4	4.3 MC.
L.W.(B_6)	150 KC. to 375 KC.

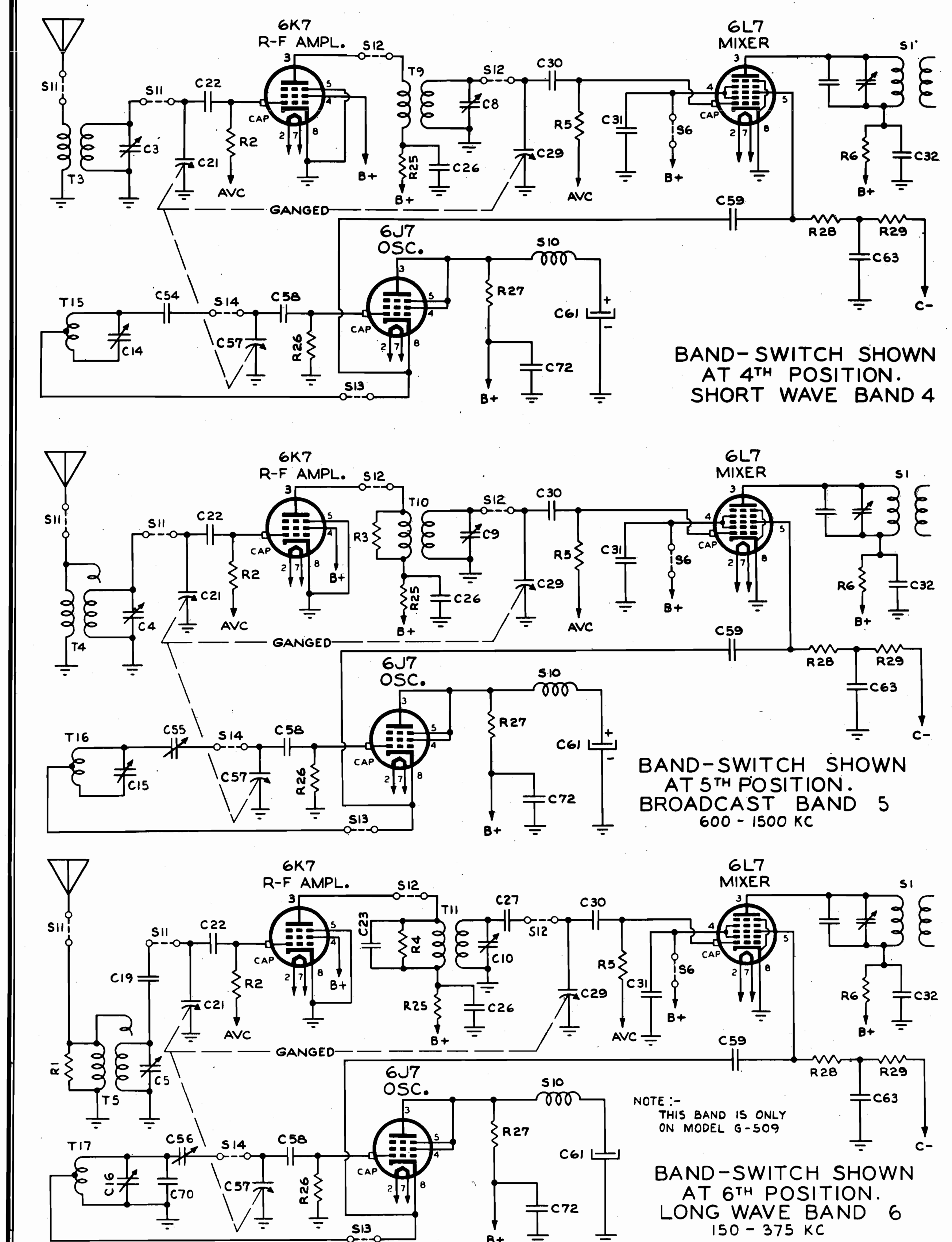
PILOT RADIO CORP.

MODELS G-508, G-509

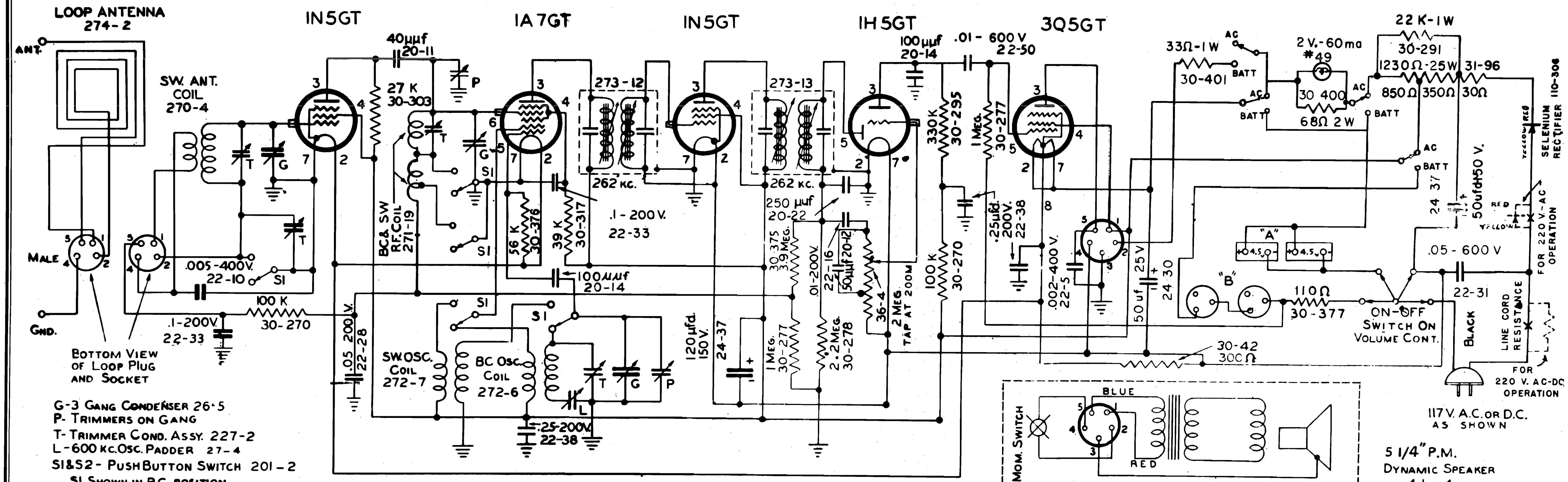


MODELS G-508, G-509

PILOT RADIO CORP.



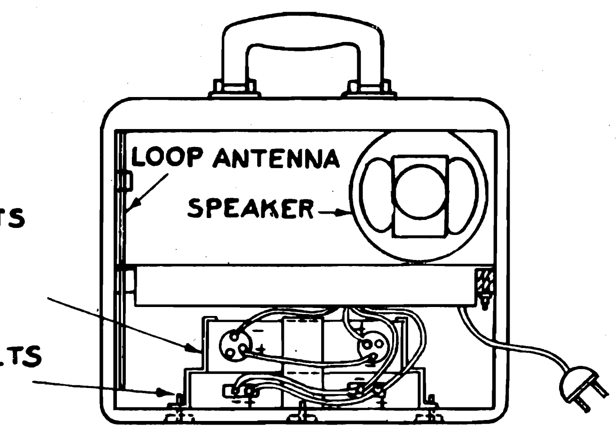
PILOT RADIO CORP.



G-3 GANG CONDENSER 26-5
P- TRIMMERS ON GANG
T- TRIMMER COND. ASSY. 227-2
L-600 KC. OSC. PADDER 27-4
S1 & S2 - PUSHBUTTON SWITCH 201-2
S1 SHOWN IN BC POSITION
S2 SHOWN IN AC-DC POSITION

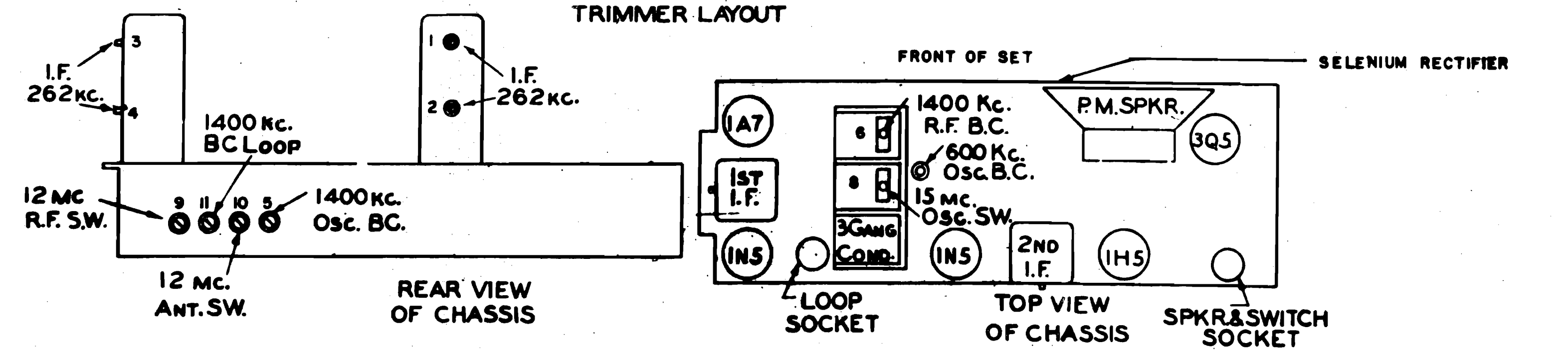
ALL RESISTORS ARE 1/2 WATT UNLESS OTHERWISE SPECIFIED

UPPER BATTERIES
2 "B" BATTERIES 45 VOLTS
EVEREADY NO. 482 OR EQUIVALENT
LOWER BATTERIES
2 "A" BATTERIES 4.5 VOLTS
EVEREADY NO. 746 OR EQUIVALENT



REAR VIEW OF CABINET SHOWING BATTERIES IN PLACE

TRIMMER LAYOUT



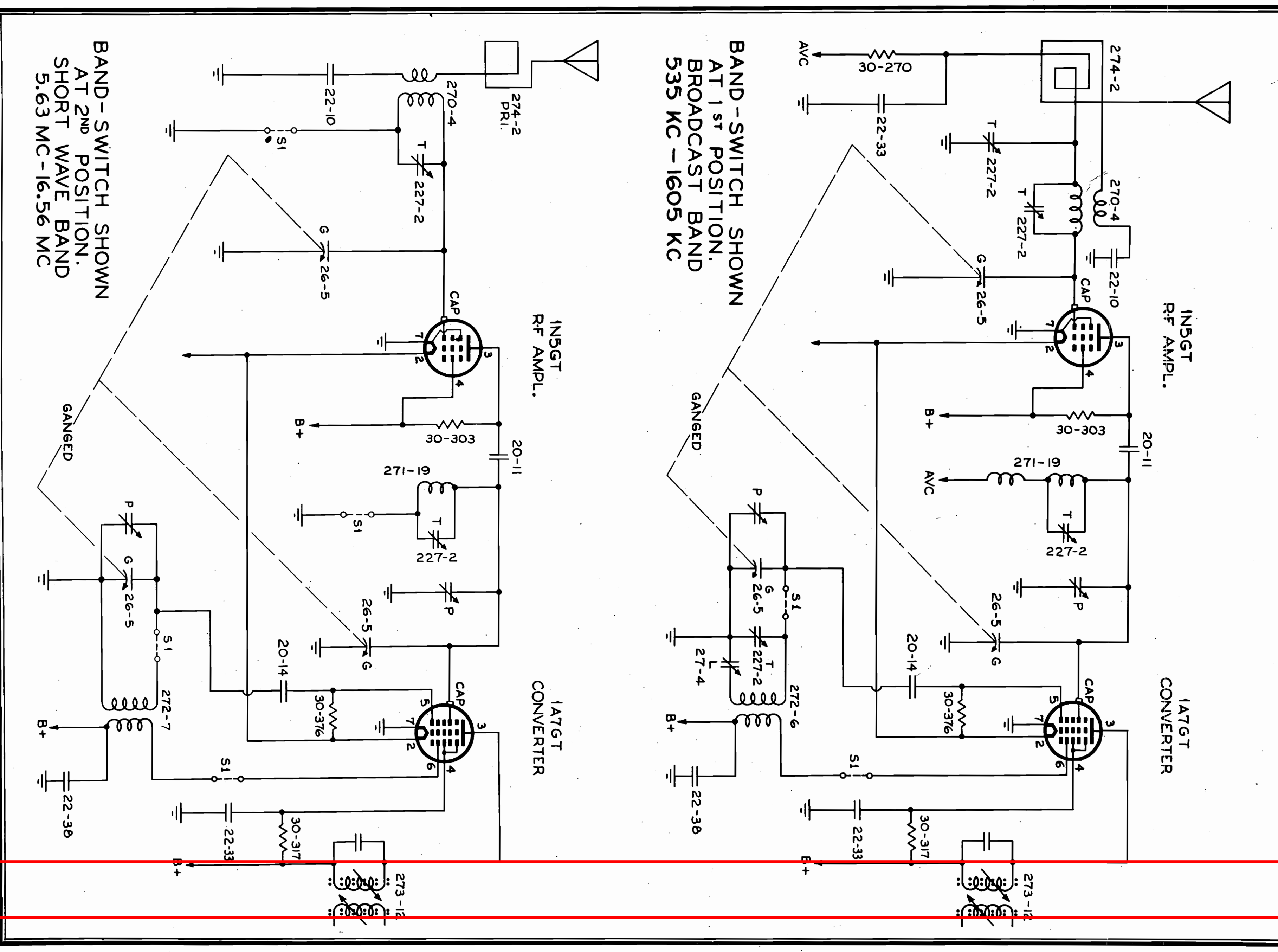
FOR BATTERY OPERATION

Do not plug the electric cord into the light socket. Push the button marked BATT and the SW or BC button for Shortwave or Broadcast reception, respectively. Rotate the volume control clockwise well past the point where the red flag appears in the dial window. The receiver will become operative immediately.

In order to light the pilot bulb for the dial ON BATTERY OPERATION, the switch button on the lower left-hand ledge inside the front door must be pressed down. When the button is released the light is automatically switched off in order to prolong the life of the batteries.

To turn off the receiver it is necessary only to turn the left-hand knob to the left until the red indicator disappears, regardless of the position of the buttons.

LINE	LINE CORD#	CHARACTERISTICS
117 V. AC-DC	103-14	REGULAR WITHOUT RESISTANCE
220 V. DC	103-21	850Ω 28 W SERIES
220 V. AC	103-20	300Ω 40 W ADDITIONAL RECTIFIER IN SERIES.



ALIGNMENT CHART

STEP	CIRCUIT ALIGNED	RECEIVER: BAND SWITCH	RECEIVER: DIAL POINTER	SIGNAL GENERATOR: FREQUENCY	SIGNAL GENERATOR: CONNECTION	DUMMY ANTENNA	ADJUSTMENTS (All maximum output)
1	IF	BC	Low end of dial	262 KC	Grid of 1A7GT conv.	0.1 mfd.	#1, 2, 3, 4
2	BC	BC	1400 KC	1400 KC	Antenna Post	200 mmfd. mica cap.	First #5 Then #6
3	BC	BC	600 KC	600 KC	Antenna Post	200 mmfd. mica cap.	#7
4	Repeat steps 2 and 3						
5	SW	SW	15 MC	15 MC	Antenna Post	400 ohm carbon resistor	#8
6	SW	SW	Tune in generator	12 MC	Antenna Post	400 ohm carbon resistor	First #9 Then #10
7	Repeat step 2, trimmer #5 only						
8	BC	BC	Tune in broadcast station near 1400 KC				#11

NOTE: Align step 1 to 7 with chassis out of cabinet, but loop plugged in. Step 8 must be taken with set properly placed in cabinet, and batteries and loop in the normal position.

Alignment should be attempted only if a low range A.C. meter, a signal generator, and insulated alignment tools are at your disposal. The A.C. meter is used as an output-meter. The signal generator must cover a frequency range from 450 kc to 16 mc.

It is essential that the signal generator be connected to the points indicated in the alignment chart through the proper dummy antenna.

A good connection between the groundpost of the signal generator and the chassis, is necessary. DO NOT connect chassis or generator to an external ground.

The output of the signal generator must always be kept at its lowest possible value. This is to prevent the automatic volume control of the receiver from interfering with accurate alignment.

During alignment, the line voltage feeding the receiver power supply should be kept at approximately 117 volts.

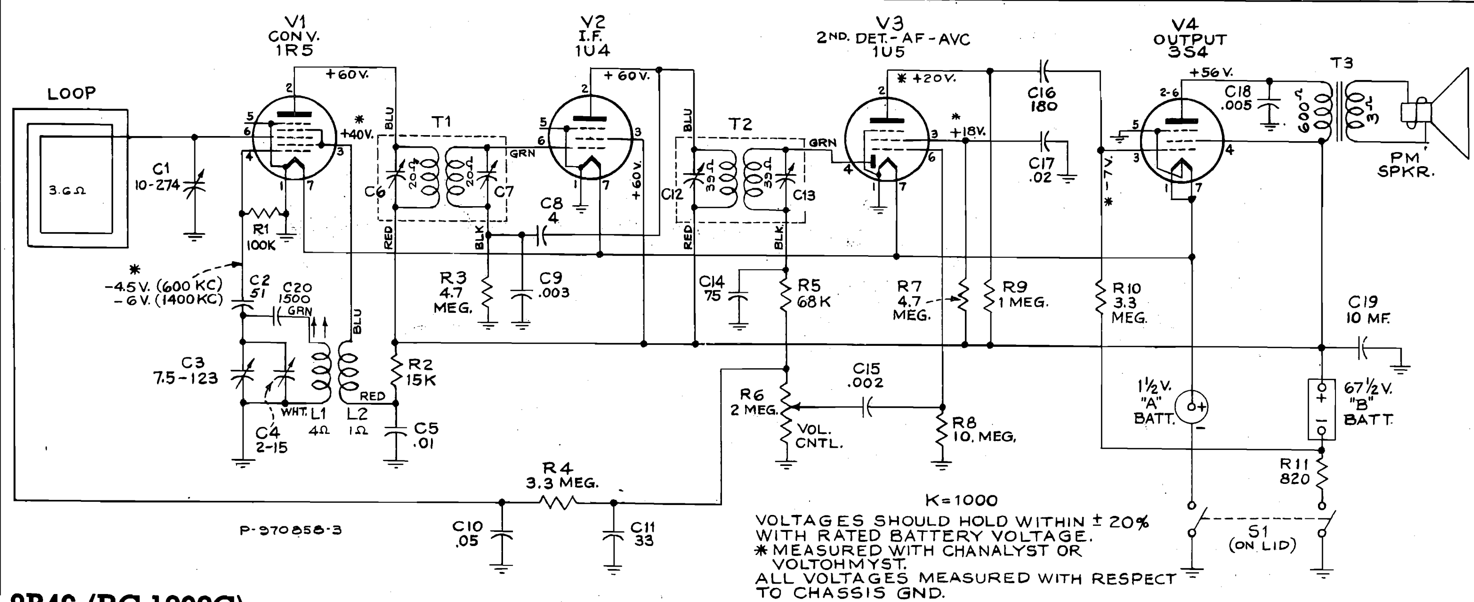
The locations of adjustment screws are indicated clearly on the schematic diagram. Alignment adjustments should be made only in the sequence given in the chart.

For all alignments, connect the outputmeter across the voice coil. With the volume control turned fully clockwise tune for a maximum reading.

MODELS 8B43, CHASSIS RC-1069B; 8B46, CHASSIS RC-1069C

RADIO CORP. OF AMERICA

MODELS 8B41, CHASSIS RC-1069; 8B42 CHASSIS RC-1069A



8B46 (RC-1069C)

Service Data:

The Service Data previously published for Models 8B41, 8B42 and 8B43 will apply to Model 8B46 except for color and the replacement parts listed below.

REPLACEMENT PARTS

CHASSIS ASSEMBLY

RC-1069C

Same as listed for RC-1069, RC-1069A, RC-1069B
EXCEPT

74366 Fastener—Push fastener to hold loop, (2 required) for Model 8B46—tan
74363 Lid—Case top lid complete with lid support and hinges —less loop—Model 8B46—ivory
74365 Loop—Antenna loop complete with connectors—less lid —Model 8B46—ivory
74367 Nameplate—"RCA" nameplate for top lid—Model 8B46

SPEAKER ASSEMBLIES

Same as listed for Models 8B41, 8B42, 8B43

MISCELLANEOUS ASSEMBLIES

74368 Bottom—Case bottom—Model 8B46—ivory
70457 Catch—Spring catch assembly
74016 Center—Case center complete with spring catch
74369 Handle—Carrying handle—Model 8B46—tan
73970 Link—Handle link (2 required)
73943 Screw—#4-40 x 3/16" binder head screw to hold case center

Specifications

Tuning Range .... 540-1600 kc
Intermediate Frequency .... 455 kc

Tube Complement:
1. RCA 1R5 .... Converter
2. RCA 1U4 .... I.F. Amplifier
3. RCA 1U5 .... 2nd Det.-A.F. Amp.-A.V.C.
4. RCA 3S4 .... Output

Loudspeaker (92523-4W):
Size and type .... 2" x 3" P.M.
Voice coil impedance .... 11¾ ohms at 1000 cycles

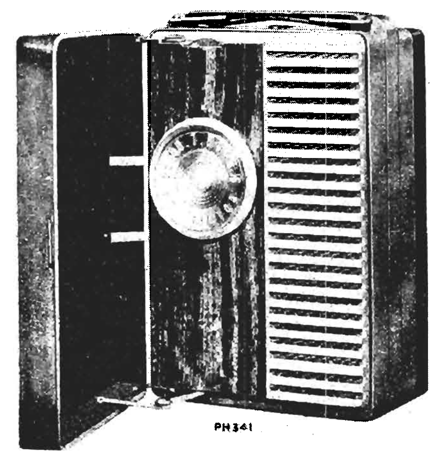
Batteries Required:

Type of Battery	Current Consumption	Approx. Life (Intermittent Service)
"A"—1.5 volt RCA VS 036 or VS 001	0.25 amp.	7 to 10 hrs.
"B"—67.5 volts RCA VS 016	8.5 ma.	40 to 60 hrs.

Power Output:
Undistorted .... 0.05 watt
Maximum .... 0.10 watt

Dimensions (overall) .... 6¼" x 4⅜" x 3⅜"
Weight (with batteries) .... 3½ lbs.

8B41 ...... Black
8B42 .... Brown
8B43 .... Red



Model 8B46 (Ivory)

MODELS 8B41, CHASSIS RC-1069; 8B42 CHASSIS RC-1069A

RADIO CORP. OF AMERICA

Alignment Procedure

MODELS 8B43, CHASSIS RC-1069B; 8B46 CHASSIS RC-1069C

Output Meter.—Connect meter from top lug of TB5 (plate of 3S4) to ground. Turn volume control to maximum position.

Test-Oscillator.—For all alignment operations, connect the low side of the test-oscillator to the receiver chassis, and keep the oscillator output as low as possible to avoid a-v-c action.

Alignment Shield.—It is necessary to use a shield during oscillator alignment.

Fig. 3 shows the modifications necessary to convert the center strip portion of a case into a convenient shield to be used as a substitute for the regular case center strip during oscillator alignment.

If a substitute case is not available, a shield may be improvised using a sheet of aluminum (DO NOT USE STEEL) to approximate the shielding effect of the case on the 1R5 tube, tuning condenser and oscillator coil.

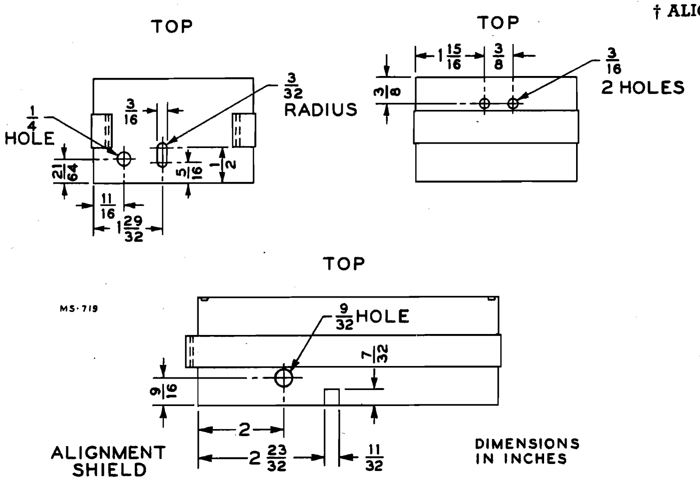
CRITICAL LEAD DRESS

1. Dress blue, green, and black leads of second I.F. transformer as direct as possible. If excess lead exists, dress down side of socket and flat against chassis to transformer opening.
2. Dress audio screen bypass capacitor (C17), and the lead to the volume control, up and underneath the shelf supporting the output transformer.
3. Dress audio coupling capacitor (C15), directly in front of C17, and against the side of the 1st I.F. transformer.
4. Wire in the three capacitors pyramided behind the speaker with enough space at the end of battery holder to allow holder to move when battery is replaced. Dress the ground leads of these capacitors to keep from shorting "+A" to chassis ground.
5. Observe the outside foil connections on all paper capacitors, also the polarity of the electrolytic capacitor, C19.
6. Keep blue and red leads of output transformer above the mounting shelf.
7. Dress leads to gang as far as possible from all metal parts.
8. Dress neutralization bypass capacitor, C9, as near metal chassis as possible.
9. Dress bypass C5 over bottom end of V2 (1U4), tube socket.
10. Dress neutralization capacitor, C8, as near metal chassis as possible.

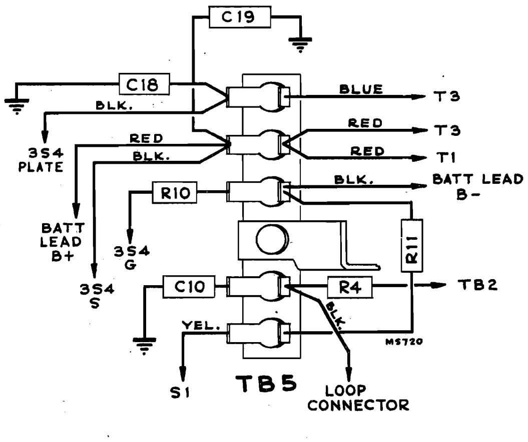
Steps	Connect the high side of test osc. to—	Tune test-osc. to—	Turn radio dial to—	Adjust the following for max. peak output—
1	Connection lug of C1 located on rear of gang in series with .01 mf.	455 kc	Quiet point near 1,600 kc	C12, C13 2nd I-F trans.
2				C6, C7 1st I-F trans.
3		Repeat steps 1 and 2		
4	*Antenna coupling loop	1,400 kc	14 Rock gang	C4 (osc.) †
5		600 kc	60 Rock gang	L1 (osc.) †
6		Repeat steps 4 and 5		

* Steps 4 and 5 require a coupling loop from the signal generator to feed a signal into the receiver loop located in the lid. This loop should be loosely coupled to the receiver loop antenna so as not to disturb the receiver loop inductance.

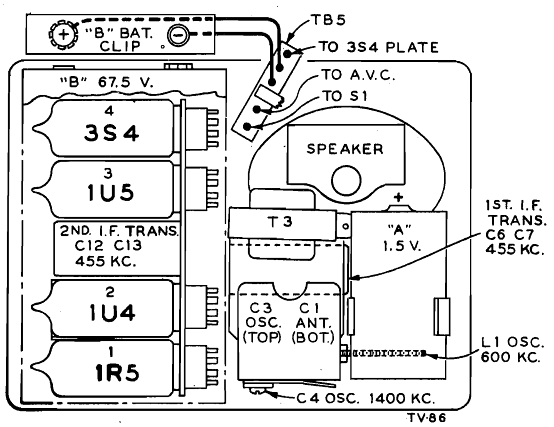
† ALIGNMENT SHIELD MUST BE USED. (See text.)



Alignment Shield



Terminal Board Wiring



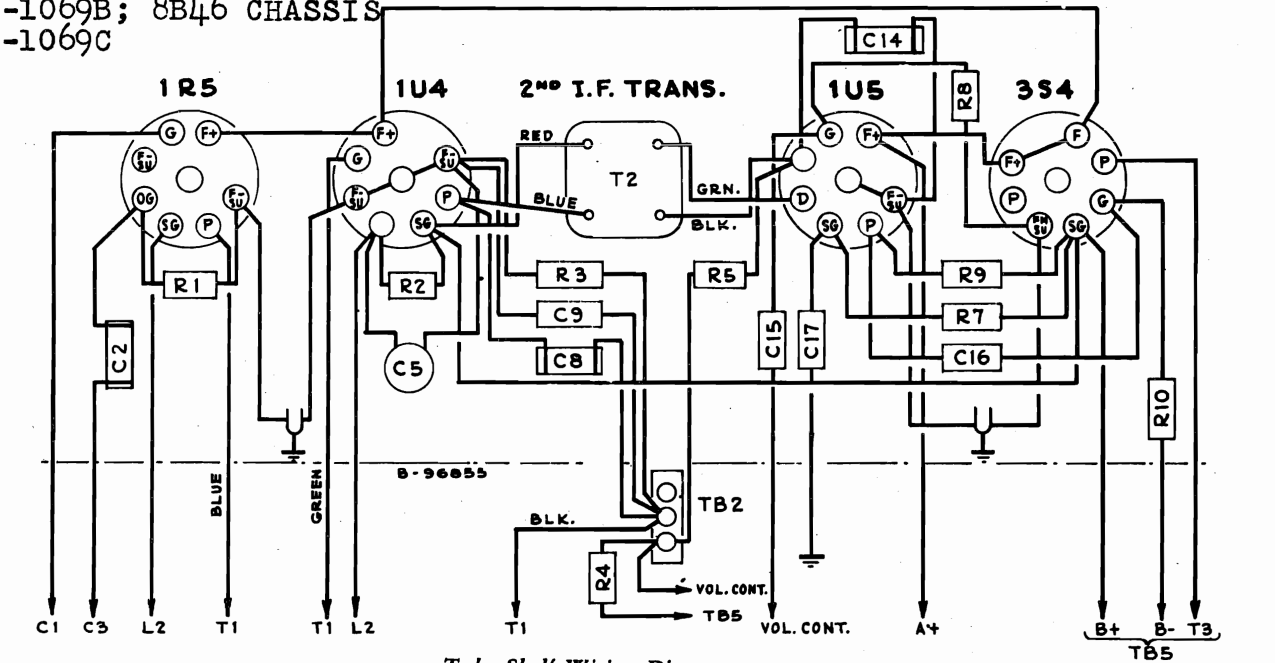
Tube and Trimmer Locations

A rubber band should be placed around each tube for cushioning.

MODELS 8B42 CHASSIS RC-1069A; 8B43 CHASSIS RC-1069B; 8B46 CHASSIS RC-1069C

RADIO CORP. OF AMERICA

MODELS 8B41, CHASSIS RC-1069



Tube Shelf Wiring Diagram

Replacement Parts

STOCK No.	DESCRIPTION
	CHASSIS ASSEMBLIES
	RC 1069—8B41, RC 1069A—8B42, RC 1069B—8B43
*73937	Baffle—Speaker baffle and grille cloth
70444	Board—Terminal board (5 contact)
70445	Board—Terminal board (1 contact)
*73947	Capacitor—Variable tuning capacitor (C1, C3, C4)
73153	Capacitor—Ceramic, 4 mmf. (C8)
*73962	Capacitor—Ceramic, 33 mmf. (C11)
73901	Capacitor—Ceramic, 51 mmf. (C2)
*73963	Capacitor—Ceramic, 75 mmf. (C14)
56653	Capacitor—Ceramic, 180 mmf. (C16)
*74093	Capacitor—Ceramic, 1500 mmf. (C20)
*73960	Capacitor—Ceramic, .01 mf. (C5)
72315	Capacitor—Tubular, .002 mf., 200 volts (C15)
*73961	Capacitor—Tubular, .003 mf., 200 volts (C9)
70606	Capacitor—Tubular, .005 mf., 400 volts (C18)
71928	Capacitor—Tubular, .02 mf., 200 volts (C17)
70615	Capacitor—Tubular, .05 mf., 400 volts (C10)
*73964	Capacitor—Electrolytic, 10 mf., 70 volts (C19)
70425	Clip—Spring clip for tuning knob
70443	Coil—Oscillator coil (L1, L2)
70452	Connector—Loop connectors (1 set) complete with eyelets
*73948	Control—Volume control (R6)
*73957	Fastener—Push fastener to hold loop (2 required) for Model 8B41—black
*73958	Fastener—Push fastener to hold loop (2 required) for Model 8B42—brown
*73959	Fastener—Push fastener to hold loop (2 required) for Model 8B43—red
70429	Grommet—Rubber grommet to mount tube support shelf (2 required)
*73950	Hinge—Lid hinge—L.H.—less mounting studs
*73951	Hinge—Lid hinge—R.H.—less mounting studs
72229	Holder—"A" battery holder
*73941	Insulator—Loop connector insulator
*73936	Knob—Calibrated tuning knob
*73946	Knob—Volume control knob
70708	Lead—"B" Battery lead complete
*73924	Lid—Case top lid complete with lid support and hinges—less loop—Model 8B41—black
*73925	Lid—Case top lid complete with lid support and hinges—less loop—Model 8B42—brown
*73926	Lid—Case top lid complete with lid support and hinges—less loop—Model 8B43—red
*73954	Loop—Antenna loop complete with connectors—less lid—Model 8B41—black
*73955	Loop—Antenna loop complete with connectors—less lid—Model 8B42—brown
*73956	Loop—Antenna loop complete with connectors—less lid—Model 8B43—red
*73949	Nameplate—"RCA" nameplate for top lid
*73940	Nut—Speed nut to lock screw clamping speaker to face panel
*73938	Panel—Chrome and mahogany face panel
	Resistor—Fixed, composition, 820 ohms ±10%, ½ watt (R11)
	Resistor—Fixed, composition, 15,000 ohms ±10%, ½ watt (R2)
	Resistor—Fixed, composition, 68,000 ohms ±20%, ½ watt (R5)
	Resistor—Fixed, composition, 100,000 ohms ±10%, ½ watt (R1)
	Resistor—Fixed, composition, 1 megohm ±20%, ½ watt (R9)
	Resistor—Fixed, composition, 3.3 megohms ±20%, ½ watt (R4, R10)
	Resistor—Fixed, composition, 4.7 megohms ±20%, ½ watt (R3, R7)
	Resistor—Fixed, composition, 10 megohms ±20%, ½ watt (R8)
*73944	Screw—#2-56 x 3/16" machine screw to hold lid hinges to face panel (2 required)
*73939	Screw—#4-40 x 5/16" binder head machine screw to clamp speaker to face panel
*73943	Screw—#4-40 x 3/16" binder head screw to fasten face panel to chassis (3 required)
70446	Screw—#6 x ¼" hex head self-tapping screw to mount battery holder
70436	Socket—Tube socket
70423	Spacer—Rubber shock spacer (cemented to case center strip)
*73942	Stud—Lid support stud (face panel end)
*73952	Stud—L.H. lid hinge mounting stud
*73953	Stud—R.H. lid hinge mounting stud
70451	Support—Lid support complete with lid end mounting stud
72230	Support—Tube support shelf less tube sockets and transformer
*73945	Switch—Power switch (S1)
70442	Transformer—First I.F. transformer (T1 [C6, C7])
70437	Transformer—Second I.F. transformer (T2 [C12, C13])
70440	Transformer—Output transformer (T3)
	SPEAKER ASSEMBLIES
	92523-4W
70428	Speaker—2" x 3" P.M. speaker complete with cone and voice coil
	MISCELLANEOUS
*73965	Bottom—Case bottom—Model 8B41—black
*73966	Bottom—Case bottom—Model 8B42—brown
*73967	Bottom—Case bottom—Model 8B43—red
70457	Catch—Spring catch assembly
*74016	Center—Case center complete with spring catch
*73968	Handle—Carrying handle—Model 8B41—black
*74022	Handle—Carrying handle—Model 8B42—brown
*73969	Handle—Carrying handle—Model 8B43—red
*73970	Link—Handle link (2 required)
73943	Screw—#4-40 x 3/16" binder head screw to hold case center

* This is the first time that this Stock No. has appeared in Service Data.

MODELS 8B41, CHASSIS RC-1069; 8B42 CHASSIS RC-1069A

RADIO CORP. OF AMERICA
Replacement of Component Parts

MODELS 8B43, CHASSIS RC-1069B; 8B46 CHASSIS RC-1069C

I. **To remove bottom cover:**
- a. Depress locking spring clip through hole in top of case.
- b. With spring clip depressed, pull cover carefully out and up off the retaining lugs in the bottom of the case center strip.

II. **To replace batteries:**
- a. Remove bottom cover.
- b. Remove, either or both, the "A" and "B" battery as may be necessary. The "B" battery snap fasteners can best be removed by inserting a screwdriver under the snap fastener strip and prying upward.

III. **To remove the case center strip:**
- a. Remove bottom cover.
- b. Remove one screw (A) on the inside at the handle end.
- c. Tilt case center strip and lift.

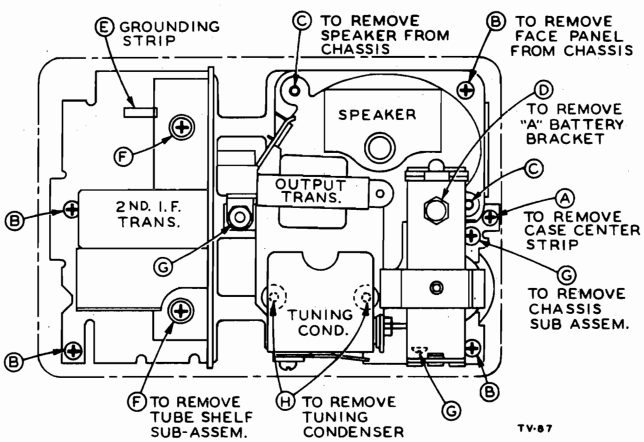
IV. **To replace tubes:**
- a. Remove bottom cover.
- b. Remove "B" battery.
- c. Remove case center strip.
- d. Remove and replace tubes as required.

V. **To remove face panel from chassis plate:**
- a. Remove dial knob (pull off).
- b. Remove bottom cover (I), batteries (II) and case center strip (III).
- c. Unsolder leads to loop connectors.
- d. Remove the four Phillips head screws (B) located at three corners and end close to 2nd I.F. transformer, which hold the chassis to face panel.
- e. The face panel may now be folded back into the case top lid.

VI. **To remove speaker:**
- a. Remove face panel (see item V).
- b. Unsolder voice coil leads.
- c. Remove two Phillips head screws (C) on chassis plate holding speaker.

VII. **To remove output transformer:**
- a. Remove speaker (see item VI).
- b. Unsolder transformer leads.
- c. Remove rivet (use bolt for replacement).
- d. Unsolder mounting lug.

VIII. **To remove chassis subassemblies from chassis plate:**
- a. Remove tubes (see item IV).
- b. Unsolder grounding strap (E) which connects tube shelf to chassis plate.
- c. Unsolder two wires which connect to speaker.
- d. Unsolder two wires attached to switch.
- e. Unsolder leads to loop connectors.
- f. Remove dial knob (pull off).
- g. Remove two screws (F) holding tube shelf to chassis plate.
- h. Remove nut (G) between I.F. transformers.
- i. Remove screw (G) beneath the negative terminal of "A" battery holder, and also screw (G) adjacent to volume control below "A" battery holder.



Chassis Disassembly

IX. **To remove volume control:**
- a. Remove chassis subassembly from chassis plate (see item VIII).
- b. Unsolder the two leads to the "A" battery holder.
- c. Lift up the "A" battery holder by removing the one screw (C) in its base. This holder has a hinge action and must be lifted up and back to remove.
- d. Unsolder volume control leads.
- e. Remove volume control knob (attached to shaft with set screw)
- f. Remove volume control assembly by bending back four lugs.

X. **To remove oscillator coil:**
- a. Same procedure and steps as covered in item VIII for removal of chassis subassembly plus the following.
- b. Unsolder oscillator coil leads.
- c. Remove coil by unsnapping spring mounting clips from angle bracket.

XI. **To remove tuning condenser:**
- a. Remove case center strip (III).
- b. Unsolder two leads and two ceramic capacitors (C2, C20) from tuning condenser.
- c. Remove tuning knob (pull off).
- d. Remove the two screws (H) (accessible through dial knob opening) which hold the tuning condenser to the chassis subassembly.

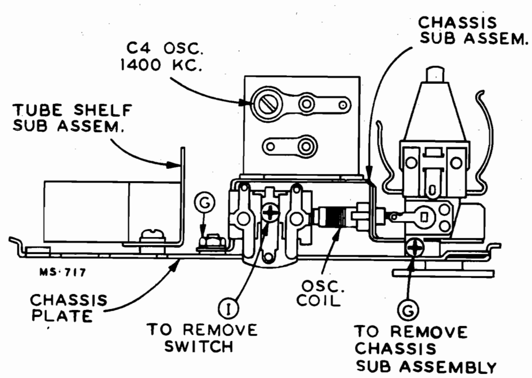
XII. **To remove 1st I-F transformer:**
- a. Remove chassis subassemblies (see item VIII).
- b. Unsolder four leads from 1st I-F transformer.
  1. Blue to screen of 1R5 tube.
  2. Green to grid of 1U4 tube.
  3. Red to B+ terminal of 5 lug terminal board TB5.
  4. Black to terminal board TB2.
- c. Unsolder and bend mounting lugs straight on the I-F transformer can.

XIII. **To remove 2nd I-F transformer:**
- a. Remove chassis subassemblies (see item VIII).
- b. Unsolder four leads from 2nd I-F transformer.
- c. Unsolder and bend mounting lugs straight on the I-F transformer can.

XIV. **To remove loop assembly:**
- a. Remove case center strip (see item III).
- b. Unsolder leads to loop connectors.
- c. Remove snap fasteners holding loop in cover.
- d. Carefully pry out on edge next to catch (opposite hinges).
- e. When reassembling press loop assembly into top lid on the side next to the connectors to cause the plastic projections on the loop assembly to engage in the detents in the top lid.

XV. **To remove switch:**
- a. Remove case center strip (III).
- b. Remove screw (I) which holds switch to chassis plate.
- c. Unsolder the two wires which connect to the switch.
- d. Unsolder switch from chassis plate.

XVI. **To adjust latching of top lid:**
- a. The hinges are attached to the face panel with Phillips head screws (one to each hinge). The mounting holes of the hinges are sufficiently large to permit adjustment of the hinges when the mounting screws are loosened. Tighten screws after adjustment.

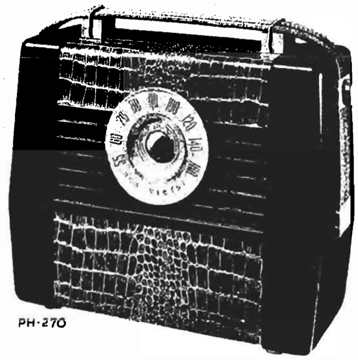


Chassis Disassembly

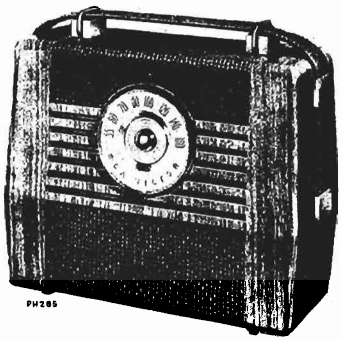
RADIO CORP. OF AMERICA

MODELS 8BX5, 8BX54, 8BX55, CHASSIS RC-1059A

Model 8BX54



Model 8BX5



Model 8BX55

Specifications

Frequency Range ....540-1,600 kc

Intermediate Frequency ....455 kc

Power Supply Rating
110 to 125 volts, AC 50 or 60 cycles, or DC....18 watts

Batteries required..........One RCA Battery Pack VS050

Tube Complement
(1) RCA—1R5 ....Converter
(2) RCA—1T4 ....I. F.-Amplifier
(1U4 in RC-1059A)
(3) RCA—1U5 ......2nd Det. AVC. & A.F.-Amplifier
(4) RCA—3V4 ....Power Output
(5) RCA—117Z3 ....Rectifier

Current Consumption
Battery Operation.............."A" 60 ma., "B" 10 ma.
(Average life of RCA VS050 Battery
100 hrs. intermittent service.)
Total Rect. Current (117 volt, 60 cycle).........60 ma.

Power Output (AC Operation)
Undistorted .... .15 watt
Maximum .... .25 watt
(Output is slightly lower on battery operation)

Loudspeaker ....4 in. P.M. 3.4 ohms at 400 cycles

Cabinet Dimensions
Height.....9½ in. Width.....11 in. Depth.....5 in.

Critical Lead Dress

1. Dress output plate bypass C20 capacitor against chassis
2. Dress output plate lead to output transformer against chassis.
3. Dress audio coupling capacitor C14 (volume control to grid of 1U5) away from chassis, away from audio limiting resistor R8 and to permit adjustment of second I.F. Transformer.
4. Dress all exposed leads away from each other, and away from chassis to prevent short circuits.
5. Dress all filament and ground leads against chassis.
6. Dress filament bypass capacitor C23 and accompanying compensating resistor R15 (volume control to IT4 [or 1U4] socket) against volume control.
7. Dress power line cord away from line-battery switch mechanism.
8. Dress all capacitors and wiring away from oscillator coil.
9. Dress 4 mmf. neutralizing capacitor C7 against A.V.C. bypass capacitor C8 (IT4 [or 1U4] filament to first I.F. trans.).

Alignment Procedure

Cathode Ray Alignment is the preferable method. Connections for the oscilloscope are shown on the schematic diagram.

Output Meter Alignment.—If this method is used, connect the meter across the voice coil and turn the receiver volume control to maximum.

Test Oscillator.—For all alignment operations, connect the low side of the test oscillator to the receiver chassis and keep the oscillator output as low as possible to avoid AVC action.

Battery operation of the receiver is preferable during alignment; on AC operation an isolation transformer (117v./117v.) may be necessary for the receiver if the test oscillator is also AC operated.

NOTE: Battery or substitute must be in place for ant. alignment (step 5).

Alignment Tabulation

Step	Connect high side of test oscillator to—	Test oscillator output—	Turn receiver dial to—	Adjust for maximum peak output
1	Disconnect loop—remove chassis—remove bottom plate, connect a 10,000 ohm resistor from C1 stator terminal to tuning condenser frame.			
2	Stator terminal of C1 thru .01 mf. capacitor	455 kc	55	*Top and bottom T2 (2nd. I-F trans.) *Top and bottom T1 (1st. I-F trans.)
3	Remove the 10,000 ohm resistor. Replace bottom cover and install chassis in cabinet. Re-connect loop.			
4	Short wire placed near receiver (for radiated signal)	1600 kc	160	†C5 (osc.)
5		1400 kc	140	†C2 (ant.)
6		600 kc	60	*L2 (osc.) while rocking gang
7		Repeat steps 4, 5 and 6		

NOTES:
*The magnetite cores of L2 and some T2 and T1 do not have visible adjusting screws. The cores have screw driver slots to permit adjustment (use non-metallic screwdriver).
†Adjustable thru hole in side of case which is accessible after unfastening one end of the carrying handle.

MODELS 8BX5, 8BX54, 8BX55, CHASSIS RC-1059A

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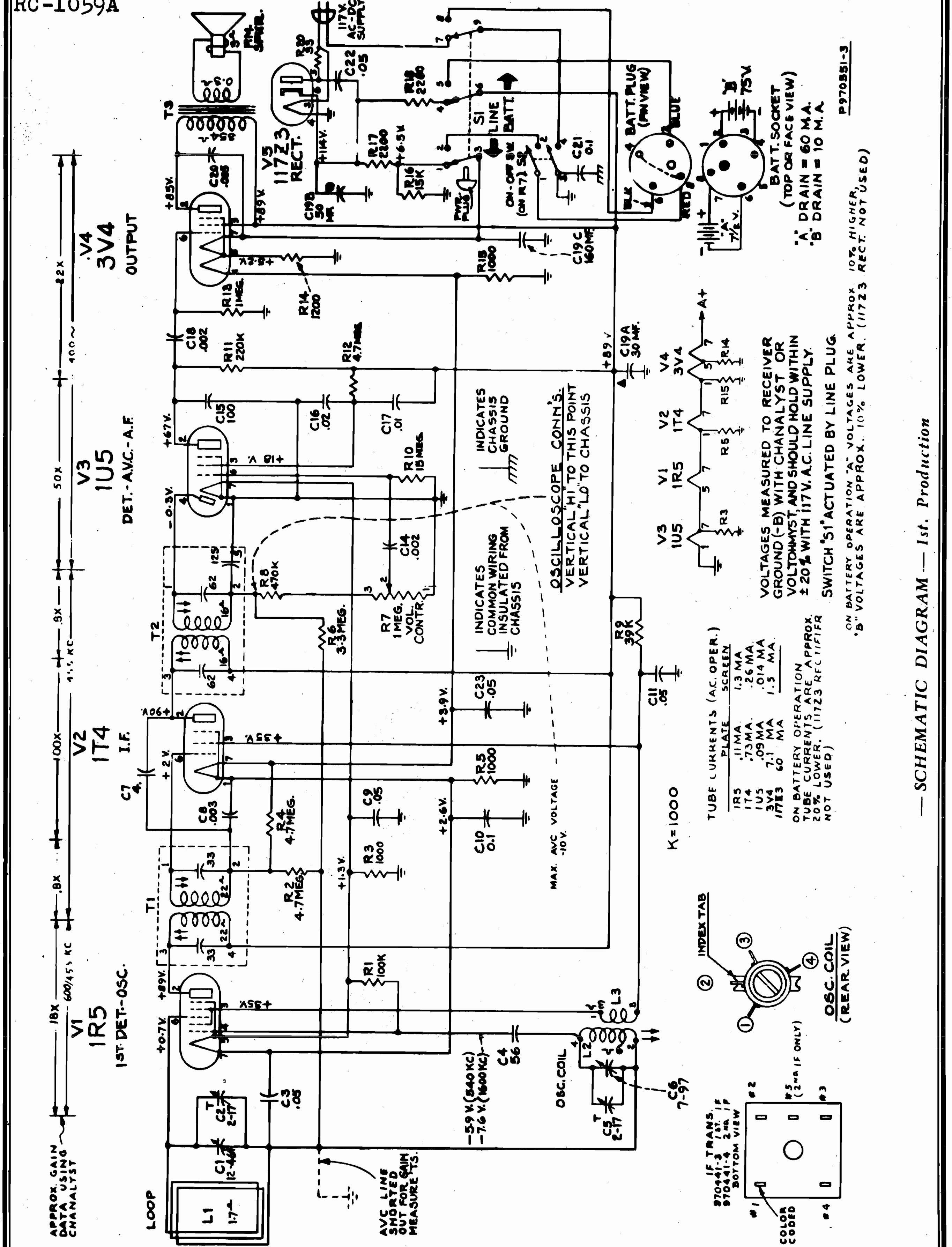
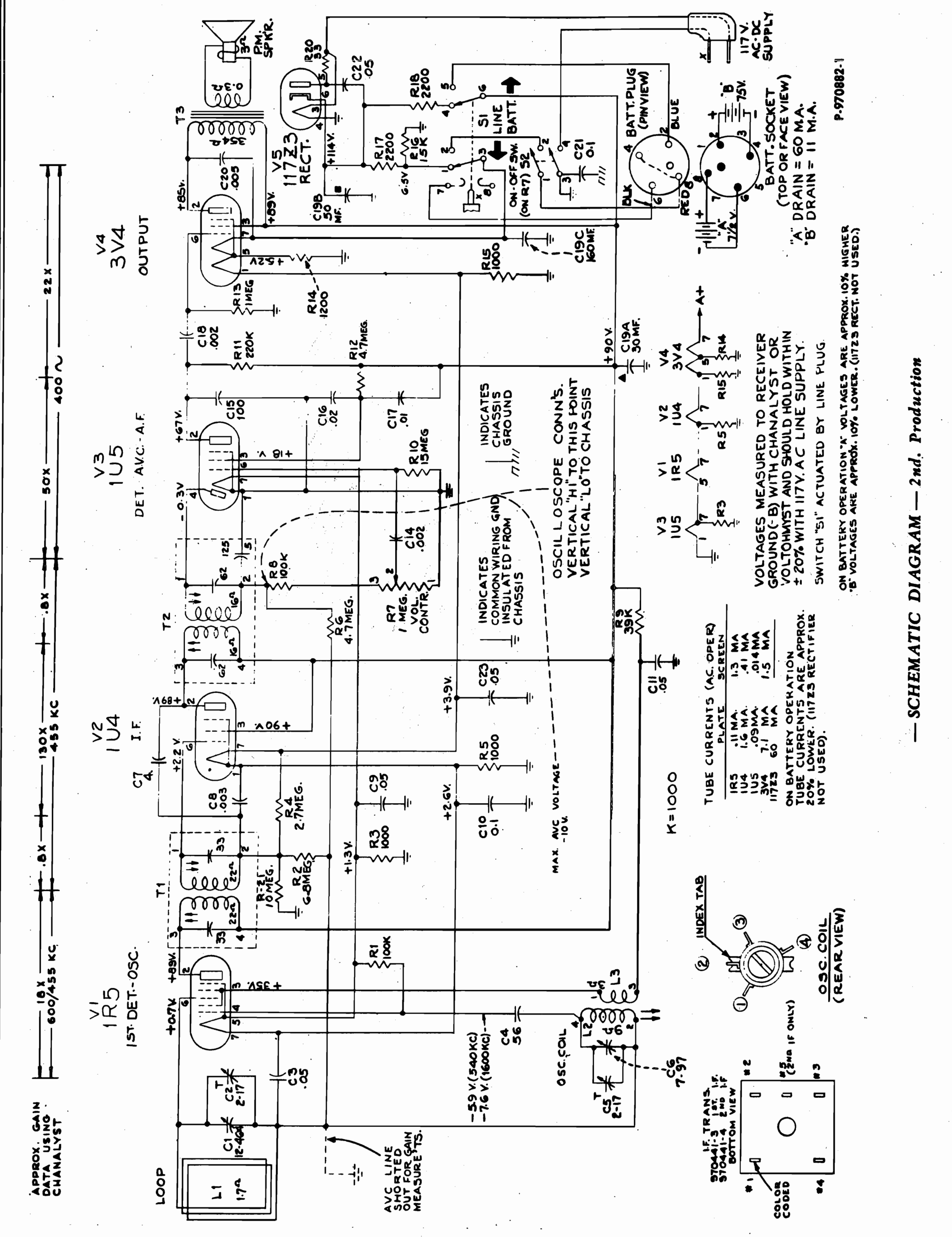


— SCHEMATIC DIAGRAM — 1st. Production

RADIO CORP. OF AMERICA

MODELS 8BX5, 8BX54, 8BX55, CHASSIS RC-1059A



MODELS 8BX5, 8BX54, 8BX55

RADIO CORP. OF AMERICA

CHASSIS RC-1059, RC-1059A

To Remove Carrying Handle

1. Pull off the volume control knob.
2. Insert a small knife blade between one side of a spring clip and the cabinet as shown below, push upward on the slip shield to disengage the locking of the slip shield to the spring clip. Repeat this procedure on the other side of the spring clip. The slip shield may then be removed by pushing it upward thus disengaging it from the spring clip.
3. Repeat step 2 for each slip shield.
4. Remove the four screws (2 on each side) which hold the carrying handle to the case.

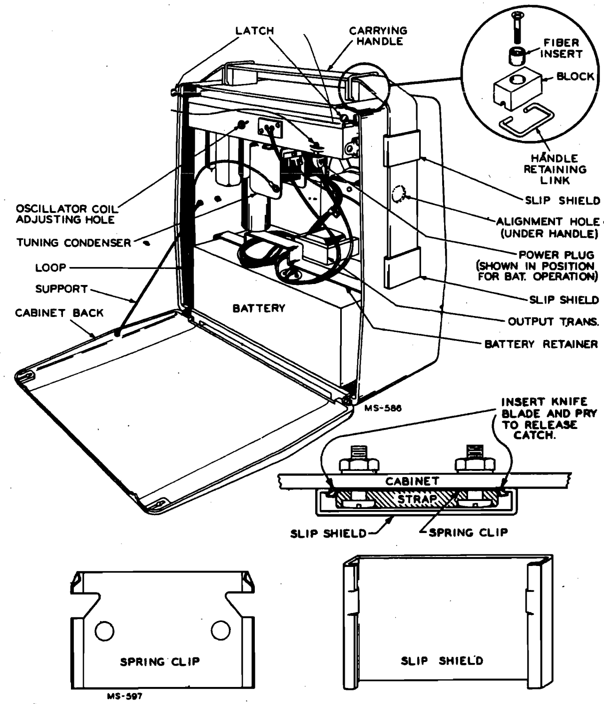
Caution: When re-assembling—make certain that the slip shield and the spring clip is assembled with their locks in the correct relation to each other.

To Remove Chassis

1. Pull off the volume control knob.
2. Close tuning condenser (dial at 55) to prevent possible damage to tuning condenser.
3. Remove dial knob by grasping both sides with the tips of the fingers of both hands and pull to the front —or—close the tuning condenser, open the back, reach in and push outward on the hub of the dial knob.

   NOTE: When re-assembling—press inward on the back of the tuning condenser and on the front of the knob to properly seat the hub on the shaft.
4. Remove the two slip shields on the R.H. side of the cabinet (opposite the volume control) and unfasten the end of the carrying handle using the procedure described under, "To Remove Carrying Handle."
5. Unsolder the loop leads.
6. Remove the two screws holding the bottom edge of the speaker to the cabinet.
7. Remove the plug from the battery.
8. Remove the two screws at the top of the cabinet while supporting the chassis with one hand.

NOTE: When re-installing—replace speaker holding screws first but do not securely tighten until the two screws at the top of the cabinet have been tightened.



Cabinet Hinges

The cabinet hinges may be readily removed, they are secured to the cabinet and back by force fit. To remove back from cabinet—pull straight outward on both hinges at the same time.

Replacement Parts—1st. Production

STOCK No.	DESCRIPTION
	CHASSIS ASSEMBLIES RC 1059
73153	Capacitor—Ceramic, 4 mmf. (C7)
71924	Capacitor—Ceramic, 56 mmf. (C4)
73152	Capacitor—Ceramic, 100 mmf. (C15)
72315	Capacitor—Tubular, .002 mfd., 200 volts (C14, C18)
71921	Capacitor—Tubular, .003 mfd., 200 volts (C8)
72791	Capacitor—Tubular, .005 mfd., 400 volts (C20)
71923	Capacitor—Tubular, .01 mfd., 200 volts (C17)
71928	Capacitor—Tubular, .02 mfd., 200 volts (C16)
72596	Capacitor—Tubular, .05 mfd., 200 volts (C9, C23)
70615	Capacitor—Tubular, .05 mfd., 400 volts (C3, C11, C22)
54788	Capacitor—Tubular, 0.1 mfd., 200 volts (C10)
70617	Capacitor—Tubular, 0.1 mfd., 400 volts (C21)
73127	Capacitor—Electrolytic, comprising 1 section of 50 mfd., 150 volts; 1 section of 30 mfd., 150 volts and 1 section of 160 mfd., 25 volts (C19A, C19B, C19C)
73114	Coil—Oscillator coil complete with core and stud (L2, L3)
73126	Condenser—Variable tuning condenser (C1, C2, C5, C6)
73125	Control—Volume control and power switch (R7, S2)
73128	Cord—Power cord and plug (72" long)
73482	Insulator—Mounting insulator for tuning condenser
73275	Plug—5 prong male plug for battery cable
73237	Resistor—Wire wound, 33 ohms, 150 MA (R20)
	Resistor—Fixed composition, 1000 ohms, ±10%, ½ watt (R3, R5, R15)
	Resistor—Fixed composition, 1200 ohms, ±10%, ½ watt (R14)
73132	Resistor—Voltage divider, 2200 ohms, 7 watt (R17)
	Resistor—Fixed composition, 2200 ohms, ±10%, ½ watt (R18)
	Resistor—Fixed composition, 15,000 ohms, ±10%, ½ watt (R16)
	Resistor—Fixed composition, 39,000 ohms, ±10%, ½ watt (R9)
	Resistor—Fixed composition, 100,000 ohms, ±20%, ½ watt (R1)
	Resistor—Fixed composition, 220,000 ohms, ±20%, ½ watt (R11)
	Resistor—Fixed composition, 470,000 ohms, ±20%, ½ watt (R8)
	Resistor—Fixed composition, 1 megohm, ±20%, ½ watt (R13)
	Resistor—Fixed composition, 3.3 megohms, ±10%, ½ watt (R6)
	Resistor—Fixed composition, 4.7 megohms, ±10%, ½ watt (R2, R4)
	Resistor—Fixed composition, 4.7 megohms, ±20%, ½ watt (R12)
	Resistor—Fixed composition, 15 megohms, ±20%, ½ watt (R10)
73103	Shield—Tube shield for 1U5
73117	Socket—Tube socket
73133	Switch—"Line Battery" change switch T.P.D.T. (S1)
73129	Transformer—First I-F transformer (T1)
73130	Transformer—Second I-F transformer (T2)
71047	Transformer—Output transformer (T3)
73131	Washer—Insulating washer—extruded—to mount tuning condenser (3 required)
	SPEAKER ASSEMBLIES 92577-1
71059	Gasket—Speaker gasket (black tubing)
73123	Speaker—4" PM speaker complete with cone and voice coil
	MISCELLANEOUS
73134	Back—Cabinet back—less hinges—for Model 8BX5
73721	Back—Cabinet back—blonde—less hinges—for Model 8BX54
73723	Back—Cabinet back—walnut—less hinges—for Model 8BX55
73147	Ball—Metal ball with groove for back cover latch mechanism
73137	Block—Chassis mounting block (with groove for link)—less fiber insert (2 required)—fits on top of cabinet
73136	Button—Center button for dial knob
73142	Button—Station selector indicator button
Y1464	Case—Carrying case with loop—less hinges, latch mechanism, back cover and carrying handle—for Model 8BX5
Y2016	Case—Carrying case—blonde—with loop—less hinges, latch mechanism, back cover and carrying handle—for Model 8BX54
Y2017	Case—Carrying case—walnut—with loop—less hinges, latch mechanism, back cover and carrying handle—for Model 8BX55
73195	Clip—Spring clip for slip shield (3 required)
70425	Clip—Spring clip for volume control and power switch knob
73143	Handle—Carrying handle—for Model 8BX5
73724	Handle—Carrying handle—tan—for Model 8BX54
73725	Handle—Carrying handle—light brown—for Model 8BX55
73144	Hinge—Cabinet hinge (2 required)
73149	Insert—Fibre insert for chassis mounting block (2 required)
73135	Knob—Dial knob complete with center button and calibrations
73138	Knob—Volume control and power switch knob
73459	Link—Carrying handle retaining link (2 required)
73141	Loop—Antenna loop (L1)
73145	Nut—Hex nut with groove for back cover latch mechanism
73139	Shield—Slip shield for carrying strap—(bottom R. H. and L.H. and upper L. H.)
73140	Shield—Slip shield for carrying strap—with hole for volume control knob shaft (upper R. H.)
73146	Spring—Extension spring for back cover latch mechanism—R. H.
73148	Spring—Extension spring for back cover latch mechanism—L. H.
30900	Spring—Retaining spring for dial knob
73483	Support—Flexible drop support for back cover

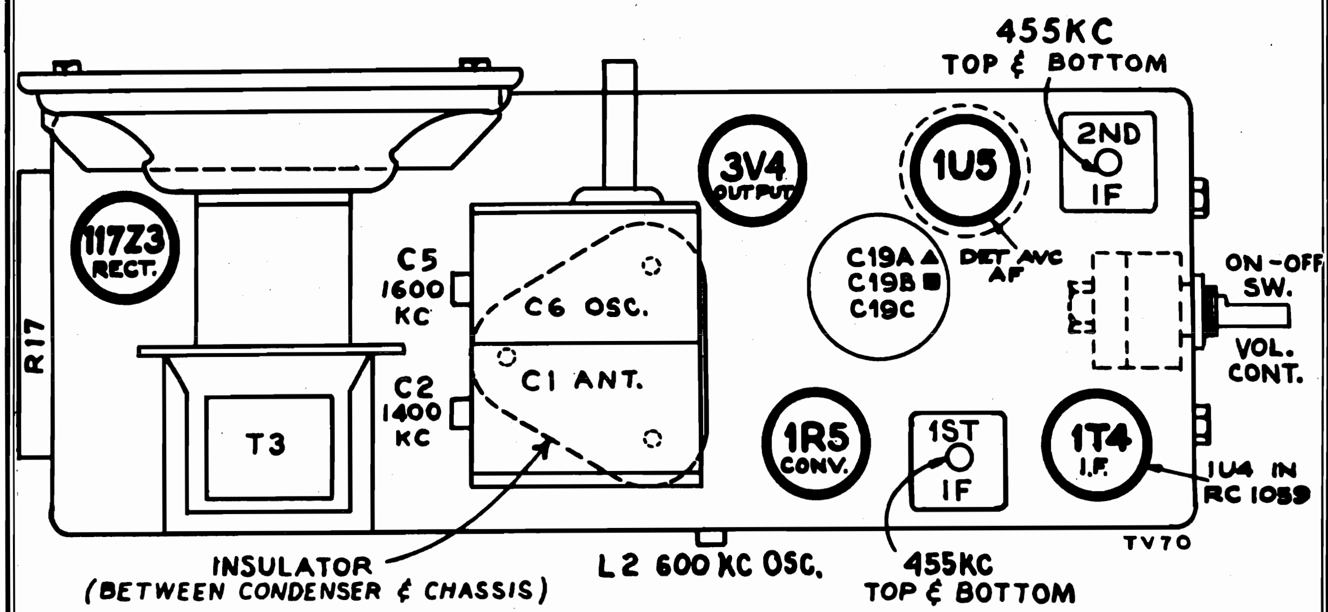
RADIO CORP. OF AMERICA MODELS 8BX5, 8BX54, 8BX55, CHASSIS RC-1059, RC-1059A

Replacement Parts—2nd. Production

STOCK No.	DESCRIPTION
	CHASSIS ASSEMBLIES RC 1059A
73153	Capacitor—Ceramic, 4 mmf. (C7)
71924	Capacitor—Ceramic, 56 mmf. (C4)
73152	Capacitor—Ceramic, 100 mmf. (C15)
72315	Capacitor—Tubular, .002 mfd., 200 volts (C14, C18)
71921	Capacitor—Tubular, .003 mfd., 200 volts (C8)
72791	Capacitor—Tubular, .005 mfd., 400 volts (C20)
71923	Capacitor—Tubular, .01 mfd., 200 volts (C17)
71928	Capacitor—Tubular, .02 mfd., 200 volts (C16)
72596	Capacitor—Tubular, .05 mfd., 200 volts (C9, C23)
70615	Capacitor—Tubular, .05 mfd., 400 volts (C3, C11, C22)
*73784	Capacitor—Tubular, 0.1 mfd., 200 volts (C10)
70617	Capacitor—Tubular, 0.1 mfd., 400 volts (C21)
73127	Capacitor—Electrolytic, comprising 1 section of 50 mfd., 150 volts; 1 section of 30 mfd., 150 volts and 1 section of 160 mfd., 25 volts (C19A, C19B, C19C)
*73935	Clip—Mounting clip for I.F. transformers
73114	Coil—Oscillator coil complete with core and stud (L2, L3)
73126	Condenser—Variable tuning condenser (C1, C2, C5, C6)
73125	Control—Volume control and power switch (R7, S2)
70022	Cord—Power cord and plug
72283	Grommet—Rubber grommet for mounting tuning condenser (3 required)
73275	Plug—5 prong male plug for battery cable
73237	Resistor—Wire wound, 33 ohms, 150 MA (R20)
	Resistor—Fixed composition, 1000 ohms, ±10%, ½ watt (R3, R5, R15)
	Resistor—Fixed composition, 1200 ohms, ±10%, ½ watt (R14)
	Resistor—Fixed composition, 2200 ohms, ±10%, ½ watt (R18)
73132	Resistor—Voltage divider, 2200 ohms, 7 watts (R17)
	Resistor—Fixed composition, 15,000 ohms, ±10%, ½ watt (R16)
	Resistor—Fixed composition, 39,000 ohms, ±10%, ½ watt (R9)
	Resistor—Fixed composition, 100,000 ohms, ±20%, ½ watt (R1)
	Resistor—Fixed composition, 100,000 ohms, ±10%, ½ watt (R8)
	Resistor—Fixed composition, 220,000 ohms, ±20%, ½ watt (R11)
	Resistor—Fixed composition, 1 megohm, ±20%, ½ watt (R13)
	Resistor—Fixed composition, 2.7 megohms, ±10%, ½ watt (R4)
	Resistor—Fixed composition, 4.7 megohms, ±20%, ½ watt (R12)
	Resistor—Fixed composition, 4.7 megohms, ±10%, ½ watt (R6)
	Resistor—Fixed composition, 6.8 megohms, ±10%, ½ watt (R2)

STOCK No.	DESCRIPTION
	Resistor—Fixed composition, 10 megohms, ±10%, ½ watt (R21)
	Resistor—Fixed composition, 15 megohms, ±20%, ½ watt (R10)
73103	Shield—Shield for 1U5 tube
73117	Socket—Tube socket
71039	Switch—"Line-Battery" change switch (S1)
73129	Transformer—First I.F. transformer (T1)
73130	Transformer—Second I.F. transformer (T2)
71047	Transformer—Output transformer (T3)
	SPEAKER ASSEMBLY 92577-1
71059	Gasket—Speaker gasket (black tubing)
73123	Speaker—4" PM speaker complete with cone and voice coil
	MISCELLANEOUS
73134	Back—Cabinet back—less hinges—Model 8BX5
73721	Back—Cabinet back—less hinges—Model 8BX54
73723	Back—Cabinet back—less hinges—Model 8BX55
73147	Ball—Metal ball with groove for back cover latch mechanism
73137	Block—Chassis mounting block (with groove for link)—less fiber insert (2 required)—fits on top of cabinet
73136	Button—Center button for dial knob
73142	Button—Station selector indicator button
Y1464	Case—Carrying case complete with loop—less hinges, latch mechanism, back cover and carrying handle—Model 8BX5
Y2016	Case—Carrying case complete with loop—less hinges, back cover, latch mechanism and carrying handle
Y2017	Case—Carrying case complete with loop—less hinges, back cover, latch mechanism and carrying handle
70425	Clip—Spring clip for volume control and power switch knob
73195	Clip—Spring clip for slip shield (4 req'd)
73143	Handle—Carrying handle—Model 8BX5
73724	Handle—Carrying handle—Model 8BX54
73725	Handle—Carrying handle—Model 8BX55
*74180	Hinge—Cabinet hinge (2 required)
73149	Insert—Fibre insert for chassis mounting block (2 required)
73135	Knob—Dial knob complete with center button and calibrations
73138	Knob—Volume control and power switch knob
73459	Link—Carrying handle retaining link (2 required)
73141	Loop—Antenna loop (L1)
73145	Nut—Hex nut with groove for back cover latch mechanism
73139	Shield—Slip shield for carrying strap (bottom R.H. and L.H. and upper L.H.)
73140	Shield—Slip shield for carrying strap—with hole for volume control shaft (upper R.H.)
30900	Spring—Retaining spring for dial knob
73146	Spring—Extension spring for back cover latch mechanism—R.H.
73148	Spring—Extension spring for back cover latch mechanism—L.H.
73483	Support—Flexible drop support for back cover

* This is the first time that this Stock No. has appeared in Service Data.

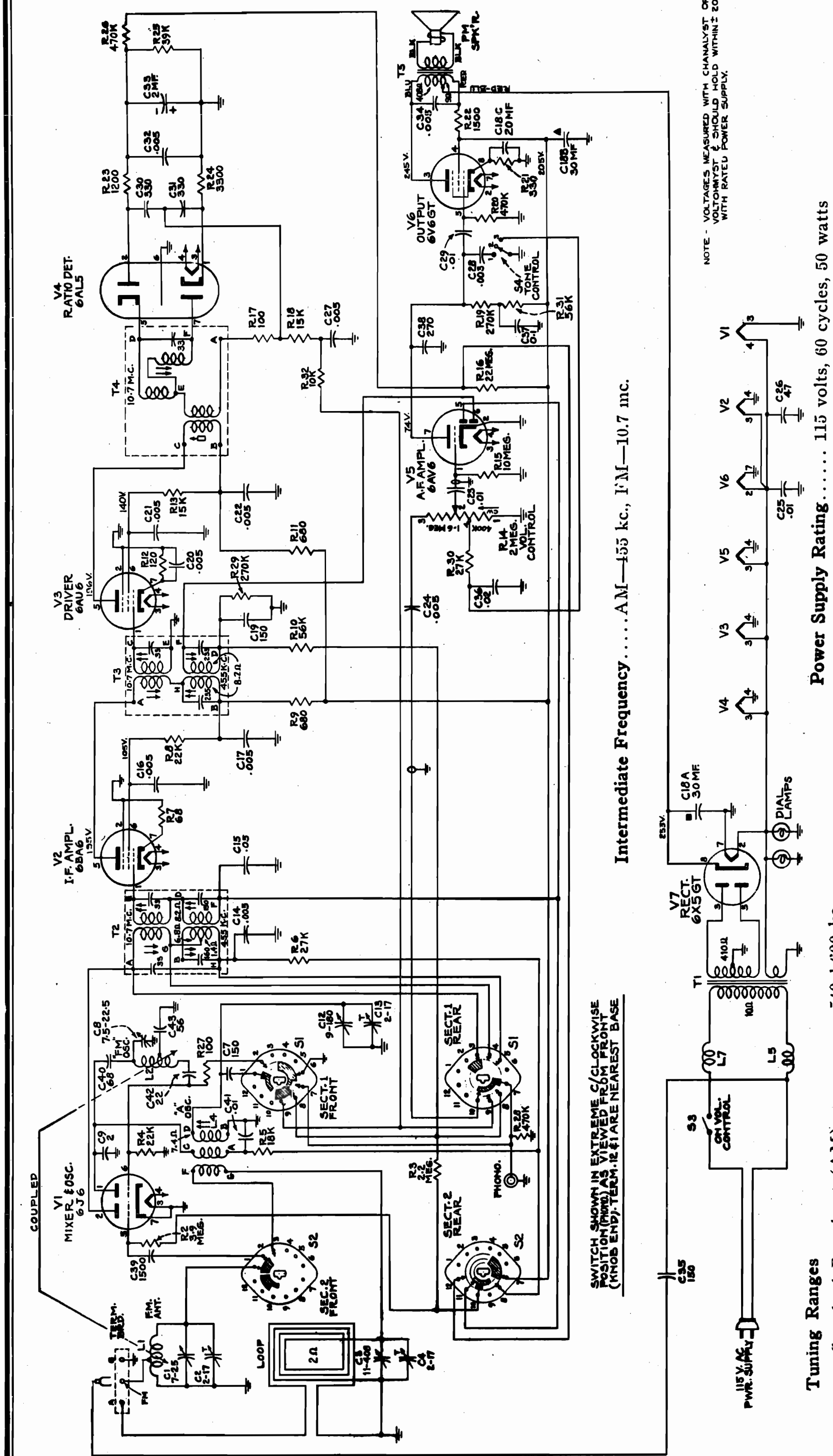


Tube and Trimmer Locations

MODELS 8R71, 8R72, 8R74, 8R75, 8R76

RADIO CORP. OF AMERICA

CHASSIS RC-1060, RC-1060A



Intermediate Frequency......AM—455 kc., FM—10.7 mc.

Power Supply Rating...... 115 volts, 60 cycles, 50 watts

Loudspeaker
Type 92572-2.......................... 5 in. P.M.
Voice coil impedance at 400 cycles.......... 3.2 ohms

Tuning Drive Ratio............ 7¼:1 (3⅝ turns of knob)

Dial Lamps (2)........ Type No. 44, 6-8 volts, 0.25 amp.

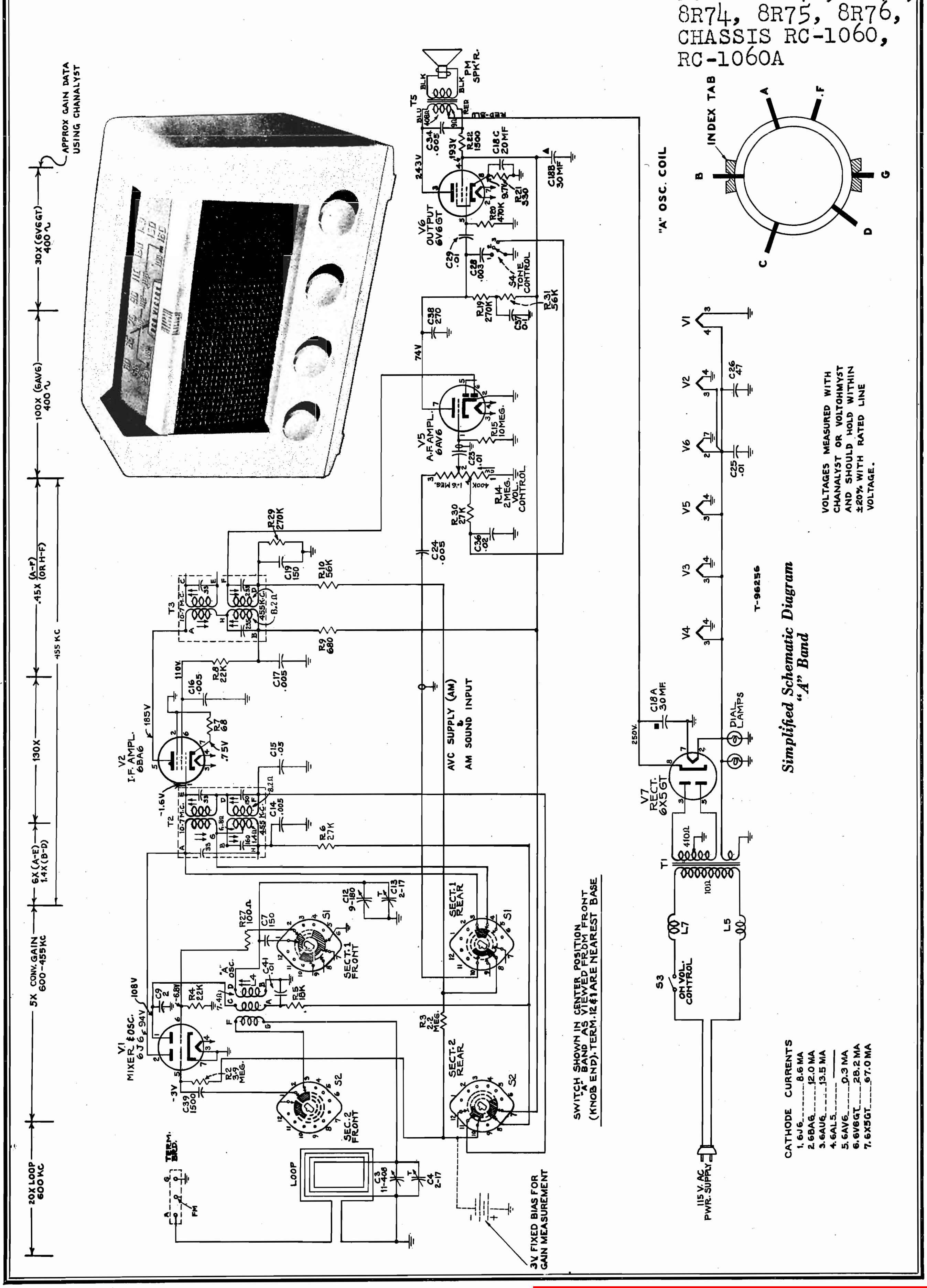
Power Output
Maximum.. 3 watts
Undistorted .... 2 watts

Tuning Ranges
Standard Broadcast (AM)............ 540-1,600 kc.
Frequency Modulation (FM) .... 88-108 mc.

Tube Complement
(1) 6J6.......................... Mixer and Oscillator
(2) 6BA6.............................. I.F. Amplifier
(3) 6AU6.. Driver
(4) 6AL5.............................. Ratio Detector
(5) 6AV6.............. AM Det.—AVC—A. F. Amp.
(6) 6V6GT.. Output
(7) 6X5GT..................................... Rectifier

RADIO CORP. OF AMERICA

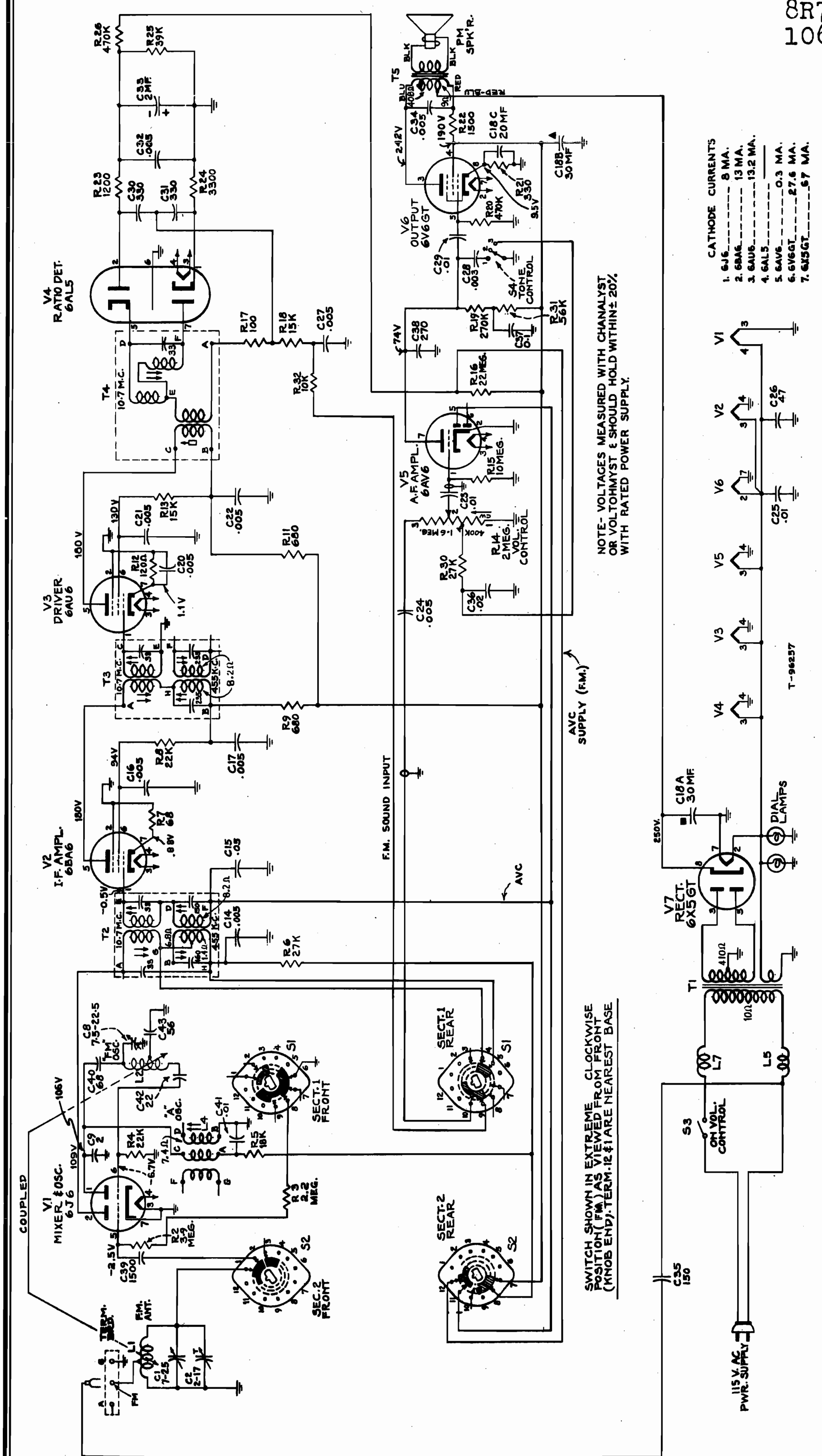
MODELS 8R71, 8R72, 8R74, 8R75, 8R76, CHASSIS RC-1060, RC-1060A



MODELS 8R71, 8R72

RADIO CORP. OF AMERICA

MODELS 8R74, 8R75, 8R76, CHASSIS RC-1060, RC-1060A



NOTE- VOLTAGES MEASURED WITH CHANALYST OR VOLTOHMYST & SHOULD HOLD WITHIN ± 20% WITH RATED POWER SUPPLY.

CATHODE	CURRENTS
1. 6J6	8 MA.
2. 6BA6	13 MA.
3. 6AU6	13.2 MA.
4. 6AL5	—
5. 6AV6	0.3 MA.
6. 6V6GT	27.6 MA.
7. 6X5GT	57 MA.

T-96257

Simplified Schematic Diagram "FM" Band

Antennas:

These receivers have built-in antennas for standard broadcast (AM) and frequency modulation (FM) reception.

Under average conditions these antennas will provide satisfactory reception. However, provision is made for the use of external antennas if desired — connect as indicated below:

Ground: Connect external ground to "G" terminal.

AM Antenna: Connect a single wire antenna to terminal "A."

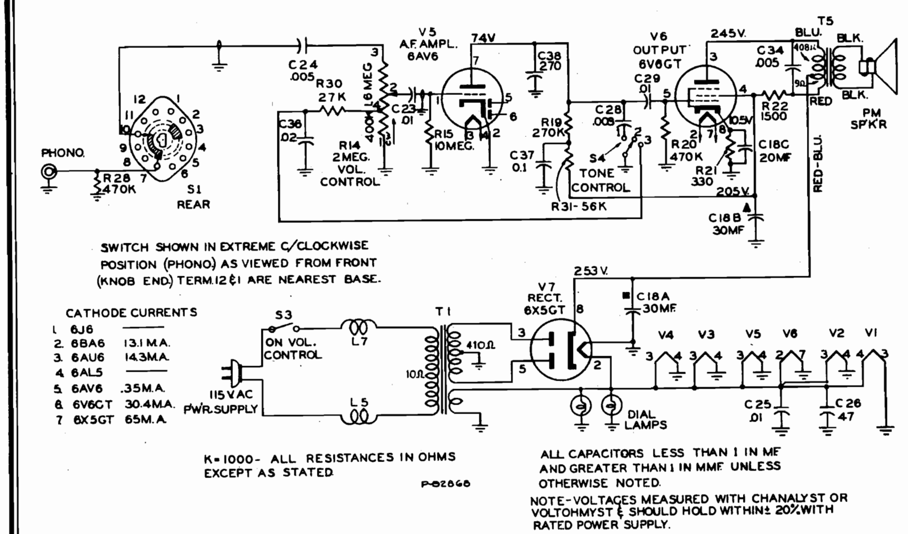
FM Antenna: Connect the transmission line from an external FM dipole antenna to "FM" and "G" terminals. Remove the internal FM antenna wire from terminal "FM."

NOTE: *For satisfactory reception on FM—when using the built-in FM antenna—the power cord must be fully extended and must not be coiled or hanked up.*

CHASSIS RC-1060, RC-1060A

RADIO CORP. OF AMERICA

MODELS 8R71, 8R72, 8R74, 8R75, 8R76



Simplified Schematic Diagram
"Phono" Position

VOLTAGE CHART

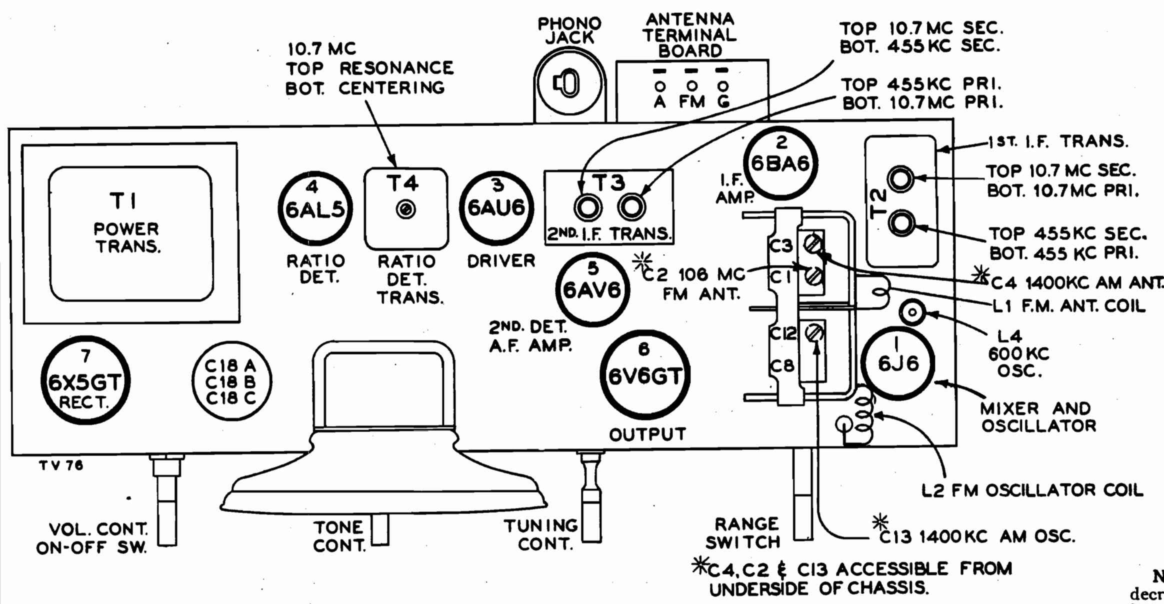
Tube	Type		Pin No.	"A"	"FM"	Phono
1	6J6	Plate Plate Grid Grid	1 2 6 5	108 94 −6.8 −3.0	106 109 −6.7 −2.5	— — — −1.0
2	6BA6	Plate Screen Cathode Grid	5 6 7 1	185 110 0.75 −1.6	180 94 0.88 −0.5	195 105 0.94 −0.8
3	6AU6	Plate Screen Cathode	5 6 7	184 132 1.1	180 130 1.1	195 140 1.2
4	6AL5	—	—	—	—	—
5	6AV6	Plate Grid	7 1	74 −0.8	74 −0.8	76 −0.8
6	6V6GT	Plate Screen Cathode	3 4 8	243 193 9.7	242 190 9.5	245 205 10.5
7	6X5GT	Cathode	8	250	250	253

CATHODE CURRENTS (MA)

1	6J6		7	8.6	8	—
2	6BA6		7	12	13	13.1
3	6AU6		7	13.5	13.2	14.3
4	6AL5		1 & 2	—	—	—
5	6AV6		2	0.3	0.3	0.35
6	6V6GT		8	28.2	27.6	30.4
7	6X5GT		8	67	67	65

Voltages and currents measured with tuning condenser closed and no signal input should hold within ±20% with rated line voltage.

Note: Plate voltage removed from 6J6 mixer and oscillator tube during "Phono" operation.



Tube and Trimmer Locations

Note: FM mixer and oscillator coils are adjustable by increasing or decreasing the spacing between turns. The position of the coils and location of the taps are critical (refer to "Critical Lead Dress").

MODELS 8R71, 8R72, 8R74, 8R75, 8R76 — RADIO CORP. OF AMERICA — CHASSIS RC-1060, RC-1060A

Alignment Procedure

CORRECT ALIGNMENT OF THE FM BAND REQUIRES THAT THE AM BAND BE ALIGNED FIRST

Alignment Indicators:

An RCA VoltOhmyst or equivalent meter is necessary for measuring developed d-c voltage during FM alignment. Connections are specified in the alignment tabulation. An output meter is also necessary to indicate minimum audio output during FM Ratio Detector alignment. Connect the output meter across the speaker voice coil.

The RCA VoltOhmyst can also be used as an AM alignment indicator, either to measure audio output or to measure a-v-c voltage.

When audio output is being measured the volume control should be turned to maximum.

Signal Generator:

For all alignment operations connect the low side of the signal generator to the receiver chassis. The output should be adjusted to provide accurate resonance indication at all times. If output measurement is used for AM alignment the output of the signal generator should be kept as low as possible to avoid a-v-c action.

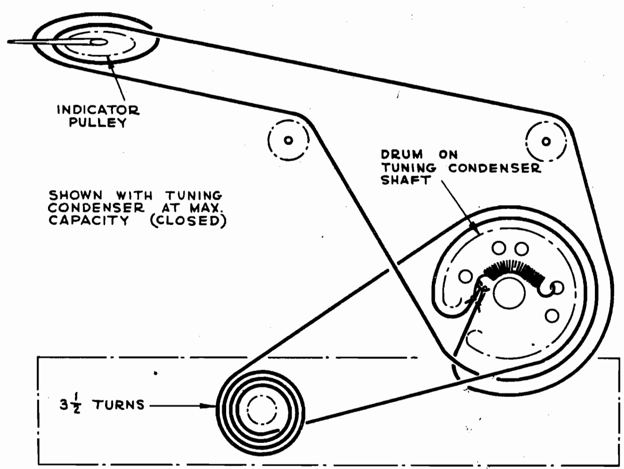
The FM i-f alignment may be checked by means of an FM sweep generator and cathode ray oscilloscope. Connect the output from the sweep generator, which is set to 10.7 mc., to the mixer grid (6J6 Pin No. 5), low side to chassis. Disconnect the 2 mfd. capacitor C33 from the Ratio Detector circuit.

Connect the high side of the oscilloscope to the junction of R25 and R26, low side to chassis. Adjust the sweep generator and oscilloscope to obtain the response curve.

The Ratio Detector characteristic may be viewed by connecting the oscilloscope across the volume control R14. Capacitor C33 should be re-connected before checking the Ratio Detector characteristic.

CRITICAL LEAD DRESS

1. Keep leads of C7 short.
2. Dress R27 away from range switch and pin No. 5 of V1.
3. The ground lead of pin No. 2 of V2 and V3 should be down against chassis. Its length is critical.
4. The AVC lead from R26 to range switch should be dressed against chassis and on front apron side of the output transformer.
5. C43 should have short leads and the color code of the capacitor should go to the coil L4. The capacitor should be cemented down with polystyrene cement at the same time L2 is cemented.
6. The lead from the high side of the loop should be dressed away from tubes.
7. Lead from pin No. 2 of V1 to terminal "A" of 1st I. F. transformer should be dressed against the chassis.
8. Connect C40 directly between the gang condenser and pin No. 1 of V1.
9. Make all FM leads as short as possible.
10. Dress lead from pin No. 5 of V2 to terminal "A" of 2nd I. F. transformer down against chassis.
11. Dress resistor R15 near chassis base.
12. Dress all A. C. leads away from volume control.
13. The lead from "FM" terminal of antenna terminal board to L1 tap should be run around the outside of the 1st I. F. transformer and away from V2.
14. The taps on L1 and L2 are critical. L1 tap should be ¾ turn from the ground end. L2 tap should be 2½ turns from the gang condenser C8.
15. The lead from R32 to terminal No. 9 of S1 should be dressed away from the output transformer.
16. Dress C25 and C26 against the chassis with the shortest lead length possible.
17. The position of L1 and L2 is critical. L1 should be midway between V1 and the 1st I. F. transformer. The end of L2 should be approximately 3/16" from V1.



Dial Indicator and Drive Mechanism

AM Alignment

RANGE SWITCH IN BC POSITION

Steps	Connect high side of sig. gen. to—	Sig. gen. output	Turn radio dial to—	Adjust for peak output
1	C3 in series with .01 mfd.	455 kc.	Quiet point at low freq. end.	AM windings.† T3 bottom core (sec.). T3 top core (pri.).
2	C3 in series with .01 mfd.	455 kc.	Quiet point at low freq. end.	AM windings.† T2 top core (sec.). T2 bottom core (pri.).
3	"A" terminal of terminal board at rear of chassis in series with 220 mmf.	1400 kc.	1400 kc.	C13 osc. C4 ant.
4	"A" terminal of terminal board at rear of chassis in series with 220 mmf.	600 kc.	600 kc.	L4 osc. (Rock gang.)
5	Repeat Steps 3 and 4.			

† Use alternate loading.

Alternate loading involves the use of a 47,000 ohm resistor to load the AM plate winding while the AM grid winding of the SAME TRANSFORMER is being peaked. Then the grid winding is loaded with the resistor while the plate winding is peaked. Only one winding is loaded at any one time. Remove the 47,000 ohm resistor after T3 and T2 have been aligned.

Oscillator frequency is above signal frequency on both AM and FM.

FM Alignment

RANGE SWITCH IN FM POSITION — VOLUME CONTROL MAXIMUM

Steps	Connect high side of sig. gen. to—	Sig. gen. output	Turn radio dial to—	Adjust for peak output
1	Connect the d-c probe of a VoltOhmyst to the negative lead of the 2 mfd. capacitor C33 and the common lead to chassis. Turn gang condenser to max. capacity (fully meshed).			
2	Pin 1 of 6AU6 in series with .01 mfd.	10.7 mc. modulated 30% 400 cycles AM (Approx. .05 volt).	Max. capacity (fully meshed).	T4 top core for max. d-c voltage across C33. T4 bottom core for min. audio output.*
3	FM ant. term. in series with a 300 ohm resistor. (Remove ant. lead from "FM" term.)	10.7 mc. Adjust to provide 2 to 3 volts indication on VoltOhmyst during alignment.	Max. capacity (fully meshed).	FM windings.†† T3 top core (sec.). T3 bottom core (pri.).
4	FM ant. term. in series with a 300 ohm resistor. (Remove ant. lead from "FM" term.)	10.7 mc. Adjust to provide 2 to 3 volts indication on VoltOhmyst during alignment.	Max. capacity (fully meshed).	FM windings.†† T2 top core (sec.). T2 bottom core (pri.).
5	FM ant. term. in series with a 300 ohm resistor. (Remove ant. lead from "FM" term.)	106 mc.	106 mc.	L2 osc.** C2 ant. Set C2 at max. capacity while adjusting L2.
6	FM ant. term. in series with a 300 ohm resistor. (Remove ant. lead from "FM" term.)	90 mc.	90 mc.	L1 ant.** (Rock gang.)
7	Repeat Steps 5 and 6 until further adjustment does not improve calibration.			

* Two or more points may be found which lower the audio output. At the correct point the minimum audio output is approached rapidly and is much lower than at any incorrect point.

†† Align T3 and T2 by means of alternate loading as explained under AM alignment. Use a 680 ohm resistor instead of a 47,000 ohm resistor and load the FM windings.

** L1 and L2 are adjustable by increasing or decreasing the spacing between turns.

Circuit Description

The chassis used in these receivers have a 6J6 tube (V1) (twin triode), one section of which is used as mixer and the other section as oscillator. The FM antenna coil and the FM oscillator coil are placed in such position as to provide coupling between them. A section of the AM oscillator coil is connected in series with the mixer grid input when the range switch is in AM position.

Dual I-F transformers are used, each transformer containing both AM and FM windings. The I-F amplifier is V2 (6BA6).

The range switch has four functions:

(1) Selection of AM or FM ranges.

(2) Selection of AVC supply voltages to be applied to the controlled tubes. Simple AVC is applied to the grids of V1 and V2 on AM. Delayed AVC is used on FM and is applied only to the grid of V2.

(3) Controls application of B+ voltage to the plate circuits of V1 (disconnected for PHONO operation).

(4) Controls audio input to volume control.

The driver V3 (6AU6) and ratio detector V4 (6AL5) circuits are similar to those used in other RCA Victor AM-FM receivers.

The audio voltage controlled by the volume control is amplified by V5 (6AV6) and V6 (6V6GT).

The rectifier V7 is type 6X5GT.

Replacement Parts

Stock No.	DESCRIPTION
	CHASSIS ASSEMBLIES
	RC 1060—Models 8R71, 8R74, 8R75
	RC 1060A—Models 8R72, 8R76
*73369	Board—"Antenna - FM - Ground" board
*73866	Capacitor—Ceramic, 2 mmf. (C9)
33101	Capacitor—Ceramic, 22 mmf. (C42)
39042	Capacitor—Ceramic, 47 mmf. (C26)
*73867	Capacitor—Ceramic, 56 mmf. (C43)
33103	Capacitor—Ceramic, 68 mmf. (C40)
48125	Capacitor—Ceramic, 150 mmf. (C7, C19)
39632	Capacitor—Mica, 150 mmf. (C35)
47617	Capacitor—Ceramic, 270 mmf. (C38)
39640	Capacitor—Mica, 330 mmf. (C30, C31)
*73748	Capacitor—Ceramic, 1,500 mmf. (C39)
72573	Capacitor—Tubular, .003 mfd., 400 v. (C28)
71553	Capacitor—Tubular, .005 mfd., 400 v. (C14, C16, C17, C21, C22)
72791	Capacitor—Tubular, .005 mfd., 400 v. (C34)
71926	Capacitor—Tubular, .005 mfd., 200 v. (C20, C24, C27, C32)
71923	Capacitor—Tubular, .01 mfd., 200 v. (C23, C25)
71925	Capacitor—Tubular, .01 mfd., 400 v. (C29, C41)
71928	Capacitor—Tubular, .02 mfd., 200 v. (C36)
72596	Capacitor—Tubular, .05 mfd., 200 v. (C15)
70617	Capacitor—Tubular, 0.1 mfd., 400 v. (C37)
*73747	Capacitor—Electrolytic, 2 mfd., 50 v. (C33)
*73372	Capacitor—Electrolytic, comprising 1 section of 30 mfd., 350 volts, 1 section of 30 mfd., 300 volts and 1 section of 20 mfd., 25 volts (C18A, C18B, C18C)
*73916	Coil—FM oscillator coil—No. 16 tinned bus wire, 7 turns per inch, 4¾ turns R. H., 15/32" I. D. (L2)
*73918	Coil—FM antenna coil—No. 16 tinned bus wire, 8 turns per inch, 1¾ turns L. H., 15/32" I. D. (L1)
	Coil—Line choke coil—No. 18 gauge solid hook-up wire, 1/32" plastic insulation, 10 turns (close wind), ¼" I. D. (L5, L7)
*73744	Coil—AM oscillator coil complete with adjustable core and stud (L4)
*73375	Condenser—Variable tuning condenser (C1, C2, C3, C4, C8, C12, C13)
*73373	Control—Tone control (S4)
38404	Control—Volume control and power switch (R14, S3)
†72953	Cord—Drive cord (approx. 40" overall length required)
*73365	Dial—Dial scale
16058	Grommet—Rubber grommet for mounting R-F shelf (4 required)
*73366	Indicator—Station selector indicator
11891	Lamp—Dial lamp—Mazda 44
*73357	Loop—Antenna loop complete
*73364	Plate—Dial back plate complete with lamp bracket and drive cord pulleys for Models 8R71, 8R74 and 8R75
*73371	Plate—Dial back plate complete with lamp bracket and drive cord pulleys for Models 8R72 and 8R76
*73368	Pulley—Station selector indicator drive pulley and shaft
	Resistor—Fixed, composition, 68 ohms, ±10%, ½ watt (R7)
	Resistor—Fixed, composition, 100 ohms, ±10%, ½ watt (R17, R27)
	Resistor—Fixed, composition, 120 ohms, ±10%, ½ watt (R12)
	Resistor—Fixed, composition, 330 ohms, ±10%, ½ watt (R21)
	Resistor—Fixed, composition, 680 ohms, ±20%, ½ watt (R9, R11)
	Resistor—Fixed, composition, 1,200 ohms, ±5%, ½ watt (R23)
52436	Resistor—Wire wound, 1,500 ohms, 5 watt (R22)
	Resistor—Fixed, composition, 3,300 ohms, ±5%, ½ watt (R24)
	Resistor—Fixed, composition, 10,000 ohms, ±10%, ½ watt (R32)
	Resistor—Fixed, composition, 15,000 ohms, ±10%, ½ watt (R13, R18)
	Resistor—Fixed, composition, 18,000 ohms, ±10%, 1 watt (R5)
	Resistor—Fixed, composition, 22,000 ohms, ±20%, ½ watt (R4)
	Resistor—Fixed, composition, 22,000 ohms, ±10%, ½ watt (R8)
	Resistor—Fixed, composition, 27,000 ohms, ±10%, ½ watt (R6, R30)
	Resistor—Fixed, composition, 39,000 ohms, ±10%, ½ watt (R25)
	Resistor—Fixed, composition, 56,000 ohms, ±10%, ½ watt (R10, R31)
	Resistor—Fixed, composition, 270,000 ohms, ±10%, ½ watt (R19, R29)
	Resistor—Fixed, composition, 470,000 ohms, ±10%, ½ watt (R20, R26, R28)
	Resistor—Fixed, composition, 2.2 megohm, ±20%, ½ watt (R3)
	Resistor—Fixed, composition, 3.9 megohm, ±10%, ½ watt (R2)
	Resistor—Fixed, composition, 10 megohm, ±20%, ½ watt (R15)
	Resistor—Fixed, composition, 22 megohm, ±20%, ½ watt (R16)
*73370	Ring—Retaining ring for indicator pulley and shaft
*73367	Shaft—Tuning knob shaft
31364	Socket—Dial lamp socket
*73374	Socket—Phono input socket
72516	Socket—Tube socket, 7 prong, miniature
*73606	Socket—Tube socket, 7 prong, miniature, mica filled rubber
31251	Socket—Tube socket, octal
72540	Spring—Drive cord spring
*73377	Switch—Range switch (S1, S2)
70127	Transformer—Power transformer, 115 volt, 60 cycle (T1)
*73745	Transformer—First I. F. transformer, dual (T2)
*73363	Transformer—Second I. F. transformer, dual (T3)
*73743	Transformer—Ratio detector transformer (T4)
*73415	Transformer—Output transformer (T5)
33726	Washer—"C" washer for tuning knob shaft
71033	Washer—Insulating washer—extruded—for mounting output transformer (2 required)
71034	Washer—Insulating washer—flat—for mounting output transformer (2 required)
	SPEAKER ASSEMBLIES
	92572-2
72201	Speaker—5" P.M. speaker complete with cone and voice coil
	MISCELLANEOUS
*73380	Baffle—Speaker baffle board and grille cloth
*73381	Bottom—Bottom cover for cabinet
*Y1485	Cabinet—Maroon plastic cabinet for Model 8R71
*Y1486	Cabinet—Ivory plastic cabinet for Model 8R72
*Y2030	Cabinet—Mahogany plastic cabinet for Model 8R74
*Y2031	Cabinet—Walnut plastic cabinet for Model 8R75
*Y2032	Cabinet—Blonde plastic cabinet for Model 8R76
*73382	Clamp—Clamp for fastening baffle board (3 required)
*73384	Decal—Control panel decal
*73378	Knob—Control knob — maroon — for Models 8R71, 8R74 and 8R75
*73379	Knob—Control knob—ivory—for Model 8R72
*73742	Knob—Control knob—tan—for Model 8R76
72649	Motif—Decorative motif for cabinet
72765	Nut—Speed nut to fasten motif
14270	Spring—Retaining spring for knobs

*This is the first time that this Stock No. has appeared in Service Data.

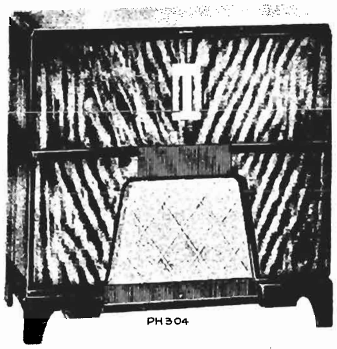
†Stock No. 72953 is a reel containing 250 feet of cord.

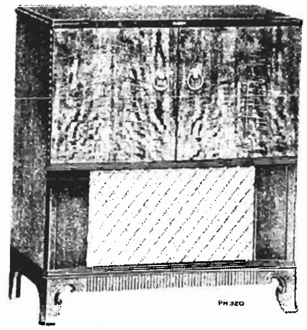
MODEL 8V90, CHASSIS RC-618, RC-618A

RADIO CORP. OF AMERICA

MODEL 8V91, CHASSIS RC-616A, RC-616H

Model 8V91





Model 8V90

Specifications

Tuning Ranges

Standard Broadcast (AM)............ 540-1,600 kc.
Frequency Modulation (FM).......... 88-108 mc.

Intermediate Frequencies...AM—455 kc., FM—10.7 mc.

Tube Complement

(1) 6J6...................... Mixer and Oscillator
(2) 6BA6......................... I. F. Amplifier
(3) 6AU6................................ Driver
(4) 6AL5......................... Ratio Detector
(5) 6AV6............................ A. F. Amp.
(6) 6V6GT.............................. Output
(7) 6AV6...............AM Det—AVC—Ph. Inv.
(8) 6V6GT.............................. Output
(9) 6X5GT............................ Rectifier

Tuning Drive Ratio.............. 18:1 (9 turns of knob)

Record Changer (RP-178)

Record Capacity......... Twelve 10-in. or ten 12-in.
Turntable Speed........................ 78 r.p.m.

Power Supply Rating...... 115 volts, 60 cycles, 90 watts

Circuit Description

The chassis used in these receivers have a 6J6 tube (V1) (twin triode), one section of which is used as mixer and the other section as oscillator. The FM antenna coil and the FM oscillator coil are placed in such position as to provide coupling between them. A section of the AM oscillator coil is connected in series with the mixer grid input when the range switch is in AM position.

Dual I-F transformers are used, each transformer containing both AM and FM windings. The I-F amplifier is V2 (6BA6).

The range switch has four functions:

(1) Selection of tuning range.
(2) Selection of AVC supply voltages to be applied to the controlled tubes. Simple AVC is applied to the grids of V1 and V2 on AM. Delayed AVC is used on FM and is applied only to the grid of V2.
(3) Controls application of B+ voltage to V1, V2, V3.
(4) Controls audio input to volume control.

The driver V3 (6AU6) and ratio detector V4 (6AL5) circuits are similar to those used in other RCA Victor AM-FM receivers.

The audio system is conventional. It consists of V5 (6AV6 a.f. amp.), V7 (6AV6 ph. inv.), V6 and V8 (6V6GT p. p. output).

The rectifier is V9 (6X5GT).

Loudspeaker

Type 92579-2W (8V90 1st Prod.)......... 8-in. P.M
Type 92569-5W (8V90 2nd Prod.)....... 12 in. P.M.
Type 92569-1KX or 92569-5W (8V91)....12 in. P.M
Voice coil impedance—
92579-2W................ 3.2 ohms at 400 cycles
92569-1KX............... 2.2 ohms at 400 cycles
92569-5W................ 3.2 ohms at 400 cycles

Cabinet Dimensions

	Height	Width	Depth
Model 8V90	33¼ in.	31$\frac{11}{16}$ in.	16⅜ in.
Model 8V91	34⅜ in.	36$\frac{7}{16}$ in.	18 in.

Dial Lamps (2)........ Type No. 51, 6-8 volts, 0.2 amp.

Jewel Lamp........... Type No. 51, 6-8 volts, 0.2 amp.

Power Output

Maximum............................... 7 watts
Undistorted .... 6 watts

Antennas:

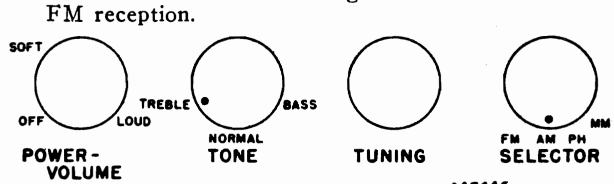
These receivers have built-in antennas for standard broadcast (AM) and frequency modulation (FM) reception.

Under average conditions these antennas will provide satisfactory reception. However, provision is made for the use of external antennas if desired — connect as indicated below:

AM Antenna: Connect a single wire antenna to terminal "A" (used on Model 8V91 only).

FM Antenna: Remove the built-in FM antenna lead from the "FM" terminals of the terminal board. Connect the transmission line of an external FM dipole antenna to these two "FM" terminals.

Ground: Connect external ground to "G" terminal (used on Model 8V91 only). Under certain conditions the use of an external ground is detrimental to FM reception.



CONTROLS

MODEL 8V91, CHASSIS RC-616A, RC-616H

RADIO CORP. OF AMERICA

MODEL 8V90, CHASSIS RC-618, RC-618A

Alignment Procedure

CORRECT ALIGNMENT OF THE FM BAND REQUIRES THAT THE AM BAND BE ALIGNED FIRST

Alignment Indicators:

An RCA VoltOhmyst or equivalent meter is necessary for measuring developed d-c voltage during FM alignment. Connections are specified in the alignment tabulation. An output meter is also necessary to indicate minimum audio output during FM Ratio Detector alignment. Connect the output meter across the speaker voice coil.

The RCA VoltOhmyst can also be used as an AM alignment indicator, either to measure audio output or to measure a-v-c voltage.

When audio output is being measured the volume control should be turned to maximum.

Signal Generator:

For all alignment operations connect the low side of the signal generator to the receiver chassis. The output should be adjusted to provide accurate resonance indication at all times. If output measurement is used for AM alignment the output of the signal generator should be kept as low as possible to avoid a-v-c action.

The FM i-f alignment may be checked by means of an FM sweep generator and cathode ray oscilloscope. Connect the output from the sweep generator, which is set to 10.7 mc., to the mixer grid (6J6 Pin No. 5), low side to chassis. Disconnect the 2 mfd. capacitor C33 from the Ratio Detector circuit.

Connect the high side of the oscilloscope to the junction of R25 and R26, low side to chassis. Adjust the sweep generator and oscilloscope to obtain the response curve.

The Ratio Detector characteristic may be viewed by connecting the oscilloscope across the volume control R14. Capacitor C33 should be re-connected before checking the Ratio Detector characteristic.

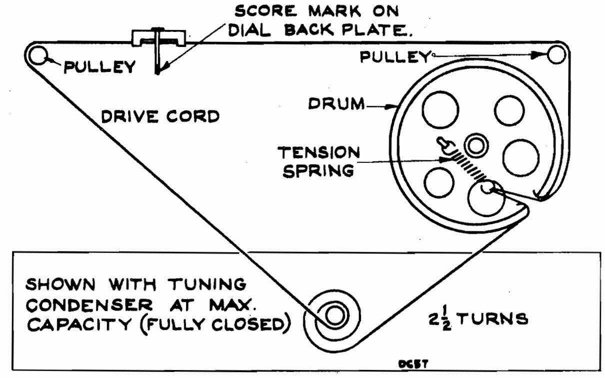
CRITICAL LEAD DRESS

1. Keep leads of C7 short.
2. Dress R27 away from range switch and pin No. 5 of V1.
3. The ground lead of pin No. 2 of V2 and V3 should be down against chassis. Its length is critical.
4. The AVC lead from R26 to range switch should be dressed against chassis and away from 6AU6 driver tube socket.
5. C43 should have short leads and the color code of the capacitor should go to the coil L4. The capacitor should be cemented down with polystyrene cement at the same time L2 is cemented.
6. The lead from the high side of the loop should be dressed away from tubes.
7. Lead from pin No. 2 of V1 to terminal "A" of 1st I. F. transformer should be dressed against the chassis.
8. Connect C40 directly between the gang condenser and pin No. 1 of V1.
9. Make all FM leads as short as possible.
10. Dress lead from pin No. 5 of V2 to terminal "A" of 2nd I. F. transformer down against chassis.
11. Dress resistor R15 near chassis base.
12. Dress all A. C. leads away from volume control.
13. The lead from "FM" terminal of antenna terminal board to L1 tap should be dressed away from V2.
14. The taps on L1 and L2 are critical. L1 tap should be ¾ turn from the ground end. L2 tap should be 2½ turns from the gang condenser C8.
15. Dress C25 and C26 against the chassis with the shortest lead length possible.
16. The position of L1 and L2 is critical. L1 should be midway between V1 and the 1st I. F. transformer. The end of L2 should be approximately 3/16" from V1.

Dial Indicator

With the tuning condenser fully meshed (closed) the indicator should be set to the reference mark on the dial back plate.

Refer to the dial scale reproductions on page 7.



Dial Indicator and Drive Mechanism — Model 8V90

AM Alignment

RANGE SWITCH IN BC POSITION

Steps	Connect high side of sig. gen. to—	Sig. gen. output	Turn radio dial to—	Adjust for peak output
1	C3 in series with .01 mfd.	455 kc.	Quiet point at low freq. end.	AM windings.† T3 bottom core (sec.). T3 top core (pri.).
2				AM windings.† T2 top core (sec.). T2 bottom core (pri.).
3	* "A" terminal of terminal board at rear of chassis in series with 220 mmf.	1400 kc.	1400 kc.	C13 osc. C4 ant.
4		600 kc.	600 kc.	L4 osc. (Rock gang.)
5	Repeat Steps 3 and 4.			

† Use alternate loading.

Alternate loading involves the use of a 47,000 ohm resistor to load the AM plate winding while the AM grid winding of the SAME TRANSFORMER is being peaked. Then the grid winding is loaded with the resistor while the plate winding is peaked. Only one winding is loaded at any one time. Remove the 47,000 ohm resistor after T3 and T2 have been aligned.

Oscillator frequency is above signal frequency on both AM and FM.

* "A" terminal used on Model 8V91 only. Use radiated signal for Model 8V90.

FM Alignment

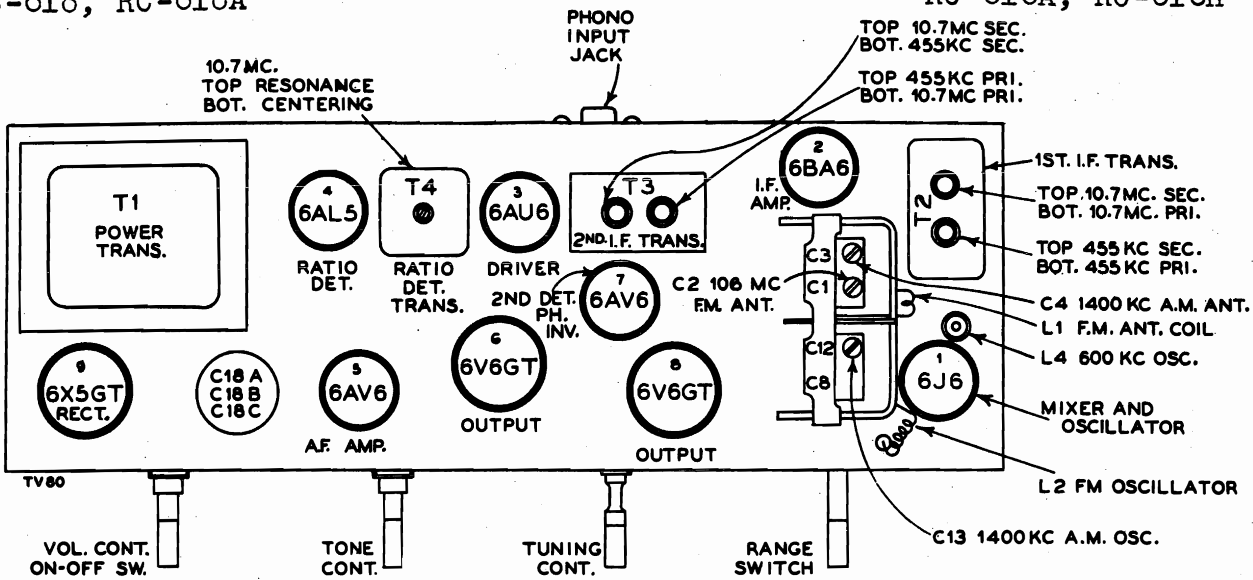
RANGE SWITCH IN FM POSITION — VOLUME CONTROL MAXIMUM

Steps	Connect high side of sig. gen. to—	Sig. gen. output	Turn radio dial to—	Adjust for peak output
1	Connect the d-c probe of a VoltOhmyst to the negative lead of the 2 mfd. capacitor C33 and the common lead to chassis. Turn gang condenser to max. capacity (fully meshed).			
2	Pin 1 of 6AU6 in series with .01 mfd.	10.7 mc. modulated 30% 400 cycles AM (Approx. .05 volt).	Max. capacity (fully meshed).	T4 top core for max. d-c voltage across C33. T4 bottom core for min. audio output.*
3	FM ant. term. in series with a 300 ohm resistor. (Remove ant. lead from "FM" term.)	10.7 mc. Adjust to provide 2 to 3 volts indication on VoltOhmyst during alignment.		FM windings.†† T3 top core (sec.). T3 bottom core (pri.).
4				FM windings.†† T2 top core (sec.). T2 bottom core (pri.).
5		106 mc.	106 mc.	L2 osc.** C2 ant. Set C2 at max. capacity while adjusting L2.
6		90 mc.	90 mc.	L1 ant.** (Rock gang.)
7	Repeat Steps 5 and 6 until further adjustment does not improve calibration.			

* Two or more points may be found which lower the audio output. At the correct point the minimum audio output is approached rapidly and is much lower than at any incorrect point.

†† Align T3 and T2 by means of alternate loading as explained under AM alignment. Use a 680 ohm resistor instead of a 47,000 ohm resistor and load the FM windings.

** L1 and L2 are adjustable by increasing or decreasing the spacing between turns.



Tube and Trimmer Locations

Note: FM mixer and oscillator coils are adjustable by increasing or decreasing the spacing between turns. The position of the coils and location of the taps are critical (refer to "Critical Lead Dress").

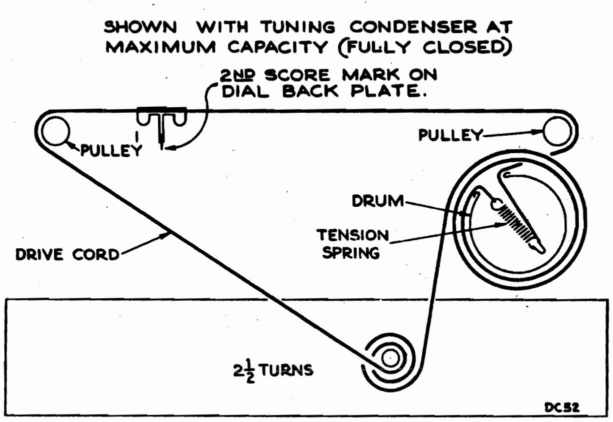
SOCKET VOLTAGES

Voltages measured with Chanalyst or VoltOhmyst and should hold within ±20% with rated line voltage. Tuning condenser closed—no signal input.

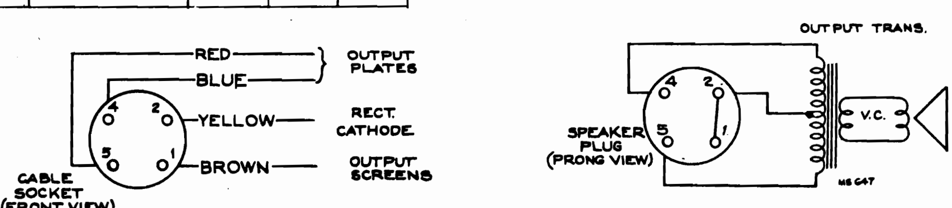
Tube	Terminal		Voltage Phono	A.M.	F.M.
(1) 6J6	Plate	1	—	102	98
	Grid	6	−0.4	−6.8	−6.0
	Plate	2	—	96	110
	Grid	5	−0.8	−2.7	−2.5
(2) 6BA6	Plate	5	—	196	192
	Screen	6	—	100	83
	Cathode	7	—	0.7	0.84
	Grid	1	−0.9	−1.3	−0.2
(3) 6AU6	Plate	5	—	190	185
	Screen	6	—	145	141
	Cathode	7	—	1.25	1.21
(4) 6AL5	———	—	—	—	—
(5) 6AV6	Plate	7	125	85	84
	Grid	1	−0.6	−0.6	−0.6
(6) 6V6GT	Plate	3	299	282	280
	Screen	4	295	220	217
	Cathode	8	21.4	15.5	15.4
(7) 6AV6	Plate	7	168	125	125
	Grid	1	−0.5	−0.5	−0.5
(8) 6V6GT	Plate	3	299	282	280
	Screen	4	295	220	217
	Cathode	8	21.4	15.5	15.4
(9) 6X5GT	Cathode	8	313	300	299

CATHODE CURRENTS (MA)

Tube	Terminal	Phono	A.M.	F.M.
(1) 6J6	7	—	8.2	8.7
(2) 6BA6	7	—	11.6	13.4
(3) 6AU6	7	—	10	9.7
(4) 6AL5	1 & 5	—	—	—
(5) 6AV6	2	0.75	0.5	0.5
(6) 6V6GT	8	25.1	19.1	18.5
(7) 6AV6	2	1.7	1.1	1.1
(8) 6V6GT	8	25.1	19	18.5
(9) 6X5GT	8	53	70	70.5



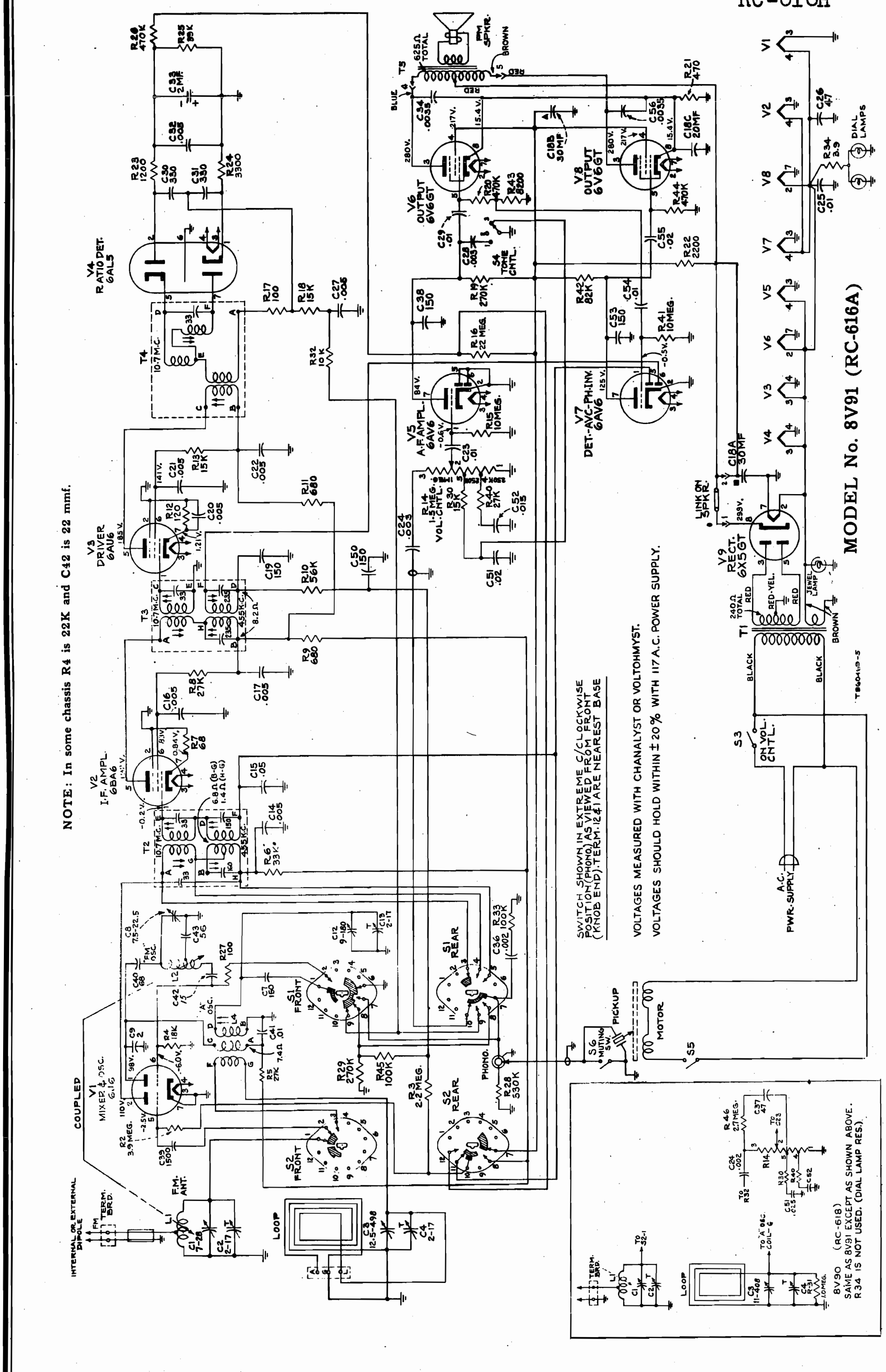
Dial Indicator and Drive Mechanism — Model 8V91



Speaker Connections

RADIO CORP. OF AMERICA

MODELS 8V90, CHASSIS RC-618, RC-618A; 8V91, CHASSIS RC-616A, RC-616H



NOTE: In some chassis R4 is 22K and C42 is 22 mmf.

SWITCH SHOWN IN EXTREME C/CLOCKWISE POSITION (PHONO) AS VIEWED FROM FRONT (KNOB END). TERM. 12 & 1 ARE NEAREST BASE

VOLTAGES MEASURED WITH CHANALYST OR VOLTOHMYST.

VOLTAGES SHOULD HOLD WITHIN ± 20% WITH 117 A.C. POWER SUPPLY.

8V90 (RC-618) SAME AS 8V91 EXCEPT AS SHOWN ABOVE. R34 IS NOT USED. (DIAL LAMP RES.)

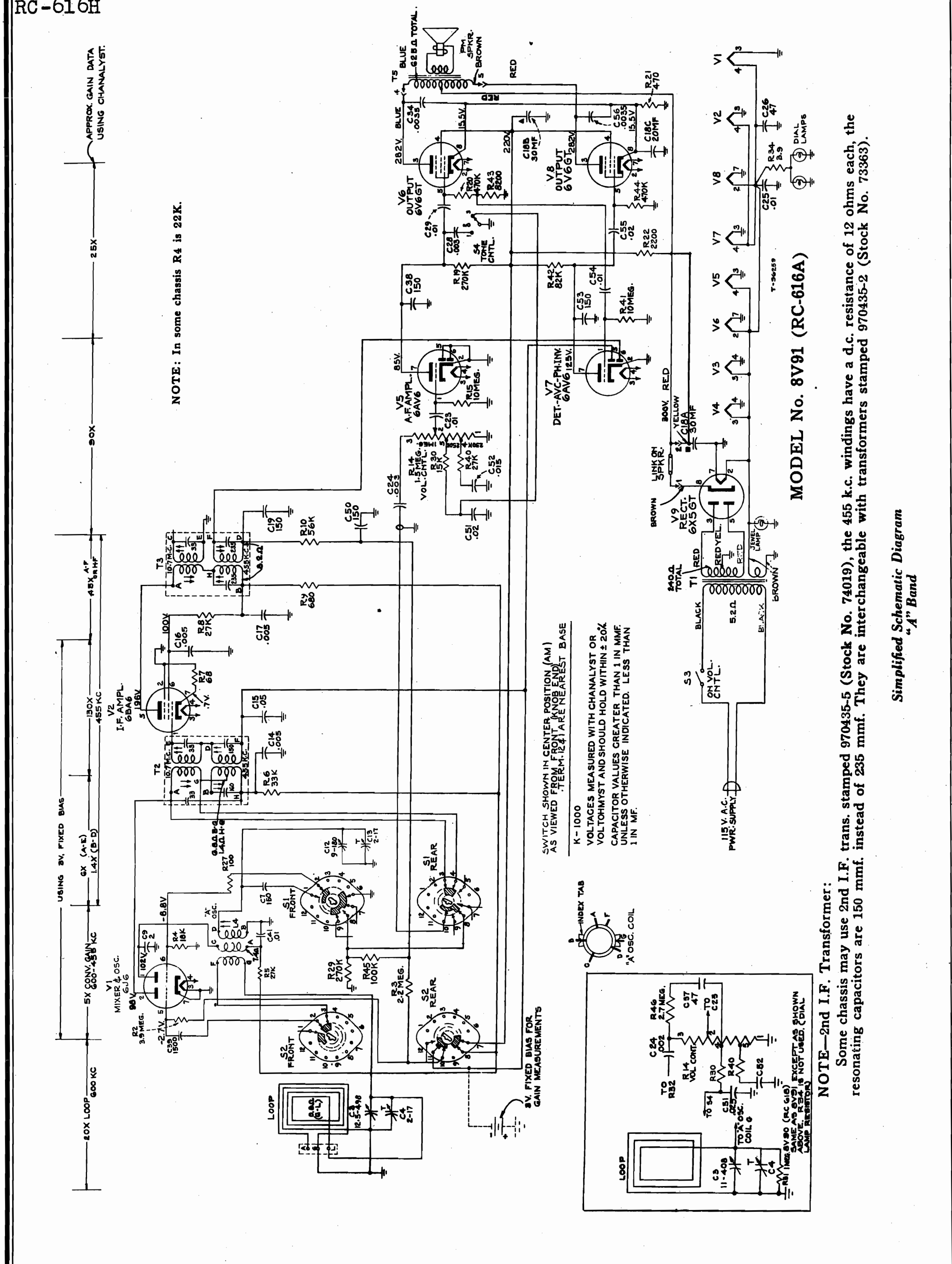
MODEL No. 8V91 (RC-616A)

NOTE—2nd I.F. Transformer:
Some chassis may use 2nd I.F. trans. stamped 970435-5 (Stock No. 74019), the 455 k.c. windings have a d.c. resistance of 12 ohms each, the resonating capacitors are 150 mmf. instead of 235 mmf. They are interchangeable with transformers stamped 970435-2 (Stock No. 73363).

Complete Schematic Diagram

MODELS 8V90, CHASSIS RC-618, RC-618A; 8V91, CHASSIS RC-616A, RC-616H

RADIO CORP. OF AMERICA



NOTE: In some chassis R4 is 22K.

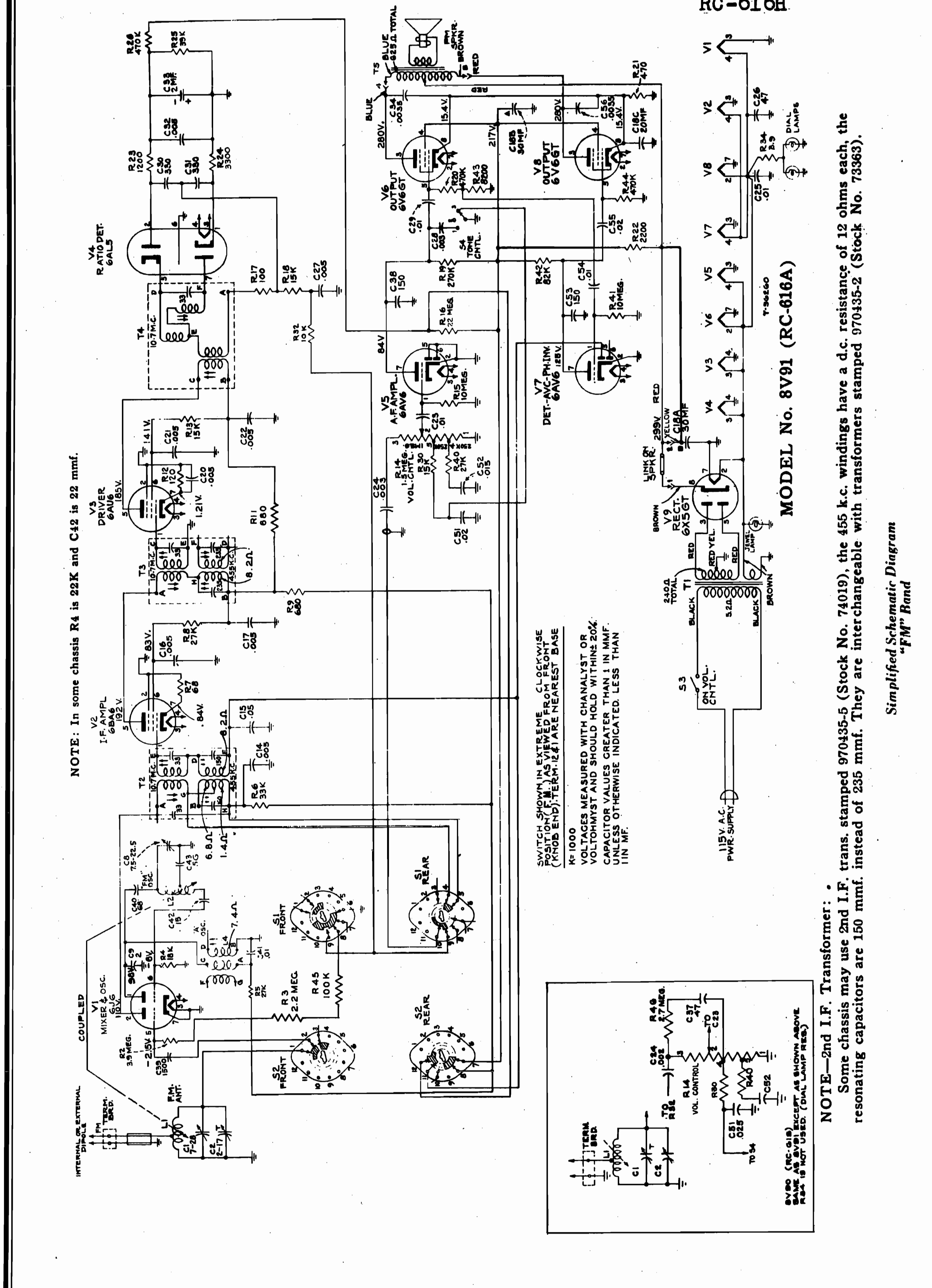
MODEL No. 8V91 (RC-616A)

Simplified Schematic Diagram "A" Band

NOTE—2nd I.F. Transformer:
Some chassis may use 2nd I.F. trans. stamped 970435-5 (Stock No. 74019), the 455 k.c. windings have a d.c. resistance of 12 ohms each, the resonating capacitors are 150 mmf. instead of 235 mmf. They are interchangeable with transformers stamped 970435-2 (Stock No. 73363).

RADIO CORP. OF AMERICA

MODELS 8V90, CHASSIS RC-618, RC-618A; 8V91, CHASSIS RC-616A, RC-616H



NOTE: In some chassis R4 is 22K and C42 is 22 mmf.

SWITCH SHOWN IN EXTREME CLOCKWISE POSITION (F.M.) AS VIEWED FROM FRONT (KNOB END). TERM. 1,2,4,1 ARE NEAREST BASE

K=1000
VOLTAGES MEASURED WITH CHANALYST OR VOLTOHMYST AND SHOULD HOLD WITHIN ± 20%
CAPACITOR VALUES GREATER THAN 1 IN MMF. UNLESS OTHERWISE INDICATED. LESS THAN 1 IN MF.

MODEL No. 8V91 (RC-616A)

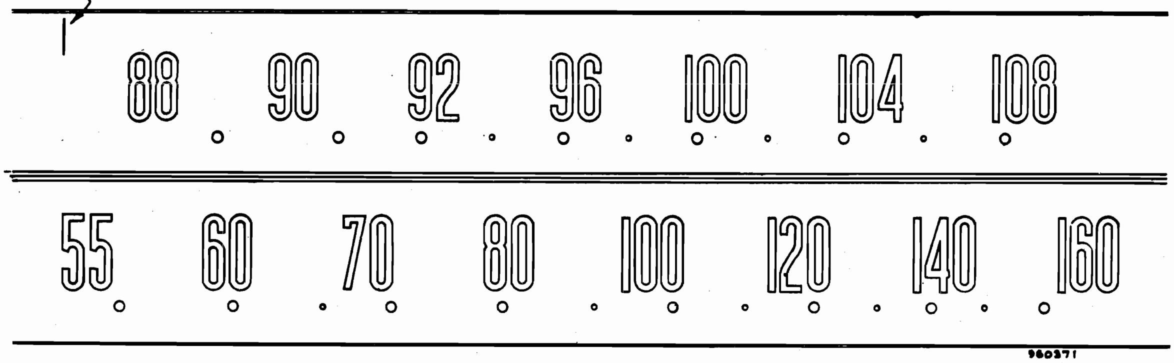
NOTE—2nd I.F. Transformer: Some chassis may use 2nd I.F. trans. stamped 970435-5 (Stock No. 74019), the 455 k.c. windings have a d.c. resistance of 12 ohms each, the resonating capacitors are 150 mmf. instead of 235 mmf. They are interchangeable with transformers stamped 970435-2 (Stock No. 73363).

Simplified Schematic Diagram "FM" Band

MODELS 8V90, CHASSIS RC-618, RC-618A;
8V91, CHASSIS RC-616A, RC-616H

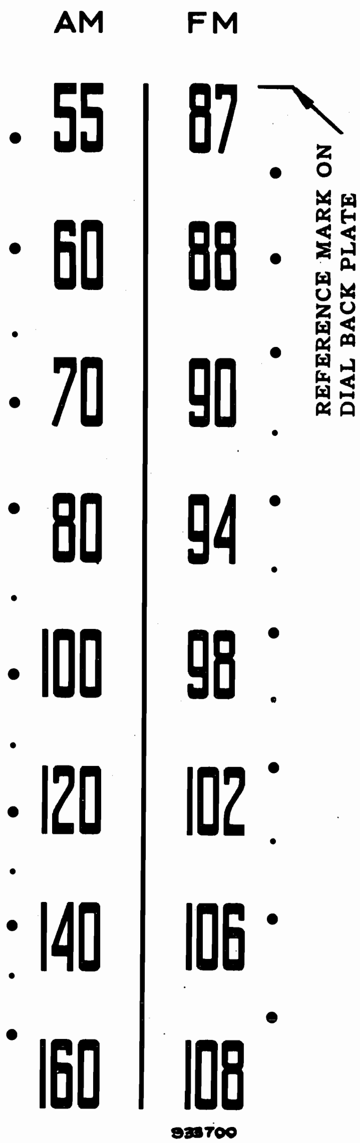
RADIO CORP. OF AMERICA

SECOND SCORE MARK ON DIAL BACK PLATE



The dial scale drawing shown is a full size reproduction. It can be used as a reference in alignment procedure.

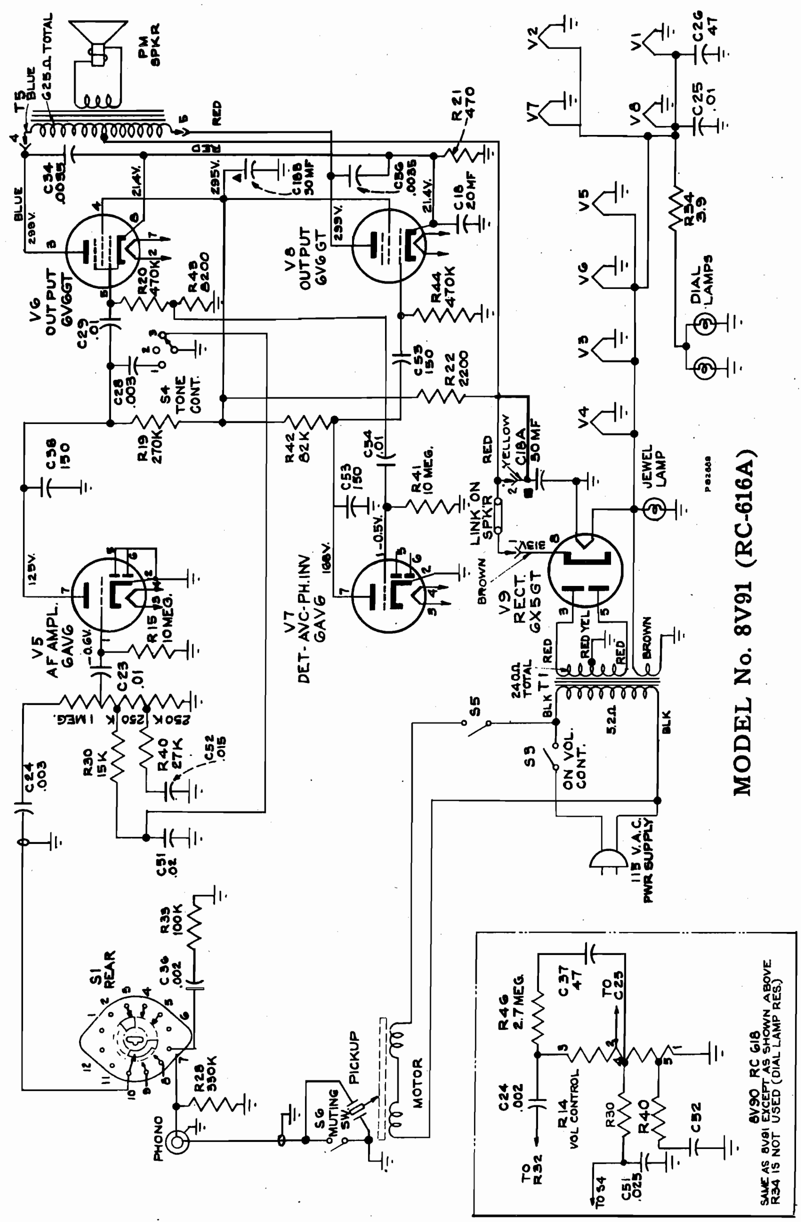
Dial Scale — Model 8V91



The dial scale drawing shown is a full size reproduction. It can be used as a reference in alignment procedure.

RCA VICTOR

Dial Scale—Model 8V90



MODEL No. 8V91 (RC-616A)

Simplified Schematic Diagram Phono Position

Model 8V90 2nd Production
Chassis No. RC-618A

Model 8V91 2nd Production
Chassis No. RC-616H

1ST PRODUCTION RC-616A and RC-618	2ND PRODUCTION RC-616H and RC-618A
Three position selector switch (PHONO—AM-FM)	Four position selector switch (AUX.-PHONO—AM-FM)
AUX. input jack is not used	AUX. input jack is used
RC-618 only	RC-618A only
8-in. speaker (92579-2)	12-in. speaker (92569-5)
C37 and R46 are used	C37 and R46 are not used
C24 is .002 mfd	C24 is .003 mfd
C51 is .025 mfd	C51 is .02 mfd

Replacement Parts — 8V91 — 2nd Prod.
Identical to those listed for 1st Prod.

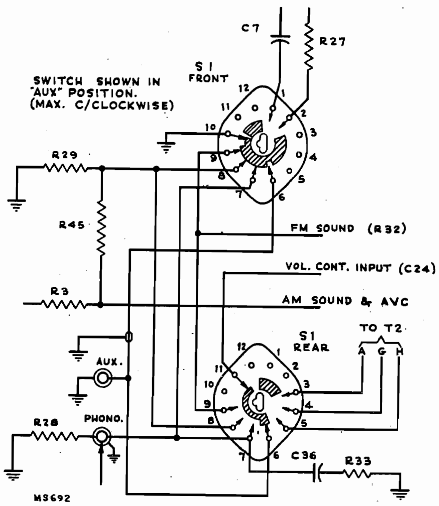
EXCEPT

Stock No.	DESCRIPTION
Add:	**CHASSIS ASSEMBLIES (RC-616H)**
*74173	Switch—Selector switch (S1, S2)
Delete:	
73609	Switch
Add:	**MISCELLANEOUS**
*74175	Decal—Control panel decal for mahogany or walnut instruments
*74176	Decal—Control panel decal for blonde instruments
Delete:	
73755 and 73756 Decals	

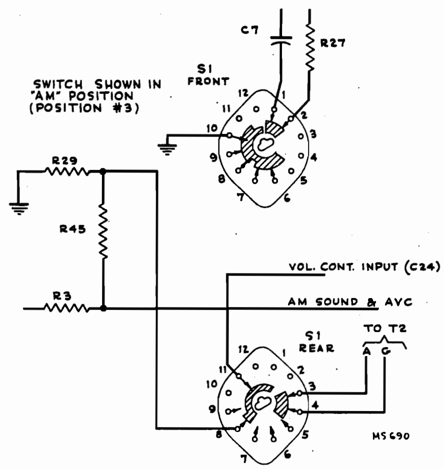
Replacement Parts — 8V90 — 2nd Prod.
Identical to those listed for 1st Prod.

EXCEPT

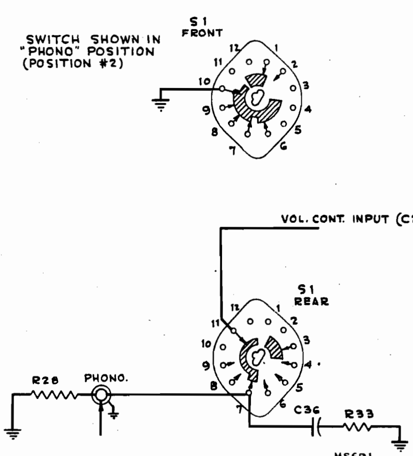
Stock No.	DESCRIPTION
Add:	**CHASSIS ASSEMBLIES (RC-618A)**
73659	Capacitor—Tubular, .003 mfd., 200 volts (C24)
71928	Capacitor—Tubular, .02 mfd., 200 volts (C51)
*74129	Switch—Selector switch (S1, S2)
Delete:	C24, C37, C51, R46, S1, S2
Add:	**SPEAKER ASSEMBLIES**
	92569-5W RL 103 B5
	As listed for Model 8V91
Delete:	**SPEAKER ASSEMBLIES**
	92579-2W RL 105 A1
Add:	**MISCELLANEOUS**
*74130	Decal—Control panel decal for mahogany finish or walnut instruments
*74131	Decal—Control panel decal for blonde instruments
Delete:	73904 and 73905 Decals.



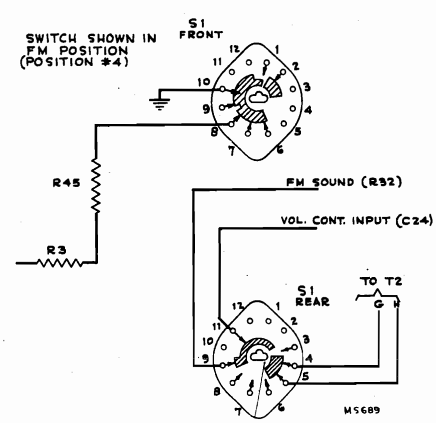
SWITCH WIRING RC-616H & RC-618A



AM SIMPLIFIED SCHEMATIC



PHONO SIMPLIFIED SCHEMATIC



FM SIMPLIFIED SCHEMATIC

The schematic diagrams above show the selector switch (S1) used in RC-616H and RC-618A. The connections to S2 are identical in all chassis — note that position No. 2 (PHONO) of RC-616H and RC-618A corresponds to position No. 1 (PHONO) of RC-616A and RC-618. No connections are made through S2 when in AUX. position.

MODELS 8V90, CHASSIS RC-618, RC-618A; 8V91, CHASSIS RC-616A, RC-616H

RADIO CORP. OF AMERICA

NOTE: In early RC 616A chassis C42 is 22 mmf., R4 is 22,000 ohms.

Replacement Parts—Model 8V90—First Prod.

Stock No.	DESCRIPTION
	CHASSIS ASSEMBLIES
	RC 618
*73893	Board—"FM" antenna board
*73889	Capacitor—Variable tuning capacitor (C1, C2, C3, C4, C8, C12, C13)
73866	Capacitor—Ceramic, 2 mmf. (C9)
31353	Capacitor—Ceramic, 15 mmf. (C42)
39042	Capacitor—Ceramic, 47 mmf. (C26, C37)
73867	Capacitor—Ceramic, 56 mmf. (C43)
33103	Capacitor—Ceramic, 68 mmf. (C40)
48125	Capacitor—Ceramic, 150 mmf. (C7, C19, C38, C50, C53)
39640	Capacitor—Mica, 330 mmf. (C30, C31)
73748	Capacitor—Ceramic, 1500 mmf. (C39)
73750	Capacitor—Tubular, .002 mfd., 200 volts (C24, C36)
72573	Capacitor—Tubular, .003 mfd., 400 volts (C28)
70646	Capacitor—Tubular, .0035 mfd., 1000 volts (C34, C56)
71926	Capacitor—Tubular, .005 mfd., 200 volts (C20, C27, C32)
71553	Capacitor—Tubular, .005 mfd., 400 volts (C14, C16, C17, C21, C22)
71923	Capacitor—Tubular, .01 mfd., 200 volts (C23, C25)
71925	Capacitor—Tubular, .01 mfd., 400 volts (C29, C41, C54)
72120	Capacitor—Tubular, .015 mfd., 200 volts (C52)
73638	Capacitor—Tubular, .02 mfd., 400 volts (C55)
70612	Capacitor—Tubular, .025 mfd., 400 volts (C51)
72596	Capacitor—Tubular, .05 mfd., 200 volts (C15)
73747	Capacitor—Electrolytic, 5 mfd., 50 volts (C33)
73372	Capacitor—Electrolytic, comprising 1 section of 30 mfd., 350 volts, 1 section of 30 mfd., 300 volts and 1 section of 20 mfd., 25 volts (C18A, C18B, C18C)
73918	Coil—Antenna coil—F.M. (No. 16 tinned bus wire, 8 turns per inch, 1¾ turns L. H.—.469 in. I. D.) (L1)
73916	Coil—Oscillator coil—F.M. (No. 16 tinned bus wire, 7 turns per inch, 4¾ turns R. H.—.469 in. I. D.) (L2)
73744	Coil—Oscillator coil—"A" band (L4)
70342	Control—Volume control and power switch (R14, S3)
†72953	Cord—Drive cord (approx. 48" overall length required)
70392	Cord—Power cord and plug
16058	Grommet—Rubber grommet to mount R.F. shelf (4 required)
72069	Grommet—Rubber grommet for rear mounting feet (2 required)
*73895	Indicator—Station selector indicator
*73892	Plate—Dial back plate complete with two (2) drive cord pulleys, less dial
30868	Plug—2 contact female plug for motor cable
5040	Plug—4 contact female plug for speaker cable
	Resistor—Fixed, composition, 68 ohms, ±10%, ½ watt (R7)
	Resistor—Fixed, composition, 100 ohms, ±10%, ½ watt (R17, R27)
	Resistor—Fixed, composition, 120 ohms, ±10%, ½ watt (R12)
	Resistor—Fixed, composition, 470 ohms, ±10%, 2 watts (R21)
	Resistor—Fixed, composition, 680 ohms, ±20% ½ watt (R9, R11)
	Resistor—Fixed, composition, 1200 ohms, ±5%, ½ watt (R23)
73637	Resistor—Wire wound, 2200 ohms, 5 watts (R22)
	Resistor—Fixed, composition, 3300 ohms, ±5%, ½ watt (R24)
	Resistor—Fixed, composition, 8200 ohms, ±10%, ½ watt (R43)
	Resistor—Fixed, composition, 10,000 ohms, ±10%, ½ watt (R32)
	Resistor—Fixed, composition, 15,000 ohms, ±10%, ½ watt (R13, R18, R30)
	Resistor—Fixed, composition, 18,000 ohms, ±10%, ½ watt (R4)
	Resistor—Fixed, composition, 27,000 ohms, ±10%, ½ watt (R8, R40)
	Resistor—Fixed, composition, 27,000 ohms, ±10%, 1 watt (R5)
	Resistor—Fixed, composition, 33,000 ohms, ±10%, ½ watt (R6)
	Resistor—Fixed, composition, 39,000 ohms, ±10%, ½ watt (R25)
	Resistor—Fixed, composition, 56,000 ohms, ±10%, 1 watt (R10)
	Resistor—Fixed, composition, 82,000 ohms, ±10%, ½ watt (R42)
	Resistor—Fixed, composition, 100,000 ohms, ±10%, ½ watt (R33, R45)
	Resistor—Fixed, composition, 270,000 ohms, ±10%, ½ watt (R19, R29)
	Resistor—Fixed, composition, 330,000 ohms, ±10%, ½ watt (R28)
	Resistor—Fixed, composition, 470,000 ohms, ±10%, ½ watt (R20, R26, R44)
	Resistor—Fixed, composition, 1 megohm, ±20%, ½ watt (R31)
	Resistor—Fixed, composition, 2.2 megohm, ±20%, ½ watt (R3)
	Resistor—Fixed, composition, 2.7 megohm, ±10%, ½ watt (R46)
	Resistor—Fixed, composition, 3.9 megohm, ±10%, ½ watt (R2)
	Resistor—Fixed, composition, 10 megohms, ±20%, ½ watt (R15, R41)
	Resistor—Fixed, composition, 22 megohms, ±20%, ½ watt (R16)
*73894	Shaft—Tuning knob shaft
31364	Socket—Dial lamp socket
35787	Socket—Phono input socket
73606	Socket—Tube socket, miniature, for tubes V1, V2 and V3
72516	Socket—Tube socket, miniature, for tubes V4, V5 and V7
31251	Socket—Tube socket, wafer, octal, for tubes V6, V8 and V9
31418	Spring—Drive cord spring
*73890	Switch—Selector switch (S1, S2)
*73891	Switch—Tone control switch (S4)
73601	Transformer—Power transformer, 115 volts, 60 cycle (T1)
73745	Transformer—First I.F. transformer—dual (T2)
74019	Transformer—Second I.F. transformer—dual (T3)
73743	Transformer—Ratio detector transformer (T4)
33726	Washer—"C" washer for tuning knob shaft
	SPEAKER ASSEMBLIES
	92579-2W
	RL 105A1
*74181	Cap—Dust cap
*73912	Cone—Cone and voice coil assembly
5039	Plug—4 prong male plug for speaker
*73911	Speaker—8" P.M. speaker complete with cone and voice coil—less output transformer and plug
73636	Transformer—Output transformer (T5)
	MISCELLANEOUS
72555	Antenna—F.M. antenna
71599	Bracket—Pilot lamp bracket
72437	Cable—Shielded pickup cable complete with pin plug
13103	Cap—Pilot lamp jewel
71892	Catch—Bullet catch and strike for doors
*73897	Clamp—Dial clamp (2 required)
X1894	Cloth—Grille cloth for blonde instruments
X1893	Cloth—Grille cloth for mahogany finish or walnut instruments
*73904	Decal—Control panel decal for mahogany finish or walnut instruments
*73905	Decal—Control panel decal for blonde instruments
71984	Decal—Trade mark decal (RCA Victor)
71966	Decal—Trade mark decal (Victrola)
*73898	Dial—Glass dial scale
11889	Grommet—Rubber grommet for front apron of chassis (2 required)
72856	Grommet—Rubber grommet for mounting record changer (3 required)
73903	Hinge—Phono compartment door or radio compartment door hinge (1 set)
71822	Hinge—Selector switch or tone control knob—maroon—for mahogany finish or walnut instruments
72824	Knob—Selector switch or tone control knob—brown—for blonde instruments
71821	Knob—Tuning or volume control knob—maroon—for mahogany finish or walnut instruments
72800	Knob—Tuning or volume control knob—brown—for blonde instruments
11765	Lamp—Dial lamp—Mazda 51
*73896	Loop—Antenna loop complete
73109	Nut—Tee nut for mounting record changer (3 required)
*73902	Pull—Phono compartment or radio compartment door pull
73110	Screw—¼-20 x 1¾ fillister head machine screw for mounting record changer (3 required)
30900	Spring—Retaining spring for knob
72936	Stop—Phono compartment or radio compartment door stop

*This is the first time that this Stock No. has appeared in Service Data.
†Stock No. 72953 is a reel containing 250 feet of cord.

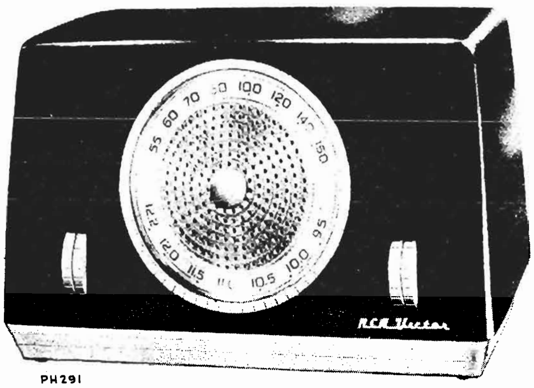
RADIO CORP. OF AMERICA MODELS 8V90, CHASSIS RC-618, RC-618A; 8V91, CHASSIS RC-616A, RC-616H

Replacement Parts—Model 8V91—First Prod.

Stock No.	DESCRIPTION
	CHASSIS ASSEMBLIES RC 616A
73610	Board—Terminal board (F.M.-G) with link
73866	Capacitor—Ceramic, 2 mmf. (C9)
31353	Capacitor—Ceramic, 15 mmf. (C42)
39042	Capacitor—Ceramic, 47 mmf. (C26)
73867	Capacitor—Ceramic, 56 mmf. (C43)
33103	Capacitor—Ceramic, 68 mmf. (C40)
48125	Capacitor—Ceramic, 150 mmf. (C7, C19, C38, C50, C53)
39640	Capacitor—Mica, 330 mmf. (C30, C31)
73748	Capacitor—Ceramic, 1500 mmf. (C39)
*73750	Capacitor—Tubular, .002 mfd., 200 volts (C36)
70646	Capacitor—Tubular, .0035 mfd., 1000 v. (C34, C56)
73659	Capacitor—Tubular, .003 mfd., 200 volts (C24)
72573	Capacitor—Tubular, .003 mfd., 400 volts (C28)
71926	Capacitor—Tubular, .005 mfd., 200 volts (C20, C27, C32)
72791	Capacitor—Tubular, .005 mfd., 400 volts (C14, C16, C17, C21, C22)
72120	Capacitor—Tubular, .015 mfd., 200 volts (C52)
71923	Capacitor—Tubular, .01 mfd., 200 volts (C23, C25)
72827	Capacitor—Tubular, .01 mfd., 400 volts (C29, C41, C54)
71928	Capacitor—Tubular, .02 mfd., 200 volts (C51)
73638	Capacitor—Tubular, .02 mfd., 400 volts (C55)
72596	Capacitor—Tubular, .05 mfd., 200 volts (C15)
73747	Capacitor—Electrolytic, 2 mfd., 50 volts (C33)
73372	Capacitor—Electrolytic, comprising 1 section of 30 mfd., 350 volts, 1 section of 30 mfd., 300 volts and 1 section of 20 mfd., 25 volts (C18A, C18B, C18C)
73918	Coil—Antenna coil—F.M. (No. 16 tinned bus wire—8 turns per inch—1¾ turns L. H.—.469 in. I. D.) (L1)
73916	Coil—Oscillator coil—F.M. (No. 16 tinned bus wire—8 turns per inch—4¾ turns R. H.—.469 in. I. D.) (L2)
73744	Coil—Oscillator coil—"A" band (L4)
73607	Condenser—Variable tuning condenser (C1, C2, C3, C4, C8, C12, C13)
70342	Control—Volume control and power switch (R14, S3)
†72953	Cord—Drive cord (approx. 38" overall length required)
73690	Cord—Power cord and plug
72069	Grommet—Rubber grommet for rear mounting feet (2 required)
16058	Grommet—Rubber grommet to mount R-F shelf (4 required)
73710	Indicator—Station selector indicator
71607	Plate—Dial back plate
30868	Plug—2 contact female plug for motor cable
5040	Plug—4 contact female plug for speaker cable
70250	Resistor—Wire wound, 3.9 ohms, 1 watt (R34)
	Resistor—Fixed, composition, 68 ohms ± 10%, ½ watt (R7)
	Resistor—Fixed, composition, 100 ohms ± 10%, ½ watt (R17, R27)
	Resistor—Fixed, composition, 120 ohms ± 10%, ½ watt (R12)
	Resistor—Fixed, composition, 470 ohms ± 10%, 2 watt (R21)
	Resistor—Fixed, composition, 680 ohms ± 20%, ½ watt (R9, R11)
	Resistor—Fixed, composition, 1200 ohms ± 5%, ½ watt (R23)
73637	Resistor—Wire wound, 2200 ohms, 5 watts (R22)
	Resistor—Fixed, composition, 3300 ohms ± 5%, ½ watt (R24)
	Resistor—Fixed, composition, 8200 ohms ± 10%, ½ watt (R43)
	Resistor—Fixed, composition, 10,000 ohms ± 10%, ½ watt (R32)
	Resistor—Fixed, composition, 15,000 ohms ± 10%, ½ watt (R13, R18, R30)
	Resistor—Fixed, composition, 18,000 ohms ±10%, ½ watt (R4)
	Resistor—Fixed, composition, 27,000 ohms ± 10%, ½ watt (R8, R40)
	Resistor—Fixed, composition, 27,000 ohms ± 10%, 1 watt (R5)
	Resistor—Fixed, composition, 33,000 ohms ± 10%, ½ watt (R6)
	Resistor—Fixed, composition, 39,000 ohms ± 10%, ½ watt (R25)
	Resistor—Fixed, composition, 56,000 ohms ± 10%, ½ watt (R10)
	Resistor—Fixed, composition, 82,000 ohms ± 10%, ½ watt (R42)
	Resistor—Fixed, composition, 100,000 ohms ± 10%, ½ watt (R33, R45)
	Resistor—Fixed, composition, 270,000 ohms ± 10%, ½ watt (R19, R29)
	Resistor—Fixed, composition, 330,000 ohms ± 10%, ½ watt (R28)
	Resistor—Fixed, composition, 470,000 ohms ± 10%, ½ watt (R20, R26, R44)
	Resistor—Fixed, composition, 2.2 megohm ± 20%, ½ watt (R3)
	Resistor—Fixed, composition, 3.9 megohm ± 10%, ½ watt (R2)
	Resistor—Fixed, composition, 10 megohms ± 20%, ½ watt (R15, R41)
	Resistor—Fixed, composition, 22 megohms ± 20%, ½ watt (R16)
73605	Shaft—Tuning knob shaft
31364	Socket—Lamp socket
35787	Socket—Phono input socket
72516	Socket—Tube socket, miniature, for tubes V4, V5 and V7
73606	Socket—Tube socket, miniature, for tubes V1, V2 and V3
31251	Socket—Tube socket, octal, for tubes V6, V8 and V9
74305	Spring—Drive cord spring
73603	Support—Dial plate mounting support complete with pulley—R.H.
73604	Support—Dial plate mounting support complete with pulley—L.H.
*73609	Switch—Range switch (S1, S2)
73602	Switch—Tone control switch (S4)
73601	Transformer—Power transformer, 115 volts 60 cycle (T1)
73745	Transformer—First I-F transformer—dual (T2)
74019	Transformer—Second I-F transformer—dual (T3)
73743	Transformer—Ratio detector transformer (T4)
33726	Washer—"C" washer for tuning knob shaft
	SPEAKER ASSEMBLIES 92569-5W RL 103B5
13867	Cap—Dust cap
*73934	Cone—Cone complete with voice coil
5039	Plug—4 prong male plug for speaker
*73635	Speaker—12" P.M. speaker complete with cone and voice coil—less output transformer and plug
71145	Suspension—Metal cone suspension
*73636	Transformer—Output transformer (T5)
	SPEAKER ASSEMBLIES 92569-1KX
70574	Cone—Cone and voice coil assembly
5039	Plug—4 prong male plug for speaker
37899	Transformer—Output transformer
	NOTE: When replacing complete speaker, order RCA 73635 (92569-5W)
	MISCELLANEOUS
71864	Antenna—F.M. antenna
*73622	Back—Back cover for blonde instruments
*73621	Back—Back cover for mahogany or walnut instruments
71599	Bracket—Pilot lamp bracket
73626	Bumper—Rubber bumper for actuating link
72437	Cable—Shielded pickup cable complete with pin plug
13103	Cap—Pilot lamp jewel
73613	Carriage—Record changer mounting carriage complete with runners
71892	Catch—Bullet catch and strike for radio or phono compartment doors
71820	Check—Radio compartment door check
X1815	Cloth—Grille cloth for blonde instruments
X1814	Cloth—Grille cloth for mahogany instruments
X1816	Cloth—Grille cloth for walnut instruments
*73755	Decal—Control panel decal for mahogany or walnut instruments
*73756	Decal—Control panel decal for blonde instruments
71966	Decal—Trade mark decal (Victrola)
71910	Decal—Trade mark decal (RCA Victor)
73628	Dial—Glass dial scale
73627	Escutcheon—Dial escutcheon less dial
*73757	Grille—Metal grille
11889	Grommet—Rubber grommet for front apron of chassis
73614	Grommet—Rubber grommet to mount record changer (3 required)
16058	Grommet—Rubber grommet to mount speaker (3 required)
73751	Hinge—Radio or phono compartment door hinge (2 required for each door)
71945	Hinge—Record storage compartment door hinge (2 required for each door)
71822	Knob—Tone control or range switch knob—maroon—for mahogany or walnut instruments
72824	Knob—Tone control or range switch knob—brown—for blonde instruments
71821	Knob—Tuning or volume control knob—maroon—for mahogany or walnut instruments
72800	Knob—Tuning or volume control knob—brown—for blonde instruments
11765	Lamp—Dial lamp—Mazda 51
73616	Link—Actuating link assembly for record changer carriage—R.H.
73617	Link—Actuating link assembly for record changer carriage—L.H.
73611	Loop—Antenna loop complete
73109	Nut—Tee nut to mount record changer (3 required)
71819	Plate—Radio compartment door check mounting plate
31048	Plug—Pin plug for shielded pickup cable
30868	Plug—2 contact female plug for power cable
*73752	Pull—Door pull (2 required) for walnut instruments
*73753	Pull—Door pull (2 required) for mahogany or blonde instruments
73615	Screw—¼-20 x 1½" fillister head machine screw to mount record changer (3 required)
73618	Spring—Connecting spring between link and record changer carriage
71818	Spring—Radio compartment door check spring
30900	Spring—Retaining spring for knobs
73185	Stop—Carriage mechanism stop (2 required)
73612	Track — Carriage mechanism track complete with mounting plate (2 required)
71814	Washer—Rubber washer for radio compartment door check

*This is the first time that this Stock No. has appeared in Service Data.
†Stock No. 72953 is a reel containing 250 feet of cord.

MODELS 8X681, 8X682, RADIO CORP. OF AMERICA
CHASSIS RC-1061



8X681—(Maroon Plastic) *8X682—(Ivory Plastic)*

Specifications

Tuning Ranges

Standard Broadcast ("A" Band) .... 540-1600 kc
Short Wave ("C" Band) .... 9.4-12 mc

Intermediate Frequency .... 455 kc

Tube Complement

(1) RCA 12BA6 .... R. F. Amplifier
(2) RCA 12BE6 .... Converter
(3) RCA 12BA6 .... I. F. Amplifier
(4) RCA 12AT6 .... Det. - A.F. - A.V.C.
(5) RCA 35C5 .... Output
(6) RCA 35W4 .... Rectifier

Dial Lamp .... Type 47, 6.3 volts, 0.15 amp.

Power Supply Rating

115 volts, D.C. or 50 to 60 cycles, A.C. .... 30 watts

Loudspeaker

Type 92572-5 .... 5 in. P.M.
V. C. Impedance .... 3.2 ohms at 400 cycles

Power Output

Undistorted .... 0.7 watts
Maximum .... 1.1 watts

Cabinet Dimensions

Height.... 8 in. Width.....12¾ in. Depth.....7¼ in.

Tuning Drive Ratio .... 7½:1 (3¾ turns of knob)

NOTE: If reception is not obtained on DC, reverse plug in outlet receptacle. This may also reduce hum on AC operation.

To Remove Chassis from Cabinet

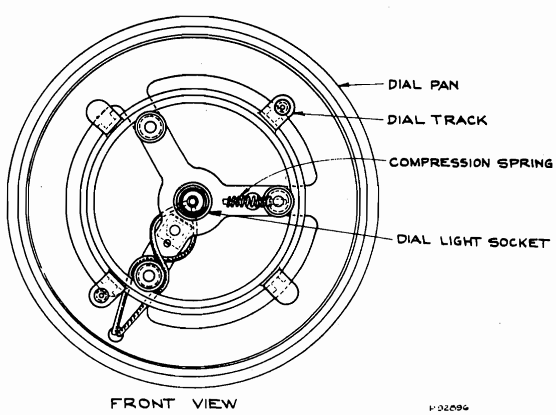
Remove the four screws at the corners of the bottom cover (accessible through holes in the cabinet base). Do not remove the hex head screws which hold the base to the bottom cover. The cabinet may now be lifted off the cabinet base.

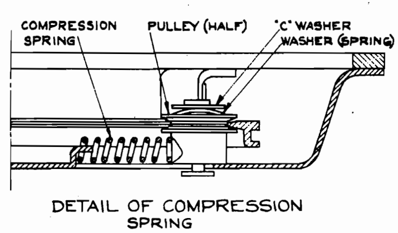
Dial Positioning

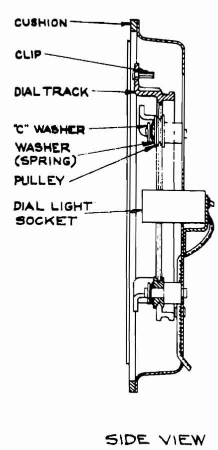
If the speaker should be replaced, it will be necessary to readjust the speaker mounting bracket position so that the dial pan will fit against the cabinet when the chassis is re-installed in the cabinet.

Insulating Washers

The cabinet base is insulated from the chassis bottom cover. When servicing make certain that the insulating washers are in place and properly positioned.







NOTE: See page 4 regarding changes in late production pan and track assembly.

Dial Pan and Track Assembly

RADIO CORP. OF AMERICA

MODELS 8X681, 8X682, CHASSIS RC-1061

Alignment Procedure

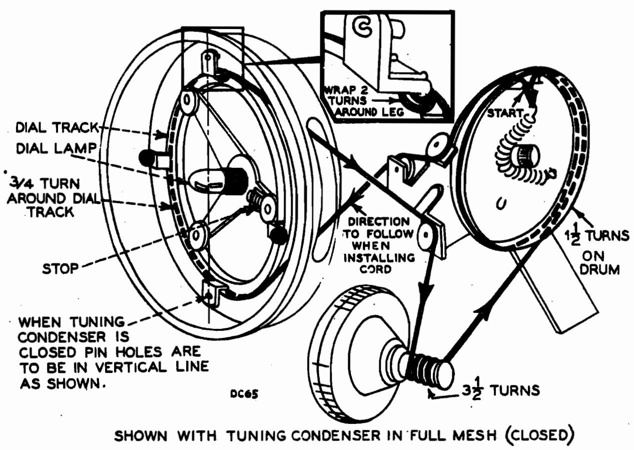
Test Oscillator.—Connect high side of test oscillator as shown in chart. Connect low side to chassis. Keep the output low to avoid A.V.C. action.

Note.—If the test oscillator is AC operated it may be necessary to use an isolation transformer (115v./115 v.) for the receiver during alignment, and the low side of the test oscillator connected to common wiring at pin No. 2 of 12AT6 socket—reverse line plug if hum is excessive.

Output Meter.—Connect meter across speaker voice coil. Turn volume control to maximum.

Dial Pointer Adjustment.—Rotate tuning condenser to maximum capacity position (plates fully meshed). Adjust dial to position indicated in drawing.

With the dial adjusted as described above mark the dial pan assembly with a pencil to provide a tuning indicator during alignment.



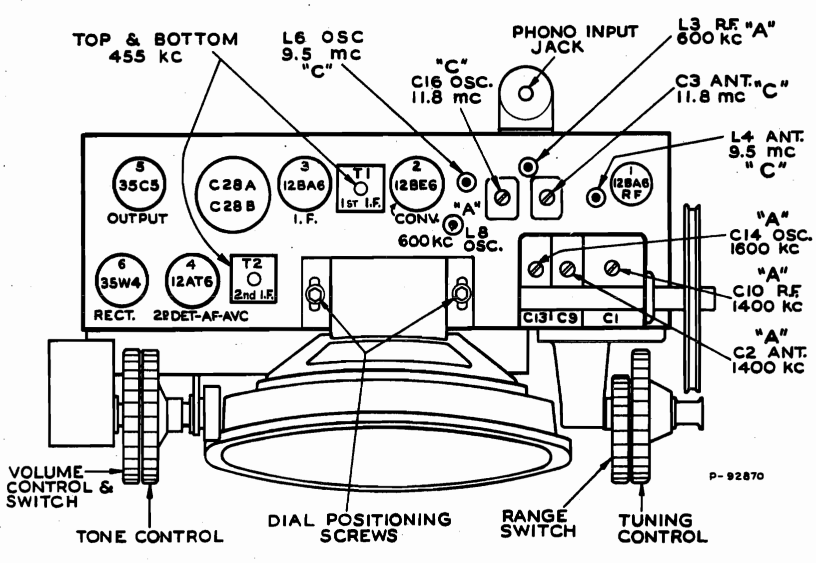
Dial-Indicator and Drive Mechanism

Steps	Connect the high side of the test-osc. to—	Tune test-osc. to—	Range switch	Turn radio dial to—	Adjust for max. output
1	Pin No. 1 of 12BA6 I.F. amp. tube in series with 0.1 mfd.	455 kc	"A"	Quiet point 1600 kc end of dial	Top and bottom T2 2nd I. F. trans.
2	Pin No. 7 of 12BE6 converter tube in series with 0.1 mfd.				Top and bottom T1* 1st I. F. trans.
3	Antenna lead in series with 100 mmfd.	1600 kc	"A"	1600 kc	C14 "A" osc.
4		1400 kc		1400 kc	C2 "A" ant. C10 "A" R. F.
5		600 kc		600 kc	†L8 "A" osc. †L3 "A" R. F.
6	Repeat Steps 3, 4 and 5.				
7	Pin No. 7 of 12BE6 converter in series with 0.1 mfd. capacitor	11.8 mc	"C"	11.8 mc	**C16 "C" osc.
8		9.5 mc		9.5 mc	†L6 "C" osc.
9	Repeat Steps 7 and 8.				
10	Antenna lead in series with 50 mmfd.	11.8 mc	"C"	11.8 mc	**C3 "C" ant.
11		9.5 mc		9.5 mc	†L4 "C" ant.
12	Repeat Steps 10 and 11.				

*Do not readjust T2.
†Rock gang.
**If two peaks are found use minimum capacity peak on C16 (osc.) and maximum capacity peak on C3 (ant.).

Lead Dress

1. Dress all heater leads down to chassis and as far as possible from all audio grid and plate wiring.
2. Dress power cord to side apron away from coupling capacitors.
3. Dress pilot lamp leads toward chassis bottom and away from audio coupling capacitor.
4. Dress all leads and components away from all coils.
5. Dress lead from range switch to phono socket against switch shield and chassis apron.
6. The antenna lead should be taped up when not in use.

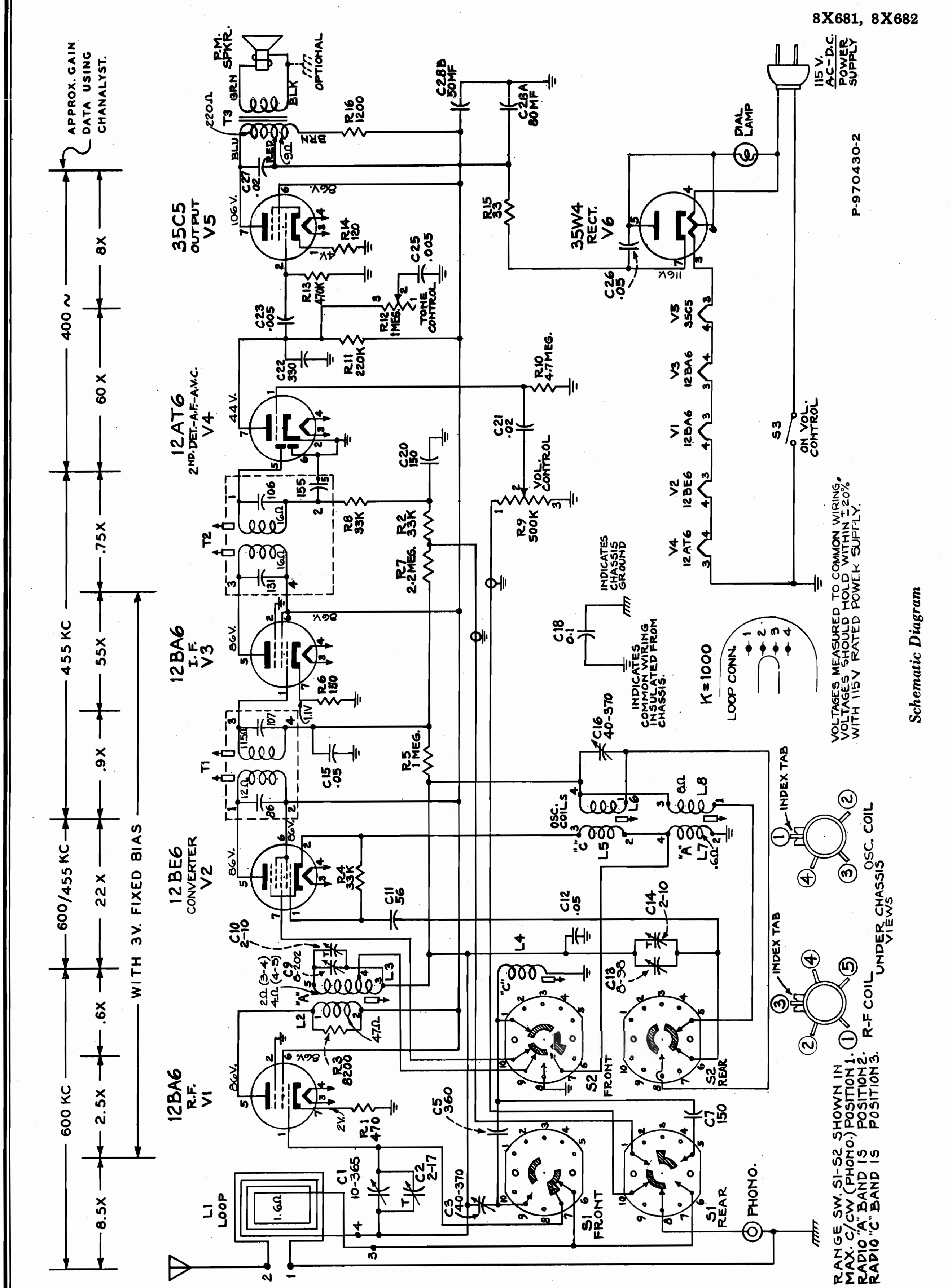


Tube and Trimmer Locations

Cathode Currents

		"A" Band	"C" Band
(1)	12BA6	4.1 ma	6.9 ma
(2)	12BE6	7.3 ma	7.2 ma
(3)	12BA6	6.7 ma	7.4 ma
(4)	12AT6	0.2 ma	0.2 ma
(5)	35C5	34.7 ma	33.5 ma
(6)	35W4	52 ma	53 ma

MODELS 8X681, 8X682, RADIO CORP. OF AMERICA
CHASSIS RC-1061



Schematic Diagram

RADIO CORP. OF AMERICA

MODELS 8X681, 8X682,
CHASSIS RC-1061

Replacement Parts

Stock No.	DESCRIPTION
	CHASSIS ASSEMBLIES RC-1061
*73536	Arm—Range switch actuating arm and hub
71924	Capacitor—Ceramic, 56 mmf. (C11)
39632	Capacitor—Mica, 150 mmf. (C7, C20)
72571	Capacitor—Mica, 330 mmf. (C22)
64641	Capacitor—Mica, 360 mmf. (C5)
73075	Capacitor—Adjustable, 40-370 mmf. (C3, C16)
72791	Capacitor—Tubular, .005 mfd., 400 volts (C23, C25)
71928	Capacitor—Tubular, .02 mfd., 200 volts (C21)
70611	Capacitor—Tubular, .02 mfd., 400 volts (C27)
72596	Capacitor—Tubular, .05 mfd., 200 volts (C12, C15)
70615	Capacitor—Tubular, .05 mfd., 400 volts (C26)
70617	Capacitor—Tubular, 0.1 mfd., 400 volts (C18)
*73520	Capacitor—Electrolytic, comprising 1 section of 80 mfd., 150 volts and 1 section of 50 mfd., 150 volts (C28A, C28B)
*73526	Clip—Tubular clip for fastening dial—located on dial mounting track (2 required)
*73518	Coil—R-F coil—"A" band—complete with adjustable core and stud (L2, L3)
*73519	Coil—Antenna coil—"C" band—complete with adjustable core and stud (L4)
*73517	Coil—Oscillator coil—"C" band—complete with adjustable core and stud (L5, L6)
*73516	Coil—Oscillator coil—"A" band—complete with adjustable core and stud (L7, L8)
*73513	Condenser—Variable tuning condenser (C1, C2, C9, C10, C13, C14)
*73544	Control—Tone control (R12)
*73543	Control—Volume control and power switch (R9, S3)
†72913	Cord—Drive cord (approx. 48" overall length required)
28451	Cover—Insulating cover for electrolytic capacitor
*73522	Dial—Dial and screen assembly
72283	Grommet—Rubber grommet for mounting tuning condenser (3 required) or for mounting capacitor (C3, C16) and bracket (1 required)
33139	Grommet—Rubber grommet for range switch connecting rod (2 required)
*73538	Knob—Range switch knob (thumb wheel type)
*73541	Knob—Tone control knob (thumb wheel type)
*73537	Knob—Tuning knob (thumb wheel type)
*73542	Knob—Volume control and power switch knob (thumb wheel type)
*73512	Loop—Antenna loop complete (L1)
*73484	Pan—Dial pan and cushion—less track, pulleys and lamp socket
*73530	Pulley—Dial track drive pulley (2 required)
*73531	Pulley—Dial track idler pulley (2 half pulleys)
73237	Resistor—Wire wound, 33 ohms, 150 MA (R15)
	Resistor—Fixed, composition, 120 ohms ± 10%, ½ watt (R14)
	Resistor—Fixed, composition, 150 ohms ± 10%, ½ watt (R6)
	Resistor—Fixed, composition, 470 ohms ± 10%, ½ watt (R1)
	Resistor—Fixed, composition, 1200 ohms ± 10%, 1 watt (R16)
	Resistor—Fixed, composition, 8200 ohms ± 10%, ½ watt (R3)
	Resistor—Fixed, composition, 33,000 ohms ± 10%, ½ watt (R2, R4, R8)
	Resistor—Fixed, composition, 220,000 ohms ± 20%, ½ watt (R11)
	Resistor—Fixed, composition, 470,000 ohms ± 20%, ½ watt (R13)
	Resistor—Fixed, composition, 1 megohm ± 20%, ½ watt (R5)
	Resistor—Fixed, composition, 2.2 megohm ± 20%, ½ watt (R7)
	Resistor—Fixed, composition, 4.7 megohm ± 20%, ½ watt (R10)
*73539	Rod—Connecting rod between range switch knob and actuating arm
*73545	Screen—Dial screen only
*73534	Shaft—Range switch and tuning knobs mounting shaft
*73521	Shield—Tube shield
*73529	Socket—Dial lamp socket
73374	Socket—Phono input socket
36069	Socket—Tube socket—for tubes V1, V2, V3, V4
9914	Socket—Tube socket—for tubes V5, V6
*74038	Spring—Drive cord spring
*73527	Spring—Pressure spring for dial track idler pulley
*73528	Stud—Dial track idler pulley mounting stud
*73514	Support—Drive cord pulley support complete with three (3) pulleys
*73535	Switch—Selector switch (S1, S2)
*73525	Track—Die cast pulley track and dial mounting ring less fastener clip
73036	Transformer—First I-F transformer (T1)
73037	Transformer—Second I-F transformer (T2)
72296	Transformer—Output transformer (T3)
33726	Washer—"C" washer to hold pulleys
2917	Washer—"C" washer to hold range switch and tuning knobs shaft
*73524	Washer—Insulating washer for mounting chassis bottom cover to cabinet base (4 required)
*73533	Washer—Spring washer to prevent pulleys from rattling or to prevent rattle in range switch and tuning knobs shaft
*73540	Washer—Spring washer between tuning knob and mounting bracket
	SPEAKER ASSEMBLY 92572-5W
*74103	Speaker—5" P.M. speaker complete with cone and voice coil
	MISCELLANEOUS
*73515	Base—Metal base for cabinet—less chassis bottom cover or rubber feet
*73547	Button—Dial crystal button to diffuse dial lamp light
*Y2002	Cabinet—Maroon plastic cabinet only for Model 8X681—less emblem, bezel ring or metal base
*Y2003	Cabinet—Ivory plastic cabinet only for Model 8X682—less emblem, bezel ring or metal base
*73546	Crystal—Dial crystal
*73549	Emblem—"RCA-Victor" emblem
*73523	Foot—Rubber foot (4 required)
31480	Lamp—Dial lamp—Mazda 47
*73548	Ring—Bezel ring for dial crystal
*73971	Screen—Ventilating screen—black—for back of cabinet for Model 8X681
*73972	Screen—Ventilating screen—ivory—for back of cabinet for Model 8X682

†Stock No. 72953 is a spool containing 250 ft. of cord.

*This is the first time this Stock No. has appeared in service data.

APPLY TO YOUR RCA DISTRIBUTOR FOR PRICES OF REPLACEMENT PARTS

DIAL PAN AND TRACK ASSEMBLY
(Late Production)

In late production the dial pan and track assembly is changed as follows:

(1) The studs (fixed and idler) are shorter — 19/32" vs. 5/8" overall length.

(2) The two half pulleys are replaced by 1 full pulley (Stock No. 73530).

(3) Spring washers are not used.

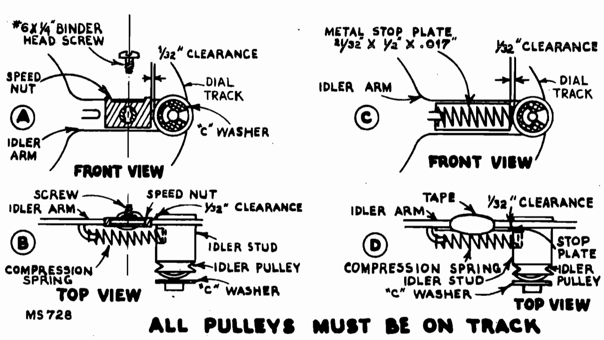
The parts are interchangeable as follows:

(1) Original stud or original pan using 5/8" studs — USE SPRING WASHER — original idler stud (Stock No. 73528) is carried in stock.

(2) Short stud or new pan using 19/32" studs — OMIT SPRING WASHER—new pan (Stock No. 73484) is carried in stock.

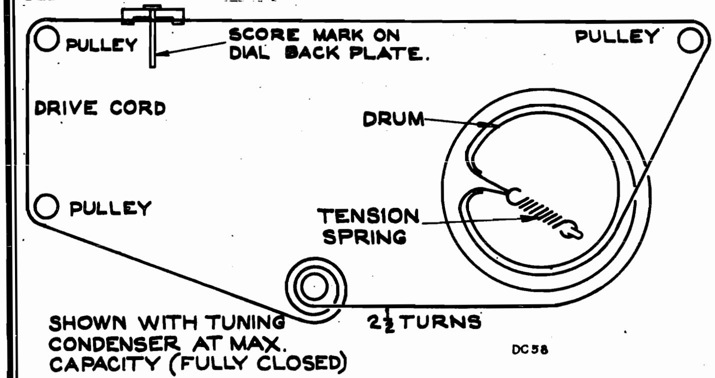
(3) The two half pulleys may be replaced by one full pulley—both are carried in stock.

A stop is used to limit the movement of the idler stud, thus preventing the pulleys from jumping off the dial track due to rough handling during shipment. This stop may be either a speed nut and screw (A & B) or a plate taped to the idler arm (C & D).

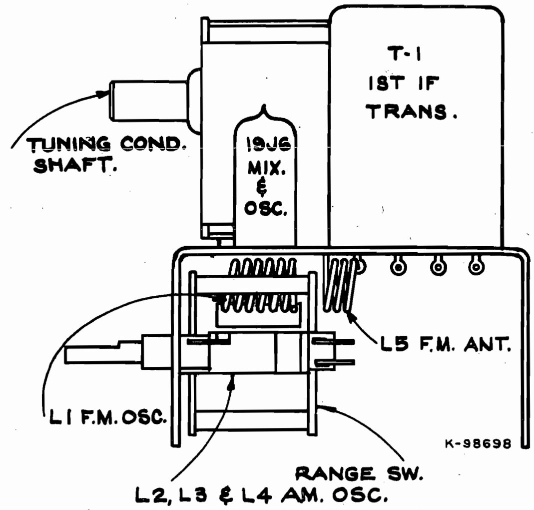


MODELS 8X71, 8X72,
CHASSIS RC-1070

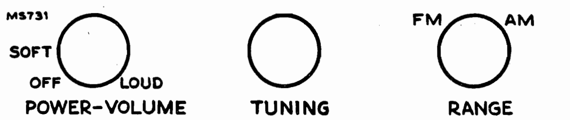
RADIO CORP. OF AMERICA



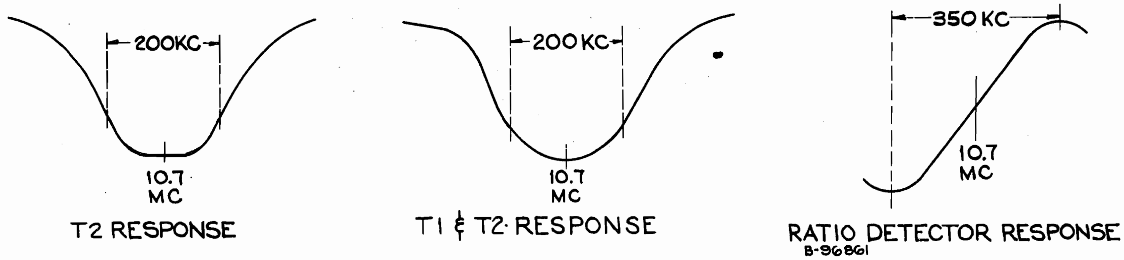
Dial Indicator and Drive Mechanism



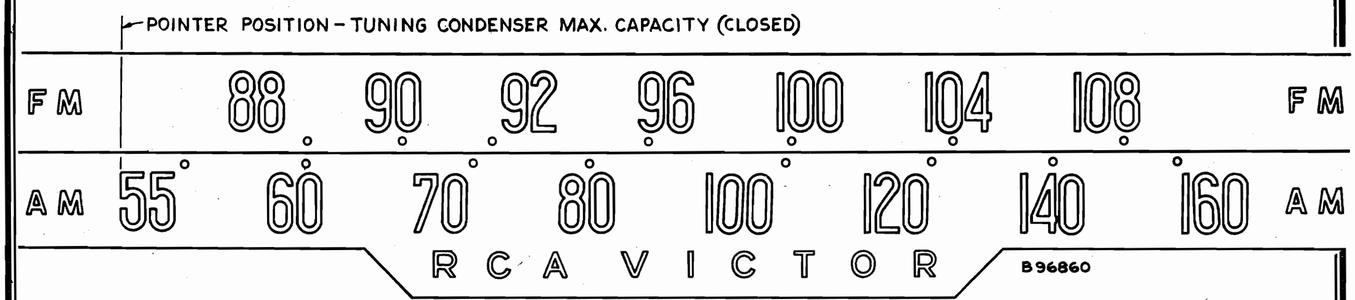
Ant. and Osc. Coil Locations (Side View)



Controls

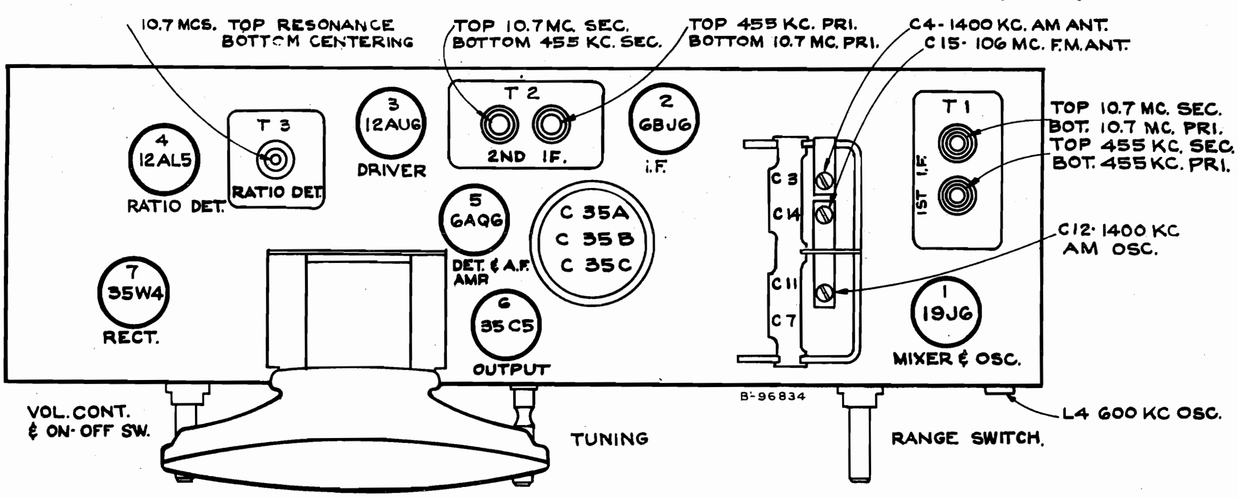


FM Response Curves



Dial Scale

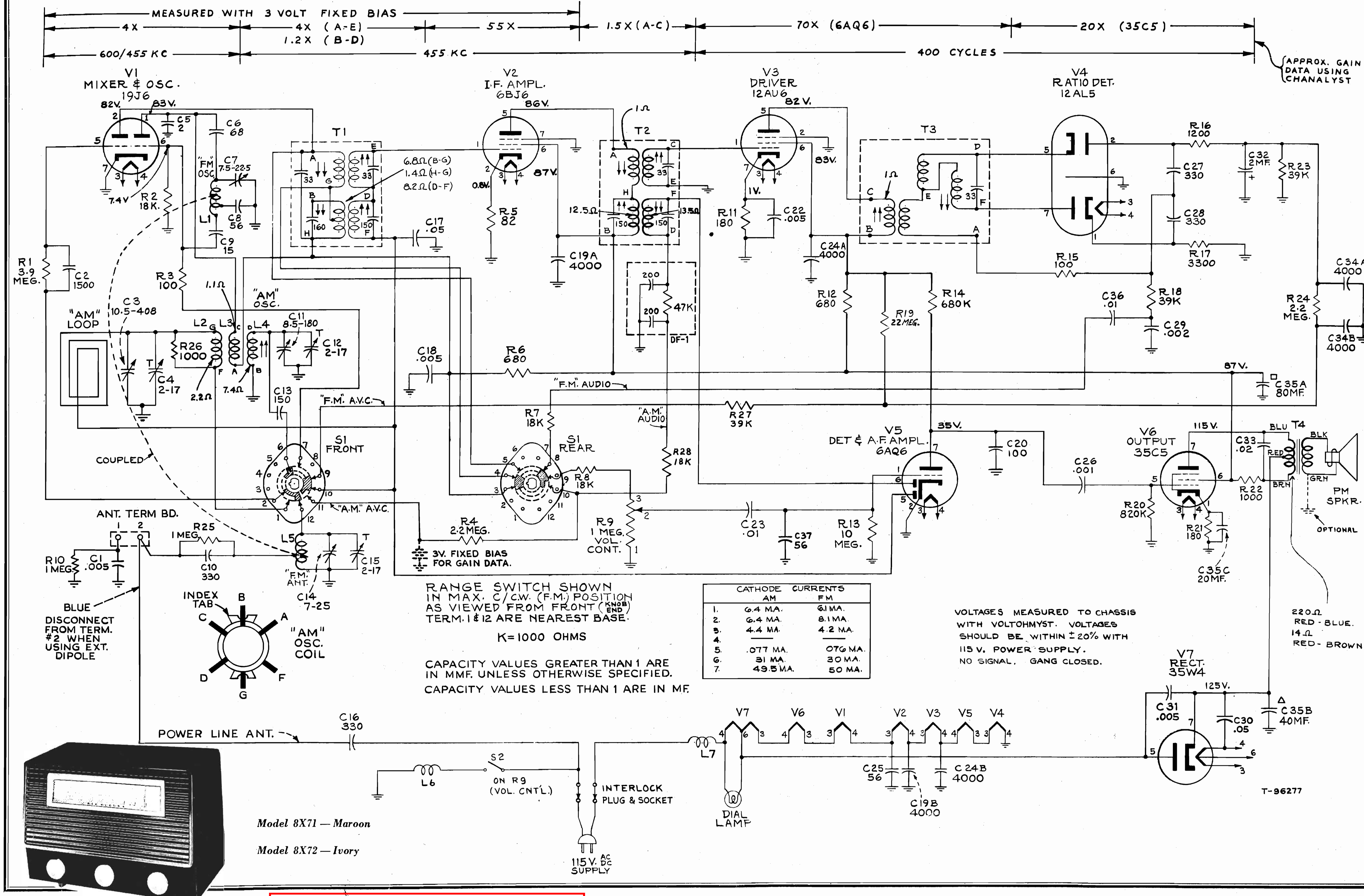
The dial scale drawing shown is a full size reproduction. It can be used as a reference in alignment procedure.



Tube and Trimmer Locations (Top View)

RADIO CORP. OF AMERICA

MODELS 8X71, 8X72,
CHASSIS RC-1070



RANGE SWITCH SHOWN IN MAX. C/CW. (F.M.) POSITION AS VIEWED FROM FRONT (KNOB END) TERM. 1 & 12 ARE NEAREST BASE.

K=1000 OHMS

CAPACITY VALUES GREATER THAN 1 ARE IN MMF. UNLESS OTHERWISE SPECIFIED.
CAPACITY VALUES LESS THAN 1 ARE IN MF.

CATHODE CURRENTS	AM	FM
1.	6.4 MA.	6.1 MA.
2.	6.4 MA.	8.1 MA.
3.	4.4 MA.	4.2 MA.
4.	—	—
5.	.077 MA.	076 MA.
6.	31 MA.	30 MA.
7.	49.5 MA.	50 MA.

VOLTAGES MEASURED TO CHASSIS WITH VOLTOHMYST. VOLTAGES SHOULD BE WITHIN ±20% WITH 115 V. POWER SUPPLY. NO SIGNAL. GANG CLOSED.

Model 8X71 — Maroon

Model 8X72 — Ivory

RADIO CORP. OF AMERICA

MODELS 8X71, 8X72, CHASSIS RC-1070

Alignment Procedure

CORRECT ALIGNMENT OF THE FM BAND REQUIRES THAT THE AM BAND BE ALIGNED FIRST

Output Indicators:

An RCA VoltOhmyst or equivalent meter is necessary for measuring developed d-c voltage during FM alignment. Connections are specified in the alignment tabulation. An output meter is also necessary to indicate minimum audio output during FM Ratio Detector alignment. Connect the output meter across the speaker voice coil.

The RCA VoltOhmyst can also be used as an AM alignment indicator, either to measure audio output or to measure a-v-c voltage.

When audio output is being measured the volume control should be turned to maximum.

Signal Generator:

For all alignment operations except as stated in the tabulation connect the low side of the signal generator to the receiver chassis. The output should be adjusted to provide accurate resonance indication at all times. If output measurement is used for AM alignment the output of the signal generator should be kept as low as possible to avoid a-v-c action.

CAUTION:

The chassis is connected to one side of the power supply. On a.c. operation it is recommended that an isolation transformer (115 v./115 v.) be used for the receiver when servicing.

Oscilloscope Alignment:

The FM I. F. alignment may be checked using a sweep generator and an oscilloscope. Shunt terminals B and C of T3 with a 1,200 ohm resistor. Connect the high side of the oscilloscope to terminal C of T3 in series with a diode probe. Apply the output of the sweep generator (10.7 mc with ±250 kc. sweep) to pin No. 1 of V2 (6BJ6) in series with .01 mf. Low side of the oscilloscope and sweep generator to chassis. This will show the response of T2.

To check the combined response of T1 and T2; connect the sweep generator to the antenna terminal board—high side to No. 2 terminal in series with 300 ohms and low side to No. 1 terminal. Oscilloscope connections as previously connected.

To check the ratio detector response; connect the high side of the oscilloscope direct to terminal No. 8 of S1 rear, low side to chassis, apply the output of the sweep generator to pin No. 1 of V3 (12AU6) in series with .01 mf. Driver plate circuit connected for normal operation (1200 ohm resistor removed). **Note:** It is difficult to observe marker signals in this step—center frequency and sweep width should be previously observed.

Alignment Indicator:

The dial and dial back plate are not attached to the chassis. During alignment a substitute frequency indication must be used. We suggest attaching a paper clip to the dial drive cord so that its movement may be measured—refer to the "Dial Scale" illustration on page 5.

CRITICAL LEAD DRESS

1. All connections in the mixer-oscillator circuit are extremely critical both in regard to lead length and lead dress. Do not disturb unless necessary—make careful notation before servicing if it becomes necessary to disturb this wiring.
2. The ground lead from pin No. 2 of V3 (12AU6 Driver) is critical in length and must be dressed down against chassis.
3. Dress audio coupling capacitor C23 away from output transformer.
4. Dress diode filter unit away from alignment hole in T-2.
5. Dress grid lead of V3 (pin No. 1 of 12AU6) against chassis apron.
6. Dress plate lead of V1 (pin No. 2 of 19J6) against chassis.
7. Dress loop antenna leads so as to prevent contact with external antenna terminal board.
8. All ground connections to chassis should be restored to the original places of connection if disturbed.
9. Dress capacitor C13 down close to range switch so as to clear the projection on the bottom of the cabinet.
10. The FM ant. and osc. coils must be cemented to the coil support to prevent microphonic howl on FM. Amphenol No. 912 cement is recommended for this purpose. Amphenol No. 916 solvent is recommended as solvent if it becomes necessary to loosen the windings.

AM Alignment

RANGE SWITCH IN AM POSITION

Steps	Connect high side of sig. gen. to—	Sig. gen. output	Turn radio dial to—	Adjust for peak output
1	AM ant. section (C3) of tuning cond. in series with .01 mfd.	455 kc.	Quiet point at low freq. end.	AM windings.† T2 bottom core (sec.). T2 top core (pri.).
2				AM windings.† T1 top core (sec.). T1 bottom core (pri.).
3	Short wire placed near loop antenna for radiated signal.	1620 kc.	Extreme high frequency end.	C12 osc.
4		1400 kc.	1400 kc.	C4 ant.
5		600 kc.	600 kc.	L4 osc. (Rock gang.)
6	Repeat Steps 3, 4 and 5.			

† Use alternate loading.

Alternate loading involves the use of a 10,000 ohm resistor to load the AM plate winding while the AM grid winding of the SAME TRANSFORMER is being peaked. Then the grid winding is loaded with the resistor while the plate winding is peaked. Only one winding is loaded at any one time. Remove the 10,000 ohm resistor after T2 and T1 have been aligned.

Oscillator frequency is above signal frequency on both AM and FM.

FM Alignment

RANGE SWITCH IN FM POSITION — VOLUME CONTROL MAXIMUM

Steps	Connect high side of sig. gen. to—	Sig. gen. output	Turn radio dial to—	Adjust for peak output
1	Connect the d-c probe of a VoltOhmyst to the negative lead of the 2 mfd. capacitor C32 and the common lead to chassis. Adjust sig. gen. output to provide approx. —3 v. indication during alignment.			
2	Pin 1 of 12AU6 in series with .01 mfd.	10.7 mc. modulated 30% 400 cycles AM.	Max. capacity (fully meshed).	T3 top core for max. d-c voltage across C32. T3 bottom core for min. audio output.*
3	No. 2 ant. term in series with a 300 ohm resistor. Connect low side to No. 1 terminal. (Remove ant. lead from No. 2 term.)			FM windings.†† T2 top core (sec.). T2 bottom core (pri.).
4				FM windings.†† T1 top core (sec.). T1 bottom core (pri.).
5		106 mc.	106 mc.	L1 osc.** C15 ant.
6		90 mc.	90 mc.	L5 ant.** (Rock gang.)
7	Repeat Steps 5 and 6 until further adjustment does not improve calibration.			

* Two or more points may be found which lower the audio output. At the correct point the minimum audio output is approached rapidly and is much lower than at any incorrect point.

†† Align T2 and T1 by means of alternate loading as explained under AM alignment. Use a 680 ohm resistor instead of a 10,000 ohm resistor and load the FM windings.

** L1 and L5 are adjustable by increasing or decreasing the spacing between turns.

RADIO CORP. OF AMERICA

Power Supply:

This instrument will operate on 115 volts d.c. or 50 to 60 cycles a.c.

If the receiver does not operate on d.c., reverse the power cord. On a.c., reversal of the cord may reduce hum or improve FM reception.

Antennas:

These receivers have built-in antennas for standard broadcast (AM) and frequency modulation (FM) reception.

Under average conditions these antennas will provide satisfactory reception · however provision is made for the use of an external antenna for FM reception if desired.

To use external FM antenna:

1. Remove the wire from under the No. 2 terminal screw of the antenna terminal board. The bare end of this wire should be taped to prevent contact with the antenna terminal screws.
2. Connect the transmission line from an external FM dipole antenna to the No. 1 and No. 2 terminals of the antenna terminal board.

To use built-in FM antenna:

1. The wire extending thru the back of the cabinet must be connected to No. 2 terminal of the antenna terminal board.
2. The power cord should be fully extended and must not be coiled or hanked up.
3. Reversal of the line cord plug may improve reception.

DO NOT USE EXTERNAL GROUND.

CAUTION:

THE CHASSIS IS CONNECTED TO ONE SIDE OF THE POWER SUPPLY. Use caution to prevent contact with pipes, radiators, etc. when servicing with chassis removed from cabinet.

Specifications

Tuning Ranges

Standard Broadcast (AM) .... 540-1,600 kc.
Frequency Modulation (FM) .... 88-108 mc.

Intermediate Frequencies .... AM—455 kc., FM—10.7 mc.

Tube Complement

(1) RCA 19J6 .... Mixer and Oscillator
(2) RCA 6BJ6 .... I. F. Amplifier
(3) RCA 12AU6 .... Driver
(4) RCA 12AL5 .... Ratio Detector
(5) RCA 6AQ6 .... AM Det.—A. F. Amp.
(6) RCA 35C5 .... Output
(7) RCA 35W4 .... Rectifier

Dial Lamp .... Type No. 47, 6-8 volts, 0.15 amp.

Loudspeaker

Type 92572-4W .... 5 inch P.M.
Voice coil impedance .... 3.2 ohms at 400 cycles

Tuning Drive Ratio .... 11½:1 (5¾ turns of knob)

Replacement Parts

Stock No.	DESCRIPTION
	CHASSIS ASSEMBLIES RC 1070
*73973	Capacitor—Variable tuning capacitor (C3, C4, C7, C11, C12, C14, C15)
73866	Capacitor—Ceramic, 2 mmf. (C5)
31353	Capacitor—Ceramic, 15 mmf. (C9)
73867	Capacitor—Ceramic, 56 mmf. (C8)
73499	Capacitor—Ceramic, 56 mmf. (C25, C37)
33103	Capacitor—Ceramic, 68 mmf. (C6)
39628	Capacitor—Mica, 100 mmf. (C20)
48125	Capacitor—Ceramic, 150 mmf. (C13)
39640	Capacitor—Mica, 330 mmf. (C10, C16, C27, C28)
71501	Capacitor—Ceramic, 1,500 mmf. (C2)
*74009	Capacitor—Ceramic, .004 mf., dual (C19A, C19B) (C24A, C24B) (C34A, C34B)
73473	Capacitor—Ceramic, .005 mf. (C1, C18, C31)
73186	Capacitor—Tubular, .001 mf., 400 volts (C26)
73750	Capacitor—Tubular, .002 mf., 200 volts (C29)
71926	Capacitor—Tubular, .005 mf., 200 volts (C22)
71923	Capacitor—Tubular, .01 mf., 200 volts (C23, C36)
*74010	Capacitor—Tubular, .02 mf., 400 volts (C33)
70615	Capacitor—Tubular, .05 mf., 400 volts (C17, C30)
73747	Capacitor—Electrolytic, 2 mf., 50 volts (C32)
*73975	Capacitor—Electrolytic, comprising 1 section of 80 mf., 150 volts, 1 section of 40 mf., 150 volts, and 1 section of 20 mf., 25 volts (C35A, C35B, C35C)
*74012	Coil—Oscillator coil—F.M. (No. 16 tinned buss wire, 9 turns per inch, 4⅞ turns L.H. .469 I.D.) (L1)
73744	Coil—Oscillator coil—A.M. (L2, L3, L4)
*74013	Coil—Antenna coil—F.M. (No. 16 tinned buss wire, 7 turns per inch, 2¾ turns L.H. .375 I.D.) (L5)
	Coil—Line choke coil (No. 18 gauge solid wire, 1/32" plastic insulation, standard hook-up wire, 10 turns, close wind) (L6, L7)
38406	Control—Volume control and power switch (R9, S2)
†72953	Cord—Drive cord (approx. 50" overall length required)
*74011	Filter—Diode filter, consisting of two 200 mmf. capacitors and one 47,000 ohm resistor (DF1)
72283	Grommet—Rubber grommet to mount tuning capacitor (4 required)
*73981	Plug—Power input plug (2 prong male)
	Resistor—Fixed, composition, 82 ohms, ±10%, ½ watt (R5)
	Resistor—Fixed, composition, 100 ohms, ±20%, ½ watt (R3)
	Resistor—Fixed, composition, 100 ohms, ±5%, ½ watt (R15)
	Resistor—Fixed, composition, 180 ohms, ±10%, ½ watt (R11, R21)
	Resistor—Fixed, composition, 680 ohms, ±20%, ½ watt (R6, R12)
	Resistor—Fixed, composition, 680 ohms, ±10%, ½ watt (R14)
	Resistor—Fixed, composition, 820 ohms, ±10%, ½ watt (R20)
	Resistor—Fixed, composition, 1,000 ohms, ±10%, 1 watt (R22)
	Resistor—Fixed, composition, 1,000 ohms, ±20%, ½ watt (R26)
	Resistor—Fixed, composition, 1,200 ohms, ±5%, ½ watt (R16)
	Resistor—Fixed, composition, 3,300 ohms, ±5%, ½ watt (R17)

Stock No.	DESCRIPTION
	Resistor—Fixed, composition, 18,000 ohms, ±10%, ½ watt (R2, R7, R8, R28)
	Resistor—Fixed, composition, 39,000 ohms, ±10%, ½ watt (R18, R27)
	Resistor—Fixed, composition, 39,000 ohms, ±5%, ½ watt (R23)
	Resistor—Fixed, composition, 1 megohm, ±20%, ½ watt (R10, R25)
	Resistor—Fixed, composition, 2.2 megohm, ±20%, ½ watt (R4, R24)
	Resistor—Fixed, composition, 3.9 megohm, ±10%, ½ watt (R1)
	Resistor—Fixed, composition, 10 megohms, ±20%, ½ watt (R13)
	Resistor—Fixed, composition, 22 megohms, ±20%, ½ watt (R19)
*73978	Shaft—Tuning knob shaft
*74014	Socket—Dial lamp socket
73117	Socket—Tube socket for V2, V3, V4, V5, V6, V7
*74179	Socket—Tube socket for V1
74038	Spring—Drive cord spring
*73979	Support—Dial drive cord pulley support complete with two (2) pulleys—L. H.
*73980	Support—Dial drive cord pulley support complete with pulley—R. H.
*73977	Switch—Range switch (S1)
73745	Transformer—First I.F. transformer—dual (T1)
*73974	Transformer—Second I.F. transformer—dual (T2)
73743	Transformer—Ratio detector transformer (T3)
*73976	Transformer—Output transformer (T4)
33726	Washer—"C" washer for tuning knob shaft
	SPEAKER ASSEMBLY 92572-4W
73900	Speaker—5" P.M. speaker complete with cone and voice coil
	MISCELLANEOUS
*73984	Back—Cabinet back—maroon—complete with loop, terminal boards, power socket and power cord for Model 8X71
*73985	Back—Cabinet back—ivory—complete with loop, terminal boards, power socket and power cord for Model 8X72
*73988	Bezel—Dial bezel less dial
*74104	Board—FM antenna terminal board
Y2051	Cabinet—Maroon plastic cabinet for Model 8X71
Y2052	Cabinet—Ivory plastic cabinet for Model 8X72
*73990	Dial—Polystyrene dial scale
*73991	Indicator—Station selector indicator
*73982	Knob—Control knob—brown—for Model 8X71
*73983	Knob—Control knob—ivory—for Model 8X72
31480	Lamp—Dial lamp—Mazda 47
*73986	Loop—Antenna loop (winding only)
72765	Nut—Speed nut for bezel and dial scale
*73989	Plate—Dial back plate
*73992	Retainer—Knob retainer (knob to cabinet)
*73987	Socket—2 contact power input socket (part of back cover and loop assembly)
14270	Spring—Retaining spring for knobs (knob to shaft)

*This is the first time that this Stock No. has appeared in Service Data.

Power Supply Rating

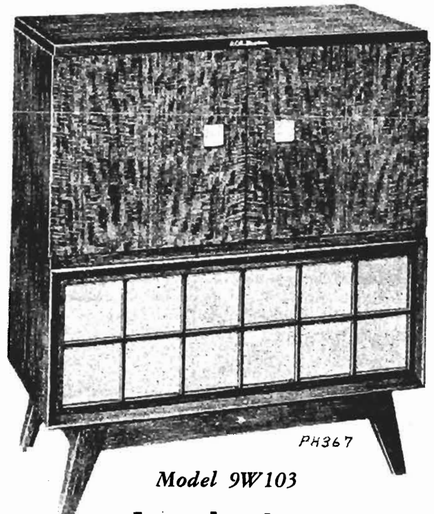
115 volts d.c. or 50 to 60 cycles a.c. .... 30 watts

Power Output

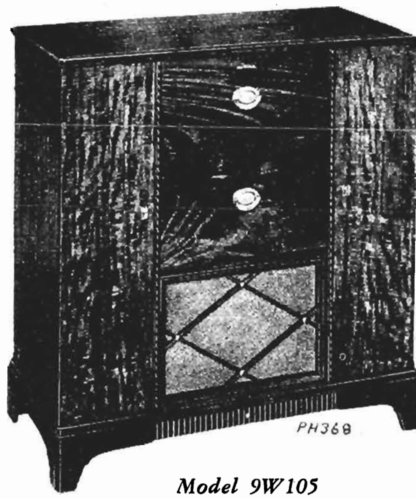
Maximum .... 1.65 watts
Undistorted .... 1.0 watt

RADIO CORP. OF AMERICA MODELS 9W101, 9W103, 9W105, CHASSIS RC-618B, RC-618C

Model 9W101



Model 9W103



Model 9W105

Introduction

All three of these instruments have the new Model RP-168A-1 record changer designed for use with the new Victor seven-inch long playing records. Model 9W105 also has a Model RP-178 record changer for use with the conventional ten- and twelve-inch records.

An auxiliary phono input jack on the back of the chassis of Models 9W101 and 9W103 (input controlled by the selector switch) is provided to permit the use of an auxiliary record player if desired.

Antennas

These receivers have built-in antennas for standard broadcast (AM) and frequency modulation (FM) reception.

Provision is made for the use of an external antenna for FM reception if desired. To use external FM antenna—remove the built-in FM antenna lead from the "FM" terminals of the antenna terminal board Connect the transmission line of an external FM dipole antenna to these two "FM" terminals.

FOR RECORD CHANGER SERVICE INFORMATION REFER TO RP-168 SERIES SERVICE DATA AND RP-178 SERIES SERVICE DATA.

Specifications

Tuning Range

Standard Broadcast (AM) ....540-1600 kc.
Frequency Modulation (FM) ....88-108 mc.
Intermediate Frequencies ....AM—455 kc., FM—10.7 mc.

Tube Complement

(1) RCA 6J6 ....Mixer and Oscillator
(2) RCA 6BA6 ....I-F Amplifier
(3) RCA 6AU6 ....Driver
(4) RCA 6AL5 ....Ratio Detector
(5) RCA 6AV6 ....A-F Amplifier
(6) RCA 6V6GT ....Output
(7) RCA 6AV6 ....AM Det.—AVC—Ph. Inv.
(8) RCA 6V6GT ....Output
(9) RCA 6X5GT ....Rectifier
(10) RCA 6BF6 ....Phono Pre-amplifier

Dial Lamps (2) ....Type No. 51, 6-8 volts, 0.2 amp.
Jewel Lamp ....Type No. 51, 6-8 volts, 0.2 amp.

Tuning Drive Ratio ....18:1 (9 turns of knob)

Power Supply Rating ....115 volts, 60 cycles, 90 watts

Loudspeaker (92569-5W)

Size and type ....12 in. PM
Voice coil impedance ....3.2 ohms at 400 cycles

Power Output

Undistorted 6 watts ....Maximum 7 watts

Record Changer (RP-168A-1)
Used in all three models

Turntable speed ....45 r.p.m.
Record capacity ....Eight 7 in.—long playing
Pickup ....Crystal (medium output)

Record Changer (RP-178)
Used in Model 9W105 only

Turntable speed ....78 r.p.m.
Record capacity ....Twelve 10 in or ten 12 in.
Pickup ....Crystal (standard output)

Cabinet Dimensions	Height	Width	Depth
Model 9W101	34 in.	31⅞ in.	15 15/16 in.
Model 9W103	34 in.	30¼ in.	15¾ in.
Model 9W105	35 in.	34⅝ in.	16⅜ in.

Circuit Description

These instruments have a ten-tube (including rectifier) chassis which is very similar to those used in other RCA Victor radio-phonograph combinations designed for AM-FM reception.

The selector switch has five functions:

(1) Selection of tuning range.
(2) Selection and distribution of a.v.c. voltages.
(3) Application of B+ voltage to tubes V1, V2 and V3.
(4) Selection of audio input applied to the volume control.
(5) Application of a.c. power to the record changer motors.

A one-tube pre-amplifier (6BF6 tube No. V10) is used with the input from the RP-168A-1 record changer.

Alignment Procedure

CORRECT ALIGNMENT OF THE FM BAND REQUIRES THAT THE AM BAND BE ALIGNED FIRST

Alignment Indicators:

An RCA VoltOhmyst or equivalent meter is necessary for measuring developed d-c voltage during FM alignment. Connections are specified in the alignment tabulation. An output meter is also necessary to indicate minimum audio output during FM Ratio Detector alignment. Connect the output meter across the speaker voice coil.

The RCA VoltOhmyst can also be used as an AM alignment indicator, either to measure audio output or to measure a-v-c voltage.

When audio output is being measured the volume control should be turned to maximum.

Signal Generator:

For all alignment operations connect the low side of the signal generator to the receiver chassis. The output should be adjusted to provide accurate resonance indication at all times. If output measurement is used for AM alignment the output of the signal generator should be kept as low as possible to avoid a-v-c action.

Oscilloscope Alignment:

The FM I-F alignment may be checked using a sweep generator and an oscilloscope. Shunt terminals B and C of T3 with a 1200 ohm resistor. Connect the high side of an oscilloscope to terminal C of T3 in series with a diode probe. Apply the output of the sweep generator (10.7 mc. with ±250 kc. sweep) to pin No. 1 of V2 (6BA6) in series with .01 mf. Low side of the oscilloscope and sweep generator to chassis. This will show the response of T2.

To check the combined response of T1 and T2; connect the sweep generator to the FM antenna terminals (remove FM antenna lead) in series with 300 ohms. **Note:** One FM terminal is grounded—it may be necessary to reverse the sweep generator connections. Oscilloscope connections remain as connected.

To check the ratio detector response; connect the high side of the oscilloscope direct to terminal No. 9 of S1, low side to chassis. Apply the output of the sweep generator to pin No. 1 of V3 (6AU6) in series with .01 mf. Driver plate circuit connected for normal operation (1200 ohm resistor removed). **Note:** It is difficult to observe marker signals in this step—center frequency and sweep width should be previously observed.

Response curves illustrated on page 5.

CRITICAL LEAD DRESS

1. Keep leads of C7 short.
2. Dress R27 away from range switch and pin No. 5 of V1.
3. The round lead of pin No. 2 of V2 and V3 should be down against chassis. Its length is critical.
4. The AVC lead from R26 to range switch should be dressed against chassis and away from 6AU6 driver tube socket.
5. C43 should have short leads and the color code of the capacitor should go to the coil L4. The capacitor should be cemented down with polystyrene cement at the same time L2 is cemented.
6. The lead from the high side of the loop should be dressed away from tubes.
7. Lead from pin No. 2 of V1 to terminal "A" of 1st I. F. transformer should be dressed against the chassis.
8. Connect C40 directly between the gang condenser and pin No. 1 of V1.
9. Make all FM leads as short as possible.
10. Dress lead from pin No. 5 of V2 to terminal "A" of 2nd I. F. transformer down against chassis.
11. Dress resistor R15 near chassis base.
12. Dress all A. C. leads away from volume control.
13. The lead from "FM" terminal of antenna terminal board to L1 tap should be dressed away from V2.
14. The taps on L1 and L2 are critical. L1 tap should be ¾ turn from the ground end. L2 tap should be 2½ turns from the gang condenser C8.
15. Dress C25 and C26 against the chassis with the shortest lead length possible.
16. The position of L1 and L2 is critical. L1 should be midway between V1 and the 1st I. F. transformer. The end of L2 should be approximately 3/16" from V1.
17. Capacitor C41 should be secured to the chassis apron with melted wax or cement.
18. FM oscillator coil L2 must be cemented to its support. Amphenol No. 912 cement is recommended for this purpose.

Dial Indicator

With the tuning condenser fully meshed (closed) the indicator should be set to the reference mark on the dial back plate.

Refer to the dial scale reproductions on page 8.

AM Alignment

RANGE SWITCH IN BC POSITION

Steps	Connect high side of sig. gen. to—	Sig. gen. output	Turn radio dial to—	Adjust for peak output
1	C3 in series with .01 mfd.	455 kc.	Quiet point at low freq. end.	AM windings.† T3 bottom core (sec.). T3 top core (pri.).
2				AM windings.† T2 top core (sec.). T2 bottom core (pri.).
3	Short wire placed near loop for radiated signal	1400 kc.	1400 kc.	C13 osc. C4 ant.
4		600 kc.	600 kc.	L4 osc. (Rock gang.)
5		Repeat Steps 3 and 4.		

† Use alternate loading.

Alternate loading involves the use of a 47,000 ohm resistor to load the AM plate winding while the AM grid winding of the SAME TRANSFORMER is being peaked. Then the grid winding is loaded with the resistor while the plate winding is peaked. Only one winding is loaded at any one time. Remove the 47,000 ohm resistor after T3 and T2 have been aligned.

Oscillator frequency is above signal frequency on both AM and FM.

FM Alignment

RANGE SWITCH IN FM POSITION—VOLUME CONTROL MAXIMUM

Steps	Connect high side of sig. gen. to—	Sig. gen. output	Turn radio dial to—	Adjust for peak output
1	Connect the d-c probe of a VoltOhmyst to the negative lead of the 2 mfd. capacitor C33 and the common lead to chassis. Turn gang condenser to max. capacity (fully meshed).			
2	Pin 1 of 6AU6 in series with .01 mfd.	10.7 mc. modulated 30% 400 cycles AM (Approx. .05 volt).	Max. capacity (fully meshed).	T4 top core for max. d-c voltage across C33. T4 bottom core for min. audio output. *
3	FM ant. term. in series with a 300 ohm resistor. (Remove ant. lead from "FM" term.)	10.7 mc. Adjust to provide 2 to 3 volts indication on VoltOhmyst during alignment.		FM windings.†† T3 top core (sec.). T3 bottom core (pri.).
4				FM windings.†† T2 top core (sec.). T2 bottom core (pri.).
5		106 mc.	106 mc.	L2 osc. ** C2 ant. Set C2 at max. capacity while adjusting L2.
6		90 mc.	90 mc.	L1 ant. ** (Rock gang.)
7	Repeat Steps 5 and 6 until further adjustment does not improve calibration.			

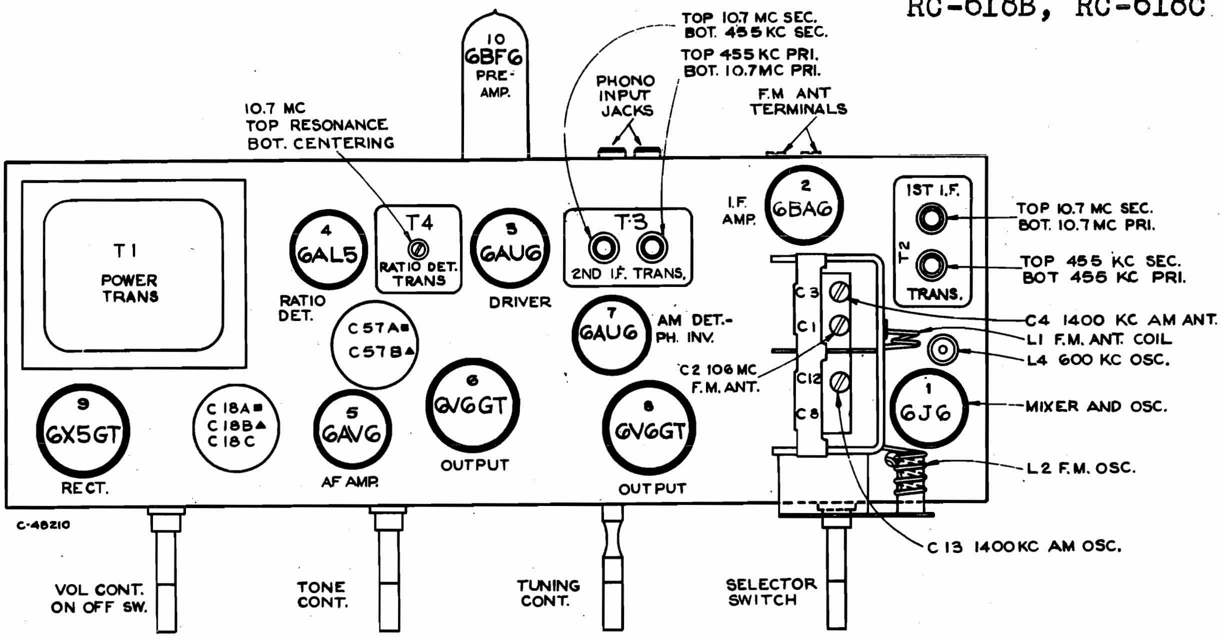
* Two or more points may be found which lower the audio output. At the correct point the minimum audio output is approached rapidly and is much lower than at any incorrect point.

†† Align T3 and T2 by means of alternate loading as explained under AM alignment. Use a 680 ohm resistor instead of a 47,000 ohm resistor and load the FM windings.

** L1 and L2 are adjustable by increasing or decreasing the spacing between turns.

RADIO CORP. OF AMERICA

MODELS 9W101, 9W103, 9W105, CHASSIS RC-618B, RC-618C



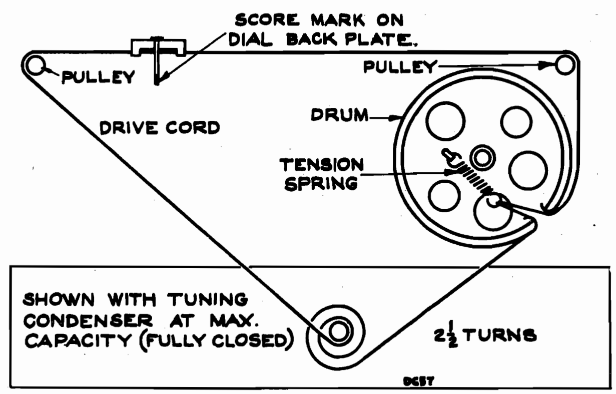
Tube and Trimmer Locations

Note: FM mixer and oscillator coils are adjustable by increasing or decreasing the spacing between turns. The position of the coils and location of the taps are critical (refer to "Critical Lead Dress").

Socket Voltages

Voltages measured with Chanalyst or VoltOhmyst and should hold within ±20% with rated line voltage. Tuning condenser closed—no signal input.

Tube	Terminal		Voltage		
			Phono	A.M.	F.M.
(1) 6J6	Plate	1	—	102	98
	Grid	6	–0.4	–6.8	–6.0
	Plate	2	—	96	110
	Grid	5	–0.8	–2.7	–2.5
(2) 6BA6	Plate	5	—	196	192
	Screen	6	—	100	83
	Cathode	7	—	0.7	0.84
	Grid	1	–0.9	–1.3	–0.2
(3) 6AU6	Plate	5	—	190	185
	Screen	6	—	145	141
	Cathode	7	—	1.25	1.21
(4) 6AL5	—	—	—	—	—
(5) 6AV6	Plate	7	125	85	84
	Grid	1	–0.6	–0.6	–0.6
(6) 6V6GT	Plate	3	299	282	280
	Screen	4	295	220	217
	Cathode	8	21.4	15.5	15.4
(7) 6AV6	Plate	7	168	125	125
	Grid	1	–0.5	–0.5	–0.5
(8) 6V6GT	Plate	3	299	282	280
	Screen	4	286	214	211
	Cathode	8	21.4	15.5	15.4
(9) 6X5GT	Cathode	8	313	300	299
(10) 6BF6	Plate	7	129	89	88
	Cathode	2	7.2	5.4	5.4



Dial Indicator and Drive Mechanism

Cathode Currents (MA)

Tube	Terminal	Phono	A.M.	F.M.
(1) 6J6	7	—	8.2	8.7
(2) 6BA6	7	—	11.6	13.4
(3) 6AU6	7	—	10	9.7
(4) 6AL5	1 & 5	—	—	—
(5) 6AV6	2	0.75	0.5	0.5
(6) 6V6GT	8	25.1	19.1	18.5
(7) 6AV6	2	1.7	1.1	1.1
(8) 6V6GT	8	24.1	18.5	18
(9) 6X5GT	8	54	70.5	71
(10) 6BF6	2	0.77	0.55	0.55

MODELS 9W101, 9W103, 9W105, CHASSIS RC-618B, RC-618C

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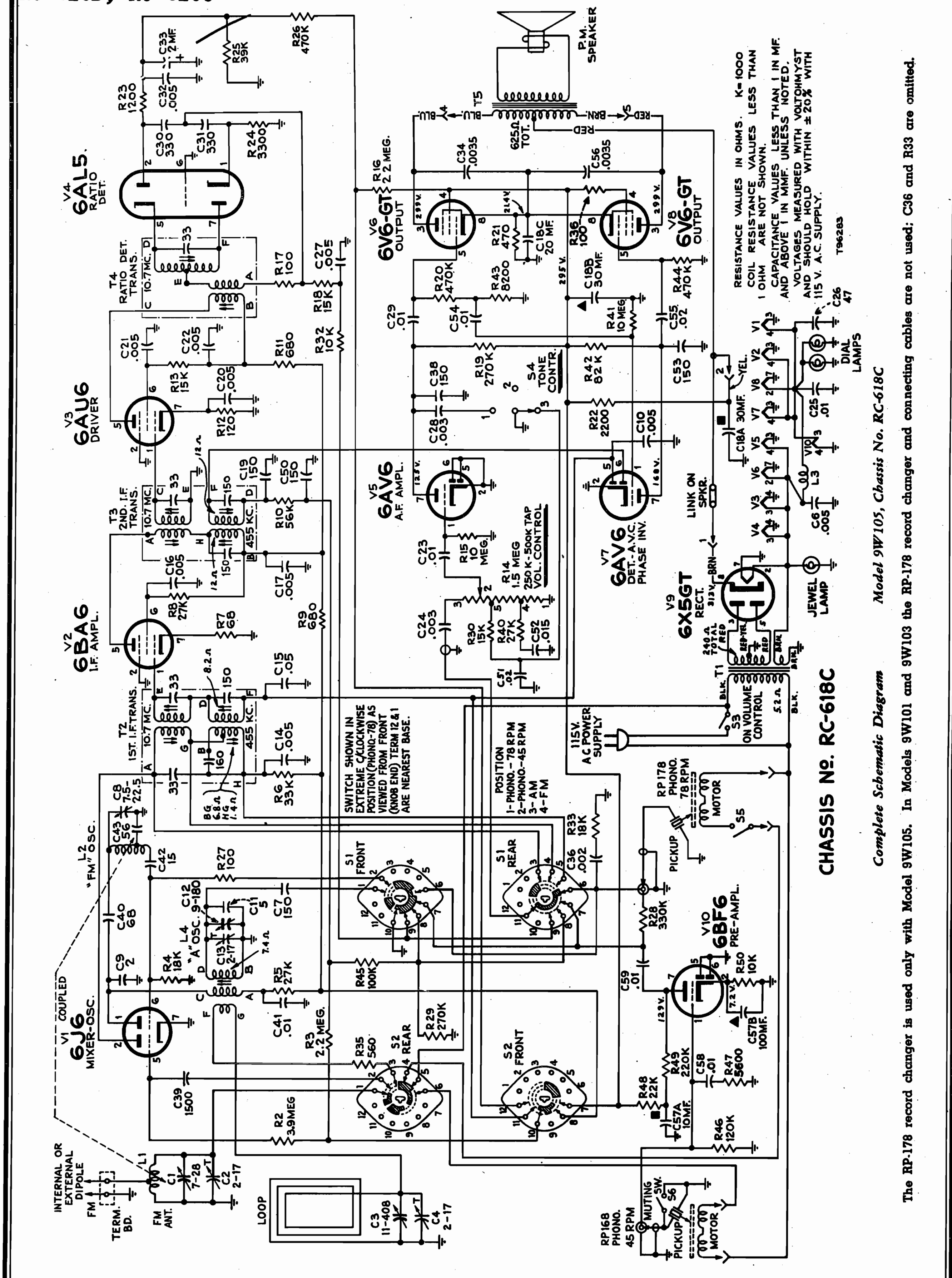
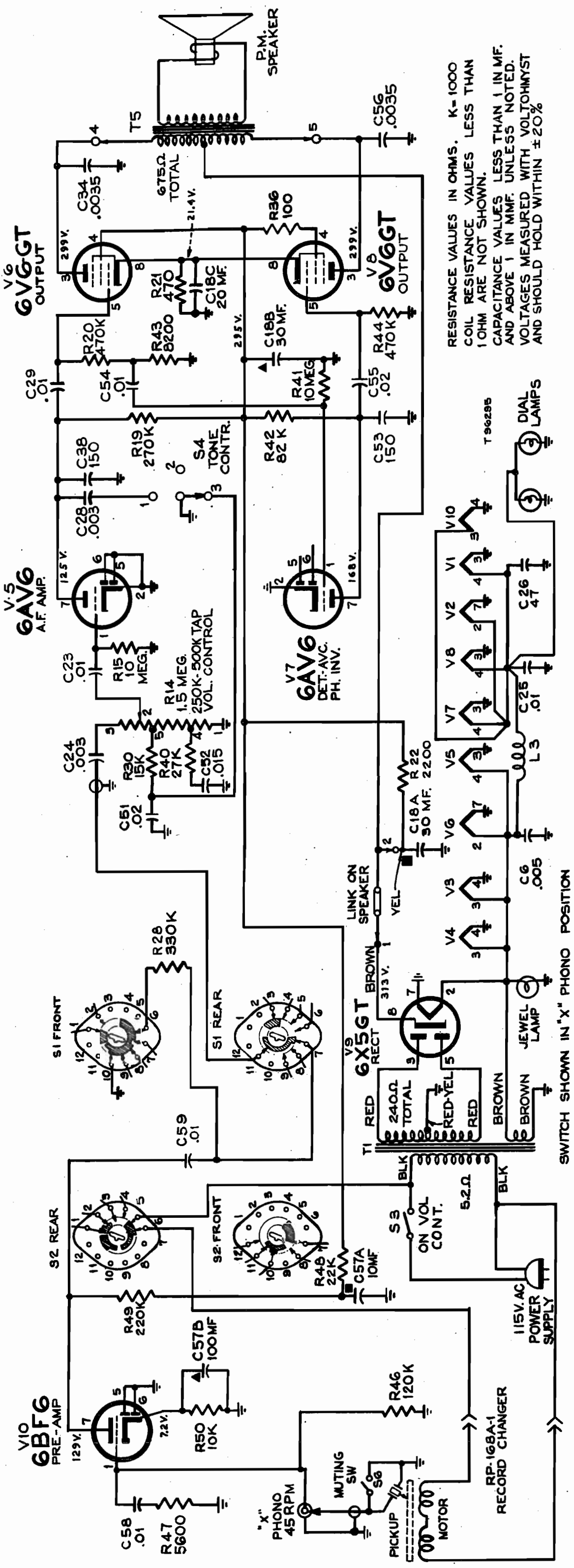


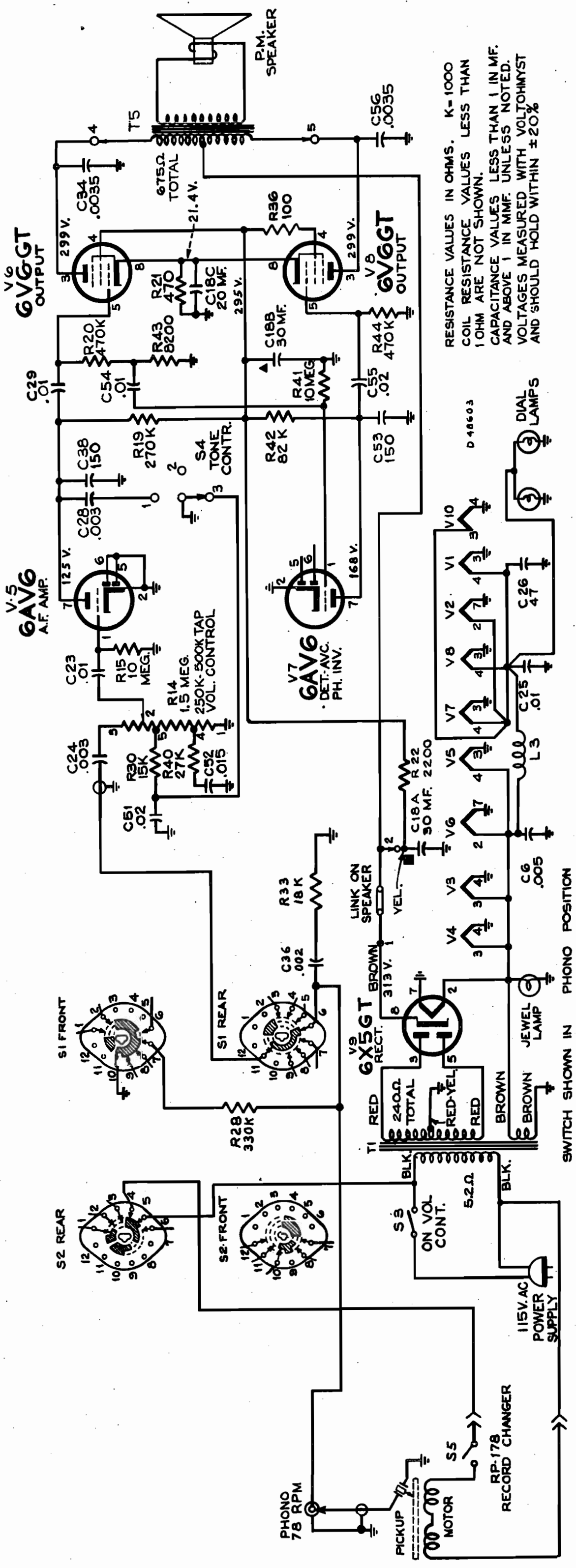
The RP-178 record changer is used only with Model 9W105. In Models 9W101 and 9W103 the RP-178 record changer and connecting cables are not used; C36 and R33 are omitted.

RADIO CORP. OF AMERICA

MODELS 9W101, 9W103, 9W105, CHASSIS RC-618B, RC-618C



Simplified Schematic Diagram
"Aux." (9W101, 9W103) or "X PH" (9W105) Position

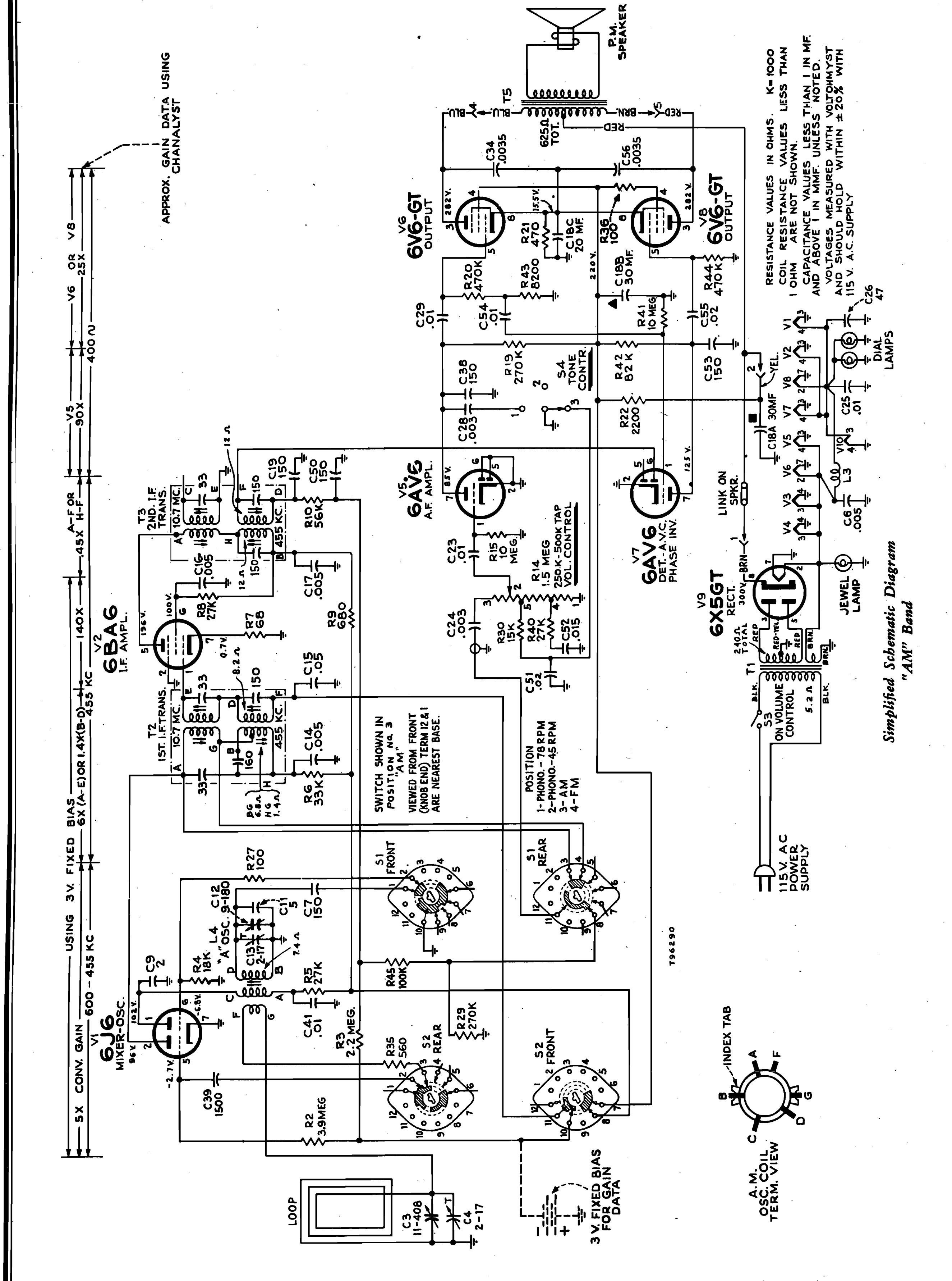


Simplified Schematic Diagram
"PH" Position

In Models 9W101 and 9W103 the RP-178 record changer and connecting cables are not used; C36 and R33 are omitted.

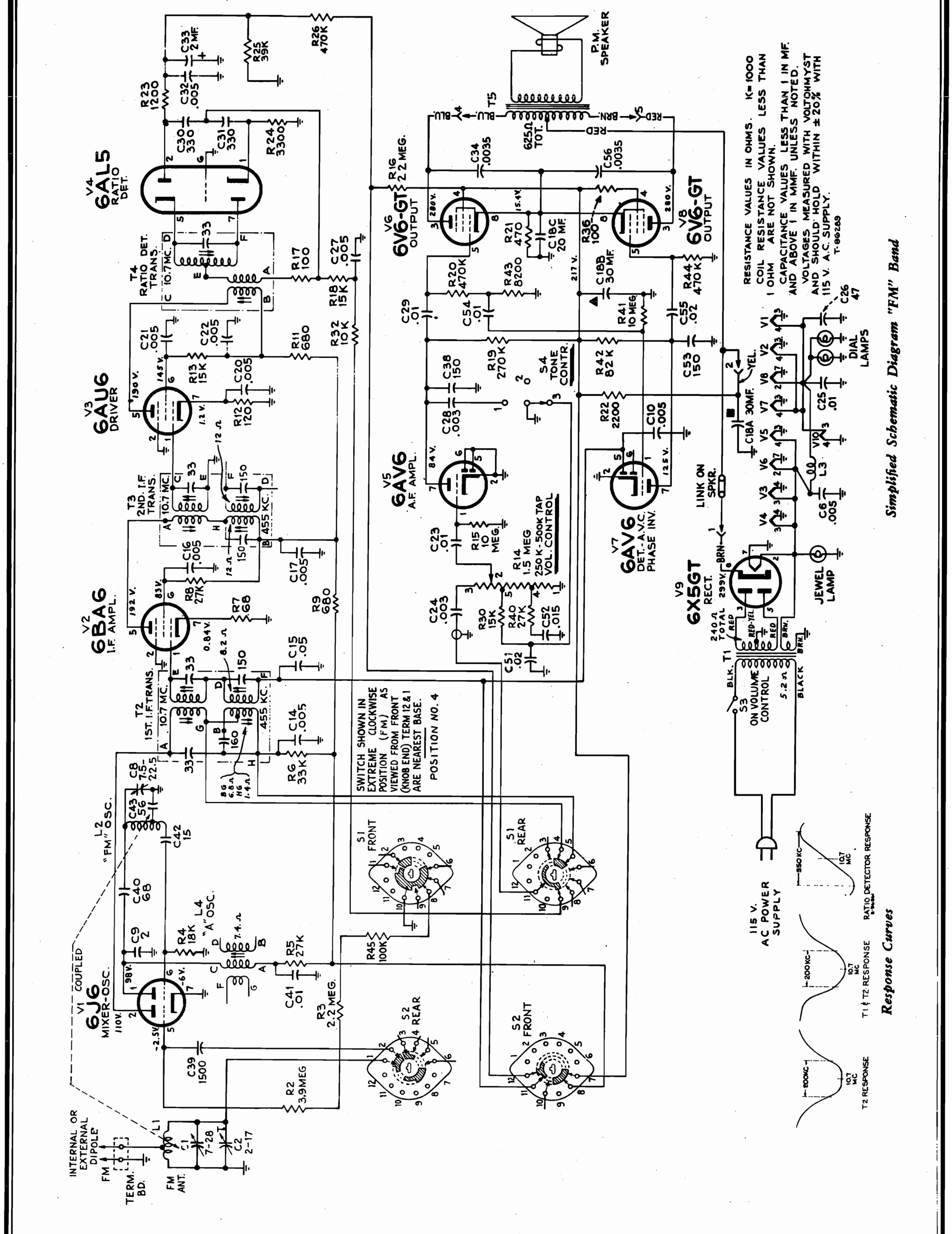
MODELS 9W101, 9W103, 9W105, CHASSIS RC-618B, RC-618C

RADIO CORP. OF AMERICA



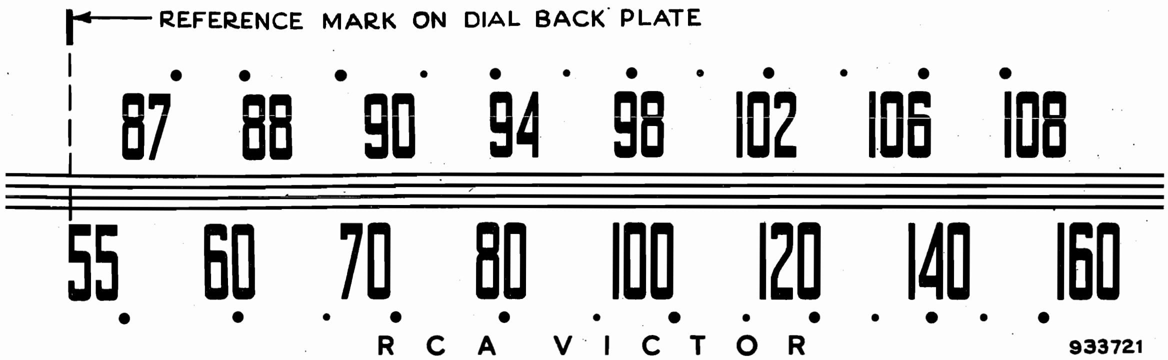
RADIO CORP. OF AMERICA

MODELS 9W101, 9W103, 9W105, CHASSIS RC-618B, RC-618C



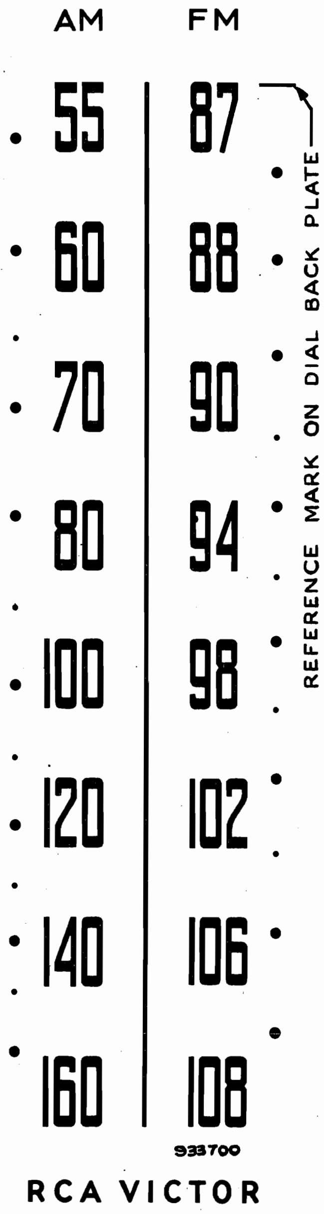
MODELS 9W101, 9W103, 9W105, CHASSIS RC-618B, RC-618C

RADIO CORP. OF AMERICA



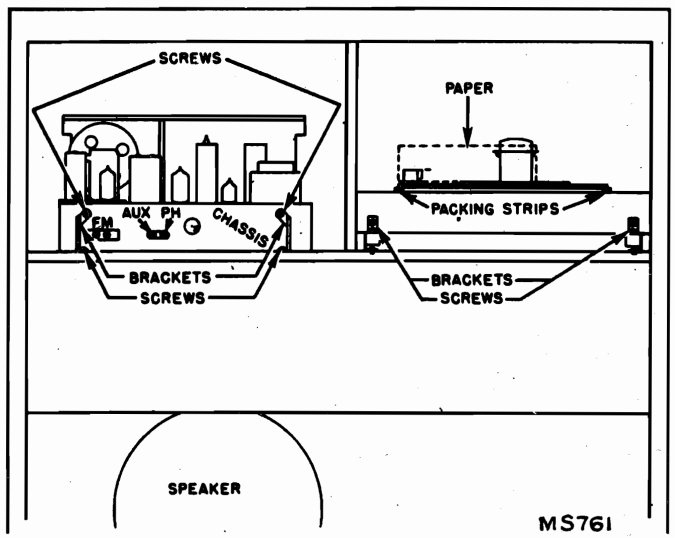
The dial scale drawing shown is a full size reproduction. It can be used as a reference in alignment procedure.

Dial Scale—Models 9W101 and 9W103

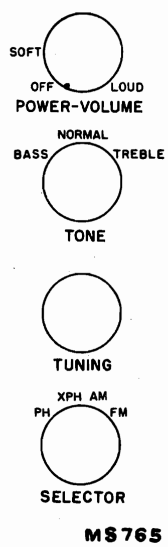


The dial scale drawing shown is a full size reproduction. It can be used as a reference in alignment procedure.

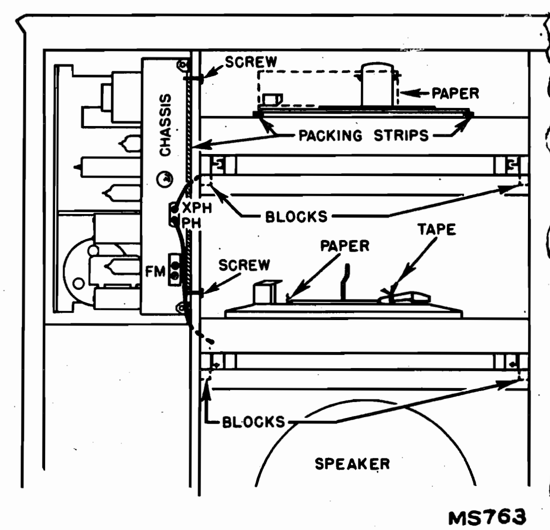
Dial Scale—Model 9W105



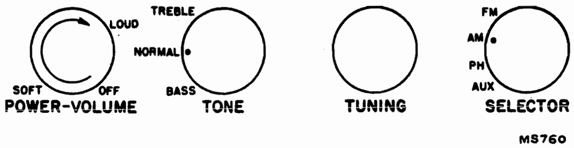
Back View—Models 9W101 and 9W103



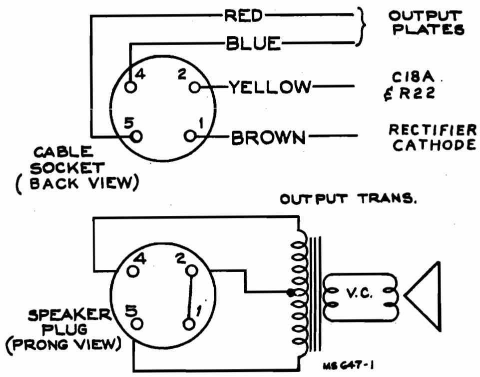
Controls—Model 9W105



Back View—Model 9W105



Controls—Models 9W101 and 9W103



Speaker Connections.

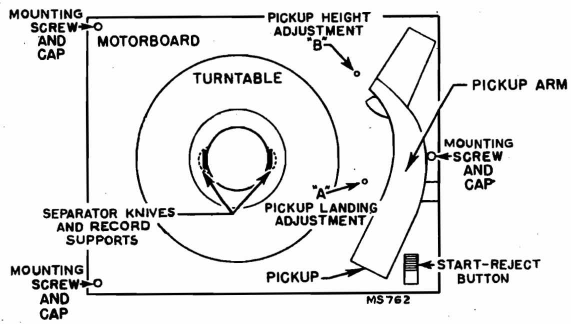
SHIPPING SCREWS

The radio chassis of these instruments is secured to the cabinet with shipping screws (painted red) which, together with wood spacing strips, should be **REMOVED** at the time of installation.

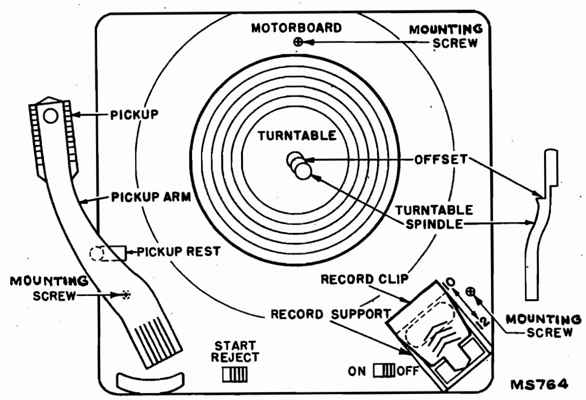
The record changers are each mounted with three screws which should be **LOOSENED** at the time of installation.

On the RP-168A-1 record changer decorative caps cover the mounting screws, unscrew the caps for access to the screws.

REFER TO ILLUSTRATIONS ON PAGES 8 AND 9.



Top View—RP-168A-1 Record Changer



Top View—RP-178 Record Changer

RP-168A-1 RECORD CHANGER

Pickup Landing Adjustment "A"

The pickup point should land half-way between the outer edge of the record and the first music groove.

If the pickup lands inside the starting grooves—turn screw "A" slightly clockwise. If pickup lands outside the starting grooves—turn screw "A" slightly counterclockwise.

Pickup Height Adjustment "B"

During cycle the pickup arm must rise high enough to clear a stack of eight records on the turntable, but not high enough to cause the top of the arm to touch records resting on the record supports.

If pickup does not clear a stack of eight records—turn screw "B" slightly clockwise. If pickup arm touches records on record supports—turn screw "B" slightly counterclockwise.

Record Separators

During service work the position of the star wheel on the underside of the record changer may be accidently shifted; this may cause the record separator knives to be extended when in the out of cycle position.

If the separator knives are thus extended—turn the power on so that the turntable is revolving, gently press fingers against the extended knives until they disappear inside the center post—DO THIS ONLY WHILE MECHANISM IS OUT OF CYCLE.

CARE OF SAPPHIRE

The sapphire point on the pickup is protected with a permanent metal guard. Lint may collect to clog the opening in the guard at the sapphire point and cause poor record reproduction. Occasional cleaning may be necessary; brush carefully with a small soft brush.

Replacement Parts

STOCK No.	DESCRIPTION
	CHASSIS ASSEMBLIES
	RC 618B—9W101, 9W103
	RC 618C—9W105
73893	Board—"F.M." antenna board
73889	Capacitor—Variable tuning capacitor (C1, C2, C3, C4, C8, C12, C13)
73866	Capacitor—Ceramic, 2 mmf. (C9)
93056	Capacitor—Ceramic, 5 mmf. (C11)
31353	Capacitor—Ceramic, 15 mmf. (C42)
39042	Capacitor—Ceramic, 47 mmf. (C26)
73867	Capacitor—Ceramic, 56 mmf. (C43)
33103	Capacitor—Ceramic, 68 mmf. (C40)
48125	Capacitor—Ceramic, 150 mmf. (C7, C19, C38, C50, C53)
39640	Capacitor—Mica, 330 mmf. (C30, C31)
73748	Capacitor—Ceramic, 1500 mmf. (C39)
73473	Capacitor—Ceramic, .005 mfd. (C6, C10)
73750	Capacitor—Tubular, .002 mfd., 200 volts (C36 for 9W105)
73659	Capacitor—Tubular, .003 mfd., 200 volts (C24)
72573	Capacitor—Tubular, .003 mfd., 400 volts (C28)
70646	Capacitor—Tubular, .0035 mfd., 1000 v. (C34, C56)
71926	Capacitor—Tubular, .005 mfd., 200 volts (C20, C27, C32)
71553	Capacitor—Tubular, .005 mfd., 400 volts (C14, C16, C17, C21, C22)
72120	Capacitor—Tubular, .015 mfd., 200 volts (C52)
71928	Capacitor—Tubular, .02 mfd., 200 volts (C51)
73638	Capacitor—Tubular, .02 mfd., 400 volts (C55)
71923	Capacitor—Tubular, .01 mfd., 200 volts (C23, C25)
73561	Capacitor—Tubular, .01 mfd., 400 volts (C58, C59)
71925	Capacitor—Tubular, .01 mfd., 400 volts (C29, C41, C54)
71551	Capacitor—Tubular, .05 mfd., 200 volts (C15)
73747	Capacitor—Electrolytic, 2 mfd., 50 volts (C33)
*74200	Capacitor—Electrolytic, comprising 1 section of 10 mfd., 300 volts and 1 section of 100 mfd., 10 volts (C57A, C57B)
73372	Capacitor—Electrolytic, comprising 1 section of 30 mfd., 350 volts, 1 section of 30 mfd., 300 volts and 1 section of 20 mfd., 250 volts (C18A, C18B, C18C)
73918	Coil—Antenna coil—F.M. (#16 tinned bus wire, 8 turns per inch, 1¾ turns L.H.—.469 I. D.) (L1)
73916	Coil—Oscillator coil—F.M. (#16 tinned bus wire, 7 turns per inch, 4¾ turns R.H.—.469 I. D.) (L2)

(Continued on following page)

MODELS 9W101, 9W103, 9W105, CHASSIS RC-618B, RC-618C

RADIO CORP. OF AMERICA

Replacement Parts (Continued)

STOCK No.	DESCRIPTION
71942	Coil—Filament choke coil (L3)
73744	Coil—Oscillator coil—A.M. (L4)
70342	Control—Volume control and power switch (R14, S3)
†72953	Cord—Drive cord (approx. 48" overall length required)
73690	Cord—Power cord and plug
16058	Grommet—Rubber grommet to mount R.F. shelf
72069	Grommet—Rubber grommet for rear mounting feet (2 required)
73895	Indicator—Station selector indicator
30868	Plug—2 contact female plug for motor cables
5040	Plug—4 contact female plug for speaker cable
*74297	Plate—Dial back plate complete with two (2) drive cord pulleys less dial
	Resistor—Fixed, composition, 68 ohms ±10%, ½ watt (R7)
	Resistor—Fixed, composition, 100 ohms ±10%, ½ watt (R17, R27, R36)
	Resistor—Fixed, composition, 120 ohms ±10%, ½ watt (R12)
	Resistor—Fixed, composition, 470 ohms ±10%, 2 watts (R21)
	Resistor—Fixed, composition, 560 ohms ±10%, ½ watt (R35)
	Resistor—Fixed, composition, 680 ohms ±20%, ½ watt (R9, R11)
	Resistor—Fixed, composition, 1200 ohms ±5%, ½ watt (R23)
73637	Resistor—Wire wound, 2200 ohms, 5 watts (R22)
	Resistor—Fixed, composition, 3300 ohms ±5%, ½ watt (R24)
	Resistor—Fixed, composition, 5600 ohms ±10%, ½ watt (R47)
	Resistor—Fixed, composition, 8200 ohms ±10%, ½ watt (R43)
	Resistor—Fixed, composition, 10,000 ohms ±10%, ½ watt (R32, R50)
	Resistor—Fixed, composition, 15,000 ohms ±10%, ½ watt (R13, R18, R30)
	Resistor—Fixed, composition, 18,000 ohms ±10%, ½ watt (R4 for 9W101, 9W103 & 9W105) (R33 for 9W105)
	Resistor—Fixed, composition, 22,000 ohms ±10%, ½ watt (R48)
	Resistor—Fixed, composition, 27,000 ohms ±10%, ½ watt (R8, R40)
	Resistor—Fixed, composition, 27,000 ohms ±10%, 1 watt (R5)
	Resistor—Fixed, composition, 33,000 ohms ±10%, ½ watt (R6)
	Resistor—Fixed, composition, 39,000 ohms ±10%, ½ watt (R25)
	Resistor—Fixed, composition, 56,000 ohms ±10%, 1 watt (R10)
	Resistor—Fixed, composition, 82,000 ohms ±10%, ½ watt (R42)
	Resistor—Fixed, composition, 100,000 ohms ±10%, ½ watt (R45)
	Resistor—Fixed, composition, 120,000 ohms ±10%, ½ watt (R46)
	Resistor—Fixed, composition, 220,000 ohms ±10%, ½ watt (R49)
	Resistor—Fixed, composition, 270,000 ohms ±10%, ½ watt (R19, R29)
	Resistor—Fixed, composition, 330,000 ohms ±10%, ½ watt (R28)
	Resistor—Fixed, composition, 470,000 ohms ±10%, ½ watt (R20, R26, R44)
	Resistor—Fixed, composition, 2.2 meg. ±20%, ½ watt (R3)
	Resistor—Fixed, composition, 3.9 meg. ±10%, ½ watt (R2)
	Resistor—Fixed, composition, 10 megohms ±20%, ½ watt (R15, R41)
	Resistor—Fixed, composition, 22 megohms ±20%, ½ watt (R16)
73894	Shaft—Tuning knob shaft
31364	Socket—Dial or jewel lamp socket
33514	Socket—Phono input socket (double)
31251	Socket—Tube socket, wafer, octal
73606	Socket—Tube socket, miniature, for tubes V1, V2, V3, V4, V5, V7
73117	Socket—Tube socket, miniature, for 6BF6 tube
31418	Spring—Drive cord spring
74202	Support—Polystyrene support for F.M. osc. coil complete with mounting bracket
73891	Switch—Tone control switch (S4)
*74201	Switch—Selector switch (S1, S2)
73601	Transformer—Power transformer, 115 volt 60 cycle (T1)
73745	Transformer—First I.F. transformer—dual (T2)
74019	Transformer—Second I.F. transformer—dual (T3)
73743	Transformer—Ratio detector transformer (T4)
33726	Washer—"C" washer for tuning knob shaft
	SPEAKER ASSEMBLIES
	92569-5W
	RL 103B5
13867	Cap—Dust cap
73934	Cone—Cone and voice coil assembly
31826	Plug—4 prong male plug for speaker
73635	Speaker—12" PM speaker complete with cone and voice coil less output transformer and plug (92569-5W)
71145	Suspension—Metal cone suspension
73636	Transformer—Output transformer (T5)

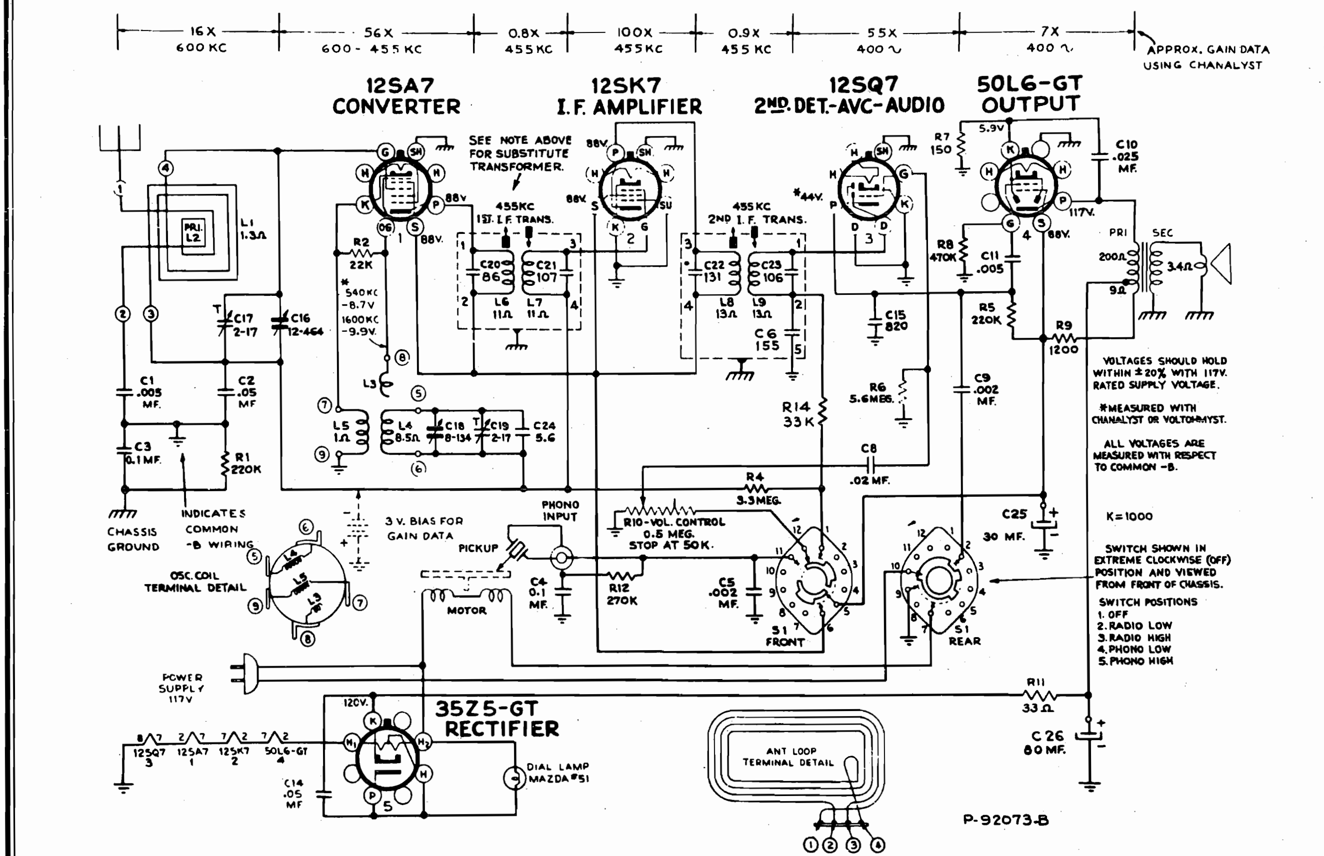
STOCK No.	DESCRIPTION
	MISCELLANEOUS
72555	Antenna—F.M. antenna
*74205	Bezel—Dial scale bezel less dial
74299	Bracket—Jewel lamp bracket for Model 9W105
71599	Bracket—Jewel lamp bracket for Models 9W101 and 9W103
*74268	Button—Rosette button (nail) for grille for Model 9W101
72437	Cable—Shielded pickup cable complete with pin plug (2 required) for Model 9W105
72583	Cable—Shielded pickup cable complete with pin plug for Models 9W101 and 9W103
13103	Cap—Jewel lamp cap
71892	Catch—Bullet catch and strike for doors
74298	Clamp—Dial clamp (2 required)
X1968	Cloth—Grille cloth for Model 9W101
X1973	Cloth—Grille cloth for Model 9W103
X1953	Cloth—Grille cloth for blonde instruments for Model 9W105
X1897	Cloth—Grille cloth for mahogany or walnut instruments for Model 9W105
74209	Cover—Mounting screw cover for RP168A record changer (3 required)
*74275	Decal—Control panel decal for limed oak instruments for Model 9W103
*74274	Decal—Control panel decal for mahogany or walnut instruments for Models 9W101 & 9W103
*74281	Decal—Control panel decal for blonde instruments for Model 9W105
*74280	Decal—Control panel decal for mahogany or walnut instruments for Model 9W105
71768	Decal—Trade mark decal (RCA Victor) for Model 9W101
74273	Decal—Trade mark decal (Victrola) for Models 9W101 and 9W103
71910	Decal—Trade mark decal (RCA Victor) for Model 9W105
71966	Decal—Trade mark decal (Victrola) for Model 9W105
*74203	Dial—Glass dial scale for Models 9W101 and 9W103
*74204	Dial—Glass dial scale for Model 9W105
73180	Emblem—"RCA Victor" emblem for Model 9W103
11889	Grommet—Rubber grommet for front apron chassis (2 required)
72856	Grommet—Rubber grommet for mounting RP178 record changer (3 required)
73903	Hinge—Cabinet door hinge (1 set)
72824	Knob—Tone control or selector switch knob—brown—for blonde or limed oak instruments
71822	Knob—Tone control or selector switch knob—maroon—for mahogany or walnut instruments
72800	Knob—Tuning or volume control knob—brown—for blonde or limed oak instruments
71821	Knob—Tuning or volume control knob—maroon—for mahogany or walnut instruments
11765	Lamp—Dial or jewel lamp—Mazda 51
*74300	Loop—Antenna loop complete for Model 9W105
73896	Loop—Antenna loop complete for Models 9W101 and 9W105
73109	Nut—Tee nut for mounting RP178 record changer (3 required)
74208	Nut—Tee nut for mounting RP-168A-1 record changer (3 required)
73771	Pull—Door pull for record storage compartment door or radio compartment door for Model 9W105
*74276	Pull—Door pull for Model 9W103
*74239	Pull—Door pull for Model 9W101
*74277	Pull—Record changers' drawer pull for Model 9W105
30868	Plug—2 contact female plug for motor cable
30870	Plug—2 prong male plug for motor cable
73184	Runner—Record changer motorboard runner—R.H.—for RP178 changer—Model 9W105
73183	Runner—Record changer motorboard runner—L.H.—for RP178 changer—Model 9W105
*74271	Runner—Record changer motorboard runner—R.H.—for RP168A-1 changer
*74272	Runner—Record changer motorboard runner—L.H.—for RP168A-1 changer
73110	Screw—#¼-20 x 1¾" fillister head screw for mounting RP178 record changer—Model 9W105
*74278	Screw—#8-30 x ¾" trimit head screw for record changers' drawer pull for Model 9W105
*74424	Screw—#8-32 x 1¾" special screw for mounting RP-168A-1 record changer (3 required)
*74269	Screw—#8-32 x ¾" trimit head screw for door pull (2 required) for Model 9W101
74113	Screw—#8-32 x 1" trimit head screw for door pull for Model 9W103
*74279	Screw—#8-32 x ⅞" trimit head screw for door pull for record storage compartment door and radio compartment door for Model 9W105
*74421	Spring—Conical spring for mounting RP-168A-1 record changer—upper—R.H. side (1 required)
*74422	Spring—Conical spring for mounting RP-168A-1 record changer—upper—L.H. side (2 required)
*74423	Spring—Conical spring for mounting RP-168A-1 record changer—lower (3 required)
30900	Spring—Retaining spring for knobs
72936	Stop—Door stop
73185	Stop—Metal stop for motorboard runners (2 required)
73182	Track—Record changer compartment track (for RP-168A-1 record changer) (2 required)

† Stock No. 72953 is a reel containing 250 feet of cord.

* This is the first time that this Stock No. has appeared in Service Data.

RADIO CORP. OF AMERICA

MODEL 75ZU, CHASSIS RC-1063A



Replacement Parts

STOCK No.	DESCRIPTION
	CHASSIS ASSEMBLIES
	RC 1063A
70407	Button—Plug button to cover holes for i-f transformers adjustment
70997	Capacitor—Ceramic, 5.6 mmf. (C24)
39650	Capacitor—Mica, 820 mmf. (C15)
70601	Capacitor—Tubular, .002 mfd., 400 volts (C5, C9)
70606	Capacitor—Tubular, .005 mfd., 400 volts (C1, C11)
70612	Capacitor—Tubular .025 mfd. 400 volts (C10)
70611	Capacitor—Tubular .02 mfd. 400 volts (C8)
70615	Capacitor—Tubular .05 mfd. 400 volts (C2, C14)
70617	Capacitor—Tubular, 0.1 mfd., 400 volts (C3, C4)
72312	Capacitor—Electrolytic, comprising 1 section of 30 mfd., 150 volts, and 1 section of 80 mfd., 150 volts (C25, C26)
70403	Coil—Oscillator coil (L3, L4, L5)
*73056	Condenser—Variable tuning condenser and drive drum (C16, C17, C18, C19)
*73057	Control—Volume control (R10)
70392	Cord—Power cord and plug
72953	Cord—Drive cord (approx. 38" overall length required)
*73063	Dial—Dial scale
70397	Gear—Power, radio and phono switch gear
*73014	Gear—Volume control gear—less spring
72283	Grommet—Rubber grommet to mount tuning condenser (3 required)
*73059	Indicator—Station selector indicator
*73010	Loop—Antenna loop complete (L1, L2)
*73055	Plate—Dial back plate less dial
30868	Plug—2 contact female plug for motor cable
*73060	Pulley—Station selector indicator pulley
72313	Resistor—Wire wound, 33 ohms, ¼ watt (R11)
	Resistor—Fixed composition, 150 ohms, ±10%, ½ watt (R7)
	Resistor—Fixed composition, 1200 ohms ±10%, 1 watt (R9)
	Resistor—Fixed composition, 22,000 ohms ±20%, ½ watt (R2)
	Resistor—Fixed composition, 33,000 ohms ±20%, ½ watt (R14)
	Resistor—Fixed composition, 220,000 ohms ±20%, ½ watt (R1, R5)
	Resistor—Fixed composition, 470,000 ohms ±20%, ½ watt (R8)
	Resistor—Fixed composition, 3.3 megohms ±20%, ½ watt (R4)
	Resistor—Fixed composition, 5.6 megohms ±10%, ½ watt (R6)
*73058	Shaft—Tuning knob shaft
*73062	Socket—Lamp socket
35787	Socket—Phono input socket
37605	Socket—Tube socket
70390	Spring—Drive cord tension spring
*73061	Spring—Station selector indicator pulley retaining spring
70396	Spring—Volume control gear tension spring
70394	Switch—Power, radio and phono switch (S1)
73036	Transformer—First I.F. transformer (L6, L7, C20, C21)
73037	Transformer—Second I.F. transformer (L8, L9, C6, C22, C23)
72296	Transformer—Output transformer (T1)
33726	Washer—"C" washer for tuning knob shaft
	SPEAKER ASSEMBLIES
	922258-2
71058	Speaker—4" x 6" P.M. speaker complete with cone and voice coil
	MISCELLANEOUS
71105	Cable—Shielded pickup cable for use with RP-178 record changer
72437	Cable—Shielded pickup cable for use with 960276 record changer
*73077	Crystal—Vinylite dial crystal
X1661	Cloth—Grille cloth
*72894	Foot—Rubber foot (4 required)
*72856	Grommet—Rubber grommet to mount record changer (3 required for RP-178) (4 required for 960276)
72692	Hinge—Lid hinge
*73064	Knob—Power, radio and phono switch knob
*73065	Knob—Tuning knob
*73078	Knob—Volume control knob
11765	Lamp—Dial lamp
73109	Nut—T nut for mounting record changer (3 required for RP-178) (4 required for 960276)
73110	Screw—¼-20 x 1¾ fillister head machine screw for mounting RP-178 record changer (3 required)
73234	Screw—¼-20 x 1½ oval head machine screw for mounting 960276 record changer (4 required)
14270	Spring—Retaining spring for knobs
71824	Stud—Stud and screw to mount one lid hinge
*73067	Support—Lid support

* THIS IS THE FIRST TIME THIS STOCK NUMBER HAS APPEARED IN SERVICE DATA.

MODEL 75ZU,
CHASSIS RC-1063A

RADIO CORP. OF AMERICA

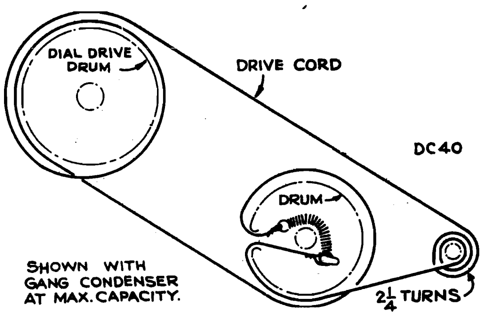
Alignment Procedure

CAUTION.—CLOSE TUNING CONDENSER PLATES COMPLETELY (C-C-W) BEFORE REMOVING CHASSIS FROM CABINET.

Take off both wooden strips on bottom of cabinet by removing wood screws before loosening chassis bolts.

CRITICAL LEAD DRESS.—

1. All heater wires should be dressed close to chassis.
2. Dress lead from switch to phono jack close to chassis and away from power cord.
3. Dress capacitor between 12SQ7 grid and terminal board away from chassis and away from other parts.
4. Dress lead from arm of volume control to terminal board against front apron and away from other leads.
5. In instrument assembly the lead from the rear section of gang to loop shall be dressed away from chassis and other wires to loop.



Test Oscillator.—Connect high side of test oscillator as shown in chart. Connect low side through a .01 mf. capacitor to common "—B." Keep the output signal as low as possible to avoid a.v.c. action.

Speaker and Dial Adjustment.—If the speaker should require replacement or if the position of the speaker mounting bracket is disturbed, reposition as follows:

Mount speaker on bracket, adjust bracket so that front edge of speaker extends ¾ inch in front of chassis base and tighten bracket screws.

Mount chassis on wood base with mounting screws loose, install in cabinet and push chassis forward until speaker contacts grille and then tighten chassis mounting screw. Adjust dial back plate mounting bracket so that the plate is parallel with cabinet.

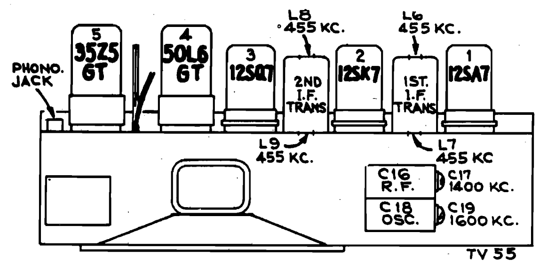
The two wood buttons at the top of the dial back plate should be adjusted to provide the best illumination of the dial and pointer.

Output Meter.—Connect meter across speaker voice coil. Turn volume control clockwise to radio maximum high position (3) for alignment.

Dial Pointer Adjustment.—Rotate tuning condenser fully counter-clockwise (plates fully meshed). Adjust indicator pointer to position illustrated on front page.

Steps	Connect the high side of test-oscillator to—	Tune test-osc. to—	Turn radio dial to—	Adjust the following for max. peak output
1	I.F. grid, in series with .01 mfd.	455 kc	Quiet point 600 kc end of dial	L8 and L9 2nd I.F. transformer
2	1st Det. grid in series with .01 mfd.			L6 and L7 *1st I.F. transformer
NOTE.—ANTENNA LOOP AND RECORD CHANGER MUST BE IN CABINET FOR STEPS 3, 4 AND 5				
3	Antenna terminal in series with 220 mmfd.	1600 kc	160	C19 (osc.)
4	Radiated signal	1400 kc	Signal frequency	C17 (ant.)
5	Repeat steps 3 and 4.			

* Do not readjust L8 or L9 when test oscillator is connected to 1st Det.



1st I.F. Trans. Substitution.—The first I.F. transformer may differ from that shown in the schematic diagram. Transformers stamped 970441-1 are as shown in the schematic. Transformers stamped 970441-5 are connected as follows: term. #4 to plate of 12SA7, term. #3 to B+, term. #1 to grid of 12SK7, term. #2 to A.V.C. The d-c resistance of each winding is 16 ohms. The primary capacitor C20 is 131 mmf., the secondary capacitor is 106 mmf.

Electrical and Mechanical Specifications

Frequency Range .... 540-1,600 kc
Intermediate Frequency .... 455 kc
Tube Complement
(1) RCA Radiotron 12SA7 .... Converter
(2) RCA Radiotron 12SK7 .... I-F Amplifier
(3) RCA Radiotron 12SQ7 .... 2nd Det., A.V.C., and A-F Amplifier
(4) RCA Radiotron 50L6GT .... Power Output
(5) RCA Radiotron 35Z5GT .... Rectifier
Pilot Lamp .... Mazda No. 51, 6-8 volts, 0.2 amp.
Power Output
Undistorted .... 1.5 watts
Maximum .... 2.4 watts
Loudspeaker
Type 922258-2 ...."PM" 4 x 6 inch elliptical
V.C. Impedance ....3.4 ohms at 400 cycles
Power Supply Rating
105-125 volts, A-C, 60 cycles .... 60 watts

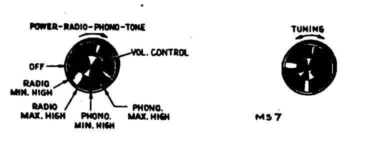
IMPORTANT: Do not plug instrument into a d-c supply.

Access to dial lamp may be obtained by removing sloping panel in record changer compartment.

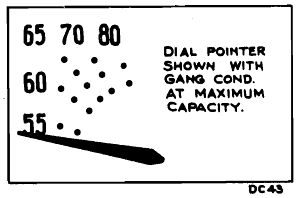
	Height	Width	Depth
Cabinet dimensions (inches)	10¼	17¼	19
Chassis overall (inches)	9	14	6¼
Chassis base (inches)	1⅝	14	3¾

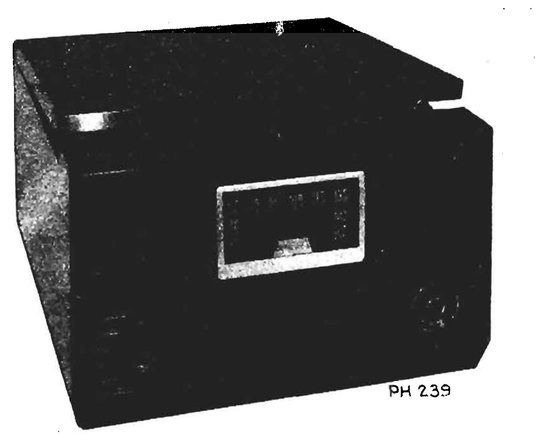
Tuning Drive Ratio 11:1

Phonograph
Type .... RP-178 or Type 960276-1
Record Capacity .... Twelve 10-in., Ten 12-in.
Turntable Speed .... 78 r.p.m.
Type Pickup .... Crystal



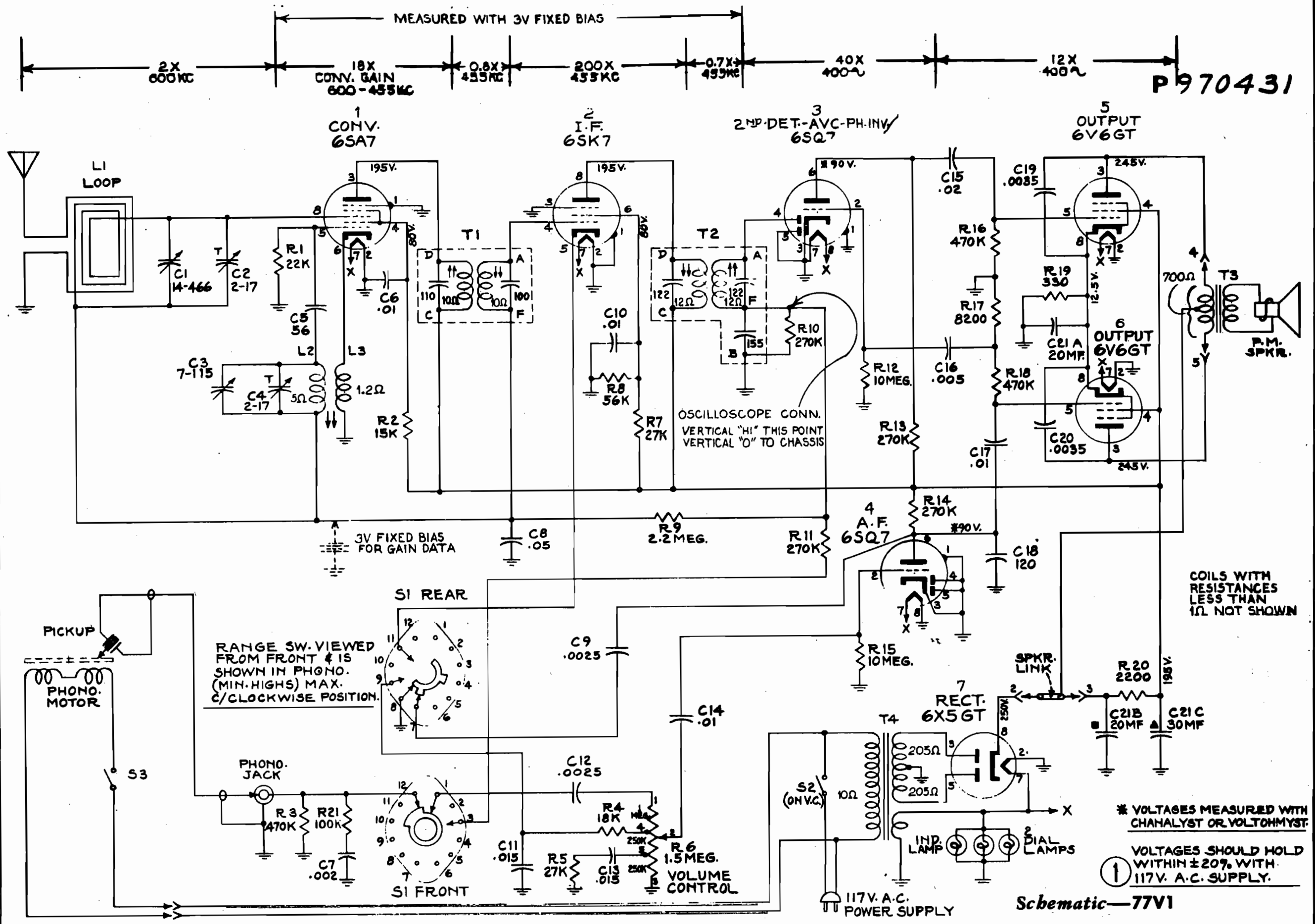
Control Positions





RADIO CORP. OF AMERICA

MODEL 77V1,
CHASSIS RC-615



Schematic—77V1

Replacement Parts

STOCK No.	DESCRIPTION
	CHASSIS ASSEMBLIES
	RC 615
*70137	Bracket—Dial bracket—L.H.—complete with drive cord pulley
*70136	Bracket—Dial bracket—R.H.—complete with drive cord pulley
71924	Capacitor—Ceramic, 56 mmf. (C5)
71614	Capacitor—Ceramic, 120 mmf. (C18)
70602	Capacitor—Tubular, .0025 mfd., 400 volts (C9, C12)
70646	Capacitor—Tubular, .0035 mfd., 1000 volts (C19, C20)
70601	Capacitor—Tubular, .002 mfd., 400 volts (C7)
70606	Capacitor—Tubular, .005 mfd., 400 volts (C14, C16)
70572	Capacitor—Tubular, .015 mfd., 400 volts (C13)
70610	Capacitor—Tubular, .01 mfd., 400 volts (C6, C10, C17)
70611	Capacitor—Tubular, .02 mfd., 400 volts (C11, C15)
70615	Capacitor—Tubular, .05 mfd., 400 volts (C8)
71976	Capacitor—Electrolytic, comprising 1 section of 20 mfd., 450 volts; 1 section of 30 mfd., 350 volts; and 1 section of 20 mfd., 25 volts (C21A, C21B, C21C)
*70133	Coil—Oscillator coil (L2, L3)
*70139	Condenser—Variable tuning condenser (C1, C2, C3, C4)
70342	Control—Volume control and power switch (R6, S2)
72953	Cord—Drive cord (approx. 49" overall length)
70930	Grommet—Rubber grommet to mount variable condenser (3 required)
71608	Indicator—Station selector indicator
*70138	Plate—Dial back plate
30868	Plug—2 contact female plug for Motor cable
12493	Plug—5 contact female plug for speaker cable
72602	Pulley—Drive cord pulley
	Resistor—Fixed composition, 330 ohms, ±10%, 1 watt (R19)
	Resistor—Fixed composition, 2200 ohms, ±10%, 2 watts (R20)
	Resistor—Fixed composition, 8200 ohms, ±10%, ½ watt (R17)
	Resistor—Fixed composition, 15,000 ohms, ±10%, 2 watts (R2)
	Resistor—Fixed composition, 18,000 ohms, ±10%, ½ watt (R4)
	Resistor—Fixed composition, 22,000 ohms, ±10%, ½ watt (R1)
	Resistor—Fixed composition, 27,000 ohms, ±10%, ½ watt (R5, R7)
	Resistor—Fixed composition, 56,000 ohms, ±10%, ½ watt (R8)
	Resistor—Fixed composition, 100,000 ohms, ±10%, ½ watt (R21)
	Resistor—Fixed composition, 270,000 ohms, ±10%, ½ watt (R10, R11, R13, R14)
	Resistor—Fixed composition, 470,000 ohms, ±10%, ½ watt (R3, R16, R18)
	Resistor—Fixed composition, 2.2 megohms, ±20%, ½ watt (R9)
	Resistor—Fixed composition, 10 megohms, ±20%, ½ watt (R12, R15)

STOCK No.	DESCRIPTION
*70135	Shaft—Tuning knob shaft
31364	Socket—Lamp socket
35787	Socket—Phono input socket
31251	Socket—Tube socket
31418	Spring—Drive cord tension spring
*70134	Switch—Range switch (S1)
70128	Transformer—First I. F. transformer (T1)
70129	Transformer—Second I. F. transformer (T2)
70127	Transformer—Power transformer, 117 volt, 60 cycles (T4)
35969	Washer—"C" Washer for tuning shaft
	SPEAKER ASSEMBLIES
	92569-1W
	RL 103-1
13867	Cap—Dust cap
36145	Cone—Cone and voice coil assembly
71560	Plug—5 prong male plug for speaker
71961	Speaker—12" P.M. speaker complete with cone and voice coil less output transformer and plug
71145	Suspension—Metal cone suspension
37899	Transformer—Output transformer (T3)
	NOTE: If stamping on speaker in instrument does not agree with above speaker number, order replacement parts by referring to model number of instrument, number stamped on speaker and full description of part required.
	MISCELLANEOUS
71599	Bracket—Lamp bracket
13103	Cap—Pilot lamp jewel
*70142	Clamp—Dial clamp (1 set)
X1668	Cloth—Grille cloth
*73084	Decal—Control panel decal
71966	Decal—Trade mark decal (Victrola)
71910	Decal—Trade mark decal (RCA-Victor)
*70141	Dial—Glass dial scale
71764	Hinge—Cabinet lid hinge
71822	Knob—Range switch knob
71821	Knob—Tuning or volume control knob
11765	Lamp—Dial or pilot lamp
*70140	Loop—Antenna loop complete (L1)
71815	Mounting—One set of hardware consisting of four (4) springs, two (2) "C" washers and two (2) rubber washers to mount record changer
30900	Spring—Retaining spring for knobs
*73080	Support—Cabinet lid support—L.H.
*73083	Support—Cabinet lid support—R.H.

MODEL 77V1,
CHASSIS RC-615

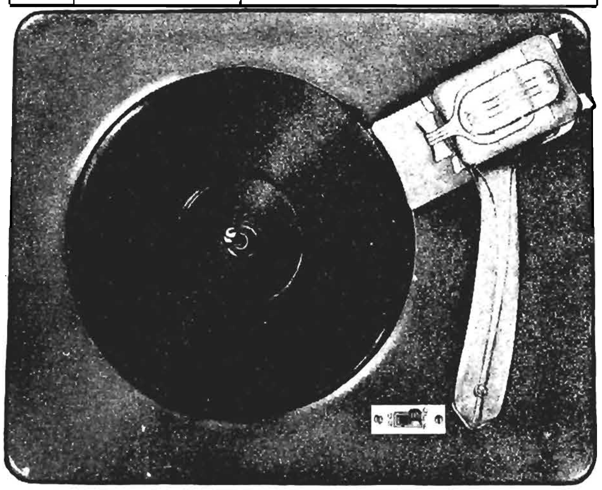
RADIO CORP. OF AMERICA

Alignment Procedure

Output Meter Alignment.—If this method is used, connect the meter across the voice coil, and turn the receiver volume control to maximum.

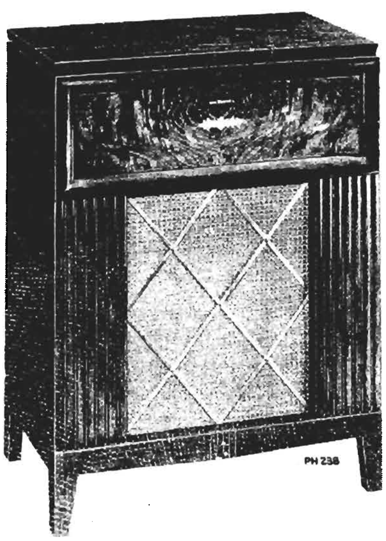
Test Oscillator.—For all alignment operations, connect the low side of the test-oscillator to the receiver chassis, and keep the oscillator output as low as possible to avoid a-v-c action.

Steps	Connect high side of test oscillator to—	Tune test oscillator to—	Turn radio dial to—	Adjust the following for maximum peak output
1	6SK7 grid in series with .01 mfd.	455 kc.	Broadcast Quiet Point at 550 kc. end of dial	Pri. and Sec. (2nd I-F Trans.)
2	6SA7 grid in series with .01 mfd.	455 kc.	Broadcast Quiet Point at 550 kc. end of dial	Pri. and Sec. (1st I-F Trans.)
3	Primary lead on loop in series with 200 mmfd.	1,400 kc.	1,400 kc.	C4 (osc.) C2 (ant.)
4	Primary lead on loop in series with 200 mmfd.	600 kc.	600 kc.	L2 (osc.) Rock gang
5	Primary lead on loop in series with 200 mmfd.	Repeat steps 3 and 4		

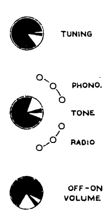


Automatic Record Changer

PH 86



Model 77V1



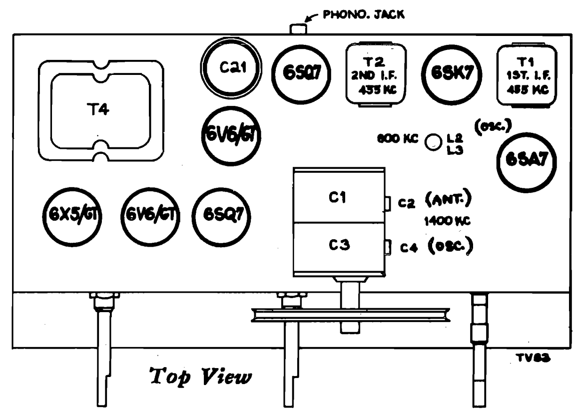
Controls

Circuit Description

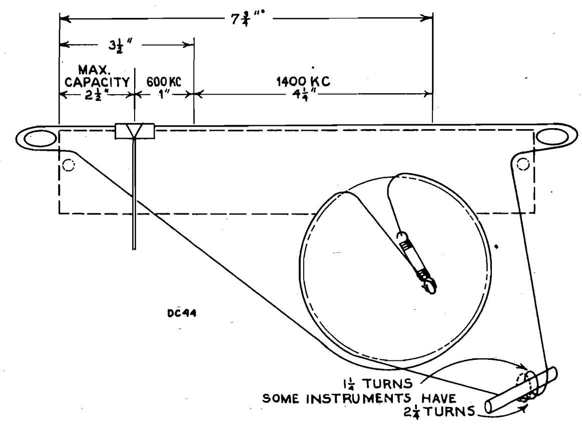
The receiver is a seven tube superheterodyne employing push-pull power unit. AVC is applied to the converter and i-f tubes. The broadcast band utilizes a standard loop antenna.

Critical Lead Dress:

1. Dress speaker cable leads down next to chassis.
2. Dress output plate capacitors next to chassis.
3. Dress plate lead of output tube away from grid of audio amplifier.
4. Dress all a-c leads away from volume control down next to chassis.
5. Dress lead from top tap of volume control to range-tone switch along front apron of chassis.
6. Dress R12 and R15 down near chassis base.



Top View



Dial Indicator and Drive Mechanism

Frequency Ranges
Standard Broadcast "A" ....540-1,600 kc

Intermediate Frequency ....455 kc

Tube Complement
(1) RCA-6SA7 ....1st Det., Oscillator
(2) RCA-6SK7 ....I-F Amplifier
(3) RCA-6SQ7 ....2nd Det., A. V. C. and Phase Inverter
(4) RCA-6SQ7 ....A-F Amplifier
(5) RCA-6V6GT ....Power Output
(6) RCA-6V6GT ....Power Output
(7) RCA-6X5GT ....Rectifier

Power Supply Rating (including Phono Motor)
105-125 volts, 60 cycles ....95 watts

Pilot Lamps ....(2) Mazda No. 51, 6-8 volts, 0.2 amp.

Compartment Lamp ....(1) Mazda No. 51, 6-8 volts, 0.2 amp.

Loudspeaker
Electrodynamic 92569-1W
Size 12-inch
V. C. impedance at 400 cycles ....2.2 ohms

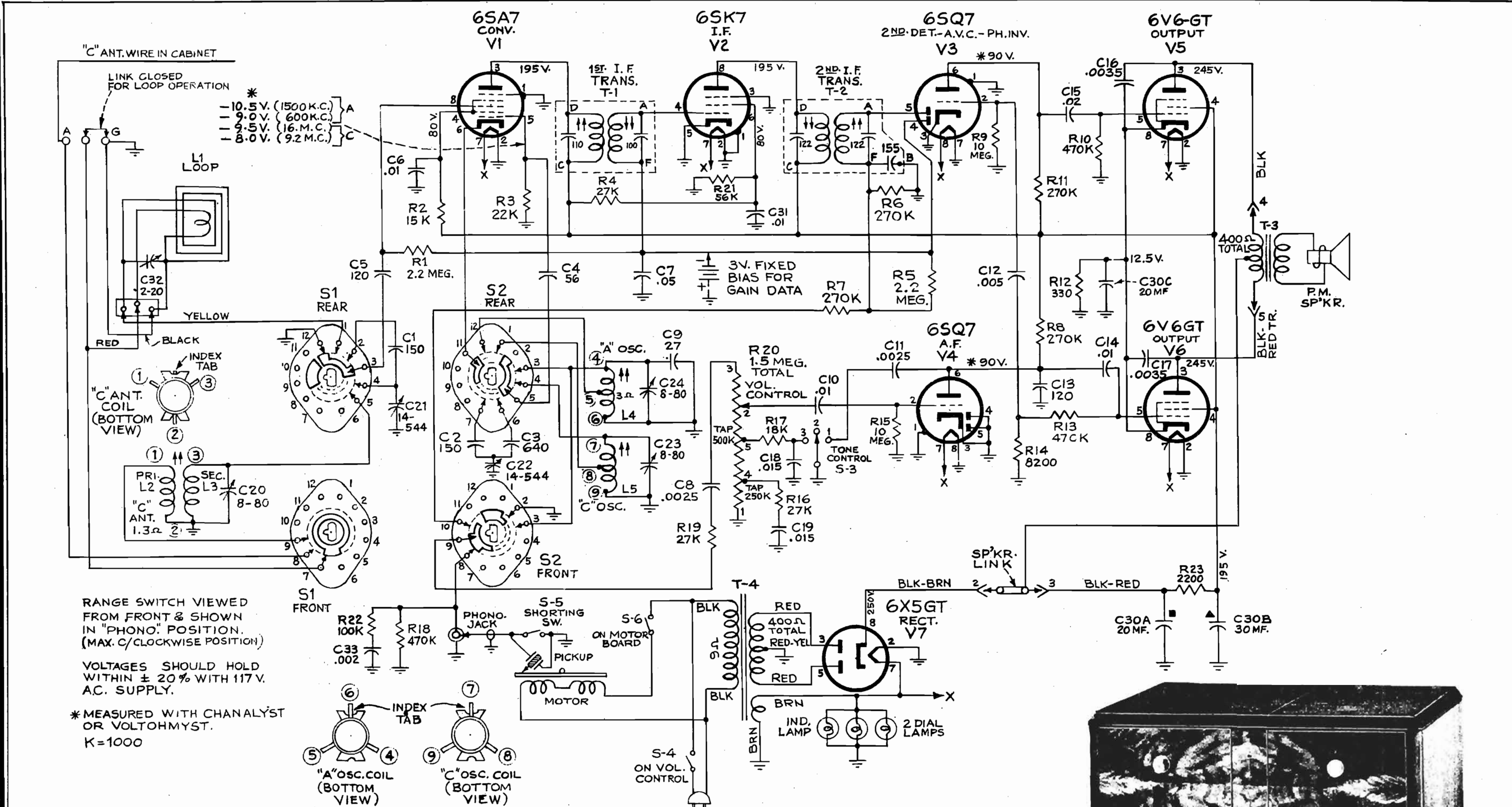
Power Output Rating
Undistorted .... 5 watts
Maximum ....5.5 watts

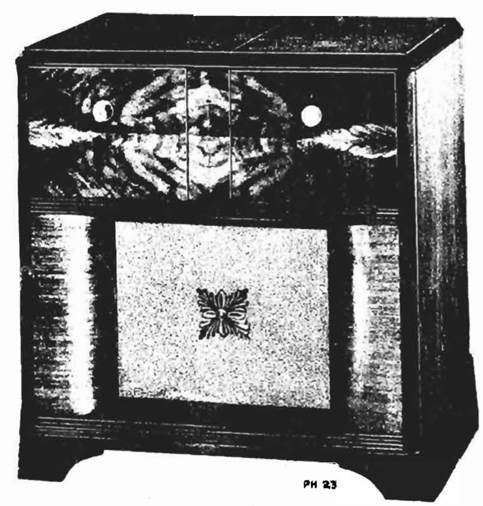
Phonograph
Type ....Automatic 960260-1
Record Capacity ....Twelve 10-in., Ten 12-in.
Turntable ....78 r.p.m. type
Type Pickup ....Crystal
Motor Power consumption (115 v., 60 cycles) ....30 watts

Tuning Drive Ratio 16:1

RADIO CORP. OF AMERICA

MODEL 77V2,
CHASSIS RC-606C





Circuit Description

The receiver is a seven tube superheterodyne employing push-pull power output. AVC is applied to the converter and i-f tubes. The broadcast band utilizes a standard loop antenna, and the short wave antenna is a wire tacked in the cabinet.

Frequency Ranges

Standard Broadcast "A"	540-1,600 kc
Short Wave "C"	9.2-16 mc

Intermediate Frequency	455 kc

Tube Complement

(1) RCA-6SA7	1st Det., Oscillator
(2) RCA-6SK7	I-F Amplifier
(3) RCA-6SQ7	2nd Det., A. V. C. and Phase Inverter
(4) RCA-6SQ7	A-F Amplifier
(5) RCA-6V6-GT	Power Output
(6) RCA-6V6-GT	Power Output
(7) RCA-6X5-GT	Rectifier

Power Supply Rating (including Phono Motor)

105-125 volts, 60 cycles	85 watts
Pilot Lamps	(2) Mazda No. 51, 6-8 volts, 0.2 amp.
Compartment Lamp	(1) Mazda No. 55, 6-8 volts, 0.4 amp.

Loudspeaker

92569-1	12 in. P. M.
V. C. impedance at 400 cycles	2.2 ohms

Power Output Rating

Undistorted	5 watts
Maximum	5.5 watts

Record Changer

Type	960260-1
Record Capacity	Twelve 10-in., Ten 12-in.
Turntable Speed	78 r.p.m
Type Pickup	Crystal

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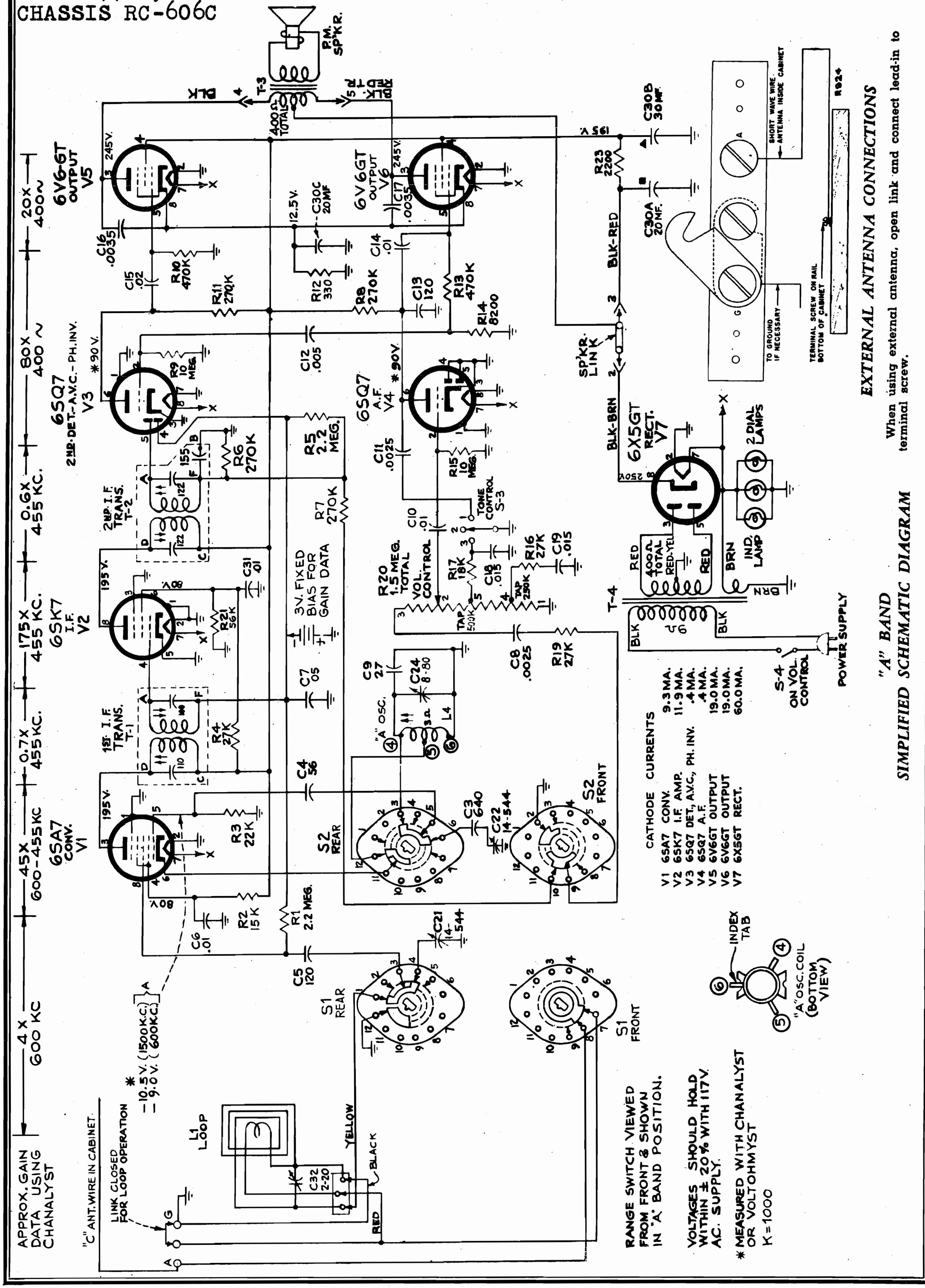
MODEL 77V2,
CHASSIS RC-606C

RADIO CORP. OF AMERICA



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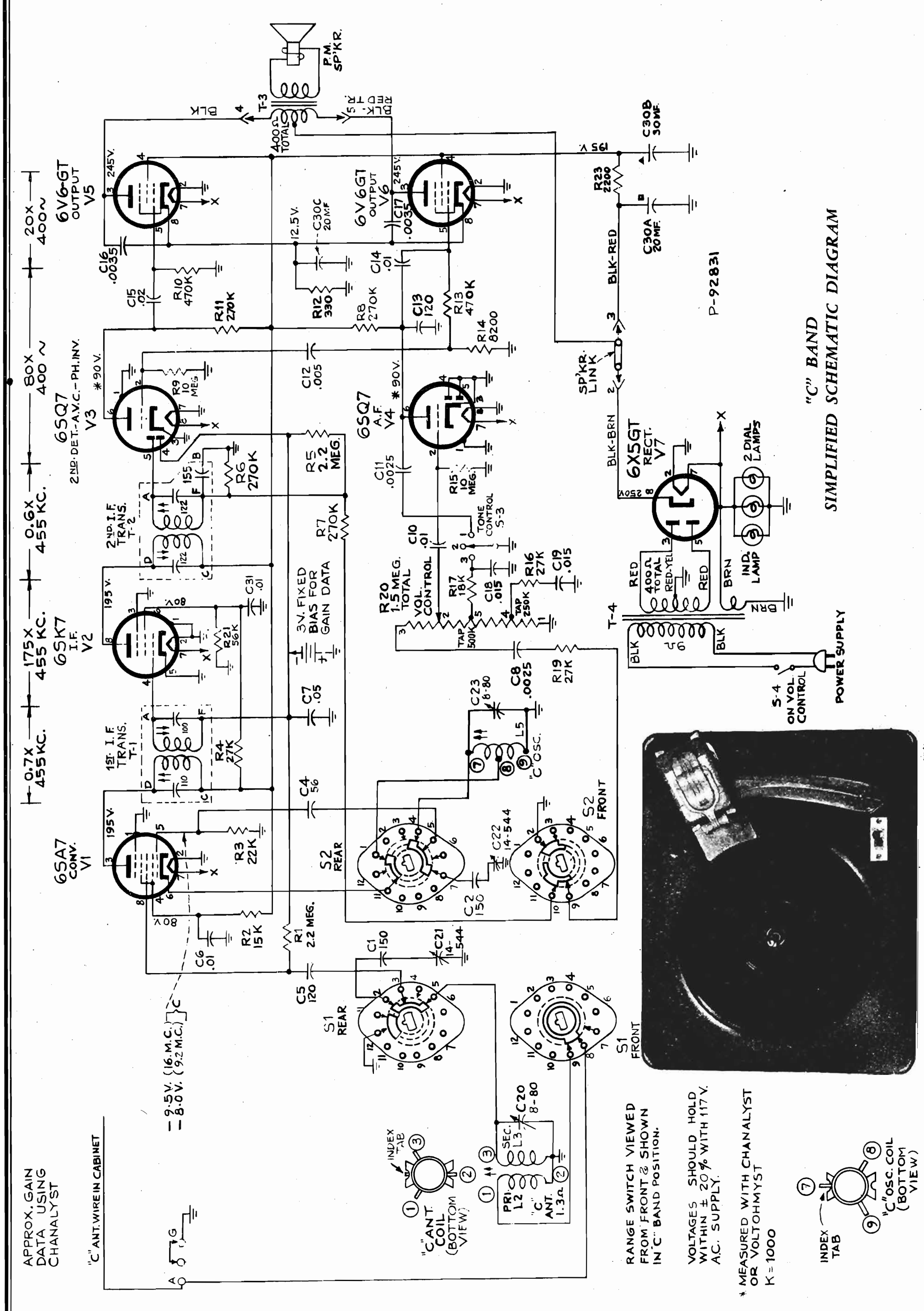
MODEL 77V2,
CHASSIS RC-606C



RECORD CHANGER—TOP VIEW

MODEL 77V2,
CHASSIS RC-606C

RADIO CORP. OF AMERICA

Alignment Procedure

Output Meter Alignment.—If this method is used, connect the meter across the voice coil, and turn the receiver volume control to maximum.

Test Oscillator.—For all alignment operations, connect the low side of the test-oscillator to the receiver chassis, and keep the oscillator output as low as possible to avoid a-v-c action

Calibration Scale.—The dial scale printed in this service note may be temporarily attached to the chassis for quick reference during alignment.

Using Printed Dial Scale.—

1. Cut out the printed dial scale, or make a tracing of the scale.
2. With gang at full mesh the pointer should be set to the second reference mark from the left hand end of the dial backing plate.
3. Place the printed dial scale or the tracing under the pointer so that the extreme left scale graduations coincide with the pointer. Use scotch tape to hold the dial scale in place.

Note.—It is not recommended that the glass dial scale in the cabinet be removed as an alignment reference. This glass dial scale is fastened to the bezel with sheet metal lugs bent over the scale to hold it in place. Removing the glass dial scale will necessitate bending the lugs, resulting in their weakening and subsequent breakage.

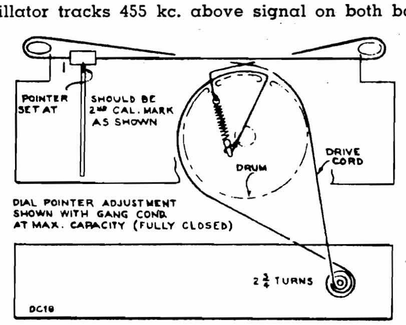
"C" Band Reception.—For best reception on "C" band with an outside antenna, adjust the trimmer screw of C20 on the antenna coil. Turn screw carefully with an insulated screwdriver (RCA Stock No. 31031) while the receiver is tuned to a station in the 31-meter band. If returning to internal antenna at any time, close the link on the center terminal and readjust "C" band antenna trimmer C20 for best reception on 31-meter band.

For additional information, refer to booklet, "RCA Victor Receiver Alignment."

Steps	Connect high side of test oscillator to—	Tune test oscillator to—	Turn radio dial to—	Adjust the following for maximum peak output
1	6SK7 grid in series with .01 mfd.	455 kc.	Broadcast Quiet Point at 550 kc. end of dial	Top and bottom T-1 (2nd I-F Trans.)
2	6SA7 grid in series with .01 mfd.	455 kc.	Broadcast Quiet Point at 550 kc. end of dial	Top and bottom T-2 (1st I-F Trans.)
3	Yellow lead on loop in series with 200 mmfd. (link closed)	1,400 kc.	Broadcast 1400 kc.	C24 (osc.)
4	Yellow lead on loop in series with 200 mmfd. (link closed)	600 kc.	Broadcast 600 kc.	L4 (osc.) Rock gang
5	Yellow lead on loop in series with 200 mmfd. (link closed)	Repeat steps 3 and 4.		
6	Antenna terminal in series with 47 mmfd.	15.2 mc.	Short Wave 15.2 mc.	C23 (osc.)* C20 (ant.)
7	Antenna terminal in series with 47 mmfd.	9.5 mc.	Short Wave 9.5 mc.	L5 (osc.) L3 (ant.)
8	Antenna terminal in series with 47 mmfd.	Repeat steps 6 and 7		
9	Install and connect chassis in cabinet with link closed. Tune in a radiated signal of 1400 kc. on broadcast band and peak C32 on loop.			

* Use minimum capacity peak if two can be obtained. Check for selection of correct peak by tuning the receiver to approximately 14.3 mc., where a weaker signal should be received.

Oscillator tracks 455 kc. above signal on both bands.

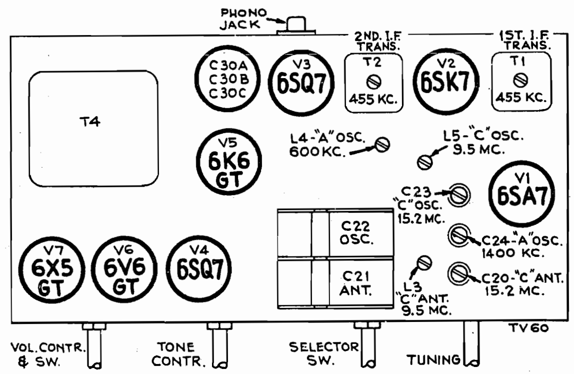


DIAL INDICATOR AND DRIVE MECHANISM

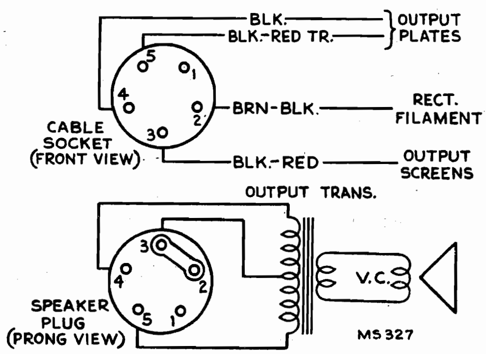
Critical Lead Dress:

1. Dress all A. C. leads away from volume control.
2. Dress lead from top tap of volume control to tone switch along front apron of chassis.
3. Dress R9 and R15 down near chassis base.

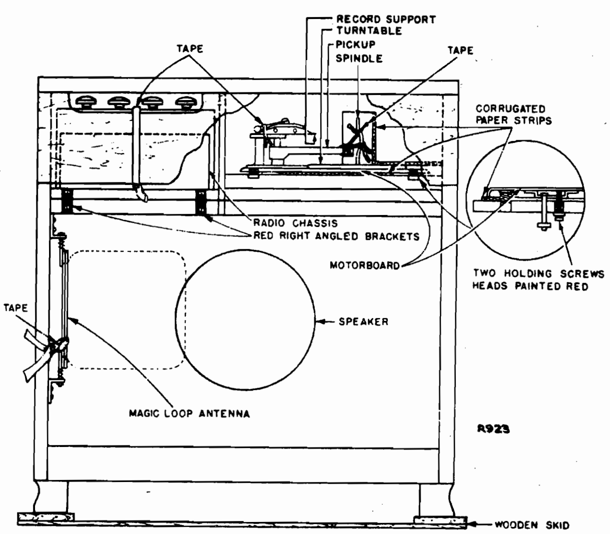
Note.—In order to remove the chassis from the cabinet, remove the knobs and the connecting cables, then unscrew the four slotted hex head screws from the two "L" brackets bolted to the rear of the chassis. The chassis may then be slid out toward the bottom rear of the cabinet. Do not remove the hinge screws or the two large nuts in the rear of the chassis. When replacing the chassis, make sure that the tapered pins on the front of the chassis fit into the holes on the metal runners attached to the cabinet door.



TOP VIEW



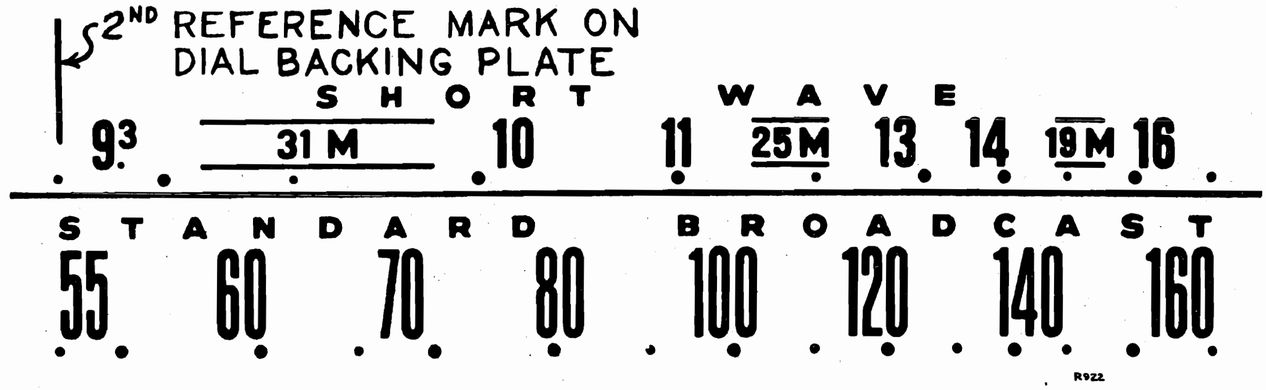
SPEAKER CONNECTIONS



BACK VIEW

RADIO CORP. OF AMERICA

MODEL 77V2,
CHASSIS RC-606C



The dial scale drawing shown is a full size reproduction. It can be used as a reference in alignment procedure.

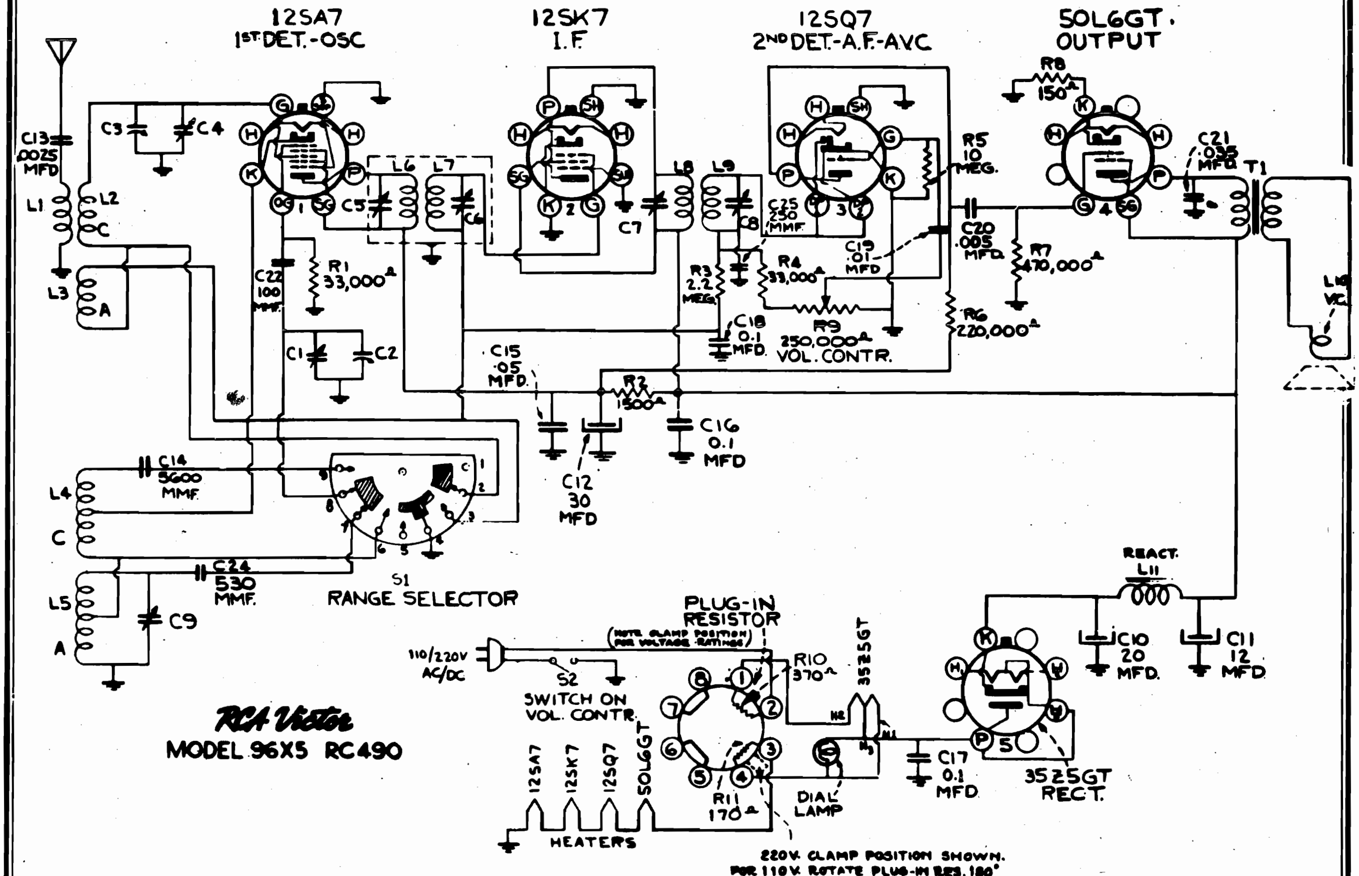
Replacement Parts

For Record Changer Parts refer to Service Data for Model 960260-1

STOCK No.	DESCRIPTION
	CHASSIS ASSEMBLIES (RC-606C)
71601	Board—"Ant. ground" board
71606	Bracket—Dial bracket with drive cord pulley (L. H.)
71605	Bracket—Dial bracket with drive cord pulley (R. H.)
71615	Capacitor—Ceramic, 27 mmf. (C9)
71924	Capacitor—Ceramic, 56 mmf. (C4)
71610	Capacitor—Mica trimmer, 3 sections 8-80 mmf. (C20, C23, C24)
71614	Capacitor—Ceramic, 120 mmf. (C5, C13)
39632	Capacitor—Silvered mica, 150 mmf. (C1, C2)
71613	Capacitor—Mica, 640 mmf. (C3)
70601	Capacitor—Tubular, .002 mfd., 400 volts (C33)
70602	Capacitor—Tubular, .0025 mfd., 400 volts (C8, C11)
70646	Capacitor—Tubular, .0035 mfd., 1000 volts (C16, C17)
70606	Capacitor—Tubular, .005 mfd., 400 volts (C12)
70610	Capacitor—Tubular, .01 mfd., 400 volts (C6, C10, C14, C31)
70572	Capacitor—Tubular, .015 mfd., 400 volts (C18, C19)
70611	Capacitor—Tubular, .02 mfd., 400 volts (C15)
70615	Capacitor—Tubular, .05 mfd., 400 volts (C7)
71976	Capacitor—Comprising 1 section 20 mfd. 450 volts, 1 section 30 mfd. 350 volts and 1 section 20 mfd. 25 volts (C30A, C30B, C30C)
71633	Coil—"A" band oscillator coil (L4)
71632	Coil—"C" band antenna coil (L2, L3)
71634	Coil—"C" band oscillator coil (L5)
71600	Condenser—Variable tuning condenser (C21, C22)
70342	Control—Volume control and power switch (R20, S4)
72953	Cord—Drive cord (approx. 45" overall length)
71609	Drum—Drive drum
72069	Grommet—Rubber grommet for rear mounting feet
70930	Grommet—Rubber grommet for mounting tuning condenser
71608	Indicator—Station selector indicator
71607	Plate—Dial back plate
38832	Plug—Pin plug for loop lead
12493	Plug—Speaker cable plug, 5 contact (female)
72602	Pulley—Drive cord pulley mounted on dial bracket
	Resistor—330 ohms, 1 watt (R12)
	Resistor—2,200 ohms, 2 watt (R23)
	Resistor—8,200 ohms, ½ watt (R14)
	Resistor—15,000 ohms, 2 watt (R2)
	Resistor—18,000 ohms, ½ watt (R17)
	Resistor—22,000 ohms, ½ watt (R3)
	Resistor—27,000 ohms, ½ watt (R4, R16, R19)
	Resistor—56,000 ohms, ½ watt (R21)
	Resistor—100,000 ohms, ½ watt (R22)
	Resistor—270,000 ohms, ½ watt (R6, R7, R8, R11)
	Resistor—470,000 ohms, ½ watt (R10, R13, R18)
	Resistor—2.2 megohms, ½ watt (R1, R5)
	Resistor—10 megohms, ½ watt (R9, R15)
71604	Shaft—Tuning shaft
35787	Socket—Input socket
30868	Socket—Motor cable socket, 2 contact (female)
31364	Socket—Pilot lamp socket
31251	Socket—Tube socket
31418	Spring—Indicator cord tension spring
71602	Switch—Range switch (S1, S2)
71603	Switch—Tone control switch (S3)
*70128	Transformer—First I-F transformer (T1)
*70129	Transformer—Second I-F transformer (T2)
*70127	Transformer—Power transformer, 117 volts, 60 cycles (T4)
35969	Washer—"C" washer for tuning shaft
	SPEAKER ASSEMBLIES 92569-1W—RL103-1
13867	Cap—Dust cap
36145	Cone—Cone and voice coil assembly
71560	Plug—5 prong male plug for speaker
71961	Speaker—12" PM speaker complete with cone and voice coil less output transformer and plug
71145	Suspension—Metal cone suspension
37899	Transformer—Output transformer (T3)
	NOTE: If stamping on speaker in instrument does not agree with above speaker number, order replacement parts by referring to model number of instrument, number stamped on speaker and full description of part required.
	MISCELLANEOUS
71819	Bracket—Door check mounting bracket
36461	Button—Plug button
38684	Capacitor—Mica trimmer, 2-20 mmf. (C32)
71820	Check—Radio compartment door check assembly less spring
X1638	Cloth—Grille cloth for walnut instruments
X1639	Cloth—Grille cloth for mahogany instruments
70547	Cover—Compartment lead cover
71769	Decal—Control function decal for walnut or mahogany instruments
71910	Decal—Trade mark decal (RCA Victor)
71966	Decal—Trade mark decal (Victrola)
71817	Dial—Glass dial scale
71816	Escutcheon—Dial scale escutcheon less dial
11889	Grommet—Rubber grommet to cushion chassis front apron (2 required)
72069	Grommet—Rubber grommet for mounting loop
71764	Hinge—Cabinet door hinge (2 required)
13103	Jewel—Pilot lamp cap
71822	Knob—Range switch or tone switch knob
71821	Knob—Volume control or tuning knob
5117	Lamp—Compartment lamp
11765	Lamp—Dial lamp
71813	Loop—Antenna loop complete (L1, C32)
71815	Mounting—One set of hardware to mount record changer—consisting of four springs, two spring washers and two rubber washers
*73187	Pull—Door pull
72324	Shade—Compartment lamp shade
36422	Socket—3 contact socket (female) for loop leads
71818	Spring—Door check spring
30900	Spring—Retaining spring for knobs
71765	Support—Cabinet lid support and hinge
71814	Washer—Rubber washer for door check

MODEL 96X5,
CHASSIS RC-490

RADIO CORP. OF AMERICA



Replacement Parts

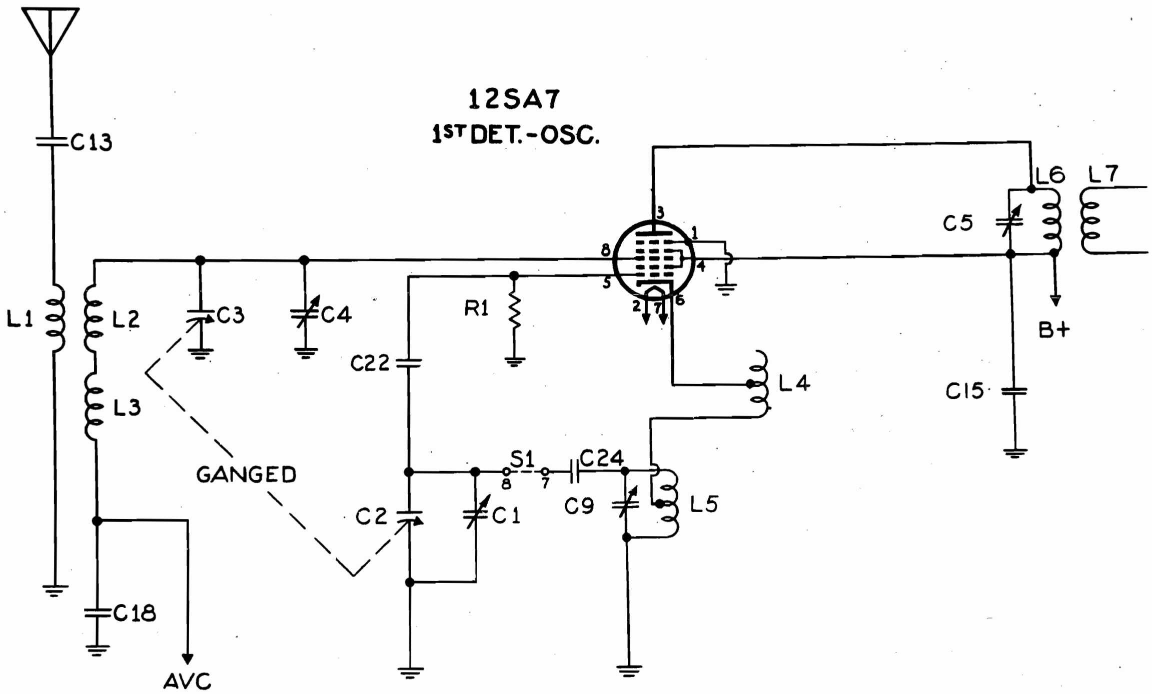
Insist on genuine factory-tested parts, which are readily identified and may be purchased from authorized dealers.

STOCK No.	DESCRIPTION	
	CHASSIS ASSEMBLIES (RC-490)	
34458	Ballast—Ballast resistor tube..	
34461	Capacitor—Electrolytic—comprising 1 section of 20 mfd. and 1 section of 12 mfd. (C10, C11).	
31379	Capacitor—Trimmer — comprising 1 section of 3-30 mmfd. and 1 section of 2-15 mmfd.	
12720	Capacitor—100 mmfd. (C22)	
12488	Capacitor—270 mmfd. (C25)	
32492	Capacitor—530 mmfd. (C24)	
13895	Capacitor—5,600 mmfd. (C14)	
34459	Capacitor—.0025 mfd. (C13)	
33584	Capacitor—.005 mfd. (C20)	
4937	Capacitor—.01 mfd. (C19)	
5196	Capacitor—.035 mfd. (C21)	
32787	Capacitor—.05 mfd. (C15)	
4839	Capacitor—0.1 mfd. (C16, C17, C18)	
34460	Capacitor—Electrolytic—comprising 1 section of 30 mfd. (C12)	
31378	Coil—Antenna coil	
34452	Coil—Oscillator coil	
32536	Condenser—Variable tuning condenser	
32545	Control—Volume control and power switch	
32634	Cord—Indicator pointer drive cord	
32266	Drum—Variable tuning condenser drive drum	
32711	Indicator—Station selector pointer	
11765	Lamp—Dial lamp	
34497	Plate—Dial plate and pulleys assembled	
32541	Pulley—Drive pulley	
34458	Resistor—Ballast resistor tube	

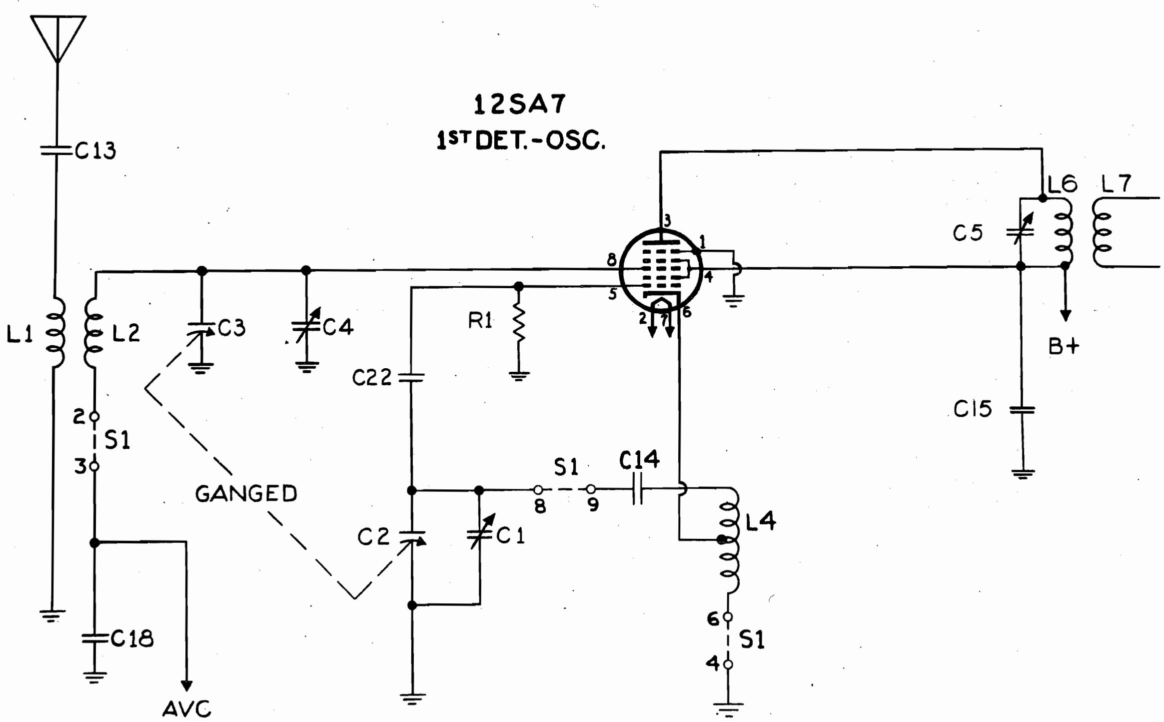
STOCK No.	DESCRIPTION	
13428	Resistor—150 ohms, ¼ watt (R8)	
14499	Resistor—1,500 ohms, ¼ watt (R2)	
12454	Resistor—33,000 ohms, ¼ watt (R1, R4)	
12264	Resistor—220,000 ohms, ¼ watt (R6)	
12285	Resistor—470,000 ohms, ¼ watt (R7)	
12679	Resistor—2.2 megohm, ¼ watt (R3)	
13601	Resistor—10 megohm, ¼ watt (R5)	
4669	Screw—No. 8-32 square head set screw for drum, Stock No. 32266	
31482	Screw—No. 8-32 square head set screw for pulley, Stock No. 32541	
34454	Shaft—Tuning condenser drive shaft	
31365	Socket—Dial lamp socket	
31319	Socket—Tube socket	
31418	Spring—Pointer drive cord spring	
31615	Spring—Tuning condenser drive cord spring	
34451	Switch—Range switch	
34453	Transformer—First i-f transformer	
32534	Transformer—Second i-f transformer	
34458	Tube—Ballast resistor tube	
2917	Washer—"C" washer for shaft, Stock No. 34454	
34457	Washer—Spring washer for shaft, Stock No. 34454	
	MISCELLANEOUS ASSEMBLIES	
34463	Dial—Glass dial scale	
31667	Escutcheon—Station selector escutcheon	
31659	Knob—Tuning, range switch or volume control and power switch	
31646	Spring—Retaining spring for knob, Stock No. 31659	

RADIO CORP. OF AMERICA

MODEL 96X5,
CHASSIS RC-490



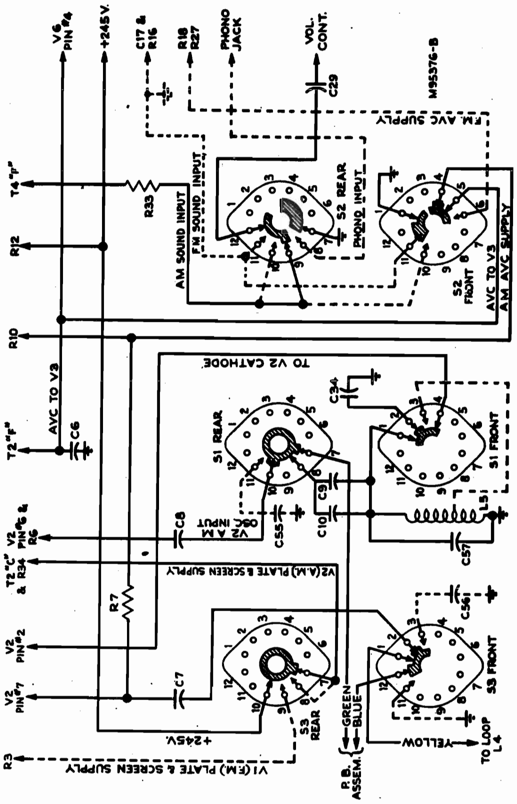
BAND-SWITCH SHOWN
AT 1ST POSITION.
BAND A



BAND-SWITCH SHOWN
AT 2ND POSITION.
BAND C

MODELS 610V, 610V2

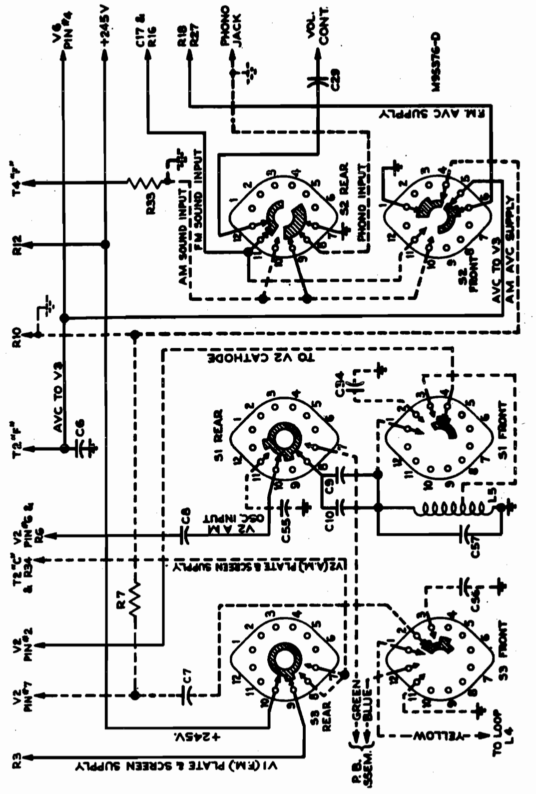
RADIO CORP. OF AMERICA



PUSH BUTTON

Simplified schematic diagram of band switch

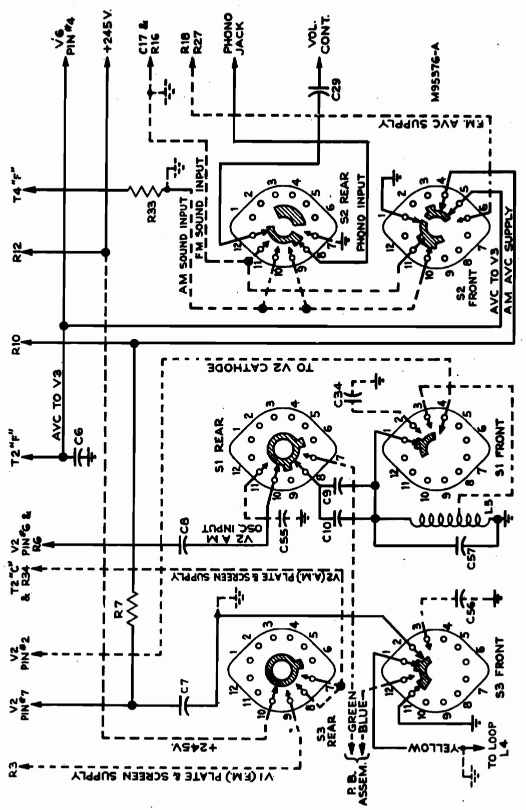
Broken lines (- - -) indicate circuits not in use, some of which may be grounded (indicated by dashed ground symbols) through range switch contacts.



FM

Simplified schematic diagram of band switch

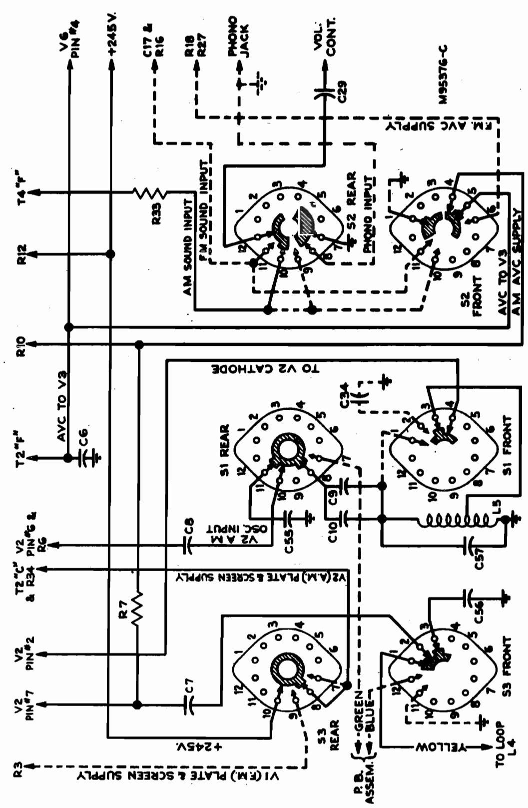
Broken lines (- - -) indicate circuits not in use, some of which may be grounded (indicated by dashed ground symbols) through range switch contacts.



PHONO

Simplified schematic diagram of band switch

Broken lines (- - -) indicate circuits not in use, some of which may be grounded (indicated by dashed ground symbols) through range switch contacts.



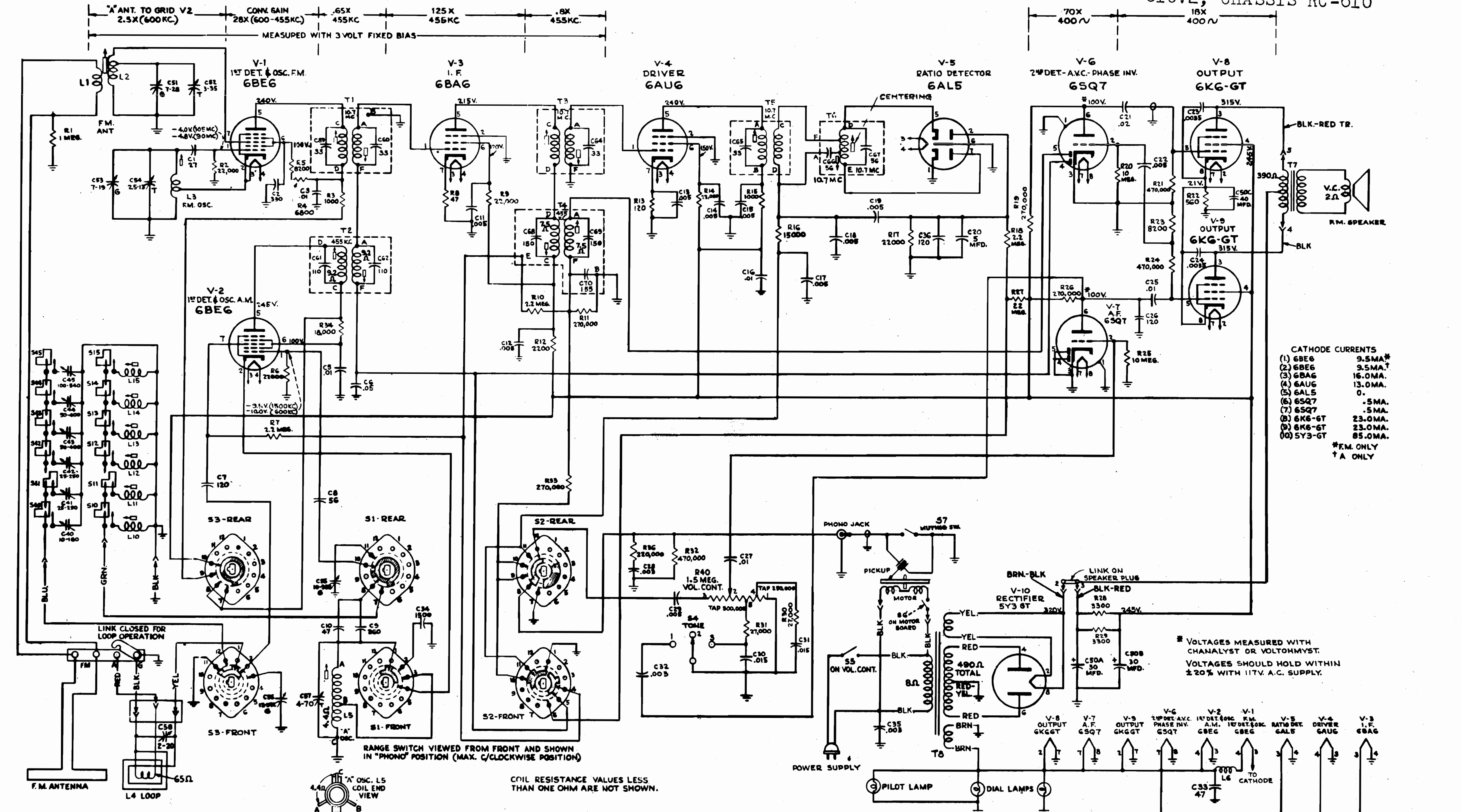
DIAL TUNING (BC)

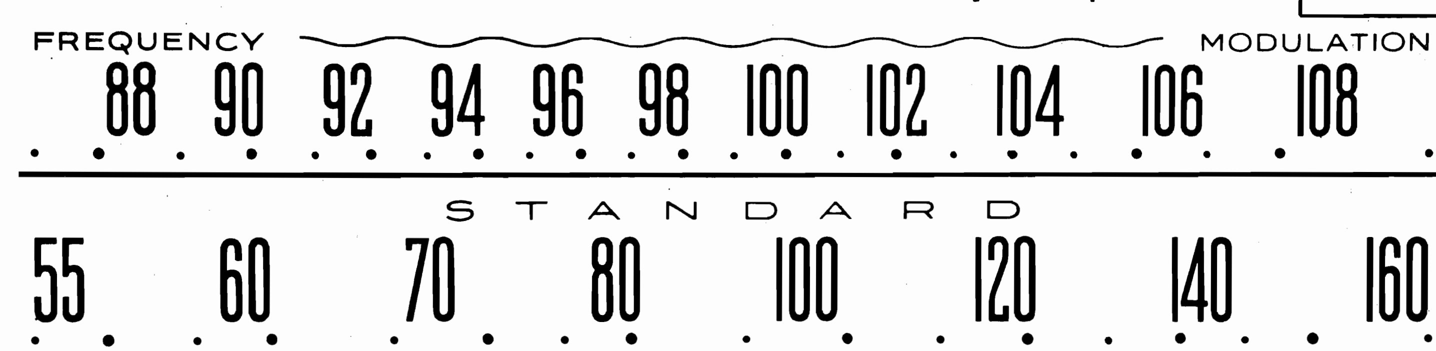
Simplified schematic diagram of band switch

Broken lines (- - -) indicate circuits not in use, some of which may be grounded (indicated by dashed ground symbols) through range switch contacts.

RADIO CORP. OF AMERICA

MODELS 610V1, CHASSIS RC-610C;
610V2, CHASSIS RC-610





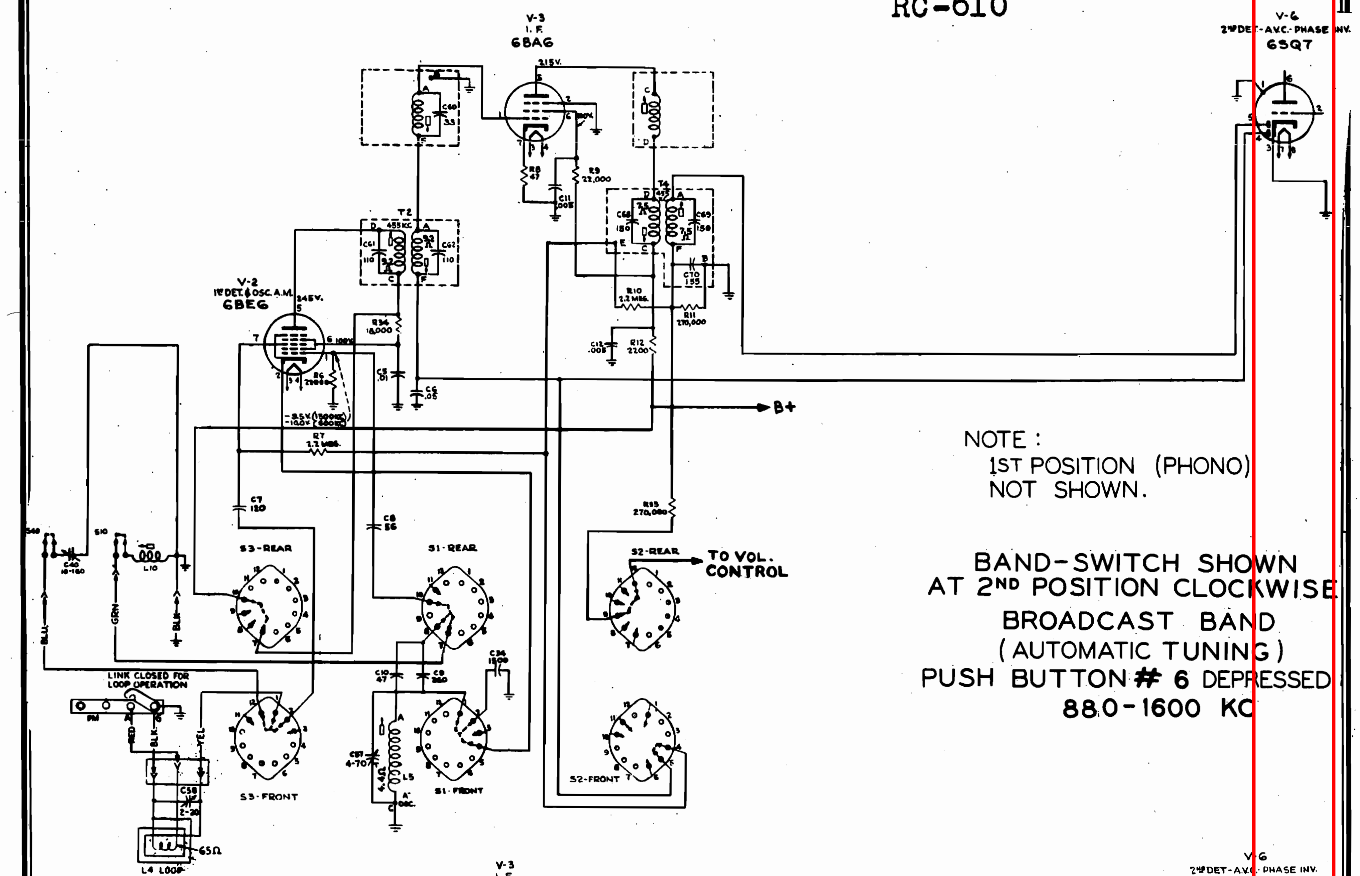
The dial scale drawing shown is a full size reproduction. It can be used as a reference in alignment procedure.

Model 610V1 (RC-610C)

The schematic diagram of RC-610C chassis is similar to that shown above, the major difference being in the ratio detector circuit the schematic diagram of which is shown on page 3, in addition C59 of T1 (1st I.F. FM) is omitted, R13 is 68 ohms, R14 is 33,000 ohms, R18 is 1.5 megohms and C36 is .005 mfd.

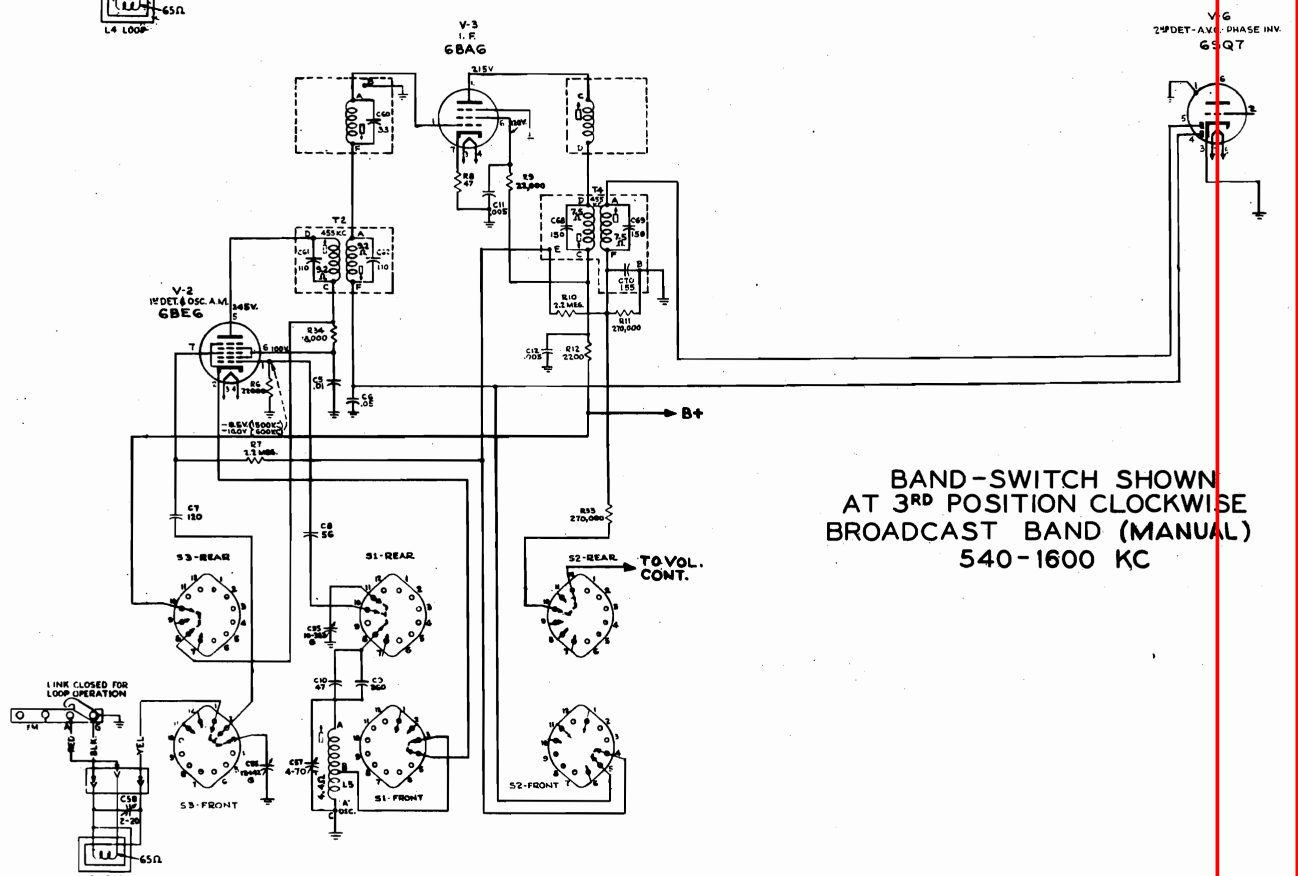
RADIO CORP. OF AMERICA

MODELS 610V1, CHASSIS RC-610C; 610V2, CHASSIS RC-610



NOTE :
1ST POSITION (PHONO) NOT SHOWN.

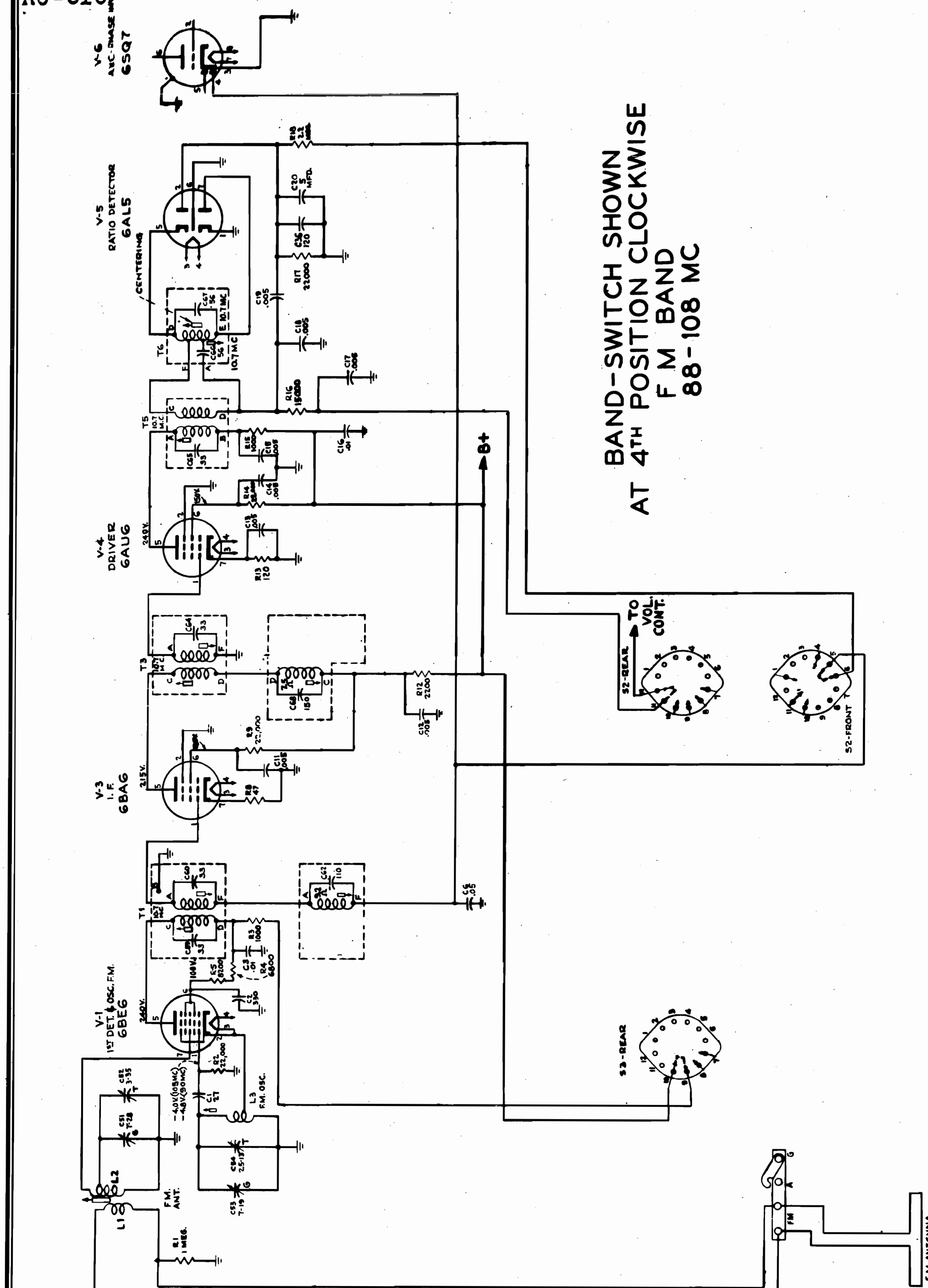
BAND-SWITCH SHOWN AT 2ND POSITION CLOCKWISE
BROADCAST BAND
(AUTOMATIC TUNING)
PUSH BUTTON # 6 DEPRESSED
880-1600 KC



BAND-SWITCH SHOWN AT 3RD POSITION CLOCKWISE
BROADCAST BAND (MANUAL)
540-1600 KC

RADIO CORP. OF AMERICA

MODELS 610V1, CHASSIS RC-610C; 610V2, CHASSIS RC-610



BAND-SWITCH SHOWN AT 4TH POSITION CLOCKWISE
F M BAND
88-108 MC

RADIO CORP. OF AMERICA MODELS 610V1, CHASSIS RC-610C; 610V2, CHASSIS RC-610

Model 610V1

Model 610V2

Electrical and Mechanical Specifications

FREQUENCY RANGES

Standard Broadcast (BC)	540-1600 kc.
Frequency Modulation (FM)	88-108 mc.
Push Button Tuning (PB)	6 stations
1 Station	540-1030 kc.
2 Stations	610-1250 kc.
2 Stations	740-1430 kc.
1 Station	880-1600 kc.
Intermediate Frequency (AM)	455 kc.
Intermediate Frequency (FM)	10.7 mc.

TUBE COMPLEMENT

(1) RCA 6BE6	FM 1st Det.-Osc.
(2) RCA 6BE6	AM 1st Det.-Osc.
(3) RCA 6BA6	IF Amplifier
(4) RCA 6AU6	Driver
(5) RCA 6AL5	FM Ratio Detector
(6) RCA 6SQ7	AM 2nd Det.-AVC-Phase Inverter
(7) RCA 6SQ7	AF Amplifier
(8) RCA 6K6GT	Output
(9) RCA 6K6GT	Output
(10) RCA 5Y3GT	Rectifier

POWER OUTPUT

Undistorted	5 watts
Maximum	6.5 watts

LOUDSPEAKER

Type (92569-1)	12 inch PM
Voice Coil Impedance	2.2 ohms at 400 cycles

POWER SUPPLY RATING (including phono motor)

105-125 volts, 60 cycles .... max. 116 watts

(This instrument can be converted to operate on 50 cycles.)

Pilot Lamps (3) .... Mazda No. 51 6-8 volts 0.2 amp.

Tuning Drive Ratio 16.25:1

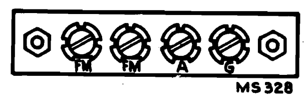
CABINET DIMENSIONS

	Height	Width	Depth
610V1	36"	35-1/16"	18"
610V2	36"	34-9/16"	17-5/8"

Antennas

Under conditions of normal field strength and interference, the RCA Victor antennas installed inside the cabinet will be effective for Frequency Modulation and Standard Broadcasts.

If reception is not satisfactory on one or both of the bands using the built-in cabinet antennas, one or two external antennas may be used. Connections are made to the **antenna terminal board** in the back of the cabinet. External antennas may be



erected indoors or outdoors and should be oriented in direction for requirements of best reception. RCA Television Antenna Stock No. 225 or 226 or the equivalent with 300 ohm transmission line is recommended for an FM external antenna. In this case, disconnect the two leads at the two terminals marked "FM" and attach the ends of the two lead wires from the RCA Television Antenna transmission line in their places. To replace the Standard Broadcast antenna, open the link across the terminals A-G and connect the lead-in from the antenna to terminal A. This antenna should consist of a wire 30 to 60 feet or so in length, mounted in a convenient location as high as possible. A ground connection to G should not be necessary but a flexible wire to a waterpipe or other good ground may be used.

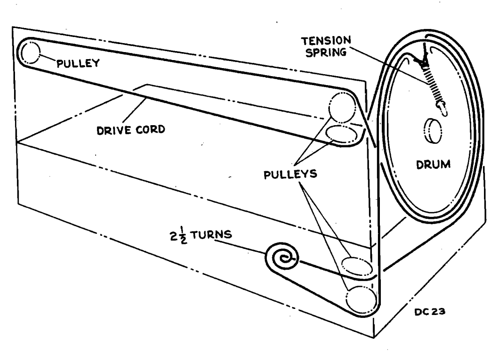
Circuit Description

Models 610V1 and 610V2 have individual built-in antennas for FM and AM coupled to individual 1st Det.-Osc. tubes (6BE6 V1 and V2). The outputs of these two tubes are connected to separate IF transformers (T1 and T2) whose secondaries are in series and connected to the IF amplifier tube (6BA6 V3). The output of V3 is connected to separate IF transformers (T3 and T4) whose primaries are in series. The secondary of T3 (FM IF) is connected to the driver tube (6AU6 V4). The secondary of T4 (AM IF) is connected to the AM second detector (6SQ7 V6). The output of the driver tube (V4) is coupled thru the driver transformer (T5) and ratio detector transformer (T6) to the FM ratio detector tube (6AL5 V5). [In 610V1 the functions of both T5 and T6 are combined in one unit (T5).]

The audio outputs of the AM second detector and the FM ratio detector are connected thru a section of the range switch to the volume control input.

The B+ supply (+245 V) to the plates and screen grids of V1 and V2 is controlled thru a section of the range switch.

Simple AVC is used on AM and is applied to both the IF amplifier (V3) and the AM 1st detector (V2). Delayed AVC is used on FM and is applied only to the IF amplifier (V3). The AVC distribution is controlled thru a section of the range switch.



DIAL INDICATOR AND DRIVE MECHANISM

MODEL 610V1, CHASSIS RC-610C **RADIO CORP. OF AMERICA** MODEL 610V2, CHASSIS RC-610

Alignment Procedure

Alignment Indicators:

An RCA VoltOhmyst or equivalent meter is necessary for measuring developed d-c voltage during FM alignment. Connections are specified in the alignment tabulation below. An output meter is also necessary to indicate minimum audio output during FM Ratio Detector alignment. Connect the output meter across the speaker voice coil.

The RCA VoltOhmyst can also be used as an AM alignment indicator, either to measure audio output or to measure a-v-c voltage.

When audio output is being measured the volume control should be turned to maximum.

Signal Generator:

For all alignment operations, except FM IF-RF, connect the low side of the signal generator to the receiver chassis. The output should be adjusted to provide accurate resonance indication at all times. If output measurement is used for AM alignment the output of the signal generator should be kept as low as possible to avoid a-v-c action.

Calibration Scale.—The dial scale printed in this service note may be temporarily attached to the chassis for quick reference during alignment.

Using Printed Dial Scale.—

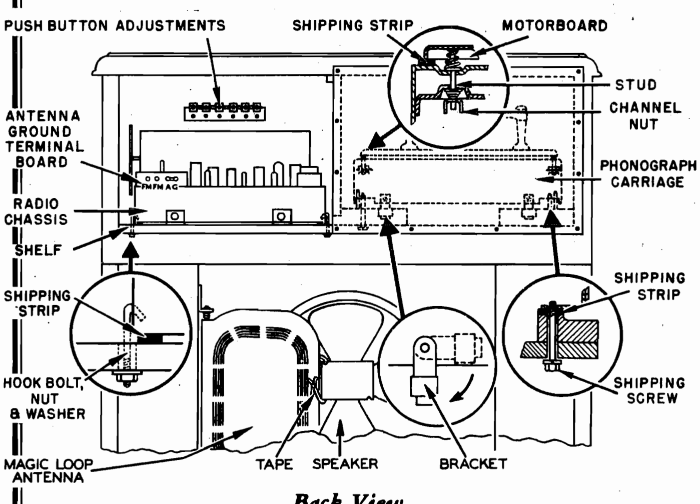
1. Cut out the printed dial scale, or, better still, make a tracing of the scale.
2. With gang at full mesh the pointer should be set to the first reference mark from the left hand end of the dial backing plate.
3. Place the printed dial scale or the tracing under the pointer so that the extreme left scale graduations coincide with the pointer. Use scotch tape to hold the dial scale in place.

Note.—It is not recommended that the glass dial scale in the cabinet be removed as a nalignment reference. This glass dial scale is fastened to the bezel with sheet metal lugs bent over the scale to hold it in place. Removing the glass dial scale will necessitate bending the lugs, resulting in their weakening and subsequent breakage.

610V1 (RC-610C) FM Ratio Detector Alignment

RANGE SWITCH IN FM POSITION—VOL. CONT. MAXIMUM

Steps	Connect high side of sig. gen. to—	Signal generator output	Adjustments and indications
1	Connect the d-c probe of a VoltOhmyst to the negative lead of the 5 mfd. capacitor, C20, the common lead of the VoltOhmyst to chassis.		
2	Pin 1 of driver tube 6AU6 in series with .01 mfd.	10.7 mc. modulated 30% 400 cycles AM (Approx. .1 volt)	Top core T5 for max. d-c across C20 (Approx. 4 volts) Bottom core T5 for minimum audio output
3	Repeat Step 2 until further adjustment does not improve alignment.		



Back View

610V2 (RC-610) FM Ratio Detector Alignment

RANGE SWITCH IN FM POSITION—VOL. CONT. MAXIMUM

Steps	Connect high side of sig. gen. to—	Signal generator output	Adjustments and indications
1	Connect a 680 ohm resistor between pins 5 and 7 of the ratio detector tube 6AL5. Connect the d-c probe of a VoltOhmyst to the negative lead of the 5 mfd. capacitor, C20, the common lead of the VoltOhmyst to chassis.		
2	Pin 1 of driver tube 6AU6 in series with .01 mfd.	10.7 mc. modulated 30% 400 cycles AM (Approx. .25 volt)	Driver trans. T5, for max. d-c across C20 (Approx. 14.5 volts)
3	Disconnect the VoltOhmyst and the 680 ohm resistor from the 6AL5. Connect two 68,000 ohm resistors (within 1% of each other) in series across the 22,000 ohm resistor R17. Connect the common lead of the VoltOhmyst to the center point of the 68,000 ohm resistors and the d-c probe to terminal "A" of the ratio detector trans. T6. Use 30 volt scale of VoltOhmyst first, reducing to lower scale as required.		
4	Same as Step 2	Same as Step 2	†T6 bottom core for zero d-c balance. †T6 top core for min. audio output.
5	Reconnect VoltOhmyst as in Step 1, omitting 680 ohm resistor.		
6	Repeat Step 2.		
7	Remove ALL connections.		

† Near the correct core position the zero point is approached rapidly and continued adjustment causes the indicated polarity to reverse. A slow approach to the zero point is an indication of severe detuning, and the bottom core should be turned in the opposite direction.

The zero d-c balance and the minimum a-f output should occur at the same point. If such is not the case, the two cores should be adjusted until both occur with no further adjustment of either core. It may be advantageous to adjust both cores simultaneously, watching the VoltOhmyst, and an output meter, hooked across the voice coil for the point at which both zero d-c and minimum a-f output occur.

FM IF-RF Alignment

(FM Ratio Detector must be aligned first.)

RANGE SWITCH IN FM POSITION

Steps	Connect sig. gen.	Sig. gen. output	Turn radio dial to—	Adjustment for peak output
1	Connect the d-c probe of a VoltOhmyst to the negative lead of the 5 mfd. capacitor C20 and the common lead to chassis. Turn gang condenser to max. capacity (fully meshed).			
2	High side to one FM ant. term. in series with .01 mfd. Low side to the other FM ant. term.	10.7 mc 30% modulation, 400 cycles AM. Adjust to provide 2 to 3 volts indication on VoltOhmyst during alignment.	Max. capacity (fully meshed)	*Using alternate loading: T3 bottom core (sec.) T3 top core (pri.) T1 bottom core (sec.) T1 top core (pri.)
3	High side to one FM ant. term. in series with a 120 ohm resistor. Low side to the other FM ant. term in series with a 120 ohm resistor.	106 mc	106 mc	C54 osc. C52 ant.
4	Same as Step 3.	90 mc	90 mc	L3 osc. L2 ant.
5	Repeat Steps 3 and 4 until further adjustment does not improve calibration.			

* Alternate loading involves the use of a 680 ohm resistor to load the plate winding while the grid winding of the SAME TRANSFORMER is being peaked. Then the grid winding is loaded with the resistor while the plate winding is peaked. Only one winding is loaded at any one time. Remove the 680 ohm resistor after T3 and T1 have been aligned.

RADIO CORP. OF AMERICA

MODELS 610V1, CHASSIS RC-610C; 610V2, CHASSIS RC-610

AM Alignment

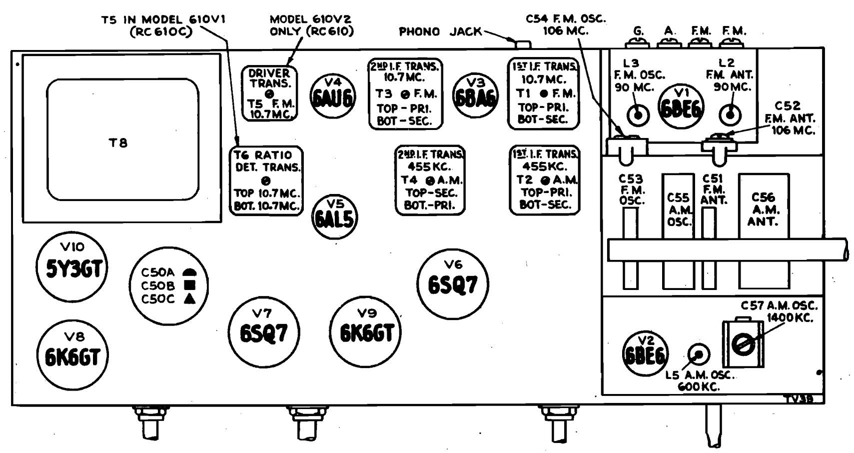
(Correct alignment of the 455 kc. IF requires that the 10.7 mc. IF be aligned previously.)

RANGE SWITCH IN BC POSITION

Steps	Connect high side of sig. gen. to—	Sig. gen. output	Turn radio dial to—	Adjust for peak output
1	AM converter grid 6BE6 V-2 in series with .01 mfd.	455 kc	Quiet point at low freq. end.	*T4 top core (sec.) *T4 bottom core (pri.)
2				*T2 bottom core (sec.) *T2 top core (pri.)
3	"A" terminal of terminal board at rear of chassis in series with 200 mmf. (link open)	1400 kc	1400 kc	C57 osc. C58 ant. (loop)
4		600 kc	600 kc	L5 osc. (Rock gang)
5	Repeat Step 3.			
6	After chassis and loop have been installed in cabinet, adjust C58 for max. output on a weak station near 1400 kc.			

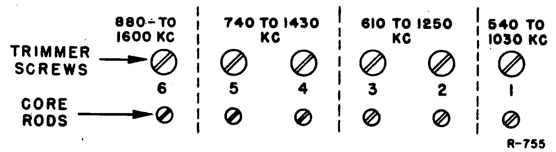
*Align T4 and T2 by means of alternate loading as explained under FM IF-RF alignment. Use a 47,000 ohm resistor instead of a 680 ohm resistor.

Oscillator frequency is above signal frequency on both AM and FM.



Top View Chassis

Push Button Adjustment



The push buttons connect to separate magnetite-core oscillator coils and separate loop circuit trimmers which must be adjusted for the desired stations. Use an insulated screwdriver or alignment tool such as RCA Stock No. 31031. Allow about five minutes warm-up period before making adjustments.

The procedure is as follows:

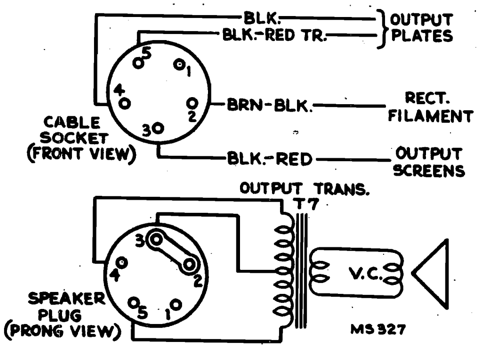
1. Make a list of the desired stations, arranged in order from low to high frequencies.
2. Turn the range switch to the broadcast position and manually tune in the first station on the list.
3. Turn range switch to push-button position and press in the left-hand button.
4. Adjust core rod No. 1 to receive the first station. To secure the best adjustment, rotate the loop for least pickup, and adjust core rod No. 1 for peak output.
5. Adjust trimmer screw No. 1 for peak output on the first station.
6. Proceed in the same manner to adjust for the remaining stations.
7. Repeat adjustments for best results.

On the 880 to 1,600 kc push-button, the higher frequency stations may be received with core rod No. 6 either in or out (oscillator frequency either 455 kc below or 455 kc above the station frequency). The adjustment with this core in its out position (oscillator frequency 455 kc above the station frequency) is the correct one.

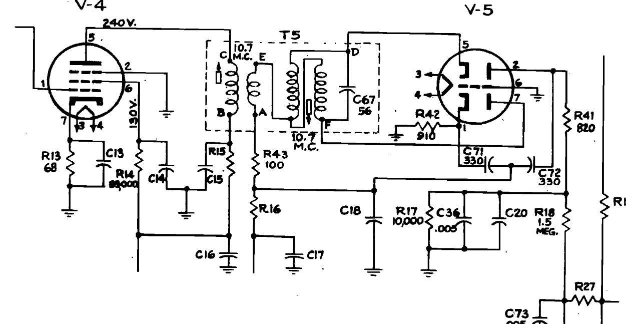
NOTE: Clockwise adjustment of cores and trimmers tunes the circuits to lower frequencies.

Critical Lead Dress

1. Dress capacitor C1 near chassis base.
2. Dress lead from pin 5, V-1, to terminal C, of transformer T1, as near bottom of FM shelf as possible.
3. The lead from capacitor C23 to the high side of the volume control must be dressed next to chassis along front apron.
4. Dress resistor R20 near chassis base.
5. Dress all A.C. leads away from volume control.
6. Solder FM antenna coil primary leads to terminal board with as short a lead length as is practical.
7. Make all FM leads as short as possible.
8. The lead from pin 2, V-3, to chassis ground must be dressed as close to base and as near to the back apron as possible. This lead provides degeneration for the IF stage and neither its length nor the point at which it is grounded to the chassis should be changed.
9. Dress all leads away from the 3300 ohm resistors R28 and R29.



SPEAKER CONNECTIONS



RATIO DETECTOR CIRCUIT 610V1 (RC-610C)

Schematic Diagram otherwise same as 610V2 (RC-610), except C59 of 1st I.F. Trans (FM) is omitted.

MODELS 610V1, CHASSIS RC-610C; 610V2, CHASSIS RC-610

RADIO CORP. OF AMERICA

Replacement Parts

STOCK No.	DESCRIPTION
	CHASSIS ASSEMBLIES
	RC-610
70258	Board—"FM-Antenna-Ground" board
72046	Capacitor—Mica trimmer, 2.5-13 mmf. (C54)
71808	Capacitor—Mica trimmer, 3-35 mmf. (C52)
72334	Capacitor—Mica trimmer, 4-70 mmf. (C57)
72570	Capacitor—Ceramic, 27 mmf. (C1)
39042	Capacitor—Ceramic, 47 mmf. (C10, C33)
71924	Capacitor—Ceramic, 56 mmf. (C8)
71614	Capacitor—Ceramic, 120 mmf. (C7, C26, C36)
72571	Capacitor—Mica, 330 mmf. (C2)
*72572	Capacitor—Mica, 360 mmf. (C9)
39656	Capacitor—Mica, 1500 mmf. (C34)
70646	Capacitor—Tubular, .0035 mfd., 1000 volts (C23, C24)
72573	Capacitor—Tubular, .003 mfd., 400 volts (C28, C32)
71087	Capacitor—Molded paper, .003 mfd., 1000 volts (C35)
72490	Capacitor—Tubular, .005 mfd., 200 volts (C17, C18, C19, C22, C29)
71553	Capacitor—Tubular, .005 mfd., 400 volts (C11, C12, C13, C14, C15)
72120	Capacitor—Tubular, .015 mfd., 200 volts (C30, C31)
71925	Capacitor—Tubular, .01 mfd., 400 volts (C3, C5, C16, C25, C27)
70611	Capacitor—Tubular, .02 mfd., 400 volts (C21)
71551	Capacitor—Tubular, .05 mfd., 200 volts (C6)
72121	Capacitor—Electrolytic, 5 mfd., 50 volts (C20)
*72052	Capacitor—Electrolytic, consisting of 1 section of 30 mfd., 450 volts, 1 section of 30 mfd., 350 volts and 1 section of 40 mfd., 25 volts (C50A, C50B, C50C)
72335	Coil—F.M. antenna coil (L1, L2)
72336	Coil—F.M. oscillator coil (L3)
72574	Coil—Filament choke coil (L6)
72333	Coil—Oscillator coil—"A" band (L5)
72059	Condenser—Variable tuning condenser less mounting bracket and trimmers (C51, C53, C55, C56)
70342	Control—Volume control and power switch (R40, S5)
34662	Cord—Drive cord (approx. 83" overall length) NOTE: Before assembling, stretch to full length.
71799	Grommet—Rubber grommet for mounting R.F. shelf (3 required)
72069	Grommet—Rubber grommet for rear mounting feet (2 required)
71608	Indicator—Station selector indicator
71607	Plate—Dial back plate less dial
30868	Plug—2 contact female plug for motor cable
12493	Plug—5 contact female plug for speaker cable
32641	Plug—3 prong male plug for selector cable or loop cable
36230	Pulley—Drive cord pulley
30732	Resistor—47 ohms, ½ watt (R8)
30189	Resistor—120 ohms, ½ watt (R13)
44632	Resistor—560 ohms, 2 watts (R22)
34766	Resistor—1000 ohms, ½ watt (R3, R15)
71991	Resistor—2200 ohms, 1 watt (R12)
19525	Resistor—3300 ohms, 2 watts (R28, R29)
38887	Resistor—6800 ohms, 1 watt (R4)
14250	Resistor—8200 ohms, ½ watt (R23)
38888	Resistor—8200 ohms, 1 watt (R5)
36714	Resistor—15,000 ohms, ½ watt (R16)
39158	Resistor—18,000 ohms, 2 watts (R34)
30492	Resistor—22,000 ohms, ½ watt (R2, R6, R14, R17)
71989	Resistor—22,000 ohms, 1 watt (R9)
30409	Resistor—27,000 ohms, ½ watt (R30, R31)
14583	Resistor—220,000 ohms, ½ watt (R36)
30651	Resistor—270,000 ohms, ½ watt (R11, R19, R26, R33)
30648	Resistor—470,000 ohms, ½ watt (R21, R24, R32)
30652	Resistor—1 megohm, ½ watt (R1)
30649	Resistor—2.2 megohms, ½ watt (R7, R10, R18)
30992	Resistor—10 megohms, ½ watt (R20, R25)
71917	Resistor—22 megohms, ½ watt (R27)
72055	Shaft—Tuning knob shaft
35787	Socket—Phono input socket
31364	Socket—Lamp socket
72516	Socket—Tube socket, miniature
31251	Socket—Tube socket, octal
31418	Spring—Tension spring for drive cord
*72056	Support—Dial support and pulley bracket complete with four pulleys—R.H.
*72057	Support—Dial support and pulley bracket complete with one pulley—L.H.
*72054	Switch—Range switch (S1, S2, S3)
71603	Switch—Tone switch (S4)
72593	Transformer—First I.F. transformer—F.M. (T1, C59, C60)
71625	Transformer—First I.F. transformer—A.M. (T2, C61, C62)
72723	Transformer—Second I.F. transformer—F.M. (T3, C64)
71631	Transformer—Second I.F. transformer—A.M. (T4, C68, C69, C70)
71935	Transformer—Driver transformer (T5, C65)
71934	Transformer—Ratio detector transformer (T6, C66, C67)
71975	Transformer—Power transformer, 117 volts, 50/60 cycle (T8)
35969	Washer—"C" washer for tuning shaft
	CHASSIS ASSEMBLIES
	RC-610C
	Same as RC-610 except:
72571	Capacitor—Mica, 330 mmf. (C71, C72)
72490	Capacitor—Tubular, .005 mfd., 200 volts (C36, C73)
34763	Resistor—68 ohms, ½ watt (R13)
34765	Resistor—100 ohms, ½ watt (R43)
30158	Resistor—820 ohms, ½ watt (R41)
12531	Resistor—910 ohms, ½ watt (R42)
3078	Resistor—10,000 ohms, ½ watt (R17)
30685	Resistor—33,000 ohms, ½ watt (R14)
31449	Resistor—1.5 megohms, ½ watt (R18)

STOCK No.	DESCRIPTION
*72887	Transformer—1st I.F. transformer—F.M. (T1)
*72888	Transformer—2nd I.F. transformer—F.M. (T3)
*72889	Transformer—Ratio detector transformer (T5)
	Stock Nos. 71614—(120 mmf., C36), 72490 Capacitor, .005 mfd. (C19), 30189—(120 ohms, R13), 30492—(22,000 ohms, R14, R17), 30649—(2.2 meg., R18), 72593 Trans. (T1), 72723 Trans. (T3), 71935 Trans. (T5), 71934 Trans. (T6)—Not used in RC-610C.
	SPEAKER ASSEMBLIES
	92569-1W—RL103-1
13867	Cap—Dust cap
36145	Cone—Cone and voice coil assembly
71560	Plug—5 prong male plug for speaker
71961	Speaker—12" PM speaker complete with cone and voice coil less output transformer and plug
71145	Suspension—Metal cone suspension
37899	Transformer—Output transformer (T7)
	MISCELLANEOUS
*72555	Antenna—Di-pole antenna
*72750	Back—Cabinet back for walnut instruments
*72751	Back—Cabinet back for mahogany instruments
*72907	Back—Cabinet back for blonde instruments
72146	Bezel—Push button bezel—walnut or mahogany instruments
*72906	Bezel—Push button bezel—blonde instruments
71599	Bracket—Pilot lamp bracket
70556	Bumper—Rubber bumper for tray—walnut or mahogany instruments
*72908	Bumper—Rubber bumper for tray—blonde instruments
*72144	Button—Push button
*72583	Cable—Shielded pickup cable complete with pin plug
13103	Cap—Pilot lamp cap
38684	Capacitor—Mica trimmer, 2-20 mmf. (C58)
36424	Capacitor—Mica trimmer, comprising 1 section of 10-160 mmf., 2 sections of 25-250 mmf., 2 sections of 50-400 mmf., and 1 section of 100-540 mmf. (C40, C41, C42, C43, C44, C45)
71892	Catch—Door catch
72157	Clip—Push button bezel spring clip
72050	Coil—P.B. oscillator coil—H.F. (L10, L11, L12)
72051	Coil—P.B. oscillator coil—L.F. (L13, L14, L15)
*72558	Decal—Control marker decal—walnut or mahogany instruments
*72910	Decal—Control marker decal—blonde instruments
71966	Decal—Trade mark decal (Victrola)
71984	Decal—Trade mark decal (RCA Victor)
*72682	Dial—Glass dial scale
*72513	Escutcheon—Dial escutcheon less dial
X1632	Grille—Grille cloth for walnut cabinet for Model 610V2
X1633	Grille—Grille cloth for mahogany cabinet for Model 610V2
X1649	Grille—Grille cloth for blonde cabinet for 610V2
X1643	Grille—Grille cloth for Model 610V1
*72808	Grille—Metal grille for Model 610V1
*72557	Grille—Metal grille for Model 610V2
72441	Guide—Carriage guide, R.H.—walnut or mahogany instruments
*72904	Guide—Carriage guide, R.H.—blonde instruments
72442	Guide—Carriage guide, L.H.—walnut or mahogany instruments
*72905	Guide—Carriage guide, L.H.—blonde instruments
39352	Hinge—Cabinet door hinge—walnut or mahogany instruments
*72911	Hinge—Cabinet door hinge—blonde instruments
71821	Knob—Control knob—walnut or mahogany instruments
72800	Knob—Control knob—blonde instruments
*72807	Knob—Record storage compartment door knob for Model 610V1
71890	Knob—Record storage compartment door knob for Model 610V2
11765	Lamp—Dial lamp—Mazda 51
70544	Loop—Antenna loop (L4, C58)
72563	Marker—Call letter marker
70546	Mounting—One set of hardware to mount record changer
30868	Plug—2 contact female plug for extension cable
30870	Plug—2 prong male plug for extension cable
31048	Plug—Pin plug for pickup cable
*72556	Pull—Door pull for record changer compartment or radio compartment door for Model 610V2
*72806	Pull—Door pull for record changer compartment or radio compartment door for Model 610V1
70551	Retainer—Tray roller retaining strip—L.H.
70552	Retainer—Tray roller retaining strip—R.H.
70554	Roller—Record changer tray roller (6 required)
36422	Socket—3 contact female socket for loop leads or for selector switch cable
72156	Spring—Push button bezel spring
34053	Spring—Push button retaining spring
30900	Spring—Retaining spring for knob
*72582	Stop—Mechanism tray stop
39360	Support—Drop support for record changer compartment door—walnut or mahogany instruments
*72912	Support—Drop support for record changer compartment door—blonde instruments
70545	Support—Loop support bracket (2 required)
*72512	Switch—Push button switch only (S10, S11, S12, S13, S14, S15, S40, S41, S42, S43, S44, S45)
70555	Tire—Rubber tire for record changer tray roller
70553	Tray—Record changer tray—walnut or mahogany instruments
*72909	Tray—Record changer tray—blonde instruments
2917	Washer—"C" washer to fasten rollers

Electrical Specifications

Tubes and Functions
(1) RCA-6K7 .... R-F Amplifier
(2) RCA-6A8 .... First Detector—Oscillator
(3) RCA-6K7 .... I-F Amplifier
(4) RCA-6R7-G .... Second Det., A-F Amp., and A.V.C.
(5) RCA-6V6-G .... Power Output
(6) RCA-6V6-G .... Power Output
Dial Light .... Mazda No. 51, 7.5 volts, 0.2 ampere

Frequency Range .... 550-1,500 kc

Alignment Frequencies
260 kc .... I-F Amplifier
600 kc .... Osc.
1,400 kc .... Osc., Det., Ant.

Power Supply Rating
Supply Voltage .... 6.3 volts
Current Drain .... 9 amperes
Fuse Protection .... 15 amperes

Power Output
Undistorted .... 6 watts
Maximum .... 8 watts

Loudspeaker
Type .... 8-inch Electrodynamic
Voice Coil Impedance .... 3.5 ohms at 400 cycles

Operating Controls .... Left, Manual tuning; Center, Six station push buttons; Right, Power switch—Volume control (small), Tone control (wing knob)

General Description

The Nash—RCA Model AC-3689 is a six-tube, deluxe, custom-built, superheterodyne automobile radio receiver consisting of three units. (1) The control unit containing the tuning mechanism and radio-frequency circuits; (2) the power unit containing the i-f, audio, and power-supply circuits; and (3) the loudspeaker. The i-f signal output of the first-detector — oscillator tube in the control unit is fed through a shielded cable to the power unit. The capacity of the shielded cable is such as to provide the correct shunt fixed capacity for the first i-f transformer primary, and alignment is made by magnetite cores in the i-f transformers.

Among the many features of this receiver are: Mechanical push button tuning for six stations; r-f amplifier stage; automatic volume control; magnetite core antenna, oscillator, and i-f transformers; ignition suppression filters in the antenna and power-supply circuits; push-pull beam power output stage; continuously variable high-frequency tone control; and an eight-inch, dust-proof electrodynamic loudspeaker.

Manual Tuning Mechanism

The manual tuning shaft is connected by a drive cord to the condenser drive-cord drum and the dial-scale pulley (located under dial scale). The "Drive-cord Hookup" shows the cord arrangement and number of turns around shafts. A three-position spring-tension adjustment is provided on the drive-cord drum to permit adjustment of the drive cord tension. Sufficient tension should be used to ensure freedom from backlash or cord slippage without causing excessive push button friction (spring stretched approximately 1/16 inch). The dial scale may be adjusted by loosening the dial nut and turning the scale until the extreme low-frequency end mark on the scale is aligned to the pointer in the escutcheon, or exactly in the center of the dial opening, while the gang condenser is in full-mesh position. See "Adjustments of push-button mechanism" for mechanical adjustments affecting both manual and push-button tuning.

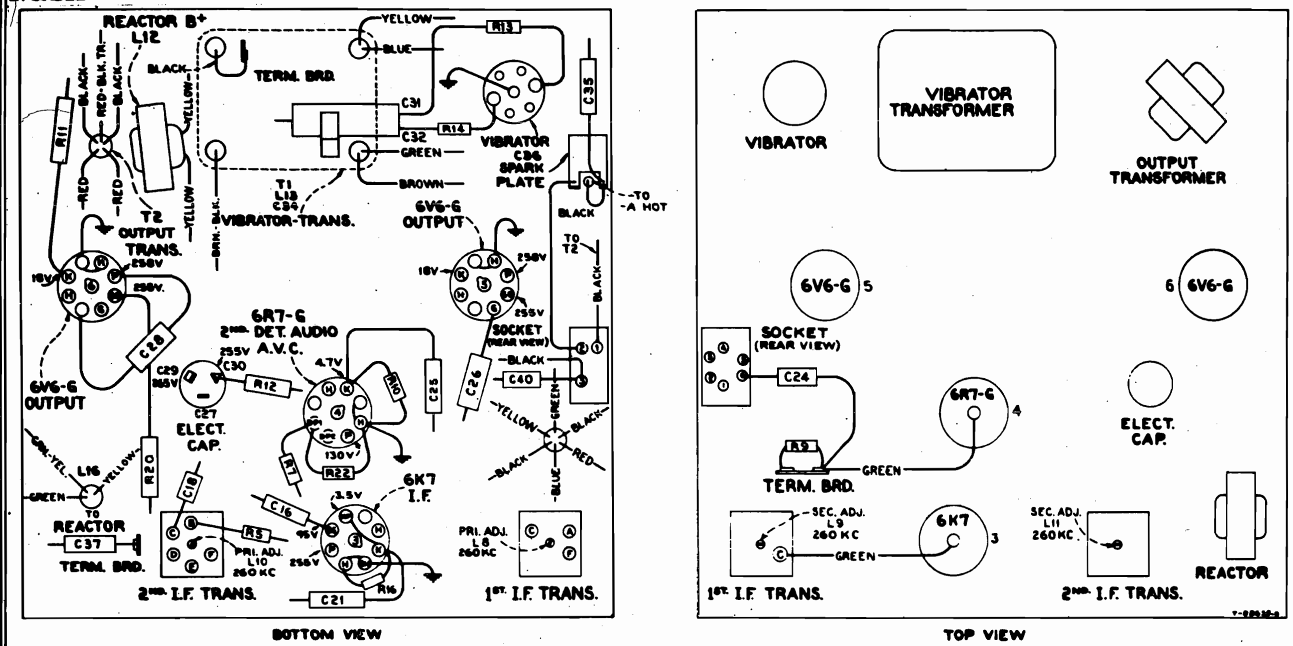
Push-Button Tuning Mechanism

The push-button tuning mechanism is of the mechanical type wherein the movement of a push button actually turns the tuning condenser to any predetermined setting. The movement is actuated through a push arm, cam, rocker plate, and sector gear, which meshes with a scissor gear directly fastened to the tuning-condenser shaft. The scissor gear prevents backlash between the sector gear and tuning condenser. Since the sector gear is mounted directly on the rocker-plate shaft, the position of the rocker plate will accurately determine the position of the tuning condenser.

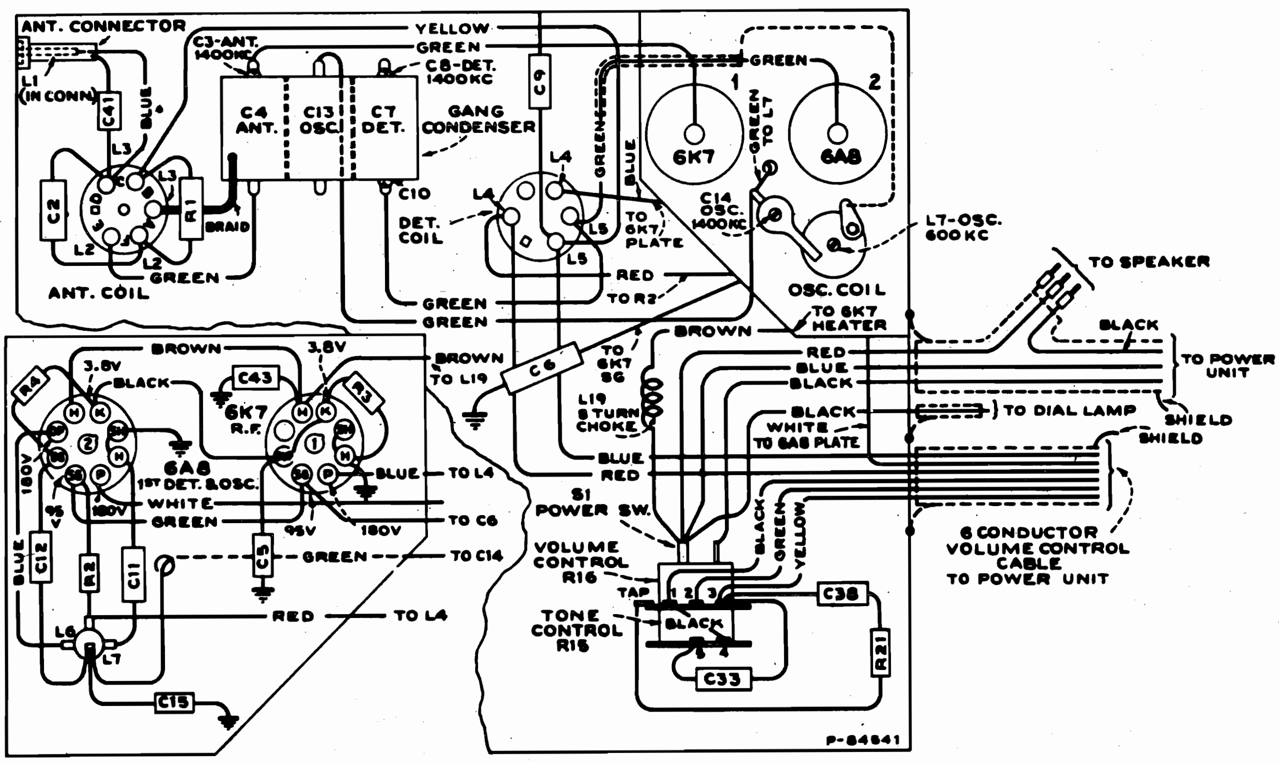
The cams, which determine the condenser stop position for each button, are mounted on the push arms and are locked in place by the push buttons and lock shoes, which press firmly against the cams when the push buttons are tightened. The push buttons should be tightened by hand and never forced with pliers or other tools.

MODEL AC3689,
CHASSIS RC-368,
Nash

RADIO CORP. OF AMERICA



Power Unit Parts, Socket Voltages, and Trimmers



Control Unit Parts, Socket Voltages, and Trimmers

RADIO CORP. OF AMERICA

MODEL AC3689, CHASSIS RC-368, Nash

ALIGNMENT PROCEDURE

Test Oscillator.—For all alignment operations, connect the low side of the test oscillator to the receiver chassis, and keep the output signal as low as possible to avoid a-v-c action.

Output Meter.—Connect the output meter across the speaker voice-coil and turn the receiver volume control and tone control to maximum (fully clockwise).

Dial Calibration.—Rotate the gang condenser to its full-mesh (maximum-capacity) position and then adjust dial scale so that the last calibration mark at the low-frequency end of dial is aligned to the pointer in the escutcheon.

Note 1.—The control unit and power unit (forming a complete receiver) must be aligned together, as proper alignment of the first i-f transformer is dependent upon the capacity of the interconnecting cable.

*** Note 2.**—The total series capacity for steps 3 to 6 must be 60 mmfd. ±10%. This capacitor must be inserted at the antenna connector of the receiver. The lead from the test oscillator to the 60 mmfd. capacitor may be shielded if desired, but no shielding should be used between capacitor and antenna connector.

† Note 3.—Install top cover of control unit, leaving tube cover off for steps 3 to 6.

Note 4.—The negative terminal of battery connects to the "A" lead and the positive terminal to receiver case.

Steps	Connect the high side of test-osc. to—	Tune test-osc. to—	Turn radio dial to—	Adjust the following for max. peak output
1	6K7 I-F grid cap in series with .01 mfd.	260 kc	No Signal 550-750 kc	L10 and L11 (2nd I-F Trans.)
2	6A8 Det. grid cap in series with .01 mfd.	260 kc		L8 and L9 (1st I-F Trans.)
3†	*Ant. connector in series with 60 mmfd.	600 kc	600 kc	L7 (osc.)
4†	*Ant. connector in series with 60 mmfd.	1,400 kc	1,400 kc	C14 (osc.) C8 (det.) C3 (ant.)
5†	*Ant. connector in series with 60 mmfd.	600 kc	600 kc (rock)	L7 (osc.)
6†	*Ant. connector in series with 60 mmfd.	1,400 kc	1,400 kc	C14 (osc.) C8 (det.) C3 (ant.)

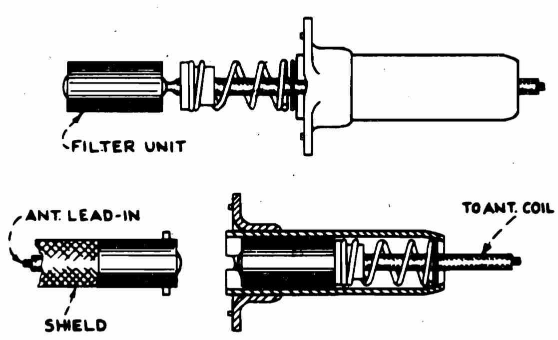
* See Note 2.
† See Note 3.

Precautionary Lead Dress

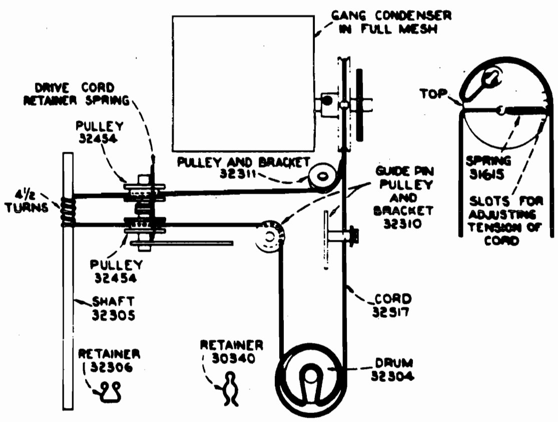
1. All ground leads and leads from C35 and C41 should be as short as possible.
2. Black lead from contact 4 on six-contact socket to terminal "D" on second I-F transformer should be dressed close to chassis and near case.
3. One lug of electrolytic capacitor can must be soldered to chassis.
4. Heater lead from 6K7 I-F to 6R7G should be dressed away from diode terminals.
5. Dress shielded lead from 3-contact socket to terminal board along edge of case, over C35, and away from vibrator socket.
6. Green lead from gang to 6K7 R-F grid must pass through shield clamps to rear of gang and dressed to rear of 6K7 R-F tube.
7. Dress green lead from center section of gang to C14 away from 6K7 R-F grid lead and in front of C9.
8. Dress heavy rubber covered lead from connector cable to 6A8 plate through hole between triangular chassis and case and away from oscillator coil.
9. Dress parts and leads under triangular chassis close to this chassis to prevent possibility of cutting through insulation paper.
10. Yellow lead from antenna to detector coil must be dressed over top of gang.
11. Leads to volume control must be dressed to front of control and away from "A" leads to power switch.
12. Dress all leads clear of gang rotor and push arms.

Loudspeaker

The loudspeaker cone may be centered in the usual manner with three celluloid or paper feelers after gently cutting away the front dust cover. A new cover should be cemented in place upon completion of the adjustment.



Antenna Filter



Drive Cord Hookup

MODEL AC3689,
CHASSIS RC-368,
Nash

RADIO CORP. OF AMERICA

Adjustments of Push-Button Mechanism

The mechanism should be so adjusted that when using either manual tuning or push-button tuning, it operates positively and without bind or backlash. The complete sequence of adjustments are outlined below, however, inspection will generally enable the particular trouble to be located and then only that adjustment and the ones which follow will be necessary without disturbing other adjustments found to be correct. Proceed as follows in the sequence given:

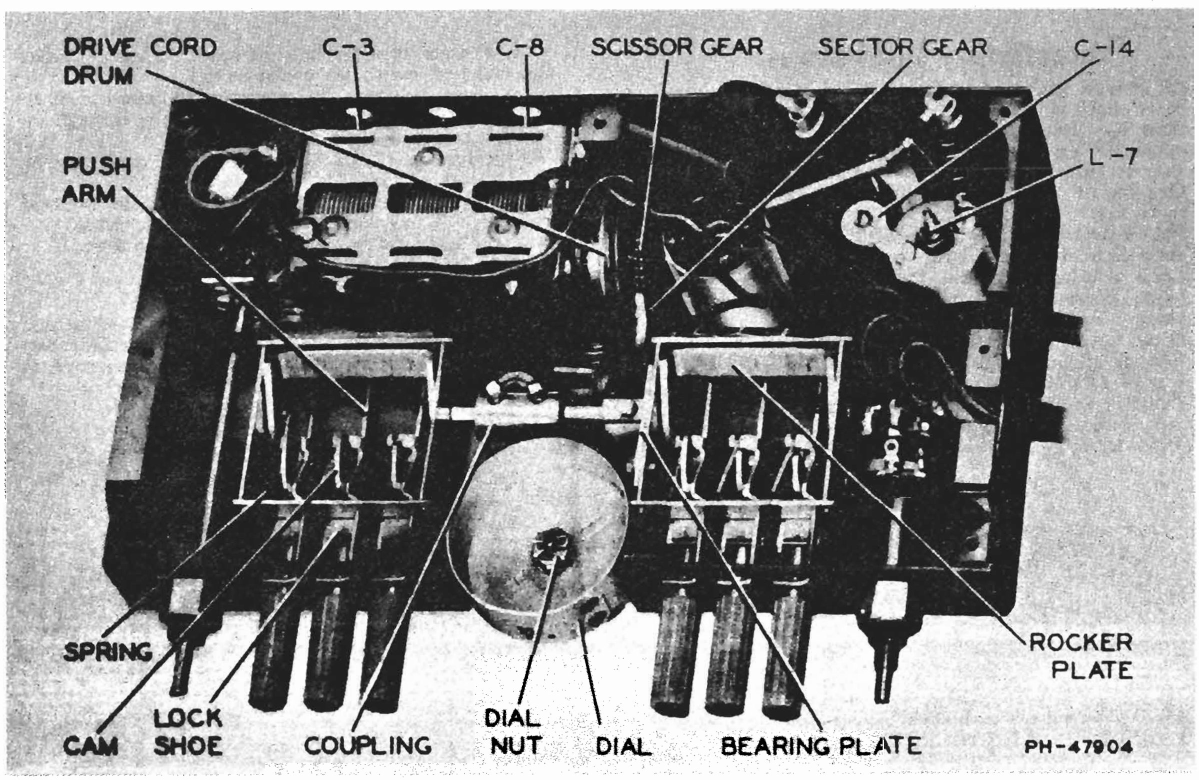
1. Remove dial scale. Loosen coupling set-screws, sector gear set-screws, gang-condenser mounting screws, and bearing-plate screws.
2. Place escutcheon in place and check for proper centering of push buttons in escutcheon. If push buttons are not properly centered, loosen the push-button-unit nuts (underneath) and adjust position of each unit until properly centered. Tighten mounting nuts. The coupling and sector gear must be on rocker-plate shafts but not tightened.
3. Align rocker plates with each other and tighten coupling screws. The position of the set-screws should be such that they definitely clear dial when gang is out of mesh and definitely clear pulley when gang is in full mesh.
4. Rotate rocker-plate shaft to obtain normal position of bearing plate and then tighten screws holding bearing plate.
5. Rotate gang condenser to full mesh, move free (inner) scissor gear one tooth from its free position and then mesh the sector gear with the scissor gear with two end teeth of the sector gear fully meshed. See photograph. Tighten condenser mounting screws. Slide sector gear along shaft until it is correctly aligned with the scissor gear, and with top of rocker plates 1/16 inch from frame tighten screws of sector gear.
6. Adjust mesh of scissor gear with sector gear by shifting gang condenser position. Adjust for minimum backlash without binding.
7. Adjust drive-cord drum on condenser shaft for correct alignment with drive cord, and so that the cord hole is at the top when gang is in full mesh.
8. Lubricate the push arms, rocker-plate shafts, and pulley shafts with light grease or heavy oil (sparingly) to provide free operation, being careful to keep lubricant off of drive cord.
9. With gang condenser fully meshed and drive cord properly installed, adjust dial scale so that the extreme low-frequency end calibration mark is aligned to the pointer in the escutcheon, or exactly in the center of the dial opening.

Adjusting Push Buttons for Stations

The six push buttons should be adjusted for six favorite stations after the receiver is installed and operating.

Any six standard broadcast stations may be chosen. The preferable arrangement is to adjust for stations in the order of frequency, from low to high. Proceed as follows:

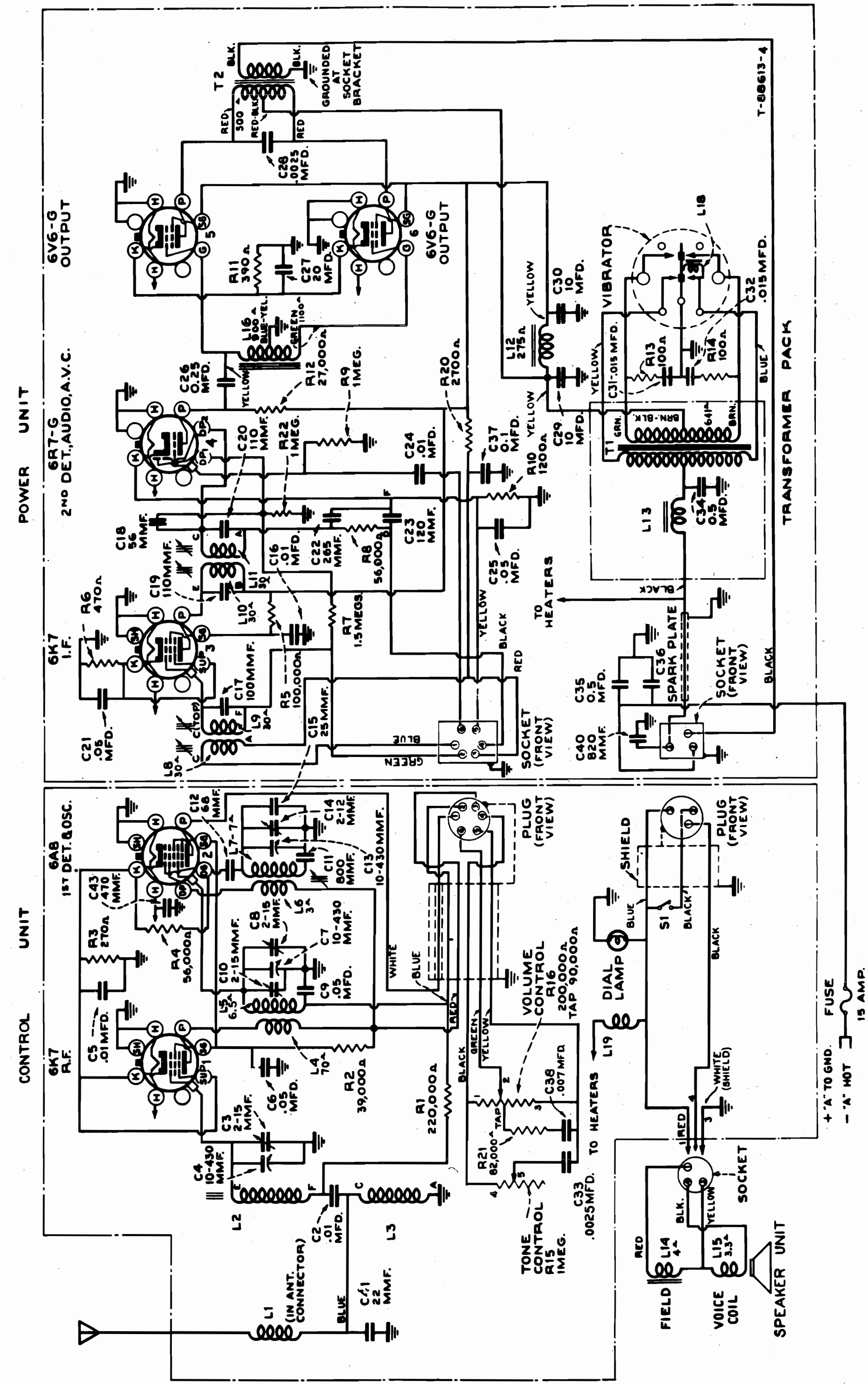
1. Loosen the push buttons one-half turn.
2. Using the tuning control, accurately tune in the first station.
3. With station accurately tuned in, press the first push button fully in and then gently release so as not to jar mechanism.
4. Tighten the push button securely with fingers. Do not force with pliers.
5. Proceed in same manner to adjust the other five push buttons.



Photograph of Control Unit

RADIO CORP. OF AMERICA

MODEL AC3689,
CHASSIS RC-368,
Nash



Schematic Circuit Diagram

MODEL AC3689,
CHASSIS RC-368,
Nash

RADIO CORP. OF AMERICA

REPLACEMENT PARTS

STOCK No.	DESCRIPTION
	CONTROL UNIT ASSEMBLIES
32307	Bushing—Station selector knob shaft bushing
32876	Cable—3-conductor shielded speaker cable complete with male plug
32374	Cable—6-conductor shielded volume control cable complete with male plug
32300	Capacitor—Trimmer 2-15 mmfd. (C14)
14021	Capacitor—22 mmfd. (C41)
31707	Capacitor—25 mmfd. (C15)
13057	Capacitor—68 mmfd. (C12)
30433	Capacitor—470 mmfd. (C43)
32362	Capacitor—800 mmfd. (C11)
5148	Capacitor—.007 mfd., 500 volts (C38)
5107	Capacitor—.0025 mfd., 700 volts (C33)
14393	Capacitor—.01 mfd., 300 volts (C2, C5)
4886	Capacitor—.05 mfd., 400 volts (C6, C9)
32308	Case—Control unit case complete with all riveted and welded parts
31977	Coil—Antenna filter (L1)
32301	Coil—Antenna coil—less shield (L2, L3)
32297	Coil—Oscillator and shield (L6, L7)
31600	Coil—R-f coil—less shield (L4, L5)
32292	Condenser—3-gang variable tuning condenser complete with scissors gear, and drive cord drum (C3, C4, C7, C8, C10, C13)
32294	Control—Volume control, tone control, and power switch (R15, R16, S1)
32517	Cord—Dial drive cord
32291	Coupling—R.h. and l.h. tuning mechanisms coupling with screws
32304	Drum—Dial drive drum
32296	Dial—Dial scale and holder
32290	Gear—Tuning mechanism gear sector
11765	Lamp—Dial lamp—Mazda No. 51
32288	Mechanism—L.h. push button tuning mechanism less push buttons (short cam shaft)
32287	Mechanism—R.h. push button tuning mechanism less push buttons (long cam shaft)
32378	Pin—Contact pin for speaker cable
32377	Plug—3-contact male plug and shell for speaker and "A" lead cable
32375	Plug—6-contact male plug and shell for volume control cable
32311	Pulley—Drive cord intermediate pulley on bracket
32310	Pulley—Drive cord intermediate pulley and guide pin on bracket
32454	Pulley—Drive cord pulley on L.H.P.B. mechanism (11/16-in. dia.)
13454	Resistor—270 ohms, ½ watt (R3)
12266	Resistor—39,000 ohms, ½ watt (R2)
12286	Resistor—56,000 ohms, ½ watt (R4)
14023	Resistor—82,000 ohms, ½ watt (R21)
12264	Resistor—220,000 ohms, ½ watt (R1)
30340	Retainer—Retainer for drive cord pulley, Stock No. 32454, and dial Stock No. 32296
32306	Retainer—Retainer for station selector knob shaft, Stock No. 32305
13471	Ring—Retaining ring for antenna coil
3584	Ring—Retaining ring for r.f. coil
14350	Screw—No. 8-32 x 11/64-in. square head set screw for coupling, Stock No. 32291
31482	Screw—No. 8-32 x 5/16-in. square head set screw for gear sector, Stock No. 32290
31611	Screw—No. 8-32 x ¼-in. square head set screw for drive cord drum on condenser shaft
12252	Screw—No. 8 x ¼-in. S.T. screws for control case
32305	Shaft—Station selector knob shaft
32303	Shield—Antenna coil shield
3623	Shield—R.f. coil shield
32453	Socket—Dial lamp socket and lead
32299	Socket—Octal base tube socket
31615	Spring—Drive cord tension spring
30585	Spring—Push button arm tension spring
	DASH POWER UNIT ASSEMBLIES
12723	Capacitor—56 mmfd. (C18)
32239	Capacitor—110 mmfd. (C19, C20, C23)
32238	Capacitor—110 mmfd. (C17)
13618	Capacitor—265 mmfd. (C22)
12536	Capacitor—820 mmfd. (C40)
5107	Capacitor—.0025 mfd., 700 volts (C28)
14393	Capacitor—.01 mfd., 300 volts (C24)
4858	Capacitor—.01 mfd., 500 volts (C16)
32235	Capacitor—2-sections .015 mfd., 1,000 volts (C31, C32)
4886	Capacitor—.05 mfd., 400 volts (C21, C25)
4839	Capacitor—0.1 mfd., 400 volts (C37)
12484	Capacitor—0.25 mfd., 300 volts (C26)
12741	Capacitor—0.5 mfd., 150 volts (C35)
32240	Capacitor—Comprising 2-sections 10 mfd., 400 volts, and 1-section 20 mfd., 25 volts (C27, C29, C30)
32284	Case—Complete dash power unit case
4288	Connector—"A" lead male connector cap
4286	Ferrule—"A" lead connector ferrule and bushing
5066	Reactor—"B" filter reactor (L12)
30540	Resistor—100 ohms, ½ watt (R13, R14)
30547	Resistor—390 ohms, 2 watts (R11)
30546	Resistor—470 ohms, ½ watt (R6)
12267	Resistor—1,200 ohms, ½ watt (R10)
13204	Resistor—8,200 ohms, 2 watts (R20)
13477	Resistor—27,000 ohms, 1 watt (R12)
11282	Resistor—56,000 ohms, 1/10 watt (R8)
14560	Resistor—100,000 ohms, ½ watt (R5)
13730	Resistor—1 meg., ½ watt (R9, R22)
12201	Resistor—1.5 meg., ½ watt (R7)
5129	Ring—Tube shield ring
12252	Screw—No. 8 x ¼-in. S.T. screw for dash power unit case
32286	Shield—Tube shield comprising 2-halves and 1-ring
32245	Socket—3-contact socket and mounting plate for "A" lead and speaker cable
32244	Socket—6-contact socket and mounting plate for volume control cable
31251	Socket—Octal base tube socket
12241	Socket—6-contact vibrator socket
32236	Transformer—First i-f transformer (L8, L9, C17)
32237	Transformer—Second i-f transformer (L10, L11, C19, C20, C22, C23, R8)
32243	Transformer—Input transformer (L16)
32241	Transformer—Output transformer (T2)
32233	Transformer—Vibrator transformer (T1, L13, C34)
12236	Vibrator—(L18)
	SPEAKER ASSEMBLIES
32315	Cap—Cone center dust cap
32314	Coil—Speaker field coil (L14)
32313	Cone—8-in. speaker cone and voice coil (L15)
32312	Speaker—8-in. dynamic, complete
	MISCELLANEOUS ASSEMBLIES
12291	Body—Fuse holder body (female portion only)
32320	Button—Station selector push button and screw
9829	Cable—Antenna cable approx. 36-in. long, with connector
32438	Capacitor—Ignition coil capacitor
32439	Capacitor—Generator capacitor
4291	Clip—Ammeter clip
32321	Escutcheon—Control panel escutcheon less small dial escutcheon
32322	Escutcheon—Dial escutcheon (small)
4286	Ferrule—Center contact ferrule and bushing for fuse holder
5023	Fuse—15 amp.
4290	Insulator—Fuse holder insulating sleeve
32318	Knob—Dummy knob (1 required)
32316	Knob—Station selector or volume control knob
32319	Knob—Tone control wing knob
32323	Lead—Ammeter "A" lead and clip, complete with female section of fuse holder
13193	Nut—Control unit mounting nut
32317	Screw—No. 8-32 x 7/32-in. headless set screw for knob, Stock No. 32316
32324	Screw — Speaker mounting screws, spacers, washer, and nuts
4284	Spring—Tension spring for fuse holder
12448	Stud—Dash power unit mounting stud, nut, and washers
32437	Suppressor — Distributor suppressor (10,000 ohms)
4285	Washer—Insulating washer for fuse holder
13192	Washer—Felt washer for under control knobs

RADIO DISPLAYS CO.

MODEL Beer Bottle Type

Sparkling Champaign Music, Metz Beer, Melody Beer, Red Top Beer, Imperial Beer, Hyde Park Beer, Gold Star Beer, Country Club Beer, Barbarossa Beer, Mitchell's Beer, Webster Coffee, Pepsi-Cola

TUBE COMPLEMENT

1—12BE6 Oscillator and Mixer tube.
1—12BA6 IF Amplifier tube.
1—50B5 Power Output tube.
1—35W4 Rectifier tube.
1—12AT6 Second Detector and First Audio tube.

ALIGNMENT PROCEDURE

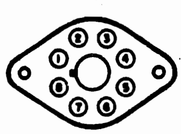
The following equipment is necessary to properly align this chassis:

1. A signal generator which will provide an accurately calibrated signal at the frequencies listed.
2. An output meter.
3. A non-metallic screwdriver.
4. Dummy antenna: —.1 mfd., — 10 mmf.

GENERATOR	CONNECTION AT RADIO	DUMMY ANTENNA	DIAL	TO TUNE TRIMMERS	REMARKS
IF 455 kc.	12BE6 Grid	.1 mfd.	HF end	IF trimmers C D E F	Tune to max.
535 kc.	12BE6 Grid	10 mmf.	LF end	Osc. trimmer B	Set limit of band
1400 kc.	12BE6 Grid	10 mmf.	1400 kc.	Ant. trimmer A	Tune to max.

SOCKET VOLTAGES

TUBE	POSITION	1	2	3	4	5	6	7	8
12BE6	Osc. and Mixer	0	37.5 AC	99	99	—4.2	0	24.5 AC	0
12BA6	IF Amplifier	0	24.5 AC	0	0	0	99	12.5 AC	99
12AT6	2nd Det.—1st Audio	0	0	0	0	0	16	12.5 AC	0
50B5	Power Output	0	85 AC	91.5	99	0	0	37.5 AC	5.9
35W4	Rectifier	0	117 AC	112 AC	0	112 AC	0	85 AC	112



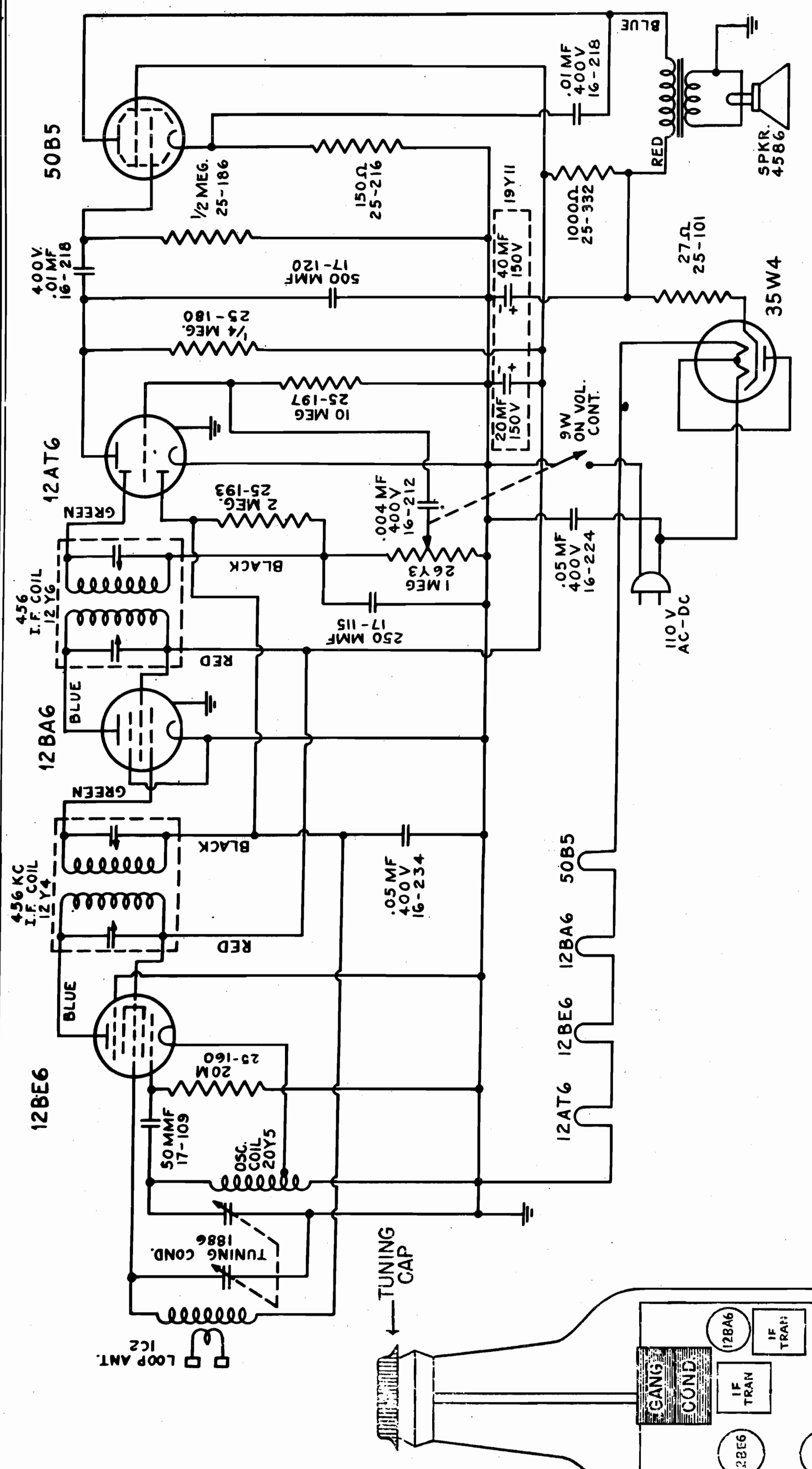
NOTE: All DC voltages measured with a 1000 ohm per volt meter from ON-OFF switch (—B) to socket contact indicated. All AC voltages are measured from ON-OFF switch (—B) to socket contact indicated.
All voltages are positive DC unless otherwise marked.
Volume control full on.
Line voltage 117 volts AC.

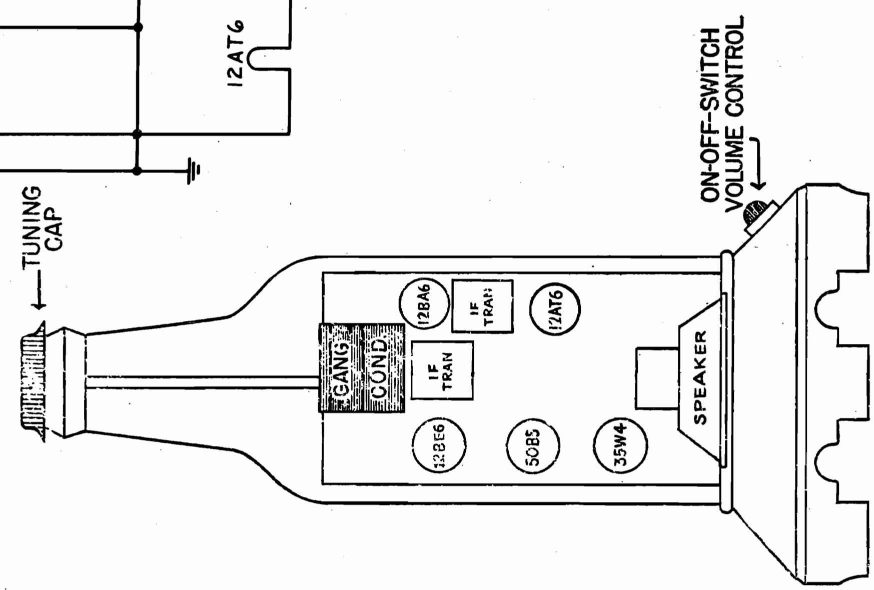
PARTS LIST

Part No.	Description
1C2	Loop antenna assembly.
18B6	Tuning gang condenser.
12Y4	1st I.F. transformer 456 kc.
12Y8	2nd I.F. transformer 456 kc.
15Y11	Two section electrolytic condenser.
26Y3	Vol. control and switch 1 megohm.
20Y5	Oscillator coil.
45B6	4" PM dynamic speaker.

MODEL Beer
Bottle Type

RADIO DISPLAYS CO.

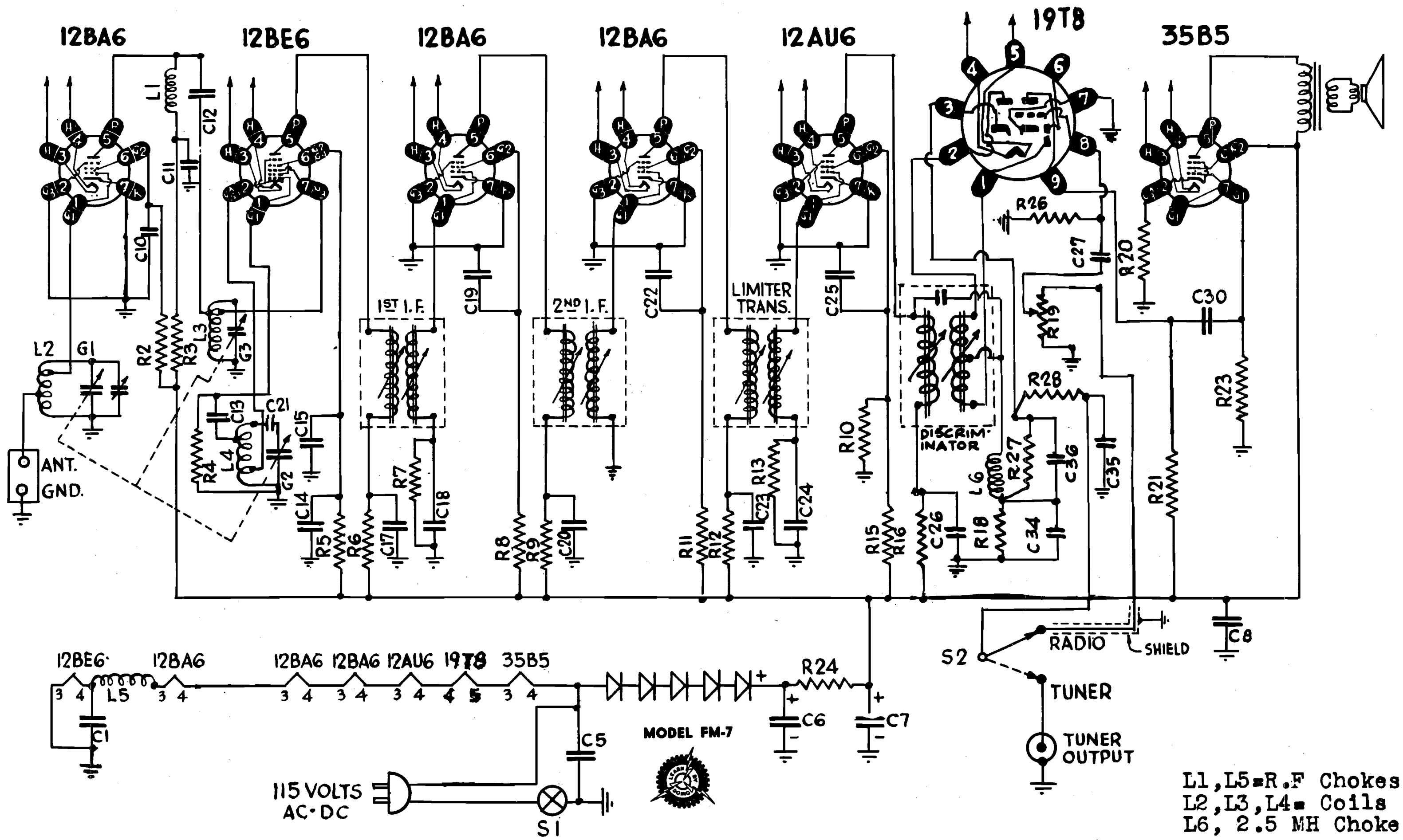




Electrical and Mechanical Specifications

Frequency Range	540-1700 kc.
Intermediate Frequency	455 kc.
Power Supply	105-125 volts AC-DC
Loudspeaker	4 inch Dynamic
V.C. Impedance	3.5 ohms at 400 cycles
Power Output (Undistorted)	.75 watts
Power Output (Maximum)	1.5 watts
Tuning Drive Ratio	1 to 1
Rated Power Input	32 watts

RADIO KITS, INC. MODEL FM-7



L1,L5=R.F Chokes
L2,L3,L4= Coils
L6, 2.5 MH Choke

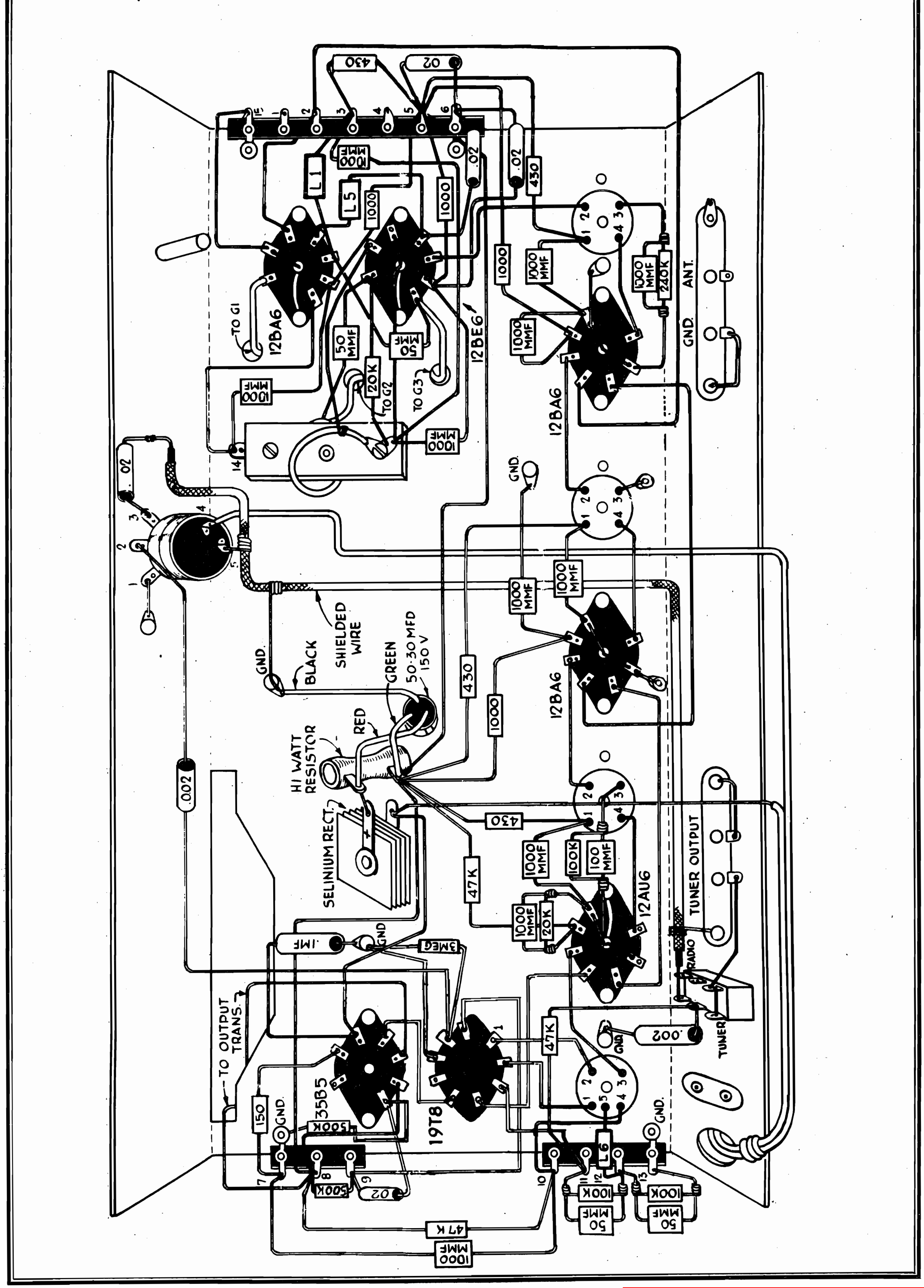
R2-1000	R10-20 K	R19-500 K PoT.	C1-.02	C13-50 mmf#	C22-.001 mf
R3-430	R11-1000	R20-150	C5-.1	C14-1000 mmf*	C23-.001 mf
R4-20 K	R12-430	R21-240 K	C6} C7} 50+30 @ 150V	C15-.02	C24-100 mmf
R5-1000	R13-100 K	R23-500 K	C8-.02	C17-.001	C25-.001 mf
R6-430	R15-47 K	R24-625 10 watt	C10-1000 mmf*	C18-1000mmf*	C26-.001 mf
R7-240 K	R16-47 K	R26-3 megs.	C11-1000 mmf*	C19-.001 mf	C27-.002
R8-1000	R18-100 K	R27-100 K	C12-50 mmf*	C20-.001	C30-.02
R9-430		R28-47 K		C21-100 mmf#	C34-50 mmf
					C35-.002
					C36-50mmf*

Note: Letter K denotes that the value before it is multiplied by 1000
Example: 20K=20,000

* Use ceramic condensers only
\# Already mounted

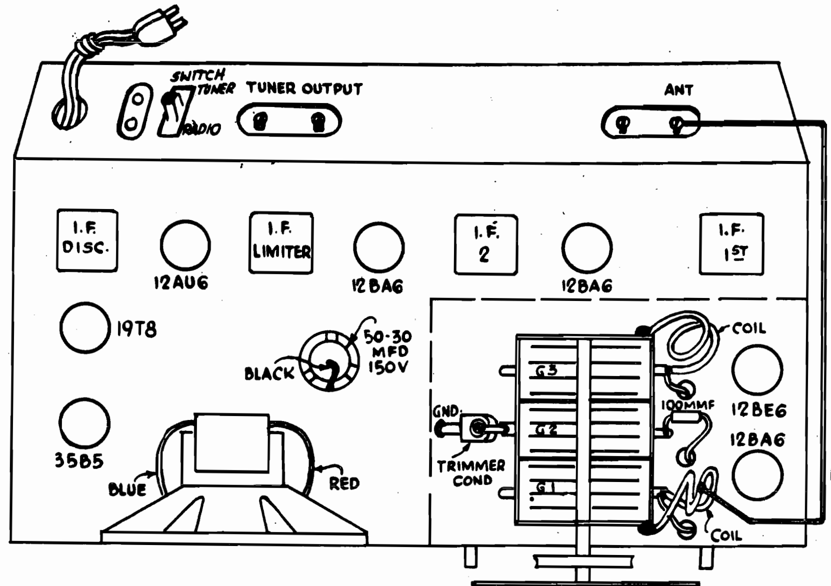
MODEL FM-7

RADIO KITS, INC.



RADIO KITS, INC.

MODEL FM-7



ALIGNMENT PROCEDURE FOR MODEL FM-7

Alignment Procedure without the Use of Instruments

The I.F. and discriminator transformers are pretracked at the factory and will require only to be peaked to compensate for the additional capacities that are introduced when the set is wired. A signal should be tuned in and each I.F. transformer starting from the limiter and working to the first I.F. should be aligned for maximum signal.

R.F. Alignment

Set the dial pointer to correspond with the station transmitting on the high-frequency end of the dial (make certain that the station desired to be received is transmitting at the time alignment is attempted). Adjust osicllator trimmer until the station to be received is tuned in at the proper dial setting. Adjust the spacing on the antenna coil for maximum response at the high-frequency end of the dial. A station is then tuned in at the low-frequency end of the band and the spacing of the R.F. coil is then adjusted for maximum response. Spacing of the coil is accomplished with the aid of an insulated fibre tool or a small wooden wedge.

Discriminator Alignment

The bottom slug of the discriminator coil should be adjusted for maximum output.

The top slug of discriminator should be adjusted for clear, undisturbed reception. This adjustment is critical and should be adjusted very slowly, until the proper point is reached. It will be noted as a clear spot between two distorted points one above and the other below resonance.

ALIGNMENT WITH THE USE OF INSTRUMENTS

If instruments are available they should be used for proper alignment. Insert a high sensitivity micro-ammeter in series with the limiter grid resistor at the grounded end (R-13). Set the signal generator at 10.7 mc. Apply this signal to the grid of the limiter and adjust I.F. to the maximum meter reading. The signal generator should be applied on the grid of each preceeding stage and the meter left in the limiter grid circuit and each I.F. adjusted for maximum response. Always reduce the input as the sensitivity increases. When the alignment is completed it should be rechecked by placing the signal generator on the grid of the 12BE6 and each transformer should be repeaked for maximum meter deflection. The I.Fs. are now aligned.

The R.F. Section

Apply a 106 mc signal to the antenna terminal. Adjust oscillator trimmer for maximum response on meter. Then adjust antenna coil spacing for maximum response. Reset the signal generator for 90 megacycles. Set dial to 90 megacycles. Adjust spacing of R.F. coil for maximum response. The R.F. alignment is now completed.

The Discriminator Alignment

Remove the meter from the limiter grid circuit and place a high-sensitivity volt meter in the order of 20,000 ohms per volt or a DC vacumm tube volt meter from R-18 to ground. Apply a 10.7 mc signal to grid of limiter tube. Adjust bottom slug on discriminator I.F. for maximum deflection. Then adjust top slug on the discriminator I.F. for zero (minimum deflection). This completes alignment of the receiver.

MODEL 3W10A

RADIO KITS, INC.

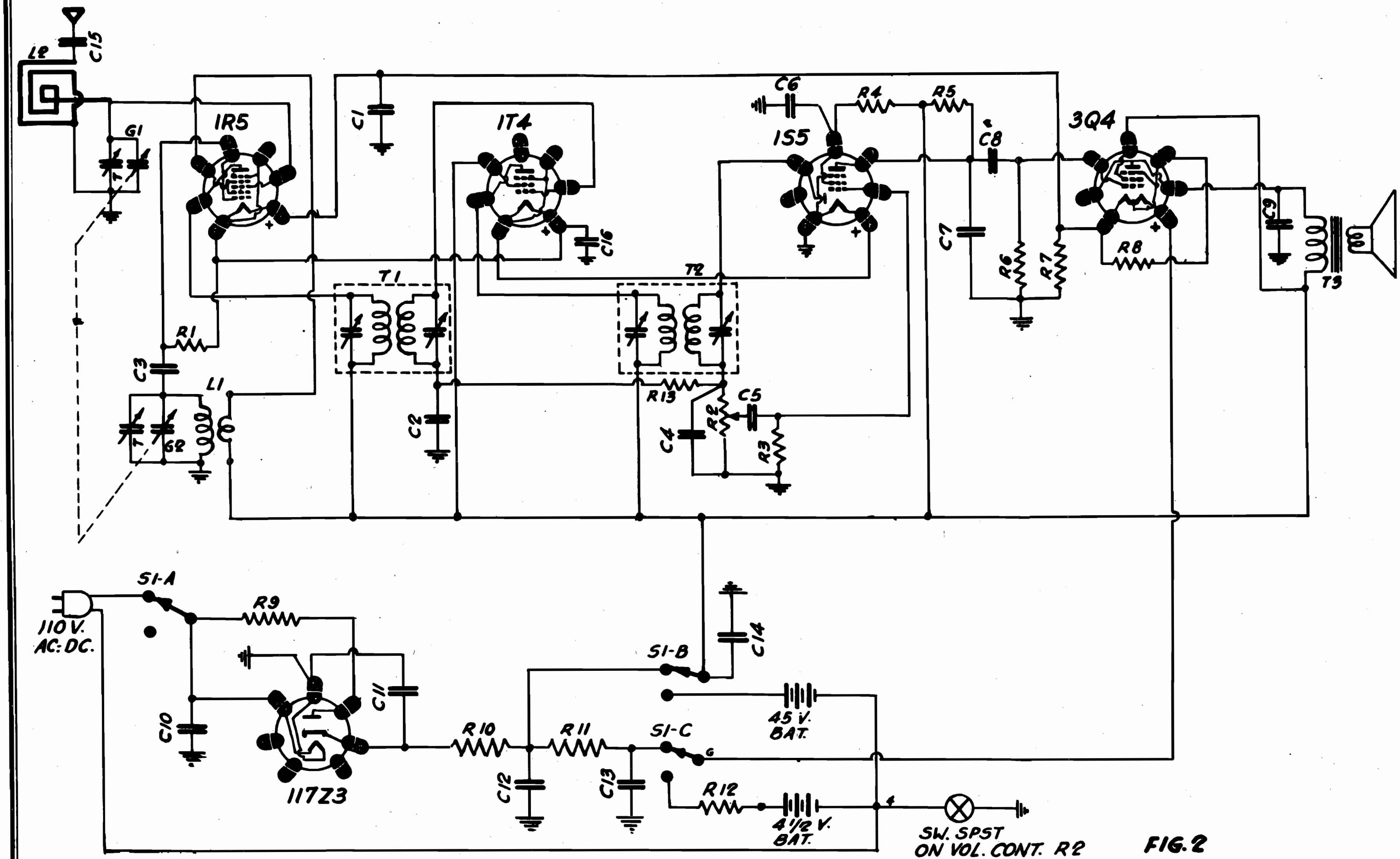


FIG. 2

SYMBOL	VALUE	SYMBOL	VALUE	SYMBOL	VALUE	SYMBOL	VALUE
R 1	100K	R 8	270 ohm	C 1	.1 MF	C 8	.02 MF
R 2	500K Pot	R 9	33 ohm	C 2	.05 MF	C 9	.002 MF
R 3	10M	R 10	(700 10 watts	C 3	.0001MF	C 10	.05 MF
R 4	5M	R 11	(1550 10 watts	C 4	.0001MF (100 MMF)	C 11	80 MF @ 150V
R 5	1M	R 12	33 ohm	C 5	.02 MF	C 12	40 MF @ 150V
R 6	500K	R 13	2 meg	C 6	.1 MF	C 13	100MF @ 25V
R 7	1K			C 7	.0001MF (100 MMF)	C 14	.1 MF

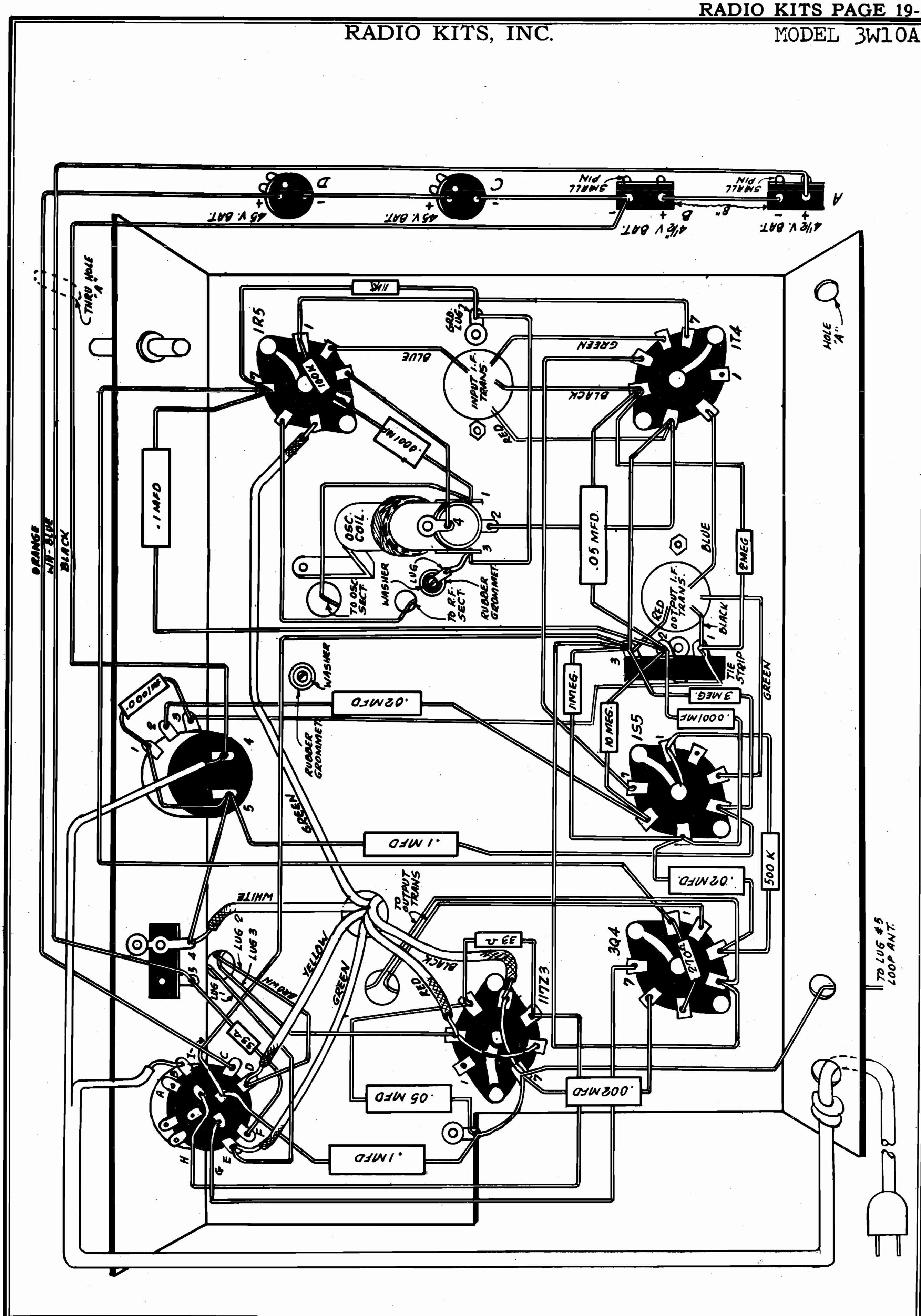
All resistors ½ watt unless otherwise specified

SYMBOL	VALUE
L 1	Osc. coil
L 2	Loop antenna
S 1A, S 1B, S 1C	Selector switch

SYMBOL	VALUE
C 15	.02 MF
C 16	100 MF @ 25V

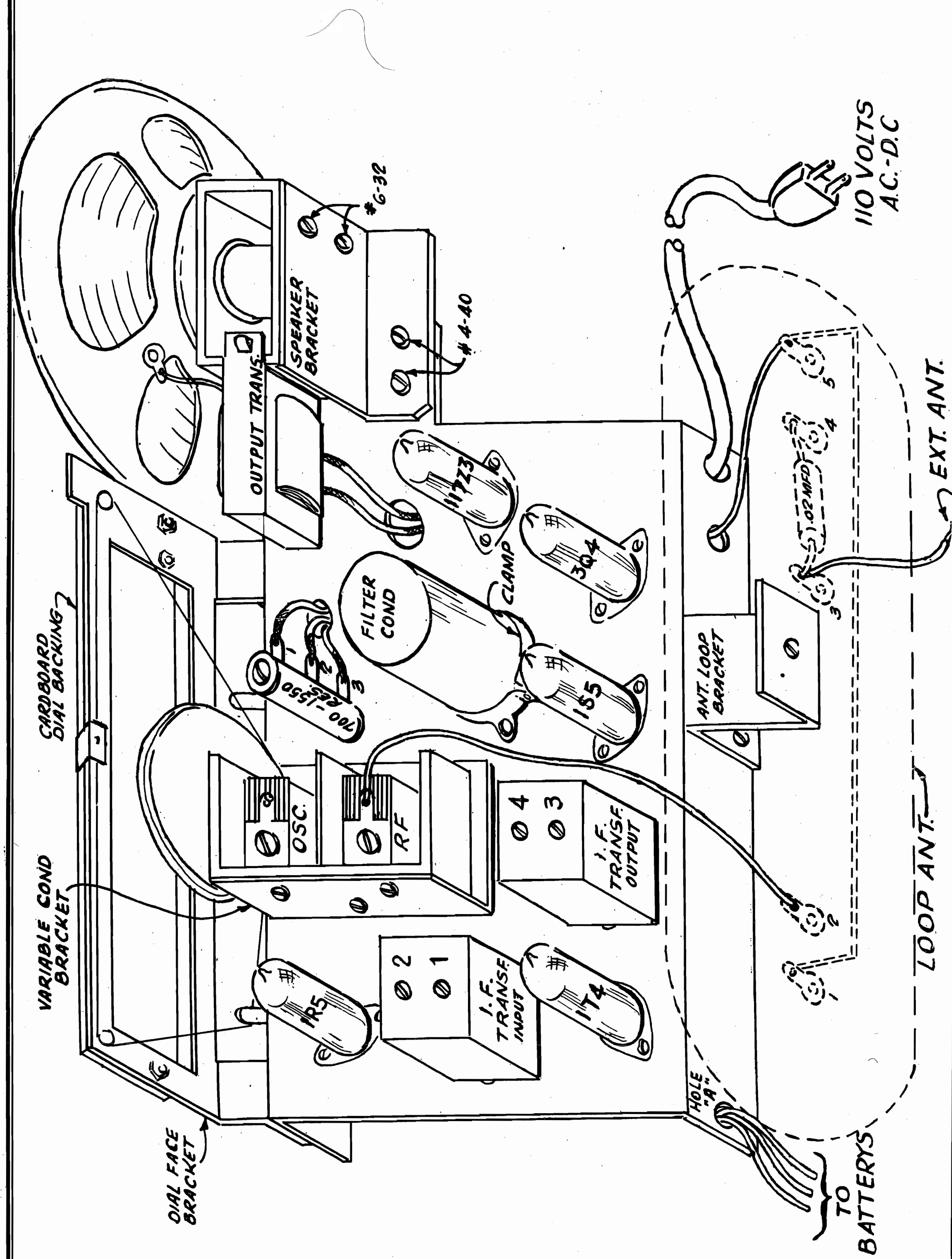
SYMBOL	VALUE
T 1	Input IF trans.
T 2	Output IF trans.
T 3	Output trans. (speaker)

RADIO KITS, INC. MODEL 3W10A



MODEL 3W10A

RADIO KITS, INC.



RADIO KITS, INC. MODEL 3W10A

SERVICING NOTES

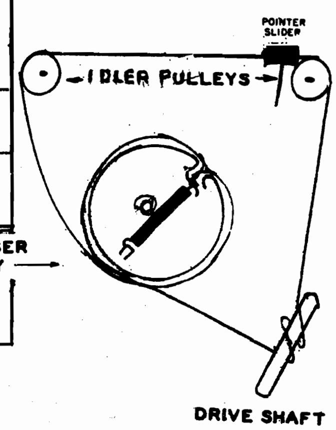
All specifications and measurements based on 117 volts, 60 cycles, and all readings based on a 20,000 ohms per volt meter. All readings are taken with volume control (switch No. 2) in maximum clockwise position. Apply the lowest signallevel from the signal generator.
Output: 50 mw into a 3.2 ohm voice coil impedance.
Approximate reading 0.4 volt.

I.F. ALIGNMENT: With signal generator, set a 455 KC, apply signal through a .1 MFD condenser dummy to R.F. grid of convertor (1R5) or the stator of RF section of the variable condenser (condenser must be fully meshed). Peak I.F. trimmers 1,2,3,4, (top view diagram) to give maximum reading on output meter connected across voice coil. (Note: If for any possible reason the signal does not come through indicating the receiver is way out of alignment, apply the signal to the grid of the I.F. Amplifier (1T4) and tune signal in by trimmers 3,4 of second IF. transformer. Peak for maximum and once this stage is tuned, repeat above procedure).

R.F. ALIGNMENT: With signal generator, set at 1400 KC, apply signal through a dummy antenna (200 mmf condenser) to the antenna loop wire. Set dial of receiver to 1400 KC and peak trimmers 5 & 6 to give maximum reading of output meter. Then set signal generator at 600 KC and tune receiver to 600 KC mark on dial. This setting should fall on calibrated point.

Generator Connection	Dummy Ant.	Freq.	Adj. Trimmers	Output	Sensitivity uv.
Stator large section gang open	.1 MFD cond.	455 KC	1,2,3,4,	Max.	120
Antenna loop wire	200 mmf cond.	1400 KC	5 & 6	Max.	50
Antenna loop wire	200 mmf	600 KC	Variable plates	Max.	150

Battery Complement: 2—4½ Volt "A" Batteries Eveready No. 746 or equivalent
2—45 Volt "B" Batteries Eveready No. 482 or equivalent



VOLTAGE MEASUREMENT

All reading in AC-DC position of power selector switch with 20,000 ohms per meter. Readings taken are referred to ground.

117Z3

PIN	AC	DC	RESISTANCE IN OHMS
1	117V	--	540
2		120V	2000
3	117V	--	500
4	--	--	---
5	117V	--	500
6	120V	--	2000
7	--	--	---

3Q4

PIN	DC	RESISTANCE IN OHMS
1	4.8V	50
2	86V	2000
3	---	500,000
4	88V	1500
5	6V	50
6	86V	2000
7	7.6V	70

1S5

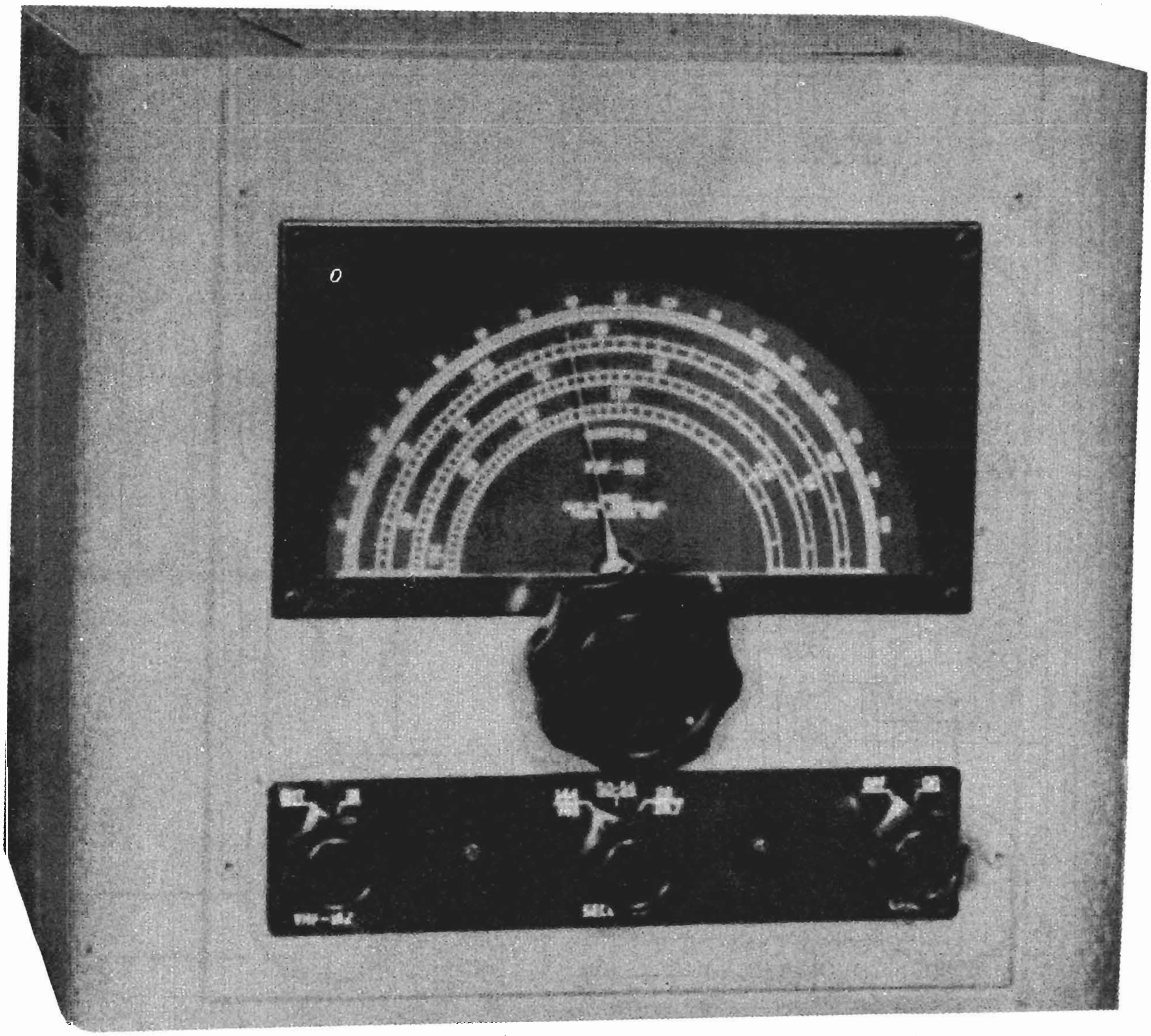
PIN	DC	RESISTANCE IN OHMS
1	--	---
2	--	---
3	--	400,000
4	19V	3,000,000
5	7.8V	1,500,000
6	--	10,000,000
7	1.5V	260

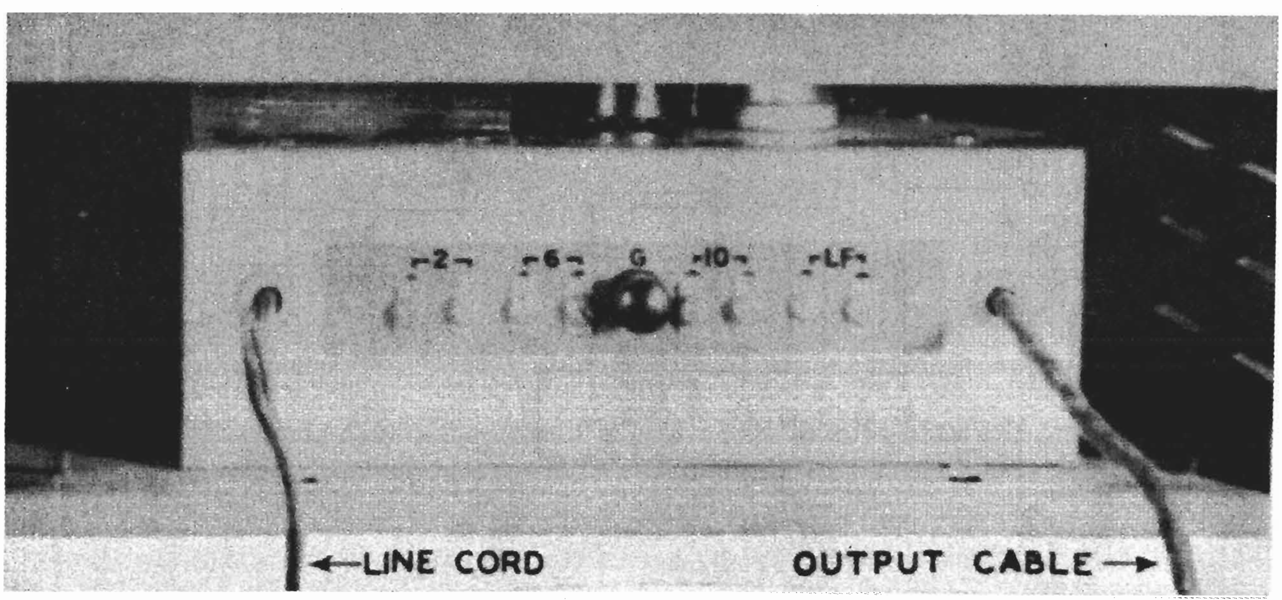
1T4

PIN	DC	RESISTANCE IN OHMS
1	1.5V	260
2	88V	1500
3	88V	1500
4		---
5	1.5V	---
6		2,200,000
7	3V	45

1R5

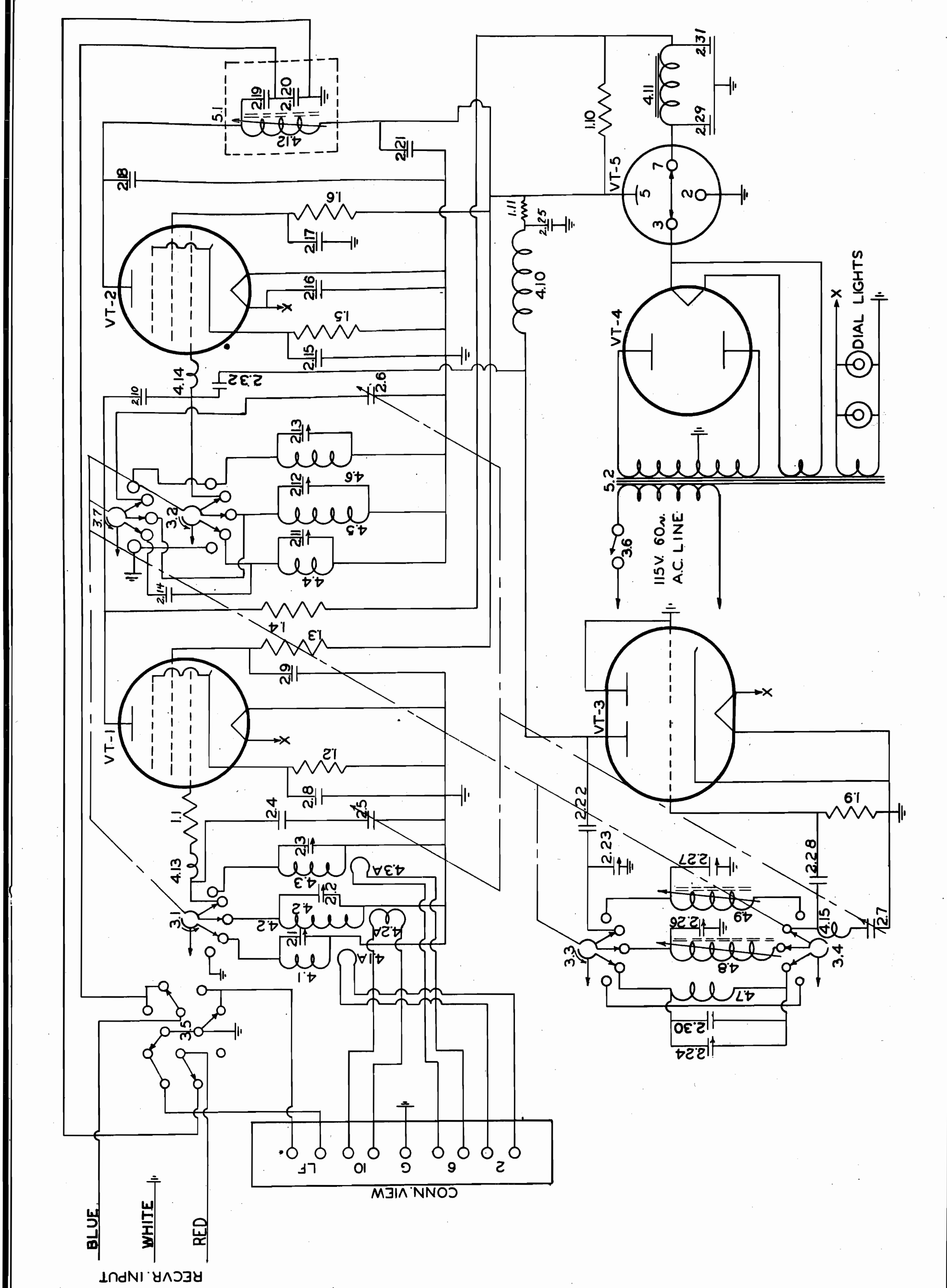
PIN	DC	RESISTANCE IN OHMS
1	3.3V	45
2	88V	1500
3	88V	1500
4	--	85
5	1.6V	45
6	--	--
7	2.3V	50



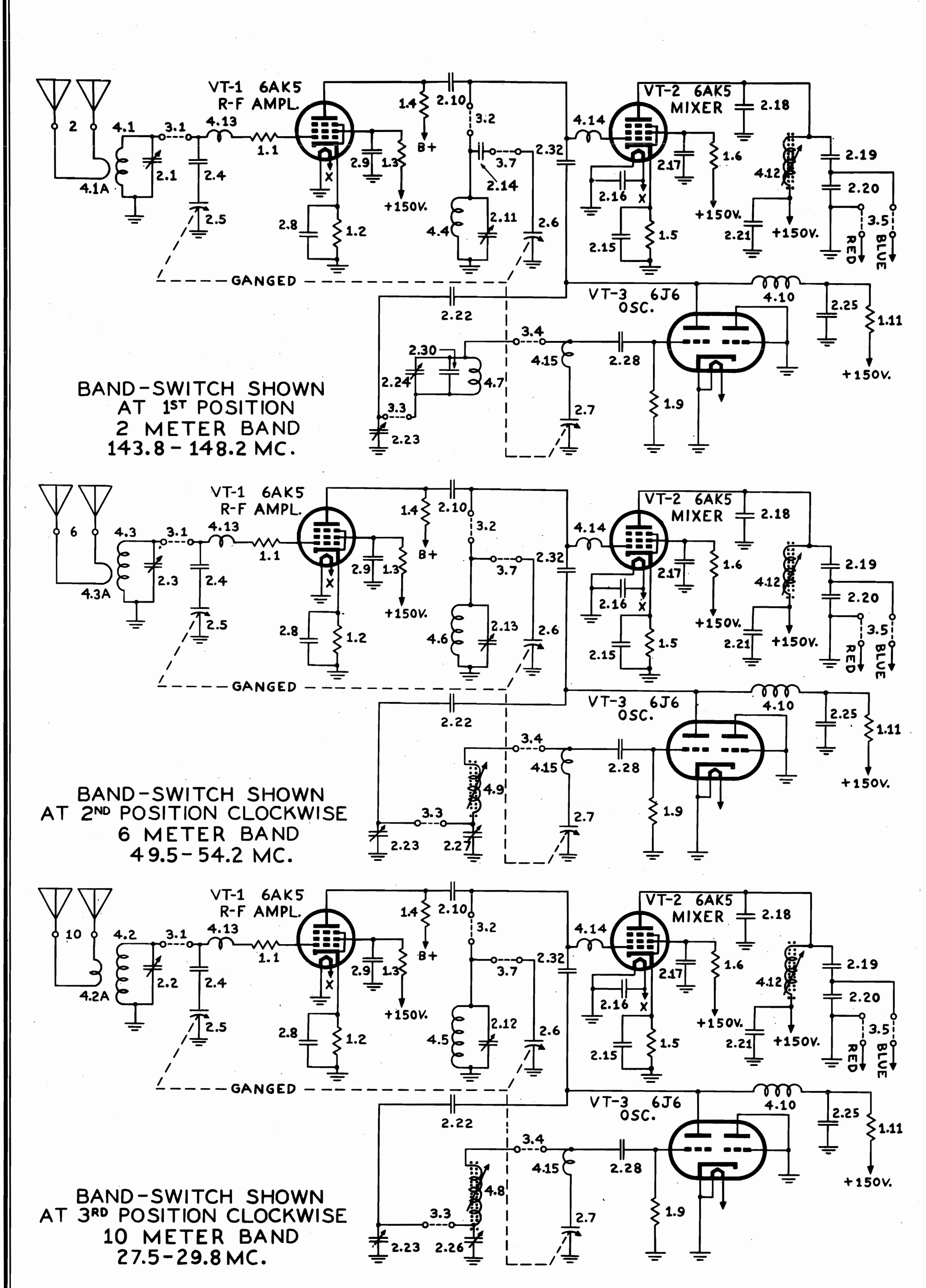

2
6
G
10
LF
←LINE CORD
OUTPUT CABLE→

MODEL VHF-152

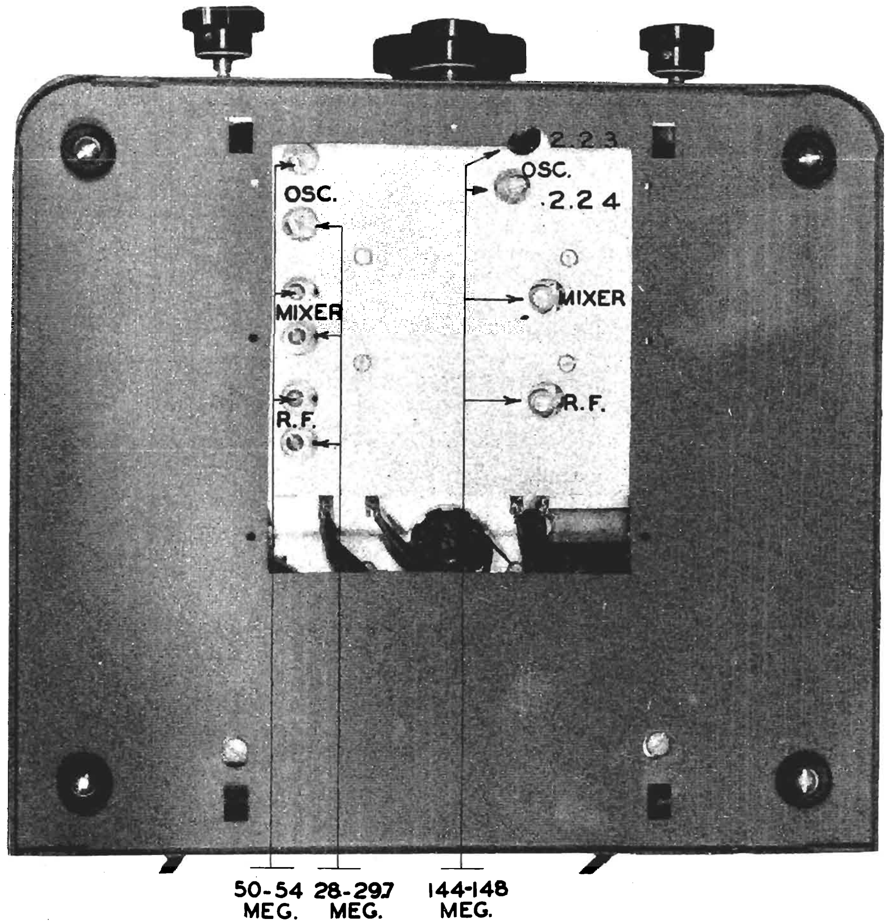
RADIO MFG. ENGINEERS INC.

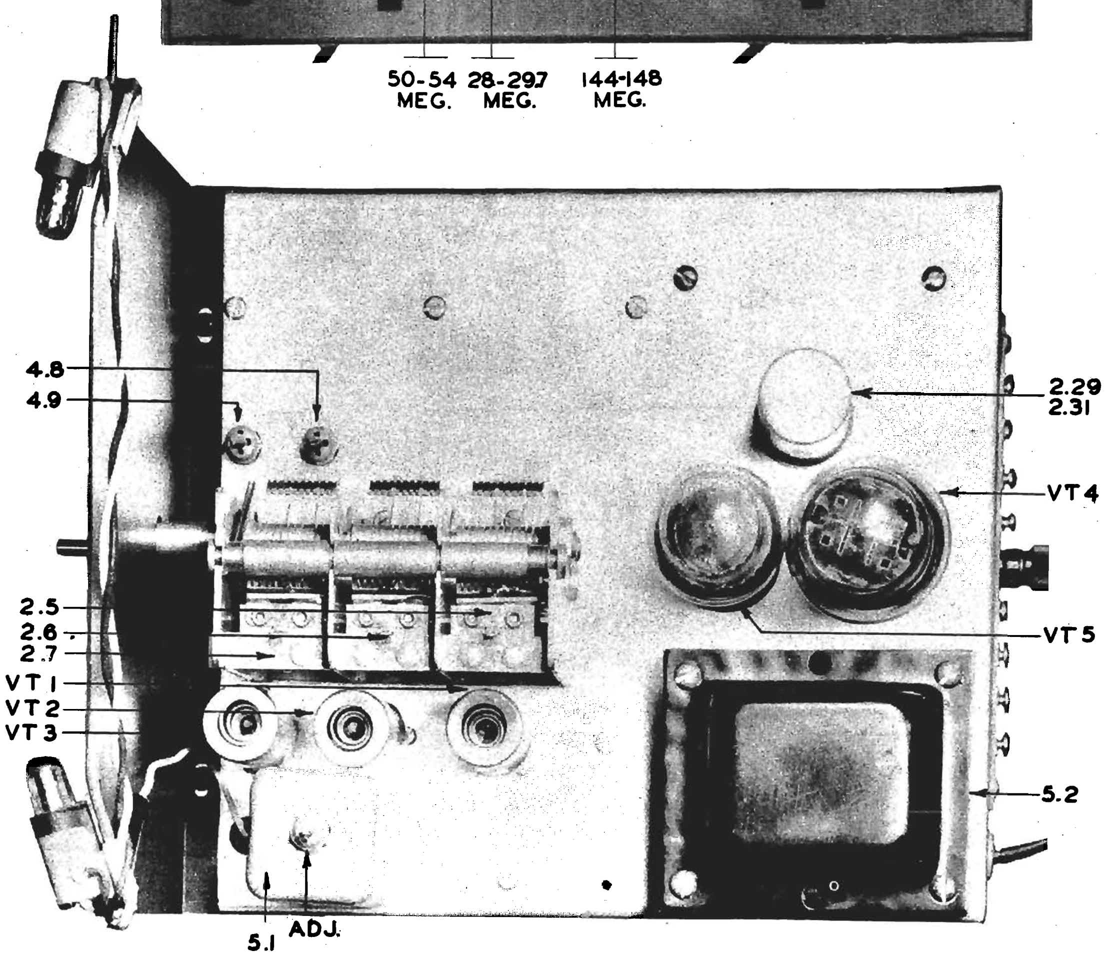


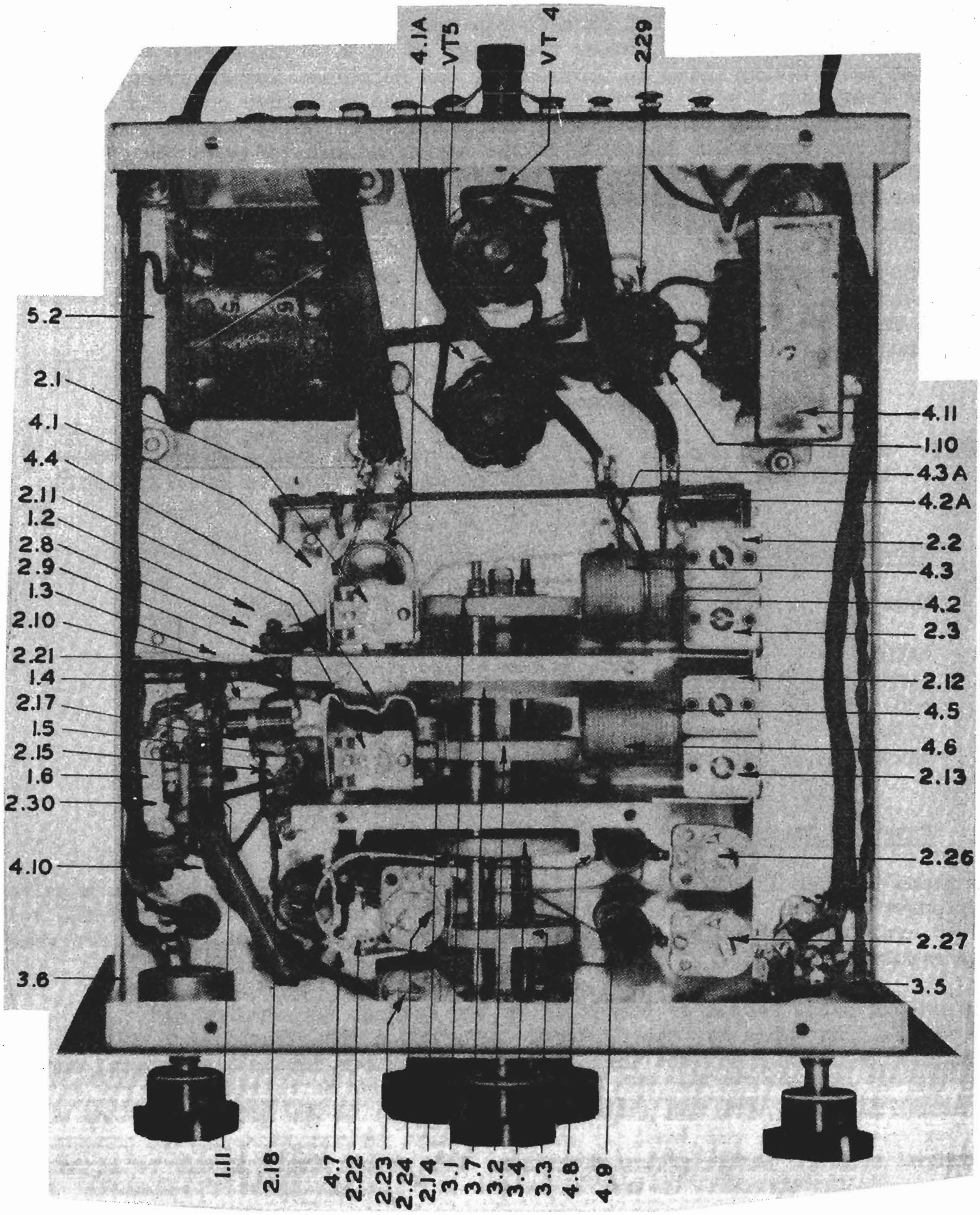
RADIO MFG. ENGINEERS INC. MODEL VHF-152



RADIO MFG. ENGINEERS INC.






4.1A
VT5
VT 4
229
5.2
2.1
4.1
4.4
2.11
1.2
2.8
2.9
1.3
2.10
2.21
1.4
2.17
1.5
2.15
1.6
2.30
4.10
3.6
4.11
1.10
4.3A
4.2A
2.2
4.3
4.2
2.3
2.12
4.5
4.6
2.13
2.26
2.27
3.5
1.11
2.18
4.7
2.22
2.23
2.24
2.14
3.1
3.7
3.2
3.4
3.3
4.8
4.9

MODEL VHF-152 RADIO MFG. ENGINEERS INC.

The VHF-152 Frequency Converter has been designed for use with a conventional communication type receiver to extend its range to cover the 10, 6 and 2 meter amateur bands. The unit consists of an RF amplifier, a mixer, and a high frequency oscillator. The function of the unit is to convert the very high frequencies received by it to a new fixed frequency of 7 megacycles which is fed to the receiver and amplified and detected in the normal manner. This system of receiving may be described as a double heterodyne system. Its advantages are: high image rejection, since the image is 14 megacycles from the signal; and high selectivity which is provided by the selective low frequency intermediate frequency amplifier of the receiver. The auxiliary controls on the receiver, such as the beat frequency oscillator, the noise limiter, and RF and audio gain controls, function in the normal manner, as does the signal strength meter if the receiver is equipped with one. The RME-45 and RME-84 Receivers are admirably suited for use with the VHF-152 Converter.

Specifications

Power Supply: 115 volts, 50-60 cycles, single phase*
Power Consumption: 40 watts @ 115 volts
Output Frequency: 7 mc (7000 kc)
Frequency Range: 27.5 - 29.8 mc
49.5 - 54.2 mc
143.8 -148.2 mc

*NOTE: On special order the VHF-152 may be obtained with a special power transformer suitable for operation on 115-230 volts 25-60 cycles.

Tube Complement

	Type	Use	Schematic Symbol
1.	6AK5	RF Amplifier	V1
2.	6AK5	Mixer	V2
3.	6J6	Oscillator	V3
4.	5Y3G	Rectifier	V4
5.	VR150	Voltage Regulator	V5

External Connections

To place the VHF-152 in operation the line cord should be plugged into a suitable power source. The standard model is designed for operation on 100-120 volt 50-60 cycle AC line only. Use of the VHF-152 on any other voltage or frequency may result in damage.

The output cable should be connected to the antenna terminal of the receiver. The cable has two shielded leads and a ground lead each ending in a terminal lug. On receivers which have provision for doublet operation, such as the RME-45 and the RME-84, the blue coded lead must be connected to the antenna terminal farthest from the ground terminal. This is the hot side of the converter output. The red lead, or low side, must be connected to the antenna terminal nearest to the ground terminal. The ground braid should be connected to the receiver ground. On receivers not equipped for doublet operation, the blue lead should be connected to the antenna terminal and the red and ground (shield) leads should be connected to the receiver ground. This lead is coded white. Unless the above instructions are followed, the changeover switch will not operate properly.

If an RME DB-20 Preselector is used ahead of the receiver, the connections will be made as above except that the converter output cable connects in the same manner to the DB-20 antenna terminals instead of to the receiver.

Precautions

IMPORTANT - Attempted operation of the VHF-152 on any voltage or frequency than that for which it is designed will result in damage to the unit. The operator must be sure that the supply is correct before plugging in the converter.

Antennas

On frequencies of 30 megacycles and above, the use of a resonant antenna is mandatory. For this reason the VHF-152 is provided with separate antenna connection for each frequency band. On the terminal strip on the rear apron are four sets of two terminals each. These terminals are marked "2" for the 144-148 mc band: "6" for the 50-54 mc band, and "10" for the 28-29.7 mc band. The input impedance for each band has been designed to be 300 ohms so that the owner may make use of the 300 ohm twin lead line now available. The remaining set of two terminals marked "LF" are for connecting the low frequency antenna used with the receiver. This pair of terminals is connected through to the receiver when the antenna changeover switch is turned to "OUT".

Operation and Circuit Details

Introduction

The VHF 152 operates in conjunction with a communication type receiver tuned to approximately 7 mc. The accuracy of setting the receiver will effect the accuracy of calibration of the VHF-152 by the same amount. That is to say if the low frequency receiver is off 100 kilocycles, the calibration of the VHF-152 will also be off by 100 kilocycles. It should be noted that the operator is not bound to use the output frequency of exactly 7.0 mc. If interference is encountered he may move the receiver tuning slightly to a clear channel, realizing that the VHF-152 calibration will change by the same amount the low frequency receiver was moved. If it is necessary to move the receiver frequency so far that the calibration is affected, he may recalibrate by following instructions in Section IV. It is not recommended that the output frequency be moved more than 150 kc higher or lower than 7.0 mc because of tracking troubles that may be encountered. In the factory the I.F. is left aligned at 6950 kc.

In double heterodyne receiving systems spurious signals may be received which are harmonics of the receiver local oscillator. On the VHF-152 two such signals may be received. One signal will be heard at 29.8 mc, which is outside the 28-29.7 mc band. Another may be heard at 52.2 mc. If it is found that this spurious signal falls on a real signal which is desired, the spurious signal may be moved by changing the receiver tuning slightly.

Line Switch

The equipment is turned on by means of the line switch on the right hand side of the control panel.

Changeover Switch

On the left side of the control panel is the changeover switch. When this switch is turned to "IN", the output of the VHF-152 is fed to the receiver input terminals. At the same time the low frequency antenna terminals are grounded to prevent 7 mc signals from feeding through the VHF-152 to the receiver. When the changeover switch is turned to "OUT" the output of the VHF-152 is grounded and the low frequency "LF" antenna terminals are connected through the receiver. Thus by turning the changeover switch to "OUT" the receiver functions normally.

Band Switch

In the center of the control panel is the band change switch. This switch has three positions marked: 144-148, 50-54, and 28-29.7, and is used to switch the VHF-152 to the desired range.

RF Stage Peaking

When the VHF-152 leaves the factory, the stages are peaked to maximum sensitivity. It may be found that some antennas may reflect a reactance into the RF stage that will detune it slightly. With the antenna for a certain band connected the RF padder for that band may be peaked up by listening to a signal. Figure IV shows the location of the RF padders for each band. To get at the padders it is necessary to remove the bottom cover plate.

IF Stage Peaking

The IF transformer on the VHF-152 is peaked at the factory at 6.95 mc. Different receivers connected to the output may change this tuning slightly. The owner should check the peaking of this transformer with the receiver connected. Peaking is accomplished by turning the screw on the top of the can. The screw should be adjusted for maximum gain as indicated by a received signal or maximum background noise if a signal is not available.
The owner may, if he has an accurate signal source available, recalibrate his converter as discussed in succeeding paragraphs. It should be born in mind that the calibration of the converter is affected by the setting of the companion receiver. Therefore, before attempting to recalibrate the converter, the calibration of the receiver should be checked.

The VHF-152 will drift somewhat during the first three minutes after being turned on and to a much less extent during the next ten or twenty minutes. It is recommended that no attempt be made to recalibrate or align the equipment until it has reached a stable temperature.

All calibrating and alignment should be done with the receiver connected and the changeover switch in the "IN" position.

If the receiver has a carrier level meter such as is on the RME-45, this meter is used as a tuning indicator when peaking the circuits. If the receiver is not equipped with a meter, it will be necessary to connect an audio output meter to the receiver for a tuning indicator. When using an audio output meter, it is necessary to remove the AVC from the receiver.

IF Coil Alignment

As pointed out. the VHF-152 is calibrated and aligned for an output frequency of 6.95 mc. The output tuning is controlled by the screw on the top of the aluminum can on the top of the chassis. The tr may be peaked with a 6.95 mc signal fed into the mixer grid or with a signal tuned in on the converter. Connection to the mixer grid is most easily made on the stator of the center section of the tuning condenser. In either case, the transformer is adjusted to maximum sensitivity as indicated by the meter on the receiver.

Calibration

Calibration of the VHF-152 should not be attempted unless it is definitely established that the calibration is off.

Calibration is controlled by the oscillator padders. These padders are made accesible by removal of the cabinet bottom plate. Beneath this plate is a second aluminum plate in which are padder access holes. All calibrating and aligning should be done with this cover on.

High beat is used on all bands. That is to say, the oscillator is always 7 mc (approximately) above the received signal. As in the case of all super heterodyne receivers, if sufficient input is used each signal may be received at two points differing by twice the IF frequency. With a signal being received, the padder setting that gives the highest oscillator frequency is the proper setting.

The two low frequency ranges have iron core oscillator coils. The screws for adjusting the inductance of these coils is accessible on the top of the chassis. Unless the screws have been disturbed, adjustment should never be necessary.

RF Alignment

When the calibration is correct, the RF circuits should be aligned. Each of the R-F padders should be adjusted for maximum sensitivity as indicated by the meter on the receiver.

When using a signal generator in aligning the VHF-152 a 300 ohm resistor should be inserted between the signal generator and the antenna terminals in order that the low impedance of the signal generator will not swamp the RF circuit and cause a misalignment of this circuit. Best results will be obtained when the RF circuit is aligned with the antenna connected.

Voltage Charts

As an aid in trouble shooting on the VHF-152, the following chart of voltages at various points in the circuit is tabulated below. Voltage readings should be made with a voltmeter of at least 2000 ohms per volt resistance. Variation of ± 15% may be expected. All voltages are measured from the point indicated to ground.

Circuit	Volts
RF Plate	190
RF Screen	115
RF Cathode	1.9
Mixer Plate	150
Mixer Screen	121
Mixer Cathode	6.0
Osc. Plate	49
Osc. Grid*	-12.0 (10 meters), - 7.0 (6 Meters), - 3.0 (2 Meters)

* Note: With a 2.5 mh choke in series with the voltmeter lead.

MODEL VHF-152 RADIO MFG. ENGINEERS INC.

Parts List

No.	Component
1.1	20 ohm 1/2 watt ±20% carbon
1.2	220 ohm 1/2 watt ±10% carbon
1.3	15K ohm 1/2 watt ±10% carbon
1.4	18K ohm 2 watt ±10% carbon
1.5	2200 ohm 1/2 watt ±5% carbon
1.6	250K 1/2 watt ±10% carbon
1.9	4.7K ohm 1/2 watt ±10% carbon
1.10	3.5K ohm 10 watt Brown Devil
1.11	18K ohm 2 watt ±10%
2.1	30 Mmfd. - Mica Padder
2.2	20 Mmfd. - Mica Padder
2.3	20 Mmfd. - Mica Padder
2.4	25 Mmfd. - Ceramic ±10% Neg.Coeff
2.5	Tuning Condenser, Rear Sec. (RF)
2.6	Tuning Condenser, Middle Sec.(Mixer)
2.7	Tuning Condenser, Front Sec. (Osc.)
2.8	1000 Mmfd. ± 20% 500 volt
2.9	1000 Mmfd. ± 20% 500 volt
2.10	100 Mmfd. Ceramic ± 10%
2.11	30 Mmfd. Mica Padder
2.12	20 Mmfd. Mica Padder
2.13	20 Mmfd. Mica Padder
2.14	15 Mmfd. Ceramic ± 5%
2.15	1000 Mmfd. ±20% 500 volt
2.16	1000 Mmfd. ±20% 500 volt
2.17	1000 Mmfd. ±20% 500 volt
2.18	25 Mmfd. Ceramic ±10% Neg. Coeff
*2.19	100 Mmfd. ±5% 500 volt
2.20	1000 Mmfd. ±20% 500 volt
2.21	.01 Mfd. Paper 600 volt
2.22	25 Mmfd. Ceramic ±10% Neg. Coeff
2.23	3-13 Mmfd. Ceramic Padder, Neg. Coeff
2.24	3-13 Mmfd. Ceramic Padder, Neg. Coeff
2.25	1000 Mmfd. ± 10% 500 volt
2.26	3.13 Mmfd. Ceramic Padder, Neg. Coeff
2.27	3-13 Mmfd. Ceramic Padder, Neg. Coeff
2.28	25 Mmfd. Ceramic ±10% Neg. Coeff
2.29	10 Mfd. Electrolytic 450 volt
2.30	20 Mmfd. Ceramic ±5% Neg. Coeff
2.31	10 Mfd. Electrolytic 450 volt
2.32	1.5 Mmfd. ± .25 Mmfd.
3.1	R.F. Switch Section, Ceramic
3.2	Mixer Switch Section, Ceramic
3.3	Osc. Plate Switch Section, Ceramic
3.4	Osc. Grid Switch Section, Ceramic
3.5	Changeover Switch 4 pole, 2 position
3.6	A.C. Line Switch Single Pole Single Throw
3.7	Mixer Switch Section, Ceramic

No.	Component
4.1	2 Meter R.F. Coil
4.2	10 Meter R.F. Coil
4.3	6 Meter R.F. Coil
4.4	2 Meter Mixer Coil
4.5	10 Meter Mixer Coil
4.6	6 Meter Mixer Coil
4.7	2 Meter Osc. Coil
4.8	10 Meter Osc. Coil
4.9	6 Meter Osc. Coil
4.10	Osc. Plate Choke ±10% 2.5 Microhenry
4.11	Power Supply Filter Choke
*4.12	7 mc I.F. Coil
4.13	R.F. Lead Inductance
4.14	Mixer Leader Inductance
4.15	Osc. Lead Inductance
5.1	7 mc I.F. Transformer
5.2	Power Transformer
VT-1	6AK5
VT-2	6AK5
VT-3	6J6G
VT-4	5Y3GT
VT-5	VR150-30

*In some units the coil 4.12 will be fixed in inductance and capacitor 2.19 will be 100 mmfd. - adjustable.

RADIO & TELEVISION INC.

MODELS D-1000, D-1100, T-9000, T-2200, T-2200X

TUBE COMPLEMENT

Type	Function	Type	Function
6AG5	FM RF Amplifier	6H6	Ratio Detector
6SB7Y	FM Converter	6SK7	AM RF amplifier
6SK7	FM 1st I.F. Amplifier	6SA7	AM Converter
6SK7	FM 2nd I.F. Amplifier / AM 1st I.F. Amplifier	6SQ7	AM Detector and 1st Audio
		6SN7	Audio Driver and phase Inverter
		6K6GT	Push Pull Output
6SK7	FM 3rd I.F. Amplifier	6K6GT	Push Pull Output
6U5	Tuning Indicator	5Y3GT	Rectifier

ELECTRICAL SPECIFICATIONS

117 volt 60 cycle AC. operation. Power consumption 85 watts. Built in AM Loop and folded Dipole FM antenna. FM tuning range 88mc to 108mc. FM dial calibration in channel numbers and Frequency in megacycles. AM tuning range 540 KC to 1620 KC.

Speaker: 12" PM or two 6" x 9" oval PM Voice Coil Impedance 6 ohms. Power output 9 watts undistorted 12 watts maximum.

ON-OFF SWITCH AND VOLUME CONTROL

Rotate the knob on the extreme right clockwise to turn receiver on. Continued rotation to the right increases volume.

BAND SWITCH

The second knob from the left has 4 positions. Each function is marked on the instrument panel. AM extreme left, FM 2nd position from left, PH for Phono 3rd position from left and TV. for Television sound on extreme right.

TONE CONTROL

The knob on the extreme left consists of two independently variable controls. The larger section varies the high frequency response and the smaller controls bass.

TUNING AND TUNING INDICATOR

The second knob from the right tunes the receiver. In selecting stations tune for maximum closing of the tuning indicator on both AM and FM. The tuning indicator does not operate on Phono or TV.

ALIGNMENT

Before proceeding with alignment of set calibration point must be checked. This is the first line beyond 88 MC. Set Dial pointer to this line with tuning condenser fully meshed.

MODELS D-1000, D-1100, T-9000, T-2200, T-2200X

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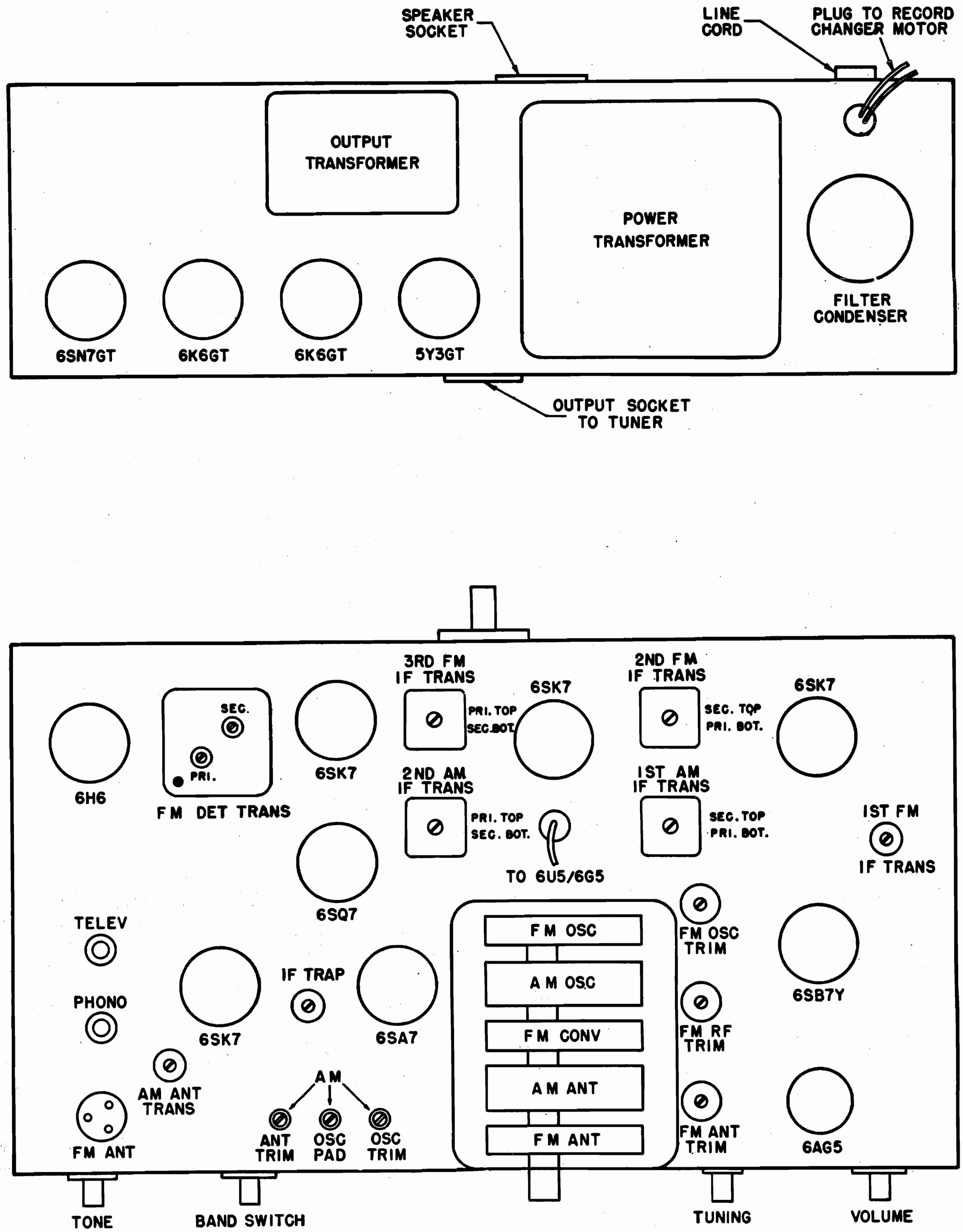

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MODELS D-1000, D-1100, T-9000, T-2200, T-2200X

RESISTANCE READINGS (Ohms)

K—1000
M—1,000,000

Symbol	Tube	Pin 1	Pin 2	Pin 3	Pin 4	Pin 5	Pin 6	Pin 7	Pin 8
1	6AG5	0	70	0	2	400K	400K	70	—
2	6SB7	0	0	400K	400K	20K	0	0	0
3	6SK7	0	0	180	150K	180	400K	0	400K
4	6SK7	0	0	0	650K	0	400K	0	400K
5	6SK7	0	0	180	150K	180	400K	0	400K-FM INF-AM
6	6SK7	0	0	0	2.5M	0	400K	0	400K-AM INF-FM
7	6SA7	0	0	400K-AM INF-FM	400K-AM INF-FM	20K	1.0	0	85K
8	6SQ7	0	10M	0	75K	75K	1M	0	0
9	6H6	0	0	130K	0	24K	—	0	130K
10	6U5	0	1.5M	700K	400K	0	0	—	—
11	6SN7	120K Tone Mx. 200K " Min.	500K	3.3K	42K	500K	3.3K	0	0
12	6K6GT	—	0	500K	400K	500K	—	0	410
13	6K6GT	—	0	500K	400K	540K	42K	0	410
14	5Y3GT	—	400K	—	120	—	120	400K	400K

VOLTAGE READINGS

Symbol	Tube		Pin 1	Pin 2	Pin 3	Pin 4	Pin 5	Pin 6	Pin 7	Pin 8
1	6AG5		OV.	0.7V DC	OV.	6.3V AC	85V DC	85V DC	0.7V DC	—
2	6SB7Y		OV.	6.3V AC	85V DC	85V DC	-6.0	OV.	OV.	OV.
3	6SK7		OV.	6.3V AC	OV.	OV.	OV.	85V DC	OV.	85V DC
4	6SK7	AM	OV.	OV.	OV.	OV.	OV.	110V DC	6.3V AC	107V DC
		FM	OV.	OV.	OV.	OV.	OV.	85V DC	6.3V AC	85V DC
5	6SK7		OV.	OV.	OV.	OV.	OV.	90V DC	6.3V AC	95V DC
6	6SK7		OV.	OV.	OV.	OV.	OV.	110V DC	6.3V AC	60V DC
7	6SA7		OV.	OV.	120V DC	85V	-12.0(VTVM)	OV.	6.3V AC	OV.
8	6SQ7		OV.	OV.	OV.	OV.	OV.	70V DC	OV.	6.3V AC
9	6H6		OV.	OV.	OV.	OV.	1.9V DC	—	6.3V AC	15V DC
10	6U5		6.3VAC	105V DC	OV.	130V DC	OV.	OV.	—	—
11	6SN7	AM	OV.	94V DC	2.0V DC	OV.	94V DC	2.0V DC	OV.	6.3V AC
		FM	OV.	82V DC	1.8V DC	OV.	82V DC	1.8V DC	OV.	6.3V AC
		PH.	OV.	135V DC	2.6V DC	OV.	133V DC	2.6V DC	OV.	6.3V AC
12-13	6K6GT	AM	NC	6.3V AC Bet. 2 & 7	318V DC	245V DC	OV.	NC	6.3V AC Bet. 2 & 7	18.5V DC
		FM	NC	"	305V DC	207V DC	OV.	NC	"	16.0V DC
		PH.	NC	"	340V DC	310V DC	OV.	NC	"	24.5V DC
14	5Y3GT	AM	NC	5.0V AC Bet. 2 & 7	NC	320V AC	NC	320V AC	5.0V AC Bet. 2 & 7	320V DC
		FM	NC	"	NC	320V AC	NC	320V AC	"	310V DC
		PH.	NC	"	NC	320V AC	NC	320V AC	"	340V DC

Line at 117 Volts AC. All DC Readings taken with 20,000 Ohms per Volt Meter unless otherwise indicated. AC Readings taken at 1000 Ohms per volt. Allow ± 10%.

MODELS D-1000, D-1100, T-9000, T-2200, T-2200X

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AM ALIGNMENT INSTRUCTION SHEET

Steps	Connect Generator	Set Generator at	Set Gang at	Adjust	To Obtain
1	Pin No. 4 6SK7 R.F Tube with .05 Mfd. Series Cond.	455 Kc	Quiet point	1st and 2nd I.F. Pri. & Sec.	Max. output
2	"	"	"	Wave trap	Min. output
3	"	1500 Kc	1500 Kc	BC OSC trimmer	Max. output
4	"	600 Kc	600 Kc	OSC. padder	"
5	"	1500 Kc	1500 Kc	BC. OSC. trimmer	"
6	Use Coupling Coil between Generator and Loop	600 Kc	600 Kc	Ant. Loading Coil	"
7	"	1500 Kc	1500 Kc	Ant. Trimmer	"

Set Band switch to AM.
Set Tone control to maximum left.
Set Volume control to maximum right.
Place AM loop in same relative position as in cabinet.

Keep output of signal generator low to prevent AVC Action.
Use output meter across voice coil.

FM ALIGNMENT INSTRUCTION SHEET

Steps	Connect Generator	Set Generator at	Set Gang at	Adjust	To Obtain
1	Pin No. 8 6SB7Y	10.7 MC	Hi. Freq. Stop	Ratio Det. Primary (Red Dot)	Max. output from point B to Gnd.
2	"	"	"	3rd IF Pri. & Sec.	"
3	"	"	"	2nd IF Pri. & Sec.	"
4	"	"	"	1st IF	"
5	"	"	"	Ratio Det. Sec.	Zero Balance on VTVM from C to A
6	Clip on to FM Dipole	108 MC	108 MC	Osc. Trimmer	Max output from point B to Gnd.
7	"	88 MC	88 MC	Osc Coil*	"
8	"	103 MC	103 MC	RF Trimmer	"
9	"	103 MC	103 MC	Ant. Trimmer	"

Set Band Switch to FM
See Circuit Diagram for VTVM Connections.
For Steps 1 through 5 use .01 Mfd. condenser in Series with High side of generator.

Use V.T.V.M for output Indication
*This adjustment is made by pushing turns together or pulling apart. Use insulated tool.

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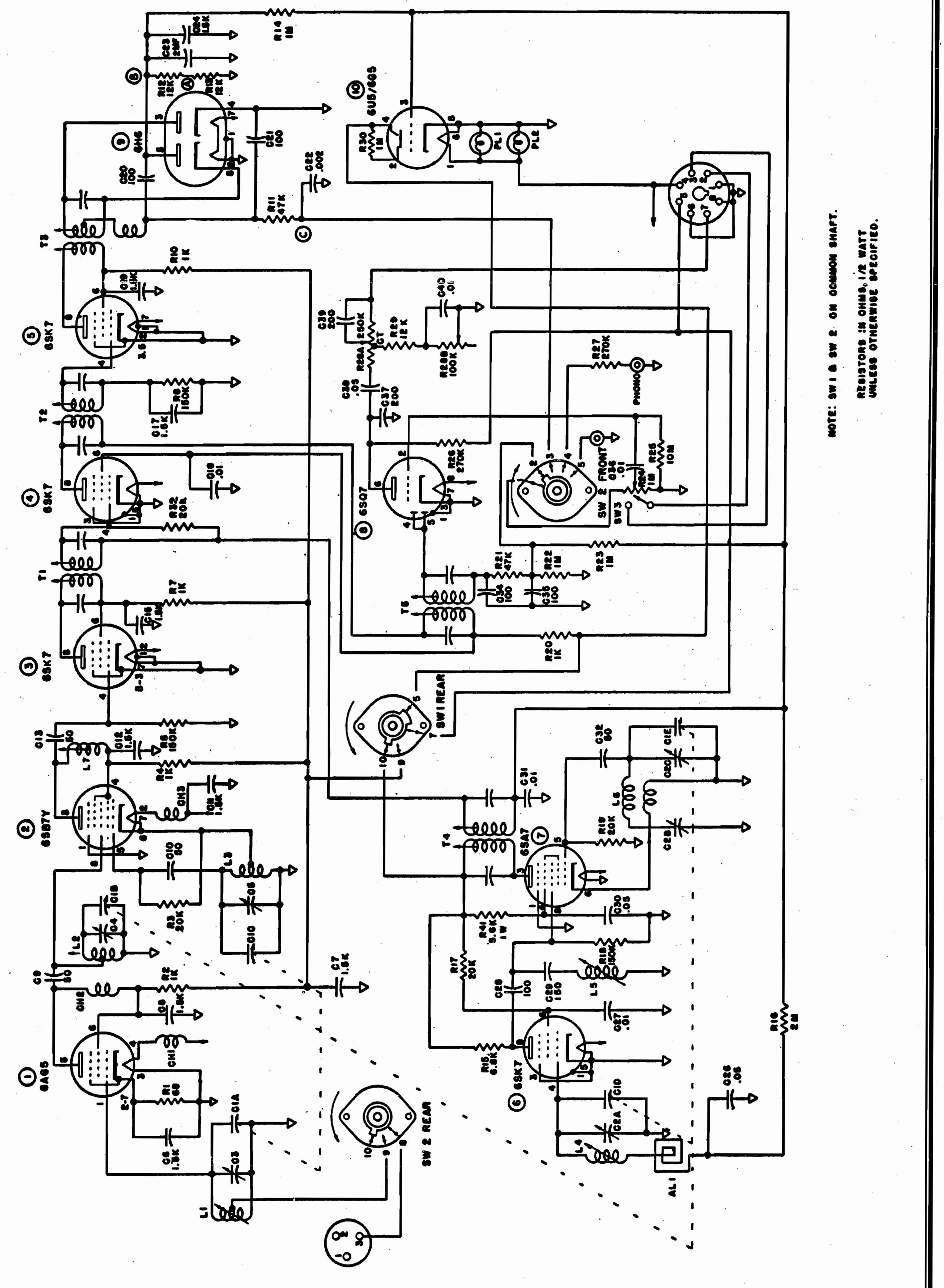
MODELS D-1000, D-1100, T-9000, T-2200, T-2200X



MODELS D-1000, D-1100, T-9000, T-2200, T-2200X

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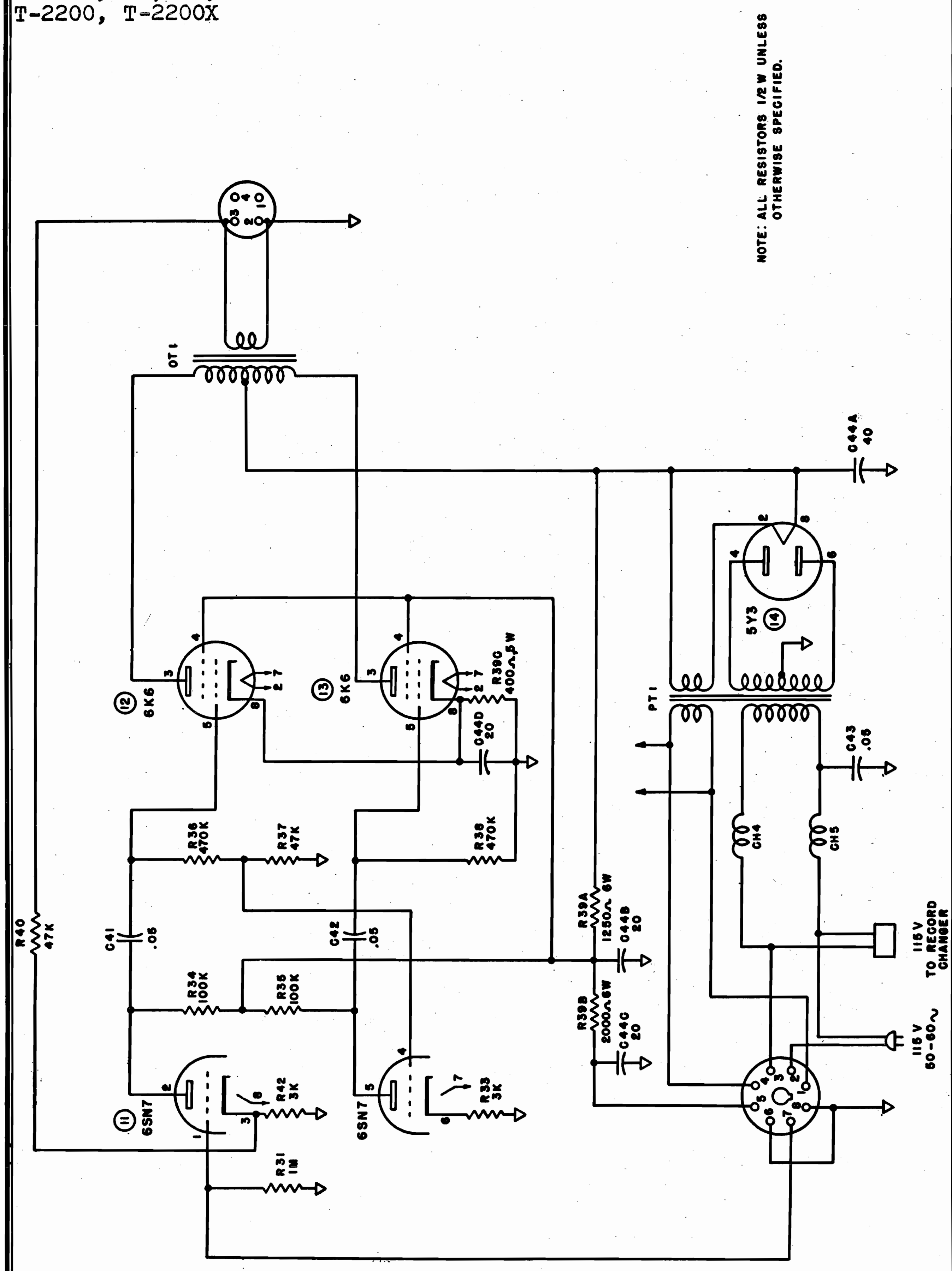

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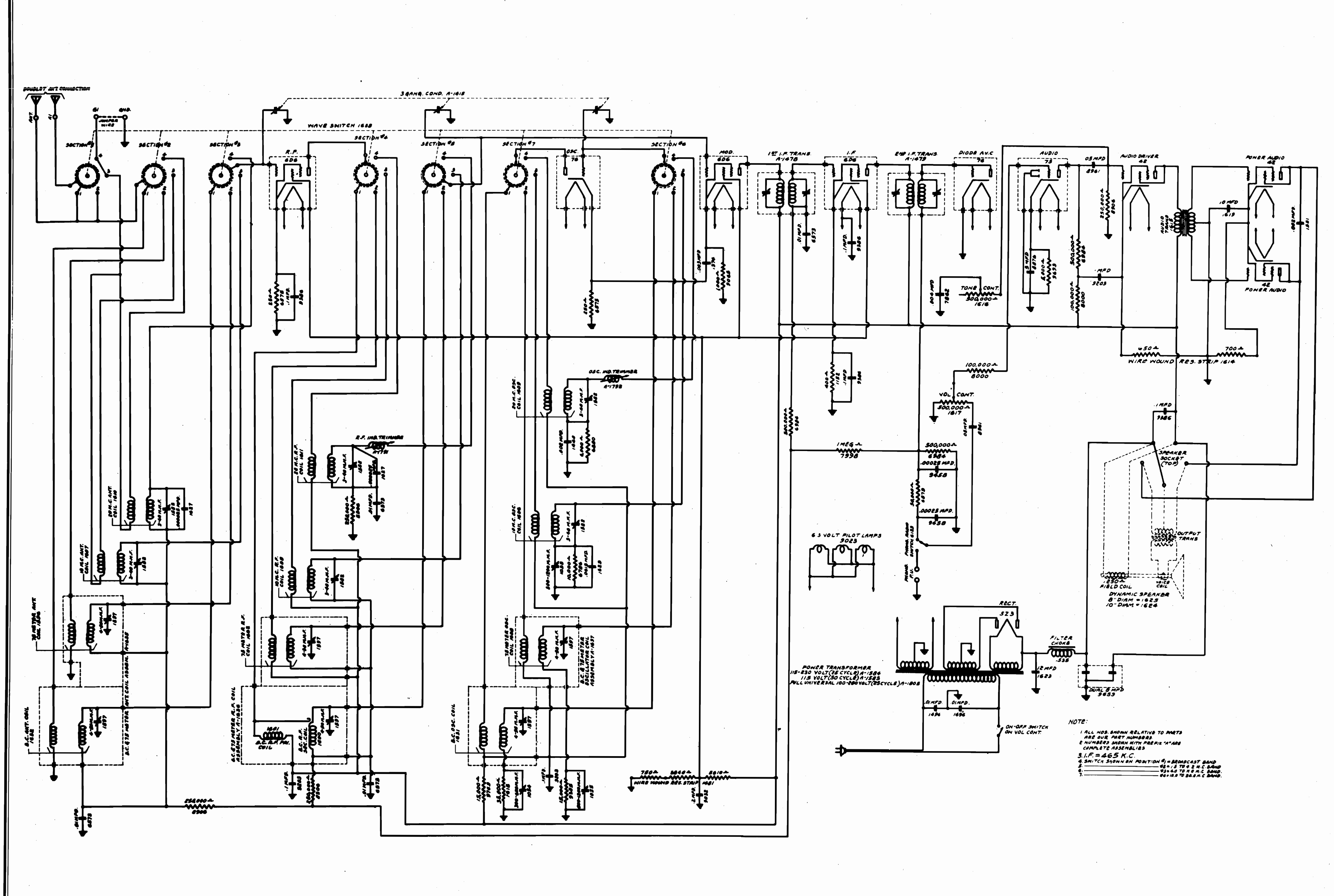
MODELS D-1000, D-1100, T-9000, T-2200, T-2200X

PARTS LIST

Symbol	Part No.	DESCRIPTION	Symbol	Part No.	DESCRIPTION
C1A-B-C-D-E	CV106	AM-FM Tuning Condenser	R11-40-21-37	RS473B	47K ½ W. ±10%
C2A-B-C	CT107	3 Section Trimmer Assembly	R12-13-29	RS123B	12K ½ W. ±10%
			R14-22-23-30-31	RS105B	1 Meg. ½ W. ±10%
C3	CT174	FM RF Trimmer 1-8 Mmfd.	R15	RS682B	6.8K ½ W. ±10%
C4	CT174	FM Mixer Trimmer 1-8 Mmfd.	R16	RS225B	2.2 Meg. ½ W. ±10%
			R24	VC150	1 Meg. Volume Control and Switch
C5	CT175	FM Oscillator Trimmer 1-12 Mmfd.	R25	RS106B	10 Meg. ½ W. ±10%
C6-7-8-11-12-15-17-19-24	CC144	1500 Mmfd. Ceramic ±20%	R26-27	RS274B	270K ½ W. ±10%
			R28A-B	VC151	Dual Tone Control
			R33-42	RS322B	3000 ½ W. ±10%
C9-10-13-32	CC141	51 Mmfd. Ceramic ±20%	R34-35	RS104B	100K ½ W. ±10%
			R36-38	RS474B	470K ½ W. ±10%
C16-27	CP102	.01 Mfd. 400 V.	R39A-B-C	RD123	Voltage Divider and Bias Res.
C20-21-28-34-35	CC142	100 Mmfd. Ceramic ±20%	R41	RS562	5.6K 1 W. ±10%
C22	CC145	200 Mmfd. Ceramic ±20%	L1	FM221	FM Antenna Coil
			L2	FM221	FM RF Coil
C23	CE101	2 Mfd. Electrolytic 25 V	L3	FM222	FM Osc. Coil
C26-31-43	CP105	.05 Mfd. 200 V.	L4	AN183	AM Ant. Coil
C29	CC178	150 Mmfd. Ceramic	L5	TR184	AM IF Trap
C30-38-41-42	CP104	.05 Mfd. 400 V.	L6	OS182	AM Osc. Coil
			CH1-2-3-4-5	LC181	Choke
C36-40	CP103	.01 Mfd. 200 V.	AL1	AL236	AM Loop
C37-39		200 Mmfd. Ceramic ±20%	L7	IF180	FM 1st I.F.T.
			T1	KT161	FM 2nd I.F.T.
C44A-B-C-D	CE100	Electrolytic Cond. 40 20-20 Mfd. 450 V. 20 Mfd. 25 V.	T2	KT162	FM 3rd I.F.T.
			T3	RD168	FM Ratio Detector
			T4	KT163	AM 1st I.F.T.
R1	RS68B	68 ½ W. ±10%	T5	KT164	AM 2nd I.F.T.
R2-4-7-10-20	RS102B	1000 ½ W. ±10%	SW1-2	SW124	Band Switch
			PT1	PT119	Power Transformer
R3-17-19-32	RS203B	20K ½ W. ±10%	OT1	OT120	Output Transformer
R5-8-18	RS151B	150K ½ W. ±10%	PL1-2	PL147	No. 47 Pilot Light

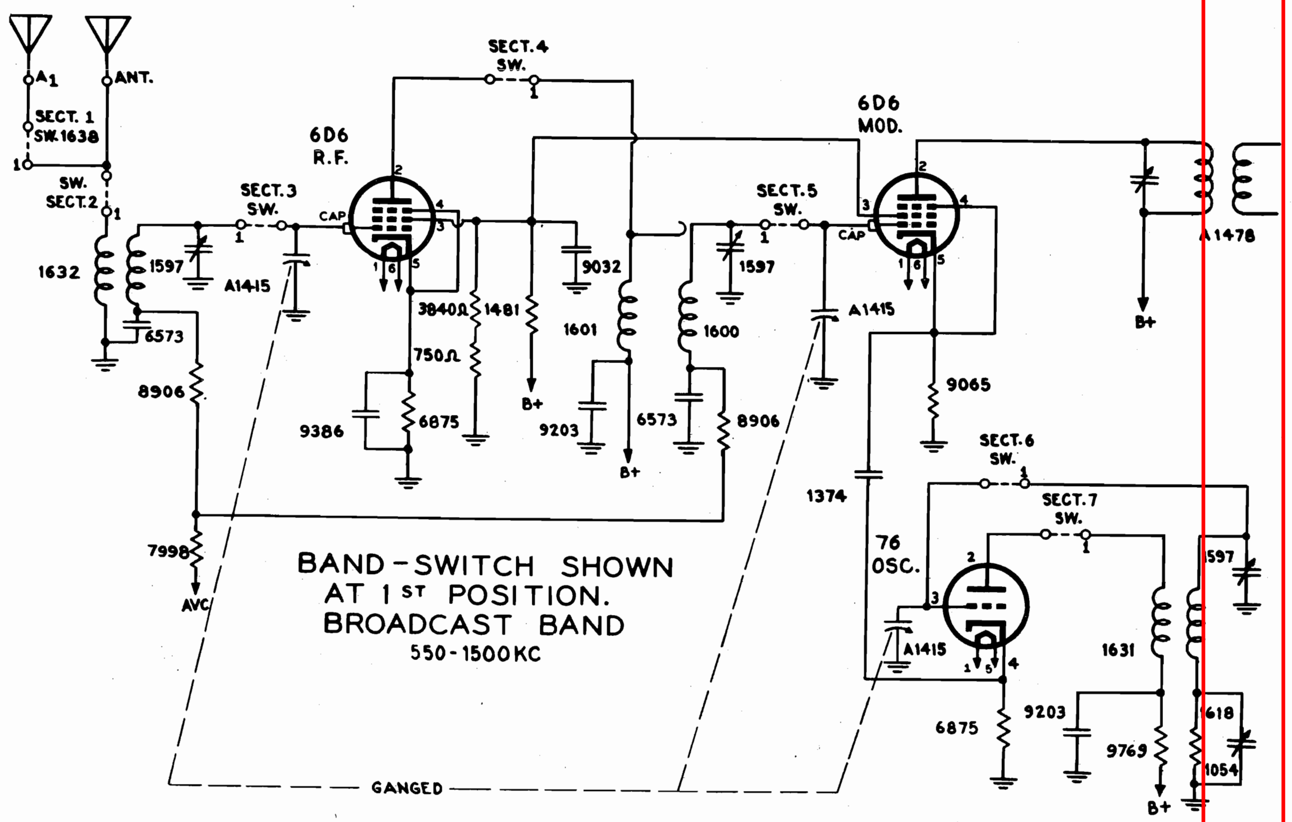
RADIO WIRE TELEVISION

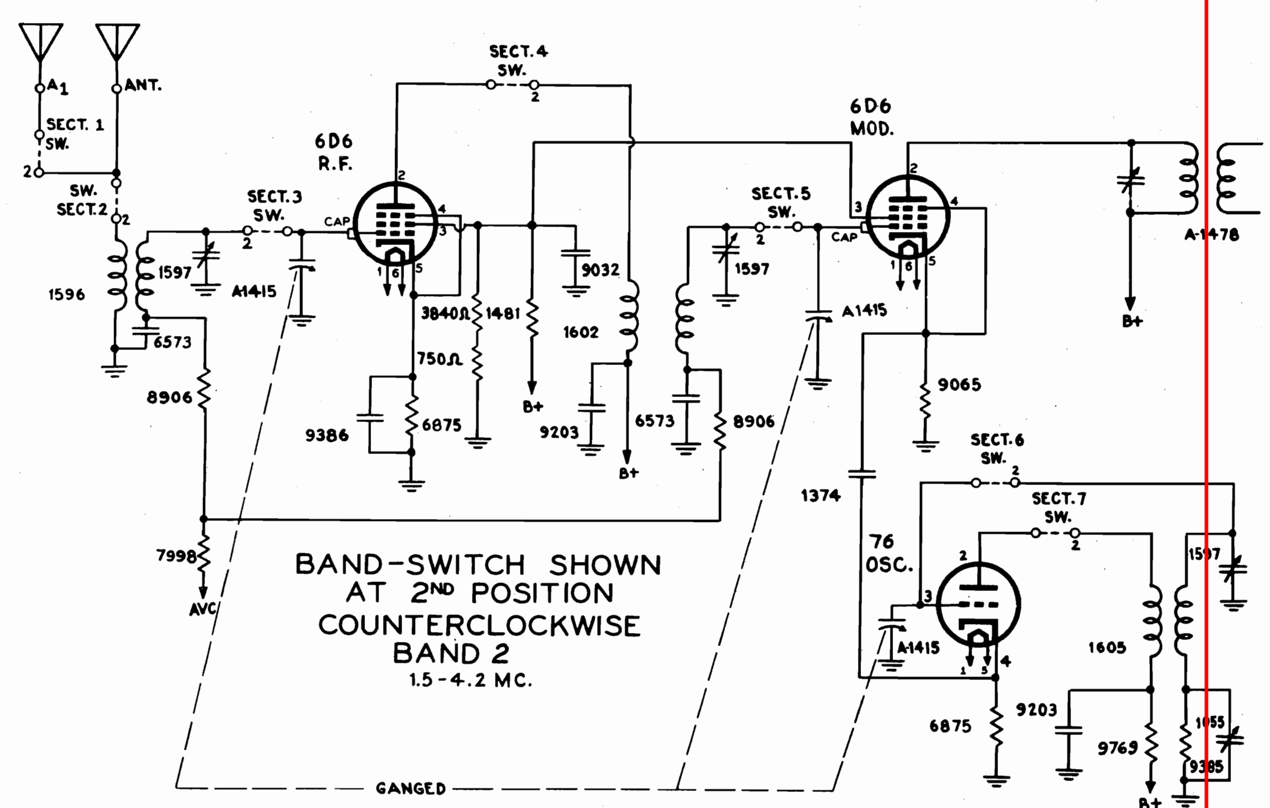
MODEL F-62



RADIO WIRE TELEVISION

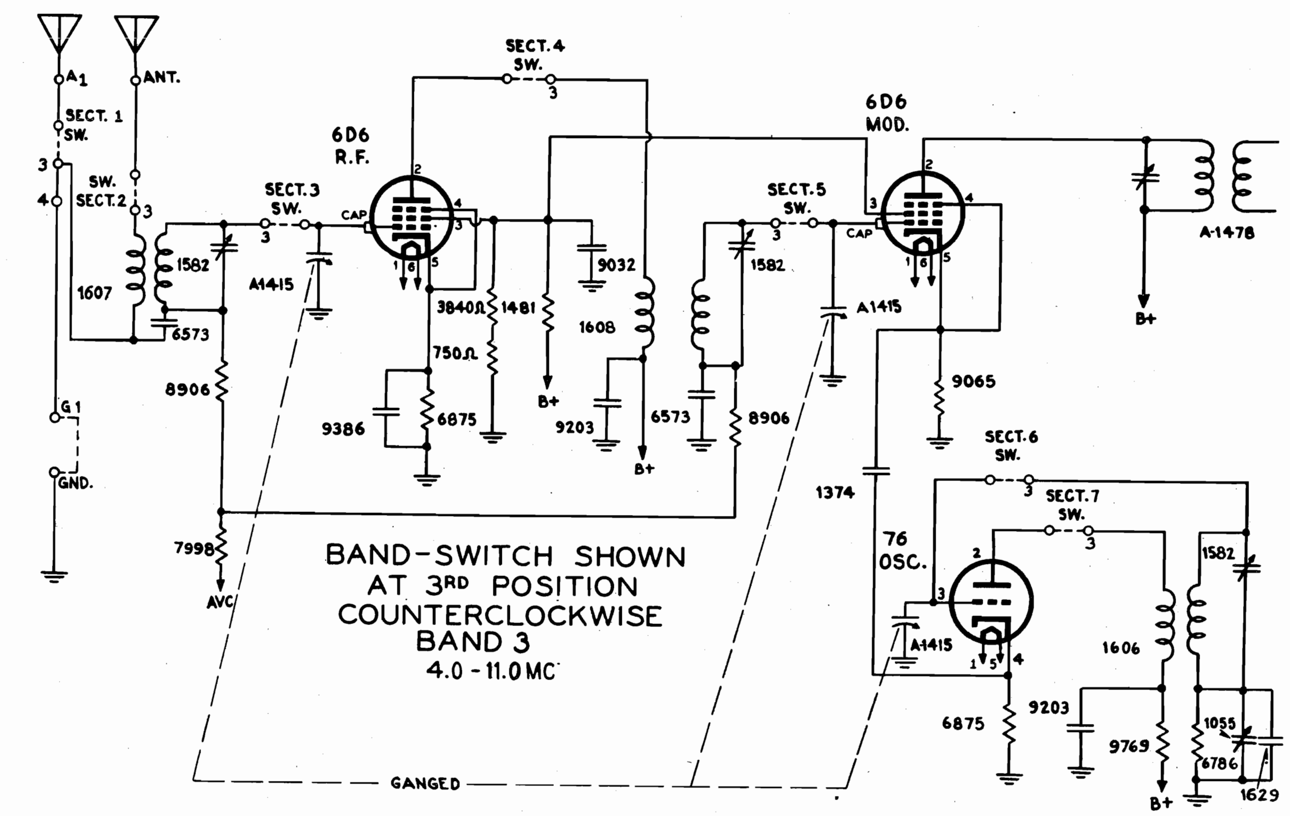
MODEL F-62

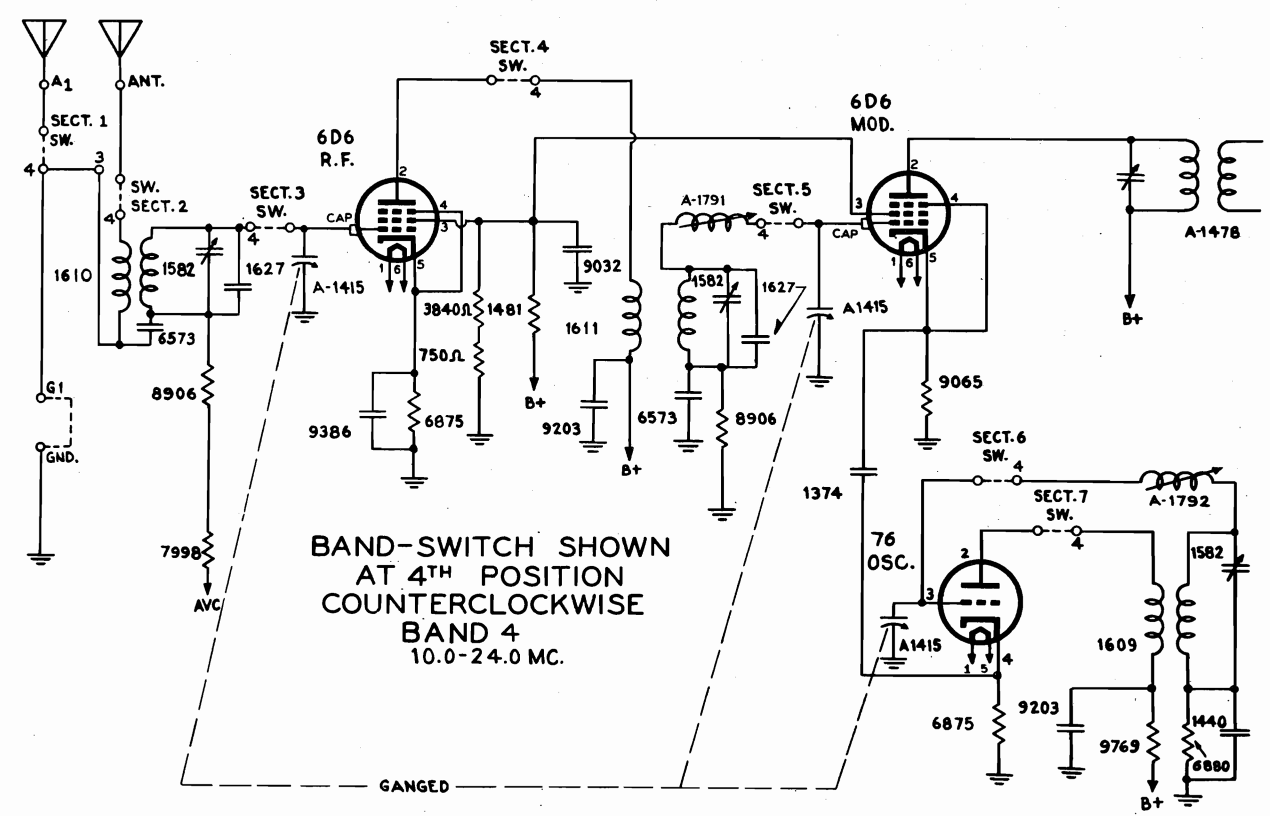




RADIO WIRE TELEVISION

MODEL F-62





RADIO WIRE TELEVISION

MODEL F-62

ALIGNMENT PROCEDURE: Realignment of this receiver should never be necessary unless one of the oscillator, antenna, or RF coils has been replaced, and then only the frequency band in which that coil is used will require realignment. Lack of sensitivity, selectivity, and poor tone quality may be due to any one or a combination of causes such as weak or defective tubes or speaker, inadequate or excessively long antenna, open or grounded bias resistor, bypass condenser, etc. Under no circumstances should realignment be attempted until all other possible sources have been first throughly investigated and have been definitely proven not to be the cause. If an IF tube is replaced it is advisable to realign the IF amplifier, particularly if the replacement tube is one of e different manufacture than the one in the receiver. IT IS IMPERATIVE THAT AN ACCURATELY CALIBRATED OSCILLATOR BE USED WITH SOME TYPE OF OUTPUT MEASURING DEVICE.

INTERMEDIATE ALIGNMENT:

1. Connect the high side of the oscillator output to the control grid of the 6D6 modulator tube. Leave the grid cap disconnected and connect a 1 meg ohm resistor from the modulator grid to the chassis base. Connect the ground side of the oscillator to the receiver ground post.

2. Set the test oscillator frequency to 465 kilocycles (this must be accurate).

3. Align the first intermediate transformer by turning one of the trimmer screws accessible through the holes in the top of the coil shield up and down (increasing and decreasing capacity) until maximum reading is obtained on the output meter, after which adjust the other trimmer screw of the same transformer for maximum sensitivity.

4. Adjust the other intermediate transformer in the same manner.

TO ALIGN THE VARIABLE CONDENSER: It is important when aligning the gang condensers, padder condensers, and trimmer condensers to follow the procedure carefully, otherwise the receiver will be insensitive and the dial calibration will be incorrect. The trimmer and padder condensers will be referred to by number as indicated on the diagram which shows their relative locations.

1. Connect the high output side of the test oscillator through a .00025 Mfd. condenser to the set antenna post, and the ground to the set ground.

2. Place the band selector switch for operation on the 10 to 22 megacycle band, tune the receiver dial to EXACTLY 20 MEGACYCLES and set the test oscillator frequency to EXACTLY 20 MEGACYCLES. THEN TUNE IN THE 20 MEGACYCLE SIGNAL TO MAXIMUM OUTPUT BY ADJUSTING TRIMMER NO. 13. Next, rock the gang condenser slightly to the right and left and adjust trimmers No. 15 and 17 for maximum 20 megacycle signal sensitivity. CARE MUST BE TAKEN SO THAT THE FUNDAMENTAL PEAK AND NOT THE IMAGE PEAK IS USED FOR ALIGNING THE RECEIVER AT 20 MEGACYCLES. When making trimmer No. 13 adjustment always back off the trimmer to minimum capacity and then screw down the trimmer (add capacity) until the first peak, which is the fundamental and the one you are to use, is tuned in. If the trimmer is screwed down beyond the point where this first peak is received, the incorrect image peak will be tuned in. After completing adjustment of trimmers No. 13, 15, and 17 always check to see if the proper peak has been used. To do this leave the test oscillator frequency at 20 megacycles, increase the output of the test oscillator, and tune the receiver dial to approximately 19 megacycles Vary the receiver dial slightly to the right and left of 19 megacycles and if the fundamental peak was used in aligning at 20 megacycles, the test oscillator signal will be heard at approximately 19 megacycles on the set dial. If it is not possible to receive the signal at approximately 19 megacycles, then the fundamental peak was not used and the 20 megacycle adjustment of trimmers No. 13, 15, and 17 must be gone over and properly adjusted.

3. Leave the band selector switch for operation on the 10 to 22 megacycle band, tune the receiver to 11 megacycles on the dial,and set the test oscillator frequency to approximately 11 megacycles. Then while rocking the gang condenser slightly to the right and left adjust inductance trimmers No. 14 and 16 for maximum sensitivity.

4. Recheck 20 megacycle adjustment of trimmers No. 13, 15, and 17.

5. Place the band selector switch for operation on the 4 to 10 megacycle band and set the receiver dial and the test oscillator frequency to exactly 9 megacycles. When adjusting trimmer No. 10 two peaks, the fundamental and the image peak, will be noticed. CARE MUST BE TAKEN SO THAT THE FUNDAMENTAL PEAK AND NOT THE IMAGE PEAK IS USED FOR ALIGNING THE RECEIVER AT 9 MEGACYCLES. First back off trimmer No. 10 to minimum capacity, next screw down the trimmer (add capacity) until the first peak, which is the fundamental and the one you are to use, is tuned in. When the first peak has been located adjust trimmer No. 10 TO BRING IN THE 9 MEGACYCLE SIGNAL TO MAXIMUM OUTPUT. Next adjust trimmers No. 11 and 12 for maximum 9 megacycle sensitivity After completing adjustment of trimmers No. 10, 11, and 12 always check to see if the proper peak has been used. To do this leave the test oscillator frequency at 9 megacycles and increase the test oscillator output. Vary the receiver dial slightly to the right and left of 8 megacycles,and if the fundamental peak of trimmer No. 10 was used in aligning at 9 megacycles the test oscillator signal will be heard at approximately 8 megacycles on the receiver dial. If it is not possible to receive the signal, then the fundamental peak was not used and the 9 megacycle adjustment of trimmers No. 10, 11, and 12 must be gone over and properly adjusted.

6. Leave the band selector switch for operation on the 4 to 10 megacycle band and. tune the receiver and set the test oscillator frequency to approximately 4.2 megacycles. Then while rocking the gang condenser slightly to the right and left, adjust padder No. 7 for maximum sensitivity.

7. Place the band selector switch for operation on the 1.5 to 4 megacycle band and tune the receiver dial and set the test oscillator frequency to EXACTLY 3.8 MEGACYCLES. THEN BRING IN THE 3.8 MEGACYCLE SIGNAL TO MAXIMUM OUTPUT BY ADJUSTING TRIMMER NO. 1, after which adjust trimmers No. 2 and 3 for maximum sensitivity.

8. With the band selector switch in the same position (1.5 to 4 megacycle band) tune the receiver dial and set the test oscillator frequency to approximately 1.6 megacycles. Then while rocking the gang condenser slightly to the right and left adjust padder condenser No. 8 for maximum 1.6 megacycle signal sensitivity.

9. Adjust the band selector switch for operation on the 1500 to 550 kilocycle band and tune the receiver dial and set the test oscillator frequency to EXACTLY 1400 KILOCYCLES. THEN BRING IN THE 1400 KILOCYCLE SIGNAL TO MAXIMUM OUTPUT BY ADJUSTING TRIMMER NO. 4, AFTER WHICH ADJUST TRIMMERS NO. 5 and 6 FOR MAXIMUM SENSITIVITY.

10. Leave the band selector switch for operation on the 1500 to 550 kilocycle band and tune the receiver dial and set the test oscillator frequency to approximately 600 kilocycles. Next, while rocking the gang condenser slightly to the right and left adjust padder condenser No. 9 for maximum sensitivity.

MODEL F-62

RADIO WIRE TELEVISION

Alignment of all bands will rarely be necessary. If a coil on any one of the bands should become defective and replacement is necessary, then only the band in which the coil was replaced will require realignment. Wherever complete realignment has been made it is recommended that all of the adjustments be gone over again. Generally it will be found that improved results can be obtained if this is done. Assuming that all tubes and component parts of the set are okeh, then extreme inaccuracies in the dial calibration, low sensitivity, and poor selectivity are indications that the alignment procedure has not been followed. Should these conditions be apparent proceed to realign and carefully follow each step in the order given.

VOLTAGE TABLE

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

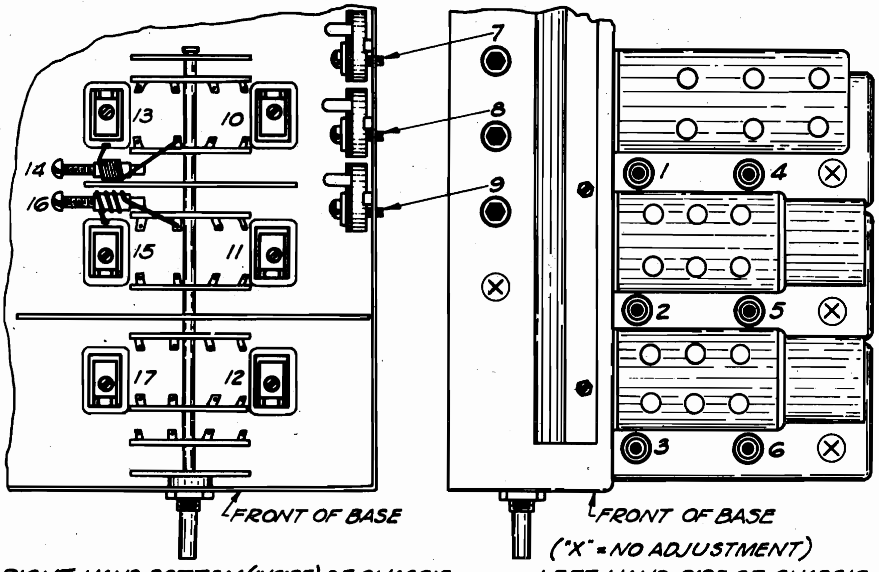
TUBE		FILAMENT	PLATE	SCREEN	CATHODE
6D6	Radio Frequency	6.2	250	94	2.2
76	Oscillator	6.2	115		2.2
6D6	Modulator	6.2	250	94	4.5
6D6	Intermediate Frequency	6.2	250	94	2.2
76	Second Detector & AVC	6.2			
75	Audio	6.2	55*		1
42	Audio Driver	6.2	225		16
42	Output	6.2	330		28
42	Output	6.2	330		28
5Z3	Rectifier	4.8	118 M. A. Total Drain		

* Triode Plate comparative voltage only.
Read all voltages from socket to chassis with 1000 ohm per volt voltmeter.

PART NUMBER	
1635	BC & 1.5-4.2 M.C. Band Antenna Coil Assembly
1636	BC & 1.5-4.2 M.C. Band RF Coil Assembly
1637	BC & 1.5-4.2 M.C. Band Oscillator Coil Assembly
1607	4-10 M.C. Band Antenna Coil
1608	4-10 M.C. Band RF Coil
1606	4-10 M.C. Band Oscillator Coil
1610	10-24 M.C. Band Antenna Coil
1611	10-24 M.C. Band RF Coil
1609	10-24 M.C. Band Oscillator Coil
1478	First IF Transformer
1479	Second IF Transformer
1638	Wave Switch
1415	Three Gang Condenser
1584	25 Cycle Power Transformer (230-115V)
1585	50-60 Cycle Power Transformer (115V)
1535	Filter Choke
1619	10 Mfd. Electrolytic Condenser
1623	12 Mfd. Wet Electrolytic Condenser
8876	5 Mfd. Electrolytic Condenser
9659	Dry Electrolytic Condenser Dual 8 Mfd.
1615	Audio Transformer
1616	Tone Control with S.P.S.T. Switch
1617	Volume Control
1481	Vitreous Enameled Resistor
1614	Vitreous Enameled Resistor
6576	Phonograph Jacks
6123	Radio-Phonograph Switch
1582	Trimmer Condenser

PART NUMBER	
1054	Padding Condenser
1055	Padding Condenser
1791	Oscillator Inductance Trimmer
1792	RF Inductance Trimmer
1440	.002 Mfd. Mica Condenser
1629	.0015 Mfd. Moulded Condenser
9458	.00025 Mfd. Moulded Condenser
1374	.003 Mfd. Moulded Condenser
6573	.01 Mfd. 200 Volt Condenser
1496	.01 Mfd. 600 Volt Condenser
1551	.002 Mfd. 600 Volt Condenser
8961	.05 Mfd. 400 Volt Condenser
9386	.1 Mfd. 200 Volt Condenser
9203	.1 Mfd. 400 Volt Condenser
7862	.004 Mfd. 400 Volt Condenser
6875	250 Ohm 1/3 Watt Resistor
6879	50,000 Ohm 1/3 Watt Resistor
6786	10,000 Ohm 1/3 Watt Resistor
9065	1,000 Ohm 1/3 Watt Resistor
6984	500 Ohm 1/3 Watt Resistor
1152	400 Ohm 1/3 Watt Resistor
7998	1 Meg Ohm 1/3 Watt Resistor
9693	5,000 Ohm 1/3 Watt Resistor
8000	100,000 Ohm 1/3 Watt Resistor
6918	35,000 Ohm 1/3 Watt Resistor
9385	15,000 Ohm 1/3 Watt Resistor
9769	15,000 Ohm 1/2 Watt Resistor
1420	Antenna and Ground Strip
1565	7/8" Octagon Knob
1566	1 1/8" Octagon Knob

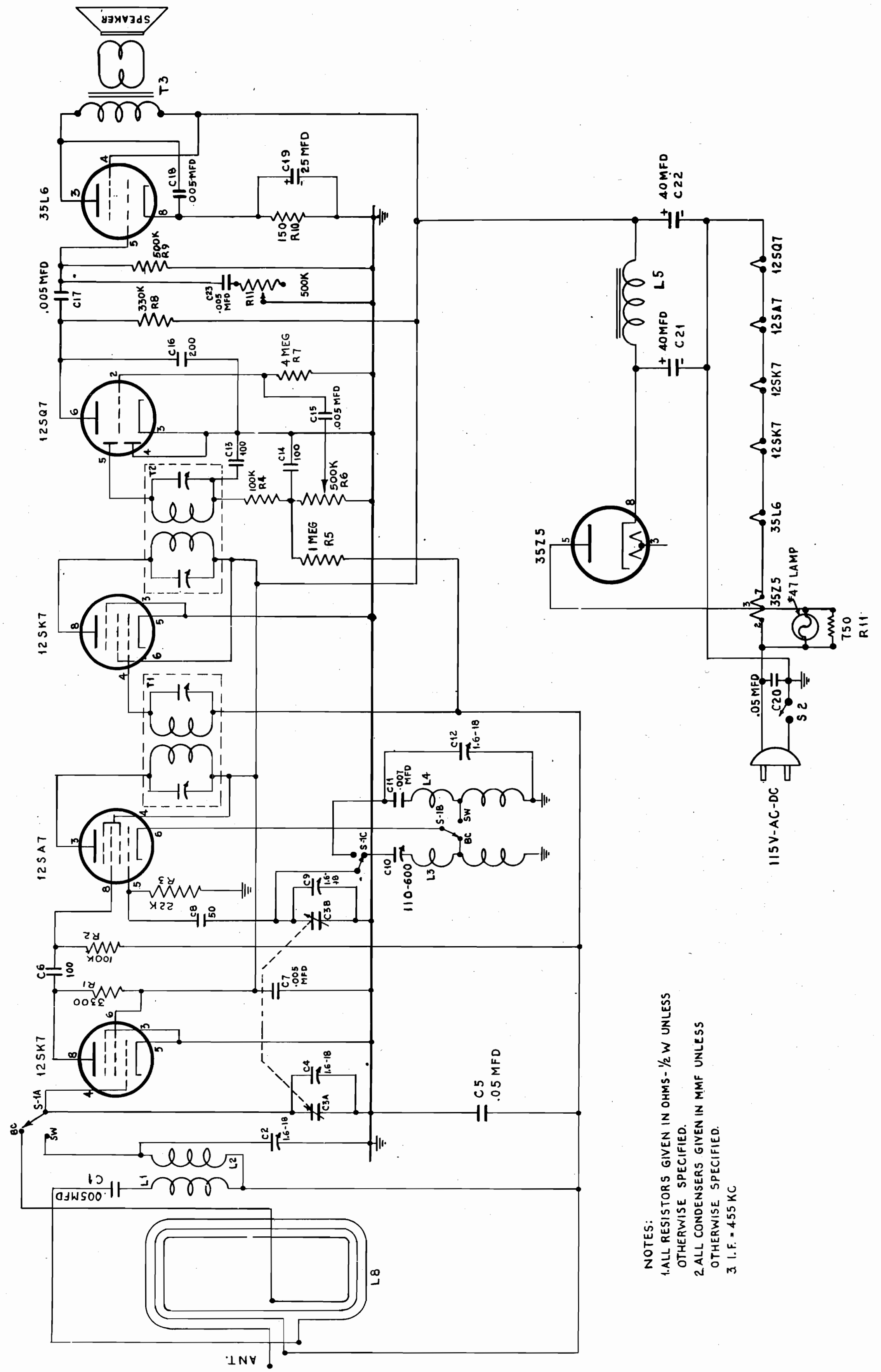
#1 = 1.5-4 MC. OSC. TR.
#2 = 1.5-4 MC. R.F. TR.
#3 = 1.5-4 MC. ANT. TR.
#4 = 550-1500 KC. OSC. TR.
#5 = 550-1500 KC. R.F. TR.
#6 = 550-1500 KC. ANT. TR.
#7 = 4-10 MC. OSC. PA.
#8 = 1.5-4 MC. OSC. PA.
#9 = 550-1500 KC. OSC. PA.
#10 = 4-10 MC. OSC. TR.
#11 = 4-10 MC. R.F. TR.
#12 = 4-10 MC. ANT. TR.
#13 = 10-22 MC. OSC. TR.
#14 = 10-22 MC. OSC. INDUCT. TR.
#15 = 10-22 MC. R.F. TR.
#16 = 10-22 MC. R.F. INDUCT. TR.
#17 = 10-22 MC. ANT. TR.
TR. = TRIMMER PA. = PADDER



RIGHT HAND BOTTOM (INSIDE) OF CHASSIS LEFT HAND SIDE OF CHASSIS
VIEWS SHOWING LOCATION OF PADDERS & TRIMMERS

RADIO WIRE TELEVISION

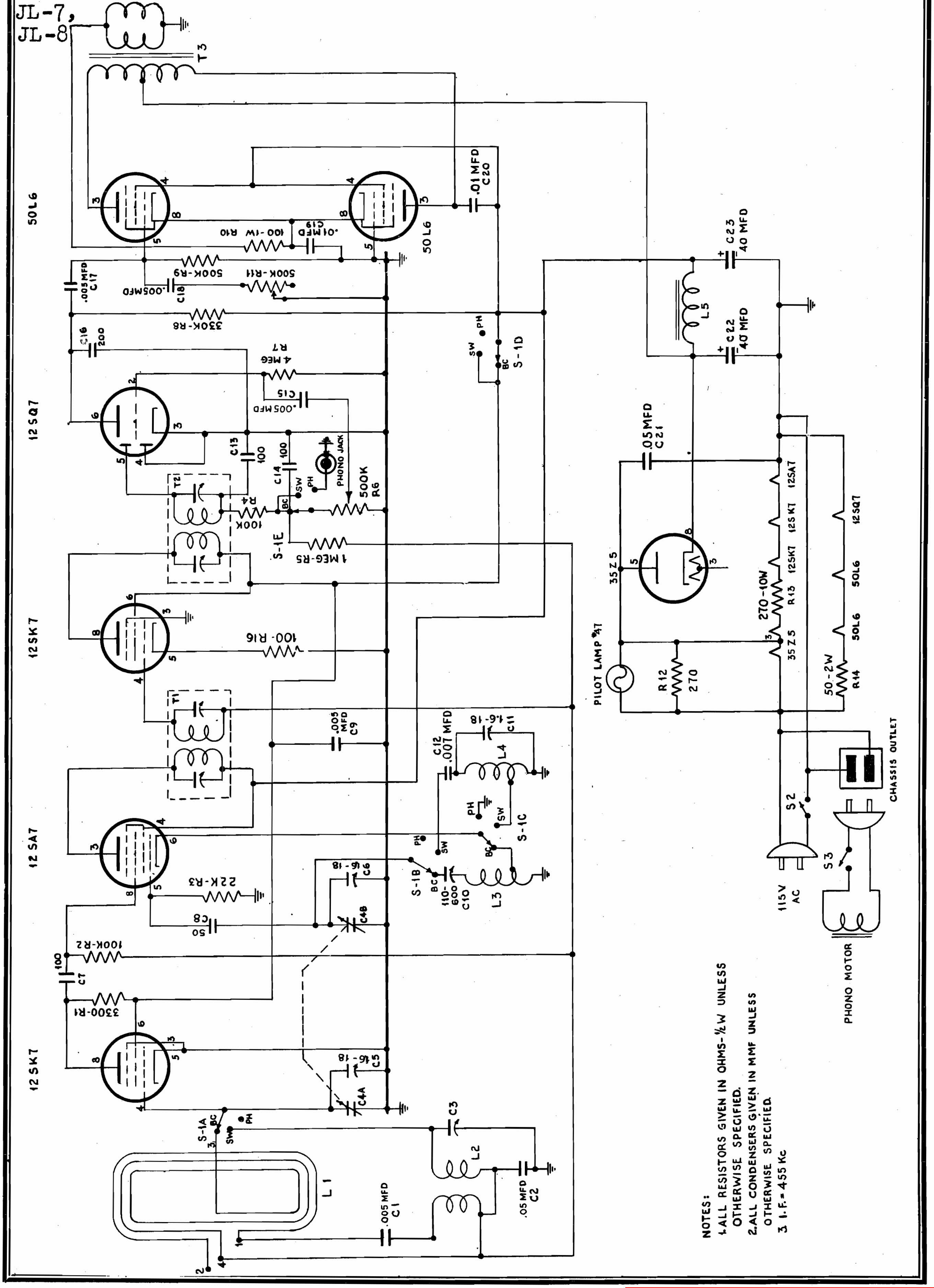
MODEL JL-6



NOTES:
1. ALL RESISTORS GIVEN IN OHMS-½W UNLESS OTHERWISE SPECIFIED.
2. ALL CONDENSERS GIVEN IN MMF UNLESS OTHERWISE SPECIFIED.
3. I.F. = 455 KC

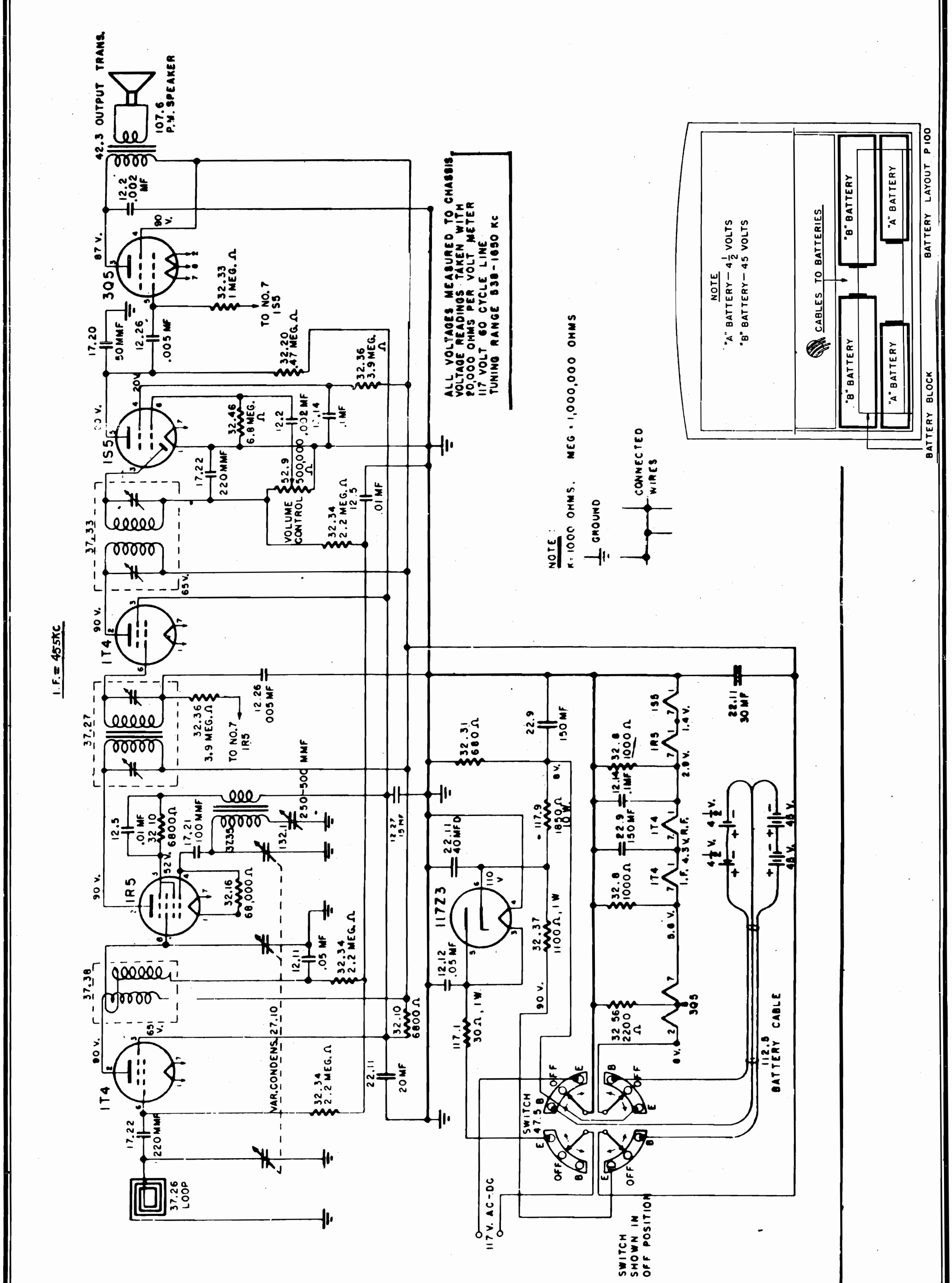
RADIO WIRE TELEVISION

MODELS JL-7, JL-8



RADIO WIRE TELEVISION

MODEL JS-1



MODEL JS-1 RADIO WIRE TELEVISION

ALIGNMENT PROCEDURE

No attempt should be made to realign the various circuits until all other causes have been checked, unless the condition is so obvious as to indicate that realignment is necessary. Then proceed as follows:

Volume Control full on.

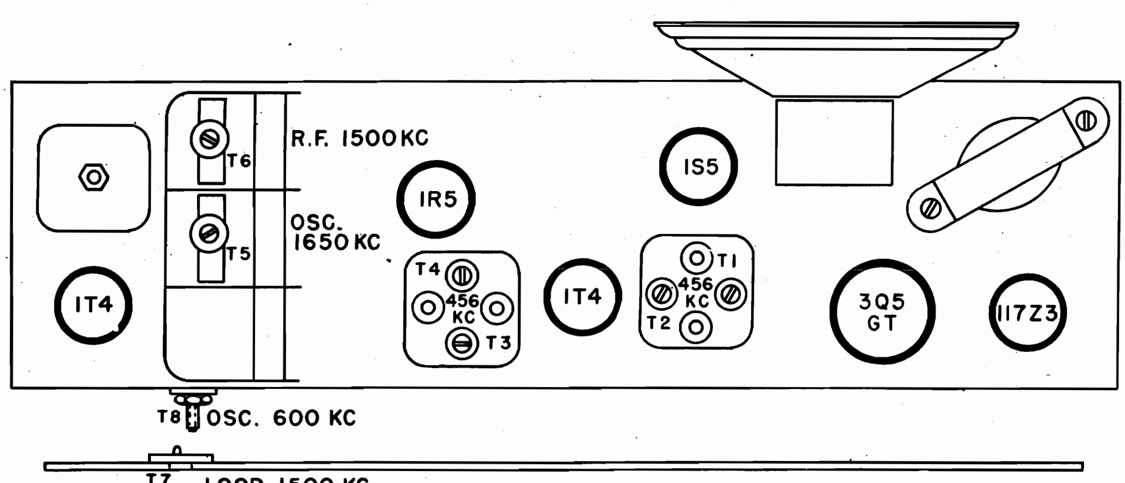
Low range A.C. meter connected across voice coil to indicate output.

Keep signal generator attenuated so as to maintain ½ scale reading on output meter.

Make certain that dial pointer is exactly on index line (top left side of dial plate) when variable condenser is fully meshed.

REMOVE CHASSIS BOTTOM PLATE

RECEIVER DIAL AT:	SIGNAL GENERATOR	DUMMY ANTENNA	CONNECT SIGNAL GENERATOR TO:	REFER TO CHASSIS LAYOUT FOR LOCATION OF TRIMMERS
1 Fully closed	Exactly 456 KC	.1 MF	Common Ground and Control Grid 1R5 top front section var. cond.	Adjust for maximum output T1, T2, T3, and T4.
2 Fully closed	Approx. 538 KC	.1 MF	Control Grid 1T4 top rear section var. condenser	Adjust for maximum output T8
3 Fully open	Exactly 1650 KC	.1 MF	Control Grid 1T4 top rear section var. cond.	Adjust for maximum output T5
REPEAT OPERATIONS 2 and 3.				
4 Approx. 1500 KC	Approx. 1500 KC	.1 MF	Control Grid 1T4 same as No. 3	Adjust for maximum output T6
The next two operations are performed with the bottom plate on and the chassis in the cabinet — with lid closed				
5 Approx. 1500 KC	Approx. 1500 KC	.1 MF	Radiating Loop 20" from Receiver	Adjust T7 for maximum output
6 Approx. 600 KC	Approx. 600 KC		Radiating Loop 20" from Receiver	Adjust T8 for maximum while rocking variable condenser

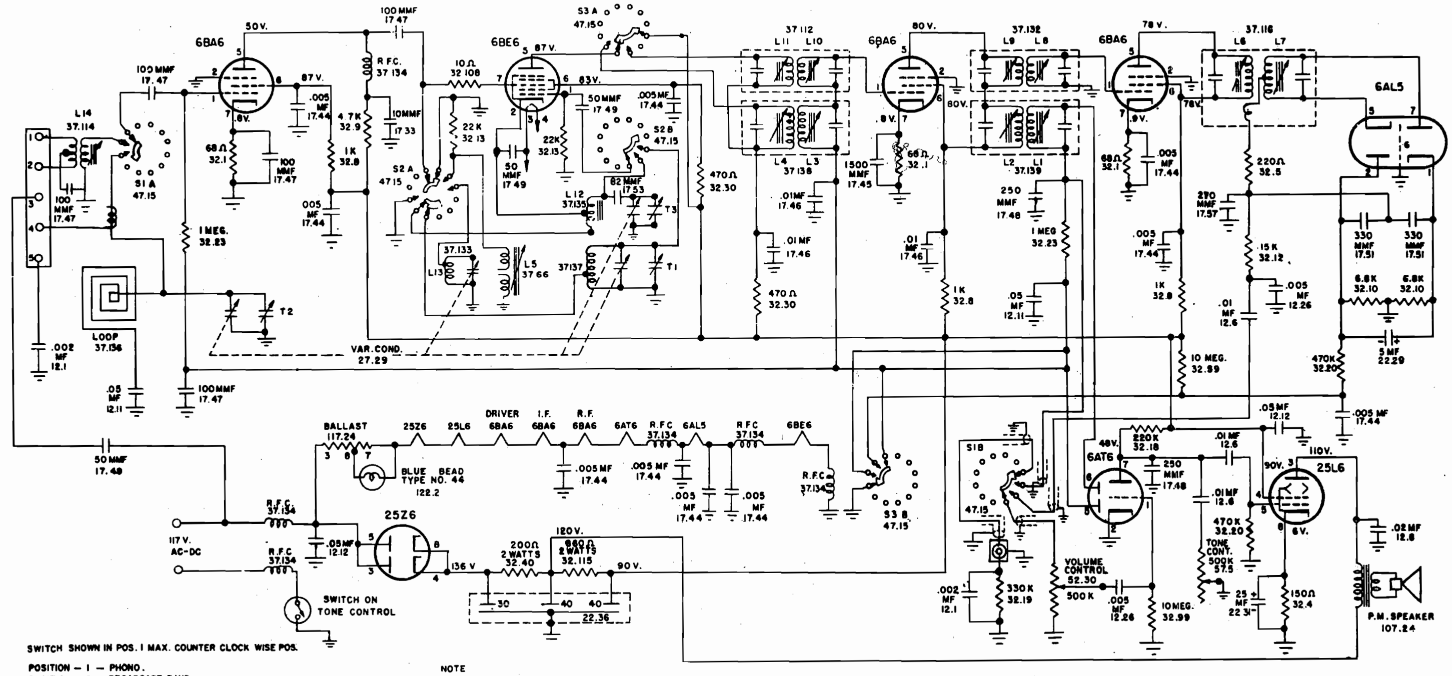


TUBE LAYOUT

TUNING RANGE 538-1650 KC

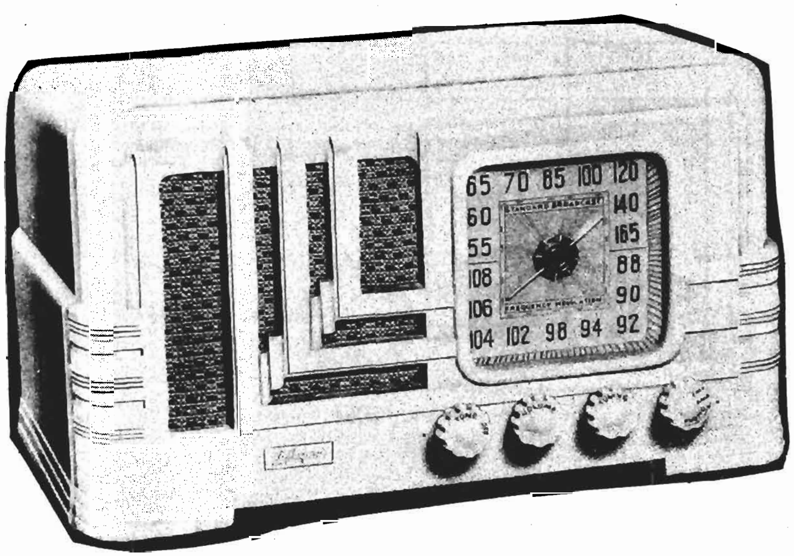
RADIO WIRE TELEVISION

MODEL JS-2



SWITCH SHOWN IN POS. I MAX. COUNTER CLOCK WISE POS.
POSITION – 1 – PHONO.
POSITION – 2 – BROADCAST BAND
POSITION – 3 – F.M.
ALL VOLTAGE READINGS TAKEN WITH V.T.V.M. AT 117V, 60 CYCLE LINE

NOTE
K = 1000 OHMS
GROUND
CONNECTED WIRES

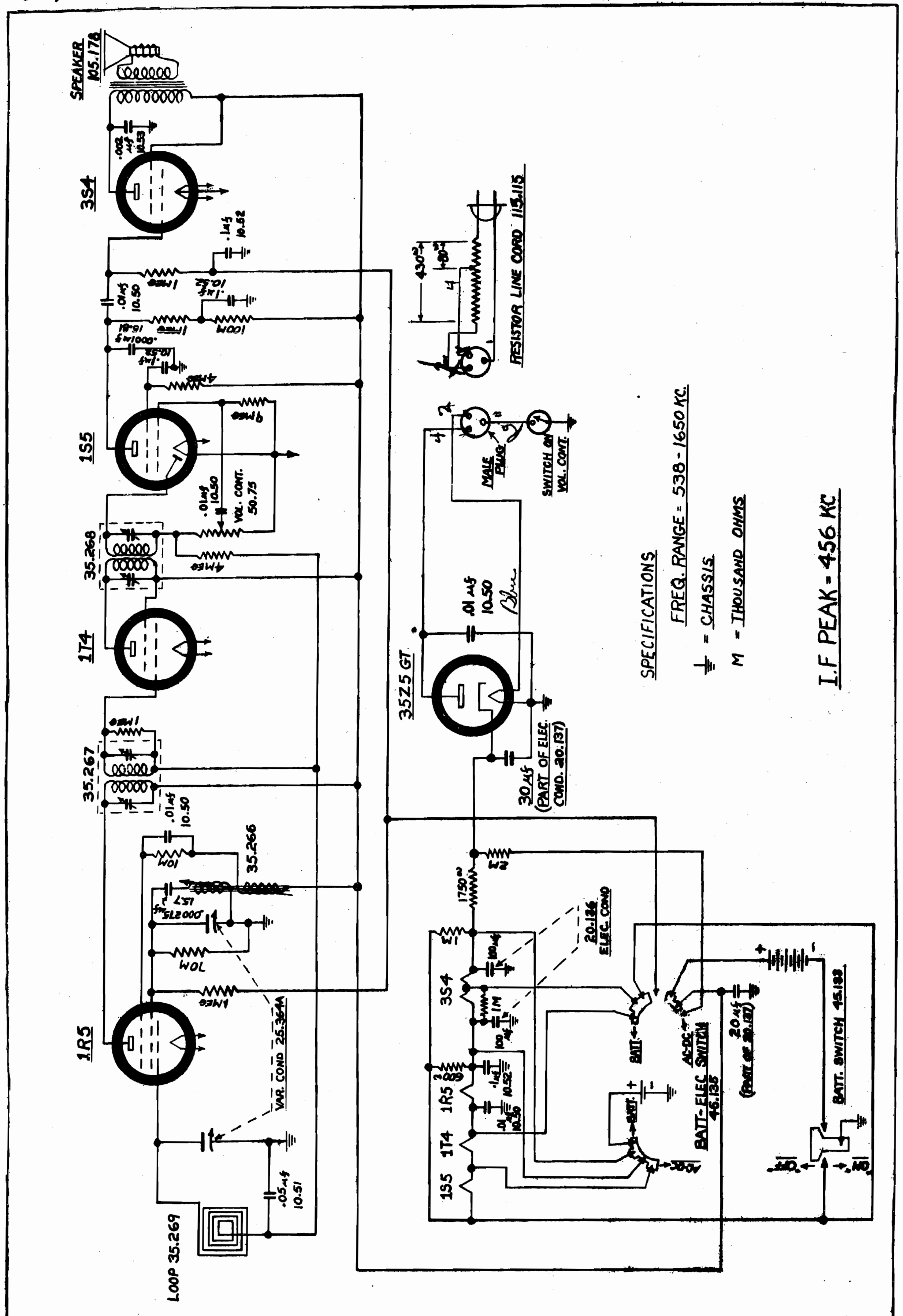


The receiver is designed to operate on 105-125 volts, 40 to 60 cycles, alternating current (AC) or 105-125 volts direct current (DC). The power consumption is 60 watts.

The tuning range on FM is from 87 MC to 109 MC, covering all FM stations from channels 200 to 300. The tuning range for standard broadcast is from 530 to 1680 kilocycles covering the full broadcast range and high fidelity stations with sufficient overlap at both ends of the dial.

MODELS JS-115, JS-319

RADIO WIRE TELEVISION



RADIO WIRE TELEVISION

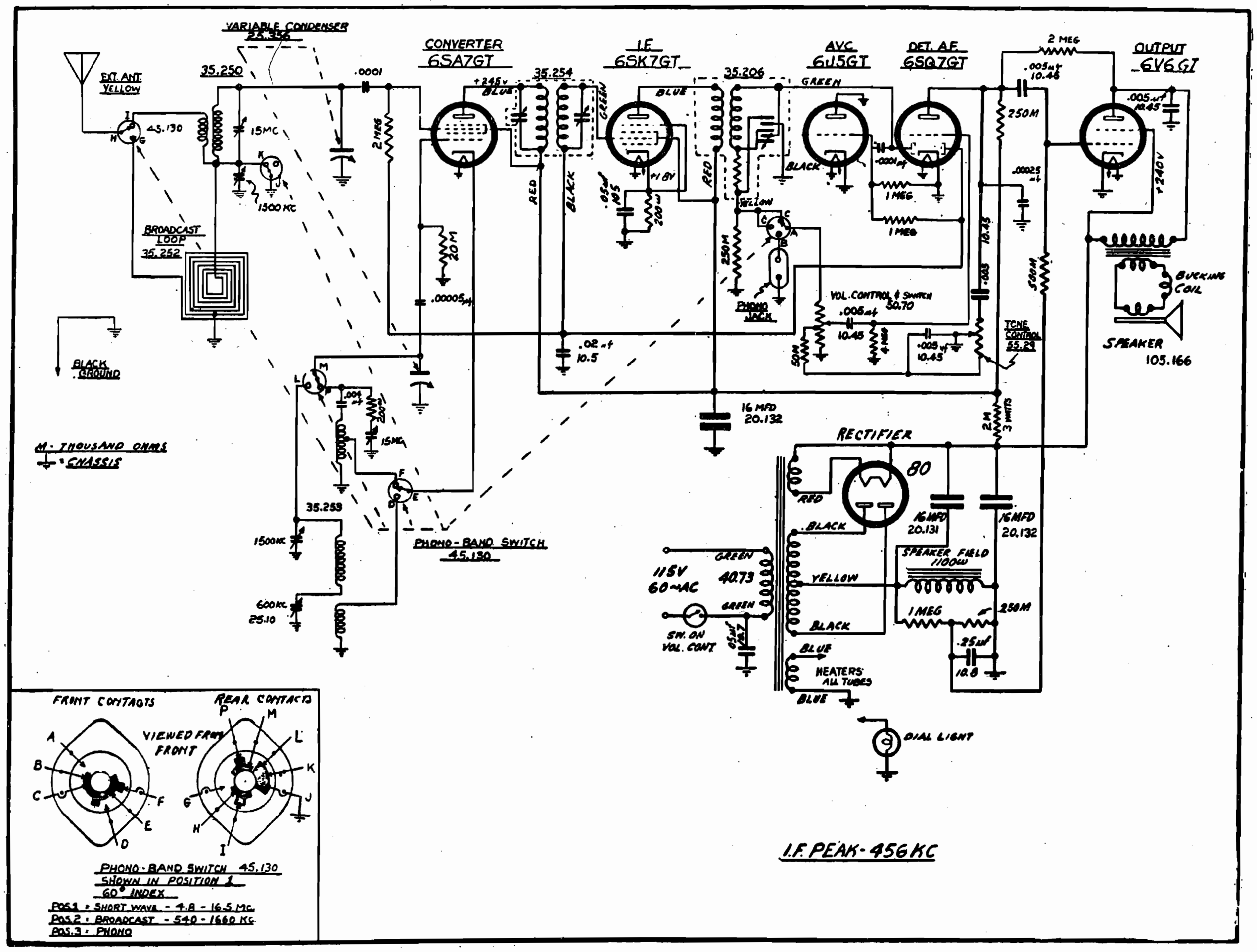
MODEL JS-135

Turn receiver on and wait for tubes to reach operating heat. Adjust Wave Band Switch to desired Wave Band. LEFT for Short Wave; CENTER for Standard Broadcast; and RIGHT connects terminals for phonograph record player in the circuit. The UPPER HALF of the Dial Scale covers the Broadcast Band. The LOWER HALF covers the Short Wave Band. Turn the Vernier Tuning Knob until the desired station (see dial pointer), is heard. Adjust Volume to a satisfactory level after making certain that the station is tuned correctly. Tuning on Short Wave is more critical. Use more care lest worthwhile stations be passed over unnoticed.

A Phonograph Record Player can be attached to the terminals marked "PHONO" in rear of chassis.

One 6 Volt 250 M. A. lamp is used for dial illumination. Use similar type for replacement.

WARNING: Check power line for voltage nad frequency (cycles) to make certain they are the same as specified on label located at rear of the receiver chassis before inserting the receiver power line in electric outlet.



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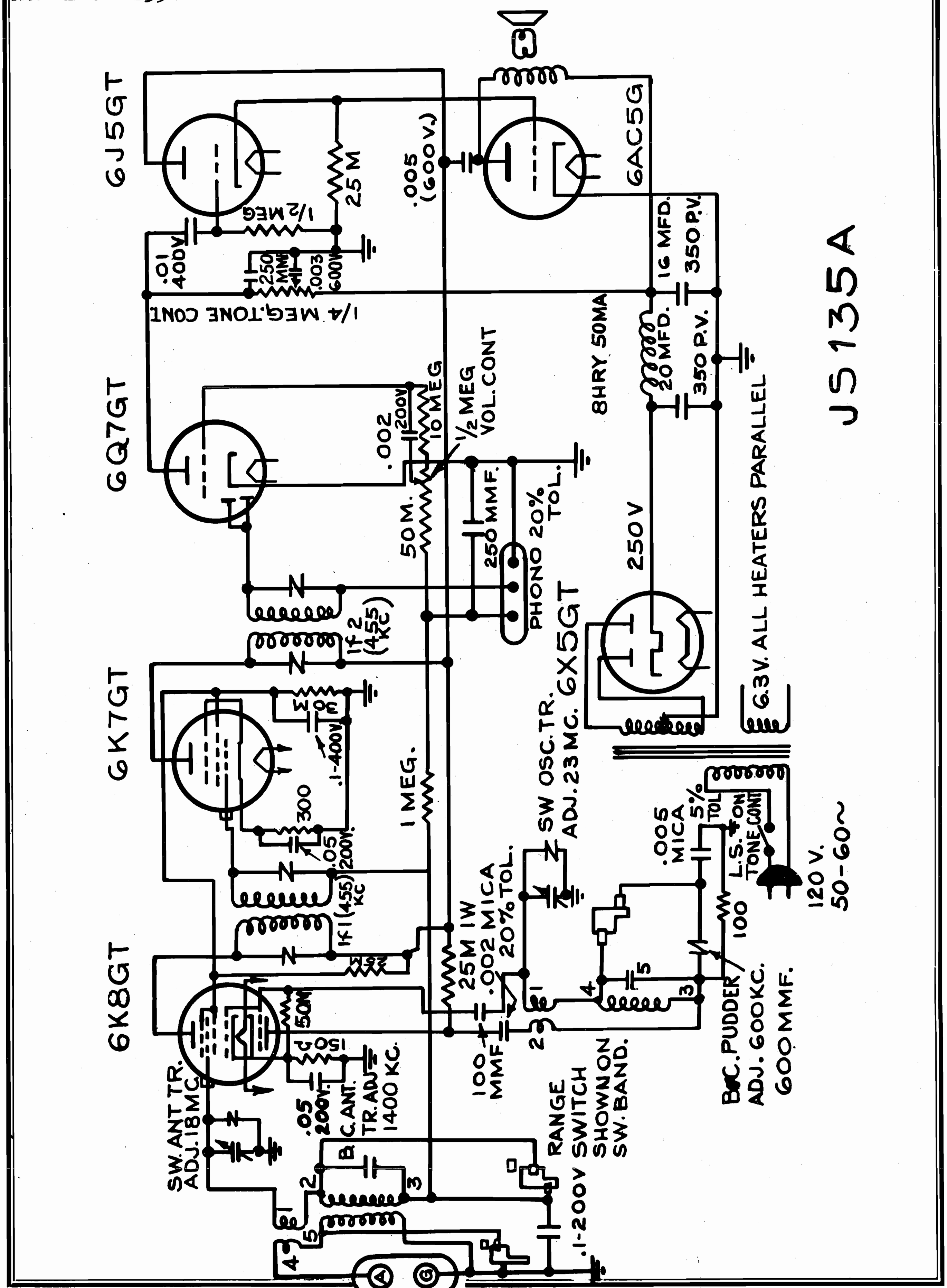
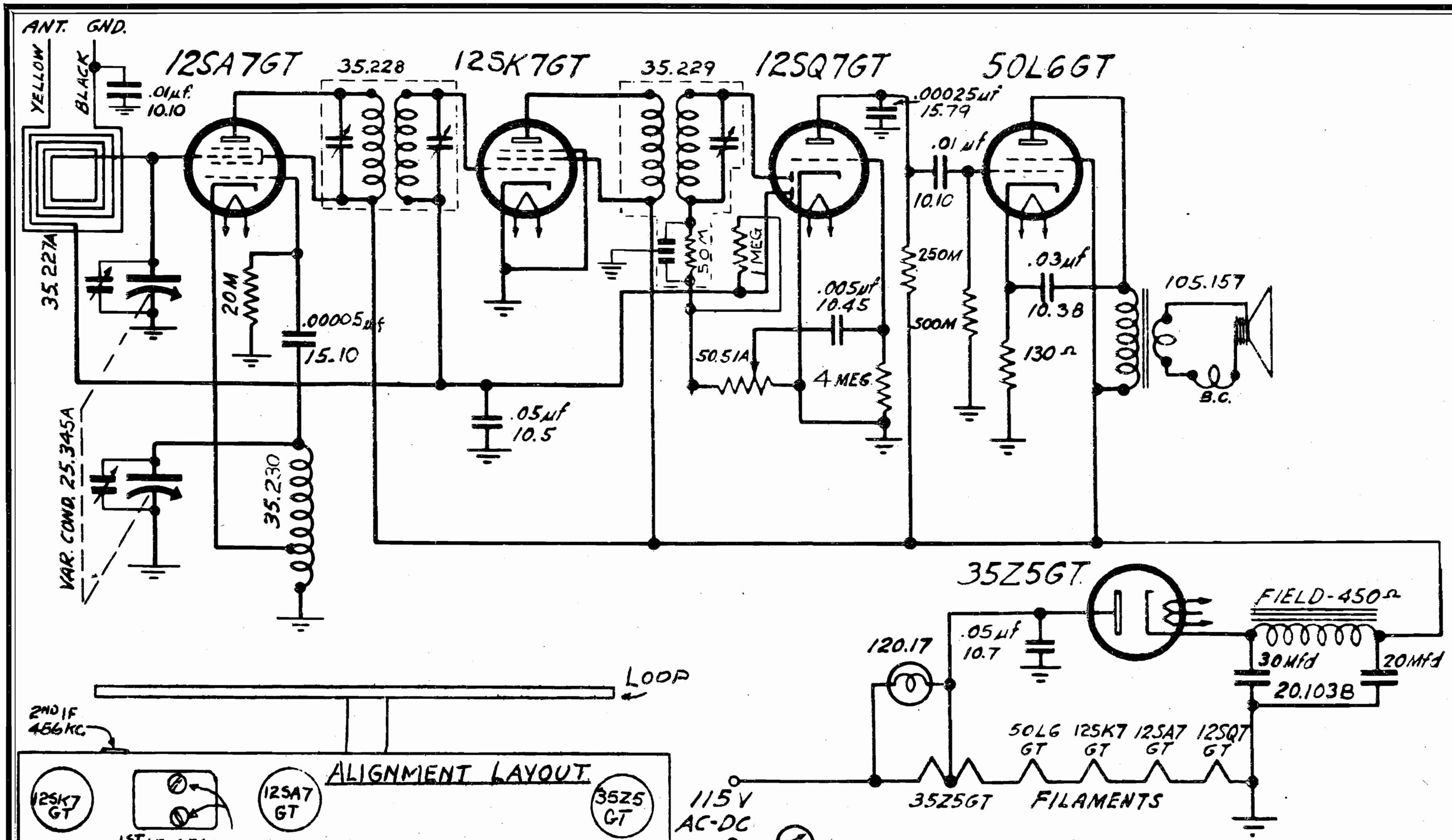
MODEL JS-135A

RADIO WIRE TELEVISION

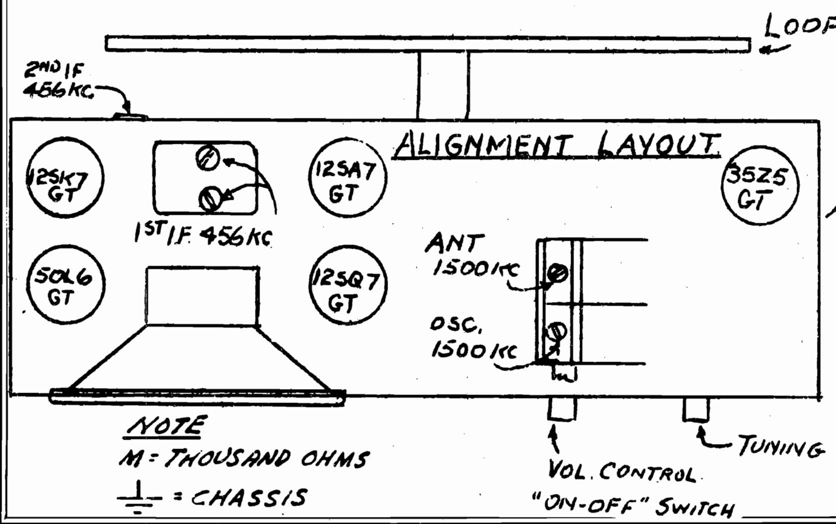


RADIO WIRE TELEVISION

MODELS JS-166, JS-167



I.F. = 456 KC.



NOTE
M = THOUSAND OHMS
⏚ = CHASSIS

ALIGNMENT PROCEDURE

Feed 456 K.C. through .01 condenser to antenna (rear section of variable condenser. Adjust I.F. trimmers for maximum output.

R.F. -

Set variable condenser to 1500 K.C. Feed 1500 K.C. signal through 100 mmf. condenser to antenna lead (rear of loop). Adjust ant. and osc. trimmers for maximum output. Check sensitivity at 600 K.C. Bend rotor plates if necessary to insure proper tracking.

MODELS JS-173, JS-184, JS-185

RADIO WIRE TELEVISION

WARNING: Check power line for voltage and frequency (cycles) to make certain they are the same as specified on label located at rear of the receiver chassis before inserting the receiver power line in electric outlet.

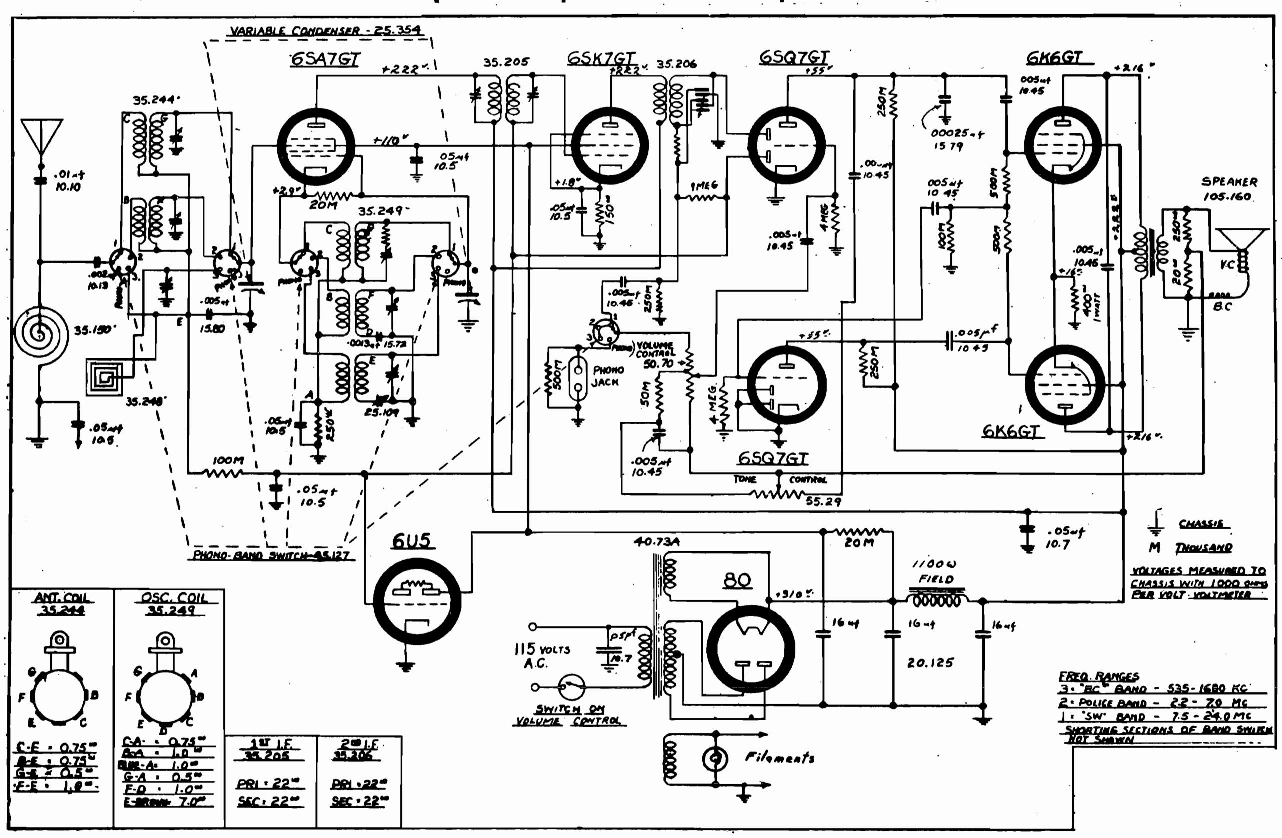
These Receivers must be operated on 60 Cycles, 120 Volt current. Any other type Voltage, if used will result in damage to the receiver.

SHORT WAVE RECEPTION: An external Antenna is absolutely necessary for good reception on either of the Short Wave Bands. This antenna may consist of a short wire strung indoors or preferably a good OUTSIDE ANTENNA.

In installing an antenna to be used with a sensitive short wave receiver every precaution should be observed to keep interfering noises at a minimum. The lead-in and antenna proper should be located as far as possible from any potential source of interference, such as electric signs, elevators, trolley wires, motors, power lines, etc. The antenna should also be as remote as possible from pick up from the ignition systems of passing automobiles. For connection to the antenna, a yellow wire is brought out through the rear of the receiver. Insert the power line plug in the electric outlet and turn the "ON-OFF" switch and Volume Control knob to the right. A few seconds will be required for the tubes to reach operating temperature.

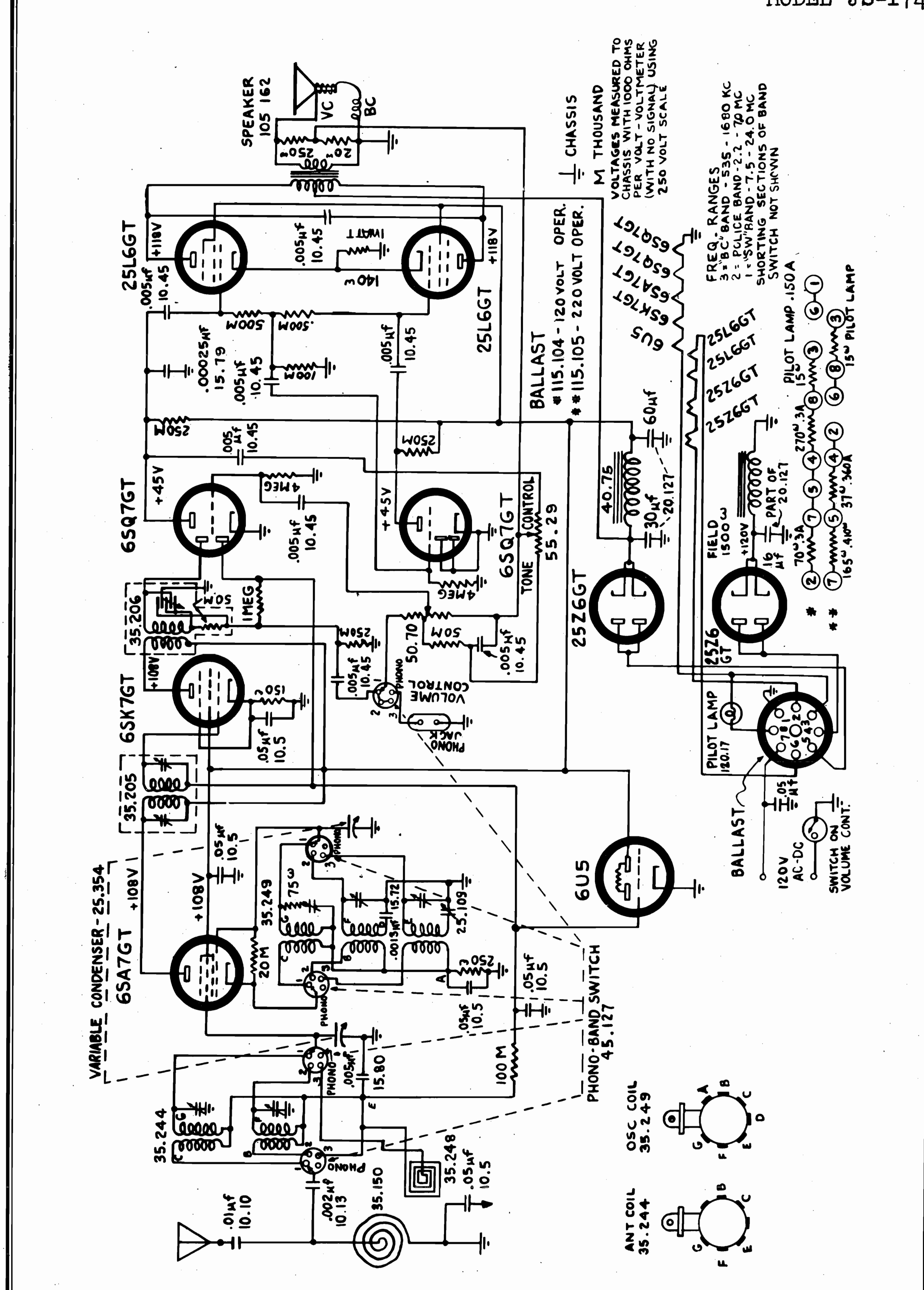
DIAL LAMP: Thse models use one 6-8 Volt, 150 M. A. Lamp. Use similar lamps when replacing or damage will result.

CAUTION: When pilot lamp burns out, replace at once.



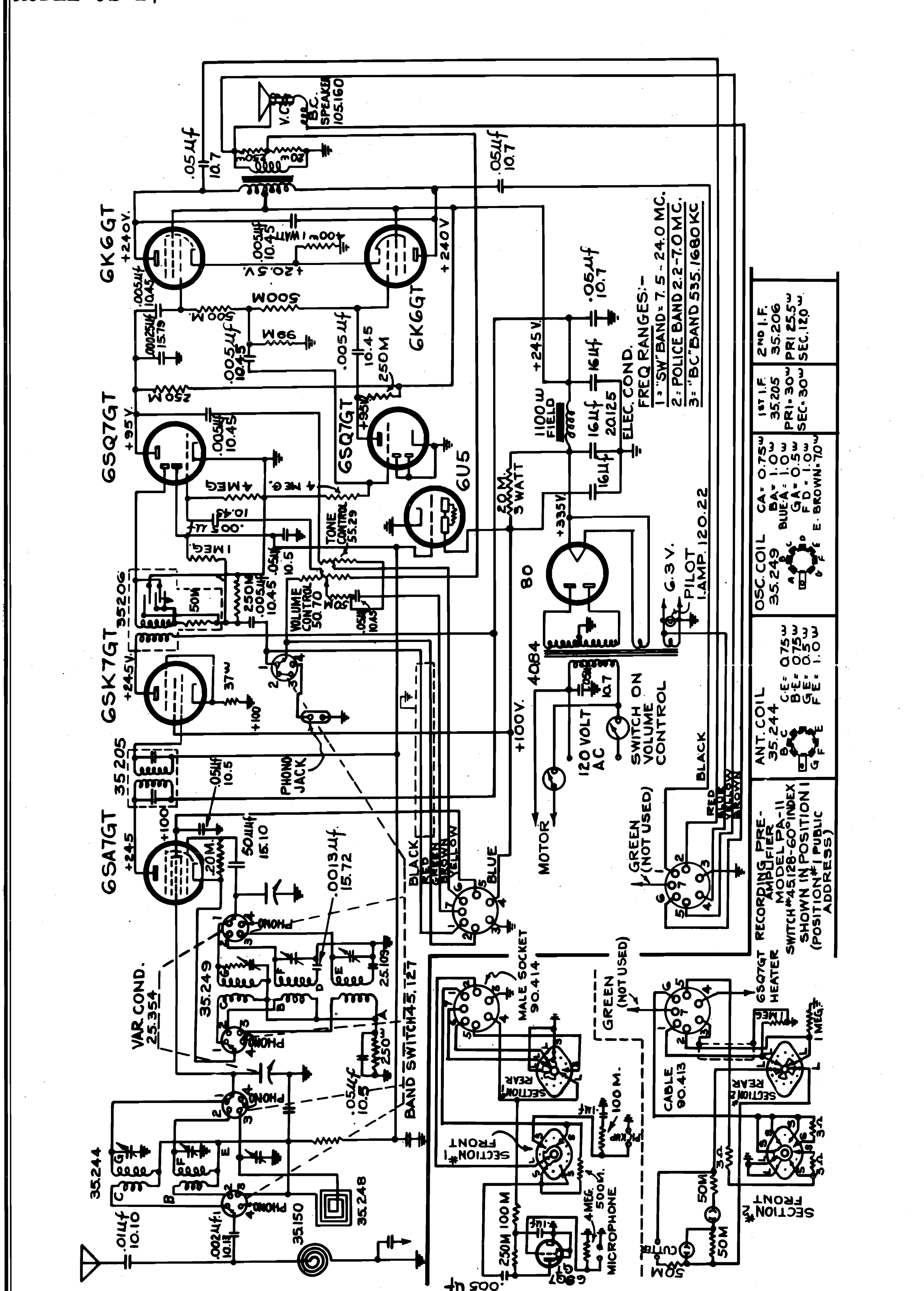
RADIO WIRE TELEVISION

MODEL JS-174



MODEL JS-176

RADIO WIRE TELEVISION



RADIO WIRE TELEVISION MODEL JS-183

This receiver is equipped for FM (Frequency Modulation); Television and Phonograph Units.

Located on the rear of the chassis is a two pin JACK provided for this purpose. The Band Switch must be in the left position when operating.

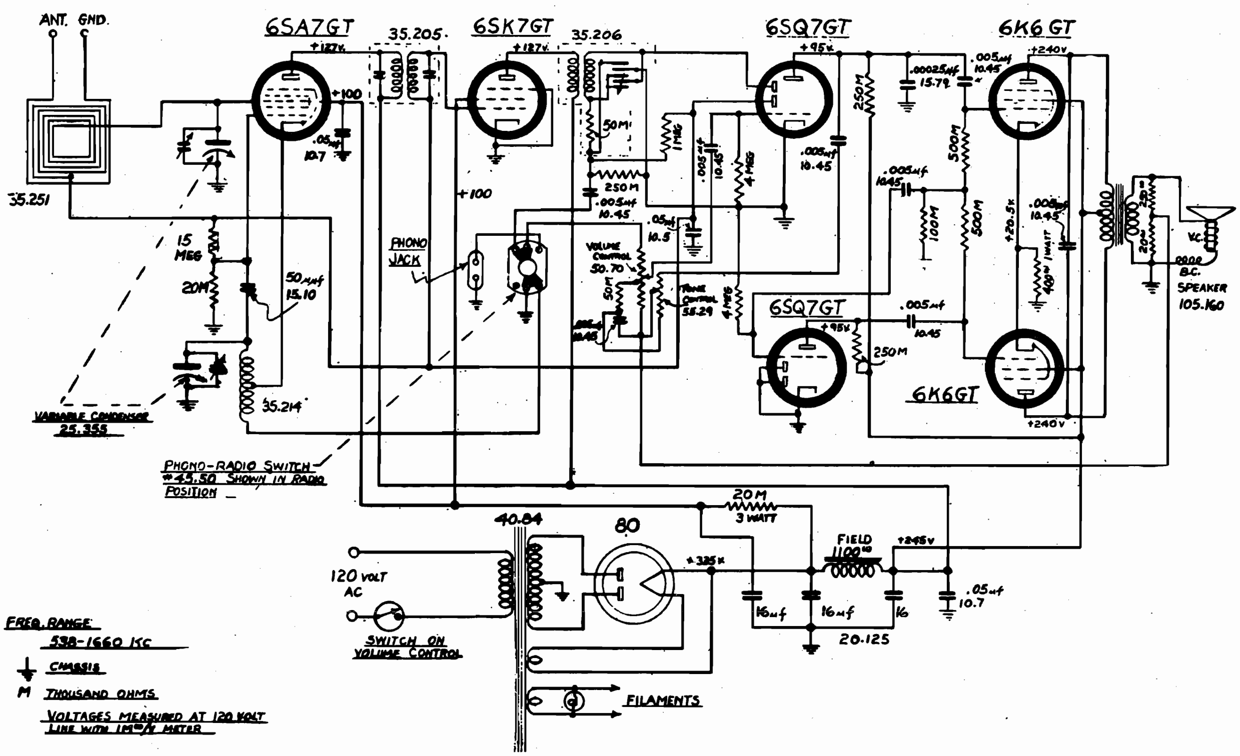
If receiver hums slightly reverse the Power Cord Plug.

TUBE COMPLEMENT: A tube layout chart at the rear of the receiver indicates the type of tubes employed, as well as their location on the receiver chassis. When replacing these tubes replace only with tubes having identical type numbers.

When operating the receiver in a steel re-enforced building or other shielded locations, an outside antenna is recommended. This may be connected to the terminal on the loop marked "AERIAL". A ground may also be connected to the terminal marked "GROUND".

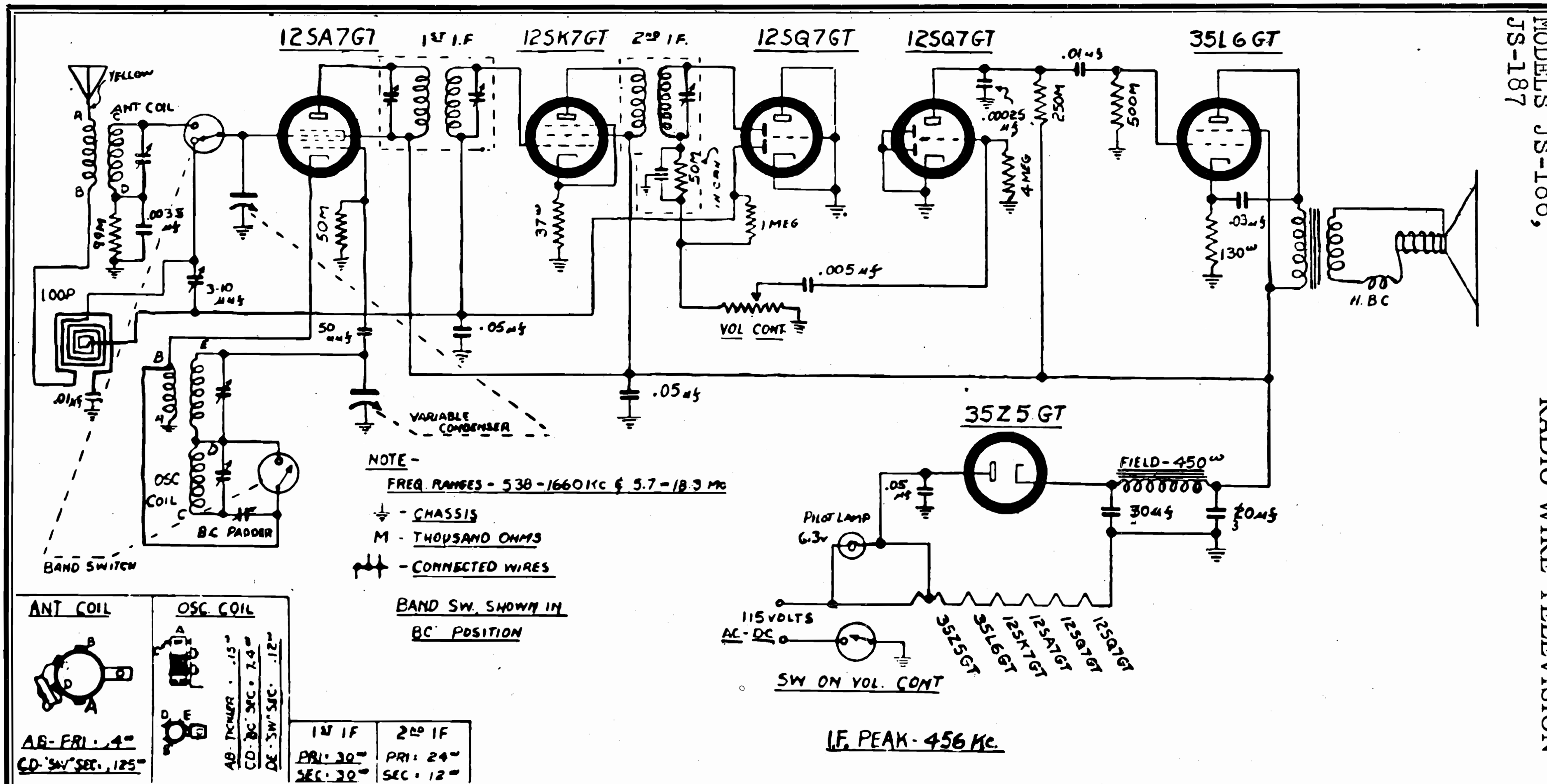
WARNING: Check power line for voltage and frequency (cycles) to make certain they are the same as specified on label located at rear of the receiver chassis, before inserting the power line in electric outlet.

This Receiver is equipped with a ROTATING LOOP ANTENNA. By rotating the Loop Control from left to right or vice versa, reception may be greatly improved. A correct position of the LOOP ANTENNA will result in noise-free reception.



MODELS JS-186, JS-187

RADIO WIRE TELEVISION



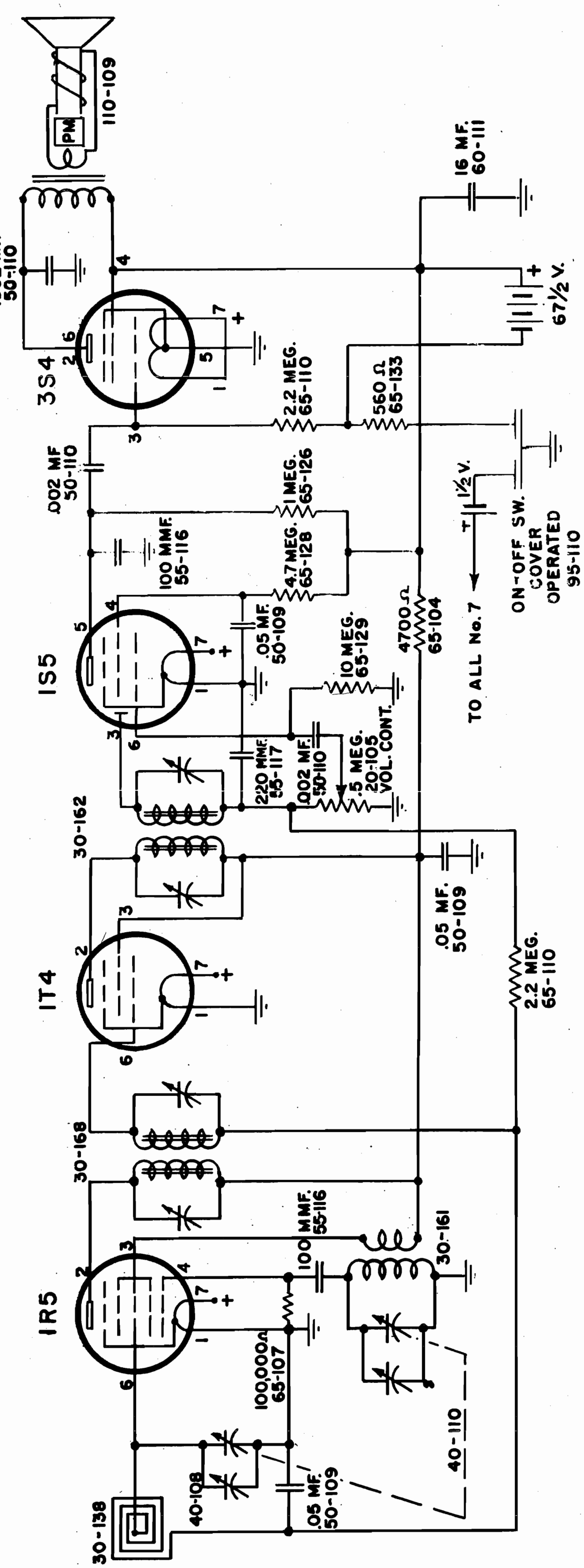
This 6 Tube Superheterodyne is designed to operate on 115 volts, 40 to 60 cycles, alternating current (AC) or 115 volts direct current (DC).

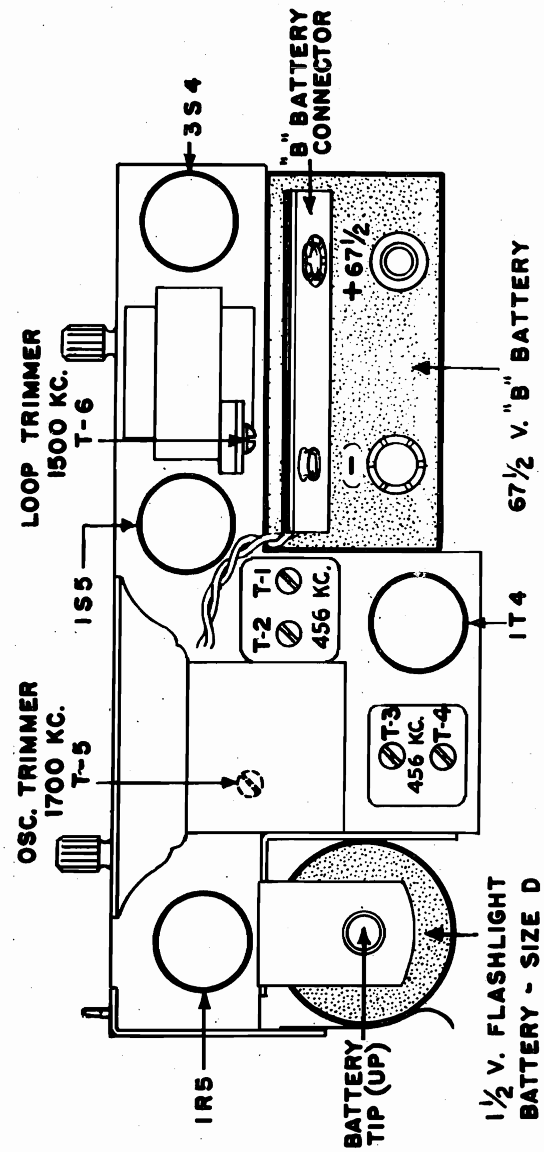
The Tuning Ranges, 533 to 1660 kilocycles (KC) and 5.7 to 18.3 megacycles (MC), cover all the major Domestic and Foreign Short Wave Broadcast, Police, Aircraft and Amateur Bands.

One 6-8 volt 150 M.A. lamp is used to illuminate the dial. Similar lamp should be used for replacement or damage may result.

REGAL ELECTRONICS CORP.

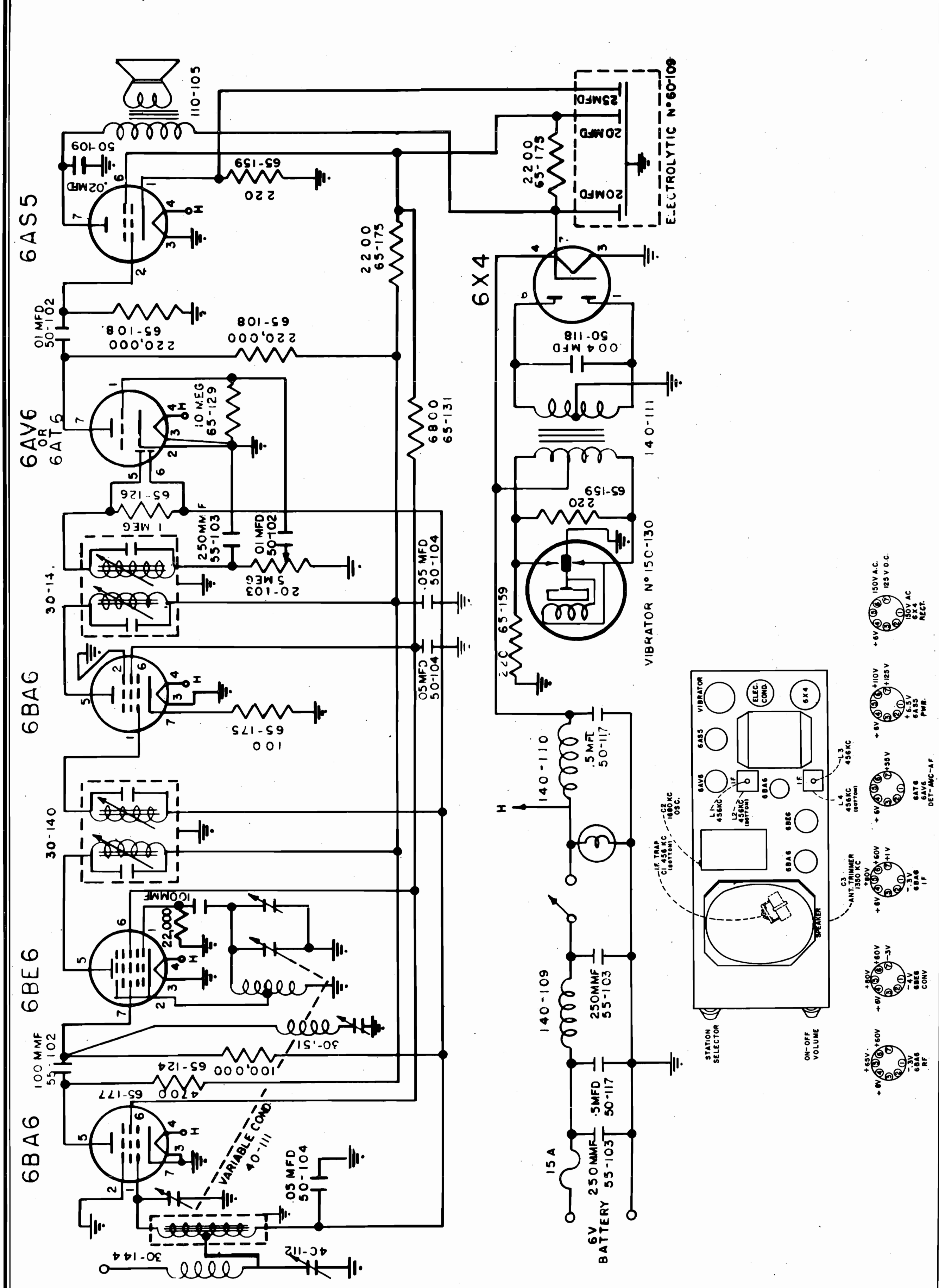
MODEL BP-48





TUBE AND BATTERY LAYOUT

MODEL CR-761 REGAL ELECTRONICS CORP.



REGAL ELECTRONICS CORP. MODEL CR-761

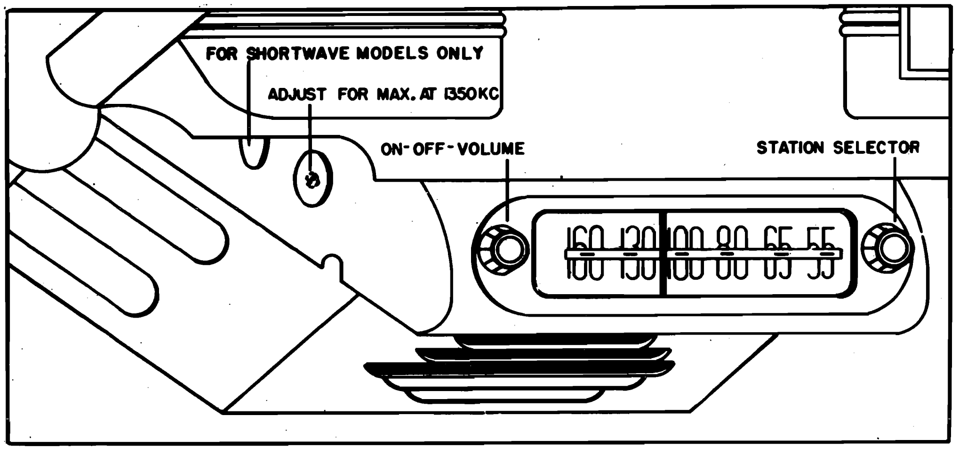


FIGURE 1. RADIO IN POSITION

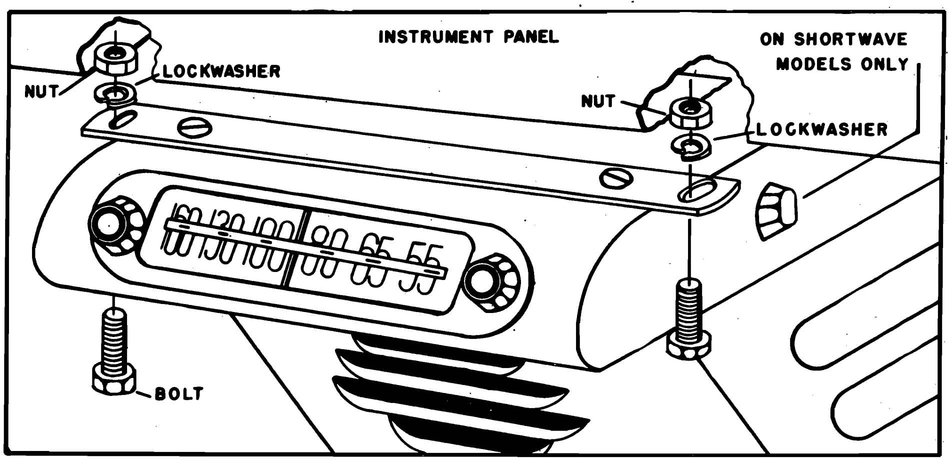


FIGURE 2. FRONT VIEW OF RADIO INSTALLATION

INSTALLATION

This radio is designed to operate at maximum efficiency when used with any good make auto-radio aerial. Install the aerial before proceeding with the installation of the radio. The aerial lead and complete installation instructions are packed with each aerial. The location of the aerial will determine the length of the aerial lead required to reach the radio. The shortest possible aerial lead should be used.

RADIO INSTALLATION: Determine the best possible location for the radio along the lower edge of the instrument panel. Using the front mounting strap as a template, mark and drill two 1/4" holes in the instrument-panel flange.

Fasten the strap to the top of the radio housing with two screws; then attach the fire-wall mounting strap to the stud on the back of the radio. Hold the radio in place, and bend the fire-wall strap to fit the fire wall. Mark and center-punch the location for the mounting-bolt hole on the fire-wall, and drill a 3/8" hole. Before drilling the hole, make certain that there are no obstructions such as ignition coil, battery, etc. on the motor side of the fire wall. Fasten the front mounting strap to the flange of the instrument panel (see figure 2), and bolt the fire-wall mounting strap securely to the fire wall (see figure 3).

CONNECTIONS: Plug the aerial lead into the connector on the radio. Place the fuse in the fuse housing on the "A" lead, and connect the fuse end of the "A" lead to the short lead on the back of the radio. Connect the other end of the "A" lead to the ignition switch or ammeter stud.

ANTENNA COMPENSATOR: An adjustment (see figure 1), reached through a hole on the upper-left side of the radio, near the front, is used to balance the radio to the aerial. With the radio turned on and the aerial fully extended, tune in a weak signal between 1200 kc and 1400 kc on the dial. With the volume control set just high enough to make the program audible, set the trimmer adjustment to obtain maximum signal strength. A small screwdriver is required for this adjustment.
Radio is now ready for operation.

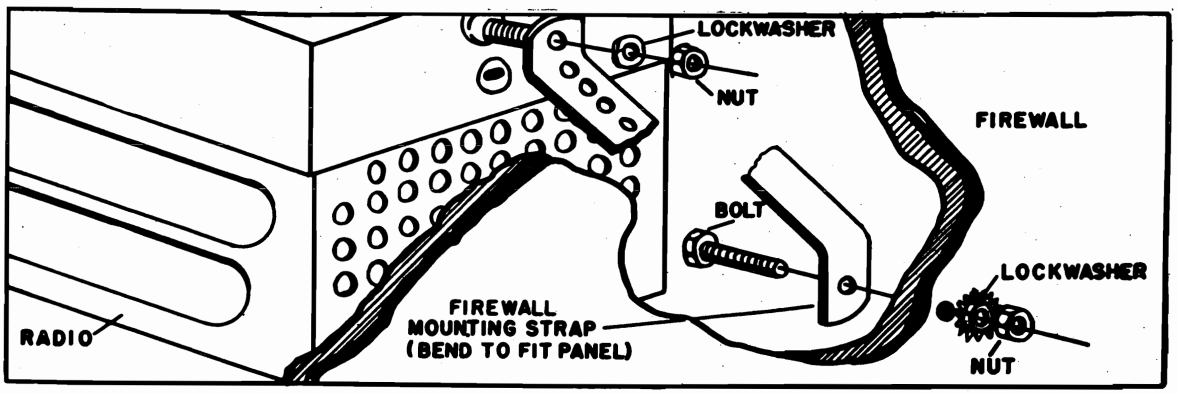


FIGURE 3. REAR VIEW OF RADIO INSTALLATION

ELIMINATION OF INTERFERENCE FROM CAR ELECTRICAL SYSTEM

Remove the coil-to-distributor high-tension lead from the distributor. Cut the lead two inches from the end, and screw the distributor resistor into the coil lead (see figure 4). Then screw the short length into the resistor, and plug the cable into the distributor cap. Two noise-filter condensers are furnished. One condenser must be connected to the output terminal of the generator (never to the field terminal), and the other to the battery side of the ignition coil. The generator-condenser bracket should be fastened to the generator housing, under the screw that holds the field (see figure 5), while the coil-condenser bracket should be fastened under the coil mounting bolts.
In some particularly stubborn cases of motor interference, one or more of the following procedures may be necessary:

A condenser can often be used to advantage on the electrically operated oil gauge or gas gauge. Connect the condenser lead to the terminal of the gauge, and bolt the condenser case securely to the frame or some other grounded part of the car.

Bonding the steering column to the fire wall with a short braid may also be effective. Clean the paint from the steering column at the fire wall where the column enters the motor compartment, and solder on a short piece of braid. Ground the end of the braid to the fire wall.

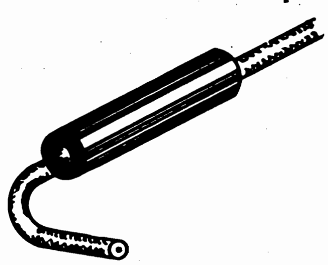


FIGURE 4. DISTRIBUTOR RESISTOR

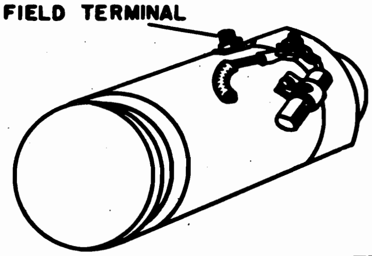


FIGURE 5. GENERATOR CONDENSER

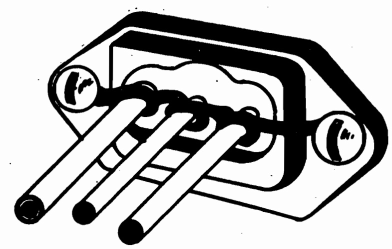
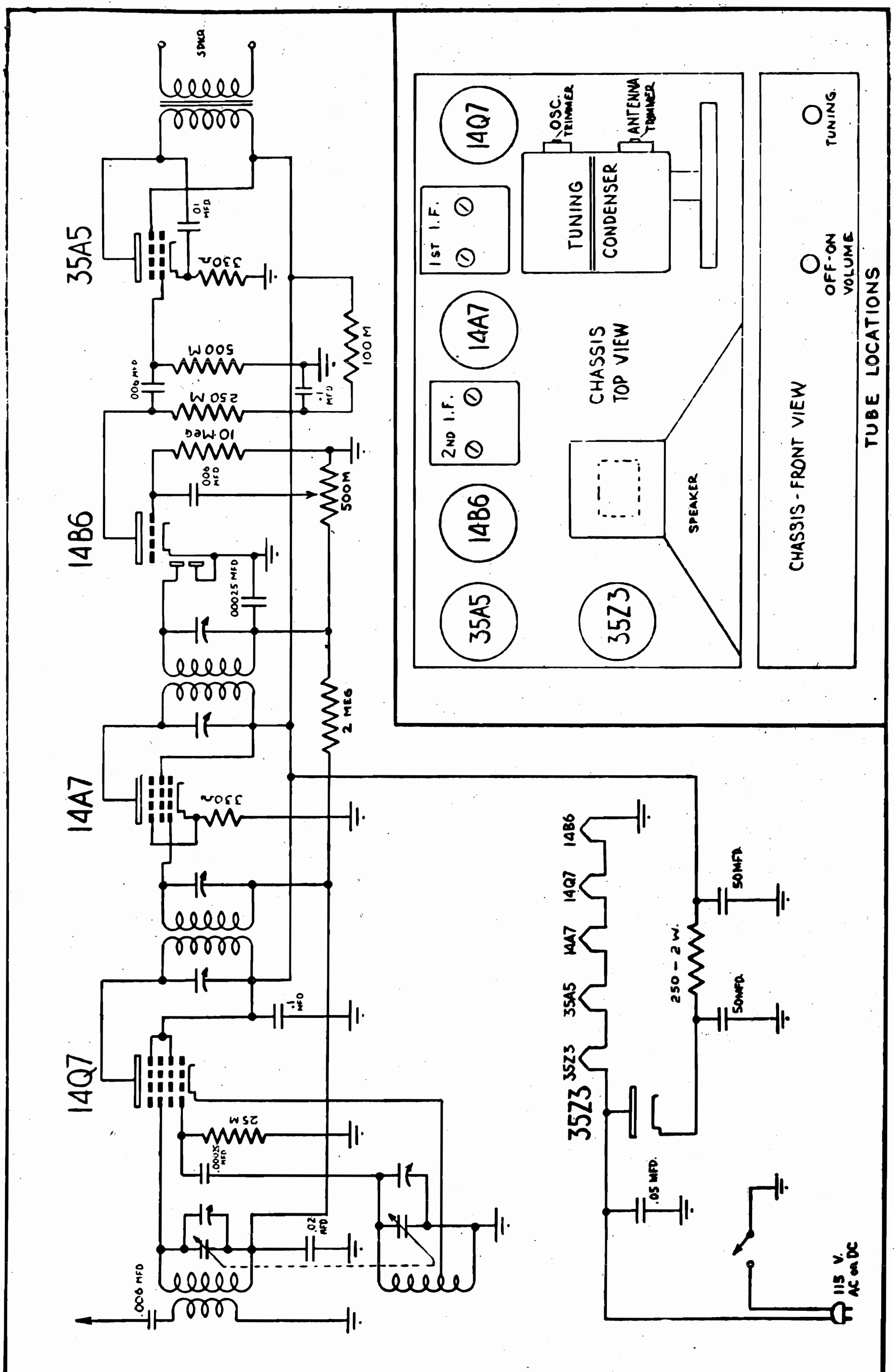


FIGURE 6. BONDING OF FIRE-WALL TUBES

In some cases it may be necessary to ground the tubes and rods coming through the fire wall in order to reduce the interference. Clean them with emery cloth and spot-solder the braid, fastening the end under a convenient screw (see figure 6).
In some cases it may be necessary to connect an additional condenser to the ammeter or to the ignition switch.
It may be necessary to use a condenser on the voltage regulator. The condenser case should be mounted under one of the voltage-regulator mounting screws, or at some other convenient location, and connected to the battery terminal of the voltage regulator.
Interference from electric clocks can be eliminated by connecting a condenser to the ammeter terminal. The case of the condenser must be securely grounded.
If tire-static interference is noted in a particular installation, static collector springs should be obtained and installed in the front wheels of the car.

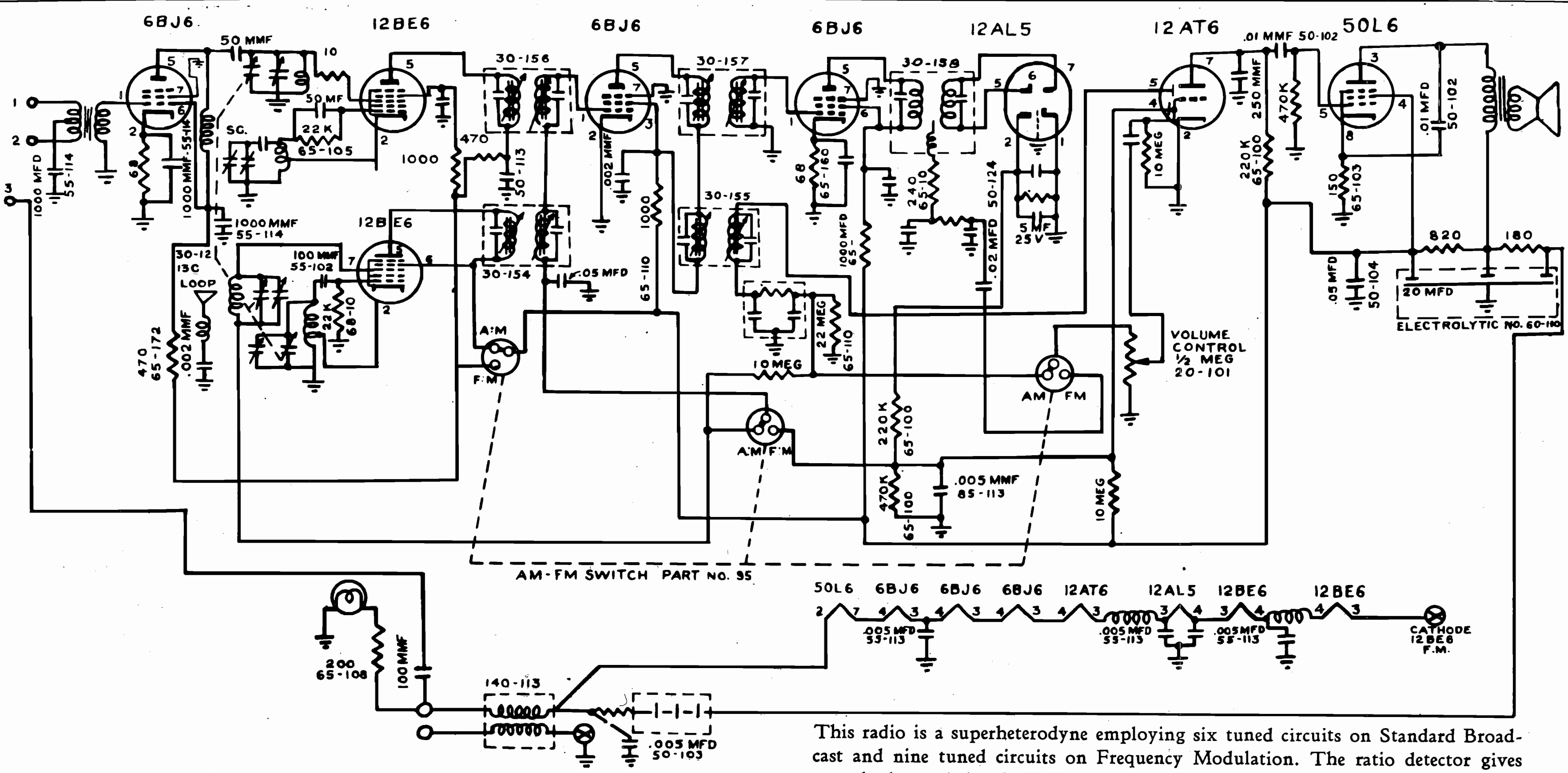
REGAL ELECTRONICS CORP.

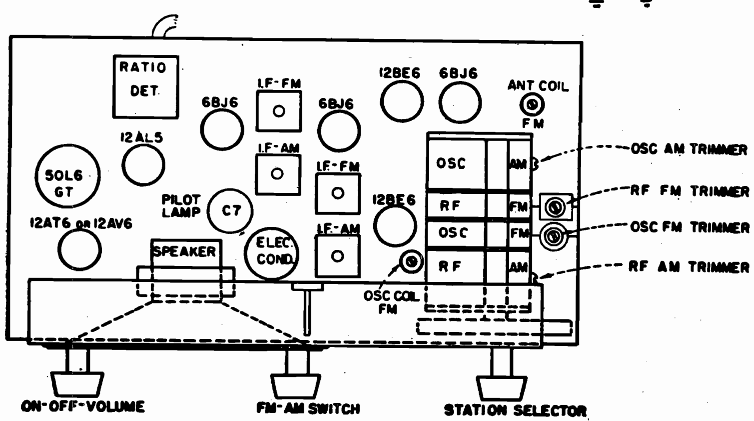
MODEL L-43



MODEL 78

REGAL ELECTRONICS CORP.





This radio is a superheterodyne employing six tuned circuits on Standard Broadcast and nine tuned circuits on Frequency Modulation. The ratio detector gives you the latest design in F.M. reception. Automatic volume control, beam power output, and selinium long life rectifier makes this receiver an outstanding model.

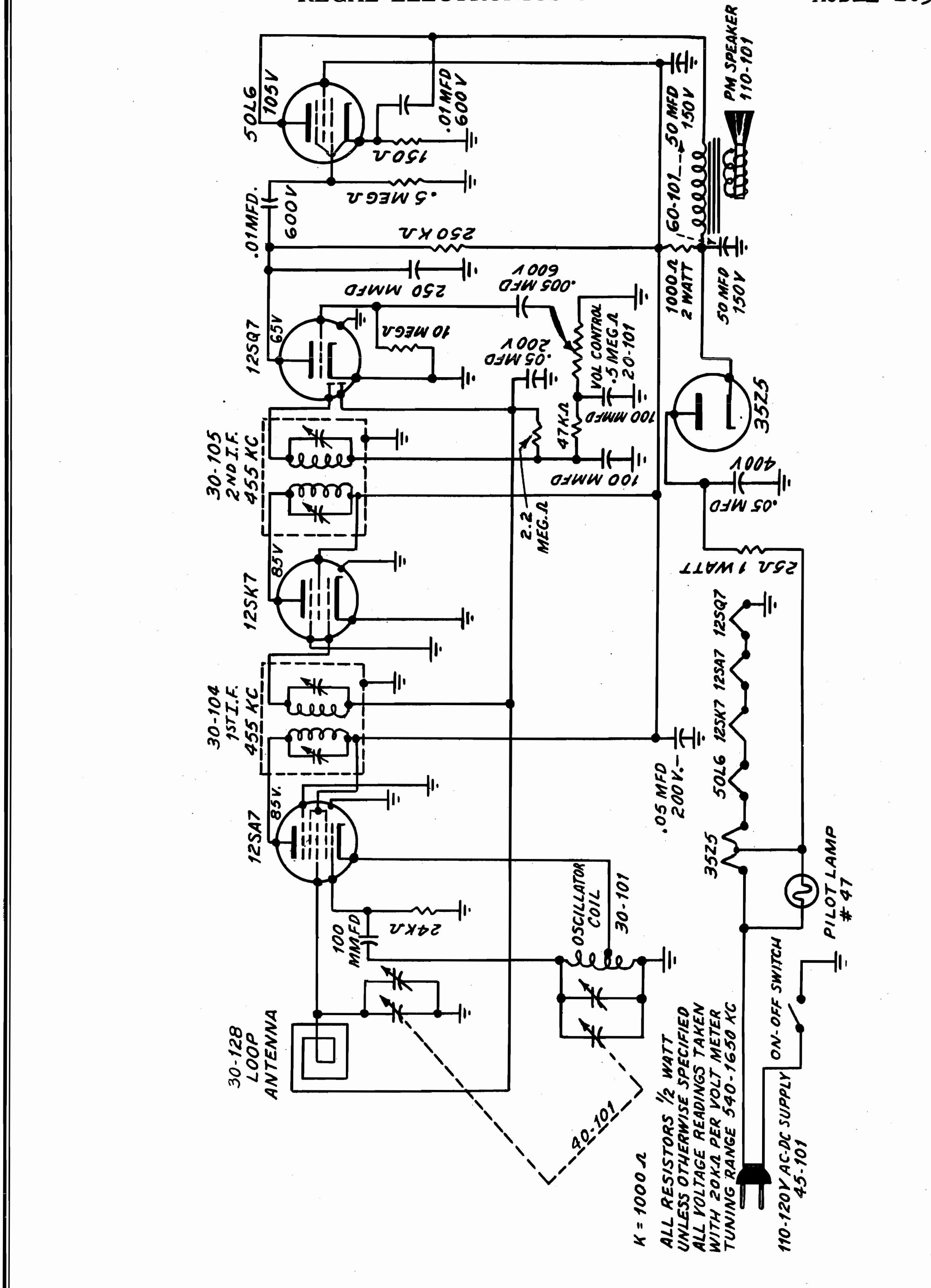
The tube complement consists of (1) 6BJ6 Radio Frequency Amplifier, (1) 12BE6 Converter (FM), (1) 12BE6 Convertor (AM), (1) 6BJ6 I.F. Amplifier, (1) 6BJ6 Driver, (1) 12AL5 Ratio Detector, (1) 12AT6 Detector AVC First Audio Amplifier, (1) 50L6GT Beam Power Amplifier.

The Pilot light is a type C-7 Mazda.

The tuning range on standard broadcast is 540 to 1650 Kilocycles covering the full broadcast range and 87.6 to 109.4 MC, covering all the FM channels from 200 to 300.

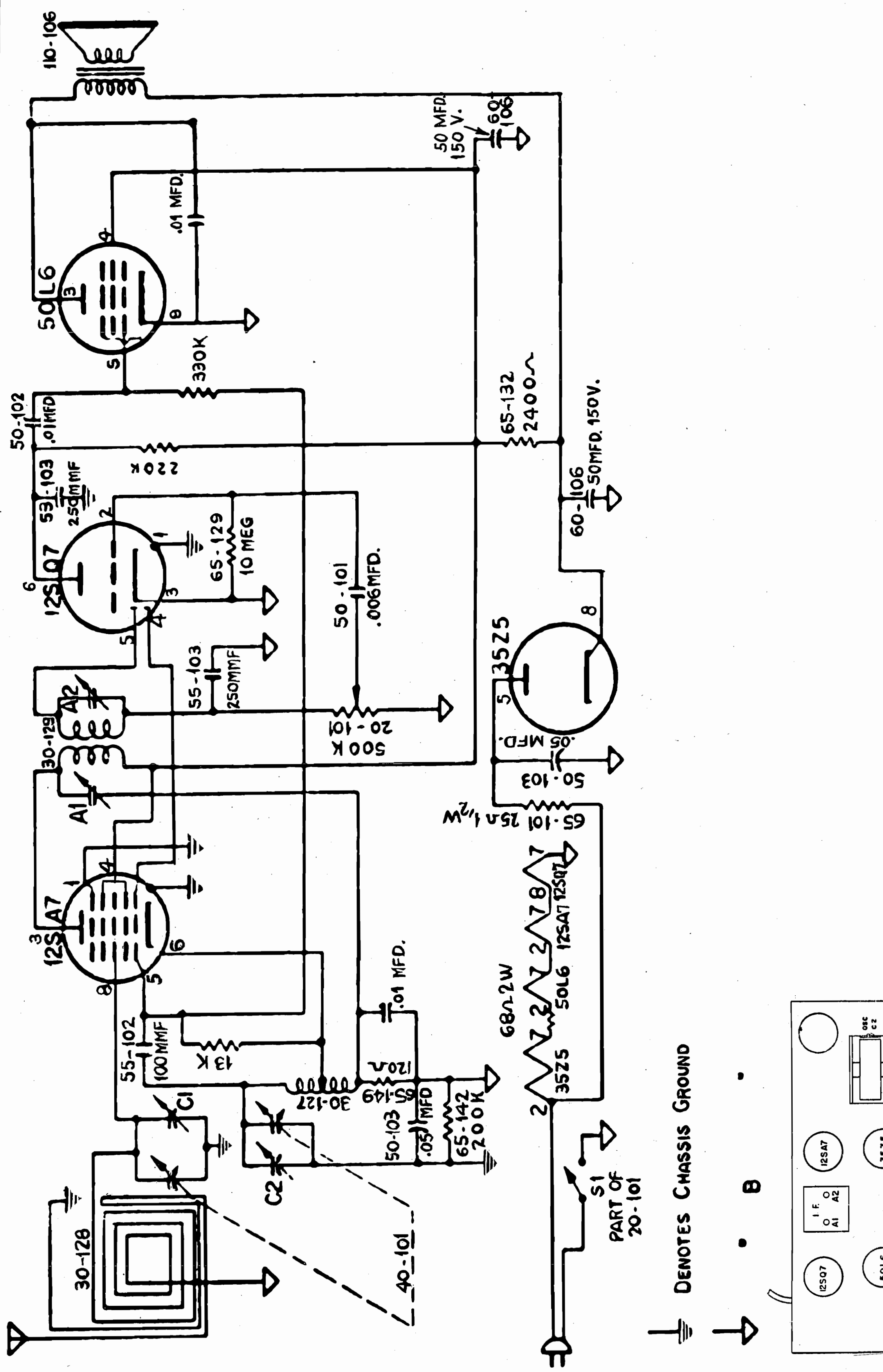
This radio is designed for convenient use in any location within range of a standard outlet receptacle. It will operate on 105 to 125 volts, 50 to 60 cycles alternating current, or on 105 to 125 volts direct current. Power consumption is 37 watts.

REGAL ELECTRONICS CORP. MODEL 205

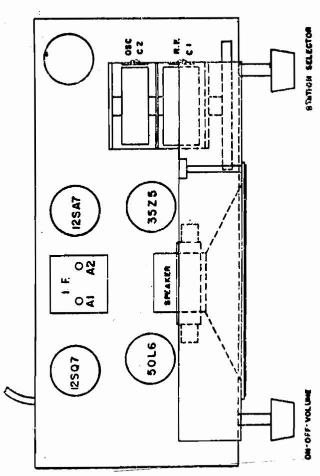


MODEL 1107

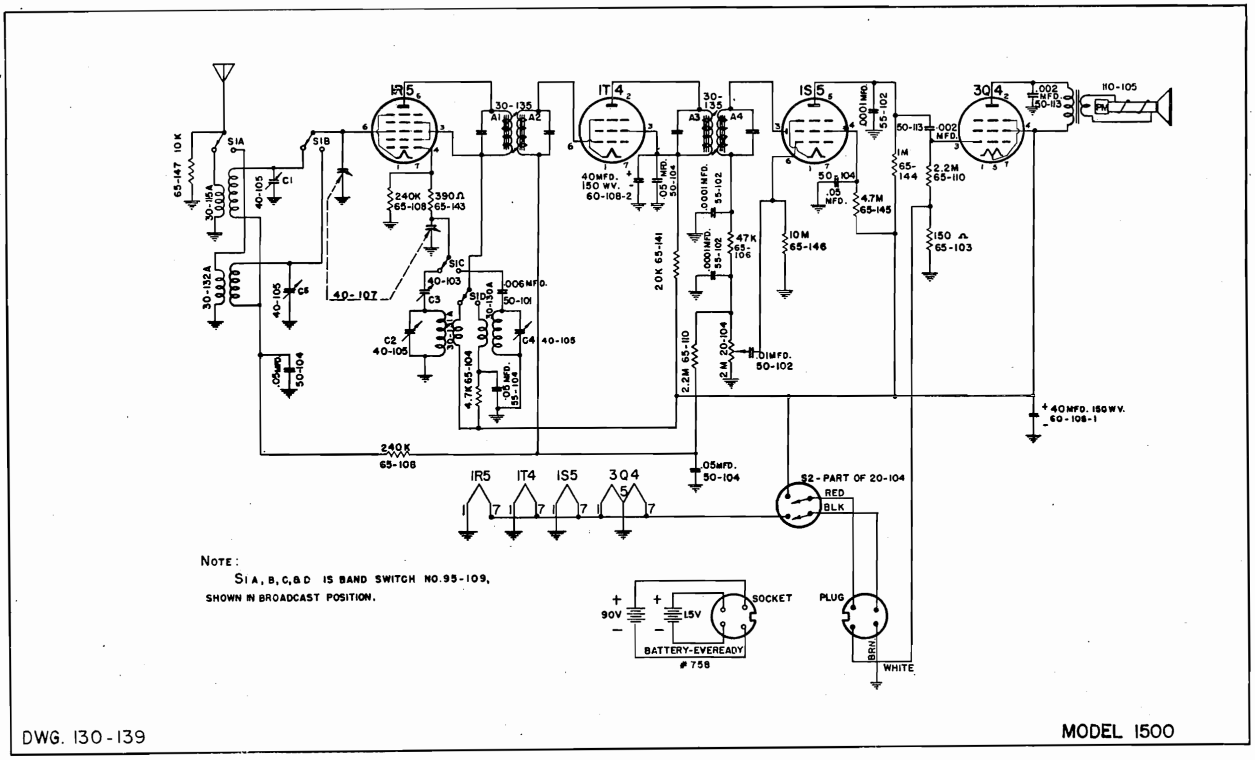
REGAL ELECTRONICS CORP.



The Model 1107 is a 4 tube, 1 Band super-heterodyne with a built in Regaloop Antenna. The tunning range of the Broadcast frequency is 540 to 1650 kilocycles or 560 to 182 meters. This receiver operates on 105-125 volts, 50-60 cycles alternating current or on 105-125 volts direct current.



REGAL ELECTRONICS CORP. MODEL 1500



THE MODEL 1500 is a 4-tube battery-operated superheterodyne farm radio receiver with two tuning ranges for reception of standard broadcast and short-wave stations. The tuning range of the broadcast frequency is 540 to 1650 kilocycles, or 560 to 182 meters. The short wave frequency is 5.8 to 18.3 in megacycles, or 16 to 49 meters, which include the following 16, 19, 25, 31, 39 and 49 meter bands.

This radio is designed to operate from an Eveready #758 battery pack. This unit has a 90 volt "B" supply and a 1½ volt "A" supply, and is connected to the receiver by means of a 6-foot flexible battery cable and plug.

ELECTRICAL SPECIFICATIONS

THE CIRCUIT OF 1500 is a superheterodyne employing eight tuned circuits for maximum sensitivity and selectivity, with Automatic Volume Control (AVC) and a beam power output system. The tube complement consists of (1) 3Q4 power amplifier, (1) 1S5 Detector, AVC and first audio amplifier, (1) 1T4 IF amplifier, and (1) 1R5 converter.

If your set does not work check your tubes. Make sure each tube is in its socket.

MODEL 1500

REGAL ELECTRONICS CORP.

ALIGNMENT INSTRUCTIONS

SET VOLUME CONTROL AT MAXIMUM VOLUME AND OUTPUT FROM SIGNAL GENERATOR NO HIGHER THAN IS NECESSARY TO OBTAIN OUTPUT READING.

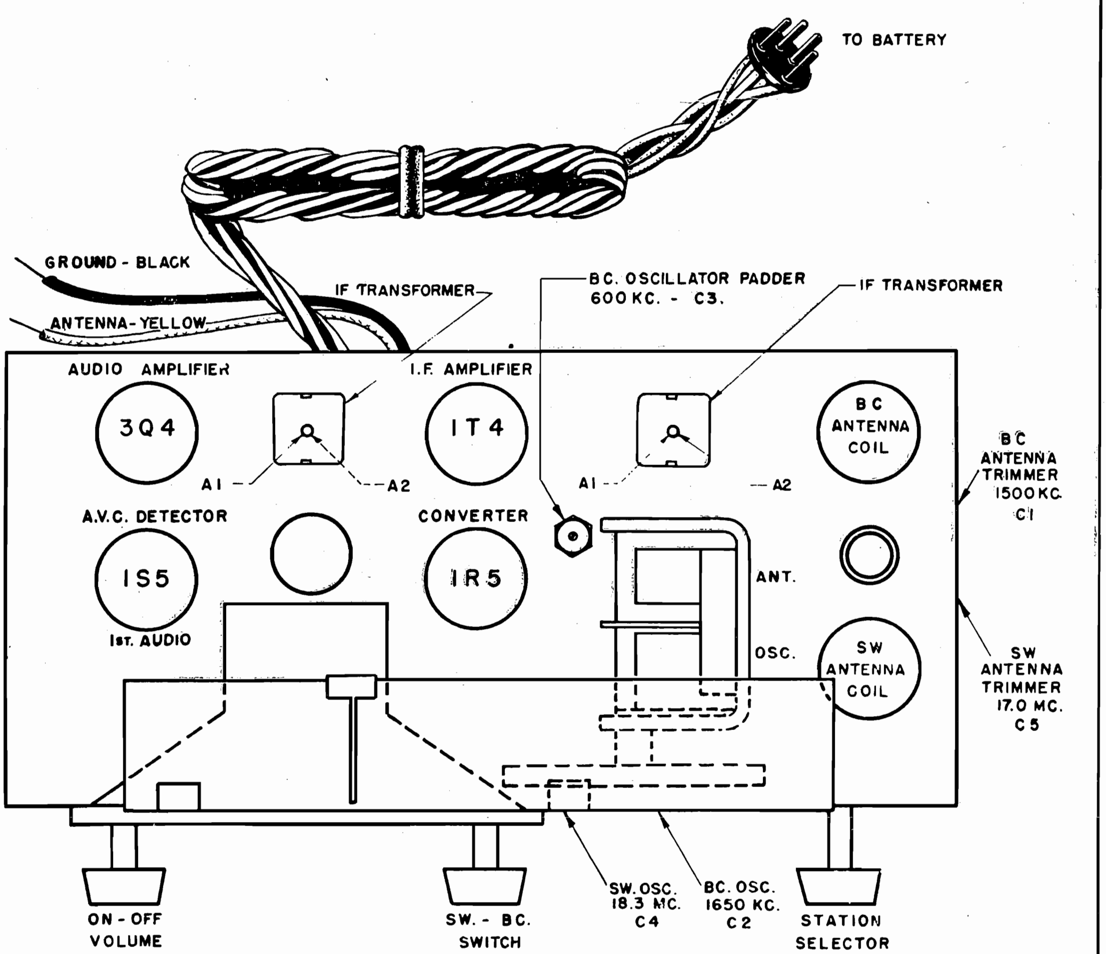
TUNING RANGE

BROADCAST:- 540 - 1650 KC. SHORTWAVE:- 5.8 - 18.3 MC.

DUMMY ANTENNA	SIGNAL GENERATOR COUPLING	BAND SWITCH POSITION	SIGNAL GEN'R FREQUENCY	RADIO DIAL SETTING	OUTPUT METER	ADJUST	REMARKS
.1 MFD	R.F. SECTION OF VARIABLE CONDENSER	B C	455 KC.	1650 KC.	ACROSS VOICE COIL	A 1, A2, A 3, A 4.	ADJUST FOR MAXIMUM
200 MMFD.	ANTENNA LEAD	B C	1650 KC.	1650 KC.	" "	C 2	" " "
200 MMFD.	" "	B C	1500 KC.	1500 KC.	" "	C 1	" " "
200 MMFD.	" "	B C	600 KC.	600 KC.	" "	C 3	ROCK GANG & ADJUST FOR MAXIMUM OUTPUT. RECHECK C1 & C2 ADJUSTMENTS AS GIVEN.
400 Ω	" "	S W	18.3 MC.	18.3 MC.	" "	C 4	ADJUST FOR MAXIMUM.
400 Ω	" "	S W	17 MC.	17 MC.	" "	C 5	ROCK GANG & ADJUST FOR MAXIMUM OUTPUT.

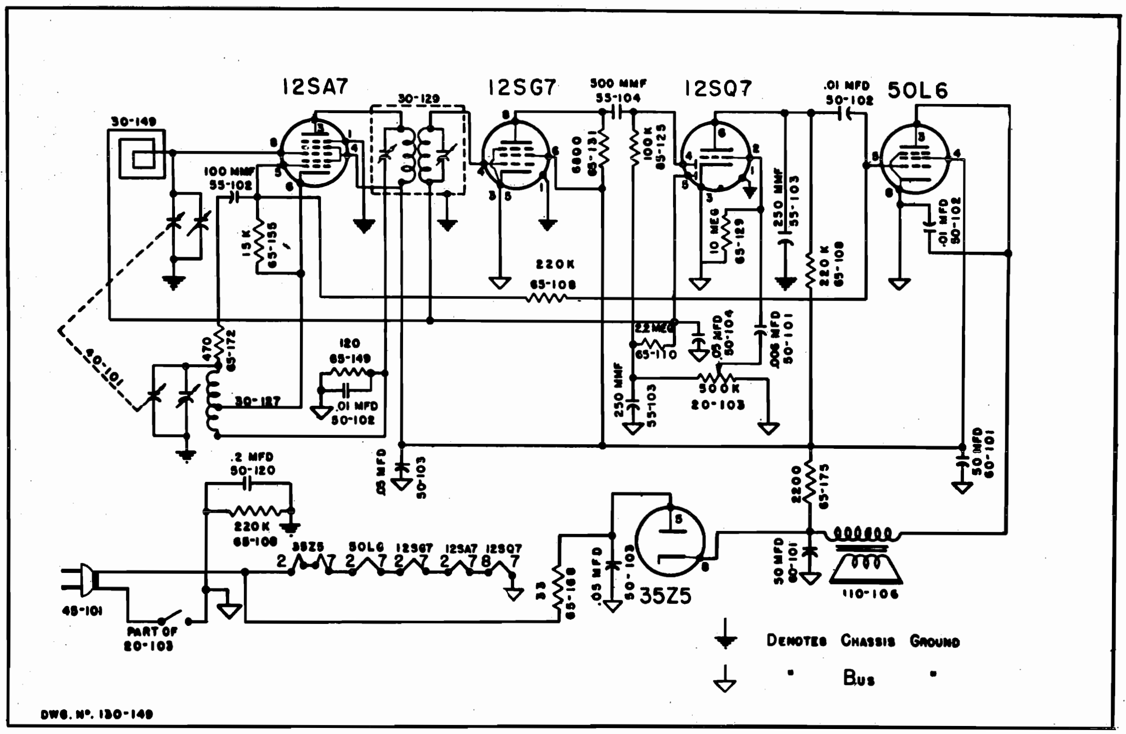
IF TWO PEAKS CAN BE OBTAINED, USE ONE WITH TRIMMER SCREW FURTHER OUT.

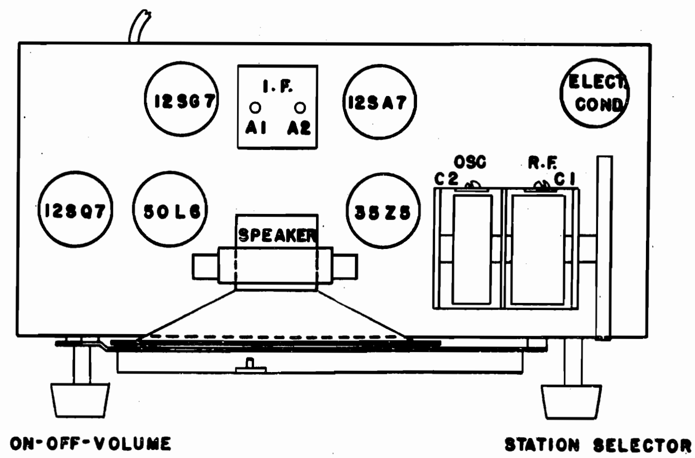
DWG. NO. 130-142 MODEL 1500



DWG. NO. 130-141 MODEL 1500

REGAL ELECTRONICS CORP. MODEL 7251





This Model is a 5 tube, 1 Band super-heterodyne with a built in Regaloop Antenna. The tuning range of the Broadcast Band is 540 to 1650 kilocycles or 560 to 182 meters. This receiver operates on 105-125 volts, 50-60 cycles alternating current or on 105-125 volts direct current.

Antenna

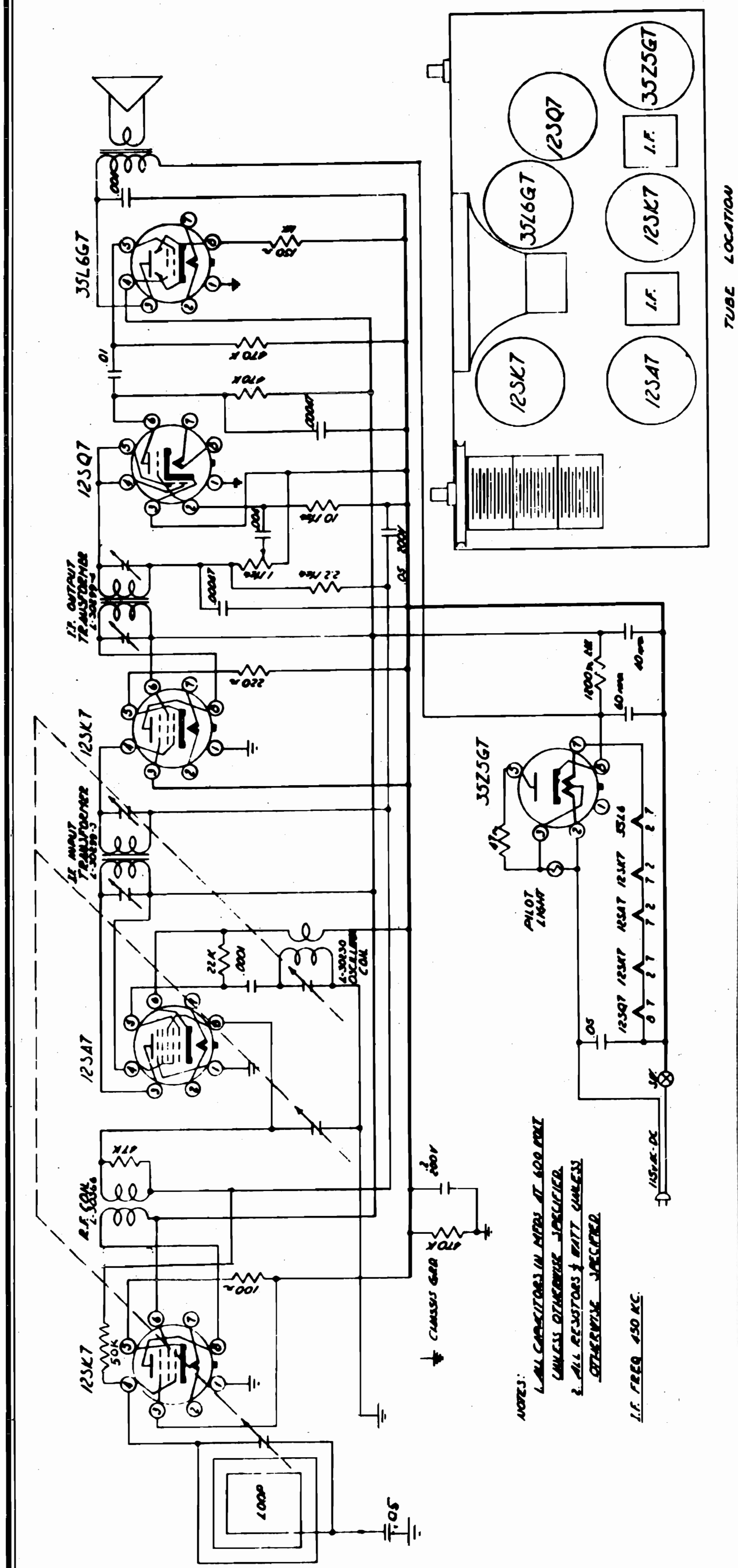
The loop Antenna in this receiver will give good reception under normal conditions. It is directional and the best position may be obtained by slowly rotating the receiver in different directions until the signal volume is at its strongest. For better results on weak signals connect a good outside Antenna. A connection is provided at the rear of the receiver for connecting an outdoor Antenna.

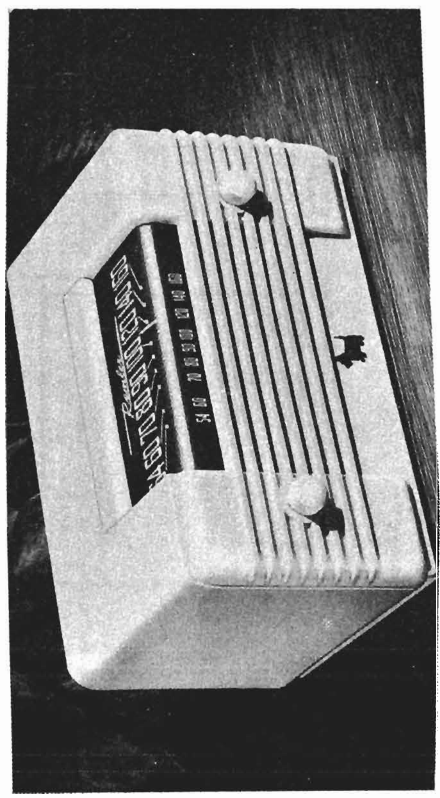
ELECTRICAL SPECIFICATIONS

Super-heterodyne with Beam Power out-put system. TUBES: 1-12SA7, 1-12SG7, 1-12SQ7, 1-50L6, 1-35Z5.

REMLER COMPANY LTD.

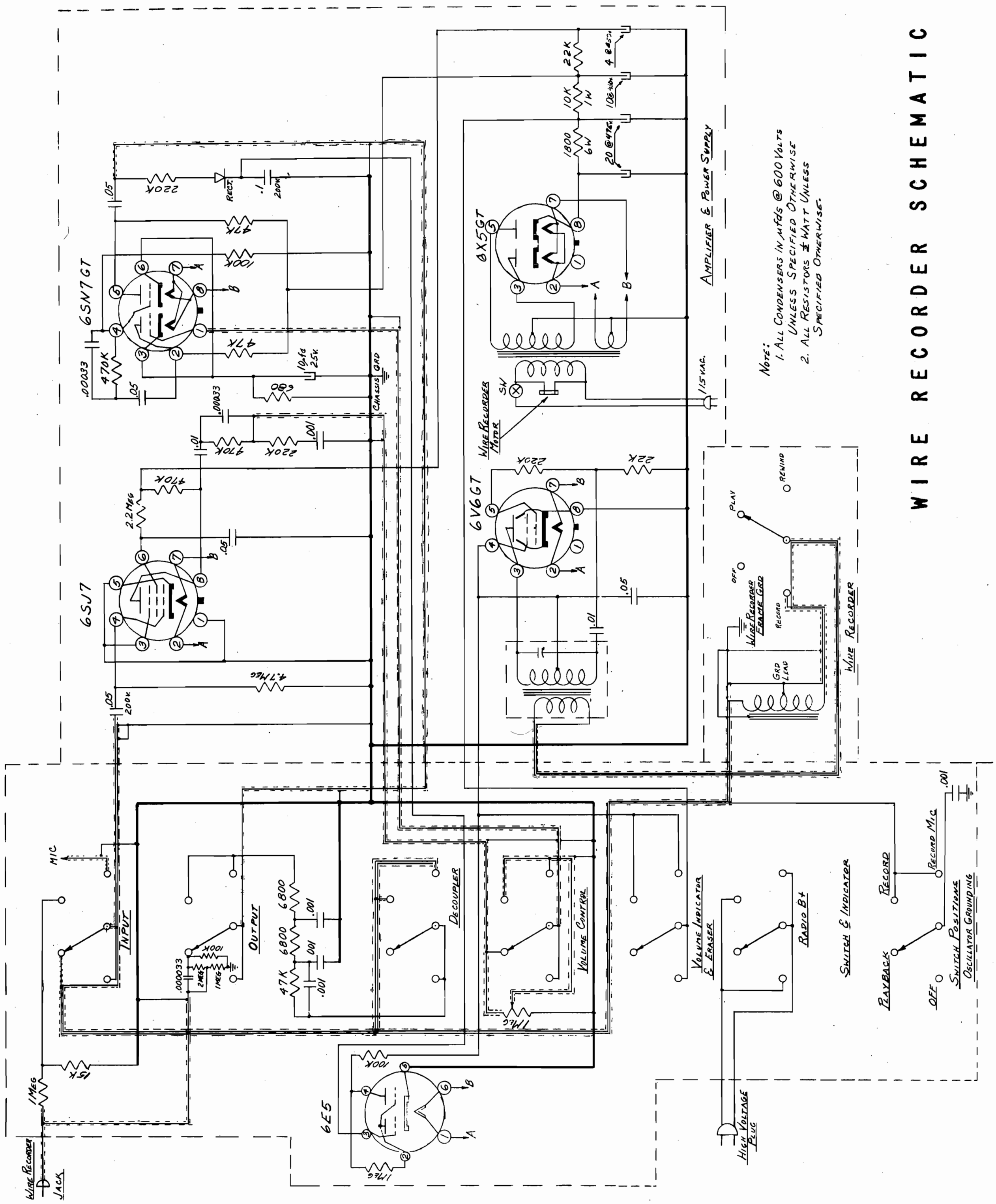
MODEL 6000, Scottie





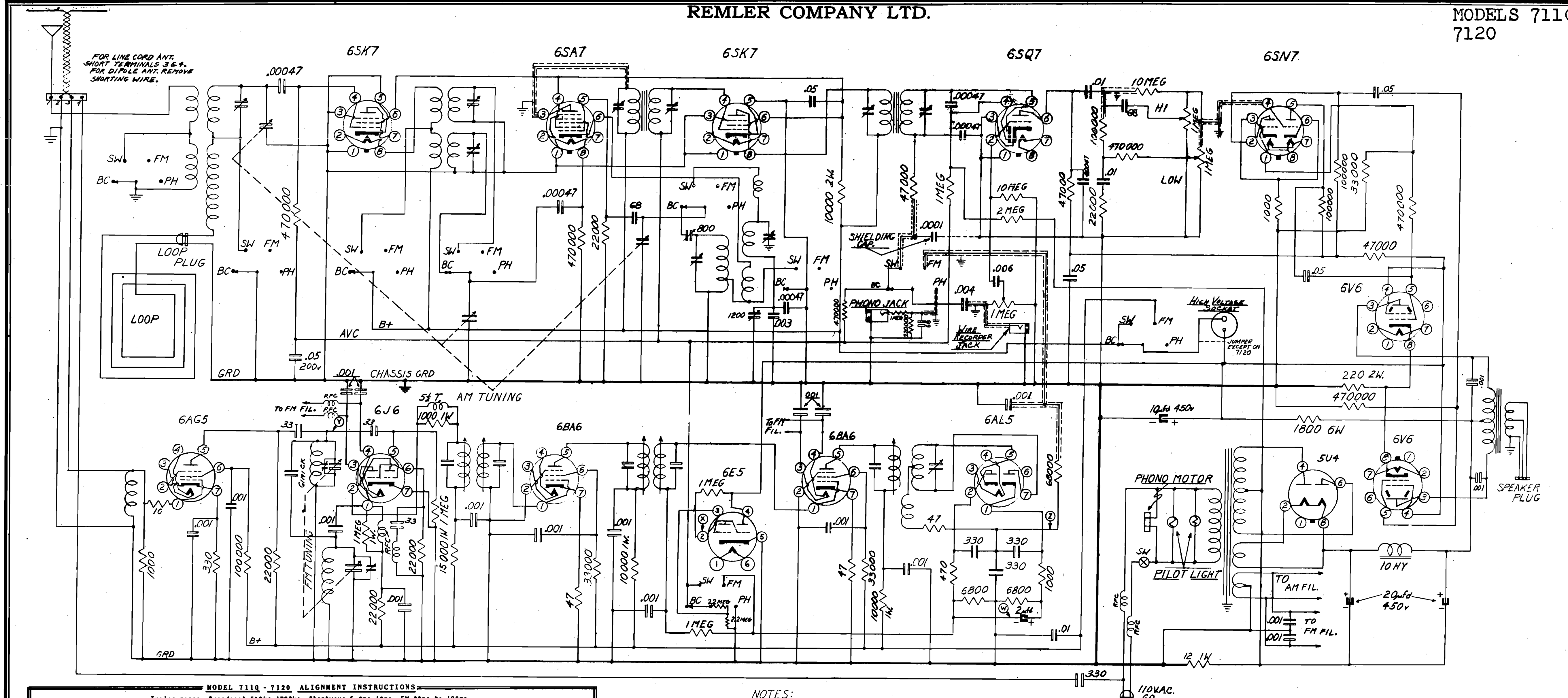
MODELS 7110, 7120

REMLER COMPANY LTD.



REMLER COMPANY LTD.

MODELS 7110, 7120



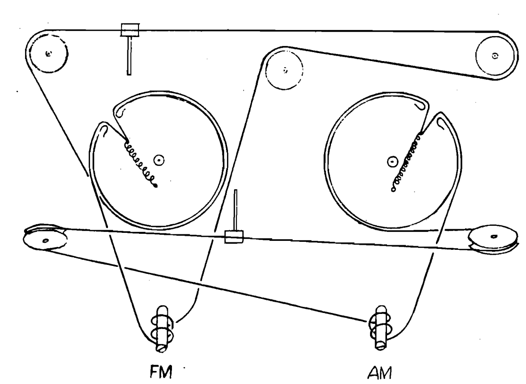
MODEL 7110 - 7120 ALIGNMENT INSTRUCTIONS

Tuning range, Broadcast 540kc-1700kc, Shortwave 5.8mc-18mc, FM 88mc to 108mc.

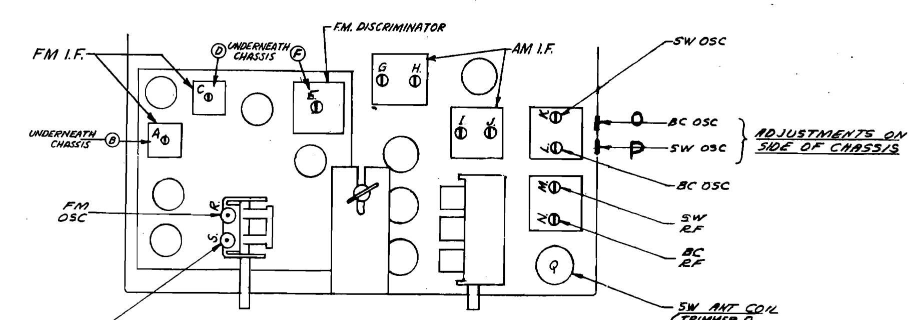
Keep volume control at comfortable listening level, and output from signal generator no higher than necessary to obtain output reading. It is absolutely necessary that an insulated alignment tool be used for all adjustments. The broadcast band antenna loop should remain connected. Connecting link should be open between antenna terminals 3 and 4 on rear of chassis when aligning, but closed when tuning FM stations. Use dial scale provided with these instructions, centered on receiver dial plate. Receiver and signal generator must be turned on at least 10 minutes prior to commencing alignment.

DUMMY ANT.	SIG. GEN. COUPLING	SIG. GEN. FREQ.	RADIO DIAL SETTING	OUTPUT METER	ADJUST	REMARKS
BROADCAST BAND (Bandswitch on BC)						
.1 mfd	To pin #8 on 6SA7 and ground	450kc	Between stations on high freq. end of band	DC VTVM neg. on point "X" (Lead from grid of 6E5)	G, H, I, J	Aligns I.F. for both broadcast or shortwave bands.
.1 mfd	To Ant.term. strip, screw No. 1	1500kc	1500kc	Same as Above	Turn L until Sig. is heard. then peak N on VTVM.	
.1 mfd	Same as Above	600kc	600kc	Same as Above	Turn O until Sig. is heard.	Repeat preceding step and this step, until neither L nor O requires further adjustments for peak on VTVM.
SHORTWAVE BAND (Bandswitch on SW)						
.1 mfd	To Ant.term. strip, screw No. 1. Link open	16mc	16mc	DC VTVM neg. on point "X" (Lead from grid of 6E5)	Turn K until Sig. is heard. then peak M and Q on VTVM	
.1 mfd	Same as Above	6mc	6mc	Same as Above	Turn P until Sig. is heard.	Repeat preceding step and this step, until neither K nor P requires further adjustments for peak on VTVM.
FM Band (Bandswitch on FM)						
.1 mfd	To pin 1 on 2nd 6BA6 and ground	10.7mc. Less than 30 % AM	Between stations at approx. 100mc	DC VTVM neg. on AVC bus (Point "W")	Adjust E for Max. Neg. Volt.	NOTE: All. I.F. alignment must be done without moving the signal generator setting from the 10.7mc point. If it becomes necessary to move the signal generator setting during the process of I.F. alignment, ALL I.F.'s must be realigned when the generator is reset to 10.7mc.
.1 mfd	To pin 1 on 1st 6BA6 and ground	Same as Above	Same as Above	Same as Above	Adjust D and C for Max. Neg. Voltage.	
.1 mfd	Same as Above	Same as Above	Same as Above	DC VTVM neg on Pt. "Z". Pos on ground	Adjust F until VTVM reads zero	Signal generator output must be low enough so that AVC value will be less than 1v. when setting F for zero.
.1 mfd	Point Y	Same as Above	Same as Above	DC VTVM neg. on AVC bus (Point "W")	Adjust B and A for Max. Neg. Voltage.	Repeat preceding 3 steps and this step; after 1st adjustments at this step.
.1 mfd	Ant. term. strip. term. #3 link open	100mc Less than 30 % AM	100mc	Same as Above	Peak R and S	After completing following step, return to this step and check for accuracy of dial calibration by using input from station of known frequency instead of the 100mc from signal generator.
Remove dummy ant. and connect link betw. ant. term. Pts. 3 and 4	None	None	Tune in any FM station near center of dial, if possible	See Remarks Column	See Remarks Column	Station must be tuned in for maximum AVC neg. voltage by using VTVM on Point "W". After station is tuned in, move VTVM connection to point "Z" and readjust "F" until meter needle excursions are symmetrical about the zero point.

NOTES:
1. Resistors ½ Watt Unless Specified Otherwise.
2. Condensers 600v. Unless Specified Otherwise.
3. Condensers Having Values Of 33, 68 & 330 Are In µµfd. All Others Are In µfd.



DIAL CORD DRIVE



TOP FRONT VIEW CHASSIS

REMLER COMPANY LTD. MODELS 7110, 7120

OPERATION OF WIRE RECORDER

MODEL 7120

TO INSTALL WIRE:

1. Remove rubber band from spool and press spool onto spindle so that the wire will reel off from the front side of the spool.

2. Hold top of spool with fingertips to prevent unwinding and draw out the celluloid leader past recording head and into channel of turntable.

3. While holding the leader against inner edge of the channel, rotate the turntable by hand until two complete turns of wire are in the channel. See that the wire threads into the recording head. The full length of the leader must be pressed against the inner surface of the channel or speed variations will result.

4. The Model 7120 comes equipped with a quarter hour spool of recording wire. Standard spools of wire are available in quarter hour, half hour and one hour lengths, any of which will fit the wire recorder.

TO SPLICE BROKEN WIRE:

1. Use several inches of the two ends of the wire and tie a common square knot. Draw knot tight and trim ends close.

TO RECORD RADIO PROGRAMS OR PHONOGRAPH RECORDS ON WIRE:

1. Turn radio selector switch to desired position.

2. Turn wire recorder selector switch at left of tuning eye to RECORD.

3. The Magic Eye indicates the volume of the sound being recorded. It will normally flicker as the sound varies in intensity. Turn the recorder VOLUME control until the eye just barely closes but never overlaps. Too much overlapping of the indicator eye may cause distortion or recording at a high level that can not be erased. If the eye is not brought to the closing point, the recorded level may be so low as to allow wire noise to be heard on the playback.

4. Turn motor switch at right hand back corner to RECORD. The small button next to the switch must be depressed when switching to RECORD position.

5. Whatever sound is heard from the loudspeaker is now being recorded. The radio volume and tone controls may be set in any position while recording as they do not affect the program being recorded.

TO RECORD FROM MICROPHONE:

1. Turn recorder selector to MIC.

2. Adjust VOLUME control as in para. 3 above, while speaking into microphone.

3. Turn motor switch to RECORD.

4. Speak in a normal tone of voice, holding the microphone about four inches from the lips.

5. None of the radio controls have any effect while recording from the microphone, except that the power switch must be turned ON.

MODELS 7110, 7120 REMLER COMPANY LTD.

REWINDING AND PLAYBACK:

Before the recording can be played back, the wire must first be rewound to the start of the program. This rewinding is accomplished at a speed of about five times the recording and playback speed.

1. Turn the recorder selector switch to PLAYBACK.

2. Turn the radio volume control to the extreme counter clock-wise position.

3. Turn the motor switch to REWIND.

4. The radio volume control can now be adjusted until the chattering sound is at the desired volume. This sound is the program that has just been recorded running in the reverse direction. After some experience, this sound may be used to judge when the recorded program has been rewound.

5. When the wire has been rewound to the desired point, turn the motor switch to PLAY.

6. The program that has been recorded will now be heard on the radio speaker. The volume and tone may be adjusted with the radio tone and volume controls. The recorder volume control has no effect during the playback.

7. To stop playback at any time, turn motor switch to OFF.

8. If wire is completely wound off of either the spool or turntable, the motor will automatically shut off. In this case, turn the motor switch to OFF, rethread the wire and press reset button to reconnect motor.

9. If a spool of wire is to be stored, REWIND entire length of wire as above and remove spool. Place a rubber band around spool to retain wire.

10. When not using the wire recorder, turn motor switch and recorder selector switch to OFF. Never turn radio power switch or recorder selector switch to OFF until motor switch is turned to OFF and turntable has stopped revolving. If this procedure of first turning the motor switch to OFF position is not followed, the wire is likely to unwind from one spool and not wind onto the other spool, thus causing it to become tangled.

ERASING RECORDED MATERIAL:

The recording may be played and replayed as often as desired without affecting the performance of the record. If it is desired to use the same spool of wire over again, simply REWIND and RECORD right over the old program. The wire will automatically be cleared of previously recorded material at the same time the new recording is being made. If it is desired to erase the program on the wire without recording a new one, the following procedure should be used.

1. Rewind wire to the point at which erasing is to start.

2. Turn recorder selector switch to RECORD.

3. Turn recorder volume control to extreme counter clock-wise position.

4. Turn motor switch to RECORD.

5. Turn motor switch to OFF after desired amount of wire has been erased.

The Models 7110 and 7120 are designed for operation on 115 volt, 60 cycle house current only.

Model 500 Radio-Phonograph is a console combination designed for operation on the AM and the FM broadcast bands and for record reproduction with standard 78 rpm and LP 33 1/3 rpm records. The radio receiver is comprised of two units; a tuner for AM and FM with all controls, and a power unit containing the transformer and rectifying circuits as well as the final audio amplifying circuits. The record player will operate with intermixed 10 and 12 inch records on 78 rpm and will play the new LP, or 33 1/3 rpm records singly using a special pickup provided. A 12 inch diameter, permanent magnet, dynamic speaker is used in a special acoustic compartment. The record changer compartment is lined with sound absorbing material to prevent undesirable acoustic resonances.

INSTALLATION

The Model 500 is shipped with the tuner (Figure 1) and the loudspeaker installed in the cabinet. The power amplifier (Figure 2) and the record changer are shipped in individual cartons.

To install the power amplifier it is necessary only to remove the unit from its packing carton, and place it in the compartment at the left of the speaker housing, as viewed from the rear of the cabinet. Install the unit with connecting sockets outward, that is, with the power transformer on the inside. Fasten the unit to the cabinet floor with the wood screws provided.

To install the record changer remove from packing carton, pull phono drawer fully forward, and set changer on the mounting board making sure that the spring mounts on the changer fit securely in the counterbored holes provided in the mounting panel. While doing this feed the a.c. cord and the pickup cord through the mounting board, making sure that they both clear moving parts of the mechanism. Now remove the board covering the back of the phono compartment. Dress the a.c. cord and the pickup lead in the clear under the mechanism. Fasten the a.c. cord at the right of the phono drawer, viewed from the rear of the cabinet. Then feed the a.c. cord through the right hand hole (the larger one) of the back board and the pickup lead through the left hand hole, and replace phono board. Insert the pickup plug in the socket labeled "PH" at the right rear of the tuner. Insert the a.c. cord of the phono in the a.c. receptacle of the power unit, dressing the cord so that it moves freely when the phono drawer is moved out and in.

Connect the tuner to the power amplifier by means of the outlets provided. The power pack a.c. cord should be plugged into the tuner receptacle labeled "Amplifier" (Figure 3).

NOTE: Do not use the tuner receptacle labeled "Phono" for a.c. supply to the record player. As described above, use the outlet in the power amplifier as this provides better dressing of the record player a.c. cord.

MODEL 500 SCOTT RADIO LABS., INC.

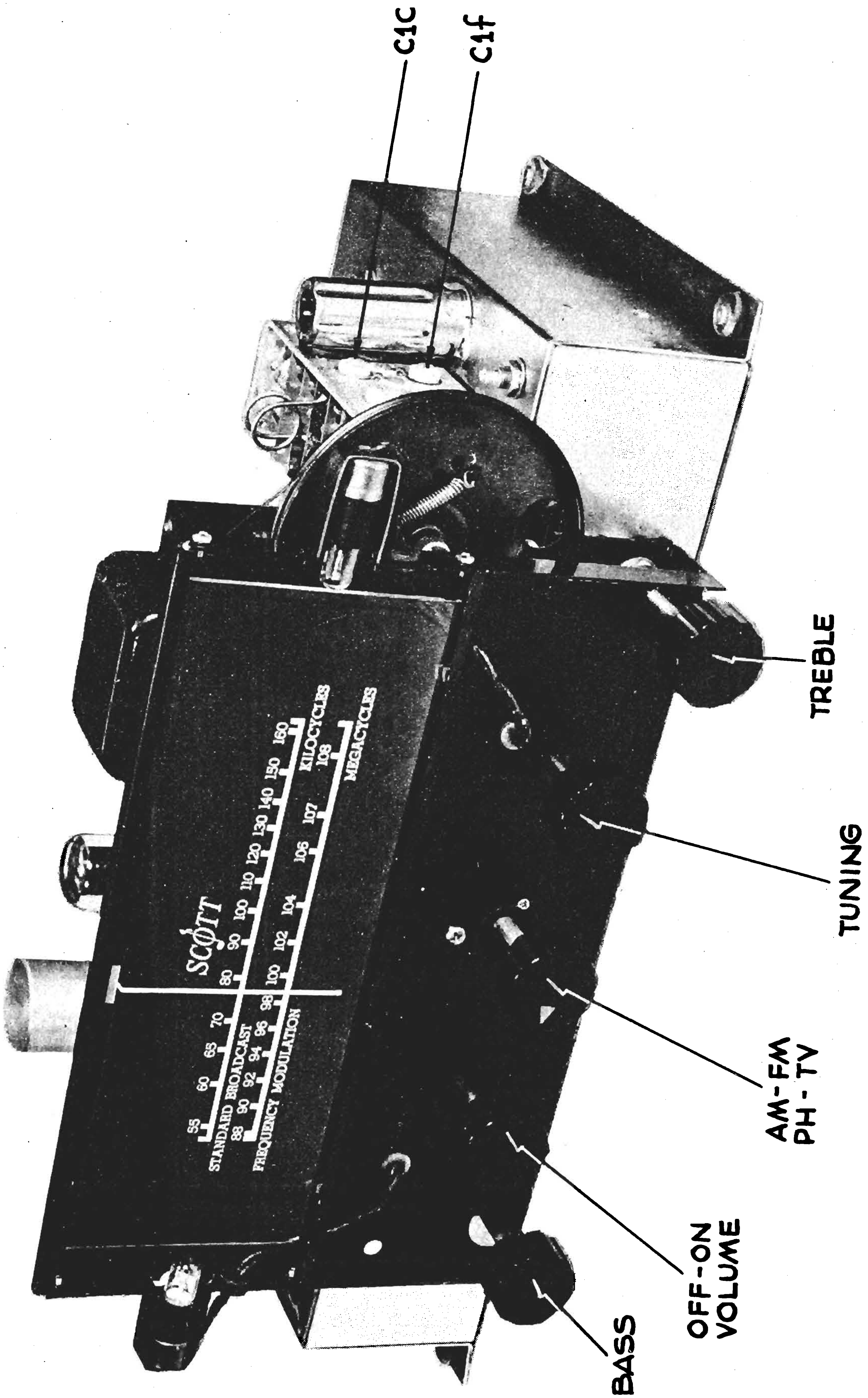


Figure 1 Tuner - Front View

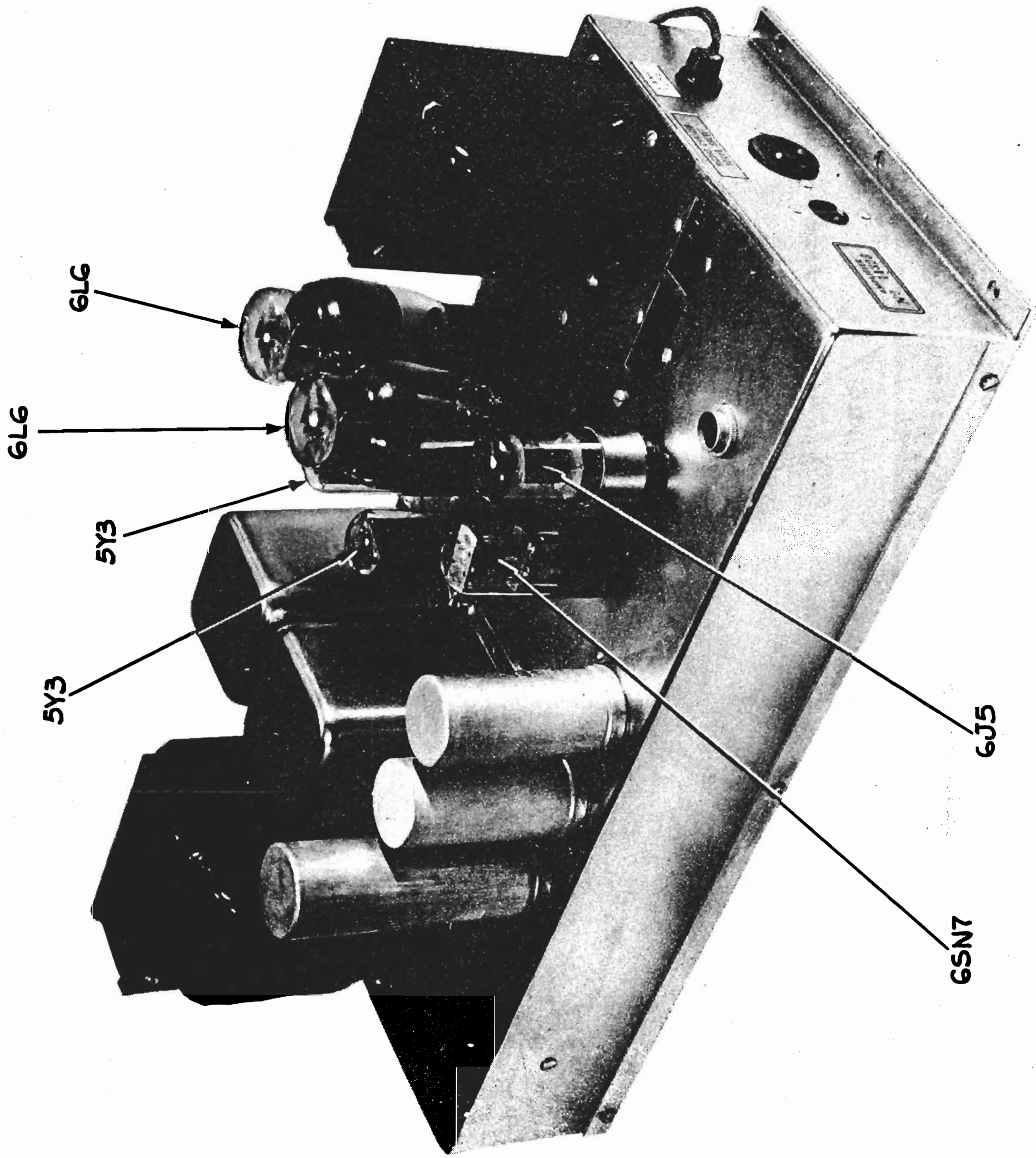


Figure 2 Amplifier - Top View

MODEL 500 SCOTT RADIO LABS., INC.

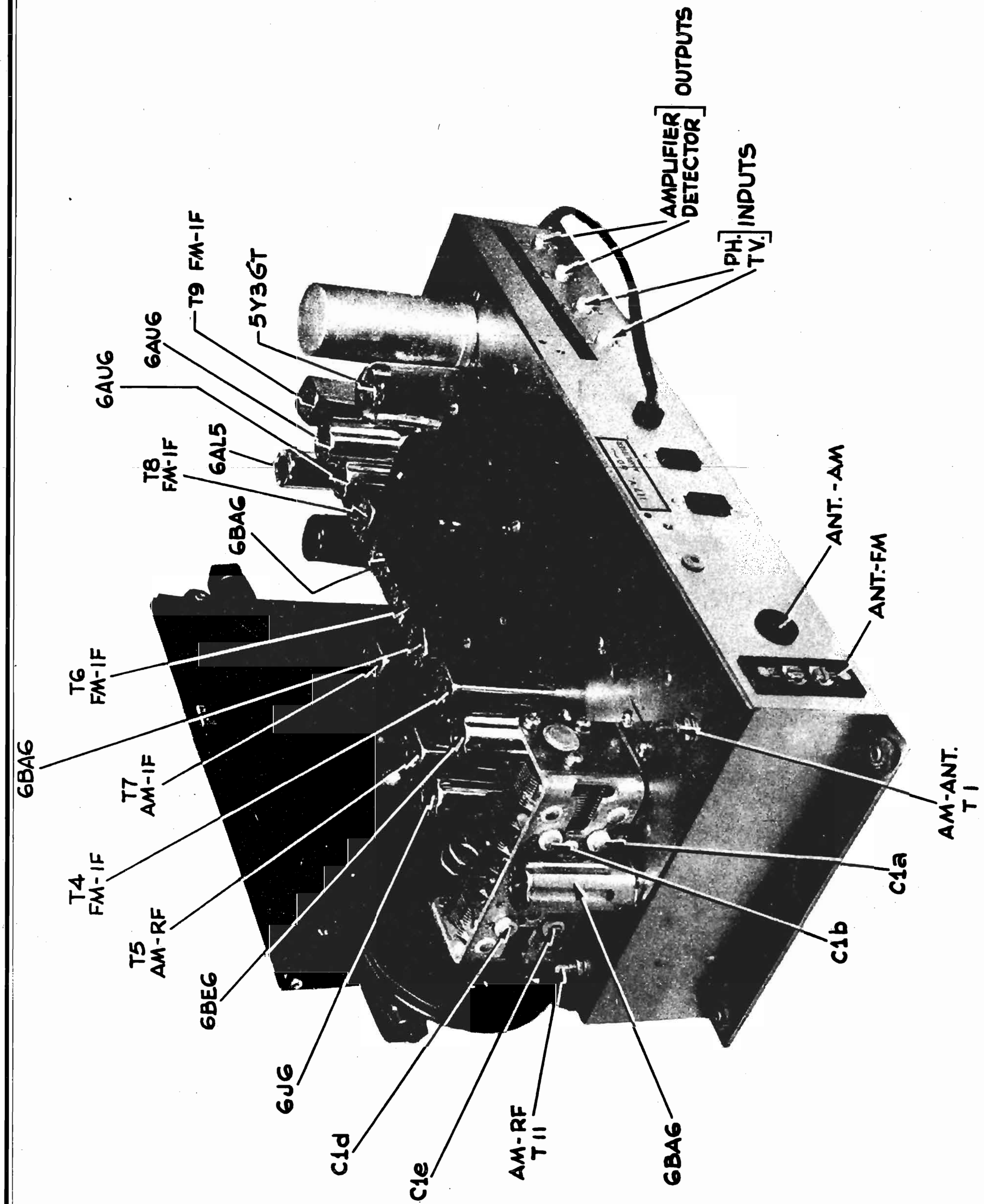


Figure 3 Tuner - Rear View

SCOTT RADIO LABS., INC.

MODEL 500

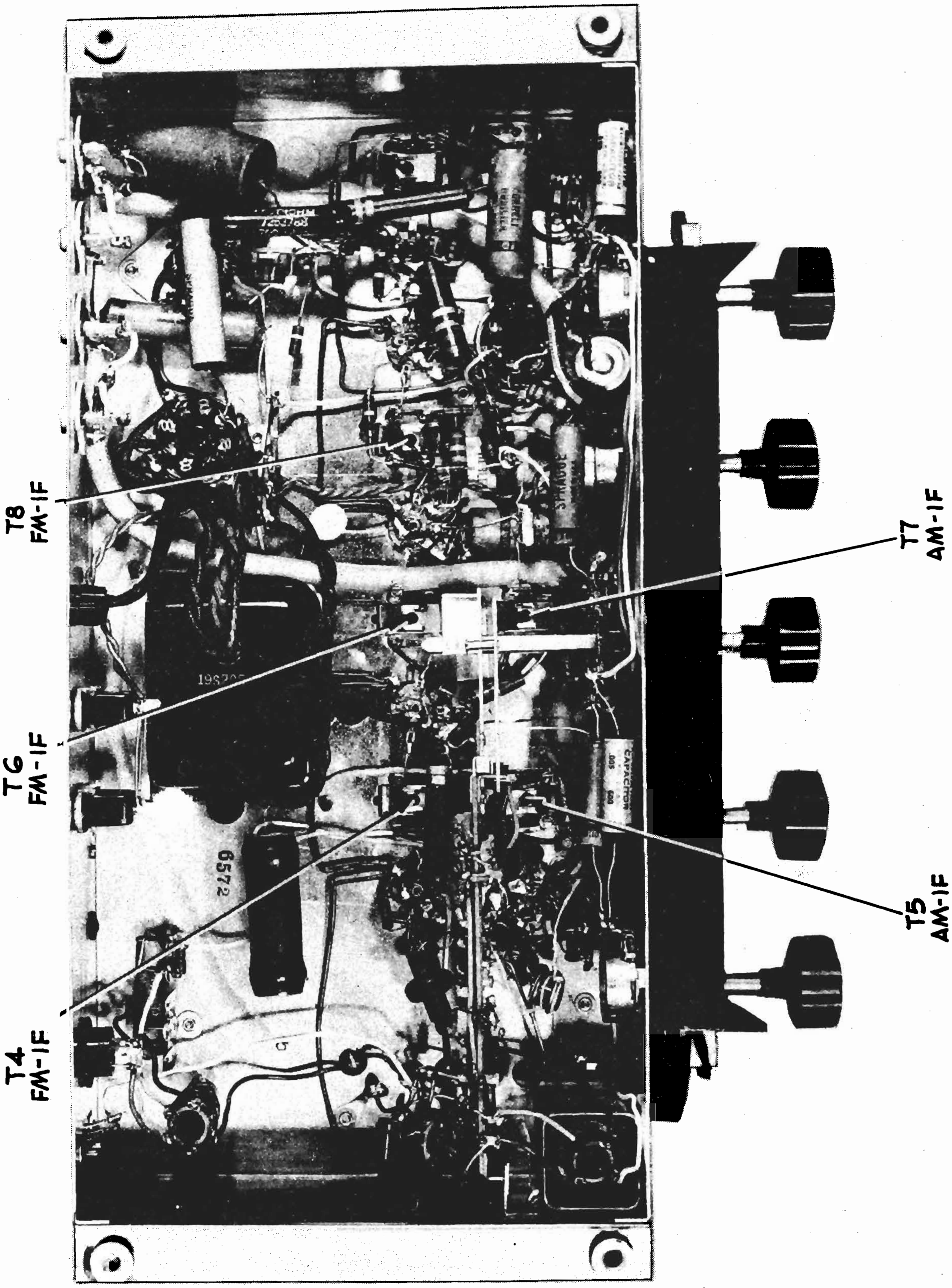


Figure 4 Tuner - Bottom View

MODEL 500

SCOTT RADIO LABS., INC.

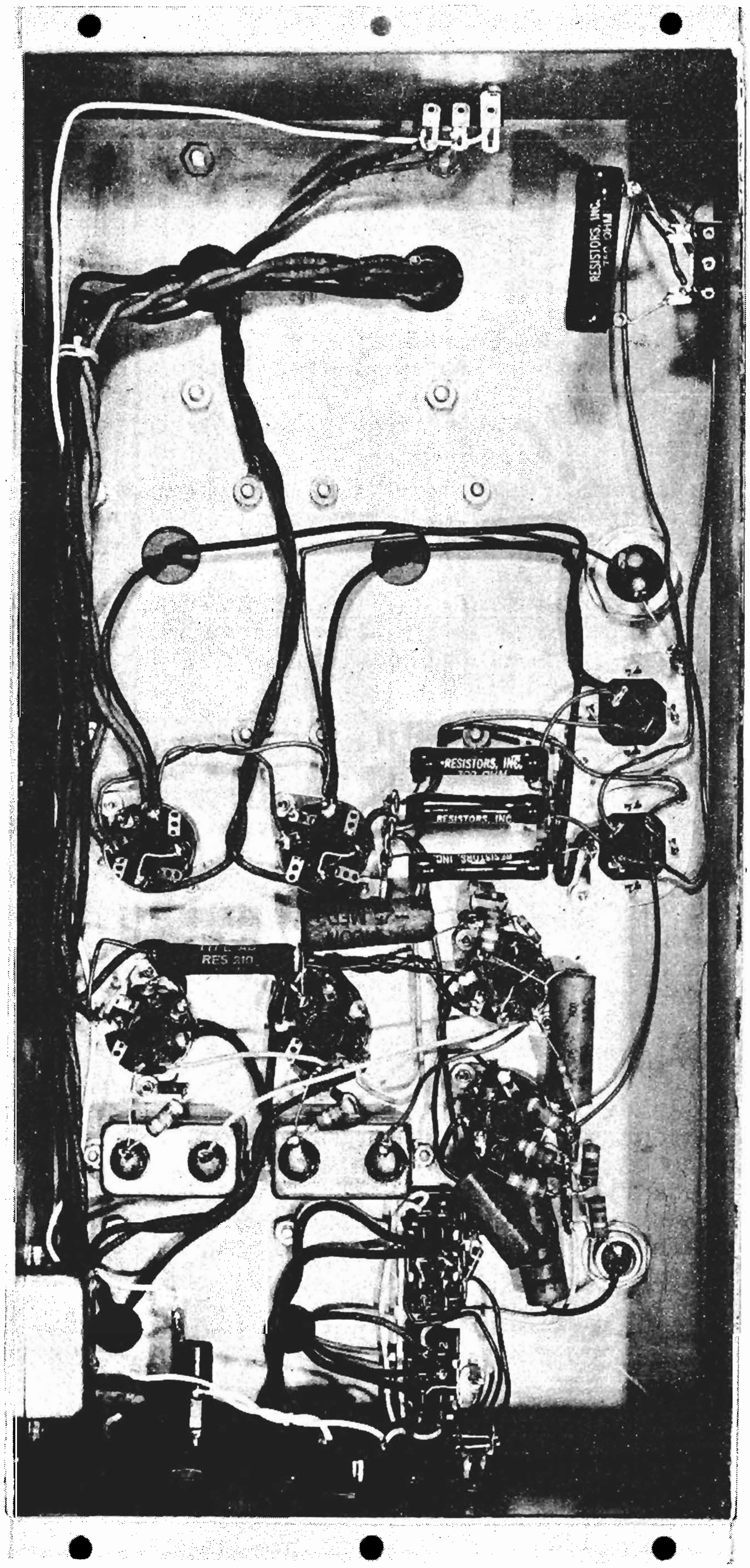


Figure 5 Amplifier - Bottom View

SERVICE ADJUSTMENT

Alignment Procedure

Check position of pointer on the dial scale. When the condenser gang is completely meshed the pointer should be at the last reference mark on the low frequency end of the dial - just beyond 55. The volume control should be fully to the right. The output of the signal generator should be adjusted only high enough to obtain an output reading. Do not use a metallic blade screwdriver for adjusting the IF transformers. Use an insulated blade which will accurately fit the slot in the iron cores. Care should be taken as it is easy to damage the cores with a poorly fitting screwdriver. To align see Figures 1, 3 and 4 and proceed as follows:

1. Connect the signal generator to pin #7 (grid) of the 6BE6 through a .1 mf capacitor and adjust the signal generator to 455 kc. Modulate at 400 cps. Set band switch to AM position, that is, fully to the left. Set the dial to a point of no interference from local broadcasting stations. Connect an a.c. voltmeter across the audio output (speaker) terminals, and adjust T7 and T5, both top and bottom, for maximum deflection of the output meter.

2. Connect the signal generator to pin #2 of loop socket through a 220 mmf condenser. Adjust signal generator to 1500 kc and modulate at 400 cps. Keep band switch in AM position, that is, fully to the left. Set the tuner dial to 1500 kc and adjust C1A, C1E and C1F for maximum deflection of audio output meter.

3. Set signal generator to 600 kc, adjust tuner dial for maximum response and then tune T1 and T11 for maximum deflection of audio output meter.

4. Return signal generator to 1500 kc and repeat operation #2.

5. Return signal generator to 600 kc and repeat operation #3.

6. Connect signal generator to pin #7 of the 6BE6 through a .01 mf coupling condenser. Set generator frequency to 10.7 mc without modulation. Set the band switch one step to the right and put the dial at a point of no interference from local FM stations. Connect audio voltmeter to output of diode filter F1 on lower side of IF transformer T6. Adjust T8, T6 and T4 (top and bottom) for maximum output deflection.

7. Transfer output voltmeter to output of FM discriminator (across C25) and adjust T9 for zero deflection. Be sure that voltmeter goes first plus and then minus (reverse voltmeter terminals) and set finally at zero.

8. Connect signal generator through a 300 ohm carbon resistor to FM antenna post and set to 104 mc modulated (FM) 400 cps. Connect audio voltmeter across output terminals. Adjust C1D, C1C, C1B and the bottom of T9 for maximum deflection of audio output voltmeter. This completes the alignment.

MODEL 500 SCOTT RADIO LABS., INC.

Dial Cord Drive

The correct method of installing the cord of the dial drive is given in Figure 6.

Voltage Readings

The voltage appearing on all sockets is given in Table I. Measurements are taken on the tuner in both AM and FM settings.

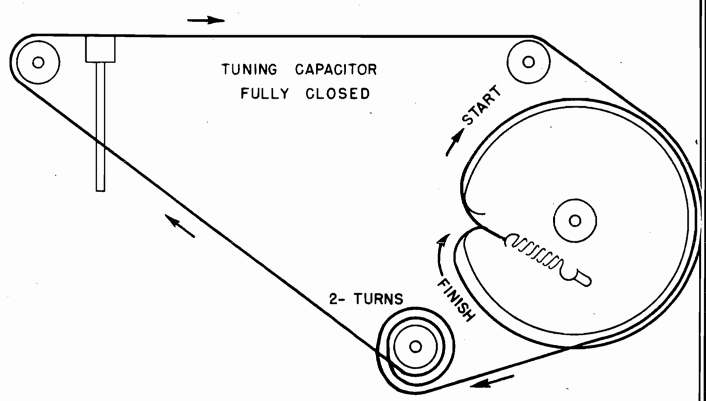


Figure 6 Dial Drive Cord Installation

RECORD CHANGER OPERATION

The Scott Special two speed record changer (standard 78 rpm and long playing 33 1/3 rpm) will operate only on a 105-125 volt 60 cycle power supply.

For reproduction of standard 78 rpm records the record changer is put in operation as follows:

1. Set control on the radio receiver to "PH" position. This is the knob directly to the left of the large tuning knob.

2. Make sure the LP tone arm is firmly in its rest bracket.

3. With the record changer selector control set at "A" (automatic) position, turn back the record stabilizing weight on the record shelf, then load 10 or 12 inch records (or a mixed stack if you desire). Loading should not exceed a 1 1/8 inch stack of records. Now turn the record stabilizing weight over onto the top record.

4. Set the speed control to the 78 rpm position.

5. Press the "ON" button and the record changer will operate. (The changer will shut off automatically after playing the last record.)

6. Adjust the volume control on the radio receiver for the desired output level and the bass and treble controls for desired tone quality.

7. If it is desired to reject a record that is playing, press the "ON" button all the way down and release it.

8. To play records one at a time set the selector control to the "M" position; place the record on the turntable and depress the "ON" button. At the conclusion of the record the changer must be turned off manually by depressing the "OFF" button.

9. The record changer may be stopped at any time while the record is being played, by pressing the "OFF" button. The pickup arm may be picked up off the record and returned to the "OFF" position.

NOTE: At all times when the phono player is not in operation be sure that the speed control is set to the center, or neutral position.

For reproduction of LP (long playing), 33 1/3 rpm records the record changer is put into operation as follows:

1. Remove any records that may happen to be on the turntable.

2. Remove center spindle, place LP record on turntable, center record carefully on turntable and replace spindle.

3. Turn speed control to the 33 1/3 position.

4. Set the selector control to "M" (manual) position.

5. Depress the "ON" button.

6. Remove LP tone arm from its rest bracket and carefully place it in the starting groove of the record.

7. On completion of the record carefully lift tone arm from record and place on rest bracket. Actuate "OFF" button by lifting the standard tone arm and replace, pressing down at the same time in order to operate the switch.

NOTE: When phono player is not in operation be sure that speed control is set at the center, or neutral position.

IMPORTANT: The LP record is fragile and the following precautions should be taken.

1. Handle gently to prevent scratching the soft record surface.

2. When placing pickup on record or removing pickup from record be careful not to damage record grooves by rough usage.

3. Always replace record in its envelope when not in use to prevent dust accumulations on the record surface or physical damage.

4. Keep records at normal room temperature.

5. Be sure that operating instructions are followed carefully. If, by incorrect procedure, the standard 78 rpm pickup should operate, and come to rest on an LP record, the record will be permanently damaged.

6. The LP tone arm should never be used on standard records or on a home recording. This use will seriously damage the pickup needle.

TUBE COMPLEMENT

The tube complement of the Series 500 Radio-Phonograph is as follows:

Symbol	Type	Application	Symbol	Type	Application
V1	6BA6	RF Amplifier	V8	6AL5	2nd Detector, FM
V2	6BE6	Converter AM & FM	V9	6SJ7	Audio Amplifier
V3	6J6	Oscillator, Reactance Mod.	V10	5Y3G	Rectifier
			V11	6J5	Audio Amplifier
V4	6BA6	IF Amplifier	V12	6SN7	Inverter, Driver
V5	6BA6	IF Amplifier, FM & 2nd Detector AM	V13	6L6G	Power Amplifier
			V14	6L6G	Power Amplifier
V6	6AU6	1st Limiter, FM	V15	5Y3G	Rectifier
V7	6AU6	2nd Limiter, FM	V16	5Y3G	Rectifier

FUSE REPLACEMENT

A fuse is provided in the power supply chassis for protection of the electrical circuits against overload. If the fuse blows replace it with a 3 ampere fuse. If the overload was momentary the replacement fuse will put the equipment back in working order. However, if the replacement fuse blows immediately, DO NOT replace it with a fuse of higher rating. The receiver must be checked to find and correct the cause of the overload.

TELEVISION SOUND RECEPTION

Used in conjunction with the Scott Model 6T11 Television Receiver, the high power, high quality audio and acoustic system of the Series 500 may be used in the reproduction of television sound. For this purpose a special audio cable is used to connect the audio output terminal on the 6T11 Television Receiver to the audio input terminal of the Series 500. The switch position "TV" on the Series 500 will make the audio system available for this service.

Table I Voltage Readings

Symbol Desig.	Tube	Description	Pin 1	Pin 2	Pin 3	Pin 4	Pin 5	Pin 6	Pin 7	Pin 8
TUNER										
V1	6BA6	RF Amp.	0	0	0	6.6ac	+172 +200	+100 +103	+0.7 +0.9	-
V2	6BE6	Mixer	-6.8 -5.2	0	0	6.6ac	+185 +200	+103 +118	-0.7 -0.6	-
V3	6J6	Oscillator	+162 +190	0	0	6.6ac	+0.3 +0.3	-5.8 -1.1	+2.7 +4.5	-
V4	6BA6	1st IF	-0.7 -0.1	0	0	6.6ac	+230 +240	+112 +110	+1.0 +1.1	-
V5	6BA6	2nd IF	-0.9 -0.2	0	0	6.6ac	-0.9 +232	-.85 +100	0 +0.9	-
V6	6AU6	Lim. 1st	-.36 -.36	0	0	6.6ac	+ 25 + 25	+59 +62	0	-
V7	6AU6	Lim. 2nd	-.4 -.4	0	0	6.6ac	+230 +240	+90 +95	0	-
V8	6AL5	Discrim.	0	-.50 -3.5	6.6ac	0	+.10 -.60	0	-.60 -36	-
V9	6SJ7	Audio	0	6.6ac	+1.4 +1.6	0	+1.4 +1.6	+52 +60	0	+55 +64
V10	5Y3G	Rectifier	-	+285 +295	-	300ac 300ac	-	300ac 300ac	-	+285 +295
POWER AMPLIFIER										
V11	6J5	Amplifier	0	6.2ac	+160	-	0	-	0	+6.7
V12	6SN7	Inv.,Driver	+54	+215	+65	+54	+215	+65	6.2ac	0
V13	6L6	Amp. Audio	0	0	+360	+275	0	-	6.2ac	+21
V14	6L6	Amp. Audio	0	0	+360	+275	0	-	6.2ac	+21
V15	5Y3G	Rectifier	0	+400	-	380ac	-	380ac	-	+400
V16	5Y3G	Rectifier	0	+400	-	380ac	-	380ac	-	+400

Line Voltage - 117 V
Dial set at low frequency end of range.
In the tuner readings where two figures are given the top one is the AM voltage reading and the bottom figure the FM voltage reading.

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Table II Parts List By Symbol Designation

Symbol Desig.	Function	Description	Part No.
C1	V1 AVC filter	Capacitor, paper, .05 MF 400 V	15L3466
C2	V1 cathode bypass	Capacitor, ceramic, 47 MMF 500 V	15G2830
C3	V1 screen bypass	Capacitor, ceramic, 5000 MMF 400 V	15L3462
C4	V1 plate filter	Capacitor, ceramic, 5000 MMF 400 V	15L3462
C5	V1 plate to V3 grid coupling	Capacitor, ceramic, 15 MMF 500 V	15E1268
C6	V3 grid coupling FM	Capacitor, ceramic, 15 MMF 500 V	15E1268
C7	V3 oscillator grid coupling	Capacitor, ceramic, 47 MMF 500 V	15G2830
C8	V2 AFC plate decoupling	Capacitor, ceramic, 5000 MMF 400 V	15L3462
C9	V2 oscillator plate coupling	Capacitor, ceramic, 470 MMF 500 V	15P3938
C10	BC band oscillator plate decoupling	Capacitor, ceramic, 47 MMF 500 V	15G2830
C11	V2 oscillator grid coupling	Capacitor, ceramic, 47 MMF 500 V	15G2830
C12	V2 oscillator cathode bypass	Capacitor, ceramic, 5000 MMF 400 V	15L3462
C13	V2 AFC plate coupling	Capacitor, ceramic, 22 MMF 500 V	15P3939
C14	V2 AFC grid RF bypass	Capacitor, ceramic, 100 MMF 500 V	15E1269
C15	V2 AFC grid audio bypass	Capacitor, paper, .1 MF 600 V	15H2706
C16	RF section +B bypass	Capacitor, ceramic, 5000 MMF 400 V	15L3462
C17	V3 mixer screen bypass	Capacitor, ceramic, 5000 MMF 400 V	15L3462
C18	V3 plate decoupling	Capacitor, ceramic, 5000 MMF 400 V	15L3462
C19	1st FM-IF coil primary tuning	Capacitor, ceramic, 33 MMF 500 V	15P3940
C20	1st AM-IF coil primary tuning	Capacitor, ceramic, 130 MMF 500 V	15P3941
C21	1st FM-IF coil secondary tuning	Capacitor, ceramic, 33 MMF 500 V	15P3940
C22	1st AM-IF coil secondary tuning	Capacitor, ceramic, 105 MMF 500 V	15P3942
C23	RF and mixer AVC bypass	Capacitor, paper, .02 MF 600 V	15E1001
C24	V4 heater bypass	Capacitor, ceramic, 5000 MMF 400 V	15L3462
C25	V4 screen bypass	Capacitor, ceramic, 5000 MMF 400 V	15L3462
C26	V4 plate decoupling	Capacitor, ceramic, 5000 MMF 400 V	15L3462

Table II Parts List By Symbol Designation

Symbol Desig.	Function	Description	Part No.
C27	2nd FM-IF coil primary tuning	Capacitor, ceramic, 33 MMF 500 V	15P3940
C28	2nd AM-IF coil primary tuning	Capacitor, ceramic, 130 MMF 500 V	15P3941
C29	2nd FM-IF coil secondary tuning	Capacitor, ceramic, 33 MMF 500 V	15P3940
C30	2nd AM-IF coil secondary tuning	Capacitor, ceramic, 105 MMF 500 V	15P3942
C31	AM audio series resistor bypass	Capacitor, ceramic, 2 x 150 MMF 400 V. See F1	
C32A	V5 cathode bypass	Capacitor, ceramic 3 x 5000 MMF 400 V	15P3944
B	V5 screen bypass		
C	V5 plate decoupling		
C33	3rd FM-IF coil primary tuning	Capacitor, ceramic, 33 MMF 500 V	15P3940
C34	3rd FM-IF coil secondary tuning	Capacitor, ceramic, 33 MMF 500 V	15P3940
C35	1st FM limiter grid decoupling	Capacitor, ceramic, 47 MMF 500 V	15G2830
C36	V6 2nd FM limiter screen bypass	Capacitor, ceramic, 5000 MMF 400 V	15L3462
C37	V6 plate and screen decoupling	Capacitor, ceramic, 5000 MMF 400 V	15L3462
C38	V6 plate to V7 grid coupling	Capacitor, ceramic, 22 MMF 500 V	15P3939
C39	V7 2nd FM limiter screen bypass	Capacitor, ceramic, 5000 MMF 400 V	15L3462
C40	V7 plate decoupling	Capacitor, ceramic, 5000 MMF 400 V	15L3462
C41	FM discriminator coil primary tuning	Capacitor, ceramic, 33 MMF 500 V	15P3940
C42	FM discriminator coil coupling	Capacitor, ceramic, 33 MMF 500 V	15P3940
C43	FM discriminator coil secondary tuning	Capacitor, ceramic, 33 MMF 500 V	15P3940
C44	FM discriminator output bypass	Capacitor, ceramic, 100 MMF 500 V	15E1269
C45	FM de-emphasis network	Capacitor, ceramic, 1500 MMF 350 V	15L3459
C46	Bass control circuit	Capacitor, paper, 5000 MMF 600 V	15E1002
C47	Bass control circuit	Capacitor, paper, .02 MF 600 V	15E1001
C48	Treble control series	Capacitor, paper, 5000 MMF 600 V	15E1002
C49	Treble control series	Capacitor, paper, .01 MF 400 V	15L3474
C50	V9 1st audio plate coupling	Capacitor, paper, .1 MF 400 V	15E1848
C51	V9 1st audio screen bypass	Capacitor, paper, .25 MF 200 V	15L3469
C52	V9 1st audio cathode bypass	Capacitor, electrolytic, 25 MF 50 V	15B638

Table II Parts List By Symbol Designation

Symbol Desig.	Function	Description	Part No.
C53	V9 plate decoupling	Capacitor, electrolytic, 10 MF 300 V	15P3945
C54A	+B filter	Capacitor, electrolytic, 40 MF 400 V	15P3946
B	+B filter	40 MF 400 V	
C	+B filter	20 MF 300 V	
C55	AC line bypass tuner chassis	Capacitor, paper, .01 MF 600 V	15E1050
C56	AC line bypass audio chassis	Capacitor, paper, 2 x .05 MF 600 V	15A11
C57	+B filter 6L6 plate supply	Capacitor, paper, 4 MF 600 V	15B481
C58	+B filter 6L6 plate supply	Capacitor, electrolytic, 2 x 30 MF 450 V	15A17
C59A	+B filter audio plate supply	Capacitor, electrolytic, 30 MF 450 V	15K3010
B	+B filter audio plate supply	30 MF 450 V	
C	+B filter audio plate supply	30 MF 450 V	
C60	Audio input coupling	Capacitor, paper, .05 MF 600 V	15E1041
C61	V13 cathode bypass	Capacitor, electrolytic, 25 MF 25 V	15B795
C62	V13 plate to V14 grid coupling	Capacitor, paper, .05 MF 600 V	15E1041
C63	V14 plate to V15 grid coupling	Capacitor, paper, .25 MF 600 V	15A14
C64	V14 plate to V16 grid coupling	Capacitor, paper, .25 MF 600 V	15A14
C65	V-15-V16 cathode bypass	Capacitor, electrolytic, 25 MF 50 V	15B638
C66	Audio input coupling	Capacitor, paper, .05 MF 400 V	15L3466
F1	AM diode filter	Filter, consists of 47 K ohm resistor bypassed with 2 150 MMF capacitors on ceramic form	2P3943
I1	Dial lamp	Lamp, 6-8 volts .25 A #44 blue bead	49E1091
I2	Dial lamp	Lamp, 6-8 volts .25 A #44 blue bead	49E1091
L1	AM band antenna coil	RF coil	20P3947
L2	FM band antenna coil	RF coil	20P3948
L3	V1 plate choke	RF choke, 3.5 uh	17P3949
L4	AM Band RF coil	RF coil	20P3950

Table II Parts List By Symbol Designation

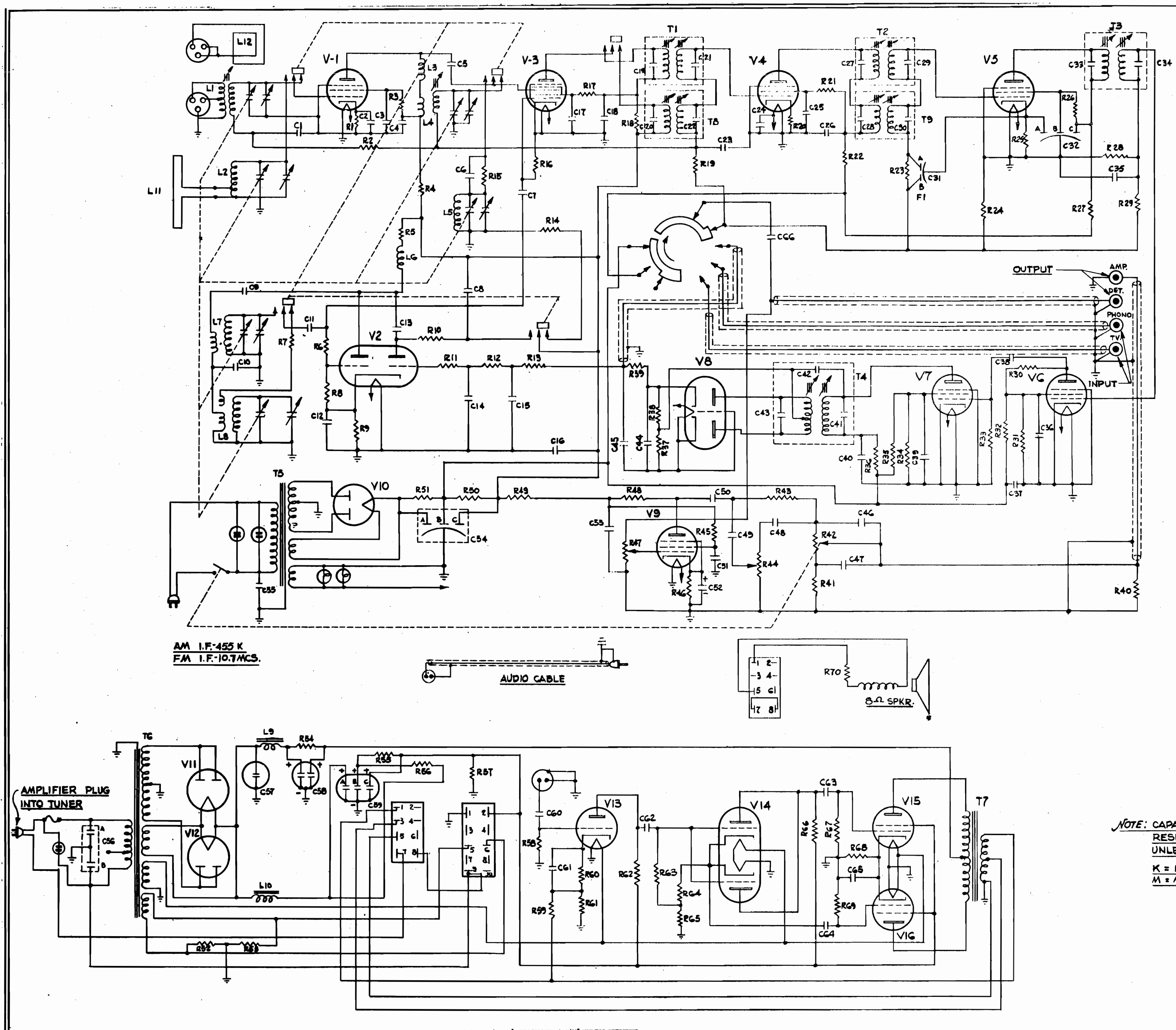
Symbol Desig.	Function	Description	Part No.
L5	FM band RF coil	RF coil	20P3951
L6	Oscillator +B RF choke	RF choke, 3.5 uh	17P3949
L7	FM band oscillator coil	RF coil	20P3952
L8	AM band oscillator coil	RF coil	20P3953
L9	+B filter 6L6 plate supply	LF choke	17B492
L10	+B filter audio plate supply	LF choke	17B492
L11	FM folded dipole antenna	Antenna	1P3954
L12	AM loop antenna	Antenna	1P3955
R1	V1 cathode bias	Resistor, 68 ohm 10% ½ W	70E1195
R2	V1 grid return	Resistor, 1 meg 20% ½ W	70A63
R3	V1 screen filter	Resistor, 22 K ohm 10% ½ W	70H2708
R4	V1 plate filter	Resistor, 1000 ohm 10% ½ W	70A47
R5	V2 oscillator plate filter	Resistor, 2200 ohm 10% ½ W	70K3023
R6	V2 oscillator grid series	Resistor, 6.8 ohm 10% ½ W	70P3956
R7	BC band oscillator coil damping	Resistor, 220 ohm 10% ½ W	70E1289
R8	V2 oscillator grid return	Resistor, 22 K ohm 10% ½ W	70H2708
R9	V2 cathode bias	Resistor, 220 ohm 10% ½ W	70E1289
R10	V2 AFC plate filter	Resistor, 6800 ohm 10% 1 W	70P3957
R11	V2 AFC grid series	Resistor, 220 ohm 10% ½ W	70E1289
R12	V2 AFC grid filter	Resistor, .1 meg 10% ½ W	70A58
R13	V2 AFC grid filter	Resistor, .47 meg 10% ½ W	70A61
R14	+B bleeder in Am position	Resistor, 5000 ohm 10% 10 W	70D2919
R15	V3 FM grid leak	Resistor, 47 K ohm 10% ½ W	70A54
R16	V3 oscillator grid return	Resistor, 22 K ohm 10% ½ W	70H2708
R17	V3 screen filter	Resistor, 10 K ohm 10% 2 W	70P3958
R18	1st FM-IF primary +B filter	Resistor, 1000 ohm 10% ½ W	70A47
R19	AVC filter RF & mixer & 1st IF amplifier	Resistor, 2.2 meg 20% ½ W	70A64
R20	V4 cathode bias	Resistor, 68 ohm 10% ½ W	70E1195
R21	V4 screen filter	Resistor, 33 K ohm 10% 1 W	70A67
R22	V4 plate filter	Resistor, 1000 ohm 10% ½ W	70A47
R23	AM 2nd det. audio filter	Resistor, 47 K ohm See F1	
R24	AM 2nd det. audio load	Resistor, .47 meg 10% ½ W	70A61
R25	V5 cathode bias	Resistor, 68 ohm 10% ½ W	70E1195
R26	V5 screen filter	Resistor, 33 K ohm 10% 1 W	70A67
R27	V5 plate filter	Resistor, 1000 ohm 10% ½ W	70A47
R28	V6 grid return	Resistor, .1 meg 10% ½ W	70A58
R29	AVC filter 1st FM limiter	Resistor, 2.2 meg 20% ½ W	70A64
R30	V6 plate load	Resistor, 10 K ohm 10% ½ W	70A419
R31	V6 screen bleeder	Resistor, 22 K ohm 10% ½ W	70H2708
R32	V6 screen & plate filter	Resistor, 22 K ohm 10% 2 W	70P3959
R33	V7 grid return	Resistor, .15 meg 10% ½ W	70E1214
R34	V7 screen bleeder	Resistor, 22 K ohm 10% ½ W	70H2708
R35	V7 screen filter	Resistor, 22 K ohm 10% 2 W	70P3959
R36	V7 plate filter	Resistor, 1000 ohm 10% ½ W	70A47

Table II Parts List By Symbol Designation

Symbol Desig.	Function	Description	Part No.
R37	FM discriminator audio load	Resistor, .1 meg 10% ½ W	70A58
R38	FM discriminator audio load	Resistor, .1 meg 10% ½ W	70A58
R39	FM audio de-emphasis	Resistor, 47 K ohm 10% ½ W	70A54
R40	Audio output load	Resistor, .1 meg 10% ½ W	70A58
R41	Bass control limiting	Resistor, 22 K ohm 10% ½ W	70H2708
R42	Bass control	Potentiometer, .5 meg ¼ W	70P3960
R43	Bass control series	Resistor, 47 K ohm 10% ½ W	70A54
R44	Treble control	Potentiometer, .5 meg ¼ W	70P3961
R45	V9 screen filter	Resistor, .15 meg 10% ½ W	70E1214
R46	V9 cathode bias	Resistor, 560 ohm 10% ½ W	70A46
R47	Volume control	Potentiometer, .5 meg ¼ W	70P3962
R48	V9 plate load	Resistor, 47 K ohm 10% ½ W	70A54
R49	+B supply filter tuner chassis	Resistor, 22 K ohm 10% 1 W	70P3963
R50	+B supply filter tuner chassis	Resistor, 700 ohm 10% 10 W	70P3964
R51	+B supply filter tuner chassis	Resistor, 500 ohm 10% 10 W	70E1236
R52	Heater supply center tap	Resistor, 270 ohm 10% ½ W	70E1197
R53	Heater supply center tap	Resistor, 270 ohm 10% ½ W	70E1197
R54	+B filter 6L6 plate supply	Resistor, 300 ohm 10% 10 W	70B682
R55	+B filter audio supply	Resistor, 2000 ohm 10% 10 W	70K3136
R56	+B filter	Resistor, 750 ohm 10% 20 W	70B990
R57	+B bleeder	Resistor, 10 K ohm 10% 10 W	70B660
R58	V13 grid return	Resistor, .22 meg 10% ½ W	70A59
R59	Feedback circuit series	Resistor, 560 ohm 10% ½ W	70A46
R60	V13 cathode series	Resistor, 2400 ohm 10% ½ W	70A49
R61	V13 cathode load	Resistor, 56 ohm 10% ½ W	70A43
R62	V13 plate load	Resistor, 47 K ohm 10% ½ W	70A54
R63	V14 grid return	Resistor, .22 meg 10% ½ W	70A59
R64	V14 cathode series	Resistor, 680 ohm 10% ½ W	70E1077
R65	V14 cathode load	Resistor, 6800 ohm 10% ½ W	70D2770
R66	V14 plate load	Resistor, 7500 ohm 10% ½ W	70E1074
R67	V15 grid return	Resistor, 47 K ohm 10% ½ W	70A54
R68	V15-V16 cathode bias	Resistor, 210 ohm 10% 10 W	70D2769
R69	V16 grid return	Resistor, 47 K ohm 10% ½ W	70A54
SW1	AM-FM switch	Switch, slide, 5 P. D.T.	89P3965
SW2	AM-FM-PH-TV switch	Switch, rotary, 2 P. 4 T.	89P3966
T1	1st FM-IF transformer	Transformer, IF, 10.7 mc	91P3967
T2	2nd FM-IF transformer	Transformer, IF, 10.7 mc	91P3968
T3	3rd FM-IF transformer	Transformer, IF, 10.7 mc	91P3969
T4	FM discriminator transformer	Transformer, IF, 10.7 mc	91P3970
T5	Power transformer - tuner chassis	Transformer, power	91P3971

SCOTT RADIO LABS., INC.

MODEL 500



CAPACITORS

C1-.05 MF	C34-33
C2-47	C35-47
C3-.005 MF	C36-.005 MF
C4-.005 MF	C37-.005 MF
C5-15	C38-22
C6-15	C39-.005 MF
C7-47	C40-.005
C8-.005 MF	C41-33
C9-470	C42-33
C10-47	C43-33
C11-47	C44-100
C12-.005 MF	C45-1500
C13-22	C46-.005 MF
C14-100	C47-.02 MF
C15-.1	C48-.005 MF
C16-.005 MF	C49-.01 MF
C17-.005 MF	C50-.1 MF
C18-.005 MF	C51-.25 MF
C19-33	C52-25 MF.
C20-130	C53-10 MF
C21-33	C54-40/40/20 MF
C22-105	C55-.01 MF
C23-.02 MF	C56-2X.05 MF
C24-.005 MF	C57-4 MF
C25-.005 MF	C58-2X30 MF
C26-.005 MF	C59-3X30 MF
C27-33	C60-.05 MF
C28-130	C61-25MF
C29-33	C62-.05 MF
C30-105	C63-.25 MF
C31-2X150	C64-.25 MF
C32-3X.003MF	C65-25 MF
C33-33	C66-.05 MF

RESISTORS

R1-68	R36-1000
R2-1M	R37-.1M
R3-22K	R38-.1M
R4-1000	R39-47K
R5-2200	R40-.1M
R6-6800	R41-22K
R7-2200	R42-.5M
R8-22K	R43-47K
R9-220	R44-.5M
R10-6800 1W.	R45-.15M
R11-220	R46-560
R12-.1M	R47-.5M
R13-.47M	R48-47K
R14-5000-10W.	R49-22K-1W
R15-47K	R50-700-10W
R16-22K	R51-500-10W
R17-10K-2W.	R52-270
R18-1000	R53-270
R19-2.2M	R54-300-10W
R20-68	R55-2000-10W
R21-3K-1W.	R56-750-20W
R22-1000	R57-10K-10W
R23-47K	R58-.22M
R24-.47M	R59-560
R25-68	R60-2400
R26-33K-1W.	R61-56
R27-1000	R62-47K
R28-.1M	R63-.22M
R29-2.2M	R64-680
R30-10K	R65-6800
R31-22K	R66-7500
R32-22K-2W.	R67-47K
R33-.15M.	R68-210-10W
R34-22K	R69-47K.
R35-22K-2W.	R70-8-10W.

NOTE: CAPACITORS ARE IN μμf — RESISTORS ARE IN Ohms UNLESS INDICATED OTHERWISE.

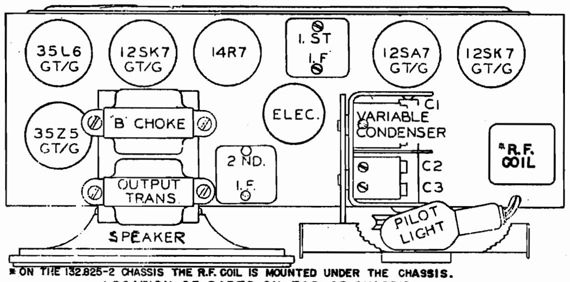
K = 1000.
M = MEGOHMS.

Table II Parts List By Symbol Designation

Symbol Desig.	Function	Description	Part No.
T6	Power transformer - audio chassis	Transformer, power	91K3043
T7	Audio output transformer	Transformer, output	91C2699
T8	1st AM-IF transformer	Transformer, IF, 455 kc	91P3972
T9	2nd AM-IF transformer	Transformer, IF, 455 kc	91P3973
V1	RF amplifier	Tube, 6BA6	92G2871
V2	HF oscillator & AFC	Tube, 6J6	92G3199
V3	Mixer	Tube, 6BE6	92P3728
V4	1st IF amplifier AM & FM	Tube, 6BA6	92G2871
V5	AM 2nd det. & 2nd FM-IF amplifier	Tube, 6BA6	92G2871
V6	1st FM limiter	Tube, 6AU6	92C2659
V7	2nd FM limiter	Tube, 6AU6	92C2659
V8	FM discriminator	Tube, 6AL5	92G2870
V9	1st audio amplifier	Tube, 6SJ7	92A236
V10	Rectifier for tuner chassis	Tube, 5Y3G	92B480
V11	Rectifier for audio chassis	Tube, 5Y3G	92B480
V12	Rectifier for audio chassis	Tube, 5Y3G	92B480
V13	2nd audio amplifier	Tube, 6J5	92A228
V14	Phase inverter	Tube, 6SN7	92A230
V15	Audio output amplifier	Tube, 6L6G	92A233
V16	Audio output amplifier	Tube, 6L6G	92A233

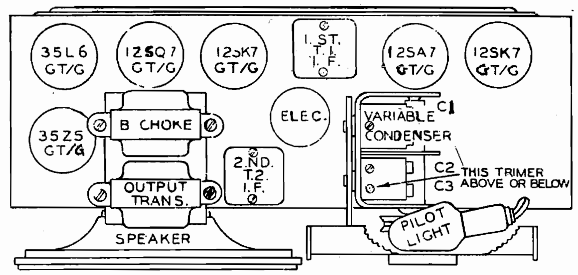
SEARS, ROEBUCK & CO.

MODEL 6050, CHASSIS 132.825, 132.825-1, 132.825-2, 132.825-3, 132.825-4

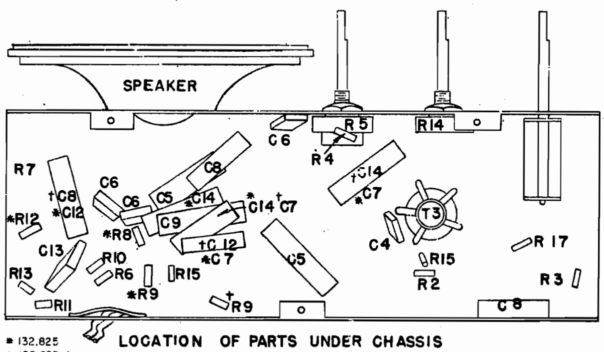


* ON THE 132.825-2 CHASSIS THE R.F. COIL IS MOUNTED UNDER THE CHASSIS.

LOCATION OF PARTS ON TOP OF CHASSIS
132.825, 132.825-1, & 132.825-2

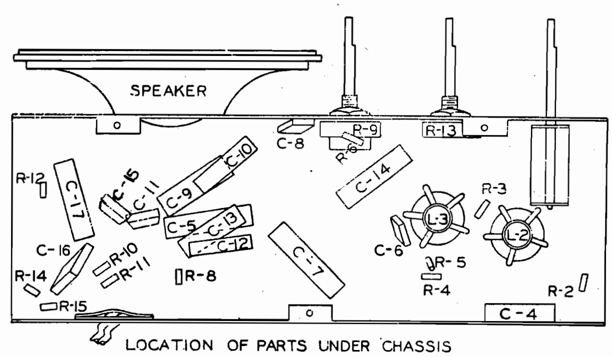


LOCATION OF PARTS ON TOP OF CHASSIS
132.825-3 & 132.825-4

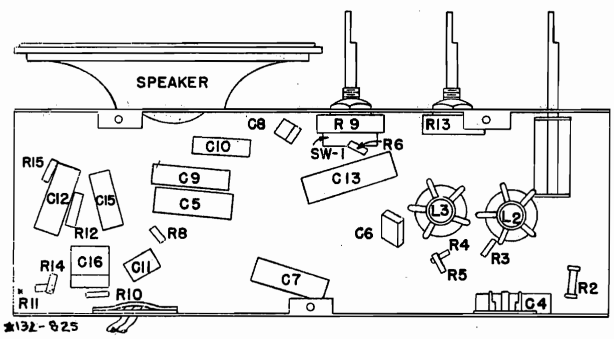


* 132.825
† 132.825-1

LOCATION OF PARTS UNDER CHASSIS
132.825 AND 132.825-1

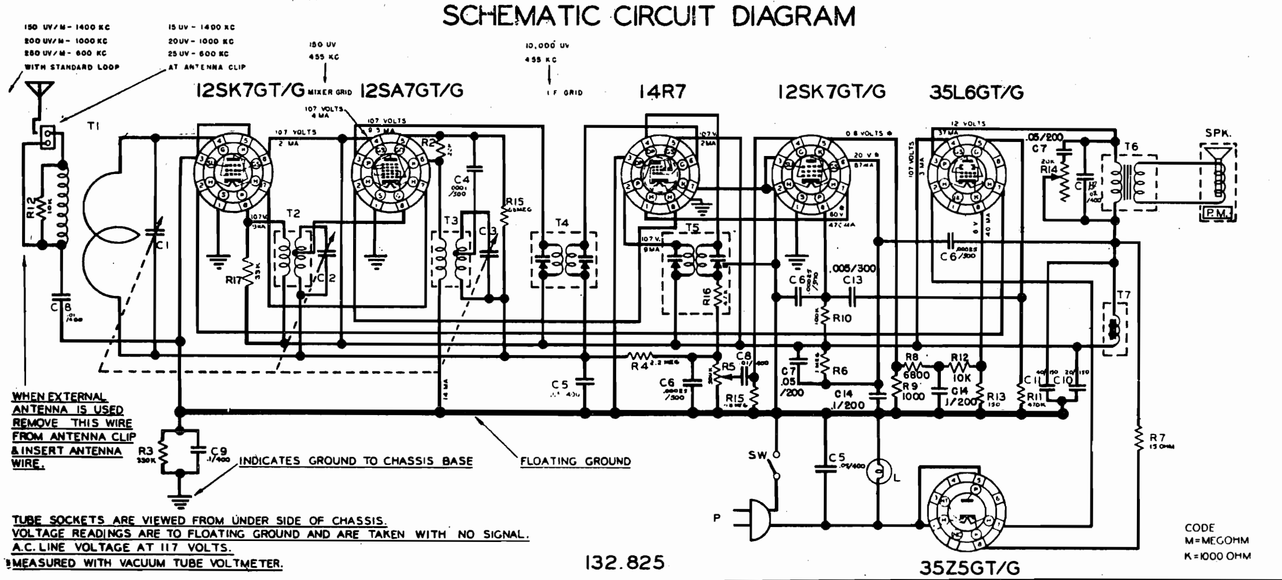


LOCATION OF PARTS UNDER CHASSIS
132.825-2



LOCATION OF PARTS UNDDER CHASSIS
132.825-3 AND 132.825-4

SCHEMATIC CIRCUIT DIAGRAM

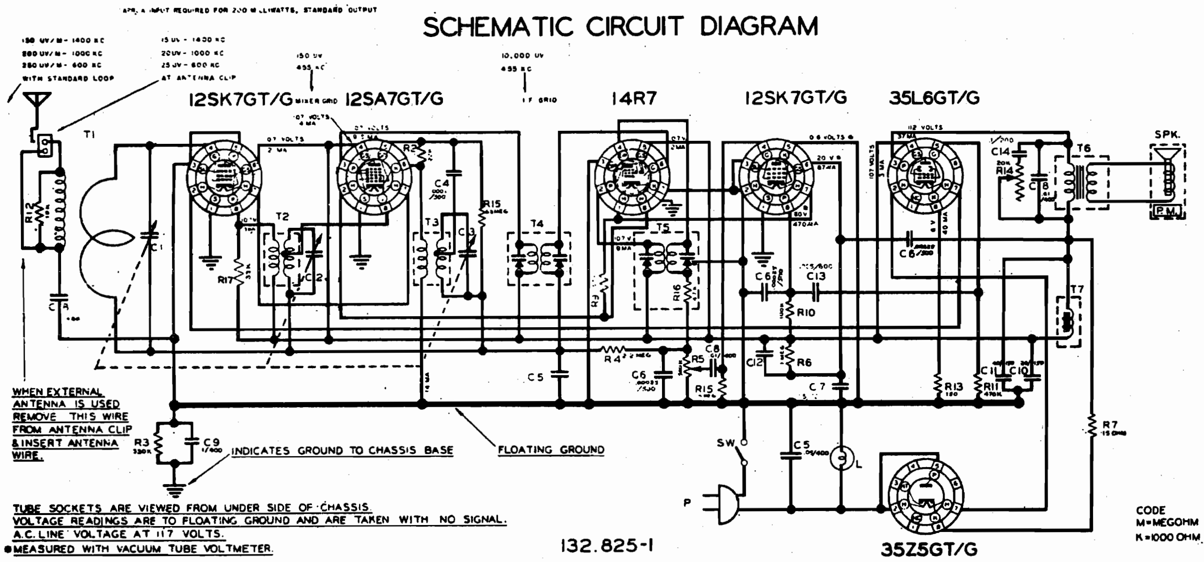


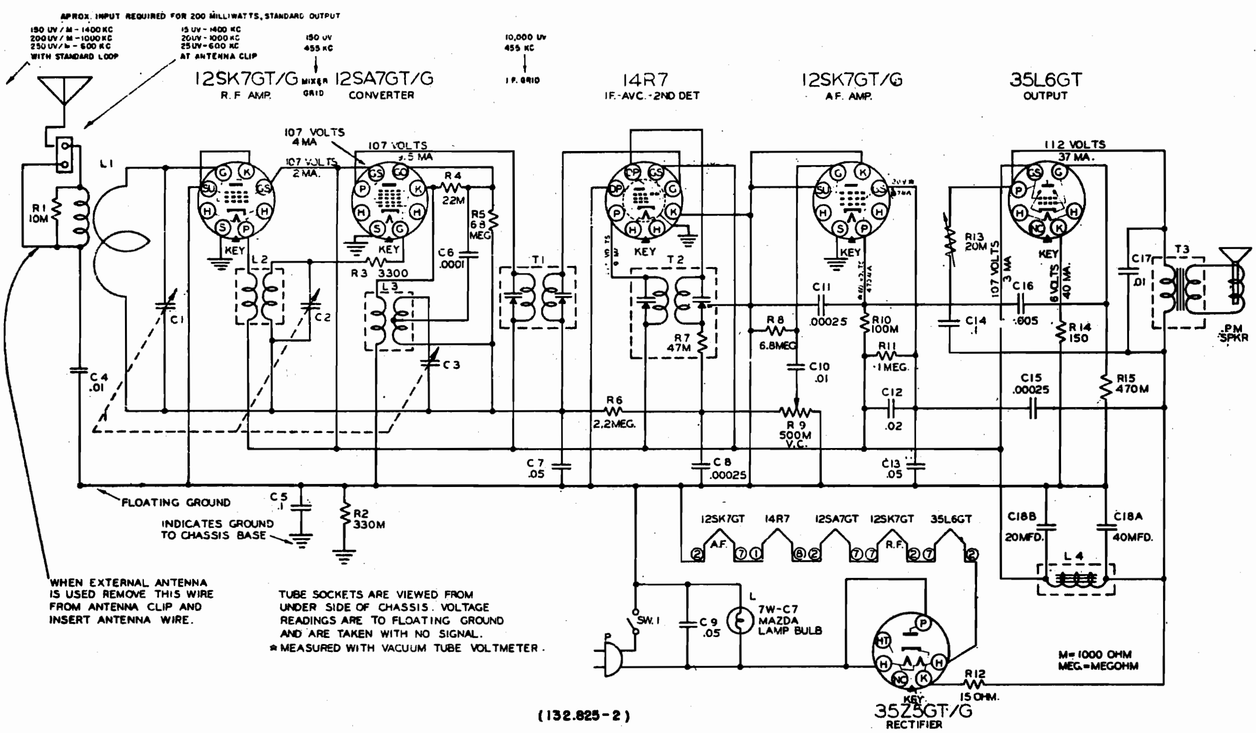
TUBE SOCKETS ARE VIEWED FROM UNDER SIDE OF CHASSIS.
VOLTAGE READINGS ARE TO FLOATING GROUND AND ARE TAKEN WITH NO SIGNAL.
A.C. LINE VOLTAGE AT 117 VOLTS.
*MEASURED WITH VACUUM TUBE VOLTMETER.

MODEL 6050, CHASSIS
132.825, 132.825-1,
132.825-2, 132.825-3,
132.825-4

SEARS, ROEBUCK & CO.

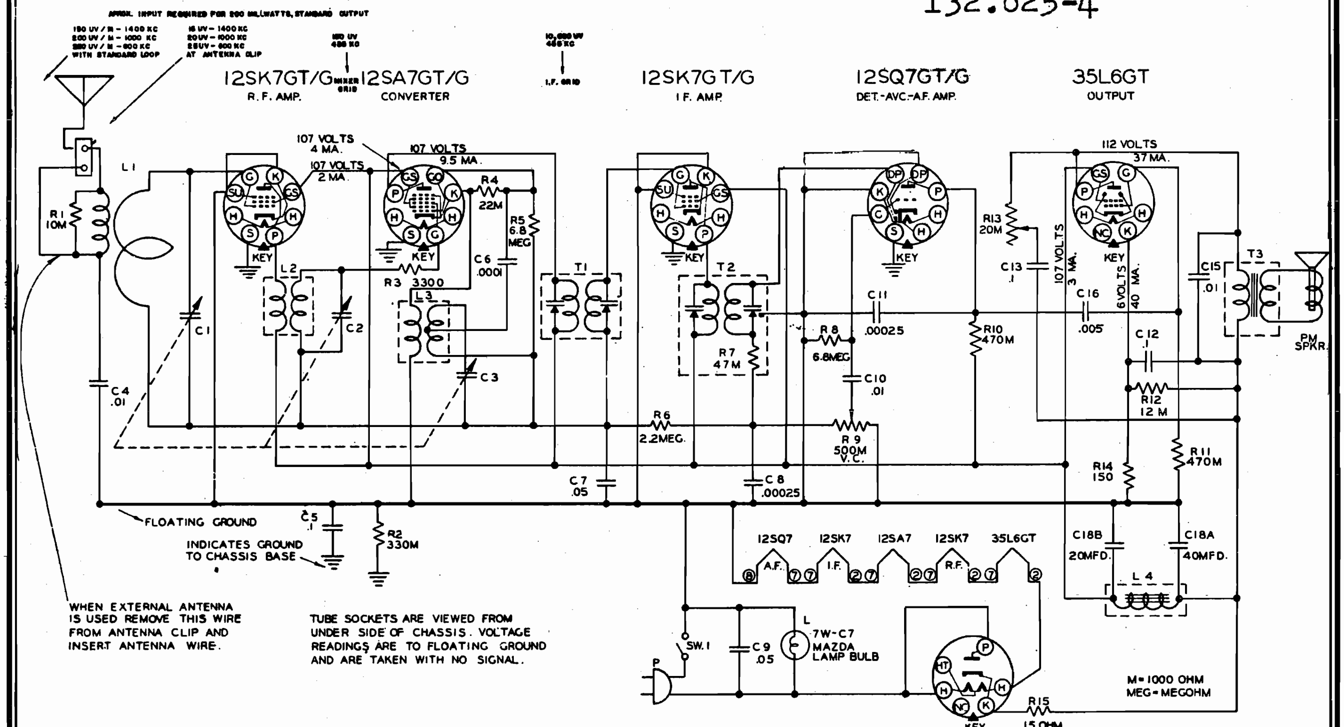
SCHEMATIC CIRCUIT DIAGRAM





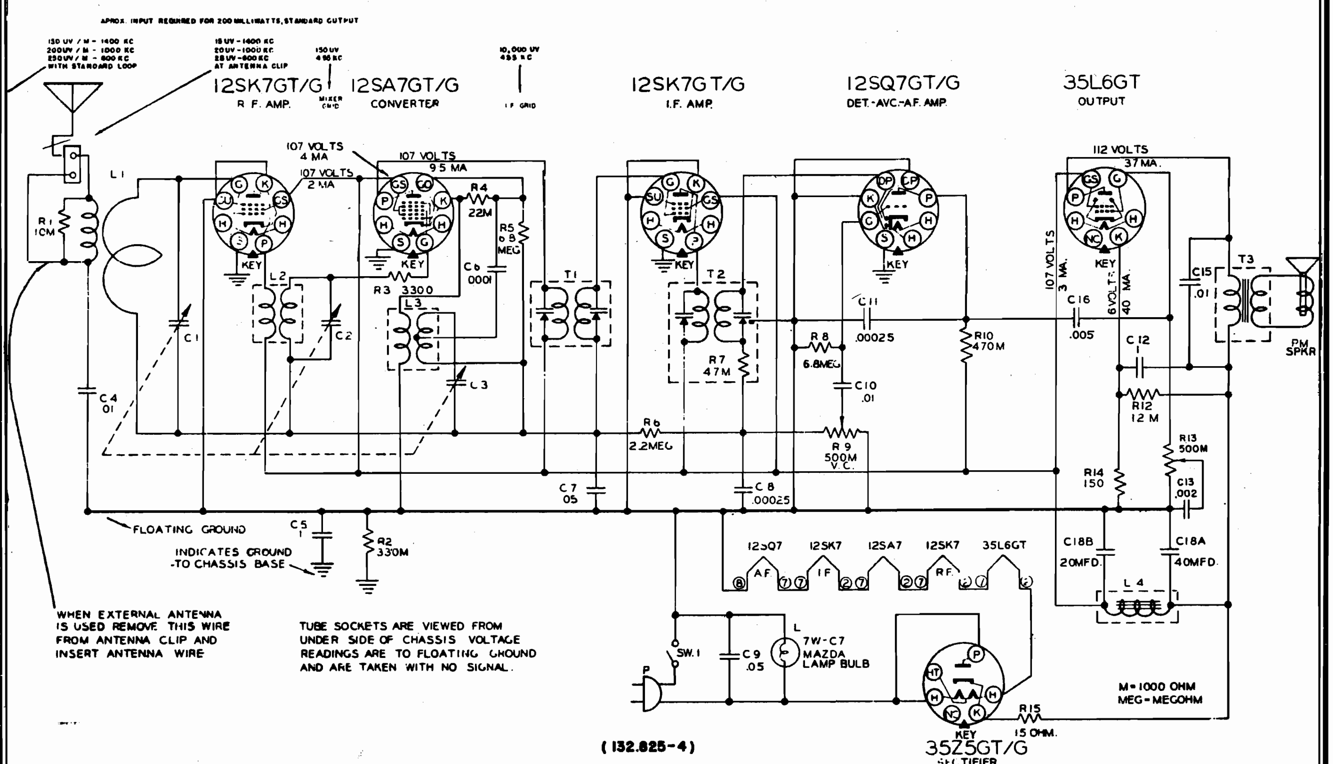
SEARS, ROEBUCK & CO.

MODEL 6050, CHASSIS 132.825, 132.825-1, 132.825-2, 132.825-3, 132.825-4



(132.825-3)

SERVICE NOTE: The a-c hum can often be greatly reduced on these chassis by replacing C12 with a 0.03-µf, 400-V capacitor. Sometimes the hum can be further reduced by replacing R12 with a 15,000-ohm, 1-watt resistor.



(132.825-4)

MODEL 6050, CHASSIS 132.825, 132.825-1, 132.825-2, 132.825-3, 132.825-4

SEARS, ROEBUCK & CO.

SPECIFICATIONS

Power Supply -- 105-125 Volts AC-DC, 45 Watts
Power Output
Undistorted .8 Watts, maximum - 2.5 Watts

Tuning Range Broadcast Band 540-1600 Kc
Speaker
Voice Coil Impedance 3.2 Ohms

CHASSIS DIFFERENCES

Note: On a few of the 132.825 chassis, a 470 ohm resistor was placed across the heater of the 14R7 tube to equalize the warm up period of the tubes. This is not shown on the Circuit Diagram.

132.825-1

Addition of Suffix Number - I to Chassis Identification Number 132.825 covers the following changes from the 132.825 chassis.

1. Removal of the bass boost circuit to reduce hum.
2. Change in tone control circuit.
3. Circuit changes as follows: Tone control condenser C14, .1 mfd. 200V was C7, .05 mfd., 200v; C8, .01 mfd. 400V fixed tone condenser in output circuit was C12, .02 mfd. 400v; C13, .005 mfd., 600V was .005 mfd., 300V; R9, 470 ohm 1/4 watt resistor added to 14R7 tube socket between heater lugs; C12, .02 mfd., 400V was C7, .05 mfd., 200v, on 12SK7 screen grid to floating ground. C14, .1 mfd., 200V condenser: R8, 6800 ohm 1/4 watt resistor, R9 1,000 ohm 1/4 watt resistor and R12, 10,000 ohm 1/4 watt resistor deleted from cathode circuit of 12 SK7 and 35L6 tubes.
4. Revision of parts price list; schematic diagram: and parts layout.

132.825-2

Addition of Suffix Number 2 to Chassis Identification Number 132.825 covers the following changes from the 132.825-1 chassis.

1. RF coil N18598 is replaced by RF coil N19860.
2. The RF coil location is changed from the top of chassis to under chassis.
3. 470 ohm resistor deleted from 14R7 tube heater circuit.
4. The schematic diagram is redrawn with rearrangement of schematic location symbols in consecutive order from left to right without duplication.
5. Rearrangement of schematic location symbols on parts list and parts location drawings to correspond with schematic diagram.

132.825-3

Addition of Suffix Number - 3 to Chassis Identification Number 132.825 covers the following changes from the 132.825-2 chassis.

1. Addition of 12SQ7 tube and deletion of 14R7 tube.
2. Addition of hum bucking circuit in output stage (C12 & R12) from B+ to cathode of 35L6 tube, to replace the hum bucking circuit used in the 12SK7 screen grid circuit. Resistor R11, 1 megohm, 1/4 watt; and condensers C13, .05 mfd., C12 .02 mfd., and C15 .00025 mfd. deleted.
3. Resistor R10, in the plate circuit of the first audio tube changed from 100,000 ohms to 470,000 ohms.
4. Revision of parts price list: schematic diagram and parts and tube layouts.

Note: All schematic diagrams on the instruction sheets and chassis stickers supplied with radios bearing the chassis number 132.825-3 are incorrect. They show the secondary of the second IF transformer connected to the grid of the 12SQ7 tube, and both diodes of the tube connected to floating ground. The schematic diagram on this RL has been corrected.

132.825-4

Addition of Suffix Number - 4 to the Chassis Identification Number 132.825, covers the following changes from the 132.825-3 chassis.

1. Tone control changes from plate circuit to grid circuit of output tube.
2. Resistor R13, 500,000 ohms, part #N19967 was 20,000 ohms, N19530. Resistor R11, 470,000 ohms 1/4 watt deleted; condenser C13, .002 mfd. 600V was .1 mfd. 200V.
3. Revision of parts price list, and schematic diagram.

SEARS, ROEBUCK & CO.

MODEL 6050, CHASSIS 132.825, -1, -2, -3, -4

PARTS LIST

132.825 & 132.825-1

Schematic Location	Part No.	Description
R2		Resistor, 22,000 ohm, ¼ watt
R3		Resistor, 330,000 ohm, ¼ watt
R4		Resistor, 2.2 megohms, ¼ watt
R5	N19529	Resistor, 500,000 ohm, vol. cont. & sw.
R6		Resistor, 1 megohm, ¼ watt
R7		Resistor, 15 ohm, ¼ watt
R8		Resistor, 6800 ohm, ¼ watt (132.825)
R9		Resistor, 1000 ohm, ¼ watt (132.825)
R9		Resistor, 470 ohm, ¼ watt (132.825-1)
R10		Resistor, 100,000 ohm, ¼ watt
R11		Resistor, 470,000 ohm, ¼ watt
R12		Resistor, 10,000 ohm, ¼ watt (132.825)
R13		Resistor, 150 ohm, ¼ watt
R14	N19530	Resistor, 20,000, tone control
R15		Resistor, 6.8 megohm, ¼ watt
R16		Resistor, 47,000 ohm, ¼ watt
R17		Resistor, 33,000 ohm, ¼ watt
C1,2,3	N18564	Condenser, variable
C4		Condenser, .0001 mfd., 500 volt, mica
C5		Condenser, .05 mfd., 400 volt
C6		Condenser, .00025 mfd., 500 volt, mica
C7		Condenser, .05 mfd., 200 volt
C8		Condenser, .01 mfd., 400 volt
C9		Condenser, .1 mfd., 400 volt
C10,11	N19239	Condenser; Elect. 20-40 mfd., 150 volt
C12		Condenser, .02 mfd., 400 volt

Schematic Location	Part No.	Description
C13		Condenser, .005 mfd., 600 volt (132.825-1)
C13		Condenser, .005 mfd., 300 volt (132.825)
C14		Condenser, .1 mfd., 200 volt
T1	N19516	Cabinet back with Antenna Loop Assy.
T2	N18598	Coil, R. F.
T3	N18580	Coil, Oscillator
T4	N18581	Transformer, 1st I. F.
T5	N18578	Transformer, 2nd I. F.
T6	N18582	Transformer, Output
T7	N18583	Choke, Iron Core "B"
Spk.	N18550	Speaker, 5¼ in. P.M.less Output Trans & Choke
P	N20064	Line Cord with Plug
L		Lamp, Dial, Mazda 7WC7 117V
	N19463	Knob, walnut, volume
	N19469	Knob, walnut, tuning
	N19466	Knob, walnut, tone
	N19533	Scale, Dial
	N19512	Escutcheon, dial with crystal
	N19226	Pointer, Dial
	N19523	Instruction Sheet (132.825)
	N19523-1	Instruction Sheet (132.825-1)
	N19395	Tuning Shaft
	N19132	Cord, Dial Drive
	N19234	Socket, Antenna
	N19134	Socket, Dial Light with leads

132.825-2, 132.825-3, & 132.825-4

Schematic Location	Part No.	Description
R1		Resistor, 10,000 ohm, ¼ watt
R2		Resistor, 330,000 ohm, ¼ watt
R3		Resistor, 3,300 ohm, ¼ watt
R4		Resistor, 22,000 ohm, ¼ watt
R5-R8		Resistor, 6.8 megohm, ¼ watt
R6		Resistor, 2.2 megohm, ¼ watt
R7		Resistor, 47,000 ohm, ¼ watt
R9	N19529	Resistor, 500,000 ohm volume cont. & sw.
R10		Resistor, 470,000 ohm, ¼ watt (132.825-3 & -4)
R10		Resistor, 100,000 ohm, ¼ watt (132.825-2)
R11		Resistor, 1 megohm, ¼ watt (132.825-2)
R11		Resistor, 470,000 ohm, ¼ watt (132.825-3)
R12		Resistor, 12,000 ohm, 1 watt (132.725-3 & -4)
R12		Resistor, 15 ohm, ¼ watt (132.825-2)
R13	N19530	Resistor, 20,000 ohm tone control (132.825-2 & -3)
R13	N19967	Resistor, 500,000 ohm tone control (132.825-4)
R14		Resistor, 150 ohm, ¼ watt
R15		Resistor, 470,000 ohm, ¼ watt (132.825-2)
R15		Resistor, 15 ohm, ¼ watt (132.825-3 & -4)
C1,2,3	N18564	Condenser, Variable
C4-C10		Condenser, .01 mfd., 400 volt
C5		Condenser, .1 mfd., 400 volt
C6		Condenser., .0001 mfd., 500 volt Mica
C7-C9		Condenser, .05 mfd., 400 volt
C8-C11		Condenser, .00025 mfd., 500 volt Mica
C12		Condenser, .02 mfd., 200 volt (132.825-2)
C12		Condenser, .1 mfd., 400 volt (132.825-3 & -4)
C13		Condenser, .05 mfd., 200 volt (132.825-2)
C13		Condenser, .1 mfd., 200 volt (132.825-3)
C13		Condenser, .002 mfd., 600 volt (132.825-4)
C14		Condenser, .1 mfd., 200 volt (132.825-2)

Schematic Location	Part No.	Description
C15		Condenser, .00025 mfd., 500 volt Mica (132.825-2)
C15		Condenser, .01 mfd., 400 volt (132.825-3 & -4)
C16		Condenser, .005 mfd., 600 volt Mica
C17		Condenser, .01 mfd., 400 volt (132.825-2)
C18A-18B	N19239	Condenser, Elect., 20-40 mfd., 150 volt
L1	N19516	Cabinet back with Antenna Loop Assy.
L2	N19860	Coil, R. F.
L3	N18580	Coil, Oscillator
L4	N18583	Choke, Iron Core "B"
T1	N21009	Transformer, First I. F. (132.825-3 & -4)
T1	N18581	Transformer, First I. F. (132.825-2)
T2	N18578	Transformer, Second I. F.
T3	N18582	Transformer, Output
Spkr.	N18550	Speaker, 5¼" P.M.less Output Trans and Choke
P	N20064	Line Cord with Plug
L		Dial Light, Mazda 7W, C7-117 volt
	N19463	Knob, Volume
	N19456	Knob, Tone
	N19469	Knob, Tuning
	N19533	Scale, Dial
	N19512	Escutcheon, Dial with Crystal
	N19226	Pointer, Dial
	N19395	Shaft, Tuning
	N19132	Cord, Dial Drive
	N19234	Socket, Antenna
	N19134	Socket, Ass'y., Dial Light with Leads
	N19295	Spring, Dial Cord
	N19523-2	Instruction Sheet (132.825-2)
	N19523-3	Instruction Sheet (132.825-3)
	N19523-4	Instruction Sheet (132.825-4)

ALIGNMENT PROCEDURE

PRELIMINARY:

Output meter connection.................................. Across Speaker Voice Coil
Output meter reading to indicate 200 mw (Standard output)................. .8 Volts
Dummy antenna value used in series with generator output............ See Chart Below
Connection of generator output lead........................... See Chart Below
Connection of generator ground lead........................... Floating Ground
Generator modulation...................................... 30% 400 Cycles
Position of volume control................................ Fully clockwise
Position of tone control..................................... Treble
Position of dial pointer with variable fully closed..................... Horizontal

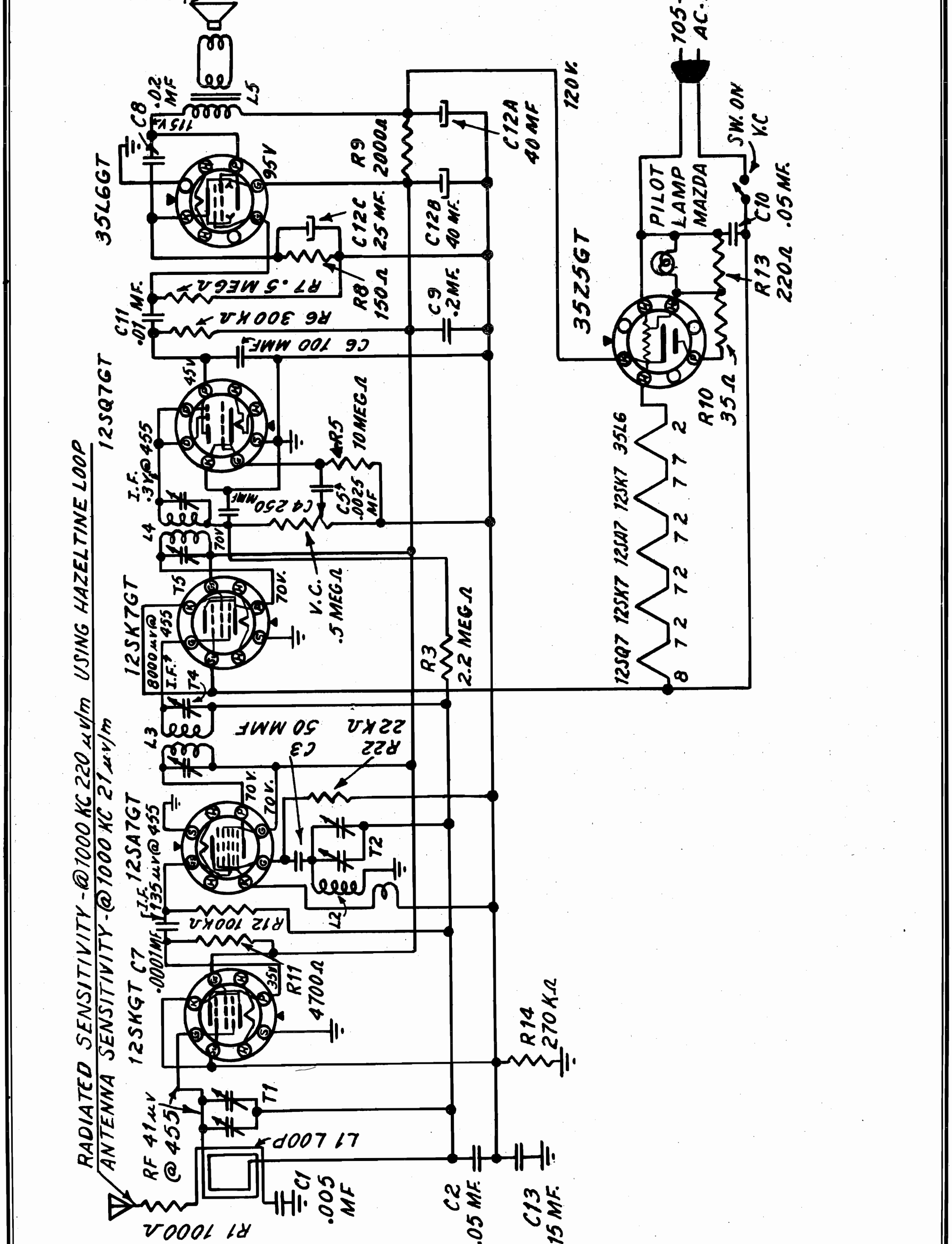
POSITION OF VARIABLE	FREQUENCY OF GENERATOR	DUMMY ANTENNA	GENERATOR OUTPUT CONNECTION	TRIMMERS ADJUSTED IN ORDER SHOWN FOR MAX. OUTPUT	FUNCTION OF TRIMMER
Open	455	.05 mfd.	12SA7 Grid (or Stator of C-2)	Top of 2nd & 1st IF Trans.	IF
1400	1400	.0002 mfd.	Antenna Clip (with black wire removed)	C-3; C-2; & C-1 Trimmers located on variable condenser	Oscillator Mixer RF

IMPORTANT ALIGNMENT NOTES:

1. Place set loop in the same position and at the same distance with respect to the back of the chassis as it would be when the set is mounted in the cabinet, during alignment of the RF stage.
2. If a standard test loop is used with the Signal Generator for alignment of the receiver, the black wire will be left in the antenna clip.
3. The alignment procedure should be repeated in the original order for greatest accuracy. Always keep the output from the signal generator at its lowest possible value to make the A.V.C. action of the receiver ineffective.

MODEL 6052, CHASSIS 110.452; 6052A, CHASSIS 110.452-1

SEARS, ROEBUCK & CO.



SEARS, ROEBUCK & CO.

MODEL 6052, CHASSIS 110.452; 6052A, CHASSIS 110.452-1

ALIGNMENT PROCEDURE

PRELIMINARY

OUTPUT METER CONNECTION . . . . ACROSS LOUD SPEAKER VOICE COIL

METER READING FOR 1/2 WATT OUTPUT . . . . 1.26 VOLTS

CONNECTION OF GENERATOR GROUND. . . . . FLOATING GROUND

GENERATOR MODULATION. . . . . APP. 30%. 400 CYCLES

POSITION OF VOLUME CONTROL. . . . . FULLY CLOCKWISE

POSITION OF DIAL POINTER WITH VARIABLE CONDENSER FULLY CLOSED . . . . . . LAST LINE ON LEFT HAND SIDE OF SCALE

POSITION OF DIAL POINTER	GENERATOR FREQUENCY	GENERATOR CONNECTION	DUMMY ANTENNA	TRIMMERS ADJUSTED	FUNCTION
1000 KC	455 KC	R. F. GRID OF 12SA7	.2 MFD	T3. T4. T5. T6	I.F.
1500 KC	1500 KC	STANDARD RADIATING LOOP	.0002 MFD	T2. T1	OSC., R. F.
600 KC	600 KC	STANDARD RADIATING LOOP	.00020 MFD	CHECK POINT	*

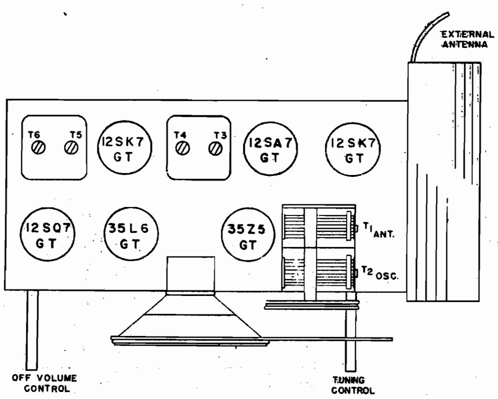
It is advisable to repeat the entire alignment procedure in the original order to insure greater accuracy.

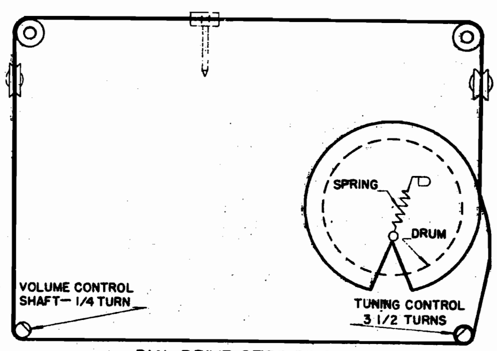
Always keep the output from the test oscillator at its lowest possible value. As the sensitivity is increased by alignment, the generator output should be reduced correspondingly.

Approximately 90 microvolts per meter input using standard Hazeltine alignment loop 24" from set for 1/2 watt output.

*Check the sensitivity at 600 KC, if weak, adjust antenna section plates for maximum output at 600 KC. Tracking is accomplished by adjusting plates of rotor.

Approximate stage by stage sensitivities are: R. F. Grid - 455 KC - 95 UV
R. F. Grid - 1000 KC - 150 UV, Antenna - 1500 KC - 40 UV, 600 KC - 60 UV





DIAL DRIVE STRINGING DIAGRAM

PARTS LIST

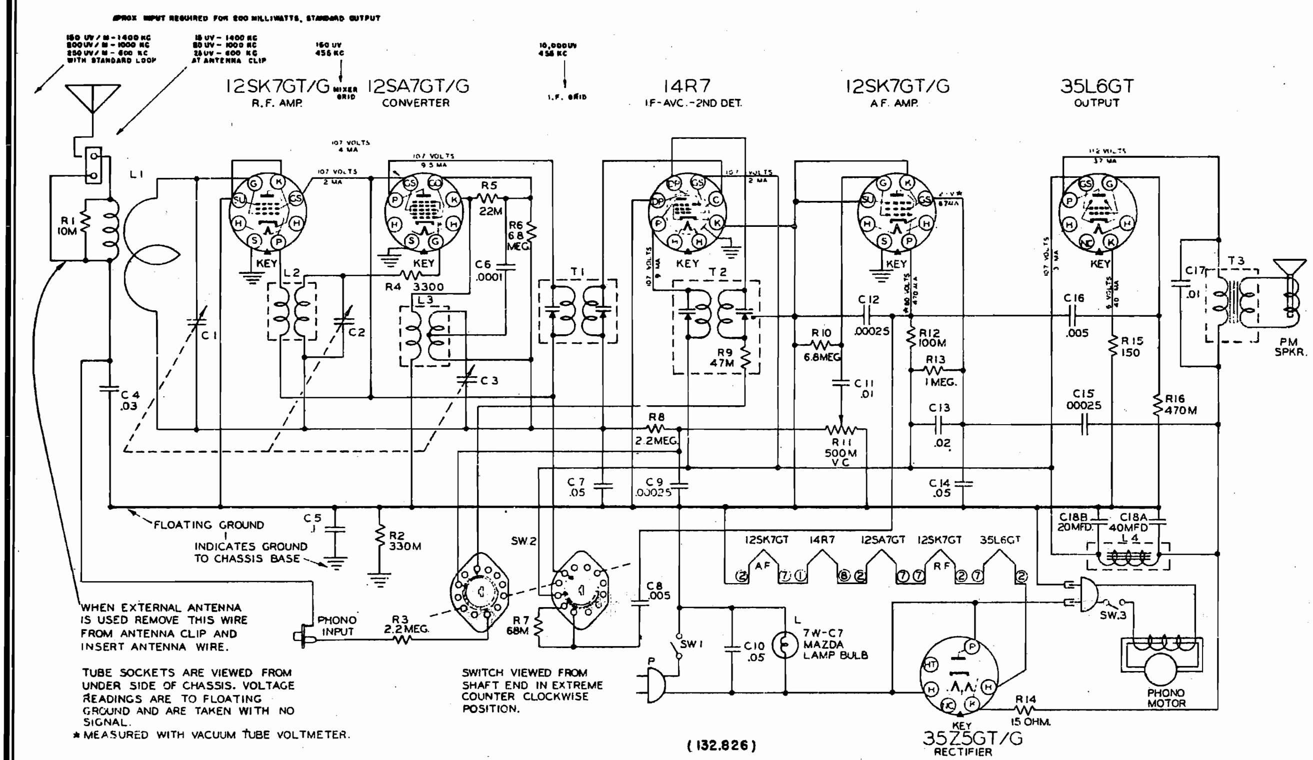
SCH. LOC.	PART NO.	DESCRIPTION
	A62163C	BACK COVER
L1	A28147	COIL-LOOP
L2	A28160	COIL-OSCILLATOR
C1		CONDENSER, .005 MFD 400 VOLT
C2		CONDENSER, .05 MFD 200 VOLT
C3		CONDENSER, .00005 MFD MICA
C4		CONDENSER, .00025 MFD MICA
C5		CONDENSER, .002 MFD 400 VOLT
C6, C7		CONDENSER, .0001 MFD MICA
C8		CONDENSER, .02 MFD 400 VOLT
C9		CONDENSER, .2 MFD 400 VOLT
C10		CONDENSER, .05 MFD 400 VOLT
C11		CONDENSER, .01 MFD 400 VOLT
C12	A2068D	CONDENSER, ELECTROLYTIC 40-40 MFD X 150VOLT 25 MFD X 25 VOLT
C13		CONDENSER, .15 MFD 400 VOLT
	A2463	CONTROL, VOLUME WITH SWITCH. (S.P.S.T.) .5 MEGOHM
	A5559	CORD, LINE
	A4640	SHAFT ASSEMBLY, DIAL DRIVE
	A1851	DIAL LAMP SOCKET
	A4137	DIAL POINTER
	A4574	DIAL POINTER DRIVE CORD
	A-4137	DIAL POINTER DRIVE SPRING
	A40112	DIAL SCALE (GLASS)
	A39125	KNOB, OFF-VOLUME
	A39126	KNOB, TUNING
	A59259	LEAFLET, INSTRUCTION
R1		RESISTOR, 1000 OHMS 1/4 WATT
R2		RESISTOR, 22,000 OHMS 1/4 WATT
R3		RESISTOR, 2.2 MEGOHMS 1/4 WATT
R5		RESISTOR, 10 MEGOHMS 1/4 WATT
R6		RESISTOR, 300,000 OHMS 1/4 WATT
R7		RESISTOR, .5 MEGOHMS 1/4 WATT
R8		RESISTOR, 150 OHMS 1/2 WATT
R9		RESISTOR, 2000 OHMS 2 WATT
R10		RESISTOR, 35 OHMS 1/4 WATT
R11		RESISTOR, 4700 OHMS 1/4 WATT
R12		RESISTOR, 100,000 OHMS 1/4 WATT
R13		RESISTOR, 220 OHMS 1/2 WATT
R14		RESISTOR, 270,000 OHMS 1/4 WATT
	A5871	SPEAKER, 5" P. M.
L5	A1330	TRANSFORMER, OUTPUT
L3	A3329	TRANSFORMER, I.F. INPUT
L4	A3529	TRANSFORMER, I.F. OUTPUT
	A1652	VARIABLE CONDENSER

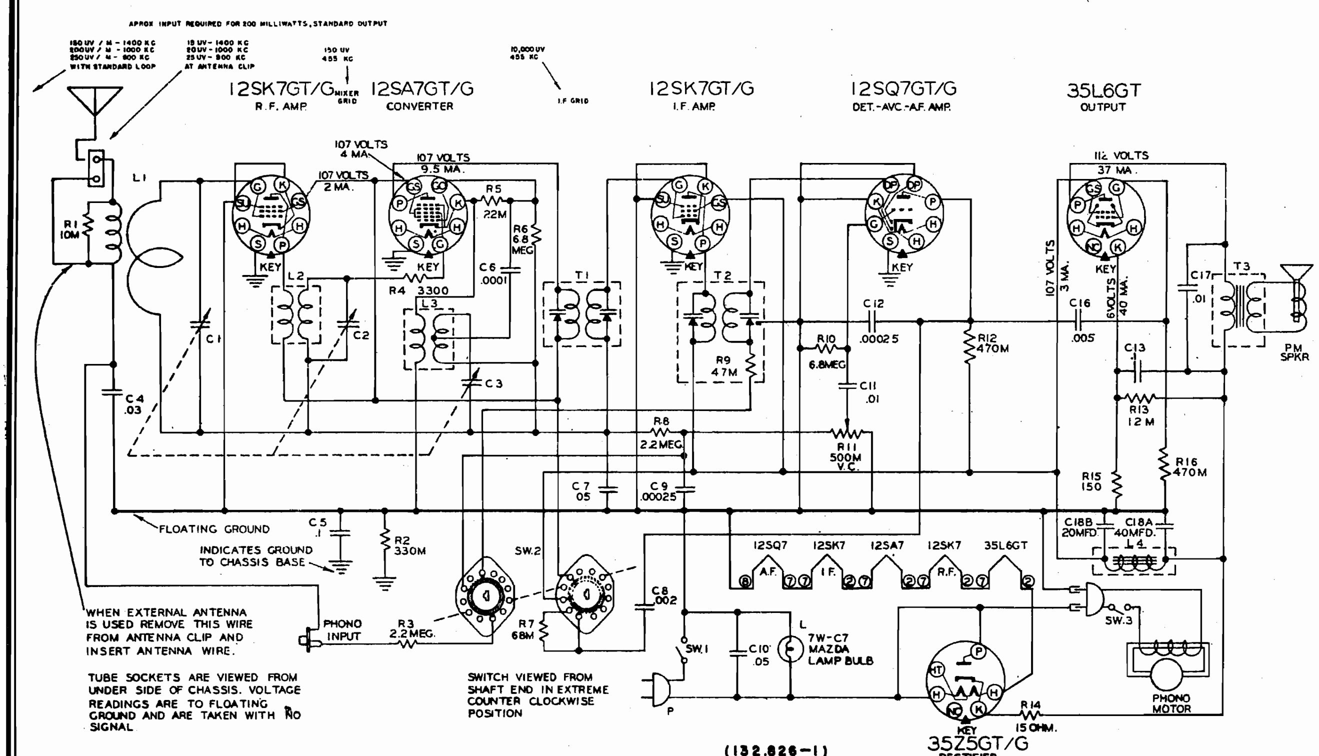
POWER SUPPLY -- 105-125 VOLTS AC-DC, 40 WATTS
POWER OUTPUT -- UNDISTORTED . 6 WATTS, MAXIMUM 1.7 WATTS

TUNING RANGE BROADCAST BAND 535-1740 KC
SPEAKER VOICE COIL IMPEDANCE 3.2 OHMS

MODEL 6071, CHASSIS 132.826, 132.826-1

SEARS, ROEBUCK & CO.

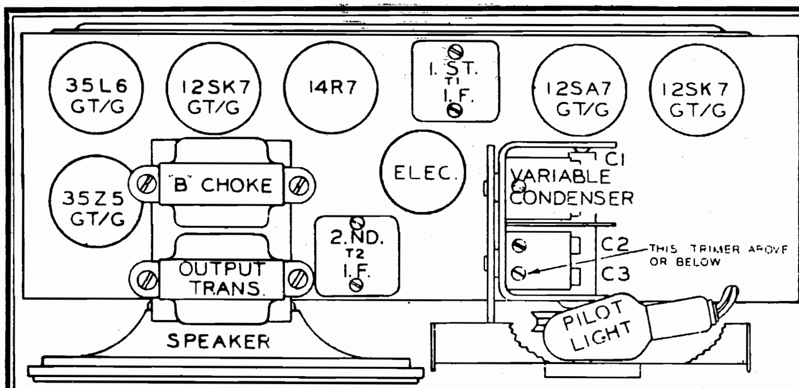




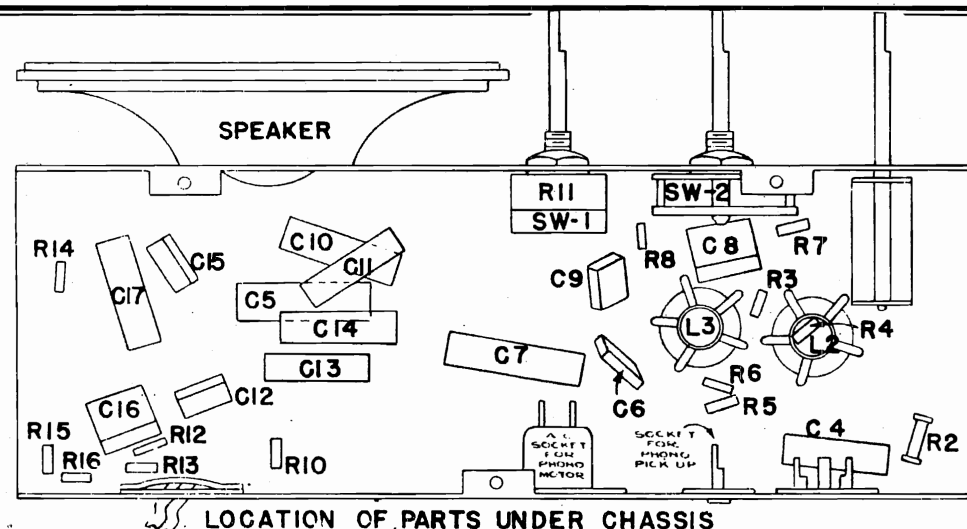
SERVICE NOTE: The a-c hum can often be greatly reduced on this chassis by replacing C13 with a 0.03-µf, 400-V capacitor. Sometimes the hum can be further reduced by replacing R13 with a 15,000-ohm, 1-watt resistor.

SEARS, ROEBUCK & CO.

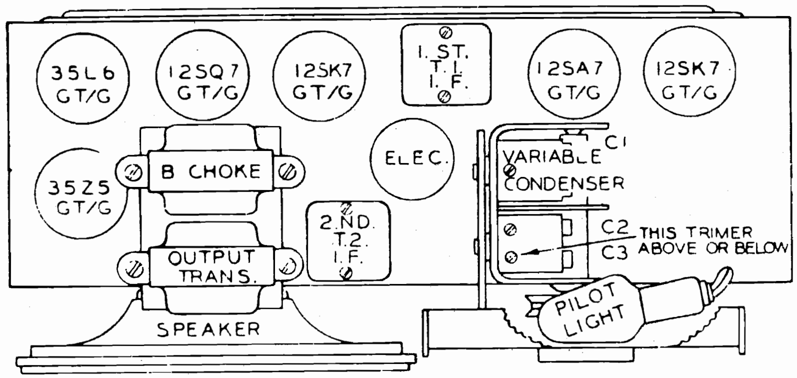
MODEL 6071, CHASSIS 132.826, 132.826-1



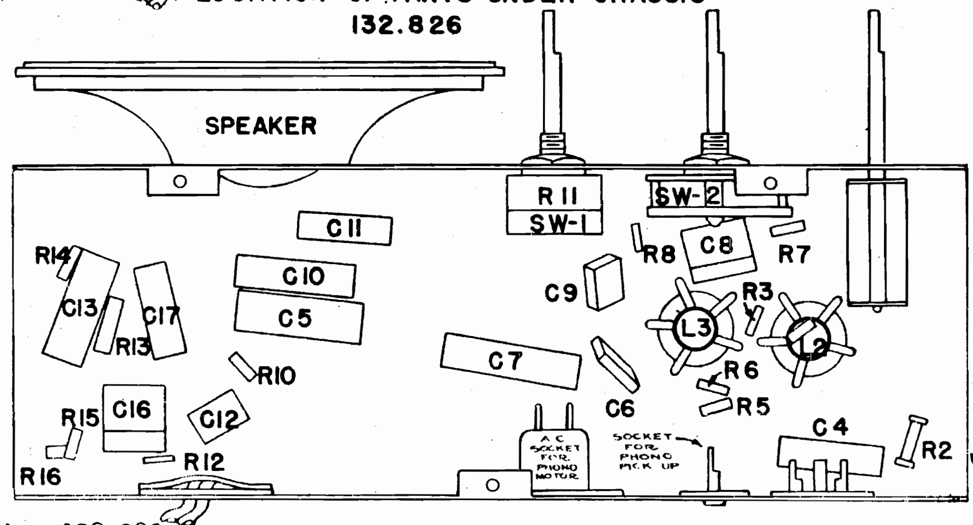
LOCATION OF PARTS ON TOP OF CHASSIS
132.826



LOCATION OF PARTS UNDER CHASSIS
132.826



LOCATION OF PARTS ON TOP OF CHASSIS
132.826-1



LOCATION OF PARTS UNDER CHASSIS
132.826-1

CHASSIS DIFFERENCES

Addition of Suffix Number "1" to Chassis Identification Number 132.826, covers the following changes:

1. Addition of 12SQ7GT/G tube, deletion of 14R7 tube, addition of hum bucking circuit in output circuit to replace the one previously used in the screen circuit of the 12SK7 AF Amp. tube. Change 1st IF coil to increase sensitivity.
2. R12 - 470-M was 100M; R13 - 12M was 1 meg; C8 - .002 uf. was .005 uf; C13 - .1 mfd 400 V was .02 mfd 200 V; C14 & C15 deleted; T1, 1st IF coil, N21009 was N18581.
3. Revision of Parts List Prices, Schematic Diagram, Parts & Tube Layout Drawings.

MODEL 6071, CHASSIS 132.826, 132.826-1

SEARS, ROEBUCK & CO.

SPECIFICATIONS

Power Supply -- 105-125 volts AC, 65 watts
Power Output
Undistorted .8 watts, maximum - 2.5 watts

Tuning Range Broadcast Band 540-1600 Kc
Speaker
Voice Coil Impedance 3.2 Ohms

ALIGNMENT PROCEDURE

PRELIMINARY:

Output meter connection ....Across Speaker Voice Coil
Output meter reading to indicate 200 mw (Standard Output)................. .8 Volts
Dummy antenna value used in series with generator output .... See Chart Below
Connection of generator output lead.................................. See Chart Below
Connection of generator ground lead.................................. Floating Ground
Generator modulation.. 30% 400 Cycles
Position of volume control... Fully Clockwise
Position of tone control.. Treble
Position of dial pointer with variable fully closed.................... Horizontal

POSITION OF VARIABLE	FREQUENCY OF GENERATOR	DUMMY ANTENNA	GENERATOR OUTPUT CONNECTION	TRIMMERS ADJUSTED IN ORDER SHOWN FOR MAX. OUTPUT	FUNCTION OF TRIMMER
Open	455	.05 mfd.	12SA7 Grid (or Stator of C-2)	Top of 2nd & 1st IF Trans.	IF
1400	1400	.0002 mfd.	Antenna Clip (with black wire removed)	C-3; C-2; & C-1 Trimmers located on Variable Condenser	Oscillator Mixer RF

IMPORTANT ALIGNMENT NOTES:

1. Place set loop in the same position and at the same distance with respect to the back of the chassis as it would be when the set is mounted in the cabinet, during alignment of the RF stage.
2. If a standard test loop is used with the Signal Generator for alignment of the receiver, the black wire will be left in the antenna clip.
3. The alignment procedure should be repeated in the original order for greatest accuracy. Always keep the output from the signal generator at its lowest possible value to make the A. V. C. action of the receiver ineffective.

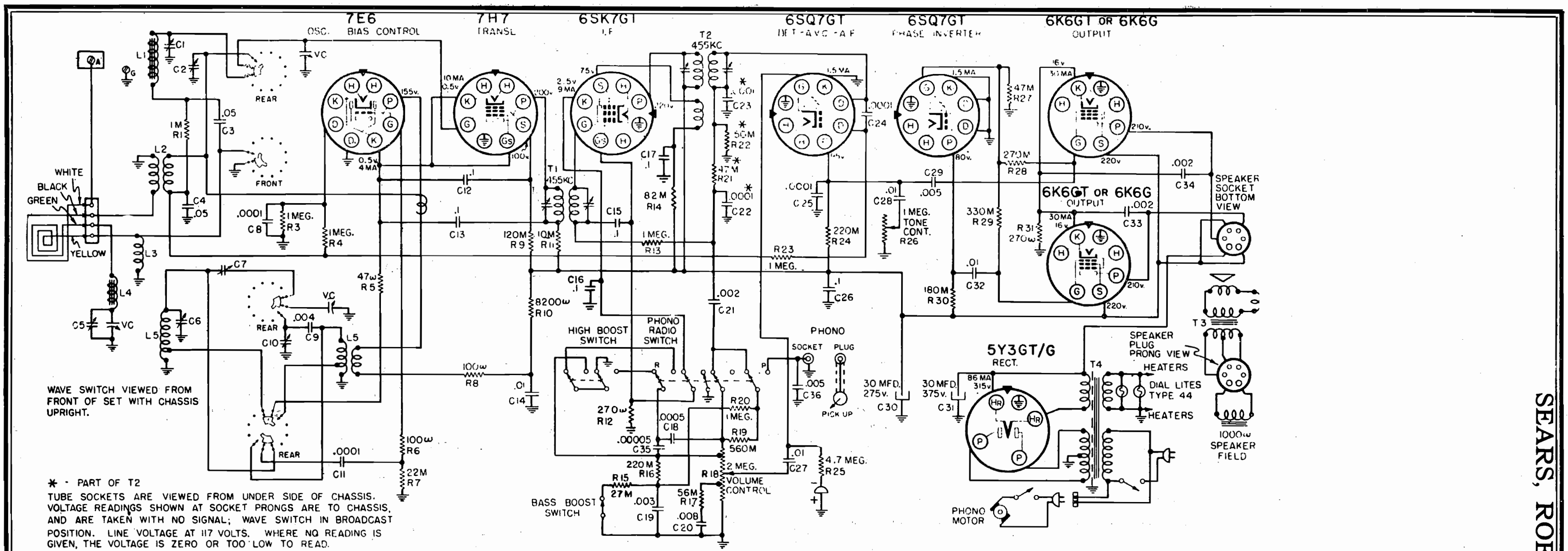
PARTS LIST

Schematic Location	Part No.	Description
R1		Resistor, 10,000 ohm, ½ watt
R2		Resistor, 330,000 ohm, ½ watt
R3-R8		Resistor, 2.2 megohm, ½ watt
R4		Resistor, 3300 ohm, ½ watt
R5		Resistor, 22,000 ohm, ½ watt
R6-R10		Resistor, 6.8 megohm, ½ watt
R7		Resistor, 68,000 ohm, ½ watt
R9		Resistor, 47,000 ohm, ½ watt
R11.	N19529	Resistor, 500,000 ohm, Vol. Cont. & Sw.
R12-R16		Resistor, 470,000 ohm, ½ watt
R13		Resistor, 1 megohm, ½ watt (132.826)
R13		Resistor, 12,000 ohm, 1 watt (132.826-1)
R14		Resistor, 15 ohm, ½ watt
R15		Resistor, 150 ohm, ½ watt
C1-C2-C3	N18564	Condenser, Variable, 3 gang
C4		Condenser, .03 mfd., 400 volt
C5		Condenser, .1 mfd., 400 volt
C6		Condenser, .0001 mfd., 500 volt, Mica
C7-C10		Condenser, .05 mfd., 400 volt
C8		Condenser, .005 mfd. 600 volt (132.826)
C8		Condenser, .002 mfd., 600 volt (132.826-1)
C9-C12		Condenser, .00025 mfd., 500 volt, mica
C11-C17		Condenser, .01 mfd., 400 volt
C13		Condenser, .02 mfd. 200 volt (132.826)
C13		Condenser, .1 mfd., 400 volt (132.826-1)
C14		Condenser, .05 mfd., 200 volt (132.826)
C15		Condenser, .00025 mfd., 500v.Mica (132.826
C16		Condenser, .005 mfd., 600 volt
C18A-C18B	N19239	Condenser, Electrolytic, 40-20 mfd, 150volt
L1	N19558	Cabinet Back with Ant. Loop Assy.
L2	N19860	Coil, R. F.
L3	N18580	Coil, Oscillator
L4	N18583	Choke, Iron Core "B"

Schematic Location	Part No.	Description
T1	N18581	Transformer, First I. F.
T1	N21009	Transformer, First I. F.
T2	N18578	Transformer, Second, I. F.
T3	N18582	Transformer, Output
Spkr.	N18550	Speaker, 5¼"P.M.less Output Trans & Choke
P	N20064	Line Cord with Plug
L		Dial Light, Mazda 7 W, C7, 117 volt
SW-2	N19546	Switch, Phono-Radio-Tone
SW-3	N19545	Switch, Phono-Motor
	N19395	Shaft, Tuning
	N19533	Scale, Dial
	N19226	Pointer, Dial
	N19132	Cord, Dial Drive
	N19295	Spring, Dial Cord
	N19234	Socket, Antenna
	N19134	Socket Assy., Dial Light with Leads
	N19551	Socket, AC, for Phono-Motor
	N19552	Socket, for Phono Input
	N19512	Escutcheon, Dial with Crystal
	N19475	Motor, Phono with 9" Turntable
	N19906	Turntable only for Phono-Motor 9"
	N19477	Pickup arm with cartridge
	N19907	Pickup cartridge only, Shure No. P93B
	N19569	Escutcheon, Phono-Motor Switch
	N19555	Rest, Pickup-Arm
	N19463	Knob, Volume
	N19469	Knob, Tuning
	N19470	Knob, Tone-Phono-Radio
	N19554	Plug, Phono Input
	N19556	Plug, AC, Phono-Motor
	N19397	Instruction Sheet (132.826)
	N19397-1	Instruction Sheet (132.826-1)

SEARS, ROEBUCK & CO.

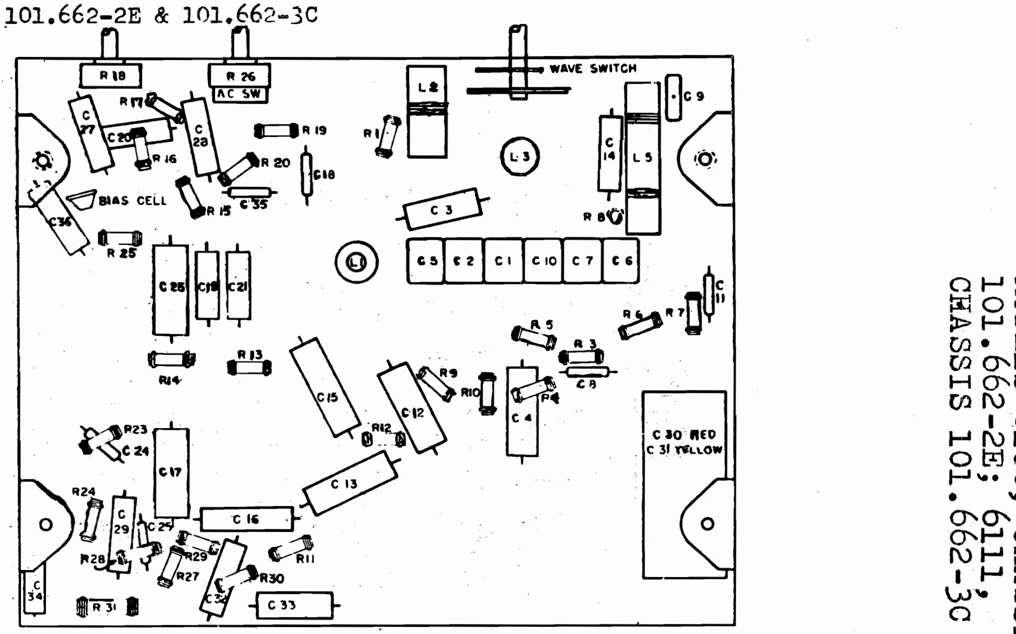
MODELS 6106, CHASSIS 101.662-2E; 6111, CHASSIS 101.662-3C



SCHEMATIC DIAGRAM 101.662-2E & 101.662-3C

PARTS LIST

SCHEMATIC LOCATION	PART NUMBER	DESCRIPTION
	R17998	Board - Antenna
	R45512	Board - Terminal - Loop
	R57205	Button - Push (High Boost, Bass Boost, Phono-Tel. - Freq. Mod.)
	R57204	Button - Push Stations
C30,C31	R45829	Capacitor - Electrolytic, 30 Mfd. 275 V., 30 Mfd. 375 V.
C1,C2,C5, C6,C7,C10	R47199	Capacitor - Trimmer - 6 Gang
C15,C16		Capacitor - .1 Mfd. 200 V.
C12,C13, C17,C26		Capacitor - .1 Mfd. 400 V.
C14,C28		Capacitor - .01 Mfd. 400 V.
C27,C32		Capacitor - .01 Mfd. 600 V.
C3,C4		Capacitor - .05 Mfd. 200 V.
C21,C33,C34		Capacitor - .002 Mfd. 600 V.
C19		Capacitor - .003 Mfd. 400 V.
C29,C36		Capacitor - .005 Mfd. 400 V.
C20		Capacitor - .008 Mfd. 400 V.
C9		Capacitor - .004 Mfd. Mica
C8,C11, C24,C25		Capacitor - .0001 Mfd. Mica
C18		Capacitor - .0005 Mfd. Mica
C35		Capacitor - .00005 Mfd. Mica
	R17915	Cell - Bias
	R57203	Clip - Pilot Light
L4	R47193	Coil - Antenna, Loop Loading
L5	R47192	Coil - BC. & S. W. Oscillator
L1	R47194	Coil - BC., Translator
L3	R57187	Coil - Preselector Coupling
L2	R47195	Coil - S. W. Antenna
R26	R47235	Control - On-Off & Tone - 1 Megohm
R18	R47240	Control - Volume - 2 Megohm
	R18395	Cord - Line (Power)
	R42673	Cover - Push Button Tabs - Celluloid
	R57206	Dial - Station (101.662-2E)
	R57233	Dial - Station (101.662-3C)
	R57231	Escutcheon - Dial
	R49940	Knob - On-Off & Tone (101.662-3C)
	R61119	Knob - On-Off & Tone (101.662-2E)
	R59939	Knob - Tuning (101.662-3C)
	R61121	Knob - Tuning (101.662-2E)
	R49941	Knob - Volume (101.662-3C)
	R61120	Knob - Volume (101.662-2E)
	R49943	Knob - Wave Switch (101.662-3C)
	R61122	Knob - Wave Switch (101.662-2E)
		Lamp - Dial, Mazda Type #44
	R59054	Leaflet - Instruction (101.662-3C)
	R54572	Leaflet - Instruction (101.662-2E)
	R57216	Loop - Complete (101.662-2E)
	R57196	Loop - Complete (101.662-3C)
	R18112	Mounting - Bias Cell
	R16039	Pin - Loop Lead
	R57207	Pointer - Dial
	R13477	Pulley - Wood, Large
	R43416	Pulley - Wood, Small
R3,R4,R13, R20,R23		Resistor - 1 Megohm 1/3 Watt
R25		Resistor - 4.7 Megohm 1/3 Watt
R1		Resistor - 1,000 Ohm 1/3 Watt
R11		Resistor - 10,000 Ohm 1/3 Watt
R7		Resistor - 22,000 Ohm 1/3 Watt
R15		Resistor - 27,000 Ohm 1/3 Watt
R27		Resistor - 47,000 Ohm 1/3 Watt
R17		Resistor - 56,000 Ohm 1/3 Watt
R14		Resistor - 82,000 Ohm 1/3 Watt
R9		Resistor - 120,000 Ohm 1/3 Watt
R30		Resistor - 180,000 Ohm 1/3 Watt
R16,R24		Resistor - 220,000 Ohm 1/3 Watt
R28		Resistor - 270,000 Ohm 1/3 Watt
R29		Resistor - 330,000 Ohm 1/3 Watt
R19		Resistor - 560,000 Ohm 1/3 Watt
R5		Resistor - 47 Ohm 1/3 Watt
R6,R8		Resistor - 100 Ohm 1/3 Watt
R12		Resistor - 270 Ohm 1/3 Watt
R31		Resistor - 270 Ohm 2 Watt
R10		Resistor - 8,200 Ohm 1 Watt
	R47262A	Shaft - Dial Drive Assy.
	R44897	Socket - Phono - Tel. - Freq. Mod.
	R16958	Socket - Rectifier
	R17983	Socket - Speaker
	R17987	Socket - Tube - Octal
	R44145	Socket - 2 Prong - AC Rec. Chgr.
	R45956	Socket - Tube - 8 Prong Lock-in
		WHEN ORDERING SPEAKER PARTS ALWAYS GIVE THE PART NUMBER ON THE SPEAKER
	R57221	Speaker - 10" Dynamic
	R52989	Cone and Voice Coil
	R45838	Field Coil
T3	R45837	Output Transformer
	R18251	Spring - Dial Drive Tension
	R45844	Switch - Tone & Phono - Tel.-Freq. Mod.
	R47191	Switch - Wave
	R45995	Tab - Bass Boost
	R45994	Tab - High Boost
	R45996	Tab - Phono - Tel. - Freq. Mod.
	R42879	Tab - Call Letter Sheets
T1	R45305	Transformer - #1 - I. F.
T2	R45306	Transformer - #2 - I. F.
T4	R45953	Transformer - Power - 60 Cycle
VC	R47259	Tuner - Push Button with Variable Cap.

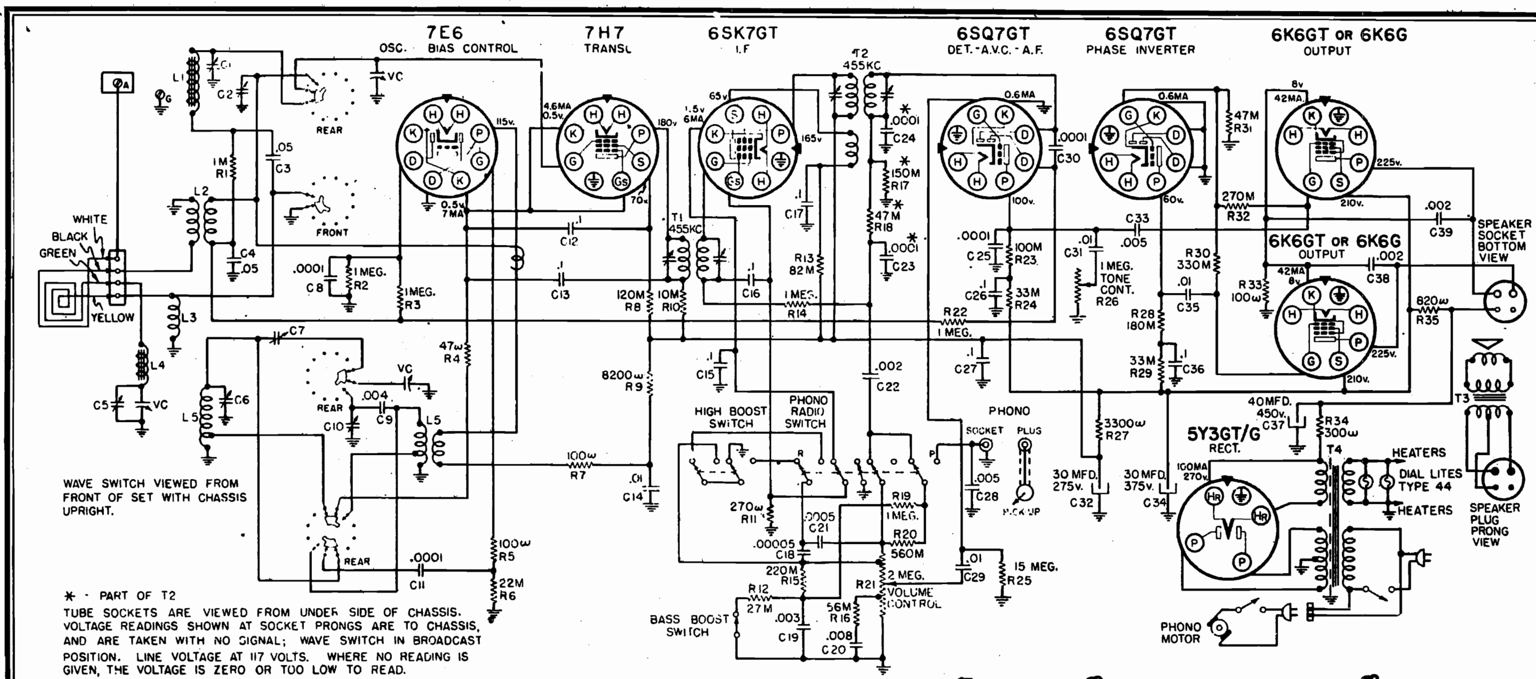


LOCATION OF PARTS UNDER CHASSIS

RECORD CHANGERS: For 101.662-2E, Model 101.206-1, RCD.CH. 18-6; For 101.662-3C, Model 101.204, RCD.CH. 18-1

MODELS 6106A, CHASSIS 101.662-4E; 6111A, CHASSIS 101.662-5F

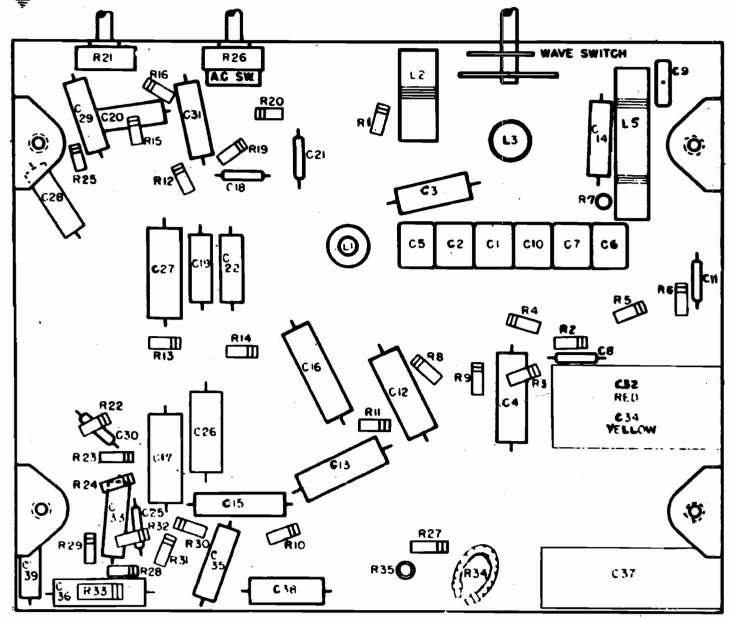
SEARS, ROEBUCK & CO.



SCHEMATIC DIAGRAM 101.662-4E & 101.662-5F

PARTS LIST

SCHEMATIC LOCATION	PART NUMBER	DESCRIPTION
	R17998	Board - Antenna
	R45512	Board - Terminal - Loop
	R57205	Button - Push (High Boost, Bass Boost, Phono-Tel. - Freq. Mod.)
	R57204	Button - Push Stations
C32,C34	R45829	Capacitor - Electrolytic, 30 Mfd. 275 V., 30 Mfd. 375 V.
C37	R61272	Capacitor - Electrolytic, 40 Mfd. 450 V.
C1,C2,C5, C6,C7,C10	R47199	Capacitor - Trimmer - 6 Gang
C15,C16		Capacitor - .1 Mfd. 200 V.
C12,C13,C17, C26,C27,C36		Capacitor - .1 Mfd. 400 V.
C31,C14		Capacitor - .01 Mfd. 400 V.
C29,C35		Capacitor - .01 Mfd. 600 V.
C3,C4		Capacitor - .05 Mfd. 200 V.
C22,C38,C39		Capacitor - .002 Mfd. 600 V.
C19		Capacitor - .003 Mfd. 400 V.
C28,C33		Capacitor - .005 Mfd. 400 V.
C20		Capacitor - .008 Mfd. 400 V.
C9		Capacitor - .004 Mfd. Mica
C8,C11, C30,C25		Capacitor - .0001 Mfd. Mica
C21		Capacitor - .0005 Mfd. Mica
C18		Capacitor - .00005 Mfd. Mica
	R57203	Clip - Pilot Light
L4	R47193	Coil - Antenna Loop Loading
L5	R47192	Coil - BC. & S. W. Oscillator
L1	R47194	Coil - BC., Translator
L3	R57187	Coil - Preselector Coupling
L2	R47195	Coil - S. W. Antenna
R26	R47235	Control - On-Off & Tone - 1 Megohm
R18	R47240	Control - Volume - 2 Megohm
	R18395	Cord - Line (Power)
	R42673	Cover - Push Button Tabs (Celluloid)
	R57233	Dial - Station
	R57231	Escutcheon - Dial with Glass
	R61119	Knob - On-Off & Tone
	R61121	Knob - Tuning
	R61120	Knob - Volume
	R61122	Knob - Wave Switch
		Lamp - Dial, Mazda Type #44
	R54430	Leaflet - Instruction
	R57196	Loop - Complete (101.662-5F)
	R57216	Loop - Complete (101.662-4E)
	R16039	Pin - Loop Lead
	R57207	Pointer - Dial
	R18477	Pulley - Wood, Large
	R43416	Pulley - Wood, Small
R2,R3,R14, R19,R22		Resistor - 1 Megohm 1/3 Watt
R25		Resistor - 15 Megohm 1/3 Watt
R1		Resistor - 1,000 Ohm 1/3 Watt
R10		Resistor - 10,000 Ohm 1/3 Watt
R6		Resistor - 22,000 Ohm 1/3 Watt
R12		Resistor - 27,000 Ohm 1/3 Watt
R24,R29		Resistor - 33,000 Ohm 1/3 Watt
R31		Resistor - 47,000 Ohm 1/3 Watt
R16		Resistor - 56,000 Ohm 1/3 Watt
R13		Resistor - 82,000 Ohm 1/3 Watt
R23		Resistor - 100,000 Ohm 1/3 Watt
R8		Resistor - 120,000 Ohm 1/3 Watt
R28		Resistor - 180,000 Ohm 1/3 Watt
R15		Resistor - 220,000 Ohm 1/3 Watt
R32		Resistor - 270,000 Ohm 1/3 Watt
R30		Resistor - 330,000 Ohm 1/3 Watt
R20		Resistor - 560,000 Ohm 1/3 Watt
R4		Resistor - 47 Ohm 1/3 Watt
R5,R7		Resistor - 100 Ohm 1/3 Watt
R11		Resistor - 270 Ohm 1/3 Watt
R33		Resistor - 100 Ohm 1 Watt
R27		Resistor - 3,300 Ohm 1 Watt
R9		Resistor - 8,200 Ohm 1 Watt
R35		Resistor - 820 Ohm 2 Watt
R34	R61414	Resistor - 300 Ohm 5 Watt - Glasohm
	R47262A	Shaft - Dial Drive Assy.
	R44897	Socket - Phono - Tel. - Freq. Mod.
	R16958	Socket - Rectifier
	R17981	Socket - Speaker
	R17987	Socket - Tube - Octal
	R44145	Socket - 2 Prong - AC Rec. Chgr.
	R45956	Socket - Tube - 8 Prong Lock-in
		WHEN ORDERING SPEAKER PARTS ALWAYS GIVE THE PART NUMBER ON THE SPEAKER
	R61260	Speaker - 10" P. M.
	R61036	Cone and Voice Coil
	R45837	Output Transformer
	R18251	Spring - Dial Drive Tension
	R45844	Switch - Tone & Phono - Tel.-Freq.Mod.
	R47191	Switch - Wave
	R45995	Tab - Bass Boost
	R45994	Tab - High Boost
	R45996	Tab - Phono - Tel. - Freq. Mod.
	R42879	Tab - Call Letter Sheets
T1	R45305	Transformer - #1 - I. F.
T2	R45306	Transformer - #2 - I. F.
T4	R45953	Transformer - Power - 60 Cycle
VC	R47259	Tuner - Push Button with Variable Cap.

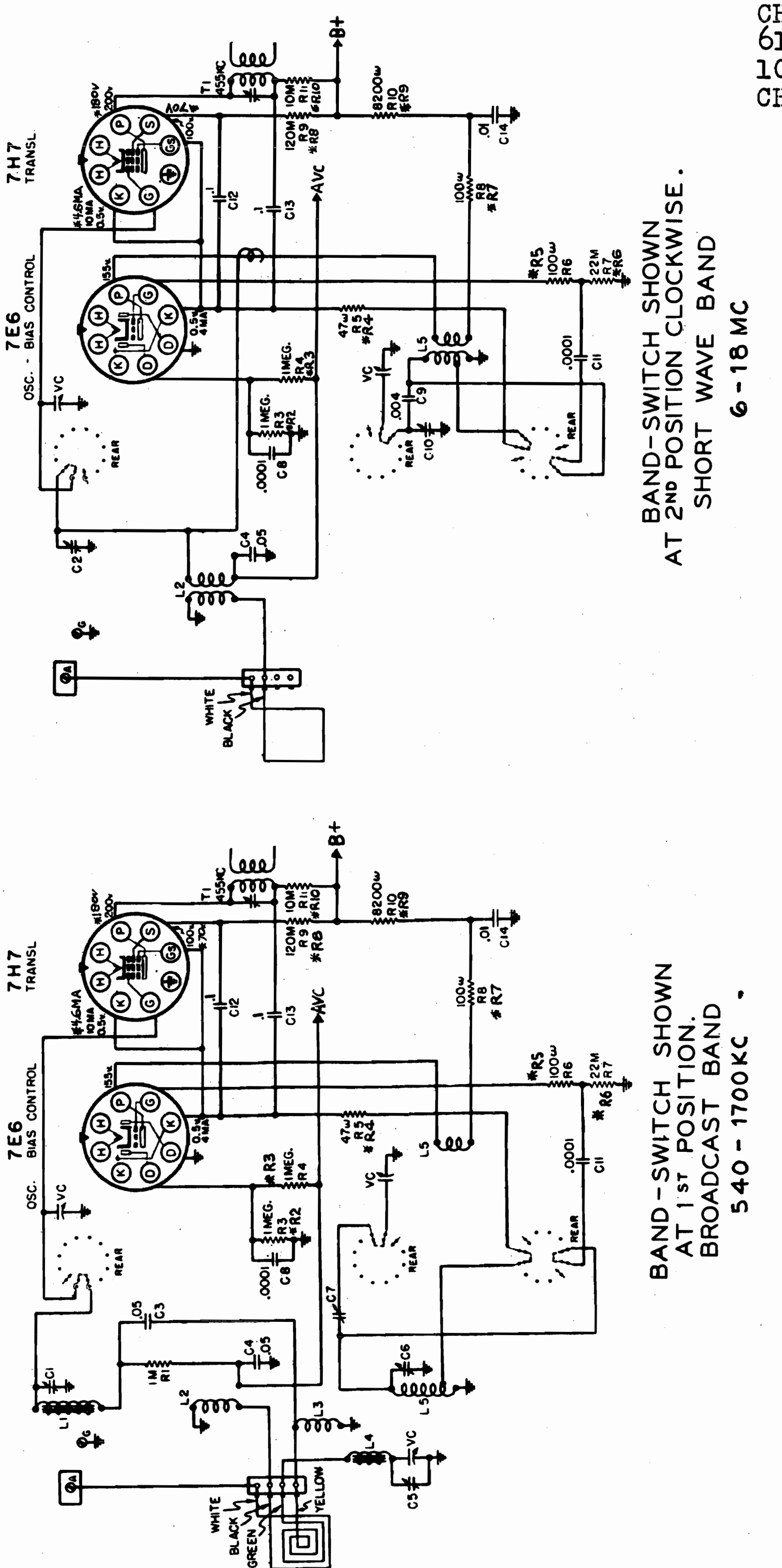


LOCATION OF PARTS UNDER CHASSIS

 RECORD CHANGERS: For 101.662-4E, Model 101.206-1 RCD.CH. 18-6; For 101.662-5F, Model 101.204, RCD.CH. 18-1

SEARS, ROEBUCK & CO.

MODELS 6106, CHASSIS 101.662-2E; 6106A, CHASSIS 101.662-4E; 6111, CHASSIS 101.662-3C; 6111A, CHASSIS 101.662-5F



NOTE:-
ALL ITEMS MARKED WITH AN * APPLY ONLY TO MODELS 6106A & 6111A

MODELS 6106, CHASSIS 101.662-2E; 6106A, CHASSIS 101.662-4E

SEARS, ROEBUCK & CO.

MODELS 6111, CHASSIS 101.662-3C; 6111A, CHASSIS 101.662-5F

ALIGNMENT PROCEDURE

Preliminary:

Output Meter Connection................................Across Loud Speaker Voice Coil
Output Meter Reading to Indicate 50 Milliwatts (Standard Output)............1.2 Volts
Generator Ground Lead Connection...................................Receiver Chassis
Dummy Antenna Value to be in Series with Generator Output.............See Chart Below
Connection of Generator Output Lead...................................See Chart Below
Generator Modulation...30%, 400 Cycles
Position of Volume Control...Fully on
Position of Tone Control...Treble
Position of Pointer with Tuner Fully Closed......Last Line Below 540 Calibration Mark

WAVE BAND SWITCH POSITION	POSITION OF TUNER	GENERATOR FREQUENCY	DUMMY ANTENNA	GENERATOR CONNECTION	ADJUSTMENTS (IN ORDER SHOWN)	TRIMMER FUNCTION
BC	Closed	455 KC	.1 Mfd.	7H7 Transl. Grid	T2, T1	I. F.
BC	Open	1750 KC	.0002 Mfd.	Ant. Terminal	C6	Oscillator
BC	1410	1410 KC	.0002 Mfd.	Ant. Terminal	C5, C1	Ant.,Transl.
BC	600 (rock)	600 KC	.0002 Mfd.	Ant. Terminal	C7	Padder
SW	Open	18.3 MC	400 Ohms	Ant. Terminal	C10	Oscillator
SW	15 (rock)	15 MC	400 Ohms	Ant. Terminal	C2	Transl.

IMPORTANT ALIGNMENT NOTES

The Alignment must be done in the order given.

The Alignment Procedure should be repeated step by step in the original order for greatest accuracy.

Always keep the output power from the generator at its lowest possible value to prevent the AVC of the receiver from interfering with accurate alignment.

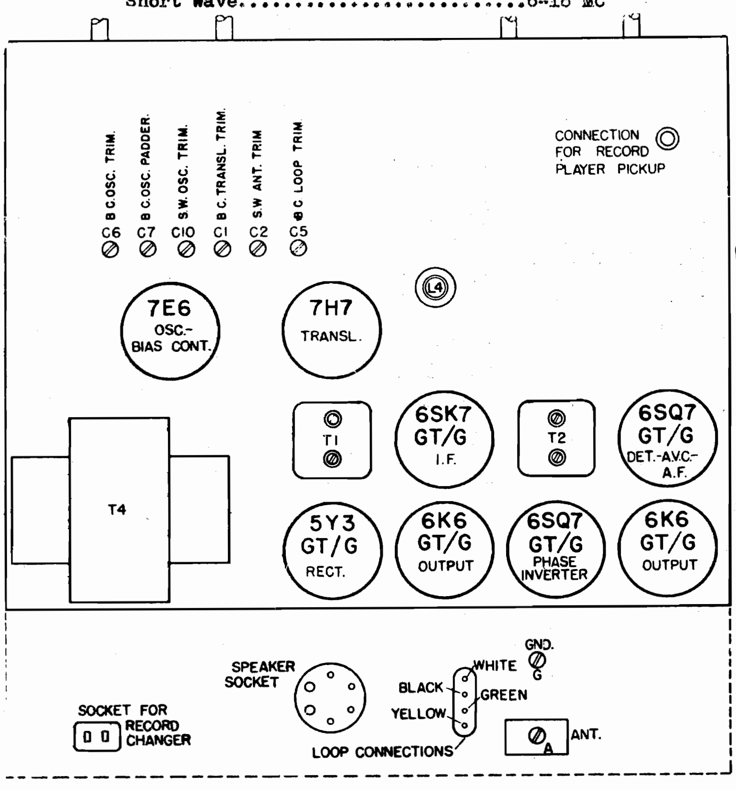
During alignment of the BC Band Padder and the SW Band Translator Trimmers, the Tuner should be rocked through resonance to assure alignment.

Power Output   Undistorted 3.6 Watts   Maximum 6.5 Watts

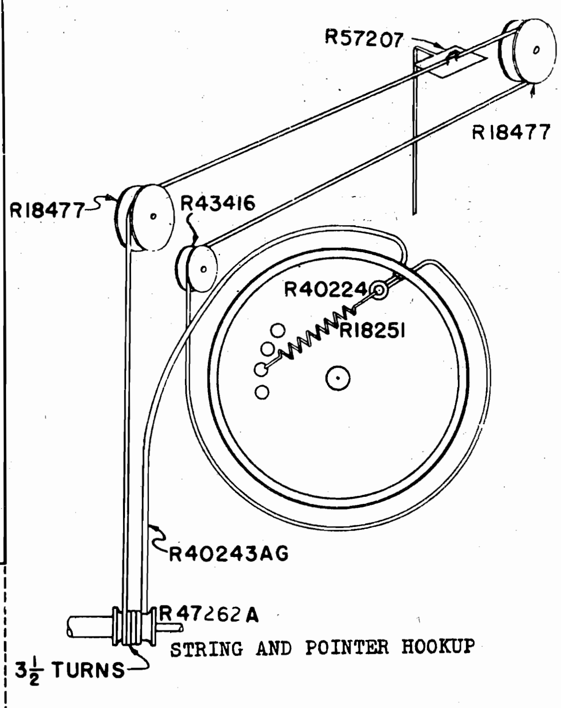
SPECIFICATIONS

Power Supply:
All models available..117 Volts 60 Cycles AC 100 Watts

Frequency Range:
Broadcast.......................540-1700 KC
Short Wave.........................6-18 MC

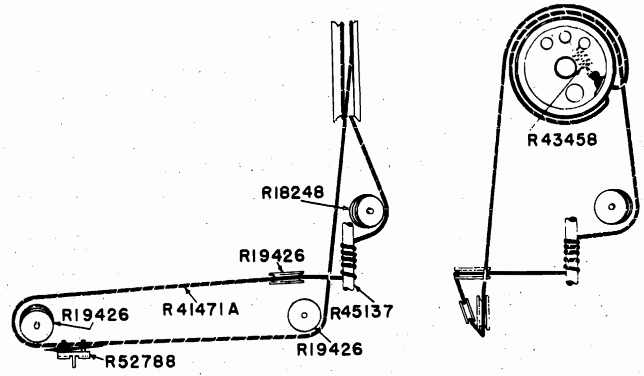


LOCATION OF PARTS ON TOP OF CHASSIS

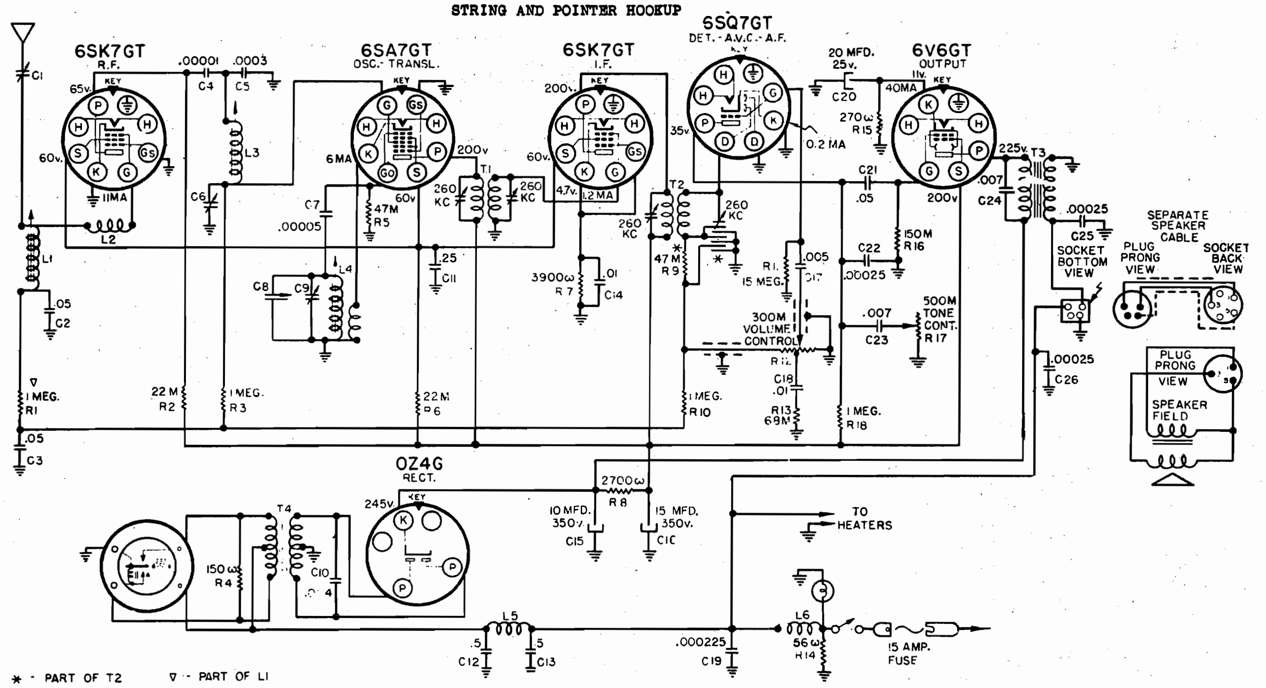


STRING AND POINTER HOOKUP

SEARS, ROEBUCK & CO. MODEL 6285, CHASSIS 101.666A, 101.666-1B



STRING AND POINTER HOOKUP

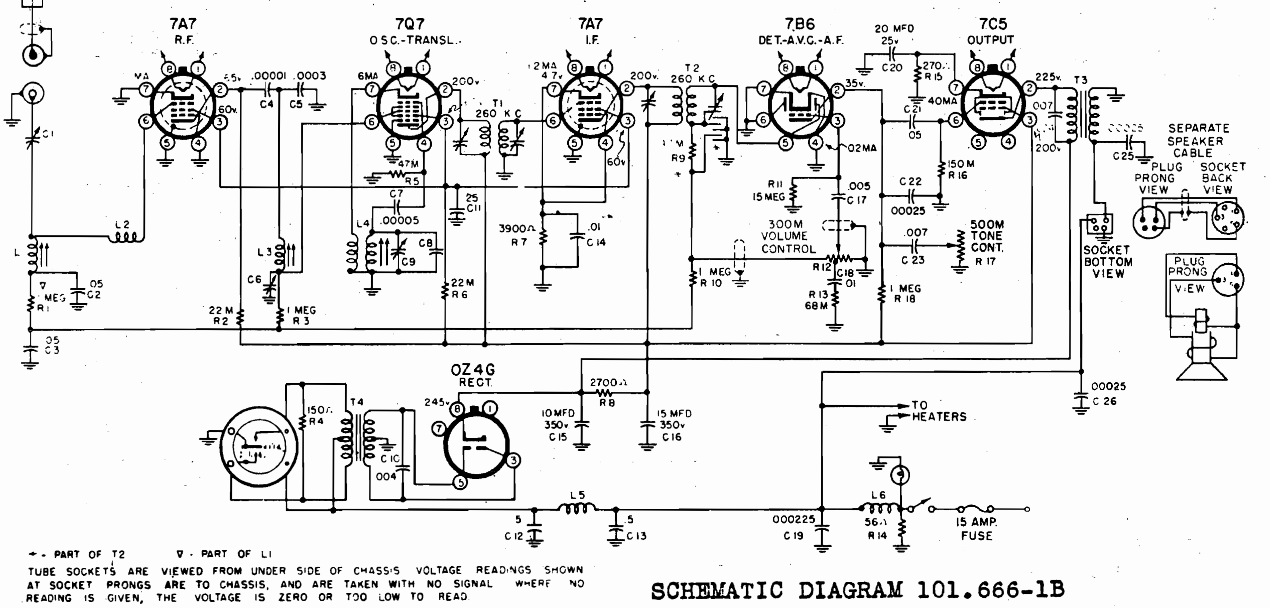


* - PART OF T2   ∇ - PART OF L1

TUBE SOCKETS ARE VIEWED FROM UNDER SIDE OF CHASSIS. VOLTAGE READINGS SHOWN AT SOCKET PRONGS ARE TO CHASSIS, AND ARE TAKEN WITH NO SIGNAL. WHERE NO READING IS GIVEN, THE VOLTAGE IS ZERO OR TOO LOW TO READ.

"A" BATTERY = 6. VOLTS   CURRENT DRAIN = 6.5 AMPERES

SCHEMATIC DIAGRAM 101.666A



* - PART OF T2   ∇ - PART OF L1

TUBE SOCKETS ARE VIEWED FROM UNDER SIDE OF CHASSIS. VOLTAGE READINGS SHOWN AT SOCKET PRONGS ARE TO CHASSIS, AND ARE TAKEN WITH NO SIGNAL. WHERE NO READING IS GIVEN, THE VOLTAGE IS ZERO OR TOO LOW TO READ.

"A" BATTERY = 6. VOLTS   CURRENT DRAIN = 6.5 AMPERES

SCHEMATIC DIAGRAM 101.666-1B

MODEL 6285, CHASSIS 101.666A, 101.666-1B

SEARS, ROEBUCK & CO.

ALIGNMENT PROCEDURE

PRELIMINARY:

Output Meter Connection..................................Across Loud Speaker Voice Coil
Output Meter Reading to Indicate Standard Output of 1.0 Watt...............1.78 Volt
Connection of Signal Generator Ground Lead.........................Receiver Chassis
Connection of Signal Generator Output Lead............................See Chart Below
Dummy Antenna Value to be in Series with Generator Output............See Chart Below
Position of Volume Control...Fully On
Position of Tone Control...Treble

POSITION OF TUNER	GENERATOR FREQUENCY	DUMMY ANTENNA	GENERATOR CONNECTION	TRIMMER ADJUSTMENTS IN ORDER SHOWN	TRIMMER FUNCTION
Closed	260 KC	0.1 Mfd.	Translator Grid	T2,T1	I.F.
Fully Open	1610 KC	.00005 Mfd.	Ant. Connection	C9,C6,C1	Osc.,RF., Ant.
1410 KC	1410 KC	.00005 Mfd.	Ant. Connection	L4,L3,L1	Osc.,RF., Ant.

IMPORTANT ALIGNMENT NOTES

Always keep the output power from the generator at its lowest possible value to prevent the AVC of the receiver from interfering with accurate alignment.

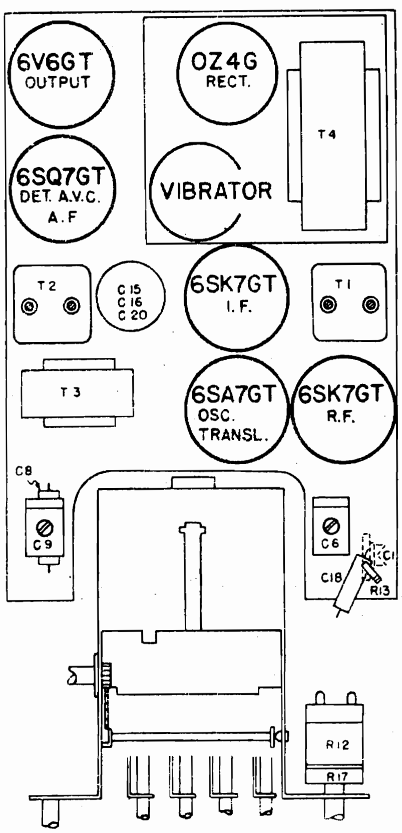
The Alignment Procedure should be repeated in the original order, step by step to insure greater accuracy.

SPECIFICATIONS

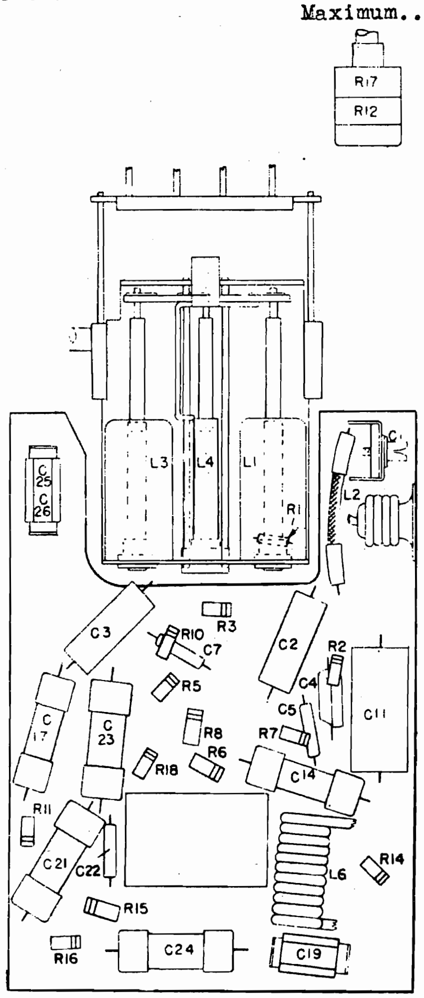
Power Supply:
All models available.....................................6 Volt DC; 6.5 Amperes

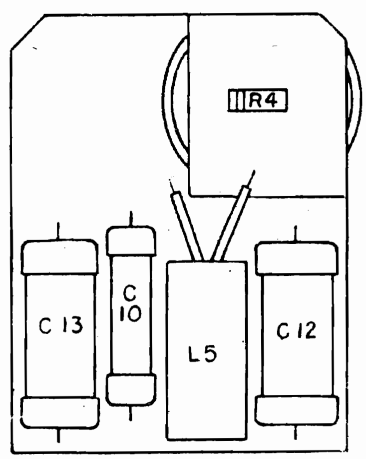
Frequency Range:
Standard Broadcast.......540-1600 KC

Power Output:
Undistorted.............3.5 Watts
Maximum..................5 Watts



LOCATION OF PARTS
BOTTOM COVER REMOVED
101.666A



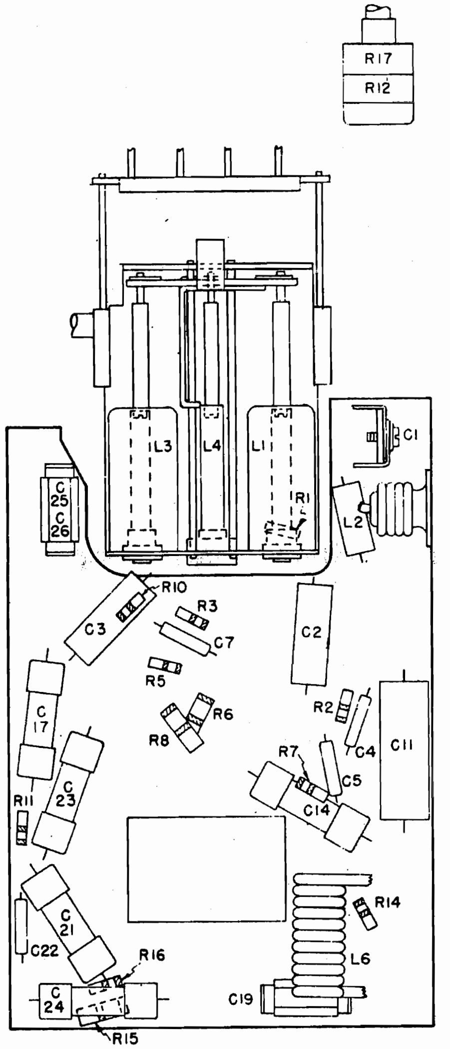


LOCATION OF PARTS
UNDER POWER SUPPLY
101.666A-1B

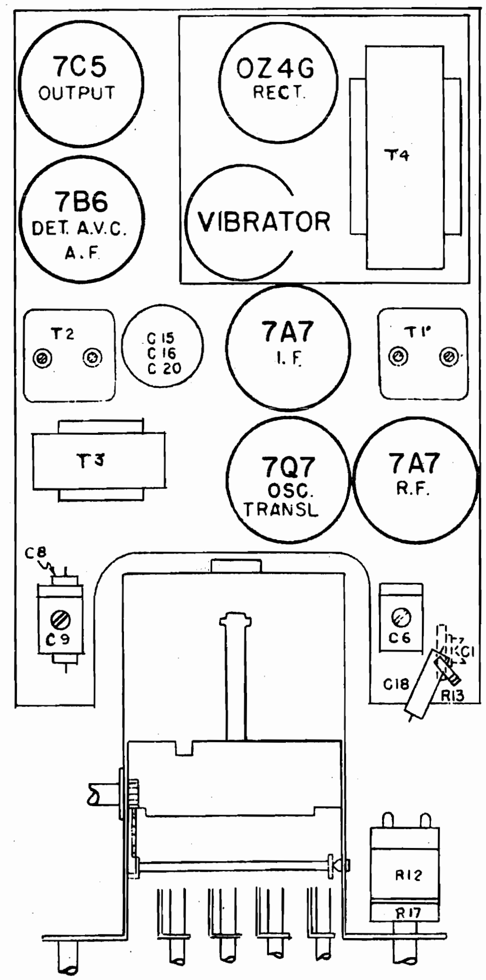
LOCATION OF PARTS UNDER CHASSIS 101.666A

SEARS, ROEBUCK & CO.

MODEL 6285, CHASSIS 101.666A, 101.666-1B



LOCATION OF PARTS UNDER CHASSIS 101.666-1B



LOCATION OF PARTS BOTTOM COVER REMOVED 101.666-1B

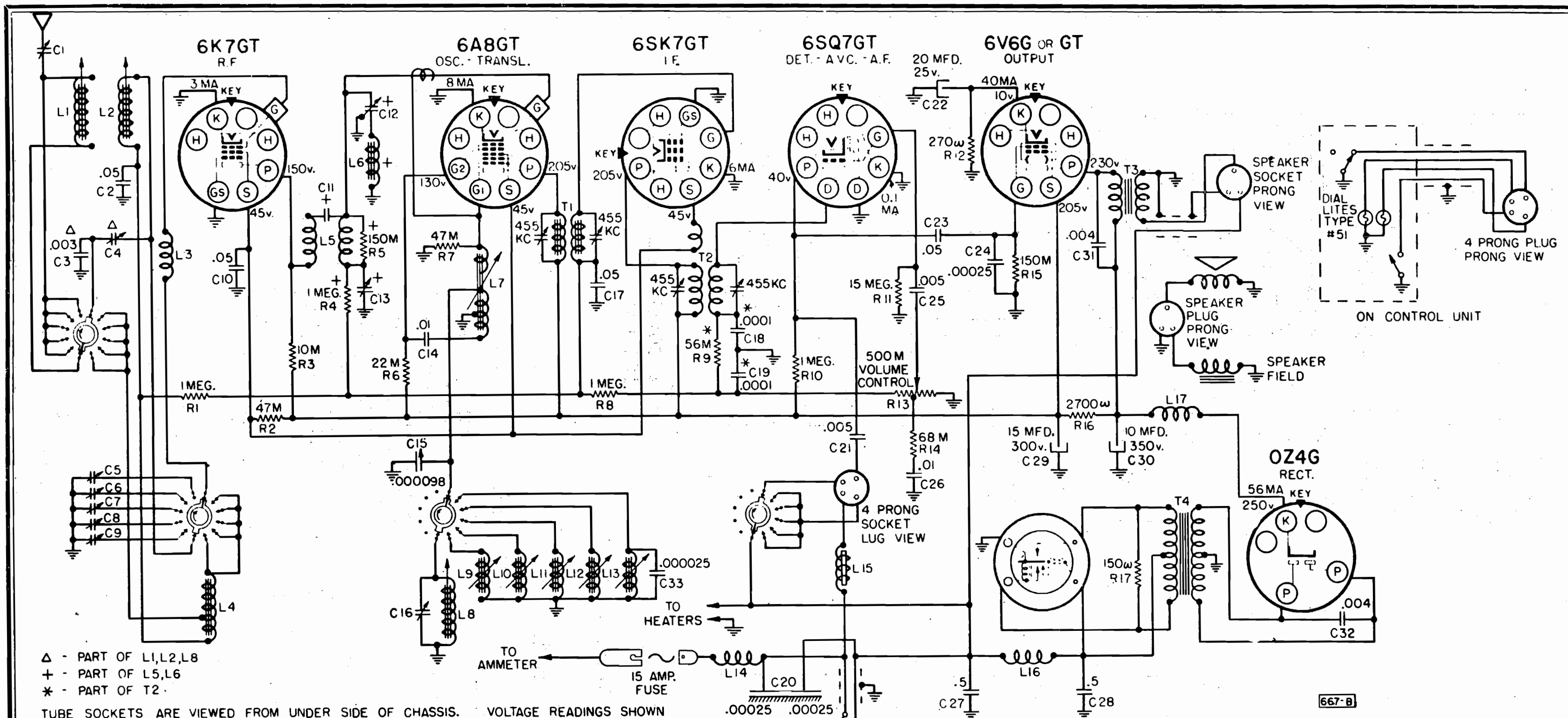
PARTS LIST

SCHEMATIC LOCATION	PART NUMBER	DESCRIPTION
	R43842	Bolt - 3/8-24 x 3/4" Rec. Front Mtg. Brkt.
	R41483	Bolt - 5/16-24 x 2" Rec. Rear Mtg. Brkt.
	R45265	Bolt - Carriage - 10-24 x 3/4 Speaker Mtg.Brkt.
	R45817	Bracket - Speaker Mtg. - Lower
	R45228	Bracket - Speaker Mtg. - Upper
	R52800	Bracket - Rec. Mtg. - Front L.H. (101.666A-1B)
	R52801	Bracket - Rec. Mtg. - Front R.H. (101.666A-1B)
	R43870A	Bracket Assembly - Rear Mtg.
	R16149	Capacitor - Ammeter
	R16150	Capacitor - Generator
C15,C16,C20	R45167	Capacitor - Electrolytic - 10 Mfd. 350 V., 15 Mfd. 350 V., 20 Mfd. 25 V.
C1	R43793	Capacitor - Trimmer - Antenna
C6	R43694	Capacitor - Trimmer - (101.666A-1B)
C9	R45518	Capacitor - Trimmer - Oscillator
C12,C13		Capacitor - .5 Mfd. 100 V.
C11		Capacitor - .25 Mfd. 200 V.
C2,C3,C21		Capacitor - .05 Mfd. 200 V.
C14		Capacitor - .01 Mfd. 400 V.
C18		Capacitor - .01 Mfd. 100 V.
C23,C24		Capacitor - .007 Mfd. 600 V.
C17		Capacitor - .005 Mfd. 200 V.
C10		Capacitor - .004 Mfd. 1500 V.
C5		Capacitor - .0003 Mfd. Mica
C22		Capacitor - .00025 Mfd. Mica
C19		Capacitor - .000225 Mfd. Mica
C8	R45851	Capacitor - .000165 Mfd. Temp. Compensating
C25,C26		Capacitor - .00025 Mfd. Dual - Mica
C7		Capacitor - .00005 Mfd. Mica
C4		Capacitor - .00001 Mfd. Mica
	R52802	Case - Speaker (101.666A-1B)
	R9741	Clip - Ammeter
	R45271	Clip - Dial Lamp Socket
L2	R48820	Coil - Antenna Choke (101.666A-1B)
L5	R9044B	Coil - Hash Choke (101.666A-1B)
L6	R5220CH	Coil - Spark Choke (101.666A-1B)
L1,L3,L4	R45217	Coils - Perm. Unit - Less Tuner (101.666A-1B)
L1,L3,L4	R52790	Coils & Tuner Assembly (101.666A)
L1,L3,L4	R61575	Coils & Tuner Assembly (101.666-1B)
R12,R17	R45139	Control - On-Off - Volume & Tone
	R41471	Cord - Dial Drive - 40"
	R52792	Dial - Station (101.666A-1B)
	R52827	Escutcheon - (101.666A-1B)
		Fuse - (Type 3 AG - 15 Amp - 25 V.)
	R19418	Knob - Tone

SCHEMATIC LOCATION	PART NUMBER	DESCRIPTION
	R19455	Knob - Dummy
	R52793	Knob - Tuning (101.666A-1B)
		Lamp - Dial - Mazda Type #44
	R9578AA	Lead - "A" Connector Assembly
	R59098	Leaflet - Instruction (101.666A)
	R54487	Leaflet - Instruction (101.666-1B)
	R45282	Nut - Wing 10-24
	R43969	Nut - Wing 6-32
	R52788	Pointer - Dial (101.666A-1B)
	R19426	Pulley - Wood
	R43423	Pulley - Wood
	R52785	Push Button (101.666A-1B)
R14		Resistor - 56 Ohm - 1/3 Watt
R4		Resistor - 150 Ohm - 1 Watt
R15		Resistor - 270 Ohm - 1 Watt
R8		Resistor - 2,700 Ohm - 1 Watt
R7		Resistor - 3,900 Ohm - 1/3 Watt
R6		Resistor - 22,000 Ohm - 1 Watt
R2		Resistor - 22,000 Ohm - 1/2 Watt
R5		Resistor - 47,000 Ohm - 1/3 Watt
R13		Resistor - 68,000 Ohm - 1/3 Watt
R16		Resistor - 150,000 Ohm - 1/3 Watt
R1,R3,R10,R18		Resistor - 1 Megohm - 1/3 Watt
R11		Resistor - 15 Megohm - 1/3 Watt
	R43407	Ring - Rubber - Power Supply Case
	R41612	Ring - Rubber - Vibrator
	R45136	Shaft - Front Drive
	R45137A	Shaft - Rear Drive
	R43701	Socket - Rectifier
	R17627	Socket - Speaker
	R41542	Socket - Tube - 8 Prong Octal (101.666A)
	R42477	Socket - Tube - 8 Prong Lock-in (101.666-1B)
	R41111	Socket - Vibrator
	R61206	Speaker - 7" P.M. (101.666A-1B)
	R43458	Spring - Dial Cord
	R42274	Suppressor - Distributor
T1	R45168	Transformer - I.F. #1
T2	R45169	Transformer - I.F. #2
T4	R45162	Transformer - Power
T3	R45166	Transformer - Output (101.666A)
T3	R62510	Transformer - Output (101.666-1B)
	R52804	Tabs - Station Call Letter (101.666A-1B)
	R52787	Tuner - Push Button - Less Coils (101.666A)
	R61574	Tuner - Push Button - Less Coils (101.666-1B)
	R45160	Vibrator

MODEL 6290,
CHASSIS 101.667B

SEARS, ROEBUCK & CO.



Δ - PART OF L1,L2,L8
+ - PART OF L5,L6
* - PART OF T2

TUBE SOCKETS ARE VIEWED FROM UNDER SIDE OF CHASSIS. VOLTAGE READINGS SHOWN AT SOCKET PRONGS ARE TO CHASSIS, AND ARE TAKEN WITH NO SIGNAL. WHERE NO READING IS GIVEN, THE VOLTAGE IS ZERO OR TOO LOW TO READ.

"A" BATTERY = 6. VOLTS CURRENT DRAIN = 7.2 AMPERES

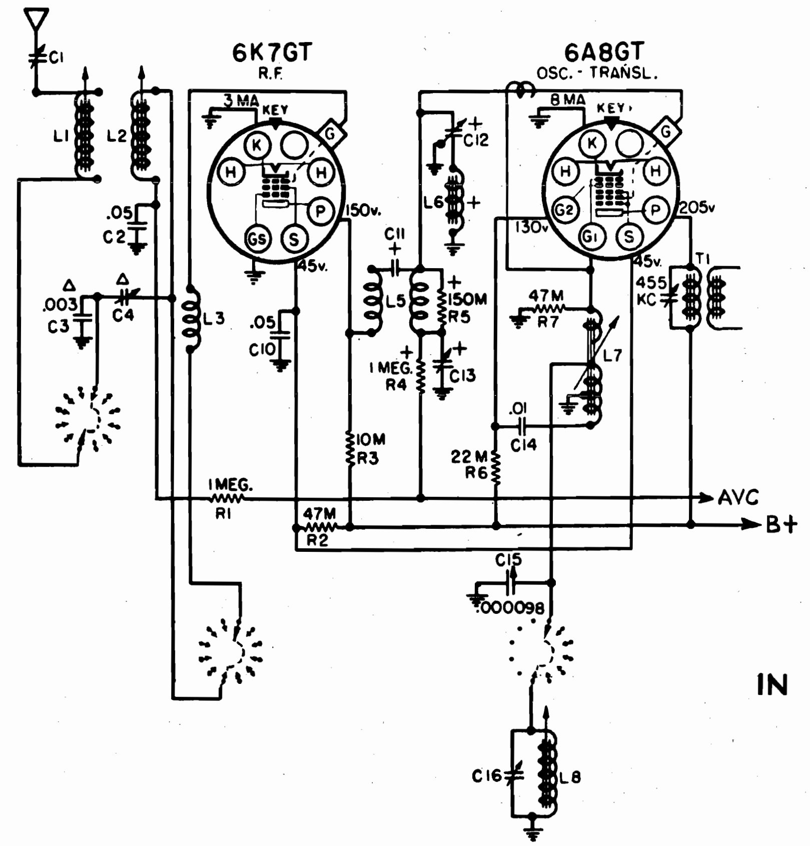
SCHEMATIC DIAGRAM FOR 101.667B

PARTS LIST

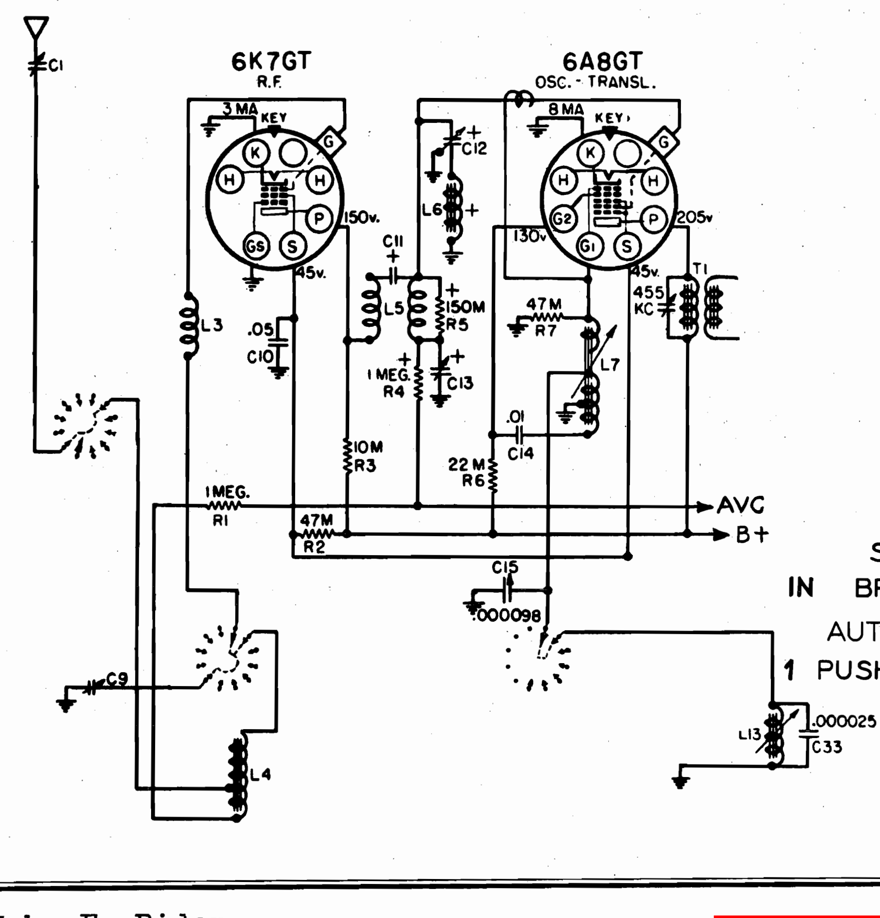
SCHEMATIC LOCATION	PART NUMBER	DESCRIPTION
	R45265	Bolt - Carriage - 10-24 x 3/4"
	R45228	Bracket - Upper Speaker Mtg.
	R45817	Bracket - Lower Speaker Mtg.
	R42306	Cable - Flex. Dr. - Volume Control
	R42373	Cable - Flex. Dr. - Volume Control - Extra Length - 33"
	R42307	Cable - Flex. Dr. - Tuning Control
	R42374	Cable - Flex. Dr. - Tuning Control - Extra Length - 32"
	R45020	Cable - Speaker
	R18150	Clip - Grid
	R9741	Clip - Ammeter
L4	R45112	Coil - Antenna
L3	R48820	Coil - Antenna Choke
R4,R5,L5,L6 C11,C12,C13	R45206	Coil - Untuned R.F.
L7	R47294	Coil - Oscillator
C5,C6,C7,C8, C9,L9,L10,L11 L12,L13	R45097	Coils - Perm. & Capacitor Assembly
C3,C4,C16 L1,L2,L8	R45017	Coil - Ant. - Osc., Manual Tuning
L16	R9044G	Coil - Hash Choke
L17	R5114CM	Coil - Hash Choke
	R16149	Capacitor - Ammeter
	R16150	Capacitor - Generator
C22,C29,C30	R42243	Capacitor - Electrolytic - 20 Mfd. 25 V., 15 Mfd. 300 V., 10 Mfd. 350 V.
C1	R45237	Capacitor - Trimmer
C27,C28		Capacitor - .5 Mfd. 100 V.
C2,C10,C17, C23		Capacitor - .05 Mfd. 200 V.
C14		Capacitor - .01 Mfd. 400 V.
C26		Capacitor - .01 Mfd. 100 V.
C21		Capacitor - .005 Mfd. 400 V.
C25		Capacitor - .005 Mfd. 400 V.
C31		Capacitor - .004 Mfd. 600 V.
C32		Capacitor - .004 Mfd. 1500 V.
C24		Capacitor - .00025 Mfd. Mica
C15	R47295	Capacitor - .000098 Mfd. - Temp. Compensator
C20		Capacitor - .00025 Mica - Dual
R13	R42244	Control - On-Off & Volume
	R42490	Control - Push Button Unit
	R42491	Cable & Plug Assembly
	R42492	Switch - Tone
	R42493	Switch - Station Selector
		Lamp - Dial, Mazda Type #51
	R42847	Drum - Call Letter
	R42848	Stud - Call Letter Drum
	R42849	Socket - Lamp
	R42701	Tabs - Numeral
	R45221	Control - Manual Tuning
	R40079	Control - Manual Volume
	R52816	Envelope - Instruction (With All Contents)
	R10292	Fuse - 15 Amp. - 25 Volt
	R52812	Grille - Case & Screen Assembly
	R15636	Insulator - Fuse
	R54504	Leaflet - Instruction
	R45321	Nut - Wing - 1/4-20
	R45282	Nut - Wing - #10-24
	R45205A	Relay & Switch Assembly
R17		Resistor - 150 Ohm - 1 Watt
R12		Resistor - 270 Ohm - 1 Watt
R16		Resistor - 2700 Ohm - 1 Watt
R3		Resistor - 10,000 Ohm - 1/3 Watt
R6		Resistor - 22,000 Ohm - 1/2 Watt
R7		Resistor - 47,000 Ohm - 1/2 Watt
R2		Resistor - 47,000 Ohm - 1 Watt
R14		Resistor - 68,000 Ohm - 1/3 Watt
R15		Resistor - 150,000 Ohm - 1/3 Watt
R1,R8,R10		Resistor - 1 Megohm - 1/3 Watt
R11		Resistor - 15 Megohms - 1/3 Watt
	R45226	Screen - Speaker
	R20539	Socket - Rectifier
	R42224	Socket - Control Plug
	R18860	Socket - Tube - 8 Prong Octal
	R19321	Socket - Vibrator
	R45016	Speaker - 7" Dynamic
	R61409	Speaker - 7" P.M.
	R19157	Strap - Ground
	R11534	Stud - Case Mounting
	R43954	Stud - Speaker Mounting
	R42274	Suppressor - Distributor
T1	R45018	Transformer - I.F. #1
T2	R45019	Transformer - I.F. #2
T4	R45100	Transformer - Power
T3	R45079	Transformer - Output
	R45160	Vibrator

SEARS, ROEBUCK & CO.

MODEL 6290,
CHASSIS 101.667B



SWITCH SHOWN
IN BROADCAST POSITION.
MANUAL TUNING



SWITCH SHOWN
IN BROADCAST POSITION
AUTOMATIC TUNING
1 PUSH BUTTON DEPRESSED

MODEL 6290,
CHASSIS 101.667B

SEARS, ROEBUCK & CO.

GENERAL INFORMATION AND SERVICE HINTS

MATCHING THE ANTENNA:

Before proceeding with this adjustment the receiver should be left on for about 15 minutes to warm up.

An adjusting screw, accessible to a screw driver through a hole in the bottom cover of the case, is provided to match the receiver to the car antenna. With the receiver adjusted for "DIAL" tuning, use the Station Selector knob to tune in a very weak station at about 1400 kilocycles, with the volume control fully on. Then turn the adjusting screw to the point affecting maximum volume.

THE PUSH BUTTON TUNING MECHANISM:

Preselection of push button tuned stations is accomplished by settings of the iron cores in the oscillator coils and settings of the trimmer condensers across the antenna coil. The proper coils are selected by a switch which is rotated one step at a time by means of a solenoid, controlled by the tuning push button. Pushing the button also mechanically rotates the station call letter drum.

Each button can be set only to a station within a certain frequency range as follows:

STATION	FREQUENCY RANGE
#1	535 to 920 Kc
#2	630 to 1070 Kc
#3	690 to 1170 Kc
#4	850 to 1450 Kc
#5	950 to 1610 Kc

To set up the mechanism, insert the call letter tabs in their proper frequency order in the call letter drum. The drum is accessible by removing the snap-in button at the top of the push button unit before mounting the unit. One of the positions is for manual tuning. When this position is reached, the manual tuning dial will become illuminated and the receiver can be tuned manually.

Stations are set up by removing the front grille of the receiver, exposing the station tuning screws. The adjusting screws are labeled. The Osc. screw must be adjusted first; then the ANT. screw. Then repeat the two adjustments.

TO SYNCHRONIZE THE MECHANISM, PUSH THE TUNING BUTTON UNTIL THE MANUAL TUNING DIAL BECOMES ILLUMINATED. REMOVE THE PUSH BUTTON CABLE FROM ITS SOCKET IN THE SIDE OF THE RECEIVER CASE AND THEN PUSH THE BUTTON UNTIL THE "DIAL" TAB COMES INTO VIEW. THEN REINSERT THE CABLE PLUG.

Under certain conditions the mechanism may fall out of synchronism if the button is not pushed all the way in and completely released when operating it. The user should be instructed accordingly.

ALIGNMENT PROCEDURE

PRELIMINARY:

Output Meter Connection................................Across Loud Speaker Voice Coil
Output Meter Reading to Indicate Standard Output of 1.0 Watt................1.78 Volt
Connection of Signal Generator Ground Lead..........................Receiver Chassis
Connection of Signal Generator Output Lead...........................See Chart Below
Dummy Antenna Value to be in Series with Generator Output.............See Chart Below
Position of Volume Control..Fully On
Position of Tone Control..Treble

POSITION OF TUNER	GENERATOR FREQUENCY	DUMMY ANTENNA	GENERATOR CONNECTION	TRIMMER ADJUSTMENTS IN ORDER SHOWN	TRIMMER FUNCTION
Closed	455 KC	0.1 Mfd.	Translator Grid	T2, T1	I.F.
Closed	455 KC	0.1 Mfd.	R. F. Grid	C12	I.F. Trap
1610 KC	1610 KC	.00005 Mfd.	Ant. Connection	C16, C4, C1	Osc.,R.F., Ant.
1610 KC	2520 KC	.00005 Mfd.	Antenna	C13	Image Trap
1410 KC	1410 KC	.00005 Mfd.	Antenna	L8, L2, L1	Osc.,R.F., Ant.
600 KC	600 KC	.00005 Mfd.	Antenna	L7	Osc. Padder

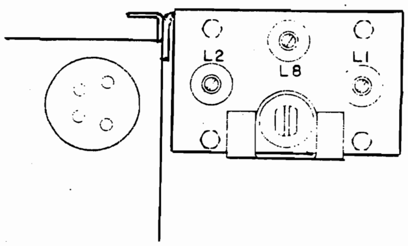
SEARS, ROEBUCK & CO.

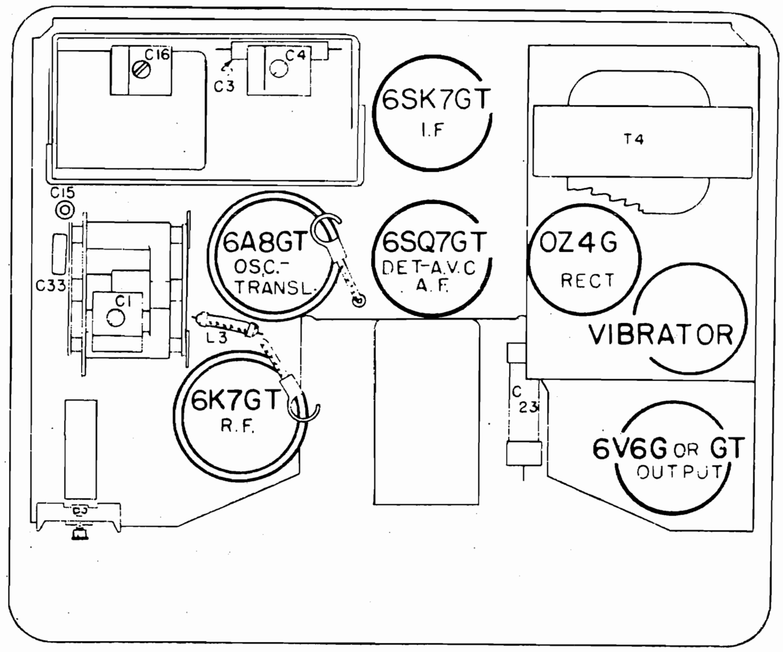
MODEL 6290,
CHASSIS 101.667B

IMPORTANT ALIGNMENT NOTES

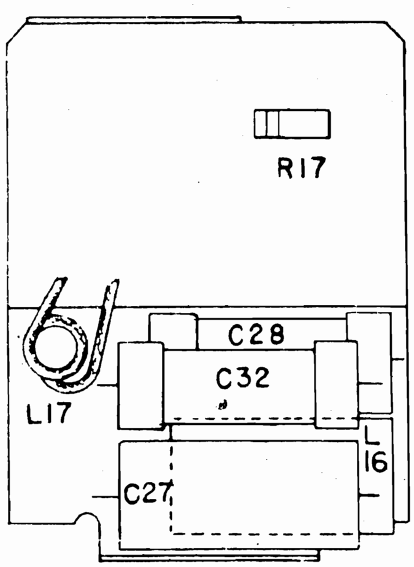
Always keep the output power from the generator at its lowest possible value to prevent the AVC of the receiver from interfering with accurate alignment.

The Alignment Procedure should be repeated in the original order, step by step to insure greater accuracy.

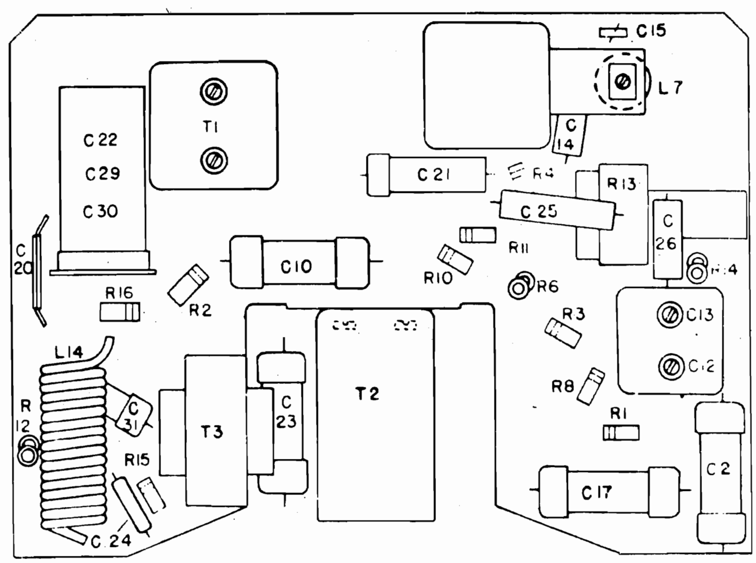




LOCATION OF PARTS - BOTTOM COVER REMOVED



PARTS UNDER POWER SUPPLY



LOCATION OF PARTS - TOP COVER REMOVED

SPECIFICATIONS

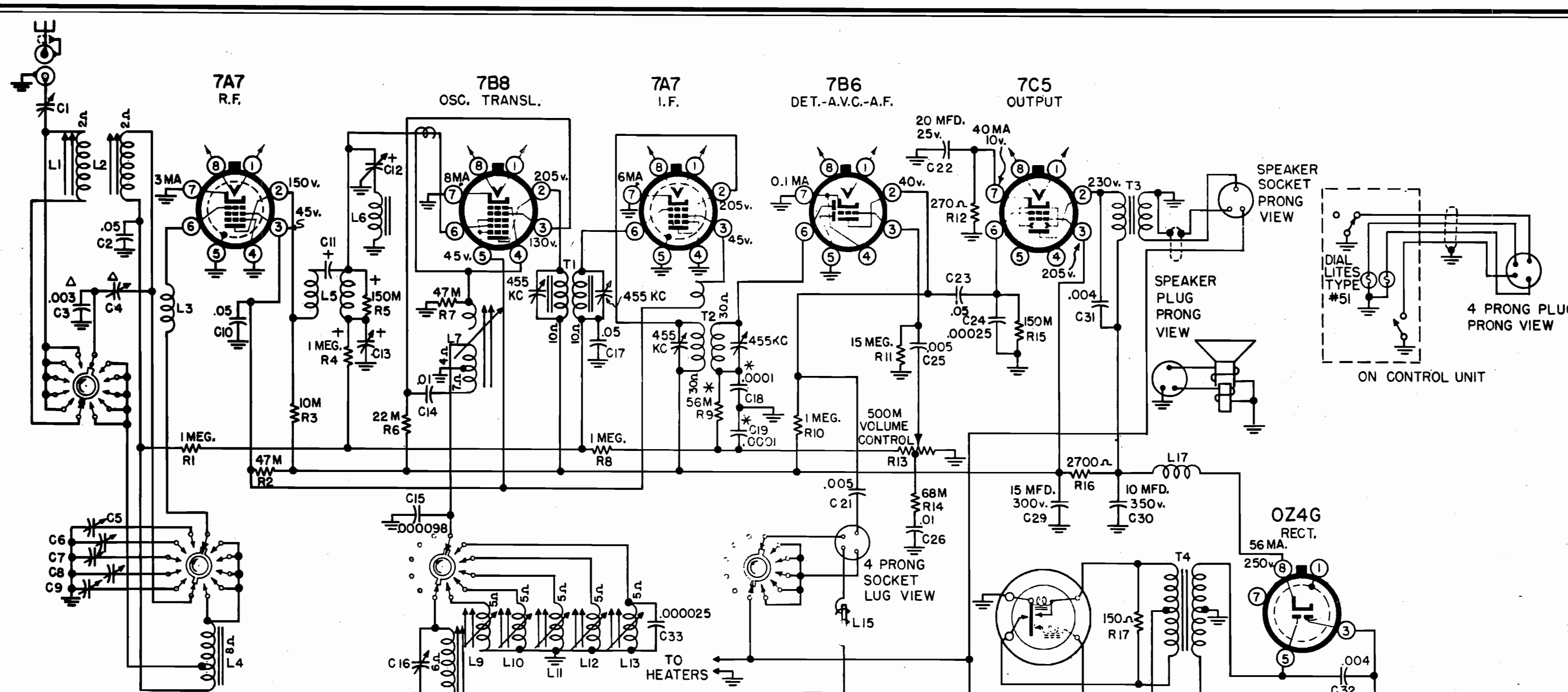
Power Supply:
All models available..6 Volt DC; 6.9 Amperes

Frequency Range:
Standard Broadcast.......540-1600 KC

Power Output:
Undistorted............3.75 Watts
Maximum................5.65 Watts

MODEL 6290,
CHASSIS 101.667-1B

SEARS, ROEBUCK & CO.



Δ - PART OF L1,L2,L8
+ - PART OF L5,L6
✱ - PART OF T2

TUBE SOCKETS ARE VIEWED FROM UNDER SIDE OF CHASSIS. VOLTAGE READINGS SHOWN AT SOCKET PRONGS ARE TO CHASSIS, AND ARE TAKEN WITH NO SIGNAL. WHERE NO READING IS GIVEN, THE VOLTAGE IS ZERO OR TOO LOW TO READ.
VOLTAGE READINGS ARE TAKEN WITH A VOLTMETER HAVING A RESISTANCE OF ONE THOUSAND OHMS PER VOLT.
SYMBOLS ARE IN ACCORDANCE WITH A.S.A. STANDARDS Z 32.5 AND Z 32.10 UNLESS OTHERWISE STATED.
"A" BATTERY = 6. VOLTS CURRENT DRAIN = 7.2 AMPERES

POWER SUPPLY

All models rated at 6 Volts DC; 6.9 Amperes.

TUNING

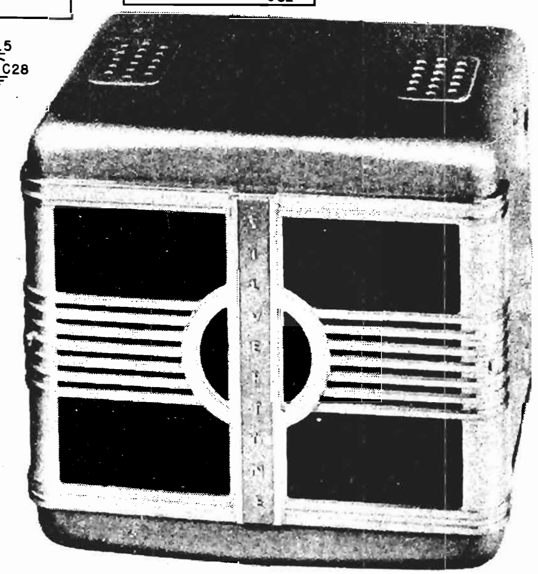
Manual and 5 electrical push buttons.

FREQUENCY RANGE

540 - 1600 Kc.

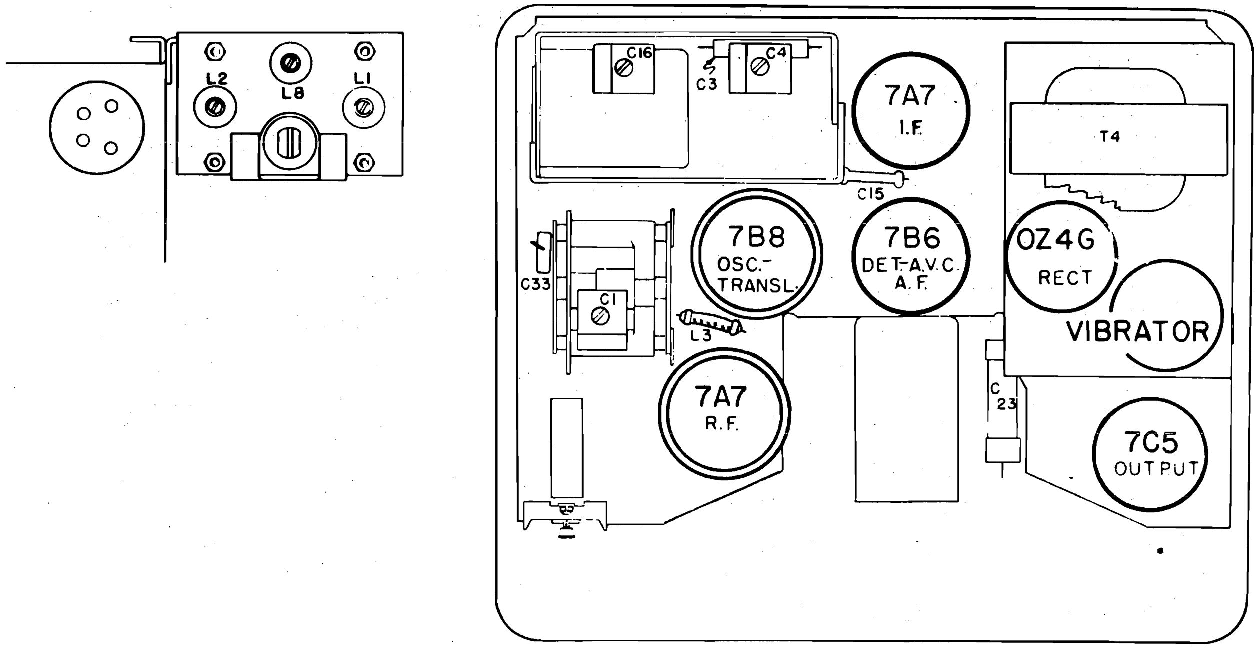
ANTENNA CAPACITY

50 - 90 mmfd.

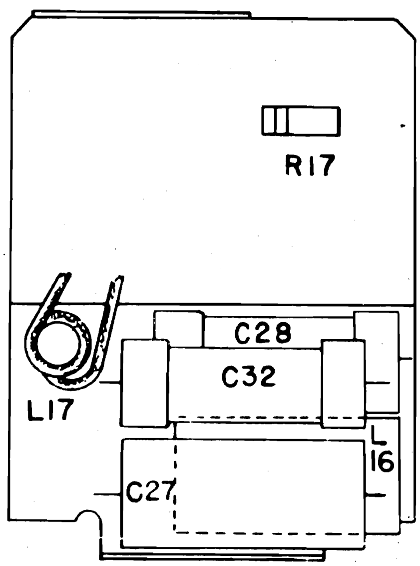


SEARS, ROEBUCK & CO.

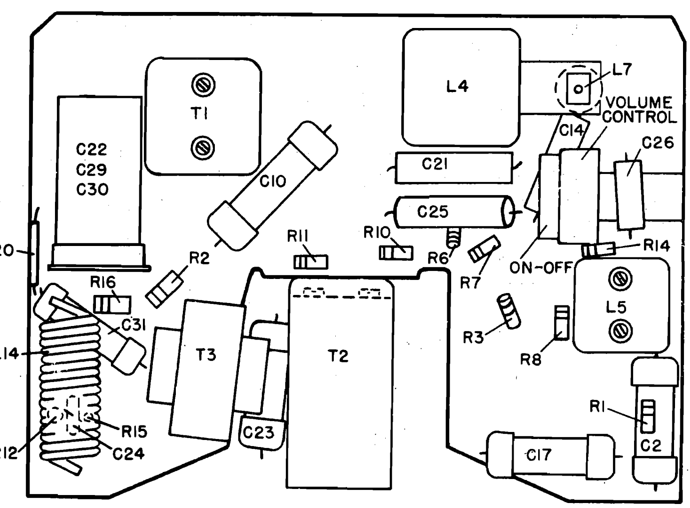
MODEL 6290,
CHASSIS 101.667-1B



LOCATION OF PARTS - BOTTOM COVER REMOVED



LOCATION OF PARTS
UNDER POWER SUPPLY



LOCATION OF PARTS - TOP COVER REMOVED

MATCHING THE ANTENNA:

Before proceeding with this adjustment the receiver should be left on for about 15 minutes to warm up.

An adjusting screw, accessible with a screw driver through the hole in the bottom cover of the case, is provided to match the receiver to the car antenna. With the receiver adjusted for "DIAL" tuning, use the Station Selector knob to tune in a very weak station at about 1400 kilocycles, with the volume control fully on. Then turn the adjusting screw to the point affecting maximum volume.

MODEL 6290,
CHASSIS 101.667-1B

SEARS, ROEBUCK & CO.

ALIGNMENT PROCEDURE

PRELIMINARY

Output Meter Connection . . . . .Across Loud Speaker Voice Coil
Output Meter Reading to Indicate Standard Output of 1.0 Watt . . . . .1.78 Volt
Connection of Signal Generator Ground Lead. . . . . Receiver Chassis
Connection of Signal Generator Output Lead . . . . See Chart Below
Dummy Antenna Value to be in Series with Generator Output . . . . See Chart Below
Position of Volume Control . . . . .Fully On
Position of Tone Control. . . . . Treble

POSITION OF TUNER	GENERATOR FREQUENCY	DUMMY ANTENNA	GENERATOR CONNECTION	TRIMMER ADJUSTMENTS IN ORDER SHOWN	TRIMMER FUNCTION
Closed	455 KC	0.1 Mfd.	Translator Grid	T2, T1	I.F.
Closed	455 KC	0.1 Mfd.	R. F. Grid	C12 *	I.F. Trap
1610 KC	1610 KC	.00005 Mfd.	Antenna	C16, C4, C1	Osc.,R.F., Ant.
1610 KC	2520 KC	.00005 Mfd.	Antenna	C13 *	Image Trap
1410 KC	1410 KC	.00005 Mfd.	Antenna	L8, L2, L1	Osc.,R.F., Ant.
600 KC	600 KC	.00005 Mfd.	Antenna	L7	Osc. Padder

IMPORTANT ALIGNMENT NOTES

Always keep the output power from the generator at its lowest possible value to prevent the AVC of the receiver from interfering with accurate alignment.

The alignment procedure should be repeated in the original order, step by step to insure greater accuracy.

* The signal generator should be adjusted for high output and the trimmer should be adjusted for minimum response.

THE PUSH BUTTON TUNING MECHANISM:

Preselection of push button tuned stations is accomplished by settings of the iron cores in the oscillator coils and settings of the trimmer condensers across the antenna coil. The proper coils are selected by a switch which is rotated one step at a time by means of a solenoid, controlled by the tuning push button. Pushing the button also mechanically rotates the station call letter drum.

Each button can be set to a station within a certain frequency range as follows:

STATION	FREQUENCY RANGE
#1	535 to 920 Kc
#2	630 to 1070 Kc
#3	690 to 1170 Kc
#4	850 to 1450 Kc
#5	950 to 1610 Kc

To set up the mechanism, insert the call letter tabs in their proper frequency order in the call letter drum. The drum is accessible by removing the snap-in button at the top of the push button unit before mounting the unit. One of the positions is for manual tuning. When this position is reached, the manual tuning dial will become illuminated and the receiver can be tuned manually.

Stations are set up by removing the front grille of the receiver, exposing the station tuning screws. The adjusting screws are labeled. The Osc. screw must be adjusted first; then the ANT. screw. Then repeat the two adjustments.

TO SYNCHRONIZE THE MECHANISM, PUSH THE TUNING BUTTON UNTIL THE MANUAL TUNING DIAL BECOMES ILLUMINATED. REMOVE THE PUSH BUTTON CABLE FROM ITS SOCKET IN THE SIDE OF THE RECEIVER CASE AND THEN PUSH THE BUTTON UNTIL THE "DIAL" TAB COMES INTO VIEW. THEN REINSERT THE CABLE PLUG.

Under certain conditions the mechanism may fall out of synchronism if the button is not pushed all the way in and completely released when operating it. The user should be instructed accordingly.

SEARS, ROEBUCK & CO.

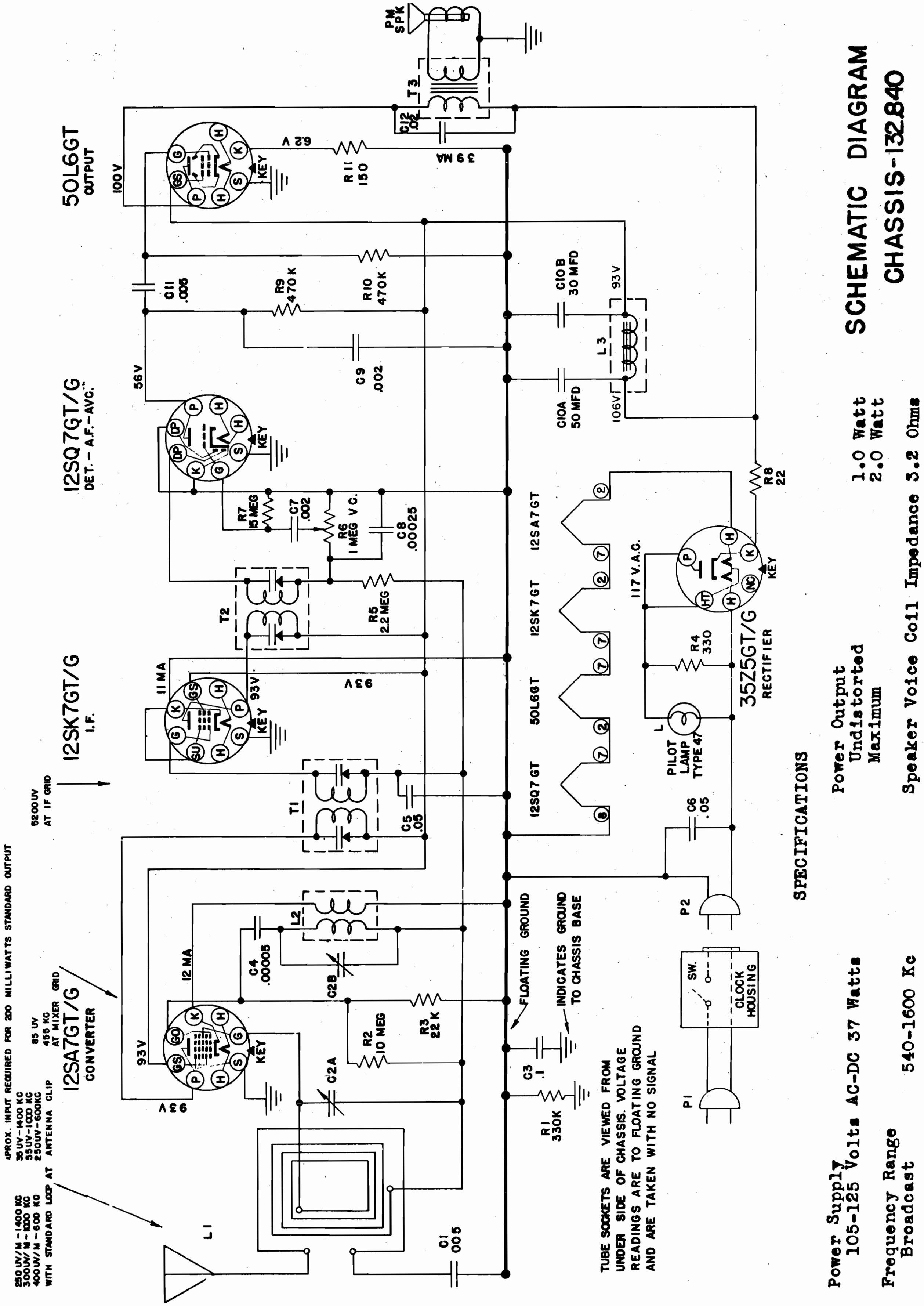
MODEL 6290,
CHASSIS 101.667-1B

SCHEMATIC LOCATION	PART NUMBER	DESCRIPTION
	R42490	Control - Push Button Unit
	R42491	Cable & Plug Assembly (Part of R42490)
	R42492	Switch - Tone (Part of R42490)
	R45221	Control - Manual Tuning
	R40079	Control - Manual Volume
	R42847	Drum - Call Letter
	R10292	Fuse - 15 Amp. - 25 V.
	R52812	Grille - Case & Screen Assembly
		Lamp - Dial - Mazda, Type #51
	R64093	Leaflet - Instruction
	R45321	Nut - Wing - 1/4-20
	R45282	Nut - Wing - #10-24
	R45205	Relay & Switch Assembly
R17		Resistor - 150 Ohm - 1 W.
R12		Resistor - 270 Ohm - 1 W.
R16		Resistor - 2700 Ohm - 1 W.
R3		Resistor - 10,000 Ohm - 1/2 W.
R6		Resistor - 22,000 Ohm - 1/2 W.
R7		Resistor - 47,000 Ohm - 1/2 W.
R2		Resistor - 47,000 Ohm - 1 W.
R14		Resistor - 68,000 Ohm - 1/2 W.
R15		Resistor - 150,000 Ohm - 1/2 W.
R1,R8,R10		Resistor - 1 Megohm - 1/2 W.
R11		Resistor - 15 Megohm - 1/2 W.
	R45226	Screen - Speaker
	R42849	Socket - Lamp
	R20539	Socket - Rectifier
	R42224	Socket - Control Plug
	R62871	Socket - 8 Prong Lock-in
	R19321	Socket - Vibrator
	R57193	Shield - Tube
	R61409	Speaker - 7'' P.M.
	R19157	Strap - Ground
	R11534	Stud - Speaker Mounting
	R42274	Suppressor - Distributor
	R42493	Switch - Station Selector
T1	R62516	Transformer - I.F. #1
T2	R45019	Transformer - I.F. #2
T4	R45100	Transformer - Power
T3	R45079	Transformer - Output
	R45160	Vibrator

SCHEMATIC LOCATION	PART NUMBER	DESCRIPTION
	R45265	Bolt - Carriage #10-24 x 3/4''
	R45228	Bracket - Upper Speaker Mtg.
	R45817	Bracket - Lower Speaker Mtg.
	R42306	Cable - Flex. Dr. - Volume Control
	R42373	Cable - Flex. Dr. - Volume Control - Extra Length
	R42307	Cable - Flex. Dr. - Tuning Control
	R42374	Cable - Flex. Dr. - Tuning Control - Extra Length
	R45020	Cable - Speaker
L14	R5220A	Coil - Spark Choke
	R9741	Clip - Ammeter
L4	R45112	Coil - Antenna
L4	R48820	Coil - Antenna Choke
R4,R5,L5,L6, C11,C12,C13	R62517	Coil - Untuned R. F.
L7	R47294	Coil - Oscillator
C5,C6,C7,C8, C9,L9,L10,L11, L12,L13	R45097	Coils - Perm. & Capacitor Assy.
C3,C4,C16, L1,L2,L8	R45017	Coil - Antenna - Oscillator, Manual Tuning
L16	R9044G	Coil - Hash Choke
L17	R5114CM	Coil - Hash Choke
	R16149	Capacitor - Ammeter
	R16150	Capacitor - Generator
C22,C29,C30	R42243	Capacitor - Electrolytic - 20 Mfd. 25 V. 15 Mfd. 300 V., 10 Mfd. 350 V.
C1	R45237	Capacitor - Trimmer
C27,C28		Capacitor - .5 Mfd. 100 V.
C2,C10,C17,C23		Capacitor - .05 Mfd. 600 V.
C14,C26		Capacitor - .01 Mfd. 600 V.
C21,C25		Capacitor - .005 Mfd. 600 V.
C31		Capacitor - .004 Mfd. 600 V.
C32		Capacitor - .004 Mfd. 1500 V.
C24		Capacitor - .00025 Mfd. Mica
C15	R47295	Capacitor - .000098 Mfd. - Temp. Compensator
C20	R43696	Capacitor - .00025 Mfd. Mica - Dual
R13	R42244	Control - On-Off & Volume

MODEL 8010,
CHASSIS 132.840

SEARS, ROEBUCK & CO.



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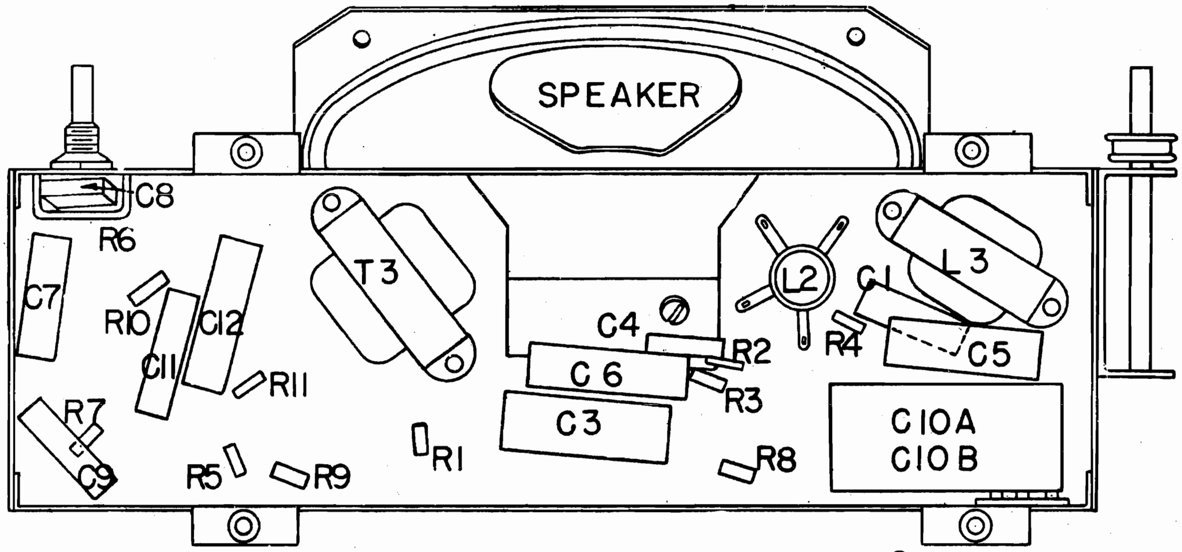
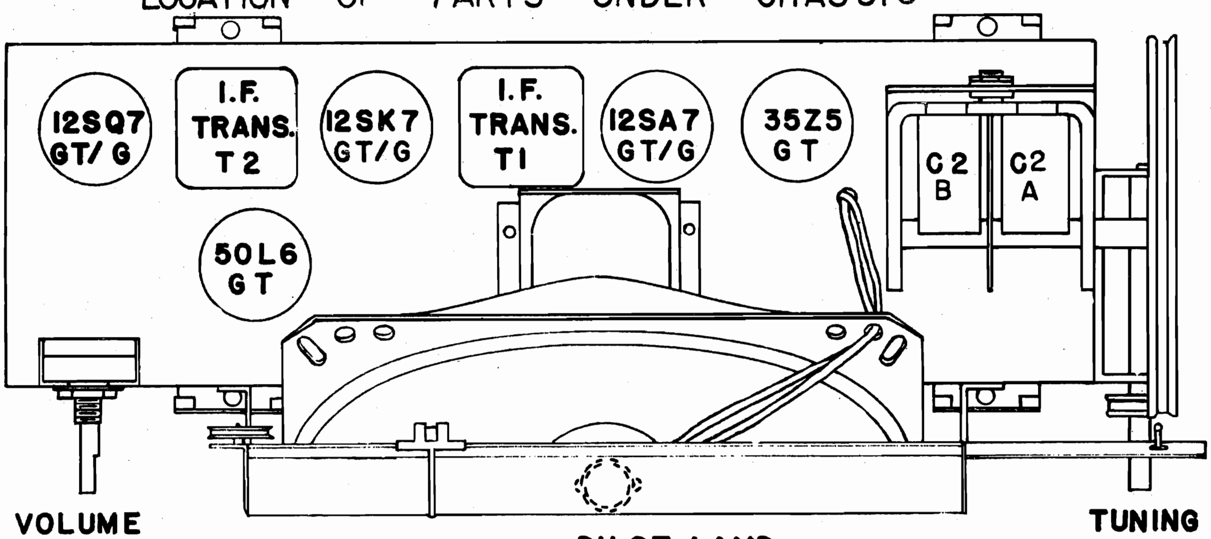
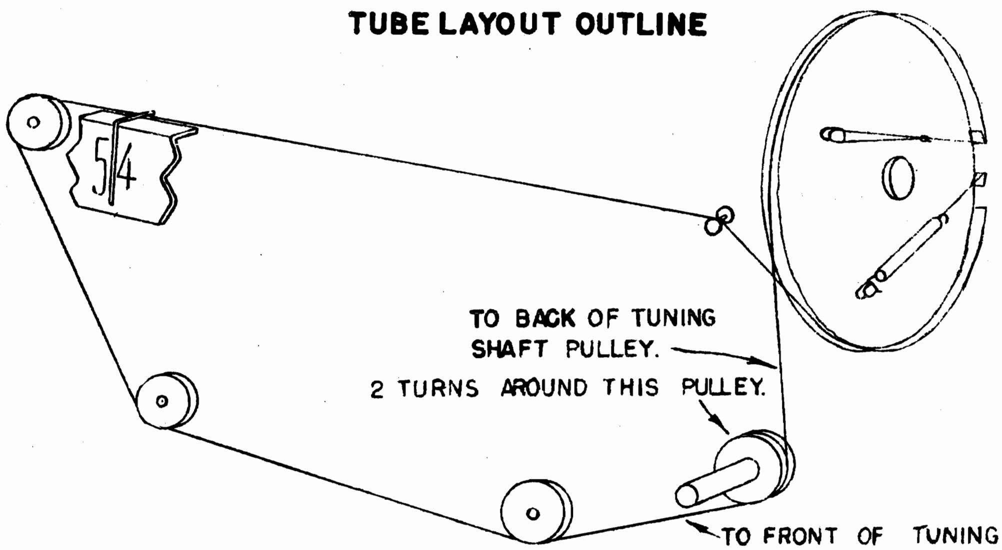
MODEL 8010, CHASSIS 132.840



LOCATION OF PARTS UNDER CHASSIS



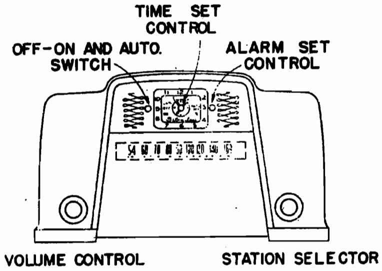
TUBE LAYOUT OUTLINE



DIAL STRINGING ARRANGMENT

MODEL 8010,
CHASSIS 132.840

SEARS, ROEBUCK & CO.



ALIGNMENT PROCEDURE

PRELIMINARY:

Output meter connection .... Across Speaker Voice Coil
Output meter reading to indicate 200 MW (Standard output) .... .8 Volt
Generator modulation .... 30 % 400 Cycles
Position of volume control .... Fully Clockwise
Dial pointer position with variable condenser closed .... Last Mark on Dial

POSITION OF VARIABLE	GENERATOR FREQUENCY	DUMMY ANTENNA	GENERATOR CONNECTION (HIGH SIDE)	GENERATOR CONNECTION GND. LEAD	ADJUST TRIMMERS ORDER SHOWN	TRIMMER FUNCTION
Open	455 KC	.05 Mfd.	Mixer Grid	Fltg. Gnd.	T2-T1	IF
1400 KC	1400 KC	50 Mmf.	*Ant. Lead	Fltg. Gnd.	C2B	Oscillator
1400 KC	1400 KC	50 Mmf.	*Ant. Lead	Fltg. Gnd.	C2A	Antenna
600 KC	600 KC	50 Mmf.	*Ant. Lead	Fltg. Gnd.	**Check Point	Antenna

IMPORTANT ALIGNMENT NOTES

* Connect generator lead to green wire on loop antenna or a test loop may be used on the generator placed a short distance from the set loop.
**Check sensitivity at 600 KC. If low, adjust antenna section plates of variable for maximum output at 600 KC.
The alignment procedure should be repeated in the original order for greatest accuracy. Always keep the output from the signal generator at its lowest possible value to make the A. V. C. action of the receiver ineffective.

PARTS LIST

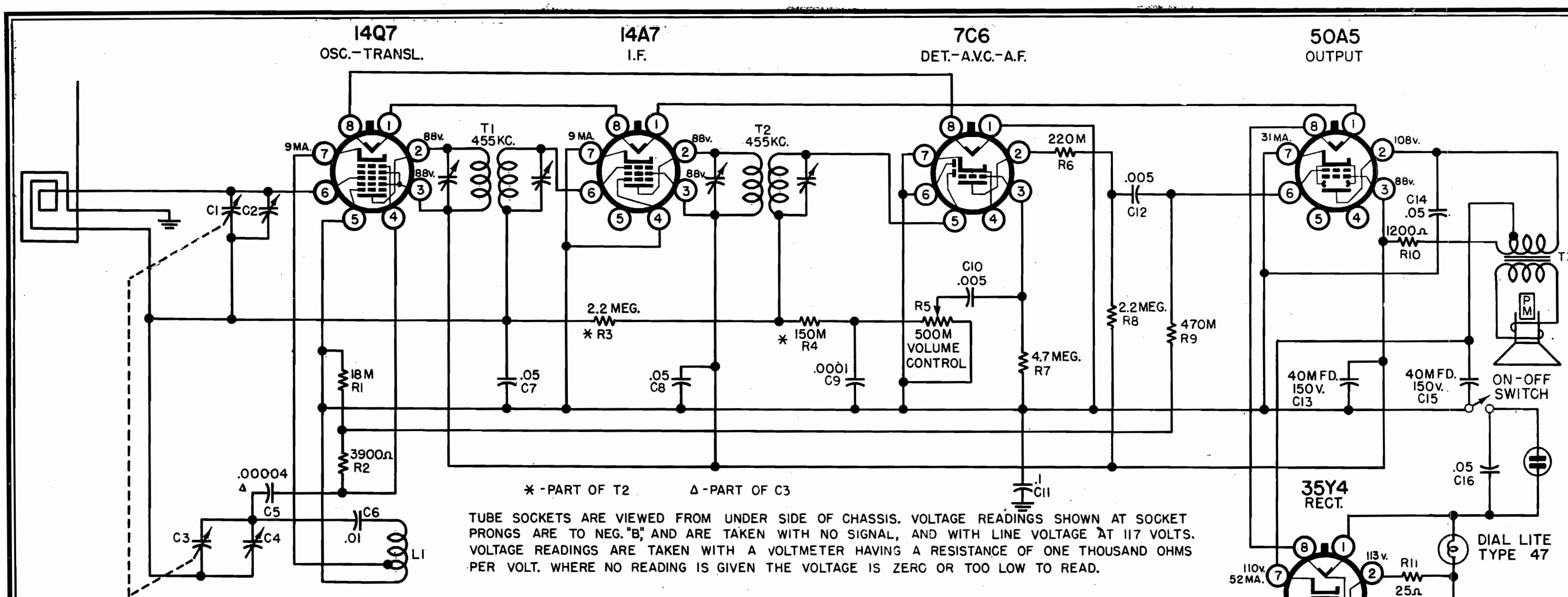
Schematic Location	Part No.	Description
L1	N21297	Antenna Loop Assembly
	N21092	Cabinet, Less Front Trim Assy.
	N21262	Trim Assembly, Cabinet Front
	N21246	Choke Filter.
*See note below	N21265	Clock, less knobs, cord & metal hsrg.
	N21693	Knob, Clock, Off-On-Auto
	N21694	Knob, Clock, Alarm Set
	N21695	Knob, Clock Time Set
L2	N19354	Coil, Oscillator
C1, 11		Condenser, .005 mfd, 400V
C2A, 2B	N21305	Condenser, Variable
C3		Condenser, .1 mfd, 400V
C4		Condenser, .00005 mfd, 500V, Mica
C5		Condenser, .05 mfd, 200V
C6		Condenser, .05 mfd, 400V
C7		Condenser, .002 mfd, 400V
C8		Condenser, .00025 mfd, 500V, Mica
C9		Condenser, .0005 mfd, 500V, Mica
C10A, 10B	N21253	Condenser, Electrolytic, 50-30 mfd, 150V
C12		Condenser, .02 mfd, 400V
R6	N21304	Control, Volume, 1 megohm
	N21303	Cord, Power, Chassis to Clock (11")
	N20138-11	Cord, Power, Clock (6')

M.U. Code	Schematic Location	Part No.	Description
		N19132	Cord, Dial Drive
AO		N21274	Insulator, Chassis
AO		N21204-2	Knob, Control, Volume or Tuning
			Lamp, Dial, Mazda No. 47
B5		N21276	Leaflet, Instruction
		N21295	Pointer, Dial
	R1		Resistor, 330,000 ohms, 1/4 W
	R2		Resistor, 10 megohms, 1/4 W
	R3		Resistor, 22,000 ohms, 1/4 W
	R4		Resistor, 330 ohms, 1/4 W
AAO	R5		Resistor, 2.2 megohm, 1/4 W
	R7		Resistor, 15 megohm, 1/4 W
	R8		Resistor, 22 ohms, 1/4 W
	R9, R10		Resistor, 470,000 ohms, 1/4 W
	R11		Resistor, 150 ohms, 1/4 W
		N21290	Scale, Dial
		N21291	Shaft, Tuning with Pulley
		N19234	Socket, Antenna Loop
		N21296	Socket, Dial Light, with Leads
		N21302	Speaker, 4" x 6" P. M.
		N20149	Spring, Dial Cord
		N21424	Transformer, 1st I. F.
		N21425	Transformer, 2nd I. F.
		N21247	Transformer, Output

* Repair parts for this clock are not available.

SEARS, ROEBUCK & CO.

MODEL 8051,
CHASSIS 101.839



SCHEMATIC LOCATION	PART NUMBER	DESCRIPTION
R9		Resistor - 470,000 Ohm 1/2 Watt
R8		Resistor - 2.2 Megohm 1/2 Watt
R7		Resistor - 4.7 Megohm 1/2 Watt
R10		Resistor - 1200 Ohm 1 Watt
R11		Resistor - Glasohm 25 Ohm 1 Watt
	R64762	Shaft - Tuning
	R45992	Shield - Pilot Lamp
	R57193	Shield - Tube
	R57049	Socket - Tube - 8 Prong Lock-In
	R64763	Socket - Pilot Lamp
	R64764	Speaker - 5 1/2" P.M.
	R62669	Cone & Voice Coil
	R64765	Transformer - Output
	R43458	Spring - Dial Cord Tension
	R41472	Cord - Dial Drive (35") (per foot)
	R64772	Transformer - I.F. #1
	R64773	Transformer - I.F. #2
	R40951	Washer - Drive Shaft Retaining
	R62206	Washer - Mica - Coupling Capacitor
	R62214	Washer - Flat - Coupling Capacitor
	R15496	Washer - Flat - Chassis Mounting

SCHEMATIC LOCATION	PART NUMBER	DESCRIPTION
	R64751	Background - Dial
C7,C8,C14,C16		Capacitor - .05 mfd. 600 Volt
C11		Capacitor - .1 mfd. 600 Volt
C6		Capacitor - .01 mfd. 600 Volt
C10,C12		Capacitor - .005 mfd. 600 Volt
C1,C3	R64753	Capacitor - Variable Tuning
C13,C15	R64754	Capacitor - Electrolytic - 40x40 mfd. 150 Volt
C9	R64912	Capacitor - Ceramic - 100 mmfd.
L1	R64755	Coil - Oscillator
	R64756	Control - On-Off & Volume
	R64757	Cord - Line
	R65155	Cover - Cabinet Back
	R64770	Dial - Station
	R62712	Knob - Tuning
	R62713	Knob - On-Off & Volume
		Lamp - Mazda Type #47
	R64273	Leaflet - Instruction
	R65149	Loop - Antenna Assembly
	R64761	Pointer - Dial
R2		Resistor - 3900 Ohm 1/2 Watt
R1		Resistor - 18,000 Ohm 1/2 Watt
R6		Resistor - 220,000 Ohm 1/2 Watt

ALIGNMENT PROCEDURE

PRELIMINARY

Output Meter reading to indicate 0.05 Watt across voice coil . . . . 0.4 Volt
Generator ground lead connection . . . . I.F. alignment-negative "B" lead
. . . . R.F. alignment-Receiver chassis
Generator Modulation . . . . 30%, 400 cycles
Position of Volume Control . . . . Fully on
Position of pointer with tuner fully closed . . . . Last line to left of 540 Kc. calibration mark on escutcheon or light brown mark about 1 inch from the left hand end on the lower edge of dial background.

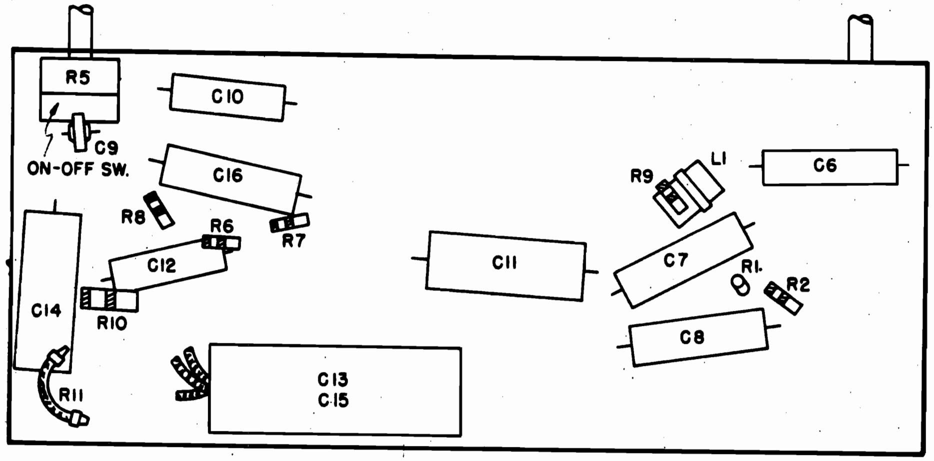
Frequency Range:
Broadcast . . . . 540-1600 KC

Power Output
Undistorted . . . . 1.0 Watt
Maximum . . . . 1.5 Watts

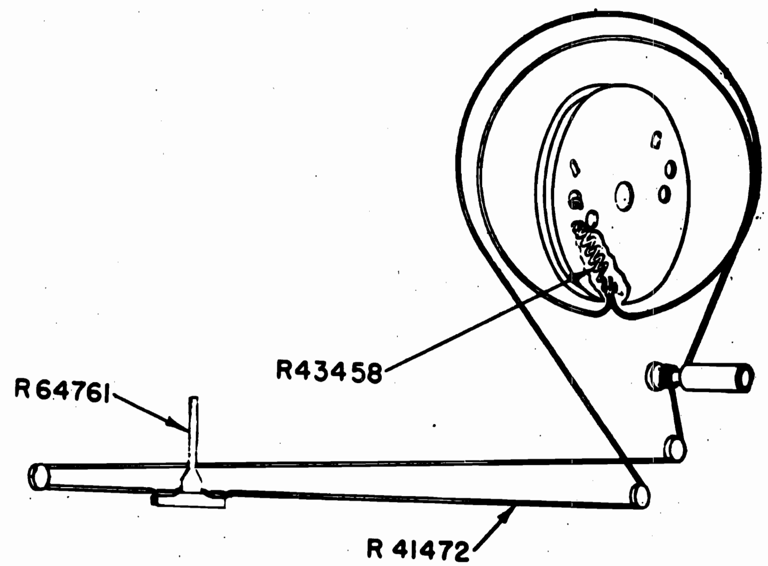
Power Supply:
All models available . . . . .117 Volts DC, 25-60 Cycles AC, 30 Watts

MODEL 8051,
CHASSIS 101.839

SEARS, ROEBUCK & CO.

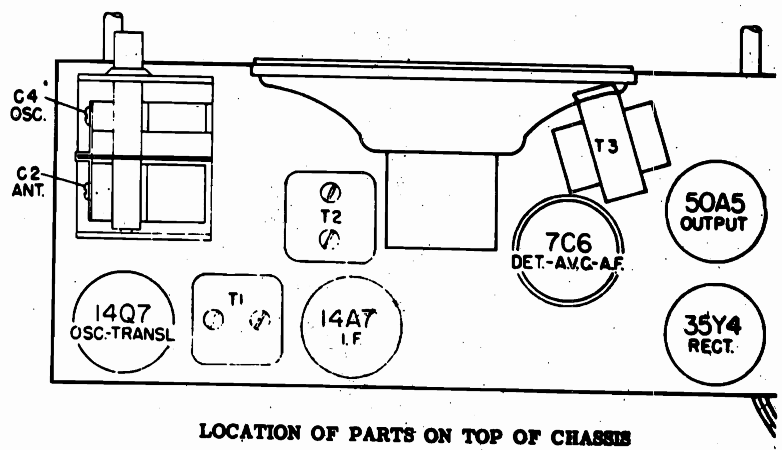


LOCATION OF PARTS UNDER CHASSIS



STRING AND POINTER HOOKUP

POSITION OF TUNER	GENERATOR FREQUENCY	DUMMY ANTENNA	GENERATOR CONNECTION	TRIMMERS (ADJ. IN ORDER SHOWN)	TRIMMER FUNCTION
Closed	455 Kc.	0.1 mfd.	Transl.-Grid	T2 & T1	I.F.
Fully Open	1650 Kc.	.0002 mfd.	Ant.	C4	Osc.
See Note Below	1410 Kc.	.0002 mfd.	Ant.	C2	Ant.



LOCATION OF PARTS ON TOP OF CHASSIS

IMPORTANT ALIGNMENT NOTES

NOTE: It is recommended that an isolation transformer be connected between the radio chassis and the line before aligning receiver on A.C.

The 1410 Kc. calibration point is a light brown mark about 2 inches from the right-hand end on the lower edge of the dial background.

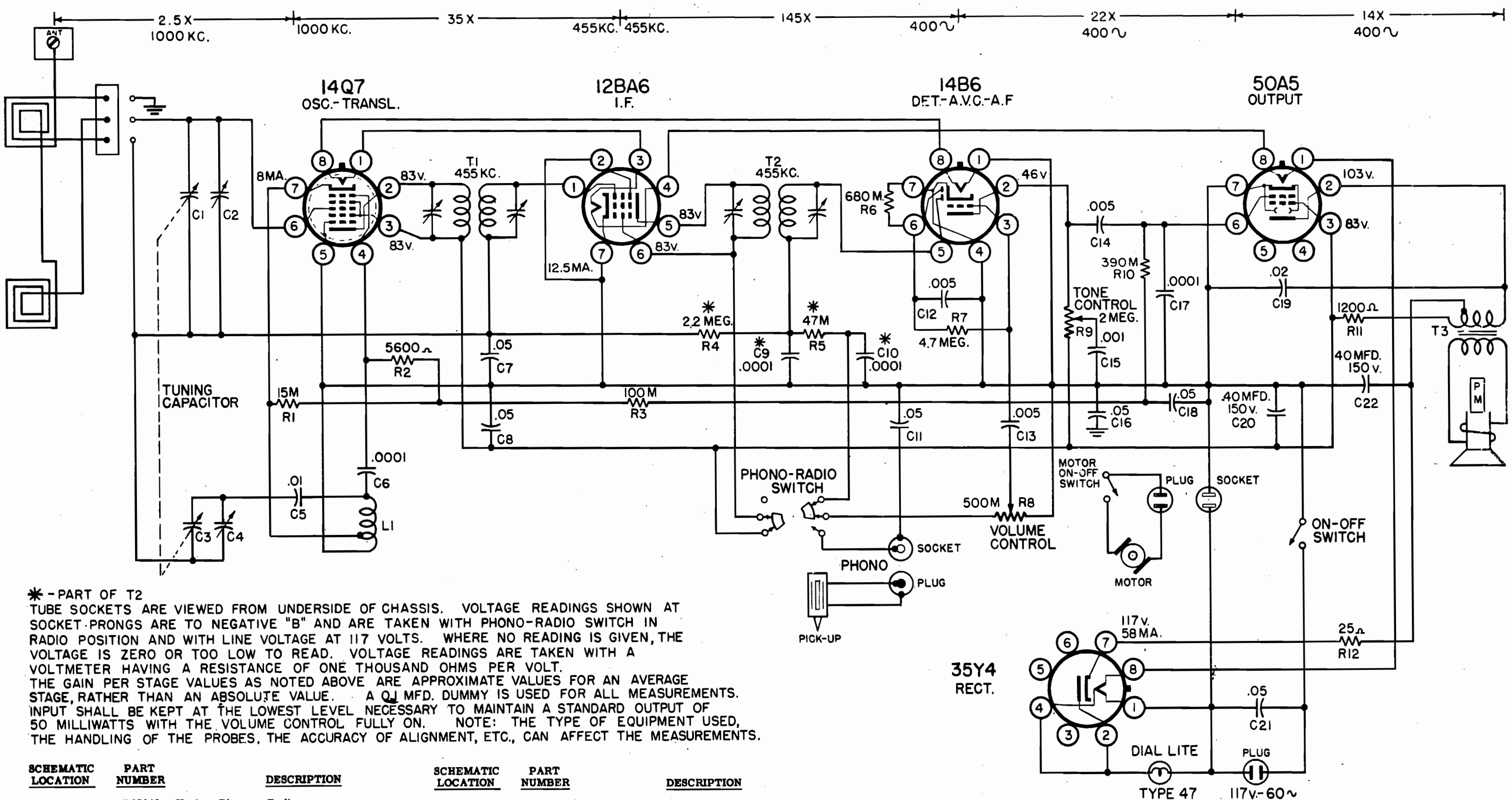
The Alignment must be done in the order given.

The entire Alignment Procedure should be repeated step by step in the original order for greatest accuracy.

Always keep the output from the generator at its lowest possible value to prevent the AVC of the receiver from interfering with accurate alignment.

SEARS, ROEBUCK & CO.

MODEL 8080, CHASSIS 101.852



✱ - PART OF T2

TUBE SOCKETS ARE VIEWED FROM UNDERSIDE OF CHASSIS. VOLTAGE READINGS SHOWN AT SOCKET-PRONGS ARE TO NEGATIVE "B" AND ARE TAKEN WITH PHONO-RADIO SWITCH IN RADIO POSITION AND WITH LINE VOLTAGE AT 117 VOLTS. WHERE NO READING IS GIVEN, THE VOLTAGE IS ZERO OR TOO LOW TO READ. VOLTAGE READINGS ARE TAKEN WITH A VOLTMETER HAVING A RESISTANCE OF ONE THOUSAND OHMS PER VOLT.
THE GAIN PER STAGE VALUES AS NOTED ABOVE ARE APPROXIMATE VALUES FOR AN AVERAGE STAGE, RATHER THAN AN ABSOLUTE VALUE. A .01 MFD. DUMMY IS USED FOR ALL MEASUREMENTS. INPUT SHALL BE KEPT AT THE LOWEST LEVEL NECESSARY TO MAINTAIN A STANDARD OUTPUT OF 50 MILLIWATTS WITH THE VOLUME CONTROL FULLY ON. NOTE: THE TYPE OF EQUIPMENT USED, THE HANDLING OF THE PROBES, THE ACCURACY OF ALIGNMENT, ETC., CAN AFFECT THE MEASUREMENTS.

SCHEMATIC LOCATION	PART NUMBER	DESCRIPTION
	R65648	Knob - Phono - Radio
	R65647	Knob - Tone
	R65646	Knob - Tuning
		Lamp - Mazda - #47
	R65644	Loop & Board Assy.
	R65602	Pointer - Dial
R2	XY35621	Resistor - 5,600 ohm - 1/2 W.
R1	XY31531	Resistor - 15,000 ohm - 1/2 W.
R3	XY31041	Resistor - 100,000 ohm - 1/2 W.
R10	XY33941	Resistor - 390,000 ohm - 1/2 W.
R6	XY36842	Resistor - 680,000 ohm - 1/2 W.
R7	XY34752	Resistor - 4.7 megohm - 1/2 W.
R11	XY31221	Resistor - 1,200 ohm - 1 W.
R12	R40232	Resistor - 25 ohm - 1 W. - Glasohm
	R65611	Shaft - Tuning
	R44897	Socket - Phono Input
	R65626	Socket - Pilot Lamp
	R44145	Socket - AC to Changer
	R57049	Socket - Tube - 8 Prong - Lock-in
	R66237	Socket - Tube - Miniature
	R65634	Speaker - 5" x 7" P.M.
	R66443	Cone & Voice Coil
T3	R66444	Output Transformer
	R43458	Spring - Tension - Drive String Assy.
	R65623	Switch - Phono - Radio
T1	R65606	Transformer - #1 I.F.
T2	R65607	Transformer - #2 I.F.

SCHEMATIC LOCATION	PART NUMBER	DESCRIPTION
	R65603	Background - Dial
	R65618	Baffle - Grille Assy.
	R65538	Button - Snap
	R65637	Cabinet - Bottom Section
	R65638	Cover
	R66440	Bumper - Lid
	R65639	Hinge
	R65640	Support - Cover
C12,C13,C14		Capacitor - .005 Mfd. - 600 V.
C15		Capacitor - .001 Mfd. - 600 V.
C7,C8,C11, C16,C18,C21		Capacitor - .05 Mfd. - 600 V.
C19		Capacitor - .02 Mfd. - 600 V.
C5		Capacitor - .01 Mfd. - 600 V.
C6,C17		Capacitor - Ceramic - 100 Mmfd.
	R65609	Capacitor - Electrolytic
C20		60 Mfd. - 150 V.
C22		60 Mfd. - 150 V.
C1,C3	R66430	Capacitor - Variable - 2 Gang
C2	R61629	Capacitor - Trimmer - Single
L1	R65608	Coil - Oscillator
R8	R65622	Control - On-Off & Volume
	R65621	Control - Tone
	R41472	Cord - Dial Drive - 47"
	R65624	Cord - Line
	R65604	Dial - Station - Lucite
	R65615	Drum & Bushing Assy.
	R65643	Foot - Mounting - Rubber
	R65620	Grille - Metal
	R65649	Knob - On-Off & Volume

Frequency Range
Broadcast . . . . . 540-1600 Kc.

Power Output
Undistorted . . . . . . 1.5 Watts
Maximum . . . . 2.5 Watts

MODEL 8080,
CHASSIS 101.852

SEARS, ROEBUCK & CO.

PRELIMINARY:

ALIGNMENT PROCEDURE

Output meter reading to indicate 0.05 Watt across voice coil . . . . 0.4 Volt
Generator ground lead connection . . . . I.F. alignment - negative "B" lead
. . . . R.F. alignment - receiver chassis
Generator modulation . . . . 30%, 400 cycles
Position of volume control . . . . Fully on
Position of tone control . . . . Treble
Position of pointer with tuner fully closed . . . . Last line to the left of 540 kc. calibration mark

POSITION OF TUNER	GENERATOR FREQUENCY	DUMMY ANTENNA	GENERATOR CONNECTION	TRIMMER ADJUSTMENTS (IN ORDER SHOWN)	TRIMMER FUNCTION
Closed	455 Kc.	0.1 mfd.	Transl.-Grid	T2 & T1	I.F.
1600 Kc.	1600 Kc.	50 mmfd.	Hazeltine Loop	C4	Osc.
1400 Kc.	1400 Kc.	50 mmfd.	Hazeltine Loop	C2	Ant.

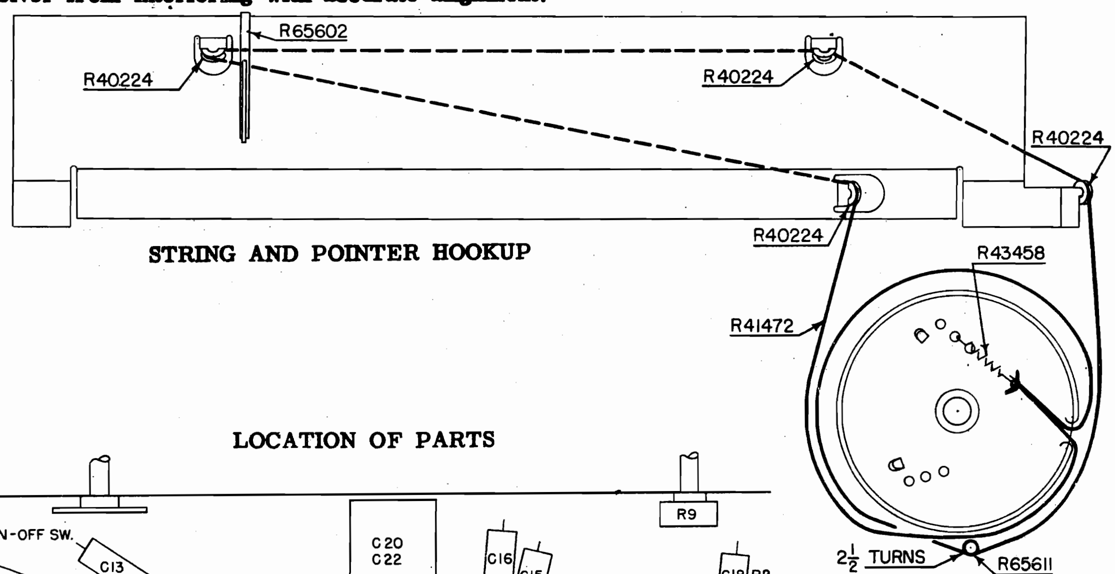
IMPORTANT ALIGNMENT NOTES:

NOTE: It is recommended that an isolation transformer be connected between the radio chassis and the line before aligning receiver on A.C.

The alignment must be done in the order given.

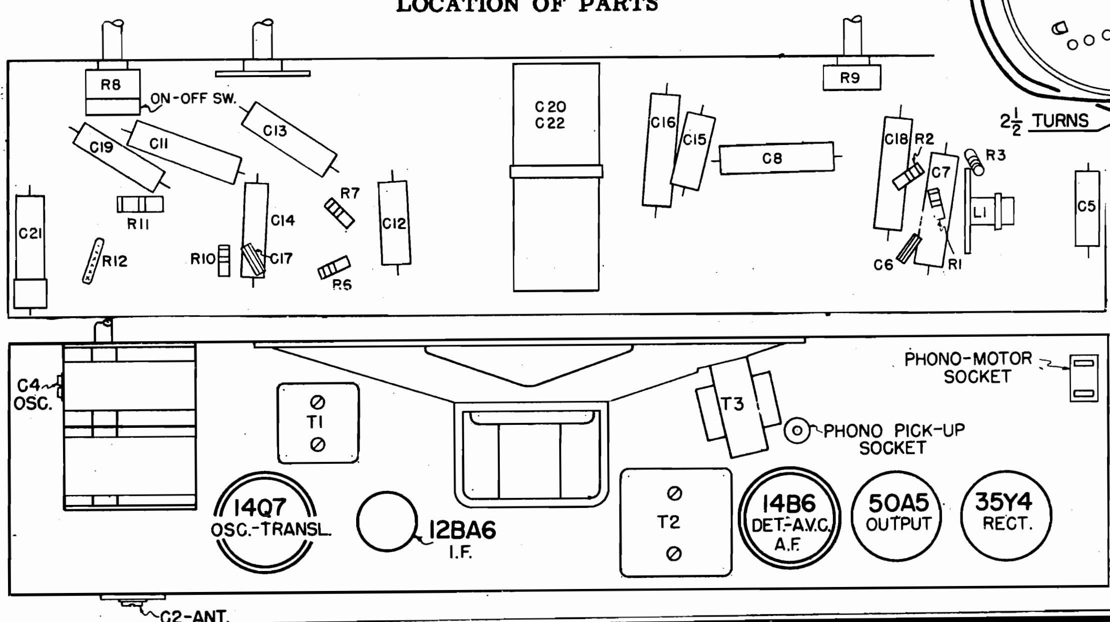
The entire alignment procedure should be repeated step by step in the original order for greatest accuracy.

Always keep the output power from the generator at its lowest possible value to prevent the AVC of the receiver from interfering with accurate alignment.



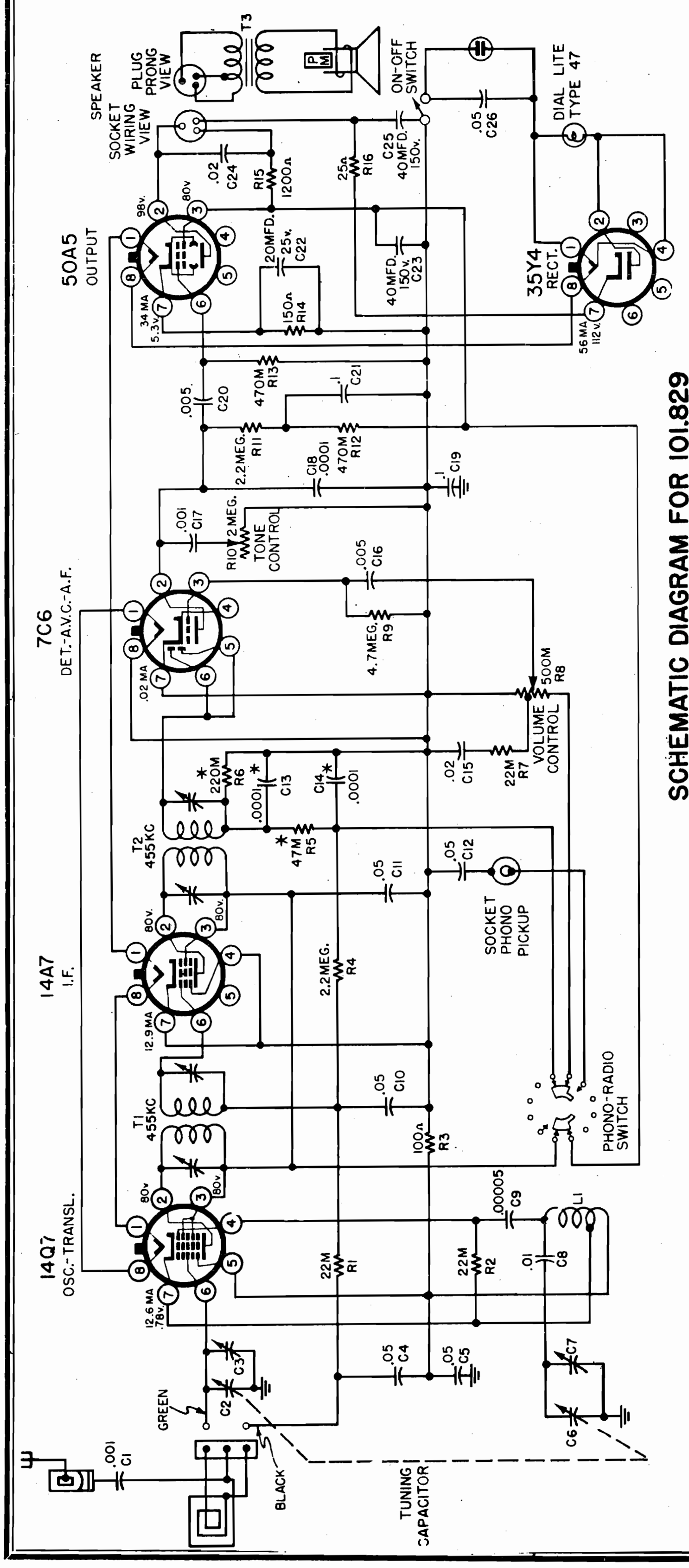
STRING AND POINTER HOOKUP

LOCATION OF PARTS

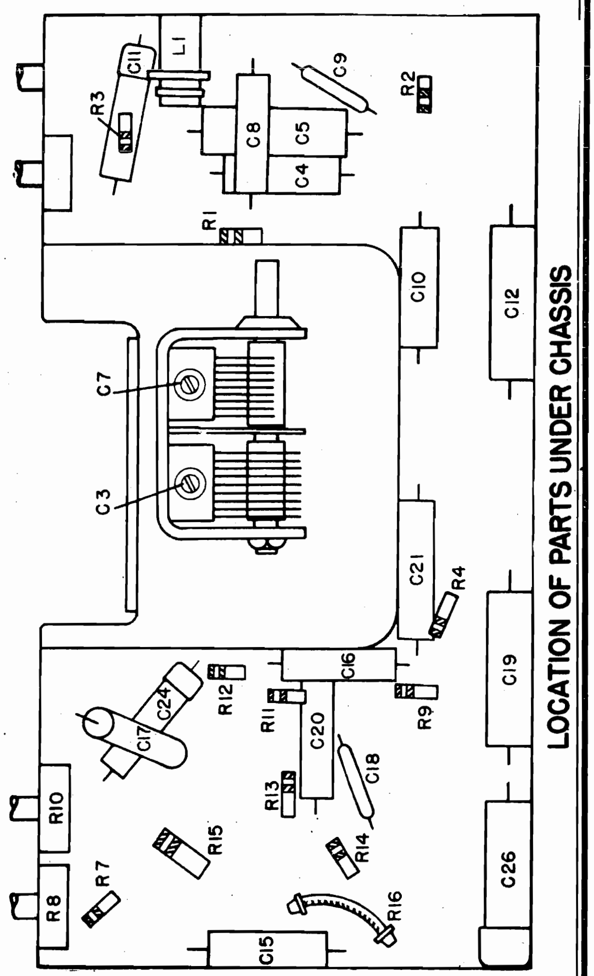


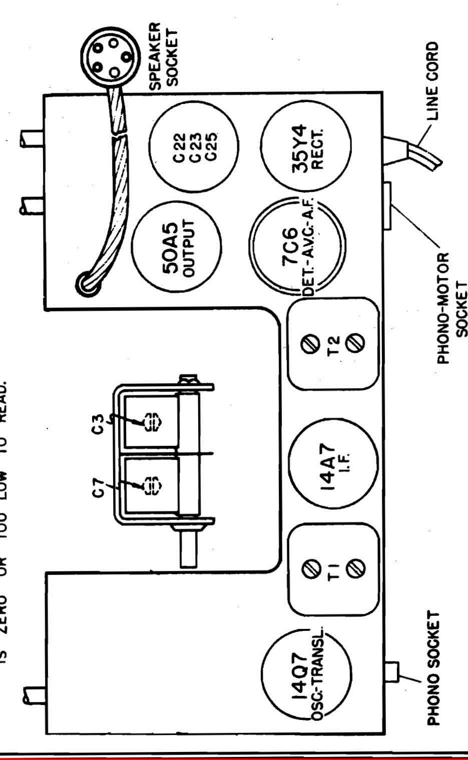
SEARS, ROEBUCK & CO.

MODEL 8100, CHASSIS 101.829



SCHEMATIC DIAGRAM FOR 101.829





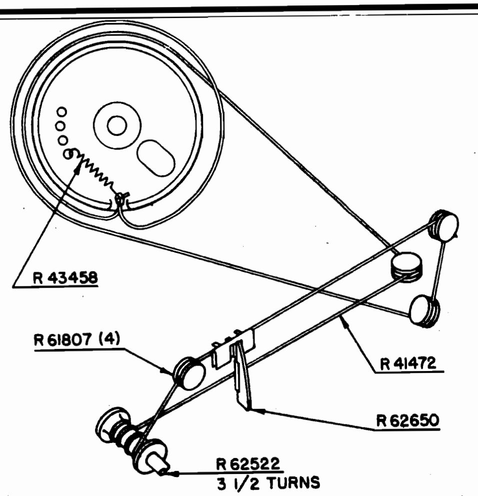
LOCATION OF PARTS UNDER CHASSIS

* - PART OF T2

TUBE SOCKETS ARE VIEWED FROM UNDER SIDE OF CHASSIS. VOLTAGE READINGS SHOWN AT SOCKET PRONGS ARE TO NEG."B", AND ARE TAKEN WITH NO SIGNAL, WITH PHONO-RADIO SWITCH IN RADIO POSITION, AND WITH LINE VOLTAGE AT 117 VOLTS. VOLTAGE READINGS ARE TAKEN WITH A VOLTMETER HAVING A RESISTANCE OF ONE THOUSAND OHMS PER VOLT. WHERE NO READING IS GIVEN THE VOLTAGE IS ZERO OR TOO LOW TO READ.

MODEL 8100,
CHASSIS 101.829

SEARS, ROEBUCK & CO.



STRING AND POINTER HOOKUP

Power Supply:
All models available...117 Volts 60 Cycle AC
30 Watts

Frequency Range:
Broadcast..........540-1600 KC

Power Output:
Undistorted...........1.0 Watt
Maximum..............1.5 Watts

ALIGNMENT PROCEDURE

PRELIMINARY:

Output meter reading to indicate 0.05 Watt across voice coil................0.4 Volt

Generator ground lead connection....................I.F. alignment-negative "B" lead
....................Ant. alignment-Receiver chassis

Generator modulation..30%, 400 cycles

Position of volume control..Fully on

Position of tone control..HI

Position of pointer with tuner fully closed..Last line beneath the 540 Kc. calibration mark on the dial or the "START" of calibration mark on the bottom of the dial background mounting plate.

POSITION OF TUNER	GENERATOR FREQUENCY	DUMMY ANTENNA	GENERATOR CONNECTION	TRIMMER ADJUSTMENTS (IN ORDER SHOWN)	TRIMMER FUNCTION
Closed	455 Kc.	0.1 mfd.	Transl.-Grid	T2 - T1	I. F.
Fully open	1650 Kc.	.0002 mfd.	Antenna	C7	Oscillator
See note below	1400 Kc.	.0002 mfd.	Antenna	C3	Translator

IMPORTANT ALIGNMENT NOTES:

NOTE: The dial pointer shall be positioned at the 1400 Kc. calibration mark on the bottom of the dial background mounting plate.

The alignment must be done in the order given.

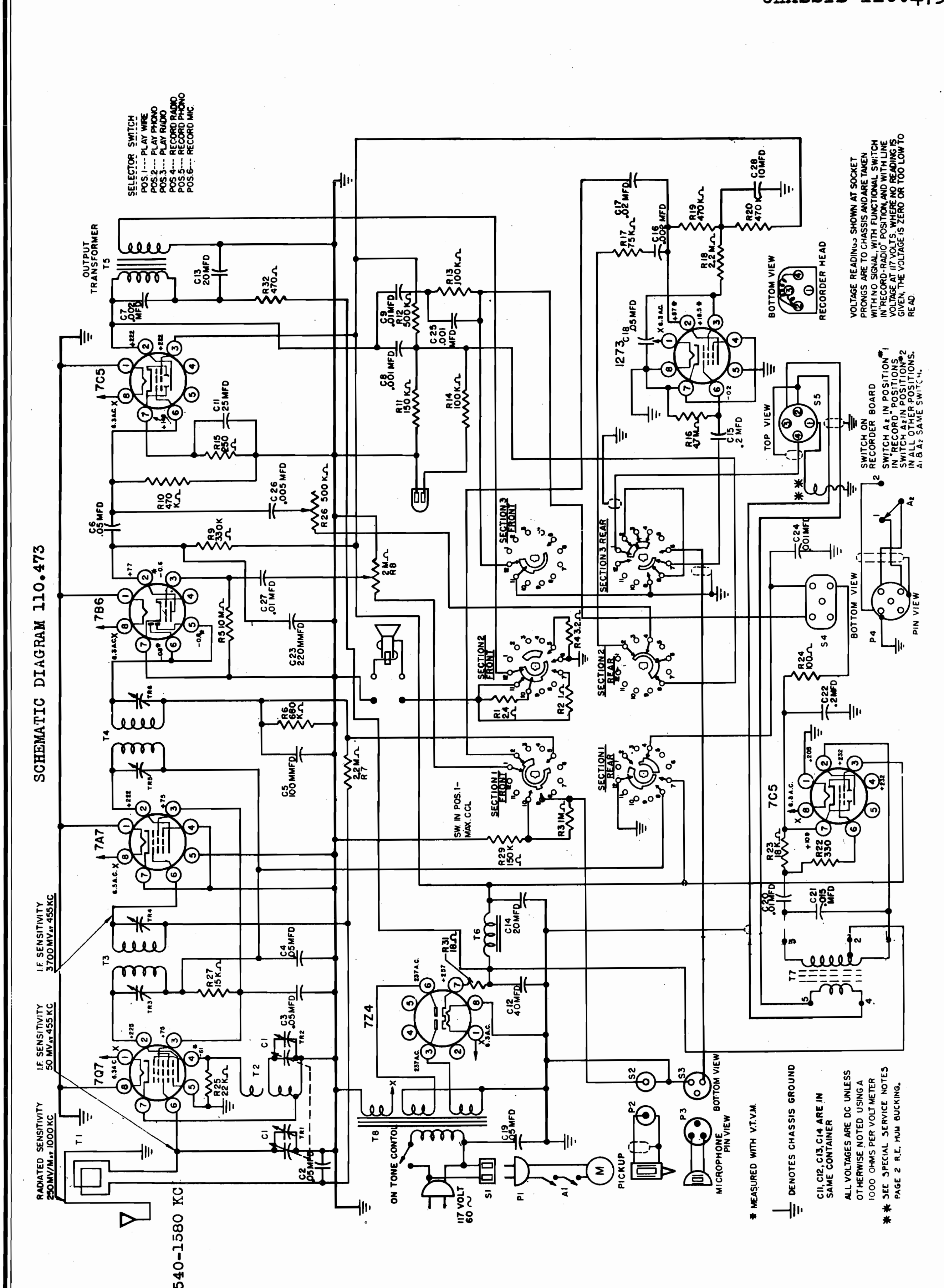
The entire alignment procedure should be repeated step by step in the original order for greatest accuracy.

Always keep the output from the generator at its lowest possible value to prevent the AVC of the receiver from interfering with accurate alignment.

SCHEMATIC LOCATION	PART NUMBER	DESCRIPTION
	R62379	Background - Dial
	R60985	Board Assembly - Loop Antenna
	R13961	Button - Snap
C19,C21		Capacitor - 0.1 Mfd. 400 Volt
C8		Capacitor - .01 Mfd. 600 Volt
C15,C24		Capacitor - .02 Mfd. 600 Volt
C4,C5,C10,C11,C12,C26		Capacitor - .05 Mfd. 600 Volt
C1,C17		Capacitor - .001 Mfd. 600 Volt
C16,C20		Capacitor - .005 Mfd. 600 Volt
C9		Capacitor - Mica - 50 Mmfd.
C18		Capacitor - Mica - 100 Mmfd.
C22,C23,C25	R60416	Capacitor - Electrolytic - 20 Mfd. 25 Volt, 40 Mfd. 150 Volt, 40 Mfd. 150 Volt
C2,C6	R61100	Capacitor - Variable - 2 Gang
L1	R61107	Coil - Oscillator
R10	R62529	Control - On-Off & Tone
R8	R62612	Control - Volume
	R41472	Cord - Dial Drive - 42"
	R16706	Cord - Line
		Dial Lamp #47
	R62878	Escutcheon & Dial Assembly
	R62534	Knob - On-Off & Tone
	R62535	Knob - Phono - Radio
	R62712	Knob - Tuning
	R62531	Knob - Volume
	R64013	Leaflet - Instruction
	R49789	Motor - Phono - 117 Volt, 60 Cycle (Less Turntable) - Alliance
	R49662	Idler Wheel - Phono Motor
	R49663	Turntable - 9" (only)
	R57311	Spring - 50 Cycle Conversion
	R57692	Pickup Arm (Less Crystal Cartridge)
	R52826	Crystal Cartridge (Astatic - L-70)
	R57272	Plug - Phono Connector - 1 Prong
	R62650	Pointer & Slide Assembly
	R61807	Pulley - Metal
R3		Resistor - 100 Ohm - 1/3 Watt
R14		Resistor - 150 Ohm - 1/3 Watt
R1,R2,R7		Resistor - 22,000 Ohm - 1/3 Watt
R12,R13		Resistor - 470,000 Ohm - 1/3 Watt
R4,R11		Resistor - 2.2 Megohm - 1/3 Watt
R9		Resistor - 4.7 Megohm - 1/3 Watt
R15		Resistor - 1200 Ohm - 1 Watt
R16		Resistor - Glasohm - .25 Ohm - .1 Watt
	R62906	Rest - Pickup Arm
	R62522	Shaft - Tuning
	R44145	Socket - A. C. Phono Motor
	R44897	Socket - Phono Connector - 1 Prong
	R60515	Socket - Pilot Lamp
	R60693	Socket - Speaker Cable
	R57049	Socket - Tube - 8 Prong Lock-In
		WHEN ORDERING SPEAKER PARTS ALWAYS GIVE THE PART NUMBER ON THE SPEAKER
	R62636	Speaker - 6" P. M.
	R62601	Cone & Voice Coil
T3	R62602	Output Transformer
	R49743	Plug (Speaker)
	R62854	Spring - Automatic Shut Off Switch Latch
	R43458	Spring - Dial Drive Cord Tension
	R57457	Spring - Pickup Arm
	R61915	Switch - Automatic Shut Off
	R62657	Switch - Phono-Radio
T1	R62513	Transformer - I. F. #1
T2	R60418	Transformer - I. F. #2
	R60480	Wafer - Electrolytic Mounting

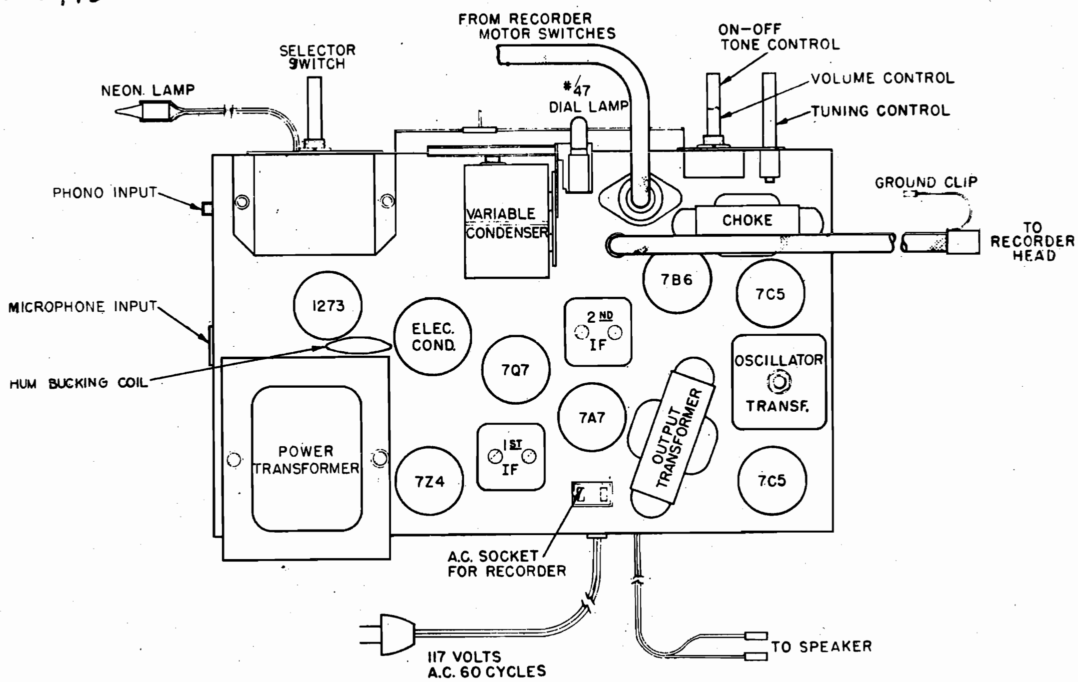
SEARS, ROEBUCK & CO.

MODEL 8103,
CHASSIS 110.473

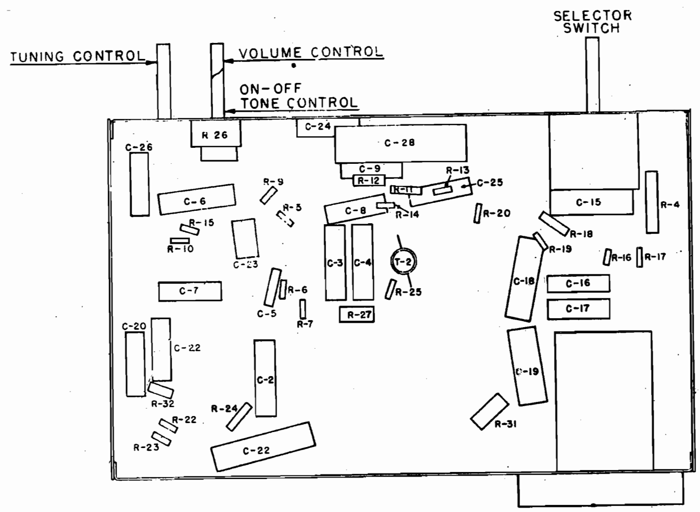


MODEL 8103,
CHASSIS 110.473

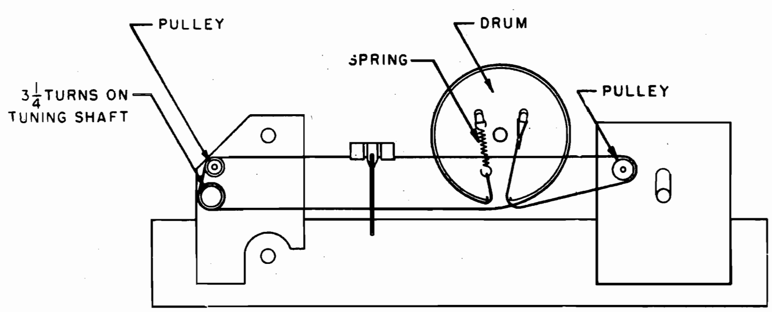
SEARS, ROEBUCK & CO.



TUBE LOCATION



LOCATIONS OF PARTS UNDER CHASSIS



DIAL STRINGING DIAGRAM

SEARS, ROEBUCK & CO.

MODEL 8103,
CHASSIS 110.473

ALIGNMENT PROCEDURE

Output Meter Connection..............................Across Loud Speaker Voice Coil
Output Meter Reading to Indicate 500 Milliwatts..........................1.25 Volts
Dummy Antenna Value to be in Series with Generator Output............See Chart Below
Connection of Generator Output Lead..................................See Chart Below
Connection of Generator Ground Lead........................I. F. Alignment B - Bus
Generator Modulation...30% at 400 cycles
Position of Volume Control...Fully Clockwise
Position of Tone Control.......................................Counter Clockwise (HI)
Position of Dial Pointer with Variable Fully Closed.On Mark Below 540 KC Calibration
Position of Master Control Switch......................................"Play Radio"

POSITION OF VARIABLE	GENERATOR FREQUENCY	DUMMY ANTENNA	GENERATOR CONNECTION	ADJUSTMENTS (IN ORDER SHOWN)	FUNCTION
Closed	455	0.1 Mfd.	Grid 7Q7	TR3 TR4 TR5 TR6	I.F.
1500 KC	1500 KC	***	***See Below	TR2	Osc.
1500 KC	1500 KC	***	***See Below	TR1	Trans.
600 KC	600 KC	***	***See Below	(Check-Point)	Check Point

*** Run a wire from the output terminal of generator near the receiver. No connection is made between the signal generator and the receiver.

IMPORTANT ALIGNMENT NOTES

The alignment procedure should be repeated stage by stage, in the original order for greatest accuracy. Always keep the output from the test oscillator at its lowest possible value to make the AVC action of the Receiver ineffective.

Power Output Undistorted....2.25 Watts Maximum....6 Watts

SCHEMATIC LOCATION	PART NUMBER	DESCRIPTION
R3		Resistor - 1 meg ohm 1/4 Watt
R4		Resistor - 3.2 ohm 1 Watt Wirewound
R5		Resistor - 10 meg ohms 1/4 Watt
R6		Resistor - 680,000 ohms 1/4 Watt
R7		Resistor - 2.2 meg ohms 1/4 Watt
R9		Resistor - 330,000 ohms 1/4 Watt
R10		Resistor - 470,000 ohms 1/4 Watt
R11		Resistor - 150,000 ohms 1/4 Watt
R12		Resistor - 500,000 ohms 1/4 Watt
R13		Resistor - 100,000 ohms 1/4 Watt
R14		Resistor - 100,000 ohms 1/4 Watt
R15		Resistor - 250,000 ohms 1/2 Watt
R16		Resistor - 4.7 meg ohms 1/4 Watt
R17		Resistor - 75,000 ohms 1/4 Watt
R18		Resistor - 2.2 meg ohms 1/4 Watt
R19		Resistor - 470,000 ohms 1/4 Watt
R20		Resistor - 470,000 ohms 1/4 Watt
R22		Resistor - 330,000 ohms 1/4 Watt
R23		Resistor - 18,000 ohms 1/4 Watt
R24		Resistor - 100 ohms 1/4 Watt
R25		Resistor - 22,000 ohms 1/4 Watt

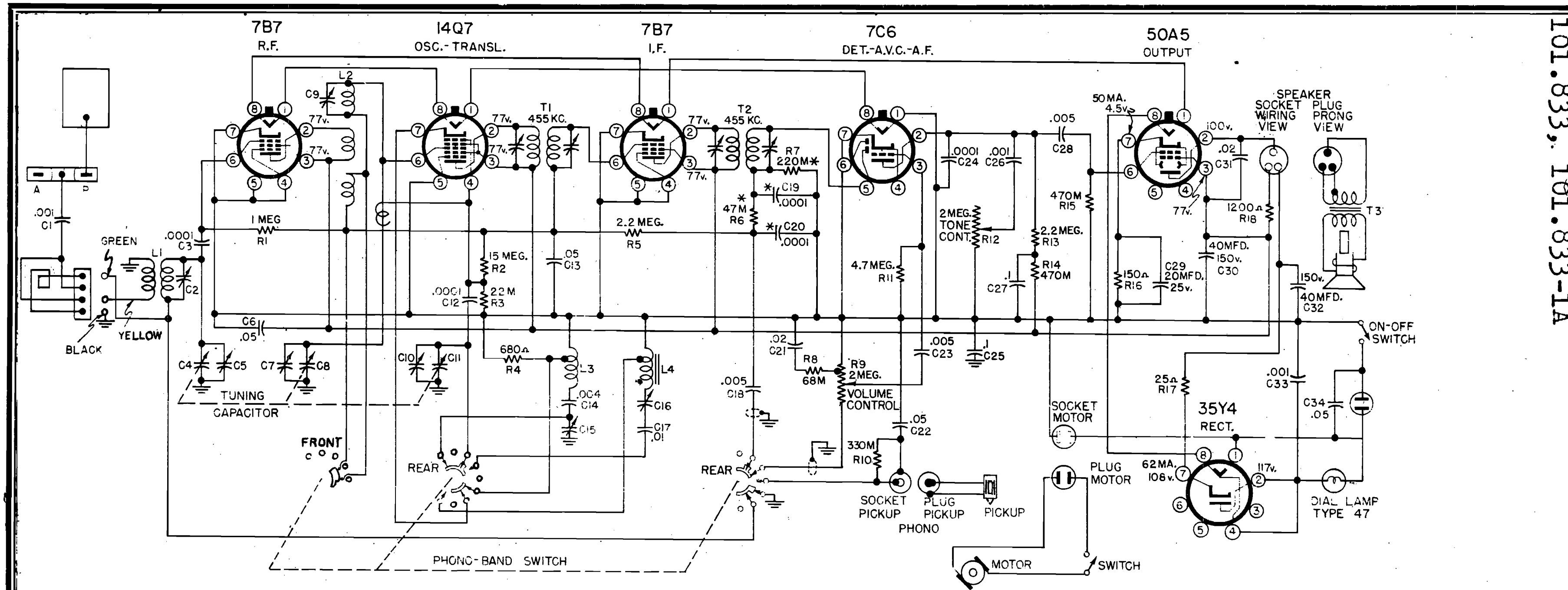
SCHEMATIC LOCATION	PART NUMBER	DESCRIPTION
R27		Resistor - 15,000 ohms 2 Watt
R29		Resistor - 150,000 ohms 1/4 Watt
R31		Resistor - 18 ohms, 2 Watt
R32		Resistor - 150,000 ohms 1/4 Watt
	A18146	Socket, AC
	A18144	Socket, Dial Light
	A54374	Socket, (for cable from recorder switch)
	A18101	Socket, Microphone
	A18104	Socket, Phono
	A58103	Speaker - 10" (P.M.)
	A54335	Spring - Dial Cord
	A3791	Switch - Wafer - 6 Position
T3	A3371	Transformer - 1st I.F.
T4	A3535	Transformer - 2nd I.F.
T5	A1339	Transformer - Output
T6	A28176	Transformer - Bias Oscillator
T8	A1091	Transformer - Power

SCHEMATIC LOCATION	PART NUMBER	DESCRIPTION
R26	A2486	Control - Tone, with switch
R8	A2485	Control - Volume
	A54373	Cord - Dial Drive (per yard)
	A5592	Cord - Line 8 feet long
	A40131	Dial
	A4448	Escutcheon (Dial Crystal)
	A31972	Knob - Master Selector Switch
	A39171	Knob - Tone, Off-On
	A39169	Knob - Tuning
	A39170	Knob - Volume-Control
	A4926	Lamp - Neon Light Ass'y
		Lamp - Pilot Light #47
	A59398	Leaflet - Instruction
	A54372	Lens - Neon Light
T1	A28205	Loop Antenna Ass'y
	A6610	Microphone - Cord, Plug & Stand
	A4146	Pointer - Dial
R1		Resistor - 2.4 ohms 1/2 Watt
R2		Resistor - 1.0 ohms 1/2 Watt

SCHEMATIC LOCATION	PART NUMBER	DESCRIPTION
	A5594	Cable - Recorder Head
C1	A1695	Capacitor - Variable
C2		Capacitor - .05 mfd 200 V
C3 C4 C16 C18		Capacitor - .05 mfd 400 V
C5		Capacitor - 100 mmfd Mica or Ceramic
C7 C16		Capacitor - .002 mfd 400 V
C8 C24 C25		Capacitor - .001 mfd 400 V
C9 C20 C27		Capacitor - .01 mfd 400 V
C11 C12 C13 C14	A20114	Capacitor - Electrolytic 25 mfd 20 V 40 mfd 300 V 20 mfd 300 V
C15		Capacitor - .2 mfd 200 V
C17		Capacitor - .02 mfd 400 V
C19		Capacitor - .05 mfd Oil (metal case) 400 V
C21		Capacitor - .015 mfd 600 V
C22		Capacitor - .2 mfd 400 V
C23		Capacitor - 220 mmfd Mica or Ceramic
C26		Capacitor - .005 mfd 400 V
C28	A20117	Capacitor - Electrolytic 10 mfd 400 V
T7	A3368	Choke - Filter
T2	A28184	Coil - Oscillator B.C.

MODELS 8105, 8105A, 8106, 8106A, CHASSIS 101.833, 101.833-1A

SEARS, ROEBUCK & CO.



*-PART OF T2.
TUBE SOCKETS ARE VIEWED FROM UNDER SIDE OF CHASSIS. VOLTAGE READINGS SHOWN AT SOCKET PRONGS ARE TO NEGATIVE "B" AND ARE TAKEN WITH NO SIGNAL, WITH PHONO-BAND SWITCH IN BC. POSITION, AND WITH LINE VOLTAGE AT 117 VOLTS. VOLTAGES SHOWN ARE TAKEN WITH A VOLTMETER HAVING A RESISTANCE OF ONE THOUSAND OHMS PER VOLT. WHERE NO READING IS GIVEN, THE VOLTAGE IS ZERO OR TOO LOW TO READ.
PHONO-BAND SWITCH IS SHOWN IN EXTREME COUNTER-CLOCKWISE (S.W.) POSITION (VIEWED FROM SHAFT END) AND ROTATES CLOCKWISE FROM S.W. TO BC. TO PHONO. SECTIONS MARKED "RFAR" ARE TRANSPARENT VIEWS.

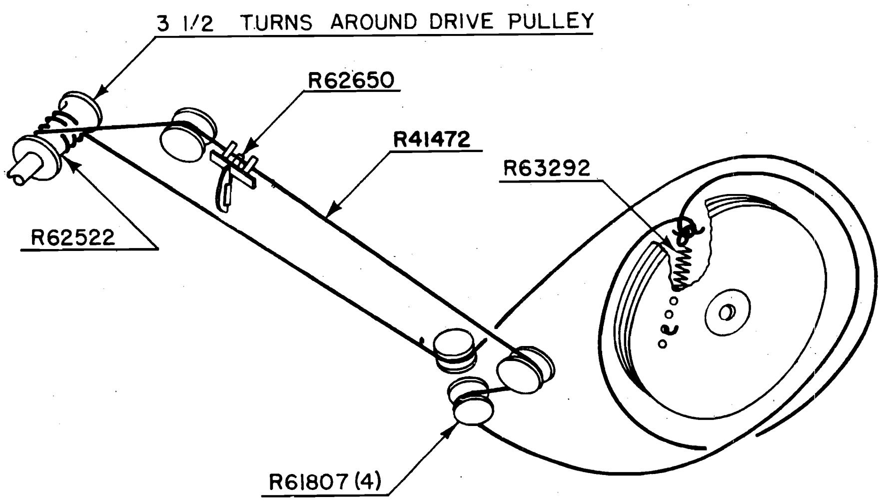
Six Tube Superhetrodyne Receiver with Push Button Tuning and Automatic Record Changer

Chassis 101.833-1A same as 101.833 except those parts
R63021 Speaker - 10" P. M.
R65588 Transformer - Output

Power Output

Undistorted 1.1 Watts

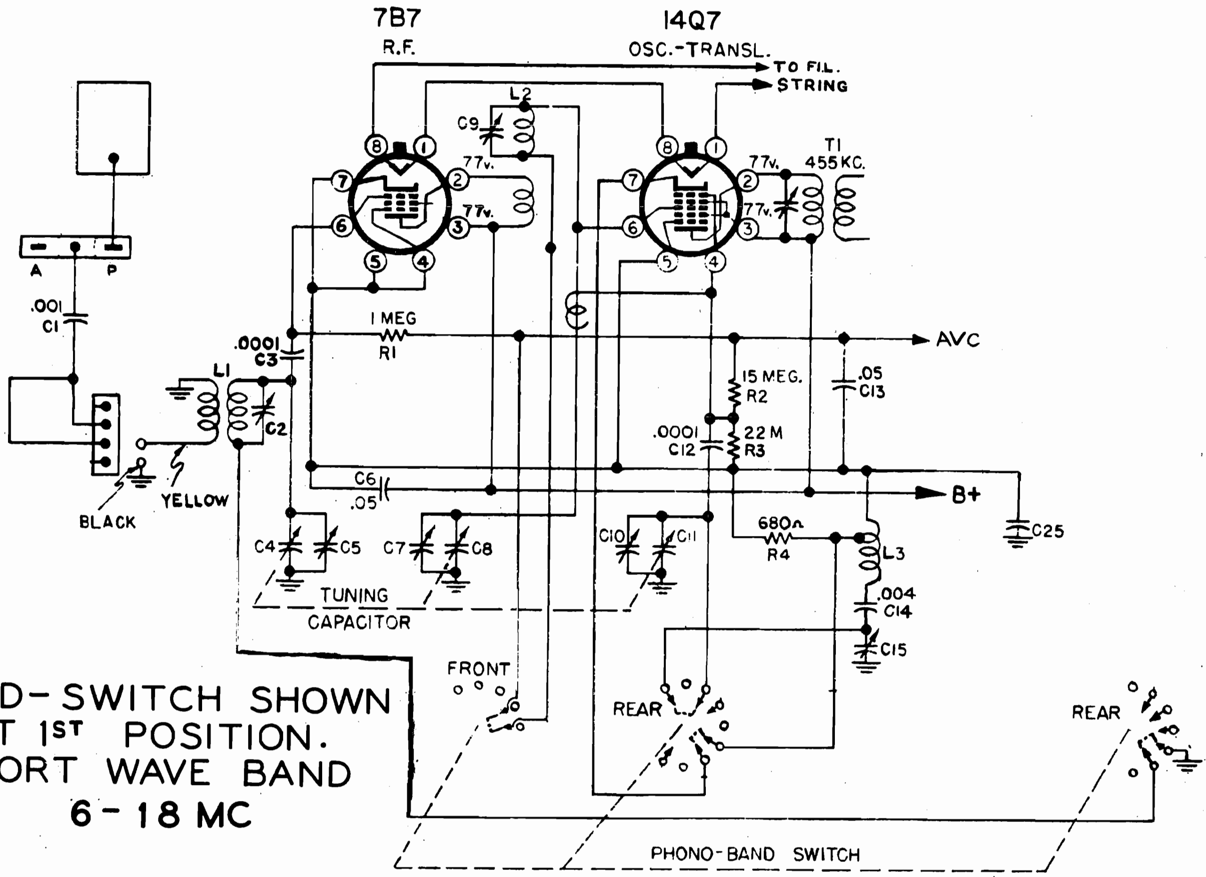
Maximum 1.9 Watts



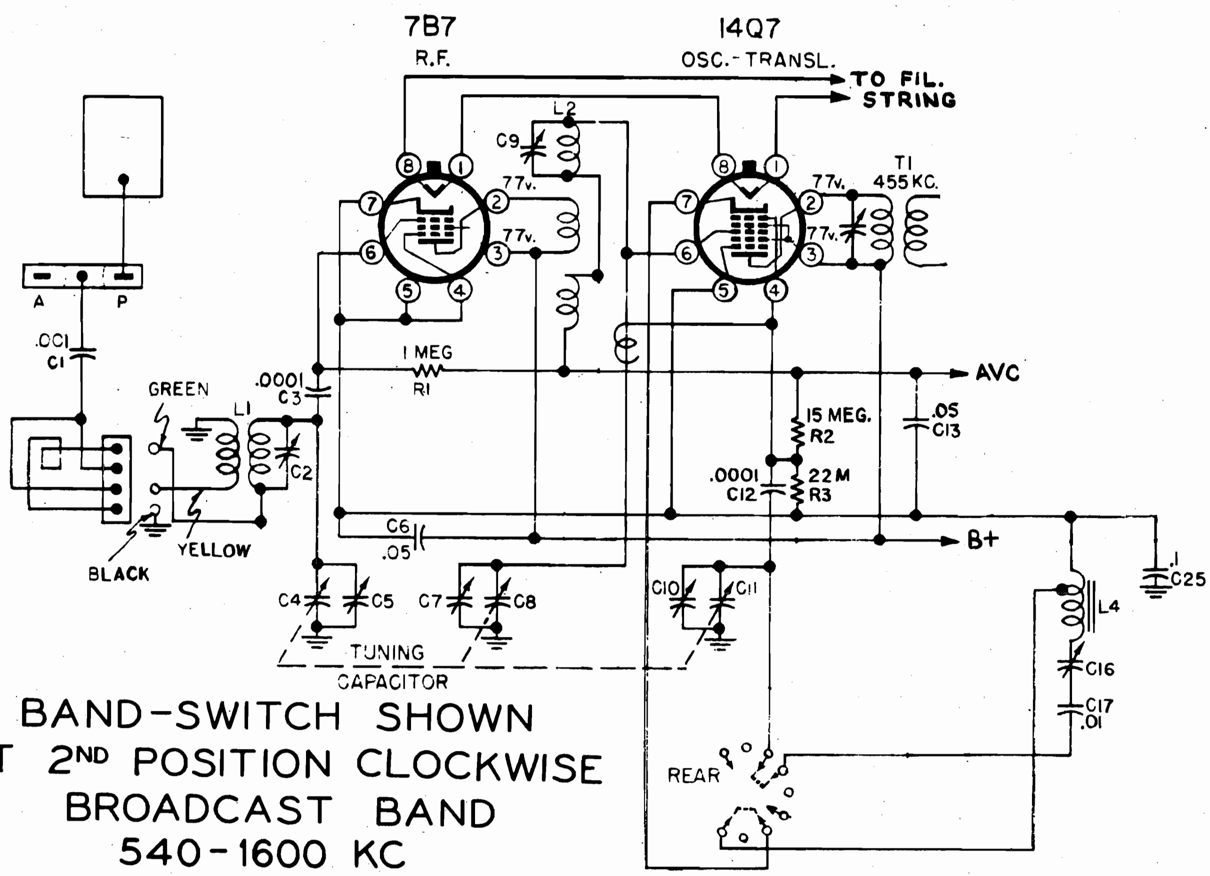
STRING AND POINTER HOOKUP

SEARS, ROEBUCK & CO.

MODELS 8105, 8105A, 8106, 8106A, CHASSIS 101.833, 101.833-1A



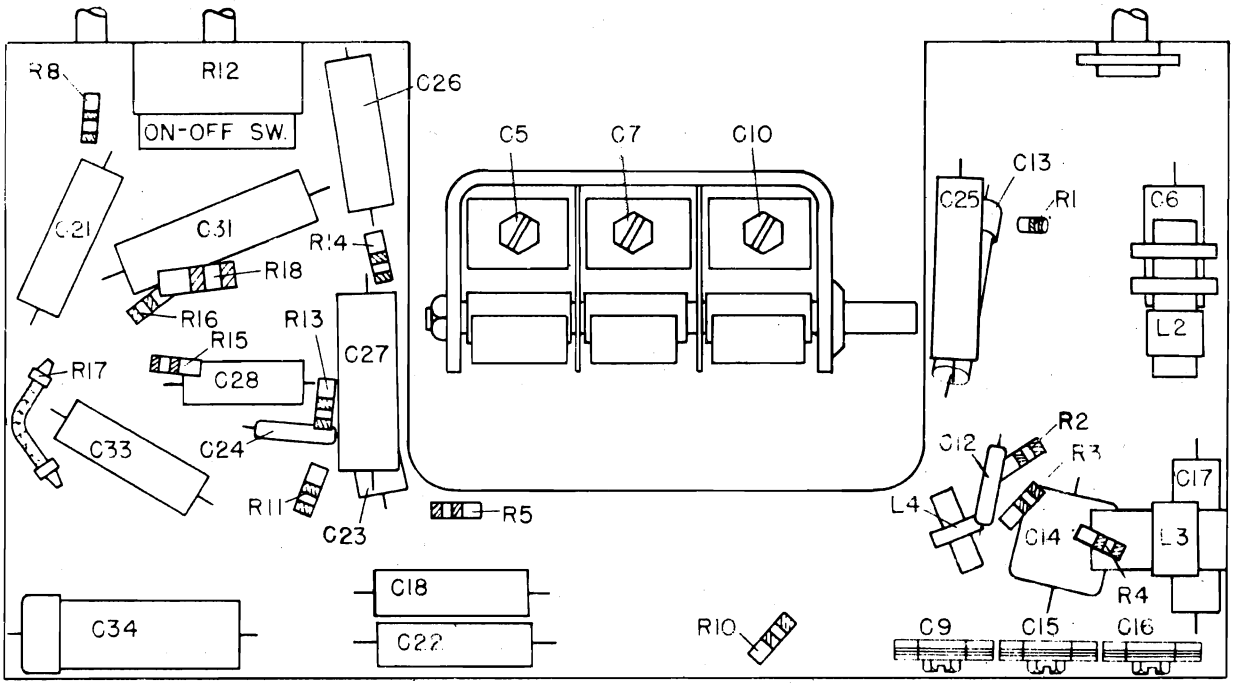
BAND-SWITCH SHOWN AT 1ST POSITION. SHORT WAVE BAND 6-18 MC



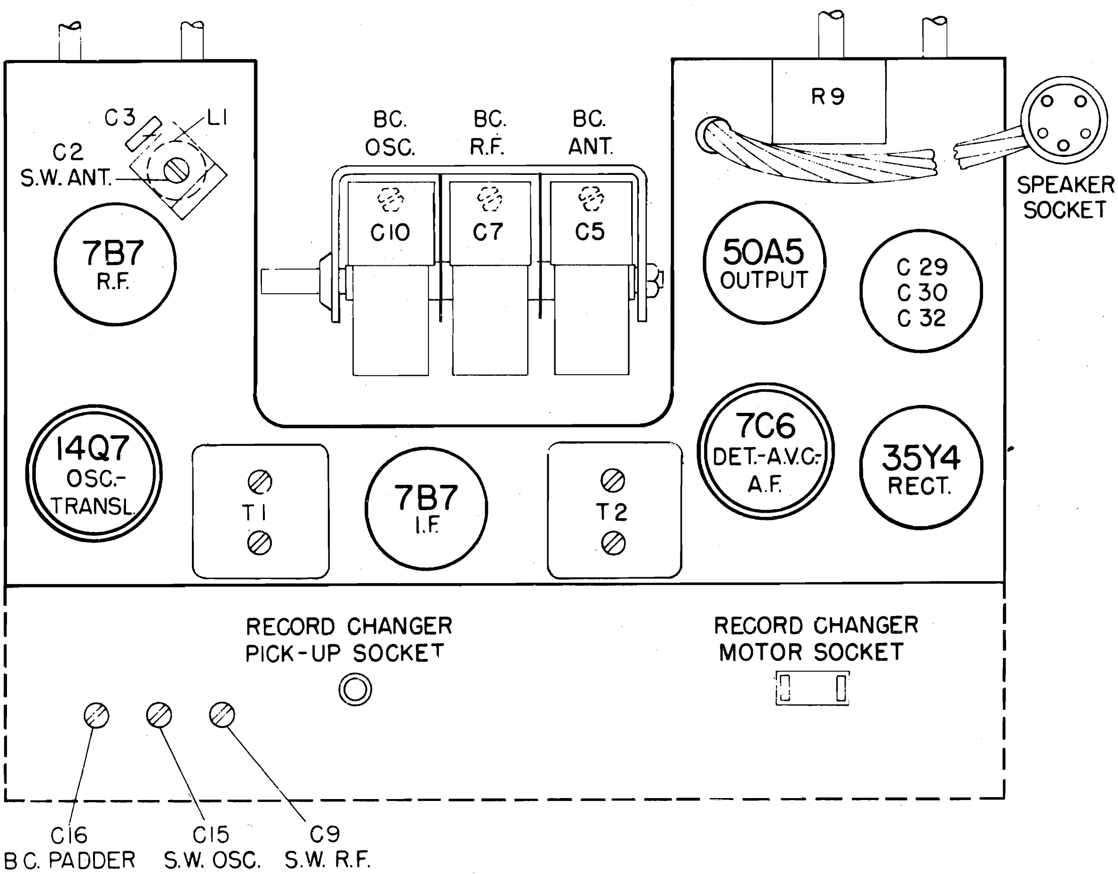
BAND-SWITCH SHOWN AT 2ND POSITION CLOCKWISE BROADCAST BAND 540-1600 KC

MODELS 8105, 8105A, 8106, 8106A, CHASSIS 101.833, 101.833-1A

SEARS, ROEBUCK & CO.



LOCATION OF PARTS UNDER CHASSIS



LOCATION OF PARTS ON TOP AND BACK OF CHASSIS

SEARS, ROEBUCK & CO.

MODELS 8105, 8105A, 8106, 8106A, CHASSIS 101.833, 101.833-1A

REPAIR PARTS LIST

SCHEMATIC LOCATION	PART NUMBER	DESCRIPTION	MU CODE
	R62379	Background - Dial	
	R62652	Button - Push	
	R13961	Button - Snap	
C25,C27		Capacitor - .1 Mfd. 200 Volt	
C17		Capacitor - .01 Mfd. 600 Volt	
C21,C31		Capacitor - .02 Mfd. 600 Volt	
C6,C13,C22,C34		Capacitor - .05 Mfd. 600 Volt	
C1,C23,C26		Capacitor - .001 Mfd. 600 Volt	
C18,C23,C28		Capacitor - .005 Mfd. 600 Volt	
C14		Capacitor - Mica - .004 Mfd.	
C3,C12,C24		Capacitor - Mica - 100 Mmfd.	
C29,C30,C32	R60416	Capacitor - Electrolytic - 40 Mfd. 150 Volt, 20 Mfd. 25 Volt, 40 Mfd. 150 V.	
C9,C15,C16	R62651	Capacitor - Trimmer - 3 Gang	
C4,C8,C11	R61200	Capacitor - Variable - 3 Gang	A0
L2	R61236	Coil - R. F. - BC & SW	
L4	R61237	Coil - Oscillator - BC	
L1	R61238	Coil - Antenna - SW	
L3	R62512	Coil - Oscillator - SW	
	R60639	Connector - Loop Terminal	
R9	R62528	Control - Volume	
R12	R62529	Control - On-Off & Tone	
	R16706	Cord - Line	
	R41472	Cord - Dial Drive	
	R62653	Covers - Tab	
	R60461	Drum & Pinion Assembly	
	R62389	Escutcheon & Dial Assembly	A5
	R62387	Dial - Station - Lucite	
	R62388	Escutcheon (Without Dial)	
	R60459	Gear & Hub Assembly	
	R62315	Key - Plunger	
	R62531	Knob - Volume	
	R62534	Knob - On-Off & Tone	
	R62537	Knob - BC, SW & Phono	
	R62712	Knob - Tuning	
		Lamp - Mazda Type #47	
	R64022	Leaflet - Instruction	
	R62385	Lever, Arm & Link Assembly	
	R61235	Loop & Board Assembly	
	R62307	Plunger & Yoke Assembly	
	R62650	Pointer & Slide Assembly	
	R61807	Pulley - Metal	
R16		Resistor - 150 Ohm - 1/3 Watt	
R4		Resistor - 680 Ohm 1/3 Watt	
R3		Resistor - 22,000 Ohm - 1/3 Watt	
R8		Resistor - 68,000 Ohm - 1/3 Watt	
R10		Resistor - 330,000 Ohm - 1/3 Watt	
R14,R15		Resistor - 470,000 Ohm - 1/3 Watt	
R1		Resistor - 1 Megohm - 1/3 Watt	
R5,R13		Resistor - 2.2 Megohm - 1/3 Watt	
R11		Resistor - 4.7 Megohm - 1/3 Watt	
R2		Resistor - 15 Megohm - 1/3 Watt	
R18		Resistor - 1200 Ohm - 1 Watt	
R17	R40232	Resistor - Glasohm - 25 Ohm - 1 Watt	
	R62303	Rocker - Bar & Plate Assembly	
	R57193	Shield - Tube	
	R44145	Socket - 2 Prong - Female A.C.	
	R44897	Socket - 1 Prong - Phono	
	R57049	Socket - Tube 8 Prong Lock-In	
	R60515	Socket - Pilot Lamp	
	R60639	Socket - Speaker Cable	
		WHEN ORDERING SPEAKER PARTS ALWAYS GIVE THE PART NUMBER ON THE SPEAKER	
	R61032	Speaker - 8" P. M.	B5
	R61037	Cone & Voice Coil	
T3	R61038	Output Transformer	
	R60427	Spring - Extension - Tuner Assembly	
	R60437	Spring - Compression - Tuner Assembly	
	R60677	Spring - Dial Drive	
	R62382	Switch - Wave	
	R62522	Tuning Shaft Assembly	
T1	R60417	Transformer - I. F. #1	
T2	R60418	Transformer - I. F. #2	
	R60450	Wafer - Electrolytic Capacitor Mounting	
	R62384	Wafer - Rear - Wave Switch	
	R45523	Washer - Spring - Lever, Arm & Link Assy.	
	R46042	Washer - Insulating - Phono Socket	

SPECIFICATIONS

Power Supply:
All models available..........................117 Volts 60 Cycles AC 60 Watts

Frequency Range:
Broadcast...............540-1600 KC
Short Wave..................6-18 MC

ALIGNMENT PROCEDURE

PRELIMINARY:

Output meter reading to indicate 0.05 Watt across voice coil.................0.4 Volt
Generator ground lead connection....................I.F. alignment-negative "B" lead
....................R.F. alignment-Receiver chassis
Generator Modulation..30%, 400 cycles
Position of volume control...Fully on
Position of tone control...Treble
Position of pointer with tuner fully closed....Last line to left of 540 calibration mark on the dial scale or first light brown mark from the left-hand end on the upper edge of the dial background.

WAVE SWITCH POSITION	POSITION OF TUNER	FREQUENCY GENERATOR	DUMMY ANTENNA	GENERATOR CONNECTION	TRIMMERS (ADJ. IN ORDER SHOWN)	TRIMMER FUNCTION
BC	Closed	455 Kc.	0.1 mfd.	Transl.-Grid	T2 & T1	I.F.
BC	Fully open	1650 Kc.	200 mmfd.	Antenna	C10	Osc.
BC	See Note 1	1400 Kc.	200 mmfd.	Antenna	C7	Transl.
BC	See Note 1	1400 Kc.	200 mmfd.	Antenna	C5	Ant.
BC	See Note 2	600 Kc. (Rock)	200 mmfd.	Antenna	C16	Padder
SW	16.5 Mc.	16.5 Mc.	400 ohms	Antenna	C15	Osc.
SW	See Note 1	14 Mc. (Rock)	400 ohms	Antenna	C9	Transl.
SW	See Note 1	14 Mc. (Rock)	400 ohms	Antenna	C2	Ant.

IMPORTANT ALIGNMENT NOTES:

NOTE 1: The 1400 Kc. & 14 Mc. calibration point is the second light brown mark from the right-hand end on the upper edge of the dial background.

NOTE 2: The 600 Kc. calibration point is the third light brown mark from the left-hand edge of the dial background.

The Alignment must be done in the order given.

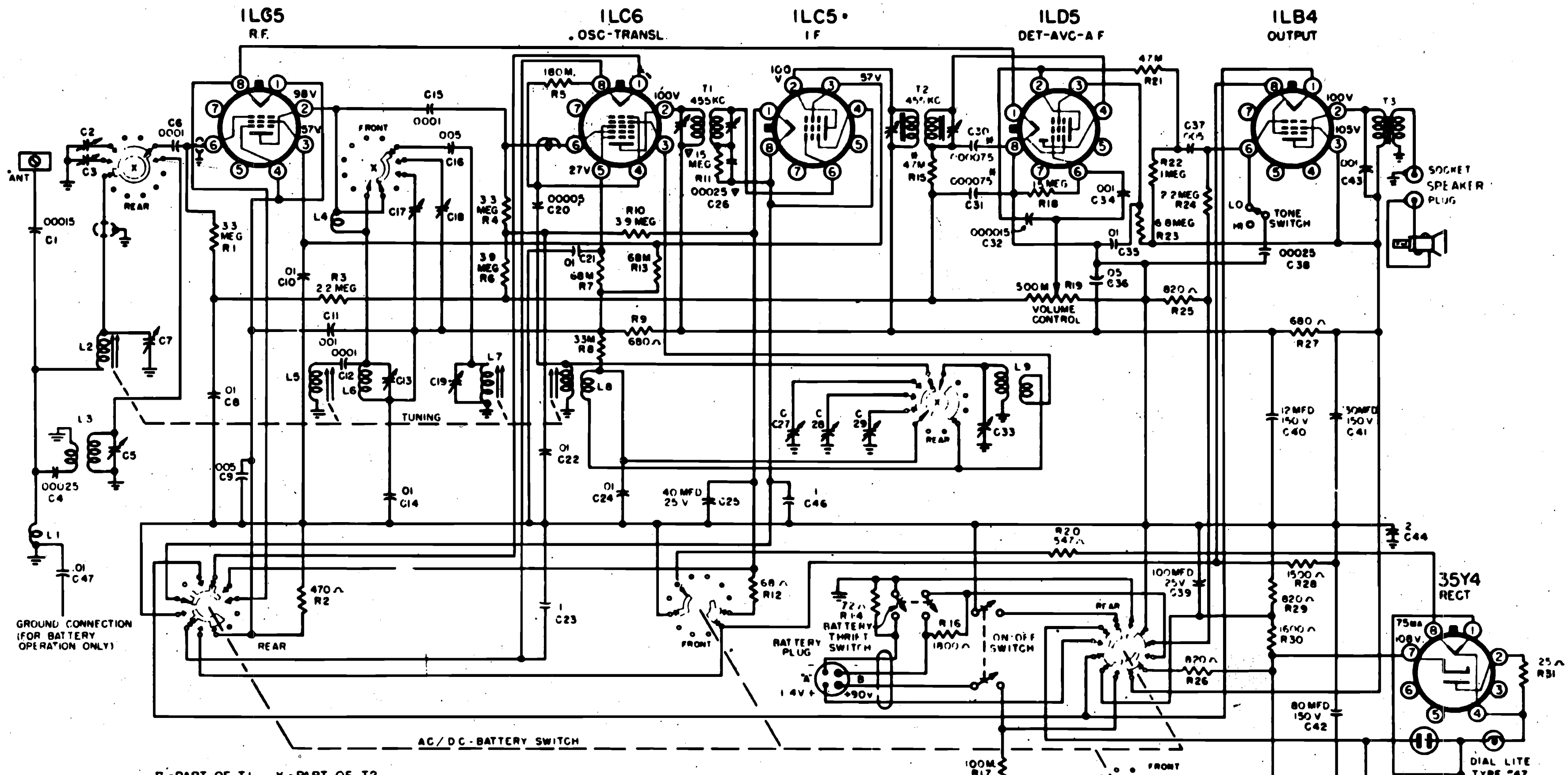
The entire Alignment Procedure should be repeated step by step in the original order for greatest accuracy.

Always keep the output from the generator at its lowest possible value to prevent the AVC receiver from interfering with accurate alignment.

During alignment of the "BC" Band Padder and the "SW" Band R.F. and Antenna Trimmers, the tuner should be rocked through resonance to assure alignment.

MODEL 8230,
CHASSIS 101.835

SEARS, ROEBUCK & CO.



▽-PART OF T1 ✱-PART OF T2

TUBE SOCKETS ARE VIEWED FROM UNDER SIDE OF CHASSIS. BAND SWITCH SECTIONS (X) AND AC DC BATTERY SWITCH SECTIONS ARE VIEWED FROM DRIVING END OF SWITCH SHAFTS. SECTIONS MARKED "REAR" ARE TRANSPARENT VIEWS. BAND SWITCH SECTIONS (X) ARE SHOWN IN EXTREME COUNTER CLOCKWISE (BC) POSITION AND ROTATE CLOCK-WISE FROM BC TO 9MC TO 11MC. TO 15MC POSITIONS. AC DC BATTERY SWITCH SECTIONS ARE SHOWN IN EXTREME COUNTER CLOCKWISE AC/DC POSITION AND ROTATE CLOCKWISE FROM AC DC TO BATTERY POSITION.

VOLTAGE READINGS SHOWN AT SOCKET PRONGS ARE TO NEGATIVE "B" AND ARE TAKEN WITH NO SIGNAL, WITH BAND SWITCH IN BC POSITION, WITH AC/DC BATTERY SWITCH IN AC/DC POSITION AND WITH LINE VOLTAGE AT 117 VOLTS. WHERE NO READING IS GIVEN, THE VOLTAGE IS ZERO OR TOO LOW TO READ. VOLTAGE READINGS ARE TAKEN WITH A VOLTMETER HAVING A RESISTANCE OF ONE THOUSAND OHMS PER VOLT.

SEARS, ROEBUCK & CO.

MODEL 8230,
CHASSIS 101.835

PRELIMINARY:

ALIGNMENT PROCEDURE

Output meter reading to indicate 0.05 watt across voice coil.................0.4 volt
Generator ground lead connection......................I.F. alignment-negative "B" lead
......................Ant. alignment-receiver chassis
Generator modulation..30%, 400 cycles
Position of volume control...Fully on
Position of tone control..Treble
Position of pointer with tuner fully closed..Last line to left of 540 calibration mark on the dial scale.

WAVEBAND SWITCH POSITION	POSITION OF TUNER	GENERATOR FREQUENCY	DUMMY ANTENNA	GENERATOR CONNECTION	TRIMMER ADJUSTMENTS (IN ORDER SHOWN)	TRIMMER FUNCTION
BC	Closed	455 Kc.	0.1 mfd.	Transl.-Grid	T2 & T1	I. F.
BC	See Note	1725 Kc.	75 mmfd.	Antenna	C29	Oscillator
BC	See Note	1725 Kc.	75 mmfd.	Antenna	C7 & C19	Ant., Transl.
BC	See Note	1500 Kc.	75 mmfd.	Antenna	L8	Oscillator
BC	See Note	1500 Kc.	75 mmfd.	Antenna	L2 & L7	Ant., Transl.
C	See Note	15.2 Mc.	400 ohms	Antenna	C33	Oscillator
C	See Note	15.2 Mc.	400 ohms	Antenna	C5 & C13	Ant., Transl.
B	See Note	11.8 Mc.	400 ohms	Antenna	C27	Oscillator
B	See Note	11.8 Mc.	400 ohms	Antenna	C2 & C17	Ant., Transl.
A	See Note	9.6 Mc.	400 ohms	Antenna	C28	Oscillator
A	See Note	9.6 Mc.	400 ohms	Antenna	C3 & C18	Ant., Transl.

IMPORTANT ALIGNMENT NOTES·

NOTE: Before alignment of receiver, remove the dial background. The tuner should be positioned at the frequency noted under "GENERATOR FREQUENCY" on the above chart. These frequencies are noted on the dial background mounting plate. "START," shall be considered the position of the tuner fully closed and "FINISH," the position of the tuner at 1725 Kc.

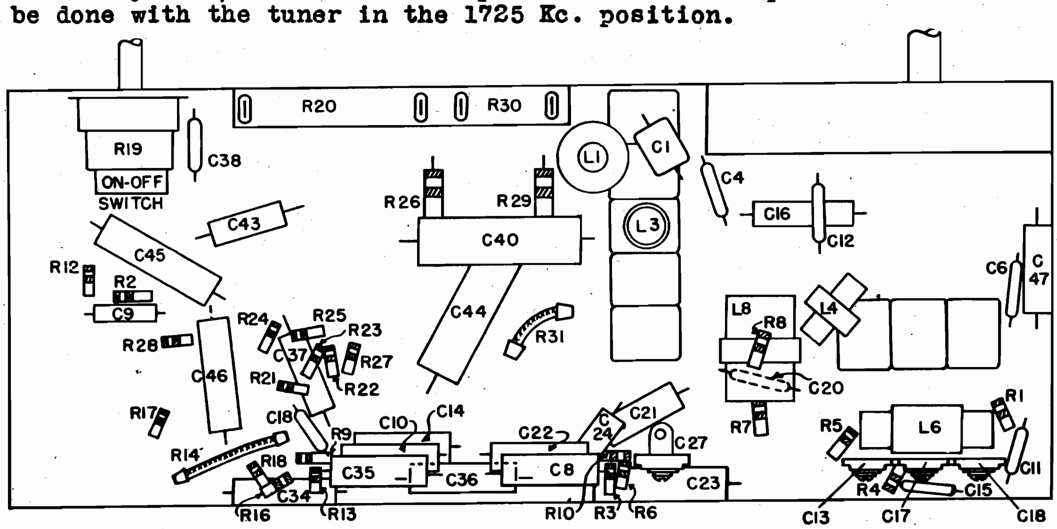
During the alignment of the antenna and translator trimmers on the shortwave spreadbands the tuner should be rocked through resonance to assure alignment.

The alignment must be done in the order given.

The entire alignment procedure should be repeated step by step in the original order for greatest accuracy.

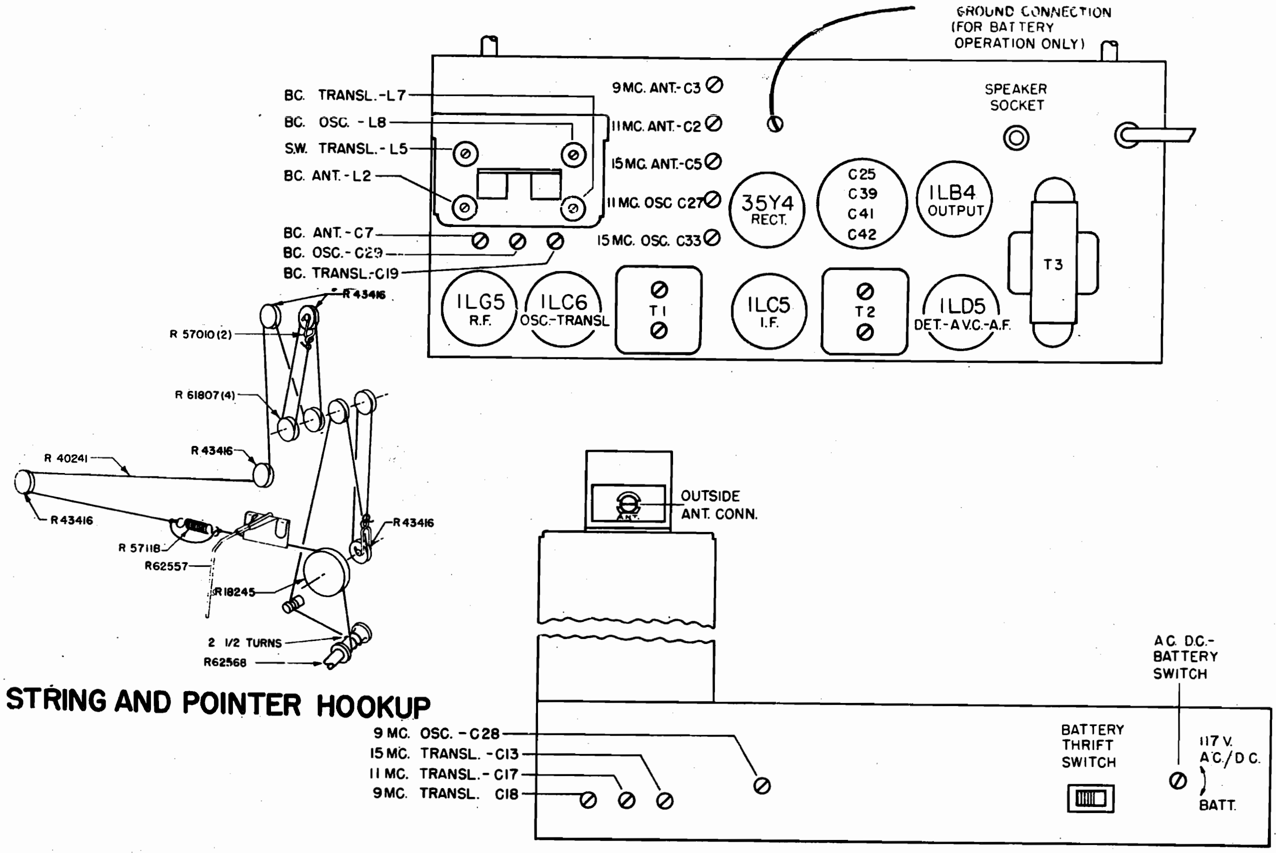
Always keep the output power from the generator at its lowest possible value to prevent the AVC action of the receiver from interfering with accurate alignment.

Before attempting shortwave alignment, the L5 core should be adjusted to a dimension of approximately 1-21/32" from the top of core to the top turn of the winding. This should be done with the tuner in the 1725 Kc. position.



MODEL 8230,
CHASSIS 101.835

SEARS, ROEBUCK & CO.



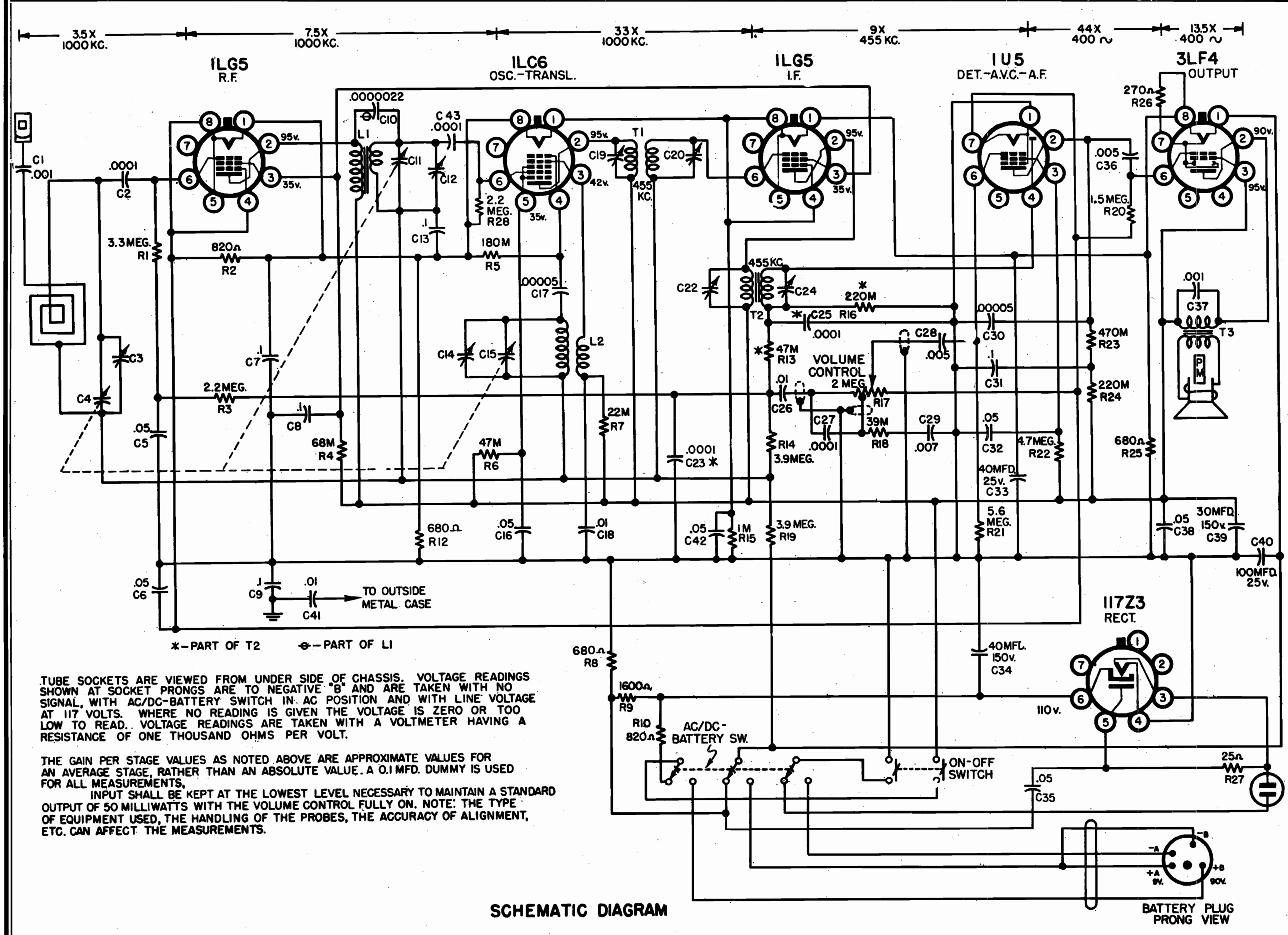
STRING AND POINTER HOOKUP

LOCATION OF PARTS ON TOP & BACK OF CHASSIS

SCHEMATIC LOCATION	PART NUMBER	DESCRIPTION
	R57045	Antenna Kit
	R62558	Background - Dial
	R57021	Bushing - Shaft
	R61846	Button - Snap
C23,C46		Capacitor - .1 Mfd. 600 Volt
C44		Capacitor - .2 Mfd. 600 Volt
C8,C10,C14,C21, C22,C24,C35,C47		Capacitor - .01 Mfd. 600 Volt
C36,C45		Capacitor - .05 Mfd. 600 Volt
C34,C43		Capacitor - .001 Mfd. 600 Volt
C16,C37		Capacitor - .005 Mfd. 600 Volt
C32		Capacitor - Mica - 15 Mmfd.
C20		Capacitor - Mica - 50 Mmfd.
C6,C12,C15		Capacitor - Mica - 100 Mmfd.
C1		Capacitor - Mica - 150 Mmfd.
C38		Capacitor - Mica - 250 Mmfd.
C11		Capacitor - Mica - 1000 Mmfd.
C4		Capacitor - Silver Mica - 250 Mmfd.
C9		Capacitor - Mica - 5000 Mmfd.
C28	R57080	Capacitor - Trimmer - Single
C7,C19,C29	R57081	Capacitor - Trimmer - 3 Gang
C13,C17,C18	R57020	Capacitor - Trimmer - 3 Gang
C2,C3,C5,C27, C33	R57082	Capacitor - Trimmer - 5 Gang
C40	R61840	Capacitor - Dry Electrolytic - 12 Mfd. 150 Volt
C25,C39,C41, C42	R60803	Capacitor - Electrolytic - 40 Mfd. 25 Volt 100 Mfd. 25 V., 30 Mfd. 150 V., 80 Mfd. 150 V.
L3	R45074	Coil - Antenna - S. W. Shunt
L6	R45077	Coil - R.F. - S.W. Shunt
L1	R45255	Coil - Choke
L9	R57078	Coil - Oscillator - S.W. Shunt
R19	R62577	Control - On-Off, Volume & Tone
	R17166	Cord - Line
	R40241	Cord - Dial Drive (48")
	R62586	Dial - Station
	R62559	Escutcheon
	R62540	Knob - On-Off & Volume
	R62541	Knob - Tone
	R62542	Knob - Tuning
	R62543	Knob - Wave Switch
	R20963	Lamp - Mazda Type #47
	R64090	Leaflet - Instruction
	R40457	Plug - 4 Prong - Battery Cable
	R62557	Pointer - Dial
	R18245	Pulley - Wood - 1 1/16" O.D.
	R43416	Pulley - Wood - 17/32" O.D.
	R61807	Pulley - Metal
R12		Resistor - 68 Ohm - 1/2 Watt
R2		Resistor - 470 Ohm - 1/2 Watt
R9,R27		Resistor - 680 Ohm - 1/2 Watt
R25,R26		Resistor - 820 Ohm - 1/2 Watt
R28		Resistor - 1500 Ohm - 1/2 Watt
R16		Resistor - 1800 Ohm - 1/2 Watt
R8		Resistor - 33,000 Ohm - 1/2 Watt
R21		Resistor - 47,000 Ohm - 1/2 Watt
R7,R13		Resistor - 68,000 Ohm - 1/2 Watt
R17		Resistor - 100,000 Ohm - 1/2 Watt
R5		Resistor - 180,000 Ohm - 1/2 Watt
R22		Resistor - 1 Megohm - 1/2 Watt
R3, R24		Resistor - 2.2 Megohm - 1/2 Watt
R1, R4		Resistor - 3.3 Megohm - 1/2 Watt
R6,R10		Resistor - 3.9 Megohm - 1/2 Watt
R23		Resistor - 6.8 Megohm - 1/2 Watt
R18		Resistor - 15 Megohm - 1/2 Watt
R29		Resistor - 820 Megohm - 1 Watt
R31	R40232	Resistor - Glasohm - 25 Ohm - 1 Watt
R14	R45254	Resistor - Flexohm - .72 Ohm - 1/2 Watt
R20,R30	R61838	Resistor - Wire Wound - 2 Section
	R62592	Screw - #2 x 5/8 - Escutcheon & Dial Mounting
	R62640	Screw - #2 x 3/8 - Escutcheon & Dial Mounting
	R62568	Shaft & Link Assembly
	R44897	Socket - 1 Prong - Speaker Connector
	R57040	Socket - Pilot Lamp
	R57049	Socket - Tube - 8 Prong Lock-In
		WHEN ORDERING SPEAKER PARTS ALWAYS GIVE THE PART NUMBER ON THE SPEAKER
	R57061	Speaker - 5 1/4" P.M.
	R57272	Plug
	R57118	Spring - Extension
	R57038	Switch - Slide Type - D.P.S.T.
	R61828	Switch - AC - DC - Battery
	R57064	Switch - Wave
T1	R57120	Transformer - I.F. #1
T2	R62571	Transformer - I.F. #2
T3	R62253	Transformer - Output
	R62724	Tuner - Permability Unit
L2	R63128	Coil - Antenna
L8	R63129	Coil - Oscillator
L7	R63130	Coil - R.F.
L5	R63131	Coil - S.W. Shunt
	R61819	Core Slide Bracket Assembly
	R62811	Core - Iron
	R45067	Cover
	R13335	Washer - "C" - Shaft & Link Assembly Retaining
	R61815	Washer - Metal Pulleys Retaining
	R15496	Washer - Flat - Chassis Mounting
	R62587	Washer - Felt (behind knob)

SEARS, ROEBUCK & CO.

MODELS 8270, 8270A,
CHASSIS 101.822,
101.822A



TUBE SOCKETS ARE VIEWED FROM UNDER SIDE OF CHASSIS. VOLTAGE READINGS SHOWN AT SOCKET PRONGS ARE TO NEGATIVE "B" AND ARE TAKEN WITH NO SIGNAL, WITH AC/DC-BATTERY SWITCH IN AC POSITION AND WITH LINE VOLTAGE AT 117 VOLTS. WHERE NO READING IS GIVEN THE VOLTAGE IS ZERO OR TOO LOW TO READ. VOLTAGE READINGS ARE TAKEN WITH A VOLTMETER HAVING A RESISTANCE OF ONE THOUSAND OHMS PER VOLT.

THE GAIN PER STAGE VALUES AS NOTED ABOVE ARE APPROXIMATE VALUES FOR AN AVERAGE STAGE, RATHER THAN AN ABSOLUTE VALUE. A 0.1 MFD. DUMMY IS USED FOR ALL MEASUREMENTS.
INPUT SHALL BE KEPT AT THE LOWEST LEVEL NECESSARY TO MAINTAIN A STANDARD OUTPUT OF 50 MILLIWATTS WITH THE VOLUME CONTROL FULLY ON. NOTE: THE TYPE OF EQUIPMENT USED, THE HANDLING OF THE PROBES, THE ACCURACY OF ALIGNMENT, ETC. CAN AFFECT THE MEASUREMENTS.

SCHEMATIC DIAGRAM

MODELS 8270, 8270A,
CHASSIS 101.822,
101.822A

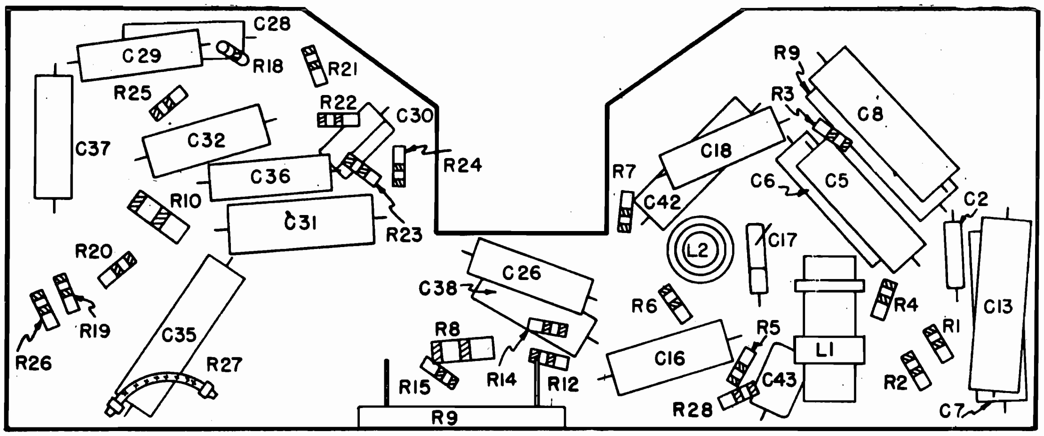
SEARS, ROEBUCK & CO.

SPECIFICATIONS

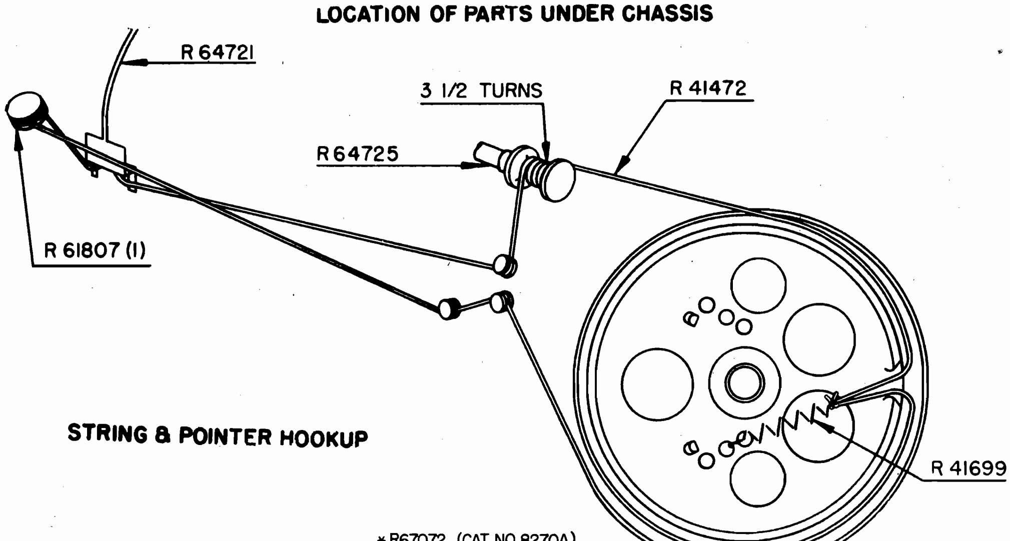
Power Supply:
All Models available..117 Volts DC, 25-60 Cycle AC, 20 Watts or Catalog No. 6404 Battery Pack

Power Output:
Undistorted.......................... .25 Watts
Maximum.......................... .45 Watts

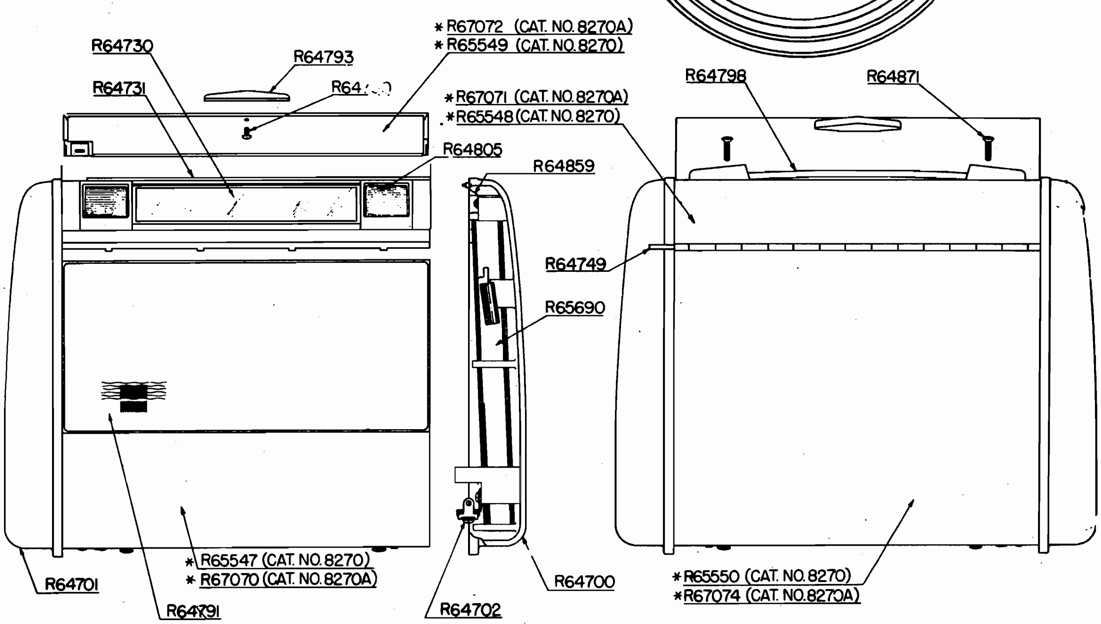
Frequency Range:
Broadcast...................... 540-1600 KC



LOCATION OF PARTS UNDER CHASSIS



STRING & POINTER HOOKUP



SEARS, ROEBUCK & CO.

MODELS 8270, 8270A, CHASSIS 101.822, 101.822A

PRELIMINARY:

ALIGNMENT PROCEDURE

Output meter reading to indicate 0.05 Watt across voice coil	0.4 Volt
Generator ground lead connection	To B- through 0.1 mfd. capacitor
Generator modulation	30%, 400 cycles
Position of volume control	Fully on
Position of pointer with tuner fully closed	The second line to the left of the 540 Kc. calibration mark.

POSITION OF TUNER	GENERATOR FREQUENCY	DUMMY ANTENNA	GENERATOR CONNECTION	ADJUSTMENTS (IN ORDER SHOWN)	FUNCTION
Closed	455 Kc.	0.1 mfd.	Trans-Grid	T2 & T1	I.F.
1400 Kc.	1400 Kc.	50 mmfd.	Hazeltine Loop	C14	Oscillator
1400 Kc.	1400 Kc.	50 mmfd.	Hazeltine Loop	C12	R.F.
1400 Kc.	1400 Kc.	50 mmfd.	Hazeltine Loop	* C3	Antenna

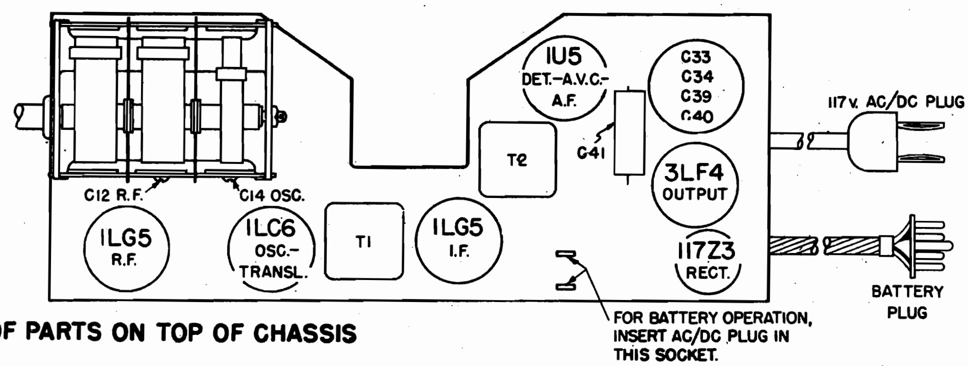
IMPORTANT ALIGNMENT NOTES:

NOTE: It is recommended that an isolation transformer be connected between the radio chassis and the line before aligning the receiver on AC.

The alignment must be done in the order given.

Always keep the output power from the generator at its lowest possible value to prevent the AVC of the receiver from interfering with accurate alignment.

*Located on Loop and Case End Assembly



LOCATION OF PARTS ON TOP OF CHASSIS

PARTS LIST

SCHEMATIC LOCATION	PART NUMBER	DESCRIPTION	MU CODE
	R64702	Capacitor - Trimmer - Loop & End Case Assy.	
C7,C9,C8, C13,C31		Capacitor - .1 mfd. 600 Volt	
C18,C26,C41		Capacitor - .01 mfd. 600 Volt	
C5,C6,C16,C35, C38,C32,C42		Capacitor - .05 mfd. 600 Volt	
C2,C27,C43		Capacitor - Mica - 100 mmfd.	
C17,C30		Capacitor - Mica - 50 mmfd.	
C1,C37		Capacitor - .001 mfd. 600 Volt	
C28,C36		Capacitor - .005 mfd. 600 Volt	
C29		Capacitor - .007 mfd. 600 Volt	
C34,C39,C40, C33	R64703	Capacitor - Electrolytic - 40 mfd. 25 Volt, 100 mfd. 25 Volt, 30 mfd. 150 Volt, 40 mfd. 150 Volt	
C4,C11,C15	R64716	Capacitor - 3 Gang Variable	A5
	* R65550	Case Assembly - Rear Cat. #8270-Leatherette	AAO
	* R67074	Case Assembly - Rear Cat. #8270A-Painted	
	* R67070	Case Assembly - Front Cat. #8270A-Painted	
	* R65547	Case Assembly - Front Cat. #8270-Leatherette	AAO
	* R65548	Case Assembly - Top Cat. #8270-Leatherette	
	* R67071	Case Assembly - Top Cat. #8270A-Painted	
	R64700	Case - End - R.H.	
	R64701	Case - End - L.H.	
	R64730	Cover - Dial Celluloid	
	* R65549	Cover Assembly-Escutcheon Cat. #8270-Leatherette	
	* R67072	Cover Assembly-Escutcheon Cat. #8270A-Painted	
	R64738	Clip - Coil Mounting	
L1	R64705	Coil - R.F.	
L2	R64706	Coil - Oscillator	
R17	R64704	Control - On-Off & Volume	
	R64711	Cord - Line	
	R41472	Cord - Dial Drive (54")	
	R64923	Dial - Station	
	R64731	Escutcheon	
	R64791	Grille	A5
	R64793	Handle - Escutcheon Cover	
	R64287	Leaflet - Instruction	
	R65690	Loop - Antenna	
	R64805	Knob - On-Off or Tuning	
	R64749	Pin - Hinge	
	R64567	Plug - Battery Cable	
	R64721	Pointer - Dial	
	R61507	Pulley - Metal	
R26		Resistor - 270 ohm 1/2 Watt	
R12,R8,R25		Resistor - 680 ohm 1/2 Watt	
R10		Resistor - 820 ohm 1/2 Watt	
R15		Resistor - 1000 ohm 1/2 Watt	
		Resistor - 22,000 ohm 1/2 Watt	
R16		Resistor - 39,000 ohm 1/2 Watt	
R6		Resistor - 47,000 ohm 1/2 Watt	
R4		Resistor - 68,000 ohm 1/2 Watt	
R5		Resistor - 180,000 ohm 1/2 Watt	
R7,R24		Resistor - 220,000 Ohm 1/2 Watt	
R23		Resistor - 470,000 ohm 1/2 Watt	
R20		Resistor - 1.5 megohm 1/2 Watt	
R3,R28		Resistor - 2.2 megohm 1/2 Watt	
R1		Resistor - 3.3 megohm 1/2 Watt	
R19,R14		Resistor - 3.9 megohm 1/2 Watt	
R22		Resistor - 4.7 megohm 1/2 Watt	
R21		Resistor - 5.6 megohm 1/2 Watt	
R2		Resistor - 820 Ohm 1 Watt	
R27	R40232	Resistor - Glasohm - 25 ohm 1 Watt	
R9	R64716	Resistor - 1600 ohm - 6 Watt	
	R57049	Socket - Tube - 6 Prong Lock-in	
	R65153	Socket - Tube - Miniature	
	R65545	Socket - Miniature Tube (117Z3 Tube)	
		WHEN ORDERING SPEAKER PARTS ALWAYS GIVE THE PART NUMBER ON THE SPEAKER	
	R65157	Speaker - 5 1/4" P.M.	AO
	R62919	Cone & Voice Coil	
T3	R64764	Transformer - Output	
	R41699	Spring - Dial Drive	
	R60613	Switch - A.C. - Battery	
	R64725	Shaft Assembly - Tuning	
	R64790	Screw - Escutcheon - Cover Assembly	
	R64871	Screw - Carrying Strap Mounting	
	R64859	Spring Assembly - Loop & Case End Assembly	
	R64798	Strap - Carrying	
T1	R64707	Transformer - I.F. #1	
T2	R64708	Transformer - I.F. #2	
	R61830	Wafer - Electrolytic Capacitor Mounting	
	R15496	Washer - Flat - Chassis Assembly Mounting	
	R61615	Washer. - Metal Pulley Retaining	
	R64744	Washer - Insulating - Pointer Drive Assembly Mtg.	

MODEL 9054,
CHASSIS 101.849

SEARS, ROEBUCK & CO.

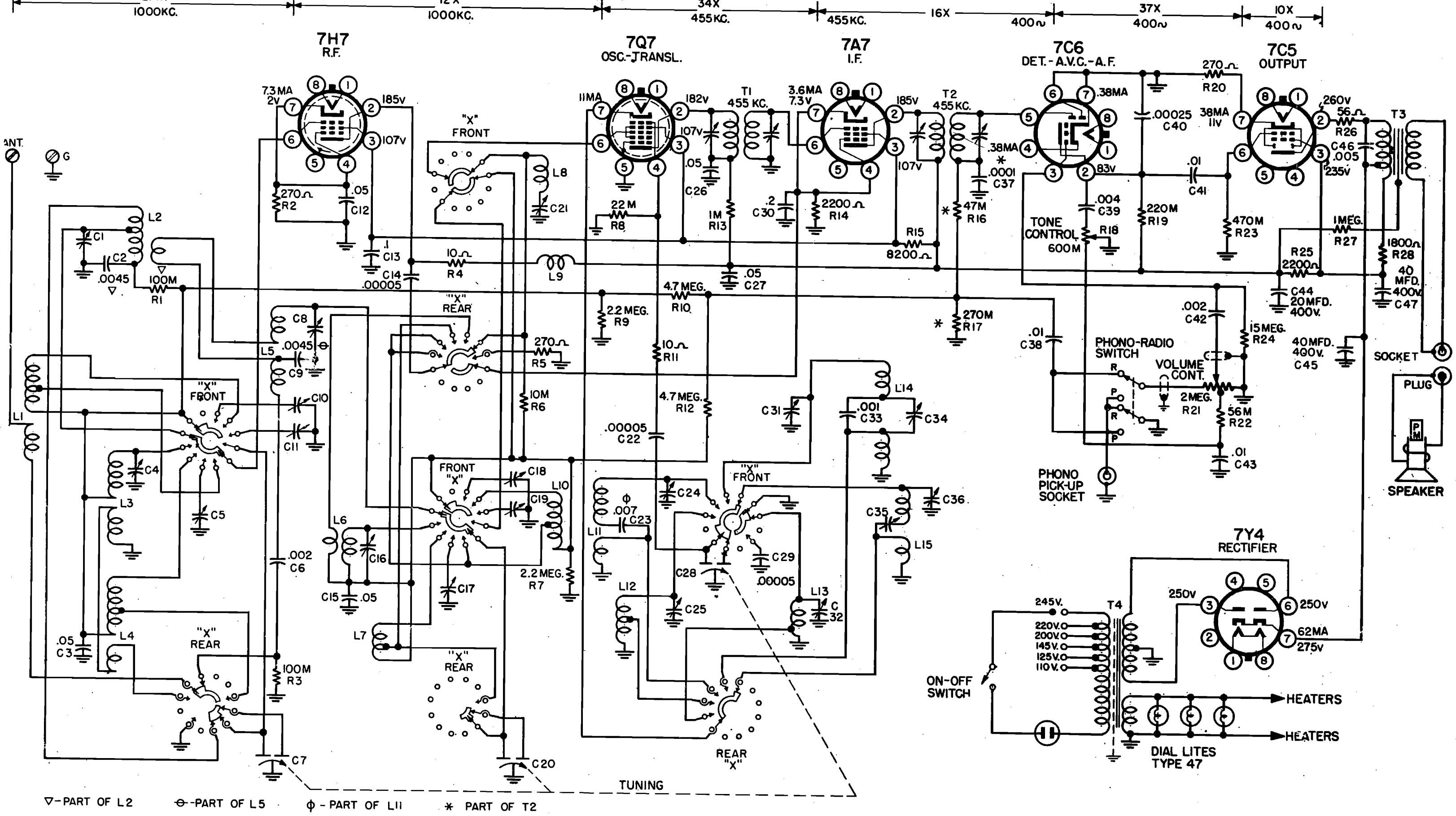
SPECIFICATIONS

Power Supply:
All models available . . . . 110-125-145-200-245 Volts 40 to 60 Cycle AC - 50 Watts

Frequency Range
Band "A" . . . . 540-1600 Kc.
Band "B" . . . . 1.65-4.6 Mc.
Band "C" . . . . 4.6-10.0 Mc.
Band "D" . . . . 10.0-15.6 Mc.
Band "E" . . . . 15.6-22.1 Mc.

Power Output:
Undistorted . . . . 3.0 Watts
Maximum . . . . 4.0 Watts

SCHEMATIC DIAGRAM FOR YOUR RADIO



▽-PART OF L2 ⊖-PART OF L5 ϕ - PART OF L11 * PART OF T2

BAND SWITCH "X" IS SHOWN IN EXTREME CLOCKWISE (BC. OR BAND A) POSITION (VIEWED FROM KNOB END OF SHAFT) AND ROTATES COUNTER CLOCKWISE FROM BAND A TO BAND B TO BAND C TO BAND D TO BAND E POSITION. SECTIONS MARKED REAR ARE TRANSPARENT VIEWS. TUBE SOCKETS ARE VIEWED FROM UNDER SIDE OF CHASSIS. VOLTAGE READINGS SHOWN AT SOCKET PRONGS ARE TO CHASSIS AND ARE TAKEN WITH NO SIGNAL, WITH PHONO-RADIO SWITCH IN RADIO POSITION, WITH BAND SWITCH IN BC. OR BAND A POSITION, WITH POWER TRANSFORMER TAP IN 110 VOLT POSITION, AND WITH LINE VOLTAGE AT 110 VOLTS. WHERE NO READING IS GIVEN, THE VOLTAGE IS ZERO OR TOO LOW TO READ. ALL VOLTAGE READINGS ARE TAKEN WITH A VOLTMETER HAVING A RESISTANCE OF ONE THOUSAND OHMS PER VOLT.

THE GAIN PER STAGE VALUES AS NOTED ABOVE ARE APPROXIMATE FOR AN AVERAGE STAGE, RATHER THAN AN ABSOLUTE VALUE. A 0.1 MFD. DUMMY IS USED FOR ALL MEASUREMENTS EXCEPT FOR THE ANTENNA WHERE A 200 MMFD. DUMMY IS USED. INPUT SHALL BE KEPT AT THE LOWEST LEVEL NECESSARY TO MAINTAIN A STANDARD OUTPUT OF 0.5 WATT WITH THE VOLUME CONTROL FULLY ON. NOTE: THE TYPE OF EQUIPMENT USED, THE HANDLING OF THE PROBES, THE ACCURACY OF ALIGNMENT, ETC. CAN AFFECT THE MEASUREMENTS.

SEARS, ROEBUCK & CO.

MODEL 9054, CHASSIS 101.849

ALIGNMENT PROCEDURE

PRELIMINARY:

Output meter reading to indicate 0.5 watt across voice coil	1.26 volt
Generator ground lead connection	To receiver chassis
Generator modulation	30%, 400 cycles
Position of volume control	Fully on
Position of tone control	Treble
Position of pointer with tuner fully closed	Last line below 540 Kc. calibration mark on dial scale "A"

WAVE BAND SWITCH POS.	POSITION OF TUNER	GENERATOR FREQUENCY	DUMMY ANTENNA	GENERATOR CONNECTION	TRIMMER ADJUSTMENTS (IN ORDER SHOWN)	TRIMMER FUNCTION
Band B	Closed	455 Kc.	0.1 mfd.	Transl.-Grid	T2 - T1	I.F.
Band A	Closed	See Note	200 mmfd.	Ant.	C21	I.F. Trap
Band A	1410 Kc.	1410 Kc.	200 mmfd.	Ant.	C36	Osc.
Band A	1410 Kc.	1410 Kc.	200 mmfd.	Ant.	C8	Transl.
Band A	1410 Kc.	1410 Kc.	200 mmfd.	Ant.	C1	Ant.
Band A	600 Kc.	600 Kc.	200 mmfd.	Ant.	C35	Osc. Pad.
Band B	4.2 Mc.	4.2 Mc.	400 ohms	Ant.	C31	Osc.
Band B	4.2 Mc.	4.2 Mc.	400 ohms	Ant.	C16	Transl.
Band B	4.2 Mc.	4.2 Mc.	400 ohms	Ant.	C4	Ant.
Band B	1800 Kc.	1800 Kc.	400 ohms	Ant.	C34	Osc. Pad.
Band C	9.6 Mc.	9.6 Mc.	400 ohms	Ant.	C24	Osc.
Band C	9.6 Mc.	9.6 Mc.	400 ohms	Ant.	C19	Transl.
Band C	9.6 Mc.	9.6 Mc.	400 ohms	Ant.	C11	Ant.
Band E	21.6 Mc.	21.6 Mc.	400 ohms	Ant.	C32	Osc.
Band E	21.6 Mc.	21.6 Mc.	400 ohms	Ant.	C18	Transl.
Band E	21.6 Mc.	21.6 Mc.	400 ohms	Ant.	C10	Ant.
Band D	15.2 Mc.	15.2 Mc.	400 ohms	Ant.	C25	Osc.
Band D	15.2 Mc.	15.2 Mc.	400 ohms	Ant.	C17	Transl.
Band D	15.2 Mc.	15.2 Mc.	400 ohms	Ant.	C5	Ant.

IMPORTANT ALIGNMENT NOTES:

NOTE: The signal generator frequency shall be adjusted for highest response near 455 Kc. for alignment of the I.F. trap.

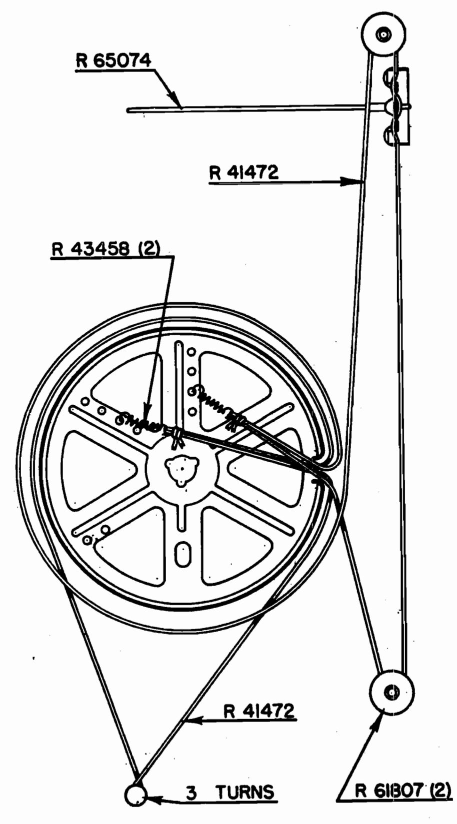
Band E oscillator operates below the signal frequency. The setting of the oscillator trimmer occurs at the first peak out from tight for the fundamental. All other bands have the oscillator operating above the signal frequency and are to be aligned in the normal manner.

During the alignment of the oscillator padder on bands A and B the tuner should be rocked through resonance to assure alignment.

The alignment must be done in the order given.

The entire alignment procedure should be repeated step by step in the original order for greatest accuracy.

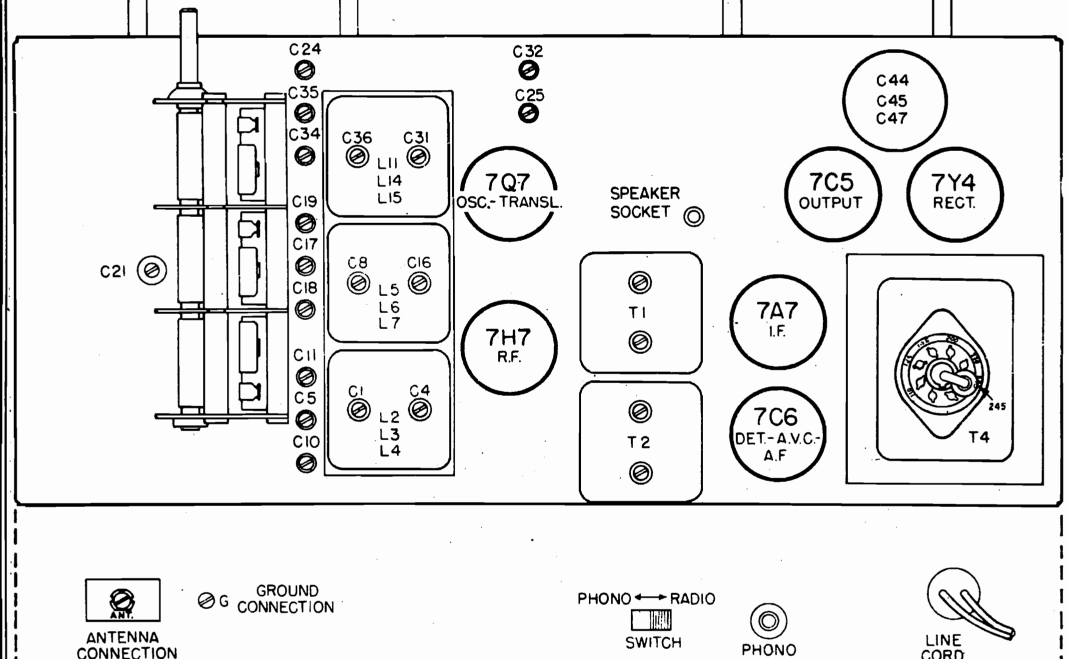
Always keep the output power from the generator at its lowest possible value to prevent the AVC action of the receiver from interfering with accurate alignment.



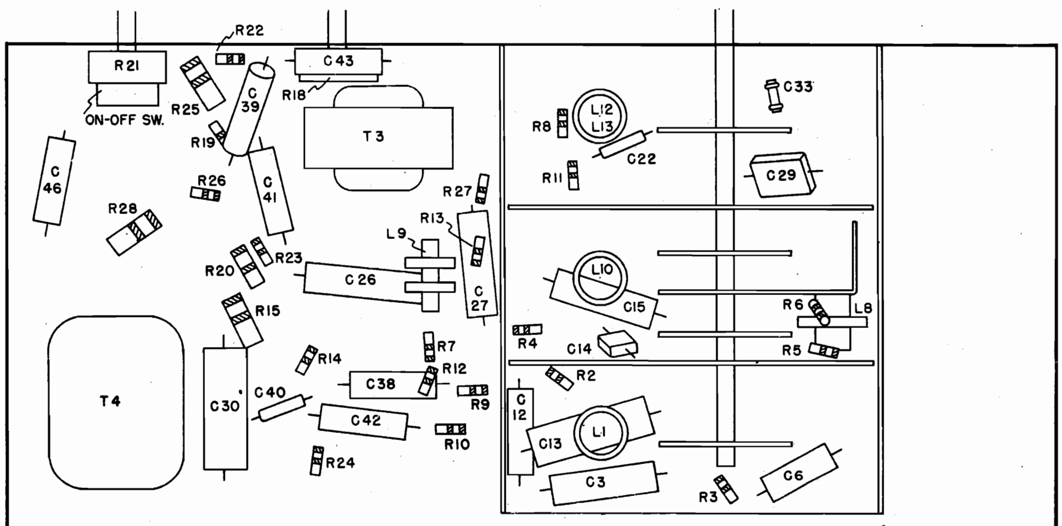
STRING AND POINTER HOOKUP

MODEL 9054,
CHASSIS 101.849

SEARS, ROEBUCK & CO.



LOCATION OF PARTS ON TOP OF CHASSIS



LOCATION OF PARTS UNDER CHASSIS

REPAIR PARTS LIST

SCHEMATIC LOCATION	PART NUMBER	DESCRIPTION	MU CODE
	R65099	Background - Dial	
	R61846	Button - Snap	
C46		Capacitor - .005 mfd. - 600 V.	
C39		Capacitor - .004 mfd. - 600 V.	
C6,C42		Capacitor - .002 mfd. - 600 V.	
C3,C12,C15, C26,C27		Capacitor - .05 mfd. - 600 V.	
C38,C41,C43		Capacitor - .01 mfd. - 600 V.	
C30		Capacitor - 0.2 mfd. - 600 V.	
C13		Capacitor - 0.1 mfd. - 400 V.	
C22		Capacitor - Mica - 50 mmfd.	
C40		Capacitor - Mica - 250 mmfd.	
C33		Capacitor - Mica - 1000 mmfd.	
C14		Capacitor - Silver Mica - 50 mmfd.	
C25,C32	R45705	Capacitor - Trimmer - 2 Gang	
C5,C10,C11	R45703	Capacitor - Trimmer - 3 Gang	
C17,C18,C19	R45703	Capacitor - Trimmer - 3 Gang	
C24,C34,C35	R59519	Capacitor - Trimmer - 3 Gang	
C7,C20,C28	R65071	Capacitor - Variable - 3 Gang	B5
C29	R46109	Capacitor - Compensating	
C21	R59518	Capacitor - I.F. Trap Trimmer	
	R65076	Capacitor - Electrolytic	AAO
C44		20 mfd. - 400 V.	
C45		40 mfd. - 400 V.	
C47		40 mfd. - 400 V.	
L1	R65077	Coil - Antenna - Bands D and E	
L2,L3,L4	R65085	Coil - Antenna - Bands A, B, and C	AO
L8	R65089	Coil - I.F. Trap Choke	
L12,L13	R65078	Coil - Oscillator - Bands D and E	
L11,L14,L15	R65084	Coil - Oscillator - Bands A, B, and C	A5
L9	R65090	Coil - Plate Choke	
L5,L6,L7	R65086	Coil - Translator - Bands A, B, and C	A5
L10	R65088	Coil - Translator - Bands D and E	
R21	R65073	Control - On-Off and Volume	
R18	R65072	Control - Tone	
	R41472	Cord - Band Indicator - 9"	
		Dial Drive - 37"	
		Pointer Drive - 23"	
	R65233	Cord - Line	
	R65270	Cover - Back - Cabinet	
	R65187	Cover - Transformer Tap Socket	
	R65240	Dial - Station - Glass	
	R65069	Disc - Band Indicator - Assy.	
	R65098	Escutcheon - Dial	
	R65257	Knob - Band	
	R65256	Knob - On-Off and Volume	
	R65255	Knob - Tone	
	R62933	Knob - Tuning	
		Lamp - Dial - Type #47	
	R65074	Pointer - Dial	
	R61807	Pulley - Metal - Dial	
R4,R11		Resistor - 10 ohm - 1/2 W.	
R26		Resistor - 56 ohm - 1/2 W.	
R2,R5		Resistor - 270 ohm - 1/2 W.	
R13		Resistor - 1,000 ohm - 1/2 W.	
R14		Resistor - 2,000 ohm - 1/2 W.	
R6		Resistor - 10,000 ohm - 1/2 W.	
R8		Resistor - 22,000 ohm - 1/2 W.	
R22		Resistor - 56,000 ohm - 1/2 W.	
R3		Resistor - 100,000 ohm - 1/2 W.	
R19		Resistor - 220,000 ohm - 1/2 W.	
R23		Resistor - 470,000 ohm - 1/2 W.	
R27		Resistor - 1 megohm - 1/2 W.	
R7,R9		Resistor - 2.2 megohm - 1/2 W.	
R10,R12		Resistor - 4.7 megohm - 1/2 W.	
R24		Resistor - 15.0 megohm - 1/2 W.	
R20		Resistor - 270 ohm - 1 W.	
R28		Resistor - 1,800 ohm - 2 W.	
R25		Resistor - 2,200 ohm - 2 W.	
R15		Resistor - 8,200 ohm - 2 W.	
	R65063	Shaft - Tuning	
	R44897	Socket - Phono and Speaker	
	R57049	Socket - Tube - 8 Prong Lock-in	
	R61013	Socket - Tube - 8 Prong Lock-in (Molded) - 7Z4	
	R60997	Socket - Tube - 8 Prong Lock-in (Molded) - 7H7 & 7Q7	
	R65264	Socket - Band Indicator - Pilot Lamp	
	R65261	Socket - Pilot Lamp Assy. - (Dual)	

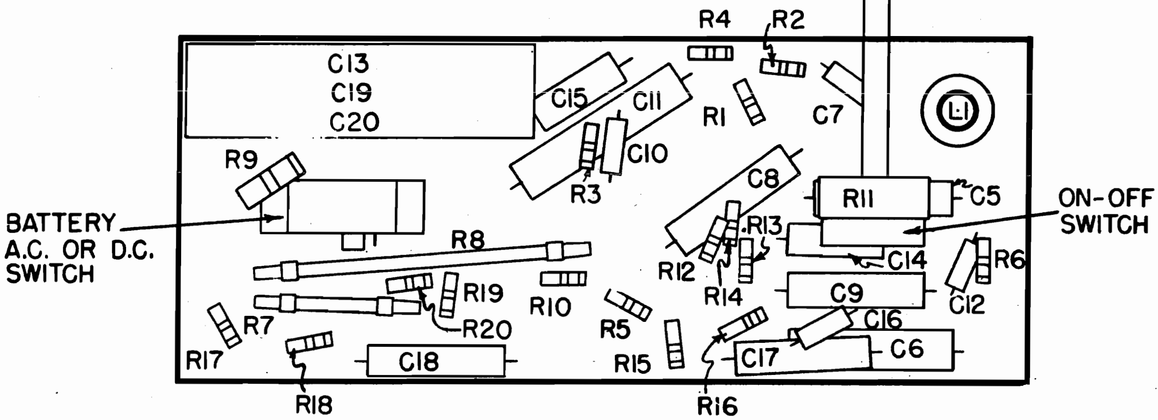
WHEN ORDERING SPEAKER PARTS, ALWAYS GIVE THE PART NUMBER APPEARING ON THE SPEAKER

SCHEMATIC LOCATION	PART NUMBER	DESCRIPTION	MU CODE
	R65260	Speaker - 8" P.M.	
	R59603	Cone & Voice Coil	
	R57272	Plug	
	R43000	Switch - D.P.D.T. - Phono - Radio	
T1	R65079	Transformer - I.F. #1	
T2	R65080	Transformer - I.F. #2	
T3	R65087	Transformer - Output	
T4	R65058	Transformer - Power 50-60 cycle	

SEARS, ROEBUCK & CO.

MODEL 9260, CHASSIS 101.850

Five Tube AC-DC Superheterodyne Portable Receiver



LOCATION OF PARTS UNDER CHASSIS

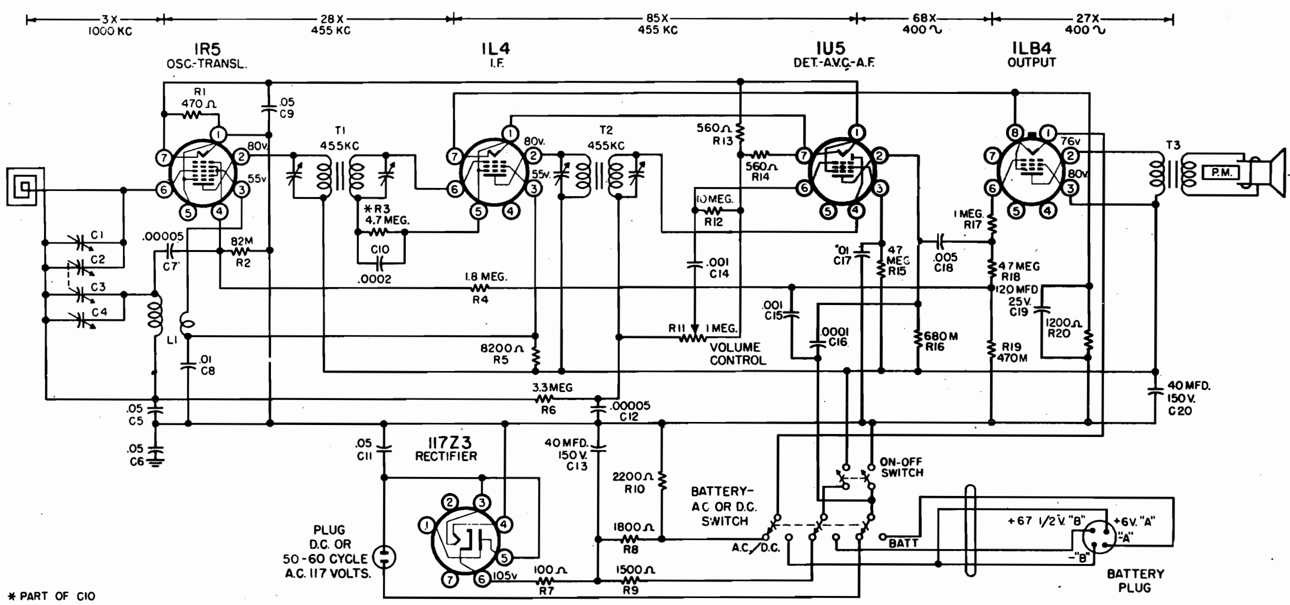
PARTS LIST

SCHEMATIC LOCATION	PART NUMBER	DESCRIPTION
	R65303	Cover - Cabinet
	R65316	Clip - Tubular
	R65301	Cabinet (Body)
	R55810	Clip (Cover Retaining)
	R65318	Clip (Handle)
	R65302	Grille (Front)
	R65317	Handle (Carrying)
	R65319	Loop (Antenna)
	R65327	Cable - Battery (With Plug)
	R67010	Plug - Battery
C18		Capacitor - .005 mfd. - 600 Volt
C14,C15		Capacitor - .001 mfd. - 600 Volt
C11		Capacitor - .05 mfd. - 600 Volt
C6	R20720	Capacitor - .05 mfd. - 200 Volt
C5,C9	R4462?	Capacitor - .05 mfd. - 100 Volt
C8,C17		Capacitor - .01 mfd. - 600 Volt
C7,C12	R65332	Capacitor - Ceramic - 50 mmfd.
C16	R65333	Capacitor - Ceramic - 100 mmfd.
C2,C3	R65307	Capacitor - Variable - 2 Gang
C13,C19,C20	R65308	Capacitor - Electrolytic 40 mfd. - 150 Volt; 40 mfd. - 150 Volt; 120 mfd. - 250 Volt
	R65315	Clip - Chassis Mounting
L1	R65322	Coil - Oscillator
R11	R65309	Control - On-Off & Volume
	R65310	Cord - Line
	R65304	Cover - Bottom of Chassis
	R64767	Insulator - Line Cord Mounting
	R65349	Knob - On-Off & Volume
	R65348	Knob - Tuning
	R65325	Pointer - Dial Assy.
R1		Resistor - 470 ohm - 1/2 Watt
R13,R14		Resistor - 560 ohm - 1/2 Watt
R20		Resistor - 1,200 ohm - 1/2 Watt
R5		Resistor - 8,200 ohm - 1/2 Watt
R2		Resistor - 82,000 ohm - 1/2 Watt
R19		Resistor - 470,000 ohm - 1/2 Watt
R16		Resistor - 680,000 ohm - 1/2 Watt
R17		Resistor - 1 megohm - 1/2 Watt
R4		Resistor - 1.8 megohm - 1/2 Watt
R6		Resistor - 3.3 megohm - 1/2 Watt
R15,R18		Resistor - 4.7 megohm - 1/2 Watt
R12		Resistor - 10 megohm - 1/2 Watt
R9		Resistor - 1,500 ohm - 1 Watt
R10		Resistor - 2,200 ohm - 1 Watt
R7	R61219	Resistor - Glasohm - 100 ohm - 2 Watt
R8	R60810	Resistor - Glasohm - 1,800 ohm - 5 Watt
R3, C10	R65326	Resistor-Capacitor Combination - 4.7 megohm - 200 mmfd.
	R57049	Socket - Tube - 8 Prong Lock-in
	R65153	Socket - Tube - Miniature
	R65323	Socket - Tube - Miniature (with Ground Term.)

WHEN ORDERING SPEAKER PARTS, ALWAYS GIVE THE PART NUMBER APPEARING ON THE SPEAKER

SCHEMATIC LOCATION	PART NUMBER	DESCRIPTION
	R65311	Speaker - 3 1/2" P.M.
	R60890	Cone & Voice Coil
	R65313	Switch - T.P.D.T. - AC-DC & Battery
T1	R65320	Transformer - I.F. #1
T2	R65321	Transformer - I.F. #2
T3	R65312	Transformer - Output

SCHEMATIC DIAGRAM FOR YOUR RADIO



* PART OF C10

TUBE SOCKETS ARE VIEWED FROM UNDER SIDE OF CHASSIS. VOLTAGE READINGS SHOWN AT SOCKET PRONGS ARE TO NEG. "B", AND ARE TAKEN WITH NO SIGNAL, AND WITH LINE VOLTAGE AT 117 VOLTS A.C. WHERE NO READING IS GIVEN THE VOLTAGE IS ZERO OR TOO LOW TO READ.
THE GAIN PER STAGE VALUES AS NOTED ABOVE ARE APPROXIMATE VALUES FOR AN AVERAGE STAGE, RATHER THAN AN ABSOLUTE VALUE. A O.I MFD. DUMMY IS USED FOR ALL MEASUREMENTS EXCEPT THE 1000KC WHERE A STANDARD RADIATING LOOP IS USED. INPUT SHALL BE KEPT AT THE LOWEST LEVEL NECESSARY TO MAINTAIN A STANDARD OUTPUT OF 50 MILLIWATTS WITH THE VOLUME CONTROL FULLY ON. NOTE: THE TYPE OF EQUIPMENT USED, THE HANDLING OF THE PROBES THE ACCURACY OF ALIGNMENT, ETC., CAN AFFECT THE MEASUREMENTS.

MODEL 9260,
CHASSIS 101.850

SEARS, ROEBUCK & CO.

SPECIFICATIONS

Power Supply
All models available . . . . 117 Volt, 50-60 Cycles AC or DC, 15 Watts

Frequency Range
Broadcast . . . . 540-1600 KC

Power Output
Undistorted . . . . .05 Watt
Maximum . . . . 0.1 Watt

PRELIMINARY:

ALIGNMENT PROCEDURE

Output meter reading to indicate 0.05 Watt across voice coil. . . . . 0.4 Volts
Generator ground lead connection . . . . .To B—through 0.1 mfd. capacitor (I.F. Alignment)
Generator modulation . . . . 30%, 400 cycles
Position of volume control . . . . Fully on
Position of pointer with tuner fully closed . . . . Below the 540 kc. calibration mark

POSITION OF TUNER	GENERATOR FREQUENCY	DUMMY ANTENNA	GENERATOR CONNECTION	ADJUSTMENTS (IN ORDER SHOWN)	FUNCTION
Closed	455 Kc.	0.1 mfd.	Transl.-Grid	T2 & T1	I.F.
*1400 Kc.	1400 Kc.	200 mmfd.	Hazeltine Loop	C4	Oscillator
*1400 Kc.	1400 Kc.	200 mmfd.	Hazeltine Loop	C1	Antenna

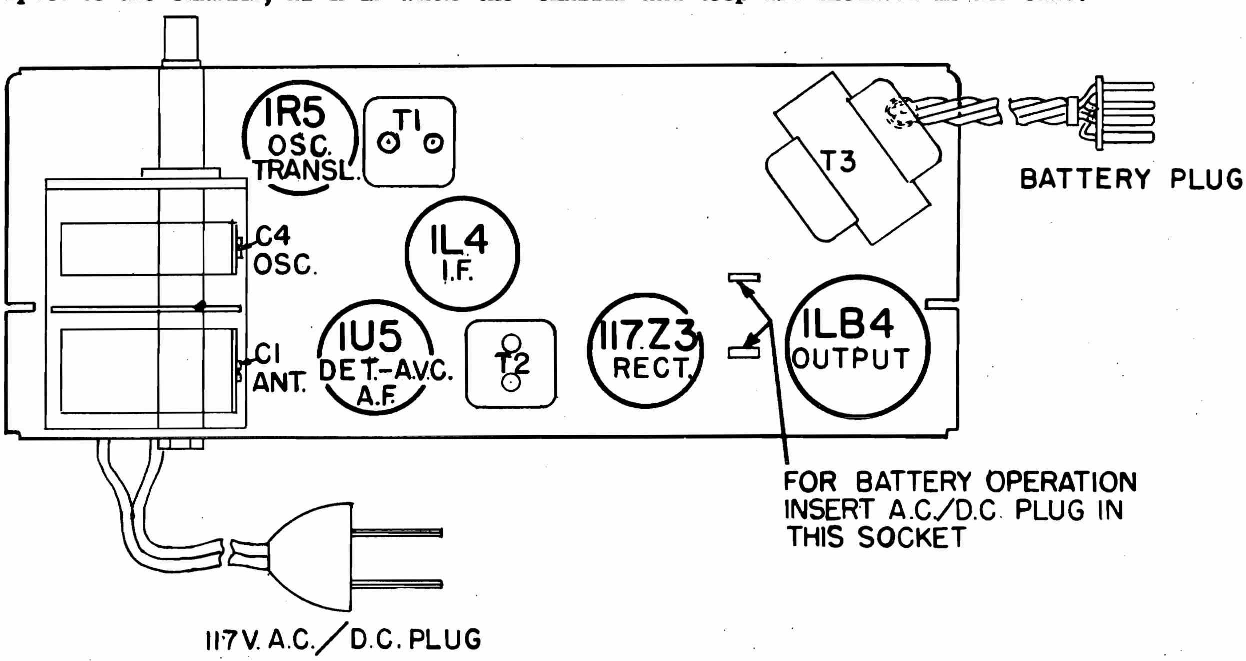
IMPORTANT ALIGNMENT NOTES:

NOTE: It is recommended that an isolation transformer be connected between the radio chassis and the line before aligning the receiver on A.C.

The alignment must be done in the order given.

Always keep the output power from the generator at its lowest possible value to prevent the AVC of the receiver from interfering with accurate alignment.

*Always make these trimmer adjustments with the loop in approximately the same position, with respect to the chassis, as it is when the chassis and loop are mounted in the case.



LOCATION OF PARTS ON TOP OF CHASSIS

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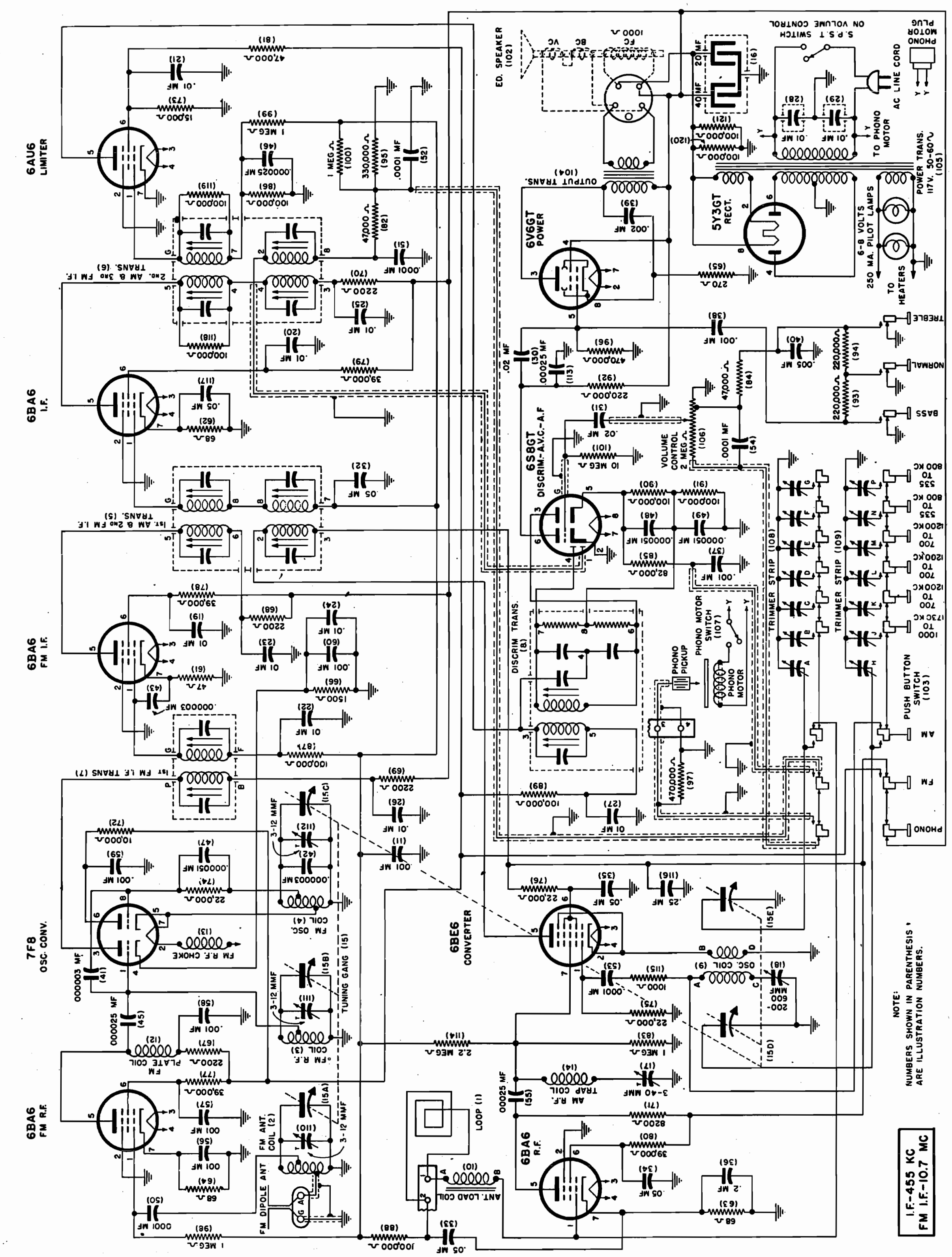

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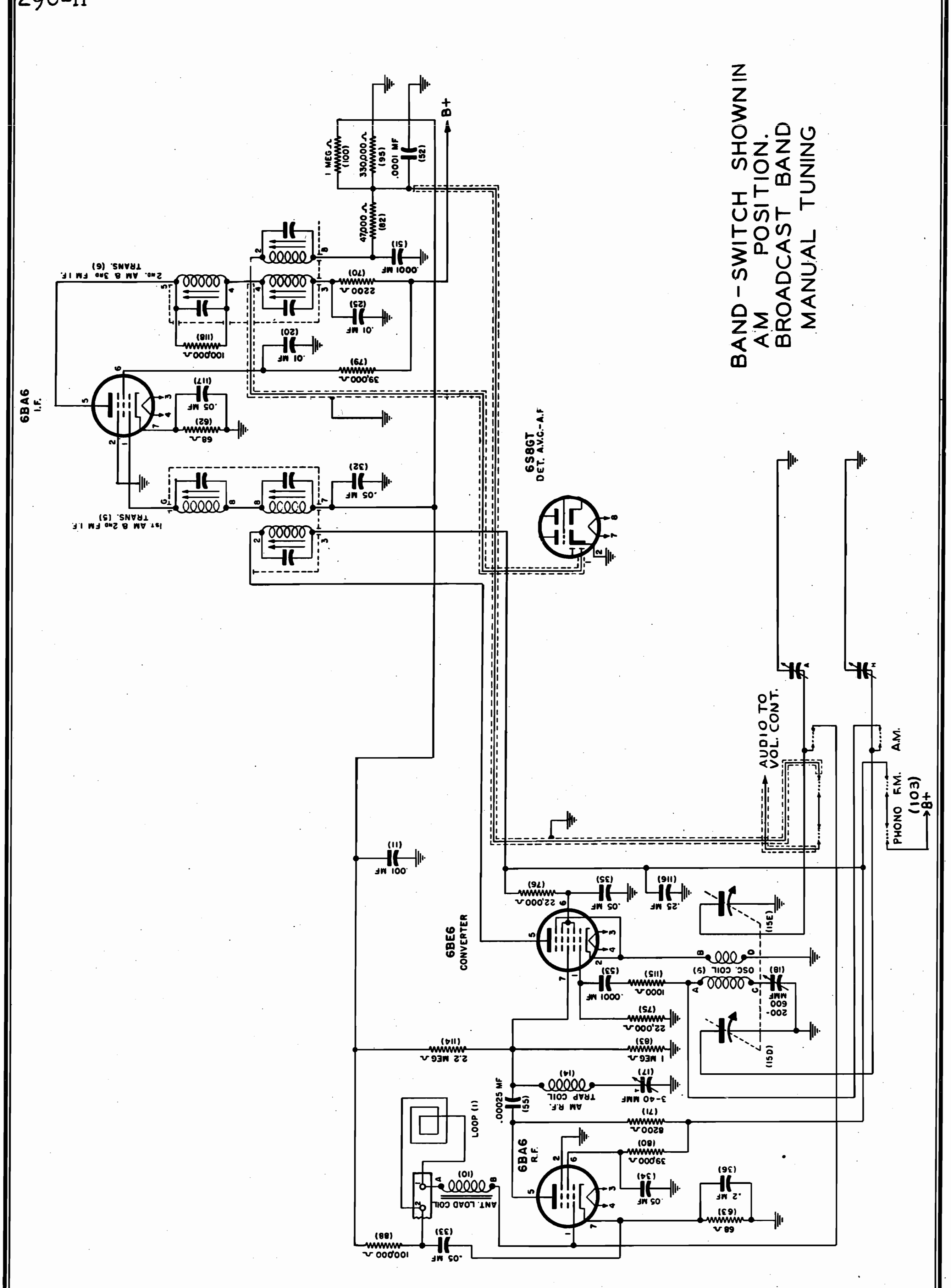

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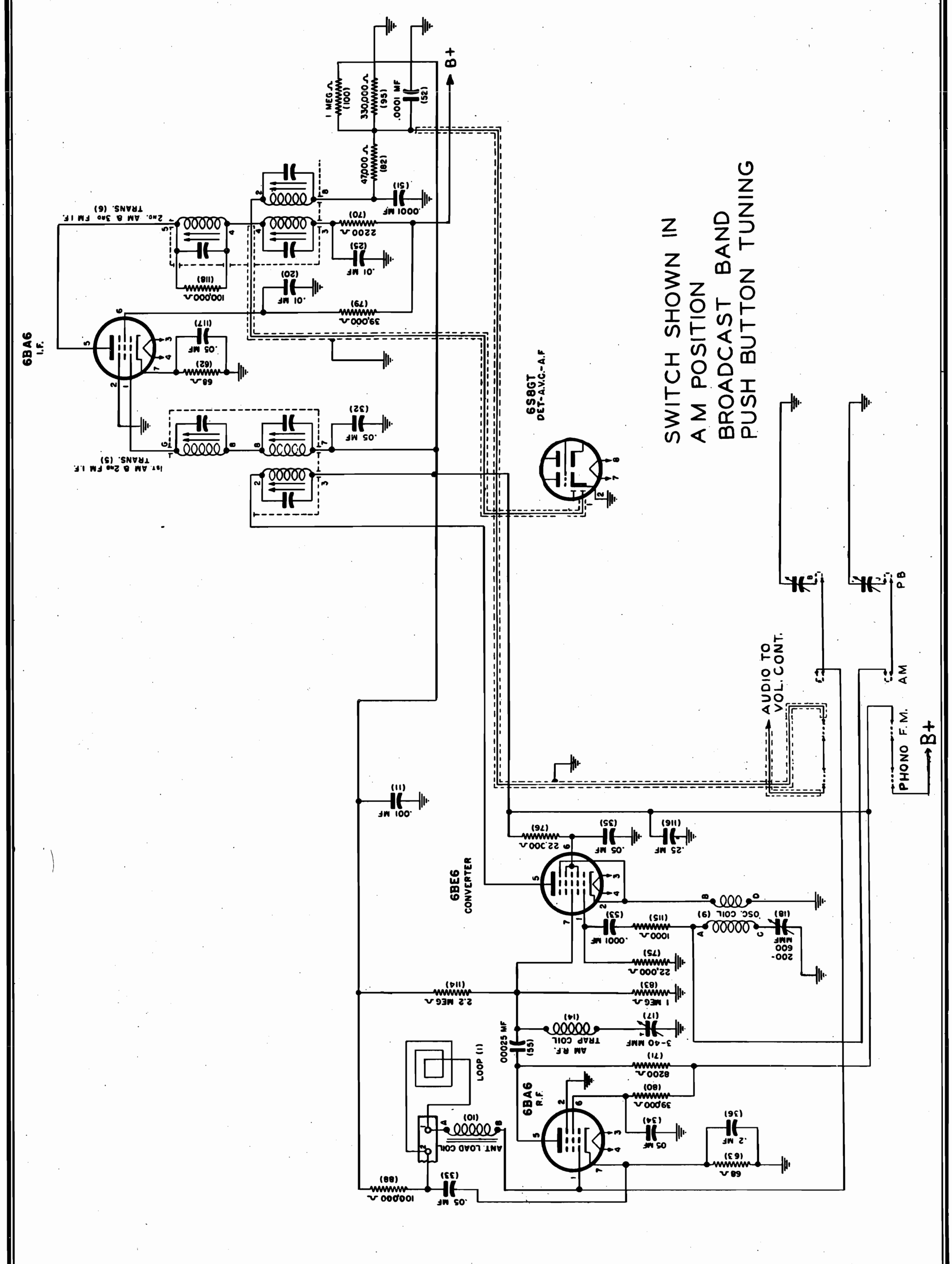

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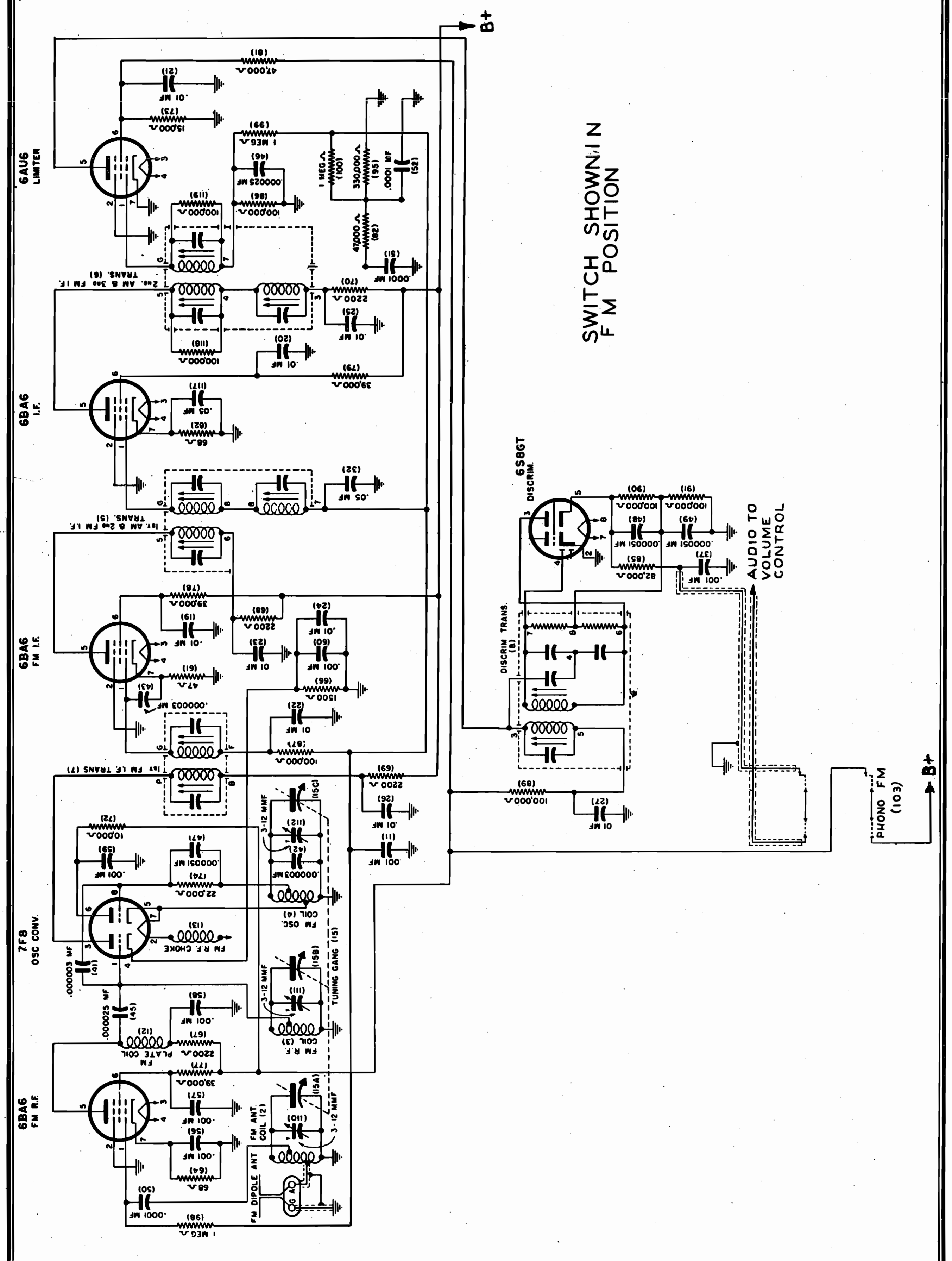

FM ALIGNMENT

Instructions for Alignment of the Frequency Modulation I. F. Transformers, Discriminator, Oscillator, R. F. and Antenna Circuits, with AM equipment generally available to the service man.

The equipment necessary for this procedure consists of the following:

D.C. Vacuum Tube Voltmeter of the Volt-Ohmyst Type. An AM Signal Generator that will supply:

(1) A 10.7 M.C. Signal for I F. alignment.

(2) A 105 M.C. and 109 M.C. Signal—a Signal Generator that only goes up to 30 M.C. but which has sufficient fourth harmonics present in the carrier could be used for this purpose.

THE GENERATOR USED NEED NOT BE FREQUENCY MODULATED.

IT IS ALWAYS DESIRABLE TO ALIGN THE "AM" I. F. TRANSFORMERS BEFORE MAKING ANY OF THE "FM" I. F. ADJUSTMENTS, and to RECHECK "AM" I. F. TRIMMERS AFTER COMPLETING "FM" I. F. ADJUSTMENTS.

BE SURE TO MAKE THE "FM" ADJUSTMENTS IN THE ORDER GIVEN BELOW.

(1) PROCEDURE FOR ALIGNMENT OF FM DISCRIMINATOR TRANSFORMER:

(A) Connect the Voltmeter from Pin No. 5 of the 6S8GT tube to chassis.

(B) With a .002 Mfd. Isolation Condenser in series with hot Signal Generator lead, connect generator from Pin No. 1 of the 6AU6 Limiter tube to chassis.

(C) Set Signal Generator to EXACTLY 10.7 M. C.

(D) Adjust 10.7 M. C. Discriminator Primary Trimmer for MAXIMUM reading on Voltmeter.

(E) Leave Signal Generator set at 10.7 M. C. and modulate with a 400 cycle note.

(F) Adjust 10.7 M. C. Secondary Discriminator Trimmer for MINIMUM 400 CYCLE RESPONSE IN THE SPEAKER. IMPORTANT: The reading on the Voltmeter should be ZERO. MINIMUM AUDIO RESPONSE WILL BE RATHER CRITICAL IN ADJUSTMENT.

(G) To check adjustment, swing Signal Generator to one side of 10.7 M. C. until MAXIMUM reading is obtained on Voltmeter and NOTE FREQUENCY and VOLTAGE READING. Then swing Signal Generator to the opposite side of 10.7 M. C. until MAXIMUM reading is obtained on Voltmeter and AGAIN NOTE VOLTAGE AND FREQUENCY READINGS. The two Voltmeter readings should be similar within 3 DB. and the two Signal Frequency readings should be a reasonably equal distance from 10.7 M. C. The difference in K.C. between the center frequency and one side should not exceed the difference between the center frequency and the other side by more than 50 K. C.

NOTE: If reliable FM Generator is available at 10.7 M.C., the procedure outlined in Paragraph (G) will be simplified by aligning to the proper pattern on an Oscilloscope. 100 K. C. deviation should be used.

CAUTION: Care should be taken to align the I. F. stages at the EXACT same center frequency as the Discriminator Coil. Switching from FM to AM on some generators may shift the carrier frequency somewhat.

(2) PROCEDURE FOR ALIGNMENT OF "FM" I. F. TRANSFORMERS:

(A) Connect the Voltmeter from the junction of the two 1 Megohm Resistors, (Illus. 99 and 100) to chassis.

(B) Connect Signal Generator to Input Grid (Pin No. 1) of 7F8 Converter tube.

(C) Set Signal Generator to EXACTLY 10.7 M. C.—if possible, mark the position where this occurs right on the Generator's calibrated dial because **this becomes a reference point** in checking for proper FM I. F. alignment.

(D) Adjust each of the 1st, 2nd and 3rd FM I. F. Transformers' 10.7 M. C. trimmers for MAXIMUM reading on Voltmeter. KEEP OUTPUT OF SIGNAL GENERATOR SO THAT A READING OF APPROXIMATELY 2 to 4 VOLTS IS OBTAINED ON THE VOLTMETER.

(E) After all the above FM I. F. Transformer Trimmer adjustments have been correctly completed, MAKE A NOTE OF THE READING ON THE VOLTMETER.

(F) Next, detune the signal generator to a slightly HIGHER frequency (higher than the 10.7 reference frequency), until the Voltmeter reads ONE-HALF of the figure noted in (E) above, and MAKE A NOTE OF THE GENERATOR FREQUENCY AT WHICH THIS OCCURS.

(G) Now, detune the signal generator to a LOWER frequency (lower than the 10.7 reference frequency), until the Voltmeter again reads ONE-HALF the original figure noted in (E), and AGAIN NOTE THE GENERATOR FREQUENCY AT WHICH THIS OCCURS.

The difference between the two above frequencies obtained in (F) and (G), the one lower than 10.7 M. C. reference point and the one higher, is the "Half-amplitude" Band width of the FM-I. F. system. These two frequencies (F) and (G), should be somewhat uniformly spaced on either side of the 10.7 M. C. (C) reference frequency. A SLIGHT DIFFERENCE IS NOT SERIOUS. Only when one is more than twice as far as the other from the 10.7 M. C. reference frequency, or when there is a double peak, is the discrepancy serious. Assuming the FM I. F. Transformers have been properly adjusted, a double peak, or extremely one-sided "half-amplitude" band width, is usually caused by regeneration or a defective FM I. F. Transformer.

(3) PROCEDURE FOR THE ALIGNMENT OF THE "FM" ANTENNA, R.F., AND OSCILLATOR CIRCUITS:

(A) Leave Voltmeter connected as it was for FM I. F. Alignment.

(B) Connect the hot Signal Generator lead through a 300 Ohm Resistor to the FM Antenna Post, marked "ANT" on back of chassis, and the other lead to the post marked "GND".

(C) Set Signal Generator so that it will deliver a modulated 108 M. C. signal. If the generator available is not de-

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SENTINEL RADIO CORP.

signed to deliver a 108 M. C. signal, use a generator covering at least to 30 M. C. and set this generator frequency to 27 M. C.—the fourth harmonic of which will be 108 M. C.

(D) Set Receiver Dial Pointer to EXACTLY 108 M. C.

(E) Adjust 108 M. C. Oscillator Trimmer for MAXIMUM reading on Voltmeter or MAXIMUM signal heard in speaker.

(F) Next, tune the receiver to 104 M. C.

(G) Set Signal Generator to deliver a 104 M. C. modulated signal.

(H) Adjust 104 M. C. Antenna and R. F. Trimmers for MAXIMUM reading on Voltmeter or MAXIMUM signal heard in speaker.

Because it is somewhat helpful to hear the signal, an AM modulation on the 108 M. C. and 104 M. C. signal frequencies may be used for alignment of the FM Oscillator, R. F. and Antenna circuits. With modulated or unmodulated signal, ALWAYS ADJUST FOR MAXIMUM READING ON VOLTMETER. (ADJUSTMENT OF "FM" GANG CONDENSER PLATES AT 98 M.C. AND 90 M. C. MAY BE NECESSARY TO INSURE PROPER TRACKING.)

A FREQUENCY MODULATED SIGNAL GENERATOR may be used instead of an AM signal generator. When a Frequency Modulated Signal Generator is used, it is recommended that an unmodulated carrier be used for all of the above adjustments EXCEPT alignment of the Discriminator Secondary Trimmer. Use a Frequency Modulated signal (100 K.C. deviation) and align Discriminator Secondary for proper pattern on an Oscilloscope.

AM ALIGNMENT PROCEDURE

Be sure to follow procedure carefully and in the order given—otherwise the receiver will be insensitive and the dial calibration incorrect. For alignment procedure read tabulations from left to right. Make the adjustment marked (1) first, (2) next.

Before starting alignment:

(A) Check tuning dial adjustment by turning gang condenser until plates reach maximum capacity stop (completely in mesh) at which point the dial pointer must be exactly even with the last line at the low frequency end of the AM dial calibration. If dial pointer does not point exactly to last line move to correct position.

(B) Use an accurately calibrated test oscillator with some type of output measuring device.

(C) WHEN ADJUSTING THE 1730 KC OSCILLATOR TRIMMER, THE 455 KC TRIMMER, remove chassis from cabinet and disconnect the loop connection wires from the set. Attach a 1 megohm resistor across these connections and feed output of test oscillator across the 1 megohm resistor.

(D) THE 1400 KC LOOP ANTENNA TRIMMER and 600 KC PADDER should be adjusted only after all other adjustments have been made and with the set mounted in the cabinet, and the loop in position. When aligning the 1400 KC Antenna Trimmer and 600 KC Padder, couple test oscillator to receiver loop by: (1) make loop consisting of five to ten turns of No. 20 to No. 30 size wire, wound on a 2" or 3" form; (2) connect this loop across output of test oscillator; (3) place test oscillator loop near radio loop. BE SURE THAT NEITHER LOOP MOVES WHILE ALIGNING.

Steps	Place band switch for operation on:	Set receiver dial to:	TEST OSCILLATOR Adjust test oscillator frequency to:	Use dummy antenna in series with output of test oscillator consisting of:	Attach output of test oscillator to:	Refer to parts layout diagram for location of trimmers mentioned below:
1	AM Band position	Any point where no interfering signal is received	Exactly 455 K. C.	0.2 Mfd. Condenser	High side to AM-Osc. stator plates of tuning condenser (15D). Low side to frame of condenser through .01 Mfd. condenser.	Adjust each of the 2nd 455 K. C. AM I. F. transformer trimmers for maximum output, then adjust each of the 1st 455 K. C. I. F. transformer trimmers for maximum output.
2	AM Band position	Rotate gang condenser to maximum capacity	Exactly 455 K. C.	.00025 Condenser	See Paragraph (C) above.	Adjust 455 K. C. trap trimmer for **MINIMUM** 455 K. C. Signal.
		Exactly 1730 K. C.	Exactly 1730 K. C.			Adjust 1730 K. C. oscillator trimmer for maximum output.
		Approx. 1400 K. C.	Approx. 1400 K. C.	See Paragraph (D) above.		Adjust 1400 K. C. AM Ant. trimmer for maximum output.
		Approx. 600 K. C.	Approx. 600 K. C.			While rocking gang condenser, adjust 600 K. C. oscillator padder for maximum output.

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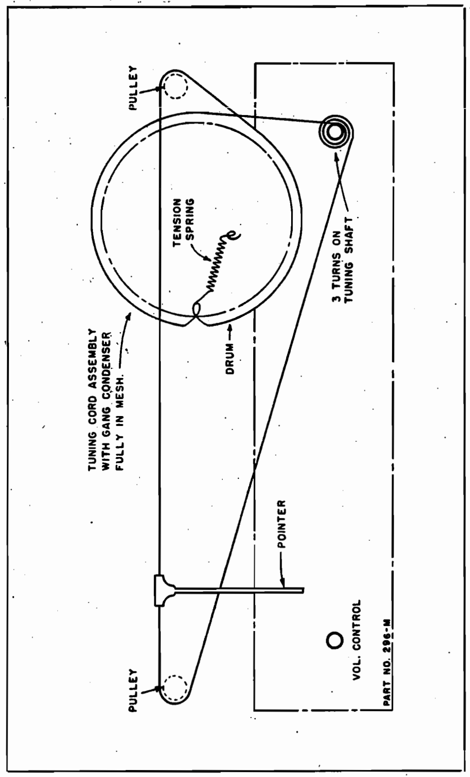

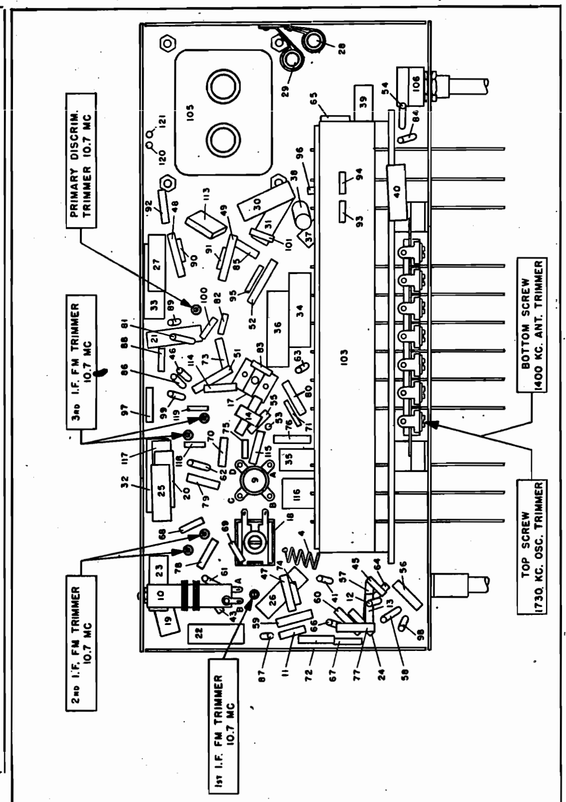

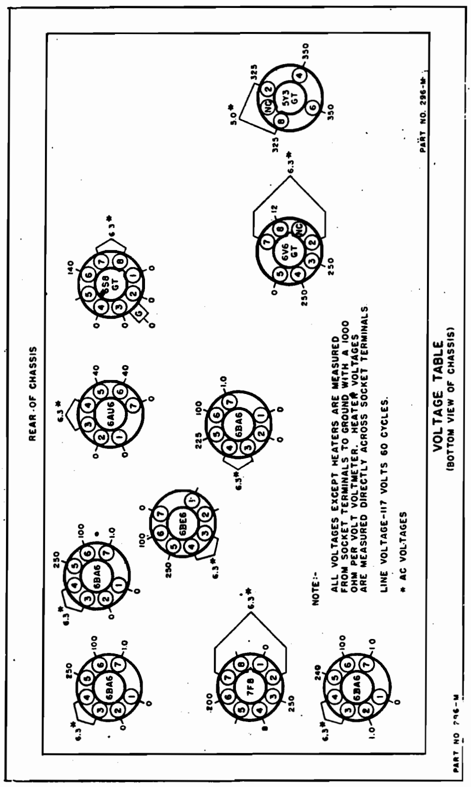

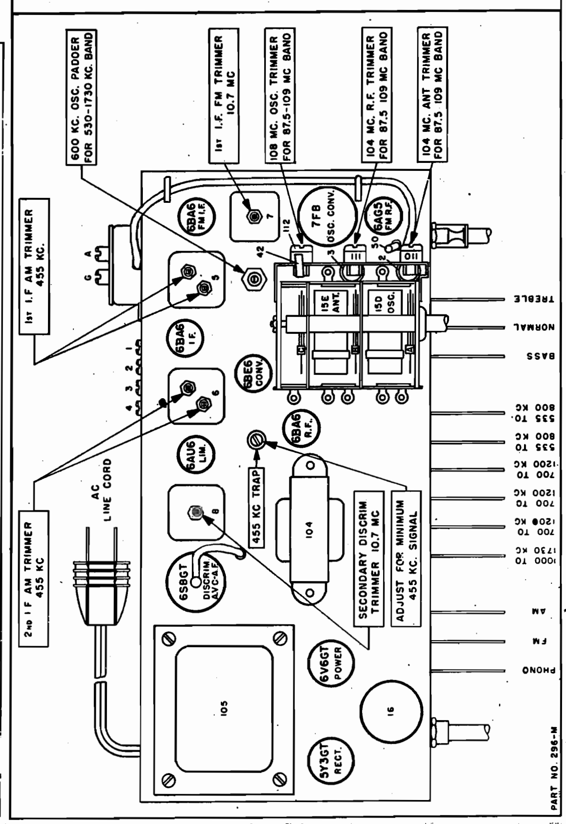

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SENTINEL RADIO CORP.

PARTS LIST

Illus. No.	Part No.	Part Name	Description
1	20E235	Antenna	Loop
2	2E48	Coil	FM Antenna
3	2E49	Coil	FM R.F.
4	2E50	Coil	FM Osc.
5	20E216	Coil	1st AM & 2nd FM I.F. Trans.
6	20E217	Coil	2nd AM & 3rd FM I.F. Trans.
7	20E218	Coil	1st FM I.F. Trans.
8	20E219	Coil	Discriminator
9	20E221	Coil	Oscillator
10	20E222	Coil	Ant. Loading
11	23E2012	Condenser	Fixed Ceramic, .001 Mfd.
12	2E52	Coil	FM Plate
13	2E47	Coil	FM R.F. Choke
14	2E19	Coil	455 KC Trap
15	24E27	Condenser	Tuning Gang
16	25E20	Condenser	Elect. Dry 20-40 Mfd. 400 V.
17	24E3	Condenser	Trimmer, 3-40 MMF.
18	24E16	Condenser	Padder, 200-600 MMF.
19	23E411	Condenser	Fixed Paper, .01 Mfd. 400 V.
20	23E411	Condenser	Fixed Paper, .01 Mfd. 400 V.
21	23E411	Condenser	Fixed Paper, .01 Mfd. 400 V.
22	23E411	Condenser	Fixed Paper, .01 Mfd. 400 V.
23	23E411	Condenser	Fixed Paper, .01 Mfd. 400 V.
24	23E2004-5	Condenser	Fixed Paper, .01 Mfd. 150 V.
25	23E411	Condenser	Fixed Paper, .01 Mfd. 400 V.
26	23E411	Condenser	Fixed Paper, .01 Mfd. 400 V.
27	23E411	Condenser	Fixed Paper, .01 Mfd. 400 V.
28	23E250	Condenser	.01 Mfd. 220 V. Metal Container
29	23E250	Condenser	.01 Mfd. 220 V. Metal Container
30	23E413	Condenser	Fixed Paper, .02 Mfd. 400 V.
31	23E213	Condenser	Fixed Paper, .02 Mfd. 200 V.
32	23E2014-8	Condenser	Fixed Paper, .05 Mfd. 200 V.
33	23E416	Condenser	Fixed Paper, .05 Mfd. 400 V.
34	23E416	Condenser	Fixed Paper, .05 Mfd. 400 V.
35	23E416	Condenser	Fixed Paper, .05 Mfd. 400 V.
36	23E2014-10	Condenser	Fixed Paper, .2 Mfd. 200 V.
37	23E204	Condenser	Fixed Paper, .001 Mfd. 200 V.
38	23E204	Condenser	Fixed Paper, .001 Mfd. 200 V.
39	23E605	Condenser	Fixed Paper, .002 Mfd. 600 V.
40	23E208	Condenser	Fixed Paper, .005 Mfd. 200 V.
41	23E20	Condenser	Fixed Ceramic, .000003 Mfd. 500 V.
42	23E20	Condenser	Fixed Ceramic, .000003 Mfd. 500 V.
43	23E13	Condenser	Fixed Ceramic, .000003 Mfd. 500 V.
45	23E8	Condenser	Fixed Ceramic, .000025 Mfd. 500 V.
46	23E8	Condenser	Fixed Ceramic, .000025 Mfd. 500 V.
47	23E2	Condenser	Fixed Ceramic, .000051 Mfd. 500 V.
48	23E2	Condenser	Fixed Ceramic, .000051 Mfd. 500 V.
49	23E2	Condenser	Fixed Ceramic, .000051 Mfd. 500 V.
50	23E10	Condenser	Fixed Ceramic, .0001 Mfd. 500 V.
51	23E11	Condenser	Fixed Ceramic, .0001 Mfd. 500 V.
52	23E11	Condenser	Fixed Ceramic, .0001 Mfd. 500 V.
53	23E11	Condenser	Fixed Ceramic, .0001 Mfd. 500 V.
54	23E11	Condenser	Fixed Ceramic, .0001 Mfd. 500 V.
55	23E42	Condenser	Fixed Mica, .00025 Mfd.
56	23E2012	Condenser	Fixed Ceramic, .001 Mfd. 500 V.
57	23E2012	Condenser	Fixed Ceramic, .001 Mfd. 500 V.
58	23E2012	Condenser	Fixed Ceramic, .001 Mfd. 500 V.
59	23E2012	Condenser	Fixed Ceramic, .001 Mfd. 500 V.
60	23E2012	Condenser	Fixed Ceramic, .001 Mfd. 500 V.
61	27E470-2	Resistor	Carbon, 47 Ohm 1/2 Watt

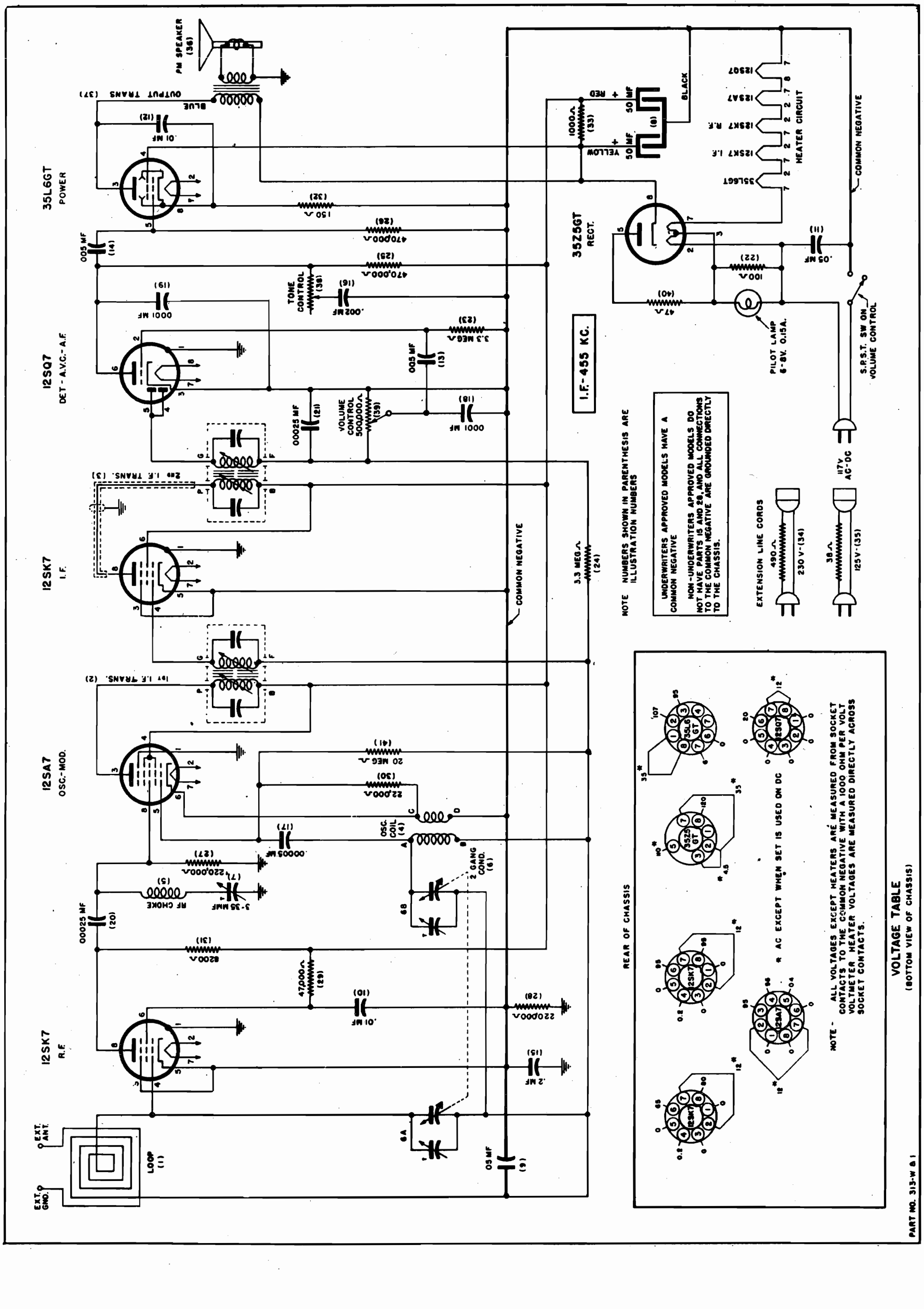
Illus. No.	Part No.	Part Name	Description
62	27E680-2	Resistor	Carbon, 68 Ohm 1/2 Watt
63	27E680-2	Resistor	Carbon, 68 Ohm 1/2 Watt
64	27E680-2	Resistor	Carbon, 68 Ohm 1/2 Watt
65	27E271-3	Resistor	Carbon, 270 Ohm 1 Watt
66	27E152-2	Resistor	Carbon, 1,500 Ohm 1/2 Watt
67	27E222-2	Resistor	Carbon, 2,200 Ohm 1/2 Watt
68	27E222-2	Resistor	Carbon, 2,200 Ohm 1/2 Watt
69	27E222-2	Resistor	Carbon, 2,200 Ohm 1/2 Watt
70	27E222-2	Resistor	Carbon, 2,200 Ohm 1/2 Watt
71	27E822-3	Resistor	Carbon, 8,200 Ohm 1 Watt
72	27E103-3	Resistor	Carbon, 10,000 Ohm 1 Watt
73	27E153-2	Resistor	Carbon, 15,000 Ohm 1/2 Watt
74	27E223-2	Resistor	Carbon, 22,000 Ohm 1/2 Watt
75	27E223-2	Resistor	Carbon, 22,000 Ohm 1/2 Watt
76	27E223-5	Resistor	Carbon, 22,000 Ohm 2 Watt
77	27E393-2	Resistor	Carbon, 39,000 Ohm 1/2 Watt
78	27E393-2	Resistor	Carbon, 39,000 Ohm 1/2 Watt
79	27E393-2	Resistor	Carbon, 39,000 Ohm 1/2 Watt
80	27E393-2	Resistor	Carbon, 39,000 Ohm 1/2 Watt
81	27E473-3	Resistor	Carbon, 47,000 Ohm 1 Watt
82	27E473-2	Resistor	Carbon, 47,000 Ohm 1/2 Watt
83	27E105-2	Resistor	Carbon, 1 Meg Ohm 1/2 Watt
84	27E473-2	Resistor	Carbon, 47,000 Ohm 1/2 Watt
85	27E823-2	Resistor	Carbon, 82,000 Ohm 1/2 Watt
86	27E104-2	Resistor	Carbon, 100,000 Ohm 1/2 Watt
87	27E104-2	Resistor	Carbon, 100,000 Ohm 1/2 Watt
88	27E104-2	Resistor	Carbon, 100,000 Ohm 1/2 Watt
89	27E104-2	Resistor	Carbon, 100,000 Ohm 1/2 Watt
90	27E104-2	Resistor	Carbon, 100,000 Ohm 1/2 Watt
91	27E104-2	Resistor	Carbon, 100,000 Ohm 1/2 Watt
92	27E224-2	Resistor	Carbon, 220,000 Ohm 1/2 Watt
93	27E224-2	Resistor	Carbon, 220,000 Ohm 1/2 Watt
94	27E224-2	Resistor	Carbon, 220,000 Ohm 1/2 Watt
95	27E334-2	Resistor	Carbon, 330,000 Ohm 1/2 Watt
96	27E474-2	Resistor	Carbon, 470,000 Ohm 1/2 Watt
97	27E474-2	Resistor	Carbon, 470,000 Ohm 1/2 Watt
98	27E105-2	Resistor	Carbon, 1 Meg Ohm 1/2 Watt
99	27E105-2	Resistor	Carbon, 1 Meg Ohm 1/2 Watt
100	27E105-2	Resistor	Carbon, 1 Meg Ohm 1/2 Watt
101	27E106-2	Resistor	Carbon, 10 Meg Ohm 1/2 Watt
102	1E24	Speaker	12″ E.D.
103	29E14	Switch	Push Button
104	22E18	Transformer	Output
105	22E19	Transformer	Power
106	28E21	Volume Control	With S.P.S.T. Switch
107	11X052	Switch	Phono Motor Assembly (On Motor Panel)
108	24E25	Capacitor	Trimmer Strip (7 Section)
109	24E26	Capacitor	Trimmer Strip (7 Section)
110	24E28	Capacitor	Trimmer (3-12 MMF)
111	24E28	Capacitor	Trimmer (3-12 MMF)
112	24E28	Capacitor	Trimmer (3-12 MMF)
113	23E42	Condenser	Fixed Mica .00025 Mfd.
114	27E225-2	Resistor	Carbon, 2.2 Meg Ohm 1/2 Watt
115	27E102-2	Resistor	Carbon, 1000 Ohm 1/2 Watt
116	23E422	Capacitor	Fixed Paper, .25 Mfd. 400 V.
117	23E416	Capacitor	Fixed Paper, .05 Mfd. 400 V.
118	27E104	Resistor	Carbon, 100,000 Ohm 1/3 Watt
119	27E104	Resistor	Carbon, 100,000 Ohm 1/3 Watt
120	27E104-5	Resistor	Carbon, 100,000 Ohm 2 Watt
121	27E104-5	Resistor	Carbon, 100,000 Ohm 2 Watt

MISCELLANEOUS PARTS

Part No.	Part Name	Description
64E9	Antenna	FM Di Pole
7E116	Back	For Cabinet
53E128	Call Letters	Complete Set Station Call Letter Sheets
53E129	Call Letters	"AM-FM," "Phono," "High," "Med.," "Bass" on Sheet
36E29	Dial Scale	Calibrated Scale
20E270-6	Dial Shaft Assem.	Drive Shaft Assembly
20E253-10	Dial Cord	Drive Cord
65E2	Dial Spring	Tension Spring for Dial Cord
20E174-4	Dial Pointer	Dial Indicator
48E3	Dial Escutcheon	Fits around Dial Scale and Push Buttons for 296M
48E3-2	Dial Escutcheon	Fits around Dial Scale and Push Buttons for 296B
40E2	Dial Light	6-8 Volt .250 Amp. Mazda Type No. 44
37E27-12	Knob	Marked "Tuning" for Model 296M
37E27-14	Knob	Marked "Off-On-Vol." for Model 296M
37E27-34	Knob	Marked "Tuning" for Model 296B
37E27-35	Knob	Marked "Off-On-Vol." for Model 296B
37E46	Knob	Push Button
17E21-2	Plug	2 Prong for Phono-Motor
18E4-2	Post	4 Post Binding
18E4-3	Post	2 Post Binding
7E111	Slide Rail	For Record Changer
17E27	Socket	For Pilot Light
20E184	Socket	2 Contact, Female, for Phono Motor

SENTINEL RADIO CORP.

MODELS 313I, 313W, 1U-313I, 1U-313W



MODELS 313I, 313W, 1U-313I, 1U-313W

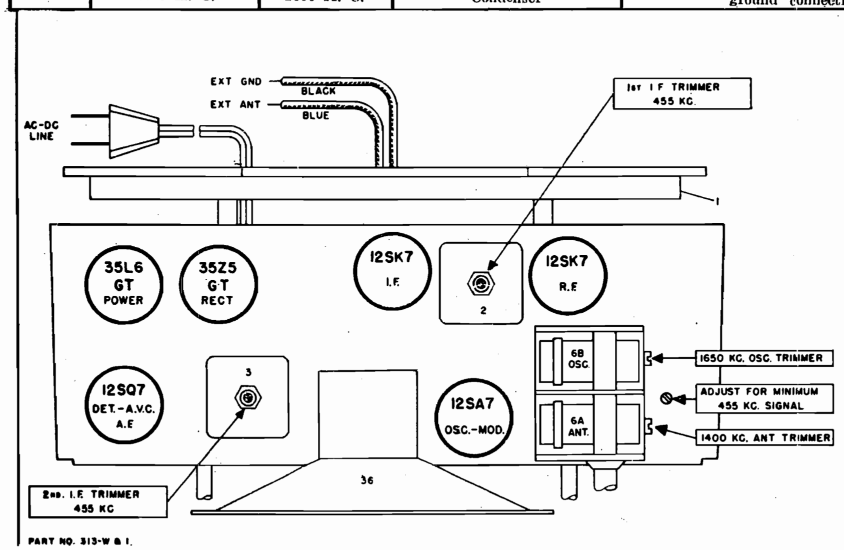
SENTINEL RADIO CORP.

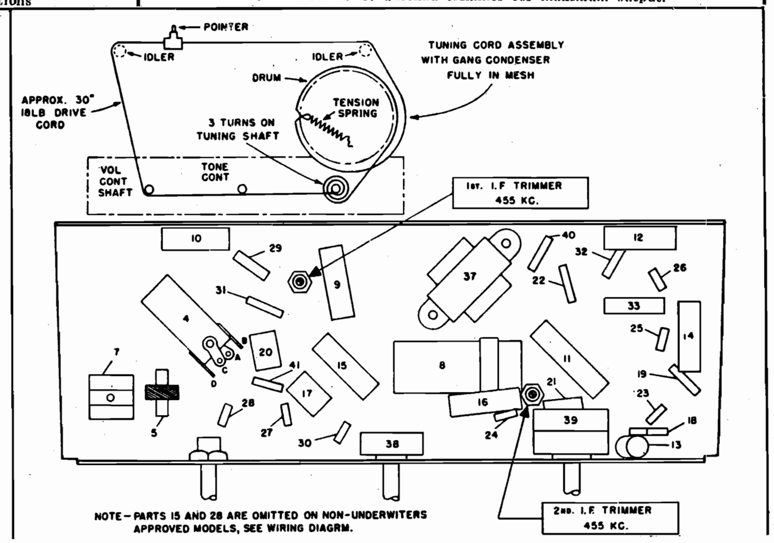
ALIGNMENT PROCEDURE

For alignment procedure read tabulations from left to right, and make the adjustment marked (1) first, (2) next, (3) third.
IMPORTANT: BEFORE ALIGNING, PLACE LOOP ANTENNA IN THE SAME POSITION IT WILL BE IN WHEN THE SET IS IN THE CABINET. BE SURE THAT IT DOES NOT MOVE WHILE ALIGNING.

When adjusting 1650 kilocycle oscillator trimmer, 455 K.C. R.F. trimmer and 1400 kilocycle antenna trimmer, connect test oscillator to loop external antenna and ground connections with a .0002 Mfd. capacitor in series with antenna lead.

Steps	Set receiver dial to:	TEST OSCILLATOR			Refer to parts layout diagram for location of trimmers mentioned below:
		Adjust test oscillator frequency to:	Use dummy antenna in series with output of test oscillator consisting of:	Attach output of test oscillator to:	
	Any point where no interfering signal is received	Exactly 455 K. C.	0.2 Mfd. Condenser	High side to grid of 12SA7 tube. Low side to chassis. (To Common Negative in 1U-313 Models.)	Adjust each of the 2nd I.F. transformer trimmer adjustment screws for maximum output, then adjust each of the 1st I.F. transformer trimmer adjustment screws for maximum output.
1	Rotate gang condenser to maximum capacity	Exactly 455 K. C.	.0002 Mfd. Condenser	To loop external antenna and ground connections	Adjust R. F. coil trimmer for **minimum** 455 K. C. signal.
2	Rotate gang condenser to minimum capacity	Exactly 1650 K. C.	.0002 Mfd. Condenser	To loop external antenna and ground connections	Adjust 1650 K. C. oscillator trimmer for maximum output.
3	Approximately 1400 K. C.	Approx. 1400 K. C.	.0002 Mfd. Condenser	To loop external antenna and ground connections	Adjust 1400 K. C. antenna trimmer for maximum output.





PARTS LIST

Illus. No.	Part No.	Part Name	Description
1	7E149	Antenna	Loop & Cabinet Back
	or		
1	7E150	Antenna	Loop & Cabinet Back
2	20E261	Coil	1st I. F. Transformer
	or		
2	20E307	Coil	1st I. F. Transformer
3	20E261-2	Coil	2nd I. F. Transformer
	or		
3	20E307-2	Coil	2nd I. F. Transformer
4	20E64	Coil	Oscillator
5	2E19	Coil	R. F. Choke
6	24E8	Condenser	Tuning, 2 Gang
7	24E3	Condenser	Trimmer (3-35 MMF)
8	25E6	Condenser	Tubular, Dry Elect. 50-50 Mfd. 150 V.
9	23E216	Condenser	Tubular, .05 Mfd. 200 V.
10	23E211	Condenser	Tubular, .01 Mfd. 200 V.
11	23E416	Condenser	Tubular, .05 Mfd. 400 V.
12	23E411	Condenser	Tubular, .01 Mfd. 400 V.
13	23E408	Condenser	Tubular, .005 Mfd. 400 V.
14	23E408	Condenser	Tubular, .005 Mfd. 400 V.
15	23E421	Condenser	Tubular, .2 Mfd. 400 V. (1U-313 Models Only)
16	23E405	Condenser	Tubular, .002 Mfd. 400 V.
17	23E37	Condenser	Mica, .00005 Mfd.
18	23E39	Condenser	Mica, .0001 Mfd.
19	23E39	Condenser	Mica, .0001 Mfd.
20	23E42	Condenser	Mica, .00025 Mfd.
21	23E42	Condenser	Mica, .00025 Mfd.
22	27E101-2	Resistor	Carbon, 100 Ohm 1/2 Watt
23	27E335	Resistor	Carbon, 3.3 Meg Ohm 1/3 Watt
24	27E335	Resistor	Carbon, 3.3 Meg Ohm 1/3 Watt
25	27E474	Resistor	Carbon, 470,000 Ohm 1/3 Watt
26	27E474	Resistor	Carbon, 470,000 Ohm 1/3 Watt
27	27E224	Resistor	Carbon, 220,000 Ohm 1/3 Watt
28	27E224	Resistor	Carbon, 220,000 Ohm 1/3 Watt (1U-313 Models Only)
29	27E473	Resistor	Carbon, 47,000 Ohm 1/3 Watt
30	27E223	Resistor	Carbon, 22,000 Ohm 1/3 Watt
31	27E822	Resistor	Carbon, 8,200 Ohm 1/3 Watt
32	27E151	Resistor	Carbon, 150 Ohm 1/3 Watt
33	27E102-3	Resistor	Carbon, 1,000 Ohm 1 Watt
36	1E1	Speaker	4" x 6" Elliptical P.M.
37	22E8	Transformer	Output
38	28E8	Tone Control	
39	28E7	Volume Control	500,000 Ohm with S.P.S.T. Switch
40	27E470-2	Resistor	Carbon, 47 Ohm 1/2 Watt
41	27E206	Resistor	Carbon, 20 Megohm 1/3 Watt

MISCELLANEOUS PARTS

Part No.	Part Name	Description
40E1	Bulb	6-8 Volt, .150 Amp. Type 47
7E149	Cabinet Back	With Loop Antenna
or		
7E150	Cabinet Back	With Loop Antenna
7E46-1	Cabinet	Walnut Plastic
7E46-2	Cabinet	Ivory Plastic
65E2	Dial Cord Spring	Tension Spring
20E253-18	Dial Cord	30" of 18 lb. Drive Cord
20E270-5	Dial Shaft Assem.	Drive Shaft Assembly
20E65	Dial Back Plate	Backplate Assembly, less scale
36E36	Dial Scale	Calibrated Glass Scale
35E23	Dial Pointer	Dial Indicator
37E27-11	Knob	For Walnut Cabinet
37E27-15	Knob	For Ivory Cabinet
17E22	Socket	Dial Light Socket Assembly
10E42	Studs	Trimount for Mounting Back to Cabinet.. 1.20

VOLTAGE RATING

THIS RADIO IS DESIGNED FOR USE ON EITHER:

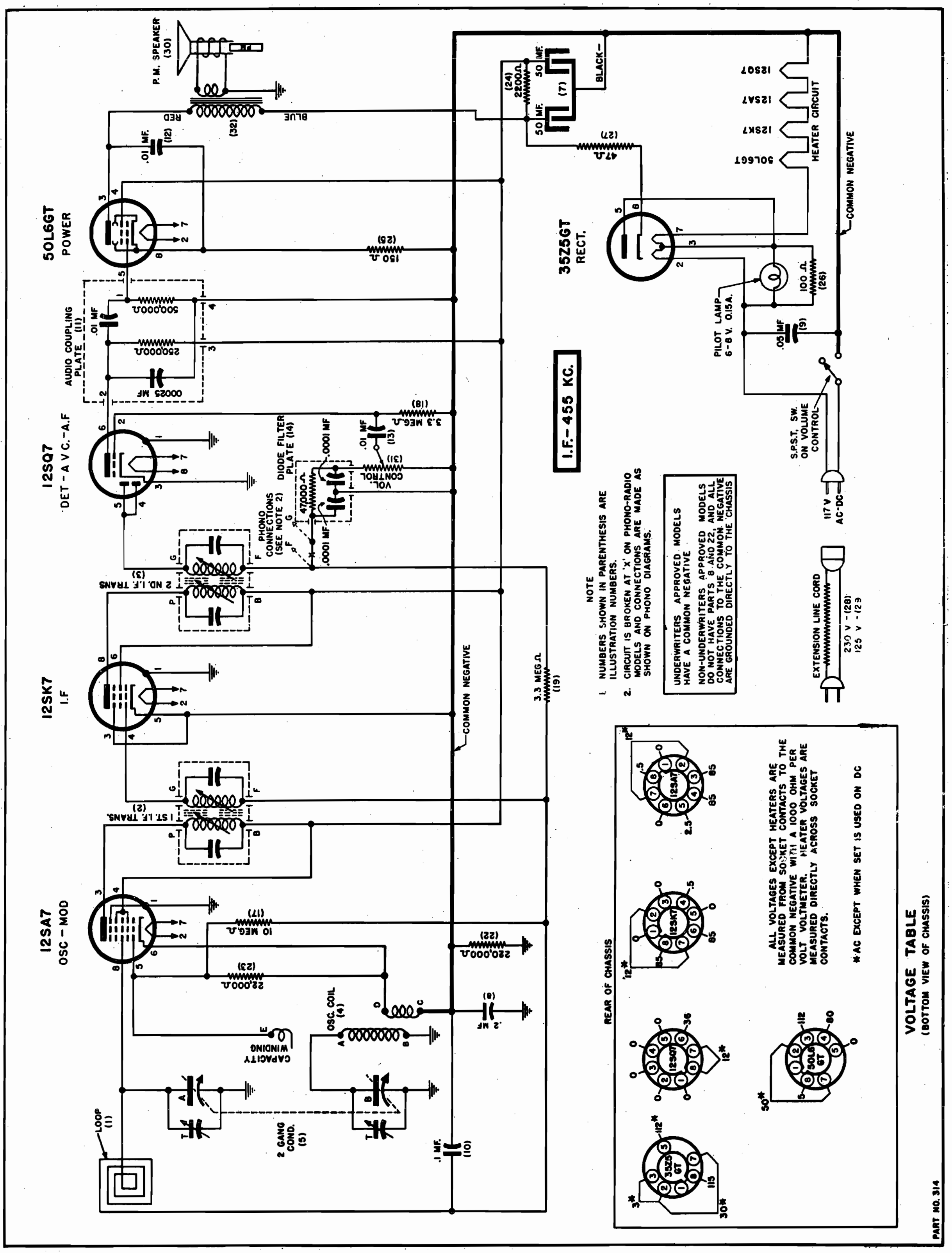
110-120 VOLTS 50-60 CYCLES ALTERNATING CURRENT (AC)

OR

110-120 VOLTS DIRECT CURRENT (DC)

MODELS 314E, 314I, 314W, 1U-314E, 1U-314I, 1U-314W

SENTINEL RADIO CORP.



SENTINEL RADIO CORP.

MODELS 314E, 314I, 314W, 1U-314E, 1U-314I, 1U-314W

ALIGNMENT PROCEDURE

For alignment procedure read tabulations from left to right, and make the adjustment marked (1) first, (2) next, (3) third.

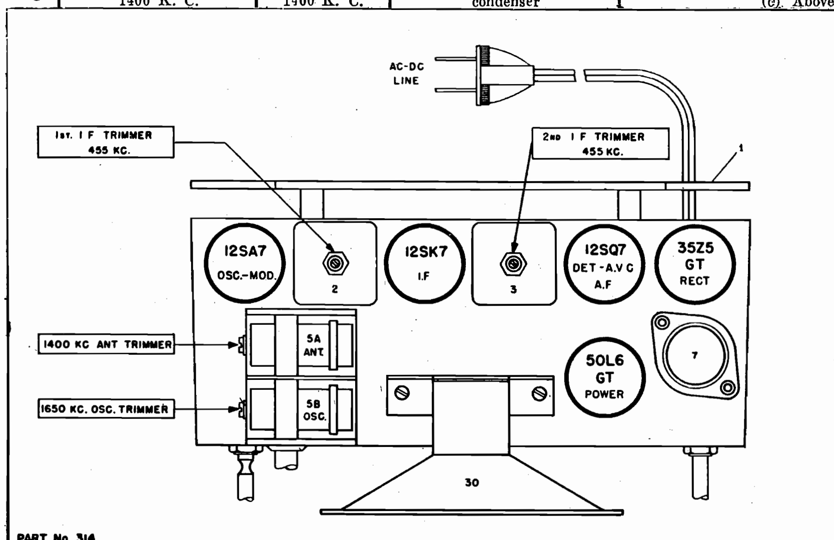
Before starting alignment:

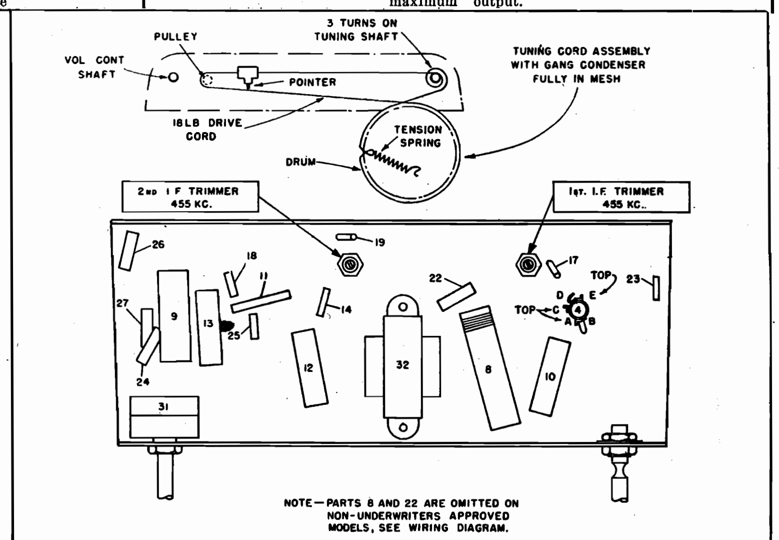
(a) Check tuning dial adjustment by tuning gang condenser until plates touch maximum capacity stop (completely in mesh) at which point the dial needle must be exactly even with the last line at the low frequency end of the dial calibration. If dial needle does not point exactly to last line move to correct position.

(b) Use an accurately calibrated test oscillator with some type of output measuring device.

(c) PLACE LOOP ANTENNA IN THE SAME POSITION IT WILL BE IN WHEN THE SET IS IN THE CABINET. Couple test oscillator to receiver loop by: (1) make loop consisting of five to ten turns of No. 20 to No. 30 size wire, wound on a 2″ or 3″ form; (2) connect this loop across output of test oscillator; (3) place test oscillator loop near radio loop. BE SURE THAT NEITHER LOOP MOVES WHILE ALIGNING.

Steps	Set receiver dial to:	TEST OSCILLATOR: Adjust test oscillator frequency to:	TEST OSCILLATOR: Use dummy antenna in series with output of test oscillator consisting of:	TEST OSCILLATOR: Attach output of test oscillator to:	Refer to parts layout diagram for location of trimmers mentioned below:
1	Any point where no interfering signal is received.	455 K. C.	.02 MFD. condenser	High side to rear stator plates of tuning condenser. Low side to frame of condenser through a .02 Mfd. blocking condenser.	Adjust each of the second I. F. transformer trimmers for maximum output—then adjust each of the first I. F. trimmers for maximum output.
2	Exactly 1650 K. C.	Exactly 1650 K. C.	.00025 MFD. condenser	See Paragraph (c) Above	Adjust 1650 K. C. oscillator trimmer for maximum output.
3	Approx. 1400 K. C.	Exactly 1400 K. C.	.00025 MFD. condenser	See Paragraph (c) Above	While rocking gang condenser adjust 1400 K. C. antenna trimmer for maximum output.





MODELS 314E, 314I, 314W, 1U-314E, 1U-314I, 1U-314W

SENTINEL RADIO CORP.

PARTS LIST

Ill. No.	Part No.	Part Name	Description
1	20E322	Antenna	Loop and Back
	or		
1	20E323	Antenna	Loop and Back
2	20E307	Coil	1st I.F. Transformer
	or		
2	20E261	Coil	1st I.F. Transformer
3	20E307-2	Coil	2nd I.F. Transformer
	or		
3	20E261-2	Coil	2nd I.F. Transformer
4	20E162	Coil	Oscillator
	or		
4	20E346	Coil	Oscillator (1U-314 Models Only)
5	24E2	Condenser	Tuning, 2 Gang
7	25E27	Condenser	Dry Elect. 50-50 Mfd. 150 V.
8	23E421	Condenser	Tubular, .2 Mfd. 400 V. (1U-314 Models Only)
9	23E416	Condenser	Tubular, .05 Mfd. 400 V.
10	23E218	Condenser	Tubular, .1 Mfd. 200 V.
11	23E2023	Condenser	Audio Coupling Plate
12	23E211	Condenser	Tubular, .01 Mfd. 200 V.
13	23E211	Condenser	Tubular, .01 Mfd. 200 V.
14	23E2022	Condenser	Diode Filter Plate
17	27E106	Resistor	Carbon, 10 Meg Ohm 1/3 Watt
18	27E335	Resistor	Carbon, 3.3 Meg Ohm 1/3 Watt
19	27E335	Resistor	Carbon, 3.3 Meg Ohm 1/3 Watt
22	27E224	Resistor	Carbon, 220,000 Ohm 1/3 Watt (1U-314 Models Only)
23	27E223	Resistor	Carbon, 22,000 Ohm 1/3 Watt
24	27E222-3	Resistor	Carbon, 2,200 Ohm 1 Watt
25	27E151	Resistor	Carbon, 150 Ohm 1/3 Watt
26	27E101	Resistor	Carbon, 100 Ohm 1/3 Watt
27	27E470-2	Resistor	Carbon, 47 Ohm 1/2 Watt
30	1E9	Speaker	5" P.M.
31	28E1	Volume Control	500,000 Ohm with S.P.S.T. Switch
32	22E2	Transformer	Output Transformer

MISCELLANEOUS PARTS

Part No.	Part Name	Description
7E31-1	Cabinet	Walnut Plastic
7E31-2	Cabinet	Ivory Plastic
7E31-3	Cabinet	Black Plastic
20E322	Cabinet Back	With Antenna Loop
or		
20E323	Cabinet Back	With Antenna Loop
41E1	Cord	6 ft. Rubber Line Cord
20E318	Dial Plate Assem.	Dial Back Plate Assembly
20E253-17	Dial Cord	30" of 18 lb. Drive Cord
9E2	Dial Crystal	Acetate Crystal
36E35	Dial Scale	Calibrated Scale
20E270-3	Dial Shaft Assem.	Drive Shaft Assembly
35E22	Dial Pointer	Dial Indicator
65E2	Dial Spring	Tension Spring for Drive Cord
37E17-1	Knob	For Walnut Cabinet
37E17-3	Knob	For Ivory Cabinet
37E17-4	Knob	For Black Cabinet
20E43	Pilot Lamp Socket	Pilot Lamp Socket Assembly
40E1	Pilot Lamp	6-8 Volt .150 Amp. Type 47 Lamp

VOLTAGE RATING

THIS RADIO IS DESIGNED FOR USE ON EITHER:

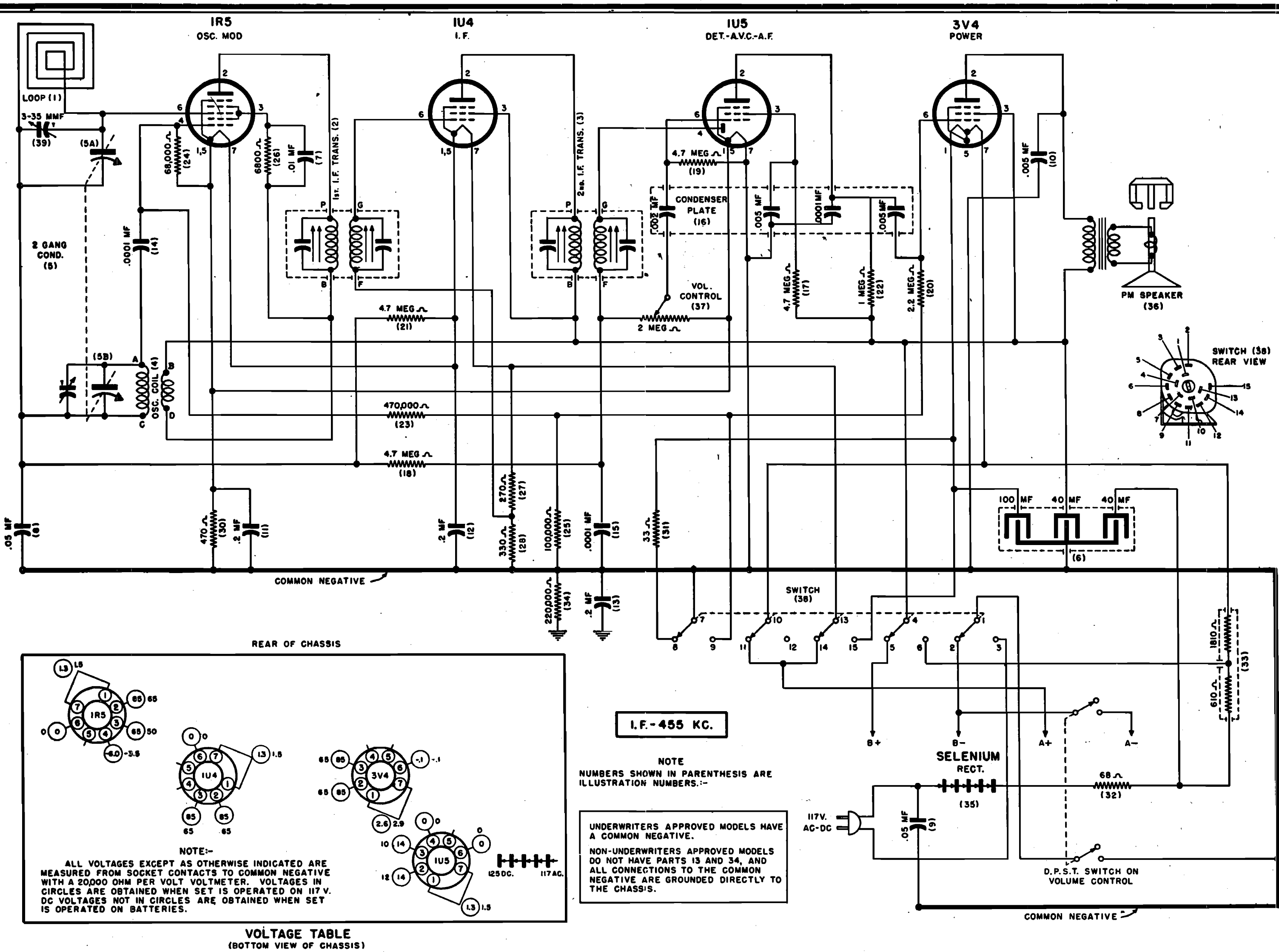
110-120 VOLTS 50-60 CYCLES ALTERNATING CURRENT (AC)

OR

110-120 VOLTS DIRECT CURRENT (DC)

SENTINEL RADIO CORP.

MODELS 316PM, 316PT, 1U-316PM, 1U-316PT



POWER SUPPLY

THIS RADIO CAN BE OPERATED ON EITHER:

110 to 120 VOLTS DIRECT CURRENT
OR
110 to 120 VOLTS, 50 to 60 CYCLE, ALTERNATING CURRENT
OR
BATTERIES—WITH ONE 4½ VOLT "A" and ONE 67½ VOLT "B"

INSTALLATION OF REQUIRED BATTERIES

Diagram shows proper location and connections of the following required types of batteries:

One 4½ Volt "A" Battery, such as SENTINEL Type A38, or Ray-O-Vac P83A or Eveready No. 736A, etc.

One 67½ Volt "B" Battery, such as SENTINEL Type B7634, or Ray-O-Vac 4367 or Eveready No. 467, etc.

NOTE: A 90 Volt "B" Battery, such as Eveready Type No. 490B, may be used in place of the 67½ Volt "B" Battery. The use of a 90 Volt "B" Battery will provide somewhat increased sensitivity and more power output, but this battery will not last quite as long as the 67½ Volt "B" Battery.

MODELS 316PM, 316PT, 1U-316PM, 1U-316PT

SENTINEL RADIO CORP.

ALIGNMENT PROCEDURE

Be sure to follow procedure carefully and in the order given—otherwise the receiver will be insensitive and the dial calibration incorrect. For alignment procedure, read tabulations from left to right. Make the adjustment marked (1) first, (2) next, (3) third.

IF RADIO HAS METAL PLATE ON BOTTOM OF CHASSIS BE SURE TO HAVE PLATE MOUNTED ON CHASSIS WHEN ALIGNING SET.

Before starting alignment:

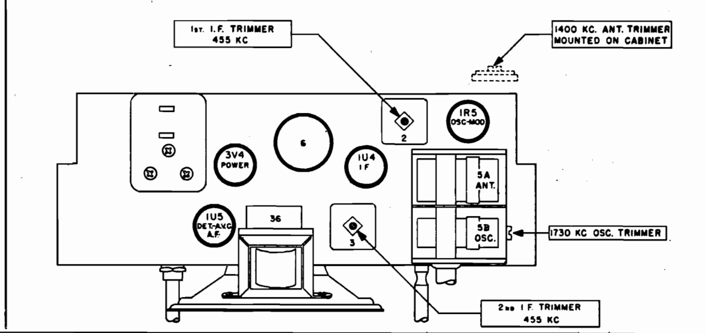
(A) Check tuning dial adjustment by tuning gang condenser until plates touch maximum capacity stop (completely in mesh) at which point the dial indicator must be exactly even with the outside edge of the first 5 in the 55 calibration number at the low frequency end of the dial scale. If dial indicator does not point exactly to the outside edge, move pointer to correct position.

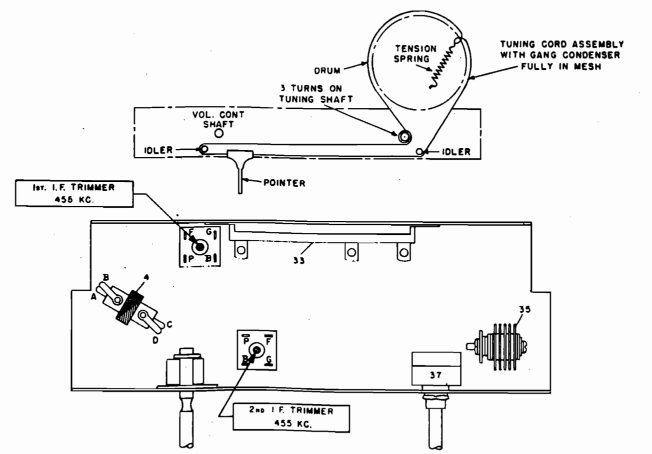
(B) Use an accurately calibrated test oscillator with some type of output measuring device.

(C) WHEN ADJUSTING THE 1730 KC OSCILLATOR TRIMMER, remove chassis from cabinet and disconnect the loop connection wires from the loop terminal strip. Attach a 1 megohm resistor across these connections and feed output of test oscillator across the 1 megohm resistor.

(D) THE 1400 KC LOOP ANTENNA TRIMMER should be adjusted only after all other adjustments have been made and with the set mounted in the cabinet. When aligning the 1400 KC Antenna Trimmer, couple test oscillator to receiver loop by: (1) make loop consisting of five to ten turns of No. 20 to No. 30 size wire, wound on a 2″ or 3″ form; (2) connect this loop across output of test oscillator; (3) place test oscillator loop near radio loop. BE SURE THAT NEITHER LOOP MOVES WHILE ALIGNING.

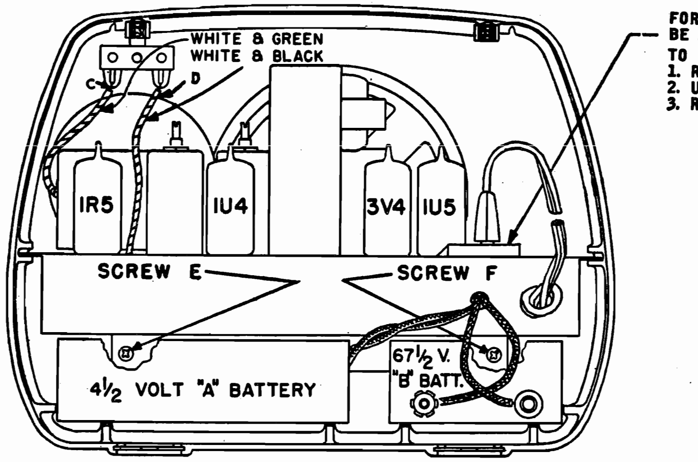
Steps	Set receiver dial to:	TEST OSCILLATOR			Refer to parts layout diagram for location of trimmers mentioned below:
		Adjust test oscillator frequency to:	Use dummy antenna in series with output of test oscillator consisting of:	Attach output of test oscillator to	
1	Any point where no interfering signal is received	Exactly 455 K. C.	0.2 Mfd. Condenser	High side to grid of 1R5 tube. Low side to chassis.	Adjust each of the 2nd I.F. transformer trimmer adjustment screws for maximum output, then adjust each of the 1st I.F. transformer trimmer adjustment screws for maximum output.
2	Rotate gang condenser to minimum capacity	Exactly 1730 K. C.	See paragraph (C) above	See paragraph (C) above	Adjust 1730 K. C. oscillator trimmer for maximum output.
3	Approximately 1400 K. C.	Approx. 1400 K. C.	See paragraph (D) above	See paragraph (D) above	Adjust 1400 K. C. antenna trimmer for maximum output.



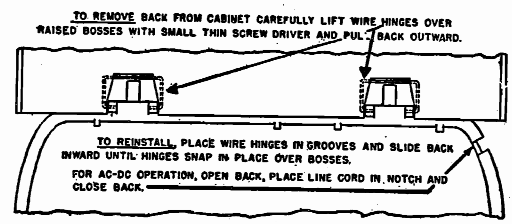


SENTINEL RADIO CORP.

MODELS 316PM, 316PT, 1U-316PM, 1U-316PT



FOR BATTERY OPERATION THE AC LINE CORD PLUG MUST BE FIRMLY INSERTED INTO THIS RECEPTACLE.
TO REMOVE CHASSIS FROM CABINET:
1. REMOVE BATTERIES.
2. UNSOLDER ANTENNA WIRES C & D.
3. REMOVE SCREWS E & F.



PARTS LIST

Illus. No.	Part No.	Part Name	Description
1	64E18	Antenna	Loop
2	20E337	Coil	1st I.F. Transformer
3	20E337	Coil	2nd I.F. Transformer
4	20E338	Coil	Oscillator
5	20E339	Condenser	Tuning, Two Gang
6	25E28	Condenser	Dry Electrolytic, 40-40 Mfd. 150 V. & 100 Mfd. 10 V.
OR			
6	25E29	Condenser	Dry Electrolytic, 40-40 Mfd. 150 V. & 100 Mfd. 10 V. (Used in 1U-316P Only)
7	23E211	Condenser	Tubular, .01 Mfd. 200 V.
8	23E216	Condenser	Tubular, .05 Mfd. 200 V.
9	23E416	Condenser	Tubular, .05 Mfd. 400 V.
10	23E408	Condenser	Tubular, .005 Mfd. 400 V.
11	23E220	Condenser	Tubular, .2 Mfd. 200 V.
12	23E220	Condenser	Tubular, .2 Mfd. 200 V.
13	20E407	Choke	R. F. (Used in 1U-316P Only)
14	23E24	Condenser	Ceramic, .0001 Mfd.
15	23E24	Condenser	Ceramic, .0001 Mfd.
16	23E2024	Condenser	Ceramic Condenser Plate
17	27E475	Resistor	Carbon, 4.7 Megohm, 1/3 W.
18	27E475	Resistor	Carbon, 4.7 Megohm, 1/3 W.
19	27E475	Resistor	Carbon, 4.7 Megohm, 1/3 W.
20	27E225	Resistor	Carbon, 2.2 Megohm, 1/3 W.
21	27E475	Resistor	Carbon, 4.7 Megohm, 1/3 W.
22	27E105	Resistor	Carbon, 1 Megohm, 1/3 W.
23	27E474	Resistor	Carbon, 470,000 Ohm, 1/3 W.
24	27E683	Resistor	Carbon, 68,000 Ohm, 1/3 W.
25	27E104	Resistor	Carbon, 100,000 Ohm, 1/3 W.
26	27E682	Resistor	Carbon, 6,800 Ohm, 1/3 W.
27	27E271	Resistor	Carbon, 270 Ohm, 1/3 W.
28	27E331	Resistor	Carbon, 330 Ohm, 1/3 W.
30	27E471	Resistor	Carbon, 470 Ohm, 1/3 W.
31	27E330-2	Resistor	Carbon, 33 Ohm, 1/2 W.
32	27E680-3	Resistor	Carbon, 68 Ohm, 1 W.
33	27E1005	Resistor	Wire Wound, 1810 and 610 Ohms, 8 W.
35	57E1-4	Rectifier	Selenium
36	1E29	Speaker	4" P.M.
37	28E30	Volume Control	With D.P.S.T. Switch, 2 Megohm
38	29E20	Switch	Spring Return Type
39	24E33	Condenser	Trimmer 3-35 MMF. Working Range

HARDWARE

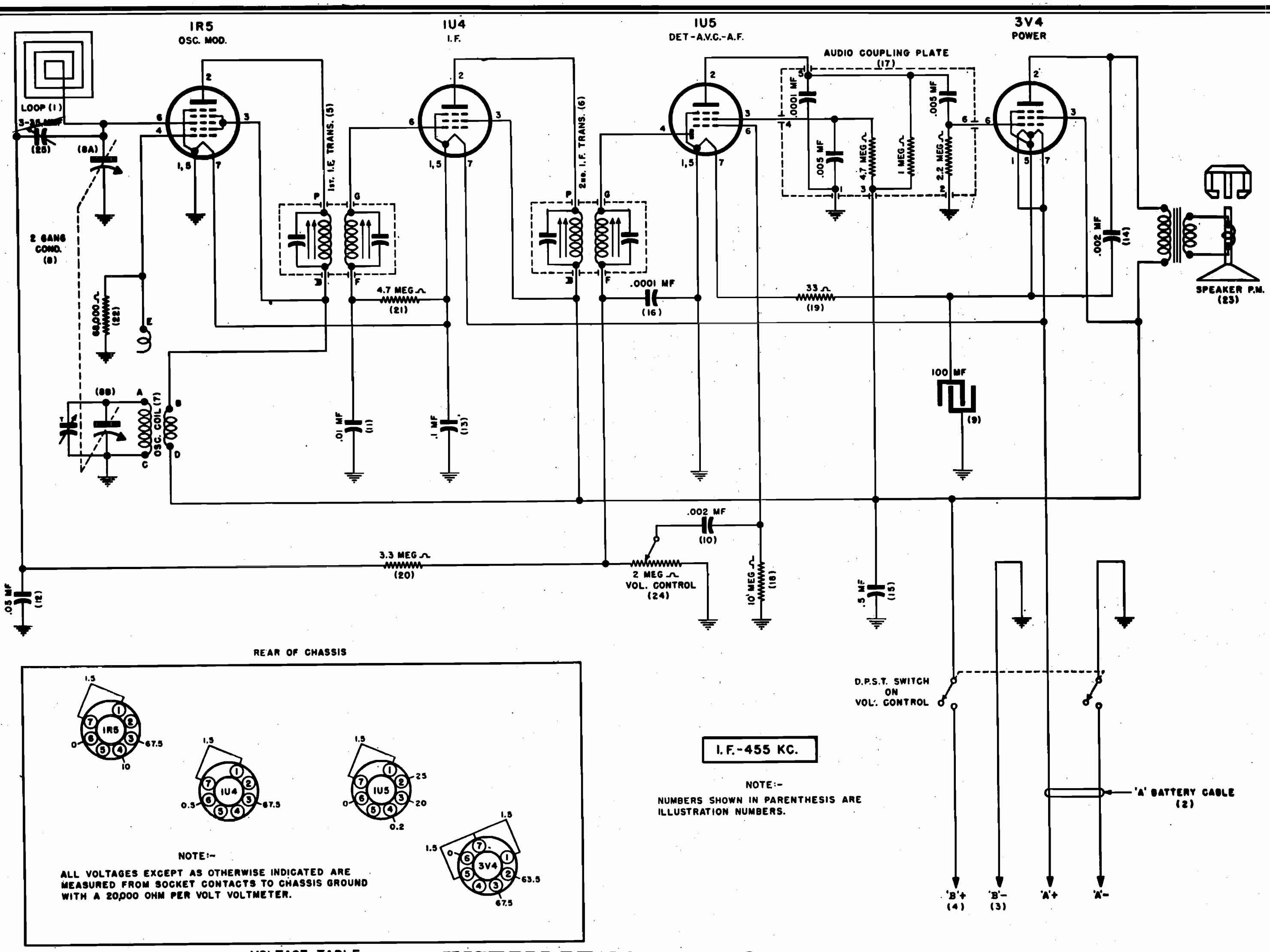
Part No.	Part Name	Description
13E103-9	Clip	Holds Back to Cabinet
82E35-F10	Screw	6-20x1/4—Holds 13E103-9 Clip to Cabt.
82E37-F10	Screw	6-20x3/8—For Mounting Chassis
10E43	Stud	Trimount, for Mounting Speaker Baffle to Cabinet
35E8-8	Dial Pointer	Dial Indicator
20E249	Batt. Connector B—	Battery Connector Assembly
20E249-2	Batt. Connector B+	Battery Connector Assembly
20E340	"A" Batt. Cable	"A" Battery Cable with Plug
55E21-1	Handle Bracket	Bracket for Mounting Handle
52E31	Handle Cover	Plastic Cover
55E39	Handle Strap	Clock Spring Steel
65E27	Hinge	Spring Hinge for Cabinet Back
37E17-5	Knob	Maroon
37E17-6	Knob	Tan
41E12	Line Cord	Line Cord and Plug

MISCELLANEOUS PARTS

Part No.	Part Name	Description
20E343	Cabinet	Complete Cabt. Assembly with Handle, Baffle, Loop and Cabt. Back, Maroon
20E343-2	Cabinet	Complete Cabt. Assembly with Handle, Baffle, Loop and Cabt. Back, Tan
20E344	Cabinet, less Back	Cabinet Assembly, less Back, but with Handle, Baffle and Loop, Maroon
20E344-2	Cabinet, less Back	Cabinet Assembly, less Back, but with Handle, Baffle and Loop, Tan
7E165-4	Cabinet Back	Back for Cabinet with 65E27 Spring Hinge Maroon
17E3-2	Plug	"A" Battery Plug
20E345	Speaker Baffle	Baffle Assembly with Grille Cloth, Tan
20E345-2	Speaker Baffle	Baffle Assembly with Grille Cloth, Maroon
7E165-8	Cabinet Back	Back for Cabinet with 65E27 Spring Tan
20E253-19	Dial Cord	Dial Drive Cord
65E2	Dial Spring	Dial Cord Tension Spring
20E348	Dial Shaft	Drive Shaft Assembly

MODELS 319PM, 319PT

SENTINEL RADIO CORP.



VOLTAGE TABLE
(BOTTOM VIEW OF CHASSIS)

INSTALLATION OF REQUIRED BATTERIES

Diagram shows proper location and connections of the following required types of batteries:

One 4½ Volt "A" Battery, such as SENTINEL Type A38, or Ray-O-Vac P83A or Eveready No. 746, etc.

One 67½ Volt "B" Battery, such as SENTINEL Type B7634, or Ray-O-Vac 4367 or Eveready No. 467, etc.

SENTINEL RADIO CORP.

MODELS 319PM, 319PT

ALIGNMENT PROCEDURE

Be sure to follow procedure carefully and in the order given—otherwise the receiver will be insensitive and the dial calibration incorrect. For alignment procedure, read tabulations from left to right. Make the adjustment marked (1) first, (2) next, (3) third.

Before starting alignment:

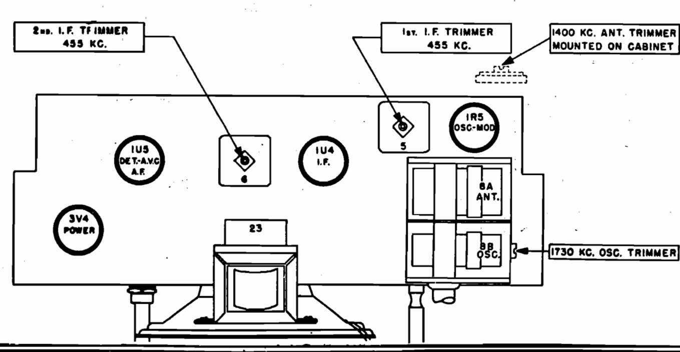
(A) Check tuning dial adjustment by tuning gang condenser until plates touch maximum capacity stop (completely in mesh) at which point the dial indicator must be exactly even with the outside edge of the first 5 in the 55 calibration number at the low frequency end of the dial scale. If dial indicator does not point exactly to the outside edge, move pointer to correct position.

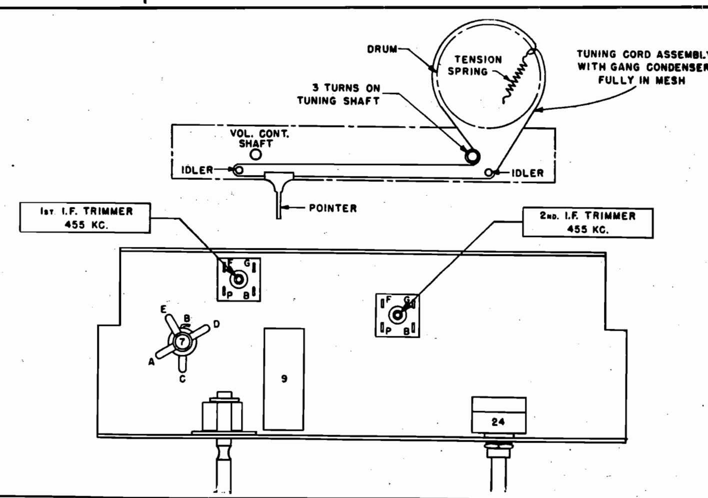
(B) Use an accurately calibrated test oscillator with some type of output measuring device.

(C) WHEN ADJUSTING THE 1730 KC OSCILLATOR TRIMMER, remove chassis from cabinet and disconnect the loop connection wires from the loop. Attach a 1 megohm resistor across these connections and feed output of test oscillator across the 1 megohm resistor.

(D) THE 1400 KC LOOP ANTENNA TRIMMER should be adjusted only after all other adjustments have been made and with the set mounted in the cabinet. When aligning the 1400 KC Antenna Trimmer, couple test oscillator to receiver loop by: (1) make loop consisting of five to ten turns of No. 20 to No. 30 size wire, wound on a 2″ or 3″ form; (2) connect this loop across output of test oscillator; (3) place test oscillator loop near radio loop. BE SURE THAT NEITHER LOOP MOVES WHILE ALIGNING.

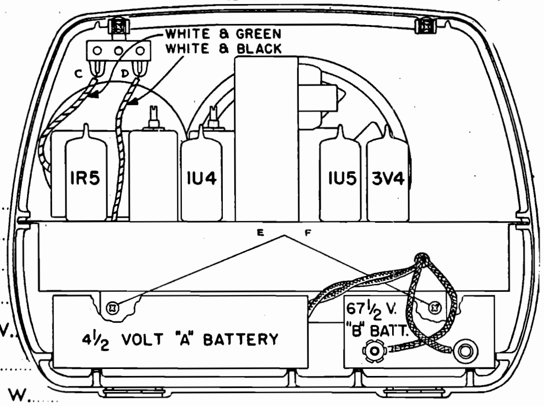
Steps	Set receiver dial to:	TEST OSCILLATOR			Refer to parts layout diagram for location of trimmers mentioned below:
		Adjust test oscillator frequency to:	Use dummy antenna in series with output of test oscillator consisting of:	Attach output of test oscillator to	
1	Any point where no interfering signal is received	Exactly 455 K. C.	0.2 Mfd. Condenser	High side to grid of 1R5 tube. Low side to chassis.	Adjust each of the 2nd I.F. transformer trimmer adjustment screws for maximum output, then adjust each of the 1st I.F. transformer trimmer adjustment screws for maximum output.
2	Rotate gang condenser to minimum capacity	Exactly 1730 K. C.	See paragraph (C) above	See paragraph (C) above	Adjust 1730 K. C. oscillator trimmer for maximum output.
3	Approximately 1400 K. C.	Approx. 1400 K. C.	See paragraph (D) above	See paragraph (D) above	Adjust 1400 K. C. antenna trimmer for maximum output.





MODELS 319PM, 319PT

SENTINEL RADIO CORP.



PARTS LIST

Illus. No.	Part No.	Part Name	Description
1	64E19	Antenna	Loop
2	20E340	Cable	"A" Battery
3	20E249	Cable	"B"— Battery
4	20E249-2	Cable	"B"+ Battery
5	20E337	Coil	1st I. F. Transformer
6	20E337	Coil	2nd I. F. Transformer
7	20E356	Coil	Oscillator
8	24E44	Condenser	Tuning, Two Gang
9	25E12	Condenser	Dry Electrolytic, 100 Mfd. 25 V.
10	23E205	Condenser	Tubular, .002 Mfd. 200 V.
11	23E211	Condenser	Tubular, .01 Mfd. 200 V.
12	23E216	Condenser	Tubular, .05 Mfd. 200 V.
13	23E218	Condenser	Tubular, .1 Mfd. 200 V.
14	23E405	Condenser	Tubular, .002 Mfd. 400 V.
15	23E224	Condenser	Tubular, .5 Mfd. 200 V.
16	23E24	Condenser	Fixed Ceramic, .0001 Mfd.
17	23E2023-2	Condenser	Ceramic Coupling Plate
18	27E106	Resistor	Carbon, 10 Megohm, 1/3 W.
19	27E330-2	Resistor	Carbon, 33 Ohm, 1/2 W.
20	27E335	Resistor	Carbon, 3.3 Megohm, 1/3 W.
21	27E475	Resistor	Carbon, 4.7 Megohm, 1/3 W.
22	27E683	Resistor	Carbon, 68,000 Ohm, 1/3 W.
23	1E29	Speaker	4" P.M.
24	28E30	Volume Control	2 Megohm, with D.P.S.T. Switch
25	24E33	Condenser	Trimmer, 3-35 MMF.

IMPORTANT: When ordering complete cabinet, cabinet less back, handle, cabinet back, or knobs, be sure to mention required color in addition to proper part number.

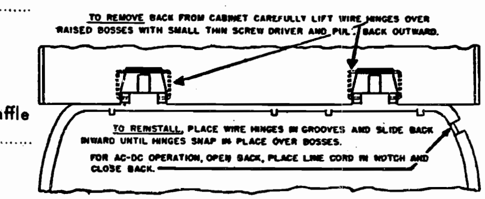
MISCELLANEOUS PARTS

Part No.	Part Name	Description
20E384	Cabinet	Complete Cabt. Assembly with Handle, Baffle, Loop and Cabt. Back, Maroon
20E384-2	Cabinet	Complete Cabt. Assembly with Handle, Baffle, Loop and Cabt. Back, Tan
20E385	Cabinet, less Back	Cabinet Assembly, less Back, but with Handle, Baffle and Loop, Maroon
20E385-2	Cabinet, less Back	Cabinet Assembly, less Back, but with Handle, Baffle and Loop, Tan
7E165-4	Cabinet Back	Back for Cabinet with 65E27 Spring Hinge, Maroon
7E165-8	Cabinet Back	Back for Cabinet with 65E27 Spring Hinge, Tan
20E253-19	Dial Cord	Dial Drive Cord
65E2	Dial Spring	Dial Cord Tension Spring
20E348	Dial Shaft	Drive Shaft Assembly
35E8-8	Dial Pointer	Dial Indicator
20E249	Batt. Connector	B— Battery Connector Assembly
20E249-2	Batt. Connector	B+ Battery Connector Assembly
20E340	"A" Batt. Cable	"A" Battery Cable with Plug
55E21-1	Handle Bracket	Bracket for Mounting Handle
52E31	Handle Cover	Plastic Cover
55E39	Handle Strap	Clock Spring Steel
65E27	Hinge	Spring Hinge for Cabinet Back
37E17-5	Knob	Maroon
37E17-6	Knob	Tan
17E3-2	Plug	"A" Battery Plug
20E345	Speaker Baffle	Baffle Assembly with Grille Cloth

TO REMOVE CHASSIS FROM CABINET:
1. REMOVE BATTERIES
2. UNSOLDER ANTENNA WIRES C & D.
3. REMOVE SCREWS E & F.

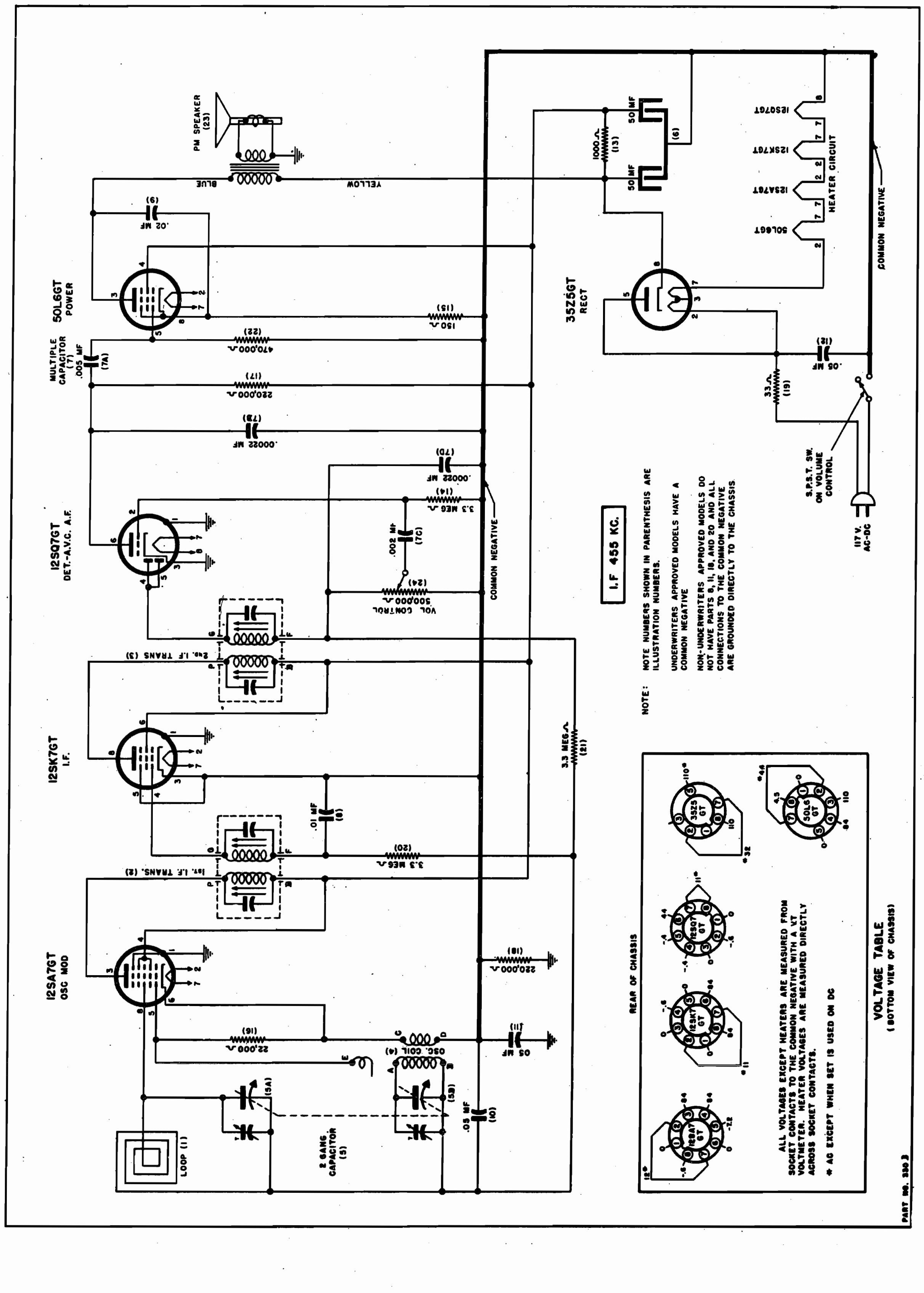
HARDWARE

Part No.	Part Name	Description
13E103-9	Clip	Holds Back to Cabinet
82E35-F10	Screw	6-20x1/4—Holds 13E103-9 Clip to Cabt
82E37-F10	Screw	6-20x3/8—For Mounting Chassis
10E43	Stud	Trimount, for Mounting Speaker Baffle to Cabinet



SENTINEL RADIO CORP.

MODELS 330-I, 330-R, 330-W, 1U-330-I, 1U-330-R, 1U-330-W



MODELS 330-I, 330-R, 330-W, 1U-330-I, 1U-330-R, 1U-330-W

SENTINEL RADIO CORP.

ALIGNMENT PROCEDURE

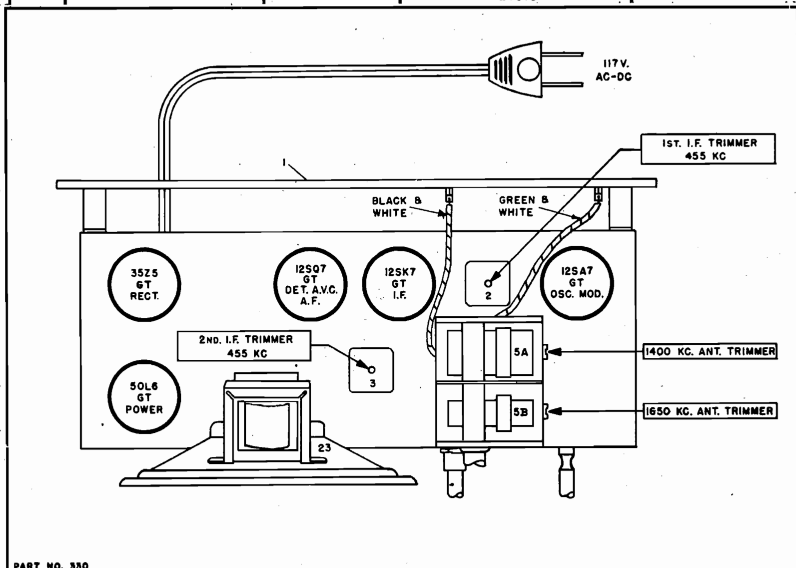
For alignment procedure read tabulations from left to right, and make the adjustment marked (1) first, (2) next, (3) third.

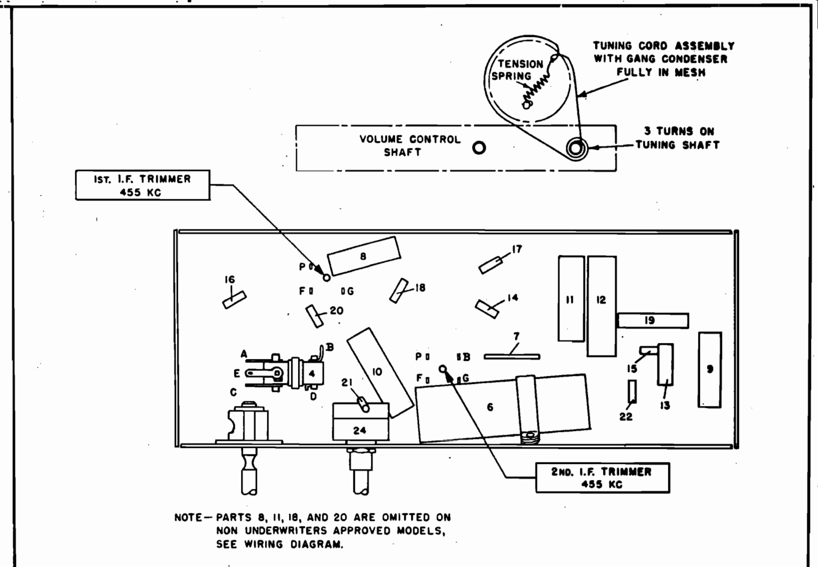
Be sure to:

(A) Use an accurately calibrated test oscillator with some type of output measuring device.

(B) WHEN ADJUSTING THE 1620 KC OSCILLATOR TRIMMER AND THE 1400 KC ANTENNA TRIMMER, remove chassis from cabinet and leave the loop attached to the chassis with the two plastic screws. Couple test oscillator to receiver loop by: (1) make loop consisting of five to ten turns of No. 20 to No. 30 size wire, wound on a 2" or 3" form; (2) connect this loop across output of test oscillator; (3) place test oscillator loop near radio loop. BE SURE THAT NEITHER LOOP MOVES WHILE ALIGNING.

Steps	Set receiver dial to:	TEST OSCILLATOR Adjust test oscillator frequency to:	TEST OSCILLATOR Use dummy antenna in series with output of test oscillator consisting of:	TEST OSCILLATOR Attach output of test oscillator to:	Refer to parts layout diagram for location of trimmers mentioned below:
1	Any point where no interfering signal is received.	455 K. C.	.02 MFD. condenser	High side to rear stator plates of tuning condenser. Low side to frame of condenser through a .02 Mfd. blocking condenser.	Adjust each of the second I.F. transformer trimmers for maximum output—then adjust each of the first I.F. trimmers for maximum output.
2	Exactly 1620 K. C.	Exactly 1620 K. C.	See paragraph (B) above	See paragraph (B) above	Adjust 1620 K. C. oscillator trimmer for maximum output.
3	Approx. 1400 K. C.	Approx. 1100 K. C.	See paragraph (B) above	See paragraph (B) above	Adjust 1400 K. C. antenna trimmer for maximum output.





SENTINEL RADIO CORP.

MODELS 330-I, 330-R, 330-W, 1U-330-I, 1U-330-R, 1U-330-W

VOLTAGE RATING

THIS RADIO IS DESIGNED FOR USE ON EITHER:
110-120 VOLTS 50-60 CYCLES ALTERNATING CURRENT (AC)
OR
110-120 VOLTS DIRECT CURRENT (DC)

TO SERVICE TUBES, it is necessary to remove the cabinet back by gently pulling out the two trimount studs and removing the two plastic screws, used to hold the back to the cabinet, and detaching the two leads from the loop.

Before remounting the back on the cabinet, be sure to properly re-connect these two leads. The green-white wire must be attached to the terminal which is marked with the word "GREEN" close to it.

PARTS LIST

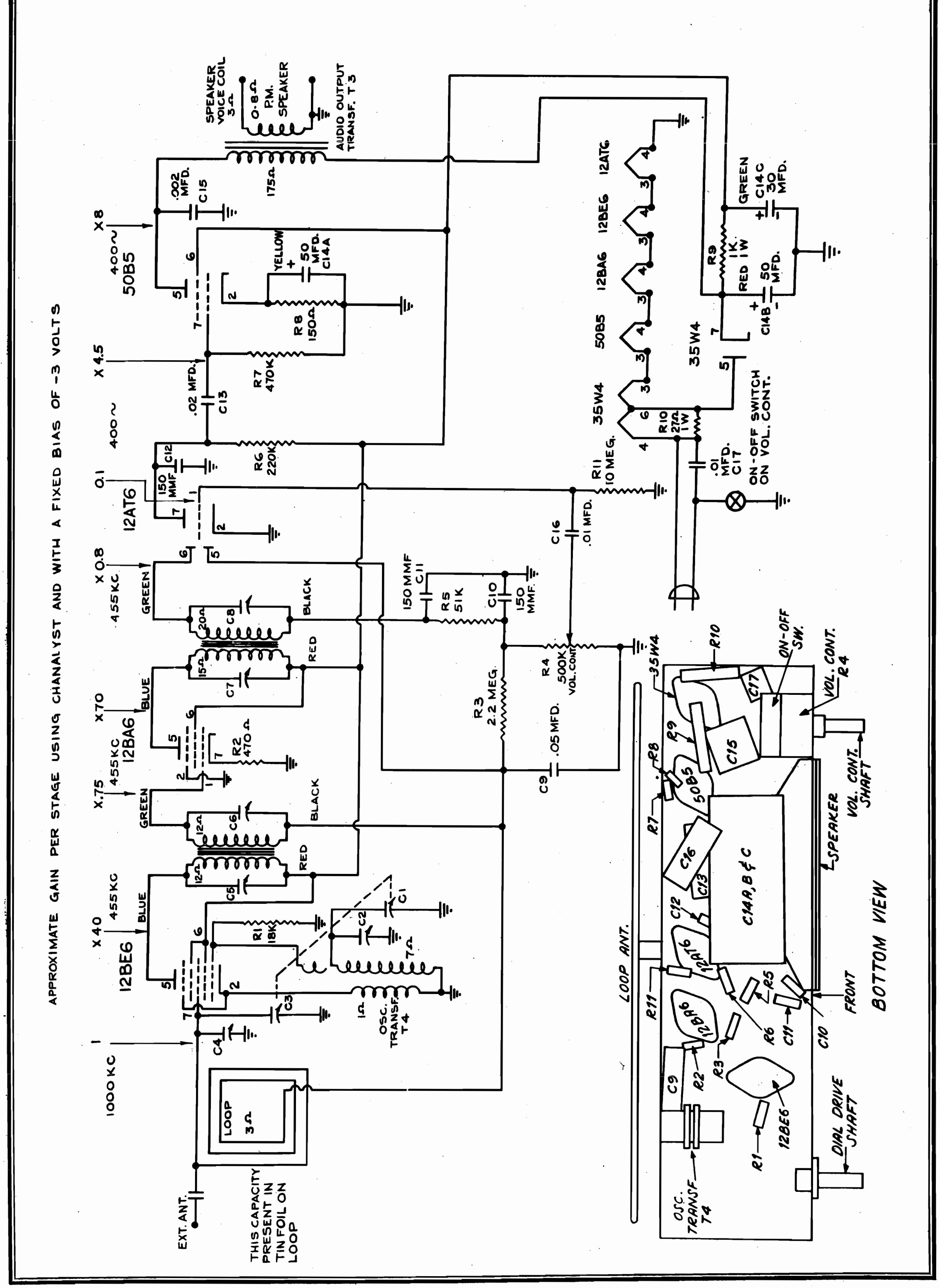
Illus. No.	Part No.	Part Name	Description
1	20E446	Antenna	Loop and back
2	20E445 OR	Coil	1st I.F. Transformer
2	20E445-2	Coil	1st I.F. Transformer
3	20E445 OR	Coil	2nd I.F. Transformer
3	20E445-2	Coil	2nd I.F. Transformer
4	20E444	Coil	Oscillator
5	-24E48	Capacitor	Variable, 2 Gang
6	25E24	Capacitor	Dry Elect., 50-50 Mfd. 150 Volt
7	23E2024-2	Capacitor	Multiple Capacitor Plate
8	23E411	Capacitor	Fixed Paper, .01 Mfd. 400 V. (Used in 1U330 only)
9	23E413	Capacitor	Fixed Paper, .02 Mfd. 400 V.
10	23E416	Capacitor	Fixed Paper, .05 Mfd. 400 V.
11	23E416	Capacitor	Fixed Paper, .05 Mfd. 400 V. (Used in 1U330 only)
12	23E416	Capacitor	Fixed Paper, .05 Mfd. 400 V.
13	27E102-3	Resistor	Carbon, 1000 Ohm, 1 Watt
14	27E335	Resistor	Carbon, 3.3 Megohm, 1/3 Watt
15	27E151	Resistor	Carbon, 150 Ohm, 1/3 Watt
16	27E223	Resistor	Carbon, 22,000 Ohm, 1/3 Watt
17	27E224	Resistor	Carbon, 220,000 Ohm, 1/3 Watt
18	27E224	Resistor	Carbon, 220,000 Ohm, 1/3 Watt (Used in 1U330 only)
19	27E330-5	Resistor	Carbon, 33 Ohm, 2 Watt
20	27E335	Resistor	Carbon, 3.3 Megohm, 1/3 Watt (Used in 1U330 only)
21	27E335	Resistor	Carbon, 3.3 Megohm, 1/3 Watt
22	27E474	Resistor	Carbon, 470,000 Ohm, 1/3 Watt
23	1E35	Speaker	5" P.M.
24	28E4	Vol. Control	500,000 Ohm

MISCELLANEOUS

Part No.	Part Name	Description
7E188-2	Cabinet	Walnut Plastic
7E188-9	Cabinet	Ivory Plastic
41E13	Cord	5 Ft. Rubber Line Cord
20E253-22	Dial Cord	Dial Drive Cord Assembly
20E348-5	Dial Shaft Assembly	Dial Drive Shaft with Bracket
35E21-2	Dial Pointer	Dial Indicator
65E2	Dial Spring	Tension Spring for Dial Cord
·37E21-7	Knob	For Walnut Cabinet
37E27-36	Knob	For Ivory Cabinet
10E42	Stud	Trimount Stud for Loop & Back
82E2002-2	Screw	Plastic Screw

SIGNAL ELECTRONIC & MFG. CO.

MODEL 241

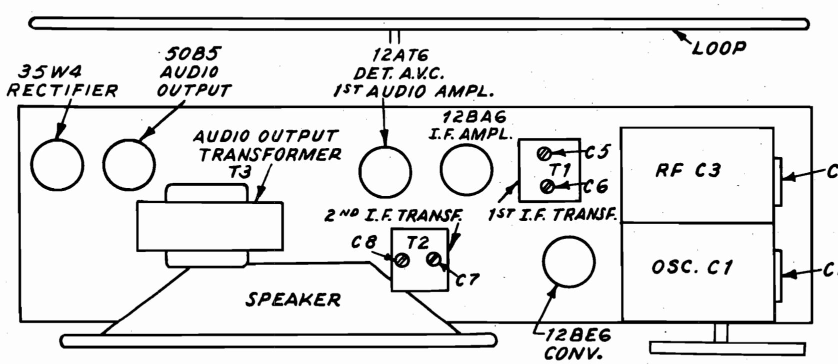


MODEL 241

SIGNAL ELECTRONIC & MFG. CO.

TUBE	PIN	VTVM	1,000 OHM/V	RESISTANCE
12BE6 conv.	1	-6.5	-3.5	18K
	2	0	0	1 ohm
	3	A.C.	A.C.	30 ohm
	4	A.C.	A.C.	16 ohm
	5	100	100	over 500K
	6	100	100	over 500K
	7	-0.6	-0.2	2.5 megs.
12BA6 I.F. AMPL.	1	-0.6	-0.2	2.5 megs.
	2	GND.	GND.	GND.
	3	A.C.	A.C.	40 ohm
	4	A.C.	A.C.	30 ohm
	5	100	100	over 500K
	6	100	100	over 500K
	7	2.5	2.5	470 ohm
12AT6 DET. A.V.C. 1st audio AMPL.	1	-0.8	-0.3	10 megs.
	2	GND.	GND.	GND.
	3	A.C.	A.C.	16 ohm
	4	GND.	GND.	GND.
	5	-0.7	-0.2	2.5 megs.
	6	-0.6	-0.1	550K
	7	50	30	over 500K
50B5 audio output	1	0	0	470K
	2	0	0	150 ohm
	3	A.C.	A.C.	90 ohm
	4	A.C.	A.C.	40 ohm
	5	115	115	over 500K
	6	100	100	over 500K
	7	0	0	470K
35W4 rectifier	1	—	—	—
	2	—	—	—
	3	A.C.	A.C.	90 ohm
	4	A.C.	A.C.	120 ohm
	5	A.C.	A.C.	115 ohm
	6	A.C.	A.C.	115 ohm
	7	120	120	over 500K

ALL VOLTAGE AND RESISTANCE MEASUREMENTS MADE WITH RESPECT TO CHASSIS GROUND. AND WITH A LINE VOLTAGE OF 116 V.A.C.



TOP VIEW PARTS & TUBE LOCATIONS

ALIGNMENT PROCEDURE

With the receiver in the cabinet, set the dial pointer to 1600 kc and make a light pencil mark on the dial backing plate. Repeat the procedure for 1400 kc. This mark can be easily erased after alignment.

Remove the receiver from the cabinet and connect output meter across voice coil.

Connect the signal generation to the standard Haseltine Loop Model 1150 and couple it loosely to the receiver loop. Set the volume control at maximum, and fully mesh the tuning capacitor.

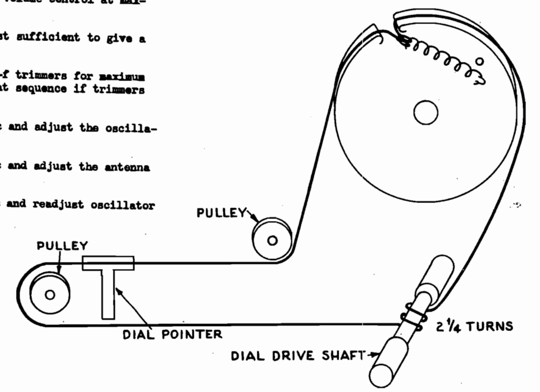
The output of the signal generator should be just sufficient to give a readable deflection on the output meter.

Set the signal generator to 455 kc and adjust i-f trimmers for maximum output in the following order: C8, C7, C8, C5. Repeat sequence if trimmers were badly maladjusted.

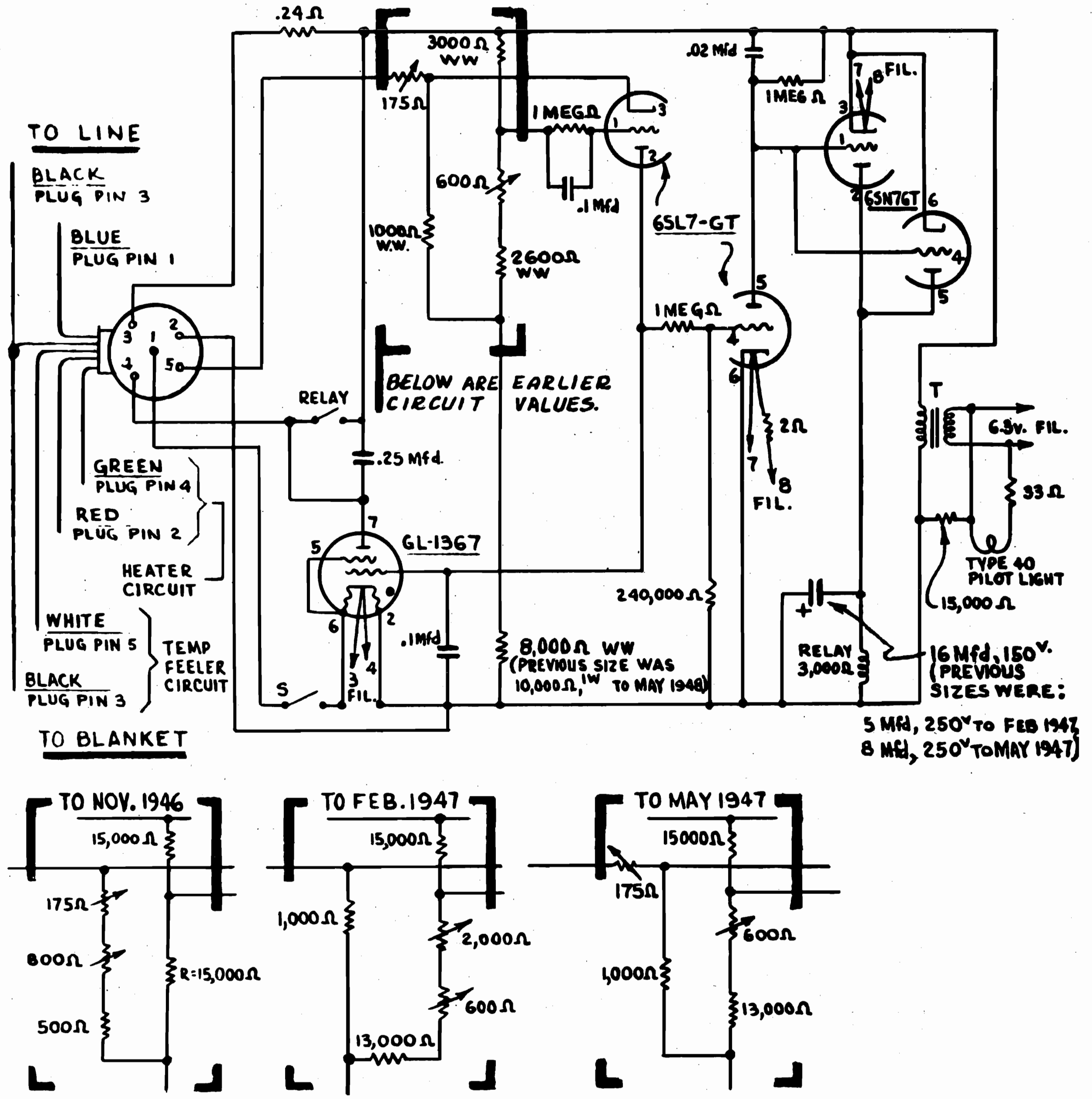
Set the signal generator and receiver to 1600 kc and adjust the oscillator trimmer C2 for maximum output.

Set the signal generator and receiver to 1400 kc and adjust the antenna trimmer C4 for maximum output.

Set the signal generator and receiver to 1600 kc and readjust oscillator trimmer C2 for maximum output.



SIMMONS CO. MODEL AC-1



NOTE: FACTORY ADJUSTMENT OF 600 Ω; WITH MAXIMUM TEMPERATURE SETTING OF DIAL CONTROL IS JUST "OFF" (LEADS RED AND GREEN), WHEN 1317 Ω IS CONNECTED BETWEEN LEADS BLACK AND WHITE.

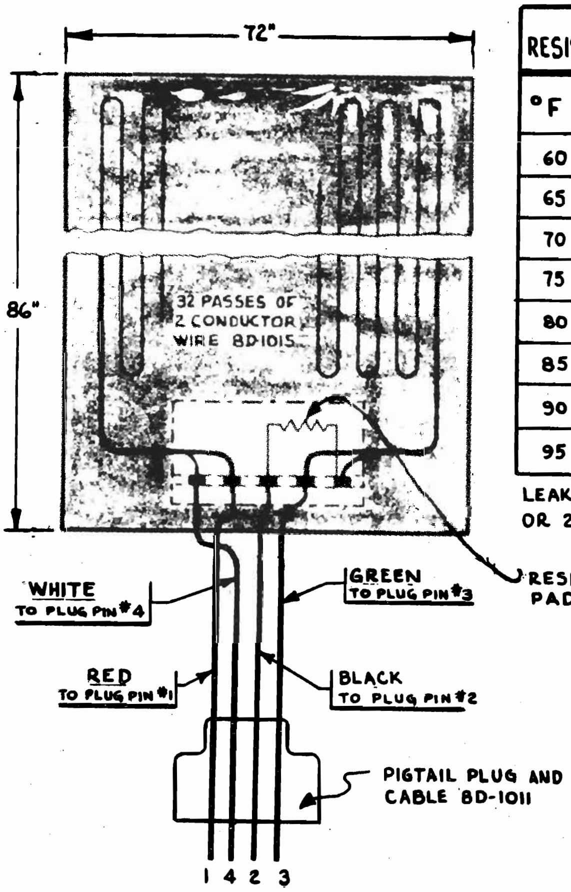
CONTROL UNIT

MODELS AB-1, AC-2

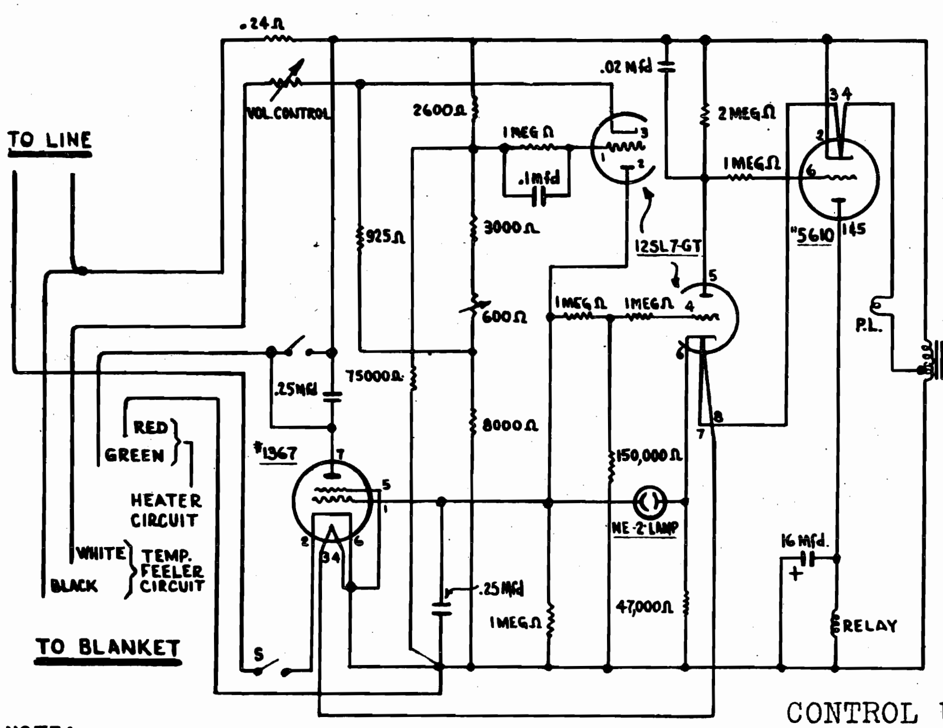
SIMMONS CO.

RESISTANCE -VS.- TEMPERATURE		
°F	HEATER (COPPER CIRCUIT) PINS 1-3	ALLOY CIRCUIT PINS 2-4
60	57.0 Ω	1164 Ω
65	57.6	1180
70	58.1	1197
75	58.8	1213
80	59.4	1230
85	60.0	1246
90	60.7	1263
95	61.3	1280

LEAKAGE RESISTANCE PINS 1-4 OR 2-3, 1 MEG. MIN.



BLANKET CIRCUIT AB-1



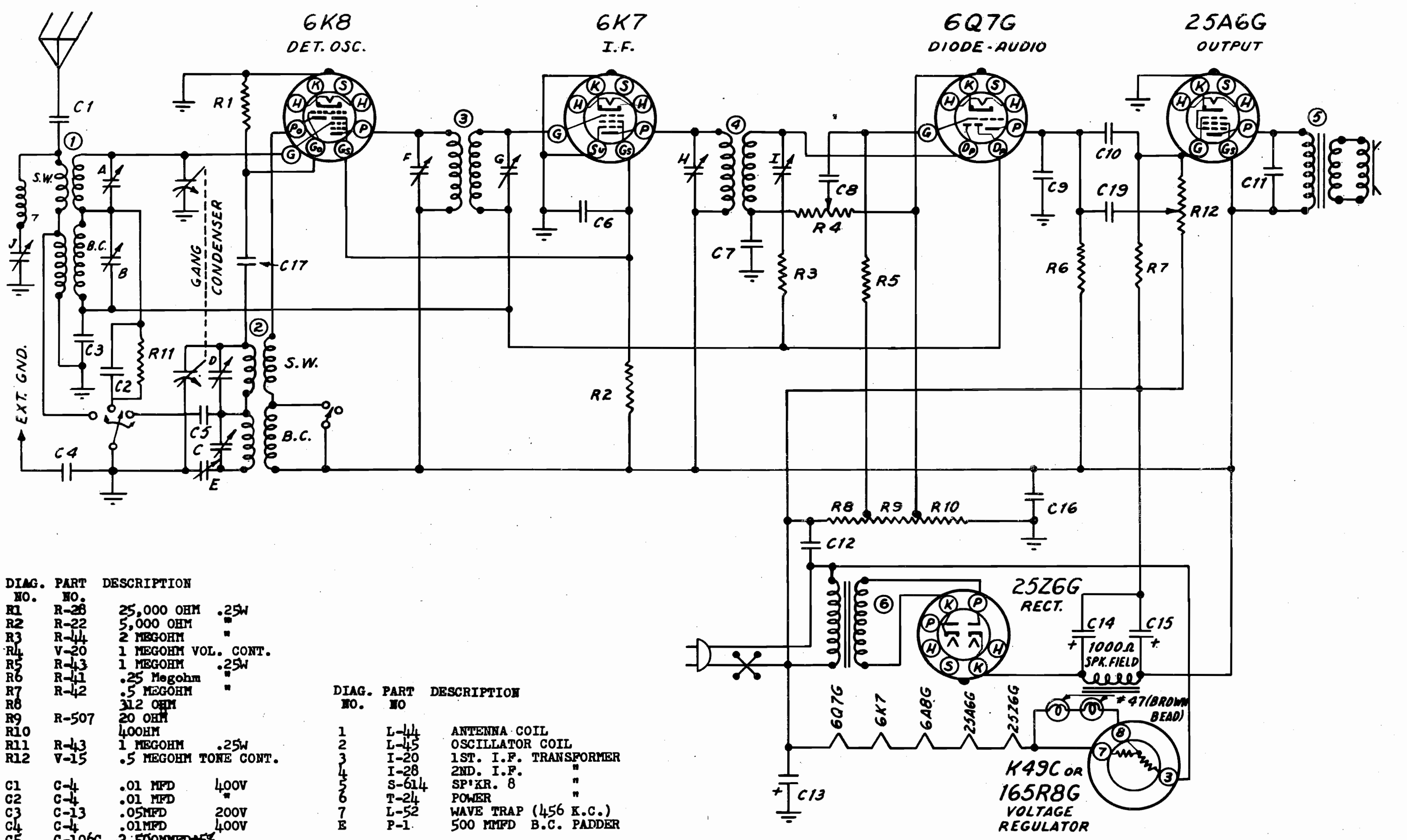
CONTROL UNIT AC-2

NOTE:

FACTORY ADJUSTMENT OF 600 Ω: WITH MAXIMUM TEMPERATURE SETTING OF DIAL CONTROL IS JUST "OFF" (LEADS GREEN AND RED) WHEN 1360 Ω IS CONNECTED BETWEEN LEADS BLACK AND WHITE.

SONORA RADIO & TELEV. CORP.

MODEL EA-33



DIAG. NO.	PART NO.	DESCRIPTION	
R1	R-28	25,000 OHM	.25W
R2	R-22	5,000 OHM	"
R3	R-44	2 MEGOHM	"
R4	V-20	1 MEGOHM VOL. CONT.	
R5	R-43	1 MEGOHM	.25W
R6	R-41	.25 Megohm	"
R7	R-42	.5 MEGOHM	"
R8		312 OHM	
R9	R-507	20 OHM	
R10		400HM	
R11	R-43	1 MEGOHM	.25W
R12	V-15	.5 MEGOHM TONE CONT.	
C1	C-4	.01 MFD	400V
C2	C-4	.01 MFD	"
C3	C-13	.05MFD	200V
C4	C-4	.01MFD	400V
C5	C-106C	2,500MMFD±5%	
C6	C-1	.1 MFD	200V
C7	C-111	250 MMFD ±20%	
C8	C-4	.01MFD	400V
C9	C-111	250MMFD ±20%	
C10	C-4	.01MFD	400V
C11	C-10A	.02MFD	600V
C12	C-14	.05MFD	400V
C13	C-238	20MFD	25V
C14	C-238	10MFD	350V
C15	C-238	10MFD	250V
C16	C-2	1MFD	400V
C17	C-110	100MMFD ±20%	

DIAG. NO.	PART NO	DESCRIPTION	
1	L-44	ANTENNA COIL	
2	L-45	OSCILLATOR COIL	
3	I-20	1ST. I.F. TRANSFORMER	
4	I-28	2ND. I.F. "	
5	S-614	SP'KR. 8 "	
6	T-24	POWER "	
7	L-52	WAVE TRAP (456 K.C.)	
E	P-1	500 MMFD B.C. PADDER	
	G-20	2 GANG VARIABLE COND.	
	X-17	BAND SWITCH	
C19	C-27	.006MFD	800V

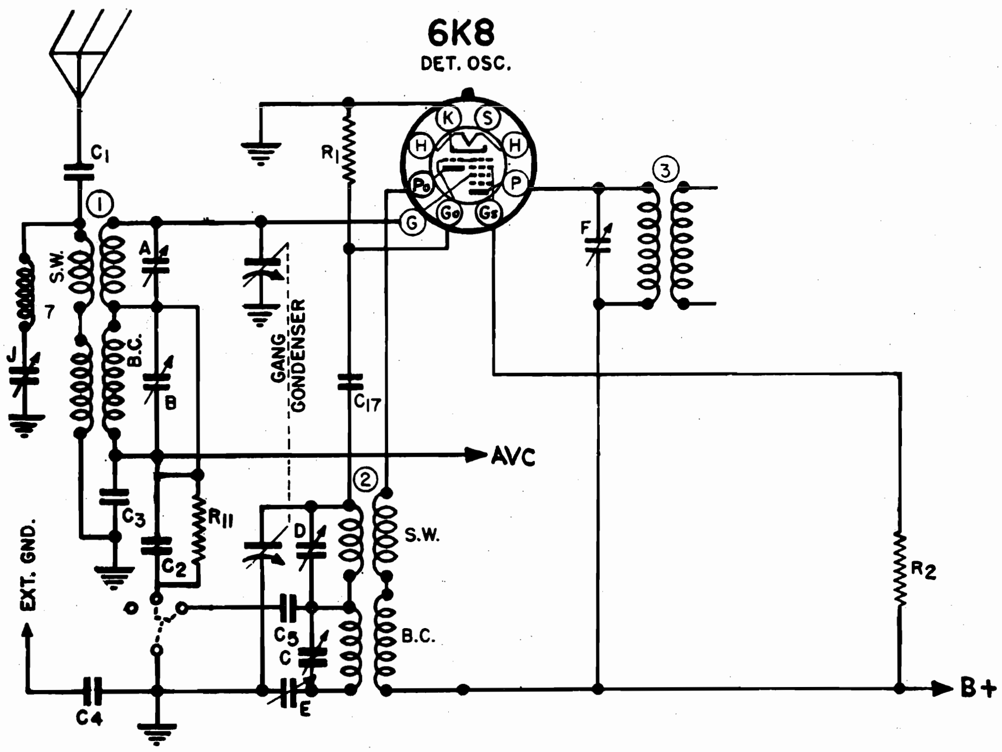
REVISIONS

7-18-38 B,C, R11 MOVED. R1 WAS 50,000
C5 WAS 4,000, C14 WAS 50, G20 WAS G17
X-17 WAS X-13, C18 REMOVED. SWITCH
ACROSS B.C. OSC. PRIMARY ADDED

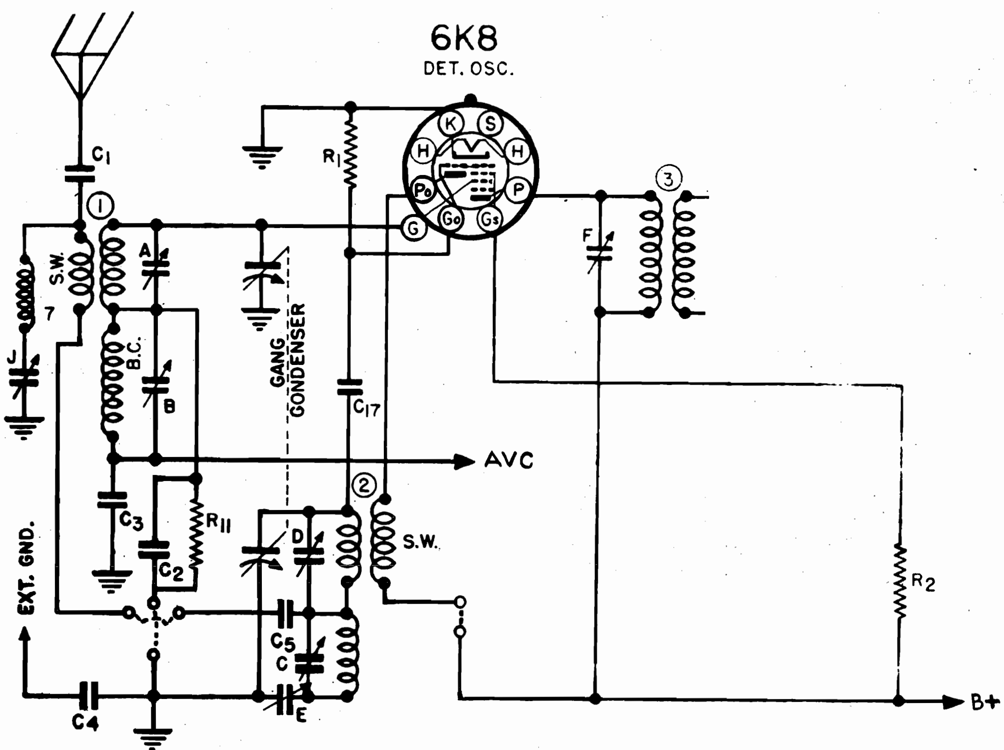
CLARI-SKEMATIX
Registered Trademark

MODEL EA-33

SONORA RADIO & TELEV. CORP.

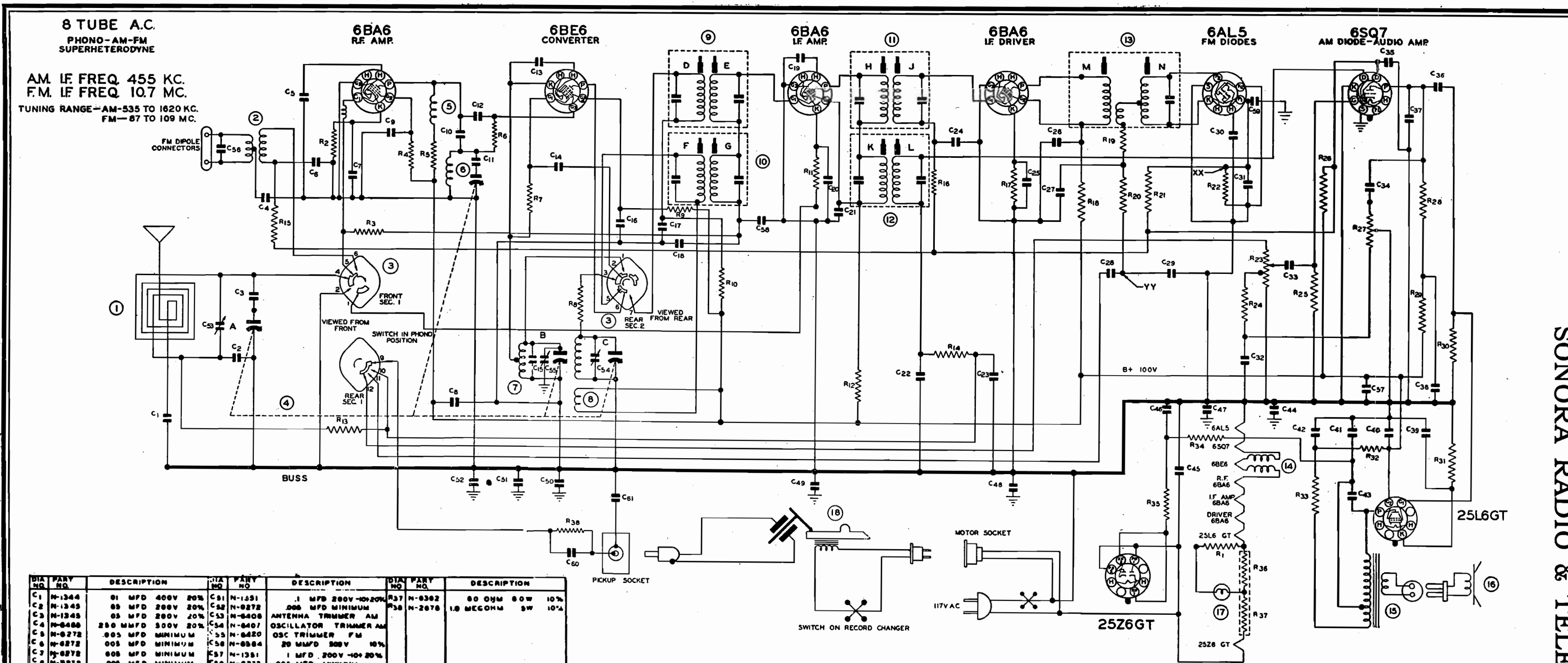


BAND-SWITCH SHOWN
AT 1ST POSITION.
BROADCAST BAND

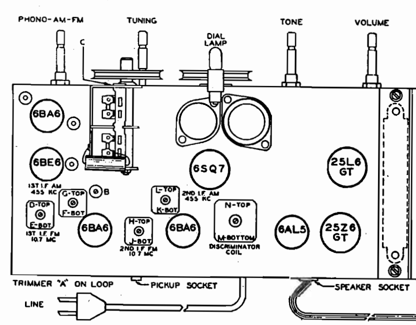


BAND-SWITCH SHOWN
AT 2ND POSITION
SHORT WAVE BAND

SONORA RADIO & TELEV. CORP. MODEL WKRU-254



CHASSIS LAYOUT AND TUBE POSITIONS



This receiver is designed to operate over two tuning ranges; the broadcast band which extends from 535 to 1620 Kilocycles (KC) (185 to 560 Meters), and the Frequency Modulation (FM) Band which extends from 87 to 109 Megacycles (MC).

DIAL CALIBRATION. (Standard Broadcast Band.) The upper scale is calibrated from 55 to 160 (Standard Broadcast). This band covers all Standard Broadcast frequencies of the United States, Canada, Mexico, Cuba, and many Central and South American Countries. Add a zero to figures on the scale to obtain kilocycles.

DIAL CALIBRATION. (Frequency Modulation Band.) The entire lower scale is calibrated from 88 to 108 Megacycles (201 to 300 FM channels) which covers the entire popular Frequency Modulation (FM) Band.

DIA NO	PART NO.	DESCRIPTION
C1	N-1344	.01 MFD 400V 20%
C2	N-1345	.05 MFD 200V 20%
C3	N-1345	.05 MFD 200V 20%
C4	N-0488	250 MMFD 500V 20%
C5	N-0272	.005 MFD MINIMUM
C6	N-0272	.005 MFD MINIMUM
C7	N-0272	.005 MFD MINIMUM
C8	N-0272	.005 MFD MINIMUM
C9	N-0272	.005 MFD MINIMUM
C10	N-0386	50 MMFD 500V 10%
C11	N-0484	75 MMFD 500V 5%
C12	N-6015	100 MMFD 500V 10%
C13	N-0403	250 MMFD 500V 20%
C14	N-0385	50 MMFD 500V 10%
C15	N-0403	45 MMFD 500V 20%
C16	N-0272	.005 MFD MINIMUM
C17	N-0272	.005 MFD MINIMUM
C18	N-1345	.05 MFD 200V 20%
C19	N-0272	.005 MFD MINIMUM
C20	N-0272	.005 MFD MINIMUM
C21	N-0272	.005 MFD MINIMUM
C22	N-0375	50 MMFD 500V 20%
C23	N-0375	50 MMFD 500V 20%
C24	N-0272	.005 MFD MINIMUM
C25	N-0272	.005 MFD MINIMUM
C26	N-0272	.005 MFD MINIMUM
C27	N-0487	130 MMFD 500V 5%
C28	N-1376	.02 MFD 400V 20%
C29	N-0377	.002 MFD 600V -15+40%
C30	N-0272	.005 MFD MINIMUM
C31	N-0374	4 MFD 50V ELECTROLYTIC
C32	N-1344	.01 MFD 400V 20%
C33	N-4884	.005 MFD 600V -15+40%
C34	N-4884	.005 MFD 600V -15+40%
C35	N-0488	250 MMFD 500V 20%
C36	N-1344	.01 MFD 400V 20%
C37	N-0488	250 MMFD 500V 20%
C38	N-1381	.1 MFD 200V -10+20%
C39	N-0313	20 MFD 25V ELECTROLYTIC
C40	N-0313	30 MFD 150V ELECTROLYTIC
C41	N-0313	30 MFD 150V ELECTROLYTIC
C42	N-0313	30 MFD 150V ELECTROLYTIC
C43	N-1344	.01 MFD 400V 20%
C44	N-0272	.005 MFD MINIMUM
C45	N-1346	.05 MFD 400V 20%
C46	N-0312	60 MFD 150V ELEC
C47	N-0482	.01 MFD MINIMUM
C48	N-0272	.005 MFD MINIMUM
C49	N-0482	.01 MFD MINIMUM
C50	N-0272	.005 MFD MINIMUM

DIA NO	PART NO	DESCRIPTION
C51	N-1351	.1 MFD 200V -10+20%
C52	N-0272	.005 MFD MINIMUM
C53	N-6408	ANTENNA TRIMMER AM
C54	N-6407	OSCILLATOR TRIMMER AM
C55	N-6420	OSC TRIMMER FM
C56	N-0584	20 MMFD 500V 10%
C57	N-1351	.1 MFD 200V -10+20%
C58	N-0272	.005 MFD MINIMUM
C59	N-0488	250 MMFD 500V 20%
C60	N-6015	100 MMFD 500V 20%
C61	N-4057	.05 MFD 200V 10%
R1	N-6311	REGULATING RESISTOR
R2	N-6485	68 OHM .5W 10%
R3	N-4077	2.2 MEGOHM .5W 20%
R4	N-4088	2,200 OHM .5W 10%
R5	N-4270	820 OHM .5W 10%
R6	N-4085	10,000 OHM .5W 20%
R7	N-4025	22,000 OHM .5W 20%
R8	N-5053	12 OHM .5W 10%
R9	N-1094	1,000 OHM .5W 20%
R10	N-1094	1,000 OHM .5W 20%
R11	N-6485	68 OHM .5W 10%
R12	N-6011	470 OHM .5W 20%
R13	N-1282	10 MEGOHM .5W 20%
R14	N-4083	47,000 OHM .5W 20%
R15	N-4026	220,000 OHM .5W 20%
R16	N-4026	220,000 OHM .5W 20%
R17	N-6485	68 OHM .5W 10%
R18	N-6311	470 OHM .5W 20%
R19	N-6485	68 OHM .5W 10%
R20	N-4084	33,000 OHM .5W 20%
R21	N-2073	100,000 OHM .5W 10%
R22	N-6376	33,000 OHM .5W 5%
R23	N-6274	.5 MEGOHM VOLUME CONT
R24	N-4451	27,000 OHM .5W 10%
R25	N-4026	.5 MEGOHM .5W 20%
R26	N-6486	1.0 MEGOHM .5W 10%
R27	N-0273	.5 MEGOHM TONE CONTROL
R28	N-4026	220,000 OHM .5W 20%
R29	N-5093	68,000 OHM .5W 10%
R30	N-4027	470,000 OHM .5W 20%
R31	N-5083	150 OHM .5W 10%
R32	N-1615	100 OHM .5W 10%
R33	N-5083	150 OHM .5W 10%
R34	N-0370	68 OHM 10W 10%
R35	N-5093	12 OHM .5W 10%
R36	N-6362	100 OHM 77W

DIA NO	PART NO.	DESCRIPTION
R37	N-0302	60 OHM 60W 10%
R38	N-2076	1.0 MEGOHM .5W 10%
1	N-6451	ANTENNA LOOP COIL
2	N-6371	ANTENNA COIL FM
3	N-6450	PHONO-AM-FM SWITCH
4	N-0276	2 GANG CAPACITOR
5	N-0373	R.F. CHOKE COIL
6	N-0372	R.F. COIL FM
7	N-0349	OSC. COIL FM
8	N-0348	OSC. COIL AM
9	N-0346	1ST IF COIL FM
10	N-0344	1ST IF COIL AM
11	N-0346	2ND IF COIL FM
12	N-0343	2ND IF COIL AM
13	N-0341	DISCRIMINATOR COIL
14	N-0389	FILAMENT CHOKE COIL
15	N-0380	OUTPUT TRANSFORMER
16	N-0440	6" P.M. SPEAKER
17	N-1147	DIAL LAMP NO. 47
18	N-8181	RECORD CHANGER

RECORD CHANGER: Crescent Model C-250, RCD.CH.18-1

MODEL WKRU-254 SONORA RADIO & TELEV. CORP.

SERVICE DATA

Lack of sensitivity and poor tone quality may be due to any one or a combination of causes, such as weak or defective tubes or speaker, open or grounded resistors, or bypass condensers. Never attempt to realign the set until all other possible sources of trouble have been first thoroughly investigated and definitely proved not to be the cause. It will be necessary to follow the procedure outlined below and to use recommended equipment for satisfactory results.

BROADCAST ALIGNMENT PROCEDURE

EQUIPMENT REQUIRED: Modulated Test Oscillator that will cover the frequencies of 455, 600, 1400 and 1620 KC, also an Output Meter to connect across the primary or secondary of the output transformer.

I. F. ALIGNMENT: Put switch in the broadcast position and connect the test oscillator to the converter grid through a .05 condenser. The ground lead of the test oscillator should be connected to the buss of the receiver. Adjust the four I. F. trimmers (F. G, L and K) for maximum reading on the output meter. Always use the peak on the slug which is obtained when screw is out of the can the greatest distance.

R. F. ALIGNMENT: Connect the test oscillator to the antenna lead on the loop through a 100 mmf. condenser. The Loop and Chassis must occupy the same relative positions on the bench as they do in the cabinet. Care should be taken to have no iron or other metal near the loop. Do not make this set-up on a metal bench. Set the gang condenser to the maximum high frequency position and the test oscillator to 1620 KC. Adjust Trimmer "C" to the maximum output. Set test oscillator to 1400 KC and tune in signal with the gang condenser and adjust Trimmer "A" to maximum response. Set test oscillator to 600 KC and tune in signal with gang condenser. Check for damage to gang condenser or coils.

F. M. ALIGNMENT PROCEDURE

EQUIPMENT REQUIRED: F. M. Generator with frequencies of 90, 98, 106, and 109 megacycles, and generator without any modulation which covers 10.7 megacycles, also a zero center microammeter, and a DC Vacuum Tube Voltmeter (An oscilloscope and variable frequency audio oscillator can be used for better results. This method of alignment is described in the last paragraph).

DISCRIMINATOR ALIGNMENT: Connect DC Vacuum Tube Voltmeter between the buss and point "XX" on circuit diagram. Point "XX" is negative potential on the vacuum tube voltmeter. Isolate point "XX" and buss connections to vacuum tube voltmeter with chokes made by wrapping approximately 20 turns of hookup wire around a pencil. This is illustrated in Figure 1. Connect two 100,000 ohm resistors in series. (These resistors must match to 5%.) Connect them from point "XX" to buss. Between junction of 100,000 ohm resistors and the point "YY" connect Zero Center Meter, which is also isolated by the choke described above. These connections are illustrated in Figure 1. Connect test oscillator which is adjusted to 10.7 megacycles to grid of IF Driver through a 250 mmf condenser. Adjust slug "M" to maximum on the vacuum tube voltmeter. Reduce test oscillator to keep vacuum tube voltmeter to around 5 volts. Adjust slug "N" to bring zero center meter to zero point. Slug "N" should never be touched after this alignment.

PRELIMINARY I. F. ALIGNMENT: Connect test oscillator to the converter grid through a 250 mmf. mica condenser. Adjust slugs D, E, H and J to maximum output on the vacuum tube voltmeter. In making these adjustments reduce the generator input to keep the vacuum tube voltmeter at approximately 5 volts when making this adjustment. Always use the peak on the slug which is obtained when the screw is out of the can the greatest distance.

FINAL I. F. ALIGNMENT: Set the test oscillator to 109 MC without frequency modulation and connect it to converter grid. Adjust trimmer "B" for approximate maximum output on the vacuum tube voltmeter and zero center for exact centering. Adjust test oscillator to approximately 25 KC deviation, carefully adjust trimmers D, E, H, J and M for maximum on vacuum tube voltmeter. It may be necessary to shift the frequency of the oscillator slightly to hold the zero center meter on center. In making this adjustment turn up volume control slightly to obtain an audio signal out of the speaker. If this signal is free of distortion, increase the deviation to approximately 75 KC and repeat the above alignment. If this is done carefully there will be no distortion in the speaker with this deviation. If distortion is obtained in the speaker with this deviation, it will be necessary to carefully repeat the I. F. alignment.

R. F. ALIGNMENT: Move the signal generator to the FM antenna terminals, using 150 ohm resistors between the generator terminals and each of the FM antenna terminals. Set the test oscillator to 106 megacycles and tune in signal with gang condenser to obtain approximate maximum on the vacuum tube voltmeter and zero center on the meter. Slightly bend the RF section in the gang condenser for maximum output with vacuum tube voltmeter. Set the signal generator to 98 megacycles, tune in signal with the gang condenser. Repeat the above procedure at this frequency and also at 90 megacycles. Recheck alignment at 106 megacycles.

FINAL ALIGNMENT OF FM IF WITH OSCILLOSCOPE AND VARIABLE AUDIO OSCILLATOR: The oscilloscope and variable audio oscillator should be connected as shown in Figure 2. Adjust the deviation to approximately 25 KC and align trimmers D, E, H, J and M to maximum on the vacuum tube voltmeter while watching the oscilloscope for a straight line. It may be necessary to vary the frequency of the variable audio oscillator in order to make the line straight on the scope. Next increase deviation to approximately 75 KC and repeat procedure, adjusting for maximum or as close to maximum as it is possible to obtain without losing the straight line on the oscilloscope. After all the trimmers have been properly adjusted to a maximum and a straight line on the scope, increase the deviation from approximately 125 to 150 KC. The curves illustrated in Figure 3 should be obtained. In making the above adjustments it may be necessary to make slight variations in the RF frequency in order to hold the zero center meter at the zero point.

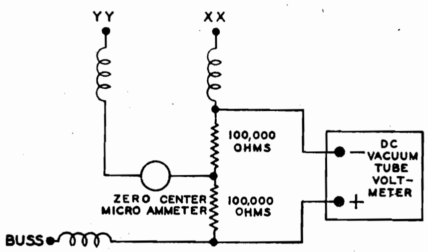


FIG. 1

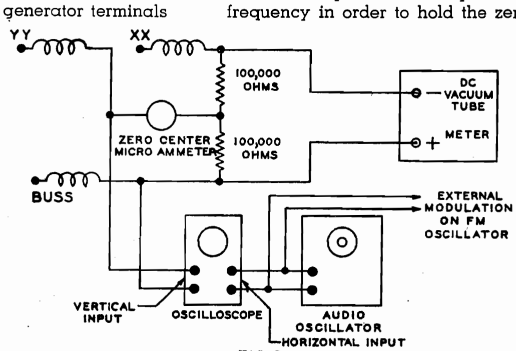


FIG. 2

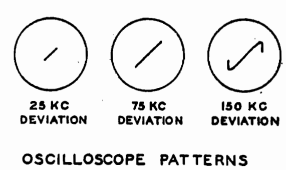


FIG. 3

AERIAL SYSTEM

This receiver has a built-in "Loop" aerial for broadcast reception. Its excellent design is such as to increase pick-up from stations having wide variations in signal strength. The efficiency and selectivity of the loop provide outstanding reception without the use of an external aerial. In or near metal buildings, iron ore deposits or steel structures, or in localities remote from broadcasting stations, reception of the Standard Broadcast Band may require an outside aerial 50 to 100 feet in length including lead-in. Connect the outside aerial to the aerial lead (Blue Wire) located at the rear of the receiver. When using the outside antenna it may be necessary to reverse the power cord plug to eliminate hum or distortion.

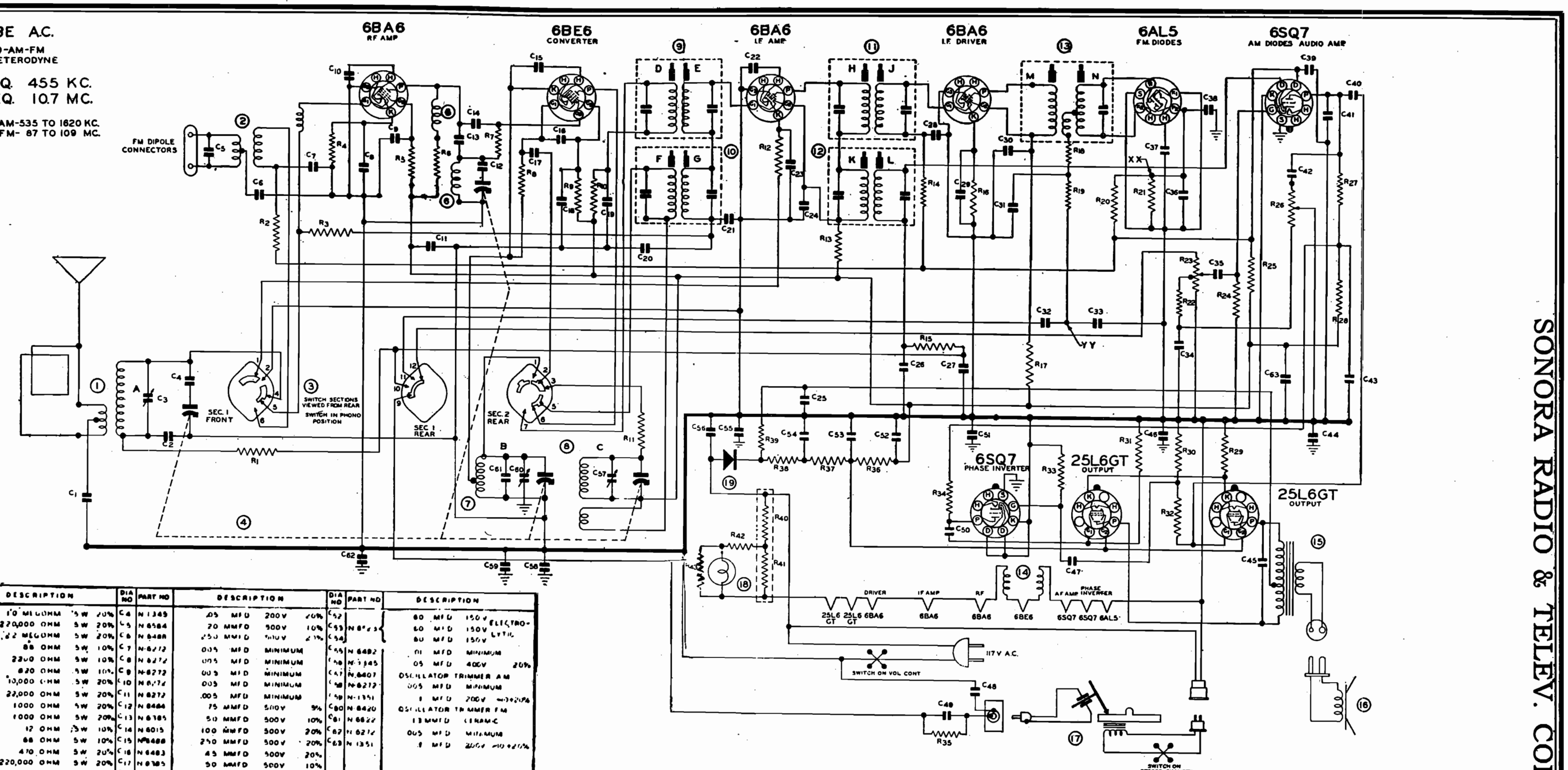
The built-in FM aerial is a folded dipole Antenna. Although the receiver performs satisfactorily on the broadcast band, your particular location may require an outside antenna for FM reception. The external aerial for FM reception must be a dipole Antenna with a 300 ohm line, which you may secure from your local Sonora Dealer. The two lead-in leads of the dipole antenna should be attached, one lead under each screw, to the terminal strip located on the cabinet back after removing the FM antenna furnished with the receiver. For best possible reception with an outside dipole, adjust lead length on the lead-in cable on the weakest station. Cut off lead 6 inches at a time and until signal comes in stronger. If cutting off an additional length does not increase signal, you have reached the correct lengths. It is not necessary to cut off more than 2½ feet.

SONORA RADIO & TELEV. CORP. MODELS WLRU-219, WLRU-220A, WLRU-254A; 402F

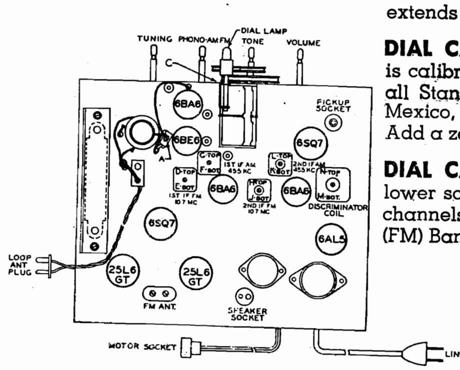
9 TUBE A.C.
PHONO-AM-FM
SUPERHETERODYNE

AM I.F. FREQ. 455 KC.
FM I.F. FREQ. 10.7 MC.

TUNING RANGE-AM-535 TO 1620 KC.
FM- 87 TO 109 MC.



DIA NO	PART NO	DESCRIPTION	DIA NO	PART NO	DESCRIPTION	DIA NO	PART NO	DESCRIPTION
R1	N-1282	10 MEGOHM .5W 20%	C4	N-1345	.05 MFD 200V 20%	C52	N-8123	80 MFD 150V ELECTROLYTIC
R2	N-4028	220,000 OHM .5W 20%	C5	N-6584	20 MMFD 500V 10%	C53		60 MFD 150V
R3	N-4277	.22 MEGOHM .5W 20%	C6	N-6488	250 MMFD 500V 20%	C54		80 MFD 150V
R4	N-6485	68 OHM .5W 10%	C7	N-6272	.005 MFD MINIMUM	C55	N-6482	.01 MFD MINIMUM
R5	N-4896	2200 OHM .5W 10%	C8	N-6272	.005 MFD MINIMUM	C56	N-1345	.05 MFD 400V 20%
R6	N-4278	820 OHM .5W 10%	C9	N-6272	.005 MFD MINIMUM	C57	N-6407	OSCILLATOR TRIMMER AM
R7	N-4895	10,000 OHM .5W 20%	C10	N-6272	.005 MFD MINIMUM	C58	N-6272	.005 MFD MINIMUM
R8	N-4025	22,000 OHM .5W 20%	C11	N-6272	.005 MFD MINIMUM	C59	N-1351	.1 MFD 200V -10+20%
R9	N-1884	1000 OHM .5W 20%	C12	N-6484	75 MMFD 500V 5%	C60	N-6420	OSCILLATOR TRIMMER FM
R10	N-1884	1000 OHM .5W 20%	C13	N-6385	50 MMFD 500V 10%	C61	N-6622	13 MMFD CERAMIC
R11	N-5053	12 OHM .5W 10%	C14	N-6015	100 MMFD 500V 20%	C62	N-6272	.005 MFD MINIMUM
R12	N-6485	68 OHM .5W 10%	C15	N-6488	250 MMFD 500V 20%	C63	N-1351	.1 MFD 200V -10+20%
R13	N-4011	470 OHM .5W 20%	C16	N-6483	45 MMFD 500V 20%			
R14	N-4028	220,000 OHM .5W 20%	C17	N-6385	50 MMFD 500V 10%			
R15	N-4083	47,000 OHM .5W 20%	C18	N-6272	.005 MFD MINIMUM			
R16	N-6485	68 OHM .5W 10%	C19	N-6272	.005 MFD MINIMUM			
R17	N-4011	470 OHM .5W 20%	C20	N-1345	.05 MFD 200V 20%	-		
R18	N-6485	68 OHM .5W 10%	C21	N-6272	.005 MFD MINIMUM			
R19	N-4084	33000 OHM .5W 20%	C22	N-6272	.005 MFD MINIMUM			
R20	N-2973	100,000 OHM .5W 10%	C23	N-6272	.005 MFD MINIMUM	1	N-6572	ANTENNA COIL, AM
R21	N-6378	33,000 OHM .5W 5%	C24	N-6272	.005 MFD MINIMUM	2	N-6371	ANTENNA COIL, FM
R22	N-4491	27,000 OHM 8W 10%	C25	N-6312	80 MFD 150V ELECTRO	3	N-6518	BAND-PHONO SWITCH
R23	N-5851	5 MEGOHM VOL. CONT.	C26	N-6375	50 MMFD 500V 20%	4	N-6278	2 GANG CAPACITOR
R24	N-4028	68 MEGOHM .5W 20%	C27	N-6375	50 MMFD 500V 20%	5	N-6373	RF CHOKE
R25	N-6486	10 MEGOHM .5W 10%	C28	N-6272	.005 MFD MINIMUM	6	N-6372	RF COIL, FM
R26	N-5578	5 MEGOHM TONE CONT	C29	N-6272	.005 MFD MINIMUM	7	N-6349	OSCILLATOR COIL FM
R27	N-4028	220,000 OHM .5W 20%	C30	N-6272	.005 MFD MINIMUM	8	N-6348	OSCILLATOR COIL AM
R28	N-5693	88,000 OHM .5W 10%	C31	N-6407	130 MMFD 500V 5%	9	N-6346	1ST IF, FM
R29	N-1892	100 OHM 1.0W 10%	C32	N-1370	.02 MFD 400V 20%	10	N-6344	1ST IF, AM
R30	N-5880	12,000 OHM .5W 10%	C33	N-6377	.002 MFD 600V -15+40%	11	N-6340	2ND IF, FM
R31	N-4027	470,000 OHM .5W 20%	C34	N-1344	.01 MFD 400V 20%	12	N-6345	2ND IF, AM
R32	N-4899	470,000 OHM .5W 10%	C35	N-4894	.015 MFD 600V -15+40%	13	N-6341	DISCRIMINATOR COIL
R33	N-4028	68 MEGOHM .5W 20%	C36	N-6374	4 MFD 50V ELECTRO	14	N-6349	FILAMENT CHOKE COIL
R34	N-4028	220,000 OHM .5W 20%	C37	N-6272	.005 MFD MINIMUM	15	N-5588	OUTPUT TRANSFORMER
R35	N-1282	10 MEGOHM .5W 20%	C38	N-6488	250 MMFD 500V 20%	16	N-457	12 FM SPEAKER
R36	N-6514	220 OHM 1.0W 20%	C39	N-6488	250 MMFD 500V 20%	17	N-3609	RECORD CHANGER
R37	N-6514	220 OHM 1.0W 20%	C40	N-1344	.01 MFD 400V 20%	18	N-1141	NO 47 DIAL LAMP
R38	N-6515	33 OHM 1.5W 10%	C41	N-6488	250 MMFD 500V 20%	19	N-6519	SELENIUM RECTIFIER
R39	N-6515	33 OHM 1.5W 10%	C42	N-4894	.005 MFD 600V -15+40%			
R40	N-6510	30 OHM 30W 10%	C43	N-1351	.1 MFD 200V -10+20%			
R41		120 OHM 4.5W 7.5%	C44	N-6272	.005 MFD MINIMUM			
R42	N-6311	REGULATING RESISTOR	C45	N-1478	.01 MFD 600V 20%			
R43	N-6311	REGULATING RESISTOR	C46	N-6482	.01 MFD MINIMUM			
			C47	N-1344	.01 MFD 400V 20%			
			C48	N-4857	.08 MFD 200V 10%			
C1	N-1344	.01 MFD 400V 20%	C49	N-2381	150 MMMD MICA			
C2	N-1345	.05 MFD 200V 20%	C50	N-1344	.01 MFD 400V 20%			
C3	N-6408	ANTENNA TRIMMER AM	C51	N-6272	.005 MFD MINIMUM			



This receiver is designed to operate over two tuning ranges; the broadcast band which extends from 535 to 1620 Kilocycles (KC) (185 to 560 Meters), and the Frequency Modulation (FM) Band which extends from 87 to 109 Megacycles (MC).

DIAL CALIBRATION. (Standard Broadcast Band.) The upper scale is calibrated from 55 to 160 (Standard Broadcast). This band covers all Standard Broadcast frequencies of the United States, Canada, Mexico, Cuba, and many Central and South American Countries. Add a zero to figures on the scale to obtain kilocycles.

DIAL CALIBRATION. (Frequency Modulation Band.) The entire lower scale is calibrated from 88 to 108 Megacycles (201 to 300 FM channels) which covers the entire popular Frequency Modulation (FM) Band.

RECORD CHANGER: Oak Model 6666, RCD.CH.15-1

MODELS WLRU-219, WLRU-220A, WLRU-254A; 402F

SONORA RADIO & TELEV. CORP.

BROADCAST ALIGNMENT PROCEDURE

EQUIPMENT REQUIRED: Modulated Test Oscillator that will cover the frequencies of 455, 600, 1400 and 1620 KC, also an Output Meter to connect across the primary or secondary of the output transformer.

I. F. ALIGNMENT: Put switch in the broadcast position and connect the test oscillator to the converter grid through a .05 condenser. The ground lead of the test oscillator should be connected to the buss of the receiver. Adjust the four I. F. trimmers (F. G, L and K) for maximum reading on the output meter. Always use the peak on the slug which is obtained when screw is out of the can the greatest distance.

R.F. ALIGNMENT. Connect the test oscillator to the antenna lead on the loop through a 100 mmf. condenser. For the antenna adjustment, it is necessary to connect the loop on the cabinet to the chassis, or use an equivalent dummy. An equivalent dummy can be constructed by winding two turns of hookup wire on a piece of carton material to form a loop 22x35 inches. Set the gang condenser to the maximum high frequency position and the test oscillator to 1620 KC. Adjust Trimmer "C" to the maximum output. Set test oscillator to 1400 KC and tune in signal with the gang condenser and adjust Trimmer "A" to maximum response. Set test oscillator to 600 KC and tune in signal with gang condenser. Check for damage to gang condenser or coils.

F. M. ALIGNMENT PROCEDURE

EQUIPMENT REQUIRED: F. M. Generator with frequencies of 90, 98, 106, and 109 megacycles, and generator without any modulation which covers 10.7 megacycles, also a zero center microammeter, and a DC Vacuum Tube Voltmeter (An oscilloscope and variable frequency audio oscillator can be used for better results. This method of alignment is described in the last paragraph).

DISCRIMINATOR ALIGNMENT: Connect DC Vacuum Tube Voltmeter between the buss and point "XX" on circuit diagram. Point "XX" is negative potential on the vacuum tube voltmeter. Isolate point "XX" and buss connections to vacuum tube voltmeter with chokes made by wrapping approximately 20 turns of hookup wire around a pencil. This is illustrated in Figure 1. Connect two 100,000 ohm resistors in series. (These resistors must match to 5%.) Connect them from point "XX" to buss. Between junction of 100,000 ohm resistors and the point "YY" connect Zero Center Meter, which is also isolated by the choke described above. These connections are illustrated in Figure 1. Connect test oscillator which is adjusted to 10.7 megacycles to grid of IF Driver through a 250 mmf condenser. Adjust slug "M" to maximum on the vacuum tube voltmeter. Reduce test oscillator to keep vacuum tube voltmeter to around 5 volts. Adjust slug "N" to bring zero center meter to zero point. Slug "N" should never be touched after this alignment.

PRELIMINARY I. F. ALIGNMENT: Connect test oscillator to the converter grid through a 250 mmf. mica condenser. Adjust slugs D, E, H and J to maximum output on the vacuum tube voltmeter. In making these adjustments reduce the generator input to keep the vacuum tube voltmeter at approximately 5 volts when making this adjustment. Always use the peak on the slug which is obtained when the screw is out of the can the greatest distance.

FINAL I. F. ALIGNMENT: Set the test oscillator to 109 MC without frequency modulation and connect it to converter grid. Adjust trimmer "B" for approximate maximum output on the vacuum tube voltmeter and zero center for exact centering. Adjust test oscillator to approximately 25 KC deviation, carefully adjust trimmers D, E, H, J and M for maximum on vacuum tube voltmeter. It may be necessary to shift the frequency of the oscillator slightly to hold the zero center meter on center. In making this adjustment turn up volume control slightly to obtain an audio signal out of the speaker. If this signal is free of distortion, increase the deviation to approximately 75 KC and repeat the above alignment. If this is done carefully there will be no distortion in the speaker with this deviation. If distortion is obtained in the speaker with this deviation, it will be necessary to carefully repeat the I. F. alignment.

R. F. ALIGNMENT: Move the signal generator to the FM antenna terminals, using 150 ohm resistors between the generator terminals and each of the FM antenna terminals. Set the test oscillator to 106 megacycles and tune in signal with gang condenser to obtain approximate maximum on the vacuum tube voltmeter and zero center on the meter. Slightly bend the RF section in the gang condenser for maximum output with vacuum tube voltmeter. Set the signal generator to 98 megacycles, tune in signal with the gang condenser. Repeat the above procedure at this frequency and also at 90 megacycles. Recheck alignment at 106 megacycles.

FINAL ALIGNMENT OF FM IF WITH OSCILLOSCOPE AND VARIABLE AUDIO OSCILLATOR: The oscilloscope and variable audio oscillator should be connected as shown in Figure 2. Adjust the deviation to approximately 25 KC and align trimmers D, E, H, J and M to maximum on the vacuum tube voltmeter while watching the oscilloscope for a straight line. It may be necessary to vary the frequency of the variable audio oscillator in order to make the line straight on the scope. Next increase deviation to approximately 75 KC and repeat procedure, adjusting for maximum or as close to maximum as it is possible to obtain without losing the straight line on the oscilloscope. After all the trimmers have been properly adjusted to a maximum and a straight line on the scope, increase the deviation from approximately 125 to 150 KC. The curves illustrated in Figure 3 should be obtained. In making the above adjustments it may be necessary to make slight variations in the RF frequency in order to hold the zero center meter at the zero no-'

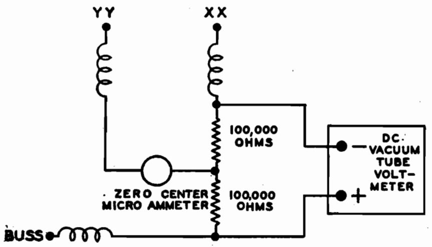


FIG. I

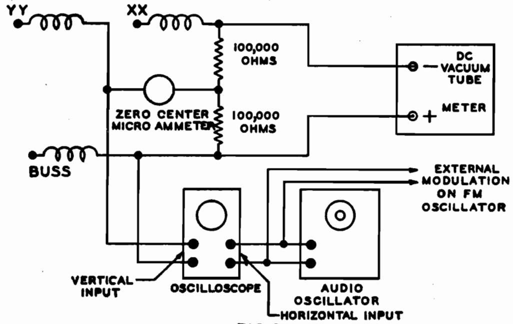
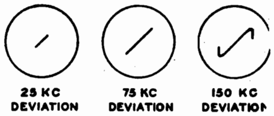


FIG. 2



OSCILLOSCOPE PATTERNS

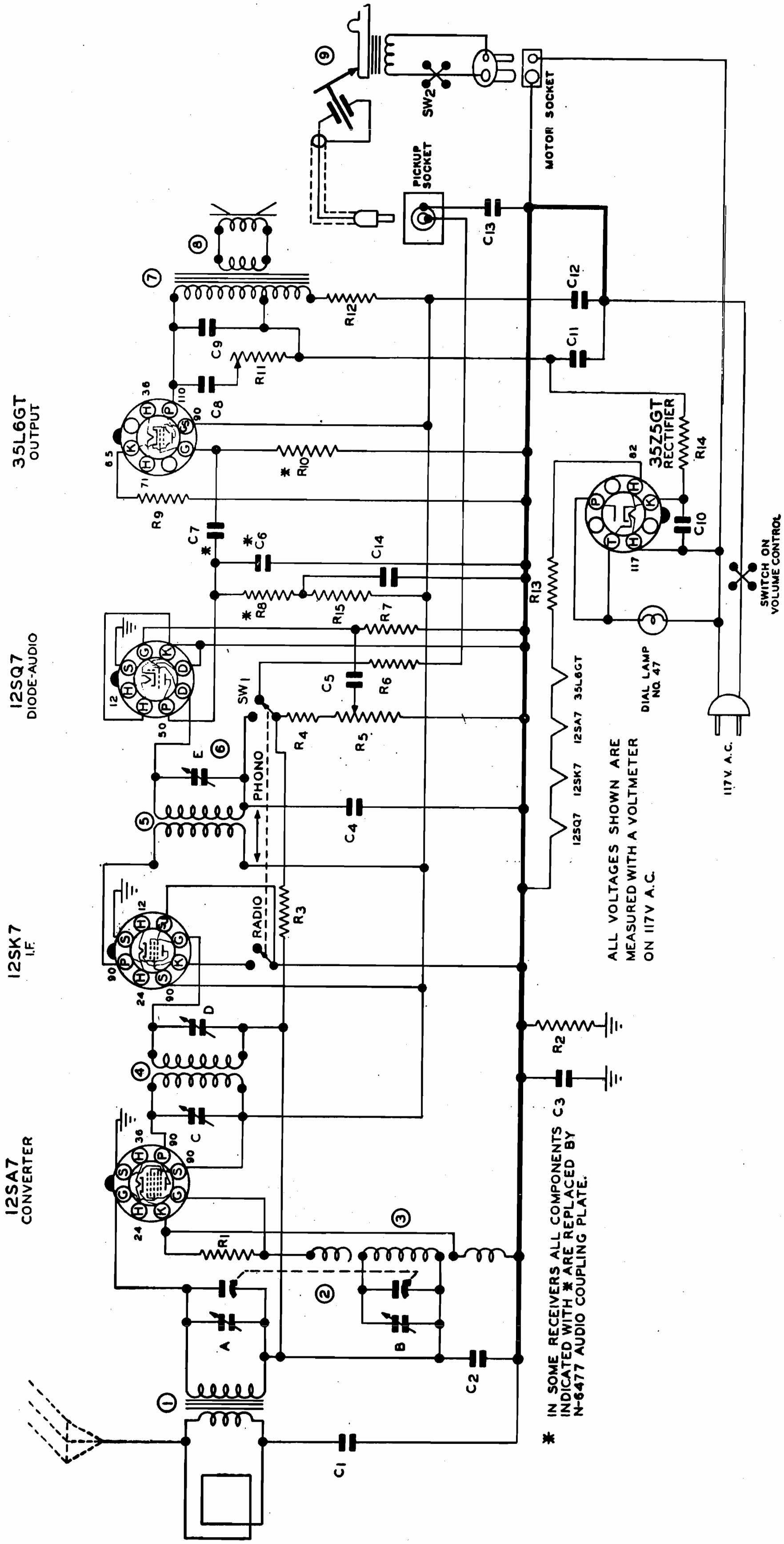
FIG. 3

AERIAL SYSTEM

This receiver has a built-in "Loop" aerial for broadcast reception. Its excellent design is such as to increase pick-up from stations having wide variations in signal strength. The efficiency and selectivity of the loop provide outstanding reception without the use of an external aerial. In or near metal buildings, iron ore deposits or steel structures, or in localities remote from broadcasting stations, reception of the Standard Broadcast Band may require an outside aerial 50 to 100 feet in length including lead-in. Connect the outside aerial to the aerial lead (Blue Wire) located at the rear of the receiver. When using the outside antenna it may be necessary to reverse the power cord plug to eliminate hum or distortion.

The built-in FM aerial is a folded dipole Antenna. Although the receiver performs satisfactorily on the broadcast band, your particular location may require an outside antenna for FM reception. The external aerial for FM reception must be a dipole Antenna with a 300 ohm line, which you may secure from your local Sonora Dealer. The two lead-in leads of the dipole antenna should be attached, one lead under each screw, to the terminal strip located on the chassis after removing the FM antenna furnished with the receiver. For best possible reception with an outside dipole, adjust lead length on the lead-in cable on the weakest station. Cut off lead 6 inches at a time and until signal comes in stronger. If cutting off an additional length does not increase signal, you have reached the correct lengths. It is not necessary to cut off more than 2½ feet.

SONORA RADIO & TELEV. CORP. MODEL 401



I.F. 455 KC.

5 TUBE A.C.-D.C.
SUPERHETERODYNE
SINGLE BAND
PHONO-CHANGER COMBINATION

TUNING RANGE

The receiver is designed to operate over the standard broadcast band which extends from 535 to 1620 Kilocycles (KC) (185 to 560 Meters).

DIAL CALIBRATION. The scale is calibrated from 55 to 160 (Standard Broadcast). This band covers all Standard Broadcast frequencies of the United States, Canada, Mexico, Cuba and many Central and South American Countries. Add a zero to figures on the scale to obtain kilocycles.

MODEL 401

SONORA RADIO & TELEV. CORP.

Lack of sensitivity and poor tone quality may be due to any one or a combination of causes such as weak or defective tubes or speaker, open or grounded bias resistor, bypass condenser, etc. Never attempt to realign set until all other possible sources of trouble have been first thoroughly investigated and definitely proved not to be the cause.

NOTE: IT IS ABSOLUTELY NECESSARY THAT AN ACCURATELY CALIBRATED TEST OSCILLATOR WITH SOME TYPE OF OUTPUT MEASURING DEVICE BE USED WHEN ALIGNING THE RECEIVER AND THAT THE PROCEDURE BE CAREFULLY FOLLOWED. OTHERWISE THE RECEIVER WILL BE INSENSITIVE AND THE DIAL CALIBRATION WILL BE INCORRECT. THE TRIMMERS WILL BE REFERRED TO BY THEIR FUNCTION AS INDICATED ON THE PARTS DIAGRAM.

ALIGNMENT PROCEDURE

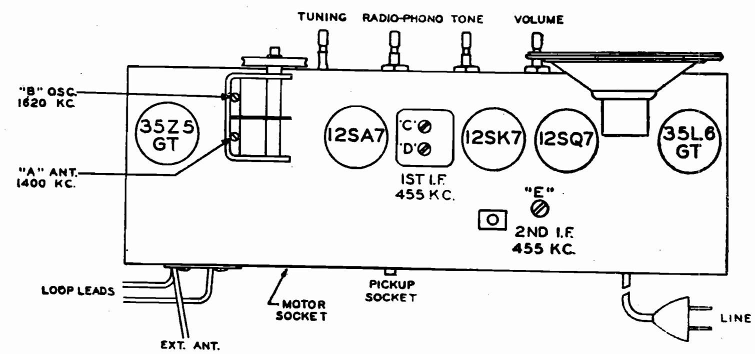
GENERAL DATA. The alignment of this receiver requires the use of a test oscillator that will cover the frequencies of 455, 600, 1400 and 1620 KC and an output meter to be connected across the primary or secondary of the output transformer. If possible, all alignments should be made with the volume control on maximum and the test oscillator output as low as possible to prevent the AVC from operating and giving false readings.

CORRECT ALIGNMENT PROCEDURE. The intermediate frequency (I.F.) stages should be aligned properly as the first step. After the I.F. transformers have been properly adjusted and peaked, the broadcast band should be adjusted.

I. F. ALIGNMENT. Remove chassis from the cabinet. Care should be taken to have no iron or other metal near the loop.

Do not make this set-up on a metal bench. With the gang condenser set at minimum, adjust the test oscillator to 455 KC and connect the output to the grid of the first detector tube (12SA7) through a .05 or .1 mfd. condenser. The ground on the test oscillator should be connected to the ground buss, indicated on the circuit diagram. Align all three I.F. trimmers to peak or maximum reading on the output meter.

BROADCAST BAND ALIGNMENT. Connect the test oscillator to the antenna of the set through a 100 mmfd. (.0001) condenser. With the gang condenser set at minimum capacity, set the test oscillator at 1620 KC, and adjust the oscillator (or 1620 KC trimmer) on gang condenser. Next—set the test oscillator at 1400 KC, and tune in the signal on the gang condenser. Adjust the antenna trimmer (or 1400 KC trimmer) for maximum signal. Next set the test oscillator at 600 KC, and tune in signal on condenser to check alignment of coils.



DIA NO.	PART NO.	DESCRIPTION	DIA NO.	PART NO.	DESCRIPTION
R1	N-4025	22,000 OHM .5W 20%	C6	N-6135	250 MMFD 500V 20%
R2	N-4026	220,000 OHM .5W 20%	C7	N-1344	.01 MFD 400V 20%
R3	N-1262	1. MEGOHM .5W 20%	C8	N-1623	.1 MFD. 400V -10 +20%
R4	N-4063	47,000 OHM .5W 20%	C9	N-1376	.02 MFD 400V 20%
R5	N-4843 / N-5757	.5 MEGOHM VOL. CONT.	C10	N-1346	.05 MFD 400V 20%
			C11 / C12	N-5051	40 MFD 150V / 40 MFD 150V ELECTROLYTIC
R6	N-1262	1. MEGOHM .5W 20%			
R7	N-4028	6.8 MEGOHM .5W 20%	C13	N-4957	.09 MFD 200V 20%
R8	N-4026	220,000 OHM .5W 20%	C14	N-1345	.05 MFD 200V 20%
R9	N-4067	180 OHM .5W 10%			
R10	N-4027	470,000 OHM .5W 20%	1	N-6149	ANT. COIL
R11	N-6157	25,000 OHM TONE CONT.	2	N-6154	2 GANG CONDENSER
R12	N-5358	1000 OHM 1.W 10%	3	N-4810	OSCILLATOR COIL
R13	N-4023	82 OHM 2.W 10%	4	N-4813	1ST I.F. TRANSFORMER
R14	N-4022	33 OHM .5W 20%	5	N-4846	2ND I.F. TRANSFORMER
R15	N-4064	33,000 OHM .5W 20%	6	N-4985	TRIMMER
			7	N-4875	OUTPUT TRANSFORMER
			8	N-6148	5" P.M. SPEAKER
C1	N-6015	100 MMFD 500V 20%	9	N-6151	RECORD CHANGER
C2	N-1345	.05 MFD 200V 20%			
C3	N-1345	.05 MFD 200V 20%	S1	N-6145 / N-6156	RADIO-PHONO SWITCH
C4	N-6015	100 MMFD 500V 20%			
C5	N-4894	.005 MFD 600V -15+40%	S2		MOTOR SWITCH ON CHANGER

AERIAL SYSTEM

The receiver has a built-in "loop" aerial. Its excellent design is such as to increase pick-up from stations having wide variations in signal strength. The efficiency and selectivity of the loop provide outstanding reception without the use of an external aerial. The "loop" aerial used on this receiver is somewhat directional so reception from weak stations can be improved by turning the set in the proper direction. In or near metal buildings, iron ore deposits or steel structures or in localities remote from broadcasting stations, reception can be improved by using an outside aerial 50 feet to 100 feet in length including lead-in. Connect the outside aerial to the aerial lead. When using the outside aerial it may be necessary to reverse the power cord plug in wall socket to eliminate hum or distortion.

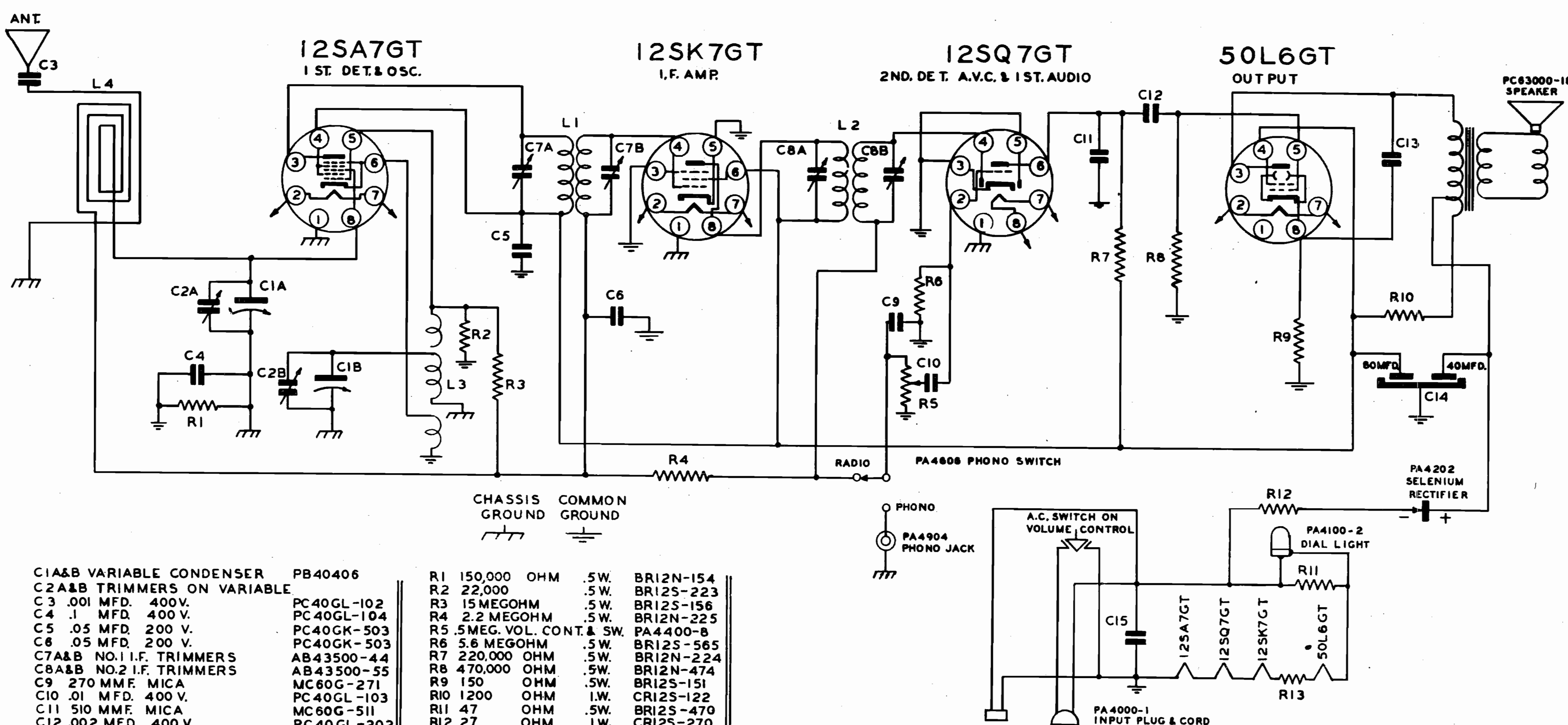
THE SPARKS-WITHINGTON CO.

MODEL 5-07-PA

(Original) June 24, 1947

INTERMEDIATE FREQUENCY 456 KC.

BOTTOM VIEWS OF ALL SOCKET CONNECTIONS



C1A&B	VARIABLE CONDENSER	PB40406
C2A&B	TRIMMERS ON VARIABLE	
C3	.001 MFD. 400 V.	PC40GL-102
C4	.1 MFD. 400 V.	PC40GL-104
C5	.05 MFD. 200 V.	PC40GK-503
C6	.05 MFD. 200 V.	PC40GK-503
C7A&B	NO.1 I.F. TRIMMERS	AB43500-44
C8A&B	NO.2 I.F. TRIMMERS	AB43500-55
C9	270 MMF. MICA	MC60G-271
C10	.01 MFD. 400 V.	PC40GL-103
C11	510 MMF. MICA	MC60G-511
C12	.002 MFD. 400 V.	PC40GL-202
C13	.01 MFD. 400 V.	PC40GL-103
C14	ELECTROLYTIC	PA4306
C15	.05 MFD. 400 V.	PC40GL-503

R1	150,000 OHM	.5W.	BR12N-154
R2	22,000	.5W.	BR12S-223
R3	15 MEGOHM	.5W.	BR12S-156
R4	2.2 MEGOHM	.5W.	BR12N-225
R5	.5 MEG. VOL. CONT.& SW.		PA4400-8
R6	5.6 MEGOHM	.5W.	BR12S-565
R7	220,000 OHM	.5W.	BR12N-224
R8	470,000 OHM	.5W.	BR12N-474
R9	150 OHM	.5W.	BR12S-151
R10	1200 OHM	1.W.	CR12S-122
R11	47 OHM	.5W.	BR12S-470
R12	27 OHM	1W.	CR12S-270
R13	165 OHM	5.W.	PA4200-6

L1	NO.1 I.F. COIL ASSEM.	AA6800-1
L2	NO.2 I.F. COIL ASSEM.	AA6800-2
L3	B.C. OSC. COIL ASSEM.	AA6797-1
L4	LOOP ASSEM.	AB43508-1

MODEL 5-07-PA

THE SPARKS-WITHINGTON CO.

ALIGNMENT CHART

OPER-ATION	ALIGNMENT OF	GENERATOR CONNECTED TO	DUMMY ANTENNA	GENERATOR FREQUENCY	TUNING COND. SETTING	TRIMMERS	REMARKS
1	Set dial pointer even with last calibration with cond. gang fully closed.						
2	I.F.	*	.02 MFD. Cond.	456 KC.	Open	C8 A & B	Peak Accurately
						C7 A & B	" "
3	Special Note: Before realigning the R.F. stages of this receiver please observe the special note at the bottom of this page.						
4	Broad-cast	**	Driver Loop	1500 KC.	1500 KC.	C2B Osc. Trim.	Peak Accurately
						C2A Ant. Trim.	***
5	Repeat operations (2 and 4).						
6	Check calibration at 600 KC., 1000 KC., and 1500 KC.						

* Pin No. 8 on 12SA7GT Tube.
** Use driver loop as shown
*** Rock dial while adjusting for maximum output.

SPECIAL NOTE: In view of the fact that the metal speaker grill will affect the R. F. alignment on this set, please observe the following instructions when alignment is necessary. After the receiver has been removed from cabinet, turn the chassis in such manner that the speaker faces the metal cabinet grill. Slide chassis up against cabinet so that the metal grill and the loop antenna will be in the same relative position as when the chassis is properly mounted in the cabinet. By using the procedure as outlined in this bulletin the receiver will remain properly aligned when placed back into cabinet.

VOLTAGE CHART

RECEIVER OPERATED ON: A.C.
Line Voltage: 117 Volts

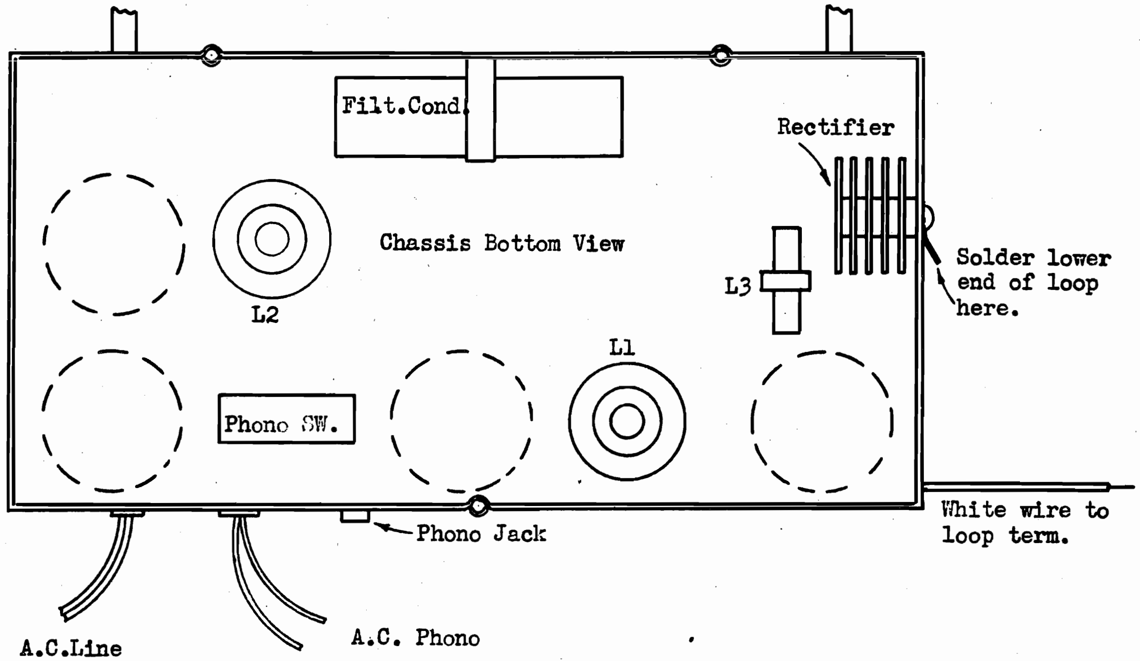
Position of Volume Control:Full with set tunned to quiet channel.

TUBE	FUNCTION	Voltage of socket prongs to B-. See prong Nos. on schematic.							
		No. 1	No. 2	No. 3	No. 4	No. 5	No. 6	No. 7	No. 8
12SA7GT	Osc. & Det.	0	0*	97.0	97.5	**	0	12.4*	0
12SK7GT	I. F. Amp.	0	24.6*	0	-.5	0	97.5	37.2*	97.0
12SQ7GT	2nd Det. A.V.C., 1st Audio	0	0.5	0	**	0	5.5	24.6*	12.4*
50L6GT	Output	0	112*	131	97	0	117*	66.0*	6.2

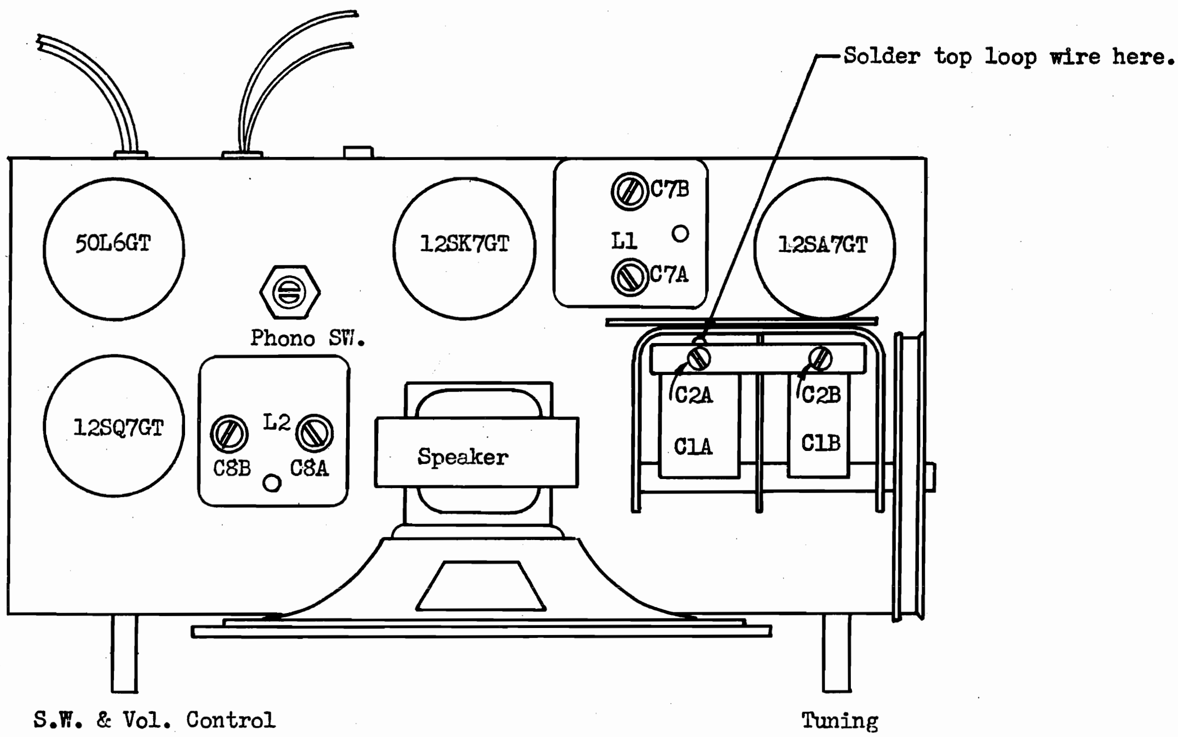
NOTE: Voltage readings are for schematic diagram in this bulletin. Allow 15% + or - on all measurements. Always use meter scale which will give greatest deflection within scale limits. All DC measurements made with 20,000 ohms per volt voltmeter. All AC voltages made with rectifier type voltmeter.
* Designates A.C. Volts
** Cannot be measured with 20,000 ohms per volt voltmeter.

THE SPARKS-WITHINGTON CO.

MODEL 5-07-PA

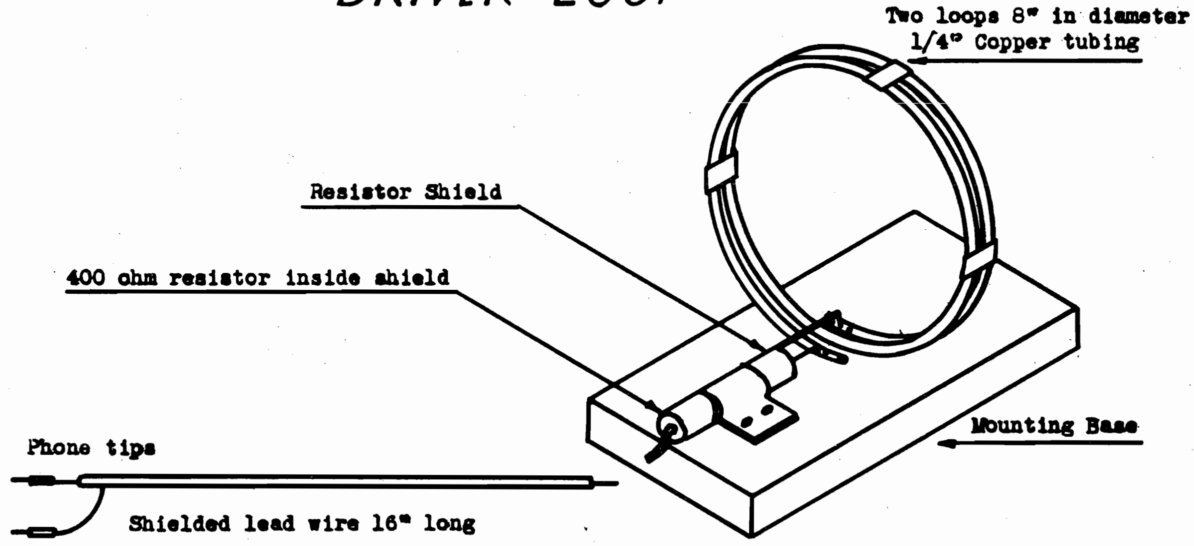


CHASSIS DIAGRAM



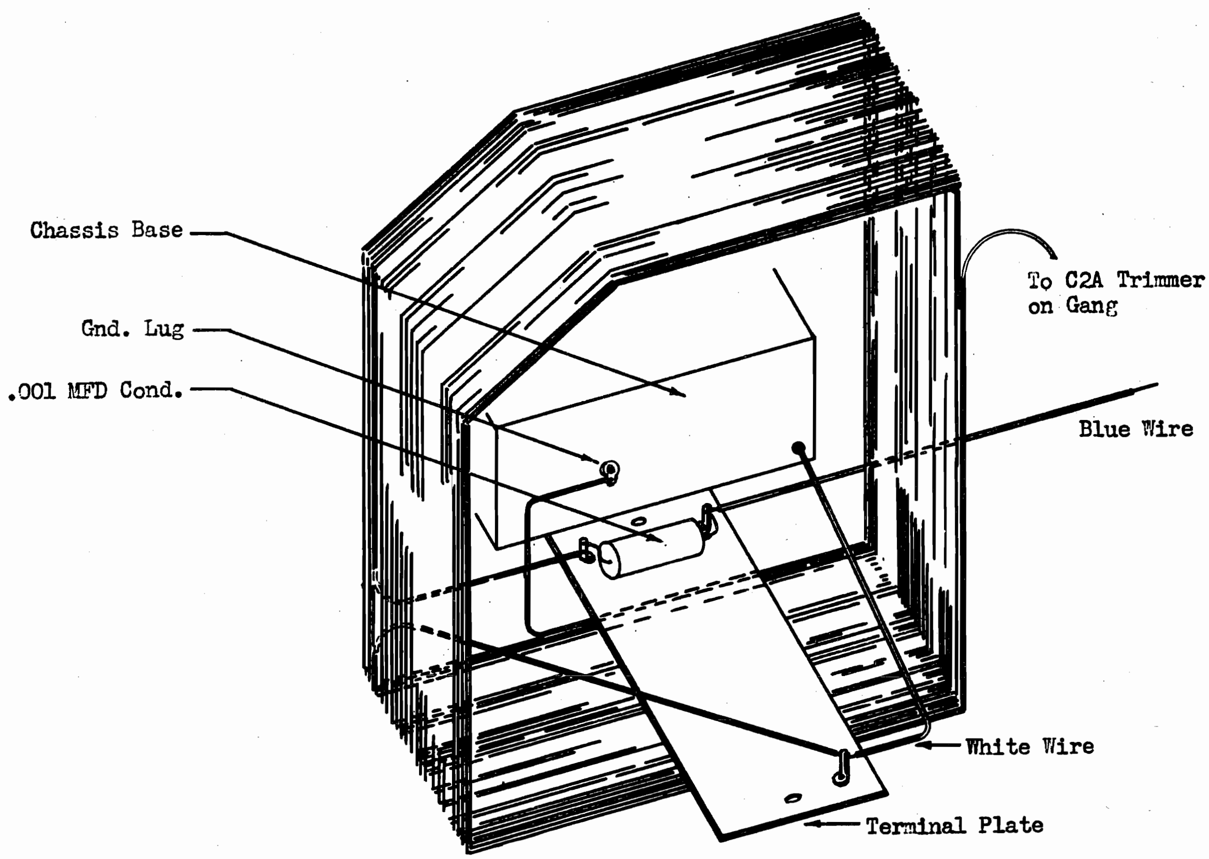
MODEL 5-07-PA THE SPARKS-WITHINGTON CO.

DRIVER LOOP



SPECIFICATIONS

Two loops of 1/4" copper tubing 8" in diameter spaced 1/4" apart with 400 ohms resistor in series. Connecting cable and resistor must be shielded.
The loop should be spaced twice the diameter of the loop from the receiver being aligned to prevent an over modulated signal and poor alignment of the receiver.



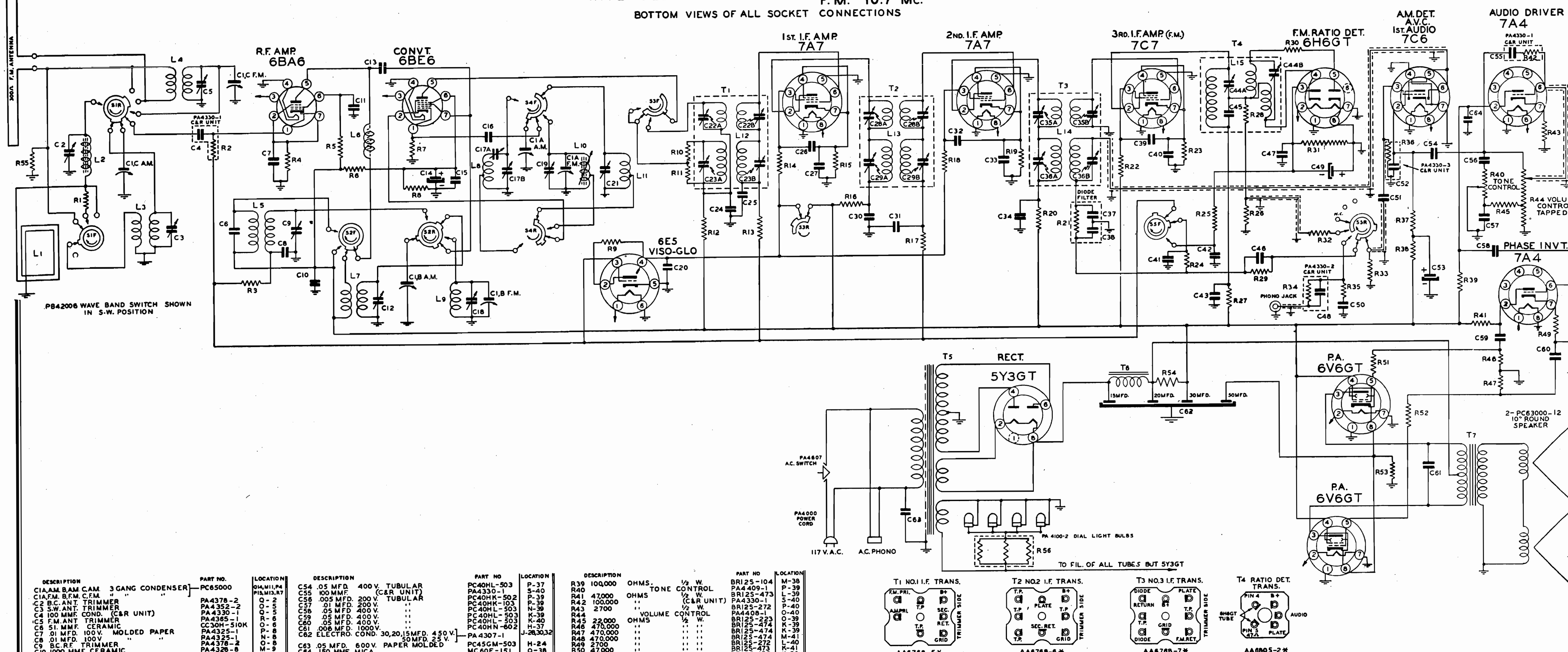
Model 5-07PA Loop Hookup

THE SPARKS-WITHINGTON CO.

MODELS 1000, 1001, 1003, 1020, 1021, 1023, CHASSIS 12L7

INTERMEDIATE FREQUENCY A.M. 456 Kc. F.M. 10.7 Mc.

BOTTOM VIEWS OF ALL SOCKET CONNECTIONS



TERMINAL HOOKUP FOR L12, L13, L14 & L15.

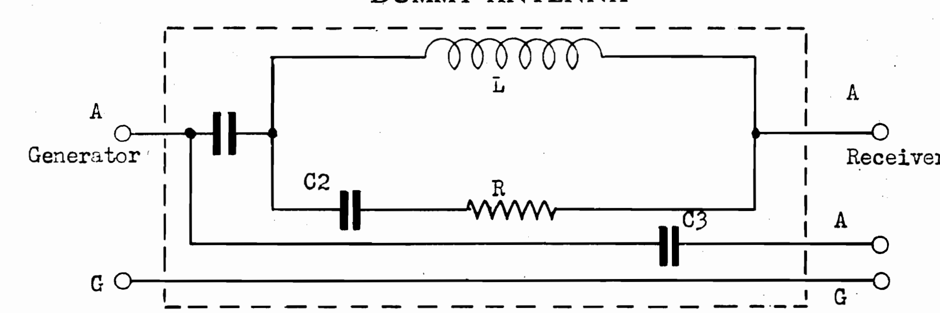
*SPECIAL SERVICE NOTE: THESE TRANSFORMERS SUPPLIED AS COMPLETE ASSEMBLIES ONLY.

DESCRIPTION	PART NO.	LOCATION
C1A,A.M. B,A.M. C,A.M. 3 GANG CONDENSER	PC65000	Q14,M11,P4
C1A,F.M. B,F.M. C,F.M. " "		P15,M13,R7
C2 B.C. ANT. TRIMMER	PA4378-2	Q-2
C3 S.W. ANT. TRIMMER	PA4352-2	O-5
C4 100 MMF. COND. (C&R UNIT)	PA4330-1	Q-5
C5 F.M. ANT. TRIMMER	PA4365-1	R-6
C6 51 MMF. CERAMIC	CC30H-510K	O-6
C7 .01 MFD. 100V. MOLDED PAPER	PA4325-1	P-8
C8 .01 MFD. 100V. " "	PA4325-1	N-8
C9 B.C. R.F. TRIMMER	PA4378-2	O-8
C10 1000 MMF. CERAMIC	PA4328-8	M-9
C11 1000 MMF. "	PA4328-8	R-10
C12 S.W. R.F. TRIMMER	PA4378-2	M-10
C13 5 MMF. CERAMIC	PA4328-7	S-10
C14 4 MFD. 250V. ELECTRO. COND.	PA4303-8	P-12
C15 1000 MMF. CERAMIC	PA4328-8	P-12
C16 51 MMF. "	CC30H-510K	Q-13
C17A B.C. OSC. PAD. C17B B.C. OSC. TRIM.	AB43500-36	Q-13
C18 F.M. R.F. TRIMMER	PA4365-1	M-13
C19 F.M. OSC. "	PA4365-1	P-15
C20 .05 MFD. 400V. TUBULAR	PC40HL-503	M-18
C21 S.W. OSC. TRIMMER	PA4378-2	P-16
C22 A&B NO.1 I.F. TRIMMER F.M. *	PA4359-3	Q19-20
C23 A&B NO.2 I.F. " A.M. *	PA4359-1	P19-20
C24 .01 MFD. 400V. PAPER MOLDED	PC45GL-103	O-19
C25 .01 MFD. 200V. " "	PC45GK-103	O-19
C26 .01 MFD. 300V. " "	PA4325-4	Q-21
C27 .01 MFD. 200V. " "	PC45GK-103	P-21
C28 A&B NO.2 I.F. TRIMMER F.M. *	PA4359-1	Q23-24
C29 A&B NO.2 I.F. " A.M. *	PA4359-3	P23-24
C30 .05 MFD. 400V. TUBULAR	PC40HL-503	O-23
C31 .01 MFD. 200V. PAPER MOLDED	PC4GK-103	P-23
C32 .01 MFD. 300V. " "	PA4325-4	Q-25
C33 .01 MFD. 200V. " "	PC45GK-103	P-26
C34 .05 MFD. 400V. TUBULAR	PC40HL-503	P-27
C35 A&B NO.3 I.F. TRIMMER F.M. *	PA4359-1	Q27-28
C36 A&B NO.3 I.F. " A.M. *	PA4359-3	P27-28
C37 100 MMF. DIODE FILTER UNIT	PA4329-1	O-28
C38 100 MMF. DIODE FILTER UNIT	PA4329-1	N-28
C39 .01 MFD. 300V. PAPER MOLDED	PA4325-4	Q-30
C40 .01 MFD. 200V. " "	PC45GK-103	P-30
C41 .1 MFD. 200V. TUBULAR	PC40HK-104	N-30
C42 .001 MFD. 200V. PAPER MOLDED	PA4325-2	N-31
C43 .05 MFD. 400V. TUBULAR	PC40HL-503	N-31
C44 A&B RATIO DET. TRIMMER *	PA4359-1	R32-33
C45 51 MMF. MICA	MC60F-510	Q-32
C46 330 MMF.	MC60G-331	N-33
C47 1000 " CERAMIC	PA4328-8	P-33
C48 220 " (C&R UNIT)	PA4330-2	M-34
C49 3 MFD. 50V. ELECTRO COND.	PA4308-1	P-34
C50 .01 MFD. 200V. TUBULAR	PC40HK-103	L-35
C51 .01 " 100V. PAPER MOLDED	PA4325-1	O-36
C52 100 MMF. (C&R UNIT)	PA4330-3	P-36
C53 4 MFD. 400V. ELECTRO. COND.	PA4303-1	M-37

DESCRIPTION	PART NO.	LOCATION
C54 .05 MFD. 400V. TUBULAR	PC40HL-503	P-37
C55 100 MMF. (C&R UNIT)	PA4330-1	S-40
C56 .005 MFD. 200V. TUBULAR	PC40HK-502	P-39
C57 .01 MFD. 200V. "	PC40HK-103	P-39
C58 .05 MFD. 400V. "	PC40HL-503	N-39
C59 .05 MFD. 400V. "	PC40HL-503	K-39
C60 .05 MFD. 400V. "	PC40HL-503	K-40
C61 .006 MFD. 1000V. "	PC40HN-602	H-37
C62 ELECTRO. COND. 30,20,15 MFD. 450 V. 50 MFD. 25 V.	PA4307-1	J-28,30,32
C63 .05 MFD. 600V. PAPER MOLDED	PC45GM-503	H-24
C64 150 MMF MICA	MC60F-151	Q-38
R1 2200 OHMS ½ W.	BR12S-222	P-2
R2 100,000 " (C&R UNIT)	PA4330-1	P-6
R3 100,000 " " W.	BR12S-104	M-7
R4 68 " " "	BR12S-680	P-8
R5 47,000 " 1 W.	CR12S-473	Q-9
R6 15,000 " 2 "	DR12S-153	P-10
R7 22,000 " ½ "	BR12S-223	Q-11
R8 22,000 " 1 "	CR12S-223	P-11
R9 1 MEGOHM ½ "	BR12S-105	O-16
R10 220,000 OHMS " "	BR12S-224	P-18
R11 10,000 " " "	BR12S-103	P-18
R12 10,000 " " "	BR12S-103	O-18
R13 100,000 " " "	BR12S-104	O-20
R14 68,000 " " "	BR12S-683	P-20
R15 330 " " "	BR12S-331	P-22
R16 4700 " " "	BR12S-472	O-22
R17 100,000 " " "	BR12S-104	O-24
R18 68,000 " " "	BR12S-683	P-25
R19 330 " " "	BR12S-331	P-27
R20 4700 " " "	BR12S-472	P-27
R21 47,000 " (DIODE FILTER)	PA4329-1	O-28
R22 220,000 " ½ W.	BR12S-224	P-29
R23 1000 " " "	BR12S-102	P-31
R24 2.2 MEGOHM " "	BR12S-225	N-31
R25 1 " " "	BR12S-105	O-31
R26 470,000 OHMS " "	BR12S-474	O-32
R27 4700 " " "	BR12S-472	M-32
R28 10,000 " " "	BR12S-103	Q-32
R29 470,000 " " "	BR12S-474	M-33
R30 47 " " "	BR12S-470	S-33
R31 15,000 " " "	BR12S-153	Q-34
R32 150,000 " " "	BR12S-154	N-34
R33 22,000 " " "	BR12S-223	M-34
R34 2.2 MEGOHM (C&R UNIT)	PA4330-2	M-34
R35 10,000 OHMS " W.	BR12S-103	M-35
R36 1.5 MEGOHM (C&R UNIT)	PA4330-3	Q-37
R37 220,000 OHMS " W.	BR12S-224	O-37
R38 33,000 " " "	BR12S-333	N-37

DESCRIPTION	PART NO.	LOCATION
R39 100,000 OHMS. ½ W.	BR12S-104	M-38
R40 TONE CONTROL	PA4409-1	P-39
R41 47,000 OHMS ½ W.	BR12S-473	L-39
R42 100,000 " (C&R UNIT)	PA4330-1	S-40
R43 2700 " ½ W.	BR12S-272	P-40
R44 VOLUME CONTROL	PA4408-1	O-40
R45 22,000 OHMS ½ W.	BR12S-223	O-39
R46 470,000 " " "	BR12S-474	K-39
R47 470,000 " " "	BR12S-474	K-39
R48 470,000 " " "	BR12S-474	M-41
R49 2700 " " "	BR12S-272	L-40
R50 47,000 " " "	BR12S-473	K-41
R51 1500 " " "	BR12S-152	K-36
R52 1500 " " "	BR12S-152	J-36
R53 220 " 2 "	DR12S-221	H-36
R54 470 " 2 "	DR12S-471	K-31
R55 100,000 " ½ "	BR12S-104	O-1
R56 3.3 " (3-10Ω ½ ")	AA6687-1	G-26
L1 B.C. LOOP ASSEMBLY	AC67008-2	N-1
L2 B.C. ANT. LOADING COIL ASSEM.	AA6780-3	P-3
L3 S.W. ANT. COIL "	AA6758-7	O-4
L4 F.M. " "	AA6767-8	R-5
L5 B.C. R.F. " "	AA6756-5	N-7
L6 R.F. CHOKE " "	AA6798-2	Q-10
L7 S.W. R.F. COIL "	AA6760-6	M-10
L8 B.C. OSC. " "	AA6752-6	P-13
L9 F.M. R.F. "	PA3234	M-13
L10 F.M. OSC. " ASSEM.	AA6767-7	P-15
L11 S.W. OSC. " "	AA6770-3	P-17
L12 NO.1 I.F. COIL ASSEMBLY *	AA6803-2	Q-19
L13 NO.2 I.F. " " *	AA6803-2	Q-23
L14 NO.3 I.F. " " *	AA6803-2	Q-28
L15 RATIO DETECTOR COIL ASSEM. *	AA6805-2	Q-32
T1 NO.1 I.F. TRANS ASSEM. *	AA6768-5	Q-19
T2 NO.2 I.F. " " *	AA6768-6	Q-23
T3 NO.3 I.F. " " *	AA6768-7	Q-28
T4 RATIO DET. TRANS. *	AA6805-2	Q-32
T5 POWER TRANS	AB44011-1	J-24
T6 FILTER CHOKE	AB47000-3	K-29
T7 OUTPUT TRANS.	AB44059-1	I-38

DUMMY ANTENNA

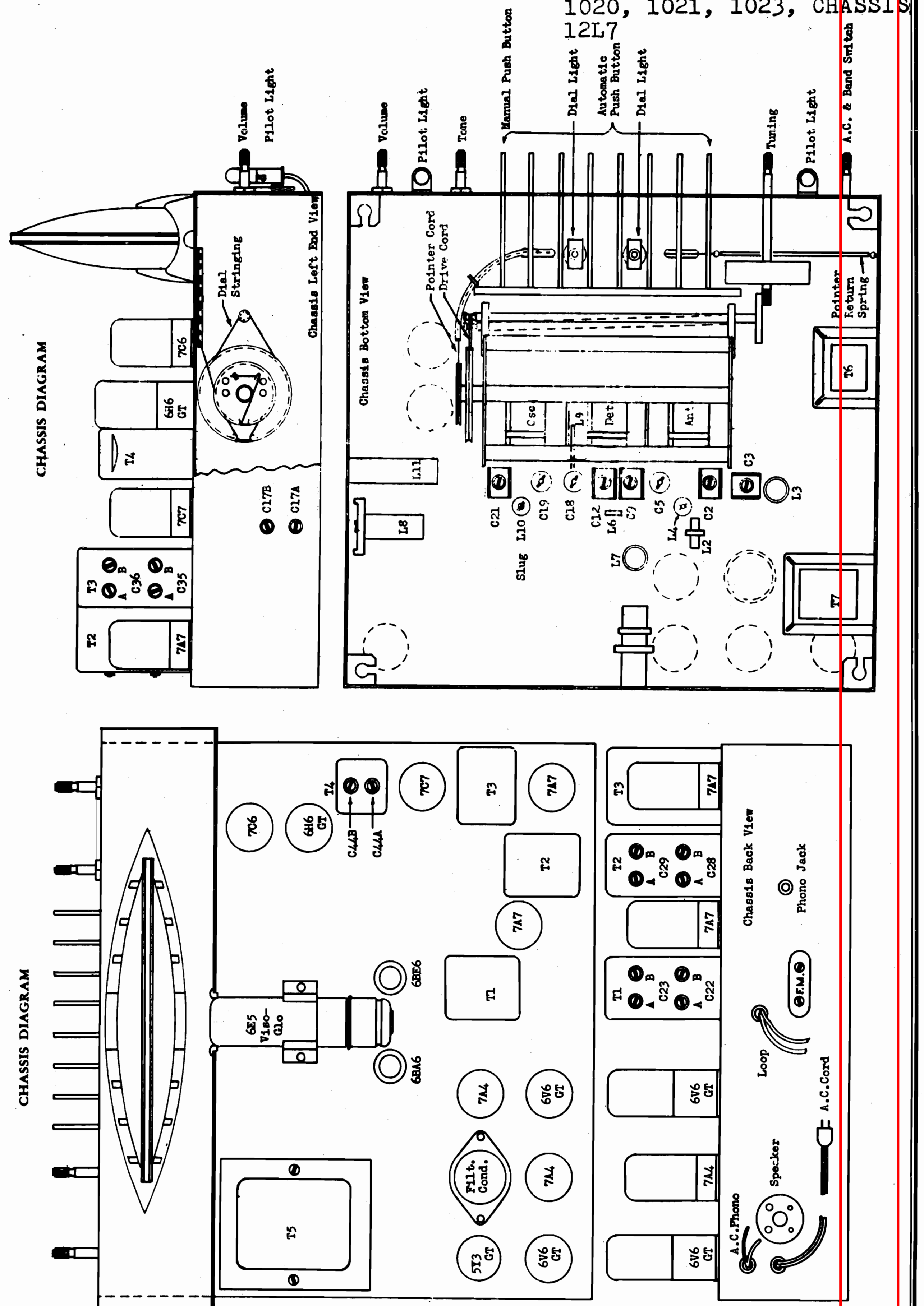


C1-200 mmf. Condenser 400 V.D.C.
C2-400 mmf. Condenser 400 V.D.C.
C3-.02 mmf. Condenser 400 V.D.C.
R-100 ohms Resistor 1/4 Watt
L-Choke Coil

----Case Shield
Choke Coil Specification
Tubing - 3/8" Diameter Bakelite
Wire - No. 38 Enameled
Turns - 59 closely wound (Impregnated)

NOTE: When using this dummy antenna the generator output impedance should be 10 ohms or lower.

THE SPARKS-WITHINGTON CO. MODELS 1000, 1001, 1003, 1020, 1021, 1023, CHASSIS 12L7



MODELS 1000, 1001, 1003, 1020, 1021, 1023, CHASSIS 12L7 THE SPARKS-WITHINGTON CO.

ALIGNMENT CHART

OPERATION	ALIGNMENT OF	GENERATOR CONNECTED TO	DUMMY ANT.	GENERATOR FREQUENCY	BAND SWITCH SETTING	TUNING COND. SETTING	TRIMMER	REMARKS
1	Set dial pointer to 88 Mc. with gang condenser closed.							
2	A. M. I. F.	Center A. M. Section of Gang Condenser	*	456 KC.	BC.	Open	C36 A & B T3 C29 A & B T2 C23 A & B T1	Peak Accurately " " " "
3	BC. R.F.	Ant.	*	1600 KC.	BC.	1600 KC.	C17B Osc. Tr.	" "
4				1400 KC.		1400 KC.	C9 R.F. Tr. C2 Ant. Tr.	** Peak Accurately
5				600 KC.		600 KC.	C17A Osc. Pad.	**
6	Repeat operations 2, 3, and 4.							
7	Check calibrations at 600 Kc., 1000 Kc., and 1400 Kc.							
8	S. W. R. F.	Ant.	*	16 MC.	S. W.	16 MC.	C21 Osc. Tr. C12 R.F. Tr. C3 Ant. Tr.	Max. A. V. C. Peak Accurately " "
9	Repeat operation #8.							
10	Check calibrations at 6 Mc., 10 Mc., and 16 Mc.							
11	SPECIAL NOTE: For complete F.M.-I.F. visual alignment instructions please refer to pages 7, 8, 9, 10, 11, and 12, of this bulletin.							
12	F.M.-I.F. alignment using A.M. Generator and Output Meter.							
13	T4 F. M. Ratio Det.	Pin #6 on 7C7 3rd I. F. Amp.	.05 MFD. Cond.	10.7 MC.	F. M.	Open 108 MC.	C44A C44B	Peak Accurately " "
14	NOTE: Operation #13 must be made with generator output as low as possible, consistent with usable output meter reading.							
15	Connect a 15,000 ohm resistor (to prevent overcoupling) between pin #6 (grid) on 7C7 3rd I. F. Amp. tube to gnd. After operation #16 is completed leave resistor connected for operations to follow.							
16	T3 F.M.-I.F.	Pin #6 of 2nd 7A7 Tube	.05 MFD. Cond.	10.7 MC.	F. M.	108 MC.	C35B C35A	Peak Accurately " "
17	Connect a 15,000 ohm resistor between Pin #6 on 2nd 7A7 I. F. Amp. and Gnd. After operation #18 is completed leave resistor connected for operations to follow.							
18	T2 F.M.-I.F.	Pin #6 of 2nd 7A7 I.F.Amp.	.05 MFD. Cond.	10.7 MC.	F. M.	Open 108 MC.	C28B Sec. C28A Pri.	Peak Accurately " "
19	NOTE: Operation #18 must be made with generator output as low as possible, consistent with usable output meter reading.							
20	Connect another 15,000 ohm resistor between Pin #6 (Grid) on 1st 7A7 tube to Gnd. After operation #21 is completed leave resistor connected for operations to follow.							
21	T1 F.M.-I.F.	Center Sec. of Gang Condenser	.05 MFD. Cond.	10.7 MC.	F. M.	Open 108 MC.	C22B Sec. C22A Pri.	Peak Accurately " "
22	NOTE: Operation #21 must be made with generator output as low as possible, consistent with usable output meter reading.							
23	Repeat operations 13, 16, 18, and 21.							
24	Remove the three 15,000 ohm resistor dummies from Pin #6 on the two 7A7 and the 7C6 tubes but leave generator coupled through the .05 MFD. Cond. to the center F.M. Section of Gang Condenser.							
25	Adjust C44B secondary trimmer on T4 ratio detector transformer to minimum deflection or dip on output meter. Under certain conditions it is possible to adjust C44B secondary trimmer to minimum noise with the receiver tuned to a weak station. This operation is very sharp and the receiver must be tuned to the center response only.							
26	Repeat operation #25.							
27	F.M.-R.F. alignment using an A.M. generator with frequency of 88 to 108 Mc. and vacuum tube voltmeter, D.C. Voltmeter (20,000 ohms per volt).							
28	Place meter across C49 Elect. Cond. Meter reading approx. 1 Volt.							

NOTE: * Use dummy antenna
** Rock dial while adjusting for maximum output.

ALIGNMENT CHART

OPERATION	ALIGNMENT OF	GENERATOR CONNECTED TO	DUMMY ANT.	GENERATOR FREQUENCY	BAND SWITCH SETTING	TUNING COND. SETTING	TRIMMER	REMARKS
29	F. M. R. F.	Ant.	Match to 300 Ohms	108 MC.	F. M.	108 MC.	C19 F.M.Osc.	Max. A. V. C. V.
							C18 F.M.-R.F.	Peak Accurately
							C5 F.M. Ant.	" "
30	Repeat operation #29.							
31	Check calibration at 88 and 100 Mc.							

VOLTAGE CHART

Line Voltage: 117 Volts AC

Position of volume control: Full with set tuned to quiet channel.
Position of Band Switch: Broadcast.

TUBE	FUNCTION	Voltage of Sockets Prongs to Ground See Prong Nos. on schematic. No. 1	No. 2	No. 3	No. 4	No. 5	No. 6	No. 7	No. 8
6BA6	R. F. Amp.	-.15	.65	6.2*	0	235	80	.65	-
6BE6	Converter	-9.0	0	6.2*	0	205	75	-.40	-
7A7	No. 1 I.F. Amp.	0	205	95	2.7	0	-.20	2.7	6.2*
7A7	No. 2 I.F. Amp.	0	205	95	2.7	0	-.20	2.7	6.2*
7C7	No. 3 I.F. Amp. (F.M.)	0	225	100	3.2	0	0	3.2	6.2*
6H6GT	Ratio Det. (F.M.)	0	0	-.15	**	**	-	6.2*	.15
7C6	Det., A.V.C., & 1st A.F.(A.M.)	0	120	-.20	0	-.35	-.35	0	6.2*
7A4	No. 2 A.F. Amp.	0	85	235	75	80	0	0	6.2*
7A4	Phase Inverter	6.2*	160	-	-	70	18	75	0
6V6GT	Power Amp. (2)	0	6.2*	250	235	0	0	0	13
5Y3GT	Rectifier	-	260	-	260*	-	260*	-	260
6E5	Tuning Eye (Viso-Glo)	6.2*	**	-.40	235	0	-	-	-

NOTES: Voltage readings are for schematic diagram in this bulletin. Allow 15% ≠ or - on all measurements. Always use meter scale which will give greatest deflection within scale limits. All DC measurements made with 20,000 ohms per volt voltmeter. All AC voltages made with rectifier type voltmeter.

* AC Volts.

** Cannot be measured with 20,000 Ohms per volt voltmeter.

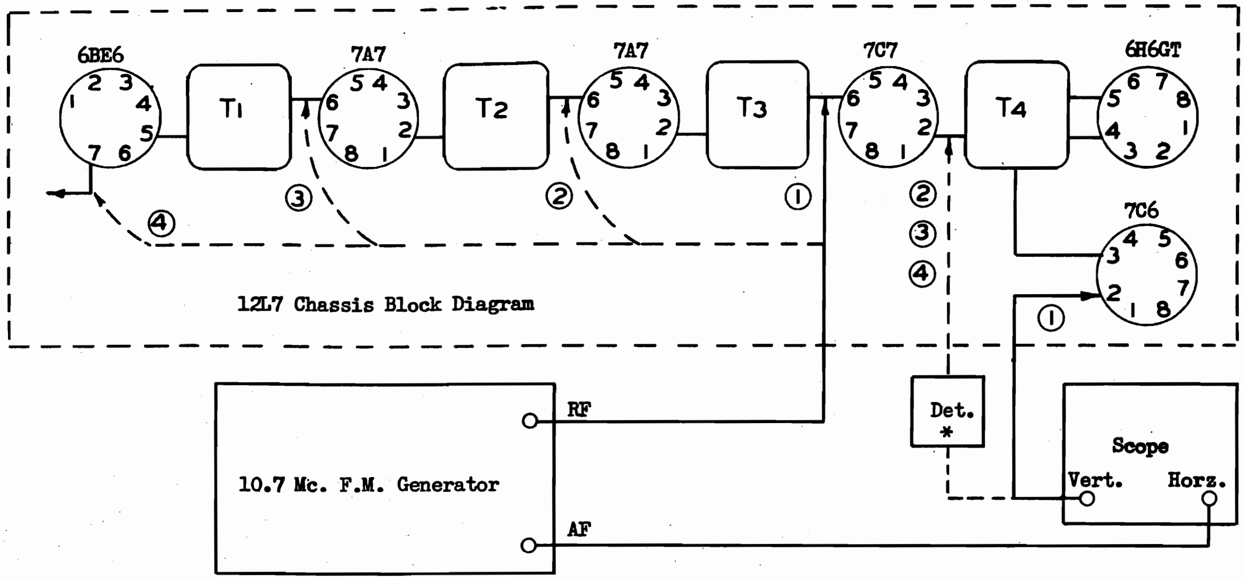
MODELS 1000, 1001, 1003, 1020, 1021, 1023, CHASSIS 12L7

THE SPARKS-WITHINGTON CO.

VISUAL I. F.-F. M. ALIGNMENT DATA

DESCRIPTION OF CIRCUIT USED:

A 6H6GT is employed as a ratio detector. This tube is preceded by a 7C7 ratio detector driver and two stages of 10.7 Mc. amplification using type 7A7 tubes. All stages are coupled by transformer coupling. The transformers are of the composite type wherein both 10.7 Mc. and 456 Kc. units are constructed within one can.



Gen. & Scope Position	Use
1	Align Ratio Detector - Adjust T4
2	Align I.F. - Adjust T3
3	Align I.F. - Adjust T2
4	Align I.F. - Adjust T1
*	See paragraph 3(e) under equipment required.

THEORY OF VISUAL ALIGNMENT.

One of the characteristics of a tuned circuit is the fact that when it is excited or driven by a generator such as a vacuum tube or another tuned circuit, the voltage developed across it will vary with slight changes in frequency. This voltage will be greatest when the frequency is equal to the resonant frequency of the circuit and will be less if the frequency is higher or lower than the resonant frequency.

Thus if we were to shift the frequency from high to low or low to high across the resonant frequency and make a record of the voltage across the tuned circuit, we could plot the voltage against frequency and obtain a curve which might look like Fig. 1.

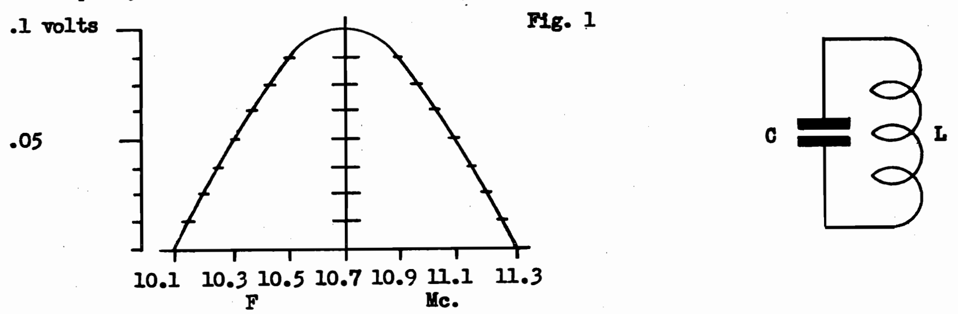


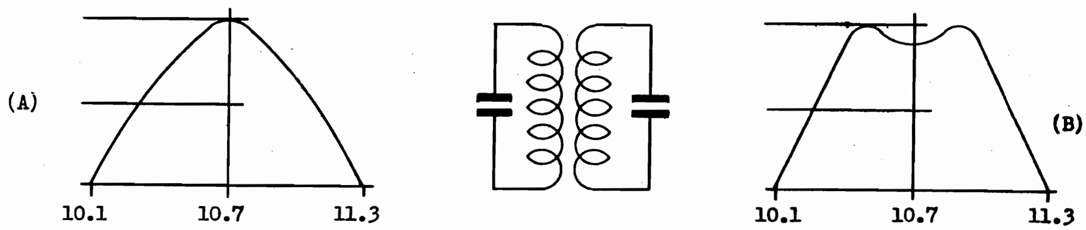
Fig. 1

This is the selectivity curve or response curve for the circuit under discussion. This type of circuit may be aligned or adjusted to resonance by simply changing either L or C until maximum voltage is obtained at the resonant frequency. Now if another circuit tuned to the same resonant frequency is coupled to the simple case above, a number of things can happen. First current flowing in one circuit will induce current in the second circuit, the magnitude of this current depending on the degree or amount of coupling between the two circuits. This coupling may be in the form of mutual inductance, mutual capacitance or any impedance common to the two circuits. Now if we repeat the proceedure outlined for obtaining the response curve of a single tuned circuit using the voltage developed across the secondary of the coupled circuit while driving the primary, we may get either

VISUAL I. F.-F. M. ALIGNMENT DATA

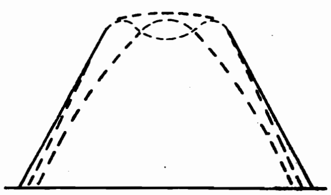
of two types of curves depending on the magnitude of the coupling, (a) in Fig. 2 is a typical curve for two circuits coupled below critical coupling and (b) is a representation of the curve for an overcoupled circuit.

Fig. 2



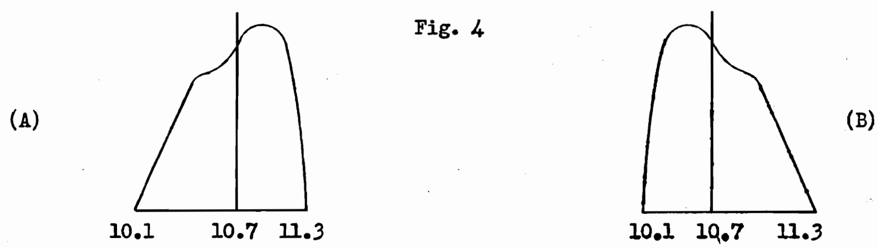
Overcoupled circuits producing a response curve like (b) Fig. 2 are often employed where it is important that the response curve remain approximately flat over a narrow band of frequencies near the resonant frequency. They are also frequently combined with single peaked circuits to produce a response curve like Fig. 3.

Fig. 3



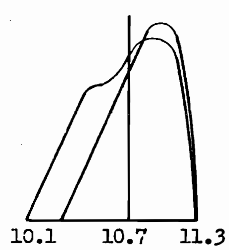
The dotted lines indicate the curves of the individual circuits and the solid curve shows the overall response of the two or more pairs of coupled circuits. Circuits like the above or approaching them in form are desirable in an F.M. receiver where the pass band should be of the order of 200 Kc. Now from the above it is evident that simple peaking both sides of a circuit coupled below critical for maximum voltage will provide optimum alignment but if this proceedure is followed with an overcoupled circuit it is almost a certainty that the two circuits will not be tuned to the resonant frequency but will instead be aligned so that either one or the other is accentuated. The response curve will then look like Fig. 4 (a) or (b).

Fig. 4



Now if this overcoupled circuit is combined with a single peaked circuit (where the coupling is below critical), the misalignment becomes worse, something like Fig. 5.

Fig. 5



From the above it appears that to properly align a receiver using overcoupled IF transformers it will be necessary to take a response curve of each stage and align the circuit so that the two peaks are symmetrical, that is, approximately equal in amplitude and displaced equally from the center frequency. To do this with a CW or AM signal would be laborious and time consuming whereas the use of visual equipment makes it nearly as simple as adjusting a simple single peaked amplifier.

MODELS 1000, 1001, 1003, 1020. 1021, 1023, CHASSIS 12L7

THE SPARKS-WITHINGTON CO.

VISUAL I. F.-F. M. ALIGNMENT DATA

Visual alignment test equipment performs the operation of plotting the response curve almost exactly as described above except that instead of manually changing the generator frequency, recording the voltage and then plotting the results, these operations are performed automatically and simultaneously by a combination of electronic circuits. The operation is briefly as follows.

In the signal generator a low AC voltage is applied to a reactance tube modulator which shifts the oscillator frequency from low to high or from high to low at a rate determined by the frequency of the AC voltage and by an amount determined by the AC voltage. The frequency at any instant is then dependant on the AC voltage present at that instant of time. An oscilloscope is provided which may be considered a voltmeter used to read the voltage across the tuned circuit, provided a detector is used to convert the RF to a low audio frequency. This voltage is then applied to the vertical plates and results in a vertical displacement of the spot on the screen. Some of the voltage used to shift the oscillator frequency is also applied to the horizontal plates of the oscilloscope providing a means of displacing the spot horizontally. It is now evident that since that for any given AC voltage only one frequency may be obtained and since that AC voltage will result in an exact amount of spot deflection on the scope we can read the voltage across the circuit under examination by noticing the position of the spot at this exact instant.

Now if we consider the frequency as shifting from low to high 60 times per second and remember that the spot is moving across the screen of the scope 60 times per second at exact synchronization with the change in frequency it is only necessary to apply the voltage from our circuit to the vertical plates to obtain a replica of the response curve on the face of the cathode ray tube. This curve will be repeated 60 times per second if our sweep frequency is 60 cycles. Adjustments to the circuit may now be made and the effect on the response curve noted instantaneously.

EQUIPMENT REQUIRED.

(a) A sweep signal generator with a center frequency of 10.7 Mc. and a total sweep width of at least 400 Kc. This generator should be equipped with filters to remove all spurious oscillator frequencies and limiters should be provided to remove all amplitude modulation. There should also be a crystal oscillator to provide a marker frequency at 10.7 Mc. for accurate determination of the center frequency.

(b) An amplitude modulated signal generator tuned to 456 Kc. This generator should be either crystal controlled or means should be provided for accurate frequency calibration.

(c) An Oscilloscope with either a 3" or 5" tube equipped with both vertical and horizontal amplifiers.

(d) A power output meter with an internal impedance to match the output transformer for use in 456 Kc. alignment.

(e) A diode detector for use in connection with the oscilloscope while aligning the F.M.-I.F. channel. This diode detector may be either a crystal or a two element vacuum tube such as the 6H6. A diode load resistor, coupling condenser, etc. will also be necessary.

ALIGNMENT OF THE 456 KC. I.F.

This alignment adjustment should be made before attempting to align the 10.7 I.F. circuit because of the possible effects on the operation of the F.M. I.F.

Connect the output meter to the receiver. Connect the signal generator output lead to the converter grid. Turn the wave band switch to BC. and the generator to 456 Kc. Using the output meter as an indicator peak the A.M. I.F. trimmers for maximum output.

ALIGNMENT OF THE 10.7 I.F.

Turn the wave band switch to F.M. and the generator to 10.7 Mc. Move the signal generator lead to the grid of the ratio detector driver tube and the scope to the 1st audio plate. Now proceed to align the ratio detector transformer for maximum linearity and minimum noise. This operation can be faciliated by applying a small amount of amplitude modulation along with the F.M. and then adjusting the secondary trimmer for minimum noise. Please note that the adjustment of the secondary circuit, controls to a large extent, the linearity of the pattern and adjustment of the primary is responsible for the gain in the circuit. Fig. 6 will represent a linear detector curve and Fig. 7, a detector curve with noise or A.M. present.

With the generator output lead connected to the grid of the next I.F. amplifier, connect the scope through the temporary detector mentioned previously (3e) to the ratio detector driver plate. Align for maximum output and symmetry.

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MODELS 1000, 1001, 1003, 1020, 1021, 1023, CHASSIS 12L7

VISUAL I. F.-F. M. ALIGNMENT DATA

Fig. 6

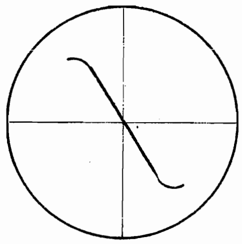
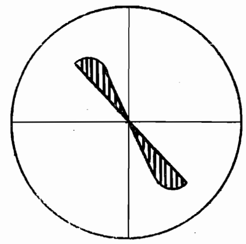


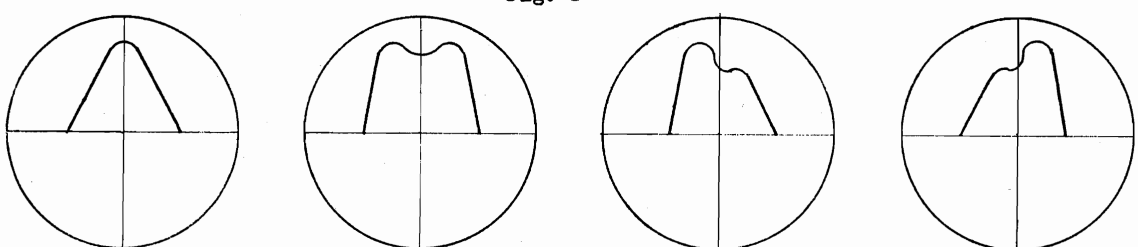
Fig. 7



*Move the generator lead to the grid of the next I.F. tube and align the next I.F. transformer. Adjust both trimmer screws for maximum gain, meanwhile maintaining symmetry in the curve. Observe that by alternately adjusting the primary and secondary trimmer, the vertical amplitude can be increased without allowing the response curve to become greatly distorted. Move the generator lead to the grid of the converter tube and align No. 1 I.F. transformer following the same proceedure as above.

Fig. 8, (A), (B), (C), and (D) below represent typical response curves of an overall I.F. amplifier.

Fig. 8



(A) Not Overcoupled Properly Aligned (Right)

(B) Overcoupled Properly Aligned (Right)

(C) Overcoupled Improperly Aligned (Wrong)

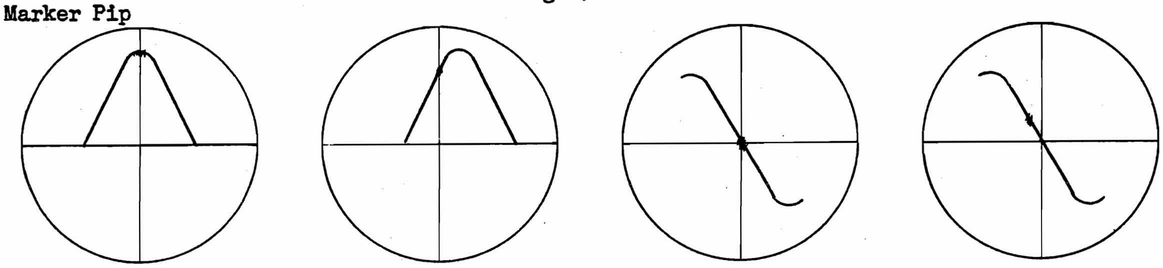
(D) Overcoupled Improperly Aligned (Wrong)

With the generator lead still connected to the converter grid, connect the scope to the 1st audio plate, and check the detector curve for linearity and noise. Should this appear unsatisfactory, a very slight readjustment of the detector secondary alignment may be made at this time. If, however, the adjustment required is very great the entire alignment procedure should be repeated in that the need for adjustment is an indication of incorrect alignment in one of the other stages.

USE OF MARKER FREQUENCIES.

A crystal controlled marker frequency should be provided at 10.7 Mc. The frequency of the sweep oscillator is correct when the pip will appear in the exact center of the sweep and so in the center of the resonance curve. See Fig. 9.

Fig. 9



Right

Wrong Resonance Curve Off Frequency

Right

Wrong Sweep Oscillator Off Frequency

Note that either the sweep oscillator or the circuit alignment may be off frequency.

*This stage may or may not be included depending upon the particular model.

MODELS 1035, 1035A, 1036, 1036A, 1037, 1037A, CHASSIS 9L8

THE SPARKS-WITHINGTON CO.

STEP BY STEP ALIGNMENT PROCEDURE

OPERATION	ALIGNMENT OF	GENERATOR CONNECTED TO	DUMMY ANT.	GENERATOR FREQUENCY	BAND SWITCH SETTING	TUNING COND. SETTING	TRIMMER	REMARKS
1	Set dial pointer even with left-hand stop line with condenser gang closed.							
2	A.M.-I.F.	Pin #7 of 6BE6 Convt. Tube	.02 MFD. Cond.	456 KC.	BC.	Open	C33 A & B	Peak Accurately
							C26 A & B	" "
3	A.M.-R.F.	BC. Ant.	*	1500 KC.	BC.	1500 KC.	C15 Osc. Tr.	" "
							C13 R.F. Tr.	" "
							C2 Ant. Tr.	" "
4				600 KC.		600 KC.	C16 Osc. Pad.	**
5	Repeat operations 3 and 4.							
6	Check calibrations at 600, 1000 and 1500 Kc.							
7	SPECIAL NOTE: For complete F.M.-I.F. Visual alignment instructions please refer to pages 6, 7, 8, 9, 10, and 11.							
8	F.M.-I.F. Alignment using an A.M. Generator and Output Meter.							
9	T4 F. M. Ratio Det.	Pin #6 on 7AG7 Driver Tube	.05 MFD. Cond.	10.7 MC.	F.M.	Open 108 MC.	L13 Sec.	Max. Reading
							L13 Pri.	" "
10	NOTE: Operation #9 must be made with generator output as low as possible with maximum reading on output meter.							
11	T3 Plate Choke	Pin #6 on 7AG7 #2 I.F. Amp.	.05 MFD. Cond.	10.7 MC.	F. M.	Open 108 MC.	L12 Slug	Max. Reading
12	T2 F.M.-I.F.	Pin #6 on 7A7 I.F. Amp.	.05 MFD. Cond.	10.7 MC.	F. M.	Open 108 MC.	C32 B	Peak Accurately
							C32 A	" "
13	NOTE: Operation #11 & 12 must be made with generator output as low as possible with maximum reading on output meter.							
14	Connect a 15,000 ohm resistor between pin #6 (Grid) on 7A7 tube to ground.							
15	T1 F.M.-I.F.	Pin #7 on 6BE6 Tube or C.T. on L6 coil	.05 MFD. Cond.	10.7 MC.	F. M.	Open 108 MC.	C25 B	Peak Accurately
							C25 A	" "
16	NOTE: Operation #15 must be made with generator output as low as possible with maximum reading on output meter.							
17	Remove the 15,000 ohm resistor dummy from pin #6 on 7A7 tube, but leave generator coupled through .05 Mfd. condenser to pin #7 on 6BE6 tube or C.T. on L6 coil.							
18	Adjust L13 secondary slug on T4 ratio detector transformer to minimum deflection or dip on output meter. Under certain conditions it is possible to adjust L13 secondary slug to minimum noise with the receiver tuned to a weak station. This operation is very sharp and the receiver must be tuned to the center response only.							
19	F. M. - R. F. alignment using an A. M. Generator with frequencies of 88 to 108 Mc. and vacuum tube voltmeter, or D.C. Voltmeter. (20,000 ohms per volt).							
20	Place meter across C50 elect. condenser. (Meter reading approx. 1 volt.)							
21	F.M.-R.F.	F.M. Ant.	Match to 300 Ohms.	108 MC.	F. M.	108 MC.	C21 Osc. Tr.	Max. A.V.C. V.
							C18 R.F. Tr.	Peak Accurately
							C3 Ant. Tr.	" "
22	Check calibration at 88 Mc.							

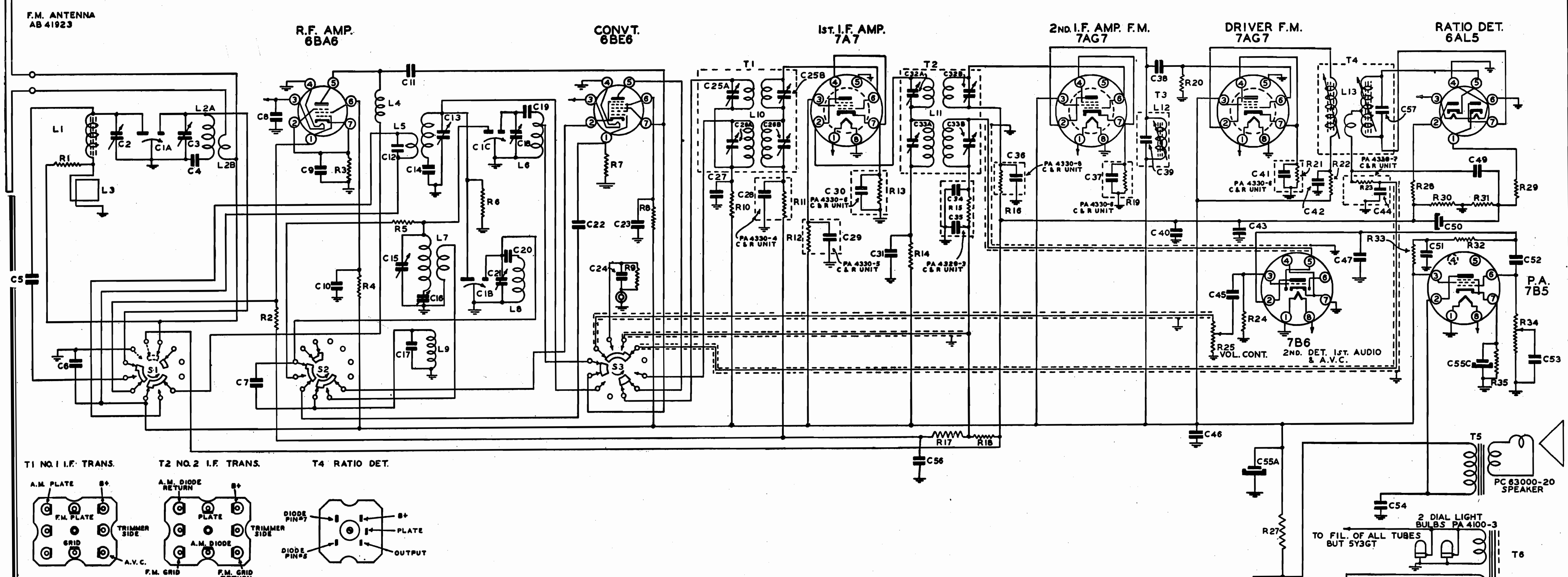
NOTE:
- * Use dummy antenna as described
- ** Rock dial while adjusting for maximum output.

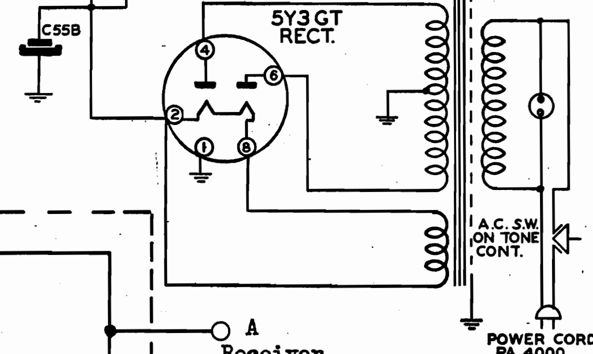
THE SPARKS-WITHINGTON CO.

MODELS 1035, 1035A, 1036, 1036A, 1037, 1037A, CHASSIS 9L8

INTERMEDIATE FREQUENCY A.M. 456 Kc. F.M. 10.7 Mc.

BOTTOM VIEWS OF ALL SOCKET CONNECTIONS





* SPECIAL SERVICE NOTE: THESE TRANSFORMERS SUPPLIED AS ASSEMBLIES COMPLETE ONLY.

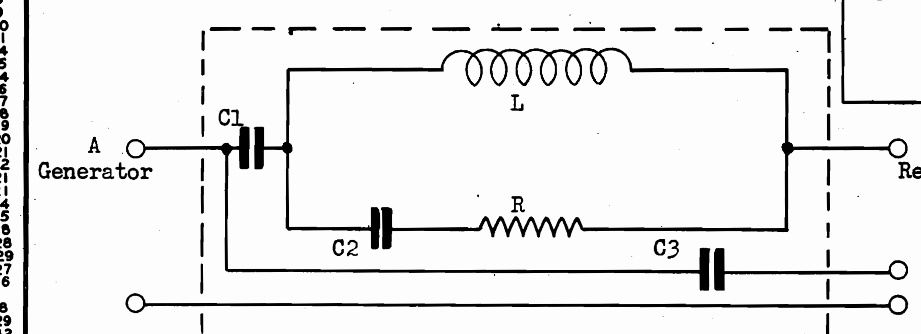
TERMINAL HOOKUP FOR T1, T2 & T4 BOTTOM VIEW

DESCRIPTION	PART NO.	LOCATION
C1A,B,C 3 GANG CONDENSER	PC 65001	P-4,N-11,P-11
C2 A.M. ANT. TRIMMER	PA4352-1	P-4
C3 F.M. ANT. TRIMMER	PA4366	P-5
C4 F.M. ANT. PADDER 51 MMF	PA4328-9	P-5
C5 51 MMF. MICA	MC60G-510	N-2
C6 .02 MFD. CERAMIC	HK35G-203	L-3
C7 10 MMF. CERAMIC	CC31H-100K	L-7
C8 1000 MMF. MOLDED PAPER	PA4325-2	Q-7
C9 10,000 MMF. MOLDED PAPER	PA4325-1	P-8
C10 1000 MMF. MOLDED PAPER	PA4325-2	M-8
C11 5 MMF. CERAMIC	PA4328-5	R-10
C12 51 MMF CERAMIC	CC31H-510K	P-9
C13 B.C. R.F TRIMMER	PA4352-1	P-10
C14 .05 MFD. 200V. TUBULAR	PC40GK-503	P-10
C15 A.M. OSC. TRIMMER	PA4352-3	N-10
C16 B.C. OSC. PADDER	PA4352-8	M-10
C17 15 MMF CERAMIC	CC31H-150K	L-10
C18 F.M. R.F. TRIMMER	PA4366	P-12
C19 F.M. R.F. PADDER (46 MMF.)	PA4328-2	Q-12
C20 F.M. OSC. PADDER (85 MMF)	PA4328-6	N-12
C21 F.M. OSC. TRIMMER	PA4366	N-12
C22 51 MMF. MICA.	MC60G-510	O-13
C23 1000 MMF. MOLDED PAPER	PA4325-2	O-14
C24 .002 MFD. CERAMIC	HK35G-202	N-14
C25A&B NO. 1 I.F TRIMMER F.M.	PA4359-1	Q-16,Q-17
C26A&B NO. 1 I.F. TRIMMER A.M.	PA4359-3	P-16, P-17
C27 .02 MFD. CERAMIC	HK35G-203	O-16
C28 .02 MFD. (C&R UNIT)	PA4330-4	O-17
C29 .02 MFD. (C&R UNIT)	PA4330-5	N-18
C30 .02 MFD. (C&R UNIT)	PA4330-6	O-19
C31 .02 MFD. CERAMIC	HK 35G-203	N-20
C32A&B NO. 2 I.F. TRIMMER F.M.	PA4359-1	Q-20,Q-21
C33A&B NO. 2 I.F. TRIMMER A.M.	PA4359-3	P-20,P-21
C34 100 MMF. (C&R UNIT)	PA4329-3	O-21,O-21
C35 100 MMF. (C&R UNIT)		
C36 .001 MFD. (C&R UNIT)	PA4330-8	P-22
C37 .02 MFD. (C&R UNIT)	PA4330-6	P-24
C38 100 MMF MICA	MC60G-101	R-25
C39 20 MMF. MICA	MC65F-200	P-25
C40 .02 MFD. CERAMIC	HK35G-203	N-25
C41 .02 MFD. (C&R UNIT)	PA4330-6	P-28
C42 .02 MFD. CERAMIC	HK35G-203	O-28
C43 .01 MFD. 200V. TUBULAR	PC40GK-103	O-27
C44 .002 MFD (C&R UNIT)	PA 4330-7	O-30
C45 .02 MFD. CERAMIC	HK35G-203	M-27
C46 .02 MFD. CERAMIC	HK35G-203	J-26
C47 150 MMF MICA	MC60F-151	N-29

DESCRIPTION	PART NO.	LOCATION
C49 330 MMF. CERAMIC	HK35F-331	P-32
C50 3 MFD. 50V. ELECT.	PA4308-1	O-31
C51 .05 MFD. 400 V.	PC40GL-503	N-30
C52 .02 MFD. 400 V.	PC40GL-203	N-32
C53 .01 MFD. 200V. TUBULAR	PC40GK-103	L-33
C54 .006 MFD. 1000 V.	PC40GN-602	I-30
C55A,B&C 40-40-20 MFD. ELECT.	PA4307-3	J-27,G-27,L-32
C56 .01 MFD. 400V.	PC40FL-103	K-21
C57 33 MMF. MICA	MC65E-330	Q-30
L1 A.M. ANT. LOADING COIL	AA6686-2	P-3
L2A F.M. ANT. COIL (PRI.)	AA6786-1	P-6
L2B F.M. ANT. COIL (SEC.)	AA6767-10	P-6
L3 A.M. ANT. LOOP	AC67008-4	O-3
L4 F.M. R.F. CHOKE	AA6769-2	Q-9
L5 B.C. R.F. COIL	AA6756-7	P-10
L6 F.M. R.F. COIL	AA6767-5	P-12
L7 B.C OSC COIL	AA6759-4	N-10
L8 F.M. OSC. COIL	AA6767-4	N-12
L9 F.M. CATHODE CHOKE	AA6798-1	L-10
L10 NO. 1 I.F. COIL*	AA6803-2	Q-17
L11 NO. 2 I.F. COIL*	AA6803-3	Q-21
L12 TUNED CHOKE ASSEM.*	AA6785-3	Q-25
L13 RATIO DET COIL*	AA6805-3	Q-29

DESCRIPTION	PART NO.	LOCATION
R1 2200 OHMS .5W	BR12S-222	P-3
R2 1 MEG. " .5W	BR12S-105	M-7
R3 68 " .5W	BR12S-680	P-8
R4 33,000 " .5W	BR12S-333	N-9
R5 47 " .5W	BR12S-470	O-10
R6 1 MEG " .5W	BR12S-105	O-11
R7 22,000 " .5W	BR12S-223	P-14
R8 22,000 " 2W	DR12S-223	O-15
R9 1 MEG " .5W	BR12S-105	N-14
R10 1000 " .5W	BR12S-102	O-16
R11 100,000 " (C & R UNIT)	PA4330-4	O-17
R12 82,000 " (C & R UNIT)	PA4330-5	N-18
R13 270 " (C & R UNIT)	PA4330-6	O-19
R14 1000 OHMS .5W	BR12S-102	N-20
R15 56,000 " (C & R UNIT)	PA4329-3	O-21
R16 1 MEG " (C & R UNIT)	PA4330-8	P-22
R17 100,000 " .5W	BR12S-104	K-21
R18 330,000 " .5W	BR12S-334	J-21
R19 270 " (C & R UNIT)	PA4330-6	P-24
R20 15,000 " .5W	BR12S-153	R-25
R21 270 " (C&R UNIT)	PA4330-6	P-28
R22 1000 " .5W	BR12S-102	O-28
R23 39,000 " (C&R UNIT)	PA4330-7	O-29
R24 10 MEG " .5W	BR12S-106	M-27
R25. VOLUME CONTROL	PA4407-2	L-26
R27 650 OHMS 10W	PA4200-4	I-28
R28 200 " .5W	BR12S-201	O-29
R29 470 " .5W	BR12S-471	O-32
R30 15,000 " .5W	BR12S-153	O-31
R31 15,000 " .5W	BR12S-153	O-32
R32 220,000 " .5W	BR12S-224	N-31
R33 56,000 " .5W	BR12S-563	N-30
R34 TONE CONTROL & SWITCH	PA4400-7	M-32
R35 470 OHMS 2W	DR12S-471	L-32
T1 NO. 1 I.F. TRANS. ASSEM.	AA6768-3	Q-17
T2 NO. 2 I.F. TRANS. ASSEM.	AA6768-4	Q-20
T3 F.M. PLATE CHOKE	AA6720-5	Q-25
T4 RATIO DETECTOR ASSEM.	AA6684-1	Q-29
T5 OUTPUT TRANS.	AB44056-2	J-32
T6 POWER TRANS.	AB44010-2	

DUMMY ANTENNA



C1 - 200 mmf. Condenser 400 V.D.C.
C2 - 400 mmf. Condenser 400 V.D.C.
C3 - .02 mmf. Condenser 400 V.D.C.
R - 100 Ohms Resistor 1/4 Watt
L - Choke Coil

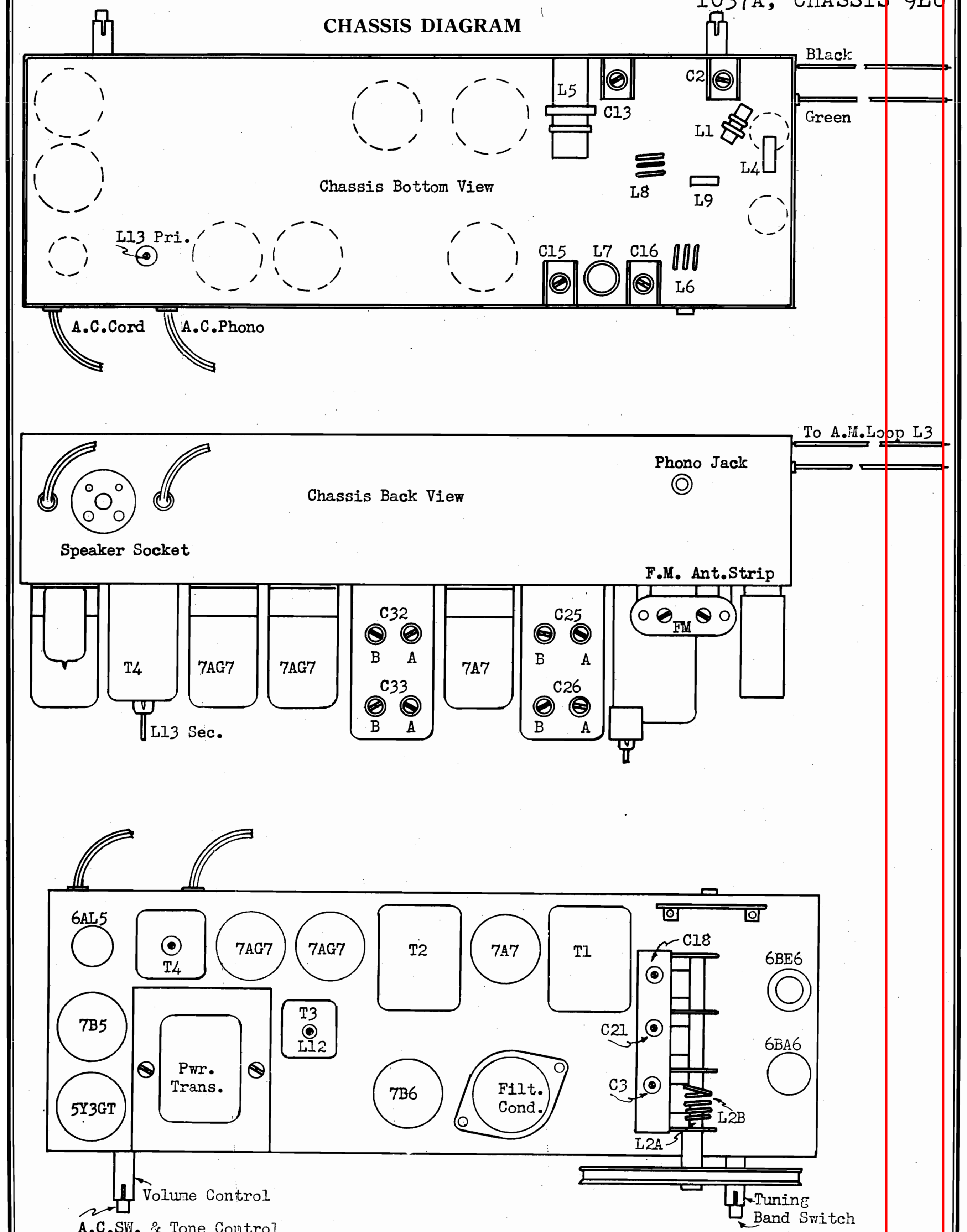
----Case Shield
Choke Coil Specification
Tubing - 3/8" Diameter Bakelite
Wire - No. 38 Enameled
Turns - 59 closely wound (Impregnated)

NOTE: When using this dummy antenna the generator output impedance should be 10 ohms or lower.

THE SPARKS-WITHINGTON CO.

MODELS 1035, 1035A, 1036, 1036A, 1037, 1037A, CHASSIS 9L8

CHASSIS DIAGRAM



MODELS 1035, 1035A, 1036, 1036A, 1037 1037A, CHASSIS 9L8

THE SPARKS-WITHINGTON CO.

VOLTAGE CHART

Line Voltage: 117 Volts AC

Position of volume control: Full with set tuned to quiet channel.
Position of Band Switch: Broadcast.

TUBE	FUNCTION	Voltage of Sockets Prongs to Ground. See Prong Nos. on schematic.							
		No. 1	No. 2	No. 3	No. 4	No. 5	No. 6	No. 7	No. 8
6BA6	R. F. Amplifier	**	.8	6.3*	0	230	98	.8	–
6BE6	Converter	-1	0	6.3*	0	225	83	0	–
7A7	1st I. F. Amplifier	6.3*	225	75	2.2	0	**	2.2	0
7AG7	2nd I. F. Amplifier (F.M.)	6.3*	220	220	1.8	0	**	1.8	0
7AG7	Driver (F.M.)	6.3*	210	220	1.5	0	**	1.8	0
7B6	2nd Det., A.V.C., & 1st Audio	6.3*	95	**	0	0	.5	0	0
6AL5	Ratio Det.	.25	0	0	6.3*	0	0	0	–
7B5	Power Amp.	0	250	230	0	0	**	14	6.3
5Y3GT	Rectifier	0	270	0	250*	0	250*	0	304

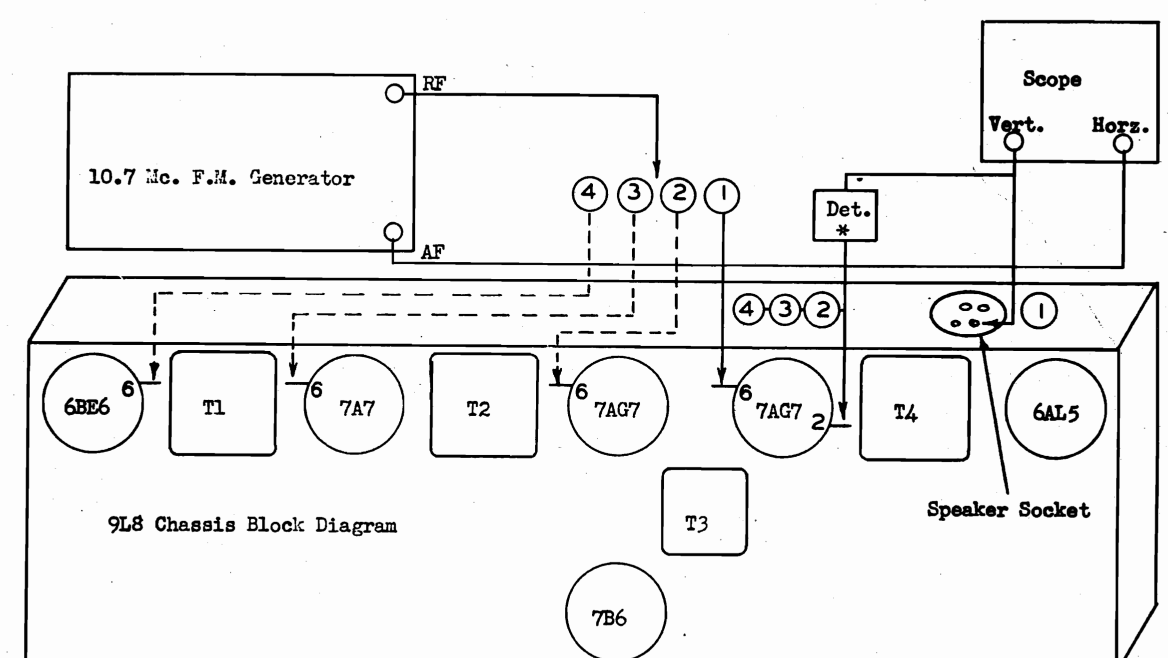
NOTES: Voltage readings are for schematic diagram in this bulletin. Allow 15% + or – on all measurements. Always use meter scale which will give greatest deflection within scale limits. All DC measurements made with 20,000 ohms per volt voltmeter. All AC voltages made with rectifier type voltmeter.
* AC Volts.
** Cannot be measured with 20,000 ohms per volt voltmeter.

VISUAL I. F.-F. M. ALIGNMENT DATA

1. DESCRIPTION OF CIRCUIT USED:

This circuit consists of a 6BE6 Converter, 7A7 1st I.F. (A.M. & F.M.), two 7AG7 2nd F.M.-I.F. Amplifier and Ratio Detector Driver, a 6AL5 Ratio Detector for F.M. The A.M.-I.F. frequency is 456 Kc. and the F.M. frequency is 10.7 Mc.

The diagram below shows the correct hook-up for generator and scope to the receiver circuit.



Gen. & Scope Position	Use
1	Align Ratio Det. - Adjust T4
2	Align Plate Choke - Adjust T3
3	Align I.F. - Adjust T2
4	Align I.F. - Adjust T1
*	See paragraph 3 (e) under equipment required.

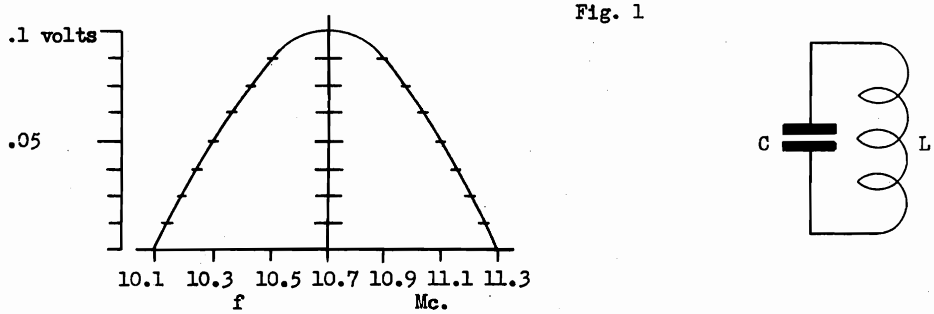
VISUAL I. F.-F. M. ALIGNMENT DATA

2. THEORY OF VISUAL ALIGNMENT.

One of the characteristics of a tuned circuit is the fact that when it is excited or driven by a generator such as a vacuum tube or another tuned circuit, the voltage developed across it will vary with slight changes in frequency. This voltage will be greatest when the frequency is equal to the resonant frequency of the circuit and will be less if the frequency is higher or lower than the resonant frequency.

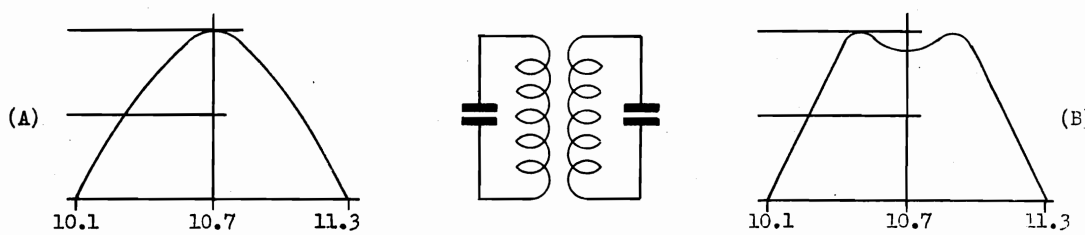
Thus if we were to shift the frequency from high to low or low to high across the resonant frequency and make a record of the voltage across the tuned circuit, we could plot the voltage against frequency and obtain a curve which might look like Fig. 1.

Fig. 1



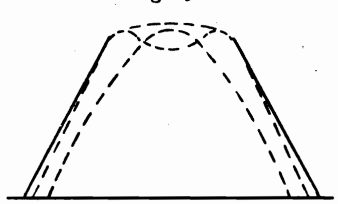
This is the selectivity curve or response curve for the circuit under discussion. This type of circuit may be aligned or adjusted to resonance by simply changing either L or C until maximum voltage is obtained at the resonant frequency. Now if another circuit tuned to the same resonant frequency is coupled to the simple case above, a number of things can happen. First current flowing in one circuit will induce current in the second circuit, the magnitude of this current depending on the degree or amount of coupling between the two circuits. This coupling may be in the form of mutual inductance, mutual capacitance or any impedance common to the two circuits. Now if we repeat the proceedure outlined for obtaining the response curve of a single tuned circuit using the voltage developed across the secondary of the coupled circuit while driving the primary, we may get either of two types of curves depending on the magnitude of the coupling, (a) in Fig. 2 is a typical curve for two circuits coupled below critical coupling and (b) is a representation of the curve for an overcoupled circuit.

Fig. 2



Overcoupled circuits producing a response curve like (b) Fig. 2 are often employed where it is important that the response curve remain approximately flat over a narrow band of frequencies near the resonant frequency. They are also frequently combined with single peaked circuits to produce a response curve like Fig. 3.

Fig. 3



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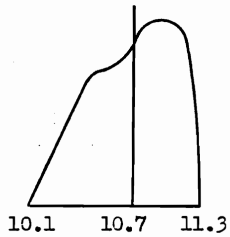
THE SPARKS-WITHINGTON CO.

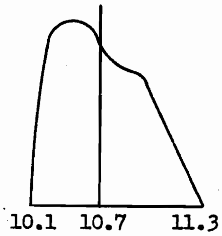
VISUAL I. F.-F. M. ALIGNMENT DATA

The dotted lines indicate the curves of the individual circuits and the solid curve shows the overall response of the two or more pairs of coupled circuits. Circuits like the above or approaching them in form are desirable in an F.M. receiver where the pass band should be of the order of 200 Kc. Now from the above it is evident that simple peaking both sides of a circuit coupled below critical for maximum voltage will provide optimum alignment but if this proceedure is followed with an overcoupled circuit it is almost a certainty that the two circuits will not be tuned to the resonant frequency but will instead be aligned so that either one or the other is accentuated. The response curve will then look like Fig. 4 (a) or (b).

Fig. 4

(A)

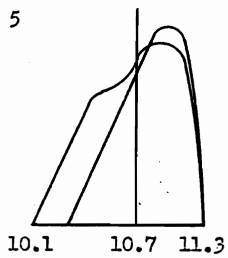




(B)

Now if this overcoupled circuit is combined with a single peaked circuit (where the coupling is below critical), the misalignment becomes worse, something like Fig. 5.

Fig. 5



From the above it appears that to properly align a receiver using overcoupled IF transformers it will be necessary to take a response curve of each stage and align the circuit so that the two peaks are symmetrical, that is, approximately equal in amplitude and displaced equally from the center frequency. To do this with a CW or AM signal would be laborious and time consuming whereas the use of visual equipment makes it nearly as simple as adjusting a simple single peaked amplifier.

Visual alignment test equipment performs the operation of plotting the response curve almost exactly as described above except that instead of manually changing the generator frequency, recording the voltage and then plotting the results, these operations are performed automatically and simultaneously by a combination of electronic circuits. The operation is briefly as follows.

In the signal generator a low AC voltage is applied to a reactance tube modulator which shifts the oscillator frequency from low to high or from high to low at a rate determined by the frequency of the AC voltage and by an amount determined by the AC voltage. The frequency at any instant is then dependant on the AC voltage present at that instant of time. An oscilloscope is provided which may be considered a voltmeter used to read the voltage across the tuned circuit, provided a detector is used to convert the RF to a low audio frequency. This voltage is then applied to the vertical plates and results in a vertical displacement of the spot on the screen. Some of the voltage used to shift the oscillator frequency is also applied to the horizontal plates of the oscilloscope providing a means of displacing the spot horizontally. It is now evident that since that for any given AC voltage only one frequency may be obtained and since that AC voltage will result in an exact amount of spot deflection on the scope we can read the result in an exact amount of spot deflection on the scope we can read the voltage across the circuit under examination by noticing the position of the spot at this exact instant.

Now if we consider the frequency as shifting from low to high 60 times per second and remember that the spot is moving across the screen of the scope 60 times per second at exact synchronization with the change in frequency it is only necessary to apply the voltage from our circuit to the vertical plates to obtain a replica of the response curve on the face of the cathode ray tube. This curve will be repeated 60 times per second if our sweep frequency is 60 cycles. Adjustments to the circuit may now be made and the effect on the response curve noted instantaneously.

VISUAL I. F.-F. M. ALIGNMENT DATA

3. EQUIPMENT REQUIRED.

(a) A sweep signal generator with a center frequency of 10.7 Mc. and a total sweep width of at least 400 Kc. This generator should be equipped with filters to remove all spurious oscillator frequencies and limiters should be provided to remove all amplitude modulation. There should also be a crystal oscillator to provide a marker frequency at 10.7 Mc. for accurate determination of the center frequency.

(b) An amplitude modulated signal generator tuned to 456 Kc. This generator should be either crystal controlled or means should be provided for accurate frequency calibration.

(c) An oscilloscope with either a 3" or 5" tube equipped with both vertical and horizontal amplifiers.

(d) A power output meter with an internal impedance to match the output transformer for use in 456 Kc. alignment.

(e) A diode detector for use in connection with the oscilloscope while aligning the F.M.-I.F. channel. This diode detector may be either a crystal or a two element vacuum tube such as the 6H6. A diode load resistor, coupling condenser, etc. will also be necessary.

4. ALIGNMENT OF THE 456 KC. I. F.

This alignment adjustment should be made before attempting to align the 10.7 I.F. circuit because of the possible effects on the operation of the F.M. I.F.

Connect the output meter to the receiver. Connect the signal generator output lead to the converter grid. Turn the wave band switch to Bc. and the generator to 456 Kc. Using the output meter as an indicator peak the A.M. I.F. trimmers for maximum output.

5. ALIGNMENT OF THE 10.7 I.F.

Turn the wave band switch to F.M. and the generator to 10.7 Mc. Move the signal generator lead to the grid of the ratio detector driver tube and the scope to the 1st audio plate. Now proceed to align the ratio detector transformer for maximum linearity and minimum noise. This operation can be faciliated by applying a small amount of amplitude modulation along with the F.M. and then adjusting the secondary trimmer for minimum noise. Please note that the adjustment of the secondary circuit, controls to a large extent, the linearity of the pattern and adjustment of the primary is responsible for the gain in the circuit. Fig. 6 will represent a linear detector curve and Fig. 7, a detector curve with noise or A.M. present.

Fig. 6

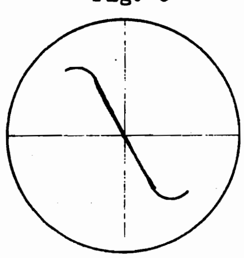
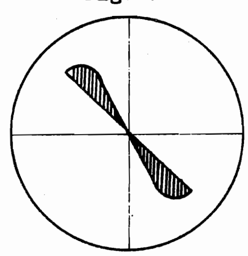


Fig. 7



With the generator output lead connected to the grid of the next I.F. amplifier, connect the scope through the temporary detector mentioned previously (3e) to the ratio detector driver plate. Align for maximum output and symmetry.

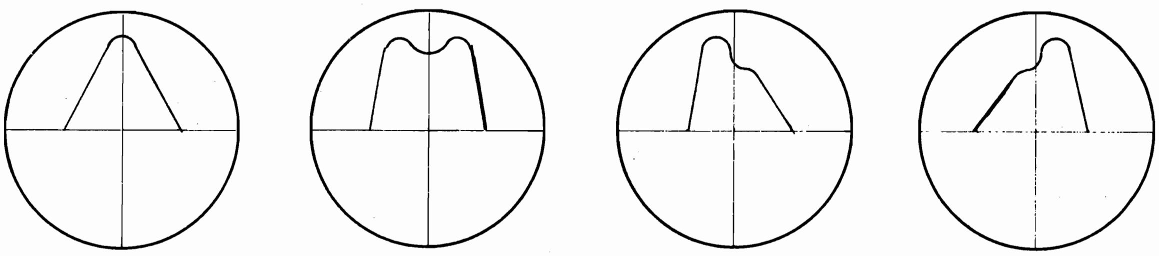
MODELS 1035, 1035A THE SPARKS-WITHINGTON CO.
1036, 1036A, 1037,
1037A,
CHASSIS 9L8

VISUAL I. F.-F. M. ALIGNMENT DATA

*Move the generator lead to the grid of the next I.F. tube and align the next I.F. transformer. Adjust both trimmer screws for maximum gain, meanwhile maintaining symmetry in the curve. Observe that by alternately adjusting the primary and secondary trimmer, the vertical amplitude can be increased without allowing the response curve to become greatly distorted. Move the generator lead to the grid of the converter tube and align No. 1 I.F. transformer following the same proceedure as above.

Fig. 8, (A), (B), (C), & (D) below represent typical response curves of an overall I.F. amplifier.

Fig. 8



(A) Not Overcoupled Properly Aligned (Right)

(B) Overcoupled Properly Aligned (Right)

(C) Overcoupled Improperly Aligned (Wrong)

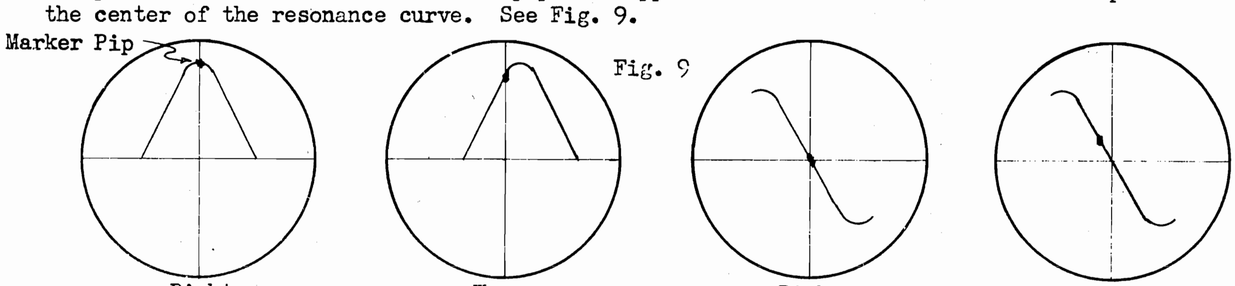
(D) Overcoupled Improperly Aligned (Wrong)

With the generator lead still connected to the converter grid, connect the scope to the 1st audio plate, and check the detector curve for linearity and noise. Should this appear unsatisfactory, a very slight readjustment of the detector secondary alignment may be made at this time. If, however, the adjustment required is very great the entire alignment procedure should be repeated in that the need for adjustment is an indication of incorrect alignment in one of the other stages.

6. USE OF MARKER FREQUENCIES.

A crystal controlled marker frequency should be provided at 10.7 Mc. The frequency of the sweep oscillator is correct when the pip will appear in the exact center of the sweep and so in the center of the resonance curve. See Fig. 9.

Fig. 9



Right

Wrong Resonance Curve Off Frequency

Right

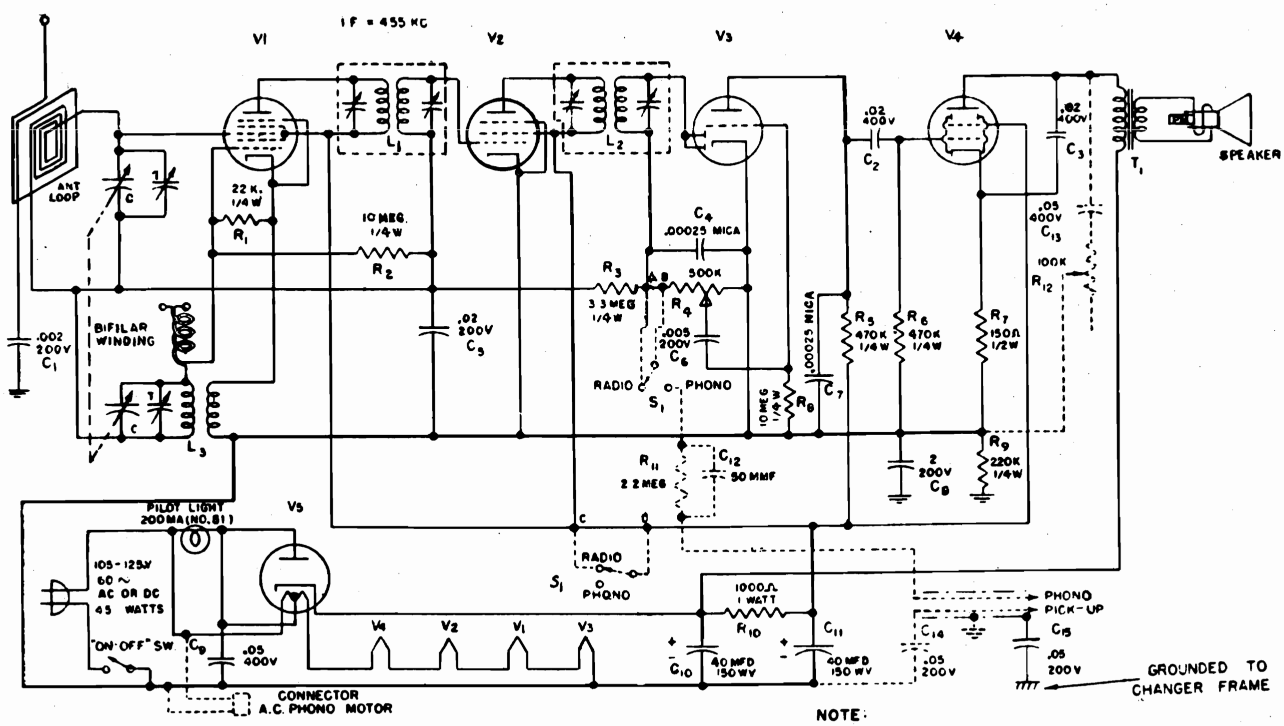
Wrong Sweep Oscillator Off Frequency

Note that either the sweep oscillator or the circuit alignment may be off frequency.

*This stage may or may not be included depending upon the particular model.

SPIEGEL

MODEL CB-7553



NOTICE: ON SETS HAVING THREE (3) CONTROLS, R12 & C13 ARE OMITTED.

NOTE:

(1) POINTS A-B, C-D JUMPED IN RADIO MODELS. SWITCH S_1 USED IN RADIO-PHONO COMBINATION

(2) DOTTED LINES IN CIRCUIT USED IN PHONO-COMBINATION ONLY

(3) RADIO POWER INPUT IS 30 WATTS, WITH PHONO 45 WATTS.

(4) C_{15} USED ON MODEL 6547 ONLY.

(5) WARNING! — DO NOT USE PHONO ON D.C.

TUBE COMPLEMENT

TUBE	LOCTAL	OCTAL	MINIATURE
V_1	14Q7		12BE6
V_2	14A7		12BA6
V_3	14B6		12AT6
V_4	50A5	50L6	50B5
V_5	35Y4		35W4

Figure 4. Schematic Diagram

PARTS LIST:

C 1—.002 Mfd., 200V paper
C 2—.02 Mfd., 400V paper
C 3—.02 Mfd., 400V paper
C 4—.00025 Mfd., mica
C 5—.02 Mfd., 200V paper
C 6—.005 Mfd., 200V paper
C 7—.00025 Mfd., mica
C 8—.25 Mfd. (or .20 Mfd.), 200V paper
C 9—.05 Mfd., 400V, molded bakelite
C10, 11—Dual 40 Mfd., 150V (*A-25.019)
C12—50 Mmfd., mica
C13—.05 Mfd., 400V
C14—.05 Mfd., 200V
C15—.05 Mfd., 200V
R 1—22K, ¼W, 20%
R 2—10 meg., ¼W, 20%
R 3—3.3 meg., ¼W, 20%
R 4—500K variable, audio taper, with SPST (*A-9.066)
R 5—470K, ¼W, 20%
R 6—470K, ¼W, 20%
R 7—150 ohms, ½W, 10%
R 8—10 meg., ¼W, 20%
R 9—220K, ¼W, 20%
R10—1000 ohms, 2W (or 1W), 20%
R11—2.2 meg., ¼W, 20%
L 1—Transformer, IF input, 455KC (*C-2.191-1)
L 2—Transformer, IF output, 455KC (*C-2.191-2)
L 3—Coil, oscillator (*B-2.192)
Antenna, loop (*B-5.006)
Loudspeaker, PM, 5" Trans. to match 50A5 (*B-11.037)
Pilot light, Mazda No. 51, 200 Ma.

* Mfg. Part. No.

Part No. NG-440 Rev. 1-21-47

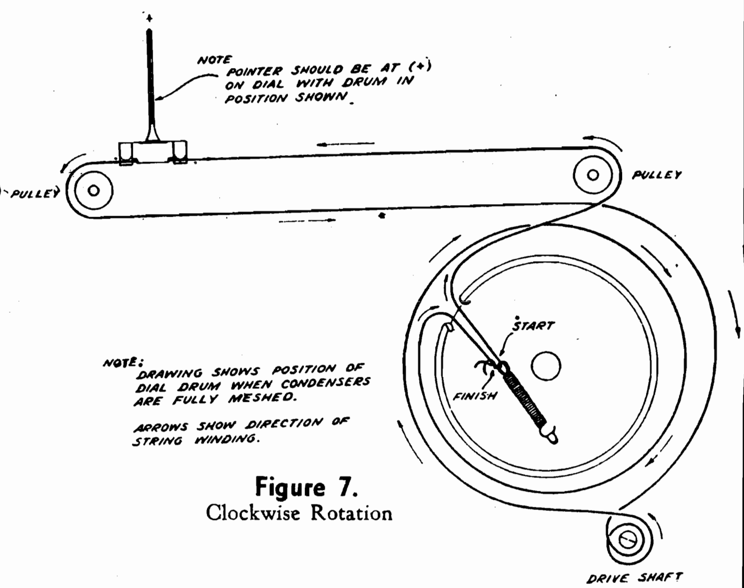


Figure 7.
Clockwise Rotation

MODEL CB-7553

SPIEGEL

Tube Complement:

loctal	octal	miniature	function
V_1—14Q7		12BE6	Osc., Conv.
V_2—14A7		12BA6	I.F. Amp.
V_3—14B6		12AT6	Det., A.V.C., Amp.
V_4—50A5	50L6	50B5	Power Amp.
V_5—35Y4		35W4	Rectifier

Loctal base tubes have a special locking arrangement which holds the tubes securely in the sockets. To remove a tube, use slightly off-side pressure towards socket rivet, thus releasing the socket lock.

This is a 5-tube Superheterodyne radio receiver designed to operate on:

1. 105-125 volts A.C. 60 cycles.
2. *105-125 volts D.C.

This receiver operates on the standard broadcast band, 540-1700 KC.

* Operate phonograph on A.C. only.

ALIGNMENT PROCEDURE.

Steps	*Connect output of oscillator to*	*Tune osc. to*	*Tune radio dial to*	*Adjust the following for max. peak output*
1	Tuning condenser stator (ant.) in series with .01 mfd.	455	Quiet point at high frequency end of dial.	1st and 2nd I.F. Transformers
2	Antenna term. of Ant. loop in series with 100 mmf.	1720	Full clockwise (out of mesh)	Osc. trimmer
3	Antenna term. of Ant. loop in series with 100 mmf.	1500	1500	Ant. trimmer

Output meter is connected across voice coil.

Receiver volume is turned to maximum

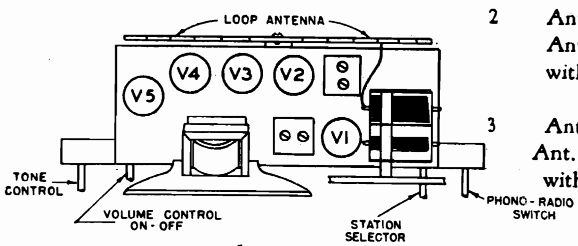


Fig. 3. Tube and Trimmer Locations—4-Control

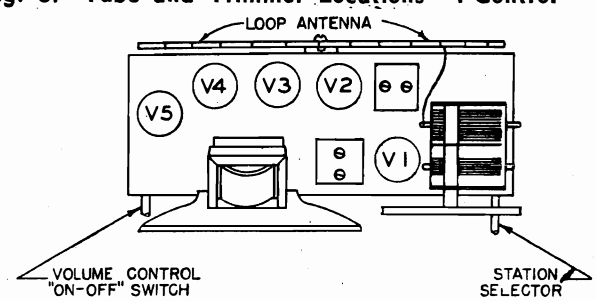


Fig. 1. Tube and Trimmer Locations—2-Control

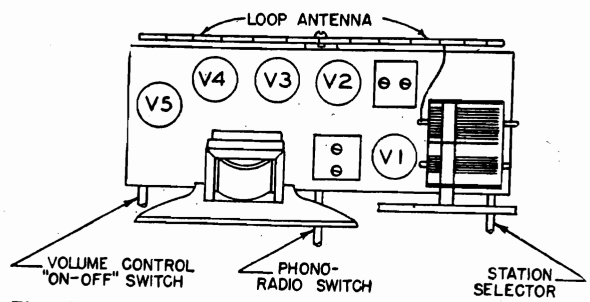
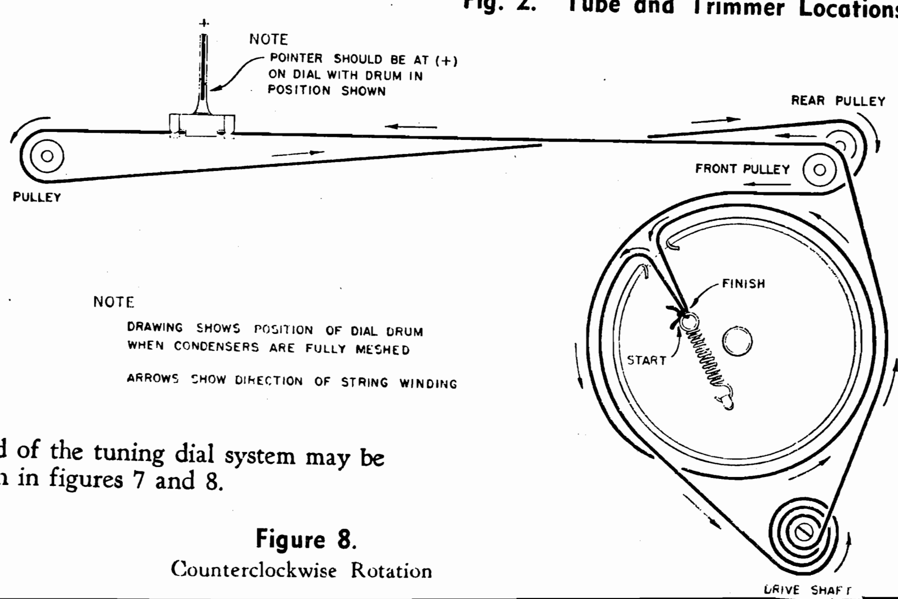


Fig. 2. Tube and Trimmer Locations—3-Control



NOTE

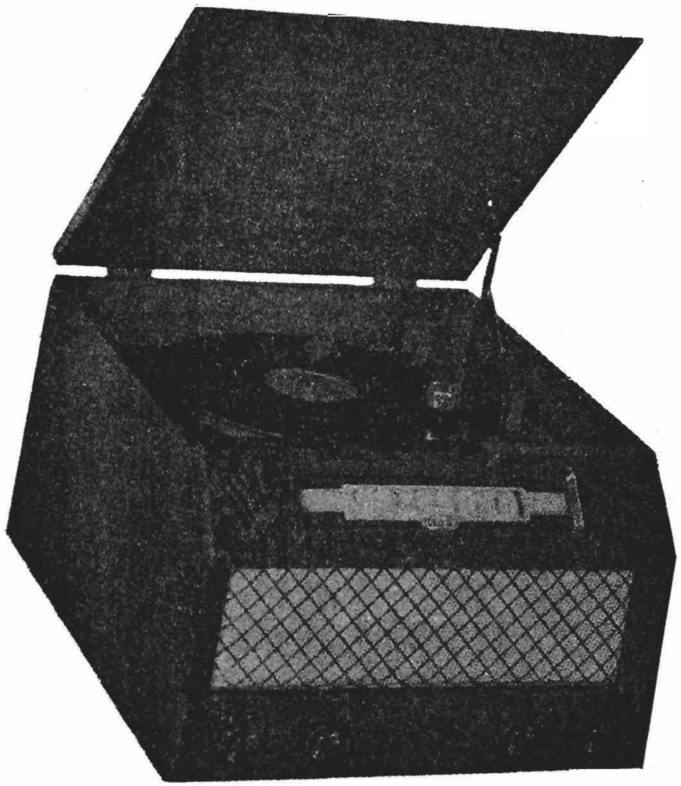
DRAWING SHOWS POSITION OF DIAL DRUM WHEN CONDENSERS ARE FULLY MESHED

ARROWS SHOW DIRECTION OF STRING WINDING

Nylon cord of the tuning dial system may be replaced as shown in figures 7 and 8.

Figure 8.
Counterclockwise Rotation

SPIEGEL



Operation: The set operates on 110 to 120 volts, 60 cycles A.C. only. Power drain is approximately 25 watts for radio and about 10 watts additional for the motor.

Range: Model G-516 covers the broadcast band from 540 to 1620 kilcycles. Since the scale is calibrated 54 to 160, the actual frequency of the station received is obtained by adding a zero to the dial calibration.

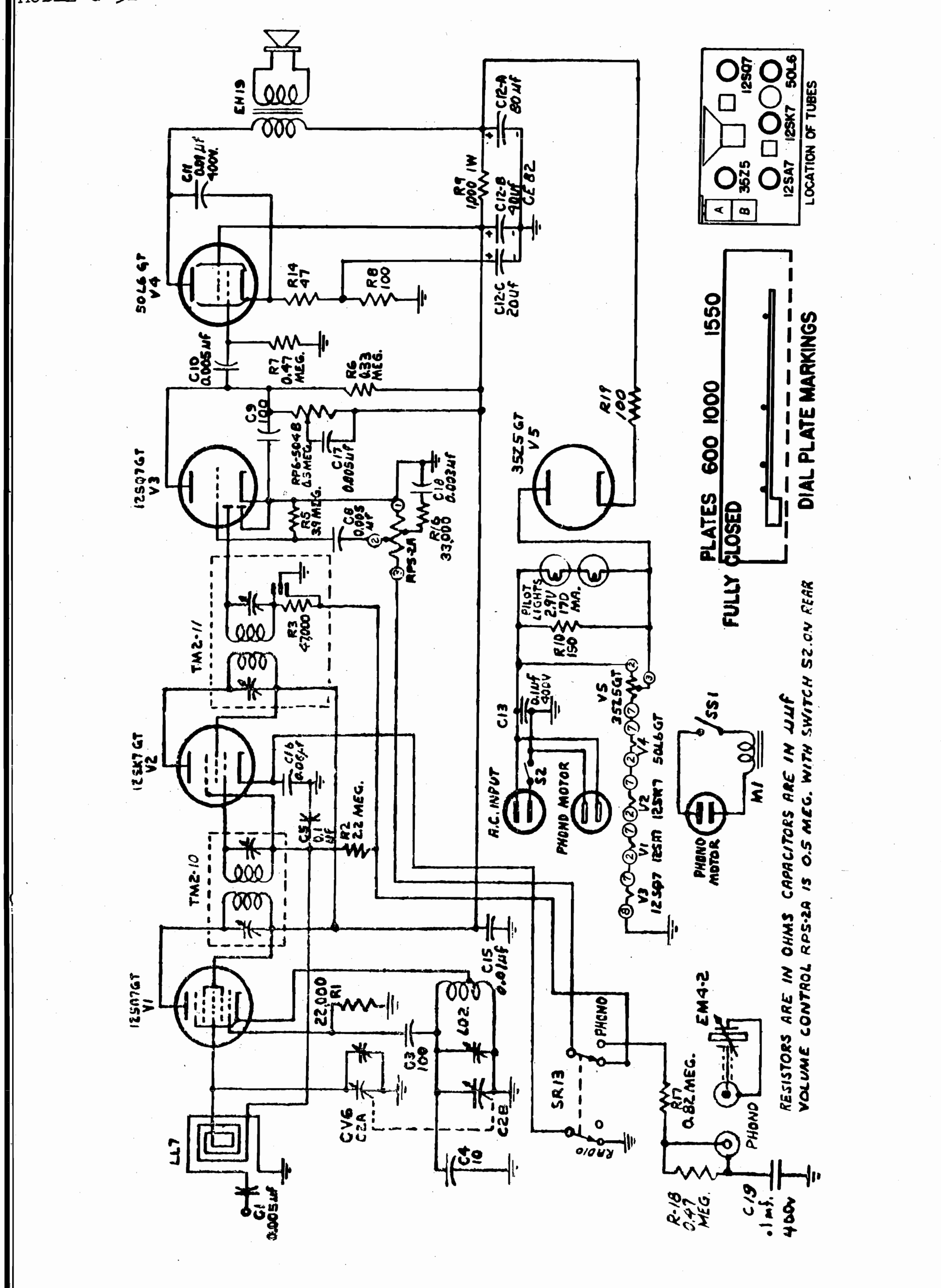
Alignment: No attempt should be made to re-align this receiver until it has been determined that a poor tube, or some local condition is not responsible for the faulty reception.

The Signal Generator may be connected through a 0.01 mf capacitor (used as dummy antenna) to the lug on RF section (B) of tuning capacitor. Connect ground clip of generator directly to chassis. Align the I. F. trimmers to 455 kc, using least possible input from Signal Generator to avoid developing A.V.C. voltage which would make the tuning adjustments very broad. An output meter may be clipped directly across the voice coil lugs.

To align RF trimmers, remove the 0.01 mf capacitor and connect the Signal Generator leads to two or three turns of heavy wire, forming a self-supporting loop of about 7 or 8 inches diameter, placed about a foot away from the receiver's loop antenna. Again, use the least possible input from the Signal Generator. With the tuning capacitor plates completely out of mesh, and pointer at extreme right end of travel, adjust the oscillator trimmer (A) (on front section of tuning capacitor) to 1700 kc. Re-adjust both Signal Generator and tuning capacitor to 1550 kc and adjust the RF trimmer (B) (on rear section) for maximum response. With tuning capacitor plates fully meshed, the receiver should tune to 532 kc; however, no adjustment is required at this point. For checking purposes, four fine marks are engraved on the dial plate. These represent, in order, the pointer position with capacitor plates fully meshed, and the pointer setting for 600, 1000 and 1550 kc.

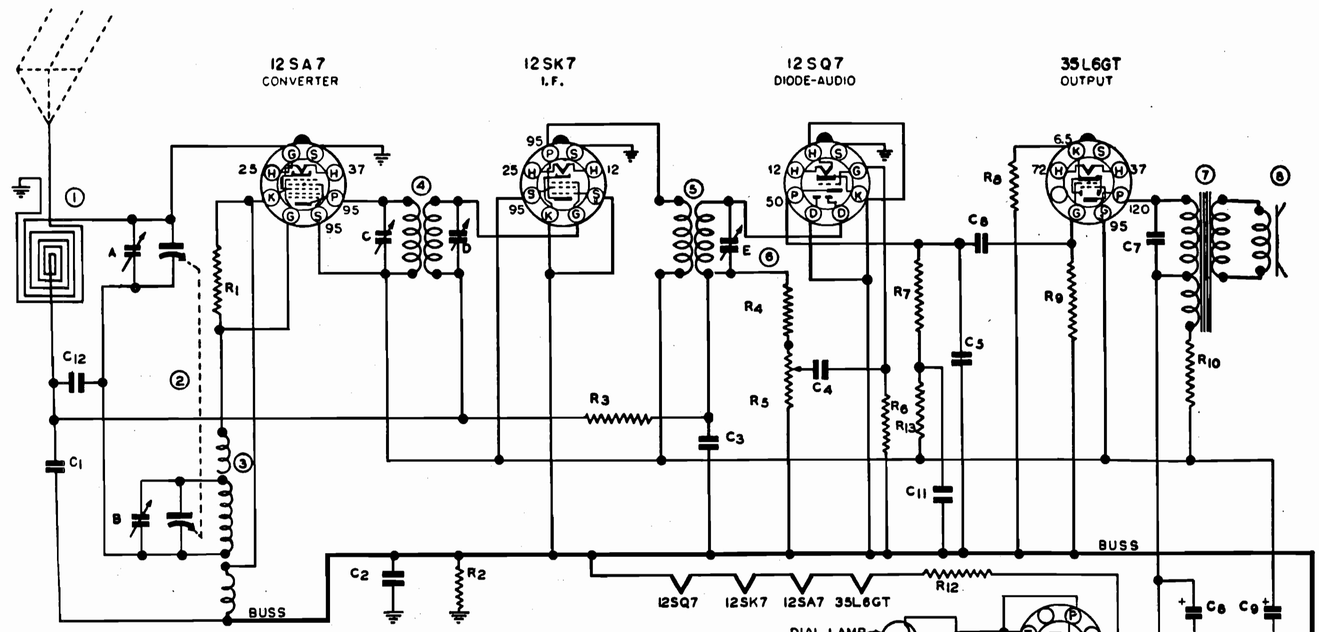
MODEL G-516

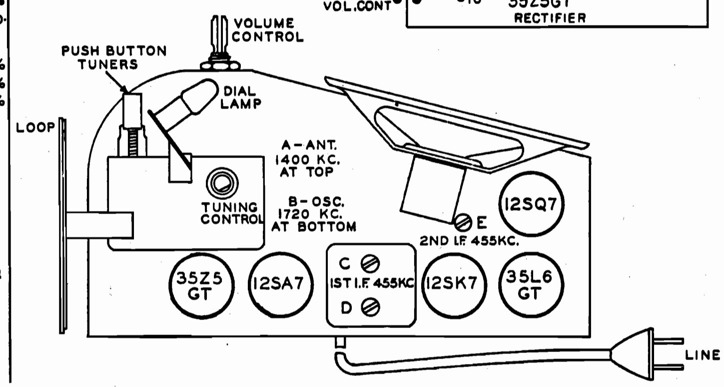
SPIEGEL



SPIEGEL

MODEL WAU-243





DIA. NO.	PART NO.	DESCRIPTION	DIA. NO.	PART NO.	DESCRIPTION
R_1	N-4025	22,000 OHM .5W 20%	C_6	N-1344	.01 MFD 400V 20%
R_2	N-4026	220,000 OHM .5W 20%	C_7	N-1376	.02 MFD 400V 20%
R_3	N-1262	1. MEGOHM .5W 20%	C_8	N-5051	40 MFD 150V ELECTRO-
R_4	N-4063	47,000 OHM .5W 20%	C_9		40 MFD 150V LYTIC
R_5	N-2087	.5 MEG. VOLUME CONTROL	C_{10}	N-1376	.05 MFD 400V 20%
R_6	N-4028	6.8 MEGOHM .5W 20%	C_{11}	N-1351	.1 MFD 200V 20%
R_7	N-4026	220,000 OHM .5W 20%	C_{12}	N-1345	.05 MFD 200V 20%
R_8	N-4067	180 OHM .5W 10%			
R_9	N-4027	470,000 OHM .5W 20%	1	N-6188	LOOP COIL
R_{10}	N-5358	1,000 OHM 1.W 10%	2	N-6192	2 GANG CONDENSER
R_{11}	N-4022	33 OHM .5W 20%	3	N-4645	OSC. COIL
R_{12}	N-4023	82 OHM 2.W 10%	4	N-4813	1ST I.F. TRANSFORMER
R_{13}	N-4823	56,000 OHM .5W 10%	5	N-4846	2ND I.F TRANSFORMER
			6	N-4985	TRIMMER
C_1	N-1345	.05 MFD 200V 20%	7	N-6191	OUTPUT TRANSFORMER
C_2	N-1345	.05 MFD 200V 20%	8	N-6187	5" SPEAKER
C_3	N-6015	100 MMFD 500V 20%			
C_4	N-4694	.005 MFD 600V -15+40%			
C_5	N-6135	250 MMFD 500V 20%			

MODEL WAU-243

SPIEGEL

SERVICE DATA

Lack of sensitivity and poor tone quality may be due to any one or a combination of causes such as weak or defective tubes or speaker, open or grounded bias resistor, bypass condenser, etc. Never attempt to realign set until all other possible sources of trouble have been first thoroughly investigated and definitely proved not to be the cause.

NOTE: IT IS ABSOLUTELY NECESSARY THAT AN ACCURATELY CALIBRATED TEST OSCILLATOR WITH SOME TYPE OF OUTPUT MEASURING DEVICE BE USED WHEN ALIGNING THE RECEIVER AND THAT THE PROCEDURE BE CAREFULLY FOLLOWED, OTHERWISE THE RECEIVER WILL BE INSENSITIVE AND THE DIAL CALIBRATION WILL BE INCORRECT. THE TRIMMERS WILL BE REFERRED TO BY THEIR FUNCTION AS INDICATED ON THE PARTS DIAGRAM.

TUNING RANGE

This receiver is designed to operate over the standard broadcast band which extends from 535 to 1720 Kilocycles (KC) (174 to 560 Meters).

DIAL CALIBRATION. The scale is calibrated from 55 to 170 (Standard Broadcast). This band covers all Standard Broadcasts frequencies of the United States, Canada, Mexico, Cuba and many Central and South American Countries. Add a zero to figures on the scale to obtain kilocycles.

ALIGNMENT PROCEDURE

GENERAL DATA. The alignment of this receiver requires the use of a test oscillator that will cover the frequencies of 455, 600, 1400 and 1720 KC and an output meter to be connected across the primary or secondary of the output transformer. If possible, all alignments should be made with the volume control on maximum and the test oscillator output as low as possible to prevent the AVC from operating and giving false readings.

CORRECT ALIGNMENT PROCEDURE. The intermediate frequency (I.F.) stages should be aligned properly as the first step. After the I.F. transformers have been properly adjusted and peaked, the broadcast band should be adjusted.

I.F. ALIGNMENT. Remove the chassis and loop antenna from the cabinet and set them up on the bench so that they occupy exactly the same respective positions on the bench as they did in the cabinet. Care should be taken to have no iron or other metal near the loop. Do not make this set-up on a metal bench. With the gang condenser set at minimum, adjust the test oscillator to 455 KC and connect the output to the grid of the first detector tube (12SA7) through a .05 or .1 mfd. condenser. The ground on the test oscillator should be connected to the ground buss, indicated on the circuit diagram. Align all three I.F. trimmers to peak or maximum reading on the output meter.

BROADCAST BAND ALIGNMENT. Connect the test oscillator to the antenna of the set through a 100 mmfd. (.0001) condenser. With the gang condenser set at minimum capacity, set the test oscillator at 1720 KC, and adjust the oscillator (or 1720 KC trimmer) on gang condenser. Next—set the test oscillator at 1400 KC, and tune in the signal on the gang condenser. Adjust the antenna trimmer (or 1400 KC trimmer) for maximum signal. Next set the test oscillator at 600 KC, and tune in signal on condenser to check alignment of coils.

AERIAL SYSTEM

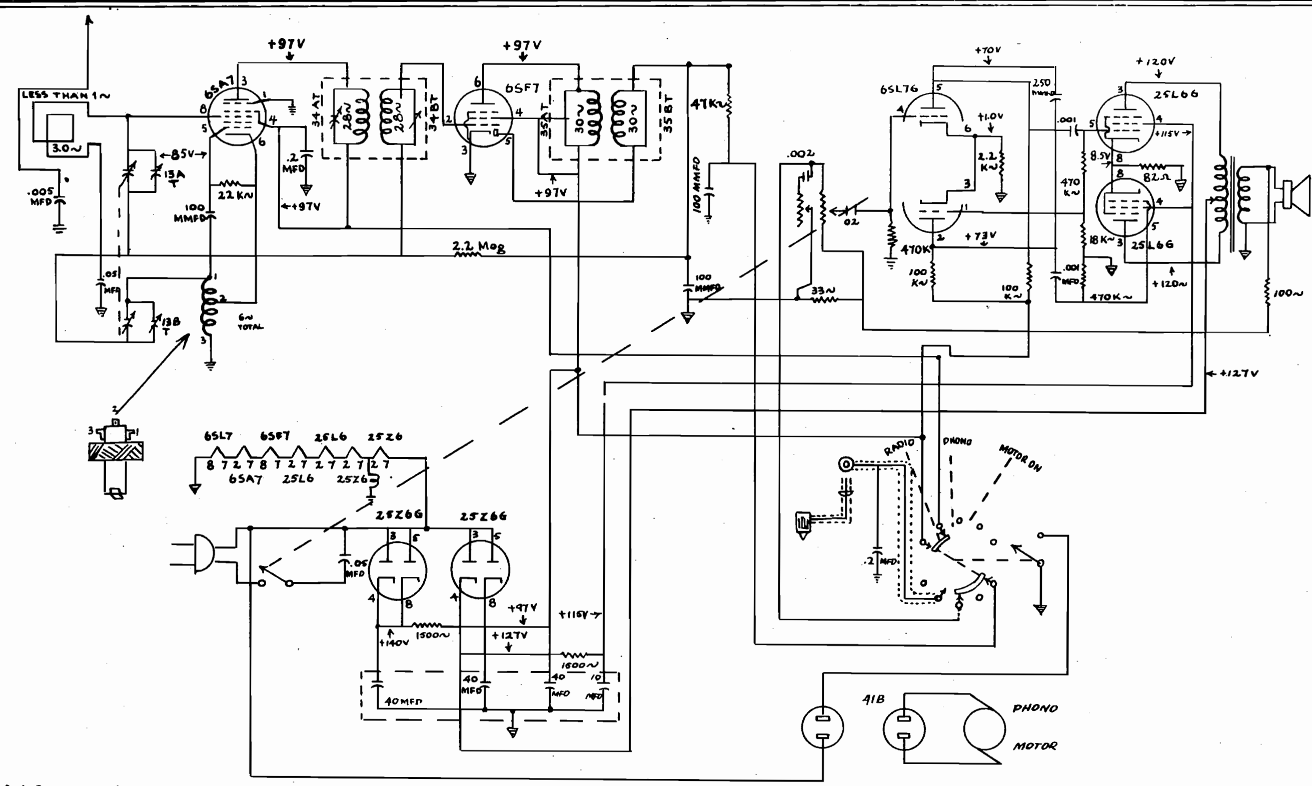
This receiver has a built-in "loop" aerial. Its excellent design is such as to increase pick-up from stations having wide variations in signal strength. The efficiency and selectivity of the loop provide outstanding reception without the use of an external aerial. The "loop" aerial used on this receiver is somewhat directional so reception from weak stations can be improved by turning the set in the proper direction. In or near metal buildings, iron ore deposits or steel structures or in localities remote from broadcasting stations, reception can be improved by using an outside aerial 50 feet to 100 feet in length including lead-in. Connect the outside aerial to the aerial lead. When using the outside aerial with AC power supply it may be necessary to reverse the power cord plug in wall socket to eliminate hum or distortion.

TUBES USED

Five tubes are used. (One tube is a rectifier.) Type numbers and locations are shown in the tube location diagram on the cabinet. If tubes are removed from their sockets for test or replacement purposes, make certain that each tube is placed in its proper socket when replacing the tubes in the set. Failure to replace the tubes in their proper sockets may result in damage to the tube, or to the receiver, or both.

SPIEGEL

MODEL 572



Phono-Radio with automatic record changer for alternating (A.C.) current, of 110 to 125 volts at 60 cycles.

1. The knob marked PHONO-RADIO, controls a three position switch. The extreme counter clockwise position is for radio reception. The center position is for FM reception when desired, to be used with an external F.M. tuning unit.

The extreme clockwise position is for phono reception.

2. The knob marked VOLUME, controls the off and on position of the radio receiver and also acts as a master switch by cutting off the current supply to the record changer.

The unit is turned off when the knob is in the extreme left. (Counter clockwise position).

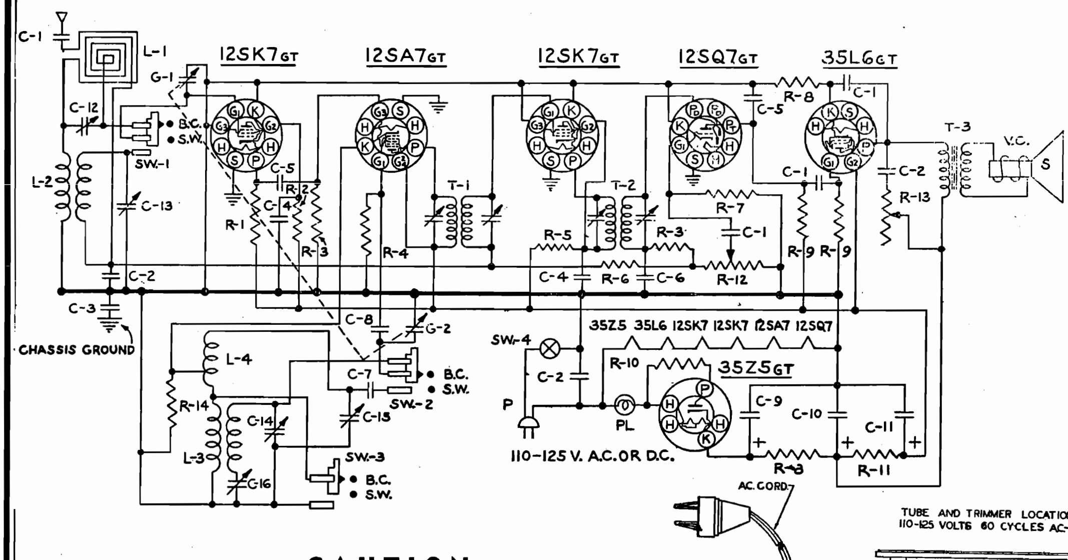
To turn on, turn this knob to the right (clockwise) until a click is heard. Further rotation adjusts the volume.

3. The knob marked TONE, is the tone control which is of the continuously, variable type and may be placed in the most pleasing position to the listener.

4. The knob marked TUNING, is for dialing the broadcast stations.

MODELS 5011, 5012

SPIEGEL

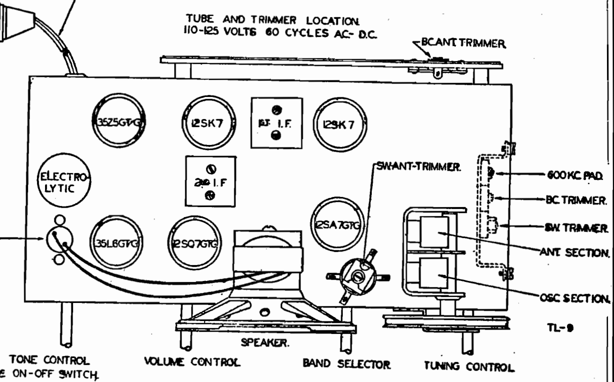


CAUTION

POWER SOURCES: — This receiver will operate either on 110-125 volt A.C., 50-60 cycle current or 110-125 volt D. C. current.

Never plug this receiver into a 220 volt line.

The components in this receiver are designed for 110-125 volt operation only. Any attempt to operate this receiver at a higher than prescribed voltage will cause serious damage.



ALIGNMENT AND SERVICE DATA

Remove the chassis from the cabinet for alignment.

A signal generator is required, having the following frequencies: 455 KC, 1400 KC, 1730 KC. 6 MC, 16 MC, and 18.3 MC. An output meter should be connected across the speaker.

I. F. ALIGNMENT: — Connect the generator lead through a .1 MFD Condenser to the terminal lug on the "Antenna" section of the gang condenser. The ground lead from the generator should be connected to the gang frame. Set the generator at 455 KC. Adjust the trimmer screws in the 1st and 2nd I. F. cans (See Fig. 1) until a maximum reading is noted on the output meter.

The receiver volume control should be turned to maximum during the I. F. and all subsequent alignments, to keep the AVC from working and giving false readings. Keep the generator output as low as possible to prevent overloading.

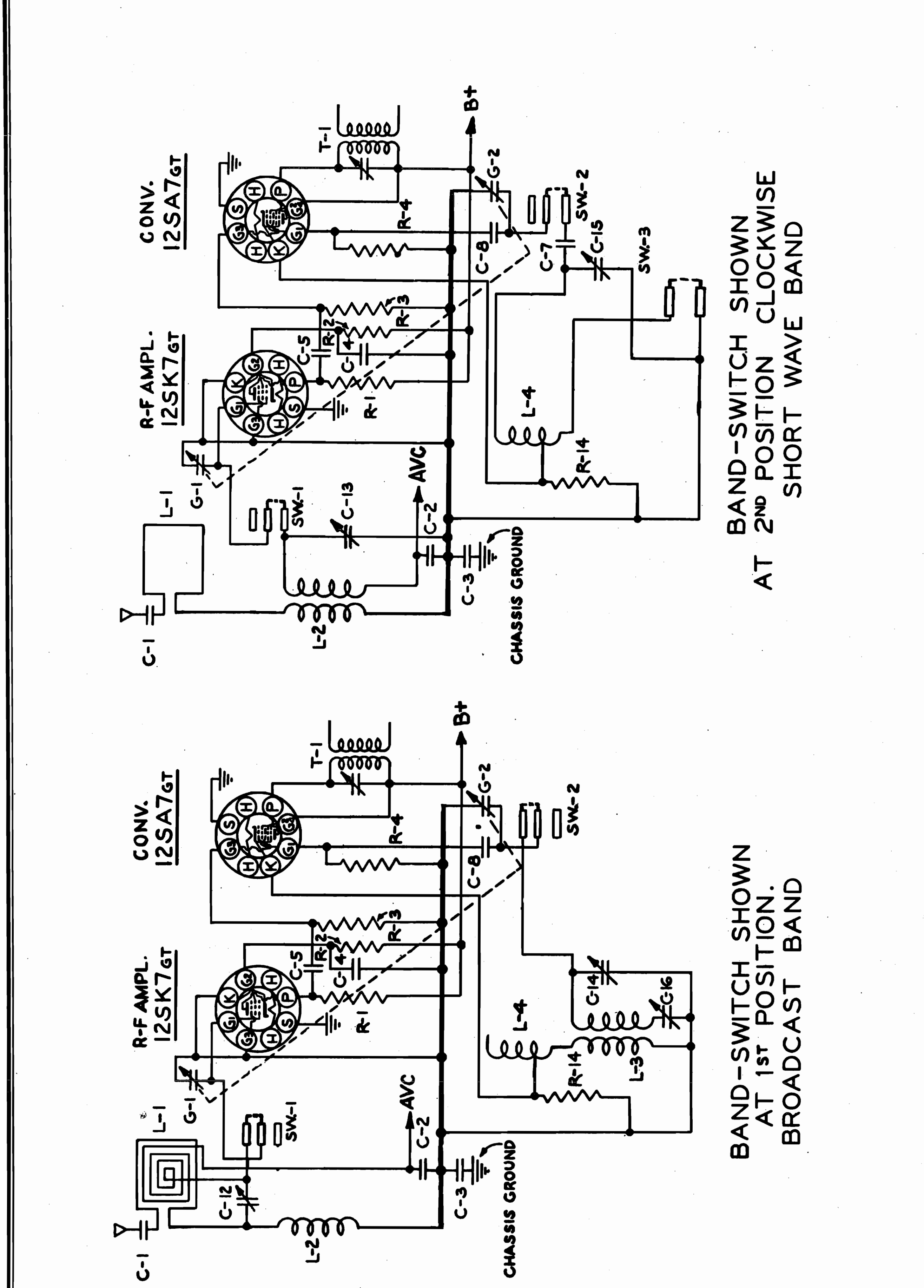
BC. OR BROADCAST ALIGNMENT: — With the generator leads still connected as in I. F. Alignment, rotate the tuning condenser to complete minimum capacity. Set the generator to 1730 KC. Adjust the BC. oscillator trimmer until the signal is tuned in. Next remove the hot lead of the generator from the "Ant" section of the gang condenser. Connect this lead to the antenna lead wire that projects from the back of the loop antenna through a 200 MMFD condenser. Set the generator to 1400 KC and rotate the tuning condenser until the signal is tuned in. Adjust the BC. antenna trimmer until a maximum reading is noted on the output meter. Set the generator to 600 KC and turn the tuning control until the signal is tuned in. Rock the tuning control back and forth slowly and at the same time adjust the 600 KC pad, slowly to the right or left until a maximum reading is noted on the output meter. It is advisable to return to the 1730 KC adjustment and re-check that setting to make sure it has not changed while padding at 600 KC.

S. W. OR SHORT WAVE ALIGNMENT: — Set the generator at 18.3 MC. Turn the receiver band switch to short band position. Turn the tuning condenser to complete minimum capacity. The generator leads should be connected to the antenna lead wire that projects from the back of the loop antenna through a 400 Ohm resistor. Adjust the S. W. oscillator trimmer slowly until the 18.3 MC signal is tuned in. At this point, it will be well to make sure that the fundamental signal is turned in. Turn up the generator output and tune the receiver to approximately 17.3 MC. At this point the 18.3 MC signal will be heard again but much weaker. This is the image frequency. If the image is not heard, then turn the tuning condenser back to complete minimum and readjust the S. W. oscillator trimmer. Remember, the image must always be heard (at 2 times the I. F. frequency in KC) lower the frequency than the fundamental signal. After the oscillator has been properly set, tune the signal generator to 16 MC and rotate the tuning control until the signal is tuned in. Adjust the S.W. antenna trimmer until a maximum reading is noted on the output meter. It is advisable to rock the gang slowly while adjusting the antenna trimmer. Set the generator to 6 MC and tune the signal in on the receiver. Check the alignment at this frequency. No adjustment should be necessary as the coils have been carefully checked before leaving the factory. A fixed oscillator padding condenser is used at 6 MC.

PART NO.		DESCRIPTION
IR-22	R-1	3900 Ω RESISTOR 1/2 W. 10%
IR-8	R-2	22,000 Ω RESISTOR 1/2 W. 10%
IR-10	R-3	47,000 Ω RESISTOR 1/2 W. 20%
IR-9	R-4	22,000 Ω RESISTOR 1/2 W. 20%
IR-24	R-5	1,000 Ω RESISTOR 1/2 W. 20%
IR-23	R-6	3.9 MEG. RESISTOR 1/2 W. 20%
IR-13	R-7	2 MEG. RESISTOR 1/2 W. 20%
IR-5	R-8	220 Ω RESISTOR 1/2 W. 10%
IR-11	R-9	470,000 Ω RESISTOR 1/2 W 20%
IR-17	R-10	39 Ω RESISTOR 1/2 W. 20%
IR-21	R-11	330 Ω RESISTOR 1/2 W. 10%
VC-3	R-12	1 MEG. VOLUME CONTROL
VC-1	R-13	25 M Ω TONE CONTROL & SW.
IR-6	R-14	470 Ω RESISTOR 1/2 W. 10%
PC-7	C-1	.01 MFD. CONDENSER 400 V.
PC-5	C-2	.05 MFD. CONDENSER 400 V.
PC-9	C-3	.25 MFD. CONDENSER 400 V.
PC-8	C-4	.1 MFD. CONDENSER 400 V.
MC-3	C-5	.00022 MFD. MICA COND. 500 V.
MC-2	C-6	.0001 MFD. MICA COND. 500 V.
MC-1	C-7	.00475 MFD. MICA COND. 3%
MC-4	C-8	.00005 MFD. MICA COND. 500 V.
EC-4	C-9 C-10 C-11	40 MFD. 40 MFD. 150 V. ELECTROLYTIC 40 MFD.
TC-7	C-12	LOOP ANTENNA TRIMMER
TC-8	C-13	S.W. ANTENNA TRIMMER
TC-1	C-14 C-15 C-16	B.C. OSC. TRIMMER S.W. OSC. TRIMMER B.C. OSC. PADDING COND.
GC-1	G-1 G-2	GANG CONDENSER
SW.-1	SW.-1 SW.-2 SW.-3	BAND SWITCH
	SW.-4	A.C. SW. ON TONE CONTROL
LI-1	T-1	INPUT I.F. TRANSFORMER
LI-2	T-2	OUTPUT I.F. TRANSFORMER
SPK.-4	T-3 V.C. S	OUTPUT SPK. TRANSFORMER VOICE COIL P.M. SPEAKER
PB-1	PL	PILOT BULB #47
CO-1	P	LINE CORD
LL-2	L-1	LOOP ANTENNA
LA-2	L-2	S.W. ANTENNA COIL
LO-3	L-3	B.C. OSC. COIL
LO-4	L-4	S.W. OSC. COIL
TU-4		12SK7GT 12SA7GT 12SK7GT 12SQ7GT 35L6GT 35Z5GT

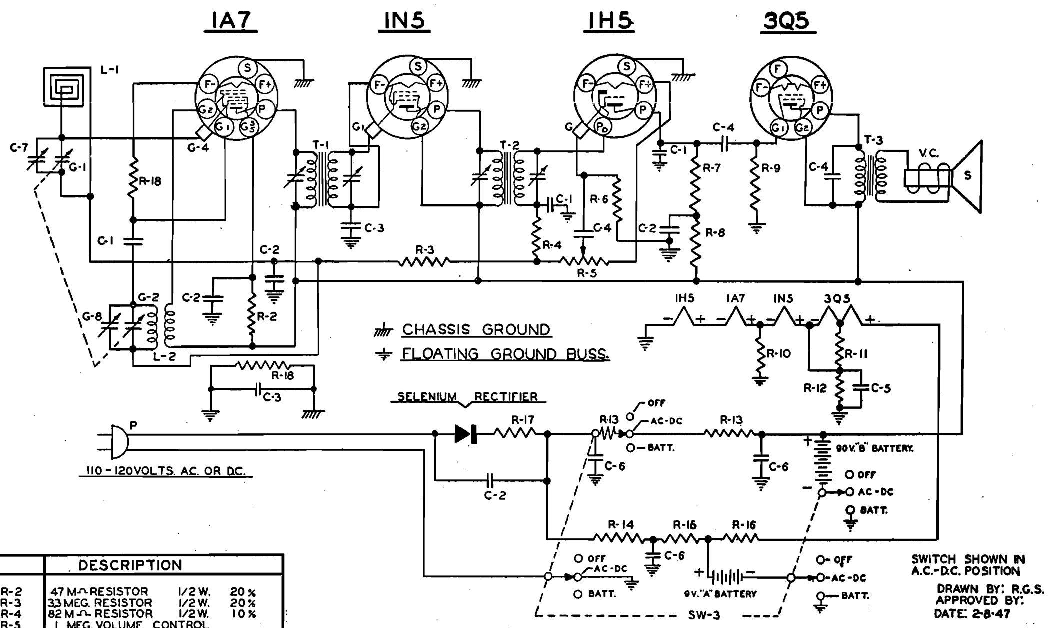
SPIEGEL

MODELS 5011, 5012



MODEL 5027

SPIEGEL



PART NO.		DESCRIPTION
IR-10	R-2	47 MΩ RESISTOR 1/2 W. 20 %
IR-23	R-3	3.3 MEG. RESISTOR 1/2 W. 20 %
IR-31	R-4	82 MΩ RESISTOR 1/2 W. 10 %
VC-2	R-5	1 MEG. VOLUME CONTROL
IR-3	R-6	10 MEG. RESISTOR 1/2 W. 20%
IR-12	R-7	1 MEG. RESISTOR 1/2 W. 20%
IR-11	R-8	470 MΩ RESISTOR 1/2 W. 20%
IR-13	R-9	2.2 MEG. RESISTOR 1/2 W. 20%
IR-32	R-10	680 Ω RESISTOR 1/2 W. 10%
IR-33	R-11	270 Ω RESISTOR 1/2 W. 10%
IR-21	R-12	330 Ω RESISTOR 1/2 W 10%
IR-39	R-13	620 Ω RESISTOR 1/2 W. 5 %
WR-3A	R-14	1050 Ω CANDOHM RESISTOR
	R-15	1050 Ω
	R-16	40 Ω
IR-35	R-17	82 Ω WIREWOUND RESISTOR. 2W. 10 %
IR-20	R-18	220 MΩ RESISTOR 1/2 W. 20 %
MC-2	C-1	100 MMFD. CONDENSER. [MICA]
PC-5	C-2	.05 MFD. CONDENSER. 400 V.
PC-8	C-3	.1 MFD. CONDENSER 400 V.
PC-6	C-4	.005 MFD. CONDENSER 600 V.

PART NO.		DESCRIPTION	PART NO		DESCRIPTION
EC-6	C-5	70 MFD. 10V. ELECTROLYTIC	SPK-5	T-3	OUTPUT SPEAKER TRANSFORMER
EC-4	C-6	40-40-40-150V. ELECTROLYTIC		VC	VOICE COIL
TC-7	C-7	ANTENNA TRIMMER		S	P.M. SPEAKER.
	G-8	OSC. TRIMMER.	SW-5	SW-3	4 POLE 3 POSITION
GC-4	G-1	GANG CONDENSER	SR-1	——	SELENIUM RECTIFIER
	G-2		TU-11	——	1A7- 1N5 - 1H5 - 3Q5
LL-10	L-1	LOOP ANNTENNA	"A" BATTERY		9 VOLTS
LO-8	L-2	OSC. COIL	"B" BATTERY		90 VOLTS.
LI-3	T-1	INPUT I.F. TRANSFORMER			
LI-4	T-2	OUTPUT I.F. TRANSFORMER			
CO-1	P	LINE CORD			

POWER SOURCES: This receiver is designed for operation on either an external power source or on the enclosed batteries.

AC OR DC OPERATION: This receiver may be operated on 50 to 60 cycle, 110 to 125 volt AC current or 110 to 125 DC current.

CAUTION: Never plug this receiver into a 220 volt line as this will seriously damage the component parts which have been designed for 110 to 125 volt operation only.

To operate on AC or DC open the small door at the lower right hand corner in the back of the cabinet. Pull out the power cord and plug into a convenient outlet of the proper voltage and current. Follow instructions under "Controls."

To operate on the enclosed batteries, follow instructions under "Control."

CONTROLS: This receiver has three control knobs which are located on the front panel of the cabinet.

STATION SELECTOR KNOB: The right hand knob is the station selector. Rotate this knob to the right or left to select your desired station. The dial scale is calibrated in kilocycles. By mentally adding a zero to the numbers on the scale, the result will be read directly in (KC) kilocycles. (i.e., 60 plus 0 equals 600 KC or 140 plus 0 equals 1400 KC).

POWER SELECTOR SWITCH: The center knob is the power selector. It has three positions which are indicated on the front panel. The extreme left hand position is the "OFF" position. The small dot on this knob must point to "OFF" when the receiver is not in use. The center position is "AC-DC" and is used when it is desired to operate the receiver from a power line source. The extreme right hand position is "BATT" and is used when it is desired to operate on the enclosed batteries.

AC OPERATION: When an AC power source is used, set the power selector knob to "AC-DC" after the power cord has been plugged into a convenient outlet. The receiver is now ready for operation.

DC OPERATION: If the receiver does not operate after a few seconds, reverse the power cord plug in the outlet and it will operate properly.

BATTERY OPERATION: The power cord is not used for battery operation and may be hanked and put back in the cabinet. Set the power control knob to "BATT" and the receiver is ready for operation on the enclosed batteries.

CAUTION: When the receiver is not in use, the power selector knob must be turned to "OFF." If the knob is allowed to remain in "BATT" position, the batteries will be in use constantly. The volume control does not control the batteries and they are still in operation even though the volume control is turned all the way off.

VOLUME CONTROL: The left hand knob is the volume control. After the power selector knob has been properly set and the receiver is in operation, rotate the volume control knob to the right to increase volume or to the left to decrease volume.

BATTERY SUPPLIERS

The batteries for this receiver may be purchased from any reliable radio dealer.

For proper operation of this receiver, you must use, two (2) 4½ Volt "A" batteries, and two (2) 45 Volt "B" batteries.

The following is a table of manufacturers and their battery type number.

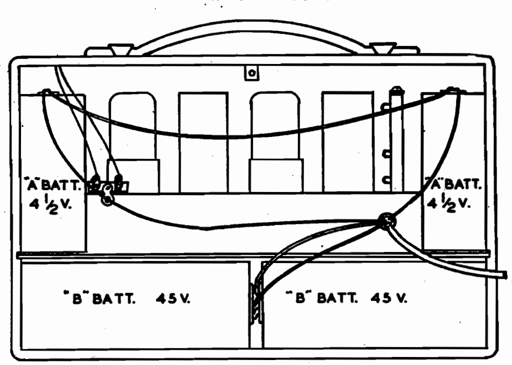
"B" BATTERIES
(2 Required)

Mfgr.	Volts		Type No.
Burgess	45	"B"	M30
General	45	"B"	W30B
Bright Star	45	"B"	3033
Usalite	45	"B"	640
Rayovac	45	"B"	P7830
Eveready	45	"B"	482

"A" BATTERIES
(2 Required)

Burgess	4½	"A"	G3
General	4½	"A"	3H3
Bright Star	4½	"A"	361
Usalite	4½	"A"	683
Rayovac	4½	"A"	P83A
Eveready	4½	"A"	746

MODEL-5027



BATTERY LOCATION

BATTERY SERVICING

(See Figure No. 1)

To replace batteries, loosen and remove the two screws at the left and right hand corners of the cabinet back. Remove the back and pull out the plug from each battery. Never pull on the wires connected to the plugs as they may break. Always grasp the plug form between the fingers, or use a flat blade to pry out the plug. Observe with care the position of the batteries and plugs when replacing. Be sure that batteries and plugs are replaced as shown in the "Battery Location" diagram. (Figure No. 1)

After the batteries have been installed, replace the back. Make sure that the two wires from the loop antenna are held in place between the brackets of the cabinet and the back by the two fastening screws.

ALIGNMENT AND SERVICE DATA

Remove chassis from cabinet for alignment.

A Signal Generator is required having the following frequencies: 455 KC, 1400 KC, 1650 KC. An output meter should be connected across the speaker.

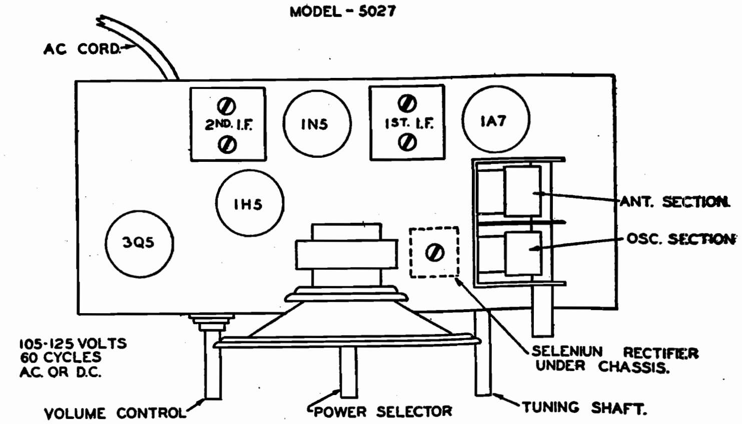
The volume control of the receiver should be turned to maximum during the I. F. and all subsequent alignment and the generator output as low as possible to prevent the A. V. C. from working and giving false readings.

FIRST STEP: Connect the hot lead from the generator to the ANT. section of the gang condenser through a .1 MFD. condenser. The ground lead from the generator must be connected to "B" minus under the chassis. Turn the gang condenser to complete minimum capacity. Set the generator to 455 KC. Adjust the trimmers of the first and second I. F. transformers until a maximum reading is noted on the output meter.

SECOND STEP: With the leads from the generator still connected in the same manner, adjust the Signal Generator to 1650 KC. Adjust the OSC. trimmer until the 1650 KC signal is tuned in. The gang condenser must be at complete minimum capacity for this adjustment.

THIRD STEP: Remove the generator leads from the gang condenser and replace the chassis in the cabinet. Loosely couple the generator to the receiver loop by making a complete turn of wire over the outside of the cabinet. With the receiver and generator set at 1400 KC, increase the generator output. Adjust the ANT. trimmer through the hole which is provided in the top of the cabinet until a maximum signal is noted on the output meter. The ANT. trimmer hole in the top of the cabinet is covered by a small plug button. Replace this button after adjustment has been made. No further adjustment should be made as the coils and gang condenser in this receiver have been specially handled at the factory to insure proper alignment at the lower frequencies.

TUBE AND TRIMMER LOCATION
MODEL - 5027



TL-50

FIGURE-1

MODEL 5028

SPIEGEL

POWER SOURCES: This receiver is designed for operation on either an external power source or on the enclosed batteries.

AC OR DC OPERATION: This receiver may be operated on 50 to 60 cycle, 110 to 125 volt AC current or 110 to 125 DC current.

CAUTION: Never plug this receiver into a 220 volt line as this will seriously damage the component parts which have been designed for 110 to 125 volt operation only.

To operate on AC or DC open the small door at the right in the back of the cabinet. Pull out the power cord and plug into a convenient outlet of the proper voltage and current. Follow instructions under "Controls."

To operate on the enclosed batteries, follow instructions under "Controls."

ANTENNA: This receiver is equipped with a sensitive loop antenna and requires no external antenna wire. However, due to the directional qualities of the loop some stations may appear to be weak in reception. This condition may be remedied by rotating or changing the position of the receiver.

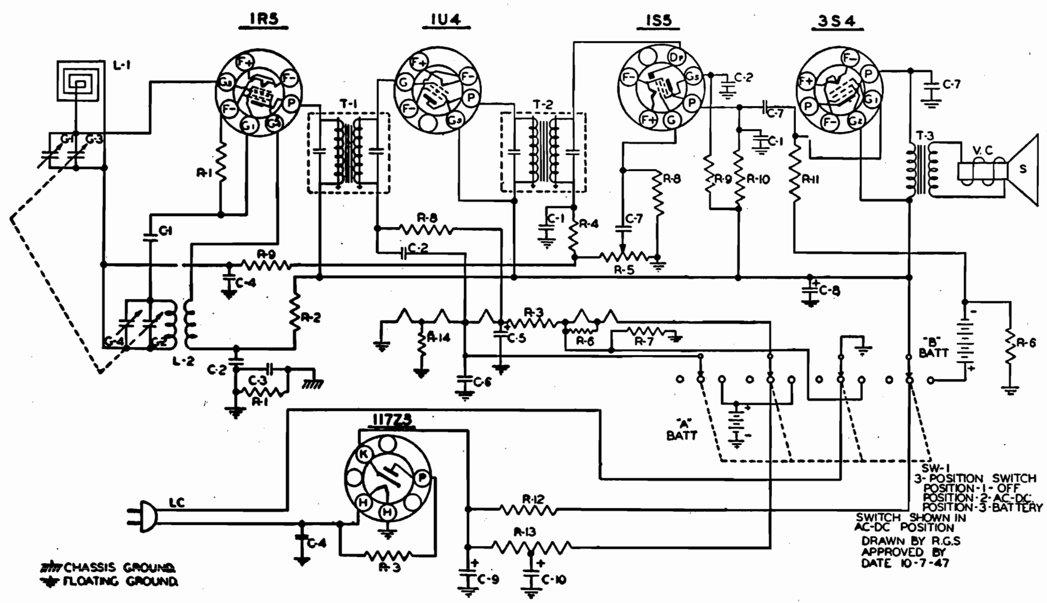
CONTROLS: This receiver has three control knobs which are located on the front panel of the cabinet.

STATION SELECTOR KNOB: The right hand knob is the station selector. Rotate this knob to the right or left to select your desired station. The dial scale is calibrated in kilocycles. By mentally adding a zero to the numbers on the scale, the result will be read directly in (KC) kilocycles. (i.e., 60 plus 0 equals 600 KC or 140 plus 0 equals 1400 KC).

POWER SELECTOR SWITCH: The left hand knob is the power selector. It has three positions which are indicated on the front panel. The extreme left hand position is the "OFF" position. The small dot on this knob must point to "OFF" when the receiver is not in use. The center position is "AC-DC" and is used when it is desired to operate the receiver from a power line source. The extreme right hand position is "BATT" and is used when it is desired to operate on the enclosed batteries.

AC OPERATION: When an AC power source is used, set the power selector knob to "AC-DC" after the power cord has been plugged into a convenient outlet. The receiver is now ready for operation.

DC OPERATION: If the receiver does not operate after a few seconds, reverse the power cord plug in the outlet and it will operate properly.



PART NO.		DESCRIPTION
IR-20	R-1	220M-Ω RESISTOR 1/2W 20 %
IR-37	R-2	10M-Ω RESISTOR 1/2W 20 %
IR-17	R-3	33-Ω RESISTOR 1/2W 20 %
IR-31	R-4	82M-Ω RESISTOR 1/2W 10 %
VC-11	R-5	1MEG VOLUME CONTROL
IR-33	R-6	270-Ω RESISTOR 1/2W 10 %
IR-39	R-7	620-Ω RESISTOR 1/2W 5 %
IR-3	R-8	10MEG-Ω RESISTOR 1/2W 20 %
IR-23	R-9	3.3MEG-Ω RESISTOR 1/2W 20 %
IR-12	R-10	1MEG-Ω RESISTOR 1/2W 20 %
IR-13	R-11	2.2MEG-Ω RESISTOR 1/2W 20 %
IR-40	R-12	3900-Ω RESISTOR 1 W 10 %
WR-7	R-13	1050-1050 CANDOHM RESISTOR 5W 5%
IR-1	R-14	470-Ω RESISTOR 1/2 20 %
MC-2	C-1	100MMFD. MICA. CONDENSER
PC-7	C-2	.01MFD. CONDENSER 400WV
PC-8	C-3	.1MFD. CONDENSER 400W.V
PC-5	C-4	.05MFD. CONDENSER 400WV
EC-6	C-5	70MFD. 10WV ELECTROLYTIC

PART NO.		DESCRIPTION
PC-3	C-6	.1 MFD. CONDENSER 200 W.V
PC-6	C-7	.005MFD CONDENSER 600 W.V
EC-14	C-8	40 MFD. } 150WV ELECTROLYTIC
	C-9	40 MFD.
	C-10	20 MFD.
	G-1	ANT TRIMMER
GC-6X	G-2	} GANG CONDENSER
	G-3	
	G-4	OSC TRIMMER
LL-14	L-1	LOOP ANTENNA
LO-8	L-2	OSC COIL
CO-1	LC	LINE CORD
SW-8	SW-1	4 POLE-3 POSITION SWITCH

PART NO.		DESCRIPTION
LI-5	T-1	INPUT I.F TRANSFORMER
LI-5	T-2	OUTPUT I.F TRANSFORMER
SPK-8	T-3	SPEAKER OUTPUT TRANSFORMER
	VC	VOICE COIL
	S	3½ PM SPEAKER
TU-31	—	117Z3-IR5-IU4-IS5-3S4
	"A" BATT	2 "D" SIZE 1½ VOLT FLASHLITE CELLS
	"B" BATT	1-67½ VOLT BATTERY

BATTERY OPERATION: The power cord is not used for battery operation and may be hanked and put back in the cabinet. Set the power control knob to "BATT" and the receiver is ready for operation on the enclosed batteries.

CAUTION: When the receiver is not in use, the power selector knob must be turned to "OFF." If the knob is allowed to remain in "BATT" position, the batteries will be in use constantly. The volume control does not control the batteries and they are still in operation even though the volume control is turned all the way off.

VOLUME CONTROL: The center knob is the volume control. After the power selector knob has been properly set and the receiver is in operation, rotate the volume control knob to the right to increase volume or to the left to decrease volume.

BATTERY SUPPLIERS

The batteries for this receiver may be purchased from any reliable dealer.

For proper operation this receiver requires two "A" batteries and one "B" battery.

The "A" batteries are size "D" flashlight cells and are made by all battery manufacturers.

The "B" battery is a 67½ volt battery and is made by the following manufacturers:

Eveready	67½	vlt.	#467
Burgess	67½	vlt.	#XX45
General	67½	vlt.	#W45A
Ray-O-Vac	67½	vlt.	#4367

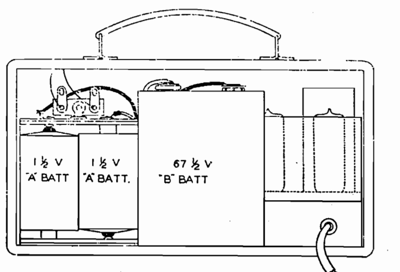


FIGURE-1
BATTERY LOCATION.

BATTERY SERVICING

(See Fig. No. 1)

To replace the batteries in this receiver:

Remove the back.

To the left, looking into the rear of the cabinet is the "A" or flashlight battery container. To the right is the "B" or 67½ volt battery.

To replace the "A" batteries, pull the old batteries out of the container. Replace with fresh batteries, making sure the batteries are inserted according to the diagram on the inside of the container.

To replace the "B" battery, disconnect the snap fastener connectors. Replace with a fresh battery and snap the connectors into place. Replace the battery in the cabinet as shown in Fig. No. 1, making sure that the connector end faces the top of the cabinet.

After the batteries have been installed, replace the back, making sure that the two washers in the bottom of the back fit into the slot near the bottom edge of the cabinet.

ALIGNMENT AND SERVICE DATA

(See Fig. No. 2 For Trimmer Location)

Remove chassis from cabinet for alignment.

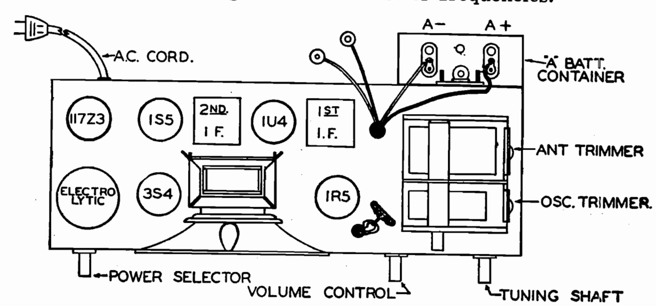
A Signal Generator is required having the following frequencies: 455 KC, 1400 KC, 1650 KC. An output meter should be connected across the speaker.

The volume control of the receiver should be turned to maximum during the I. F. and all subsequent alignment and the generator output as low as possible to prevent the A. V. C. from working and giving false readings.

FIRST STEP: Connect the hot lead from the generator to the ANT. section of the gang condenser through a .1 MFD. condenser. The ground lead from the generator must be connected to "B" minus under the chassis. Turn the gang condenser to complete minimum capacity. Set the generator to 455 KC. Adjust the movable iron cores in the IF cans. These IF adjustments are made in the top and in the bottom of the can under the chassis. Adjust the cores until a maximum reading is noted on the output meter.

SECOND STEP: With the leads from the generator still connected in the same manner, adjust the Signal Generator to 1650 KC. Adjust the OSC. trimmer until the 1650 KC signal is tuned in. The gang condenser must be at complete minimum capacity for this adjustment.

THIRD STEP: Remove the generator leads from the gang condenser and replace the chassis in the cabinet. Loosely couple the generator to the receiver loop by making a complete turn of wire over the outside of the cabinet. With the receiver and generator set at 1400 KC, increase the generator output. Adjust the ANT. trimmer through the hole which is provided in the end of the cabinet until a maximum signal is noted on the output meter. The ANT. trimmer hole in the side of the cabinet is covered by a small plug button. Replace this button after adjustment has been made. No further adjustment should be made as the coils and gang condenser in this receiver have been specially handled at the factory to insure proper alignment at the lower frequencies.



TL-60

MODEL-5028
TUBE AND TRIMMER LOCATION
FIGURE-2

MODEL 5051 | SPIEGEL

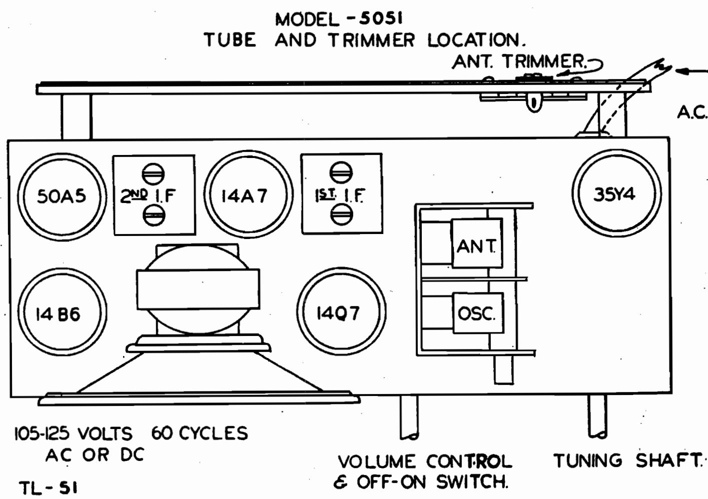
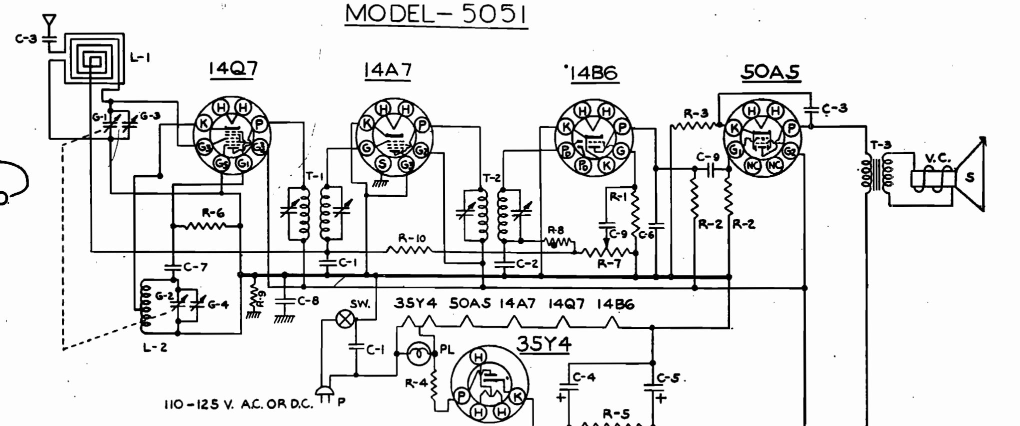


FIGURE -1.

MODEL-5051



CHASSIS NO. 201
SD-51

CHASSIS GROUND

DATE: 12-6-45 DR. APPROVED:

PART NO.		DESCRIPTION	PART NO.		DESCRIPTION	PART NO.		DESCRIPTION
IR-13	R-1	2.2 MEG RESISTOR 1/2 W 20%		G-4	OSC. TRIMMER COND.	LO-11	L-2	OSC. COIL
IR-11	R-2	470 MΩ RESISTOR 1/2 W 20%	PC-5	C-1	.05 MFD. COND. 400 V.	LI-1	T-1	INPUT I.F. TRANSFORMER
IR-14	R-3	150 Ω RESISTOR 1/2 W 20%	MC-2	C-2	.0001 MFD. MICA COND. 20%	LI-2	T-2	OUTPUT I.F. TRANSFORMER
IR-4	R-4	47 Ω RESISTOR 1/2 W 20%	PC-7	C-3	.01 MFD. COND. 400 V.	SPK.-4	T-3	OUTPUT SPK. TRANSFORMER
IR-15	R-5	2200 Ω RESISTOR 1/2 W 20%	EC-12	C-4	40 MFD. 150 V. ELECTROLYTIC CONDENSER		V.C.	VOICE COIL
IR-16	R-6	33 MΩ RESISTOR 1/2 W 20%		C-5	20 MFD.		S	P.M. SPEAKER
V.C.-3	R-7	1 MEG. VOLUME CONTROL	MC-5	C-6	.0005 MFD. COND. 20%	PB-1	PL	#47 PILOT BULB
GC-4	G-1	GANG CONDENSER	MC-4	C-7	.000056 MFD. MICA 20%		SW.	A.C. SW. ON VOL. CONTROL
	G-2		PC-9	C-8	.1 MFD. COND. 400 V.	CO-1	P	LINE CORD
TC-7	G-3	ANT. TRIMMER COND.	LL-6	L-1	LOOP ANTENNA	TU-6	—	14Q7 14A7 14B6 50A5 35Y4
IR-10	R-8	47 MΩ 1/2W 20%	IR-20	R-9	220 MΩ 1/2W 20%	IR-23	R-10	3.3 MEG. 1/2 W. 20%
						PC-6	C-9	.005 MFD. 600 V

ALIGNMENT AND SERVICE DATA

Remove chassis from cabinet for alignment.

A Signal Generator is required having the following frequencies: 455 KC, 1400 KC, 1720 KC. An output meter should be connected across the speaker.

FIRST STEP: Connect the hot lead from the generator to the ANT. section of the gang condenser, through a .1 MFD condenser. The ground lead from the generator must be connected to the metal frame of the gang condenser. Turn the gang condenser to complete minimum capacity. Adjust the generator to 455KC and adjust the trimmers of the 1st and 2nd I.F. transformers until a maximum reading is noted on the output meter.

SECOND STEP: With the leads from the generator still connected in the same manner, adjust the Signal Generator to 1720 KC. The OSC. trimmer is located on the front of the chassis between the volume and tuning controls. Adjust this trimmer until the 1720 KC signal is tuned in.

THIRD STEP: Remove the hot lead of the generator from the ANT section of the gang condenser. Connect this lead to the antenna lead wire that projects from the back of the loop antenna through a 200 MMFD condenser. Adjust the Signal Generator to 1400 KC. Rotate the tuning control until this signal is tuned in. The ANT trimmer is located on the back of the loop antenna. Adjust this trimmer until a maximum reading is noted on the output meter. No further adjustment should be necessary, unless the set has been damaged, as the coils and condenser in this receiver have been specially handled at the factory to insure proper alignment at the lower frequencies.

ALIGNMENT DATA

Remove the chassis from the cabinet. A Signal Generator with the following frequencies is required: 455 KC, 1400 KC and 1720 KC.

The receiver volume control should be turned to maximum during the I.F. and all subsequent alignments to keep the A.V.C. from working and giving false readings. Turn the tone control to complete left hand position. Keep the generator output as low as possible to prevent overloading.

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

Connect a 20,000 ohm resistor across the loop connector terminals to reflect the proper loop impedance.

FIRST STEP: Connect the hot lead from the generator to the "ANT." section of the gang condensor through a .1 MFD. condensor. The ground lead must be connected to the floating ground buss under the chassis. Turn the gang condenser to complete minimum capacity. Adjust the generator to 455 KC and adjust the trimmers of the 1st and 2nd I.F. transformers until a maximum reading is noted on the output meter.

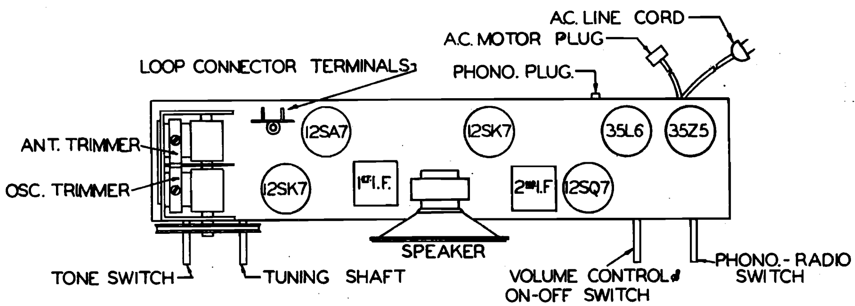
SECOND STEP: With the leads from the generator connected in the same manner as in I.F. alignment, adjust the signal generator to 1720 KC. The "OSC." trimmer is located on the front section of the gang condenser. Adjust this trimmer until the signal is tuned in. The gang condenser should be at complete minimum capacity for this setting.

THIRD STEP: Remove the generator leads from the chassis. Remove the 20,000 ohm resistor from the loop connector terminals. Reinstall the chassis in the cabinet, connect the loop leads, motor plug and phono pickup leads.

Connect the generator leads to a transmitting loop, made of a few turns of wire, and loosely couple to the receiver loop antenna which is located on the back end of the cabinet. Adjust the generator to 1400 KC. Rotate the tuning control until this signal is tuned in. The "ANT." trimmer is located on the rear section of the gang condenser. Adjust this trimmer until a maximum signal is noted on the output meter.

No further adjustment should be necessary, unless the receiver has been damaged, as the coils and tuning condenser have been specially handled at the factory to insure proper alignment at the lower frequencies.

TUBE AND TRIMMER LOCATION

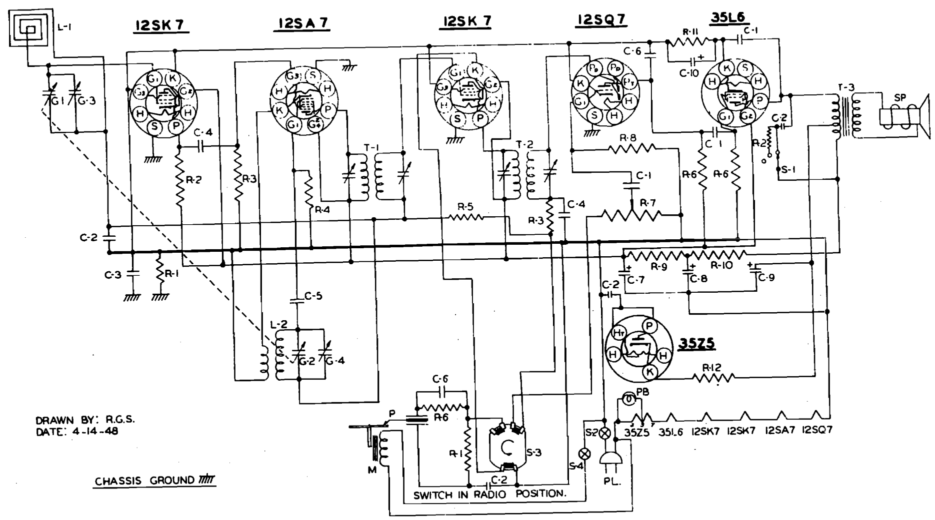


TL-69

FIGURE-1

MODEL-6041

SD-69-U



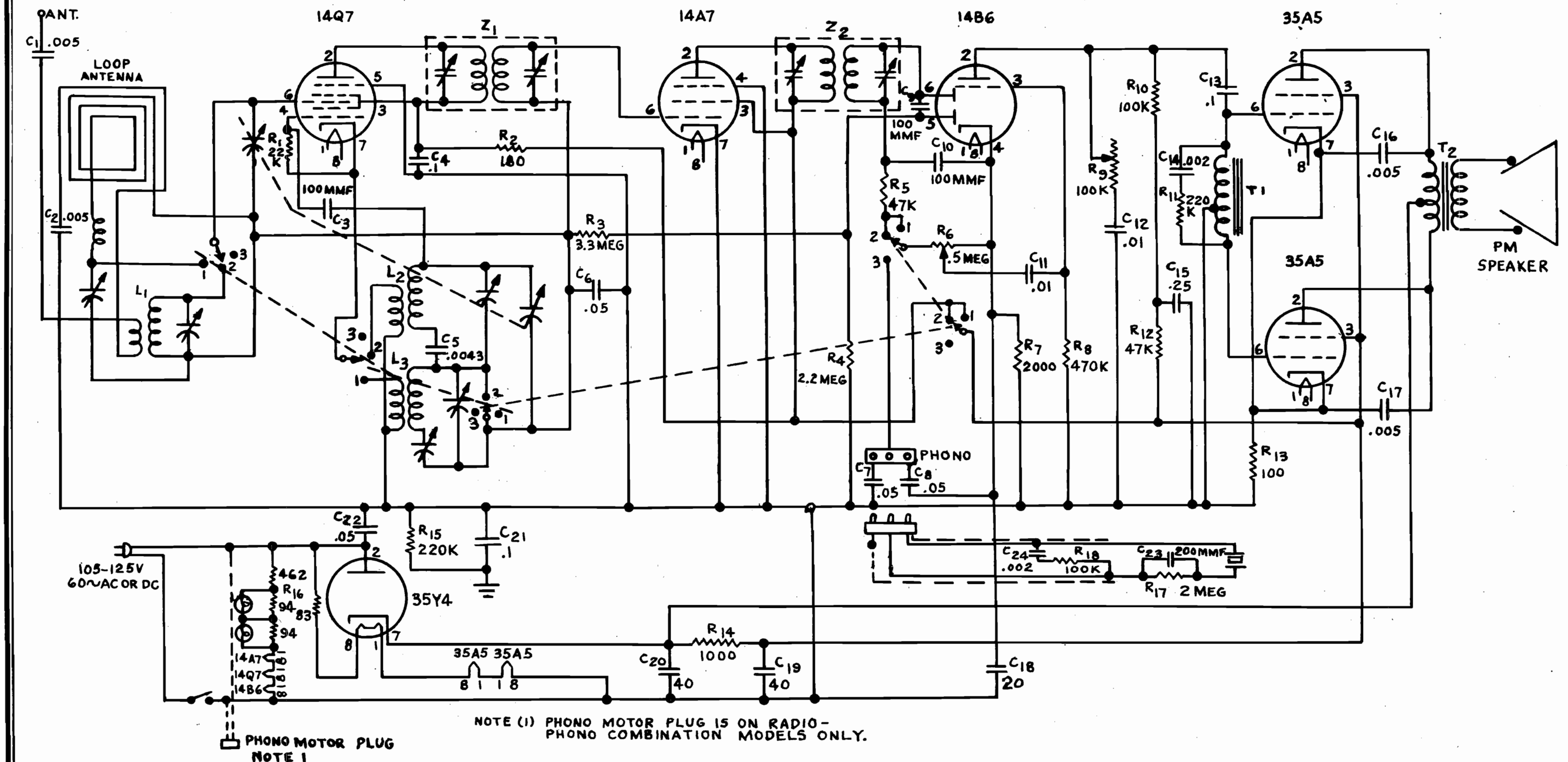
PART NO.		DESCRIPTION
PC-7	C-1	.01 MFD. CONDENSER 400 V.
PC-5	C-2	.05 MFD. CONDENSER 400 V.
PC-8	C-3	.1 MFD. CONDENSER 400 V.
MC-2	C-4	100 MMFD. MICA CONDENSER
MC-4	C-5	50 MMFD. MICA CONDENSER
MC-5	C-6	500 MMFD. MICA CONDENSER
EC-14	C-7	20 MFD. 150 WV. ELECTROLYTIC
	C-8	40 MFD. 150 WV. ELECTROLYTIC
	C-9	40 MFD. 150 WV. ELECTROLYTIC
EC-2	C-10	10 MFD. 25 W.V. ELECTROLYTIC
IR-20	R-1	220M Ω RESISTOR 1/2W. 20%
IR-15	R-2	2200 Ω RESISTOR 1/2W. 20%
IR-10	R-3	47M Ω RESISTOR 1/2W. 20%
IR-9	R-4	22M Ω RESISTOR 1/2W. 20%
IR-23	R-5	3.3 MEG. RESISTOR 1/2W. 20%
IR-11	R-6	470M Ω RESISTOR 1/2W. 20%
VC-4	R-7	1 MEG. VOLUME CONTROL

PART NO.		DESCRIPTION
IR-13	R-8	2.2 MEG. RESISTOR 1/2W. 20%
IR-1	R-9	470 Ω RESISTOR 1/2W. 20%
IR-42	R-10	1000 Ω RESISTOR 1 W 10%
IR-14	R-11	150 Ω RESISTOR 1/2 W 20%
IR-17	R-12	33 Ω RESISTOR [illegible] 20%
GC-5	G-1	GANG CONDENSER
	G-2	GANG CONDENSER
	G-3	ANT. TRIMMER
	G-4	OSC TRIMMER
LI-6	T-1	INPUT I.F TRANSFORMER
LI-7	T-2	OUTPUT I.F. TRANSFORMER
	T-3	OUTPUT TRANSFORMER
LL-17	L-1	LOOP ANT.
LO-15	L-2	OSC COIL
SPK-12	SP	5" P.M SPEAKER

PART NO.		DESCRIPTION
SW-2	S-1	TONE SWITCH
	S-2	SWITCH ON VOLUME CONTROL
SW-1	S-3	PHONO.-RADIO SWITCH
	S-4	SWITCH ON RECORD CHANGER
AC-M-7	M	RECORD CHANGER MOTOR
AC-PU-7	P	CRYSTAL PICKUP ARM. CARTRIDGE SH
	PB	#47 PILOT BULB
CO-2	PL	LINE CORD

MODELS 7541, 7547, 8714, 8715, 8718

SPIEGEL



I.F PEAK 455 KC

Tube Complement:

1 type 14Q7 Oscillator-Converter
1 type 14A7 I.F. Amplifier
1 type 14B6 Det. A.V.C. and Amplifier
2 type 35A5 Power Amp.
1 type 35Y4 Rectifier

radio receiver designed to operate on:

1. 105-125 volts A.C. 60 cycles.
2. 105-125 volts D.C.*

Power drawn is 50 watts.

Short Wave Reception:

With a good antenna connected to it this receiver is able to pick up foreign and domestic short wave programs. International broadcasts may be heard in the following bands.

49 meter	6.0 — 6.2 Mc
31 meter	9.5 — 9.7 Mc
25 meter	11.7 — 11.9 Mc
19 meter	15.1 — 15.35 Mc
16 meter	17.75 — 17.85 Mc

Amateur radio stations may be heard on the 20 meter band from 14.0 to 14.4 Mc.

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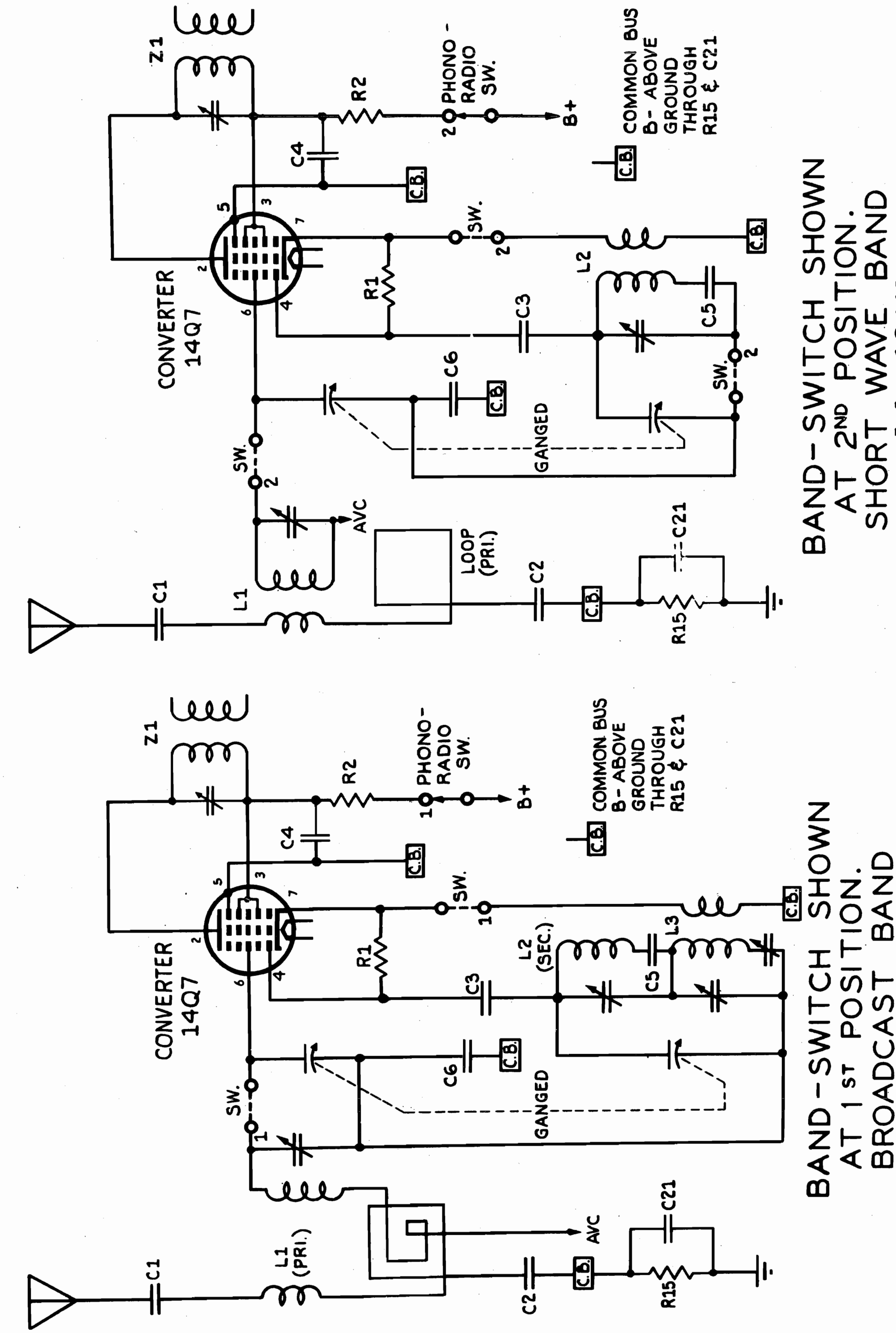
SPIEGEL

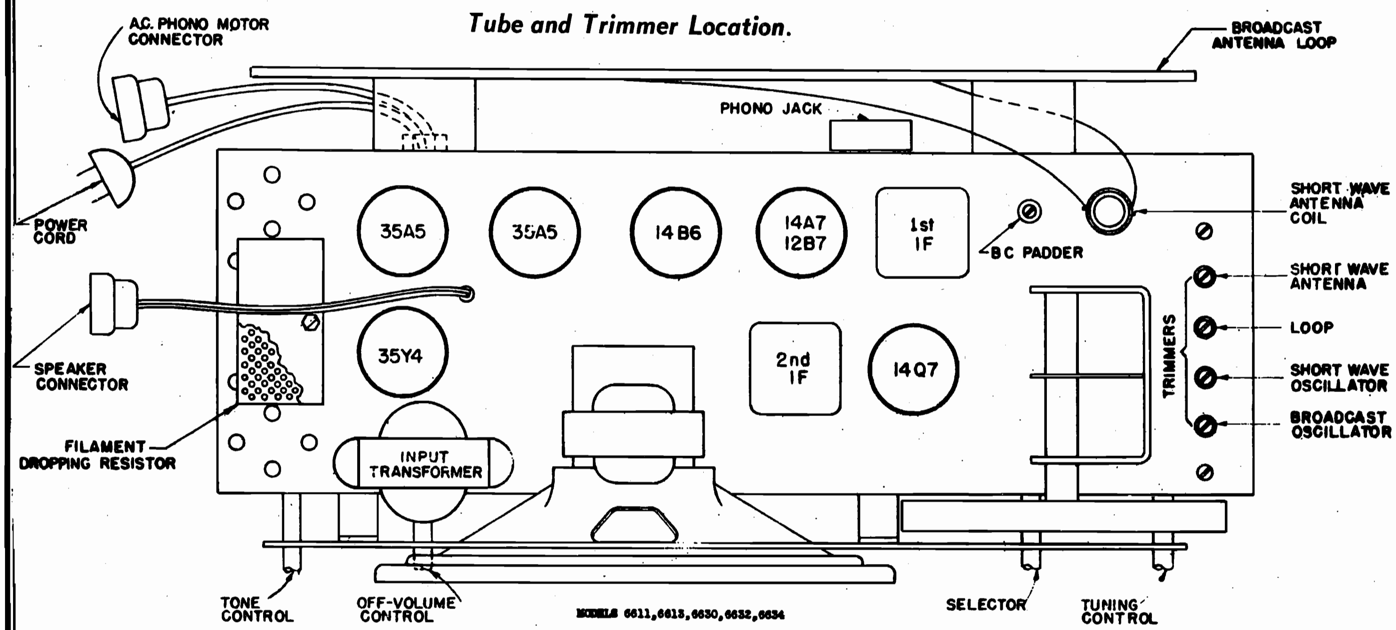
MODELS 7541, 7547, 8714, 8715, 8718



MODELS 7541, 7547, 8714, 8715, 8718

SPIEGEL

Tube and Trimmer Location.



NOTE: FOR PHONO COMBINATION MODELS, SPEAKER IS REMOVED FROM CHASSIS & FILAMENT DROPPING RESISTOR IS LOCATED IN AREA WHERE SPEAKER IS SHOWN. SPEAKER CONNECTOR IS USED ON PHONO COMBINATION MODELS ONLY.

VI. ALIGNMENT PROCEDURE:

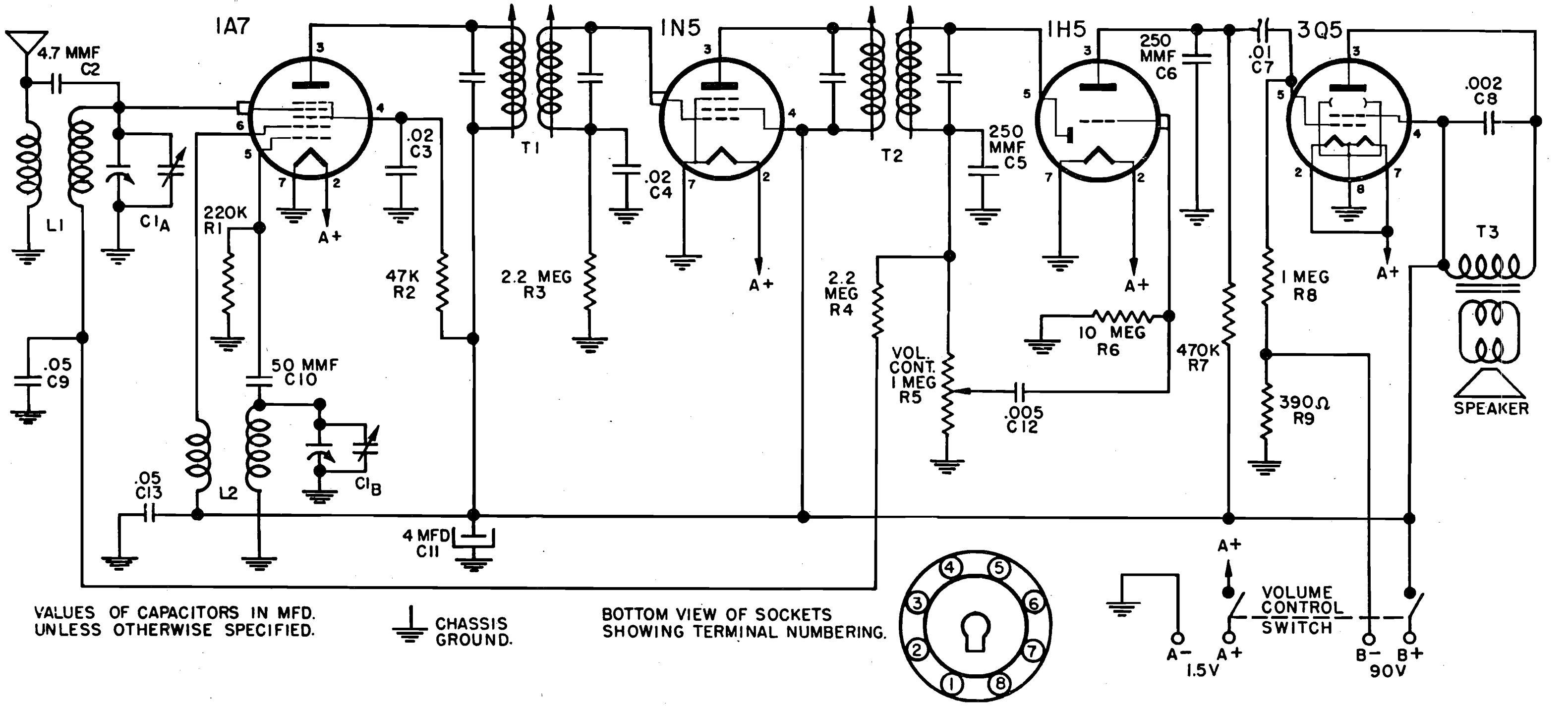
Steps	Connect output of Generator to	Tune Osc. to	Band Switch on	Tune Radio Dial to	Adjust the following for Max. Peak Output
1	Tuning condenser stator (ant.) in series with .01 mfd	455 Kc	Bcst	Quiet point on high frequency end of dial	1st and 2nd IF transformers
2	Antenna term. of Ant. loop in series with 100 mmf.	1660 Kc	Bcst	Full clockwise (out of mesh)	B.C. Osc. Trimmer
3	Same	1500 Kc	Bcst	Signal (1500 Kc)	B.C. loop trimmer
4	Same	600 Kc	Bcst	600 Kc	Osc. padder (rock in)
5	Same	1660 Kc	Bcst	Full clockwise (out of mesh)	B.C. Osc. Trimmer
6	Ant. term. in series with 100 mmf and 400 ohm resistor	18.6 Mc	S.W.	Full clockwise (out of mesh)	S.W. Osc. Trimmer
7	Same	18.0 Mc	S.W.	Signal (18.0 Mc)	S.W. Ant. Trimmer (rock in)

Output meter is connected across voice coil. Receiver volume is turned to maximum.

Parts List:

C 1—.005 Mfd. 400V
C 2—.005 Mfd. 400V
C 3—100 Mmf. 20%
C 4—.1 Mfd. 200V
C 5—.0043 Mfd. 5%
C 6—.05 Mfd. 200V
C 7—.05 Mfd. 200V
C 8—.05 Mfd. 200V
C 9—100 Mmf. 20%
C10—100 Mmf. 20%
C11—.01 Mfd. 400V
C12—.01 Mfd. 400V
C13—.1 Mfd. 200V
C14—.002 Mfd. 200V
C15—.25 Mfd. 200V
C16—.005 Mfd. 400V
C17—.005 Mfd. 400V
C18—20 Mfd. Electrolytic (*CA25.020)
C19—40 Mfd. Electrolytic (*CA25.020)
C20—40 Mfd. Electrolytic (*CA25.020)
C21—.1Mfd. 200V
C22—.05 Mfd. 400V
C23—200 Mmf. 20%
C24—.002 Mfd. 200V paper
Z 1—1st I.F. Transformer (*ZC2.191-1)
Z 2—2nd I.F. Transformer (*ZC2.191-2)
T 1—Audio Choke (*TA15.018)
R 1—22K ¼W
R 2—180 ohms ¼W
R 3—3.3 Meg ¼W
R 4—2.2 Meg ¼W
R 5—47K ¼W
R 6—.5 Meg Variable (*RA9.066)
R 7—2000 ohms ¼W
R 8—470K ¼W
R 9—100K Variable (*RA9.068)
R10—100K ¼W
R11—220K ¼W
R12—47K ¼W
R13—100 ohms 1W
R14—1000 ohms 1W
R15—220K ¼W
R16—Wire Wound (*RA14.026)
R17—2 Meg ¼W
R18—100K ¼W
Pilot Light, Mazda No. 47, 150 Ma.
*Mfr. Part No.

SPIEGEL



VALUES OF CAPACITORS IN MFD. UNLESS OTHERWISE SPECIFIED.

CHASSIS GROUND.

BOTTOM VIEW OF SOCKETS SHOWING TERMINAL NUMBERING.

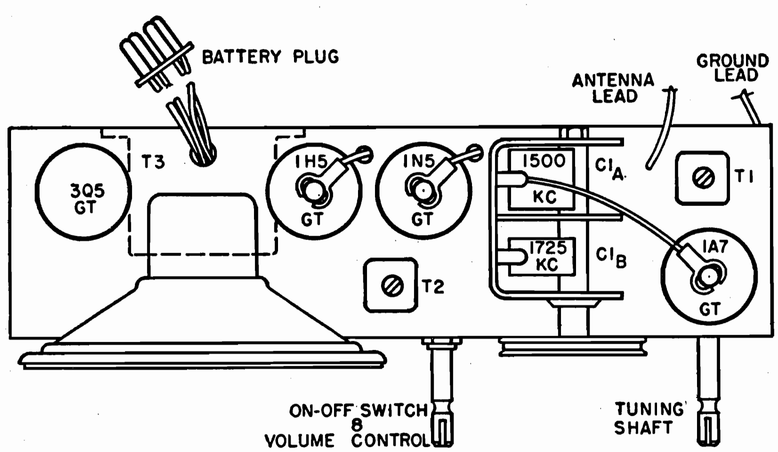
PARTS LIST

Code	Part No.	DESCRIPTION	Code	Part No.	DESCRIPTION	Code	Part No.	DESCRIPTION
C1A, C1B	B19-185	Variable Condenser (For model X132)	R1	A60-667	220K Ohm ½ Watt Resistor		B79-352	Speaker, 5" P.M.
	B19-188	Variable Condenser (For model YX132)	R2	A60-685	47K Ohm ½ Watt Resistor		A75-60	Tuning Shaft
C2	A83-355	4.7 MMFD Condenser	R3, R4	A60-684	2.2 Megohm ½ Watt Resistor		A45-118	Battery Plug
C3, C4	A16-150	.02 MFD 400 Volt Condenser	R5	A24-170	Volume Control, 1 Megohm		B67-515	Dial Scale
C5, C6	A15-176	250 MMFD Mica Condenser	R6	A60-663	10 Megohm, ½ Watt Resistor		58-31	Dial Pointer
C7	A16-156	.01 MFD 400 Volt Condenser	R7	A60-662	470K Ohm ½ Watt Resistor		48-21	Dial Crystal
C8	A16-155	.002 MFD 600 Volt Condenser	R8	A60-668	1 Megohm ½ Watt Resistor		A52-246	Knob, Ivory
C9, C13	A16-152	.05 MFD 200 Volt Condenser	R9	A60-665	390 Ohm ½ Watt Resistor		A42-436	Cabinet, Ivory, Plastic
C10	A15-175	50 MMFD Mica Condenser	L1	A10-414	Antenna Coil (For model X132)		D42-431	Cabinet, Walnut, Plastic
C11	A18-273	4 MFD 150 Volt Electrolytic Condenser		A10-485	Antenna Coil (For model YX132)		D42-437	Cabinet, Walnut, Wood
C12	A16-153	.005 MFD 600 Volt Condenser	L2	A10-415	Oscillator Coil (For model X132)		A52-245	Knob, Walnut
				A10-505	Oscillator Coil (For model YX132)			
			T1, T2	A10-506	1st and 2nd I.F. Transformer			
			T3	B80-232	Output Transformer			

540 kilocycles to 1725 kilocycles (K.C.). The tubes

1A7 GT—Osc. Converter
1N5 GT—I. F. Amplifier
1H5 GT—AVC Det. Audio Amplifier
3Q5 GT—Power Output

This receiver has been designed to operate on a self-contained battery containing both the "B" battery (90 Volts) and the "A" battery (1½ Volts) such as General #60B6L.



ALIGNMENT PROCEDURE

With an output meter connected across the voice coil of the speaker, the output meter reading for 50 milliwatts is .4 volts using a signal which is modulated 30% at 400 c.p.s. Follow through the procedure as outlined below for proper alignment.

Connect the signal generator to the grid cap of the IA7 GT Tube through a .1 MFD. Condenser. Connect the ground lead of the generator to the chassis. Adjust the signal generator to 455 K.C. and set the variable condenser of the receiver to minimum capacity (fully opened). With the volume control full on and minimum output from the signal generator adjust the two trimmers on the first and second I.F. transformers for maximum output.

Now connect the signal generator to the antenna connection of the receiver through a .00025 condenser. Adjust the signal generator frequency to 1725 K.C. and set the variable condenser to minimum capacity (fully opened), and adjust the oscillator trimmer (C1B) for maximum output. Set signal generator to 1500 K.C. and tune receiver to signal. Adjust the antenna trimmer (C1A) on the variable condenser for maximum output.

SPIEGEL

MODEL 131504

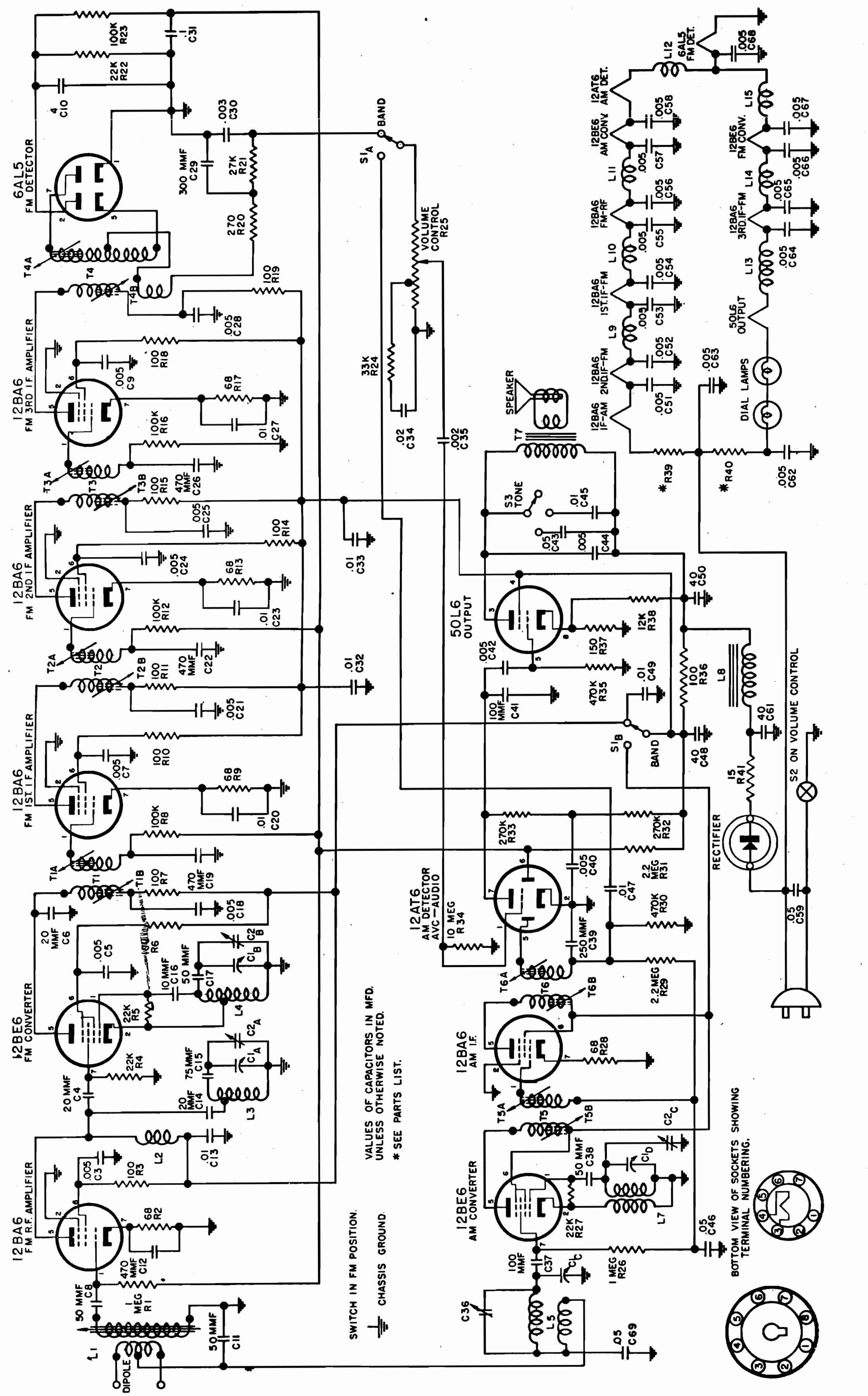


FIG. 3 SCHEMATIC DIAGRAM

ALIGNMENT PROCEDURE

STEPS	RECEIVER DIAL SETTING	BAND SWITCH POSITION	SIGNAL GENERATOR FREQUENCY	DUMMY ANTENNA	SIGNAL GENERATOR CONNECTIONS	OUTPUT INDICATOR	TRIMMER ADJUSTMENT	TRIMMER FUNCTION	REMARKS
1	Minimum capacity	AM	455 KC 400 cycle AM	.1 MFD	High side—Grid of AM converter tube (12BE6) Low side—Chassis	Output Meter across voice coil	T5A, T5B T6A, T6B	AM I.F.	Adjust for maximum output
2	"	"	1600 KC 400 cycle AM	.00025 MFD	"	"	C2C	AM Oscillator	Adjust for maximum output
3	1400 KC	"	1400 KC 400 cycle AM	"	High side—One ant. terminal Low side—Other ant. terminal	"	C36 (on back)	AM Antenna	Adjust for maximum output
4	Any position where there is no station interference.	FM	10.7 MC unmodulated .1 volt output.	.1 MFD	High side—Grid of 3rd I.F. amplifier tube (12BA6) Low side—Chassis	Connect V.T.V.M. to plate of Ratio detector tube, pin 2 (6AL5)	T4B	Ratio detector primary	Adjust for maximum negative voltage, about —5 volts
5	"	"	10.7 MC 400 cycle 30% Modulation. (See note A)	"	"	Connect scope to audio take off point (across C30)	T4A	Ratio detector secondary	Adjust for a balanced pattern on scope. See Fig. 4.
6	"	"	"	"	High side—Grid of 2nd I.F. amplifier tube (12BA6) Low side—Chassis	Connect scope across 100K ohm grid return resistor of 3rd I.F. (R16)	T3A, T3B	FM 3rd I.F.	Adjust for maximum gain and best pattern on scope. See Fig. 5 (See note "B" below)
7	"	"	"	"	High side—Grid of 1st I.F. amplifier tube (12BA6) Low side—Chassis	"	T2A, T2B	FM 2nd I.F.	Adjust for maximum gain and best pattern on scope. See Fig. 6.
8	"	"	"	"	High side—Plate of FM R.F. tube, pin 5 (12BA6) Low side—Chassis	"	T1A, T2B	FM 1st I.F.	Adjust for maximum gain and best pattern on scope. See Fig. 7.
9	109 MC	"	109 MC 400 cycle 30% modulation. (22.5 KC Deviation)	150 ohms in each lead.	High side—One ant. terminal Low side—Other ant. terminal	Connect output meter across voice coil	C2B	FM Oscillator	Adjust for maximum output (remove AVC ground)
10	103 MC	"	103 MC 400 cycle 30% modulation. (22.5 KC Deviation)	"	"	"	C2A	FM R.F.	Adjust for maximum output
11	100 MC	"	100 MC 400 cycle 30% modulation. (22.5 KC Deviation)	"	"	"	L1	FM Antenna	Adjust for maximum output

NOTE A: When aligning the FM I.F. circuits, keep the out put from the signal generator as low as possible.

NOTE B: The AVC circuit must be grounded to the chassis when aligning the FM I.F. circuits.

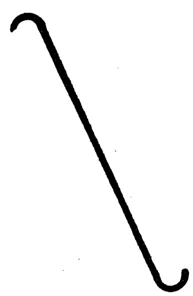


FIGURE 4

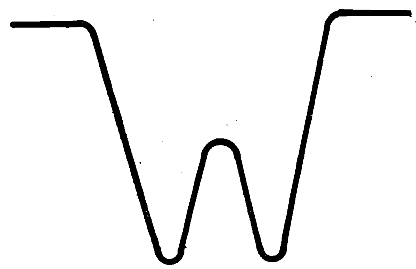


FIGURE 5

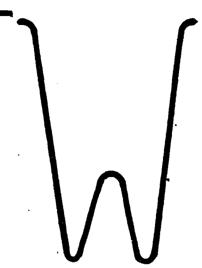


FIGURE 6

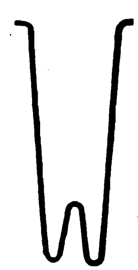


FIGURE 7

EQUIPMENT USED FOR ALIGNMENT

Vacuum tube voltmeter.
AM Signal generator
FM Sweep generator.
Oscilloscope.
Insulated screw driver.
Dummy antenna:
.1 MFD condenser
.00025 MFD mica condenser
150 ohm resistor (2)
Output meter.

SPIEGEL

MODEL 131504

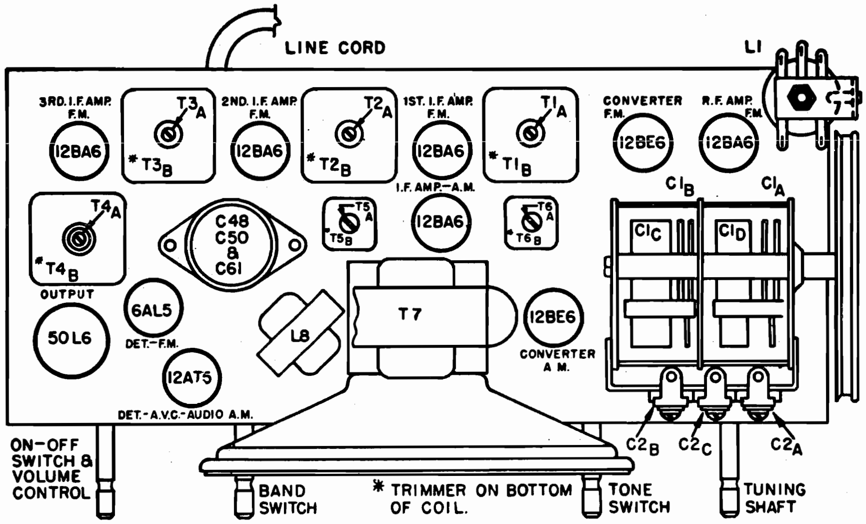


FIG. 1 TUBE AND TRIMMER LOCATIONS

VOLTAGE CHART

TUBE No.	PIN 1	PIN 2	PIN 3	PIN 4	PIN 5	PIN 6	PIN 7	PIN 8
12BE6 AM—Converter	—6	0	29ac	17ac	100	100	0	
12BA6 AM—I.F. Amp.	0	0	75ac	63ac	100	100	1	
12AT6 AM—Det.-AVC-Audio	0	0	17ac	6ac	0	0	30	
12BA6 FM—R.F. Amp.	0	0	29ac	39ac	100	95	1	
12BE6 FM—Converter	0	0	6ac	18ac	95	95	0	
12BA6 FM—1st I.F. Amp.	0	0	39ac	50ac	95	95	1	
12BA6 FM—2nd I.F. Amp.	0	0	50ac	63ac	95	95	1	
12BA6 FM—3rd I.F. Amp.	0	0	18ac	31ac	95	95	1	
6AL5 FM—Ratio detector	0	—3	0	6ac	—4	0	0	
50L6GT Power output	0	31ac	85	95	0	30	80ac	6.5

All voltage readings are taken from tube pin to chassis.

All measurements are made with no signal, using a 20,000 ohm per volt meter.

AC input voltage must be maintained at 117 volts for accurate readings.

AC voltages shown are at 1000 ohms per volt.

All voltages shown are approximate.

RESISTANCE CHART

TUBE No.	PIN 1	PIN 2	PIN 3	PIN 4	PIN 5	PIN 6	PIN 7	PIN 8
12BE6 AM—Converter	20K	1	27	18	25K	25K	3 meg.	
12BA6 AM—I. F. Amp.	2 meg.	0	70	62	25K	25K	70	
12AT6 AM—Det.-AVC-Audio	10 meg.	0	18	5	470K	120K	540K	
12BA6 FM—R.F. Amp.	1 meg.	0	27	40	25K	25K	70	
12BE6 FM—Converter	20K	0	5	18	25K	25K	22K	
12BA6 FM—1st I.F. Amp.	220K	0	40	50	25K	25K	70	
12BA6 FM—2nd I.F. Amp.	220K	0	50	62	25K	25K	70	
12BA6 FM—3rd I.F. Amp.	100K	0	18	28	25K	25K	70	
6AL5 FM—Ratio Detector	0	25K	0	5	750K	0	750K	
50L6GT Power output	0	28	25K	25K	450K	250K	70	150

All resistance readings are taken from tube pin to chassis.

Due to manufacturing tolerance on component parts, resistance readings may vary as much as 20%.

All readings are shown in ohms unless otherwise noted.

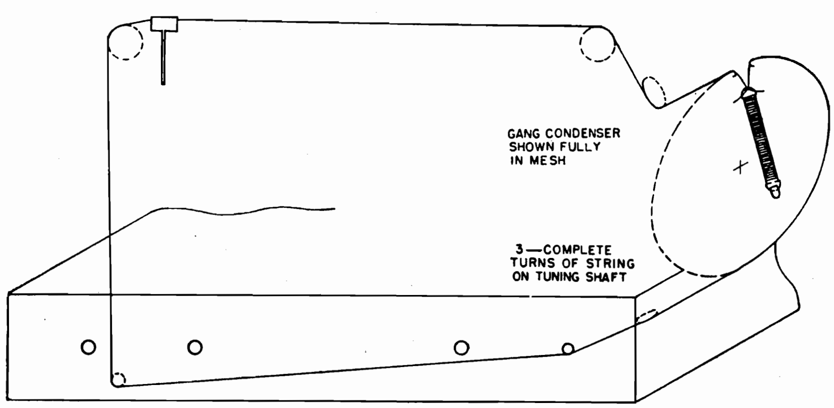


FIG. 2 DIAL CORD STRINGING

MODEL 131504

SPIEGEL

FM-AM radio receiver designed for use on 117 volts 60 cycles AC or DC current.

It covers the standard AM broadcast frequency range, 540-1600 kilocycles (KC) and the FM frequency range from 88 to 108 megacycles (MC).

SPECIFICATIONS

Power Supply	117 volts AC DC
Power Consumption	55 Watts
Frequency Range FM	88 to 108 MC.
Frequency Range AM	540 to 1600 KC.
I.F. frequency FM	10.7 MC.
I.F. frequency AM	455 KC.
Band width, FM, Ratio detector	360 KC.
Band width, FM, 2nd I.F.	280 KC.
Band width, FM, 1st I.F.	240 KC.
Band width, FM, Converter	180 KC.
Tubes	10
Rectifier	Selenium, 150 ma.
Speaker	6" P.M.

The tubes used are as follows:

12BA6	FM, R.F. Amplifier
12BE6	FM, Converter
12BA6	FM, 1st I.F. Amplifier
12BA6	FM, 2nd I.F. Amplifier
12BA6	FM, 3rd I.F. Amplifier
6AL5	FM, Ratio detector
12BE6	AM, Converter
12BA6	AM, I.F. Amplifier
12AT6	AM, Detector-AVC-1st audio
50L6GT	Power output
A83-463	Selenium rectifier
No. 47	Pilot lights (2)

PARTS LIST

Schematic Diagram Reference	Part No.	Description
R8, R12, R16, R23	A60-727	100 K Ohm 20% ½ Watt
R20	A60-723	270 Ohm 20% ½ Watt Resistor
R21	A60-745	27 K Ohm 10% ½ Watt Resistor
R24	A60-748	33 K Ohm 10% ½ Watt Resistor
R25	B24-173	Volume Control with Switch
R29, R31	A60-726	2.2 Megohm 20% ½ Watt
R30, R35	A60-731	470K Ohm ½ Watt Resistor 20%
R32, R33	A60-747	270K Ohm 20% ½ Watt
R34	A60-728	10 Megohm 20% ½ Watt
R36	A60-755	100 Ohm 1 Watt 10% Resistor
R37	A60-741	150 Ohm 10% 1 Watt Resistor
R38	A60-751	12K Ohm 10% 1 Watt Resistor
R39	A60-734	Special Compensating Resistor (Order from Spiegel)
R40	A60-735	Special Compensating Resistor (Order from Spiegel)
R41	A60-738	15 Ohm — Glassohm 10% 3 Watt Resistor
L1	SB10-488	Antenna Coil, FM
L3	B10-489	R. F. Coil, F.M.
L4	B10-490	Oscillator Coil, F. M.
L5	A10-507	Antenna Coil, A. M.
L7	B10-491	Oscillator Coil, A. M.
L8	A33-225	Filter Choke
L2, L9, L10, L11, L12, L14, L15	A33-226	Filament Choke, 11 mh.
L13	A33-227	Filament Choke
S1A, S1B	A69-181	Switch, F.M.—A.M.
S2		Switch, ON-OFF, (on volume control)
S3	A26-125	Tone Control
T1	SA10-493	1st I. F. Transformer, F. M.
T2, T3	SC10-494	2nd & 3rd I. F. Transformer, F.M.
T4	SC10-492	Ratio detector transformer, F.M.
T5	A10-499	1st I. F. transformer, A. M.
T6	A10-500	2nd I. F. transformer, A. M.
T7	A80-234	Output transformer
	B39-285	Drum, for variable condenser
	A23-151	Line cord
	A83-463	Selenium rectifier, 150 ma.
	A75-63	Tuning shaft
	B79-354	Speaker, 6¼" P. M.
	A21-111	Cover, for compensating resistors
	SB82-49	F. M. antenna assembly, Dipole
	B83-325	Speaker baffle
	D42-379	Cabinet, Walnut
	C67-534	Dial Scale
	A98-4	Grille Cloth
	A52-279	Knob, Walnut
	A83-292	Retainer, dial scale, right
	A83-293	Retainer, dial scale, left
	C83-580	Cabinet back
	B83-503	Dial diffusing plate
	A58-65	Dial pointer

Schematic Diagram Reference	Part No.	Description
C1A, C1B, C1C, C1D	C19-191	Variable Condenser
C2A, C2B, C2C	A20-144	FM—R.F. Trimmer; FM—Oscillator Trimmer; AM—Oscillator Trimmer
C3, C5, C7, C9, C18, C21, C23, C24, C25, C28, C40, C51, C52, C53, C54, C55, C56, C57, C58, C62, C64, C65, C66, C67, C68	A16-177	005 MFD Ceramic Condenser (Centralab No. DA048 or Equiv.)
C4, C14	A15-198	20 MMF 20% Ceramic Condenser (Erie Style "A" or Equiv.)
C6	A15-193	20 MMF 20% Ceramic Condenser (Erie Style K or Equiv.)
C8, C17	A15-194	50 MMF 10% Ceramic Condenser (Erie Style K or Equiv.)
C10	A18-273	4 MFD 150 Volt Elec. Condenser
C34,	A16-150	.02 MFD 400 Volt Tubular Condenser
C12, C19, C22, C26	A15-200	470 MMF 20% Mica Condenser
C13, C32, C33, C47 C49	A16-165	.01 MFD 200 V Tubular Condenser
C15	A15-195	75 MMF 10% Ceramic Condenser (Erie Style K or Equiv.)
C16	A15-197	10 MMF 10% Ceramic Condenser (Erie Style A or Equiv.)
C20, C23, C27	A16-163	.01 MFD 120 V Molded Paper Condenser
C42, C44	A16-153	.005 MFD 600 Volt Tubular Condenser
C29	A15-199	300 MMF 20% Mica Condenser
C30	A16-180	.003 MFD 200 V Molded Paper Condenser
C31	A16-157	.1 MFD 200 V Tubular Condenser
C35	A16-178	.002 MFD 200 V Molded Paper Condenser
C36	A20-139	AM Antenna Trimmer
C37	A15-190	100 MMF 20% Mica Condenser
C11, C38	A15-191	50 MMF 20% Mica Condenser
C39	A15-176	250 MMF 20% Mica Condenser
C41	A15-196	100 MMF 20% Ceramic Condenser (Erie Style K or Equiv.)
C46, C69, C43, C59	A16-158	.05 MFD 400 V Tubular Condenser
C45	A16-156	.01 MFD 400 V Tubular Condenser
C48, C50, C61	A18-284	40 MFD 150 Volt Electrolytic Condenser; 40 MFD 300 Volt Electrolytic Condenser; 40 MFD 300 Volt Electrolytic Condenser
R1, R26	A60-688	1 Megohm Resistor 20% ½ Watt
R2, R13, R17, R28, R9	A60-742	68 Ohm Resistor 10% ½ Watt
R3, R6, R7, R10, R19, R11, R14, R15, R18	A60-743	100 Ohm Resistor 20% ½ Watt
R4, R5, R22, R27	A60-744	22 K Ohm Resistor 10% ½ Watt

SPIEGEL

MODEL 138104

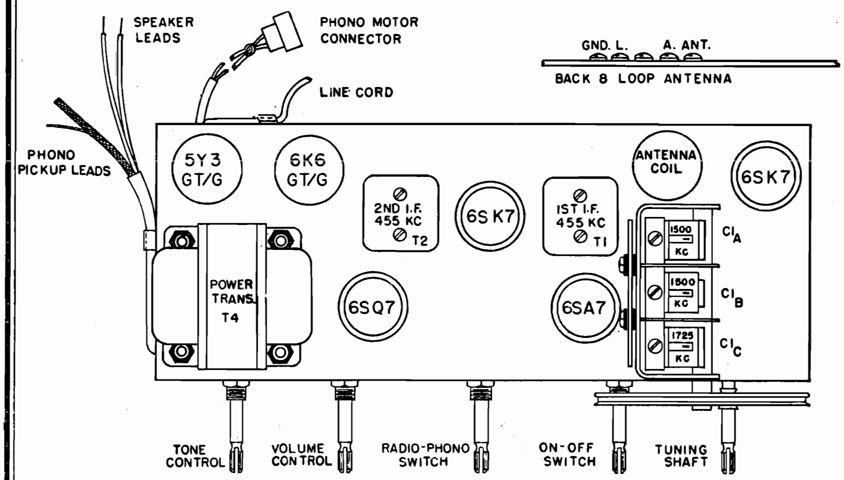


Fig. 1 Chassis, Top View

TUBE COMPLEMENT

The tube complement of this receiver consists of the following:

1—6SK7—R.F. Amplifier

1—6SA7—Mixer—OSC.

1—6SK7—I.F. Amplifier

1—6SQ7—Det. AVC—Audio

1—6K6—Power Output

1—5Y3—Rectifier

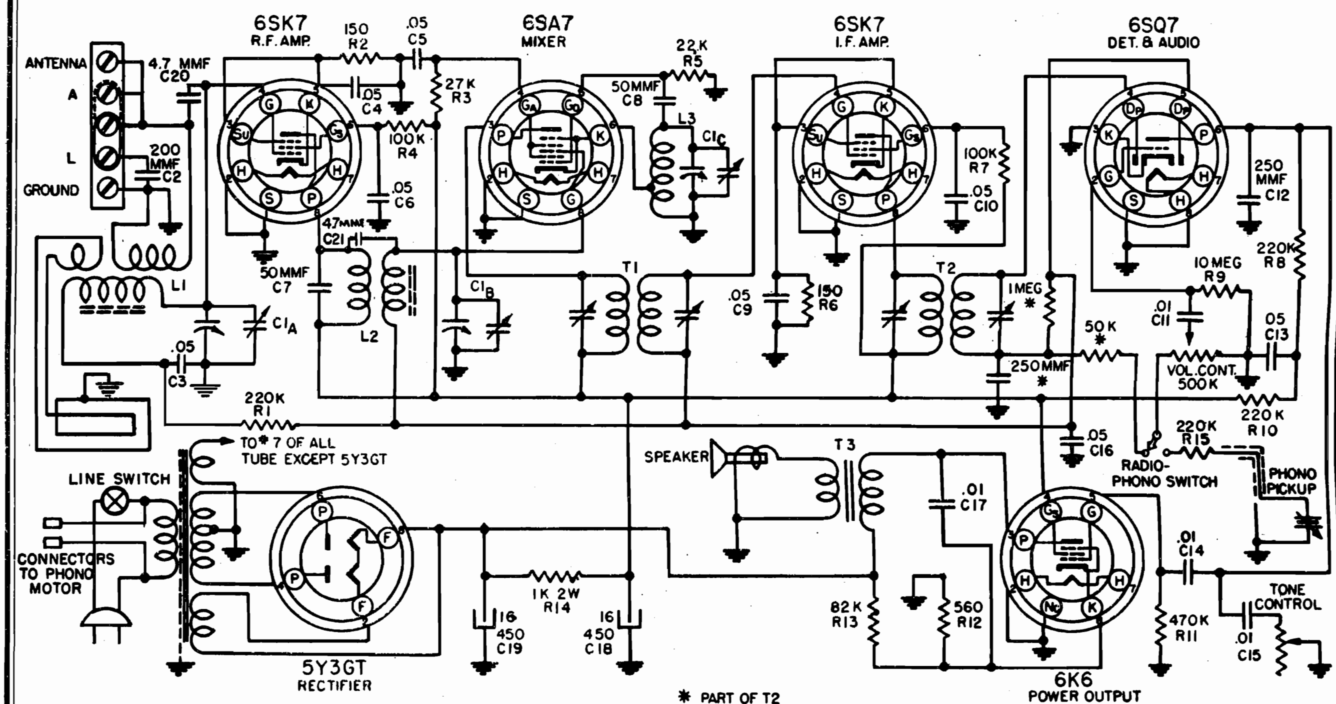


Fig. 2 Schematic Diagram

ALIGNMENT PROCEDURE

Volume control—Maximum: all adjustments.
Tone Control—Treble: Full Clockwise Rotation.
Connect ground lead of signal generator to radio chassis.
Connect dummy antenna in series with output lead of signal generator.
Connect output meter across voice coil of speaker.

The following equipment is necessary for proper alignment:
Signal generator that will provide the test frequencies as listed.
Output meter.
Non-metallic screwdriver.
Dummy antennas—.1 mfd., .00025 mfd.

Position of Variable	Generator Frequency	Dummy Ant. mfd.	Generator Connections	Trimmer Adjustment	Trimmer Function
Minimum Capacity (Fully Opened)	455 K.C.	.1	6SA7 Grid (Stator of C1B)	T1 T2	I. F.
Minimum Capacity (Fully Opened)	1725 K.C.	.00025	*Ant. Terminal on Loop	C1C	Osc.
Tune in signal From Generator	1500 K.C.	.00025	*Ant. Terminal on Loop	C1B	R. F.
Tune in signal From Generator	1500 K.C.	.00025	*Ant. Terminal on Loop	C1A	Ant.

*Be sure coupling link is in correct position for external antenna operation. See Fig 3.
Repeat the above alignment procedure as a final check.

With an output meter connected across the voice coil of the speaker, the output meter reading for ½ watt is 1.25 volts using a signal which is modulated 400 c.p.s.

SPIEGEL

POWER SUPPLY

This receiver is designed to operate from a power source of 117 volts A.C. 60 cycle current. If in doubt about the power rating in your location consult your local power company for this information. Never attempt to operate this radio on any current other than that specified.

ANTENNA and GROUND CONNECTIONS

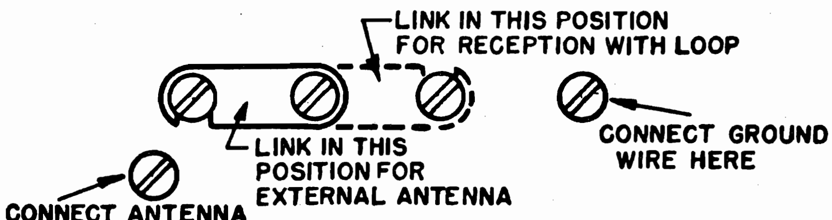
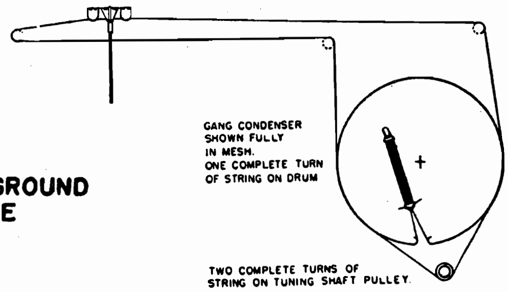


Fig. 3



PARTS LIST

Circuit Reference	Part No.	Description
		CONDENSERS
C1A, C1B, C1C	B19-186	Variable condenser
C2	B15-189	200 MMF Mica condenser (on loop)
C3, C4, C9, C16	A16-152	.05 MFD 200 volt condenser
C5, C6, C10, C13	A16-158	.05 MFD 400 volt condenser
C7, C8	A15-175	50 MMF mica condenser
C11, C14, C15	A16-156	.01 MFD 400 volt condenser
C12	A15-176	250 MMF mica condenser
C17	A16-168	.01 MFD 1000 volt condenser
C18	A18-279	16 MFD 450 volt electrolytic condenser
C19	A18-274	16 MFD 450 volt electrolytic condenser
C20, C21	A83-355	4.7 MMF condenser
		RESISTORS
R1, R8, R10, R15	A60-667	220K ohm ½ watt resistor
R2, R6	A60-686	150 ohm ½ watt resistor
R3	A60-692	27K ohm 1 watt resistor
R4, R7	A60-671	100K ohm ½ watt resistor
R5	A60-659	22K ohm ½ watt resistor
R9	A60-663	10 megohm ½ watt resistor
R11	A60-662	470K ohm ½ watt resistor
R12	A60-701	560 ohm 1 watt resistor
R13	A60-700	82K ohm 1 watt resistor
R14	A60-699	1000 ohm 2 watt resistor
		COILS
L1	C10-459	Antenna coil
L2	B10-452	R. F. Coil
L3	B10-446	Oscillator coil
T1	B10-412	1st I.F. transformer
T2	B10-444	2nd I. F. transformer
		MISCELLANEOUS
T3	A80-222	Output transformer
T4	C80-223	Power transformer
	A69-169	Switch, on-off
	A26-123	Tone control
	A24-169	Volume control
	A84-41	Dial drive shaft and pulley assembly
	B79-359	Speaker, 10" P. M.
	S84-234	Loop antenna and Back assembly
	C67-529	Dial scale
	A52-263	Knob, (tuning)
	A52-264	Knob, (tone)
	A52-265	Knob, (volume)
	A52-266	Knob, (on-off)
	A52-267	Knob, (radio-phono)
	B58-67	Dial pointer
	A83-537	Retainer, dial scale
	A69-180	Switch, radio-phono
	11200	Milwaukee Automatic Record Changer

SPIEGEL

MODEL 138124

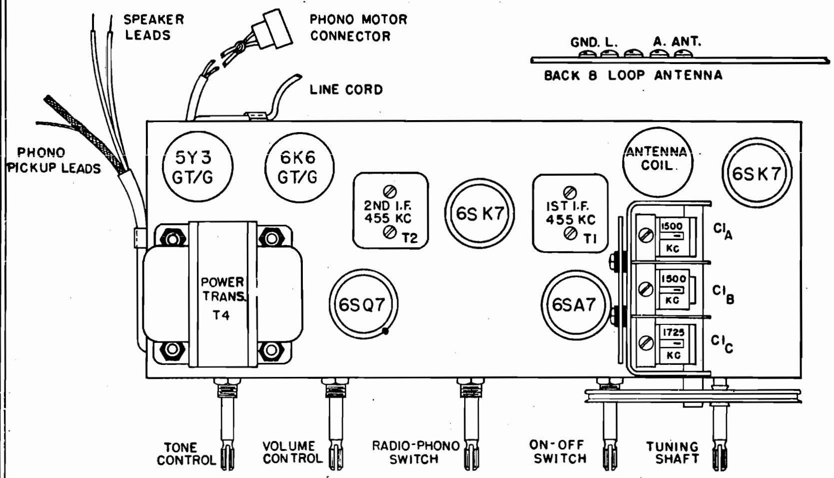


Fig. 1 Chassis, Top View

TUBE COMPLEMENT

The tube complement of this receiver consists of the following:

1—6SK7—R.F. Amplifier
1—6SA7—Mixer—OSC.
1—6SK7—I.F. Amplifier
1—6SQ7—Det. AVC—Audio
1—6K6—Power Output
1—5Y3—Rectifier

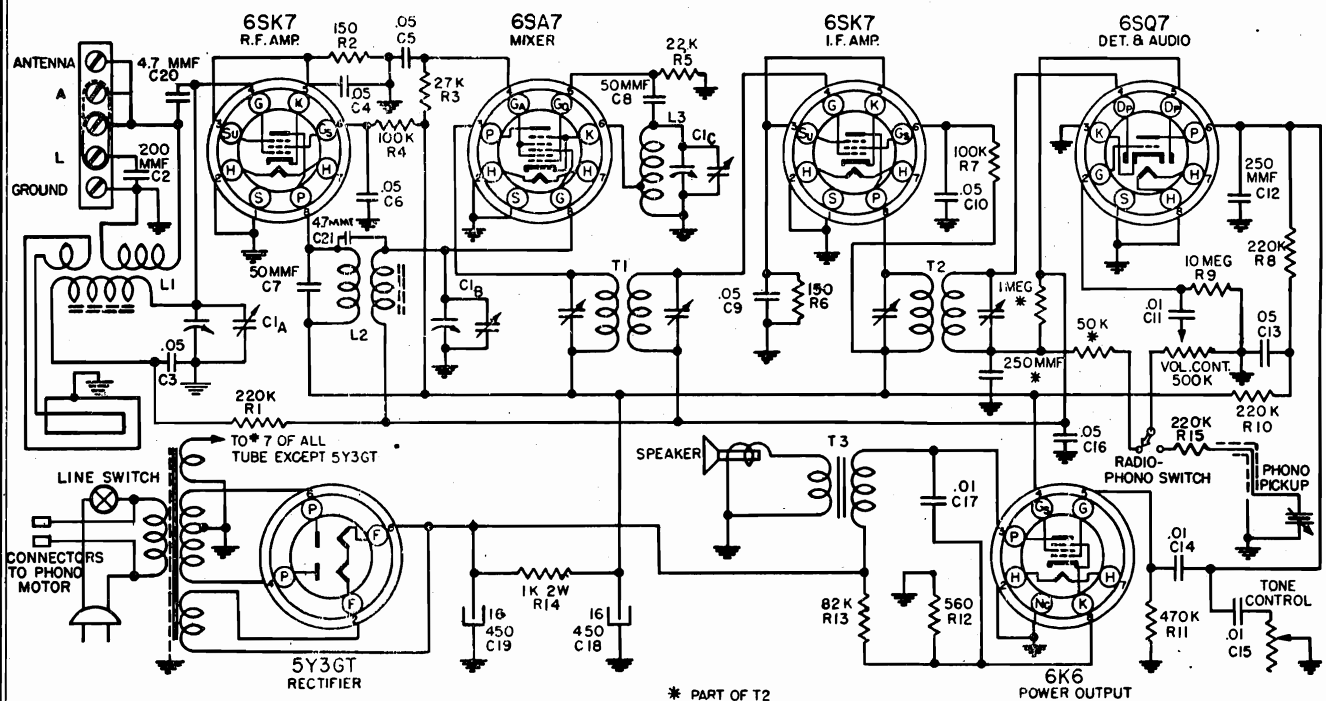


Fig. 2 Schematic Diagram

ALIGNMENT PROCEDURE

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Tone Control—Treble: Full Clockwise Rotation.
Connect ground lead of signal generator to radio chassis.
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Connect output meter across voice coil of speaker.

The following equipment is necessary for proper alignment:
Signal generator that will provide the test frequencies as listed.
Output meter.
Non-metallic screwdriver.
Dummy antennas—.1 mfd., .00025 mfd.

Position of Variable	Generator Frequency	Dummy Ant. mfd.	Generator Connections	Trimmer Adjustment	Trimmer Function
Minimum Capacity (Fully Opened)	455 K.C.	.1	6SA7 Grid (Stator of CIB)	T1 T2	I. F.
Minimum Capacity (Fully Opened)	1725 K.C.	.00025	*Ant. Terminal on Loop	C1C	Osc.
Tune in signal From Generator	1500 K.C.	.00025	*Ant. Terminal on Loop	C1B	R. F.
Tune in signal From Generator	1500 K.C.	.00025	*Ant. Terminal on Loop	C1A	Ant.

*Be sure coupling link is in correct position for external antenna operation. See Fig 3.
Repeat the above alignment procedure as a final check.

With an output meter connected across the voice coil of the speaker, the output meter reading for ½ watt is 1.25 volts using a signal which is modulated 400 c.p.s.

MODEL 138124 SPIEGEL

POWER SUPPLY

This receiver is designed to operate from a power source of 117 volts A.C. 60 cycle current. If in doubt about the power rating in your location consult your local power company for this information. Never attempt to operate this radio on any current other than that specified.

ANTENNA and GROUND CONNECTIONS

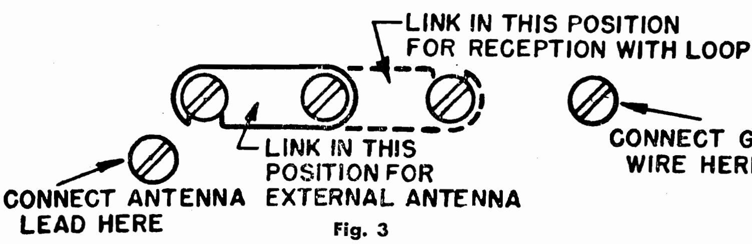
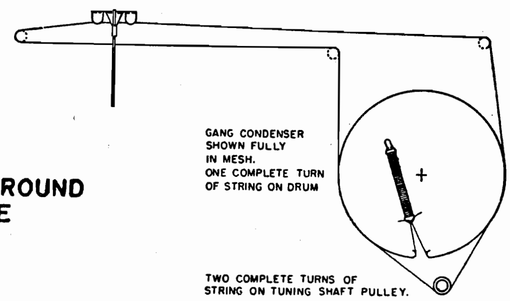


Fig. 3



PARTS LIST

CONDENSERS

Circuit Reference	Part No.	Description
C1A, C1B, C1C	B19-186	Variable condenser
C2	B15-189	200 MMF Mica condenser (on loop)
C3, C4, C9, C16	A16-152	.05 MFD 200 volt condenser
C5, C6, C10, C13	A16-158	.05 MFD 400 volt condenser
C7, C8	A15-175	50 MMF mica condenser
C11, C14, C15	A16-156	.01 MFD 400 volt condenser
C12	A15-176	250 MMF mica condenser
C17	A16-168	.01 MFD 1000 volt condenser
C18	A18-279	16 MFD 450 volt electrolytic condenser
C19	A18-274	16 MFD 450 volt electrolytic condenser
C20, C21	A83-355	4.7 MMF condenser

RESISTORS

Circuit Reference	Part No.	Description
R1, R8, R10, R15	A60-667	220K ohm 1/2 watt resistor
R2, R6	A60-686	150 ohm 1/2 watt resistor
R3	A60-692	27K ohm 1 watt resistor
R4, R7	A60-671	100K ohm 1/2 watt resistor
R5	A60-659	22K ohm 1/2 watt resistor
R9	A60-663	10 megohm 1/2 watt resistor
R11	A60-662	470K ohm 1/2 watt resistor
R12	A60-701	560 ohm 1 watt resistor
R13	A60-700	82K ohm 1 watt resistor
R14	A60-699	1000 ohm 2 watt resistor

COILS

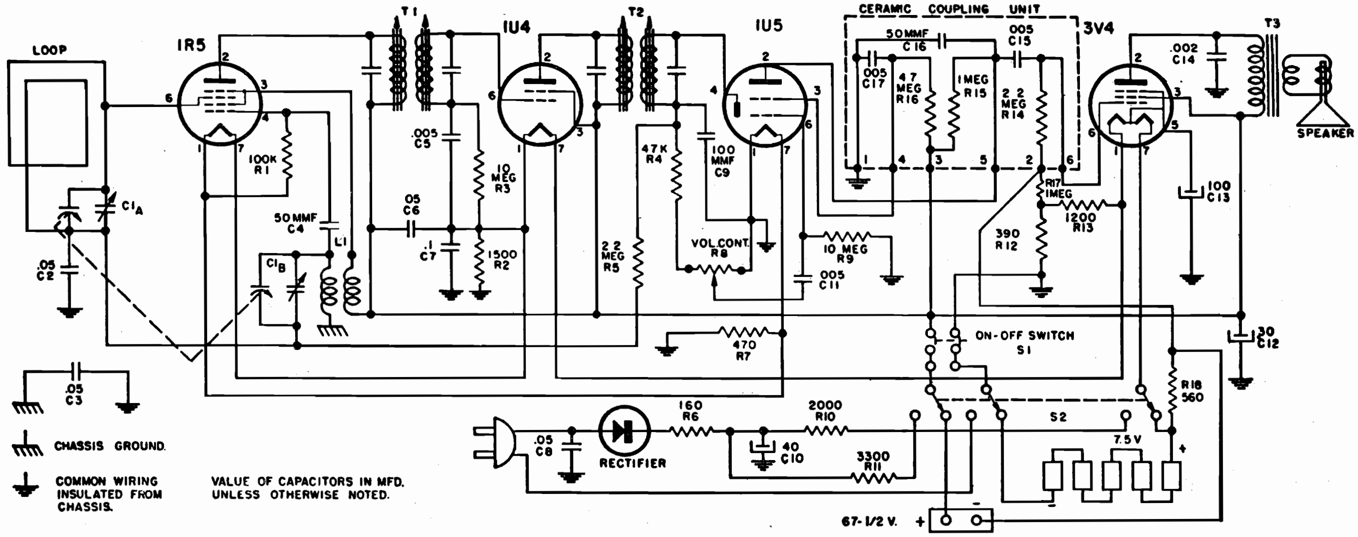
Circuit Reference	Part No.	Description
L1	C10-459	Antenna coil
L2	B10-452	R. F. Coil
L3	B10-446	Oscillator coil
T1	B10-412	1st I.F. transformer
T2	B10-444	2nd I. F. transformer

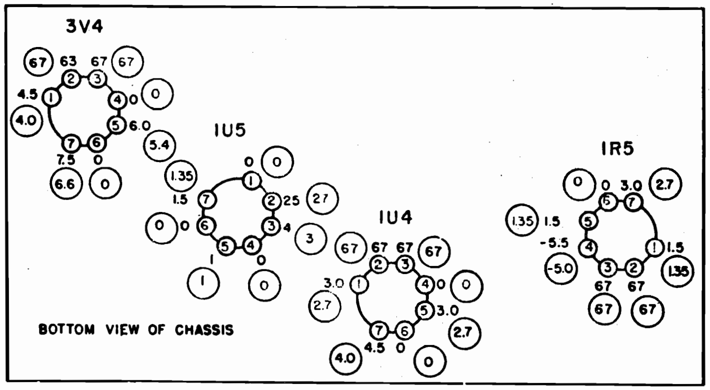
MISCELLANEOUS

Circuit Reference	Part No.	Description
T3	A80-222	Output transformer
T4	C80-223	Power transformer
	A69-169	Switch, on-off
	A26-123	Tone control
	A24-169	Volume control
	A84-41	Dial drive shaft and pulley assembly
	B79-359	Speaker, 10" P. M.
	S84-248	Loop antenna and Back assembly
	C67-533	Dial scale
	A52-263	Knob, (tuning)
	A52-264	Knob, (tone)
	A52-265	Knob, (volume)
	A52-266	Knob, (on-off)
	A52-267	Knob, (radio-phono)
	A58-68	Dial pointer
	B83-471	Retainer, dial scale
	A69-180	Switch, radio-phono
	11200	Milwaukee Automatic Record Changer

SPIEGEL

MODEL 147114



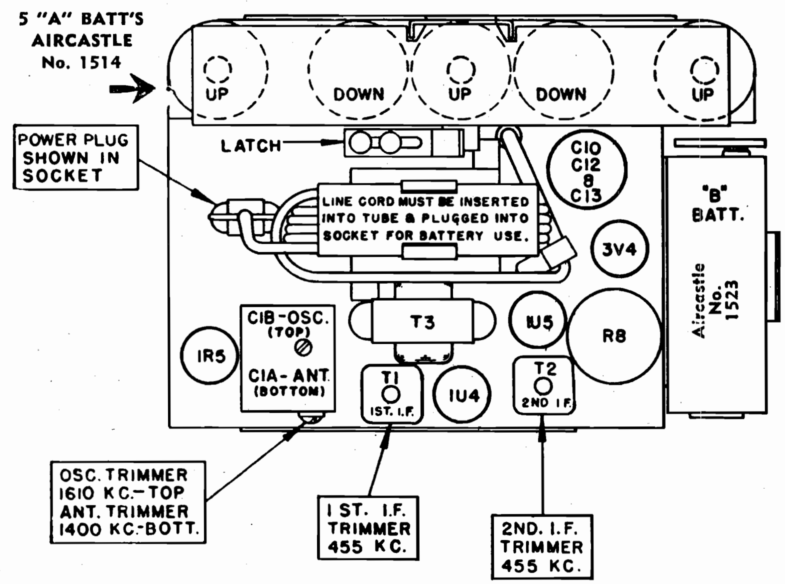


VOLTAGE CHART

All voltages are measured from tube pin to common negative with a 20,000 ohm per volt voltmeter.

Voltages shown in circles are obtained when set is operated on 117 volt current.

Voltages shown outside the circles are obtained when the set is operated on batteries. New batteries in good condition should be used for these measurements.



POWER SUPPLY

This receiver is designed to operate from self contained batteries, or from 105-125 volt AC or DC power supply. One 67½ volt "B" battery Aircastle No. 1523, and five (5) 1½ volt "A" batteries, Aircastle No. 1514, are used for battery operation.

MODEL 147114 SPIEGEL

ALIGNMENT PROCEDURE

Volume conrol—Maximum: all adjustments.

Connect ground lead of signal generator to common negative.

Connect dummy antenna in series with output lead of signal generator.

Connect output meter across voice coil of speaker.

The following equipment is necessary for proper alignment:

Signal generator that will provide the test frequencies as listed, 30% modulated, 400 c.p.s.

Output meter.

Non-metallic screwdriver.

Dummy antenna—.1 mfd.

CAUTION: This is an A.C.-D.C. receiver and if alignment is made with the receiver connected to 117 volts A.C. or D.C., it is necessary to isolate the signal generator or the receiver from the line by use of a transformer, or place a .2 M.F.D. condenser in both test leads of the Signal Generator.

Position of Variable	Generator Frequency	Dummy Ant. Mfd.	Generator Connections	Trimmer Adjustment	Trimmer Function
Fully open	455 KC	.1	*1R5 Grid (Stator of C1A)	T2	Output I.F.
Fully open	455 KC	.1	*1R5 Grid (Stator of C1A)	T1	Input I.F.
Fully open	1600 KC	.1	*1R5 Grid (Stator of C1A)	C1B	Oscillator
Tune in signal from generator	1400 KC	—	Loosely coupled to loop	C1A	Antenna

*Connect ground lead of signal generator to common negative.

Circuit Diagram Reference	Part No.	Description
C1A, C1B	B19-197	Variable condenser
C2, C6	A16-152	.05 MFD 200 volt condenser
C3	A16-189	.05 MFD 400 volt condenser
C4	A15-175	50 MMF mica condenser
C5, C11	A16-153	.005 MFD 600 volt condenser
C7	A16-157	.1 MFD 200 volt condenser
C8	A16-172	.05 MFD 400 volt condenser
C9	A15-188	100 MMF mica condenser
C10, C12, C13	A18-290	40 MFD 150 volt electrolytic cond.; 30 MFD 150 volt electrolytic cond.; 100 MFD 10 volt electrolytic cond.
C14	A16-182	.002 MFD 200 volt condenser
C15, C16, C17	*A17-100	.005 MMF; .005 MFD; 50 MMF — See note below.
R1	A60-671	100K ohm ½ watt 20% resistor
R2	A60-680	1500 ohm ½ watt 10% resistor
R3, R9	A60-663	10 megohm ½ watt 20% resistor
R4	A60-685	47K ohm ½ watt 20% resistor
R5	A60-684	2.2 megohm ½ watt 20% resistor
R6	A60-725	160 ohm 5 watt 10% resistor
R7	A60-722	470 ohm ½ watt 10% resistor
R8, S1	A24-178	Volume control, with switch
R10	A60-757	2000 ohm 10 watt 10% resistor
R11	A60-724	3300 ohm 1 watt 10% resistor
R12	A60-665	390 ohm ½ watt 10% resistor
R13	A60-756	1200 ohm ½ watt 10% resistor
R16, R15, R14	*A17-100	2.2 megohm; 1 megohm; 4.7 megohm — See note below.
R17	A60-668	1 megohm ½ watt 20% resistor
R18	A60-758	560 ohm ½ watt 10% resistor
L1	A10-514	Oscillator coil
T1, T2	C10-475	1st and 2nd I.F. transformer
T3	B80-245	Output transformer
S2	A69-182	Switch, AC-DC, Battery

MISCELLANEOUS PARTS

Part No.	Description
D21-108	Cap for handle
A83-421	Clip, I.F. transformer mounting
S84-271	Cover assembly, front (with loop)
S84-128	Cover assembly, rear
B83-442	Handle
S84-243	Hub and pointer assembly
C52-216	Knob, tuning
B52-217	Knob, volume
B23-156	Line cord and plug
A83-568	Rectifier, selenium
A71-38	Retainer, paper tube for line cord
A68-35	Socket, tube
B79-364	Speaker, 4" P.M.
A76-49	Terminal, for "B" battery

*NOTE: C15, C16, C17, R14, R15, R16 are contained in the Ceramic Coupling Unit, Part No. A17-100.

MODELS A72T3, CHASSIS 9026C; A72T4, CHASSIS 9026D

STEWART-WARNER CORP.

MODELS A72T1, CHASSIS 9026A; A72T2, CHASSIS 9026B

	A72T1	A72T2	A72T3	A72T4
CABINET	Mahogany (Plastic)	Ivory (Plastic)	Walnut (Wood)	Blonde (Wood)

FREQUENCY RANGES
- Broadcast .... 540-1600 KC
- FM .... 88-108 MC

POWER OUTPUT
- Undistorted .... 1 watt
- Maximum .... 2.5 watts

SPEAKER .... 5" PM Dynamic

INTERMEDIATE FREQUENCY .... FM—10.7 MC; AM—455 KC

This receiver will operate on either 50 or 60 cycles Alternating Current (A.C.) at 105 to 125 volts or on Direct Current (D.C.) at 105 to 125 volts. Rectified B+ voltage is obtained by using a miniature selenium type rectifier which is noted for reliability and long life.

The built-in antenna used for AM reception is a high impedance loop that is mounted on the rear of the chassis. A 46" length of wire serves as a built-in FM antenna. This wire is connected to the right hand terminal of the pair of terminals labeled "External FM Antenna" and it must be uncoiled and allowed to hang down at back of receiver.

Tuning of the radio frequency circuits of the receiver is accomplished by a 5 section gang condenser. Two sections are used to tune the AM antenna and oscillator circuits, and three sections are used to tune the FM antenna, R.F., and oscillator circuits.

An R.F. amplifier stage is utilized to give maximum sensitivity and selectivity as well as high image rejection on FM reception. Although this stage is switched out of the circuit on AM reception, overall receiver sensitivity is adequate for highly satisfactory reception where station signals are of moderate strength.

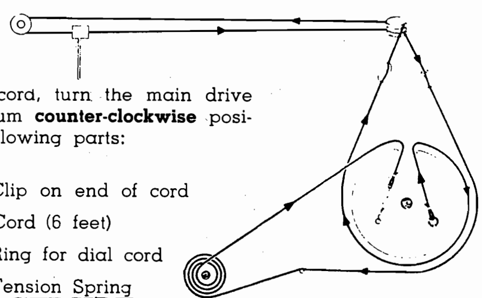
Both transformer coupled I.F. stages are used for FM and one stage is used for AM. The first and second I.F. transformers have two sets of windings; one set is tuned to 455 KC for AM operation and the other is tuned to 10.7 MC for FM operation. Switching of the windings, to alleviate undesired beat frequencies, is necessary only in the first I.F. transformer.

Detection of amplitude modulated 455 KC signals is accomplished by the 6AQ6 diode rectification circuit.

Frequency modulation detection is accomplished by an entirely new circuit that is known as the "RATIO DISCRIMINATOR." This FM detector circuit has the unusual ability to reject noise or other brief variations in amplitude of the signal. The relative insensitivity of the Ratio Discriminator to signal amplitude variation makes it possible to eliminate the use of a "limiter" stage that usually precedes the discriminator in other types of FM detector systems. It will therefore be noted that this receiver utilizes a normal I.F. amplifier stage instead of a low gain limiter stage preceding the FM discriminator.

Audio frequency output from both AM and FM detectors is amplified through the triode section of the 6AQ6. The audio power amplifier stage incorporates a 50B5 tube which is coupled to a permanent magnet dynamic speaker. A special inverse feedback arrangement is used which reduces distortion and contributes to exceptionally good tone quality.

DIAL AND POINTER DRIVE CORD ARRANGEMENT



To string dial cord, turn the main drive drum to maximum **counter-clockwise** position and use following parts:

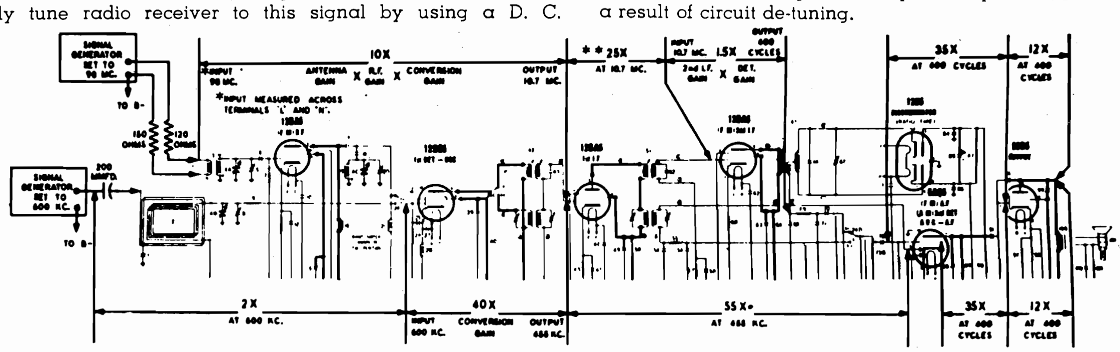
- **114955**—Clip on end of cord
- **117057**—Cord (6 feet)
- **119087**—Ring for dial cord
- **161384**—Tension Spring

STAGE GAIN MEASUREMENT PROCEDURE

REQUIRED INSTRUMENTS: The amount of amplification or "gain" of each of the stages of this receiver should be measured with an A. C. Vacuum Tube Voltmeter of the high frequency type (uniform response up to 100 MC). A conventional "AM" type signal generator may be used but it must be capable of producing **fundamental** frequencies of 600 KC. and 98 MC—**avoid using a generator that produces the 98 MC. signal by means of harmonics.**

PROCEDURE: It is exceedingly important to adhere to the procedure outlined below since the accuracy of these measurements will be affected to a considerable extent by the failure to establish proper operating conditions.

1. Be sure that R.F., I.F. and Discriminator stages are carefully and accurately aligned by utilizing the alignment procedure given in this manual.
2. Connect Signal Generator as shown below. Note that generator connections differ for "AM" and "FM" measurements.
3. For "AM" measurements, set signal generator to 600 KC. and then carefully tune radio receiver to this signal by using an output meter to indicate peak output. If a local station interferes, set generator to a nearby frequency and re-tune the receiver.
4. For "FM" measurements, set signal generator to 98 MC. and then carefully tune radio receiver to this signal by using a D. C. Vacuum Tube Voltmeter as an output indicator—meter must be connected between pin #3 of 12H6 tube and B—. If a local station interferes, set generator to a nearby frequency and re-tune the receiver.
5. The values of stage gain which are given here were measured with a fixed bias of 1.5 volts on the control grids of all R.F. and I.F. tubes which are connected to the A.V.C. circuit. Therefore, these values are not intended to indicate the full capability of a stage but they will serve as a convenient basis for determining proper operation. In order to duplicate the fixed bias voltage, connect the negative terminal of a 1.5 volt battery to A.V.C. at terminal 7 of the 1st I.F. transformer and connect the positive battery lead to B—.
6. R.F. and I.F. circuits are slightly de-tuned when contact is made with an instrument probe and this action, which is indicated by a change in the output meter reading, may seriously affect the gain measurement. Therefore, it is important to adjust the associated circuit trimmer for a maximum output meter reading and to set the input signal level to a convenient reference point on the gain-measuring instrument while the probe is making contact. After removing the probe it is again necessary to adjust the trimmer so as to obtain the same output meter reading and thereby assure that the signal voltage at the specified point has not changed as a result of circuit de-tuning.



** When measuring the gain of this stage with a vacuum tube voltmeter the input signal level for minimum meter indication may cause overloading. Under those conditions the measured gain will be found to be approximately 14X.

DIFFERENCES in tube characteristics, tolerance of parts, adjustment of tuned circuits and variations in line voltage will influence stage gain. These factors should be given due attention in event the gain of a stage varies extensively from the values shown above.

CLARI-SKEMATIX

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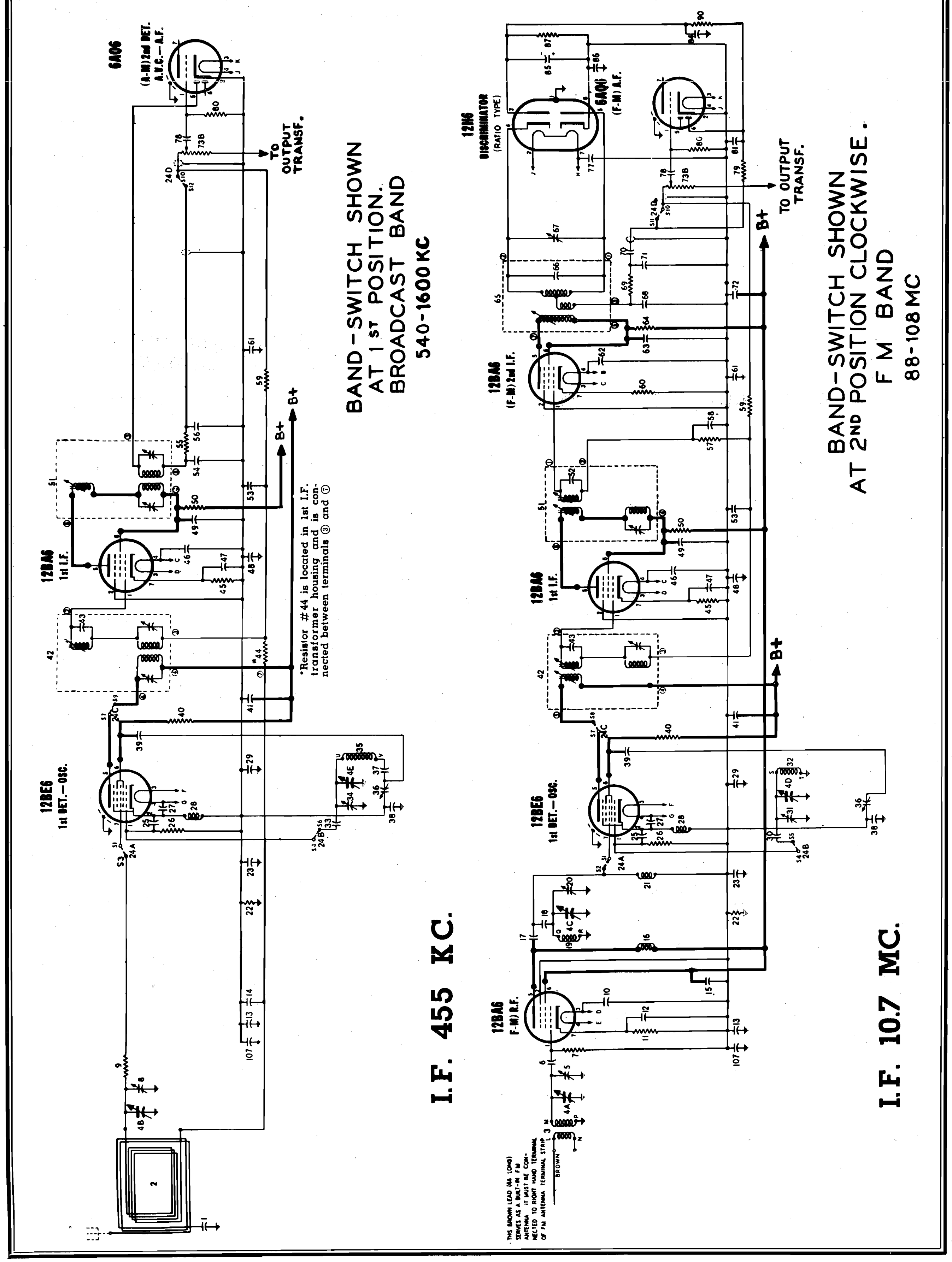
MODELS A72T1, CHASSIS 9026A; A72T2, CHASSIS 9026B

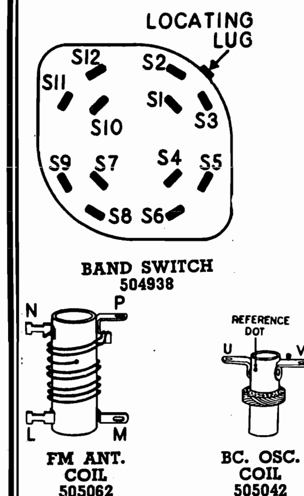
STEWART-WARNER CORP.

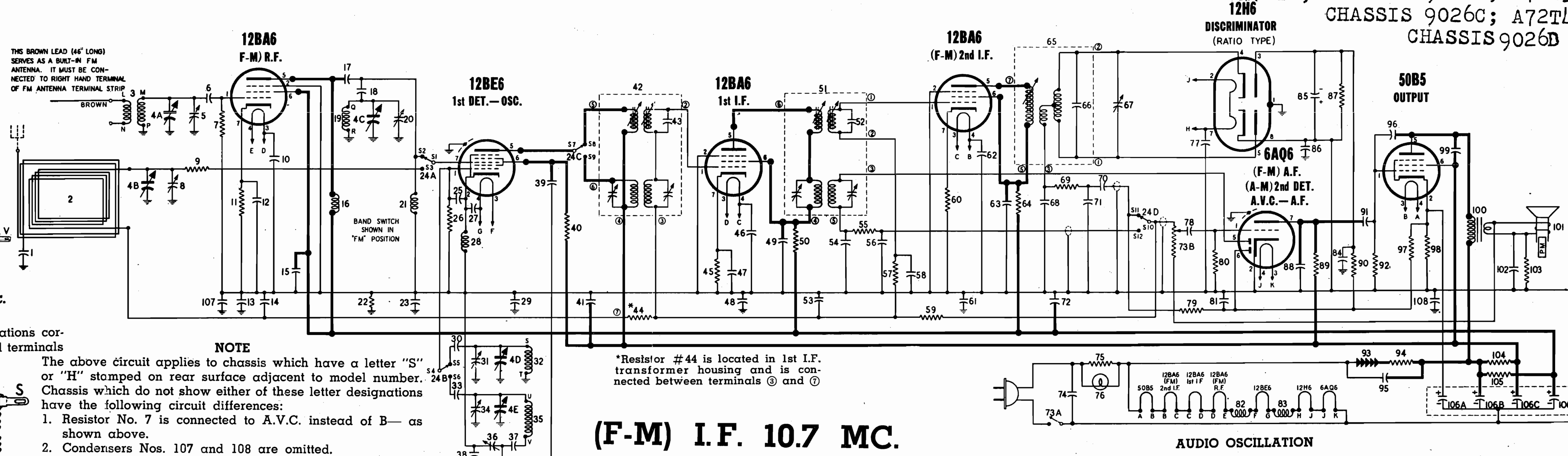
MODELS A72T3, CHASSIS 9026C; A72T4, CHASSIS 9026D



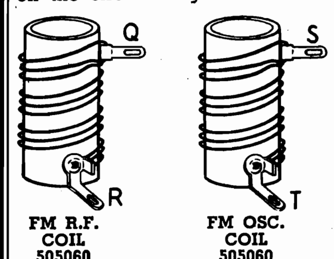
STEWART-WARNER CORP.

MODELS A72T1, CHASSIS 9026A; A72T2, CHASSIS 9026B; A72T3, CHASSIS 9026C; A72T4, CHASSIS 9026D





Lettered terminals in illustrations correspond to similarly lettered terminals on the circuit diagram.



NOTE

The above circuit applies to chassis which have a letter "S" or "H" stamped on rear surface adjacent to model number. Chassis which do not show either of these letter designations have the following circuit differences:

1. Resistor No. 7 is connected to A.V.C. instead of B— as shown above.
2. Condensers Nos. 107 and 108 are omitted.
3. Resistor R87 is 33,000 ohms.

Changes 1 and 2 are incorporated in chassis which carry the "S" designation and all three changes appear in chassis with the "H" designation.

These changes were made to increase sensitivity on FM operation.

(F-M) I.F. 10.7 MC.
(A-M) I.F. 455 KC.

WARNING: Some parts listed below have special characteristics. Do not use substitutes for replacement purposes.

DIAGRAM NO.	PART NO.	DESCRIPTION
		CONDENSERS
1	504725	Condenser—.02 Mfd. 200 volt
4-A to E	504955	Condenser—variable gang and drum
5	504954	Condenser—trimmer; 3 to 12 Mmfd.
6	504974	Condenser—ceramic 47 Mmfd. 500 volt
8	504069	Condenser—trimmer; 3 to 35 Mmfd.
10	504976	Condenser—ceramic 1500 Mmfd. 150 volt
12	505025	Condenser—ceramic 100 Mmfd. 350 volt
13	505052	Condenser—.002 Mfd. 400 volt
14	505073	Condenser—.05 Mfd. 400 volt
15	504975	Condenser—ceramic 470 Mmfd. 350 volt
17	502295	Condenser—ceramic 10 Mmfd. 500 volt
18	505053	Condenser—ceramic 15 Mmfd. 500 volt
20	504954	Condenser—trimmer; 3 to 12 Mmfd.
23	505027	Condenser—.01 Mfd. 400 volt
25	504730	Condenser—ceramic 3 Mmfd. 500 volt
27	504973	Condenser—ceramic 22 Mmfd. 500 volt
29	505454	Condenser—.05 Mfd. 400 volt (low impedance at 455 Kc.—do not substitute ordinary capacitor)
30	505072	Condenser—ceramic 33 Mmfd. 350 volt
31	504954	Condenser—trimmer; 3 to 12 Mmfd.
33	504974	Condenser—ceramic 47 Mmfd. 500 volt
34	119491	Condenser—trimmer; 10 to 90 Mmfd.
36	505051	Condenser—trimmer; 440 to 660 Mmfd.
37	504979	Condenser—ceramic .01 Mfd. 150 volt
38	504975	Condenser—ceramic 470 Mmfd. 350 volt
39	504979	Condenser—ceramic .01 Mfd. 150 volt
41	504979	Condenser—ceramic .01 Mfd. 150 volt
43	505068	Condenser—ceramic 91 Mmfd. 350 volt
46	504976	Condenser—ceramic 1500 Mmfd. 150 volt
47	505028	Condenser—.05 Mfd. 150 volt
48	504979	Condenser—ceramic .01 Mfd. 150 volt
49	505211	Condenser—.08 Mfd. 400 volt
52	505068	Condenser—ceramic 91 Mmfd. 350 volt
53	505028	Condenser—.05 Mfd. 150 volt
54	505026	Condenser—ceramic 150 Mmfd. 350 volt
56	505026	Condenser—ceramic 150 Mmfd. 350 volt
58	504978	Condenser—ceramic .005 Mfd. 150 volt
61	504979	Condenser—ceramic .01 Mfd. 150 volt
62	504976	Condenser—ceramic 1500 Mmfd. 150 volt
63	504978	Condenser—ceramic .005 Mfd. 150 volt
66	505074	Condenser—ceramic 43 Mmfd. 350 volt
67	504954	Condenser—trimmer; 3 to 12 Mmfd.
68	505025	Condenser—ceramic 100 Mmfd. 350 volt
70	505028	Condenser—.05 Mfd. 150 volt
71, 72	504979	Condenser—ceramic .01 Mfd. 150 volt
74	505083	Condenser—.02 Mfd. 400 volt
77	504976	Condenser—ceramic 1500 Mmfd. 150 volt
78	504977	Condenser—ceramic .002 Mfd. 150 volt
81	505082	Condenser—.02 Mfd. 150 volt
84	505027	Condenser—.01 Mfd. 400 volt
85	504937	Condenser—electrolytic 5 Mfd. 50 volt
86	504979	Condenser—ceramic .01 Mfd. 150 volt
88	505025	Condenser—ceramic 100 Mmfd. 350 volt
91	505028	Condenser—.05 Mfd. 150 volt
95	505073	Condenser—.05 Mfd. 400 volt
96	504973	Condenser—ceramic 22 Mmfd. 500 volt
99	505027	Condenser—.01 Mfd. 400 volt
102	505071	Condenser—.2 Mfd. 400 volt
106-A, B, C, D	504980	Condenser—electrolytic A—20 Mfd. 25 volt; B—60 Mfd. 150 volt; C—40 Mfd. 150 volt; D—40 Mfd. 150 volt
107	504975	Condenser—ceramic 470 Mmfd. 350 volt
108	504979	Condenser—ceramic .01 Mfd. 150 volt
		RESISTORS
7	502134	Resistor—carbon 470,000 Ohms ¼ watt
9	504969	Resistor—carbon 33 Ohms ¼ watt
11	502794	Resistor—carbon 68 Ohms ¼ watt
22	502133	Resistor—carbon 220,000 Ohms ¼ watt
26	502130	Resistor—carbon 22,000 Ohms ¼ watt
40	502406	Resistor—carbon 1,500 Ohms ¼ watt
44	502134	Resistor—carbon 470,000 Ohms ¼ watt
45	502794	Resistor—carbon 68 Ohms ¼ watt
50	502287	Resistor—carbon 680 Ohms ¼ watt
55	504710	Resistor—carbon 33,000 Ohms ¼ watt
57	502134	Resistor—carbon 470,000 Ohms ¼ watt
59	502268	Resistor—carbon 1 Meg. ¼ watt
60	504968	Resistor—carbon 10 Ohms ¼ watt
64	502287	Resistor—carbon 680 Ohms ¼ watt
69	502514	Resistor—carbon 3,300 Ohms ¼ watt
73-A, B	504967	Resistor—Volume control 1 Meg (with Switch)
75	505024	Resistor—carbon 22 Ohms 2 watt
79	502134	Resistor—carbon 470,000 Ohms ¼ watt
80	502136	Resistor—carbon 10 Meg. ¼ watt
87	504710	Resistor—carbon 33 000 Ohms ¼ watt
	502408	Resistor—carbon 68,000 Ohms ¼ watt (used only in chassis stamped with letter "H")
89, 90	502134	Resistor—carbon 470,000 Ohms ¼ watt
92	502134	Resistor—carbon 470,000 Ohms ¼ watt
94	505023	Resistor—carbon 33 Ohms 1 watt
97	502135	Resistor—carbon 2.2 Meg. ¼ watt
98	504437	Resistor—carbon 150 Ohms ½ watt
103	502132	Resistor—carbon 100,000 Ohms ¼ watt
104	504971	Resistor—carbon 2,200 Ohms ½ watt
105	504970	Resistor—carbon 470 Ohms, 2 watt
		COILS AND TRANSFORMERS
2	505054	Loop Antenna
3	505062	Coil—F.M. antenna
16	505075	Coil—R.F. choke (FM)
19	505060	Coil—FM R.F.
21	505076	Coil—R.F. choke (FM)
28	505076	Coil—R.F. choke (FM)
32	505060	Coil—FM oscillator
35	505042	Coil—BC oscillator
42	505066	Transformer—1st I.F.
51	505067	Transformer—2nd I.F.
65	505391	Transformer—discriminator
82, 83	505392	Coil—R.F. choke (FM)
100	502213	Transformer—output (for R-502998 sp'k'r)
	504244	Transformer—output (for W-502998 sp'k'r)
	502904	Transformer—output (for A-502998 sp'k'r)
		OTHER ELECTRICAL PARTS
24-A, B, C, D	504938	Switch—band
76	110629	Lamp—dial (Mazda #44) 6.3V 0.25 Amps
93	504972	Rectifier—selenium
101	502998	Speaker—P.M. dynamic (5 inch) includes transformer
		MISCELLANEOUS PARTS
	505084	Back for cabinet (Models A72T1, A72T2)
	505093	Back for cabinet (Models A72T3, A72T4)
	504981	Base for mounting electrolytic condenser
	504598	Base—tube shield
	502666	Cabinet—Mahogany (Model A72T1)
	502665	Cabinet—Ivory (Model A72T2)
	502506	Clamp—dial scale mounting
	504691	Clip—coil mounting; BC oscillator
	500497	Clip—retainer for cabinet back
	114955	Clip—retainer on end of dial cord
	117057	Cord—dial drive (6 ft. required) ... per ft.
	505085	Dial scale (Models A72T1, A72T2)
	505092	Dial scale (Models A72T3, A72T4)
	502563	Knob—volume or tuning (Model A72T1)
	502564	Knob—volume or tuning (Model A72T2)
	505086	Knob—volume or tuning (Model A72T3)
	505087	Knob—volume or tuning (Model A72T4)
	505090	Knob—band (Model A72T1)
	505091	Knob—band (Model A72T2)
	505088	Knob—band (Model A72T3)
	505089	Knob—band (Model A72T4)
	505095	Metal grille (Models A72T3, A72T4)
	502690	Pointer
	81145	Retaining ring for tuning shaft
	119087	Ring for dial cord
	17063	Screw—No. 6 x ¼ holds dial clamp
	114628	Screw—No. 8 x ½; chassis mounting
	79905	Screw—No. 8 x 1½ for loop mounting
	83047	Screw—No. 8 x ⅞; chassis mounting
	501777	Screw—No. 4 x ½ for mounting back
	505045	Shaft—tuning
	504599	Shield—tube
	500499	Socket—dial lamp (with leads)
	504597	Socket—miniature
	116690	Socket—octal base
	161384	Spring—dial cord tension

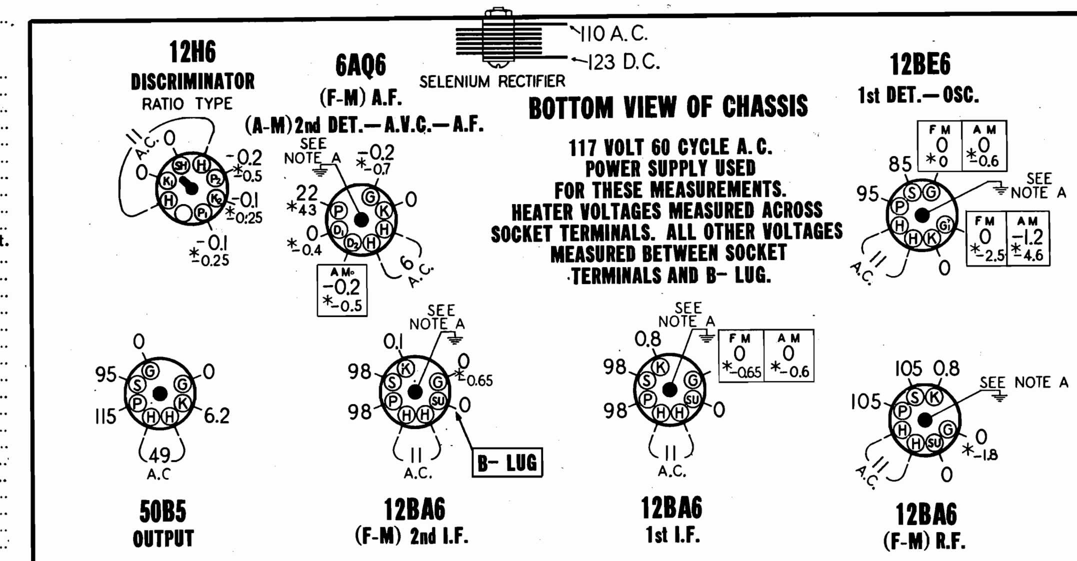
AUDIO OSCILLATION

The audio system of this receiver utilizes a two stage type of inverse feed-back arrangement and, should it ever be necessary to replace the speaker or output transformer, it is important to maintain a definite phase relationship in the feed-back circuit. If the connections to the output transformer are reversed or if the feed-back connection is made to the wrong side of the output transformer secondary, the system will become regenerative instead of degenerative. Under those conditions audio oscillation may result. If that occurs, oscillation may be prevented by reversing the connections to the secondary of the output transformer.

SOCKET VOLTAGES

Measured with voltmeter having sensitivity of 1000 ohms per volt except where indicated by (*). The (*) symbol designates a vacuum tube voltmeter measurement.

ALL MEASUREMENTS MADE WITH BAND SWITCH IN "FM" POSITION UNLESS OTHERWISE INDICATED
DIAL TUNED TO 108MC. FOR "FM" MEASUREMENTS
DIAL TUNED TO 540KC. FOR "AM" MEASUREMENTS
VOLUME CONTROL SET TO MINIMUM WITH NO SIGNAL



REAR OF CHASSIS

NOTE A: Grounding of center stud on tube socket is necessary to reduce capacity coupling between other pins. Oscillation may result if this ground is omitted.

MODELS A72T1, CHASSIS 9026A; A72T2, CHASSIS 9026B; A72T3, CHASSIS 9026C; A72T4, CHASSIS 9026D

STEWART-WARNER CORP.

FREQUENCY MODULATION — "FM" — ALIGNMENT PROCEDURE

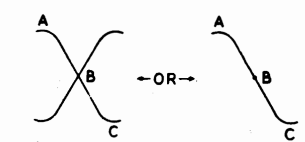
INSTRUMENTS: Alignment of the FM circuits in this receiver may be accomplished with either a conventional AM type signal generator or an FM signal generator. The output indicator should be an oscilloscope or a vacuum tube voltmeter.

Although it is preferable to use an FM generator and an oscilloscope, reasonably accurate alignment is obtainable when using a conventional AM generator and a vacuum tube voltmeter providing proper care is exercised in adjusting the discriminator circuit trimmer condenser.

IMPORTANT: If an AM signal generator is used, it should be capable of producing fundamental frequencies of 10.7 and 88 to 108 MC. Avoid using an AM generator which produces signals in the 88 to 108 MC range by using harmonics higher than the second. Generators which are dependent upon third, fourth or fifth harmonics for frequencies of 88 to 108 MC will generally produce undesireable spurious beat signals with the local oscillator in the receiver and alignment will be exceedingly difficult.

The following procedure is adaptable for use with either an AM or FM generator and oscilloscope or vacuum tube voltmeter merely follow the instructions that are applicable to the instruments that are used.

1. If alignment of both AM and FM channels is required it is necessary to align the AM channel first, then align the FM channel as instructed in the following chart (AM alignment procedure is given on page 7).
2. Before removing the chassis from the cabinet, turn the tuning control until dial pointer is at 98 MC. Then remove chassis and place a pencil mark on dial frame so as to indicate the 98 MC calibration point.
3. Do not attempt to reposition pointer by releasing it from clip on dial card as this is done only during AM alignment.
4. Set the receiver volume control to the maximum volume position.
5. Dress FM circuit leads as short and straight as possible, particularly those in the oscillator circuit. I.F. plate and grid leads should also be kept short and straight.
6. Alignment of receiver circuits may now be accomplished by using the procedure in the chart below.

SIGNAL GENERATOR CONNECTIONS			V-T VOLTMETER OR OSCILLOSCOPE CONNECTIONS		RECEIVER				TYPE OF ADJUSTMENT AND OUTPUT INDICATION	
CONNECT HIGH SIDE OF SIGNAL GENERATOR TO	*CONNECT GROUND LEAD OF SIGNAL GENERATOR TO	FREQUENCY & TYPE OF MODULATION	IF A V-T VOLTMETER IS USED, CONNECT IT AS FOLLOWS:	IF AN OSCILLOSCOPE IS USED, CONNECT IT AS FOLLOWS:	BAND SWITCH POSITION	DIAL SETTING	TRIMMER OR SLUG NUMBER	TRIMMER DESCRIPTION	ADJUSTMENT AND OUTPUT INDICATION WHEN USING A V-T VOLTMETER	ADJUSTMENT AND OUTPUT INDICATION WHEN USING AN OSCILLOSCOPE
Pin #1 of 12BA6 (FM) 2nd I.F. use a .01 MFD. condenser in series with generator lead.	B— in vicinity of 12BA6 (FM) 2nd I.F. tube.	**10.7 MC** AM signal may be 400 cycle modulated or FM signal should preferably be modulated ±300 KC.	Connect common (or ground) terminal of meter to B . D.C. probe lead of meter is then connected to pin #3 of the 12H6 tube.	Connect vertical amplifier "high" lead in series with an 0.1 MFD. condenser to pin #7 of 6AQ6 tube. Connect scope ground lead to B	**FM** Maximum clockwise position	Any position where it does not affect the signal.	8	Discriminator Primary	Set meter to a low D.C. voltage range and adjust trimmer #8 for maximum meter reading. (This voltage will be negative.)	Set vertical amplifier of scope for maximum amplification. Where FM signal generator provides an output voltage for synchronization, connect this voltage to "sync" terminals of the scope. Then adjust setting of trimmer #9, before attempting to adjust trimmer #8, until a pattern similar to the following appears on the screen. If pattern does not remain stationary, operate sweep frequency control on scope and also "sync" control until desired result is obtained.  This double "S" curve pattern results when 'scope uses "Sawtooth" horizontal deflection voltage. This single "S" curve pattern results when 'scope uses properly phased "sine wave" horizontal deflection voltage. Adjust trimmer #8 for maximum amplitude and steepness of that portion of the curve between "A" and "C".
Same as above	Same as above	Same as above	Before connecting V-T voltmeter, it is necessary to connect two 68,000 ohm resistors **(resistance of both units must compare within 1%)** in series from pin #3 of the 12H6 tube to B—. Then connect common (or ground) terminal of V-T voltmeter to the junction of these two resistors. D.C. probe lead of meter is now connected to junction of resistor #69 (3300 ohms) and condenser #70 (.05 MFD.) which are in the discriminator output circuit.	Same as above	Same as above	Same as above	9	Discriminator Secondary **Use an insulated phasing tool to adjust this trimmer.**	Set meter for operation on its lowest D.C. voltage range. Note that as trimmer #9 is rotated a point will be found where voltmeter will swing rather sharply from a positive to a negative reading or vice versa. Correct setting of trimmer #9 is obtained when meter reads zero as trimmer is moved through this point. The adjustment is somewhat critical and **considerable care must be exercised to set the trimmer for a zero meter indication.**	With the 'scope set up as described above, adjust trimmer #9 until the cross-over point "B" is centrally located in both the horizontal and vertical directions; in addition, the portion of the curve between "A" and "C" should be as linear (straight) as possible.
Recheck the two preceding adjustments to be sure that both trimmers are set as accurately as possible to obain the specified output indication on vacuum tube voltmeter or oscilloscope. Then disconnect and remove the two 68,000 ohm resistors that were used for the vacuum tube voltmeter connection in the 2nd step.										
Pin #1 of 12BA6 (FM) 1st I.F. tube; use a .01 MFD. condenser in series with generator lead.	B— in vicinity of 12BA6 (FM) 1st I.F. tube.	Same as above	Connect common (or ground) terminal of meter to B—. D.C. probe lead of meter is then connected to Pin #3 of the 12H6 tube.	Same as above	Same as above	Same as above	10 and 11	2nd I.F.	Adjust trimmers #10 and #11 for maximum meter reading.	With 'scope set up as described above, adjust trimmers #10 and #11 for maximum amplitude and steepness of that portion of the pattern between "A" and "C".
Pin #7 of 12BE6 tube; use a .01 MFD. condenser in series with generator lead.	B— in vicinity of 12BE6 tube.	Same as above	Same as above	Same as above	Same as above	Same as above	12 and 13	1st I.F.	Adjust trimmers #12 and #13 for maximum meter reading.	Adjust trimmers #12 and #13 for maximum amplitude and steepness of pattern as described above. If the enlarged pattern now indicates a lack of symmetry, readjust trimmer #9 for correct cross-over point.
Generator output leads must be connected to the two "External FM Antenna" terminals at back of antenna loop frame. Connect "high" lead to one terminal **in series with a 120 ohm resistor** and connect generator ground lead to the other terminal **in series with a 150 ohm resistor.**		**98 MC** AM signal may be 400 cycle modulated or FM signal should preferably be modulated ±300 KC.	Same as above	Same as above	Same as above	98 MC	14	Oscillator Trimmer	Set trimmer #14 to receive 98 MC. signal and adjust for maximum meter reading.	Adjust trimmer #14 to obtain the symmetrical pattern shown above. Correct setting of trimmer #14 is obtained when cross-over point in pattern is centrally located.
Same as above		**Same as above**	**Same as above**	**Same as above**	Same as above	98 MC	15	R.F. Trimmer	**Adjust trimmer #15 for maximum meter reading.**	**Adjust trimmer #15 for maximum amplitude of pattern.**
							12 and 13	1st I.F.	**Recheck adjustment of these trimmers for maximum meter reading.**	**Recheck adjustment of these trimmers for maximum amplitude and symmetry of pattern.**
Same as above		**Same as above**	**Same as above**	**Same as above**	Same as above	98 MC	16	Antenna Trimmer	**Adjust trimmer #16 for maximum meter reading.**	**Adjust trimmer #16 for maximum amplitude of pattern.**

Check calibration and tracking of receiver with input signals of 88 and 108 MC.

***If your signal generator has an AC-DC type power supply, insert a .25 MFD. condenser in series with the ground lead before making the connections shown above.**

MODELS A72T3, CHASSIS 9026C; A72T4, CHASSIS 9026D

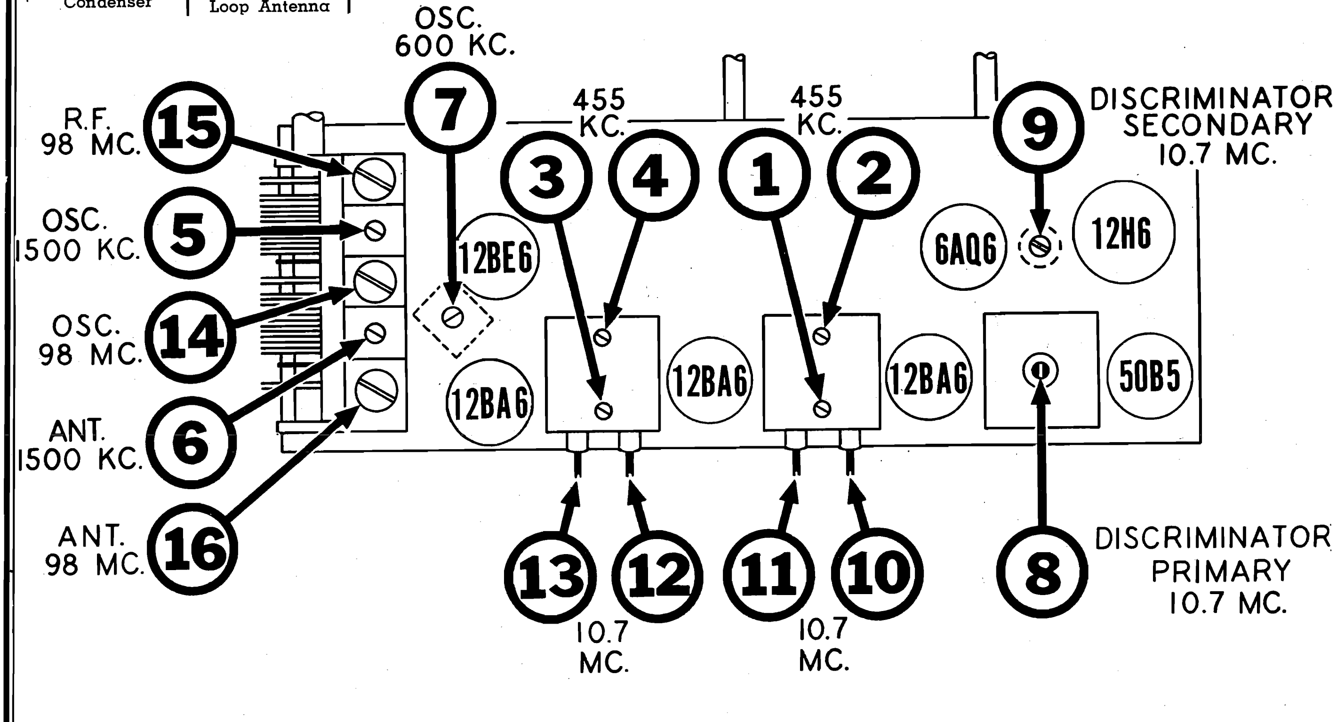
STEWART-WARNER CORP.

MODELS A72T1, CHASSIS 9026A; A72T2, CHASSIS 9026B

BROADCAST BAND — "AM" — ALIGNMENT PROCEDURE

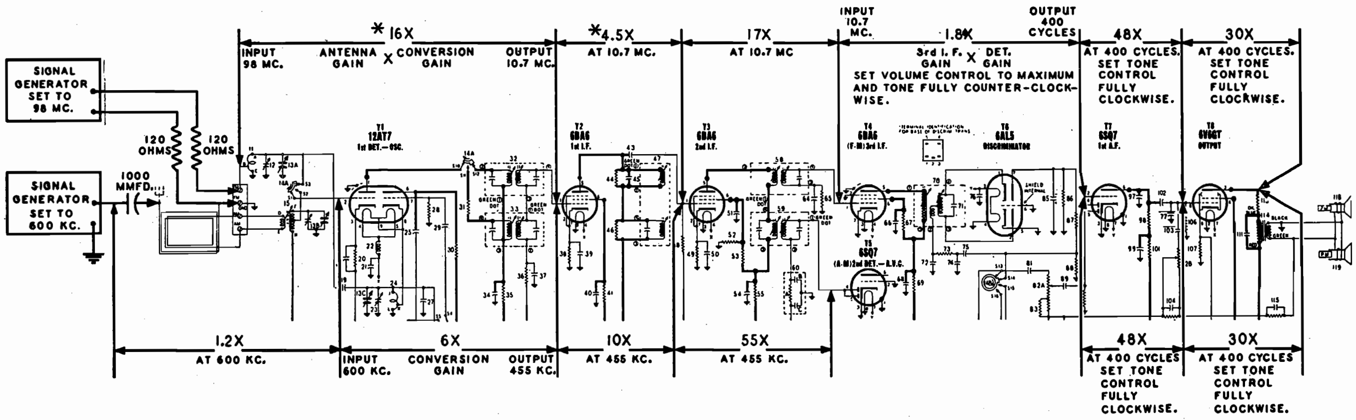
1. Remove chassis and loop antenna from cabinet.
2. With the gang fully meshed, the dial pointer should be in the position indicated by the last mark below 55 on the dial. If it is set incorrectly, release the pointer clip on the dial cord and reposition pointer.
3. During the alignment of this receiver, it will be necessary to set the dial pointer to the following frequencies: 1500 Kc., and 600 Kc. In order to avoid replacing the chassis in the cabinet each time a dial setting is required, it will be found more convenient to mark the required frequency points on the white dial background before starting the alignment.
4. Connect an output meter across speaker voice coil or from plate of the 50B5 tube to B— through a 0.1 Mfd. condenser (see voltage chart for convenient B— connection).
5. Connect ground lead of signal generator to B— lug.
   CAUTION: If your signal generator is designed with an AC-DC type power supply, connect ground lead of signal generator to B— lug through a .25 Mfd. condenser.
6. Set volume control to the maximum volume position and use a weak signal from the signal generator.
7. If alignment of both AM and FM channels is required, it is necessary to align the AM channel first; then align the FM channel as instructed in the preceding section.

DUMMY ANT. IN SERIES WITH SIGNAL GENERATOR	CONNECT HIGH SIDE OF SIGNAL GENERATOR TO	SIGNAL GENERATOR FREQUENCY	BAND SWITCH POSITION	RECEIVER DIAL SETTING	TRIMMER NUMBER	TRIMMER DESCRIPTION	TYPE OF ADJUSTMENT
0.1 MFD. Condenser	Pin #7 of 12BE6 tube.	455 KC	Broadcast (counter-clockwise)	Any point where it does not affect the signal.	1-2	2nd I.F.	Adjust for maximum output. Then repeat adjustment.
					3-4	1st I.F.	
200 MMFD. Mica Condenser	External Antenna Terminal (AM) on Loop Antenna	1500 KC	Broadcast (counter-clockwise)	1500 KC	5	Broadcast Oscillator	Adjust for maximum output.
200 MMFD. Mica Condenser	External Antenna Terminal (AM) on Loop Antenna	1500 KC	Broadcast (counter-clockwise)	Tune to 1500 KC Generator Signal	6	Broadcast Antenna	Adjust for maximum output.
200 MMFD. Mica Condenser	External Antenna Terminal (AM) on Loop Antenna	600 KC	Broadcast (counter-clockwise)	Tune to 600 KC Generator Signal	7	Broadcast Oscillator (Series Pad)	Adjust for maximum output. Try to increase output by detuning trimmer and retuning receiver dial until maximum output is obtained.
200 MMFD. Mica Condenser	External Antenna Terminal (AM) on Loop Antenna	Repeat adjustment of trimmers 5 and 6 at 1500 Kc. Then re-check adjustment of trimmer 7 at 600 Kc.					



TRIMMER LOCATION CHART

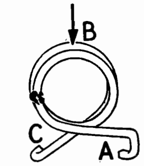
MODELS B92CR1,-2,-3,-4, -8,-9,-10; CHASSIS 9043-A,-B,-C,-D,-K,-L,-M STEWART-WARNER CORP.



*The gain of these stages cannot be made with a vacuum tube voltmeter due to the presence of RF voltage from the local oscillator as that voltage prevents a true measurement of the incoming signal. To determine actual gain, use a signal generator with calibrated output so that a signal of known value may be injected at desired points. The ratio of signal generator voltage, applied to successive stages to produce a given audio output will be the gain of that section of the receiver.

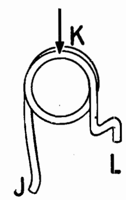
DIFFERENCES in tube characteristics, tolerance of parts, adjustment of tuned circuits and variations in line voltage will influence stage gain. These factors should be given due attention in event the gain of a stage varies extensively from the values shown above.

TERMINAL B IS LOCATED ½ TURN FROM TERMINAL C

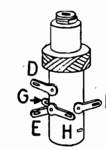


FM ANT. COIL 505919

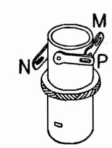
TERMINAL K IS LOCATED ½ TURN FROM TERMINAL L



FM OSC. COIL 505918



BC. ANT. COIL 505929



BC. OSC. COIL 505927

STAGE GAIN MEASUREMENT PROCEDURE

REQUIRED INSTRUMENTS: The amount of amplification or "gain" of most of the stages of this receiver can be measured with an A.C. Vacuum Tube Voltmeter of the high frequency type. An AM (600 KC.) as well as an FM (98 MC.) signal source is required. For gain measurements in the FM antenna—FM converter—FM 1st I.F. stages, a microvolt calibrated FM signal generator must be used.

PROCEDURE: It is exceedingly important to adhere to the procedure outlined below since the accuracy of these measurements will be affected to a considerable extent by the failure to establish proper operating conditions.

1. Be sure that R.F., I.F. and Discriminator stages are carefully and accurately aligned by utilizing the alignment procedure given in this manual.
2. Connect Signal Generator as shown below. Note that generator connections differ for "AM" and "FM" measurements.
3. For "AM" measurements, set signal generator to 600 KC. (400 cycle modulation) and then carefully tune radio receiver to this signal by using an output meter to indicate peak output. If a local station interferes, set generator to a nearby frequency and re-tune the receiver.
4. For "FM" measurements, set signal generator to 98 MC. (400 cycle modulation with 22½ KC. deviation) and then carefully tune radio receiver to this signal by using a D.C. Vacuum Tube Voltmeter as an output indicator—meter must be connected between pin #7 of 6AL5 tube and chassis. If a local station interferes, set generator to a nearby frequency and re-tune the receiver.
5. The values of stage gain which are given here were measured with a fixed bias of 3 volts on the control grids of all R.F. and I.F. tubes which are connected to the A.V.C. circuit. Therefore, these values are not intended to indicate the full capability of a stage but they will serve as a convenient basis for determining proper operation. In order to duplicate the fixed bias voltage, connect the negative terminal of a 3 volt battery to A.V.C. at the junctions of resistors #17 and 57 and connect the positive battery lead to the receiver chassis.
6. R.F. and I.F. circuits are slightly de-tuned when contact is made with an instrument probe and this action, which is indicated by a change in the output meter reading, may seriously affect the gain measurement. Therefore, it is important to adjust the associated circuit trimmer for a maximum output meter reading and to set the input signal level to a convenient reference point on the gain measuring instrument while the probe is making contact. After removing the probe it is again necessary to adjust the trimmer so as to obtain the same output meter reading and thereby assure that the signal voltage at the specified point has not changed as a result of circuit de-tuning.

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MODELS B92CR1, -2, -3, -4, -8, -9, -10; CHASSIS 9043-A, -B, -C, -D, -K, -L, -M

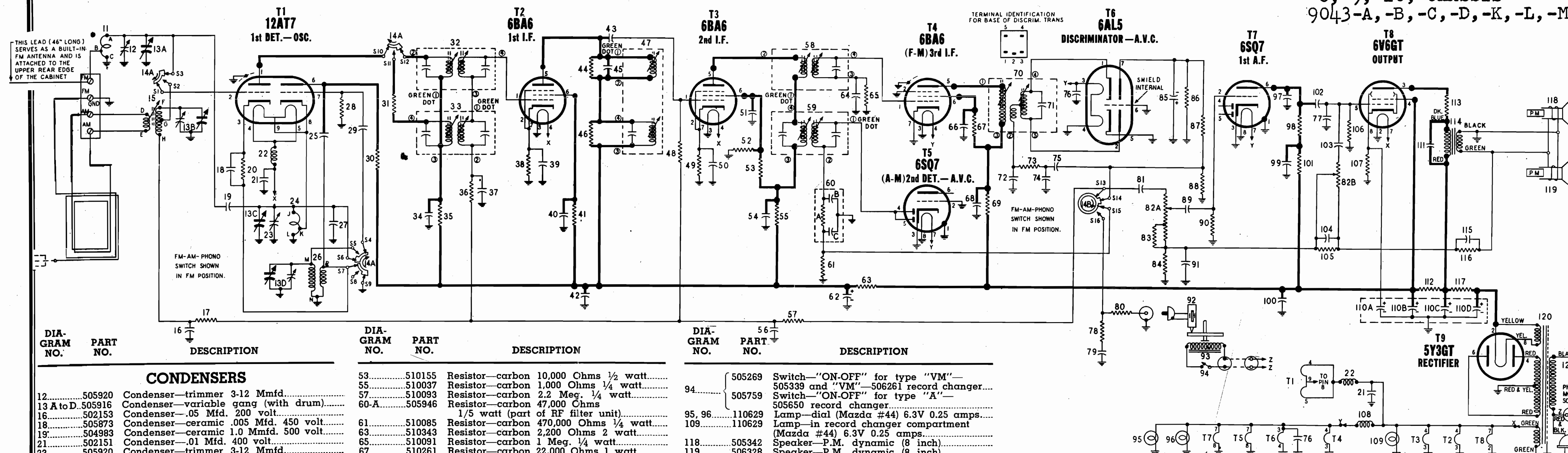


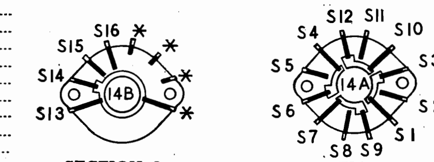
DIAGRAM NO.	PART NO.	DESCRIPTION
CONDENSERS		
12	505920	Condenser—trimmer 3-12 Mmfd.
13 A to D	505916	Condenser—variable gang (with drum)
16	502153	Condenser—.05 Mfd. 200 volt
18	505873	Condenser—ceramic .005 Mfd. 450 volt
19	504983	Condenser—ceramic 1.0 Mmfd. 500 volt
21	502151	Condenser—.01 Mfd. 400 volt
23	505920	Condenser—trimmer 3-12 Mmfd.
25	505873	Condenser—ceramic .005 Mfd. 450 volt
27	504905	Condenser—ceramic 5 Mmfd. 500 V. ± 10%
29	502182	Condenser—ceramic 39 Mmfd. 500 V. ± 5%
34	505873	Condenser—ceramic .005 Mfd. 450 volt
37	505873	Condenser—ceramic .005 Mfd. 450 volt
39	502156	Condenser—.004 Mfd. 400 volt
40	505873	Condenser—ceramic .005 Mfd. 450 volt
42	505873	Condenser—ceramic .005 Mfd. 450 volt
43	504974	Condenser—ceramic 47 Mmfd. 500 volt
45	506399	Condenser—ceramic 33 Mmfd. 500 V. ± 5%
50, 51	505873	Condenser—ceramic .005 Mfd. 450 volt
54	505873	Condenser—ceramic .005 Mfd. 450 volt
56	502153	Condenser—.05 Mfd. 200 volt
60 B, C	505946	Condenser—ceramic 150 Mmfd. 400 volts (part of RF filter unit)
62	504719	Condenser—electrolytic 4 Mfd. 450 volt
64	505873	Condenser—ceramic .005 Mfd. 450 volt
66	505873	Condenser—ceramic .005 Mfd. 450 volt
68	505873	Condenser—ceramic .005 Mfd. 450 volt
71	505183	Condenser—ceramic 47 Mmfd. 500 V. ± 2%
72	505026	Condenser—ceramic 150 Mmfd. 350 volt
74	502151	Condenser—.01 Mfd. 400 volt
75	502152	Condenser—.02 Mfd. 400 volt
76	505873	Condenser—ceramic .005 Mfd. 450 volt
77	504974	Condenser—ceramic 47 Mfd. 500 volt
79	502151	Condenser—.01 Mfd. 400 volt
81	502153	Condenser—.05 Mfd. 200 volt
85	504937	Condenser—electrolytic 5 Mfd. 50 volt
89	502260	Condenser—.002 Mfd. 600 volt
91	512044	Condenser—.25 Mfd. 200 volt
97	502931	Condenser—mica 100 Mmfd. 500 volt
99	502410	Condenser—.1 Mfd. 400 volt
100	502157	Condenser—.05 Mfd. 400 volt
102	502152	Condenser—.02 Mfd. 400 volt
103	504904	Condenser—.01 Mfd. 600 volt
104	512032	Condenser—.1 Mfd. 200 volt
110 A to D	505908	Condenser—electrolytic A—20 Mfd. 25 volt; B—10 Mfd. 450 volt; C—30 Mfd. 450 volt; D—40 Mfd. 450 volt
111	502260	Condenser—.002 Mfd. 600 volt
115	512032	Condenser—.1 Mfd. 200 volt
121	512255	Condenser—.01 Mfd. 400 volt
RESISTORS		
17	510091	Resistor—carbon 1 Meg. 1/4 watt
20	510043	Resistor—carbon 2,200 Ohms 1/4 watt
28	510055	Resistor—carbon 10,000 Ohms 1/4 watt
30	510043	Resistor—carbon 2,200 Ohms 1/4 watt
31	510001	Resistor—carbon 10 Ohms 1/4 watt
35	510037	Resistor—carbon 1,000 Ohms 1/4 watt
36	510091	Resistor—carbon 1 Meg. 1/4 watt
38	510016	Resistor—carbon 68 Ohms 1/4 watt
41	510161	Resistor—carbon 22,000 Ohms 1/2 watt
44	510046	Resistor—carbon 3,300 Ohms 1/4 watt
46	510053	Resistor—carbon 8,200 Ohms 1/4 W. ± 10%
48	510091	Resistor—carbon 1 Meg. 1/4 watt
49	510016	Resistor—carbon 68 Ohms 1/4 watt
52	510161	Resistor—carbon 22,000 Ohms 1/2 watt
53	510155	Resistor—carbon 10,000 Ohms 1/2 watt
55	510037	Resistor—carbon 1,000 Ohms 1/4 watt
57	510093	Resistor—carbon 2.2 Meg. 1/4 watt
60-A	505946	Resistor—carbon 47,000 Ohms 1/5 watt (part of RF filter unit)
61	510085	Resistor—carbon 470,000 Ohms 1/4 watt
63	510343	Resistor—carbon 2,200 Ohms 2 watt
65	510091	Resistor—carbon 1 Meg. 1/4 watt
67	510261	Resistor—carbon 22,000 Ohms 1 watt
69	510137	Resistor—carbon 1,000 Ohms 1/2 watt
73	510046	Resistor—carbon 3,300 Ohms 1/4 watt
78	510070	Resistor—carbon 68,000 Ohms 1/4 watt
80	510079	Resistor—carbon 220,000 Ohms 1/4 watt
82-A,B,C	505911	Volume and tone control A—2 Megohms; B—2 Megohms; C—"ON-OFF" switch
83	510070	Resistor—carbon 68,000 Ohms 1/4 watt
84	510037	Resistor—carbon 1,000 Ohms 1/4 watt
86	510061	Resistor—carbon 22,000 Ohms 1/4 watt
87	510093	Resistor—carbon 2.2 Meg. 1/4 watt
88	510085	Resistor—carbon 470,000 Ohms 1/4 watt
90	510098	Resistor—carbon .15 Meg 1/4 watt
98	510093	Resistor—carbon 2.2 Meg. 1/4 watt
101	510079	Resistor—carbon 220,000 Ohms 1/4 watt
105	510067	Resistor—carbon 47,000 Ohms 1/4 watt
106	510085	Resistor—carbon 470,000 Ohms 1/4 watt
107	510128	Resistor—carbon 330 Ohms 1/2 watt
112	510709	Resistor—wire wound 600 Ohms 5 watt
113	510013	Resistor—carbon 47 Ohms 1/4 watt
116	510043	Resistor—carbon 2,200 Ohms 1/4 watt
117	510709	Resistor—wire wound 600 Ohms 5 watt
COILS AND TRANSFORMERS		
11	505919	Coil—FM antenna
15	505929	Coil BC. antenna
	505894	Slug core for antenna coil
22	505075	Coil—R.F. choke (FM)
24	505918	Coil—FM oscillator
26	505927	Coil—BC. oscillator
32	506080	Transformer—1st I.F. (FM)
33	505906	Transformer—1st I.F. (AM)
47	505907	Transformer—2nd I.F. (FM and AM)
58	505905	Transformer—3rd I.F. (FM)
59	505906	Transformer—3rd I.F. (AM)
70	505904	Transformer—discriminator
108	505075	Coil—R.F. choke (FM)
114	505912	Transformer—output
120	505909	Transformer—power
OTHER ELECTRICAL PARTS		
14-A, B	505922	Switch—FM-AM-Phono
60-A,B,C	505946	RF filter unit A—Resistor—carbon 47,000 Ohms 1/5 watt; B—Condenser—ceramic 150 Mmfd. 400 volt; C—Condenser—ceramic 150 Mmfd. 400 volt
92	505100	Crystal cartridge
93	505273	Motor—for type "VM"—505339 and "VM"—506261 record changer 115 volt 60 cyc.
93	505274	Motor—for type "VM"—505339 and "VM"—506261 record changer 115 volt 50 cyc.
93	505750	Motor—for type "A"—505650 record changer 115 volt 50 cyc.
93	505758	Motor—for type "A"—505650 record changer 115 volt 60 cyc.
94	505269	Switch—"ON-OFF" for type "VM"—505339 and "VM"—506261 record changer
94	505759	Switch—"ON-OFF" for type "A"—505650 record changer
95, 96	110629	Lamp—dial (Mazda #44) 6.3V 0.25 amps.
109	110629	Lamp—in record changer compartment (Mazda #44) 6.3V 0.25 amps.
118	505342	Speaker—P.M. dynamic (8 inch)
119	506328	Speaker—P.M. dynamic (8 inch)
MISCELLANEOUS PARTS		
	301270	Base for mtg. electrolytic condenser
	505368	Base for tube shield
	505896	Bulls eye for pilot light in record changer compartment
	505165	"C" washer
	112745	Clip—coil mounting
	114955	Clip—retainer on end of dial cord
	160326	Clip—retains dial scale
	160832	Clip—retains escutcheon
	505101	Clip for mounting I.F. transformers
	117057	Cord—dial drive (3 ft. required) per ft.
	505939	Dial scale (brown background)
	506310	Dial scale (black background)
	506070	Door for radio compartment; upper right; Model B92CR1 (less hardware)
	506071	Door for record compartment; lower left; Model B92CR1 (less hardware)
	506072	Door for record compartment; lower right; Model B92CR1 (less hardware)
	506075	Door for record storage compartment; Model B92CR3 (less hardware)
	506156	Door for record storage compartment; Model B92CR2 (less hardware)
	506157	Door for record storage compartment; Model B92CR4 (less hardware)
	505333	Escutcheon—dial
	506380	Fastener for loop antenna
	506073	Handle for record storage compartment door; Model B92CR1
	506077	Handle for door; Models B92CR2, B92CR3, and B92CR4
	506265	Handle; Models B92CR8, B92CR9, B92CR10
	505466	Handle for radio door; Model B92CR1
	505467	Hinge—door; Model B92CR1 per pair
	506076	Hinge—door; Model B92CR3 per pair
	506162	Hinge for door; Model B92CR2, B92CR4 (suplied in pairs)
	505457	Hinge for lid; Models B92CR2, B92CR4, B92CR8, B92CR9, B92CR10, (supplied in pairs)
	505464	Hinge for lid; Models B92CR1 and B92CR3 (supplied in pairs)
	505935	Knob—"TUNING" (brown plastic)
	505936	Knob—"VOLUME" (brown plastic)
	505937	Knob—"TONE" (brown plastic)
	506938	Knob—"FM-AM-PHONO" (brown plastic)
	506306	Knob—"TUNE" (black plastic)
	506307	Knob—"VOLUME" (black plastic)
	506308	Knob—"TONE" (black plastic)
	506309	Knob—"FM-AM-PHONO" (black plastic)
	505462	Lid for record changer compartment; Model B92CR1 (less hardware)
	505669	Lid for record changer compartment; Model B92CR3 (less hardware)
	506159	Lid for record changer compartment; Model B92CR2 (less hardware)
	506160	Lid for record changer compartment; Model B92CR4 (less hardware)
	506268	Lid for record changer compartment; Model B92CR8
	506269	Lid for record changer compartment; Model B92CR9
	506270	Lid for record changer compartment; Model B92CR10
	505456	Lid support for Models B92CR8, B92CR9, and B92CR10
	505463	Lid support for Model B92CR1
	506074	Lid support for Model B92CR3
	506163	Lid support for Models B92CR2, B92CR4
	505469	Light diffusing strip
	505717	Needle—Phonograph
	505686	Pointer
	500966	Plug for phono. pick-up cable
	501031	Plug for phono. motor cable
	119087	Ring for dial cord
	505944	Ruber pad for mtg. chassis
	79993	Screw—#8 x 1 1/4"; for mtg. chassis
	505923	Shaft—tuning
	503588	Shaft and drum for dial
	505722	Shield—light
	505367	Shield—tube
	505930	Shield—tube (12AT7)
	505894	Slug core for antenna coil
	116690	Socket—octal base
	160039	Socket—phono. plug
	160392	Socket—octal (rectifier)
	504597	Socket—miniature
	505307	Socket and phono. motor cable
	505910	Socket—pilot light
	505921	Socket—noval base
	505933	Socket—pilot light (record changer comp.)
	505161	Spring—tension
	506275	Stop for door; Models B92CR2, B92CR4
	506276	Stop for door; Model B92CR3
	505924	Terminal strip (FM-FM-AM-AM)

NOTE

A revision that occurred during production is included in the circuit on this page and it may be identified as follows:

Condenser #77 was formerly connected from terminal S14 (switch section 14B) to ground.

This change was made to provide greater stability in the audio system. Chassis incorporating the change have a letter "S" stamped on rear surface adjacent to model number.



SECTION 2 REAR VIEW

SECTION 1 REAR VIEW

★ Not used; may serve as wiring junction point.

BAND SWITCH
505922

Lettered terminals in illustrations correspond to similarly lettered terminals on the circuit diagram.

(F-M)	**I. F.**	**10.7**	**MC.**
(A-M)	**I. F.**	**455**	**KC.**

RECORD CHANGERS: For B92CR1, Model A-505650, RCD.CH.18-1; For B92CR2,-3,-4, Model VM-505339, RCD.CH.17-14; For B92CR8,-9,-10, Model VM-506261, C18-11

STEWART-WARNER CORP.

MODELS B92CR1,-2,-3,-4,
-8,-9,-10; CHASSIS
9043-A,-B,-C,-D,-K,-L,-M

BROADCAST BAND — "AM" — ALIGNMENT PROCEDURE

1. Disconnect leads from FM-AM antenna terminal strip (labelled FM-FM-AM-AM) at back of chassis; also disconnect speaker leads and phono plugs. Remove chassis as well as the two speakers. (If desired, allow speakers to remain in cabinet and connect to receiver by extension leads.)

2. Stand chassis on one edge and space it approximately same distance from loop (attached to back of cabinet) as when installed in cabinet. Reconnect all antenna leads previously connected to the antenna terminal strip. Reconnect the two speakers.

3. With the gang condenser fully meshed, dial pointer should be in the position indicated by the last division below 55 on the dial. If it is set incorrectly, hold tuning shaft steady and reposition pointer.

4. Connect an output meter across speaker voice coils, or from plate of 6V6GT tube to chassis through a 0.1 Mfd. condenser.

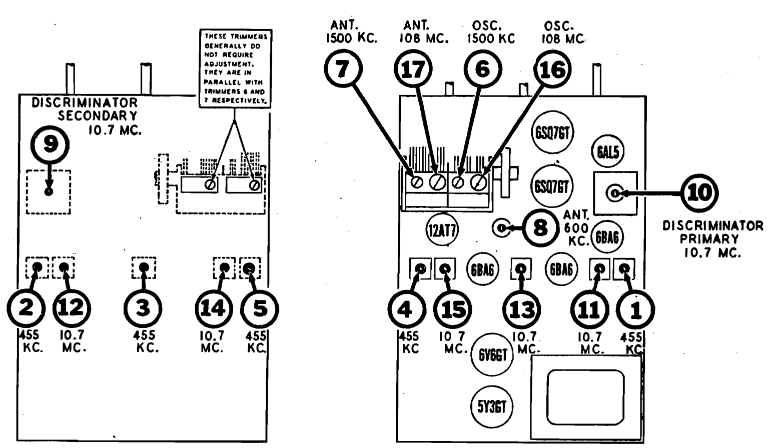
5. Connect ground lead of signal generator to the receiver chassis.

6. Set volume control at maximum volume position and use a weak signal from the signal generator.

7. After alignment procedure is completed and chassis and loop antenna have been reinstalled in cabinet, arrange leads to loop so that they are separated from each other as much as possible—avoid twisting, taping or extending these leads.

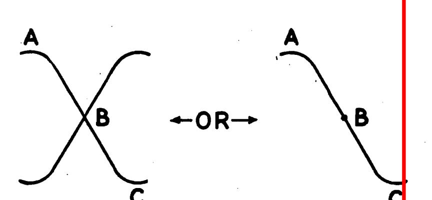
DUMMY ANT. IN SERIES WITH SIGNAL GENERATOR	CONNECT HIGH SIDE OF SIGNAL GENERATOR TO	SIGNAL GENERATOR FREQUENCY	BAND SWITCH POSITION	RECEIVER DIAL SETTING	TRIMMER OR SLUG NUMBER	TRIMMER DESCRIPTION	TYPE OF ADJUSTMENT
.1 MFD. Condenser	Lug on trimmer #7 at top of gang (see figure below for location of trimmer).	455 KC	AM Broadcast (Middle)	Any point where it does not affect the signal.	1-2	3rd I.F.	Adjust for maximum output. Then repeat adjustment.
					3	2nd I.F.	
					4-5	1st I.F.	
1000 MMFD. Mica Condenser	External Antenna Clip on Cabinet	1500 KC	AM Broadcast (Middle)	1500 KC	6	Broadcast Oscillator	Adjust for maximum output.
1000 MMFD. Mica Condenser	External Antenna Clip on Cabinet	1500 KC	AM Broadcast (Middle)	Tune to 1500 Kc. generator signal.	7	Broadcast Antenna	Adjust for maximum output.
1000 MMFD. Mica Condenser	External Antenna Clip on Cabinet	600 KC	AM Broadcast (Middle)	Tune to 600 Kc. generator signal.	8	Adjustable core of Broadcast Antenna Coil.	Adjust for maximum output.
Repeat adjustment of trimmers 7 and 8 until one no longer detunes the other.							

NOTE: It is preferable to check the alignment of the 2nd IF stage in the FM channel after completing AM alignment.



BOTTOM VIEW Fig. 1 TOP VIEW

TRIMMER LOCATION CHART



This double "S" curve pattern results when 'scope uses properly phased "Sawtooth" horizontal deflection voltage whose frequency is twice the modulation frequency of signal generator.

This single "S" curve pattern results when 'scope uses properly phased "sine wave" horizontal deflection voltage.

Fig. 2

MODELS B92CR1,-2,-3,-4,
-8,-9,-10; CHASSIS
9043-A,-B,-C,-D,-K,-L,-M

STEWART-WARNER CORP.

FREQUENCY MODULATION — "FM" — ALIGNMENT PROCEDURE

(USING A VACUUM TUBE VOLTMETER AND AM SIGNAL GENERATOR)

INSTRUMENTS: Although it is preferable to use an FM generator and an oscilloscope, reasonably accurate alignment is obtainable when using a conventional AM generator and vacuum tube voltmeter providing proper care is exercised in adjusting the discriminator circuit trimmer.

IMPORTANT: When using an AM signal generator, it should be capable of producing fundamental frequencies of 10.7 MC and 88 to 108 MC — avoid using an AM generator which produces signals in the 88 to 108 MC range by using harmonics higher than the second. Generators which are dependent upon third, fourth or fifth harmonics for output frequencies of 88 to 108 MC will generally produce undesirable spurious beat signals with the local oscillator in the receiver and alignment will be exceedingly difficult.

1. If alignment of both AM and FM channels is required it is necessary to align the AM channel first, then align the FM channel as instructed in chart below (AM alignment procedure is given on the preceding page).
2. Disconnect leads from FM-AM antenna terminal strip (labelled FM-FM-AM-AM) at back of chassis; also disconnect speaker leads and phono plugs. Remove chassis as well as the two speakers. (If desired, allow speaker to remain in cabinet and connect to receiver by extension leads.)
3. With the gang condenser fully meshed, dial pointer should be in the position indicated by the last division below 55 on the dial. If it is set incorrectly, hold tuning shaft steady and reposition pointer.
4. A specific setting of the receiver volume control is not required. however, it will be found convenient to leave it in the maximum volume position so that alignment signals will be audible even though the output indication is obtained by a V-T voltmeter connected to points in the discriminator circuit.
5. Dress FM circuit leads as short and straight as possible, particularly those in the oscillator circuit. I.F. plate and grid leads should also be kept short and straight.
6. Set band switch to the FM (extreme clockwise) position.

SIGNAL GENERATOR CONNECTIONS	FREQUENCY & TYPE OF MODULATION	VACUUM TUBE VOLTMETER CONNECTIONS	RECEIVER DIAL SETTING	TRIMMER OR SLUG NUMBER	TRIMMER DESCRIPTION	TYPE OF ADJUSTMENT AND OUTPUT INDICATION
Connect high side to Pin #2 of 12AT7. Use a .01 MFD. condenser in series with generator lead. Connect ground lead to receiver chassis in vicinity of 12AT7 tube.	10.7 MC AM signal may be 400 cycle modulated.	Connect common (or ground) terminal of meter to receiver chassis. D.C. probe lead of meter is then connected to pin #7 of the 6AL5 tube.	Any position where it does not affect the signal.	10	Discriminator Primary	Adjust these trimmers for maximum meter reading—the output voltage will be of negative polarity.
				11 and 12	3rd I.F.	
				13	2nd I.F.	
				14 and 15	1st I.F.	
Same as above	Same as above	Before connecting V-T voltmeter, it is necessary to connect two 68,000 ohm resistors (resistance of both units must compare within 1%) in series from pin #7 of the 6AL5 tube to the chassis. Then connect common (or ground) terminal of V-T voltmeter to the junction of these two resistors. D.C. probe lead of meter is now connected to junction of resistor #73 (3300 ohms) and condenser #75 (.02 MFD.) which are in the discriminator output circuit. Set meter for operation on its lowest D.C. voltage range.	Same as above	9	Discriminator Secondary	Note that as trimmer #9 is rotated a point will be found where voltmeter will swing rather sharply from a positive to a negative reading or vice versa. Correct setting of trimmer #9 is obtained when meter reads zero as trimmer is moved through this point. The adjustment is somewhat critical and considerable care must be exercised to set the trimmer for a zero meter indication
Recheck adjustment of trimmers #9 and 10 to be sure that both are set as accurately as possible to obtain the specified output indication on vacuum tube voltmeter. Then disconnect and remove the two 68,000 ohm resistors that were used for the vacuum tube voltmeter connection in the preceding step.						
Generator output leads must be connected to the two "FM" antenna terminals at back of chassis. Insert a 120 Ohm resistor in series with each of the generator leads before connecting to receiver antenna terminals.	108 MC AM signal may be 400 cycle modulated.	Connect common (or ground) terminal of meter to receiver chassis. D.C. probe lead of meter is then connected to Pin #7 of the 6AL5 tube.	108 MC	16	Oscillator Trimmer	Set trimmer #16 to receive 108 MC. signal as indicated by maximum meter reading.
Same as above	Same as above	Same as above	By means of tuning control knob, set dial pointer to 108 MC. mark on dial.	17	Antenna Trimmer	Adjust trimmer #17 for maximum meter reading.
				14 and 15	1st I.F.	Recheck adjustment of these trimmers for maximum meter reading.

Check calibration and tracking of receiver with input signals of 88 and 98 MC. If difference between dial pointer setting and 88 or 98 MC calibration mark does not exceed $\pm$ 0.3 MC. and antenna circuit is tracking properly, then alignment may be considered satisfactory and no further adjustment is necessary.

Where the calibration error is greater than $\pm$ 0.3 MC. it is advisable to make the following adjustments:

1. If pointer falls above the 88 MC. calibration point, it will be necessary to slightly spread the windings of the FM oscillator coil. Then repeat the two preceding adjustments of trimmers 16 and 17 at 108 MC. Should it be found impossible to obtain the 108 MC. signal at the proper point on the dial by adjustment of the trimmers it will then be necessary to adjust the spacing of the gang condenser plates.
2. If pointer falls below the 88 MC. calibration point, it will be necessary to push the windings together on the FM oscillator coil. Then repeat the two preceding adjustments of trimmers 16 and 17 at 108 MC. Should it be found impossible to obtain the 108 MC. signal at the proper point on the dial by adjustment of the trimmers it will then be necessary to adjust the spacing of the gang condenser plates.

STEWART-WARNER CORP. MODELS B92CR1,-2,-3,-4, -8,-9,-10; CHASSIS 9043-A,-B,-C,-D,-K,-L,-M

FREQUENCY MODULATION — "FM" — ALIGNMENT PROCEDURE

(USING AN OSCILLOSCOPE AND FM "SWEEP" GENERATOR)

INSTRUMENTS: Alignment of the FM circuits in this receiver can be most conveniently accomplished with an FM signal generator. When using this type generator, the output indicator must be an oscilloscope.

1. If alignment of both AM and FM channels is required it is necessary to align the AM channel first, then align the FM channel as instructed in chart below (AM alignment procedure is given on page 4).
2. Disconnect leads from FM-AM antenna terminal strip (labelled FM-FM-AM-AM) at back of chassis; also disconnect speaker leads and phono plugs. Remove chassis as well as the two speakers. (If desired, allow speakers to remain in cabinet and connect to receiver by extension leads.)
3. With the gang condenser fully meshed, dial pointer should be in the position indicated by the last division below 55 on the dial. If it is set incorrectly, hold tuning shaft steady and reposition pointer.
4. A specific setting of the receiver volume control is not required, however, it will be found convenient to leave it in the maximum volume position so that alignment signals will be audible even though the output indication is obtained by an oscilloscope connected to points in the discriminator circuit.
5. Dress FM circuit leads as short and straight as possible, particularly those in the oscillator circuit. I.F. plate and grid leads should also be kept short and straight.
6. Set band switch to the FM (extreme clockwise) position.
7. Set tone control to fully counter-clockwise position.

SIGNAL GENERATOR CONNECTIONS	FREQUENCY & TYPE OF MODULATION	OSCILLOSCOPE CONNECTIONS	RECEIVER DIAL SETTING	TRIMMER OR SLUG NUMBER	TRIMMER DESCRIPTION	TYPE OF ADJUSTMENT AND OUTPUT INDICATION
Connect high side to Pin #2 of 12AT7. Use a .01 MFD. condenser in series with generator lead. Connect ground lead to receiver chassis in vicinity of 12AT7 tube.	10.7 MC FM signal should preferably be modulated ±300 KC.	Connect vertical amplifier "high" lead in series with an 0.1 MFD. condenser to pin #6 of 6SQ7 1st A.F. tube. Connect scope ground lead to receiver chassis. Set vertical amplifier of scope for maximum amplification. Where FM signal generator provides an output voltage for synchronization, connect this voltage to "sync" terminals of the scope.	Any position where it does not affect the signal.	9	Discriminator Secondary	Before attempting to adjust trimmer #9, set trimmers #10, 11, 12, 13, 14 and #15 for approximately maximum sound output from the speaker (output meter not required). This is done to obtain sufficient signal for an oscilloscope pattern of desirable amplitude when making the following discriminator trimmer adjustment. Adjust setting of trimmer #9 until a pattern similar to that shown in Fig. 2 appears on the screen. If pattern does not remain stationary operate sweep frequency control on 'scope and also "sync" control until desired result is obtained. Correct setting of trimmer #9 is obtained when crossover point "B" (Fig. 2) is centrally located in both the horizontal and vertical directions; in addition that portion of the curve between "A" and "C" should be as linear (straight) as possible.
Same as above	Same as above	Same as above	Same as above	10	Discriminator Primary	Adjust these trimmers for maximum amplitude and steepness of that portion of the pattern between "A" and "C" (see Fig. 2).
				11 and 12	3rd I.F.	
				13	2nd I.F.	
				14 and 15	1st I.F.	
Recheck adjustments of trimmers #9 and 10 to be sure that both are set as accurately as possible to obtain correct cross-over point or symmetry of pattern.						
Generator output leads must be connected to the two "FM" antenna terminals at back of chassis. Insert a 120 Ohm resistor in series with each of the generator leads before connecting to receiver antenna terminals.	108 MC FM signal should preferably be modulated ±300 KC.	Same as above	108 MC	16	Oscillator Trimmer	Adjust trimmer #16 to obtain the symmetrical pattern shown in Fig. 2. Correct setting of trimmer #16 is obtained when cross-over point in pattern is centrally located.
Same as above	Same as above	Same as above	By means of tuning control knob, set dial pointer to 108 MC. mark on dial.	17	Antenna Trimmer	Adjust trimmer #17 for maximum amplitude of pattern.
				14 and 15	1st I.F.	Recheck adjustment of these trimmers for maximum amplitude of pattern.

Check calibration and tracking of receiver with input signals of 88 and 98 MC. If difference between dial pointer setting and 88 or 98 MC calibration mark does not exceed ± 0.3 MC. and antenna circuit is tracking properly, then alignment may be considered satisfactory and no further adjustment is necessary.

Where the calibration error is greater than ± 0.3 MC. it is advisable to make the following adjustments:

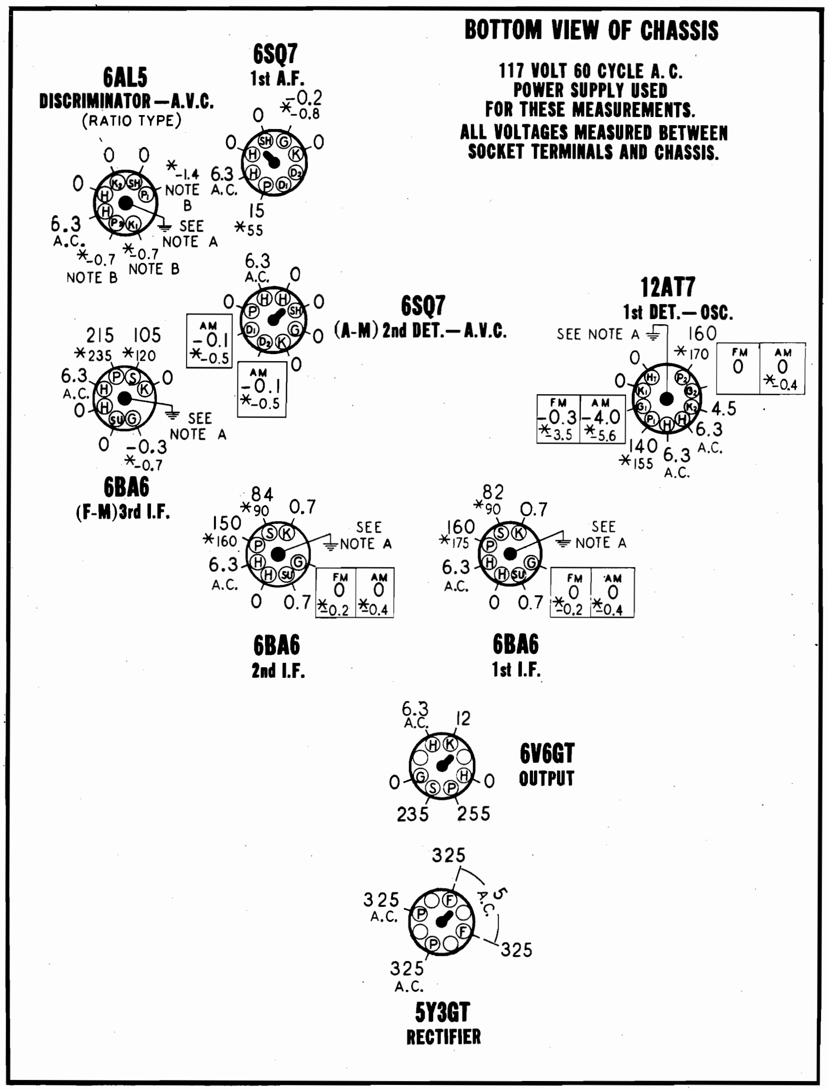
1. If pointer falls above the 88 MC. calibration point, it will be necessary to slightly spread the windings of the FM oscillator coil. Then repeat the two preceding adjustments of trimmers 16 and 17 at 108 MC. Should it be found impossible to obtain the 108 MC. signal at the proper point on the dial by adjustment of the trimmers it will then be necessary to adjust the spacing of the gang condenser plates.
2. If pointer falls below the 88 MC. calibration point, it will be necessary to push the windings together on the FM oscillator coil. Then repeat the two preceding adjustments of trimmers 16 and 17 at 108 MC. Should it be found impossible to obtain the 108 MC. signal at the proper point on the dial by adjustment of the trimmers it will then be necessary to adjust the spacing of the gang condenser plates.

MODELS B92CR1, -2, -3, -4, -8, -9, -10 STEWART-WARNER CORP. CHASSIS 9043-A, -B, -C, -D, -K, -L, -M

SOCKET VOLTAGES

Measured with voltmeter having sensitivity of 1000 ohms per volt except where indicated by (*). The (*) symbol designates a vacuum tube voltmeter measurement.

ALL MEASUREMENTS MADE WITH BAND SWITCH IN "FM" POSITION UNLESS OTHERWISE INDICATED
DIAL TUNED TO 88MC. FOR "FM" MEASUREMENTS
DIAL TUNED TO 540KC. FOR "AM" MEASUREMENTS
VOLUME CONTROL SET TO MINIMUM WITH NO SIGNAL
TONE CONTROL SET TO FULLY CLOCKWISE POSITION
GROUND ALL ANTENNA TERMINALS



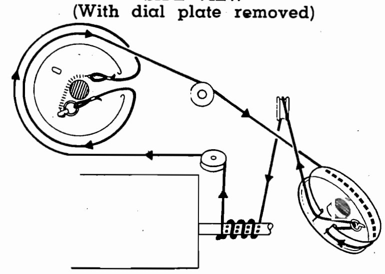
REAR OF CHASSIS

NOTE A: Grounding of center stud on tube socket is necessary to reduce capacity coupling between other pins. Oscillation may result if this ground is omitted.

NOTE B: This measurement should NOT be made with a conventional type voltmeter as circuit may break into oscillation due to coupling thru instrument leads; use a vacuum tube voltmeter with short leads.

DIAL AND POINTER DRIVE CORD ARRANGEMENT

SIDE VIEW
(With dial plate removed)



To string dial cord, first slip pointer off its shaft. Then remove dial scale by taking out the six clips around edges. Dial plate may be taken off by removing the two screws which are visible and accessible at front of chassis. Now set gang condenser to fully open position and use the following parts:

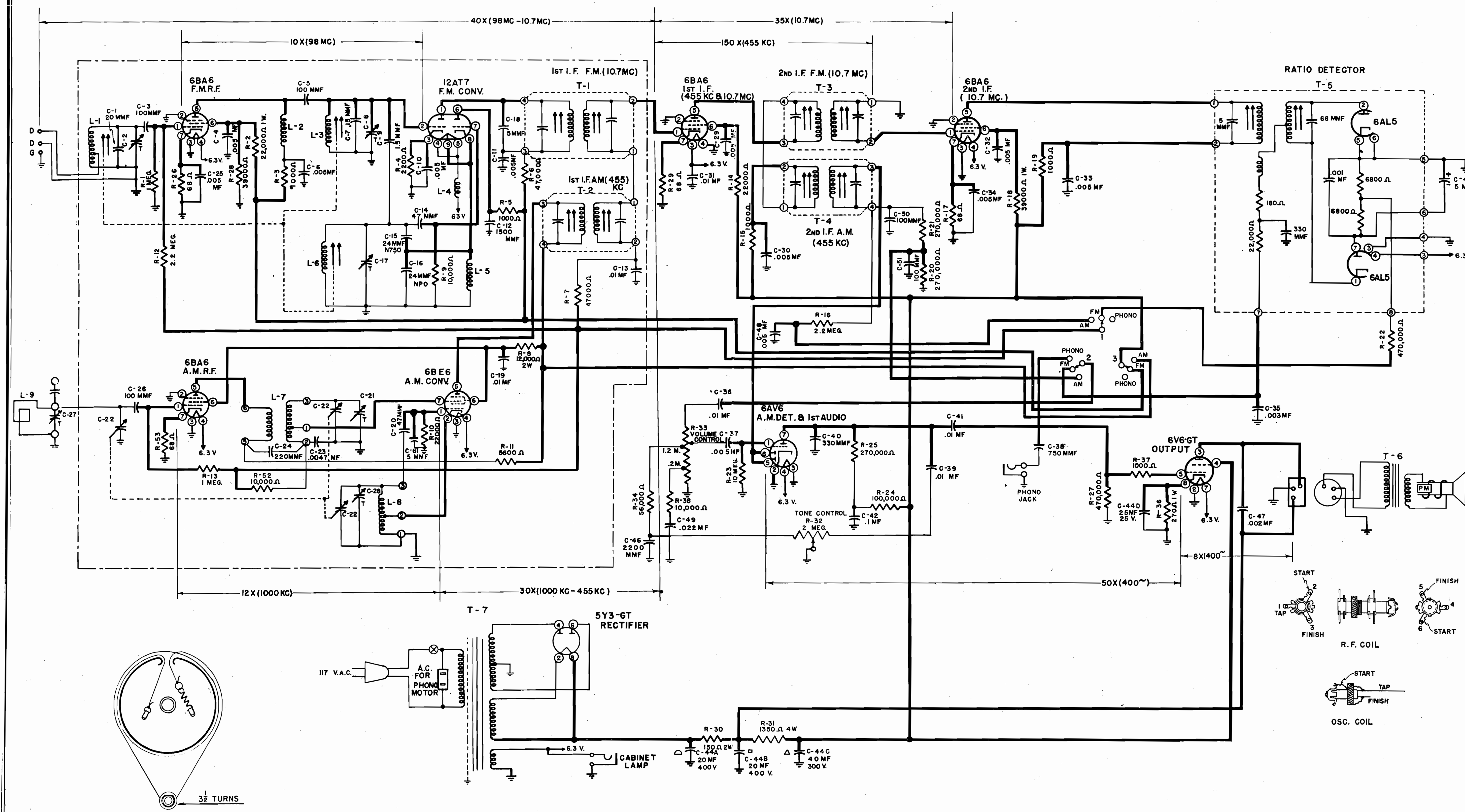
114955 Clip on end of cord
117057 Cord (3 feet)
119087 Ring for dial cord
505161 Tension spring

To replace and properly position pointer see step 3 in "AM-Alignment Procedure" on page 4.

STROMBERG-CARLSON CO.

MODELS 1406PLA, 1406PLM

SCHEMATIC



Note: C-30 should be shown returning to 6BA6 1st IF screen grid (Pin 6), instead of to ground. The wire should be shown removed from Pin 5 of 6AV6 AM Detector and then Pin 5 should be shown grounded.

STROMBERG-CARLSON CO.

MODELS 1406PLA, 1406PLM

SPECIFICATIONS

Voltage Rating....................50-60 cycle 117V

Tuning Range {AM....................535 to 1630 Kc.
{FM....................87 to 109 Mc.

Input Power Rating {Radio ....70 Watts
{Phono ....25 Watts

Itermediate Frequency {AM....................455 Kc.
{FM....................10.7 Mc.

Speaker Voice Coil Impedance at 400 Cycles....................6 Ohms

Power Output....................3 Watts

TUBE COMPLEMENT

6BA6	IF & RF Amplifiers	....	4
12AT7	FM Converter	....	1
6BE6	AM Converter	....	1
6AL5	Ratio Detector	....	1
6AV6	AM Detector	....	1
6V6GT	Power Output	....	1
5Y3GT	Rectifier	....	1
			10

IDENTIFICATION TABLE

Model	Chassis	Cabinet	Speaker	Phonograph	
				Mfr. No.	S-C No.
PLM	112052	108126	155065	VM-800A	148035
PLA	112052	108127	155065	VM-800A	148035

REPLACEMENT PARTS

The 1406 receiver uses many of the same parts that are also used on the 1407. Therefore, when ordering replacement parts, use the 1407 Service Notes with the exception of the following which replace corresponding parts of the 1407.

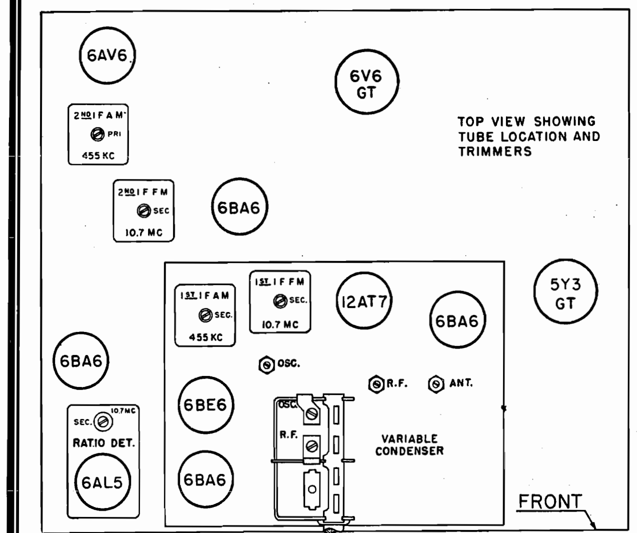
Part No.	Circuit No.	Description
110413	C-61	5MMF Ceramic Capacitor
111057	C-44	Electrolytic Capacitor
122035		Dial
124022		Drive Cord Assembly
134054		Ring
134074		Knob (Tuning)
134075		Knob (Tone and Volume)
134077		Knob (Selector)
144020		Pointer
145073	R-33	Potentiometer 2 Meg. (Volume Control)
145074	R-32	Potentiometer 2 Meg. (Tone Control)
147023		Pulley Assembly
149321	R-31	1350 Ohms 4 Watt
158034		Range Switch

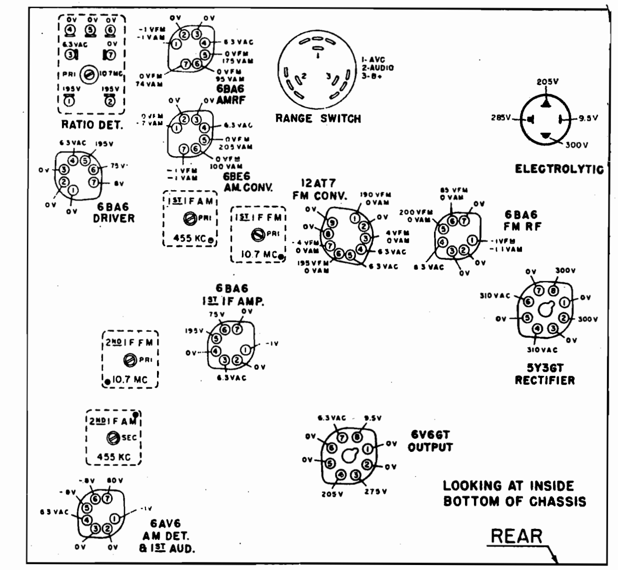
CABINET PARTS

Part No.	PLA	PLM	Description
130080	x		Grille Cloth
130081		x	Grille Cloth
132016	x	x	Bullet Catch
132063	x	x	Knife Hinge R.H.
132064	x	x	Knife Hinge L.H.
132109		x	Door Pull
132110	x		Door Pull
132112	x	x	Drawer Slide
132113	x	x	Drawer Glide
148033	x	x	Drawer Assembly
201016	x		Door Pull Screw
204041		x	Door Pull Screw
524198	x	x	Hinge Mounting Screw

MODELS 1406PLA, 1406PLM

STROMBERG-CARLSON CO.





TUBE LOCATION AND VOLTAGE CHARTS

NOTE: Dots on IF trans. indicate the position of the color coded terminals.

ALIGNMENT PROCEDURE

On IF and Ratio Detector transformers, primary slugs are under chassis and secondary slugs above chassis.
Adjust AM loop trimmer after chassis is in cabinet for best reception at 1500 Kc.
Adjust dial pointer to diamond under 88 Mc. with condenser plates fully meshed.

Band & Pointer	Signal Generator	VTVM or Scope Connection	Adjustment and Notes
A.M. - I.F.			
1. AM low end of dial.	455 Kc. 400 cy. mod. to Pin 7 (Grid) of 6BE6 tube through .01 cap.	Term. 2 of Range sw and ground.	Adj. two AM-IF trans., using —3V DC Scale.
2. "	455 Kc. swept 15 Kc.	"	Adjust same for best double-trace curve on scope.
F.M. - I.F.			
1. FM low end of dial.	10.7 Mc. 400 cy. mod. to Pin 2 (Grid) of 12AT7 tube at RF Coil thru .01 capacitor.	"	Detune secondary of ratio det. Adj. two FM-IF trans. and pri. ratio det. trans., using —3 VDC scale.
2. "	10.7 Mc. swept 150 Kc.	"	Disconnect ground end of C-43 (5 mfd. electrolytic under ratio detector can). Adj. as step 1 for best double-trace curve on scope.
3. "	"	Terms. 2 & 1 of Range sw.	Be sure VTVM is not grounded. Connect C-43, Adj. sec. ratio det. for 0 voltage.
A.M. - R.F.			
1. AM 1500 Kc.	1500 Kc. 400 cy. mod. coupled loosely to loop leads.	Term. 2 of Range sw and ground.	Adj. two trimmers on tuning cond., using low —DC scale.
F.M. - R.F.			
1. FM 100 mc.	100 Mc. 400 cy. mod. to FM Ant. Terms., thru 270 ohm resistor.	"	Adj. C-17 (Osc.) C-8 (RF) and C-2 (Ant.) on low —DC scale.

Align both IF channels if either is out of adjustment.
Use a non-metallic screwdriver and light pressure for slug adjustment.
2nd AM-IF trans. will be damaged if chassis is placed on left side.
If FM osc. coil is replaced, adjust placement of its ground lead for tracking at 88 mc.
Refer to No. 4 Vol. 1 Current Flash for suggested instrument use.

STROMBERG-CARLSON CO.

MODELS 1407PFM, 1407PLM, 1409 M-2W, M2-M, M2-Y, M3A, M3M, PGM, PGW

SPECIFICATIONS

	1407	1409
Voltage Rating	50-60 Cycle 117V	50-60 Cycle 117V
Type Of Circuit	Superheterodyne	Superheterodyne
Tuning Range AM	535 to 1630 Kc.	535 to 1630 Kc.
Tuning Range FM	87 to 109 Mc.	87 to 109 Mc.
Input Power Rating Radio	70 Watts	100 Watts
Input Power Rating Phono	25 Watts	25 Watts
Intermediate Frequency AM	455 Kc.	455 Kc.
Intermediate Frequency FM	10.7 Mc.	10.7 Mc.
Speaker Voice Coil Impedance at 400 Cycles	6 Ohms	6 Ohms
Power Output	3 Watts	11 Watts

TUBE COMPLEMENT

		1407	1409
6BA6	IF & RF Amplifiers	4	5
12AT7	FM Converter	1	1
6BE6	AM Converter	1	1
6AL5	Ratio Detector	1	1
6AV6	AM Detector & Audio Amplifier	1	1
12AU7	Audio Phase Inverter		1
6V6GT	Power Output	1	2
5Y3GT	Rectifier	1	1
6E5	Tuning Eye		1
		10	14

IDENTIFICATION TABLES

Model	Cabinet
1409 M3A	108112
1409 M3M	108098
1409 M-2W	108093
1409 M2-Y	108091
1409 M2-M	108092
1409 PGM	108095
1409 PGW	108096
1407 PLM	108090
1407 PFM	108099

Description	Part No.
1409 Chassis	112036
1407 Chassis	112037
1409 & 1407 Speaker	155065
1409 Phonograph	148022 (Seeburg SQ-2)
	148018 (Seeburg S)
	148026 (VM-402 Duo)
	148031 (VM-402)
1407-PL Phonograph	148021 (Seeburg SQ-1)
	148024 (VM-400)
1407-PF Phonograph	148026 (VM-402 Duo)
	148030 (VM-402)
	148021 (Seeburg SQ-1)

REPLACEMENT PARTS

Resistors

Part No.	1409 R-No.	1407 R-No.	Description
27640	34,35		150,000 Ohms ½ W
28144	17,21,26, 29,53	17,26,29,53	68 Ohms ½ W
28162	4	4	2200 Ohms ½ W
28169	40		8200 Ohms ½ W
28170	20		10,000 Ohms ½ W
28176	28	28	39,000 Ohms ½ W
28177	6	6	47,000 Ohms ½ W
28178	43	34	56,000 Ohms ½ W
28184	41	20,21,25	270,000 Ohms ½ W
28186	33		390,000 Ohms ½ W
28187	42,44,55		470,000 Ohms ½ W
28195	12	12	2.2 Meg. ½ W
149020	45		330 Ohms 2 W
149036		30	150 Ohms 2 W
149055	8	8	12,000 Ohms 2 W
149101	3,5,15,19, 23,31	3,5,15,19,37	1000 Ohms ½ W
149103	50,51		2200 Ohms ½ W
149107	9,52	9,38,52	10,000 Ohms ½ W
149109	10	10	22,000 Ohms ½ W
149111	7	7	47,000 Ohms ½ W
149112	47		68,000 Ohms ½ W
149113	32	24	100,000 Ohms ½ W
149115	38,39		220,000 Ohms ½ W
149117		22,27	470,000 Ohms ½ W
149119	1,13	1,13	1 Meg. ½ W
149121	16,24	16	2.2 Meg. ½ W
149123	27,46		4.7 Meg. ½ W
149125		23	10 Meg. ½ W
149170		36	270 Ohms 1 W
149184	11	11	5600 Ohms 1 W
149188	2	2,14,18	22,000 Ohms 1 W
149189	14,18,22		39,000 Ohms 1 W
149247	30		1,000 Ohms 10 W
149282	54	41	4.7 Ohms 1 W
149286		31,32	2700 Ohms 2 W

Capacitors

Part No.	1409 C-No.	1407 C-No.	Description
25483		42	.1 MF 400 V Tubular
27646	50		.002 MF 600 V Tubular
27760		30,37,48	.005 MF 600 V Tubular
46315		35	.003 MF 400 V Tubular
110025	2,8,17	2,8,17	Trimmer
110029	22	22	Variable Condenser
110031	27	27	Trimmer 1.5-15 MMF
110402	14,20	14,20	47 MMF Ceramic
110403	16	16	24 MMF Ceramic
110404	1	1	20 MMF Ceramic
110405	7	7	15 MMF Ceramic
110419	45		.005 MF 500 V Tubular
110438	9	9	1.5 MMF Ceramic
110451	3,5,26,34,40	3,5,26,50,51	100 MMF Ceramic
110453	24	24	220 MMF Ceramic
110454		40	330 MMF Ceramic
110455	39,43		470 MMF Ceramic
110456	44	38	750 MMF Ceramic
110457	12	12	1500 MMF Ceramic
110476	56		100 MMF Ceramic NPO
110478	31		Diode Filter
110488	37		.003 MF 500 V Tubular
110536		46	2200 MMF Moulded
110540	13,19,29,30, 32,33,35, 36,38,41, 47,53,54, 59,60	13,19,31,36	.01 MF 400 V Moulded

MODELS 1407PFM, 1407PLM, Series 1409

STROMBERG-CARLSON CO.

REPLACEMENT PARTS—Continued

Part No.	1409 C-No.	1407 C-No.	Description
110542	46	49	.022 MF 400 V Moulded
110546	57		.1 MF 400 V Moulded
110551		47	.0022 MF 600 V Moulded
110555		39,41	.01 MF 600 V Moulded
110538	23	23	.0047 MF 400 V Moulded
110586	4,6,10,11, 25,42,49	4,6,10,11, 25,29,32, 33,34	.005 MF Disc Ceramic
110587	48		.004 MF 500 V Tubular
110592	15	15	24 MMF Ceramic N 750
110593	18	18	5 MMF Ceramic
111043	51		Electrolytic
111044	52		Electrolytic
111045		45	Electrolytic
111046		44	Electrolytic
111047	58	43	Electrolytic
111048	55		Electrolytic

Potentiometers

145056	R-25		Volume On-Off, 1 Meg.
145057	R-37	R-35	Treble, 1 Meg.
145058	R-36		Bass, 5 Meg.
145059		R-33	Volume On-Off, 2 Meg.
145060		R-40	Bass, 2 Meg.

Coils—Transformers

114051	L-8	L-8	A.M. Osc. Coil
114052	L-7	L-7	A.M. RF Coil
114053	L-1	L-1	FM Ant. Coil
114054	L-3,6	L-3,6	FM RF and Osc. Coil
114329	L-10		3rd. IF FM Coil
114337	T-4		2nd IF AM
114363	T-1,3	T-1,3	IF FM
114364	T-2	T-2,4	IF AM
114365	T-5	T-5	Ratio Detector
114618	L-11,12		Heater Choke Coil
114620	L-5	L-5	R.F. Cathode Choke
114621	L-4	L-4	R.F. Heater Choke Coil
114633	L-2	L-2	R.F. Plate Choke Coil
161239		T-6	Output Transformer
161240	T-6		Output Transformer
161415		T-7	Power Transformer
161416	T-7		Power Transformer

Tone Dial Assembly

18630	x	x	Tone Dial Lamp
119015	x	x	Tone Dial Plug Shell
134061	x	x	Tone Wheel
138017	x	x	Red Lens
138018	x	x	Blue Lens
138019	x	x	Inside Lens Holder
138020	x	x	Outside Lens Holder
143014	x	x	Tone Dial Plug (5 point)
152058	x	x	Tone Dial Lamp Socket

Miscellaneous

29956	x	x	Pilot Lamp
32041	x		Speaker Socket
107010	x	x	Push Button
109031	x	x	Eye Cable Assembly
113030	x	x	I.F. Trans. Mtg. Clip
118028	x	x	F.M. R.F. Core
122031	x	x	Dial Glass
124018	x	x	Drive Cord Assembly
129019	x	x	Pinion Gear
129022	x	x	Core Carriage Gear Assembly
131004	x	x	A-C Cord Grommet
131015	x	x	Dial Glass Grommet
134059	x	x	Knob
139028	x	x	A.M. Loop Assembly
142048	x	x	Dial Plate

Part No.	1409	1407	Description
144017	x	x	Pointer
146192	x	x	Call Letters
147022	x	x	¾" Pulley
147023	x	x	Pulley Assembly
147026	x	x	Balance Wheel
147027	x	x	Dial Drive Pulley
150037	x	x	Dial Drive Shaft
151028	x	x	Tube Shield Base
151036	x	x	Tube Shield
151060	x	x	R.F. Shield
151063	x		I.F. Shield
152009	x	x	Pilot Light Socket & Plug Assembly
152014	x	x	Octal Socket
152021	x	x	7 Pin Miniature Socket
152033		x	Speaker Socket
152038	x	x	A-C Socket
152055	x	x	Pilot Lamp Socket
152056	x	x	9 Pin Miniature Socket
152057	x	x	5 Pt. Socket
154042	x	x	Rubber Coil Spacer
155066	x	x	Speaker Cone
158031	x	x	A.M.-F.M. Switch
158032	x	x	Radio-Phono Switch
159027	x	x	Antenna Binding Post

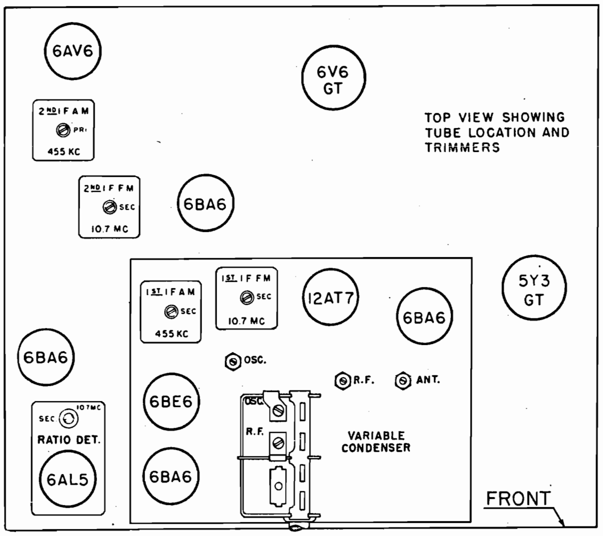
Cabinet Parts

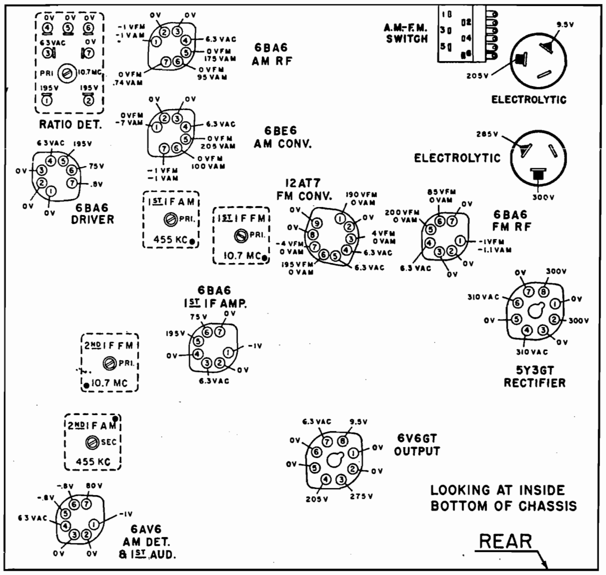
Part No.	1409—M3M, M3A	1409 M2W, M2Y, M2M	1409—PGM, PGW	1407—PLM	1407—PF	Description
37148			x			Door Pull
38442			x			Bullet Catch
41102			x	x		Stop Hinge R.H.
41103			x	x		Stop Hinge L.H.
108087	x			x	x	Phono Drawer and Track
125018		x				Speaker Escutcheon
125025	x	x	x	x	x	Plastic Escutcheon
125026	x	x	x			Metal Escutcheon
125028				x	x	Metal Escutcheon
130003		x				Grille Cloth
130030				x		Grille Cloth
130031				x		Metal Grille
130062	x					Grille Cloth
130064			x			Grille Cloth
130070					x	Grille Cloth
132009		x				Concealed Door Pull
132013		x				Butt Hinge
132016	x	x		x	x	Bullet Catch
132021		x	x			Right Phono Track
132022		x	x			Left Phono Track
132053		x				Upper Hinge, Semi-Concealed
132059	x			x	x	Right Phono Track
132060	x			x	x	Left Phono Track
132061				x		Door Pull
132062				x		Rosette
132063				x	x	Hinge, R. H.
132064				x	x	Hinge, L. H.
132065		x				Door Pull
132071				x		Album Door Pull
132084		x				Lower Hinge, Semi-Concealed
132089	x					Hinge
132090	x					Door Pull
132103					x	Door Pull
148019		x	x			Phono Drawer and Track
152009		x	x	x	x	Socket and Plug Assembly
201848					x	Door Pull Screw
201849				x		Album Door Pull Screw
801401			x	x	x	Lamp Cap
801403		x				Lamp Cap

STROMBERG-CARLSON CO.

MODELS 1407PFM, PLM

1407 TUBE LOCATION AND VOLTAGE CHARTS





NOTE: Dots on IF trans. indicate the position of the color coded terminals.

ALIGNMENT PROCEDURE 1407

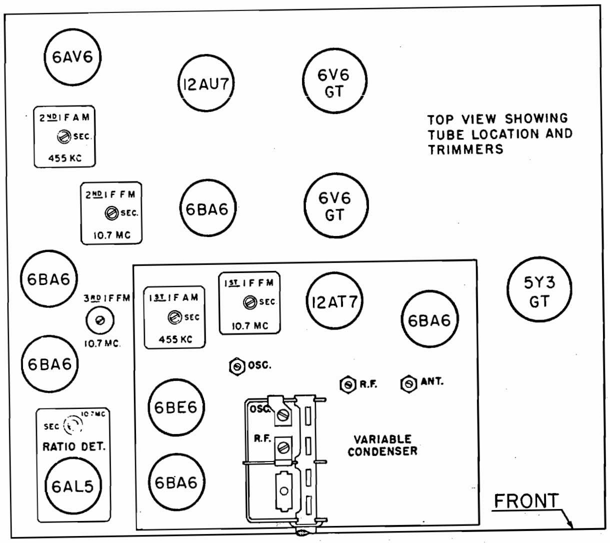
On IF and Radio Detector transformers, primary slugs are under chassis and secondary slugs above chassis.
Adjust AM loop trimmer after chassis is in cabinet for best reception at 1500 Kc.
Adjust dial pointer to marker at top left of dial with condenser plates fully meshed.

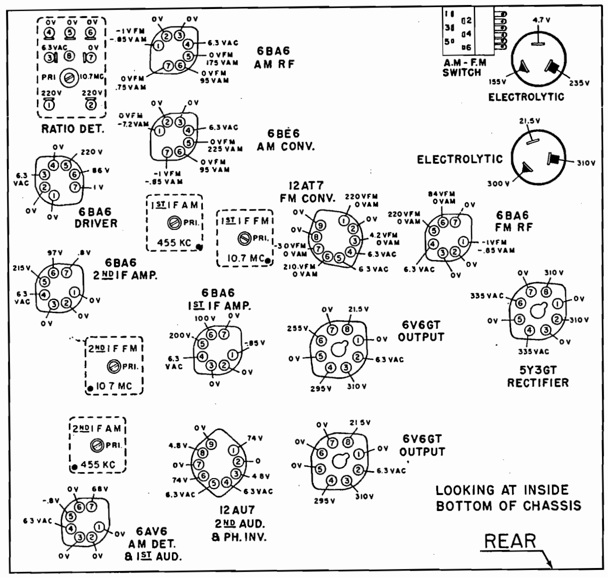
Band & Pointer	Signal Generator	VTVM or Scope Connection	Adjustment and Notes
A.M. - I.F.			
1. AM low end of dial.	455 Kc. 400 cy. mod. to Pin 7 (Grid) of 6BE6 tube through .01 cap.	Term. 2 of AM-FM sw and ground.	Adj. two AM-IF trans., using —3V DC Scale.
2. "	455 Kc swept 15 Kc.	"	Adjust same for best double-trace curve on scope.
F.M. - I.F.			
1. FM low end of dial.	10.7 Mc. 400 cy. mod. to Pin 2 (Grid) of 12AT7 tube at RF Coil thru .01 capacitor.	"	Detune secondary of ratio det. Adj. two FM-IF trans. and pri. ratio det. trans., using —3 VDC scale.
2. "	10.7 Mc. swept 150 Kc.	"	Disconnect ground end of C-43 (5 mfd. electrolytic under ratio detector can). Adj. as step 1 for best double-trace curve on scope.
3. "	"	Terms. 2 & 5 of AM-FM sw.	Be sure VTVM is not grounded. Connect C-43, Adj. sec. ratio det. for 0 voltage.
A.M. - R.F.			
1. AM 1500 Kc.	1500 Kc. 400 cy mod. coupled loosely to loop leads.	Term. 2 of AM-FM sw & ground.	Adj. two trimmers on tuning cond., using low —DC scale.
F.M. - R.F.			
1. FM 100 mc.	100 Mc. 400 cy. mod. to FM Ant. Terms., thru 270 ohm resistor.	"	Adj. C-17 (Osc.) C-8 (RF) and C-2 (Ant.) on low —DC scale.

Align both IF channels if either is out of adjustment.
Use a non-metallic screwdriver and light pressure for slug adjustment.
2nd AM-IF trans. will be damaged if chassis is placed on left side.
If FM osc. coil is replaced, adjust placement of its ground lead for tracking at 88 mc.

MODEL 1409 Series STROMBERG-CARLSON CO.

1409 TUBE LOCATION AND VOLTAGE CHARTS





NOTE: Dots on IF trans. indicate the position of the color coded terminals.

ALIGNMENT PROCEDURE 1409

On IF and Ratio Detector transformers, primary slugs are under chassis and secondary slugs above chassis.
Adjust AM loop trimmer after chassis is in cabinet for best reception at 1500 Kc.
Adjust dial pointer to marker at top left of dial with condenser plates fully meshed.

A.M. - I.F.

Band & Pointer	Signal Generator	VTVM or Scope Connection	Adjustment and Notes
1. AM low end of dial.	455 Kc. 400 cy. mod. to Pin 7 (Grid) of 6BE6 tube through .01 cap.	Term. 2 of AM-FM sw and ground.	Adj. two AM-IF trans., using —3V DC Scale.
2. "	455 Kc swept 15 Kc.	"	Adjust same for best double-trace curve on scope.

F.M. - I.F.

Band & Pointer	Signal Generator	VTVM or Scope Connection	Adjustment and Notes
1. FM low end of dial.	10.7 Mc. 400 cy. mod. to Pin 2 (Grid) of 12AT7 tube at RF Coil thru .01 capacitor.	"	Detune secondary of ratio det. Adj. three FM-IF trans & ratio det. primary using —3V DC scale.
2. "	10.7 Mc swept 150 Kc.	Pin 6 (screen) of third IF tube thru .01 capacitor.	Adj. as above for best double-trace curve on scope.
3. "	"	Term. 2 of AM-FM switch & Term 8 of ratio det. trans.	Be sure VTVM is not grounded. Adj. sec. of ratio det. for 0 voltage.

A.M. - R.F.

Band & Pointer	Signal Generator	VTVM or Scope Connection	Adjustment and Notes
1. AM 1500 Kc.	1500 Kc. 400 cy mod. coupled loosely to loop leads.	Term. 2 of AM-FM sw & ground.	Adj. two trimmers on tuning cond., using low —DC scale.

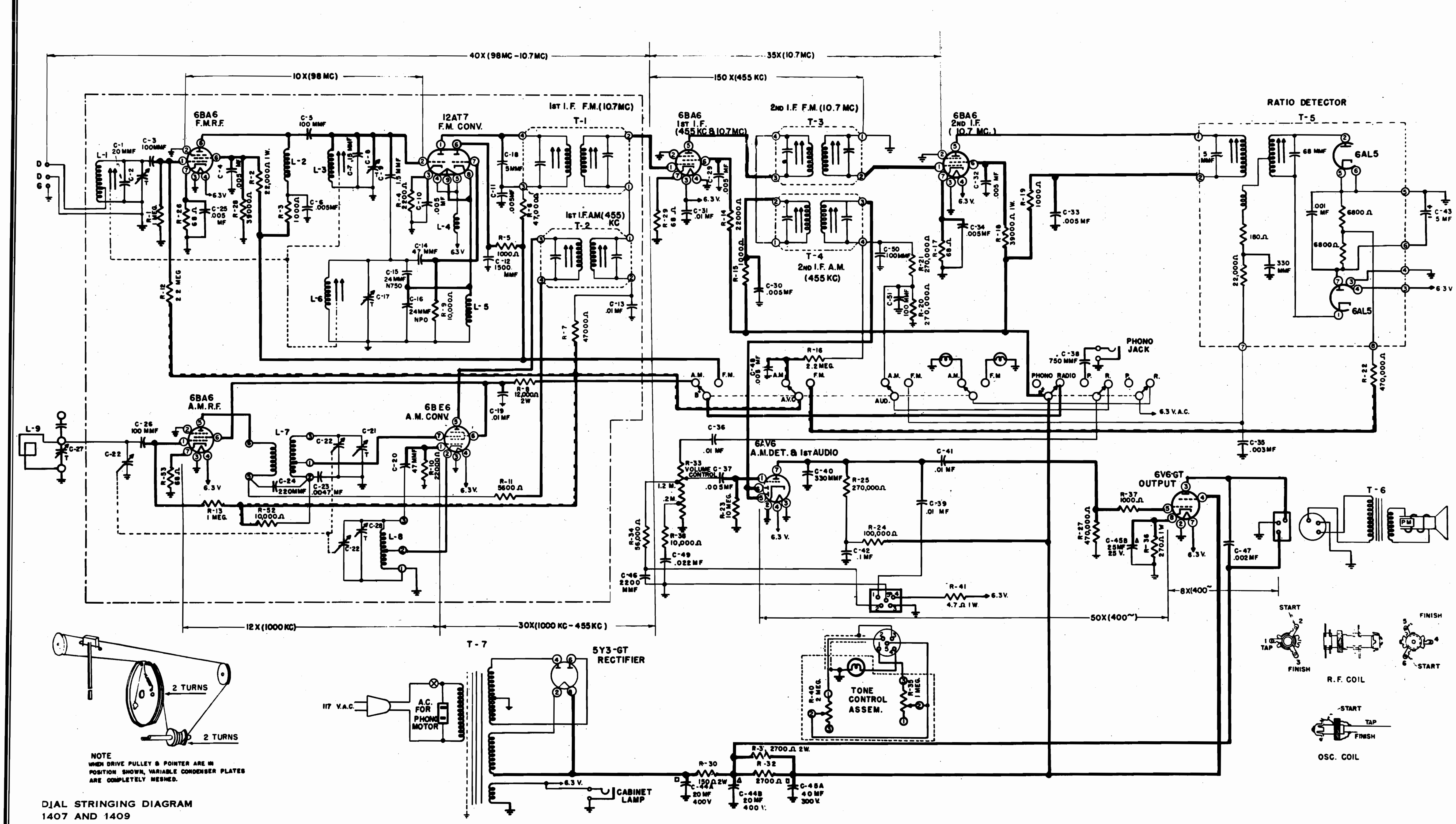
F.M. - R.F.

Band & Pointer	Signal Generator	VTVM or Scope Connection	Adjustment and Notes
1. FM 100 mc.	100 Mc. 400 cy. mod. to FM Ant. Terms., thru 270 ohm resistor.	"	Adj. C-17 (Osc.) C-8 (RF) and C-2 (Ant.) on low —DC scale.

Align both IF channels if either is out of adjustment.
Use a non-metallic screwdriver and light pressure for slug adjustment.
2nd AM-IF trans. will be damaged if chassis is placed on left side.
If FM osc. coil is replaced, adjust placement of its ground lead for tracking at 88 mc.

STROMBERG-CARLSON CO.

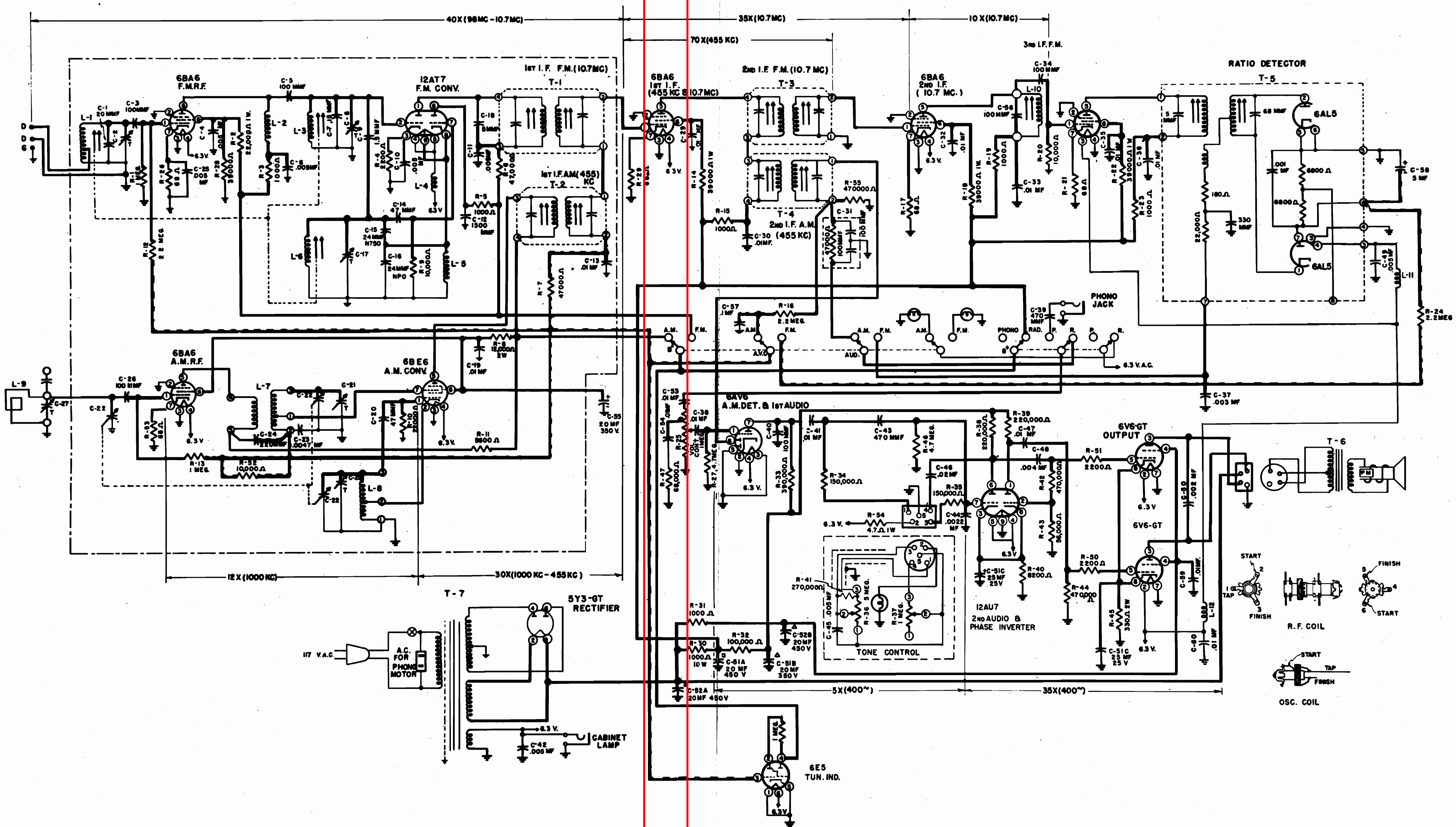
RADIO RECEIVER 1407



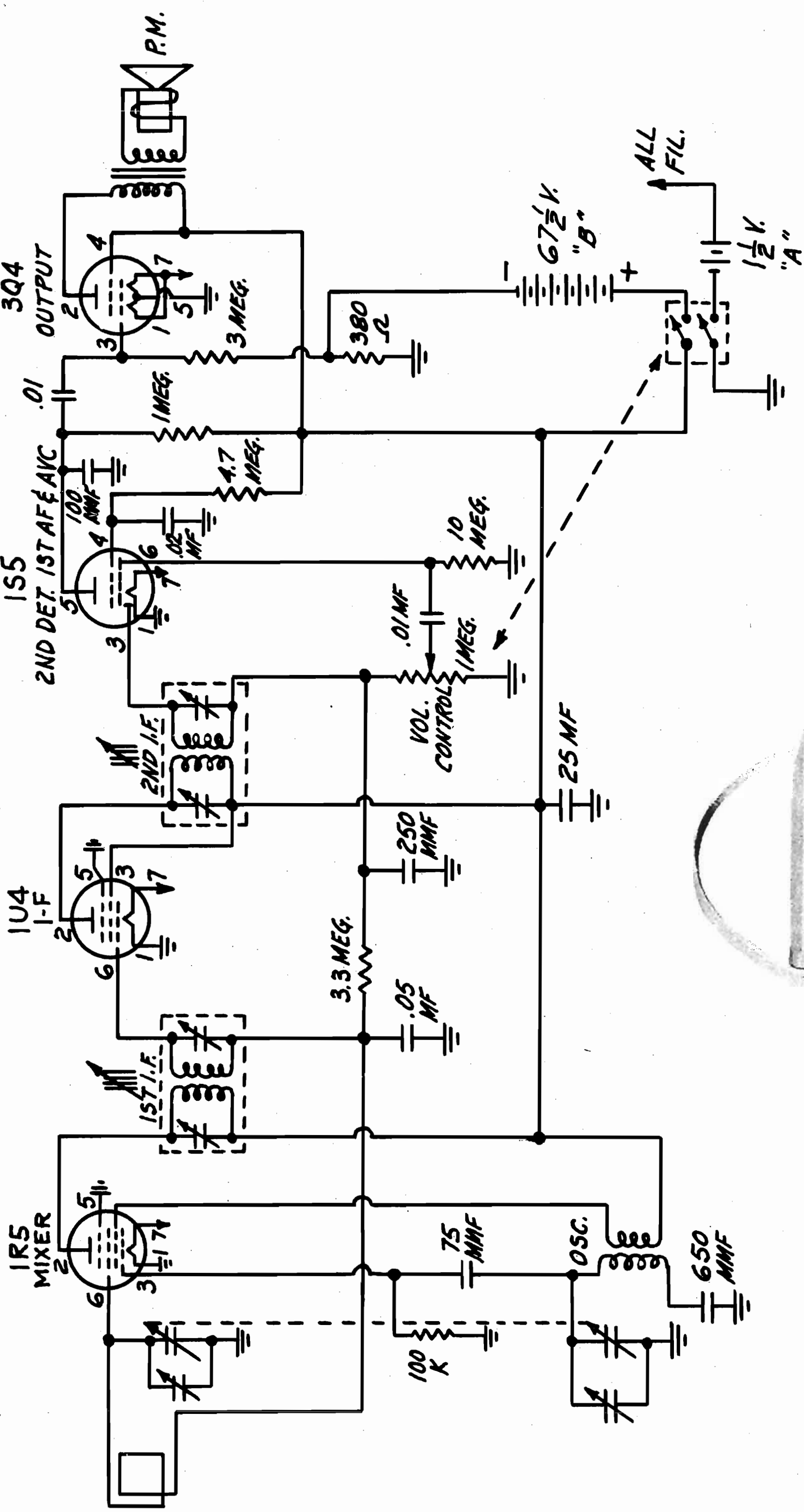
MODELS 1409 M-2W, M2-M, M2-Y, M3A, M3M, PGM, PGW

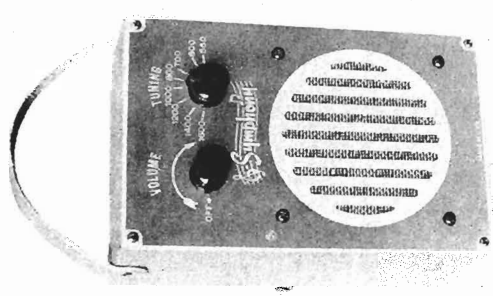
STROMBERG-CARLSON CO.

RADIO RECEIVER 1409

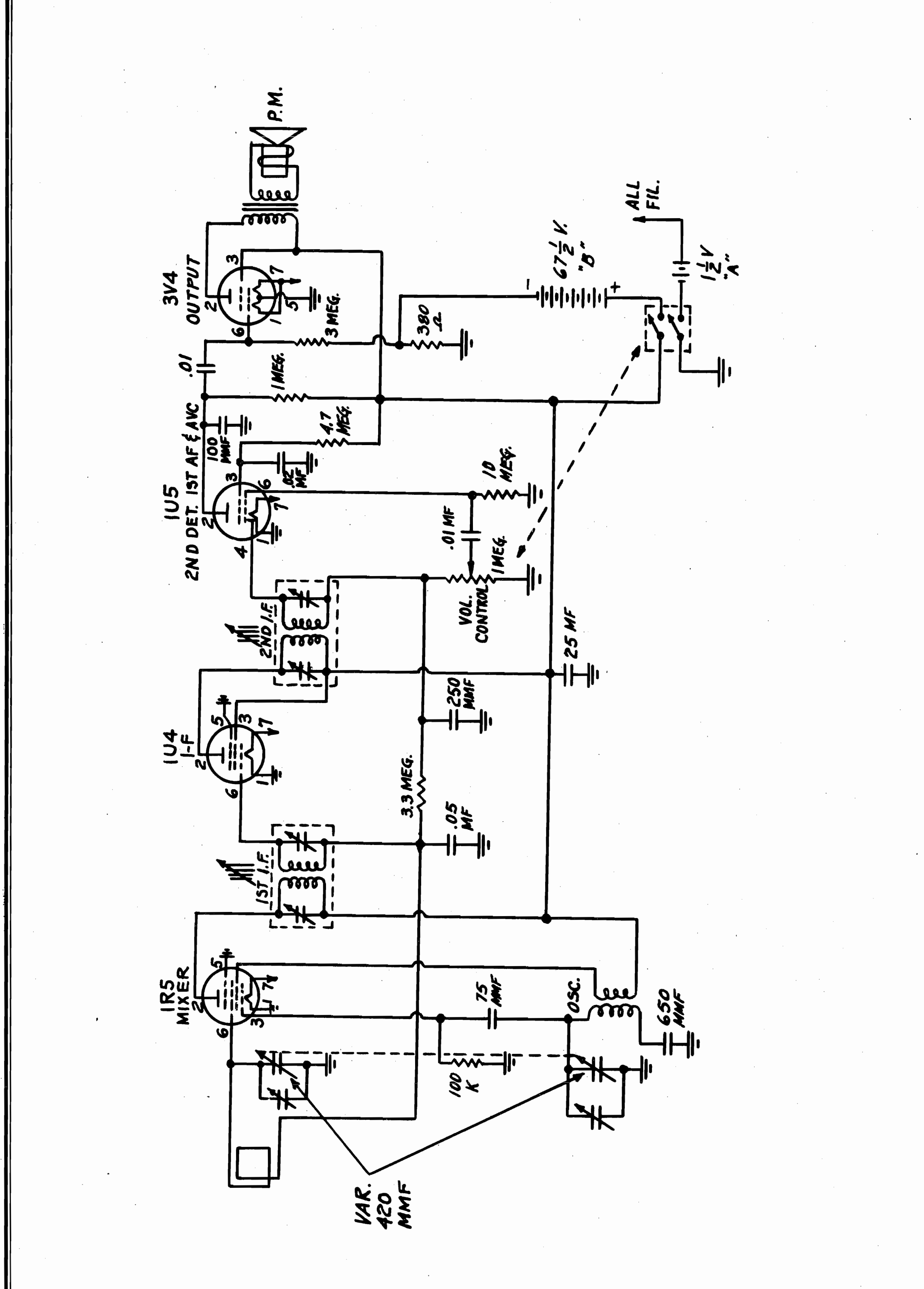


SYMPHONY RADIO & TELEV. CORP. MODEL 250



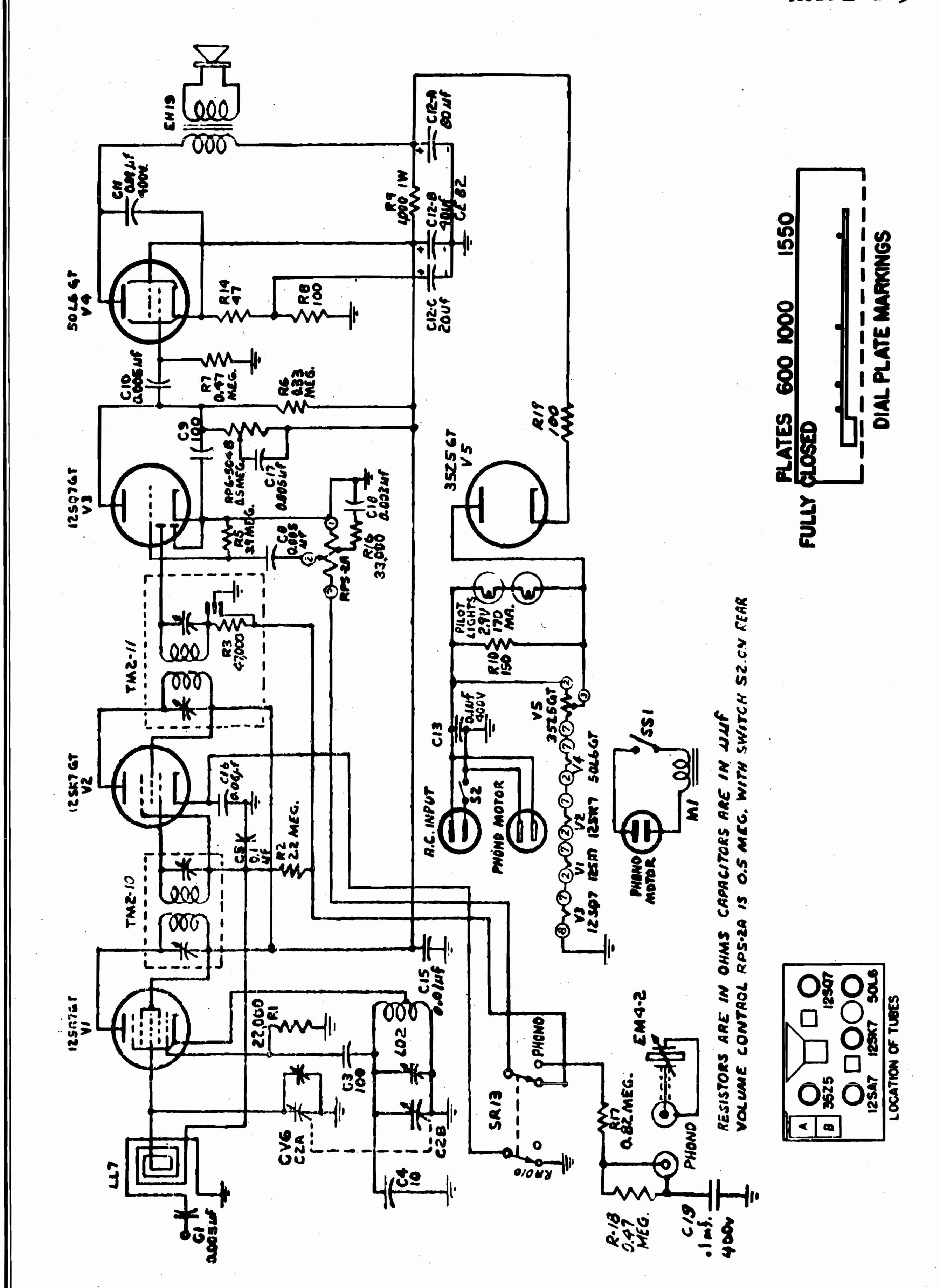


MODEL 255 SYMPHONY RADIO & TELEV. CORP.



TEMPLETONE RADIO MFG. CORP.

MODEL G-516



MODELS G-615, G-618

TEMPLETONE RADIO MFG. CORP.

OPERATING INSTRUCTIONS AND SERVICE NOTES

Model G-618 Temple Radio is a 6-tube superheterodyne receiver having an RF stage for increased sensitivity and using the latest type of low-drain electronic tubes.

Operation: The set operates on 110 to 120 volts, 50 or 60 cycles A. C. and 110 to 120 volts D. C. Power drain is approximately 30 watts.

When operated on direct current (D. C.), if no reception is obtained after approximately one minute of warm-up time, reverse the line plug in the power outlet.

Range: Model G-618 covers the broadcast band from 540 to 1620 kilocycles. Since the scale is calibrated 54 to 160, the actual frequency of the station received is obtained by adding a zero to the dial calibration.

Controls: Only two controls are required for operation. The left-hand control puts set into operation, increases the volume with clockwise rotation, and includes the power switch. The right-hand control tunes the dial to the desired station.

Antenna: For normal reception, no outside aerial is required, as more than adequate pickup is obtained by the self-contained loop antenna.

At installations remote from the stations desired to be heard, improved results may be obtained by rotating the receiver for maximum response, as the loop antenna has a marked directional effect on weak signals. Reception can also be improved, and the directional effect reduced, by attaching a length of insulated wire approximately 15 to 25 feet long, to the antenna connection provided at the back of the cabinet. This wire may be laid on the floor along one side of the room, or concealed under the rug. No external ground is required — such ground is automatically provided through the power lines.

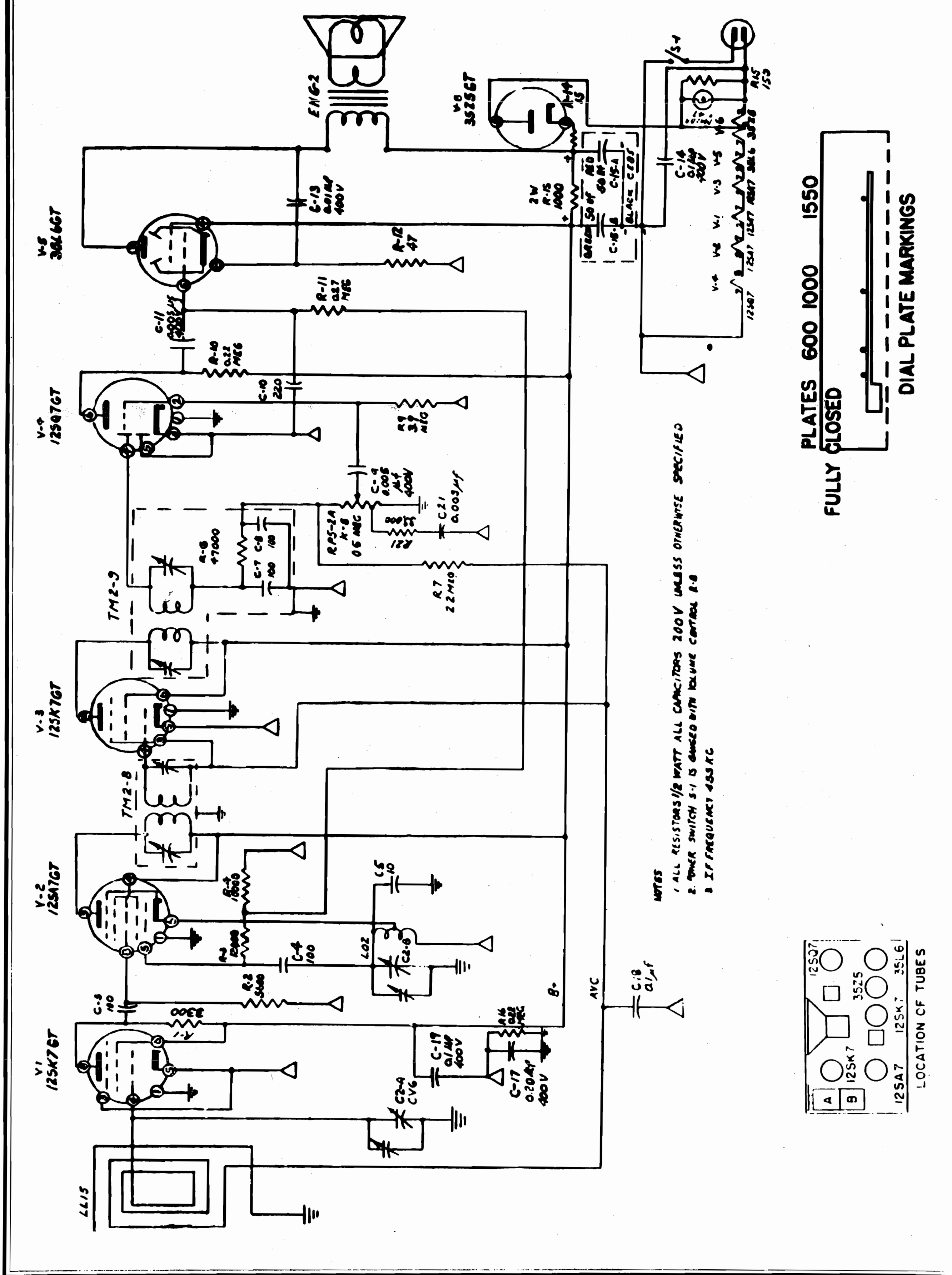
Alignment: No attempt should be made to realign this receiver until it has been determined that a poor tube, or some local condition is not responsible for faulty reception. An output meter may be clipped directly across the voice coil lugs.

The Signal Generator may be connected through a 0.01 mf capacitor (used as dummy antenna) to the lug on RF section (B)) of tuning capacitor. Connect ground clip of generator to the common negative of the electrolytic capacitor. Align the I. F. trimmers to 455 kc, using least possible input from Signal Generator to avoid developing A.V.C. voltage which would make the tuning adjustments very broad.

To align RF trimmers, remove the 0.01 mf capacitor and connect the Signal Generator leads to two or three turns of heavy wire, forming a self-supporting loop of about 7 or 8 inches diameter, placed about a footaway from the receiver's loop antenna. Again, use the least possible input from the Signal Generator. With the tuning capacitor plates completely out of mesh, and pointer at extreme right end of travel, adjust the oscillator trimmer (A) (on front section of tuning capacitor) to 1700 kc. Readjust both Signal Generator and tuning capacitor to 1550 kc and adjust the RF trimmer (B) (on rear section) for maximum response. With tuning capacitor plates fully meshed, the receiver should tune to 532 kc; however, no adjustment is required at this point. For checking purposes, four fine marks are engraved on the dial plate. These represent, in order, the pointer position with capacitor plates fully meshed, and the pointer setting for 600, 1000 and 1550 kc.

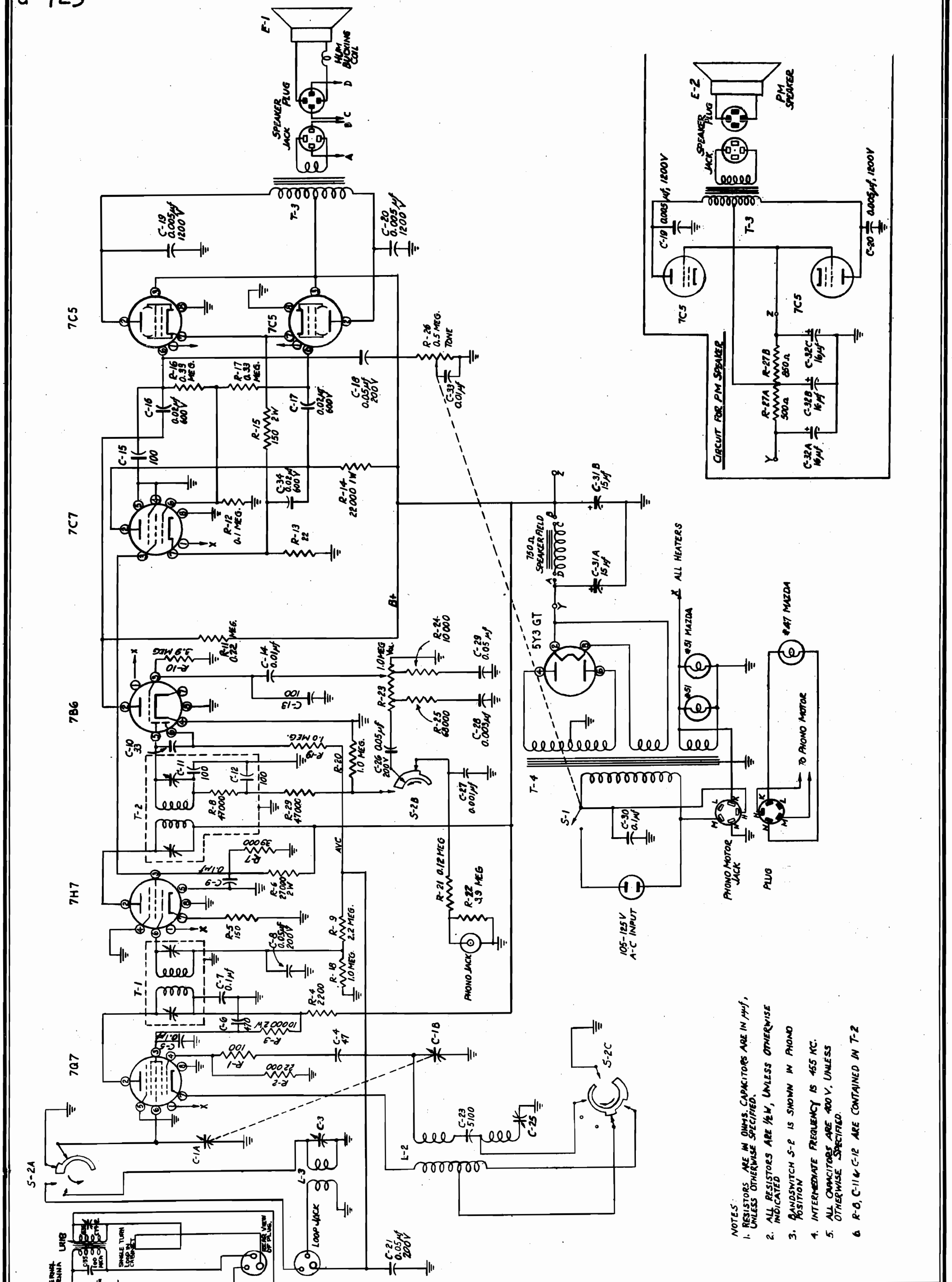
TEMPLETONE RADIO MFG. CORP.

MODELS G-615, G-618



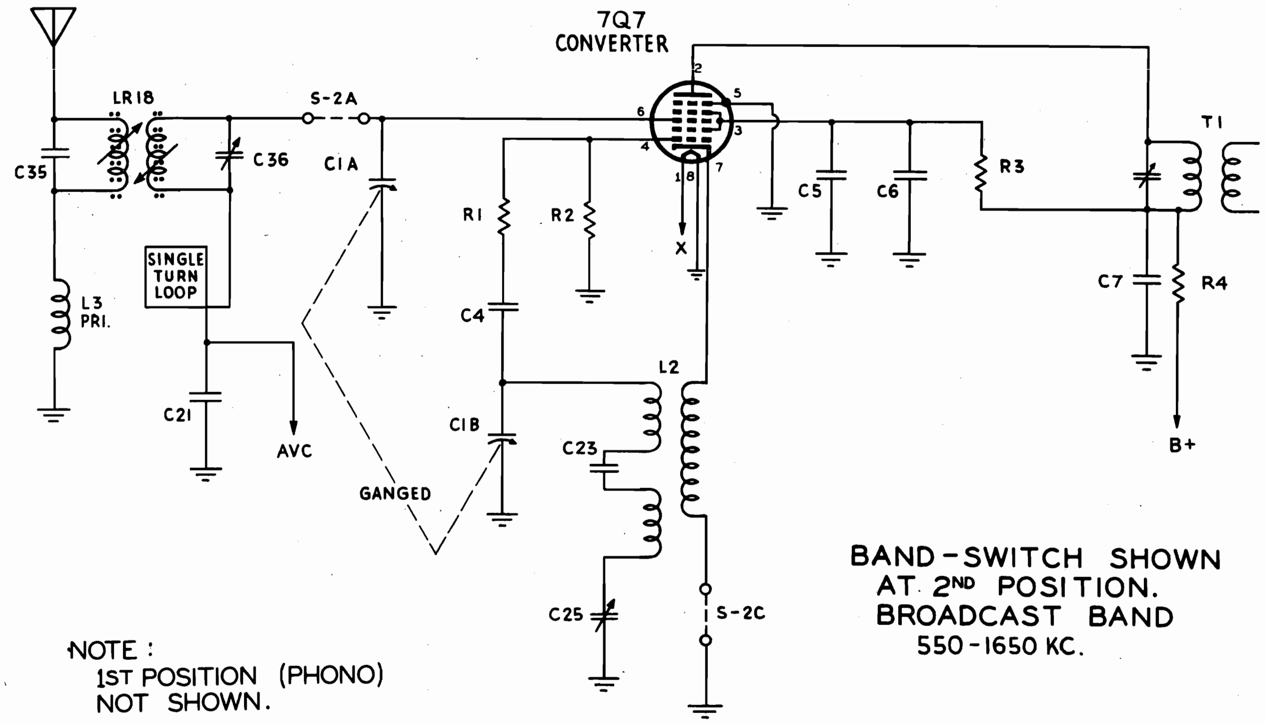
MODELS G-722, G-723

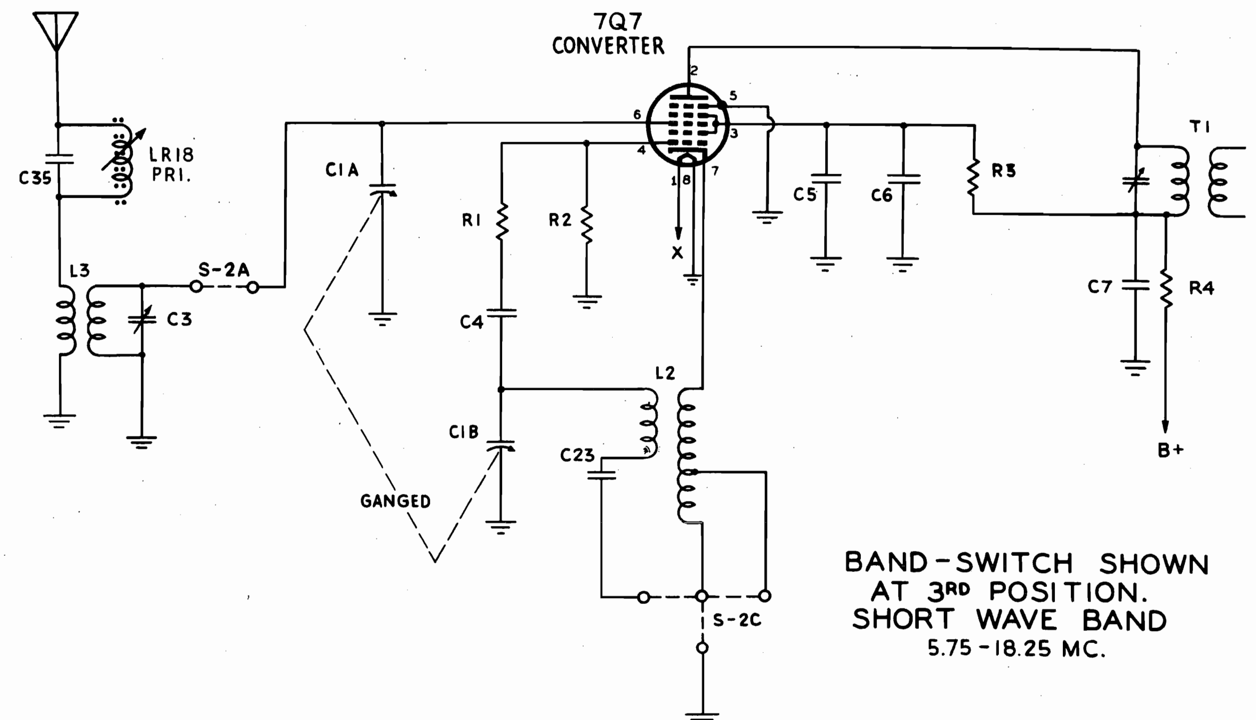
TEMPLETONE RADIO MFG. CORP.



CLARI-SKEMATIX
Registered Trademark

TEMPLETONE RADIO MFG. CORP. MODELS G-722, G-723





MODELS G-722, G-723

TEMPLETONE RADIO MFG. CORP.

Alignment: No attempt should be made to realign this receiver until it has been determined that a poor tube, or some local condition is not responsible for faulty reception. The Signal Generator may be connected through a 0.01 mf capacitor (used as a dummy antenna) to the lug on R. F. section (A) of tuning capacitor. Connect ground clip of generator directly to chassis. Align the I. F. trimmers to 455 K.C., using least possible input from the Signal Generator to avoid developing A.V.C. voltage which would make the tuning adjustments very broad. An output meter may be clipped across the voice coil lugs.

To align broadcast R. F. trimmers, remove the 0.01 mf capacitor and connect the Signal Generator leads to two or three turns of heavy wire, forming a self-supporting loop of about 7 or 8 inches diameter placed about a foot away from the receiver's loop antenna. Again, use the least possible input from the Signal Generator. With the tuning plates completely out of mesh and the pointer at the extreme right end of travel, adjust the broadcast oscillator trimmer, on the under side of the chassis, to 1650 K.C. With tuning capacitor fully meshed adjust the padder on the chassis deck to 535 K.C. Readjust both Signal Generator and tuning capacitor to 1550 K.C. and adjust the R. F. trimmer on the loop for maximum response.

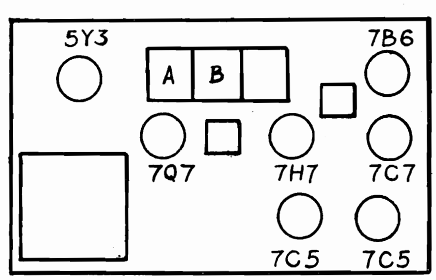
To align the short wave band connect the Signal Generator through a 0.01 mf capacitor and a 400 ohm resistor in series (used as a dummy antenna) to the antenna connection on the loop antenna. With the tuning capacitor plates completely out of mesh, and pointer at the extreme right end of travel, adjust the short wave oscillator trimmer (on the under side of the chassis) to 18.25 magacycles. Readjust both Signal Generator and tuning capacitor to 16 megacycles and adjust short wave antenna coil trimmer for maximum response. With tuning capacitor fully meshed, the receiver should tune to 5.75 megacycles, however, no adjustment is required at this point.

For checking purposes five marks are engraved on the front of the dial plate. These represent, in order, the pointer position with the capacitor plates fully meshed and the pointer settings for 600 kc, 8 mc, 16 mc, and 1550 kc.

Pushbuttons: To set pushbuttons remove pushbutton knobs. This will expose a set screw on the shaft of each pushbutton. Starting at one end push a pushbutton down and loosen its set screw. Set the bandswitch to the broadcast position. Hold the pushbutton down and tune the manual tuning control to the station to which the pushbutton is to be set. Still holding the pushbutton down tighten its set screw. The pushbutton may now be released and its knob replaced. It will now select the station to which it was set. The other pushbuttons may be set in a similar manner.

REPLACEMENT PARTS LIST

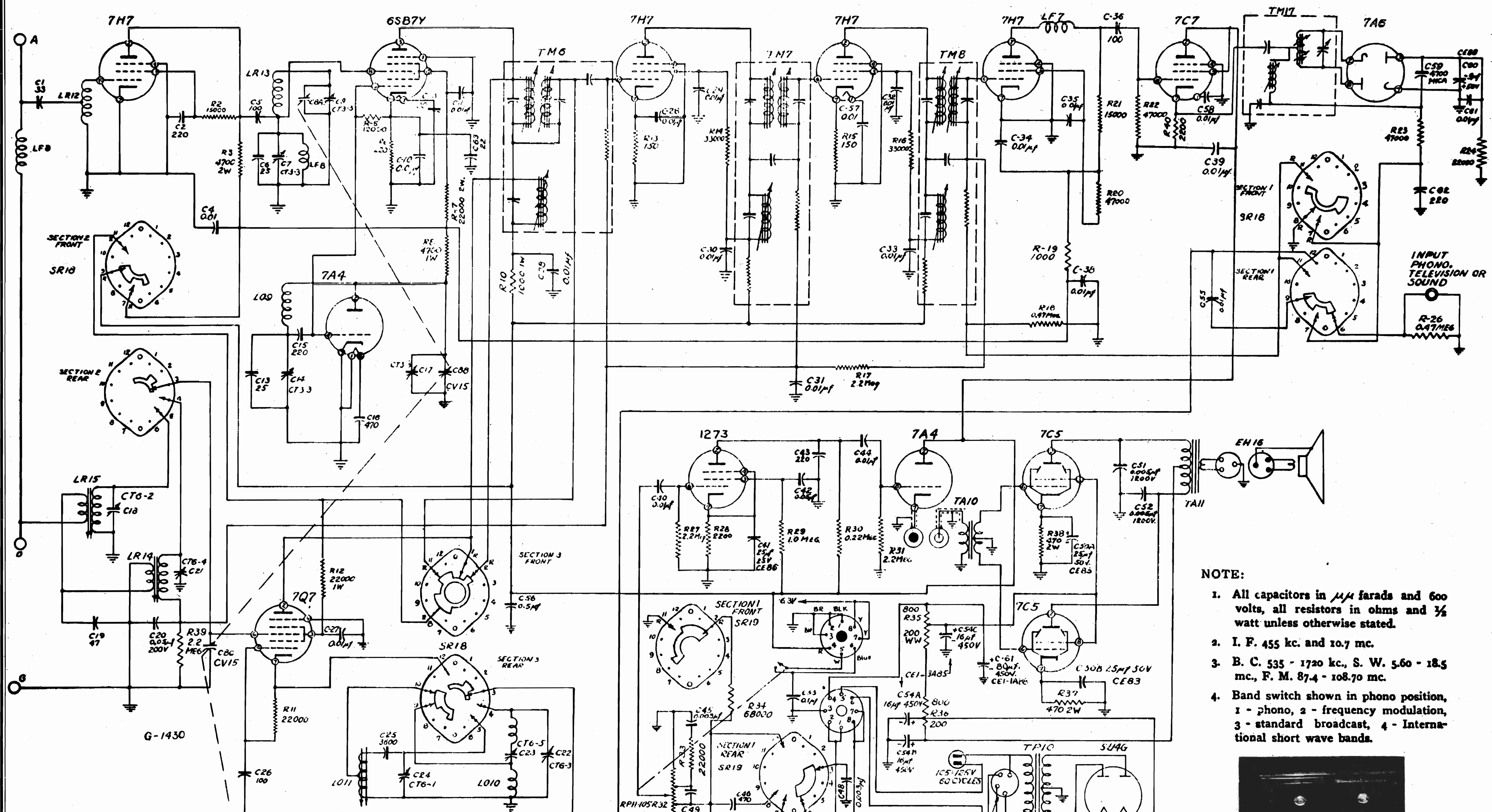
Circuit Symbol	Part Number	Item	Description
C-1 A & B	CV-9	Capacitor	Variable 2-gang, Push-button
C-2	CT1-1	Capacitor	Trimmer 1.5—15 MMF
C-3	CT1-2	Capacitor	Trimmer 2.2—40 MMF
C-22	CT1-2	Capacitor	Trimmer 2.2—40 MMF
C-23	CT1-2	Capacitor	Trimmer 2.2—40 MMF
C-25	CX2-1	Capacitor	Padder
E-1	EH-9	Speaker	10" Electrodynamic
E-2	EH-14	Speaker	10" P.M.
L-1	LL-9	Loop Antenna	
L-2	LO-4	Oscillator Coil Assembly	Broadcast & S.W. Osc. Coils
L-3	LR-4	S.W. Antenna Coil	
R-23	RP8-105	Potentiometer	1 Meg. with 2 taps, Volume Control
R-26	RP5-2	Potentiometer	0.5 Meg. with switch, Tone Control
R-27 A & B	RW3-1	Resistor	Wirewound 1350 Ohms 17 watt tapped at 500 Ohms
S-2 A, B & C	SR-9	Bandswitch	
T-1	TM2-4	Transformer	I. F. Input
T-2	TM2-5	Transformer	I. F. Output
T-3	TA-8	Transformer	Push-pull speaker output
T-4	TP-9	Transformer	Power



TUBE LOCATION

TEMPLETONE RADIO MFG. CORP.

MODEL G-1430



NOTE:

1. All capacitors in $\mu\mu$ farads and 600 volts, all resistors in ohms and ½ watt unless otherwise stated.
2. I. F. 455 kc. and 10.7 mc.
3. B. C. 535 - 1720 kc., S. W. 5.60 - 18.5 mc., F. M. 87.4 - 108.70 mc.
4. Band switch shown in phono position, 1 - phono, 2 - frequency modulation, 3 - standard broadcast, 4 - International short wave bands.

Instructions For Removing Radio From Cabinet

Main Chassis:

To remove main chassis from the cabinet it is first necessary to remove the four control knobs by pulling them gently until they come off. Remove all plugs from the rear of the main chassis and power pack chassis. Pull the 5U4G rectifier tube out of the power pack chassis. The four screws holding the chassis may now be removed. The chassis itself may now be taken out by sliding it straight back toward the rear of the cabinet.

Power Pack Chassis:

The power pack chassis may be removed from the cabinet by unscrewing the four large screws holding it to its support shelf. These are accessible from the under side of the cabinet.

Record Changer:

Most adjustments may be made to the record changer without removing it from its drawer. Before attempting to remove the record changer from the cabinet the motor plug and the phono pickup plug must first be removed from the main and power pack chassis. Loosen the cable clamps on the rear of the cabinet sufficiently to lift out cables.

Pull changer drawer forward until it hits its stop. Lift the turntable completely off. Be careful not to lose the spring and loose gear on the spindle of the record changer. Remove retaining washers from the mounting screws at the front and rear of the record changer. The mounting screws may now be removed from the bottom of record changer drawer and the record changer may be lifted out.

Alignment:

No attempt should be made to realign this receiver until it has been determined that a poor tube or some local condition is not responsible for faulty reception. The following is a list of minimum equipment necessary to realign this receiver:

1—AM signal generator covering 455KC, 600KC, 1550KC, 6 MC, 10.7 MC and 18 MC
2—FM signal generator covering 10.7 MC, 92 MC and 106 MC
3—Output meter, rectifier type, approximately 0 to 2 volts RMS
4—Dummy antennas

0.01 MFD Capacitor
200 MMF Mica Capacitor
400 Ohm Resistor
300 Ohm Resistor

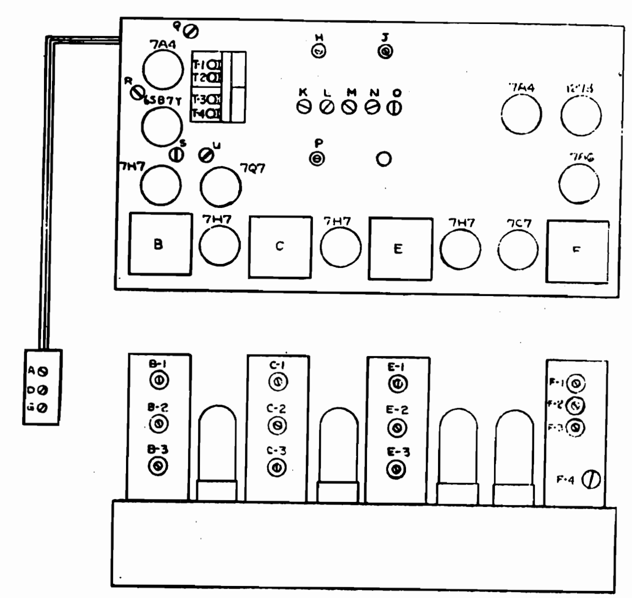
In the following alignment procedure the high side of the signal generator is connected to the terminal indicated in the "Signal Generator Coupling" column below. The ground side of the signal generator is connected directly to the chassis unless otherwise noted. The output meter should be connected across the voice coil of the speaker for all measurements.

In adjusting the radio frequency trimmers and padders it is advisable to "rock" the variable capacitor gang slightly across the signal being delivered by the signal generator until that particular signal has been accurately peaked.

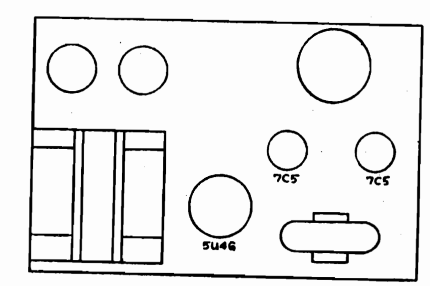
The location of the following trimmers, padders and terminals can be found by referring to the tube and trimmer location diagram.

ALIGNMENT PROCEDURE:

Dummy Antenna	Signal Generator Coupling	Signal Generator Frequency	Band Switch Position	Radio Dial Setting	Adjust	Remarks
0.01 MFD	Terminal T-2	455 KC	Broadcast	1700 KC	E-1 C-1 B-1	Adjust for maximum output Repeat for fine adjustment
"	Pin 6 of 7C7 IF tube with FM Signal Generator	10.7MC	FM	108 MC	F-2	Adjust for maximum output (Broad adustment)
"	"	"	"	"	F-4	Adjust for maximum output
"	AM Signal Generator	"	"	"	F-1 or F-3	Adjust whichever is required for minimum output
						Repeat last two steps for fine adjustment until settings for maximum FM output coincides with settings for minimum AM output.
"	"	"	"	"	E-3, E-2	Adjust for maximum output
"	"	"	"	"	C-3, C-2	" " " "
"	"	"	"	"	B-3, B-2	" " " "
						Repeat last three steps for fine adjustment
			Broadcast	535 KC	Pointer	Adjust pointer to reference mark
200 MMF	Terminal D	600 KC	Broadcast	600 KC	O, J.	Adjust for maximum output
"	"	1550 KC	"	1550 KC	M, N	" " " "
400 Ohm Resistor	"	6 MC	Shortwave	6 MC	P, H	" " " "
"	"	18 MC	"	18 MC	K, L	" " " "
300 Ohm Resistor	Terminal A Ground Side of Signal Generator to Terminal D	92 MC	FM	92 MC	R, S	" " " "
"	"	106 MC	"	106 MC	Q, U	" " " "



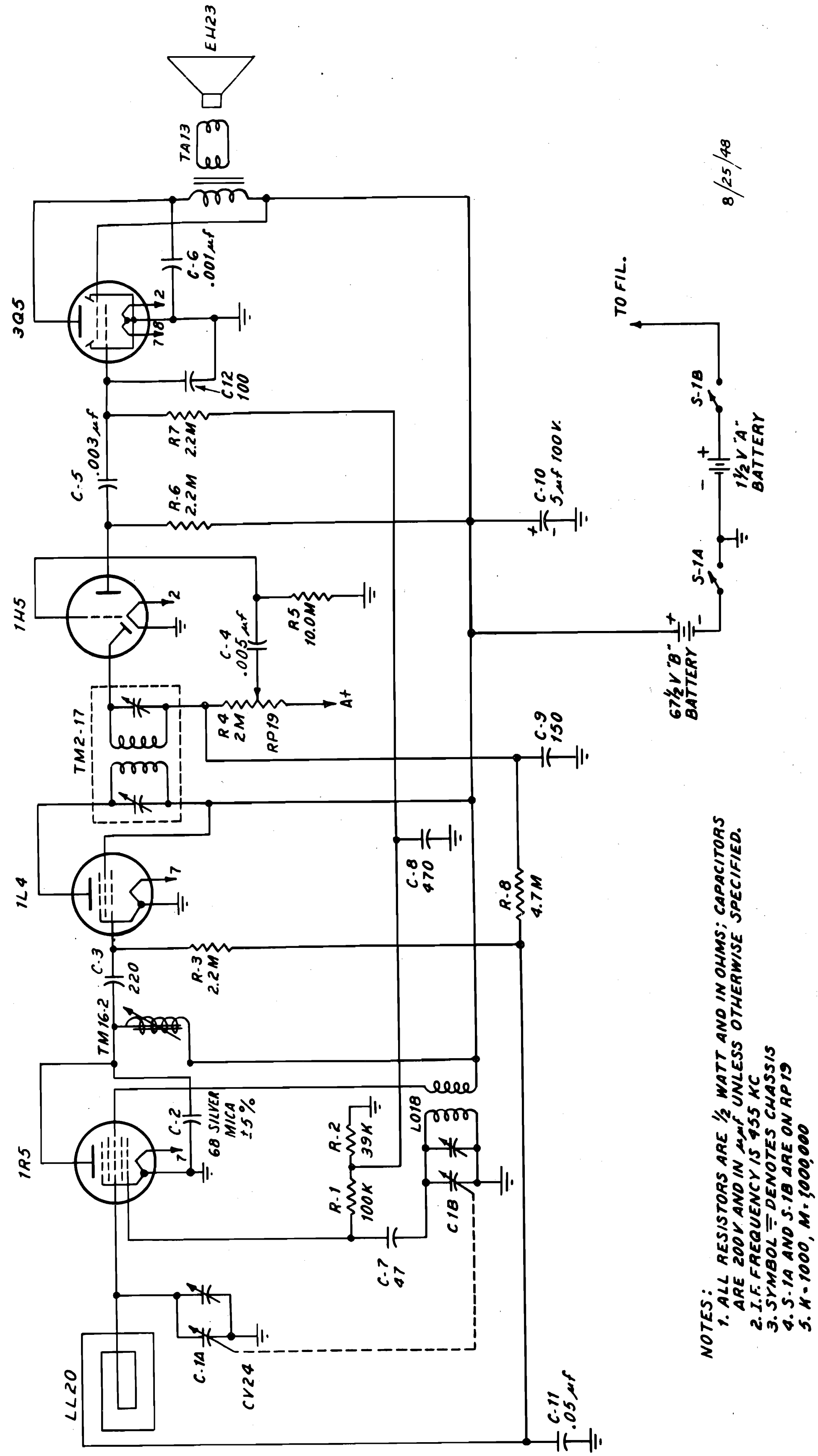
TUBE AND TRIMMER LOCATION



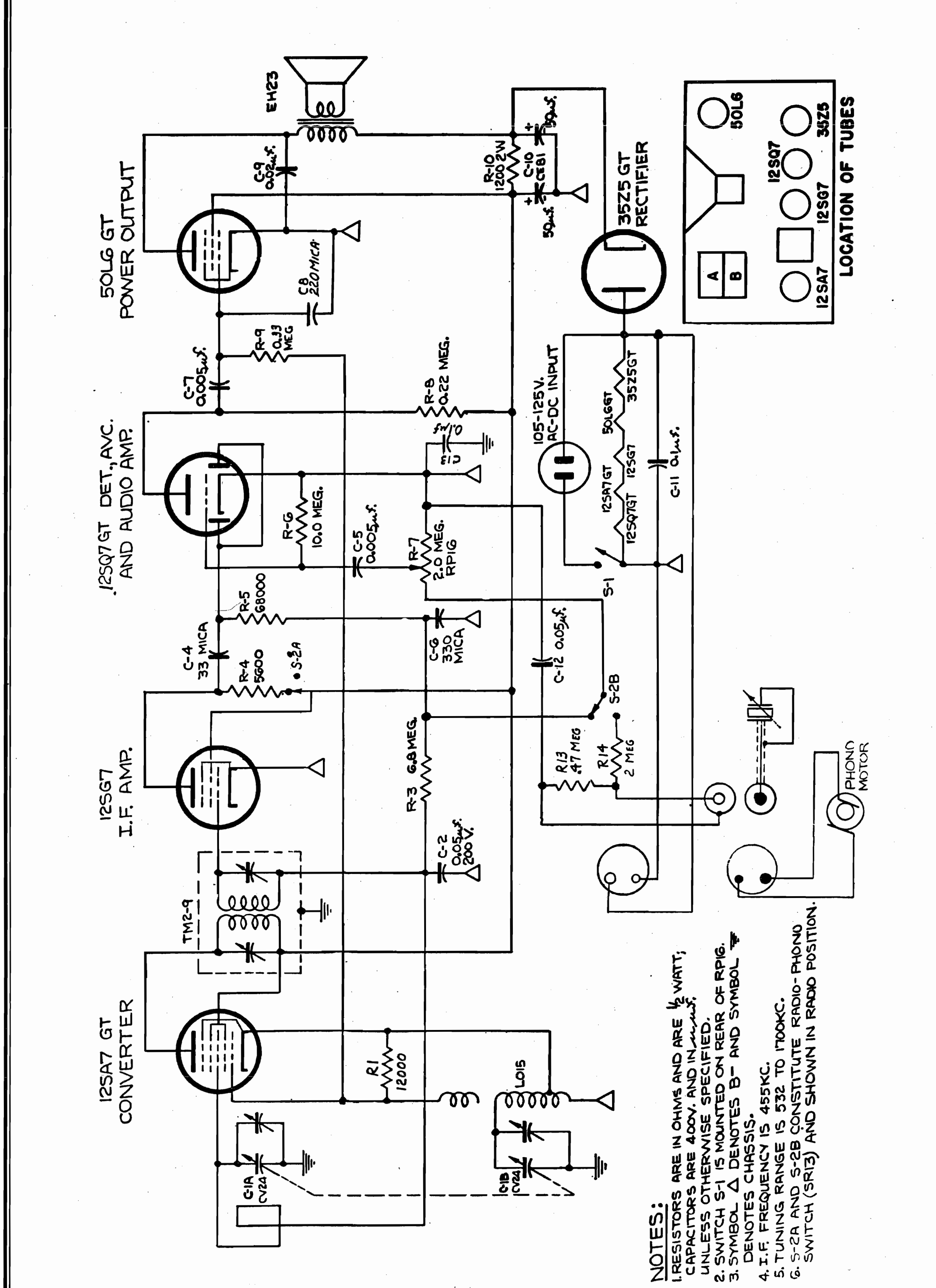
POWER PACK

TEMPLETONE RADIO MFG. CORP.

MODEL H-411



MODEL H-501 TEMPLETONE RADIO MFG. CORP.



OPERATING INSTRUCTIONS AND SERVICE NOTES

This radio-phonograph combination includes a five tube superheterodyne receiver and a smoothly-operating dependable, automatic record changer. It has a built-in sensitive loop antenna, an Alnico V permanent magnet speaker, and full size octal tubes for longer life. The radio chassis and record changer are electrically floating to prevent possibility of hazardous shock.

Operation: The set operates on 105-125 volts 60 cycles AC only. Power drain is approximately 25 watts for radio and 17 watts additional for the record changer.

Range: The complete broadcast band is covered, from 532 to 1700 kilocycles. Since the scale is calibrated from 55 to 170, the actual frequencies are read by adding a zero to the dial calibration.

Controls: Three controls are provided for operating the set. The upper right control tunes to any desired station when pointer knob is rotated. The bottom right control incorporates the on-off switch and volume control. The extreme counter-clockwise position is the "off" position and rotating the knob clockwise turns the set on and increases the volume. The control at the left is the phono-radio switch, which switches from phonograph operation in the counter-clockwise position to radio operation in the clockwise position.

Record Changer: The record changer is completely automatic and will play twelve ten-inch records or ten twelve-inch records. Complete operating instructions for the record changer are included in the record changer instruction sheet.

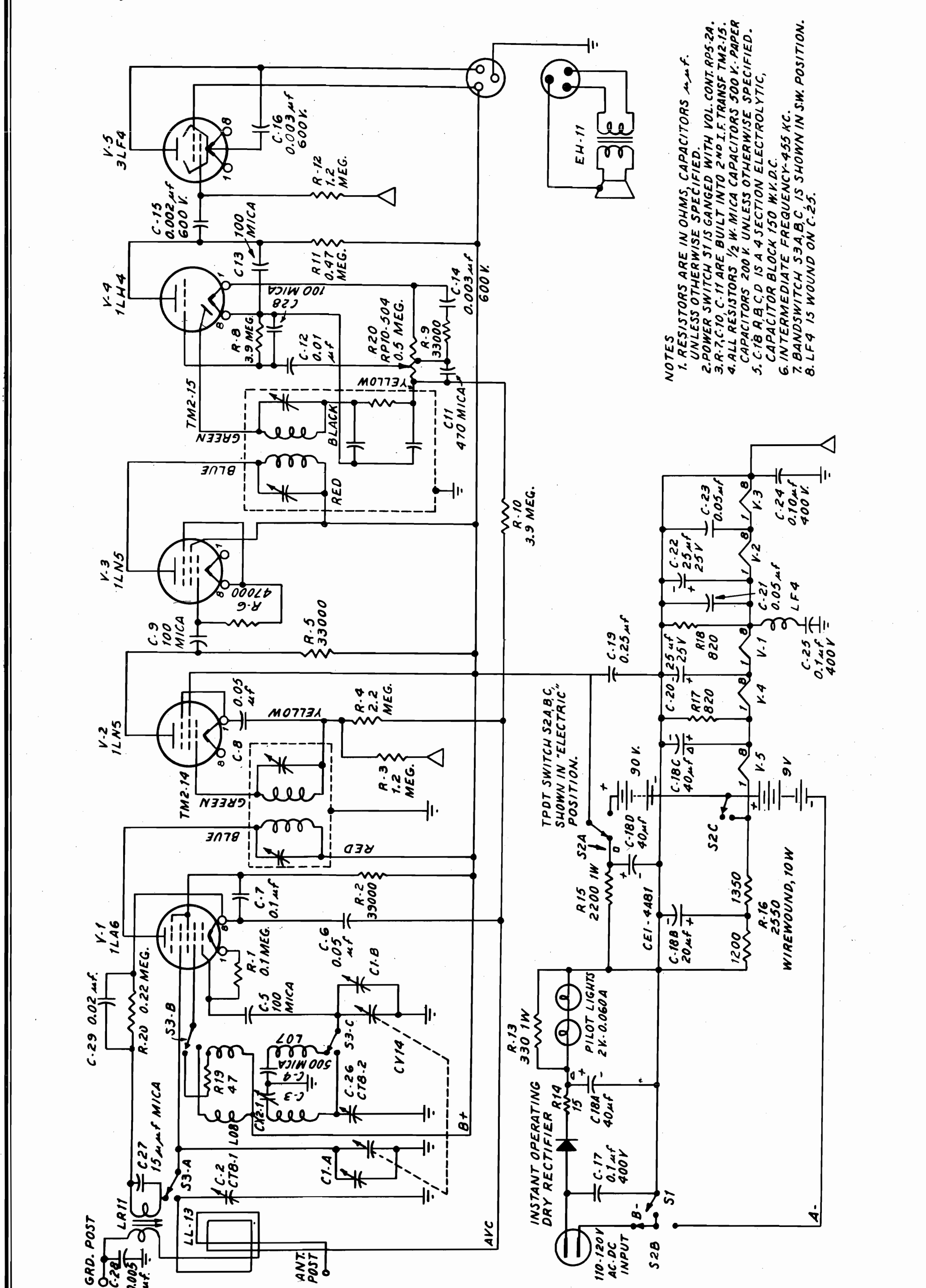
Antenna: For normal reception no outside aerial is required, as more than adequate pickup is obtained by the self-contained loop antenna. At installations remote from the desired stations, improved results may be obtained by rotating the receiver for maximum response, since the loop has marked directional effects on weak signals.

Alignment: No attempt should be made to re-align this receiver until it has been determined that a poor tube, or some local condition is not responsible for faulty reception. The signal generator may be connected through 0.01 mfd capacitor, used as a dummy antenna to the lug on the RF section of the tuning capacitor. Connect ground clip of generator to a B-point. Align the IF trimmers to 455 kilocycles using least possible input from signal generator, for maximum output as measured across voice coil or speaker.

To align RF, remove 0.01 mfd capacitor and connect signal generator to two or three turns of heavy wire forming a self-supporting loop, about 7 or 8 inches in diameter placed about a foot away from the receiver's loop antenna. Again, use least possible input from the signal generator. With the variable completely open (plates out of mesh) adjust the oscillator trimmer to 1700 kilocycles, then tune the set and signal generator to 1550 kilocycles and adjust RF trimmer for maximum response.

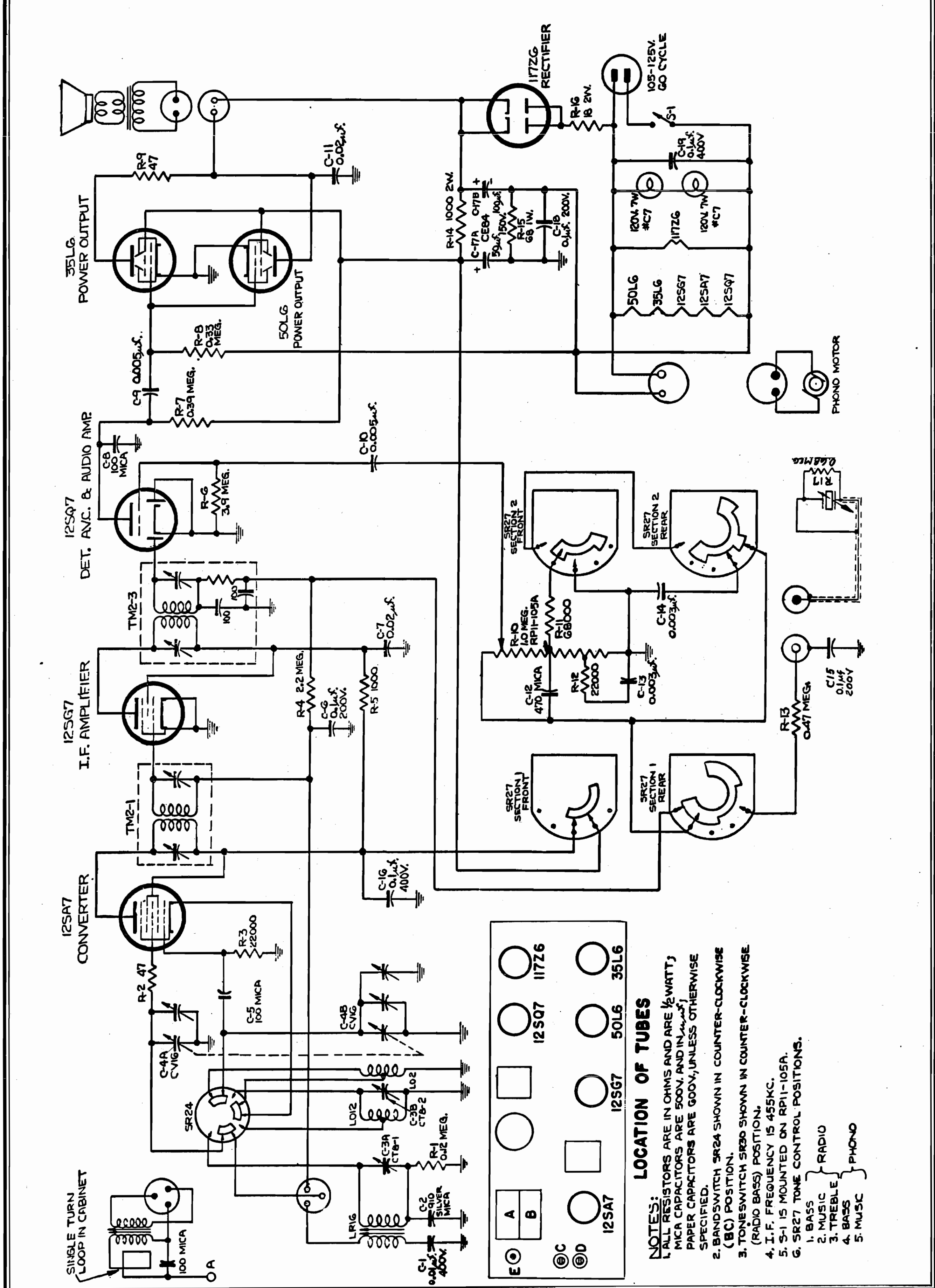
MODEL H-521

TEMPLETONE RADIO MFG. CORP.



TEMPLETONE RADIO MFG. CORP.

MODEL H-622



RECORD CHANGER: Crescent Model C-250, RCD.CH. 18-1

MODEL H-622 TEMPLETONE RADIO MFG. CORP.

OPERATING INSTRUCTIONS AND SERVICE NOTES

This set is a six-tube, two band, superheterodyne receiver and phonograph combination, using the latest type of low-drain electronic tubes and a smoothly operating, dependable record changer.

Operation: The set operates on 105-125 volts 60 cycles, AC. The power drain is approximately 35 watts on radio operation and 17 watts additional on phonograph operation.

Range: This set has both a broadcast and shortwave range. The complete broadcast band is covered from 532 to 1700 kilocycles. Since the broadcast dial scale is calibrated from 55 to 160, the actual frequency of the station may be obtained by adding zero to the dial calibration. The shortwave band covers from 5.6 to 12.5 megacycles. The shortwave dial scale is calibrated directly in megacycles.

Controls Four controls are provided for the operation of the radio set. The control at the extreme left includes the on-off switch and the volume control. The extreme counter-clockwise position is "off", and rotating the knob clockwise turns the set on and increases the volume. The second control from the left is the phono-radio switch and the tone control. The positions in order, from counter-clockwise to clockwise are: radio bass; radio music; radio treble; phonograph bass and phonograph music. Tone is varied electrically by boosting bass, treble or both, and not by merely reducing the high frequency response. The third control is the bandswitch which switches from broadcast in counter-clockwise position, to shortwave in clockwise position. The last control is the tuning control which permits accurate tuning of the slide rule dial through smooth vernier action.

Record Changer: The record changer is completely automatic and will play up to 12 ten-inch records or 10 twelve-inch records. Complete operating instructions for the record changer are included on a separate instruction sheet. It is provided with a precious metal alloy tipped, long-life needle balanced to give high quality reproduction with the speaker, amplifier and tone arm. It will provide many hours of excellent performance with low record wear.

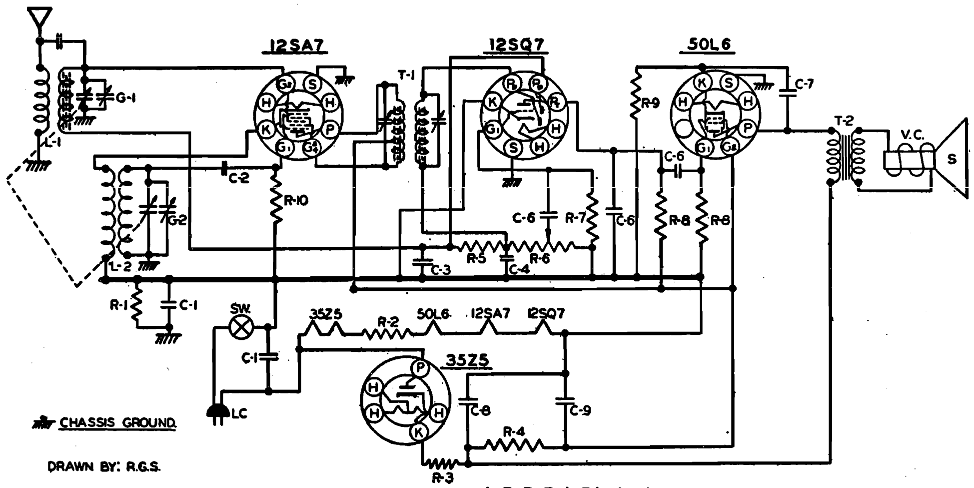
Antenna: For normal reception, no outside antenna is required, as more than adequate pick-up is obtained from the built-in cabinet loop and the high sensitivity of the receiver. In very poor receiving locations improved results may be obtained by connecting an outside aerial to the post marked "A" on the rear of the cabinet.

Alignment: No attempt should be made to re-align this receiver until it has been determined that poor tubes or some local condition is not responsible for faulty reception. The signal generator may be connected through 0.01 mfd capacitor used as a dummy antenna, to the lug on the RF section "B" of the tuning capacitor. Connect ground clip of generator directly to chassis. An output meter may be clipped across the voice coil lug on the speaker. Align IF trimmers to 455 kilocycles, using the least possible input in the signal generator. With tuning plates completely out of mesh (pointer at the extreme right end of travel) the set in broadcast position, adjust the broadcast oscillator trimmer (A) to 1700 kilocycles. Then switch to shortwave and adjust the shortwave oscillator trimmer (D) to 12.5 megacycles. Replace the 01 mfd dummy by a 39 mmfd mica capacitor and connect to antenna terminal "A." Tune set and signal generator to 600 kilocycles and adjust broadcast antenna coil slug for maximum output. Then re-tune set and signal generator to 1550 kilocycles and adjust RF trimmer "B" on tuning capacitor for maximum response. Repeat these adjustments until no further adjustment is required, then switch receiver to shortwave. Tune set and signal generator to 6 megacycles and adjust shortwave antenna coil slug "E" for maximum response. Retune set and signal generator to 10.5 megacycles and tune shortwave antenna, trimmer "C" for maximum response. In these adjustments the tuning control should be rocked for best results. Repeat these adjustments until no further adjustment is needed.

For checking purposes, five marks are engraved on the dial plate. These represent, in order from left to right: the pointer position capacitor plates fully meshed and the pointer settings for 600 kc or 6 mc; 1000 kc, 10.5 mc and 1550 kc.

TRAV-LER RADIO CORP.

MODEL 5054



ALIGNMENT AND SERVICE DATA

Remove chassis from cabinet for alignment.

A Signal Generator is required having the following frequencies: 455 KC, 1400 KC, 1650 KC. An output meter should be connected across the speaker.

The volume control of the receiver should be turned to maximum during the I. F. and all subsequent alignment and the generator output as low as possible to prevent the A. V. C. from working and giving false readings.

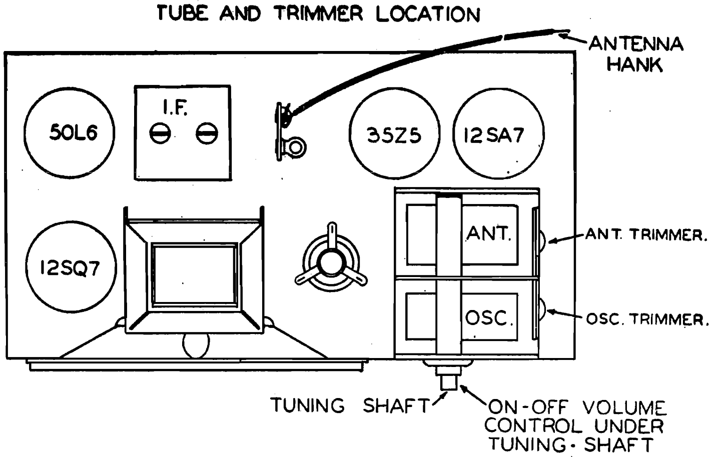
FIRST STEP: Connect the hot lead from the generator to the ANT. **section of the gang condenser through a .1 MFD. condenser. The ground lead from the generator must be connected to "B" minus under the chassis. Turn the gang condenser to complete minimum capacity. Set the generator to 455 KC. Adjust the trimmers of the I. F. transformer until a maximum reading is noted on the output meter.**

SECOND STEP: With the leads from the generator still connected in the same manner, adjust the Signal Generator to 1650 KC. Adjust the OSC. trimmer until the 1650 KC signal is tuned in. The gang condenser must be at complete minimum capacity for this adjustment.

THIRD STEP: Remove the generator hot lead and connect it to the antenna hank terminal strip through a 200 MMFD. condenser. With the receiver and generator set at 1400 KC, increase the generator output. Adjust the ANT. trimmer until a maximum signal is noted on the output meter. No further adjustment should be made as the coils and gang condenser in this receiver have been specially handled at the factory to insure proper alignment at the lower frequencies.

PART NO.		DESCRIPTION
IR-20	R-1	220MΩ RESISTOR 1/2W. 20
IR-41	R-2	47 Ω RESISTOR 1 W. 10
IR-17	R-3	33 Ω RESISTOR 1/2W. 20
IR-25	R-4	2200Ω RESISTOR 1 W. 10
IR-23	R-5	3.3MEG.RESISTOR 1/2W. 20
VC-9	R-6	1MEG. VOLUME CONTROL.
IR-3	R-7	10MEG. RESISTOR 1/2W. 20
IR-11	R-8	470M.Ω RESISTOR 1/2W. 20
IR-14	R-9	150 Ω RESISTOR 1/2W. 20
IR-9	R-10	22MΩ RESISTOR 1/2W. 20
PC-5	C-1	.05 MFD. CONDENSER 400V.
MC-4	C-2	50MMFD. MICA.
PC-2	C-3	.05 MFD. CONDENSER 200V
MC-2	C-4	100MMFD. MICA.
MC-5	C-5	500MMFD. MICA.
PC-6	C-6	.005 MFD. CONDENSER 600V
PC-7	C-7	.01 MFD. CONDENSER 400V.
EC-15	C-8 C-9	30MFD. 20MFD. ELECTROLYTIC COND.
LA-3	L-1	ANT. COIL
LO-14	L-2	OSC. COIL
LI-8	T-1	I.F. TRANSFORMER
	T-2	OUTPUT TRANSFORMER
SPK-10	S	4" P.M. SPEAKER.
	V.C.	VOICE COIL
GC-7X	G-1 G-2	TUNING CONDENSER
CO-1	LC	LINE CORD.
TU-32		35Z5-50L6-12SA7-12SQ7

TUBE AND TRIMMER LOCATION



MODEL 5056

TRAV-LER RADIO CORP.

ALIGNMENT AND SERVICE DATA

(See Fig. No. 1 For Trimmer Location)

Remove chassis from cabinet for alignment.

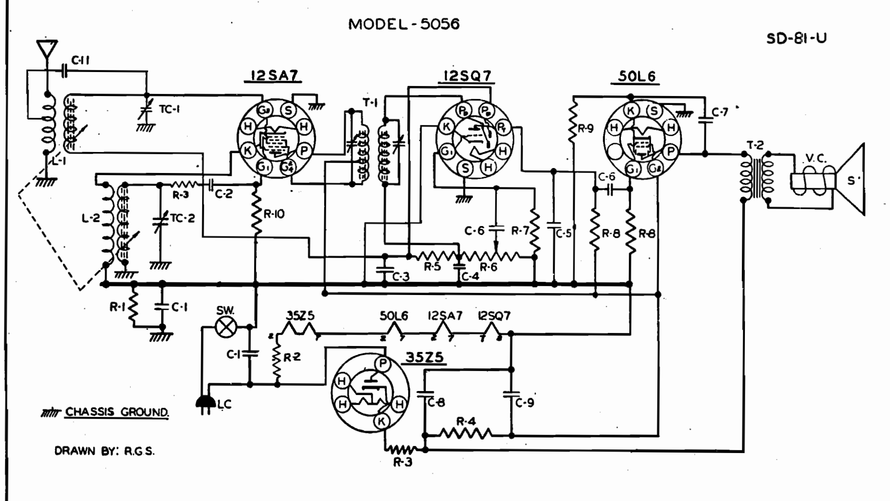
A Signal Generator is required having the following frequencies: 455 KC, 1400 KC, 1700 KC. An output meter should be connected across the speaker.

The volume control of the receiver should be turned to maximum during the I. F. and all subsequent alignment and the generator output as low as possible to prevent the A. V. C. from working and giving false readings.

FIRST STEP: Connect the hot lead from the generator to the ANT. section of the tuner through a .1 MFD. condenser. The ground lead from the generator must be connected to "B" minus under the chassis. Turn the tuner to complete minimum capacity. Set the generator to 455 KC. Adjust the trimmers of the I. F. transformer until a maximum reading is noted on the output meter.

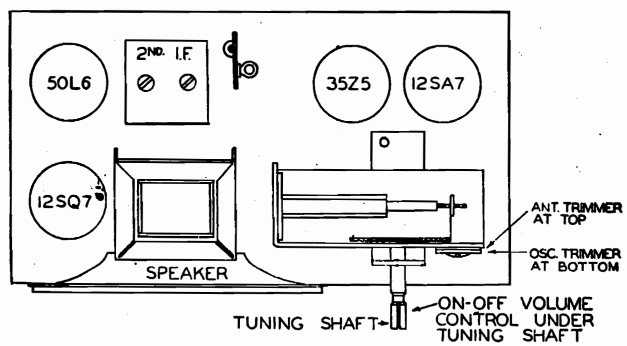
SECOND STEP: With the leads from the generator still connected in the same manner, adjust the Signal Generator to 1700 KC. Adjust the OSC. trimmer until the 1700 KC. signal is tuned in. The tuner must be at complete minimum capacity for this adjustment.

THIRD STEP: Remove the generator hot lead and connect it to the antenna hank terminal strip through a 200 MMFD. condenser. With the receiver and generator set at 1400 KC., increase the generator output. Adjust the ANT. trimmer until a maximum signal is noted on the output meter. No further adjustment should be made as the coils in this receiver have been specially handled at the factory to insure proper alignment at the lower frequencies.



PART NO.		DESCRIPTION	PART NO.		DESCRIPTION
IR-20	R-1	220M Ω RESISTOR 1/2W. 20			
IR-41	R-2	47 Ω RESISTOR 1 W. 10			
IR-17	R-3	33 Ω RESISTOR 1/2W. 20			
IR-25	R-4	2200 Ω RESISTOR 1 W. 10			
IR-23	R-5	3.3MEG.RESISTOR 1/2W. 20	LI-8	T-1	I.F. TRANSFORMER
VC-9	R-6	1MEG. VOLUME CONTROL.		T-2	OUTPUT TRANSFORMER
IR-3	R-7	10MEG. RESISTOR 1/2W. 20	SPK-10	S	4" P.M. SPEAKER.
IR-11	R-8	470M Ω RESISTOR 1/2W. 20		V.C.	VOICE COIL
IR-14	R-9	150 Ω RESISTOR 1/2W. 20	PT-1	L-1	ANT. COIL
IR-9	R-10	22M Ω RESISTOR 1/2W. 20	PT-1	L-2	OSC. COIL
			PT-1	C-11	150MMFD. MICA.
			PT-1	TC-1	ANT. TRIMMER.
PC-5	C-1	.05MFD. CONDENSER 400V.	PT-1	TC-2	OSC. TRIMMER.
MC-4	C-2	50MMFD. MICA.			
PC-2	C-3	.05MFD. CONDENSER 200V.			
MC-2	C-4	100MMFD. MICA.	CO-1	LC	LINE CORD.
MC-5	C-5	500MMFD. MICA.			
PC-6	C-6	.005MFD. CONDENSER 600V.			
PC-7	C-7	.01MFD. CONDENSER 400V.	TU-32		35Z5-50L6-12SA7-12SQ7
EC-12	C-8	40MFD. ELECTROLYTIC COND.			
EC-12	C-9	20MFD. ELECTROLYTIC COND.			

TUBE AND TRIMMER LOCATION



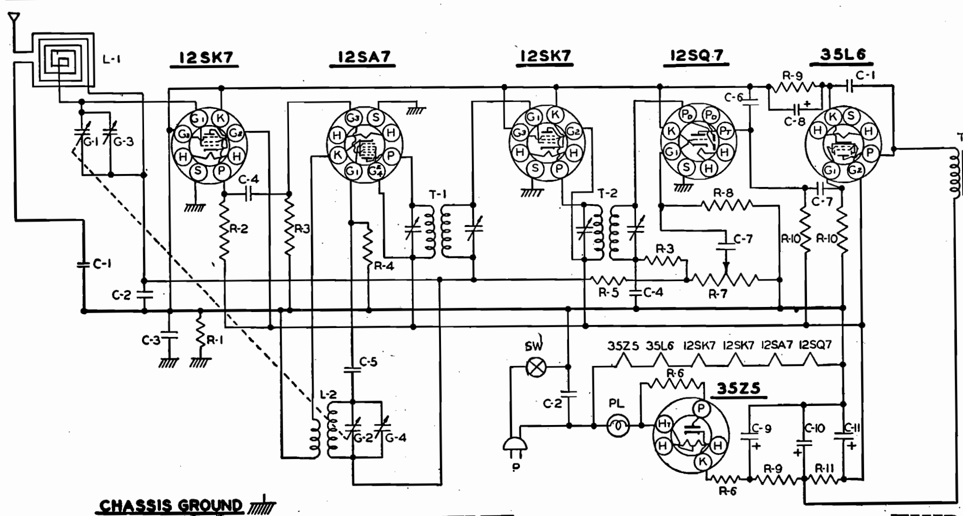
OPERATING INSTRUCTIONS

POWER SOURCES: This receiver may be operated on alternating current (AC) of 110 to 125 volts at 60 cycles or on direct current (DC) of 110 to 125 volts. When used on DC, if the tubes light up but set does not play, reverse the cord plug in the power outlet.

CAUTION: Always predetermine voltage of power source Never try to plug this receiver into a 220 volt line, as this will cause serious damage.

TRAV-LER RADIO CORP.

MODEL 5066



PART NO.		DESCRIPTION	PART NO.		DESCRIPTION
PC-7	C-1	.01MFD. CONDENSER 400 V	IR-9	R-4	22M Ω RESISTOR 1/2W. 20%
PC-5	C-2	.05MFD CONDENSER 400 V	IR-23	R-5	3.3MEG. Ω RESISTOR 1/2W. 20%
PC-8	C-3	.1MFD. CONDENSER 400 V.	IR-17	R-6	33 Ω RESISTOR 1/2W. 20%
MC-2	C-4	.0001 MICA CONDENSER	VC-13	R-7	1 MEG. VOLUME CONTROL
MC-4	C-5	.00005 MICA CONDENSER	IR-13	R-8	2.2MEG. Ω RESISTOR 1/2W. 20%
MC-5	C-6	.0005 MICA CONDENSER	IR-5	R-9	220 Ω RESISTOR 1/2W. 10%
PC-6	C-7	.005MFD. CONDENSER 600 V.	IR-11	R-10	470M Ω RESISTOR 1/2W 20%
EC-2	C-8	10MFD. 25W.V ELECTROLYTIC	IR-21	R-11	330 Ω RESISTOR 1/2W 10%
EC-14	C-9	40MFD. ELECTROLYTIC. 150 W V	GC-5	G-1	GANG CONDENSER
	C-10	40MFD.		G-2	
	C-11	20MFD.		G-3	ANT TRIMMER
				G-4	OSC. TRIMMER
IR-20	R-1	220M Ω RESISTOR 1/2W 20%	LL-16	L-1	LOOP ANT.
IR-22	R-2	3900 Ω RESISTOR 1/2W. 10%	LO-10	L-2	OSC COIL.
IR-10	R-3	47M Ω RESISTOR 1/2W 20%			
LI-6	T-1	INPUT I.F TRANSFORMER			
LI-7	T-2	OUTPUT I.F. TRANSFORMER			
	SW	SWITCH ON VOLUME CONTROL			
SPK-12	T-3	OUTPUT TRANSFORMER			
	S	5" P.M. SPEAKER			
PB-1	PL	#47 PILOT BULB			
CO-1	P	LINE CORD			

ALIGNMENT

Remove chassis from cabinet for alignment.

A Signal Generator is required having the following frequencies: 455 KC, 1400 KC, 1720 KC. An output meter should be connected across the speaker.

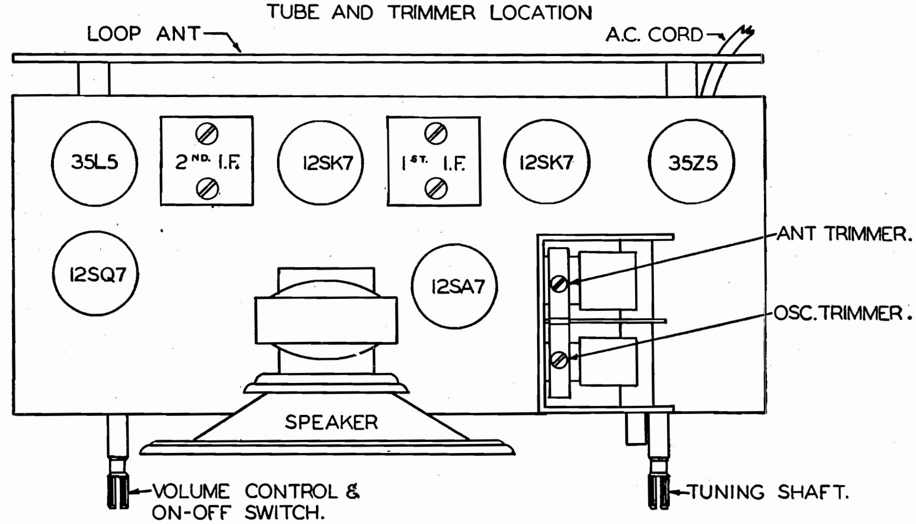
The receiver volume control should be turned to maximum during the I.F. and all subsequent alignments to keep the AVC from working and giving false readings. Keep the generator output as low as possible to prevent overloading.

FIRST STEP: Connect the hot lead from the generator to the ANT. section of the gang condenser, through a .1 MFD condenser. The ground lead from the generator must be connected to the floating ground buss under the chassis. Turn the gang condenser to complete minimum capacity. Adjust the generator to 455KC and adjust the trimmers of the 1st and 2nd I.F. transformers until a maximum reading is noted on the output meter.

SECOND STEP: With the leads from the generator still connected in the same manner, adjust the Signal Generator to 1720 KC. The OSC. trimmer is located on the front of the chassis. Adjust this trimmer until the 1720 KC signal is tuned in.

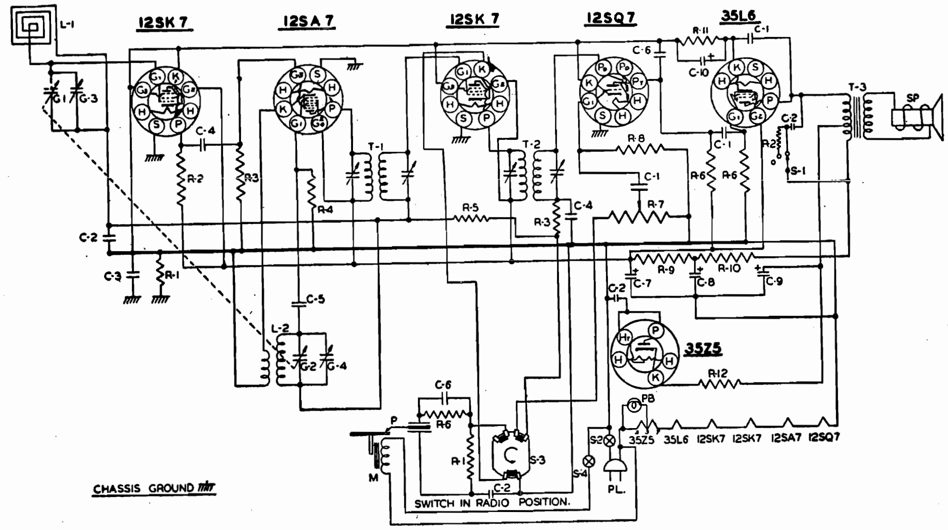
THIRD STEP: Remove the hot lead of the generator from the ANT section of the gang condenser. Connect this lead to the primary of the loop antenna through a 200 MMFD condenser. Adjust the Signal Generator to 1400 KC. Rotate the tuning control until this signal is tuned in. The ANT trimmer is located on the back of the loop antenna. Adjust this trimmer until a maximum reading is noted on the output meter. No further adjustment should be necessary, unless the set has been damaged, as the coils and condenser in this receiver have been specially handled at the factory to insure proper alignment at the lower frequencies.

TUBE AND TRIMMER LOCATION



MODEL 6040

TRAV-LER RADIO CORP.



PART NO.		DESCRIPTION
PC-7	C-1	.01 MFD. CONDENSER 400 V.
PC-5	C-2	.05 MFD. CONDENSER 400 V.
PC-8	C-3	.1 MFD. CONDENSER 400 V.
MC-2	C-4	100 MMFD. MICA. CONDENSER.
MC-4	C-5	50 MMFD. MICA CONDENSER
MC-5	C-6	500 MMFD. MICA CONDENSER
EC-14	C-7	20 MFD. 150 W.V. ELECTROLYTIC
	C-8	40 MFD.
	C-9	40 MFD.
EC-2	C-10	10 MFD. 25 W.V. ELECTROLYTIC
1R-20	R-1	220M Ω RESISTOR 1/2W. 20%
1R-15	R-2	2200 Ω RESISTOR 1/2W. 20%
1R-10	R-3	47M Ω RESISTOR 1/2W. 20%
1R-9	R-4	22M Ω RESISTOR 1/2W. 20%
1R-23	R-5	3.3 MEG. RESISTOR 1/2W. 20%
1R-11	R-6	470M Ω RESISTOR 1/2W. 20%
VC-4	R-7	1 MEG. VOLUME CONTROL
1R-13	R-8	2.2 MEG. RESISTOR 1/2W. 20%
1R-1	R-9	470 Ω RESISTOR 1/2W. 20%
1R-42	R-10	1000 Ω RESISTOR 1 W 10%
1R-14	R-11	150 Ω RESISTOR 1/2W. 20%
1R-17	R-12	33 Ω RESISTOR 1/2W. 20%
GC-5	G-1	GANG CONDENSER
	G-2	
	G-3	ANT. TRIMMER
	G-4	OSC. TRIMMER
L1-6	T-1	INPUT I.F. TRANSFORMER
L1-7	T-2	OUTPUT I.F. TRANSFORMER
	T-3	OUTPUT TRANSFORMER
LL-17	L-1	LOOP ANT.
LO-15	L-2	OSC. COIL
SPK-12	SP	5" P.M. SPEAKER
SW-2	S-1	TONE SWITCH
	S-2	SWITCH ON VOLUME CONTROL
SW-1	S-3	PHONO.-RADIO SWITCH
	S-4	SWITCH ON RECORD CHANGER
AC-M-7	M	RECORD CHANGER MOTOR
AC-PU-7	P	CRYSTAL PICKUP ARM. CARTRIDGE SH
	PB	#47 PILOT BULB
CO-2	PL	LINE CORD

ALIGNMENT DATA

Remove the chassis from the cabinet. A Signal Generator with the following frequencies is required: 455 KC, 1400 KC and 1720 KC.

The receiver volume control should be turned to maximum during the I.F. and all subsequent alignments to keep the A.V.C. from working and giving false readings. Turn the tone control to complete left hand position. Keep the generator output as low as possible to prevent overloading.

Connect an output meter across the voice coil of the speaker.
Connect a 20,000 ohm resistor across the loop connector terminals to reflect proper loop impedance.

FIRST STEP: Connect the hot lead from the generator to the "ANT." section of the gang condenser through a .1 MFD. condenser. The ground lead must be connected to the floating ground buss under the chassis. Turn the gang condenser to complete minimum capacity. Adjust the generator to 455 KC and adjust the trimmers of the 1st and 2nd I.F. transformers until a maximum reading is noted on the output meter.

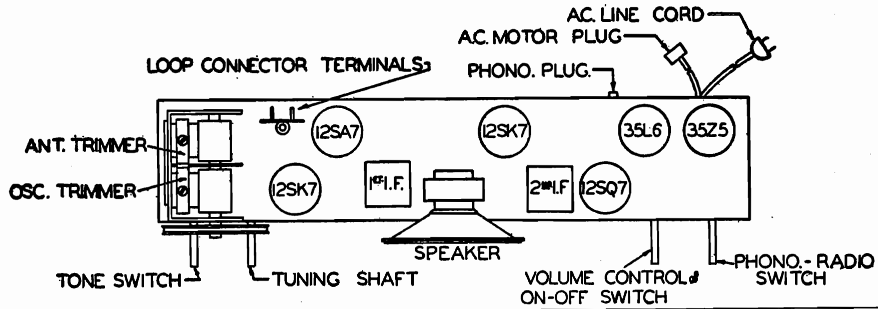
SECOND STEP: With the leads from the generator connected in the same manner as in I.F. alignment, adjust the signal generator to 1720 KC. The "O.S.C." trimmer is located on the front section of the gang condenser. Adjust this trimmer until the signal is tuned in. The gang condenser should be at complete minimum capacity for this setting.

THIRD STEP: Remove the generator leads from the chassis. Remove the 20,000 ohm resistor from the loop connector terminals. Reinstall the chassis in the cabinet, connect the loop leads, motor plug and phono pickup leads.

Connect the generator leads to a transmitting loop, made of a few turns of wire, and loosely couple to the receiver loop antenna which is located on the back end of the cabinet. Adjust the generator to 1400 KC. Rotate the tuning control until this signal is tuned in. The "ANT." trimmer is located on the rear section of the gang condenser. Adjust this trimmer until a maximum signal is noted on the output meter.

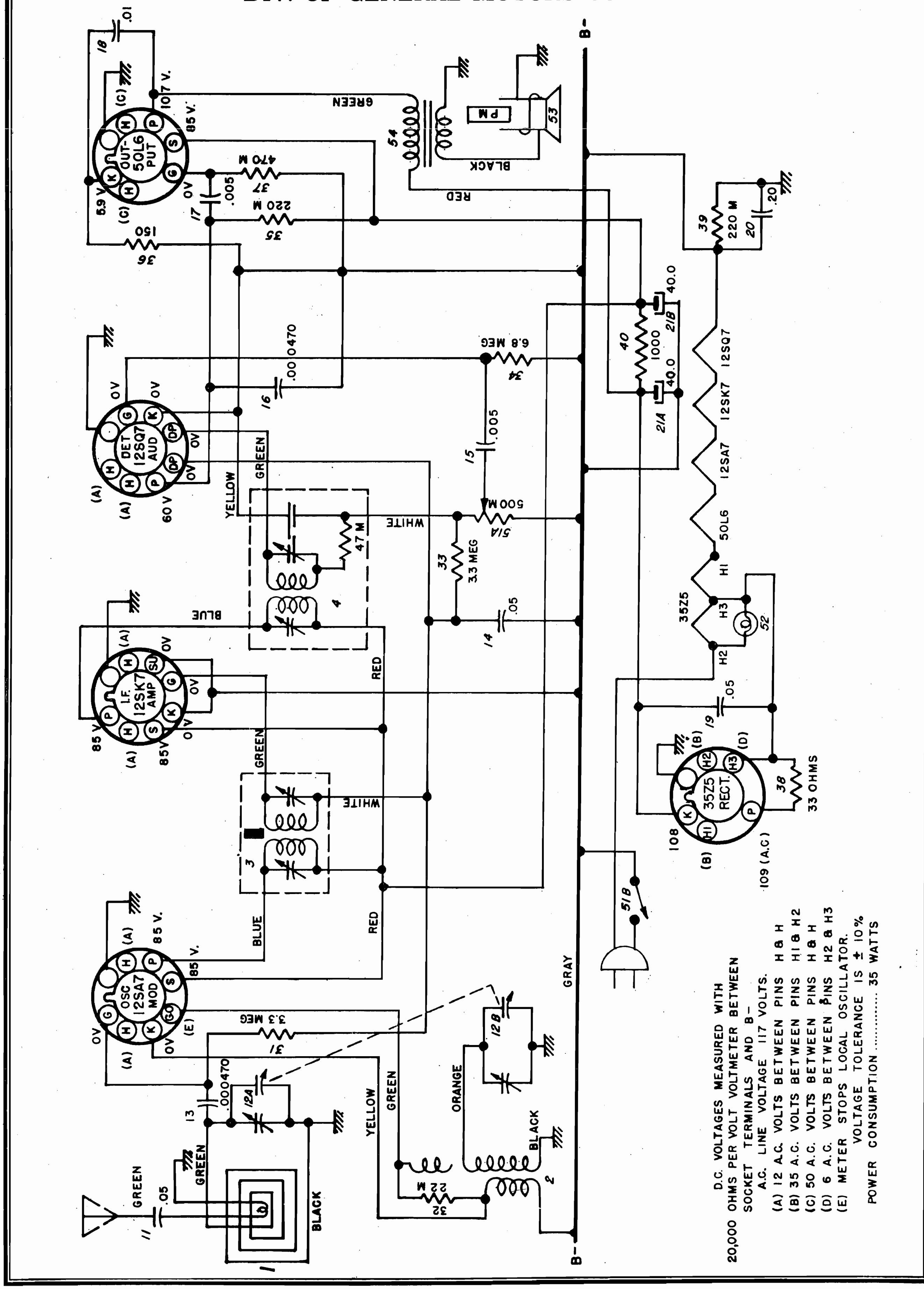
No further adjustment should be necessary, unless the receiver has been damaged, as the coils and tuning condenser have been specially handled at the factory to insure proper alignment at the lower frequencies.

TUBE AND TRIMMER LOCATION



UNITED MOTORS SERVICE
DIV. OF GENERAL MOTORS CORP.

MODEL R-1238



MODEL R-1238

UNITED MOTORS SERVICE
DIV. OF GENERAL MOTORS CORP.

GENERAL:

CIRCUIT ....AC - DC Superheterodyne

TUBES ....4 Plus Rectifier

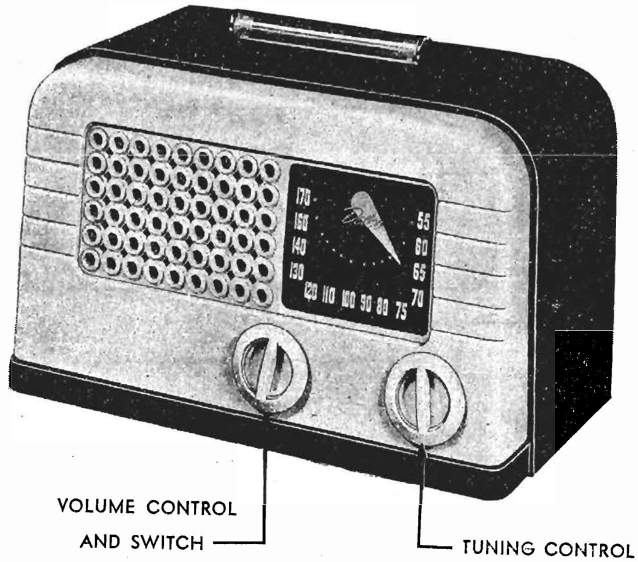
TUBING ....Manual

TUNING RANGE ....540 - 1720 KC

POWER SUPPLY ....

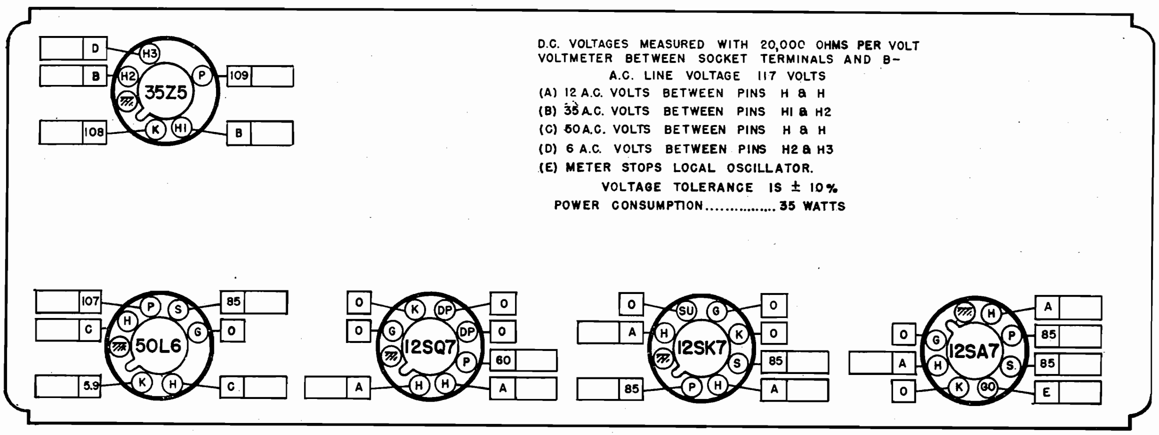
.... 105/125 Volts AC - DC

POWER CONSUMPTION ..... 35 Watts

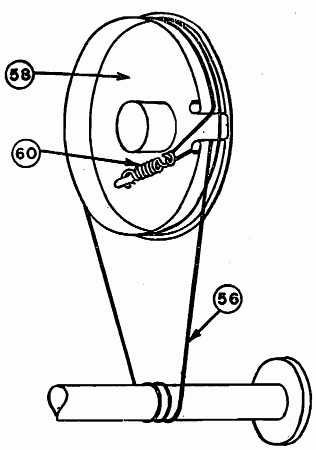


TUBE SOCKET VOLTAGE CHART

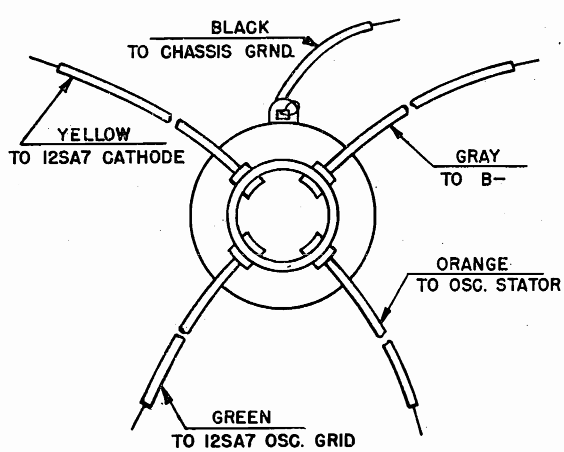
The tube socket voltages, as measured at the factory, are shown below. The blank spaces are provided so the service man may fill in actual voltage readings as measured with his own equipment. A normal operating radio should be used for these measurements.



Volt Meter Resistance .... Ohms Per Volt
Line Voltage .... Volts
Voltage Tolerance .... ± 10%



DIAL CORD SYSTEM



OSCILLATOR COIL

UNITED MOTORS SERVICE
DIV. OF GENERAL MOTORS CORP.

MODEL R-1238

ALIGNMENT PROCEDURE:

Output Meter Connections .... Across Voice Coil Winding

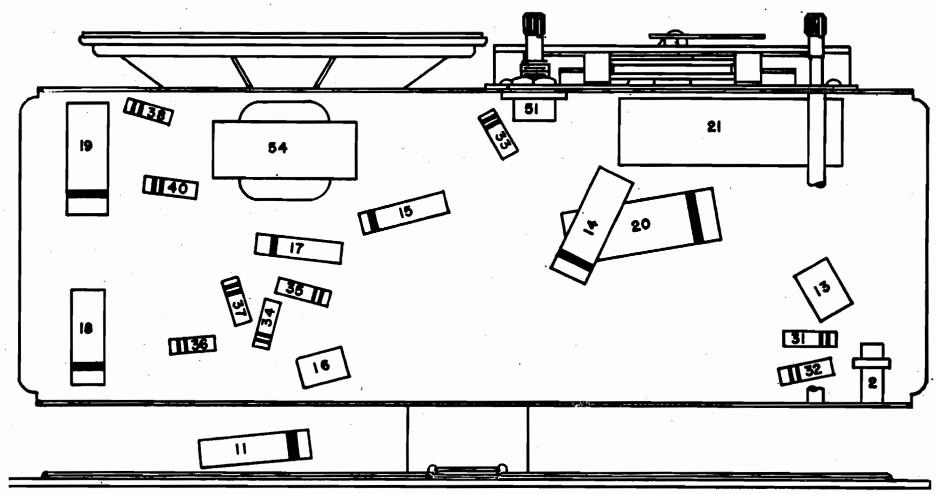
Signal Generator Ground .... To Chassis through .01 MFD

Dummy Antenna .... In series with generator

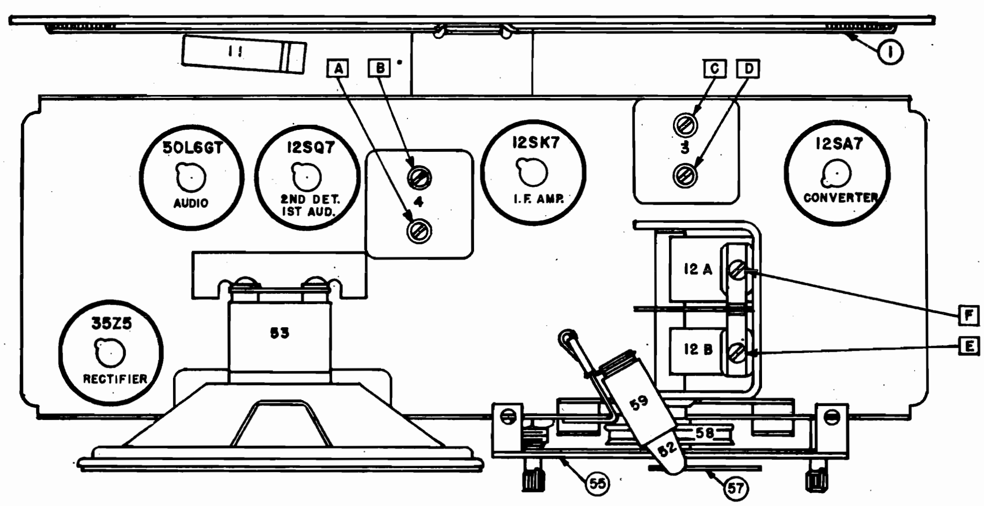
Volume Control Position .... Fully on

Signal Generator Output .... Minimum

Steps	Series Condenser or Dummy Antenna	Connect Signal Generator To	Adjust Signal Generator To	Turn Radio Dial To	Adjust Trimmers
1	0.1 Mfd.	12SA7 Grid (Pin #8) Ground Generator to B– (not chassis)	456 KC	Quiet Point near H. F. end	A-B (2nd IF Trans) C-D (1st IF Trans)
2	.000200 Mfd.	Ant. lead	1720 KC	1720 KC	E (Osc.)
3	.000200 Mfd.	Ant. lead	1400 KC	1400 KC	F (Ant.)



PARTS LAYOUT — CHASSIS VIEW



PARTS LAYOUT — TUBE VIEW

MODEL R-1238

UNITED MOTORS SERVICE
DIV. OF GENERAL MOTORS CORP.

SERVICE PARTS LIST

Illus. No.	Prod. Part No.	Service Part No.	Part Description
			ELECTRICAL PARTS
			COILS
1	1217910	1217910	Antenna - Loop Assy. (Includes Illus. 11)
2	1217905	1217905	Oscillator Coil
3	1217886	1217972	1st I. F.
4	1217887	1217973	2nd I. F.
			CONDENSERS
11	7236842	E503	0.05 Mfd. 200V Tubular (In Illus. 1)
12	1217917	1217917	Variable Condenser
			12A Antenna Section
			12B Oscillator Section
13	7238879	G471	0.000470 Mfd. Molded Mica
14	7236842	E503	0.05 200V Tubular
15	7231212	E502	0.005 600V Tubular
16	7238879	G471	0.000470 Molded Mica
17	7231212	E502	0.005 Mfd. 600V Tubular
18	1216513	E103	0.01 Mfd. 600V Tubular
19	7230592	E503	0.05 Mfd. 600V Tubular
20	7238787	E204	0.2 Mfd. 400V Tubular
21	1216527	J908	Electrolytic Condenser
21A			40 Mfd. 150V
21B			40 Mfd. 150V
			RESISTORS
31	1214564	A335	3.3 Meg. Ohms ½Watt Insulated
32	1214550	A223	22,000 Ohm ½Watt Insulated
33	1214564	A335	3.3 Meg. ½Watt Insulated
34	1215563	A685	6.8 Meg. Ohms ½Watt Insulated
35	1214555	A224	220,000 Ohm ½Watt Insulated
36	1213220	A151	150 Ohm ½Watt Insulated
37	1214559	A474	470,000 Ohm ½Watt Insulated
38	1213224	A330	33 Ohm ½Watt Insulated
39	1214555	A224	220,000 Ohm ½Watt Insulated
40	1211037	B102	1000 Ohm 1Watt Insulated
			TUBE COMPLEMENT
	1213809	5341	12SA7
	1213812	5348	12SK7
	1213813	5350	12SQ7
	1214366	5451	50L6GT
	1213848	5408	35Z5GT
			MISCELLANEOUS ELECTRICAL PARTS
51	1217883		Control, Volume and Switch
51A		8123	Volume Control
51B		8201	Switch, On-off
	1216512	1216512	Cord, Power
52	435433	47	Lamp, Dial
53	1216563	1216563	Speaker, 5" P. M
54	1217884	1217884	Transformer, Output
			MISCELLANEOUS MECHANICAL PARTS
55	1217888	1217888	Backplate Assy. Dial
56	1216994	1212233	Cord, 13" Dial Drive
	1217900	1217900	Cabinet Assy
	1217970	1217970	Dial Glass
	1217892	1217892	Knob
57	1217891	1217891	Pointer, Dial
58	1217238	1217238	Pulley, Dial Drive
59	1217839	1217839	Socket, Dial Light, with Leads
	1217403	7236279	Socket, Octal Tube
60	1217323	1217323	Spring, Dial Tension

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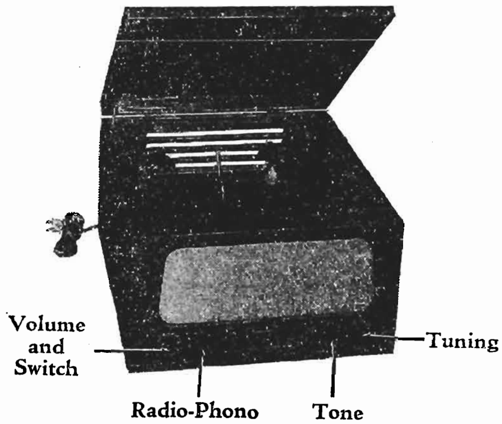
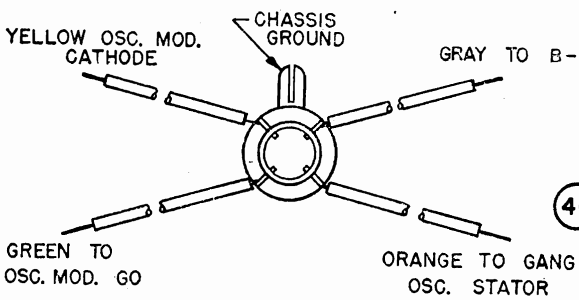
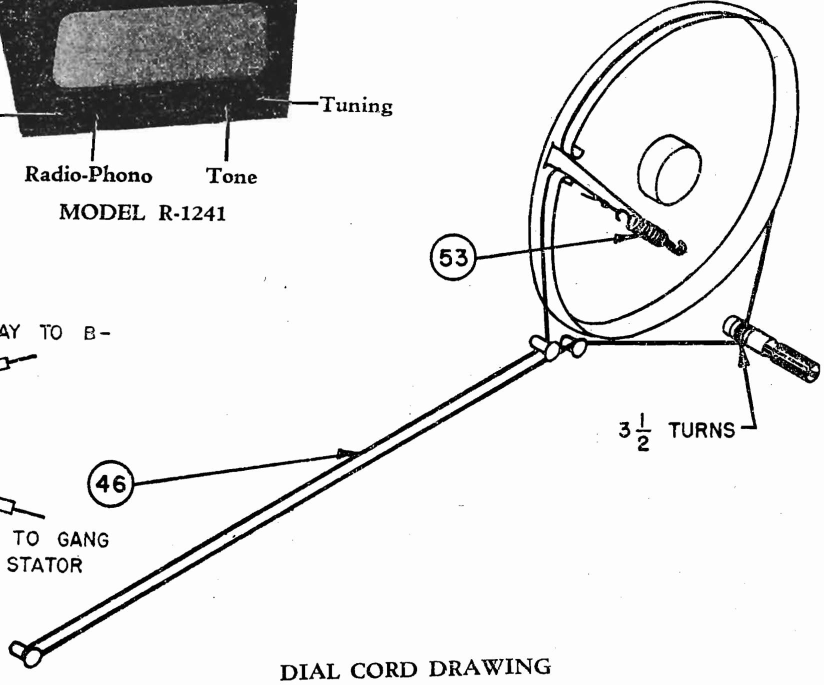


MODEL R-1241



OSCILLATOR COIL CONNECTIONS



DIAL CORD DRAWING

ALIGNMENT PROCEDURE:

Output Meter Connections .... Across Voice Coil

Generator Return .... To B—

Dummy Antenna .... In Series With Generator

Volume Control Position .... Maximum Volume

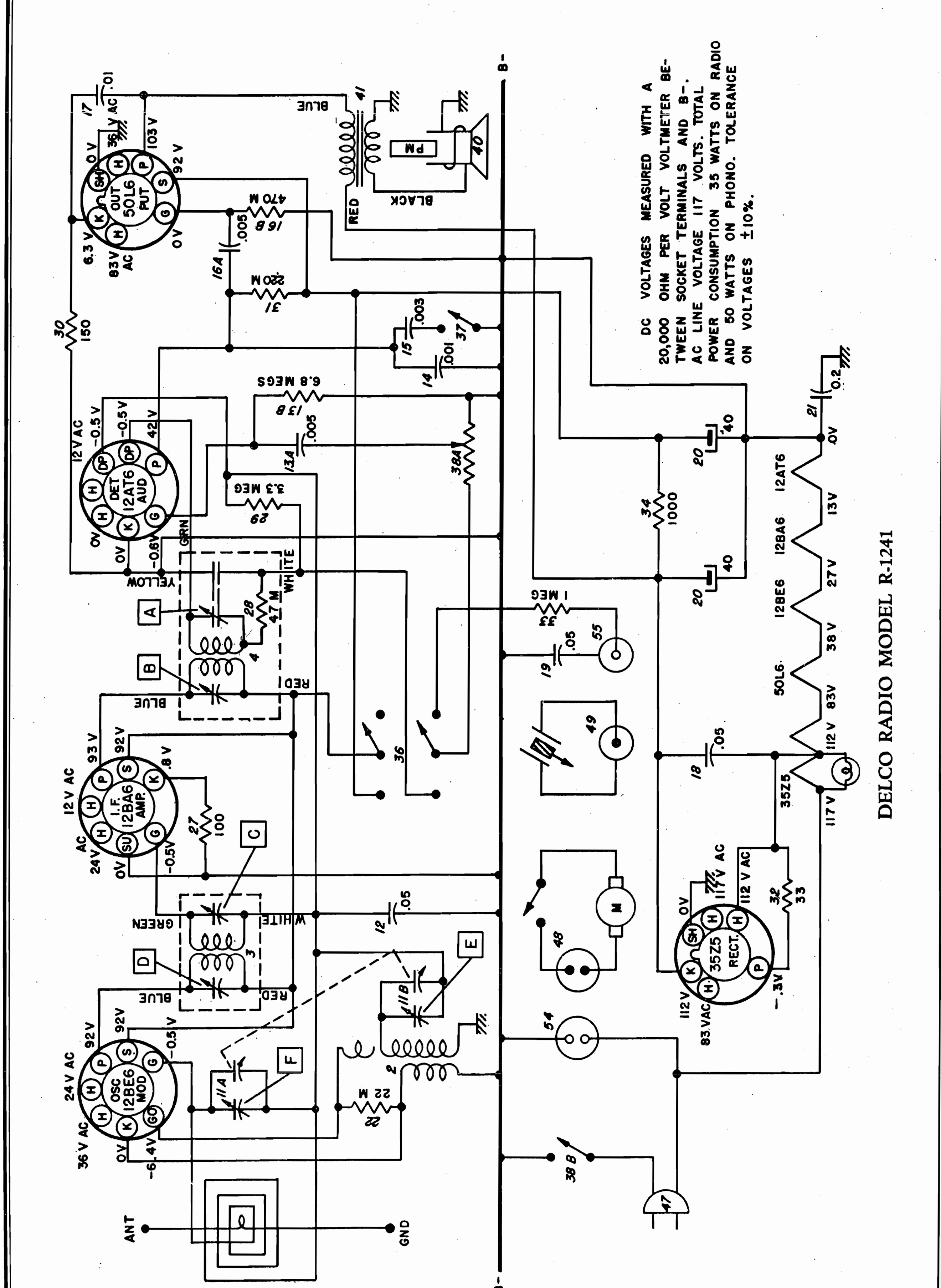
Tone Control Position .... Treble

Generator Output .... Minimum for Readable Indication

Steps	Series Condenser or Dummy Antenna	Connect Generator To	Signal Generator Frequency	Tune Receiver To	Adjust in Sequence for Max. Output
1	0.1 Mfd	Stator Lug RF Section of Gang	456 KC	High Frequency Stop	A, B, C, D
2	0.000220 Mfd	Stator Lug RF Section of Gang	1615 KC	High Frequency Stop	E
3	0.000220 Mfd	External Antenna Connection	1400 KC	Signal Generator Signal	F

MODEL R-1241

UNITED MOTORS SERVICE
DIV. OF GENERAL MOTORS CORP.



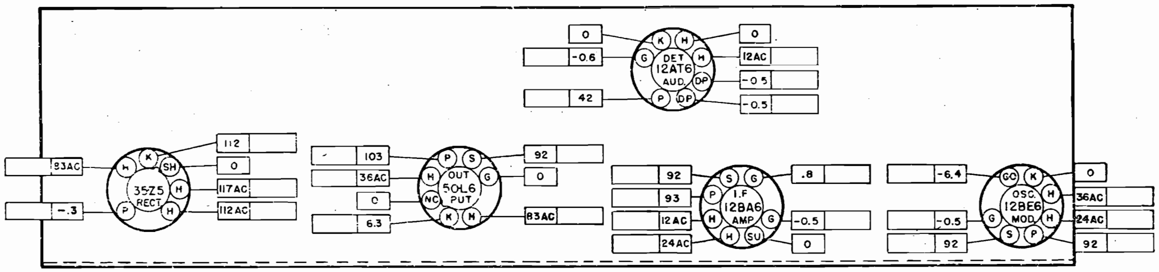
DELCO RADIO MODEL R-1241

UNITED MOTORS SERVICE
DIV. OF GENERAL MOTORS CORP.

MODEL R-1241

TUBE SOCKET VOLTAGE CHART

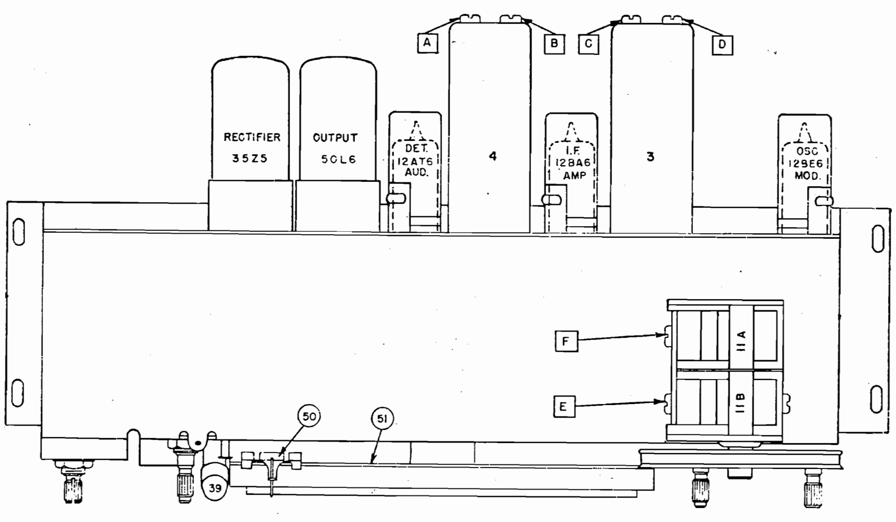
The tube socket voltages, as measured at the factory and under the conditions shown on the schematic diagram, are shown below. The blank spaces are provided so the service man may fill in actual voltage readings as measured with his own equipment. A normal operating radio should be used for these measurements.



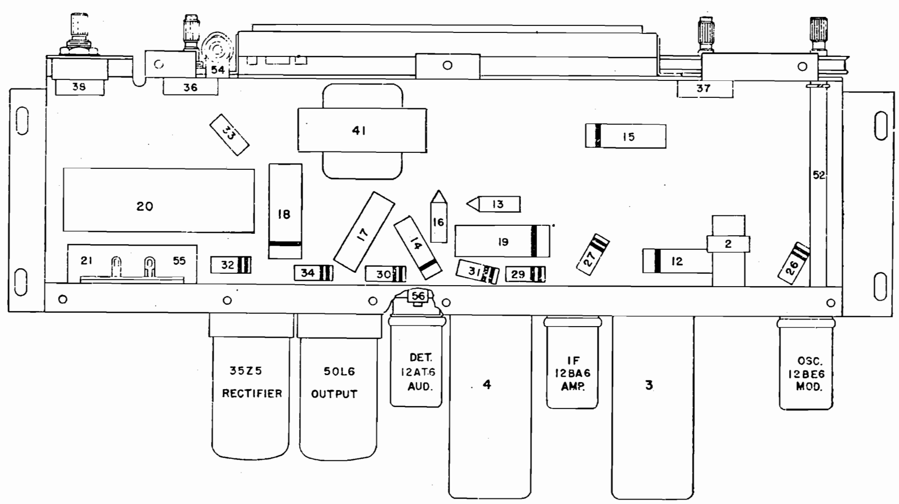
Volt Meter Resistance .... Ohms Per Volt

Line Voltage .... Volts

Voltage Tolerance .... ±10%



PARTS LAYOUT — TUBE VIEW



PARTS LAYOUT — CHASSIS VIEW

MODEL R-1241

UNITED MOTORS SERVICE
DIV. OF GENERAL MOTORS CORP.

SERVICE PARTS LIST

ELECTRICAL PARTS

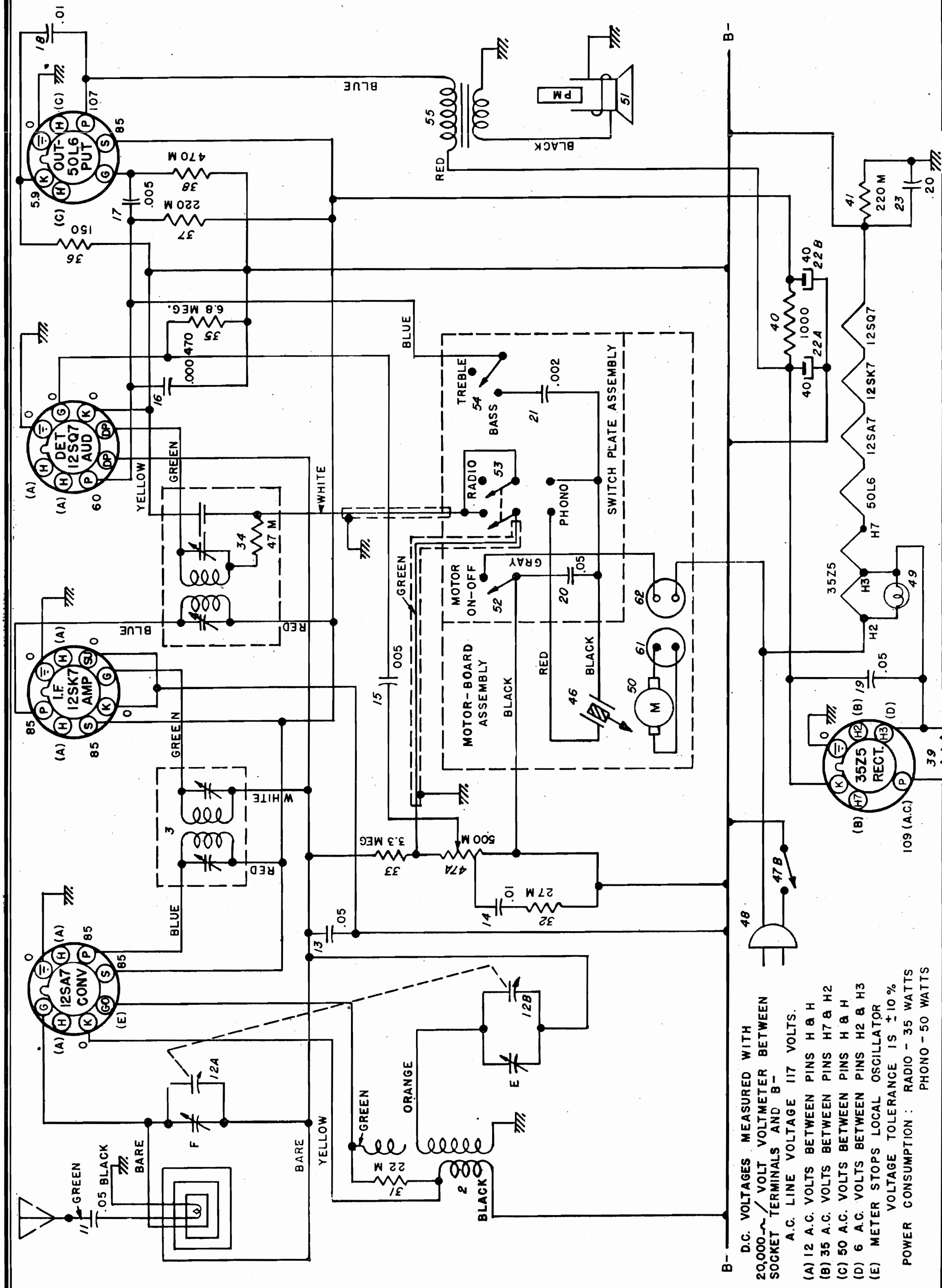
Illus. No.	Production Part No.	Service Part No.	Description
			Coils
1	1218776	1218776	Loop Antenna
2	1218781	1218781	Oscillator
3	1218766	1217972	1st I.F.
4	1218767	1217973	2nd I.F.
			Condensers
11	1219130	1219130	Variable Condenser and Pulley
11A			R.F. Section
11B			Oscillator Section
12	7236842	E 503	0.05 Mfd. 200 V. Tubular
13	1218258		Capristor
13A		E 502	0.005 Mfd. Ceramic
13B		A 685	6.8 Megohms ½ W Insulated
14	1217790	E 102	0.001 Mfd. 600 V Tubular
15	1216132	E 302	0.003 Mfd. 600 V Tubular
16	1218259		Capristor
16A		E 502	0.005 Mfd. Ceramic
16B		A 474	470,000 Ohms ½ W Insulated
17	7238790	E 103	0.01 Mfd. 200 V Tubular
18	7230592	E 503	0.05 Mfd. 600 V Tubular
19	7230592	E 503	0.05 Mfd. 600 V Tubular
20	1217027	J 908	Electrolytic
20A			40 Mfd. 150 V
20B			40 Mfd. 150 V
21	7238787	E 204	0.2 Mfd. 400 V Tubular
			Resistors
13	1218258		Capristor
13A		E 502	0.005 Mfd. Ceramic
13B		A 685	6.8 Megohms ½ W Insulated
16	1218259		Capristor
16A		E 502	0.005 Mfd. Ceramic
16B		A 474	470,000 Ohms ½ W Insulated
26	1214550	A 223	22,000 Ohms ½ W Insulated
27	1213217	A 101	100 Ohms ½ W Insulated
28	1214553	A 473	47,000 Ohms ½ W Insulated
29	1214564	A 335	3.3 Megohms ½ W Insulated
30	1213220	A 151	150 Ohms ½ W Insulated
31	1214555	A 224	220,000 Ohms ½ W Insulated
32	1214538	A 330	33 Ohms ½ W Insulated
33	1213282	A 105	1 Megohm ½ W Insulated
34	1211037	B 102	1000 Ohms 1 W Insulated
			Tubes
	1214366	5451	50L6GT
	1218807	5368	12AT6
	1218808	5370	12BE6
	1218809	5369	12BA6
	1213848	5408	35Z5GT, Rectifier
			Miscellaneous Electrical Parts
36	1218062	1218062	Control - "Radio-Phono"
37	1218806	1218806	Control - Tone
38	1218758	1218758	Control - Volume and Switch
38A			Volume Control
38B			Switch
39	435433	47	Lamp - Dial Light
40	1218817	1218817	Speaker
41	1217884	1217884	Transformer - Output

MECHANICAL PARTS

Illus No.	Production Part No.	Service Part No.	Description
			Chassis
	1217104	1217104	Clip - Fahnestock
46		6040	Cord - Dial
	1216512	1216512	Cord - Power
48	1217515	1217515	Plug - Phono Motor
49	1851850	1851850	Plug - Pickup Lead
50	1218737	1218737	Pointer
51	1218756	1218756	Pointer Backplate
52	1218073	1218073	Shaft - Tuning
53	7242189	7242189	Spring - Pointer Cord Tension
54	1217839	1217839	Socket - Dial Light
55	1216925	1216925	Socket - Phono Motor
	7236279	7236279	Socket - Octal Tube
56	1216747	1216747	Socket - Phono Pickup Lead
	1218071	1218071	Socket - Seven pin miniature tube
			Cabinet
	1219131	1219131	Cabinet Assy.
	1218818	1218818	Dial
	1218084	1218084	Knob - Volume Control, Tone Control and "Radio-Phono"
	1218085	1218085	Knob - Tuning

UNITED MOTORS SERVICE
DIV. OF GENERAL MOTORS CORP.

MODEL R-1242



D.C. VOLTAGES MEASURED WITH 20,000-~/ VOLT VOLTMETER BETWEEN SOCKET TERMINALS AND B-

A.C. LINE VOLTAGE 117 VOLTS.

(A) 12 A.C. VOLTS BETWEEN PINS H & H
(B) 35 A.C. VOLTS BETWEEN PINS H7 & H2
(C) 50 A.C. VOLTS BETWEEN PINS H & H
(D) 6 A.C. VOLTS BETWEEN PINS H2 & H3
(E) METER STOPS LOCAL OSCILLATOR

VOLTAGE TOLERANCE IS ±10%

POWER CONSUMPTION: RADIO - 35 WATTS
PHONO - 50 WATTS

UNITED MOTORS SERVICE
DIV. OF GENERAL MOTORS CORP.

ALIGNMENT PROCEDURE:

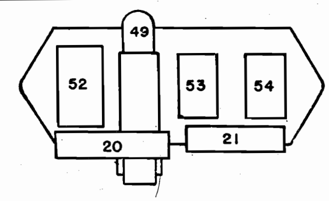
Output Meter Connections .... Across Voice Coil Winding

Generator Ground .... To Chassis through .01 MFD

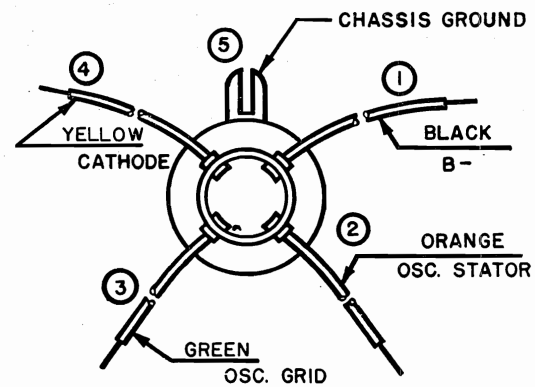
Dummy Antenna .... In Series with generator

Volume Control Position .... Fully on

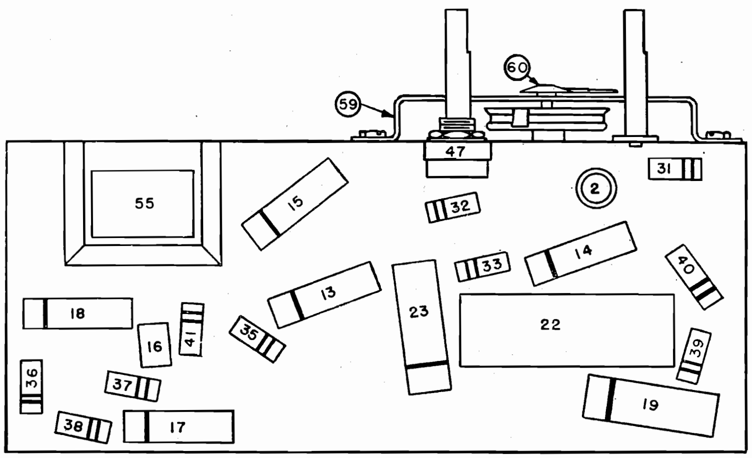
Steps	Series Condenser or Dummy Antenna	Connect Signal Generator To	Adjust Signal Generator To	Turn Radio Dial To	Adjust Trimmers
1	.02 Mfd.	12SA7 Grid (Pin #8)	456 KC	Quiet Point near H. F. end	A-B (2nd IF Trans) C-D (1st IF Trans)
2	.000200 Mfd.	Ant. lead	1720 KC	1720 KC	E (Osc.)
3	.000200 Mfd.	Ant. lead	1400 KC	1400 KC	F (Ant.)



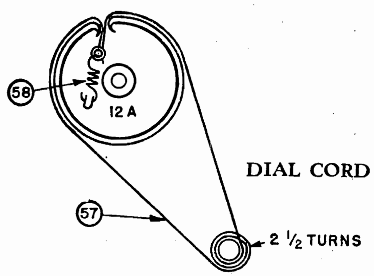
PARTS LAYOUT—SWITCH PLATE (BOTTOM VIEW)



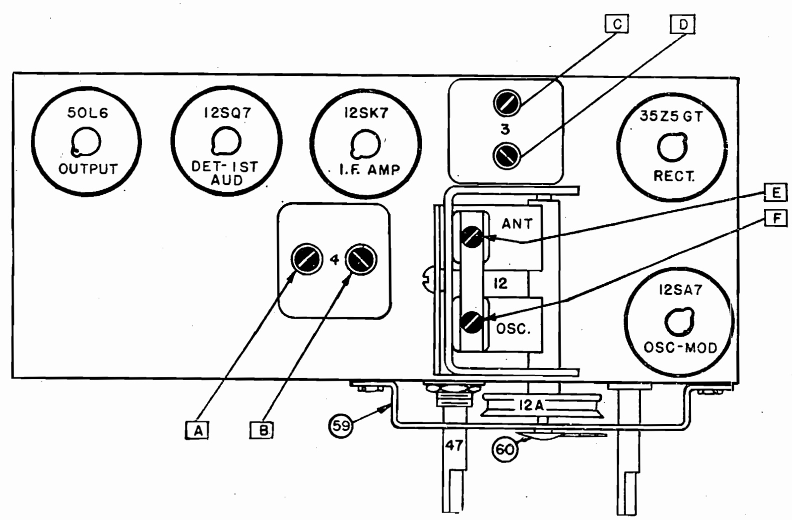
OSCILLATOR COIL CONNECTIONS



CHASSIS PARTS LAYOUT—CHASSIS VIEW



DIAL CORD DRAWING



CHASSIS PARTS LAYOUT—TUBE VIEW

UNITED MOTORS SERVICE
DIV. OF GENERAL MOTORS CORP.

MODEL R-1242

GENERAL:

AC RADIO - RECORD PLAYER

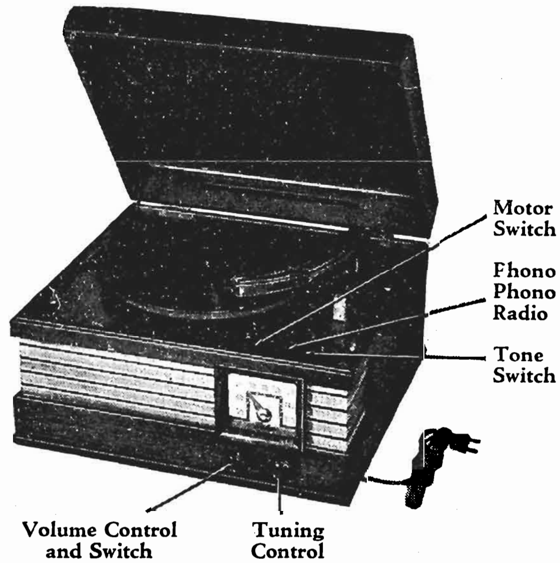
POWER SUPPLY .... 105/125 Volts AC

RADIO

- TUBES .... 4, Plus Rectifier
- SPEAKER .... 5" PM
- TUNING .... Manual
- TUNING RANGE .... 540 to 1720
- POWER CONSUMPTION .... 35 Watts

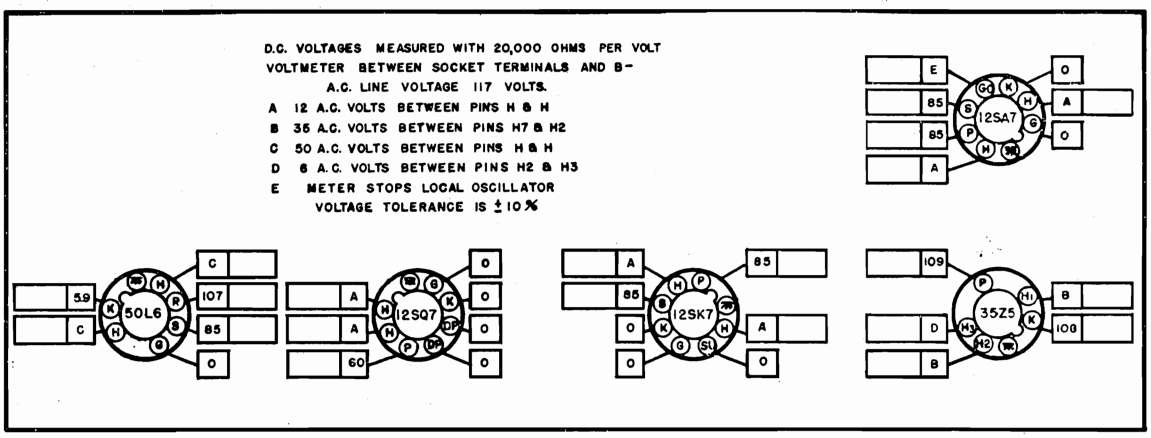
RECORD PLAYER

- TYPE .... Manual
- PICKUP UNIT .... Crystal
- NEEDLE .... Changeable
- MOTOR POWER CONSUMPTION .... 15 Watts



TUBE SOCKET VOLTAGE CHART

The tube socket voltages, as measured at the factory, are shown below. This chart provides blank spaces so the radio serviceman can enter the voltage readings as taken with his own equipment for permanent reference. A normal operating radio - record player should be used to make these measurements.



SERVICE PARTS LIST

Illus. No.	Production Part No.	Service Part No.	Description
			ELECTRICAL PARTS
			COILS
1	1217697	1217697	Antenna - Loop and Mounting Board (Includes Condenser Illus. #11)
2	1216518	1216518	Oscillator Coil
3	1217592	1217972	1st I. F. Assy.
4	1217594	1217973	2nd I. F. Assy. (Includes Resistor Illus. #34)
			CONDENSERS
11	7236842	E503	0.05 mfd. 200V Tubular (In Illus. #1)
12	1217391	1217391	Variable Cond. and Pulley Package Condenser

MODEL R-1242

UNITED MOTORS SERVICE
DIV. OF GENERAL MOTORS CORP.

Illus. No.	Production Part No.	Service Part No.	Description
12A	1217810	1217810	Pulley
			Grommet (3)
			Spacer Sleeve (3)
			Screw (3)
13	7236842	E503	0.05 mfd. 200V Tubular
14	7238881	E103	0.01 mfd. 400V Tubular
15	7231212	E502	0.005 mfd. 600V Tubular
16	7238879	G471	0.000470 mfd. Molded Mica
17	7231212	E502	0.005 mfd. 600V Tubular
18	1216513	E103	0.01 mfd. 600V Tubular
19	7230592	E503	0.05 mfd. 600V Tubular
20	7239185	E503	0.05 mfd. 400V Tubular
21	7236756	E202	0.002 mfd. 600V Tubular
22	1217027	J908	Electrolytic Cond., two section
			22A—40 mfd. 150V Common Negative
			22B—40 mfd. 150V Common Negative
23	7238787	E204	0.2 mfd. 400V Tubular
		RESISTORS	
31	1214550	A223	22,000 ohm ½W Insulated
32	1214551	A273	27,000 ohm ½W Insulated
33	1214564	A335	3.3 Megohm ½W Insulated
34	1214553	A473	47,000 ohm ½W Insulated (In 2nd I. F. Ass'y)
35	1215563	A685	6.8 Megohm ½W Insulated
36	1213220	A151	150 ohm ½W Insulated
37	1214555	A224	220,000 ohm ½W Insulated
38	1214559	A474	470,000 ohm ½W Insulated
39	1214538	A330	33 ohm ½W Insulated
40	1211037	B102	1,000 ohm 1W Insulated
41	1214555	A224	220,000 ohm ½W Insulated
		TUBE COMPLEMENT	
	1213809	5341	12SA7
	1213812	5348	12SK7
	1213813	5350	12SQ7
	1214366	5451	50L6GT
	1213848	5408	35Z5GT
		MISCELLANEOUS ELECTRICAL PARTS	
47	1216936		Control, Volume and Switch
47A		8156	Volume Control (0.5 Megohm tapped at 100 Megohms)
47B		8201	On-off switch
48	1216512	1216512	Cord, power
49	435433	47	Lamp, dial
51	1216588	1216563	Speaker, 5" P. M.
55	1216571	1217511	Transformer, output
		MECHANICAL PARTS	
57	1217323	1217323	Spring, dial tension
58	1216763	1212233	Cord, 9" Dial Drive
	1216905	1216905	Crystal, dial
59	1217501	1217501	Dial scale and plate
	1216826	1216826	Knob
60	1216831	1216831	Pointer, dial
	1217839	1217839	Socket, dial light
	7236279	7236279	Socket, octal tube
	1218218	1218218	Cabinet Assy. - Includes Motor Board
		RECORD - PLAYER PARTS	
46	1216574	1216574	Pickup Arm Assy.
	1217517	1217517	Cartridge, crystal
50	1217512	1217512	Motor and drive mechanism
	1217513	1217513	Idler Wheel Package
52	1216974	1216974	Switch, SDST - Motor on-off
53	1216695	1216695	Switch, DPDT - Radio - Phono.
54	1216696	1216696	Switch, SPDT - Tone
	1217514	1217514	Turn-Table
61	1217515	1217515	Connector, plug
62	1217516	1217516	Connector, socket

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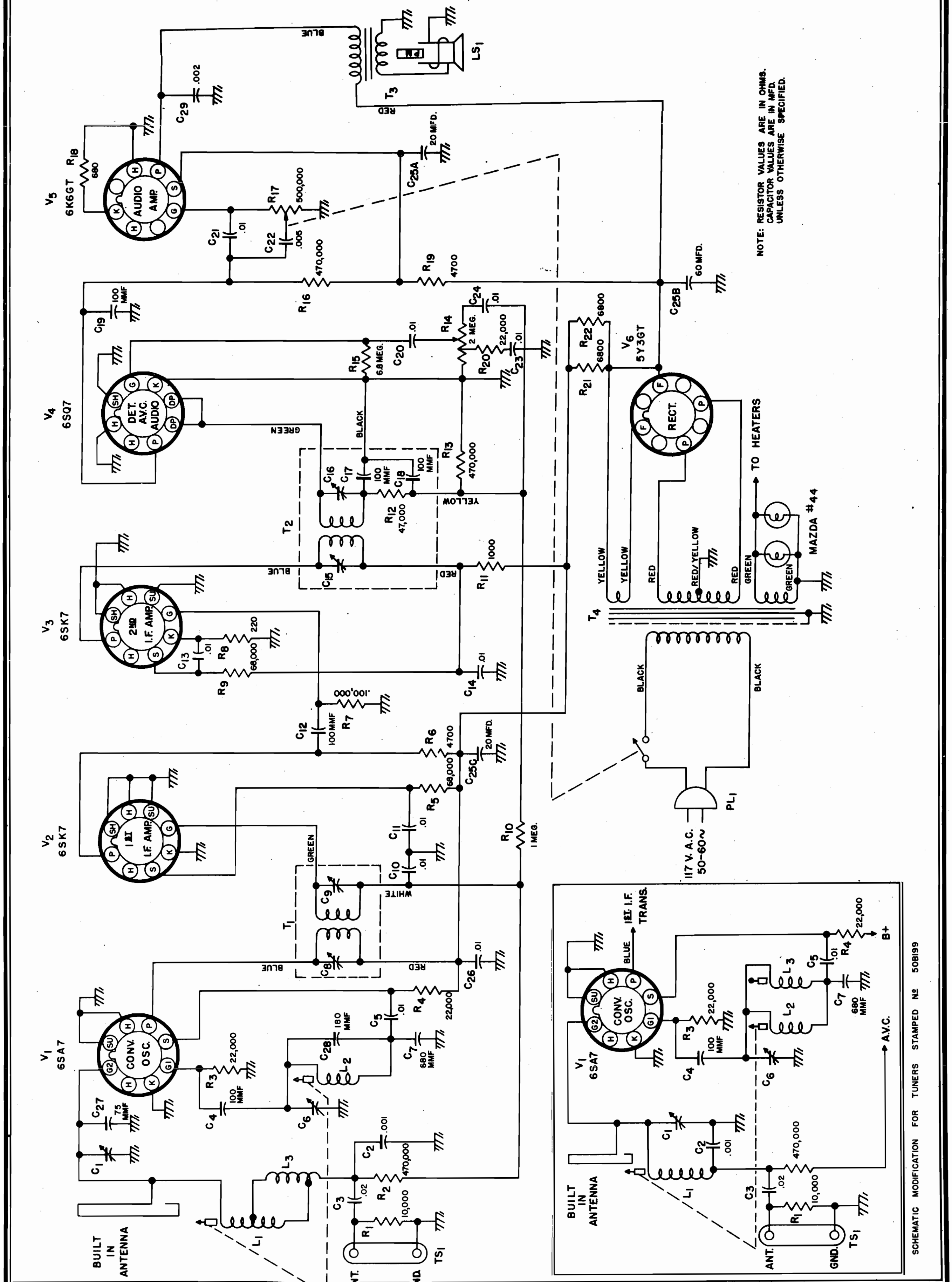
MODEL R-1243



MODEL R-1243

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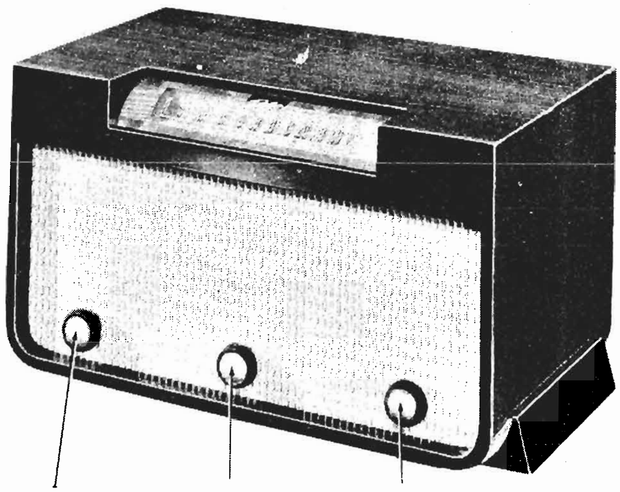
GENERAL

TUBES.................Six
SPEAKER.............5″ x 7″ Elliptical P.M. Dynamic
TUNING..............Manual
TUNING RANGE......535-1620 KC
ANTENNA............Built-in Antenna Plate and External.
POWER SUPPLY......105-125 V. A.C. 60 Cycles.
POWER CONSUMPTION..50 Watts.



ALIGNMENT PROCEDURE

Output Meter Connections...Across Voice Coil
Generator Ground.................To Chassis
Dummy Antenna.....In Series With Generator
Volume Control Position............Maximum
Tone Control Position.................Treble

NOTE: Reset Ant. Trimmer after installing receiver in cabinet and connecting up cabinet antenna.

USE THIS ALIGNMENT PROCEDURE WHEN ALIGNING RECEIVERS WITH TUNER STAMPED 50B225.

Series Cond. or Dummy Antenna	Connection at Radio	Set Generator At	Tune Receiver To		Adjust Screws At	To Obtain
		455 KC	1000 KC	A B	2nd IF trimmers	
.00025 Mfd	Antenna	455 KC	1000 KC	C D	1st IF trimmers	Max.
		1625 KC	High Freq.. Stop	E F	Osc & Ant trimmers	Output
		1400 KC	Signal Generator	G	Ant coil, slide up or down	

Repeat last two steps until no improvement in output can be made. Caution—Do not change the position of the oscillator coil (H). Adjustment of Ant coil (G) is sufficient.

USE THIS ALIGNMENT PROCEDURE WHEN ALIGNING RECEIVERS WITH TUNER STAMPED 50B199.

Series Cond. or Dummy Antenna	Connection at Radio	Set Generator At	Tune Receiver To		Adjust Screws At	To Obtain
		455 KC	1000 KC	A B	2nd IF trimmers	
		455 KC	1000 KC	C D	1st IF trimmers	
.00025 Mfd	Antenna	1660 KC	High Freq. Stop	E F	Osc & Ant trimmers	Max.
		1400 KC	Signal Generator	H	Ant coil, slide up or down	Output
		Repeat last two steps carefully.				
		600 KC	Signal Generator	I	Osc slug. Rock tuner thru signal	

Caution—Do not change the position of the oscillator coil (G). Adjustment of the antenna coil (H) is sufficient.

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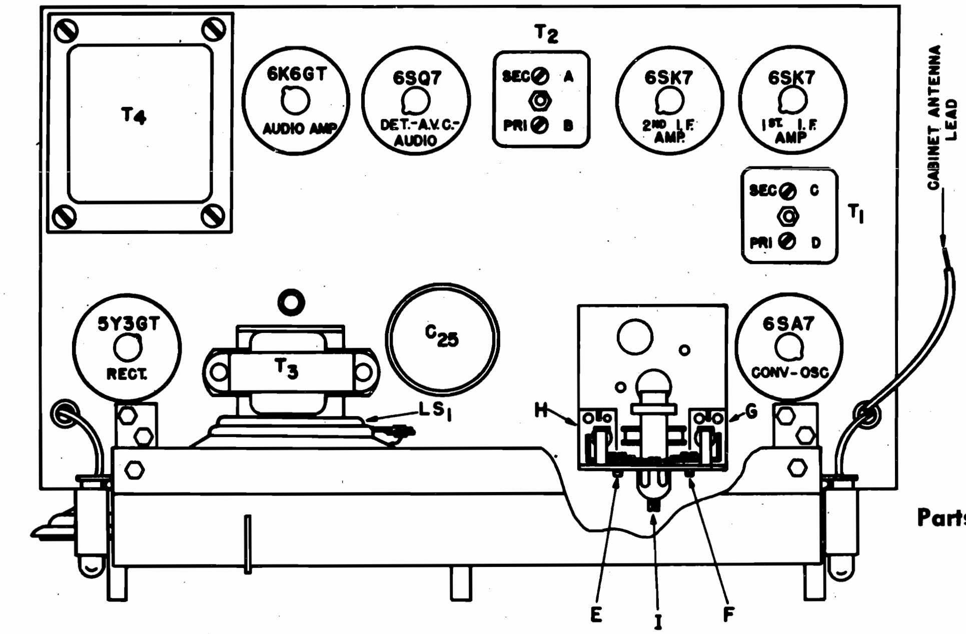
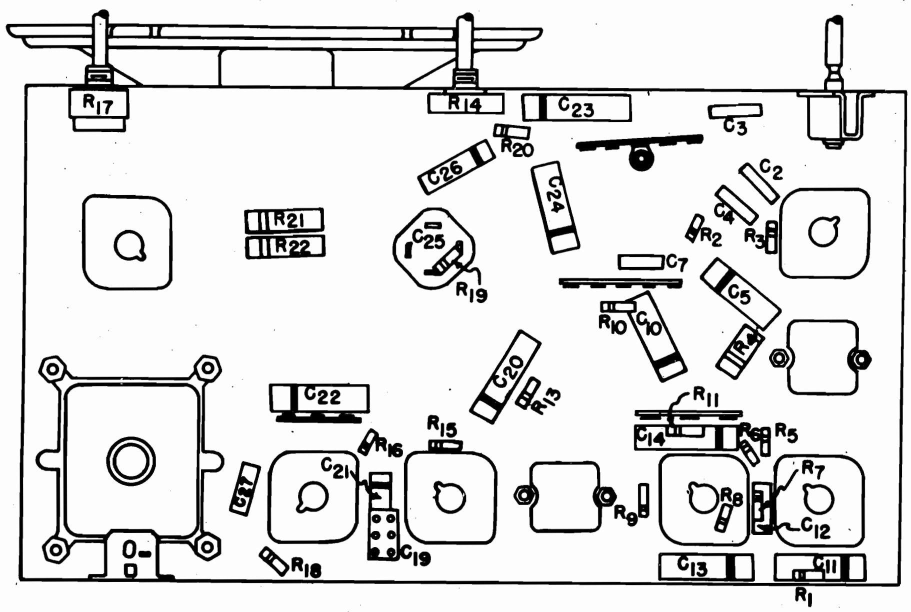
MODEL R-1243



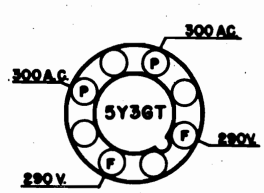
Parts Layout—*Top view.*

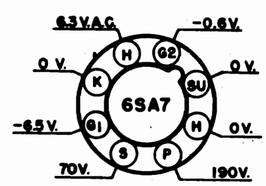


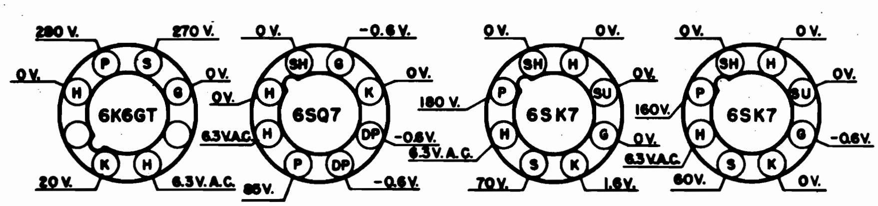
Parts Layout—*Bottom view.*

BOTTOM VIEW OF CHASSIS

ALL VOLTAGES ARE D.C. UNLESS OTHERWISE SPECIFIED.
D.C. VOLTAGES MEASURED WITH ELECTRONIC VOLTMETER BETWEEN SOCKET TERMINALS AND CHASSIS.
A.C. LINE VOLTAGE 117 VOLTS.







Tube Socket Voltages

MODEL R-1243

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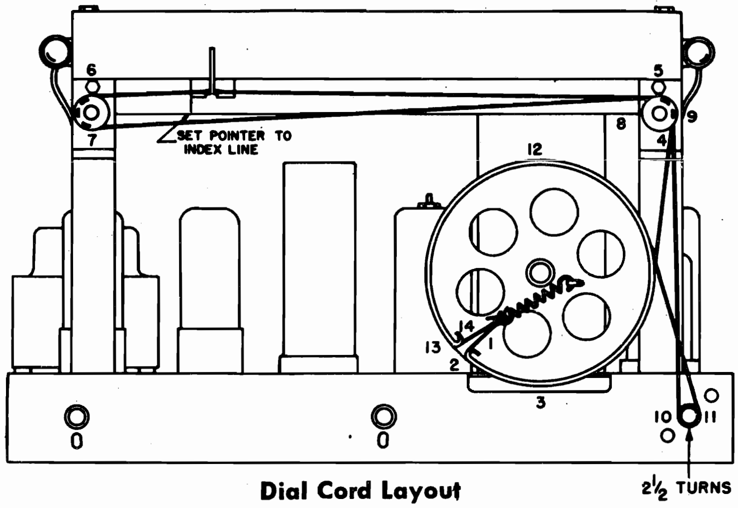

Dial Cord Layout

RESTRINGING DIAL CORD

To replace the dial drive cord, cut a 48″ length of 18 lb. test dial cord, tie one end to the tension spring and follow the stringing sequence. A series of numbers are used to show the path of the cord. Stretch the tension spring slightly and tie the finished end of the dial cord securely as shown. To position the pointer, turn the tuning shaft to the left as far as it will go and line up the pointer with the index line stamped on the left hand end of the pointer rail.

SERVICE PARTS LIST

ELECTRICAL PARTS
COILS AND TRANSFORMERS

Illus. No.	Production Part No.	Service Part No.	Description
*L-1, L-2, L-3	50B225	1217451	Permeability Tuner Assembly
†L-1, L-2, L-3	50B225 22C197	1217509	Permeability Tuner Assembly with Calibrated Glass Dial
T-1	50B196-6	1217453	1st I.F. Transformer
T-2	50B211-1	1217454	2nd I.F. Transformer
T-3	55B104	1217504	Output Transformer
T-4	50C130-1	1217459	Power Transformer

CONDENSERS

Illus. No.	Production Part No.	Service Part No.	Description
C-2	CM20A102M	G102	.001 Mfd. 500 V. Mica
C-3	46AU203J	E203	.02 Mfd. 600 V. Tubular
C-4, 12, 19	CM20A101M	G101	.0001 Mfd. 500 V. Mica
C-5, 10, 11, 13, 14, 20, 21, 23, 24, 26	46AY103F	E103	.01 Mfd. 600 V. Tubular
C-7	CM20A681M	G681	.000680 Mfd. 500 V. Mica
C-22	46AY502F	E502	.005 Mfd. 600 V. Tubular
C-25	45B113	1217457	60-20-20 Mfd. Electrolytic
C-29	46AZ202J	E202	.002 Mfd. 600 V. Tubular

RESISTORS

Illus. No.	Production Part No.	Service Part No.	Description
R-1	RC20AE103M	A103	10,000 Ohms ½ Watt Insulated
R-2, 13, 16	RC20AE474M	A474	470,000 Ohms ½ Watt Insulated
R-3, 20	RC20AE223M	A223	22,000 Ohms ½ Watt Insulated
R-4	RC40AE223M	C223	22,000 Ohms 2 Watts Insulated
R-5, 9	RC20AE683M	A683	68,000 Ohms ½ Watt Insulated
R-6, 19	RC20AE472M	A472	4,700 Ohms ½ Watt Insulated
R-7	RC20AE104M	A104	100,000 Ohms ½ Watt Insulated
R-8	RC20AE221M	A221	220 Ohms ½ Watt Insulated
R-10	RC20AE105M	A105	1 Meg-ohm ½ Watt Insulated
R-11	RC20AE102M	A102	1,000 Ohms ½ Watt Insulated
R-15	RC20AE685M	A685	6.8 Meg-ohm ½ Watt Insulated
R-18	RC30AE681M	B681	680 Ohms, 1 Watt Insulated
R-21, 22	RC40AE682M	C682	6,800 Ohms 2 Watts Insulated

TUBE COMPLEMENT

Illus. No.	Production Part No.	Service Part No.	Description
V-1	90X6SA7	5222	6SA7
V-2, 3	90X6SK7	5229	6SK7
V-4	90X6SQ7	5231	6SQ7
V-5	90X6K6GT	5196	6K6GT
V-6	90X5Y3GT	5122	5Y3GT

MISCELLANEOUS ELECTRICAL PARTS

Illus. No.	Production Part No.	Service Part No.	Description
R-14	25B620	1217448	Control, Volume
R-17	25B639	1217446	Control, Tone and Switch
		44	Lamp, Dial Light—Mazda No. 44
LS-1	85C067	1217458	Speaker, 5″ x 7″ Elliptical
PL-1	87B1574	1217433	Power Cord and Plug

MECHANICAL PARTS
CHASSIS PARTS

Illus. No.	Production Part No.	Service Part No.	Description
		7236279	Socket, Tube
	86A058	1217443	Socket, Dial Lamp
	41X10203	1217456	Dial Support Assembly (right)
	41X10204	1217505	Dial Support Assembly (left)
	67B770	1217506	Rail, Pointer
	74A205	1217439	Shaft, Drive
	4A269	1217447	"C" Washer, Drive Shaft
	28A042	1217441	Pulley, Tuner Drive
		1212233	Cord, Dial Drive (48″ length)
	75A012	1217323	Spring, Cord Tension
	82A144	1217442	Pointer, Dial
	63C317	1217507	Plate, Dial Background

CABINET PARTS

Illus. No.	Production Part No.	Service Part No.	Description
	66D408	1217503	Cabinet, Wood
	22C196	1217452	Dial, Glass (Calibrated for tuner 50B199)
	22C197	1217449	Dial, Glass (Calibrated for tuner 50B225)
	76A386	1217440	Fastener, Dial Glass
	15B093-1	1217455	Knob, Tone, Tuning and Volume
	7B064	1217508	Speaker Grill and Sound Board Assembly
	32C420	1217444	Cabinet Back

*Use when replacing Tuners stamped 50B225.
†Use when replacing Tuners stamped 50B199.

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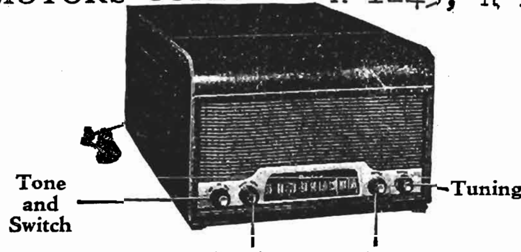
MODELS R-1244, R-1245, R-1246



MODEL R-1244

GENERAL:

TUBES—Five, Plus Rectifier.

SPEAKER—5" x 7" Elliptical Permanent Magnet.

TUNING—Manual.

TUNING RANGE—550-1600 KC.

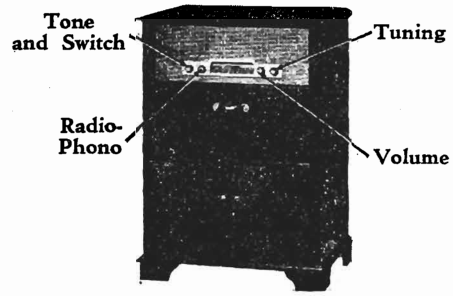
POWER SUPPLY—105/125 Volts, 60 Cycle A. C.

CABINETS:

R-1244—Walnut

R-1245—Walnut

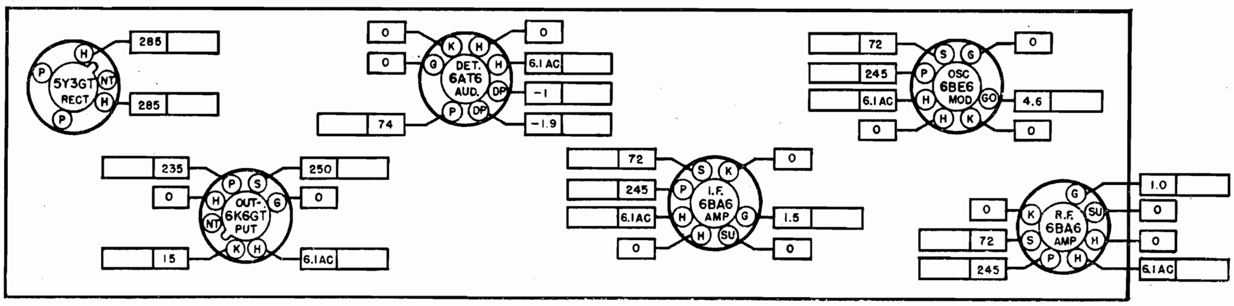
R-1246—Mahogany



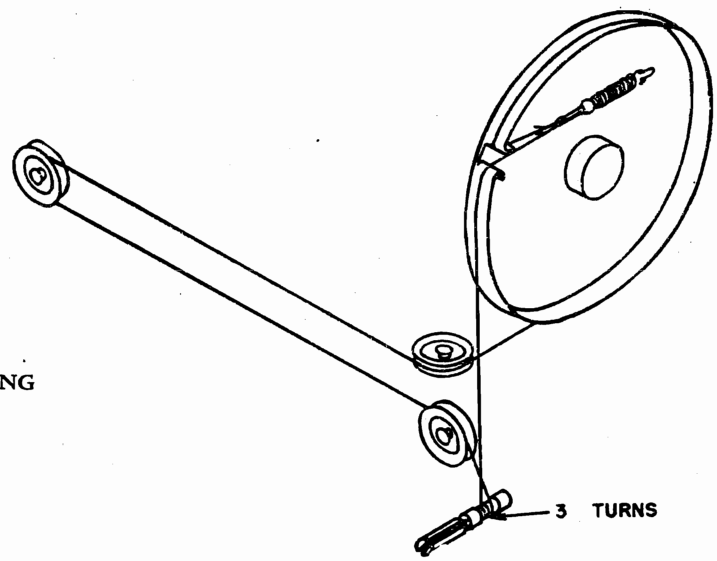
MODELS R-1245 and R-1246

TUBE SOCKET VOLTAGE CHART

The tube socket voltages, as measured at the factory and under the conditions shown on the schematic diagram, are shown below. The blank spaces are provided so the service man may fill in actual voltage readings as measured with his own equipment. A normal operating radio should be used for these measurements.



Volt Meter Resistance .... Ohms Per Volt
Line Voltage .... Volts
Voltage Tolerance .... ±10%



DIAL CORD DRAWING

MODEL R-1244

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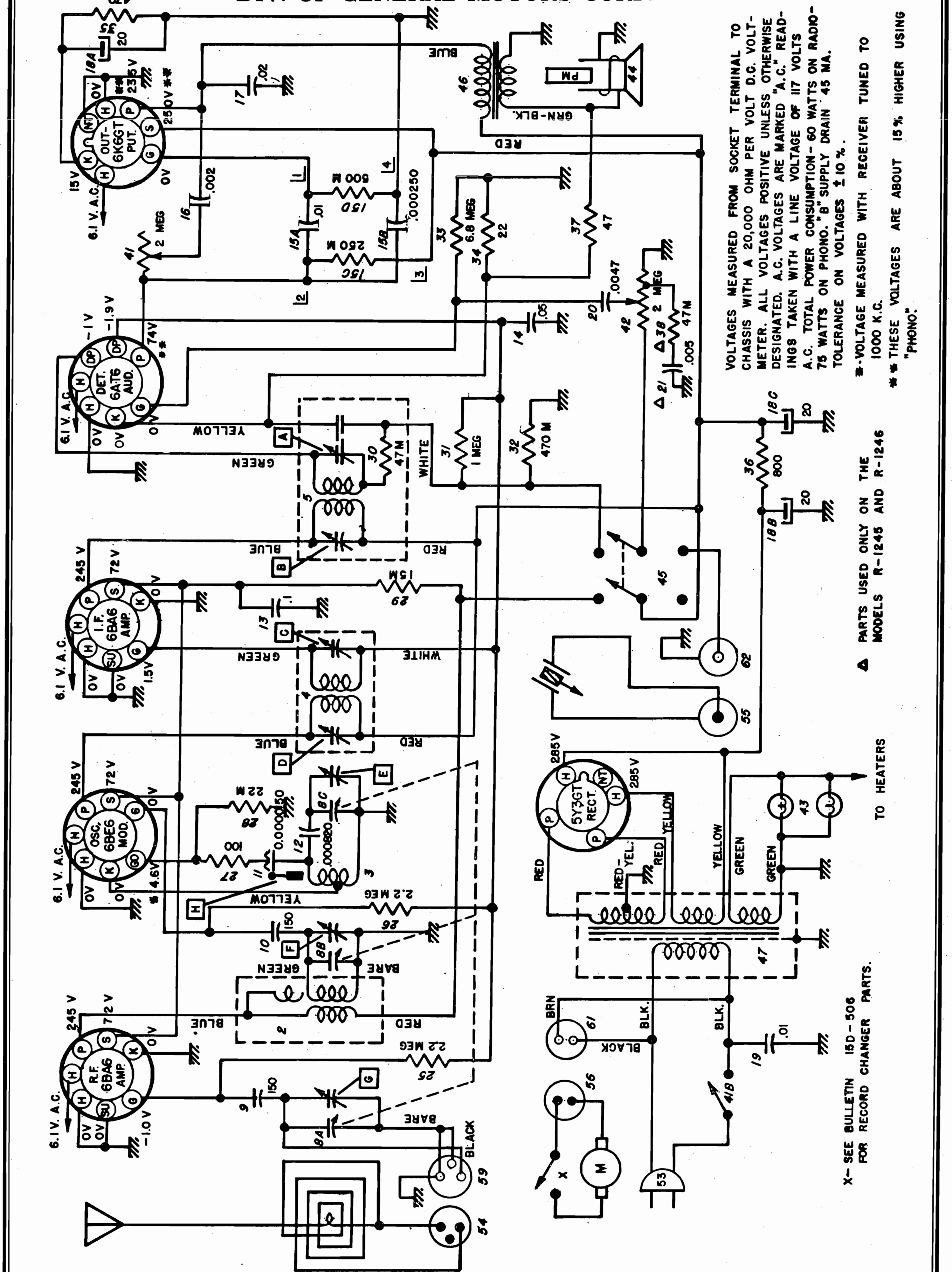
MODELS R-1245, R-1246



RECORD CHANGER: V-M Model 800, RCD. CH.17-1

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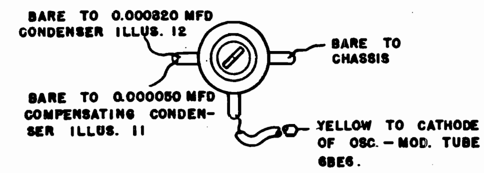
MODELS R-1244, R-1245, R-1246

ALIGNMENT PROCEDURE:

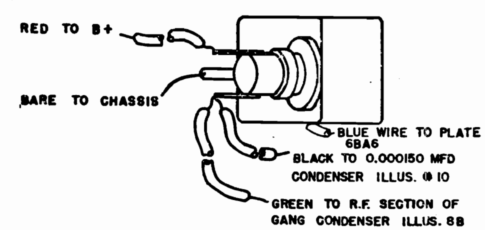
Output Meter Connections .... Across Voice Coil
Generator Return .... To Receiver Chassis
Dummy Antenna .... In Series With Generator
Volume Control Position .... Maximum Volume
Tone Control Position .... Treble
Generator Output .... Minimum For Readable Indication

Steps	Series Condenser or Dummy Antenna	Connect Generator To	Signal Generator Frequency	Tune Receiver To	Adjust in Sequence for Max. Output
1	0.1 Mfd.	Stator Lug RF Section of Gang	262 KC	High Frequency Stop	A, B, C, D
2	0.000220 Mfd.	Stator Lug RF Section of Gang	1615 KC	High Frequency Stop	E
3	0.000220 Mfd.	External Antenna Connection	1400 KC	Signal Generator Signal	F, G
4	0.000220 Mfd.	External Antenna Connection	600 KC	Signal Generator Signal	*H
5	0.000220 Mfd.	External Antenna Connection	1615 KC	High Frequency Stop	E
6	0.000220 Mfd.	External Antenna Connection	1400 KC	Signal Generator Signal	F, G

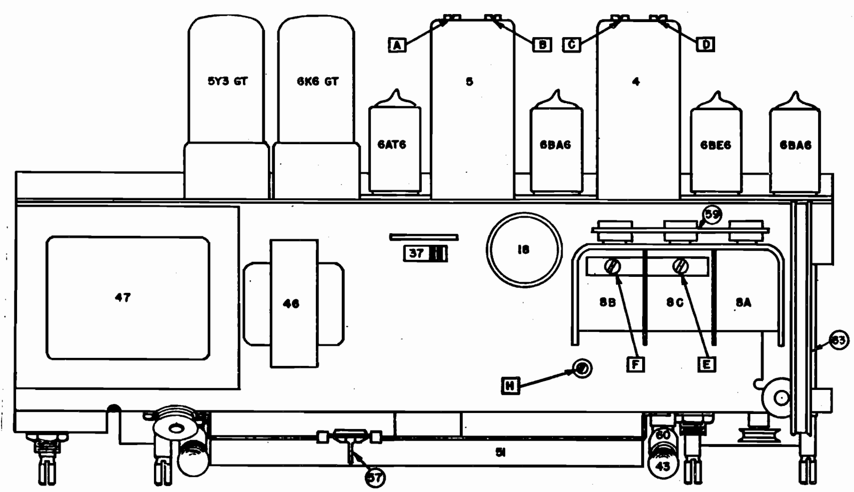
*During this Adjustment rock-in the gang condenser



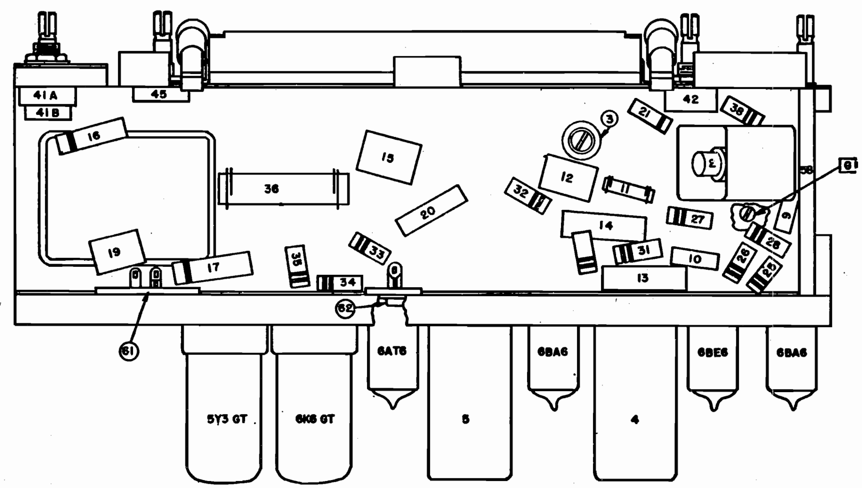
OSCILLATOR COIL CONNECTIONS



R. F. COIL CONNECTIONS



PARTS LAYOUT — TUBE VIEW



PARTS LAYOUT — CHASSIS VIEW

MODELS R-1244, R-1245, R-1246

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ELECTRICAL PARTS

Illus. No.	Prod. Part No.	Service Part No.	Part Description
			Coils
1	1218390	1218390	Loop Assy. - Antenna
2	1218677	1218677	R.F.
3	1218679	1218679	Oscillator
4	1218086	1218676	1st I.F. Assy.
5	1218088	1218088	2nd I.F. Assy.
			CONDENSERS
8	1218095	1218678	Variable Condenser and Pulley
8A			Antenna Section
8B			R.F. Section
8C			Oscillator Section
9	1218121	G151	0.000150 Mfd. Ceramic
10	1218121	G151	0.000150 Mfd. Ceramic
11	7238511	7238511	0.000051 Mfd. Compensating
12	1217742	G821	0.000821 Mfd. Molded
13	7238788	E104	0.1 Mfd. 400 V. Tubular
14	7236842	E503	0.05 Mfd. 200 V. Tubular
15	1218204		Couplate
15A		E103	0.01 Mfd. 450 V.
15B		G271	0.000250 Mfd. 450 V.
15C		A274	250,000 Ohms 1/5 W.
15D		A474	500,000 Ohms 1/5 W.
16	7237836	E202	0.002 Mfd. 600 V. Tubular
17	1209307	H203	0.02 Mfd. 1000 V. Tubular
18	7240724	M908	Electrolytic
18A			20 Mfd. 25 V.
18B			20 Mfd. 400 V.
18C			20 Mfd. 400 V.
19	1217227	E103	0.01 Mfd. 600 V. Tubular
20	1217748	G472	0.004700 Mfd. Molded
21	1216558	E502	0.005 Mfd. (used only on R-1245 and R-1246)
			RESISTORS
15	1218204		Couplate
15A		E103	0.01 Mfd. 450 V.
15B		G271	0.000250 Mfd. 450 V.
15C		A274	250,000 Ohms 1/5 W.
15D		A474	500,000 Ohms 1/5 W.
25	1214563	A225	2.2 Megohms ½ W. Insulated
26	1214563	A225	2.2 Megohms ½ W. Insulated
27	1213217	A101	100 Ohms ½ W. Insulated
28	1214550	A223	22,000 Ohms ½ W. Insulated
29	7233653	C153	15,000 Ohms 2 W. Insulated
30	1214553	A473	47,000 Ohms ½ W. Insulated (Included in 2nd I.F. Assy.)
31	1213282	A105	1 Megohm ½ W. Insulated
32	1214559	A474	470,000 Ohms ½ W. Insulated
33	1215563	A685	6.8 Megohms ½ W. Insulated
34	1214537	A220	22 Ohms ½ W. Insulated
35	1216150	B471	470 Ohms 1 W. Insulated
36	1218241	1218241	800 Ohms 10 W. Insulated
37	1213489	A470	47 Ohms ½ W. Insulated
38	7240731	A473	47,000 Ohms ½ W. Insulated (used only on R-1245 and R-1246)

MISCELLANEOUS ELECTRICAL

Illus. No.	Prod. Part No.	Service Part No.	Part Description
41	1218078	1218078	Control-Tone and Switch
41A			Tone Control
41B			Switch
42	1218536	1218536	Control-Volume
43	115273	51	Lamp-Dial
44	1218090	1218090	Speaker—5 x 7 Elliptical PM
45	1218062	1218062	Switch DPDT "Radio-Phono"
46	1218118	1218118	Transformer-Output
47	1217165	1217165	Transformer-Power
			MECHANICAL PARTS
51	1218076	1218076	Backplate-Pointer
52		6040	Cord—Pointer Drive
53	1216512	1216512	Cord—Power
54	1215418	1215418	Plug—Antenna Loop
55	1851850	1851850	Plug—Pick Up Arm
56	1217515	1217515	Plug—Phono Motor
57	1218065	1218065	Pointer
58	1218073	1218073	Shaft—Manual Tuning
59	1216962	1216962	Socket—Antenna Loop
60	1217839	1217839	Socket—Dial Light
	7236279	7236279	Socket—Octal Tube
61	1216925	1216925	Socket—Phono Motor
62	1216747	1216747	Socket—Phono Pick Up Arm
	1218071	1218071	Socket—Seven Pin Miniature Tube
63	7242189	7242189	Spring—Pointer Cord Tension
			CABINET PARTS
	1218675	1218675	Cabinet Assy. (R-1244)
	1218865	1218865	Cabinet Assy. (R-1245)
	1218871	1218871	Cabinet Assy. (R-1246)
	1218131	1218131	Dial
	1218085	1218085	Knob—Volume or Tuning
	1218084	1218084	Knob—"Radio-Phono" or Tone
	1218873	1218873	Handle—Record Player Drawer (R-1245 & R-1246)
	1218874	1218874	Knob—Cabinet Door (R-1245 & R-1246)
	1218875	1218875	Track—Record Player Drawer (R-1245 & R-1246)
	1218876	1218876	Tee Nut (R-1245 & R-1246)
	1218877	1218877	Tee Bolt (R-1245 & R-1246)
			TUBES
	1217690	5252	6BA6
	1217691	5253	6BE6
	1218105	5261	6AT6
	1213847	5196	6K6GT
	1216134	5123	5Y3GT

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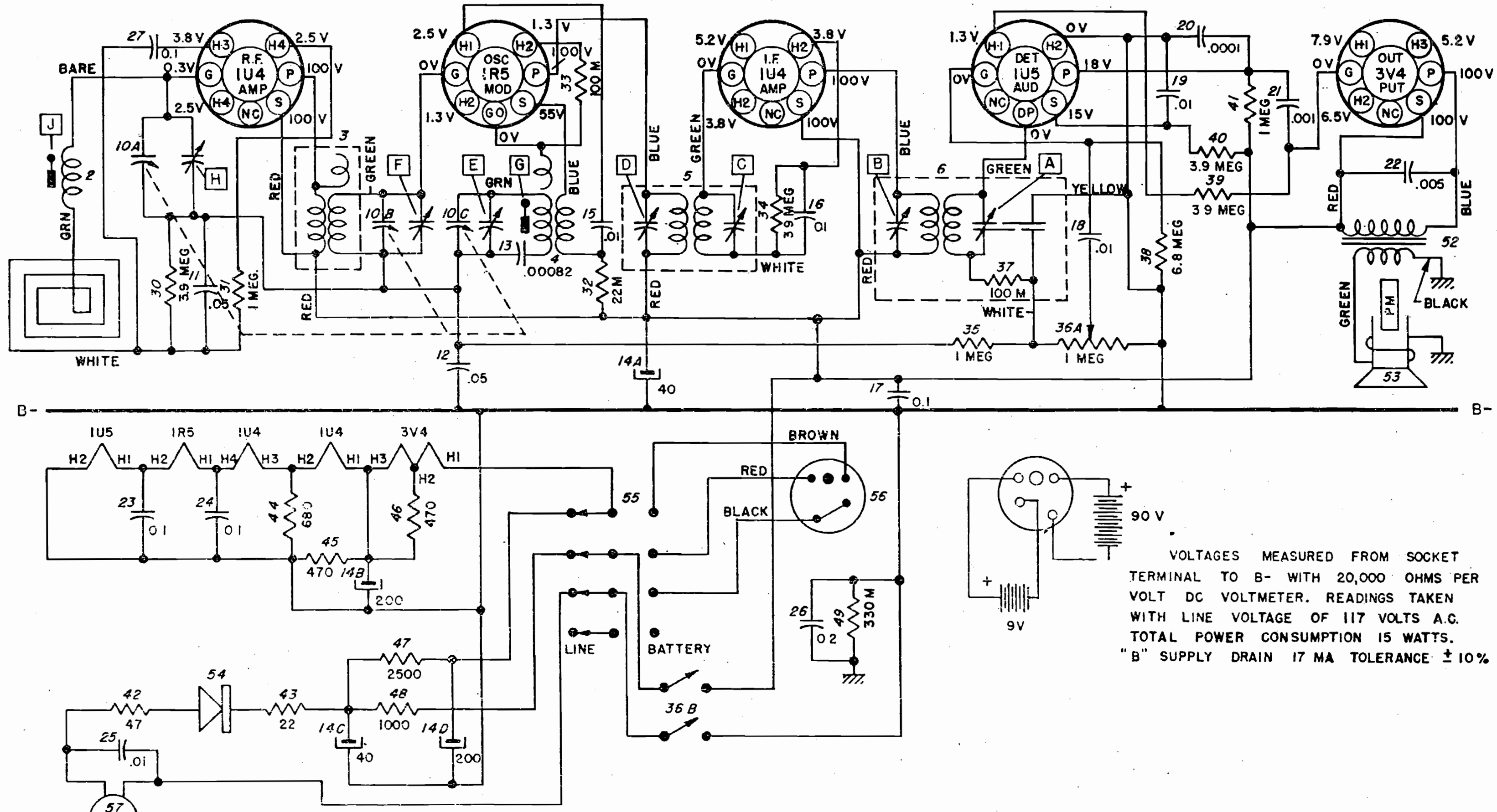
MODEL R-1410



VOLTAGES MEASURED FROM SOCKET TERMINAL TO B- WITH 20,000 OHMS PER VOLT DC VOLTMETER. READINGS TAKEN WITH LINE VOLTAGE OF 117 VOLTS A.C. TOTAL POWER CONSUMPTION 15 WATTS. "B" SUPPLY DRAIN 17 MA TOLERANCE ± 10%

Volume Control and Switch

Tuning Control

TUBES—Five, Plus Selenium Rectifier.

SPEAKER—4″ x 6″ Elliptical Permanent Magnet.

TUNING—Manual.

TUNING RANGE—540 to 1610 KC.

POWER SUPPLY—105/125 Volts, 50-60 Cycle, AC or 105/125 Volts DC or Battery.

MODEL R-1410

UNITED MOTORS SERVICE
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ALIGNMENT PROCEDURE:

Output Meter Connections .... Across Voice Coil

Generator Return .... To Receiver Chassis

Dummy Antenna .... In Series With Generator

Volume Control Position .... Maximum Volume

Generator Output .... Minimum for Readable Indication

(For best results align receiver in cabinet with battery in place)

Steps	Series Condenser or Dummy Antenna	Connect Generator To	Signal Generator Frequency	Tune Receiver To	Adjust in Sequence for Max. Output
1	.000220 Mfd	Stator Lug RF* Section of Gang	262 KC	High Frequency Stop	A, B, C, D
2	.000220 Mfd	Stator Lug RF Section of Gang	1615 KC	High Frequency Stop	E
3	.000220 Mfd	Stator Lug of RF Section of Gang	1400 KC	Signal Generator Signal	F
4	.000220 Mfd	Stator Lug of RF Section of Gang	600 KC	Signal Generator Signal	G**
5	None	Test Loop***	1400 KC	Signal Generator Signal	H
6	None	Test Loop	600 KC	Signal Generator Signal	J

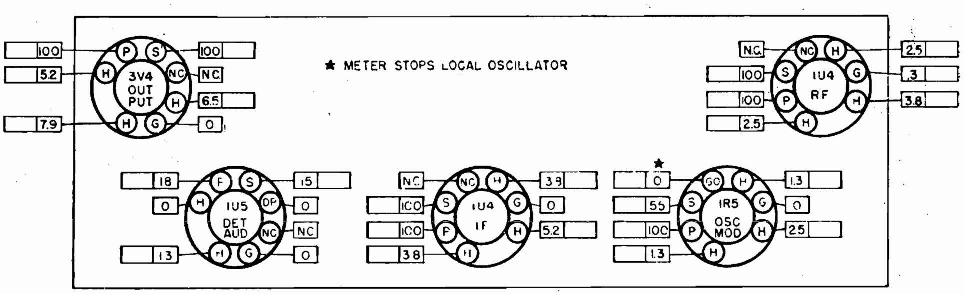
*With loop antenna terminal lugs shorted or loop connected for Steps 1, 2, 3, and 4.

**During this adjustment rock-in gang condenser

***The signal generator may be coupled to the receiver by placing a loop electrically across the output of the signal generator and physically near the receiver loop. This loop may be a loop from another radio, a home made loop of 10 or 15 turns, or other similar devices.

TUBE SOCKET VOLTAGE CHART

The tube socket voltages, as measured at the factory and under the conditions shown on the schematic diagram, are shown below. The blank spaces are provided so the service man may fill in actual voltage readings as measured with his own equipment. A normal operating radio should be used for these measurements.



Volt Meter Resistance .... Ohms Per Volt

Line Voltage .... Volts

Voltage Tolerance .... ±10%

UNITED MOTORS SERVICE
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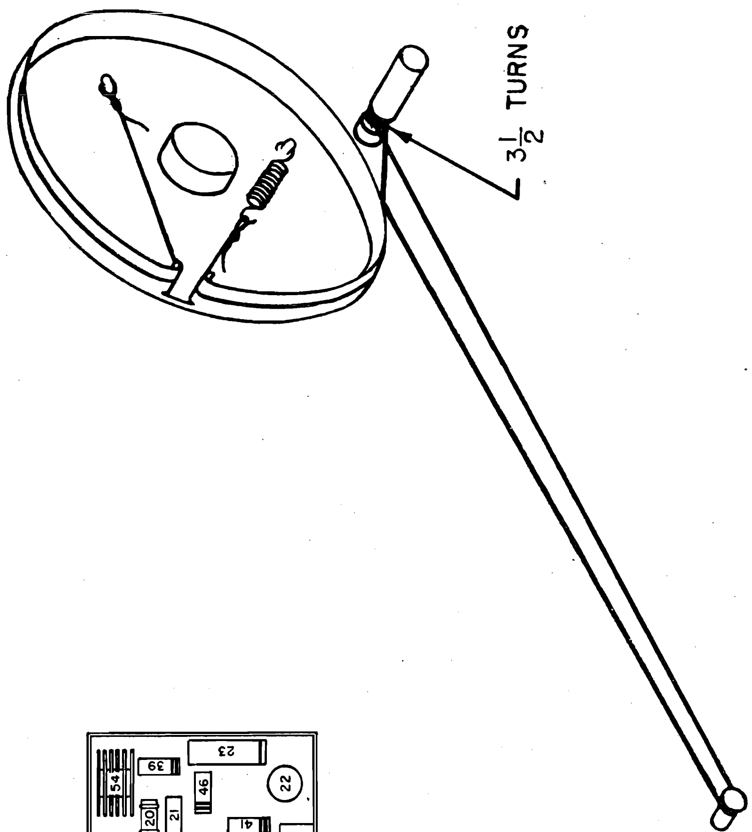
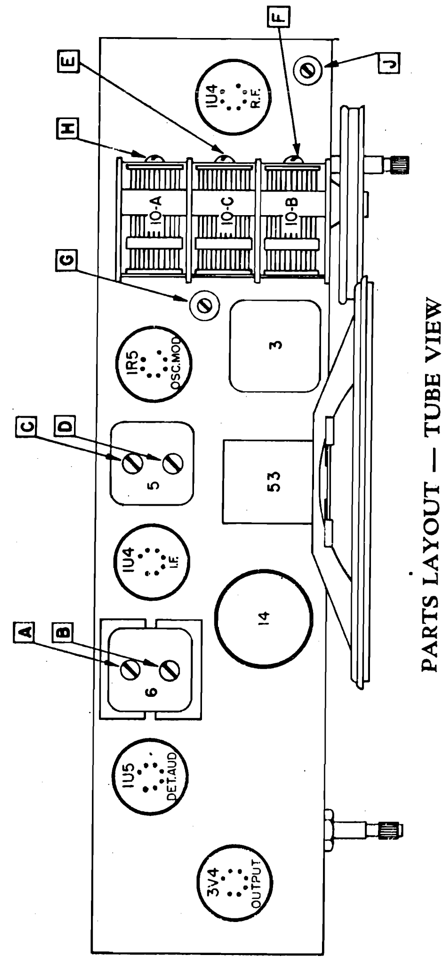
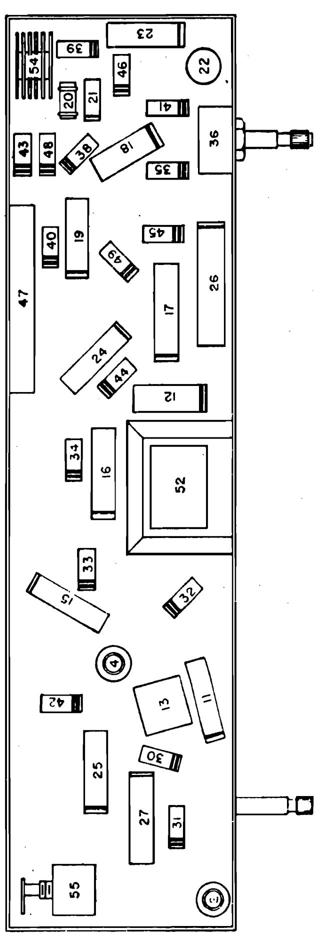
MODEL R-1410



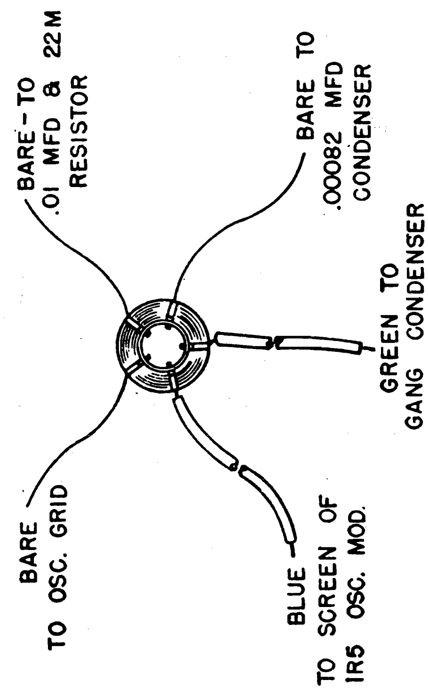
DIAL CORD DRAWING



PARTS LAYOUT — TUBE VIEW



PARTS LAYOUT — CHASSIS VIEW



OSCILLATOR COIL CONNECTIONS

MODEL R-1410

UNITED MOTORS SERVICE
DIV. OF GENERAL MOTORS CORP.

Illus. No	Production Part No.	Service Part No.	Description
			ELECTRICAL PARTS
			Coils
1			Loop Antenna (available only with cabinet assy.)
2	1219147	1219147	Loop Compensating Coil
3	1218573	1218573	R. F.
4	1218576	1218576	Oscillator
5	1218705	1218705	1st I. F.
6	1218707	1218707	2nd I. F.
			Condensers
10	1218578	1218578	Variable Condenser and Pulley
10A			Antenna Section
10B			R.F. Section
10C			Oscillator Section
11	7236842	E 503	.05 mfd 200 V. Tubular
12	7236842	E 503	.05 mfd 200 V. Tubular
13	1218142	G 821	.00082 mfd Mica Molded
14	1218721	1218721	Electrolytic
14A			40 mfd 150 V.
14B			200 mfd 25 V.
14C			40 mfd 150 V.
14D			200 mfd 25 V.
15	7238790	E 103	.01 mfd 200 V. Tubular
16	7238790	E 103	.01 mfd 200 V. Tubular
17	7238789	E 104	.1 mfd 200 V. Tubular
18	1216513	E 103	.01 mfd 600 V. Tubular
19	7238790	E 103	.01 mfd 200 V. Tubular
20	1217925	G 101	.0001 mfd Ceramic
21	1218141	G 102	.001 mfd Ceramic
22	1218298	G 472	.005 mfd Ceramic
23	7238789	E 104	.1 mfd 200 V. Tubular
24	7238789	E 104	.1 mfd 200 V. Tubular
25	1216513	E 103	.01 mfd 600 V. Tubular
26	7238787	E 204	.2 mfd 400 V. Tubular
27	7238789	E 104	.1 mfd 200 V. Tubular
			Resistors
30	1216947	A 395	3.9 Megohms ½ W. Insulated
31	7238873	A 105	1 Megohm ½ W. Insulated
32	1211192	A 223	22,000 Ohms ½ W. Insulated
33	1211118	A 104	100,000 Ohms ½ W. Insulated
34	1216947	A 395	3.9 Megohms ½ W. Insulated
35	7238873	A 105	1 Megohm ½ W. Insulated
37	1211118	A 104	100,000 Ohms ½ W. Insulated (Included in 2nd I. F. Coil Assy.)
38	7241937	A 685	6.8 Megohms ½ W. Insulated
39	1216947	A 395	3.9 Megohms ½ W. Insulated
40	1216947	A 395	3.9 Megohms ½ W. Insulated
41	7238873	A 105	1 Megohm ½ W. Insulated
42	1215570	B 470	47 Ohms 1 W. Insulated
43	1215566	B 220	22 Ohms 1 W. Insulated
44	1214543	A 681	680 Ohms ½ W. Insulated
45	1213486	A 471	470 Ohms ½ W. Insulated
46	1213486	A 471	470 Ohms ½ W. Insulated
47	1218570	1218570	2500 Ohms 10 W. Wire Wound
48	1211037	B 102	1,000 Ohms 1 W. Insulated
49	7240732	A 334	330,000 Ohms ½ W. Insulated
			Miscellaneous Electrical Parts
36	1218575	1218575	Volume Control and Switch
52	1218709	1218709	Transformer-Output
53	1218586	1218586	Speaker
54	1218683	1218683	Selenium Rectifier
55	1218571	1218571	Switch and Lever (Battery or Line)
			MECHANICAL PARTS
			Chassis
	1218071	1218071	Socket—7 Pin Miniature Tube
	1218565	1218565	Socket—Shock Proof—Miniature
	1218564	1218564	Drive Shaft—Tuning
	7245333	7245333	"C" Washer—Drive Shaft
		6040	Drive Cord
	7242189	7242189	Spring—Pointer Cord Tension
	1218574	1218574	Dial Pointer
56	1219148	1219148	Battery Plug and Shell
57	1216512	1216512	Power Cord

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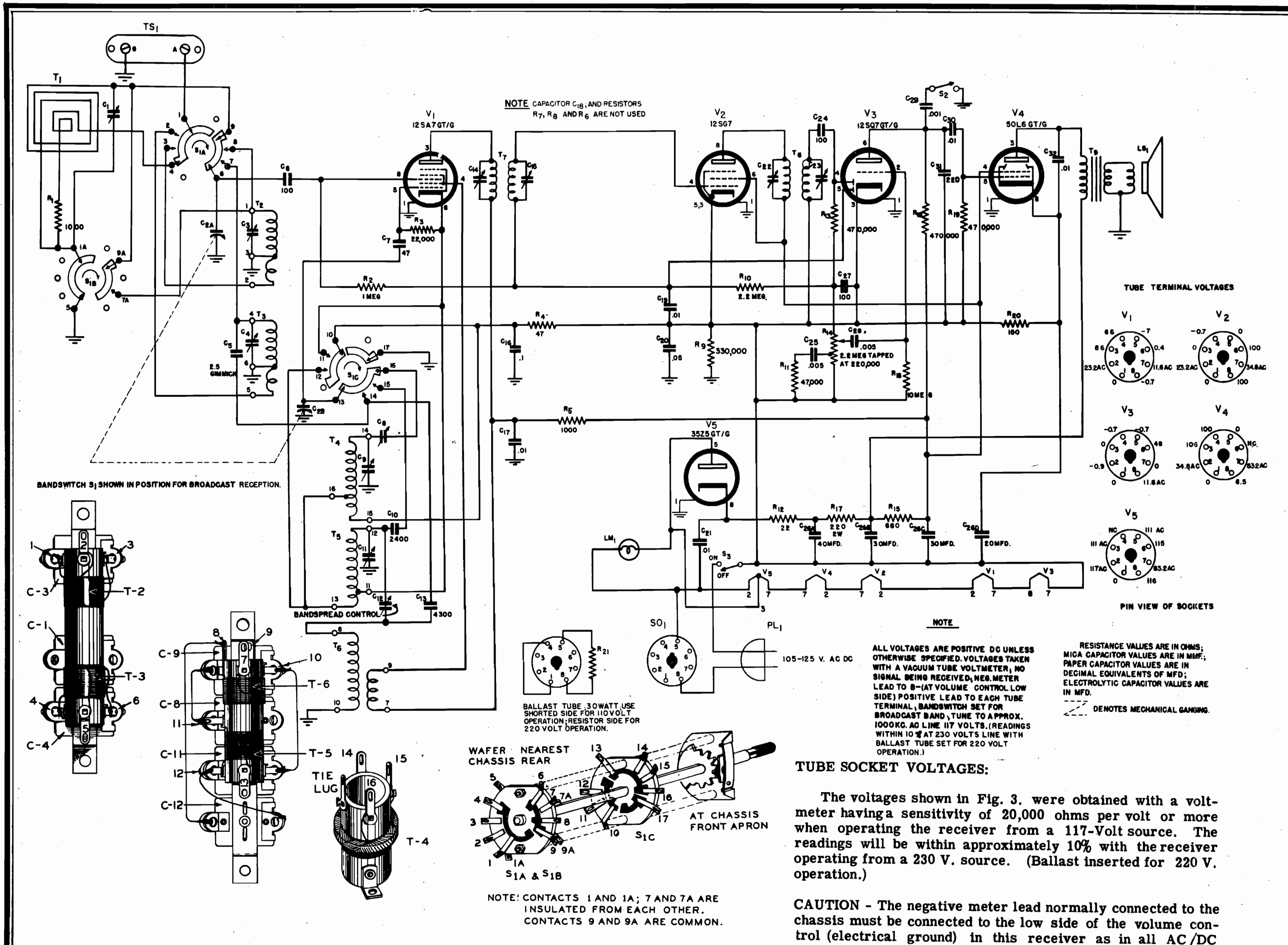
MODEL 508



TUBE SOCKET VOLTAGES:

The voltages shown in Fig. 3. were obtained with a voltmeter having a sensitivity of 20,000 ohms per volt or more when operating the receiver from a 117-Volt source. The readings will be within approximately 10% with the receiver operating from a 230 V. source. (Ballast inserted for 220 V. operation.)

CAUTION - The negative meter lead normally connected to the chassis must be connected to the low side of the volume control (electrical ground) in this receiver as in all AC/DC receivers.

MODEL 508

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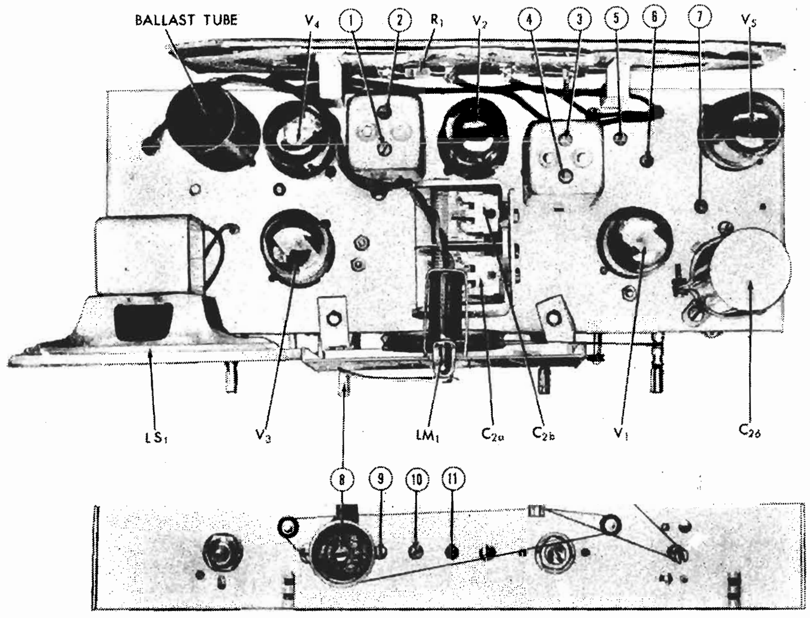
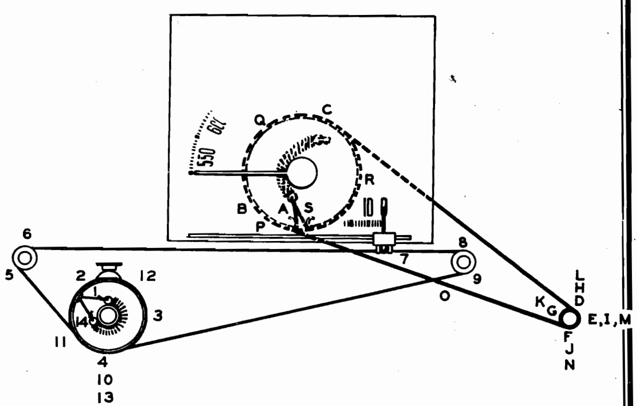


Alignment Points.

RESTRINGING DIAL CORD:

To restring the main tuning dial cord, cut a 25-inch length of 18 lb test dial cord and tie one end to the tension spring of the main tuning condenser drive pulley at position "A" on the diagram. Follow the letters "A" through "S", winding the cord on the pulley and drive shaft. At position "S", stretch the tension spring and tie the cord securely. With the tuning condenser at maximum capacity, set the pointer as shown in the diagram.

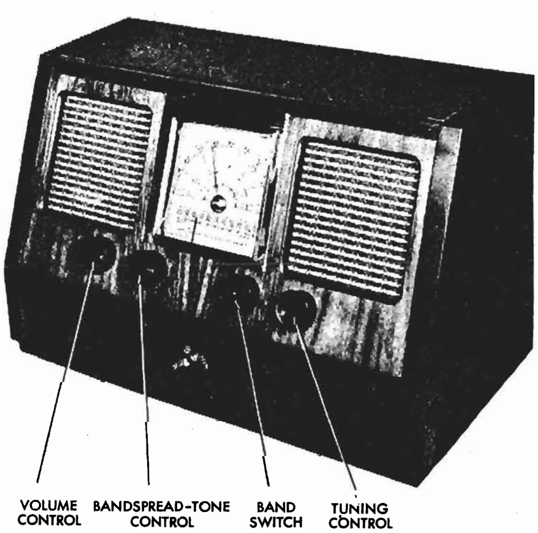
To restring the bandspread tuning dial cord, cut a 30-inch length of 18 lb test dial cord and follow the procedure outlined above, except follow the sequence starting at position "1" and ending at "14". With the pulley in the position shown (maximum clockwise), attach the pointer and index it at zero on the bandspread dial scale. Next loosen the pulley set screws and adjust the pulley shaft so that the signals on the 6.9 to 22 megacycle range follow the dial calibration on the general coverage dial. Reset the set screws with the bandspread pointer set at zero.



Dial Stringing Detail.

POWER SUPPLY:

CAUTION: This radio must be operated from a 105-125 V. or 210-250 V. 60 cycle AC supply or DC supply only. The ballast tube must be correctly inserted in its socket for the line voltage used. When operating from a 210-250 V. supply, the ballast tube must be correctly inserted in its socket for this line voltage ("230 V") to avoid damaging the receiver. If you are in doubt as to the voltage and frequency (AC) rating of the power supplied to your home, consult the local power company representative before connecting the radio to the wall outlet.



BAND SWITCH CONTROL:

The position of the band switch control determines the range of frequencies tuned by the receiver. In position 1 the receiver tunes the 550-1600 KC range. Note that a zero must be added to the dial reading to obtain the frequency of reception in kilocycles. In position 2 and 3 the receiver tunes the ranges 2.2-7.0 MC and 7-22 MC respectively. The frequency of reception for these bands is shown directly in megacycles on the dial scale.

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ALIGNMENT:

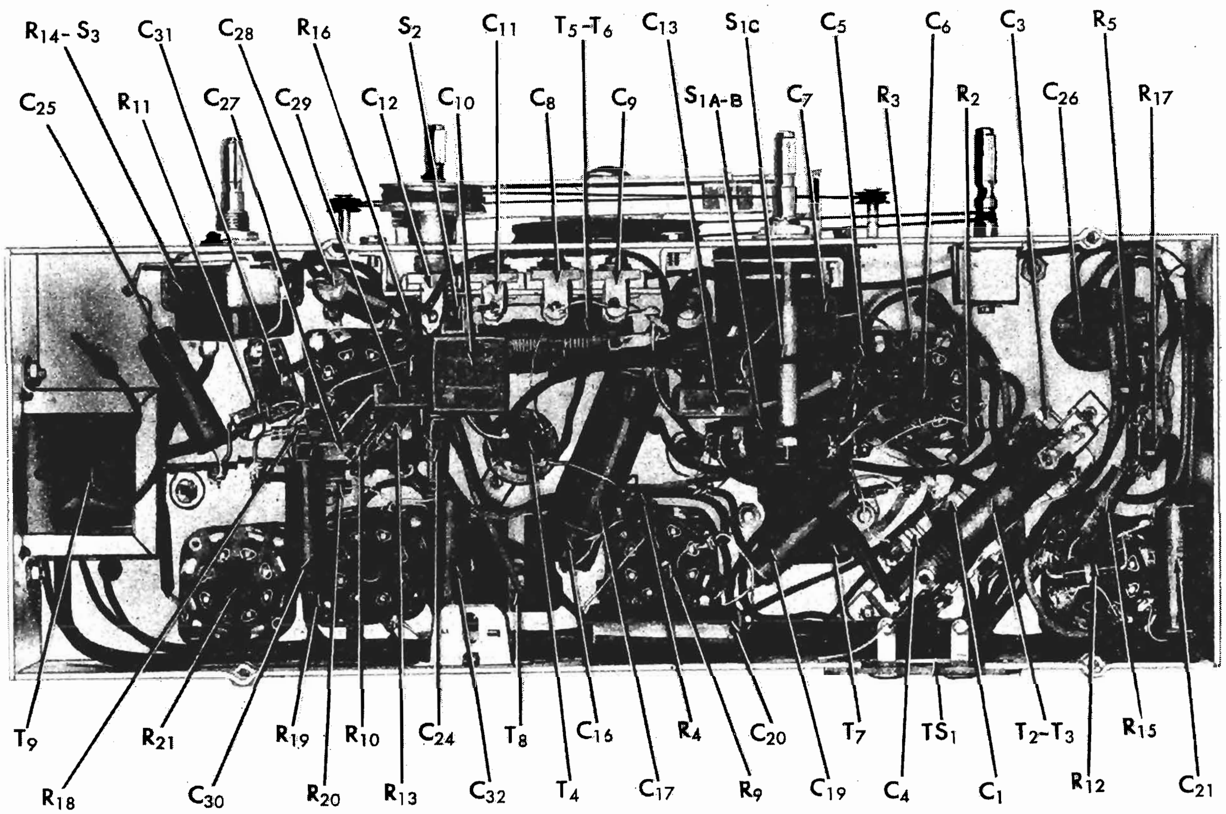
Output meter connections........................ Across speaker voice coil (3 ohms)
Generator ground........................ To "G" terminal on ant. terminal strip.
Generator output........................ See chart.
Volume control........................ Maximum volume.
Bandspread tuning........................ At zero.

CAUTION - Check the line ballast. It must be corretly inserted in its socket to correspond to the line voltage of the power source.

ALIGNMENT CHART:

Step	Dummy Antenna	Signal Generator Coupling	Signal Generator Frequency	Band Switch Pos.	Radio Dial Setting	Adjust	Remarks
1.	.01 mfd. cap.	To stator plates of tuning cond; mixer section	455 kc	1	1500 kc	1,2,3, and 4.	Adjust for max. output
2.	Std RMA dummy	To terminals "A" and "G" of antenna terminal strip	1500 kc	1	1500 kc	*11,6	Adjust for max. output
			600 kc	1	600 kc	*10	
3.	Std RMA dummy	See step 2.	22 mc	3	22 mc	*8	Set oscillator adjustment (8) with the bandspread indicator drive pulley set screw loosened and the pointer set at zero. After making the adjustment, tighten the set screw.
			20 mc	3	20 mc	5	Adjust for max. output.
4.	Std RMA dummy	See step 2.	6 mc	2	6 mc	*9,7	Adjust for max. output.

*Note - Calibration adjustment.
Note - Step 3 must be completed before making the adjustments shown in step 4.



Parts Layout.

MODEL 508

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SERVICE PARTS LIST

ELECTRICAL PARTS
COILS AND TRANSFORMERS

Illustration No.	Production Part No.	Service Part No.	Description
T-1	57C104		Antenna loop
T-2,3,	51B814		Transformer, mixer
T-4	51A811		Transformer, oscillator BC
T-5,6	51B815		Transformer, oscillator SW
T-7	50B196-1		Transformer, input IF stage
T-8	50B196-2		Transformer, diode IF stage
T-9	55B080-1		Transformer, output

CONDENSERS

Illustration No.	Production Part No.	Service Part No.	Description
C-1,3,4,	44A162		Antenna trimmer
C-2	48B165		Main tuning condenser
C-5			2.5 mmf. gimmick.
C-6,24,27	CM20A101M	G101	100 mmf. 500 V., mica
C-7	CM20A470M	G470	47 mmf. 500 V., mica
C-8,9,11,12	44B161		Oscillator trimmer
C-10	CM30A242M	G242	2400 mmf. 500 V., mica
C-13	CM35A432K	G432	4300 mmf. 500 V., mica
C-16	46AX104J	E104	.1 mfd. 600 V., tubular
C-17,19,21,30,32	46AX103F	E103	.01 mfd. 600 V., tubular
C-20	46AY503J	E503	.05 mfd. 600 V., tubular
C-25,28	46AZ502J	E502	.005 mfd. 600 V., tubular
C-26	45B095-1		40-30-30-20 mfd. electrolytic
C-29	46AZ102H	E102	.001 mfd. 600 V., tubular
C-31	CM20A101M	G221	220 mmf. 500 V., mica

RESISTORS

Illustration No.	Production Part No.	Service Part No.	Description
R-1,5	RC20AE102M	A102	1000 ohms $\frac{1}{2}$ watt insulated
R-2	RC20AE105M	A105	1 megohm $\frac{1}{2}$ watt insulated
R-3	RC20AE223M	A223	22,000 ohms $\frac{1}{2}$ watt insulated
R-4	RC20AE470M	A470	47 ohms $\frac{1}{2}$ watt insulated
R-9	RC20AE334M	A334	330,000 ohms $\frac{1}{2}$ watt insulated
R-10	RC20AE225M	A225	2.2 megohms $\frac{1}{2}$ watt insulated
R-11	RC20AE473M	A473	47,000 ohms $\frac{1}{2}$ watt insulated
R-12	RC30AE220M	B220	22 ohms 1 watt insulated
R-13,18,19	RC20AE474M	A474	470,000 ohms $\frac{1}{2}$ watt insulated
R-15	RC30AE681M	B681	680 ohms 1 watt insulated
R-16	RC20AE106M	A106	10 megohms $\frac{1}{2}$ watt insulated
R-17	RC40AE221K	C221	220 ohms 2 watt insulated
R-20	RC20AE151M	A151	150 ohms $\frac{1}{2}$ watt insulated
R-21	24B856		Ballast resistor, 460 ohms 30 watts

TUBE COMPLEMENT

Illustration No.	Production Part No.	Service Part No.	Description
V-1	90X12SA7GT	5342	12SA7GT
V-2	90X12SG7	5345	12SG7
V-3	90X12SQ7GT	5351	12SQ7GT
V-4	90X50L6GT	5451	50L6GT
V-5	90X35Z5GT	5408	35Z5GT

MISCELLANEOUS ELECTRICAL PARTS

Illustration No.	Production Part No.	Service Part No.	Description
S-1	60B250		Switch, band
S-2	60A246		Switch, tone control
R-14	25A561		Volume control and switch
LS-1	85B038		Speaker
TS-1	88A569		Antenna Terminal strip
LM-1	39A004		Lamp, 6-8V., Mazda #47
PL-1	87A078		Power cord and plug

MECHANICAL PARTS
CHASSIS PARTS

Illustration No.	Production Part No.	Service Part No.	Description
	38A001		Dial cord
	75A012		Spring, large pulley.
	75A070		Spring, small pulley.
	83B335		Dial Scale (with calibration)
	82A106		Pointer, main tuning
	82A107		Pointer, band spread tuning
	86A036-1		Socket, dial light
	6A256		Socket, tube (octal)
	6A255		Socket, tube (octal, two keyways 180 degrees apart)
	76A299	1217671	Line cord lock

CABINET PARTS

Illustration No.	Production Part No.	Service Part No.	Description
	66F451		Cabinet
	32D439		Cabinet back
	22B161		Dial crystal
	7C027		Escutcheon
	15B067-4		Knob

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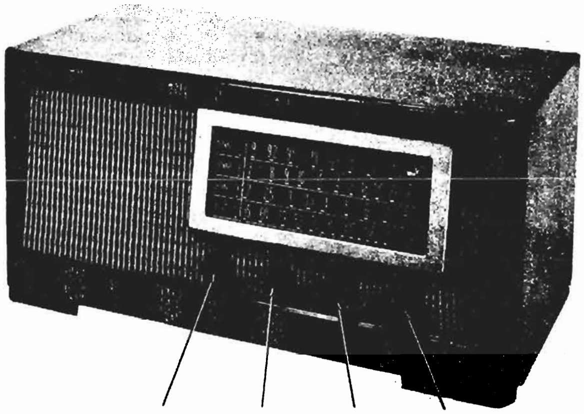

POWER SUPPLY:

This radio operates from a 105-125 volt or 210-250 volt, 50/60 cycle AC supply only. If you are in doubt as to the voltage and frequency rating of the power available at the outlets, consult the local power company. CAUTION: BEFORE PLUGGING THE POWER CORD INTO THE WALL OUTLET, CHECK TO SEE THAT THE LINE VOLTAGE SWITCH (SW2) IS SET FOR THE LINE VOLTAGE AVAILABLE. Refer to Fig. 5 for the location of this switch. The power receptacle provided for a record player supplies 110 V. AC regardless of the setting of the 110/220 V. switch on the receiver or the source to which the receiver has been connected.

ANTENNA:

A loop antenna has been installed inside the cabinet of the receiver and for reception of local and nearby stations no other additional antenna is usually required.

Metal structures concealed in walls, radiators, or other large metal objects near the receiver prevent best possible pickup of radio signals. Locate your receiver as far as possible from such objects.

For best results, especially at remote points from broadcast stations, an outside antenna about 25 to 100 feet long, including lead-in, may be necessary. The lead-in wire is connected to the terminal marked "A" located on the rear apron of the chassis. To avoid excessive electrical noise, erect the antenna so that its length runs at right angles to nearby power lines, streetcar lines, and other similar types of electrical apparatus. For some installations it will be found desirable to connect a ground wire between the "G" terminal and a suitable ground such as a water pipe or radiator.

LOCATION: Do not place the radio in a warm location, such as on a radiator or over a hot air register. When placing the radio against a wall, leave sufficient clearance for the circulation of air.

BAND SELECTOR - The band selector knob has five positions which perform the following functions in the order of its rotation from left to right.

Position 1 - Phono - When a record player is connected to the power and pick-up receptacle on the rear apron of the receiver, the receiver will operate as a phonograph. The volume and tone controls function as they do for radio reception.

Position 2 - BROADCAST Band - The receiver will tune the standard broadcast band in this position. The receiver frequency is read from the dial scale marked BROADCAST.

Positions 3, 4, 5 - SHORTWAVE Bands - The receiver tunes the shortwave ranges (A-2.2 to 7 mc), (B-7 to 22 mc), and (C-9 to 12 mc) on these last three positions and dial scales SHORTWAVE A,B, and C respectively are used to indicate the receiver frequency directly in megacycles.

CONDITIONS AFFECTING OPERATION

Though your radio may be functioning perfectly, there are circumstances under which prefect radio reception is not possible. These are not always subject to control by any presently known means. In general, the effect on reception is usually greatest when the radio is tuned to a weak station.

DAY AND NIGHT RECEPTION:

You will notice that you are able to receive several more stations during the night than during the day. This is a phenomenon due to the sun's effect on the ionosphere. It is not a peculiairty of your receiver.

FADING:

Fading will be encountered only on distant stations. It will be recognized by a gradual diminishing of volume, sometimes to a point where the signal is no longer heard, followed by a gradual return to normal volume. This happens without any change of the controls of the radio. It is often accompanied by distortion or "garbling" of the signal. By means of the automatic volume control in your receiver this effect is reduced considerably. In severe cases it will be necessary to tune to some other station.

STATIC:

Static, like fading, is not attributable to a defective receiver. It is caused by electrical disturbances in the atmosphere (lightning flashes will be heard as severe static) and the more sensitive the receiver the more static will be heard. It us usually most prevalent in the summer and during storm periods.

STATION INTERFERENCE:

Because of the limited number of channels to which broadcasting stations can be assigned it has been necessary to assign more than one station to a channel. This results in interference between the stations particularly if the desired station is not powerful or if it tends to fade. The interference will take the form of whistles or growls and in some cases the interfering station will actually be louder than the desired station. There is no remedy for this other than to tune to a different station at another point on the dial.

LOCAL INTERFERENCE:

Interference caused by electrical apparatus is known as local or "man made" static. Though somewhat similar to static it can usually be distinguished by its regularity or by some peculiar tone. It is caused by arcing or leaking of current in industrial equipment, appliances, high tension power lines, automobile ignition systems, electric razors, etc. It is usually much more prevalent in cities or industrial areas although rural power lines are a common source.

Local interference can be controlled to some extent by proper filtering of appliances and equipment and to this end present day manufacturers of such equipment are contributing a great deal in improved designs. Power companies are also helpful and cooperative in seeking out and eliminating interference where their equipment is at fault.

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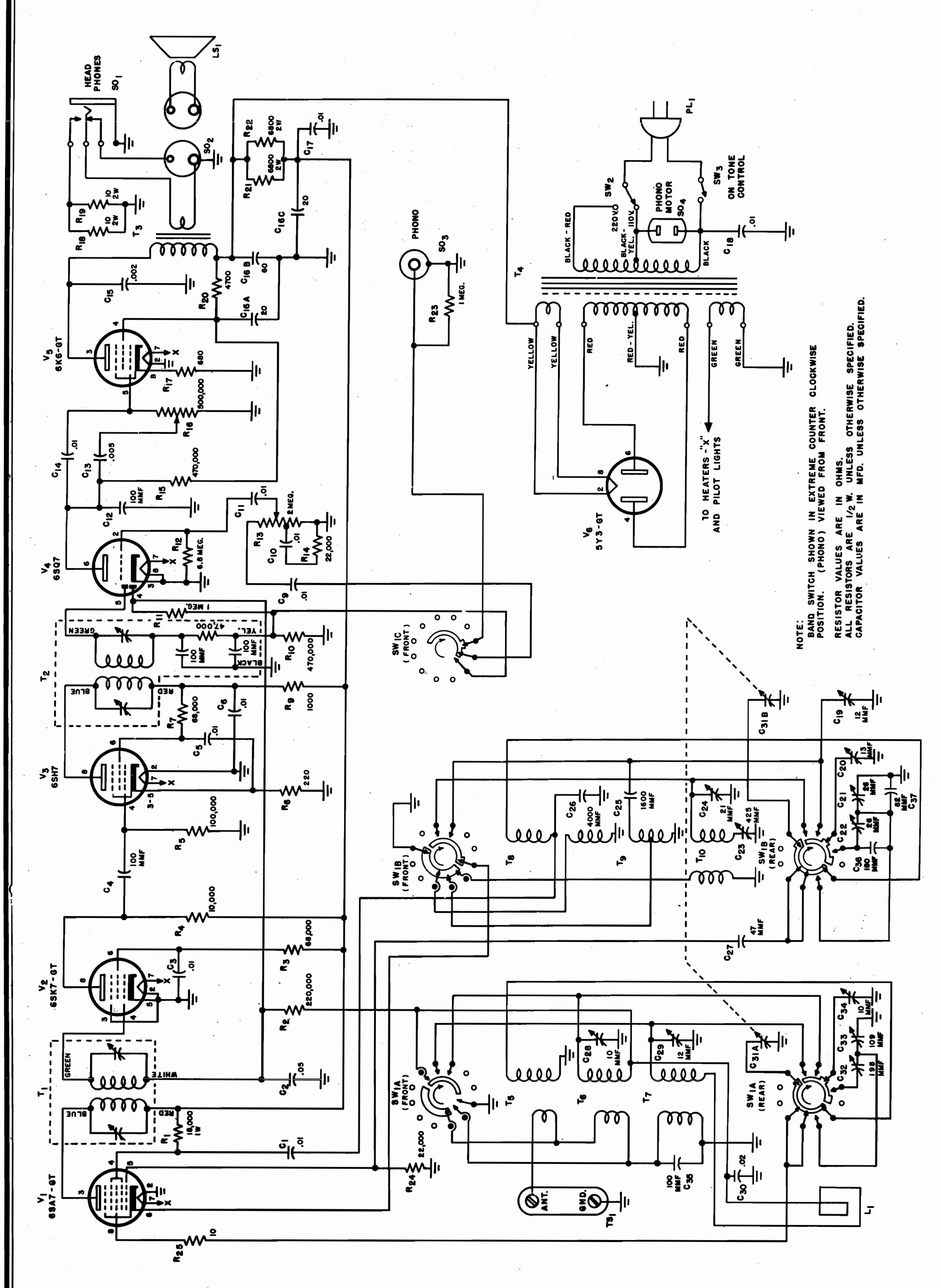

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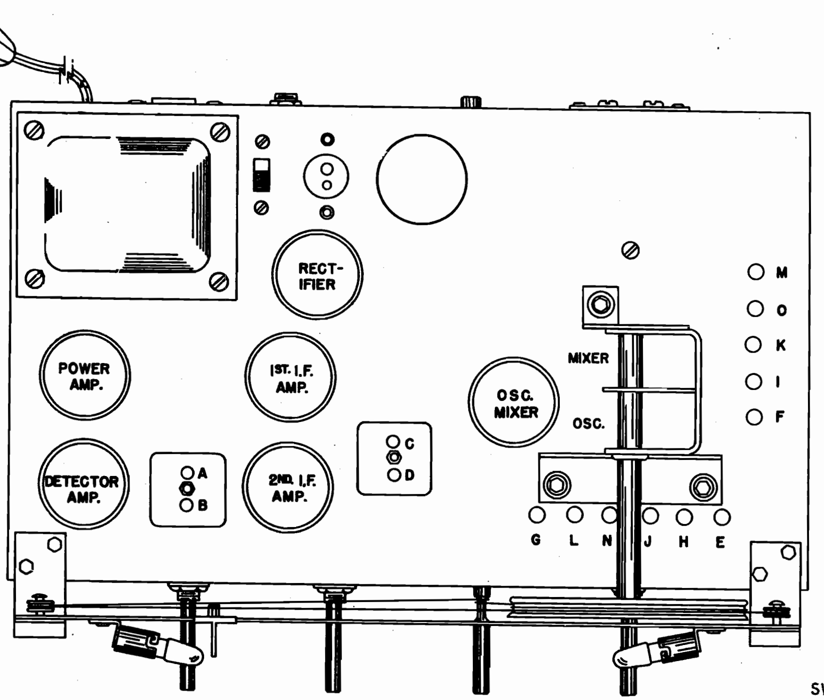
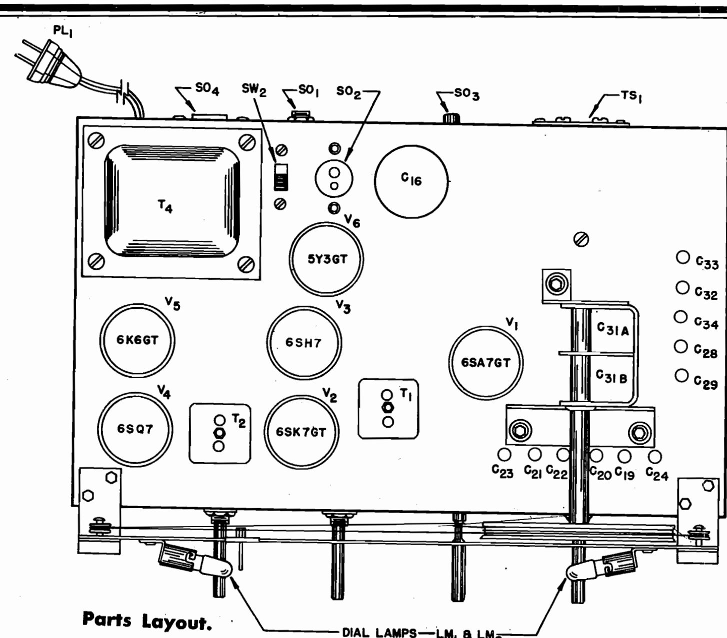
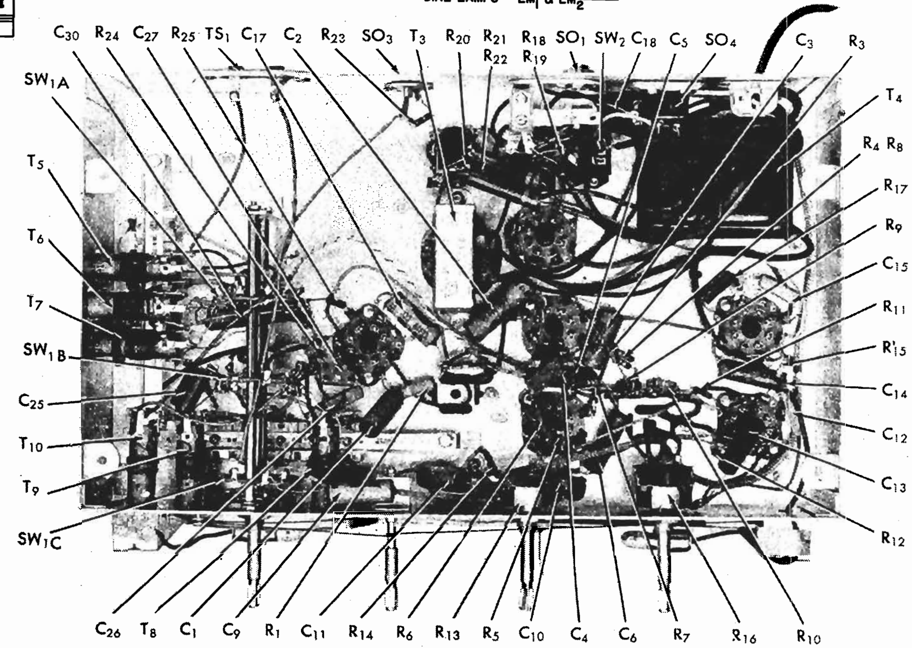


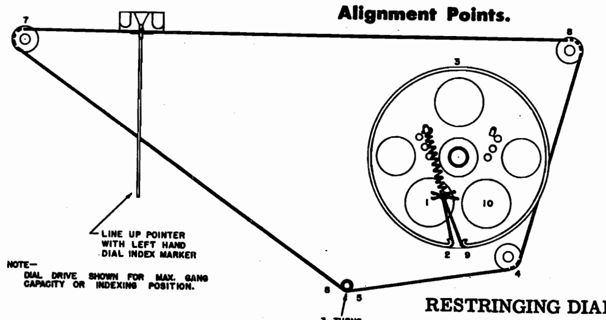
Alignment Points.



Parts Layout.



Parts Layout.



RESTRINGING DIAL CORD:

Restring the dial drive with 30 lb. test dial cord. Tie one end to the tension spring and follow the sequence outlined in Fig. 4. Stretch the tension spring and tie the end of the cord securely to the spring as shown. Set the tuning condenser at maximum capacity (closed), attach the pointer to the string and line it up with the left hand index mark on the dial scale.

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TUBES AND DIAL LAMP REPLACEMENT:

The types of tubes required and their relative position in the receiver are shown in Fig. 5. When installing a replacement tube, insert the center guide pin into the center hole of the tube socket. Rotate the tube until the key on the guide pin drops into the notch in the socket hole. Push down until the base of the tube rests firmly on the socket. To replace dial lamps it will be necessary to remove the chassis from the cabinet. Replace lamps with 6-8 V. Mazda #44 (Blue bead) or equivalent.

SOCKET VOLTAGES:

The voltages shown in the voltage chart were obtained with a 20,000 ohm per volt meter when operating the receiver from a 117-volt a-c source. All voltages are to be measured between the tube pin and chassis. Blanks are provided for your meter readings to establish an average set of readings for this receiver as measured with your test equipment. The normal power consumption for the receiver is 55 watts.

ALIGNMENT:

All connections and adjustments necessary for alignment are accessible from the top of the chassis. The output transformer is located on the under side of the chassis, hence, the output meter connection should be made at the speaker socket. Output voice coil impedance is 3 ohms.

Make all alignment adjustments at maximum volume and refer to the alignment chart for the dial and band switch settings.

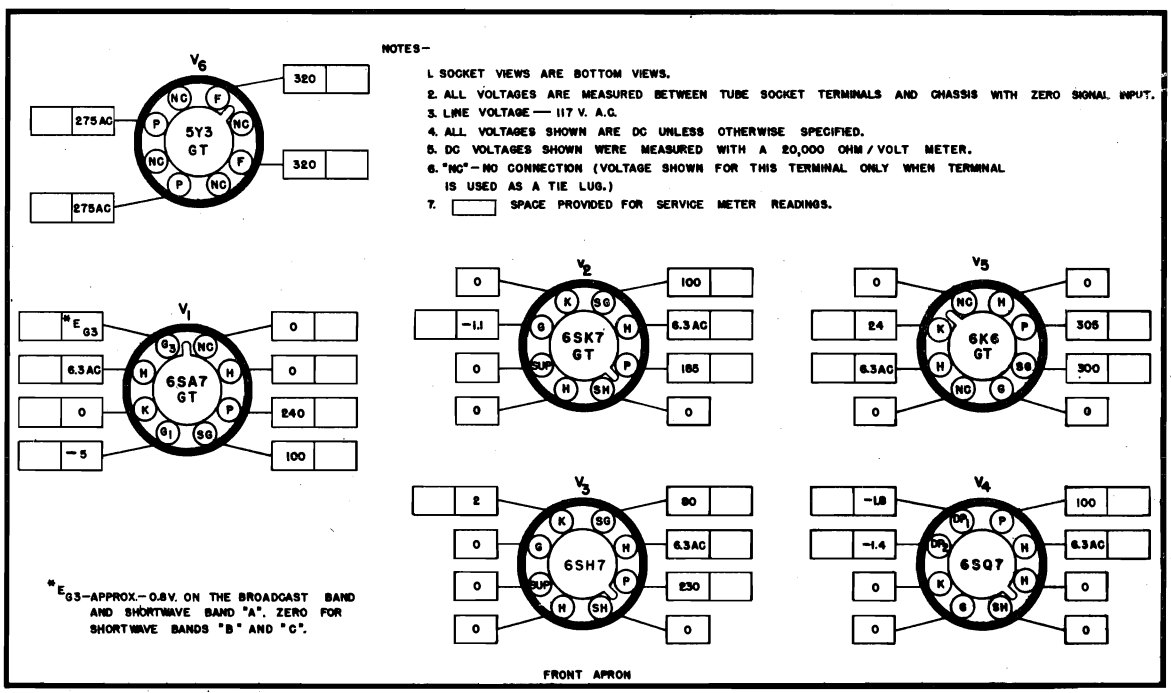
The standard RMA dummy antenna specified in the alignment chart consists of a 200 mmf condenser in series with a 20 uh r-f choke which is shunted by a 400 mmf condenser in series with a 400-ohm carbon resistor.

CAUTION - The loop antenna must be connected during alignment.

ALIGNMENT CHART:

Step	Dummy Antenna	Signal Generator Coupling	Signal Generator Frequency	Band Switch Setting	Receiver Dial Setting	Adjust
1	.01 mfd capacitor	Connect to rear section stator of tuning cap.	455 kc	BC	1000 kc	ABCD
2	Std RMA dummy	Connect to terminals "A" and "G" of antenna terminal strip TS_1.	1500 kc	BC	1500 kc	E*F
			600 kc		600 kc	G*
3	Std RMA dummy	See step 2.	6 mc	SW(A)	6 mc	H*I
4	Std RMA dummy	See step 2.	20 mc	SW(B)	20 mc	J*K
5	Std RMA dummy	See step 2.	11.5 mc	SW(C)	11.5 mc	L*M
			9.2 mc		9.2 mc	N*O

* Note - Calibration adjustment.



Voltage Chart.

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ELECTRICAL PARTS

TRANSFORMERS AND COILS

Illustration No.	Production Part No.	Service Part No.	Description
T-1	50C365		Transformer, 1st I.F.
T-2	50C364		Transformer, Detector Stage
T-3	55B104-1		Transformer, Audio Output
T-4	52C149		Transformer, Power
T-5	51B1018		Transformer, Antenna Stage, SW (B) (C)
T-6	51B960		Transformer, Antenna Stage, SW (A)
T-7	51B1060		Transformer, Antenna Stage, BC
T-8	51B964		Transformer, Oscillator Stage, SW (B) (C)
T-9	51B963		Transformer, Oscillator Stage, SW (A)
T-10	51B962		Transformer, Oscillator Stage, BC

CONDENSERS

Illustration No.	Production Part No.	Service Part No.	Description
C-1,3,5,6,9, 10,11,14,17	46AZ103F	E103	.01 mfd. 600 V., tubular
C-2	46AY503F	E503	.05 mfd. 600 V., tubular
C-4,12,35	CM20A101M	G101	100 mmf. 500 V., mica
C-13	46AZ502J	E502	.005 mfd. 600 V., tubular
C-15	46AZ202J	E202	.002 mfd. 600 V., tubular
C-16	45B113		60-20-20 mfd. 450 V., electrolytic
C-18	46AG103J		.01 mfd. 600 V., molded
C-19,20,21, 22,23,24	44B217		Trimmer assembly, 6 section, oscillator stage
C-25	CM30C162G		1600 mmf. 2% 500 V., mica
C-26	CM35A402J		4000 mmf. 5% 500 V., mica
C-27	CM20A470M	G470	47 mmf. 500 V., mica
C-28,29,32, 33,34	44B216		Trimmer assembly, 5 section, antenna stage
C-30	46AY203F		.02 mfd. 150 V., tubular
C-31	48B184		Tuning condenser, 2 section
C-36	CM20A820J		82 mmf. 5% 500 V., mica
C-37	CM20A181J		180 mmf. 5% 500 V., mica

RESISTORS

Illustration No.	Production Part No.	Service Part No.	Description
R-1	RC30AE183M	B183	18,000 ohms 1 watt, insulated
R-2	RC20AE224M	A224	220,000 ohms $\frac{1}{2}$ watt, insulated
R-3,7	RC20AE683M	A683	68,000 ohms $\frac{1}{2}$ watt, insulated
R-4	RC30AE103M	B103	10,000 ohms 1 watt, insulated
R-5	RC20AE104M	A104	100,000 ohms $\frac{1}{2}$ watt, insulated
R-6	RC20AE221M	A221	220 ohms $\frac{1}{2}$ watt, insulated
R-9	RC20AE102M	A102	1000 ohms $\frac{1}{2}$ watt, insulated
R-10,15	RC20AE474M	A474	470,000 ohms $\frac{1}{2}$ watt, insulated
R-11,23	RC20AE105M	A105	1 megohm $\frac{1}{2}$ watt, insulated
R-12	RC20AE685M	A685	6.8 megohm $\frac{1}{2}$ watt, insulated
R-14,24	RC20AE223M	A223	22,000 ohms $\frac{1}{2}$ watt, insulated
R-17	RC30AE681M	B681	680 ohms 1 watt, insulated

RESISTORS (Cont.)

Illustration No.	Production Part No.	Service Part No.	Description
R-18,19	RC40AE100M	C100	10 ohms 2 watt, insulated
R-20	RC20AE472M	A472	4700 ohms $\frac{1}{2}$ watt, insulated
R-21,22	RC40AE682M	C682	6800 ohms 2 watt, insulated
R-25	RC20AE151K	A100	10 ohms $\frac{1}{2}$ watt, insulated

TUBES AND RECTIFIER COMPLEMENT

Illustration No.	Production Part No.	Service Part No.	Description
V-1	90X6SA7GT	5223	6SA7GT, mixer
V-2	90X6SK7GT	5230	6SK7GT, 1st I.F.
V-3	90X6SH7	5255	6SH7, 2nd I.F.
V-4	90X6SQ7	5231	6SQ7, Detector and 1st Audio
V-5	90X6K6GT	5196	6K6GT, audio power amp.
V-6	90X5Y3GT	5123	5Y3GT, rectifier

MISCELLANEOUS ELECTRICAL PARTS

Illustration No.	Production Part No.	Service Part No.	Description
R-13	25B621		Control, volume
R-16	25B640		Control, tone, includes power switch SW-3
LM-1,2	39A003	44	Lamp 6-8V., 250 Ma Mazda #44
PL-1	87A078		Line cord and plug
LS-1	85C063		Speaker, P.M.
SW-1	60B290		Band switch assembly
SW-2	60A228		Line voltage switch, S.P.D.T
TS-1	88A327		Terminal strip, antenna

MECHANICAL PARTS

CHASSIS PARTS

Illustration No.	Production Part No.	Service Part No.	Description
	76A299	1217671	Lock, line cord
	38A001		Cord, dial drive (54")
	75A006	1217624	Spring, dial drive
	67B727		Rail, pointer
	83C322		Dial scale
	82A135		Dial pointer
	22B189		Dial glass
SO-1	36A036-1		Receptacle, headphone jack
SO-2	88A072		Receptacle, speaker
SO-3	36A029		Receptacle, phono
SO-4	10A015	1217633	Receptacle, phono motor
	6A190	1217684	Socket, octal (tube)
	86A054		Socket, dial light

CABINET PARTS

Illustration No.	Production Part No.	Service Part No.	Description
	66F542		Cabinet, wood
	32C440		Cover, back
	7C061		Escutcheon
	15B068-3		Knob, volume, tone and tuning
	15B137		Knob, band switch
	57C120		Loop antenna

MODEL 980782

UNITED MOTORS SERVICE
DIV. OF GENERAL MOTORS CORP.

GENERAL

MOUNTING—All 1949 Buick Cars.

TUBES—Six, Plus Synchronous Vibrator.

SPEAKER—8" Round, Permanent Magnet.

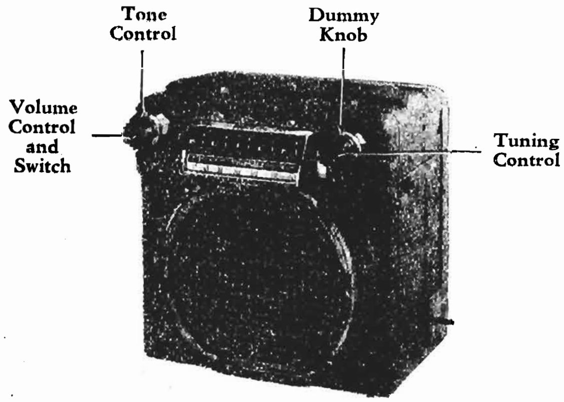
TUNING—Manual and 5 P. B. Mechanical.

ANTENNA TRIMMER COMPENSATION—For Antennas Between 0.000052 — 0.000068 Mfd.

TUNING RANGE—550-1600 KC.

PUSH BUTTON SETUP PROCEDURE

Pull Push Button to the left and out. Tune in desired station manually. Push button all the way in.



MODEL 980782

ALIGNMENT PROCEDURE

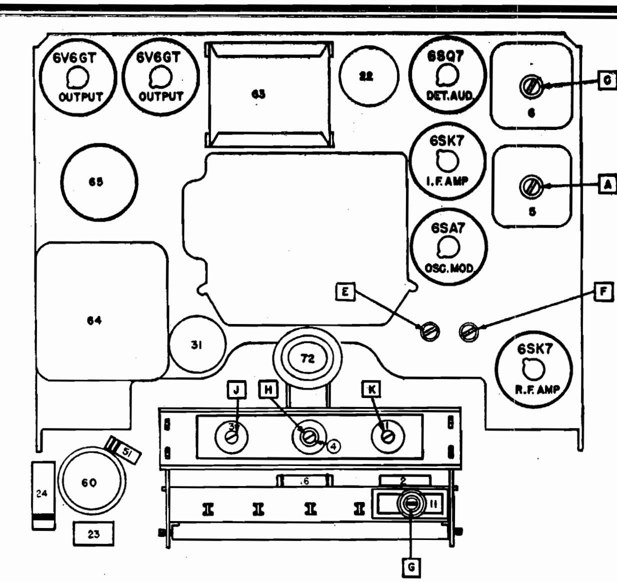
Output Meter Connections .... Across Voice Coil
Generator Return .... To Receiver Chassis
Dummy Antenna .... In Series With Generator
Volume Control Position .... Maximum Volume
Tone Control Position .... Treble
Generator Output .... Minimum for Readable Indication

Steps	Series Condenser or Dummy Antenna	Connect Signal Generator to	Signal Generator Frequency	Tune Receiver To	Adjust in Sequence For Max. Output
1	0.1 Mfd.	7Q7 Grid (Pin #6)	260 KC	High Frequency Stop	A, B, C, D
2	0.000056 Mfd.	Antenna Connector	1615 KC	High Frequency Stop	*E, F, G
3	0.000056 Mfd.	Antenna Connector	1400 KC	Signal Generator Signal	J, K
4	0.000056 Mfd.	Antenna Connector	1615 KC	High Frequency Stop	F, G
5	0.000056 Mfd.	Antenna Connector	1000 KC	Signal Generator Signal	L**

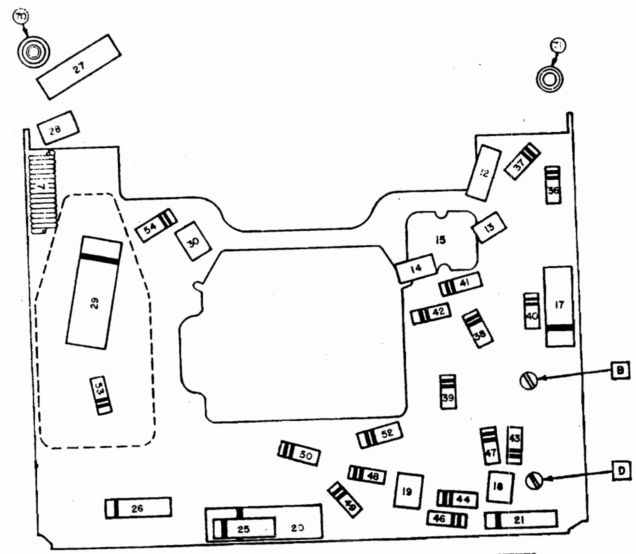
*Before making this adjustment check mechanical setting of oscillator core "H." The rear of the core should be 1 25/32" from the mounting end of the coil form. (This measurement is readily made by inserting a suitable plug in the mounting end of the coil form.) Core adjustments should be made with an insulated screw driver, and core studs should be cemented in place with glyptal or household cement after alignment.

**L is the pointer adjustment screw which is on the connecting link, between the pointer assembly and the parallel guide bar. It should be adjusted so that the dial pointer corresponds with the 1000 KC mark on the dial. (On first "0" of "100.")

With the radio installed and the car antenna plugged in adjust the antenna trimmer "G" for maximum volume with the radio tuned to a weak station near 1400 KC (see sticker on case).



PARTS LAYOUT — TUBE VIEW



PARTS LAYOUT — CHASSIS VIEW

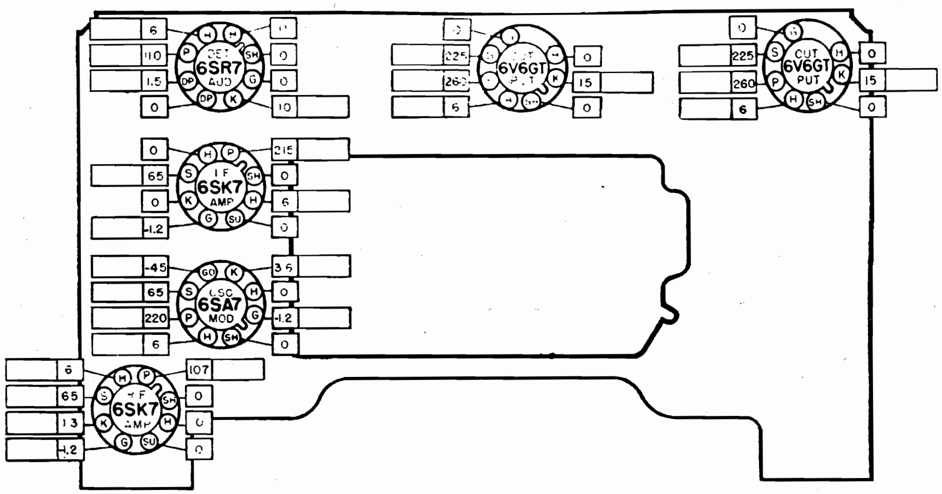
UNITED MOTORS SERVICE
DIV. OF GENERAL MOTORS CORP.

MODEL 980782

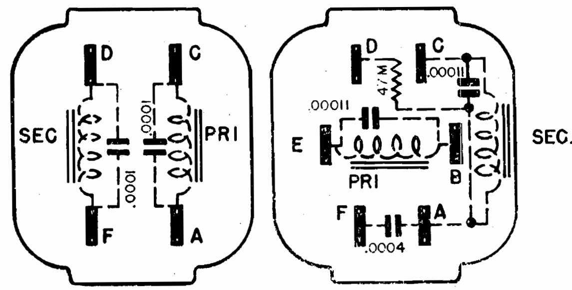
The tube socket voltages, as measured at the factory and under the conditions shown on the schematic diagram on Page 3 are shown.

The blank spaces are provided so the service man may fill in the actual voltage readings as taken with his own equipment. A normal operating radio should be used for these measurements.

TUBE SOCKET VOLTAGE CHART



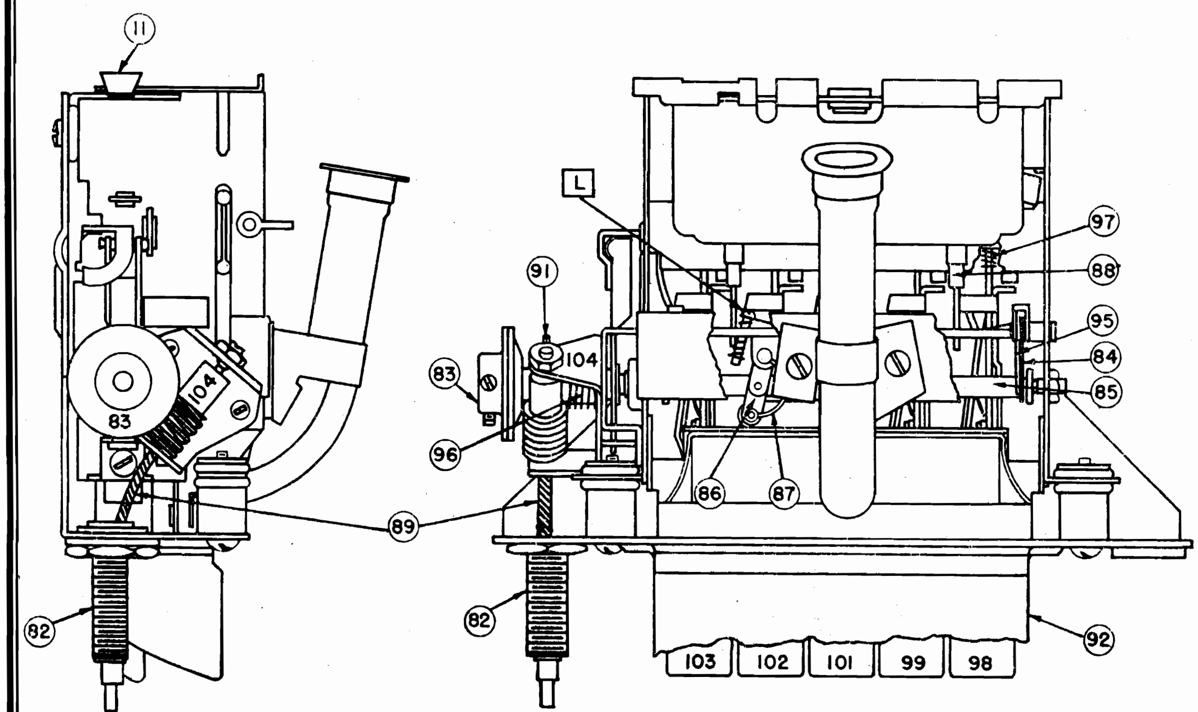
VOLT METER RESISTANCE .... OHMS PER VOLT. READINGS TAKEN WITH .... VOLTS AT SPARK PLATE. VOLTAGES MEASURED FROM SOCKET TERMINALS TO CHASSIS AND ARE POSITIVE UNLESS MARKED OTHERWISE.



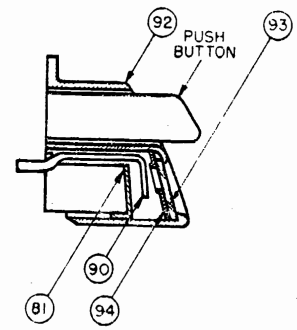
1st I. F. ASSY.

2ND I. F. ASSY.

I. F. COIL CONNECTIONS



TUNER



ESCUTCHEON CROSS SECTION

MODEL 980782

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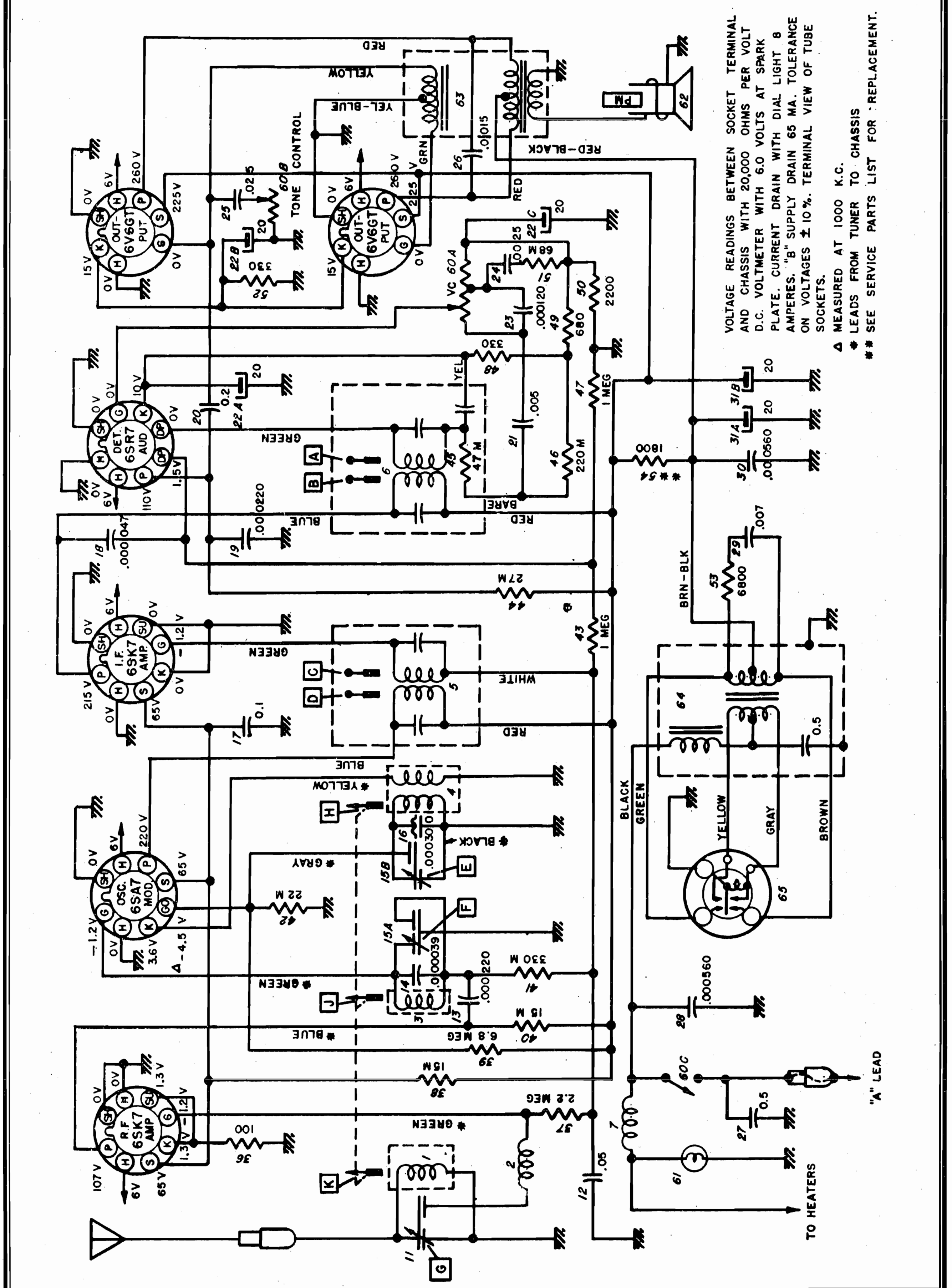

UNITED MOTORS SERVICE
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MODEL 980782

SERVICE PARTS LIST

Illus. No.	Production Part No.	Service Part No.	Description
			ELECTRICAL PARTS
			Coils
1	7257979	7257979	Antenna
2	7240251	7240251	Antenna Spark Choke
3	7257979	7257979	R. F.
4	7258148	7258148	Oscillator
5	7238546	7238546	1st I. F.
6	7240467	7240467	2nd I. F.
7	7241701	7241701	"A" Spark Choke
			Condensers
11	7256905	7256905	Antenna Trimmer
12	7236842	E 503	0.05 mfd. 200 V Tubular
13	7236105	G 221	0.000220 mfd. Molded
14	7258221	G 390	0.000039 mfd. Ceramic
15	7242454	7242454	Dual Trimmer
15A			R. F. Section
15B			Oscillator Section
16	7258162	7258162	0.000300 mfd. Compensating
17	7238788	E 104	0.1 mfd. 400 V Tubular
18	7233313	G 470	0.000047 mfd. Molded
19	7236105	G 221	0.000220 mfd. Molded
20	7240579	E 204	0.2 mfd. 400 V Tubular
21	7232956	E 502	0.005 mfd. 600 V Tubular
22	7238553	7238553	Electrolytic
22A			20 mfd. 25 V
22B			20 mfd. 25 V
22C			20 mfd. 25 V
23	7240577	G 121	0.000120 mfd. Molded
24	7240578	7240578	0.0025 mfd. 400 V Tubular
25	1211232	1211232	0.025 mfd. 400 V Tubular
26	7236134	7236134	0.0015 mfd. 800 V Tubular
27	7236621	E 504	0.5 mfd. 200 V Tubular
28	7240566	7240566	0.000560 mfd. Hi-Q Mica
29	7257439	7257439	0.007 mfd. 3000 V Buffer
30	7240566	7240566	0.000560 mfd. Hi-Q Mica
31	7240612	7240612	Electrolytic
31A			20 mfd. 400 V.
31B			20 mfd. 400 V
			Resistors
36	1213217	A 101	100 Ohms ½ W Insulated
37	1214563	A 225	2.2 Megohms ½ W Insulated
38	7233653	C 153	15,000 Ohms 2 W Insulated
39	1215563	A 685	6.8 Megohms ½ W Insulated
40	7237595	B 153	15,000 Ohms 1 W Insulated
41	1214557	A 334	330,000 Ohms ½ W Insulated
42	1214550	A 223	22,000 Ohms ½ W Insulated
43	1213282	A 105	1 Megohm ½ W Insulated
44	1213342	B 273	27,000 Ohms 1 W Insulated
45	1214553	A 473	47,000 Ohms ½ W Insulated
46	1214555	A 224	220,000 Ohms ½ W Insulated
47	1213282	A 105	1 Megohm ½ W Insulated
48	1213224	A 331	330 Ohms ½ W Insulated
49	1214543	A 681	680 Ohms ½ W Insulated
50	1214545	A 222	2200 Ohms ½ W. Insulated
51	1213844	A 683	68,000 Ohms ½ W Insulated
52	1214572	C 331	330 Ohms 2 W Insulated
53	1216154	B 682	6800 Ohms 1 W Insulated
54	1214573	{ C 272 B 562	1800 Ohms { Replace with 2700 Ohm 2 W and 5600 Ohm 1 W in parallel
			Tubes
	1213793	5241	6V6GT
	1218107	5233	6SR7
	7237751	5229	6SK7
	7237752	5222	6SA7

MODEL 980782

UNITED MOTORS SERVICE
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SERVICE PARTS LIST

Illus. No.	Production Part No.	Service Part No.	Description
			Miscellaneous Electrical
60	7256847	7256847	Control, Volume, Tone and Switch
60A			Volume Control
60B			Tone Control
60C			Switch
61	125588	55	Lamp - Dial Light
62	7255895	7255895	Speaker - 8" round, PM
63	7240464	7240464	Transformer - Input-Output
64	7256939	7256939	Transformer - Power
65	7238525	8630	Vibrator - Synchronous
			MECHANICAL PARTS
			Chassis
70	7242034	7242034	Connector - "A" Lead
71	7242035	7242035	Connector - Antenna
72	1217841	1217841	Socket - Dial Light
73	7236279	7236279	Socket - Octal Tube
74	7238539	7238539	Socket - Vibrator
			Tuner
81	7257606	7257606	Backplate - Pointer
82	7256874	7256874	Bushing - Drive Shaft
83	7258072	7258072	Clutch Disc - Driven
84	7258203	7258203	Connecting Link - Core Bar
85	7258211	7258211	Core Guide Bar - Parallel
86	7256271	7256271	Pointer Connecting Link
87	7255992	7255992	Spring - Pointer Connecting Link
88	7258468	7258468	Core - Powdered Iron
89	7256871	7256871	Drive Shaft - Manual
90	7256861	7256861	Pointer Assembly
	1219093	1219093	Pointer Tip Package
91	7256102	7256102	Gear and Bushing - Clutch
92	7256883	7256883	Escutcheon Assy.
93	7256885	7256885	Dial
94	7256886	7256886	Backplate - Dial
95	7257415	7257415	Spring - Core Bar Connecting Link
96	7255991	7255991	Spring - Clutch
97	7255984	7255984	Spring - Slide Return
98	1218036	1218036	Pushbutton and Tuner Slide "B" (Gray)
98A	1219150	1219150	Pushbutton and Tuner Slide "B" (Black)
99	1218037	1218037	Pushbutton and Tuner Slide "U" (Gray)
99A	1219151	1219151	Pushbutton and Tuner Slide "U" (Black)
101	1218038	1218038	Pushbutton and Tuner Slide "I" (Gray)
101A	1219152	1219152	Pushbutton and Tuner Slide "I" (Black)
102	1218039	1218039	Pushbutton and Tuner Slide "C" (Gray)
102A	1219153	1219153	Pushbutton and Tuner Slide "C" (Black)
103	1218040	1218040	Pushbutton and Tuner Slide "K" (Gray)
103A	1219154	1219154	Pushbutton and Tuner Slide "K" (Black)
	1219124	1219124	Pushbutton Insert - Chrome "B"
	1219125	1219125	Pushbutton Insert - Chrome "U"
	1219126	1219126	Pushbutton Insert - Chrome "I"
	1219127	1219127	Pushbutton Insert - Chrome "C"
	1219128	1219128	Pushbutton Insert - Chrome "K"
104	7256866	7256866	Worm Gear and Bracket
			INSTALLATION PARTS
	1321178	1321178	"A" Lead and Fuse Connector
	1336763	6015	Condenser - Generator
	1910147	6015	Condenser - Ignition Coil
	120151	120151	Fuse - 15 amperes
	1334393	1334393	Knob - Control
	1320577	1320577	Knob - Dummy
	1320576	1320576	Knob - Tone Control
	1853686	6008	Suppressor Adapter
	1207820	6001	Suppressor - Distributor

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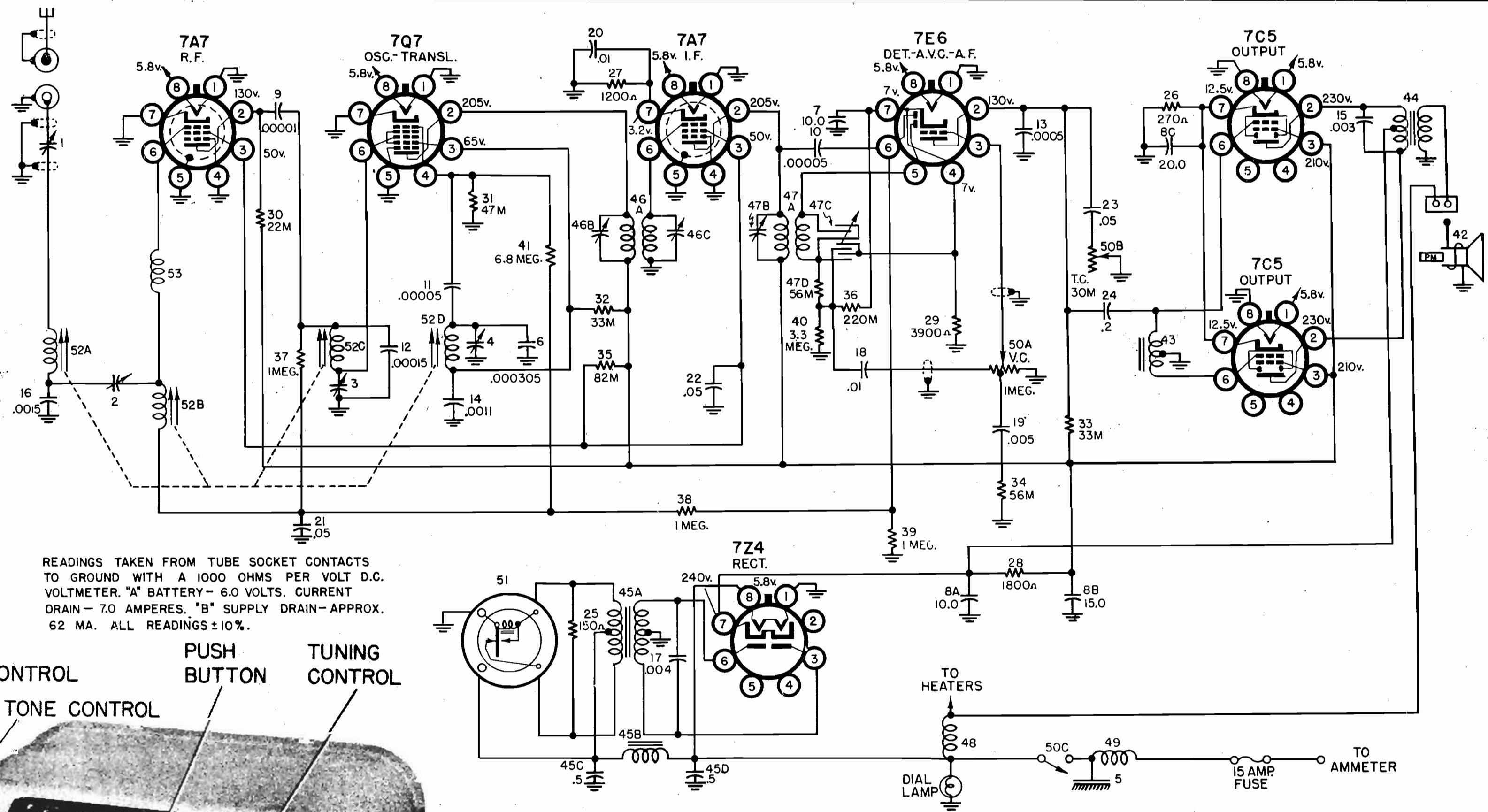
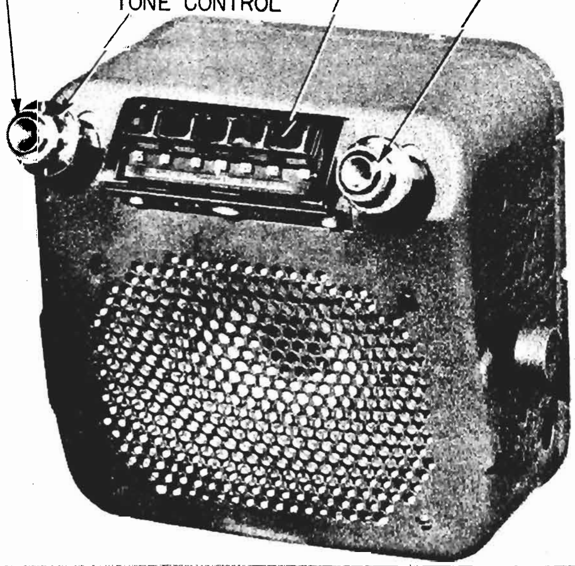
MODEL 982420, Early; Oldsmobile



READINGS TAKEN FROM TUBE SOCKET CONTACTS TO GROUND WITH A 1000 OHMS PER VOLT D.C. VOLTMETER. "A" BATTERY - 6.0 VOLTS. CURRENT DRAIN - 7.0 AMPERES. "B" SUPPLY DRAIN - APPROX. 62 MA. ALL READINGS ±10%.



TUBES — 7A7, 7Q7, 7A7, 7E6, 7C5, 7C5, 7Z4

SPEAKER — 6" x 9" Elliptical Permanent-Dynamic

TUNING — Manual and 5 P. B.

TUNING RANGE — 535 KC 1610 KC

CAR ANTENNA CAPACITY — 70 mmfd.

PUSH BUTTON SET-UP

Pull button slightly to the left and then out - tune in manually - depress selected button to set.

MODEL 982420,
Early, Late;
Oldsmobile

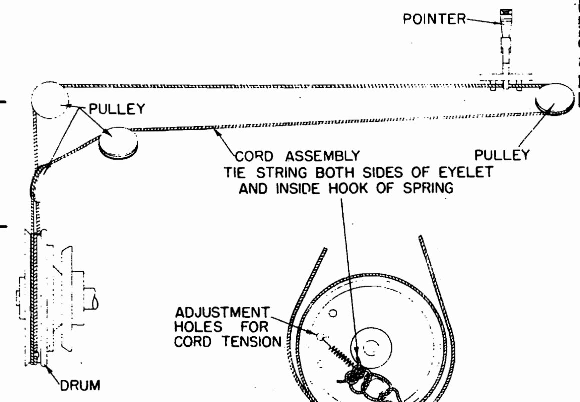
UNITED MOTORS SERVICE
DIV. OF GENERAL MOTORS CORP.

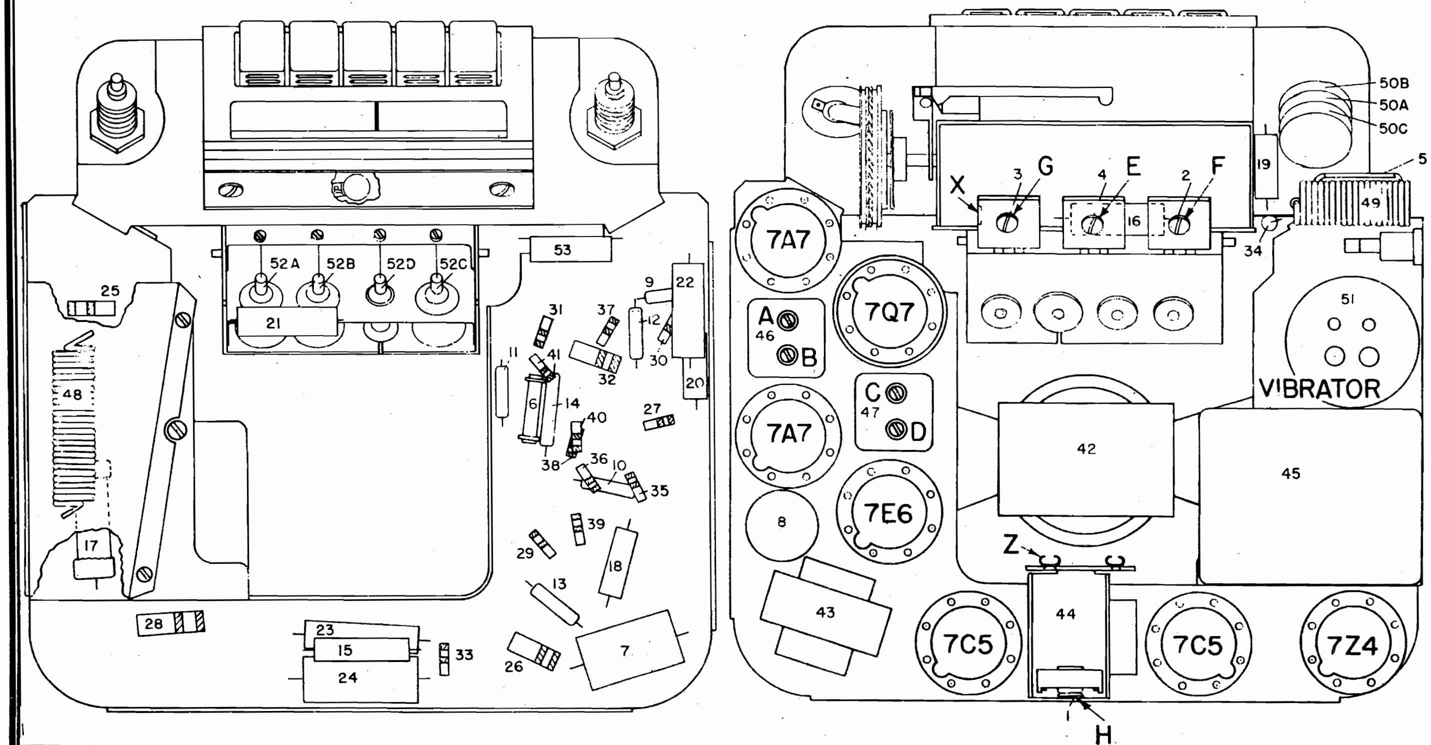
ALIGNMENT PROCEDURE

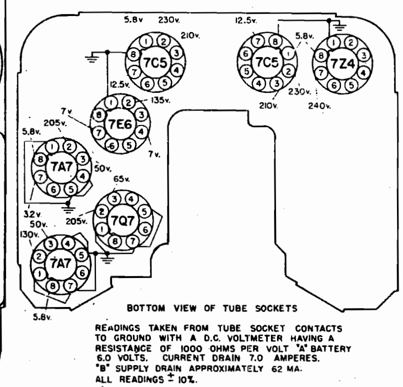
Volume Control maximum.
Tone Control on high position.
Signal Generator Output minimum for satisfactory output indication.

Series Capacitor Or Dummy Antenna	Connect To	Signal Generator Frequency	Adjust Screws In Order
0.1 mfd.	Terminal X (See Parts Layout)	257.5 KC	A, B, C, D
.000070 mfd.	Antenna Terminal	1610 KC	E, H, F, G

Low frequency alignment not required.
Adjust Trimmer "H" to match car antenna (1400 KC) when radio is installed.







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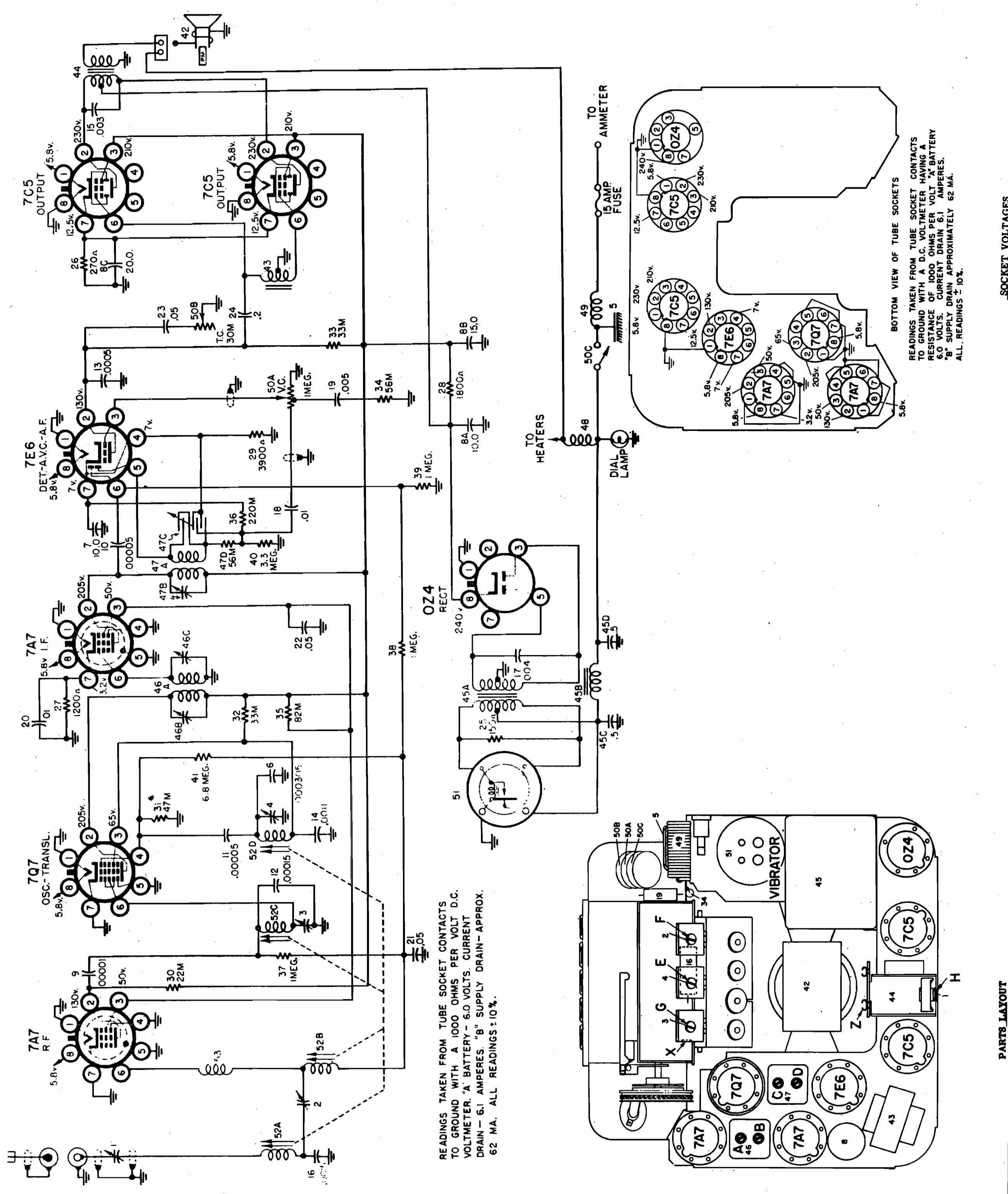
MODEL 982420, Late; Oldsmobile



MODEL 982420,
Late; Oldsmobile

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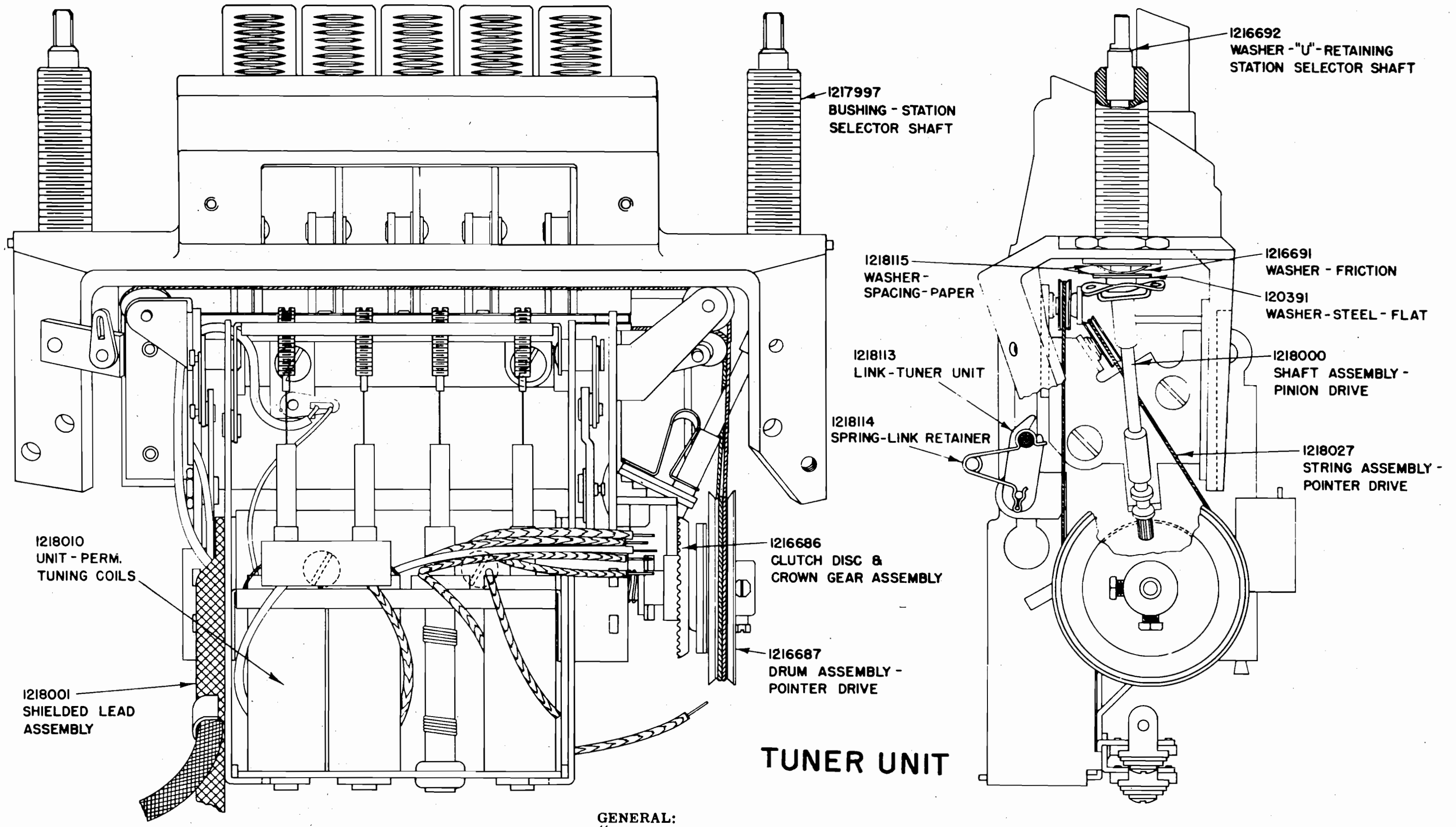


TUNER UNIT

GENERAL:
"The 1949 version of Model 982420 (identified by serial number prefix 'B-59') is identically the same as the 1948 version of Model 982420 (identified by serial number prefix 'B-58') except for the following TUBE, MOUNTING & INSTALLATION PARTS and MISCELLANEOUS CHASSIS PARTS changes:"

SERVICE PARTS LIST

PRODUCTION PART NUMBER	SERVICE PART NUMBER	DESCRIPTION
		DELETIONS
554516		Nut - 1/2-28 Hex.
419511		Washer - Felt - 9/32 I.D. (Anti-Rattle) Tone Control
1562090		Washer - Felt - 3/16 I.D. (Anti-Rattle) Tuning & Volume Control
554518		Bracket - Receiver Mounting
554520		Gasket - Speaker Baffle
1910147		Condenser - Ignition Coil
122159		Screw - #8-32 x 1/4 - Rd. Head
121841		Washer - Lock - #8 (Split)
1218424		Tube - 7Z4 Rectifier
		ADDITIONS
7255287		Nut - 1/2-28 Hex.
7257400		Washer - Wave - 3/16 I.D. (Anti-Rattle) Tuning & Volume Control
7256654		Bracket - Receiver Mounting
555437 or		Condenser - Ignition Coil
1912757		Condenser - Ignition Coil
7256684		Gasket - Speaker Baffle
164349		Screw - #8-32 x 1/4 - Phillips Hd. - Self Tapping
1912900		Condenser - Voltage Regulator
1211924	5003	Tube - OZ4 Rectifier
1219086		Socket - 8 Prong Octal (Rectifier)

UNITED MOTORS SERVICE
DIV. OF GENERAL MOTORS CORP.

MODEL 982420, Early, Late; Oldsmobile

CAPACITORS

Illus. No.	Service * Part No.	Production Part No.	Description
1		1218002	Antenna - Trimmer - Capacitor
2		1218047	Grid Trimmer - Capacitor
3		1218046	R. F. Trimmer - Capacitor
4		1218043	Oscillator - Trimmer - Capacitor
5		1212278	Spark - Capacitor
6		1217993	305 Mmfd. Compensating Capacitor
7	J100	1217998	Electrolytic - 10 Mfd. 25 Volt
8		1218009	Electrolytic
8A			10 Mfd. 350 Volt
8B			15 Mfd. 350 Volt
8C			20 Mfd. 25 Volt
9	G100	7234242	.00001 Mfd. Mica
10	G470	1207625	.00005 Mfd. Mica
11	G470	1207625	.00005 Mfd. Mica
12	G151	7230693	.00015 Mfd. Mica
13	G471	7238879	.0005 Mfd. Mica
14		1218015	.0011 Mfd. Mica - Silver
15	E302	7234126	.003 Mfd. 800 Volt
16	E102	7236134	.0015 Mfd. 800 Volt
17	H402	1217875	.004 Mfd. 1500 Volt
18	E103	1208600	.01 Mfd. 600 Volt
19	E502	7230912	.C05 Mfd. 600 Volt
20	E103	1208600	.01 Mfd. 600 Volt
21	E503	7230592	.05 Mfd. 600 Volt
22	E503	7230592	.05 Mfd. 600 Volt
23	E503	7230592	.05 Mfd. 600 Volt
24		7234127	.2 Mfd. 200 Volt

RESISTORS

Illus. No.	Service * Part No.	Production Part No.	Description
25	B151	1211005	150 Ohm - 1 Watt
26	B271	1213846	270 Ohm - 1 Watt
27	A122	1213236	1200 Ohm - 1/2 Watt
28	C182	1214573	1800 Ohm - 2 Watt
29	A392	1214546	3900 Ohm - 1/2 Watt
30	A223	1214550	22,000 Ohm - 1/2 Watt
31	A473	1214553	47,000 Ohm - 1/2 Watt
32	A333	1213845	33,000 Ohm - 1/2 Watt
33	A333	1213845	33,000 Ohm - 1/2 Watt
34	A563	1213267	56,000 Ohm - 1/2 Watt
35	A823	1214554	82,000 Ohm - 1/2 Watt
36	A224	1214555	220,000 Ohm - 1/2 Watt
37	A105	1213282	1 Megohm - 1/2 Watt
38	A105	1213282	1 Megohm - 1/2 Watt
39	A105	1213282	1 Megohm - 1/2 Watt
40	A335	1214564	3.3 Megohm - 1/2 Watt
41	A685	1215563	6.8 Megohm - 1/2 Watt

MISCELLANEOUS ELECTRICAL PARTS

Illus. No.	Service * Part No.	Production Part No.	Description
42		1218060	Speaker - 6" x 9" Elliptical Permanent-Dynamic
43		1218029	Transformer - Audio Input
44		1218059	Transformer - Audio Output
45		1218008	Transformer & Filter Assembly
45A			Transformer - Power
45B			Hash - Choke
45C			.5 Mfd. 100 Volt
45D			.5 Mfd. 100 Volt
46		1218033	1st I. F. Transformer Assembly
46A			I. F. Coil Assembly
46B			Primary Trimmer
46C			Secondary Trimmer
47		1218035	2nd I. F. Transformer Assembly
47A			I. F. Coil Assembly
47B			Primary Trimmer
47C			Secondary Trimmer
47D			56,000 Ohm - 1/2 Watt
48		1217996	Filament Choke
49		1217995	Spark Choke
50		1218005	Control - Volume - Tone On-Off Switch
50A			Volume Control - 1 Megohm
50B			Tone Control - 30,000 Ohm
50C			On-Off Switch
51	8542	1218006	Vibrator

TUNER UNIT & PARTS

Illus. No.	Service * Part No.	Production Part No.	Description
52		1218010	Unit - Perm. Tuning Coil
52A			Antenna Coil
52B			Preselector Coil
52C			R. F. Coil
52D			Oscillator Coil
		1217997	Bushing - Station Selector Shaft
		1218044	Tuner Unit Assembly - Mechanical Portion only - Includes Push Buttons, Clutch Disc, Crown Gear and Drum Assembly
		1216686	Clutch Disc & Crown Gear Assy.
		1208004	Dial Glass - Calibrated
		1218042	Escutcheon Assy. & Light Shields Without Dial (for service only)
		1216687	Drum Assembly - Pointer Drive
		1218001	Lead Assembly - Shielded
		1218000	Shaft Assembly - Drive Pinion
		1218030	Pointer & Slide Assembly
		1216692	Washer - "U" Retaining - Station Selector Shaft
		1216691	Washer - Friction - Station Selector Shaft
		1217999	Actuator Plate Assembly
		1217994	Lever Assembly
		1217992	Screw - #10-32 Special
		1218027	String Assembly - Pointer Drive
		1218041	Connector Assembly - Antenna
		121391	Washer - Steel - Flat
		1218115	Washer - Spacing - Paper
		1218113	Link - Tuner Unit
		1218114	Spring - Link Retaining
53		1214382	Antenna Choke

TUBES

Illus. No.	Service * Part No.	Production Part No.	Description
	5290	1213583	7A7 - R. F. Amplifier
	5301	1213853	7Q7 - Oscillator-Translator
	5290	1213583	7A7 - I. F. Amplifier
	5298	1213852	7B6 - Detector AVC - 1st Audio
	5295	1213586	7C5 - Audio Output
	5295	1213586	7C5 - Audio Output
	5308	1218424	7Z4 - Rectifier

MOUNTING & INSTALLATION PARTS

Part No.	Description
414997	Washer - Flat 33/64 I. D.
554516	Nut - 1/2-28 Hex
419512	Washer - Rubber - 9/32 I. D. (Anti-Rattle) Dummy Control
419511	Washer - Felt - 9/32 I. D. (Anti-Rattle) Tone Control
554515	Knob - Tone & Dummy
1562090	Washer - Felt - 3/16 I.D. (Anti-Rattle) Tuning & Volume Control
7256702	Knob (Tuning & Volume Control) Included Set Screw
554518	Bracket - Receiver Mounting
554519	Bracket - Side Mounting
554690	Bolt - 1/4-20 x 3/8 long Truss Head
120706	Bolt - 1/4-20 x 1/2 long - Hex Hd.
121797	Bolt - 1/4-20 x 3/8 long - Hex Hd.
120392	Washer - Flat - 17/64 I.D. 5/8 O.D.
120423	Washer - Lock - 1/4 (Internal Tooth Type "B")
103319	Washer - Lock - 1/4 (Split)
554691	"A" Lead Connector & Filter Condenser Assembly
120151	Fuse - "A" Lead 15 Amp. 25 Volt
1910147	Condenser - Ignition Coil
1911095	Condenser - Generator - .5 Mfd.
7257239	Distributor Suppressor - 15,000 Ohm
414237	Grommet - Distributor Suppressor
415823	Static Collector (Front Wheel)
122159	Screw - #8-32 x 1/4 - Rd. Hd.
121841	Washer - Lock - #8 (Split)
554339	Panel - Radio Control
554520	Gasket - Speaker Baffle
7256717	Spacer - Instrument Panel to Gasket
555348	Hood Grounding Clip

MISCELLANEOUS CHASSIS PARTS

Part No.	Description
1216041	Socket - Vibrator
7238455	Socket - Tube - 8 Prong Lock-In
1217991	Shield - Tube
1218007	Cover Assembly - Case Back

MODEL 982421,
Oldsmobile

UNITED MOTORS SERVICE
DIV. OF GENERAL MOTORS CORP.

GENERAL

MOUNTING—All 1949 Oldsmobile Cars.

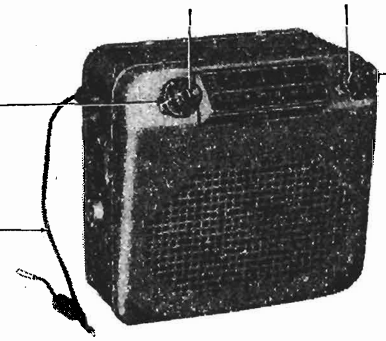
TUBES—Six, Plus Rectifier.

SPEAKER—6"x 9" Elliptical Permanent Manget.

TUNING—Manual and 5 P. B. Mechanical.

ANTENNA TRIMMER COMPENSATION—For Antennas Between 0.000050 — 0.000070 Mfd.

TUNING RANGE—550 - 1600 KC.



MODEL 982421

PUSHBUTTON SET-UP

Pull pushbutton to the left and out. Tune in desired station manually. Push button all the way in.

ALIGNMENT PROCEDURE:

Output Meter Connections	Across Voice Coil
Generator Return	To Receiver Chassis
Dummy Antenna	In Series With Generator
Volume Control Position	Maximum Volume
Tone Control Position	Treble
Generator Output	Minimum for Readable Indication

Steps	Series Condenser or Dummy Antenna	Connect To	Signal Generator Frequency	Tune Receiver To	Adjust in Sequence For Max. Output
1	0.1 Mfd.	7Q7 Grid (Pin #6)	260 KC	High Frequency Stop	A ,B, C, D
2	0.1 Mfd.	7Q7 Grid (Pin #6)	1615 KC	High Frequency Stop	*E
3	0.000068 Mfd.	Antenna Connector	1615 KC	High Frequency Stop	F, G, H
4	0.000068 Mfd.	Antenna Connector	1400 KC	Signal Generator Signal	K, L, M
5	0.000068 Mfd.	Antenna Connector	1615 KC	High Frequency Stop	F, G, H
6	0.000068 Mfd.	Antenna Connector	1000 KC	Signal Generator Signal	**N

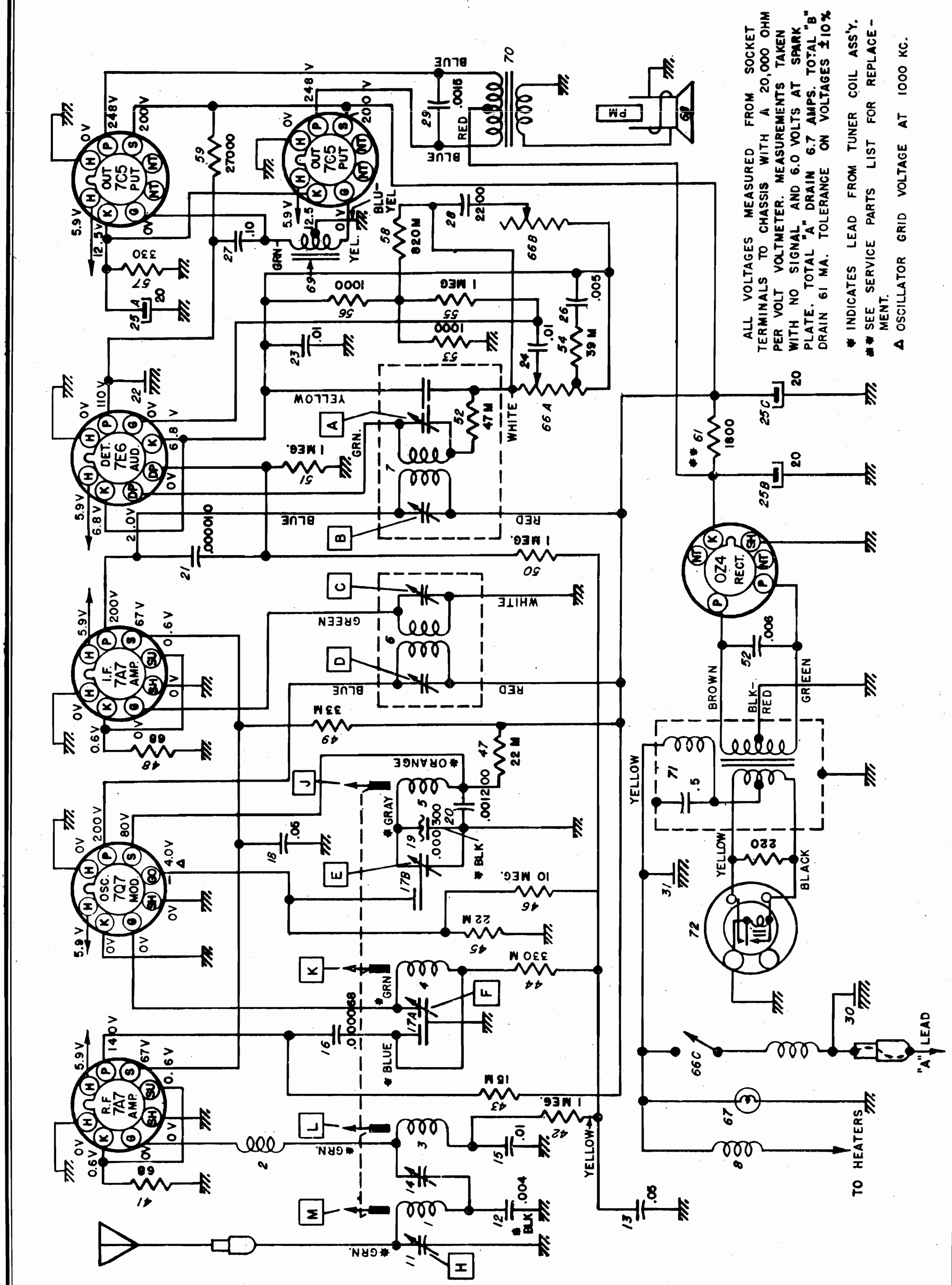
*Before making this adjustment check the mechanical setting of the oscillator core "J." The slotted end of core should be 1 21/32" from the mounting end of the coil form. (This measurement is readily made by inserting a suitable plug in the monting end of the coil form.) Core adjustments should be made with an insulated screwdriver and core studs should be cemented in place with glyptal or household cement after alignment.

**"N" is the pointer adjustment screw which is on the pointer connecting link (see tuner drawing) and should be adjusted so the pointer reads 1000 KC. (On first "0" of "100.")

With the radio installed and the car antenna plugged in adjust the antenna trimmer "H" for maximum volume with the radio tuned to a weak station near 1400 KC. (See sticker on case.)

UNITED MOTORS SERVICE
DIV. OF GENERAL MOTORS CORP.

MODEL 982421,
Oldsmobile



ALL VOLTAGES MEASURED FROM SOCKET TERMINALS TO CHASSIS WITH A 20,000 OHM PER VOLT VOLTMETER. MEASUREMENTS TAKEN WITH NO SIGNAL AND 6.0 VOLTS AT SPARK PLATE. TOTAL "A" DRAIN 6.7 AMPS. TOTAL "B" DRAIN 61 MA. TOLERANCE ON VOLTAGES ±10%

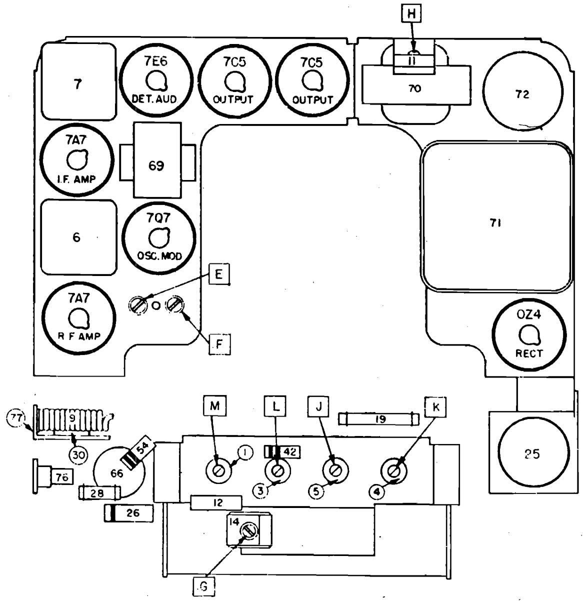
* INDICATES LEAD FROM TUNER COIL ASS'Y.

** SEE SERVICE PARTS LIST FOR REPLACEMENT.

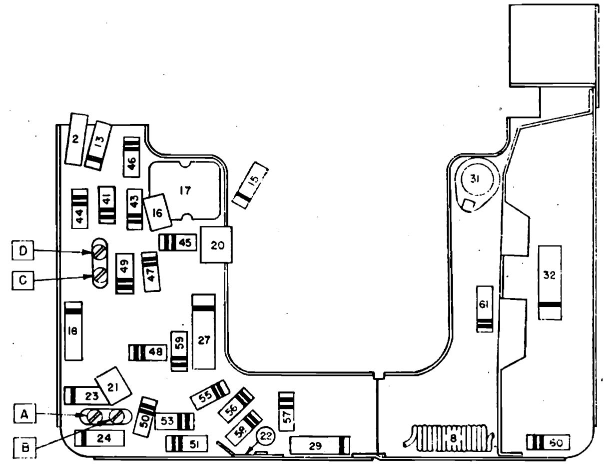
△ OSCILLATOR GRID VOLTAGE AT 1000 KC.

MODEL 982421, Oldsmobile

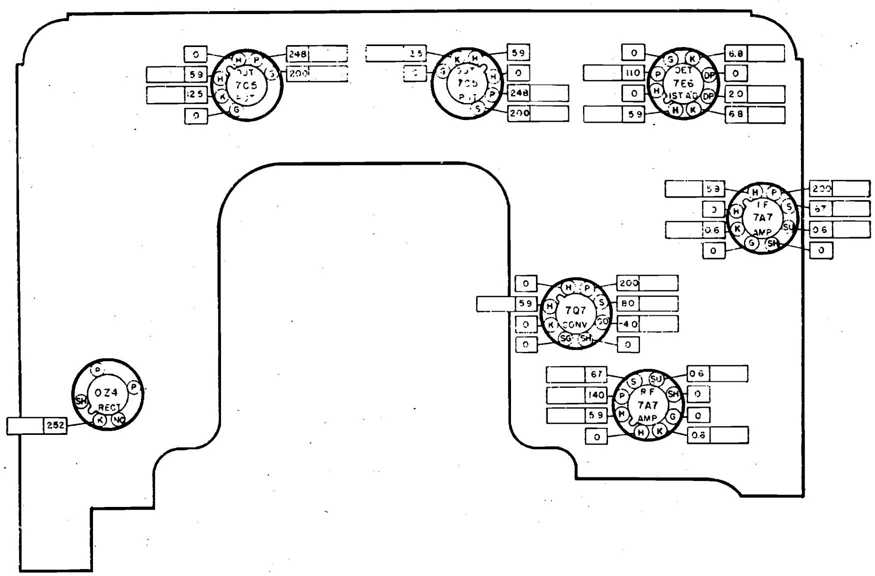
UNITED MOTORS SERVICE
DIV. OF GENERAL MOTORS CORP.



PARTS LAYOUT — TUBE VIEW



PARTS LAYOUT — CHASSIS VIEW



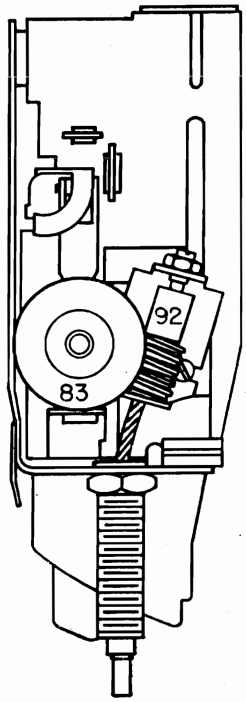
TUBE SOCKET VOLTAGE CHART

The tube socket voltages as measured at the factory and under the conditions shown on the schematic diagram are shown here. The blank spaces are provided so the serviceman may fill in the actual readings as taken with his own equipment. A normal operating radio should be used for these measurements.

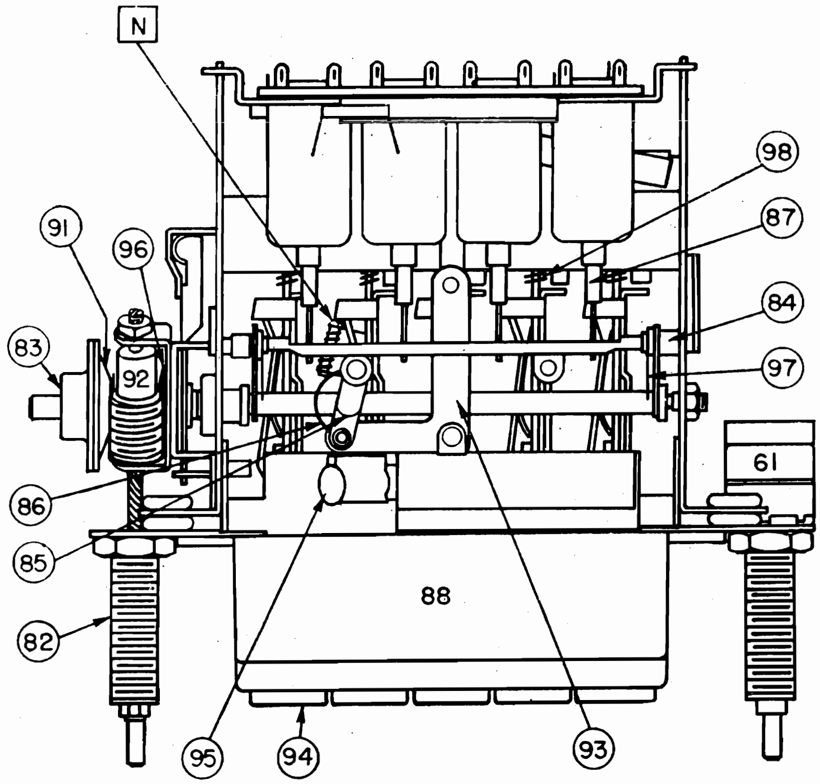
VOLTMETER RESISTANCE ______ OHMS PER VOLT. READING TAKEN WITH ______ VOLTS AT SPARK PLATE. THE VOLTAGES ARE MEASURED FROM TUBE SOCKET TERMINALS TO CHASSIS AND ARE POSITIVE UNLESS MARKED OTHERWISE.

UNITED MOTORS SERVICE
DIV. OF GENERAL MOTORS CORP.

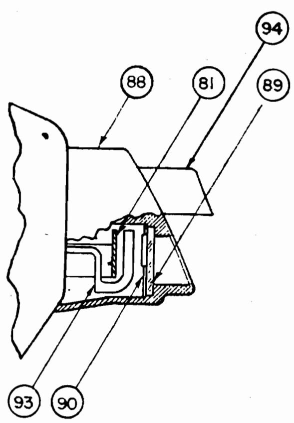
MODEL 982421, Oldsmobile



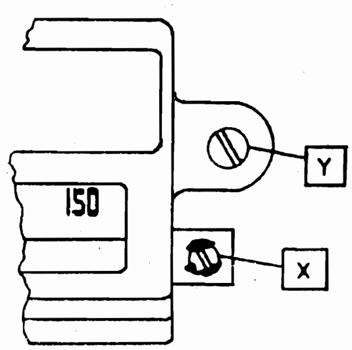
ESCUTCHEON MOUNTING



TUNER



ESCUTCHEON CROSS SECTION



ESCUTCHEON MOUNTING

SPECIAL INSTRUCTIONS

Unless special precautions are taken in removing the dial escutcheon, there is a possibility that the dial pointer tip will be broken. Therefore in removal of the escutcheon the following procedure is recommended.

1. Loosen but do not remove the two screws holding the pointer back plate ("X" in Escutcheon Mounting Drawing Above) and loosen the shellac so that the back plate is free to move.
2. Remove the escutcheon mounting screws "Y" (see Escutcheon Mounting).
3. Carefully lift off the escutcheon (DO NOT FORCE). If the dial backplate is free to move slightly downward the escutcheon will come off easily.

The same caution should be exercised when replacing the escutcheon.

MODEL 982421,
Oldsmobile

UNITED MOTORS SERVICE
DIV. OF GENERAL MOTORS CORP.

SERVICE PARTS LIST

Illus. No.	Production Part No.	Service Part No.	Description
		ELECTRICAL PARTS	
		Coils	
1	7258375	7258375	Antenna (Sheet Metal Coil Cans)
1A	7258367	7258367	Antenna (Die Cast Coil Cover)
2	7240251	7240251	Antenna Spark Choke
3	7258375	7258375	1st R. F. (Sheet Metal Coil Cans)
3A	7258367	7258367	1st R. F. (Die Cast Coil Cover)
4	7258375	7258375	2nd R. F. (Sheet Metal Coil Cans)
4A	7258367	7258367	2nd R. F. (Die Cast Coil Cover)
5	7258376	7258376	Oscillator (Sheet Metal Coil Cans)
5A	7258568	7258568	Oscillator (Die Cast Coil Cover)
6	7257832	7257832	1st I. F. Assy.
7	7256932	7256932	2nd I. F. Assy.
8	1217846	1217846	Hash Choke
9	7258434	7258434	"A" Spark Choke, Fuse Connector and spark plate condenser.
		Condensers	
11	7258160	7258160	Antenna Trimmer.
12	7258286	E 402	0.004 Mfd. 600 V Tubular
13	7236842	E 503	0.005 Mfd. 200 V Tubular
14	7258213	7258213	1st R. F. Trimmer
15	7239738	E 103	0.01 Mfd. 400 V Tubular
16	7236104	G 680	0.000068 Mfd. Molded
17	7258372	7258372	Dual Trimmer
17A			2nd R. F. Section
17B			Oscillator Section
18	7230892	E 503	0.05 Mfd. 200 V Tubular
19	7258445	7258445	0.000300 Mfd. Compensating
20	1217743	G 122	0.001200 Mfd. Molded
21	1215189	G 100	0.000010 Mfd. Molded
22	1217848	1217848	Chassis Plate Condenser
23	7237870	E 103	0.01 Mfd. 400 V Tubular
24	7237870	E 103	0.01 Mfd. 400 V Tubular
25	7241198	7241198	Electrolytic
25A			20 Mfd. 25 V
25B			20 Mfd. 400 V
25C			20 Mfd. 400 V
26	7232956	E 502	0.005 Mfd. 600 V Tubular
27	7238788	E 104	0.1 Mfd. 400 V Tubular
28	1217436	G 222	0.002200 Mfd. Ceramic
29	7236134	7236134	0.0015 Mfd. 800 V Tubular
30	1212278	1212278	Spark Condenser (Included in 7258434)
31	1217848	1217848	Chassis Plate Condenser
32	7240906	H 602	0.006 Mfd. 1600 V Buffer
		Resistors	
41	1215558	A 680	68 Ohms ½ W Insulated
42	1213282	A 105	1 Megohm ½ W Insulated
43	7237595	B 153	15,000 Ohms 1 W Insulated
44	1214557	A 334	330,00 Ohms ½ W nsulated
45	1214550	A 223	22,000 Ohms ½ W Insulated
46	1215548	A 106	10 Megohms ½ W Insulated
47	1216156	B 223	22,000 Ohms 1 W Insulated
48	1215558	A 680	68 Ohms ½ W Insulated
49	7242447	B 333	33,000 Ohms 1 W Insulated
50	1213282	A 105	1 Megohm ½ W Insulated
51	1213282	A 105	1 Megohm ½ W Insulated
52	1214553	A 473	47,000 Ohms ½ W Insulated
53	1213235	A 102	1,000 Ohms ½ W Insulated
54	1213480	A 393	39,000 Ohms ½ W Insulated
55	1213282	A 105	1 Megohm ½ W Insulated
56	1213235	A 102	1,000 Ohms ½ W Insulated
57	7233773	B 331	330 Ohms 1 W Insulated
58	1214561	A 824	820,000 Ohms ½ W Insulated
59	1213342	B 273	27,000 Ohms 1 W Insulated
60	7237994	B 221	220 Ohms 1 W Insulated
61	1214573	{ C 272 B 562	1800 Ohms { Replace with 2700 ohms 2 W and 5600 ohms 1 W in parallel

UNITED MOTORS SERVICE
DIV. OF GENERAL MOTORS CORP.

MODEL 982421, Oldsmobile

SERVICE PARTS LIST (Cont.)

Illus. No.	Production Part No.	Service Part No.	Description
			Tubes
	1211924	5003	0Z4—Rectifier
	1213980	5298	7E6
	1213568	5295	7C5
	1213562	5290	7A7
	1213981	5301	7Q7
			Miscellaneous Electrical
66	7256697	7256697	Control—Volume, Tone, and Switch
66A			Volume Control
66B			Tone Control
66C			Switch
67	187189	44	Lamp—Dial Light
68	7258146	7258146	Speaker—6 x 9 Elliptical PM
69	7256432	7256432	Transformer—Input
70	7258182	7258182	Transformer—Output
71	7255881	7255881	Transformer—Power
72	7239124	8542	Vibrator—Non-synchronous
			MECHANICAL PARTS
			Chassis
76	7256742	7256742	Connector—Antenna
77	7258434	7258434	Connector—"A" Lead, Fuse Holder and Spark Plate Condenser
	7241356	7241356	Socket—Loctal Tube
	7236279	7236279	Socket—Octal Tube
	7239125	7239125	Socket—Vibrator
			Tuner
81	7256688	7256688	Backplate—Pointer
	115529	115529	Ball Bearing Pkg.
82	7258492	7258492	Bushing and Manual Drive Shaft
83	7258072	7258072	Clutch Disc—Driven
84	7258366	7258366	Core Guide Bar—Parallel
85	7256271	7256271	Pointer Connecting Link
86	7255992	7255992	Spring—Pointer Connecting Link
87	7258214	7258214	Core—Powdered Iron
88	7258371	7258371	Escutcheon
89	7258154	7258154	Dial (Dark Numbers)
89A	7258596	7258596	Dial (Light Numbers)
90	7258369	7258369	Backplate—Dial
91	7256495	7256495	Gear and Bushing—Clutch
92	7256705	7256705	Gear and Bracket—Worm
93	7257898	7257898	Pointer Assy.
	1219174	1219174	Pointer Tip Pkg.
94	1219173	1219173	Pushbutton and Slide Assy. (Chrome)
94A	1219200	1219200	Pushbutton and Slide Assy. (Black)
95	1217820	1217820	Socket—Dial Light
96	7256488	7256488	Spring—Clutch
97	7257415	7257415	Spring—Core Bar Connecting Link
98	7255984	7255984	Spring—Slide Return
			INSTALLATION PARTS
	554339	554339	Trim Plate—Instrument Panel
	554691	554691	"A" Lead, Condenser, and Fuse Connector, male
		6016	Condenser, "A" Lead
	1911095	6015	Condenser, Generator
	1912757	6015	Condenser, Ignition Coil
	1912900	1912900	Condenser, Voltage Regulator
	120151	120151	Fuse, 15 amperes
	555348	555348	Hood Ground Clip
	7256702	7256702	Knob—Control
	554515	554515	Knob—Tone Control and Dummy
	7240138	6013	Static Collector
	7257239	7257239	Suppressor—Distributor
	414237	414237	Suppressor Insulator

MODEL 982454, Oldsmobile

UNITED MOTORS SERVICE
DIV. OF GENERAL MOTORS CORP.

GENERAL

MOUNTING—All 60 and 70 Series 1948 Oldsmobile Cars.

TUBES—Five, plus rectifier.

SPEAKER — 6"x 9" Elliptical, Permanent Magnet.

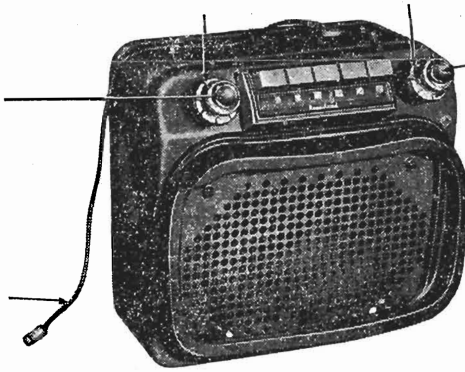
TUNING—Manual and 5 P. B. Mechanical.

ANTENNA TRIMMER COMPENSATION — For Antennas Beween 0.000060 — 0.000080 Mfd.

TUNING RANGE—550-1600 K.C.

PUSH BUTTON SETUP PROCEDURE

Pull Push Button to the left and out. Tune in desired station manually. Push button all the way in.



MODEL 982454

ALIGNMENT PROCEDURE

Output Meter Connections .... Across Voice Coil
Generator Return .... To Receiver Chassis
Dummy Antenna .... In Series With Generator
Volume Control Position .... Maximum Volume
Tone Control Position .... Treble
Generator Output .... Minimum for Readable Indication

Steps	Series Condenser or Dummy Antenna	Connect Signal Generator to	Signal Generator Frequency	Tune Receiver To	Adjust In Sequence For Max. Output
1	0.1 Mfd.	7Q7 Grid (Pin #6)	260 KC	High Frequency Stop	A B, C, D
2	0.000068 Mfd.	Antenna Connector	1615 KC	High Frequency Stop	*E, F, G
3	0.000068 Mfd.	Antenna Connector	600 KC	Signal Generator Signal	J, K
4	0.000068 Mfd.	Antenna Connector	1615 KC	High Frequency Stop	F, G
5	0.000068 Mfd.	Antenna Connector	600 KC	Signal Generator Signal	L**

*Before making this adjustment check mechanical setting of oscillator core "H." The rear of the core should be 1¾" from the mounting end of the coil form. (This measurement is readily made by inserting a suitable plug in the mounting end of the coil form.) Core adjustments should be made with an insulated screw driver, and core studs should be cemented in place with glyptal or household cement after alignment.

**L is the pointer adjustment screw which is on the connecting link, Illus. #88, between the pointer assembly and the parallel guide bar. It should be adjusted so that the dial pointer corresponds with the 600 KC mark on the dial. (Between the "6" and the "0".)

With the radio installed and the car antenna plugged in adjust the antenna trimmer "G" for maximum volume with the radio tuned to a weak station near 1400 KC (see sticker on case).

UNITED MOTORS SERVICE
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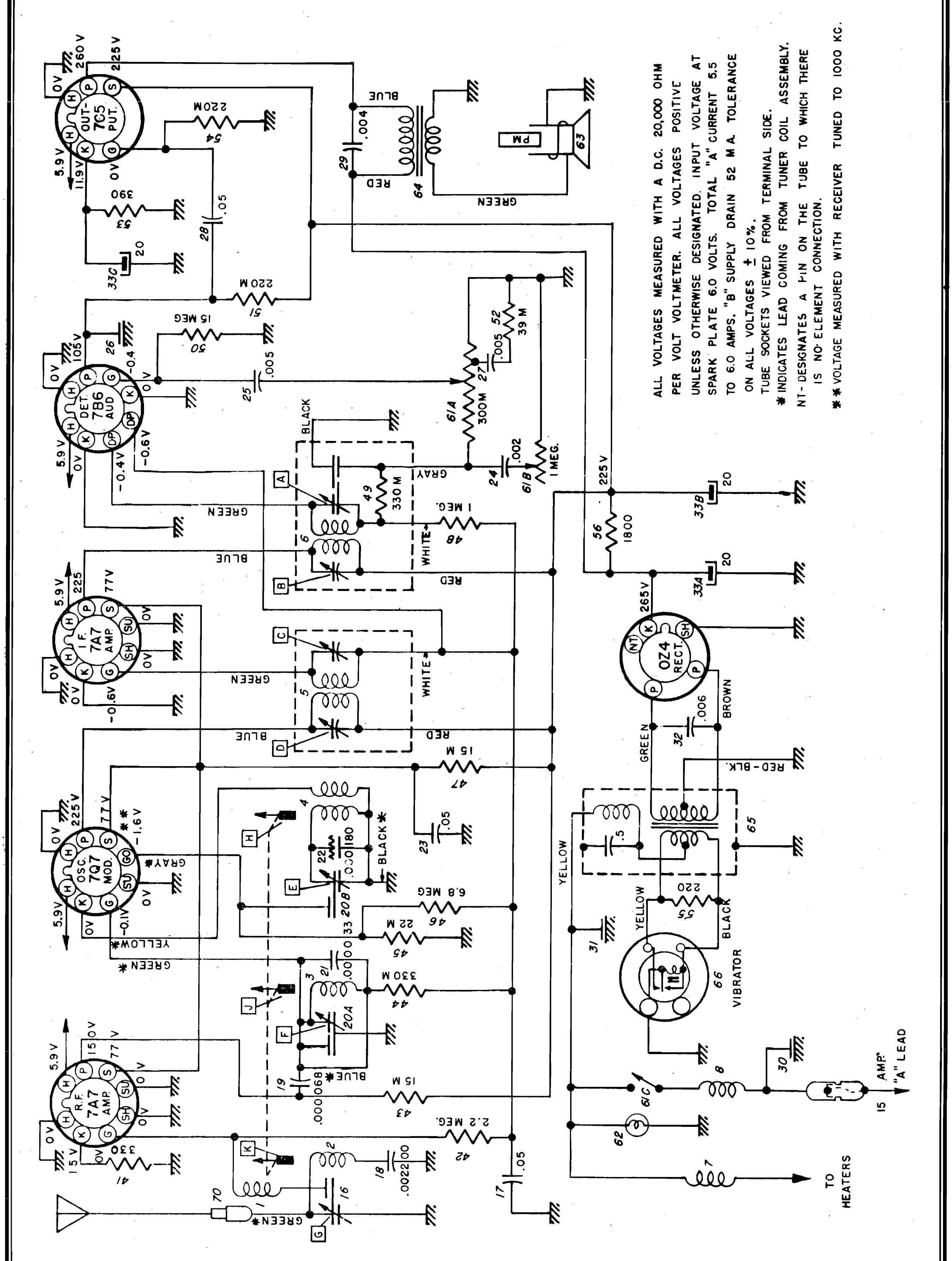
MODEL 982454, Oldsmobile



MODEL 982454,
Oldsmobile

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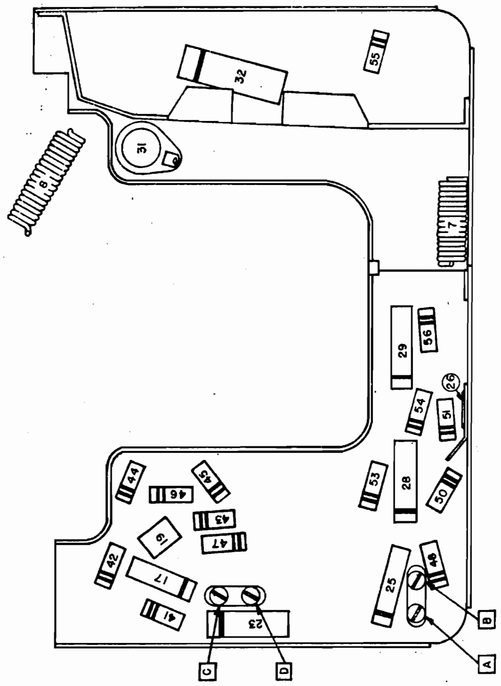
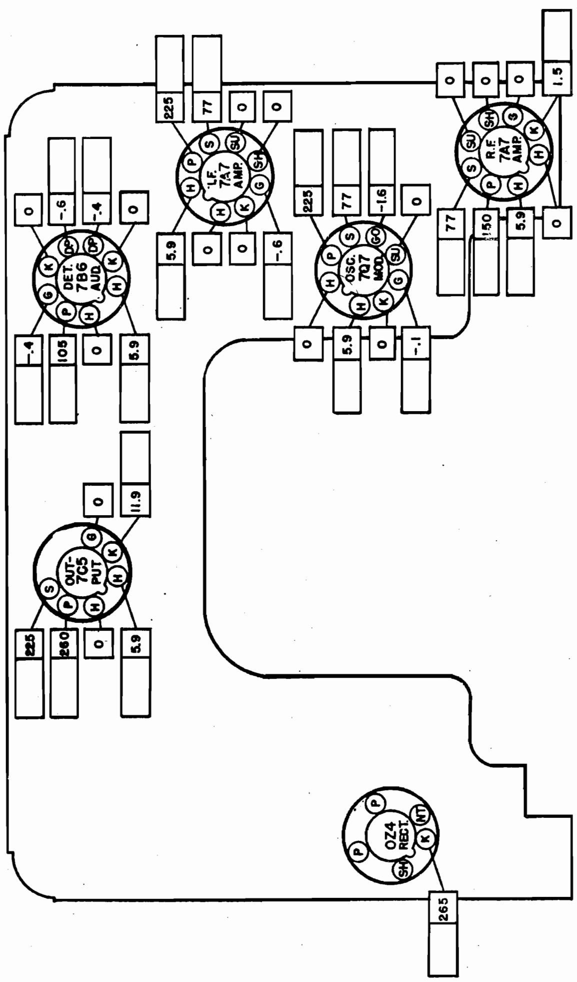
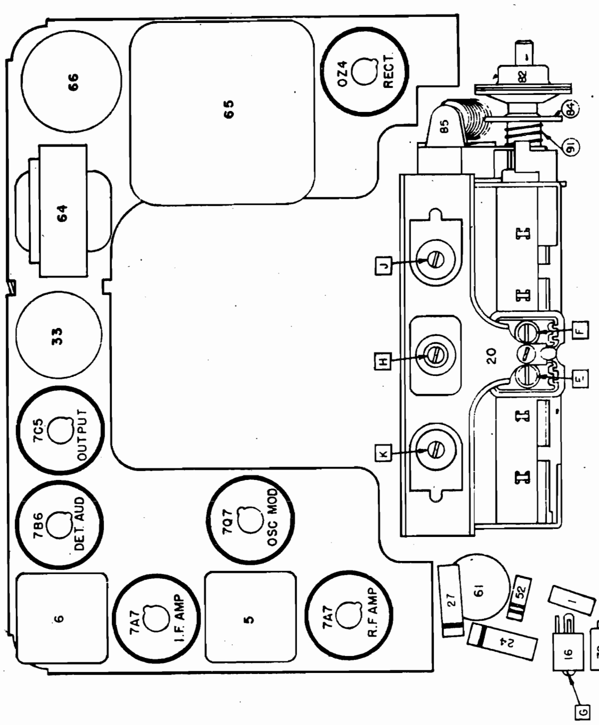


PARTS LAYOUT — CHASSIS VIEW

VOLT METER RESISTANCE ________ OHMS PER VOLT. READINGS TAKEN WITH ________ VOLTS AT SPARK PLATE. VOLTAGES MEASURED FROM SOCKET TERMINALS TO CHASSIS AND ARE POSITIVE.



TUBE SOCKET VOLTAGE CHART



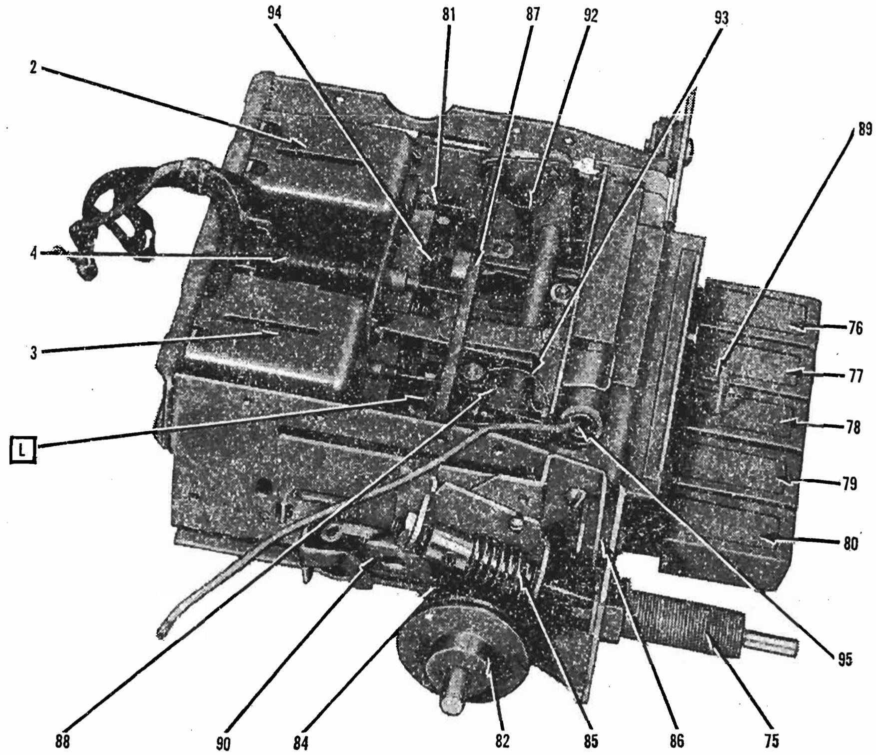
PARTS LAYOUT — TUBE VIEW

The tube socket voltages, as measured at the factory and under the conditions shown on the schematic diagram

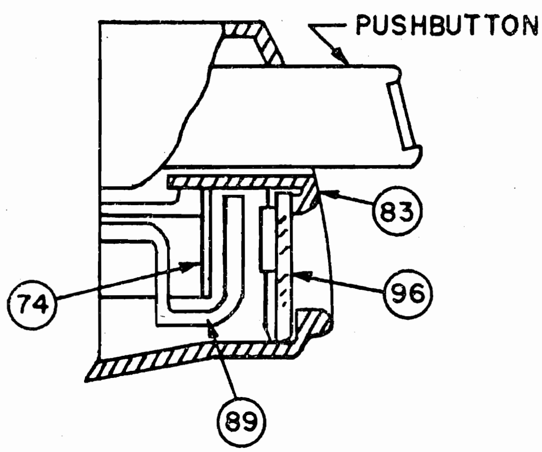
The blank spaces are provided so the service man may fill in the actual voltage readings as taken with his own equipment. A normal operating radio should be used for these measurements.

UNITED MOTORS SERVICE
DIV. OF GENERAL MOTORS CORP.

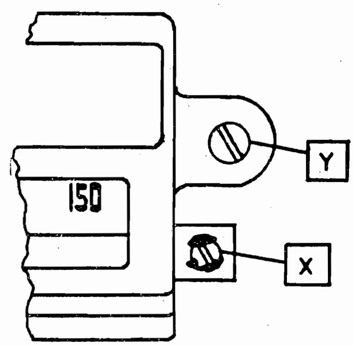
MODEL 982454, Oldsmobile



TUNER



ESCUTCHEON CROSS SECTION



ESCUTCHEON MOUNTING

SPECIAL INSTRUCTIONS

Unless special precautions are taken in removing the dial escutcheon, there is a possibility that the dial pointer tip will be broken. Therefore in removal of the escutcheon the following procedure is recommended.

1. Loosen but do not remove the two screws holding the pointer back plate ("X" in Escutcheon Mounting Drawing Above) and loosen the shellac so that the back plate is free to move.
2. Remove the escutcheon mounting screws "Y" (see Escutcheon Mounting).
3. Carefully lift off the escutcheon (DO NOT FORCE). If the dial backplate is free to move slightly downward the escutcheon will come off easily.

The same caution should be exercised when replacing the escutcheon.

MODEL 982454, Oldsmobile

UNITED MOTORS SERVICE
DIV. OF GENERAL MOTORS CORP.

Illus. No.	Production Part No.	Service Part No.	Description
			ELECTRICAL PARTS
			COILS
1	7240251	7240251	Antenna Noise Choke
2	7257391	7257391	Antenna Coil
3	7257391	7257391	R. F. Coil
4	7257386	7257386	Oscillator Coil
5	7257832	7257832	1st I. F. Assy.
6	7256662	7256662	2nd I. F. Assy.
7	7241708	7241708	Hash Choke
8	1217846	1217846	"A" Spark Noise Choke
			CONDENSERS
16	7242013	7242013	Antenna Trimmer and Bracket
17	7236842	E503	.05 Mfd. 200V Tubular
18	1217744	G222	.002200 Mfd. Ceramic
19	1212359	G680	.000068 Mfd. Molded
20	7242454	7242454	Dual Trimmer
20A			R. F. Section — Fixed Capacity .000300 Mfd.
20B			Osc. Section — Fixed Capacity .000100 Mfd.
21	1217735	G330	.000033 Mfd. Molded
22	7257424	7257424	.000180 Mfd. Temperature Compensating
23	7230892	E503	.05 Mfd. 400V Tubular
24	7236756	E202	.002 Mfd. 600V Tubular
25	7232456	E502	.005 Mfd. 600V Tubular
26	1217848	1217848	Chassis Plate Condenser
27	7232956	E502	.005 Mfd. 600V Tubular
28	7230892	E503	.05 Mfd. 400V Tubular
29	7233243	7233243	.004 Mfd. 800V Tubular
30	7241259	7241259	Spark Plate Assy.
31	1217848	1217848	Chassis Plate Condenser
32	7240906	H602	.006 Mfd. 1600V Buffer
33	7241198	7241198	Electrolytic
33A			20 Mfd. 400V
33B			20 Mfd. 400V
33C			20 Mfd. 25V
			RESISTORS
41	1213224	A331	330 Ohms ½ W Insulated
42	1214563	A225	2.2 Megohm ½ W Insulated
43	7237595	B153	15,000 Ohms 1 W Insulated
44	1214557	A334	330,000 Ohms ½ W Insulated
45	1214550	A223	22,000 Ohms ½ W Insulated
46	1215563	A685	6.8 Megohm ½ W Insulated
47	7233653	C153	15,000 Ohms 2 W Insulated
48	1213282	A105	1 Megohm ½ W Insulated
49	1214557	A334	330,000 Ohms ½ W Insulated (In 2nd I. F.)
50	1213289	A156	15 Megohm ½ W Insulated
51	1214555	A224	220,000 Ohm ½ W Insulated
52	1213480	A393	39,000 Ohms ½ W Insulated
53	1216149	B391	390 Ohms 1 W Insulated
54	1214555	A224	220,000 Ohms ½ W Insulated
55	7237994	B221	220 Ohms 1 W Insulated
56	1214573	{ C272 } { B562 }	Replace Illus. 56 with parallel { 2700 Ohm 2 W Insulated } { 5600 Ohm 1 W Insulated }
			TUBES
		5290	7A7
		5301	7Q7

Illus. No.	Production Part No.	Service Part No.	Description
	1213565	5292	7B6
	1213568	5295	7C5
	1211924	5003	0Z4 Rectifier
			MISCELLANEOUS ELECTRICAL PARTS
61	7257526	7257526	Control — Volume, Tone and Switch
61A			Volume Control
61B			Tone Control
61C			On-off Switch
62	187189	44	Lamp, Dial (Mazda 44)
63	7257645	7257645	Speaker, 6 x 9 Elliptical, Permanent Magnet
64	7256664	7256664	Transformer, Output
65	7255881	7255881	Transformer, Power
66	7239124	8542	Vibrator
			MECHANICAL PARTS
			CHASSIS
70	7256742	7256742	Connector, Antenna
	7241356	7241356	Socket, Loctal Tube
	7236279	7236279	Socket, Octal Tube
	7239125	7239125	Socket, Vibrator
			TUNER PARTS
74	7257535	7257535	Backplate, Pointer
75	1218277	1218277	Bushing and Drive Shaft Assy.
76	1218270	1218270	Button and Slide Assy. No. 1 Button
77	1218271	1218271	Button and Slide Assy. No. 2 Button
78	1218272	1218272	Button and Slide Assy. No. 3 Button
79	1218273	1218273	Button and Slide Assy. No. 4 Button
80	1218274	1218274	Button and Slide Assy. No. 5 Button
81	7257392	7257392	Core, Tuning
82	7256105	7256105	Disc. Clutch
83	7257536	7257536	Escutcheon Assy.
96	7257534	7257534	Dial
84	7256495	7256495	Gear and Bushing Assy.
85	7256705	7256705	Gear and Bracket (Worm Gear)
86	7237172	7237172	Grommet, Tuner Mounting
87	7256179	7256179	Parallel Guide Bar Assy.
88	7256271	7256271	Pointer Adjuster Assy.
89	1218269	1218269	Pointer Tip Package
			Pointer Tip
			Screw, Nut, and Lockwasher
90	7255989	7255989	Spring, Cam Return
91	7256488	7256488	Spring, Clutch
92	7257415	7257415	Spring, Connecting Link, Guide Bar
93	7255992	7255992	Spring, Connecting Link, Pointer
94	7255984	7255984	Spring, Slide Return
95	1217820	1217820	Socket and Lead, Dial Light
			INSTALLATION PARTS
	7255608	6016	Condenser, "A" Lead
	1211095	6015	Condenser, Generator
	1910147	6015	Condenser, Ignition Coil
	1218333	1218333	Fuseholder
	120151	120151	Fuse, 15 Amp.
	414237	414237	Insulator, Distributor Suppressor
	7256702	7256702	Knob
	7257427	7257427	Knob (Dummy)
	7256692	7256692	Knob, Tone Control
	7240138	6013	Static Collector
	7257239	7257239	Suppressor, Distributor

UNITED MOTORS SERVICE
DIV. OF GENERAL MOTORS CORP.

MODEL 982455, Oldsmobile

GENERAL

MOUNTING .... All 60 and 70 Series 1948 Oldsmobiles

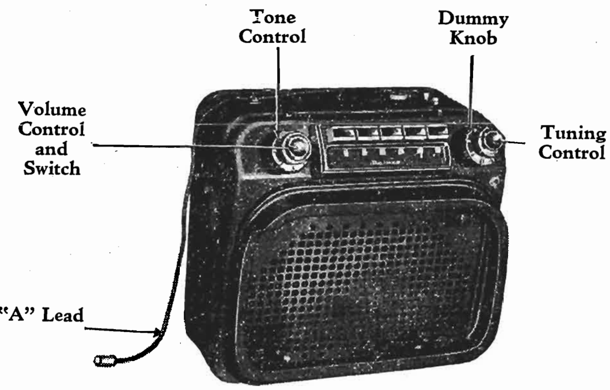
TUBES .... Six, Plus Rectifier

SPEAKER .... 6" x 9" Elliptical Permanent Magnet

TUNING ....Manual and 5 P. B. Mechanical

ANTENNA TRIMMER COMPENSATION — For Antennas Between 0.000060 — 0.000080 Mfd.

TUNING RANGE ....550 - 1600 KC.



MODEL 982455

PUSHBUTTON SET-UP

Pull pushbutton to the left and out. Tune in desired station manually. Push button all the way in.

ALIGNMENT PROCEDURE:

Output Meter Connections .... Across Voice Coil
Generator Return .... To Receiver Chassis
Dummy Antenna .... In Series With Generator
Volume Control Position .... Maximum Volume
Tone Control Position .... Treble
Generator Output .... Minimum for Readable Indication

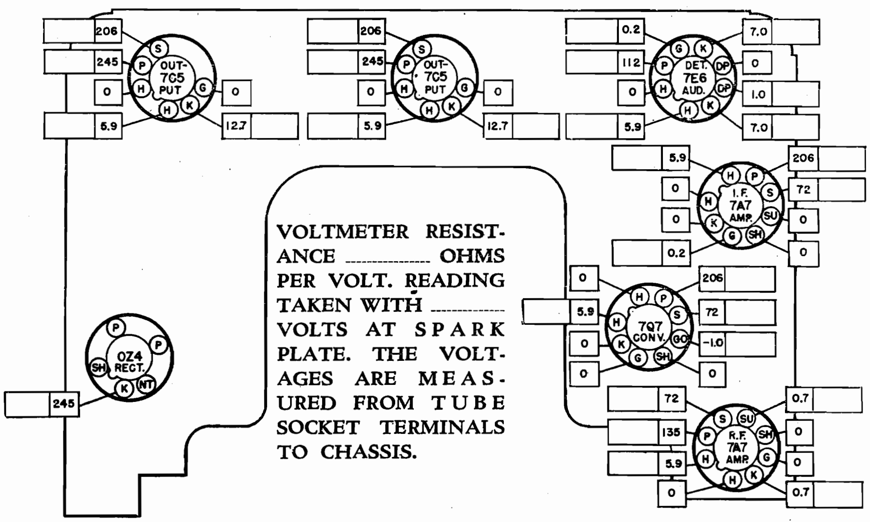
Steps	Series Condenser or Dummy Antenna	Connect To	Signal Generator Frequency	Tune Receiver To	Adjust In Sequence For Max. Output
1	0.1 Mfd.	7Q7 Grid (Pin. #6)	260 KC	High Frequency Stop	A, B, C, D
2	0.000068 Mfd.	Antenna Connector	1615 KC	High Frequency Stop	*E, F, G
3	0.000068 Mfd.	Antenna Connector	600 KC	Signal Generator Signal	J, K
4	0.000068 Mfd.	Antenna Connector	1615 KC	High Frequency Stop	F, G
5	0.000068 Mfd.	Antenna Connector	600 KC	Signal Generator Signal	**L

*Before making this adjustment check the mechanical setting of the oscillator core "H". The slotted end of core should be 1¾" from the mounting end of the coil form. (This measurement is readily made by inserting a suitable plug in the mounting end of the coil form.) Core adjustments should be made with an insulated screwdriver and core studs should be cemented in place with gyptal or household cement after alignment.

**L is the pointer adjustment screw which is on the pointer connecting link (illustration #88, see tuner picture) and should be adjusted so the pointer reads 600 KC. (Between the "6" and the "0".)

With the radio installed and the car antenna plugged in adjust the antenna trimmer "G" for maximum volume with the radio tuned to a weak station near 1400 KC. (See sticker on case.)

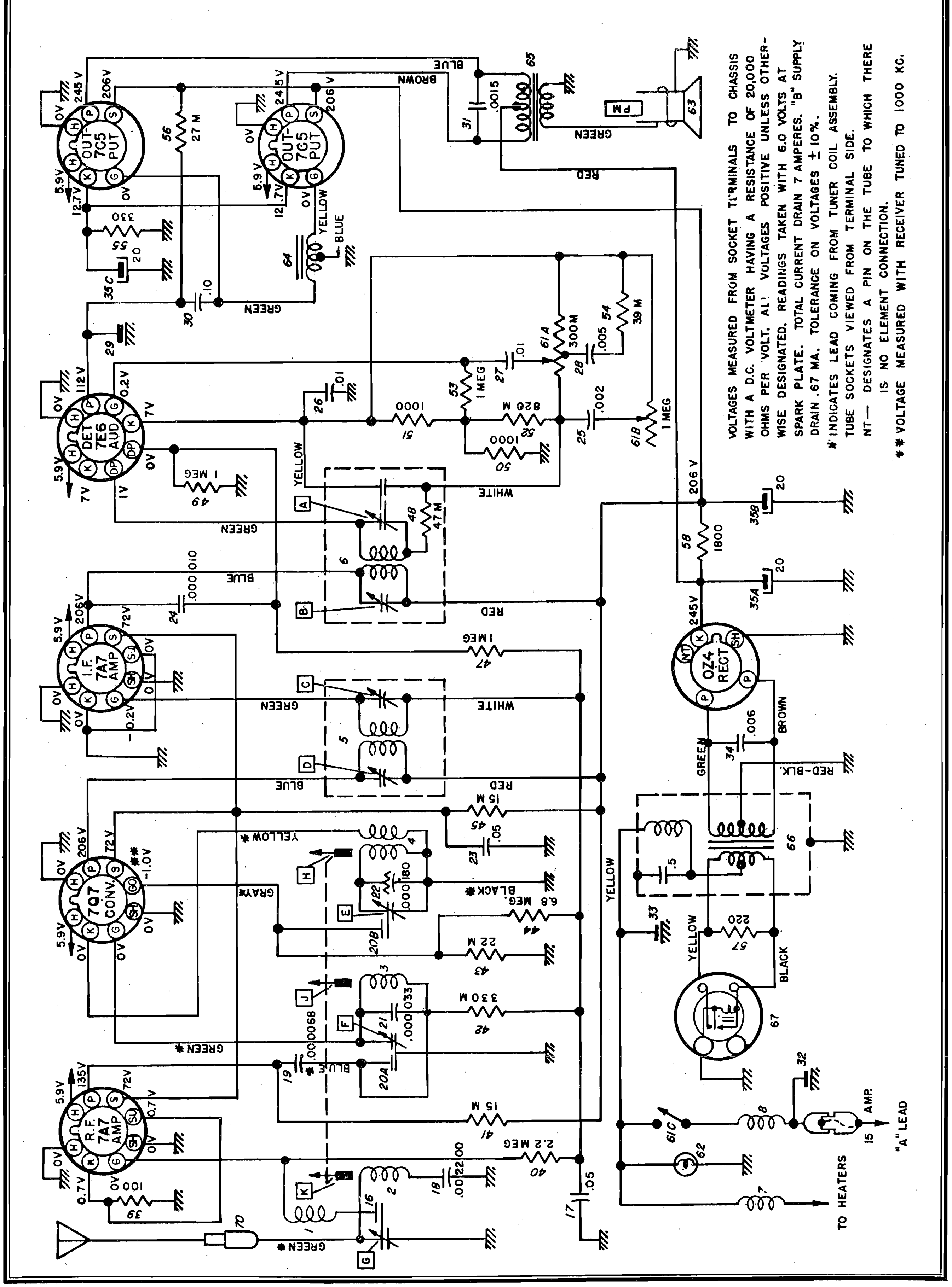
The tube socket voltages as measured at the factory and under the conditions shown on the schematic diagram The blank spaces are provided so the serviceman may fill in the actual readings as taken with his own equipment. A normal operating radio should be used for these measurements.



TUBE SOCKET VOLTAGE CHART

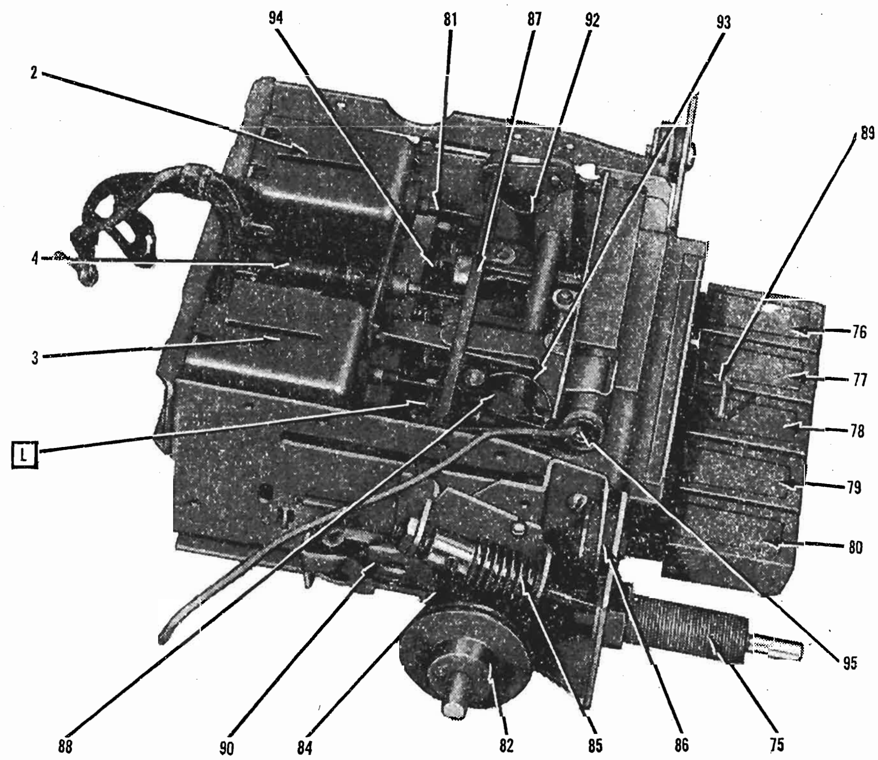
MODEL 982455, Oldsmobile

UNITED MOTORS SERVICE
DIV. OF GENERAL MOTORS CORP.

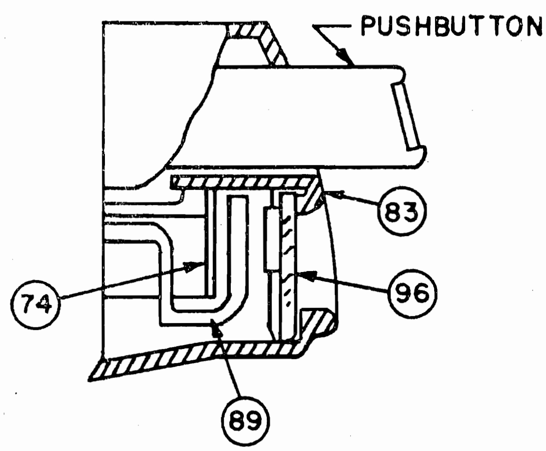


UNITED MOTORS SERVICE
DIV. OF GENERAL MOTORS CORP.

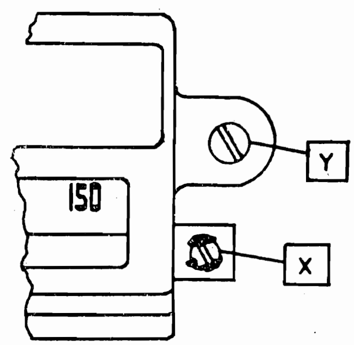
MODEL 982455, Oldsmobile



TUNER



ESCUTCHEON CROSS SECTION



ESCUTCHEON MOUNTING

SPECIAL INSTRUCTIONS

Unless special precautions are taken in removing the dial escutcheon, there is a possibility that the dial pointer tip will be broken. Therefore in removal of the escutcheon the following procedure is recommended.

1. Loosen, but do not remove, the two screws holding the pointer backplate ("X" in Escutcheon Mounting Drawing Above) and loosen the shellac so that the backplate is free to move.
2. Remove the escutcheon mounting screw "Y". (See Escutcheon Mounting).
3. Carefully lift off the escutcheon (DO NOT FORCE.) If the dial backplate is free to move slightly downward the escutcheon will clear the backplate and come off easily without breaking the pointer tip.

The same caution should be used when replacing the escutcheon.

MODEL 982455, Oldsmobile

UNITED MOTORS SERVICE
DIV. OF GENERAL MOTORS CORP.

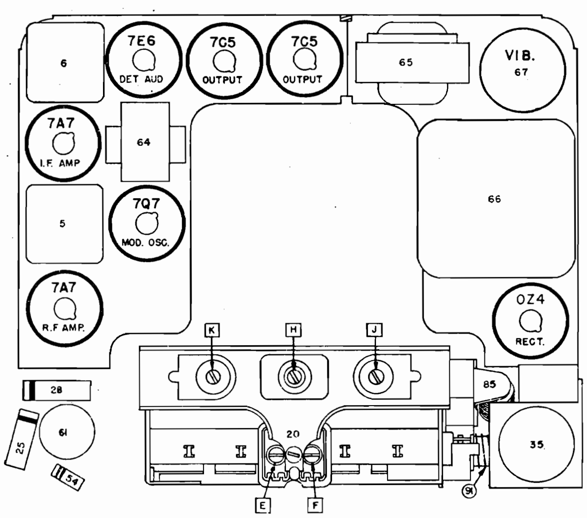
SERVICE PARTS LIST

Illus. No.	Production Part No.	Service Part No.	Description
			ELECTRICAL PARTS
			COILS
1	7240251	7240251	Antenna Choke
2	7257391	7257391	Antenna Coil
3	7257391	7257391	R. F. Coil
4	7257386	7257386	Oscillator Coil
5	7257832	7257832	1st I. F. Assembly
6	7256932	7256932	2nd I. F. Assembly (Contains Illus. #48)
7	7241708	7241708	Hash Choke
8	1217846	1217846	"A" Spark Noise Choke
			CONDENSERS
16	7242013	7242013	Antenna Trimmer and Bracket
17	7236842	E503	.05 Mfd. 200 V. Tubular
18	1217744	G222	.002200 Mfd. Ceramic
19	1212359	G680	.000068 Mfd. Molded
20	7242454	7242454	Dual Trimmer
20A			R. F. Section - Fixed Capacity .000300 Mfd.
20B			Osc. Section - Fixed Capacity .000100 Mfd.
21	1217735	G330	.000033 Mfd. Molded
22	7257424	7257424	.000180 Mfd. — Temperature Compensating
23	7230892	E503	.05 Mfd. 400 V. Tubular
24	1215189	G100	.000010 Mfd. Molded
25	7236756	E202	.002 Mfd. 600 V. Tubular
26	7237870	E103	.01 Mfd. 400 V. Tubular
27	7237870	E103	.01 Mfd. 400 V. Tubular
28	7232956	E502	.005 Mfd. 600 V. Tubular
29	1217848	1217848	Chassis Plate Condenser
30	7238788	E104	0.1 Mfd. 400 V. Tubular
31	7236134	7236134	.0015 Mfd. 800 V. Tubular
32	7241259	7241259	Spark Plate
33	1217848	1217848	Chassis Plate Condenser
34	7240906	H602	.006 Mfd. 1600 V. Buffer
35	7241198	7241198	Electrolytic Condenser
35A			20 Mfd. 400 V.
35B			20 Mfd. 400 V.
35C			20 Mfd. 25 V.
			RESISTORS
39	1213217	A101	100 Ohms ½ W. Insulated
40	1214563	A225	2.2 Megohm ½ W. Insulated
41	7237595	B153	15,000 Ohms 1 W. Insulated
42	1214557	A334	330,000 Ohms ½ W. Insulated
43	1214550	A223	22,000 Ohms ½ W. Insulated
44	1214565	A395	3.9 Megohm ½ W. Insulated
45	7233653	C153	15,000 Ohms 2 W. Insulated
47	1213282	A105	1 Megohm ½ W. Insulated
48	1214553	A473	47,000 Ohms ½ W. Insulated (Included in 2nd I. F. Assy.)
49	1213282	A105	1 Megohm ½ W. Insulated
50	1213235	A102	1,000 Ohms ½ W. Insulated
51	1213235	A102	1,000 Ohms ½ W. Insulated
52	1214561	A824	820,000 Ohms ½ W. Insulated
53	1213282	A105	1 Megohm ½ W. Insulated
54	1213480	A393	39,000 Ohms ½ W. Insulated
55	7233773	B331	330 Ohms 1 W. Insulated
56	1213342	B273	27,000 Ohms 1 W. Insulated
57	7237994	B221	220 Ohms 1 W. Insulated
58	1214573	C272 B562	Replace Illus. 58 with parallel: 2700 Ohms 2 W. Insulated; 5600 Ohms 1 W. Insulated
			TUBES
	1213562	5290	7A7
	1213981	5301	7Q7
	1213980	5298	7E6
	1213568	5295	7C5
	1211924	5003	0Z4

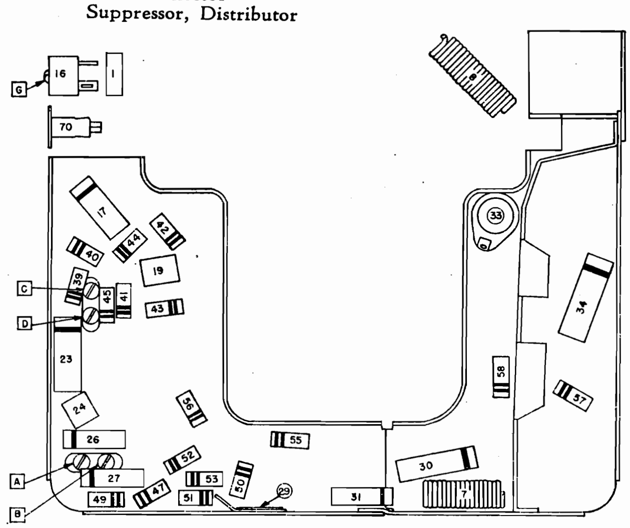
UNITED MOTORS SERVICE
DIV. OF GENERAL MOTORS CORP.

MODEL 982455, Oldsmobile

Illus. No.	Production Part No.	Service Part No.	Description
			MISCELLANEOUS ELECTRICAL PARTS
61	7257526	7257526	Control - Volume, Tone and Switch
61A			Volume Control
61B			Tone Control
61C			On - Off Switch
62	187189	44	Lamp, Dial (Mazda 44)
63	7257654	7257654	Speaker, 6 x 9 Elliptical, Permanent Magnet
64	7256432	7256432	Transformer, Input
65	7240453	7240453	Transformer, Output
66	7255881	7255881	Transformer Assy., Power
67	7239124	8542	Vibrator
			MECHANICAL PARTS
			CHASSIS
70	7256742	7256742	Connector, Antenna
	7241356	7241356	Socket, Loctal Tube
	7236279	7236279	Socket, Octal Tube
	7239125	7239125	Socket, Vibrator
			TUNER PARTS
74	7257535	7257535	Backplate, Pointer
75	1218277	1218277	Bushing and Drive Shaft Assy.
81	7257392	7257392	Core, Tuning
82	7256105	7256105	Disc. Clutch
83	7257514	7257514	Escutcheon Assy.
	7257534	7257534	Dial
84	7256495	7256495	Gear and Bushing Assy.
85	7256705	7256705	Gear and Bracket (Worm Gear)
86	7237172	7237172	Grommet, Tuner Mounting
87	7256179	7256179	Parallel Guide Bar Assy.
88	7256271	7256271	Pointer Adjuster Assy.
89	1218269	1218269	Pointer Tip Package
			Pointer Tip
			Screw, Nut, and Lockwasher
90	7255989	7255989	Spring, Cam Return
91	7256488	7256488	Spring, Clutch
92	7257415	7257415	Spring, Connecting Link, Guide Bar
93	7255992	7255992	Spring, Connecting Link, Pointer
94	7255984	7255984	Spring, Slide Return
95	1217820	1217820	Socket and Lead, Dial Light
	1218461	1218461	Pushbutton Insert — Chrome
			INSTALLATION PARTS
	7255608	6016	Condenser, "A" Lead
	1911095	6015	Condenser, Generator
	1910147	6015	Condenser, Ignition Coil
	1218333	1218333	Fuseholder
	120151	120151	Fuse, 15 Amp.
	414237	414237	Insulator, Distributor
	7256702	7256702	Knob
	7257427	7257427	Knob, Dummy
	7256692	7256692	Knob, Tone Control
	7240138	6013	Static Collector
	7257239	7257239	Suppressor, Distributor



PARTS LAYOUT — TUBE VIEW



PARTS LAYOUT — CHASSIS VIEW

MODEL 984296,
Pontiac

UNITED MOTORS SERVICE
DIV. OF GENERAL MOTORS CORP.

GENERAL

MOUNTING—All 1949 Pontiac Cars.

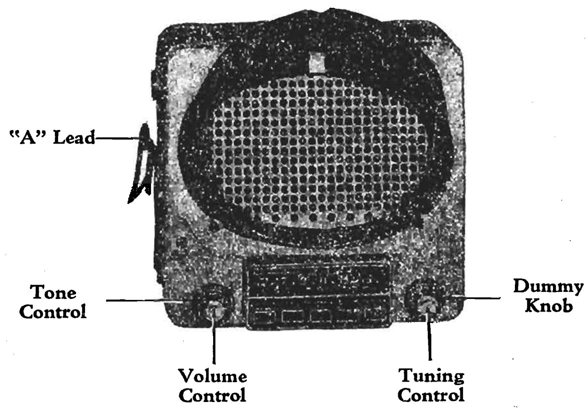
TUBES—Seven, Plus Rectifier.

SPEAKER—6″ x 9″ Elliptical, Permanent Magnet.

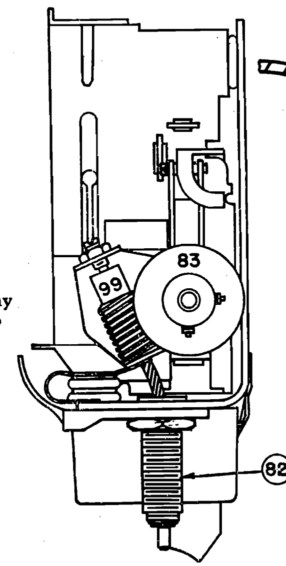
TUNING—Manual and 5 Push Button Mechanical.

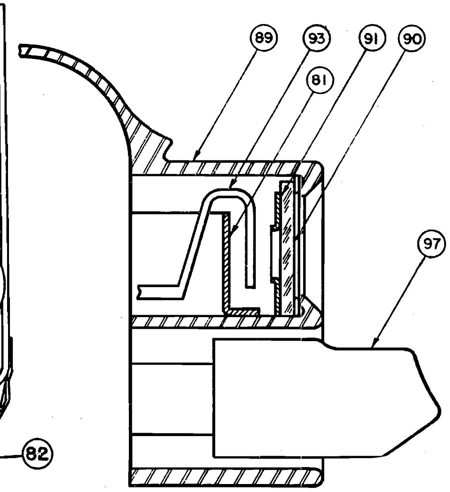
ANTENNA TRIMMER COMPENSATION — For Antennas Between 0.000060 - 0.000090 Mfd.

TUNING RANGE — 550-1600 KC.



MODEL 984296





ESCUTCHEON CROSS SECTION

PUSHBUTTON SET-UP

Pull button to the right and out. Tune in desired station manually. Push button in as far as it will go.

ALIGNMENT PROCEDURE

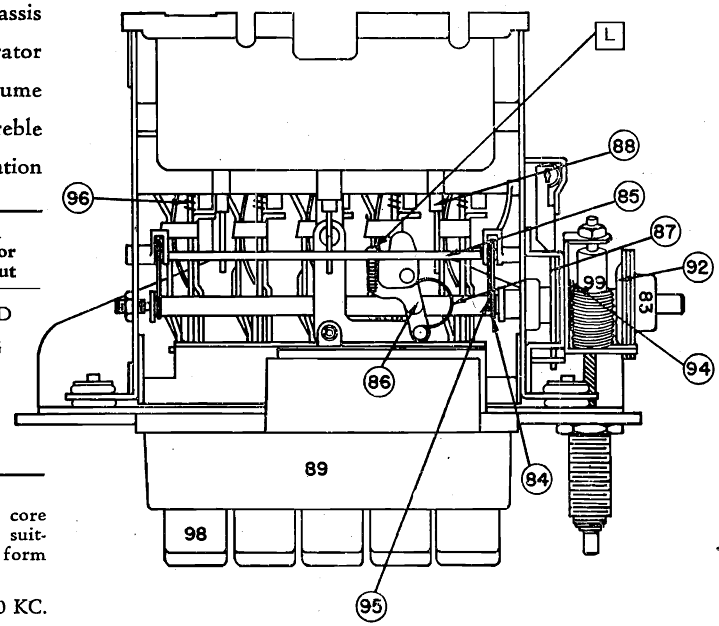
Output Meter Connections .... Across Voice Coil
Generator Ground .... Receiver Chassis
Dummy Antenna .... In Series With Generator
Volume Control Position .... Maximum Volume
Tone Control Position .... Treble
Generator Output .... Minimum for Readable Indication

Steps	Series Condenser or Dummy Antenna	Connect To	Signal Generator Frequency	Tune Receiver To	Adjust in Sequence for Max. Output
1	0.1 Mfd.	7Q7 Grid (Pin #6)	260 KC	High Freq. Stop	A, B, C, D
2	0.000068 Mfd.	Antenna Connector	1615 KC	High Freq. Stop	*E, F, G
3	0.000068 Mfd.	Antenna Connector	1000 KC	Signal Gen. Signal	J, K
4	0.000068 Mfd.	Antenna Connector	1615 KC	High Freq. Stop	F, G
5	0.000068 Mfd.	Antenna Connector	1000 KC	Signal Gen. Signal	L**

*Before making this adjustment check the mechanical setting of the oscillator core "H." The slotted end of the core should be 1 25/32″ from the mounting end of the coil form. (This measurement is readily made by inserting a suitable plug in the mounting end of the coil form). Core adjustments are made from the mounting end of the coil form with an insulated screwdriver, and core studs should be sealed with glyptal or household cement after alignment.

**"L" is the pointer adjustment screw on the pointer connecting link (see tuner drawing). Adjust so pointer reads 1000 KC.

With the radio installed and the car antenna plugged in adjust antenna trimmer "G" (see sticker on case) for maximum volume with the radio tuned to a weak station near 1400 KC.

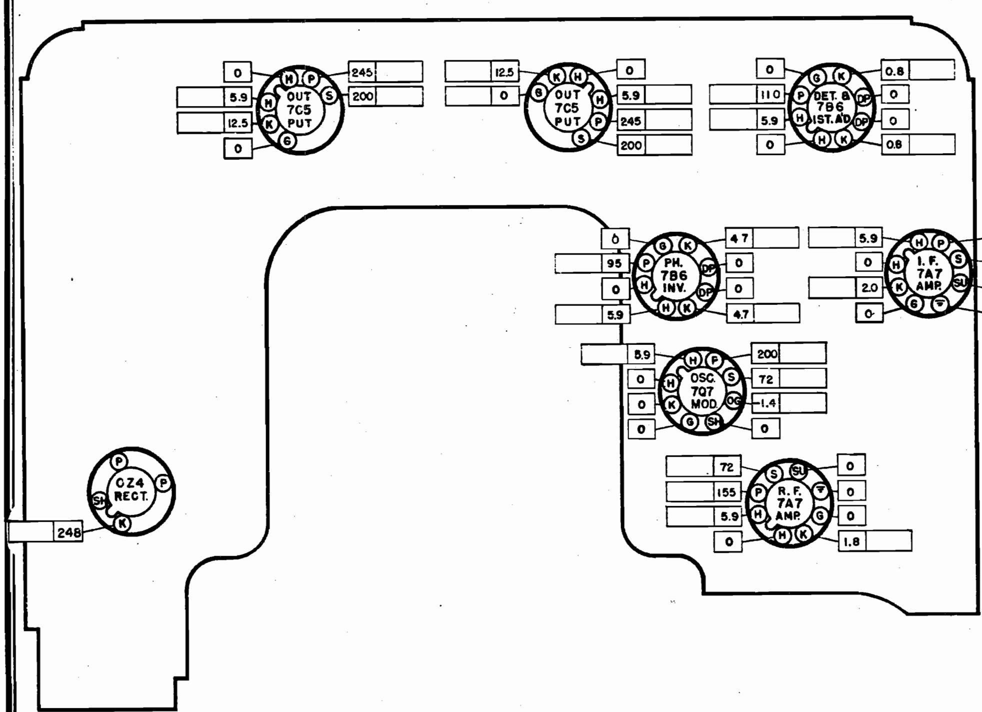


TUNER

UNITED MOTORS SERVICE
DIV. OF GENERAL MOTORS CORP.

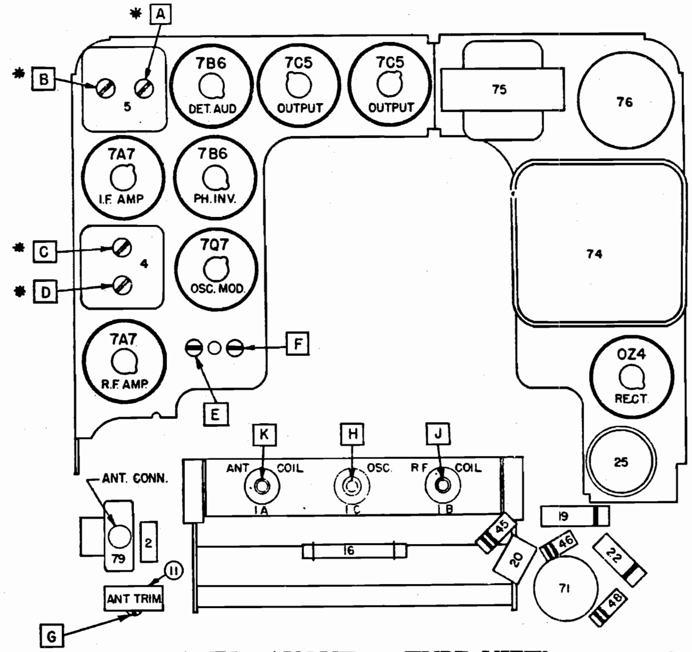
MODEL 984296,
Pontiac

TUBE SOCKET VOLTAGE CHART

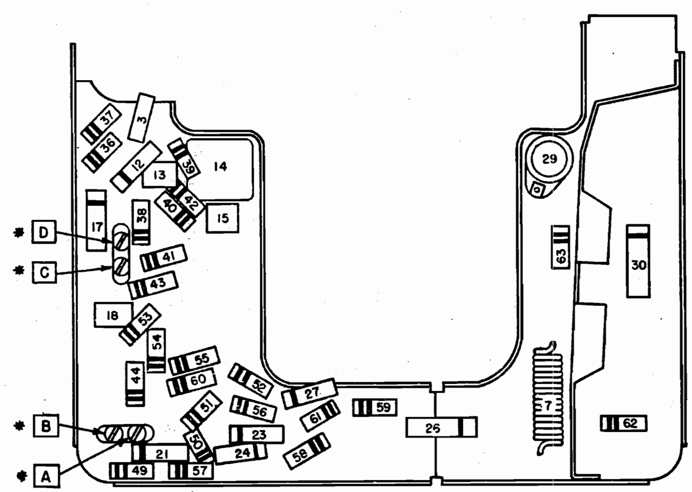


The tube socket voltages, as measured at the factory and under the conditions shown on the Schematic Diagram on Page 3, are shown above. The blank spaces are provided so the serviceman may fill in actual voltage readings as taken with his own equipment. A normal operating radio should be used for these measurements.

Voltmeter resistance is .... ohms per volt. Voltages taken with .... volts at the spark plate. Tolerance on voltages is $\pm$ 10%. All readings are taken from socket terminals to chassis.



PARTS LAYOUT — TUBE VIEW

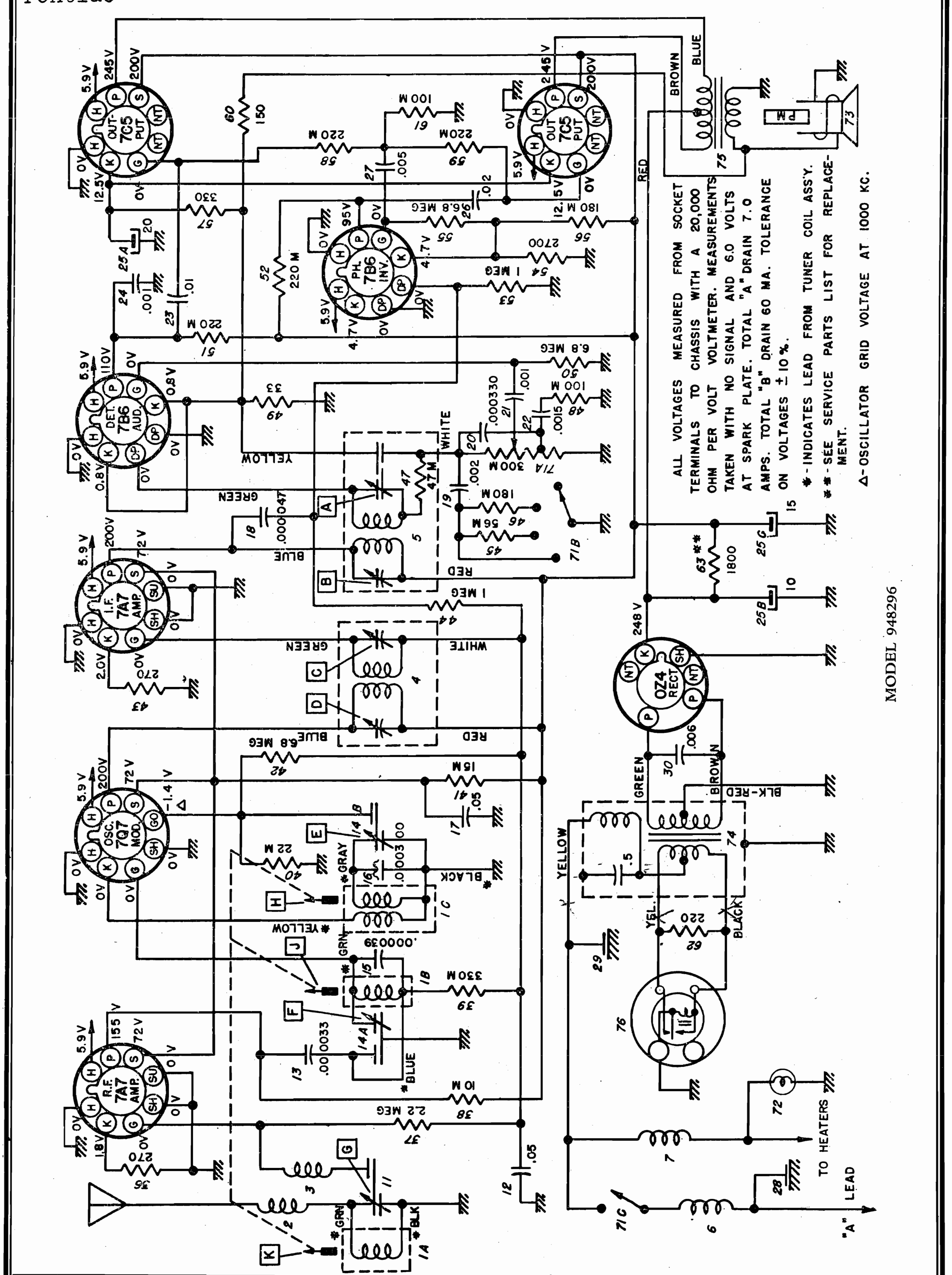


PARTS LAYOUT — CHASSIS VIEW

*Radios with serial numbers starting with "6" have these trimmers on the PARTS side of chassis. Radios with serial numbers starting with "B" have these trimmers on TUBE side of chassis.

MODEL 984296,
Pontiac

UNITED MOTORS SERVICE
DIV. OF GENERAL MOTORS CORP.



UNITED MOTORS SERVICE
DIV. OF GENERAL MOTORS CORP.

MODEL 984296, Pontiac

SERVICE PARTS LIST

ELECTRICAL PARTS

Coils

Illus. No.	Production Part No.	Service Part No.	Description
1	7257956	7257956	Coil Assy. - Tuning
1A			Antenna
1B			R. F.
1C			Oscillator
2	7255738	7255738	Antenna Series Choke
3	7240251	7240251	Antenna Spark Choke
4	7257832	7257832	1st I. F.
5	7256932	7256932	2nd I. F.
6	7241701	7241701	"A" Spark Choke
7	7241708	7241708	Hash Choke

Condensers

Illus. No.	Production Part No.	Service Part No.	Description
11	7257959	7257959	Antenna Trimmer
12	7236842	E 503	0.05 Mfd. 200 V. Tubular
13	1218348	G 330	0.000033 Mfd. Ceramic
14	7242454	7242454	Dual Trimmer
14A			R. F. Section
14B			Oscillator Section
15	7258221	G 390	0.000039 Mfd. Ceramic
16	7258162	7258162	0.000300 Mfd. Compensating
17	7258125	E 503	0.05 Mfd. 400 V. Tubular
18	7233313	G 470	0.000047 Mfd. Molded
19	7237954	E 202	.002 Mfd. 600 V. Tubular
20	7232957	G 331	0.000330 Mfd. Molded
21	7239188	E 102	0.001 Mfd. 600 V. Tubular
22	1218499	1218499	0.0015 Mfd. 200 V. Tubular
23	1209309	E 103	0.01 Mfd. 400 V. Tubular
24	7239188	E 102	.001 Mfd. 600 V. Tubular
25	7238830	M 908	Electrolytic
25A			20 Mfd. 25 V.
25B			10 Mfd. 400 V.
25C			15 Mfd. 400 V.
26	7258124	E 203	0.02 Mfd. 400 V. Tubular
27	7230767	E 502	0.005 Mfd. 600 V. Tubular
28	7241259	7241259	Spark Plate
29	1217848	1217848	Chassis Plate Condenser
30	7240906	H 602	0.006 Mfd. 1600 V. Buffer

Resistors

Illus. No.	Production Part No.	Service Part No.	Description
36	1214542	A 271	270 Ohms ½ W. Insulated
37	1214563	A 225	2.2 Megohms ½ W. Insulated
38	1211085	B 103	10,000 Ohms 1 W. Insulated
39	1214557	A 334	330,000 Ohms ½ W. Insulated
40	1214550	A 223	22,000 Ohms ½ W. Insulated
41	7233653	C 153	15,000 Ohms 2 W. Insulated
42	1215563	A 685	6.8 Megohms ½ W. Insulated
43	1214542	A 271	270 Ohms ½ W. Insulated
44	1213282	A 105	1 Megohm ½ W. Insulated
45	1213267	A 563	56,000 Ohms ½ W. Insulated
46	1215560	A 184	180,000 Ohms ½ W. Insulated
47	1214553	A 473	47,000 Ohms ½ W. Insulated (in 2nd I. F. Can)
48	1213270	A 104	100,000 Ohms ½ W. Insulated
49	1214538	A 330	33 Ohms ½ W. Insulated
50	1215563	A 685	6.8 Megohms ½ W. Insulated
51	1214555	A 224	220,000 Ohms ½ W. Insulated
52	1214555	A 224	220,000 Ohms ½ W. Insulated
53	1213282	A 105	1 Megohm ½ W. Insulated
54	1213240	A 272	2700 Ohms ½ W. Insulated
55	1215563	A 685	6.8 Megohms ½ W. Insulated
56	1215560	A 184	180,000 Ohms ½ W. Insulated
57	7233773	B 331	330 Ohms 1 W. Insulated
58	1214555	A 224	220,000 Ohms ½ W. Insulated
59	1214555	A 224	220,000 Ohms ½ W. Insulated
60	1213220	A 151	150 Ohms ½ W. Insulated
61	1213270	A 104	100,000 Ohms ½ W. Insulated
62	7237994	B 221	220 Ohms 1 W. Insulated
63	1214573	C 272 B 562	1800 Ohms — Replace with 2700 Ohms 2 W. and 5600 Ohm 1 W. in parallel

MODEL 984296,
Pontiac

UNITED MOTORS SERVICE
DIV. OF GENERAL MOTORS CORP.

SERVICE PARTS LIST

Illus. No.	Production Part No.	Service Part No.	Description
		Tubes	
	1213565	5292	7B6
	1213568	5295	7C5
	1213981	5301	7Q7
	1213562	5290	7A7
	1211924	5003	OZ4
		Miscellaneous Electrical	
71	7257708	7257708	Control - Volume, Tone and Switch
71A			Volume Control
71B			Tone Control
71C			Switch
72	187189	44	Lamp - Dial Light
73	7256355	7256355	Speaker - 6 x 9 Elliptical, Permanent Magnet
74	7255881	7255881	Transformer - Power
75	7240453	7240453	Transformer - Output
76	7239124	8542	Vibrator - Nonsynchronous
		MECHANICAL PARTS	
		Chassis	
79	7257746	7257746	Socket - Antenna
	7241356	7241356	Socket - Loctal Tube
	7236279	7236279	Socket - Octal Tube
	7239125	7239125	Socket - Vibrator
		Tuner	
81	7257722	7257722	Backplate - Pointer
82	7258494	7258494	Bushing and Manual Drive Shaft
83	7258072	7258072	Clutch Disc - Driven
84	7258203	7258203	Connecting Link - Core Bar
85	7258210	7258210	Core Guide Bar - Parallel
86	7256271	7256271	Pointer Connecting Link
87	7255992	7255992	Spring - Pointer Connecting Link
88	7258468	7258468	Core - Powdered Iron
89	7257717	7257717	Escutcheon Assy.
90	7257721	7257721	Dial
	7257719	7257719	Backplate - Dial
	7257718	7257718	Spring, Dial Retainer
91	7256495	7256495	Gear and Bushing - Clutch
92	7257742	7257742	Pointer Assy.
	1219120	1219120	Pointer Tip Pkg.
93	7256488	7256488	Spring Clutch
94	7257415	7257415	Spring - Core Bar Connecting Link
95	7255984	7255984	Spring - Slide Return
96	1218884	1218884	Socket - Dial Light
97	1218885	1218885	Push Button and Tuner Slide
98	7257711	7257711	Worm Gear and Bracket
		INSTALLATION PARTS	
	1911948	6015	Condenser, "A" Lead
	1911095	6015	Condenser, Generator
	147685	147685	Fuse, 14 Amps
	511834	511834	Knob, Control
	511831	511831	Knob, Dummy
	511833	511833	Knob, Tone Control
	511836	511836	Trim Plate, Radio

UNITED MOTORS SERVICE
DIV. OF GENERAL MOTORS CORP.

MODEL 984249, Pontiac

GENERAL

MOUNTING—All 1948 Pontiac Cars.

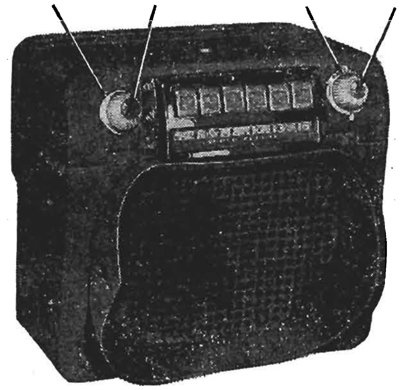
TUBES—Seven, Plus Rectifier.

SPEAKER—6″ x 9″ Elliptical, Permanent Magnet.

TUNING—Manual and 5 P. B. Solenoid Operated.

ANTENNA TRIMMER CONPENSATION — For Antennas Between 0.000060 - 0.000095 Mfd.

TUNING RANGE — 550-1600 KC.



MODEL 984249

PUSHBUTTON SET-UP

Pull button off. Push set up knob all the way in and release. Turn set up knob until desired station is tuned in. Replace button.

ALIGNMENT PROCEDURE

Output Meter Connections	Across Voice Coil
Generator Ground	Receiver Chassis
Dummy Antenna	In Series With Generator
Volume Control Position	Maximum Volume
Tone Control Position	Treble
Generator Output	Minimum For Readable Indication

Steps	Dummy Antenna or Series Condenser	Connect To	Signal Generator Frequency	Tune Receiver To	Adjust In Order For Max. Output
1	0.1 Mfd.	6SA7 Grid (Pin #8)	260 KC	High Frequency Stop	A, B, C, D
2	0.000068 Mfd.	Antenna Connector	1615 KC	High Frequency Stop	*F, G
3	0.000068 Mfd.	Antenna Connector	1200 KC	Signal Generator Sig.	J, K
4	0.000068 Mfd.	Antenna Connector	1615 KC	High Frequency Stop	F, G

*Before making this adjustment check setting of oscillator core "H." This should be adjusted so that the end opposite the core stud is $1\frac{11}{32}$″ from the terminal board end of the coil form. (This measurement is readily made by inserting a suitable plug in the coil form.)

With radio installed and the antenna plugged in adjust trimmer "G" for maximum volume with the radio tuned to a weak station near 1400 KC.

MODEL 984249, Pontiac

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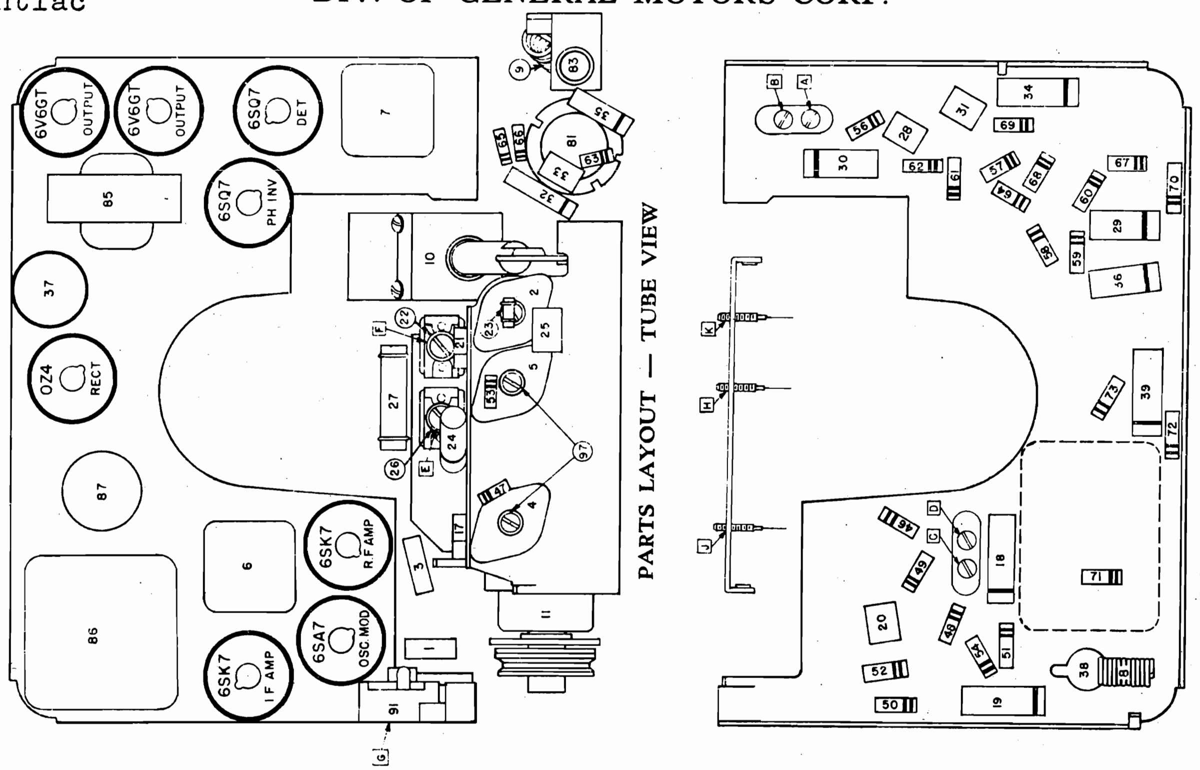
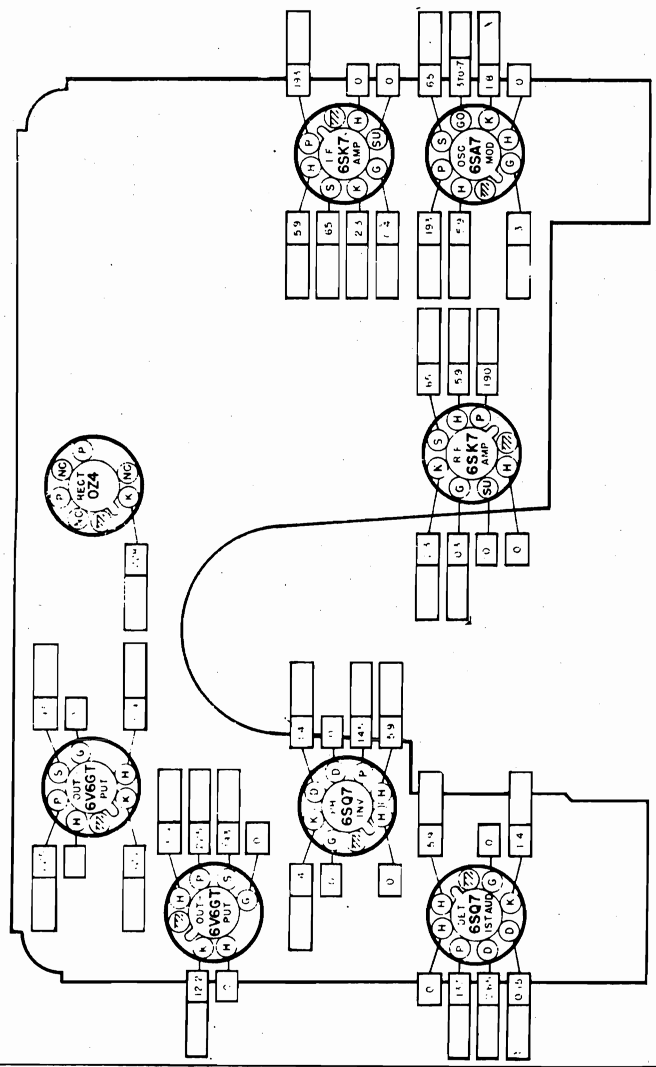


PARTS LAYOUT — TUBE VIEW

PARTS LAYOUT — CHASSIS VIEW

TUBE SOCKET VOLTAGE CHART



The tube socket voltages, as measured at the factory and under the conditions shown on the Schematic Diagram on Page 3, are shown above. The blank spaces are provided so the serviceman may fill in actual voltage readings as taken with his own equipment. A normal operating radio should be used for these measurements.

Voltmeter resistance is ________ ohms per volt. Voltages taken with ________ volts at the spark plate. Tolerance on voltages is ± 10%. All readings are taken from socket terminals to chassis.

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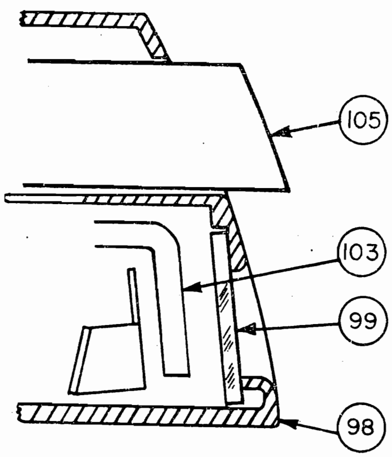
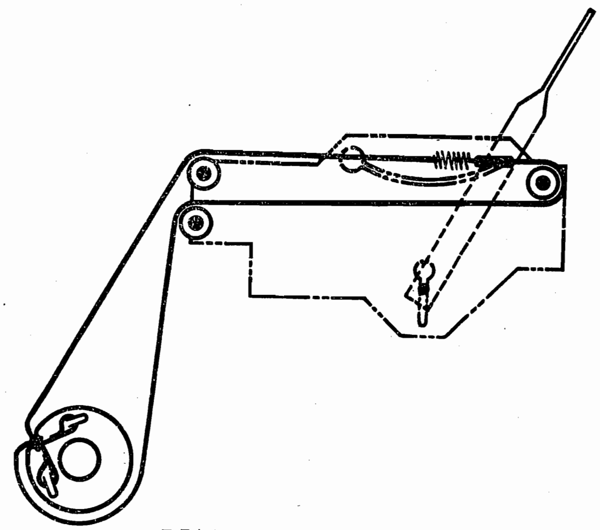
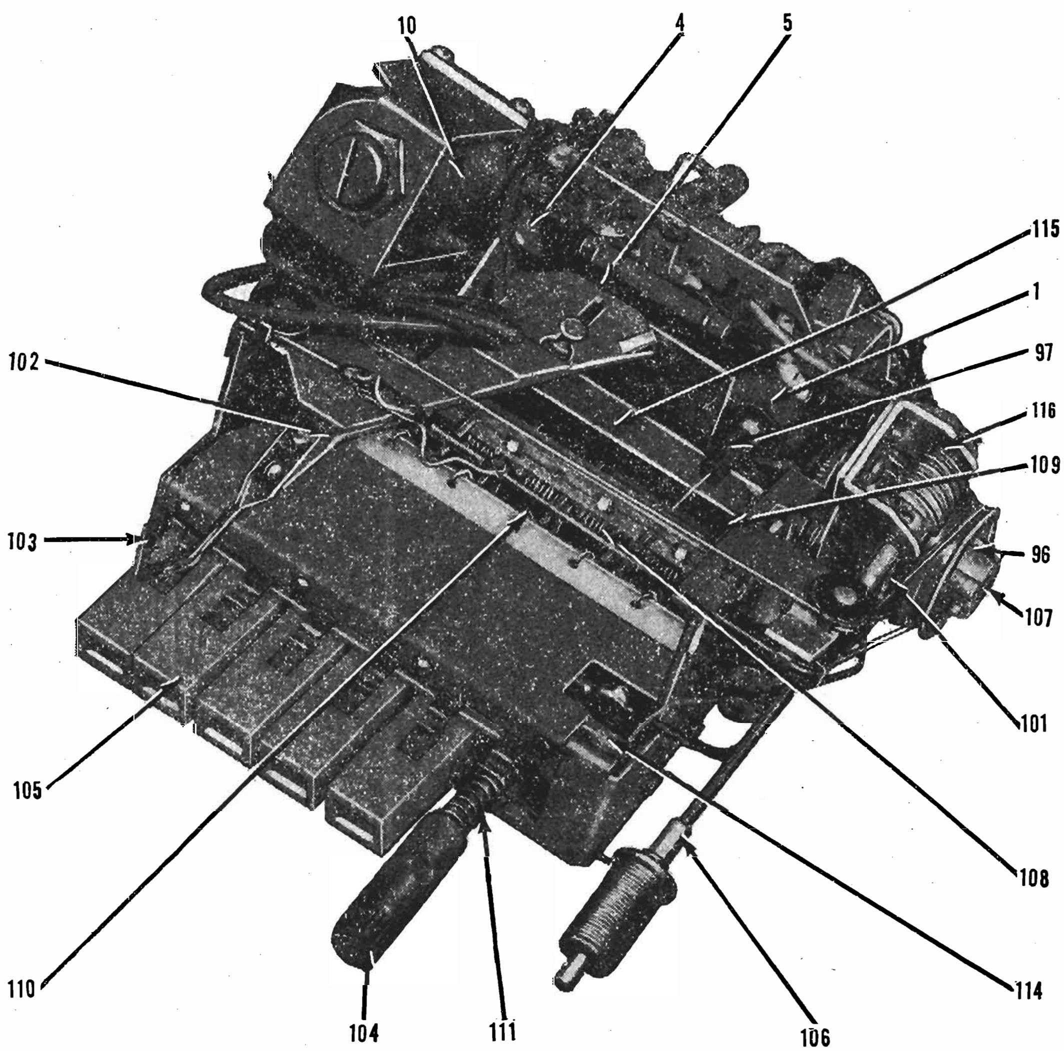
MODEL 984249, Pontiac



ESCUTCHEON CROSS SECTION



DIAL CORD DRAWING



TUNER

MODEL 984249, Pontiac

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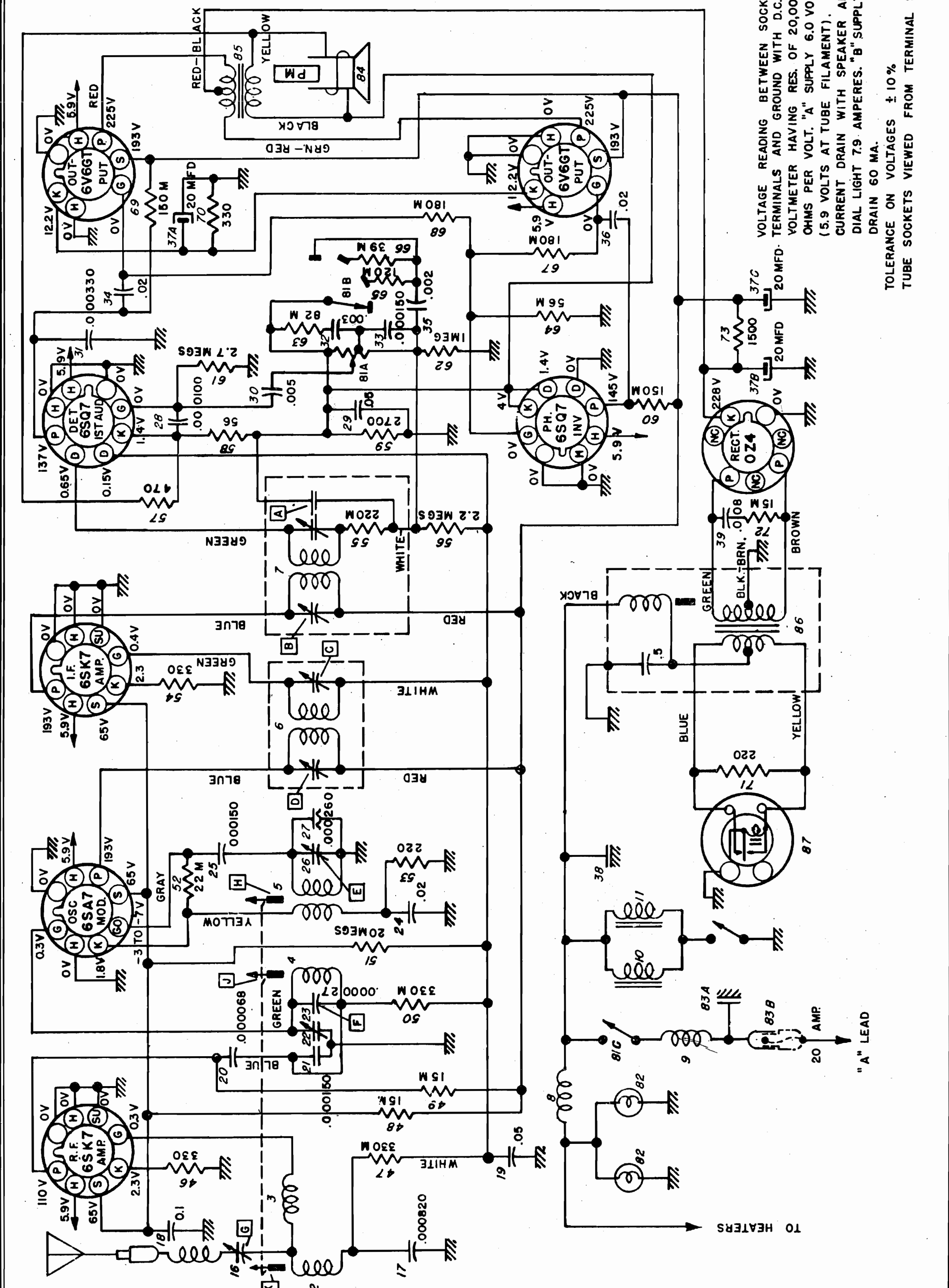

UNITED MOTORS SERVICE
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SERVICE PARTS LIST

MODEL 984249, Pontiac

Illus. No.	Production Part No.	Service Part No.	Description
			ELECTRICAL PARTS
			COILS
1	7255738	7255738	Antenna Choke
2	7257603	7257603	Antenna
3	7257558	7257558	R. F. Choke
4	7257603	7257603	R. F.
5	7257605	7257605	Oscillator
6	7257988	7257988	1st I. F.
7	7257594	7257594	2nd I. F.
8	1217846	1217846	Hash Choke
9	7257096	7257096	"A" Choke
10	1216431	1216431	Solenoid
11	1214463	1214463	Clutch
			CONDENSERS
16	1215074	1215074	Antenna Trimmer (Included in Antenna Connector Illus. #91)
17	1217742	G821	.000820 Mfd. Molded
18	7238788	E104	.1 Mfd. 400 V. Tubular
19	7236842	E503	.05 Mfd. 200 V. Tubular
20	1212359	G680	.000068 Mfd. Molded
21	7230893	G151	.000150 Mfd. Molded
22	1214456	1214456	Trimmer — R. F.
23	7256259	G270	.000027 Mfd. Ceramic
24	7236107	E203	.02 Mfd. 200 V. Tubular
25	7230893	G151	.000150 Mfd. Molded
26	1214456	1214456	Trimmer — Oscillator
27	7257567	7257567	.000260 Mfd. Compensating
28	1210275	G101	.000100 Mfd. Molded
29	7236842	E503	.05 Mfd. 200 V. Tubular
30	7230767	E502	.005 Mfd. 600 V. Tubular
31	7232957	G331	.000330 Mfd. Molded
32	7232954	E302	.003 Mfd. 600 V. Tubular
33	7230893	G151	.000150 Mfd. Molded
34	7231542	E203	.02 Mfd. 400 V. Tubular
35	7237954	E202	.002 Mfd. 600 V. Tubular
36	7231542	E203	.02 Mfd. 400 V. Tubular
37	7240724	M908	3 Section Electrolytic
37A			20 Mfd. 25 V.
37B			20 Mfd. 400 V.
37C			20 Mfd. 400 V.
38	1217848	1217848	Chassis Plate Condenser
39	1215191	H802	.008 Mfd. 1600 V. Tubular
			RESISTORS
46	1213224	A331	330 Ohms ½ W. Insulated
47	1214557	A334	330,000 Ohms ½ W. Insulated
48	7233653	C153	15,000 Ohms 2 W. Insulated
49	7237595	B153	15,000 Ohms 1 W. Insulated
50	1214557	A334	330,000 Ohms ½ W. Insulated } Replace With 2 A106 Resistors In Series
51	7242581	7242581	20 Megohms ½ W. Insulated — } Replace With 2 A106 Resistors In Series
52	1214550	A223	22,000 Ohms ½ W. Insulated } Replace With 2 A106 Resistors In Series
53	7237835	A221	220 Ohms ½ W. Insulated
54	1213224	A331	330 Ohms ½ W. Insulated
55	1214555	A224	220,000 Ohms ½ W. Insulated
56	1214563	A225	2.2 Megohms ½ W. Insulated
57	1213486	A471	470 Ohms ½ W. Insulated
58	1214540	A560	56 Ohms ½ W. Insulated
59	1213240	A272	2700 Ohms ½ W. Insulated
60	1213272	A154	150,000 Ohms ½ W. Insulated
61	7241614	A275	2.7 Megohms ½ W. Insulated
62	1213282	A105	1 Megohm ½ W. Insulated
63	1214554	A823	82,000 Ohms ½ W. Insulated
64	1213267	A563	56,000 Ohms ½ W. Insulated
65	1213271	A124	120,000 Ohms ½ W. Insulated
66	1213480	A393	39,000 Ohms ½ W. Insulated
67	1215560	A184	180,000 Ohms ½ W. Insulated
68	1215560	A184	180,000 Ohms ½ W. Insulated
69	1213272	A154	150,000 Ohms ½ W. Insulated
70	7233773	B331	330 Ohms 1 W. Insulated
71	7237994	B221	220 Ohms 1 W. Insulated
72	7237595	B153	15,000 Ohms ½ W. Insulated
73	1216125	C152	1500 Ohms 2 W. Insulated

MODEL 984249,
Pontiac

UNITED MOTORS SERVICE
DIV. OF GENERAL MOTORS CORP.

SERVICE PARTS LIST

TUBE COMPLEMENT

Illus. No.	Production Part No.	Service Part No.	Description
	7237251	5229	6SK7
	7237752	5222	6SA7
	7237753	5131	6SQ7
	1213793	5241	6V6GT
	1211924	5003	0Z4

MISCELLANEOUS ELECTRICAL PARTS

Illus. No.	Production Part No.	Service Part No.	Description
81	7257655	7257655	Control — Volume, Tone, and Switch
81A			Volume Control, 1 Meg. tapped at 250,000
81B			Tone Control
81C			Switch
82	115273	51	Lamp — Dial (Mazda #51)
83	7240797	7240797	Spark Plate, "A" Choke, and "A" Connector
83A			Spark Plate
9			"A" Choke
83B			"A" Connector
84	1216432	1216432	Speaker — 6″ x 9″ Elliptical, Permanent Magnet
85	7257220	7257220	Transformer — Output
86	1215807	1215807	Transformer — Power
87	7242449	8542	Vibrator

MECHANICAL PARTS

CHASSIS

Illus. No.	Production Part No.	Service Part No.	Description
	7239125	7239125	Socket — Vibrator
	7236279	7236279	Socket — Octal Tube
91	1214494	1214494	Socket — Antenna (Includes Illus. #16 Trimmer)
92	7257836	7257836	Socket — Dial Light

TUNER

Illus. No.	Production Part No.	Service Part No.	Description
96	7256995	7239125	Clutch Jaw — Driven
97	1215810	1215810	Core — Iron
98	7257627	7257627	Escutcheon Assy.
99	7257561	7257561	Dial
101	1216092	1216092	Gear and Disc
102	7256996	7256996	Pointer Bracket and Cord
		1212233	Cord (48 Inches)
		7238860	Spring
103	1215826	1215826	Pointer Tip
104	1215814	1215814	Pushbutton Setup Knob
105	1215813	1215813	Pushbutton
106	7256962	7256962	Shaft — Manual Drive (Includes Bushing)
107	1215828	1215828	Shaft — Clutch and Drive Gear
108	1215827	1215827	Slide Assy., Pushbutton Tuning
109	7257171	7257171	Spring — Connecting Link
110	1216441	1216441	Spring — Slide Return
111	1216118	1216118	Spring — Setup Knob
	7257598	7257598	Spring — Treadle Bar Lock
	1214466	1214466	Spring — Clutch
114	1214460	1214460	Stop Rail and Switch Contact
115	7256967	7256967	Treadle Bar and Gear
116	7256983	7256983	Worm Gear and Bracket

INSTALLATION PARTS

Illus. No.	Production Part No.	Service Part No.	Description
	7257464	7257464	"A" Lead and Fuse Connector
	1885292	6015	Condenser — "A" Lead
	1911095	6015	Condenser — Generator
	106653	106653	Fuse — 20 Amperes
	507505	507505	Knob — Control
	507510	507510	Knob — Dummy
	507511	507511	Knob — Tone Control
	7257478	7257478	Station Tabs
	508583	508583	Trim Plate
	*1207821	6000	Suppressor — Distributor
	*1853686	6008	Suppressor Adaptor
	*509129	509129	Suppressor Insulator

*Cars having a distributor with the center tower of the distributor cap 1⅜″ high instead of ⅞″ high have a built in distributor suppressor and should not have an external suppressor installed. These distributors are marked "Radio" on the lower flange.

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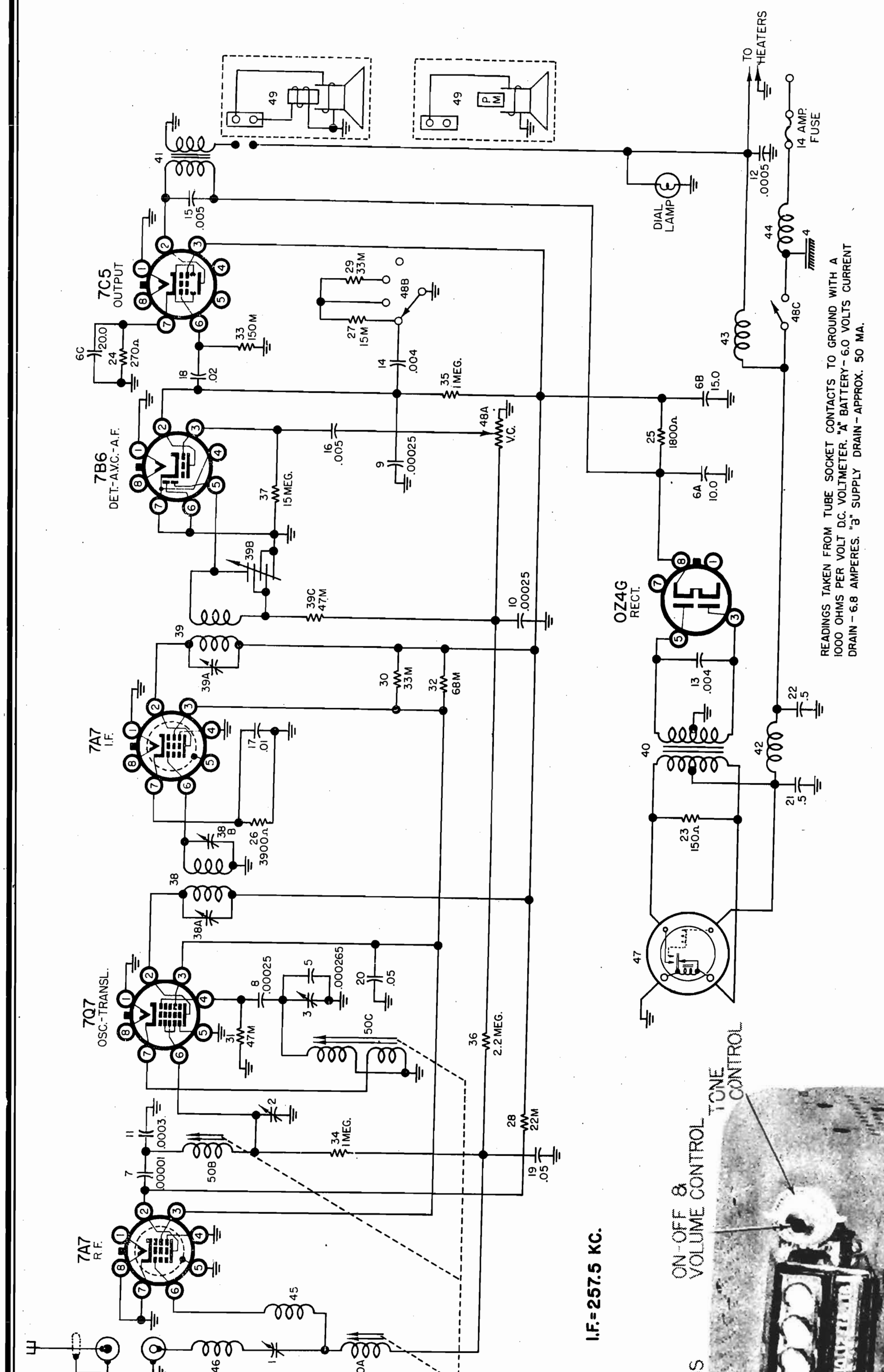
MODEL 984273,
Pontiac

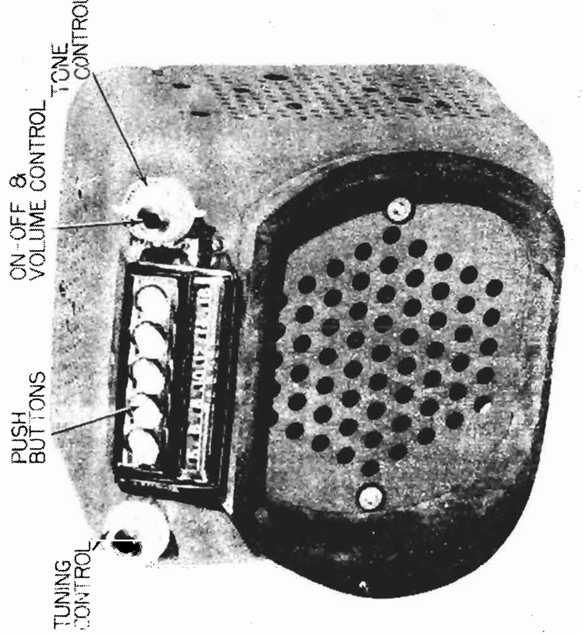


SPEAKER — 6" Electro-Dynamic

TUNING — Manual and 5 P. B.

TUNING RANGE — 535 KC — 1610 KC

CAR ANTENNA CAPACITY — 70 mmfd.



MODEL 984273,
Pontiac

UNITED MOTORS SERVICE
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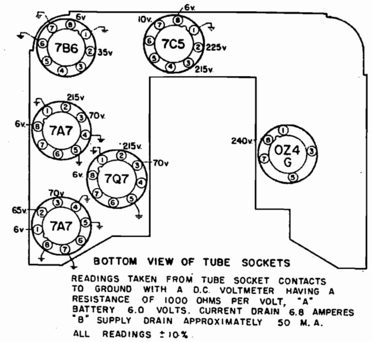
ALIGNMENT PROCEDURE

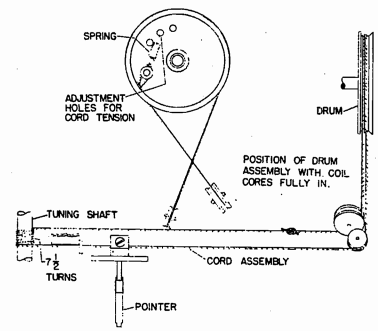
Volume Control maximum.
Tone Control on high position.
Signal Generator Output minimum for satisfactory output indication.

Series Capacitor Or Dummy Antenna	Connect To	Signal Generator Frequency	Adjust Screws In Order
0.1 mfd.	Terminal X (See Parts Layout)	257.5 KC	A, B, C, D
.000070 mfd.	Antenna Terminal	1610 KC	E, F, G

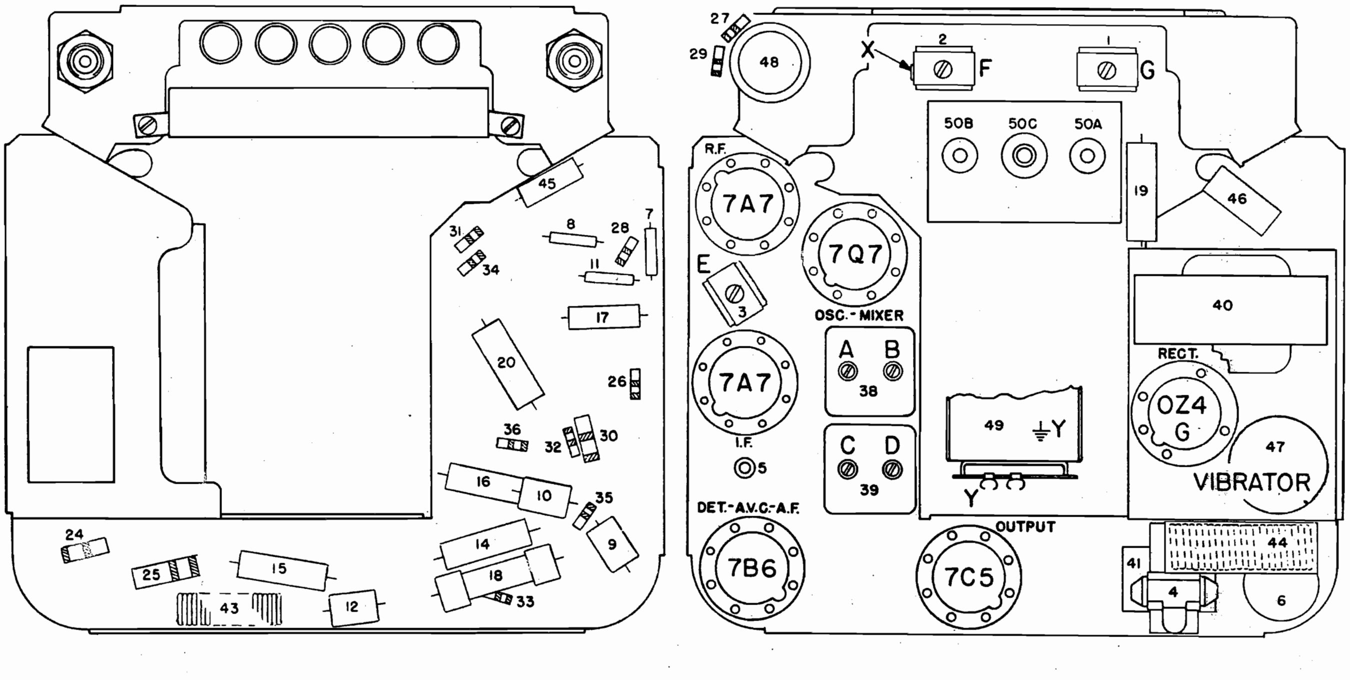
Low frequency alignment not required.
Adjust Trimmer G to match car antenna (1400 KC) when radio is installed.



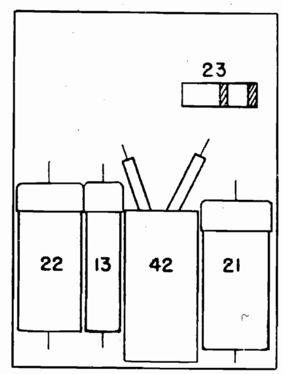
SOCKET VOLTAGES



DIAL CORD HOOKUP



PARTS LAYOUT



POWER PACK LAYOUT

UNITED MOTORS SERVICE
DIV. OF GENERAL MOTORS CORP.

MODEL 984273, Pontiac

PUSH BUTTON SET-UP

Turn counter clockwise - tune in manually - depress loosened button - turn button clockwise to tighten.

Illus. No.	Service* Part No.	Production Part No.	Description
			CAPACITORS
1		1216671	Antenna Trimmer
2		1216672	R. F. Trimmer
3		1215925	Oscillator Trimmer
4		1212278	Capacitor - Spark - 225 Mmfd.
5		1216540	Capacitor - Compensating - 265 Mmfd.
6		1213868	Electrolytic
6A			10 Mfd. 350 Volt
6B			15 Mfd. 300 Volt
6C			20 Mfd. 25 Volt
7	G100	7234242	Capacitor - Mica Moulded - 10 Mmfd.
8	G221	1209055	Capacitor - Mica Moulded - 250 Mmfd.
9	G221	1209055	Capacitor - Mica Moulded - 250 Mmfd.
10	G221	1209055	Capacitor - Mica Moulded - 250 Mmfd.
11	G271	1215553	Capacitor - Mica Moulded - 300 Mmfd.
12	G471	7238879	Capacitor - Mica Moulded - 500 Mmfd.
13	H402	1217875	Capacitor - .004 Mfd. 1500 Volt
14	E402	1212098	Capacitor - .004 Mfd. 600 Volt
15	E502	7230912	Capacitor - .005 Mfd. 600 Volt
16	E502	7230912	Capacitor - .005 Mfd. 600 Volt
17	E103	7233608	Capacitor - .01 Mfd. 600 Volt
18	E203	1207902	Capacitor - .02 Mfd. 600 Volt
19	E503	7230592	Capacitor - .05 Mfd. 600 Volt
20	E503	7230592	Capacitor - .05 Mfd. 600 Volt
21		7240248	Capacitor - .5 Mfd. 100 Volt
22		7240248	Capacitor - .5 Mfd. 100 Volt
			RESISTORS
23	B151	1211005	Resistor - 150 Ohm - 1 Watt
24	B271	1213846	Resistor - 270 Ohm - 1 Watt
25	C182	1214573	Resistor - 1800 Ohm - 2 Watt
26	A392	1214546	Resistor - 3900 Ohm - 1/2 Watt
27	A153	1213257	Resistor - 15,000 Ohm - 1/2 Watt
28	A223	1214550	Resistor - 22,000 Ohm - 1/2 Watt
29	A333	1213845	Resistor - 33,000 Ohm - 1/2 Watt
30	A333	7242447	Resistor - 33,000 Ohm - 1 Watt
31	A473	1214553	Resistor - 47,000 Ohm - 1/2 Watt
32	A683	1213844	Resistor - 68,000 Ohm - 1/2 Watt
33	A154	1213272	Resistor - 150,000 Ohm - 1/2 Watt
34	A105	1213282	Resistor - 1 Megohm - 1/2 Watt
35	A105	1213282	Resistor - 1 Megohm - 1/2 Watt
36	A225	1214563	Resistor - 2.2 Megohm - 1/2 Watt
37	A156	1213289	Resistor - 15 Megohm - 1/2 Watt
			MISCELLANEOUS ELECTRICAL PARTS
38		1215916	1st I. F. Transformer Assembly
38A			Primary Trimmer
38B			Secondary Trimmer
39		1215917	2nd I. F. Transformer Assembly
39A			Primary Trimmer
39B			Secondary Trimmer
39C			Resistor - 47,000 Ohm - 1/2 Watt
40		1214391	Transformer - Power
41		1215918	Transformer - Output
42		1213663	Choke - Hash
43		1214385	Choke - Filament
44		1217193	Choke - Spark
45		1214382	Choke - Antenna Spark
46		1218138	Coil - Antenna Choke
47		8638	Vibrator
48		1216541	Controls
48A			Volume Control
48B			Tone Control
48C			On-Off Switch
49		1214389	Speaker - 6" Electro-Dynamic
49		1217417	Speaker - 6" Permanent-Dynamic (Alternate)
			TUNER UNIT AND PARTS
50		1218217	Tuner Unit - Perm. Tuning Coils
50A			Antenna Coil
50B			R. F. Coil
50C			Oscillator Coil

Service* Part No.	Production Part No.	Description
		TUNER UNIT AND PARTS (CONT'D)
	1215926	Bushing - Station Selector Shaft
	1216535	Connector Assembly - Antenna
	1218014	Connector Assembly - "A" Lead
	1217919	Dial Pointer & Slide Assembly
	1214471	Pulley - Wood 17/32 O. D.
	1214472	Pulley - Wood 7/16 O. D.
	1216587	Push Button Assembly
	1215932	Shaft Assembly - Front Drive
	1218019	Shaft Assembly - Rear Drive
	1215936	Socket Assembly - Pilot Light
	1216036	Spring - Core Driving
	1215934	Spring - Rear Drive Shaft
	1214386	Spring & String Assembly - Pointer Drive
	1216538	Tuner Unit Assembly - Mechanical Portion only - Push Buttons Included
		MISCELLANEOUS CHASSIS PARTS
	187189	Bulb - Pilot Light (Mazda #44)
	1215937	Cover Assembly - Case Back
	1215927	Cover Assembly - Power Supply
	1217918	Dial - Window
	1218112	Escutcheon
	7242463	Nut - 1/2-28 Mounting Spacer
	1213685	Screw - Cover Retaining
	7238455	Socket - Lock-In
	1213684	Socket - Vibrator
	1214420	Socket - Rectifier
	1214399	Speaker Gasket - Rubber
		TUBES
5290	1213583	7A7 - R. F. Amplifier
5301	1213853	7Q7 - Oscillator - Translator
5290	1213583	7A7 - I. F. Amplifier
5292	1213762	7B6 - Detector AVC - 1st Audio
5295	1213586	7C5 - Audio Output
5004	7231596	OZ4G - Rectifier
		INSTALLATION AND MOUNTING PARTS
	507505	Knob - Tuning & Volume Control
	507510	Knob - Dummy
	507511	Knob - Tone Control
	1879777	Capacitor - Generator
	1882758	Capacitor - Ammeter
	504617	"A" Lead Assembly
	7235968	Nut - 1/2"-28 Hex. - Zinc (Receiver Mounting - Front)
	505630	Washer - Tone Control - Felt
	7238755	Washer - Dummy Knob - Spring
	505629	Screw - 1/4"-20 x 5/8" Hex. Hd.
	1299232	Washer - 1/4" Flat
	121753	Washer - 1/4" Ext. Tooth - Shakeproof
	144722	Screw - #7 x 3/8" (Self Tapping)
	147685	Fuse - 14 Ampere
	501270	Tube - Fuse Insulating
6000	1207821	Suppressor - Distributor
6008	1853686	Adaptor - Distributor Suppressor
	509129	Insulator - Distributor Suppressor
	508583	Plate - Control Finish

* Order parts, using service part number where shown, otherwise use production part number for service.

MODEL 986146, Serial B47-1001 and up; Chevrolet

UNITED MOTORS SERVICE
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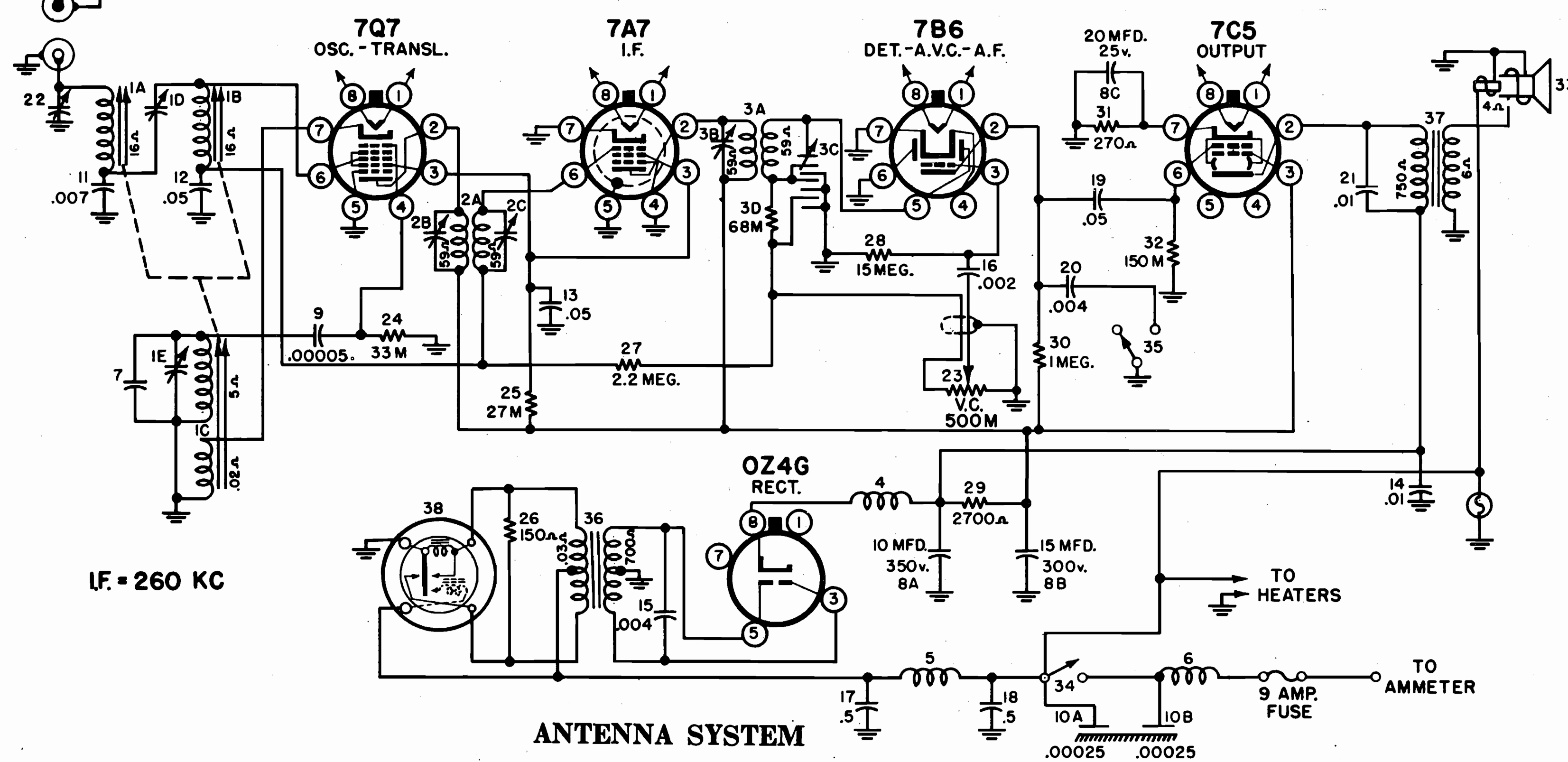
For Alignment data see Chevrolet Model 985792, page 13-3.



ANTENNA SYSTEM

The antenna system used with this receiver consists of a rod-type antenna with a specially designed low capacity lead-in.

TUBE COMPLEMENT

Type	Function	Type	Function
7Q7	Oscillator-Modulator	7C5	Audio Output
7A7	I.F. Amplifier	0Z4G	Rectifier
7B6	Detector A.V.C.-1st Audio		

CIRCUIT DESCRIPTION

The circuit used in this receiver is the superheterodyne type, employing the permeability method of tuning. An adjustable condenser is provided for matching the antenna circuit to the antenna. This adjustment is made near the high frequency end of the band (1400 kilocycles).

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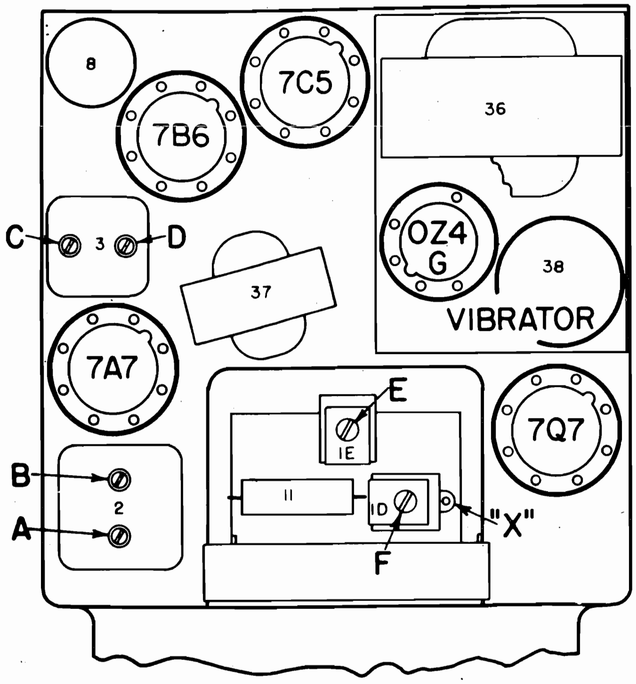
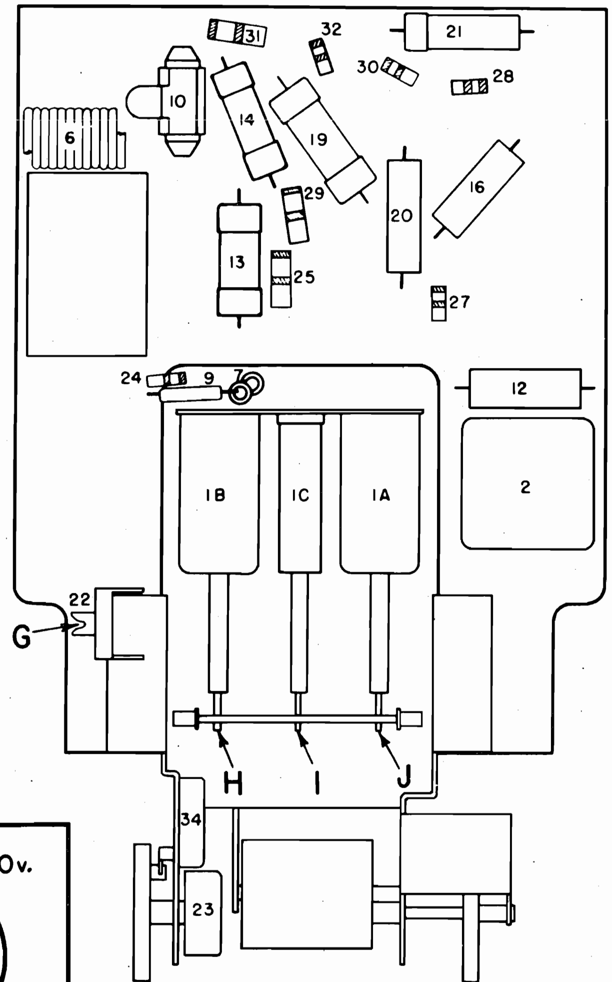
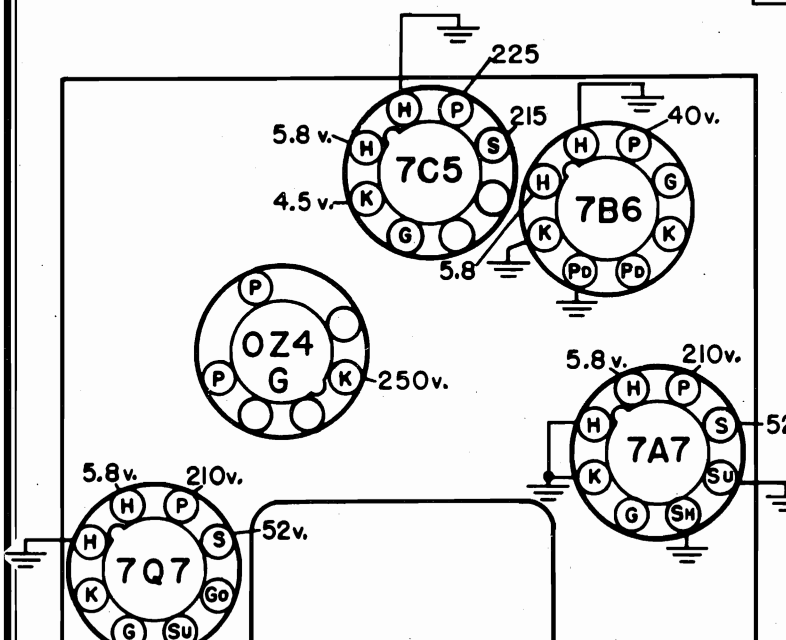
MODEL 986146, Serial B47-1001 and up; Chevrolet



Parts Layout





Voltage Chart

BOTTOM VIEW OF TUBE SOCKETS

READINGS TAKEN FROM TUBE SOCKET CONTACTS TO GROUND WITH A D.C. VOLTMETER HAVING A RESISTANCE OF 1000 OHMS PER VOLT. ALL VOLTAGES EXCEPT THE HEATER VOLTAGES MEASURED ON THE 0-250 VOLT SCALE.
"A" BATTERY 6.0 VOLTS. CURRENT DRAIN 6.2 AMPERES.
"B" SUPPLY DRAIN APPROXIMATELY 45 MA.

RADIO DATA

MODEL NUMBER—986146

SERIAL NUMBER—

TUBE COMPLEMENT—7Q7, 7A7, 0Z4G, 7B6, 7C5

BATTERY CURRENT—6.2 AMPERES

B+ VOLTS—250 VOLTS

I.F. KC—260

R.F. KC—1610-540

VIBRATOR TYPE—NON SYNCHRONOUS

YEAR—1947 AND 1948

MODEL 7258155,
Cadillac

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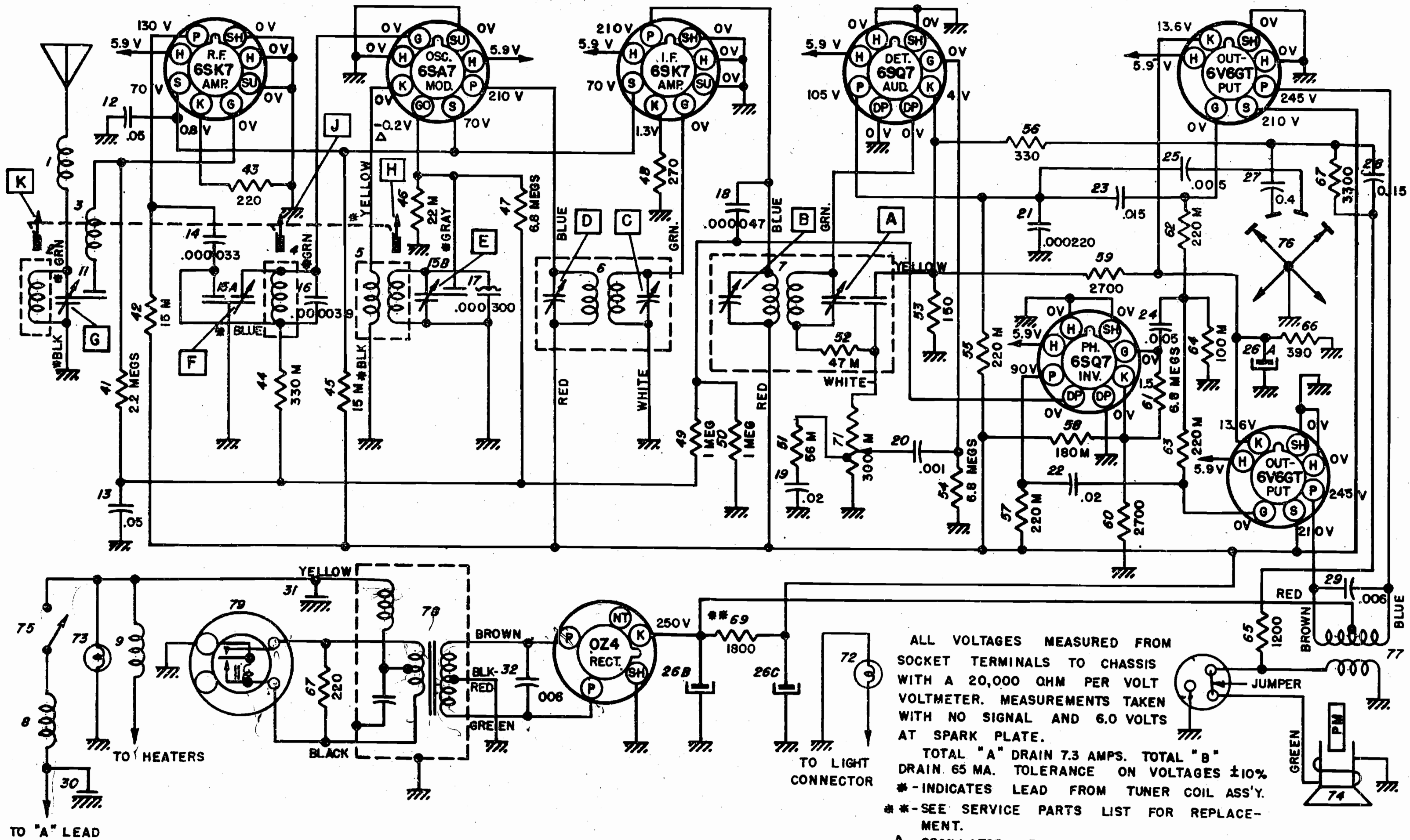


ALL VOLTAGES MEASURED FROM SOCKET TERMINALS TO CHASSIS WITH A 20,000 OHM PER VOLT VOLTMETER. MEASUREMENTS TAKEN WITH NO SIGNAL AND 6.0 VOLTS AT SPARK PLATE.

TOTAL "A" DRAIN 7.3 AMPS. TOTAL "B" DRAIN 65 MA. TOLERANCE ON VOLTAGES ±10%

✱ - INDICATES LEAD FROM TUNER COIL ASS'Y.

✱✱ - SEE SERVICE PARTS LIST FOR REPLACEMENT.

Δ - OSCILLATOR GRID VOLTAGE AT 1000 KC.

GENERAL

MOUNTING—All 1949 Cadillac Cars.

TUBES—Seven, Plus Rectifier.

SPEAKER — 6″ x 9″ Elliptical, Permanenc Magnet.

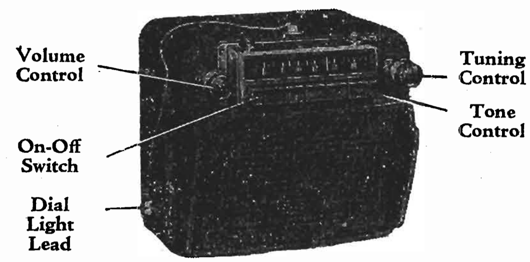
TUNING—Manual and 5 P.B. Mechanical.

ANTENNA TRIMMER COMPENSATION — 0.000060 - 0.000085 Mfd.

TUNING RANGE—550-1600 KC.

PUSHBUTTON SET-UP

Pull pushbutton to the right and out. Tune in desired station manually. Push button all the way in.



MODEL 7258155

UNITED MOTORS SERVICE
DIV. OF GENERAL MOTORS CORP.

MODEL 7258155, Cadillac

ALIGNMENT PROCEDURE:

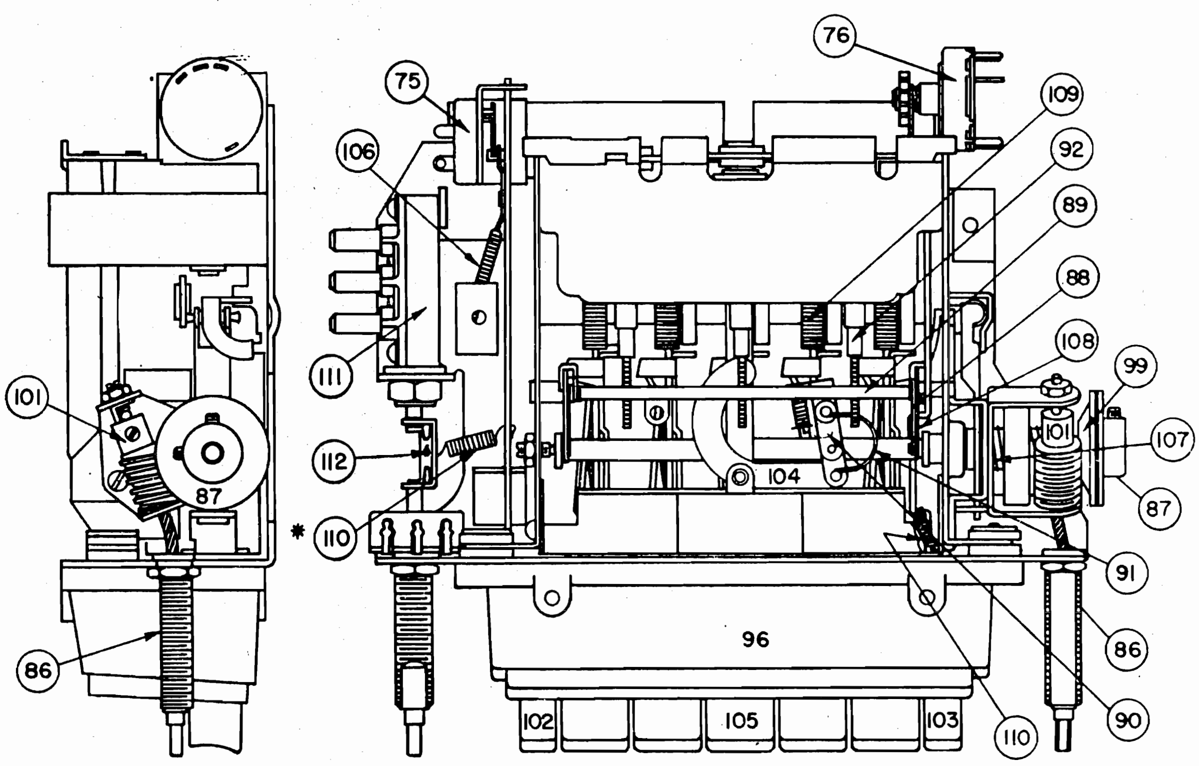
Output Meter Connection .... Across Voice Coil
Signal Generator Return .... To Chassis
Dummy Antenna .... In Series With Generator
Volume Control .... Maximum Volume
Tone Control .... Treble
Generator Output .... Minimum for Readable Indication

Steps	Series Condenser or Dummy Antenna	Connect To	Signal Generator Frequency	Tune Receiver To	Adjust in Sequence for Max. Output
1	0.1 Mfd.	6SA7 Grid (Pin #8)	260 KC	High Freq. Stop	A, B, C, D
2	0.000068 Mfd.	Antenna Connector	1615 KC	High Freq. Stop	*E, F, G
3	0.000068 Mfd.	Antenna Connector	1430 KC	Signal Gen. Signal	J, K
4	0.000068 Mfd.	Antenna Connector	1615 KC	High Freq. Stop	F, G
5	0.000068 Mfd.	Antenna Connector	1000 KC	Signal Gen. Signal	L**

*Before making this adjustment check the mechanical setting of the oscillator core "H." The slotted end of the core should be 1 25/32" from the mounting end of the coil form. (This measurement is readily made by inserting a suitable plug in the mounting end of the coil form). Core adjustments are made from the mounting end of the coil form with an insulated screwdriver, and core studs should be sealed with glyptal or household cement after alignment.

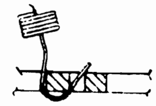
**"L" is the pointer adjustment screw on the pointer connecting link (See tuner drawing). Adjust so pointer reads 1000 KC (on the "10" calibration mark).

With the radio installed and the car antenna plugged in adjust antenna trimmer "G" (See sticker on case) for maximum volume with the radio tuned to a weak station near 1400 KC.



TUNER

*When installing this spring be sure it is fastened through the holes in the Vacuum Valve Yoke and the "On-Off" Button and Plunger as shown.



MODEL 7258155,
Cadillac

UNITED MOTORS SERVICE
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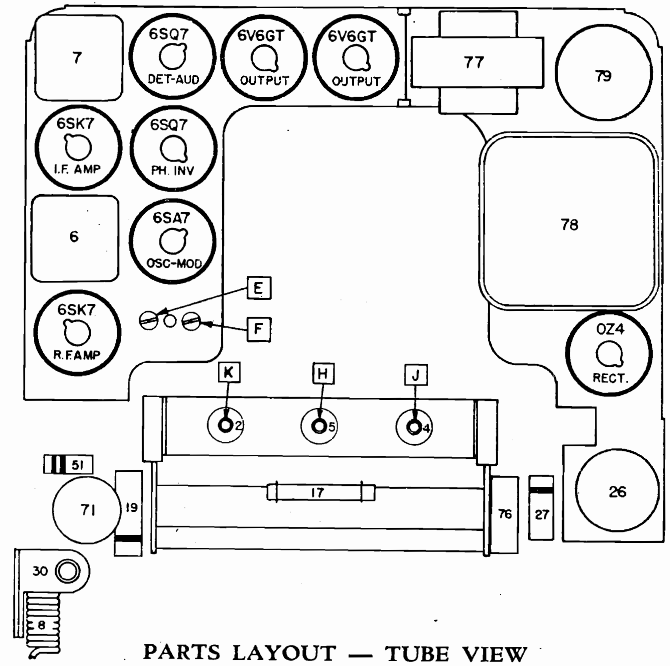
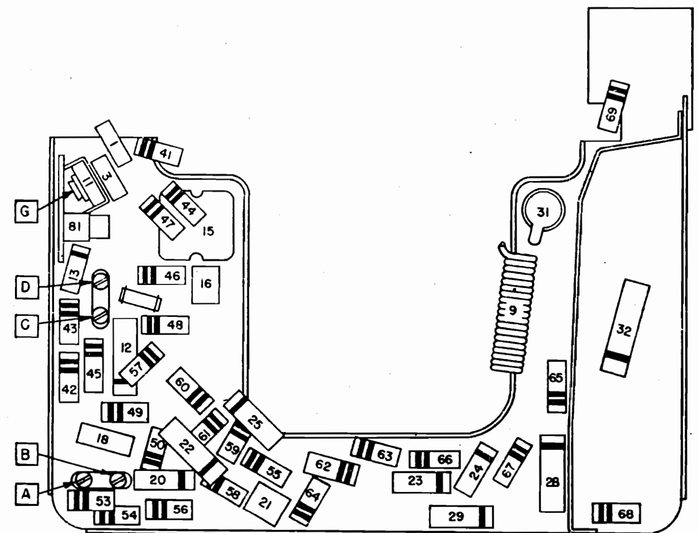
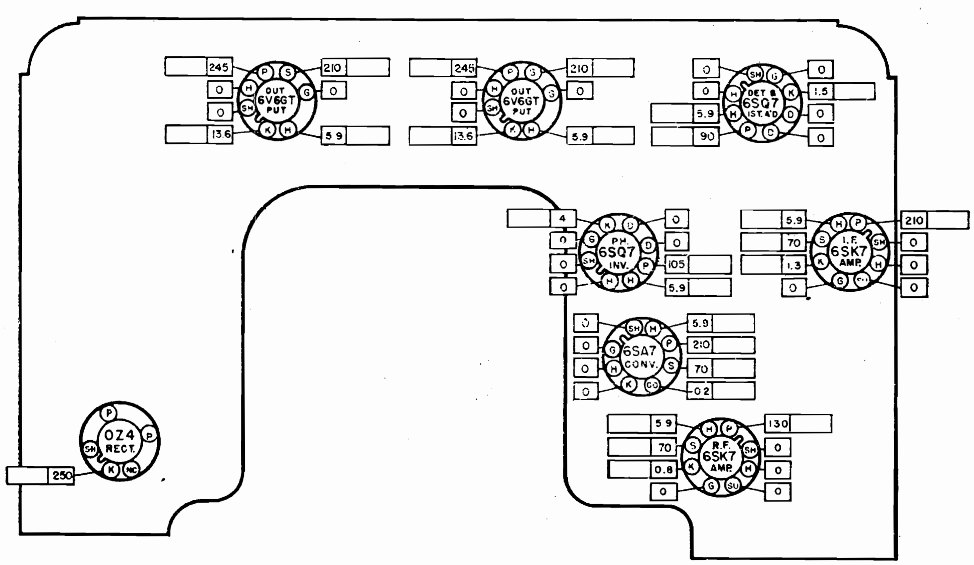


PARTS LAYOUT — TUBE VIEW



PARTS LAYOUT — CHASSIS VIEW

TUBE SOCKET VOLTAGE CHART

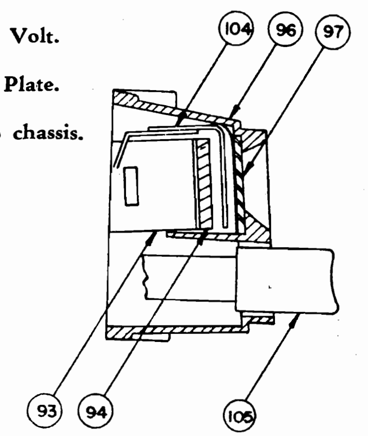


The tube socket voltages, as measured at the factory and under the conditions shown on the schematic diagram, are shown above. The blank spaces are provided so that the serviceman may fill in actual voltage readings as taken with his own equipment. A normal operating radio should be used for these measurements.

Voltmeter resistance.................................Ohms Per Volt.

Readings taken with...........................Volts At Spark Plate.

All voltages measured from socket terminals to chassis.



ESCUTCHEON CROSS SECTION

UNITED MOTORS SERVICE
DIV. OF GENERAL MOTORS CORP.
SERVICE PARTS LIST

MODEL 7258155, Cadillac

Illus. No.	Production Part No.	Service Part No.	Description
			ELECTRICAL PARTS
			Coils
1	7255738	7255738	Antenna Series Choke
2	7257979	7257979	Antenna
3	7240251	7240251	Antenna Spark Choke
4	7257979	7257979	R. F.
5	7258148	7258148	Oscillator
6	7257832	7257832	1st I. F. Assy.
7	7256932	7256932	2nd I. F. Assy.
8	1217846	1217846	"A" Spark Choke
9	1217846	1217846	Hash Choke
			Condensers
11	7258226	7258226	Antenna Trimmer
12	7258125	7230592	0.05 mfd 400 V Tubular
13	1210697	7230592	0.05 mfd 200 V Tubular
14	1218348	1217735	0.000033 mfd Ceramic
15	7242454	7242454	Dual Trimmer
15A			R. F. Section
15B			Oscillator Section
16	7258221	1217736	0.000039 mfd Ceramic
17	7258598	7258598	0.000300 mfd Compensating
18	1218202	7233313	0.000047 mfd Ceramic
19	7233770	7233770	0.02 mfd 600 V Tubular
20	1218883	1217790	0.001 mfd 600 V Tubular
21	1218886	7236105	0.000220 mfd Ceramic
22	7237720	7233770	0.02 mfd 400 V Tubular
23	7237719	7237719	0.015 mfd 600 V Tubular
24	7232956	7230767	0.005 mfd 600 V Tubular
25	7230767	7230767	0.005 mfd 600 V Tubular
26	7241198	7241198	Electrolytic
26A			20 mfd 25 V
26B			20 mfd 400 V
26C			20 mfd 400 V
27	1218882	1218882	0.4 mfd 100 V Tubular
28	1218880	1218880	0.15 mfd 100 V Tubular
29	1219084	1219084	0.006 mfd 800 V Tubular
30	7240797	7240797	Spark Plate and Choke Assy.
31	1217848	1217848	Chassis Plate Condenser
32	7240906	7240906	0.006 mfd 1600 V Buffer
			Resistors
41	1214563	1214563	2.2 Megohms ½ W Insulated
42	7233653	7233653	15,000 Ohms 2 W Insulated
43	7237835	7237835	220 Ohms ½ W Insulated
44	1214557	1214557	330,000 Ohms ½ W Insulated
45	7237595	7237595	15,000 Ohms 1 W Insulated
46	1214550	1214550	22,000 Ohms ½ W Insulated
47	1215563	1215563	6.8 Megohms ½ W Insulated
48	1214542	1214542	270 Ohms ½ W Insulated
49	1213282	1213282	1 Megohm ½ W Insulated
50	1213282	1213282	1 Megohm ½ W Insulated
51	1213267	1213267	56,000 Ohms ½ W Insulated
52	1214553	1214553	47,000 Ohms ½ W Insulated
53	1213220	1213220	150 Ohms ½ W Insulated
54	1215563	1215563	6.8 Megohms ½ W Insulated
55	1214555	1214555	220,000 Ohms ½ W Insulated
56	1213224	1213224	330 Ohms ½ W Insulated
57	1214555	1214555	220,000 Ohms ½ W Insulated
58	1215560	1215560	180,000 Ohms ½ W Insulated
59	1213240	1213240	2700 Ohms ½ W Insulated
60	1213240	1213240	2700 Ohms ½ W Insulated
61	1215563	1215563	6.8 Megohms ½ W Insulated
62	1214555	1214555	220,000 Ohms ½ W Insulated
63	1214555	1214555	220,000 Ohms ½ W Insulated
64	1213270	1213270	100,000 Ohms ½ W Insulated
65	1213236	1213236	1200 Ohms ½ W Insulated
66	1216149	1216149	390 Ohms 1 W Insulated
67	1213481	1213481	3300 Ohms ½W Insulated
68	7237994	7237994	220 Ohms 1 W Insulated
69	1214573	7242844 7240918	1800 Ohms { Replace with 2700 ohms 2 W and 5600 ohms 1 W in parallel

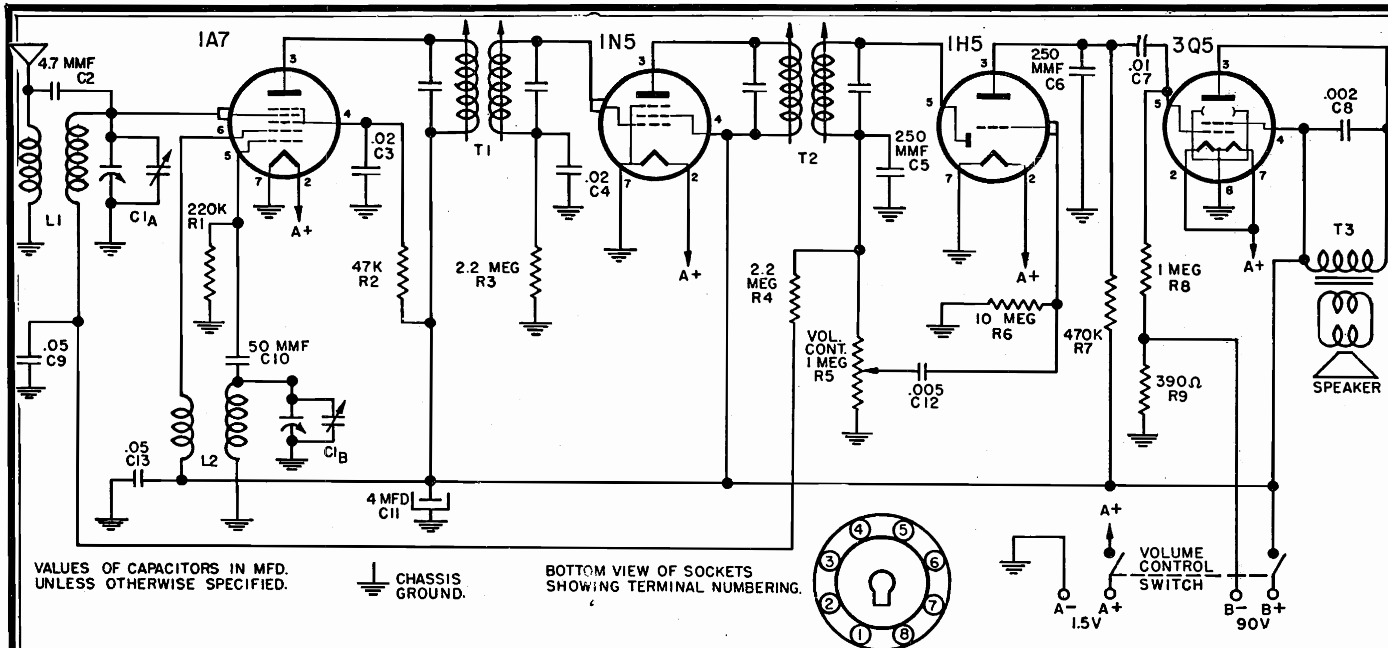
MODEL 7258155,
Cadillac

UNITED MOTORS SERVICE
DIV. OF GENERAL MOTORS CORP.
SERVICE PARTS LIST

Illus. No.	Production Part No.	Service Part No.	Description
			Tubes
	7237751	7237751	6SK7
	7237752	7237752	6SA7
	7237753	7237753	6SQ7
	1213793	1213793	6V6GT
	1211924	1211924	OZ4—Rectifier
			Miscellaneous Electrical
71	7258283	7258283	Control—Volume
72	125588	125588	Lamp—Dial Light
73	187189	187189	Lamp—Pilot Light
74	7258488	7258488	Speaker—6x9 Elliptical PM
75	7242411	7242411	Switch—"On-Off"
76	7258273	7258273	Switch—Tone Control
77	7258390	7258390	Transformer—Output
78	7255881	7255881	Transformer—Power
79	7239124	7239124	Vibrator—Non-synchronous
			MECHANICAL PARTS
			Chassis
81	7239475	7239475	Socket—Antenna
82	1219106	1219106	Socket—Dial Light
	7236279	7236279	Socket—Octal Tube
	7239125	7239125	Socket—Vibrator
			Tuner
36	7258496	7258496	Bushing and Manual Drive Shaft
87	7258072	7258072	Clutch Disc—Driven
88	7258203	7258203	Connecting Link—Core Bar
89	7258206	7258206	Core Guide Bar—Parallel
90	7256271	7256271	Pointer Connecting Link
91	7255992	7255992	Spring—Pointer Connecting Link
92	7258468	7258468	Core—Powdered Iron
93	1219105	1219105	Dial Backplate Assy.
94	7258254	7258254	Dial—Calibration
95	7258239	7258239	Dial Retainer Spring
96	7258270	7258270	Escutcheon
97	7258236	7258236	Dial Glass
98	7258232	7258232	Dial Retainer
99	7256760	7256760	Gear and Bushing
101	7256758	7256758	Gear and Bracket—Worm
102	7258267	7258267	Plunger and Button—"On-Off"
103	1219138	1219138	Plunger and Button—Tone Control
104	7258269	7258269	Pointer Assy.
105	1219104	1219104	Pushbutton and Slide Assy.
106	7257361	7257361	Spring—Toggle Lever
107	7256761	7256761	Spring—Clutch
108	7257415	7257415	Spring—Core Bar Connecting Link
109	7255984	7255984	Spring—Slide Return
110	7241042	7241042	Spring—Yoke
111	7258260	7258260	Vacuum Valve
112	7258229	7258229	Vacuum Valve Drive Yoke
			INSTALLATION PARTS
	7258542	7258542	"A" Lead and Fuse Connector
	121926	121926	Bolt—¼-20x1½
	7258219	7258219	Bracket—Radio Mtg. (Firewall)
	7258220	7258220	Bracket—Radio Mtg. (Instrument Panel)
	147685	147685	Fuse—14 amps
	7258400	7258400	Knob—Control
	7258399	7258399	Knob—Dummy
	120380	120380	Lockwasher—¼
	7258237	7258237	Nut, Spanner
	157716	157716	Screw—¼-20x½
	186493	186493	Screw and Lockwasher—¼-20x⅝
	7258436	7258436	Spacer Sleeve
	7258113	7258113	Suppressor—Distributor
	7240808	7240808	Suppressor Insulator
	7258526	7258526	Suppressor—Spark Plug
	7240138	7240138	Static Collector
	7234666	7234666	Washer—¼

WARWICK MFG. CORP.

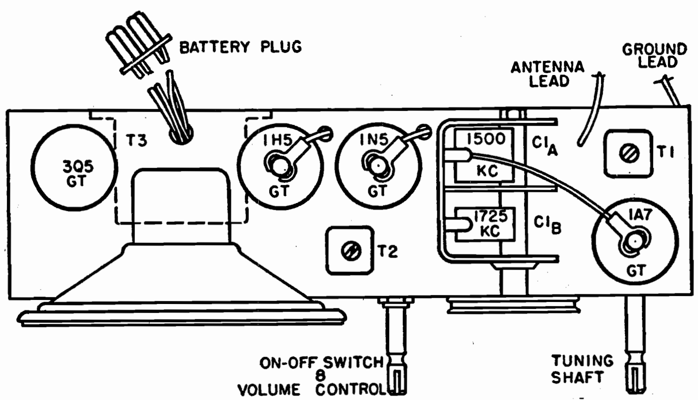
MODELS X132,
YX132 Series



Code	Part No.	DESCRIPTION
R1	A60-667	220K Ohm ½ Watt Resistor
R2	A60-685	47K Ohm ½ Watt Resistor
R3, R4	A60-684	2.2 Megohm ½ Watt Resistor
R5	A24-170	Volume Control, I Megohm
R6	A60-663	10 Megohm, ½ Watt Resistor
R7	A60-662	470K Ohm ½ Watt Resistor
R8	A60-668	I Megohm ½ Watt Resistor
R9	A60-665	390 Ohm ½ Watt Resistor
L1	A10-414	Antenna Coil (For model X132)
	A10-485	Antenna Coil (For model YX132)
L2	A10-415	Oscillator Coil (For model X132)
	A10-505	Oscillator Coil (For model YX132
T1, T2	A10-506	Ist and 2nd I.F. Transformer
T3	B80-232	Output Transformer
	B79-352	Speaker, 5" P.M.
	A75-60	Tuning Shaft
	A45-118	Battery Plug
	B67-515	Dial Scale
	58-31	Dial Pointer
	48-21	Dial Crystal
	A52-246	Knob, Ivory
	A42-436	Cabinet, Ivory, Plastic
	D42-431	Cabinet, Walnut, Plastic
	D42-437	Cabinet, Walnut, Wood
	A52-245	Knob, Walnut
C1A, C1B	B19-185	Variable Condenser (For model X132)
	B19-188	Variable Condenser (For model YX132
C2	A83-355	4.7 MMFD Condenser
C3, C4	A16-150	.02 MFD 400 Volt Condenser
C5, C6	A15-176	250 MMFD Mica Condenser
C7	A16-156	.01 MFD 400 Volt Condenser
C8	A16-155	.002 MFD 600 Volt Condenser
C9, C13	A16-152	.05 MFD 200 Volt Condenser
C10	A15-175	50 MMFD Mica Condenser
C11	A18-273	4 MFD 150 Volt Electrolytic Condenser
C12	A16-153	.005 MFD 600 Volt Condenser

This receiver has been designed to operate on a self-contained battery containing both the "B" battery (90 Volts) and the "A" battery (1½ Volts) such as General #60B6L.

The battery cable coming from the receiver has been made long enough so that it may be used with larger batteries placed outside of the cabinet. Any-one of the following batteries can be used with this receiver when they are placed on the outside of the cabinet: Eveready No. 748, General No. 60DL-11 L, Burgess No. 17G-D60, Ray-O-Vac No. AB 82.



This model is a 4-Tube Superhetrodyne radio receiver designed to cover a frequency range of from 540 kilocycles to 1725 kilocycles (K.C.). The tubes used are —

1A7 GT—Osc. Converter	1H5 GT—AVC Det. Audio Amplifier
1N5 GT—I. F. Amplifier	3Q5 GT—Power Output

ALIGNMENT PROCEDURE

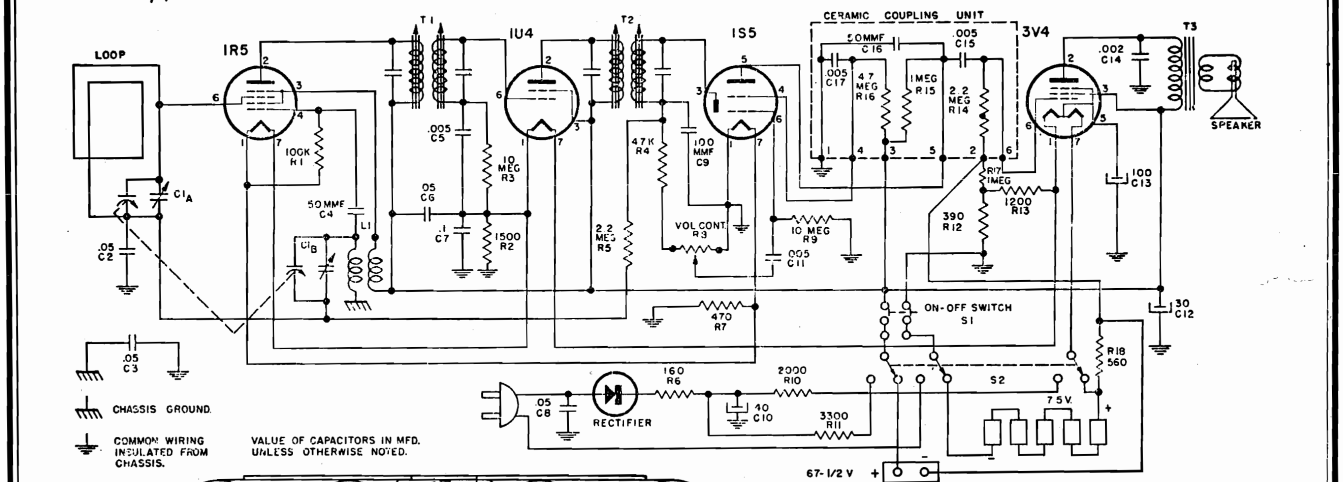
With an output meter connected across the voice coil of the speaker, the output meter reading for 50 milliwatts is .4 volts using a signal which is modulated 30% at 400 c.p.s. Follow through the procedure as outlined below for proper alignment.

Connect the signal generator to the grid cap of the IA7 GT Tube through a .1 MFD. Condenser. Connect the ground lead of the generator to the chassis. Adjust the signal generator to 455 K.C. and set the variable condenser of the receiver to minimum capacity (fully opened). With the volume control full on and minimum output from the signal generator adjust the two trimmers on the first and second I.F. transformers for maximum output.

Now connect the signal generator to the antenna connection of the receiver through a .00025 condenser. Adjust the signal generator frequency to 1725 K.C. and set the variable condenser to minimum capacity (fully opened), and adjust the oscillator trimmer (C1B) for maximum output. Set signal generator to 1500 K.C. and tune receiver to signal. Adjust the antenna trimmer (C1A) on the variable condenser for maximum output.

MODEL 147 Series

WARWICK MFG. CORP.



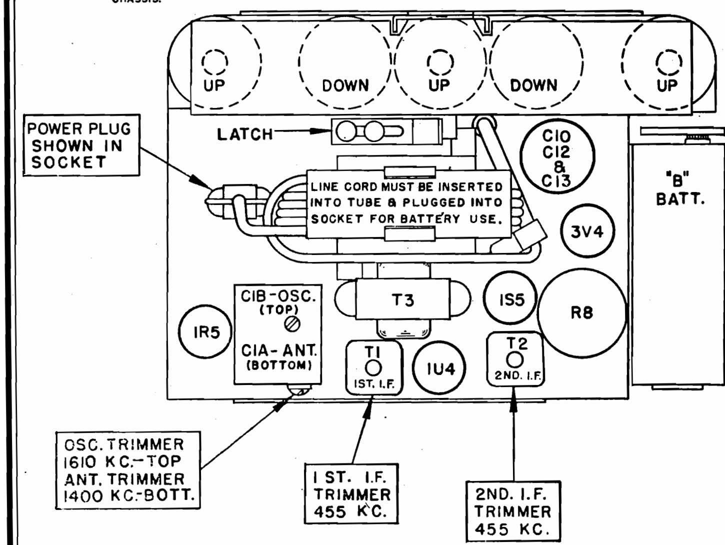


Fig. 1. Tube, Trimmer and Battery Locations

PARTS LIST

CODE NO.	PART NO.	DESCRIPTION
C1A, C1B	B19-197	Variable condenser
C2, C6	A16-152	.05 MFD 200 volt condenser
C3	A16-189	.05 MFD 400 volt condenser
C4	A15-175	50 MMF mica condenser
C5, C11	A16-153	.005 MFD 600 volt condenser
C7	A16-157	.1 MFD 200 volt condenser
C8	A16-172	.05 MFD 400 volt condenser
C9	A15-188	100 MMF mica condenser
C10, 12, 13	A18-290	40-30 MFD 150 volt, 100 MFD 10 volt, electrolytic
C14	A16-182	.002 MFD 200 volt condenser
C15, 16, 17	A17-100	.005 MMF, .005 MFD, 50 MMF. See note below.
R1	A60-671	100K ohm ½ watt 20% resistor
R2	A60-680	1500 ohm ½ watt 10% resistor
R3, R9	A60-663	10 megohm ½ watt 20% resistor
R4	A60-685	47K ohm ½ watt 20% resistor
R5	A60-684	2.2 megohm ½ watt 20% resistor
R6	A60-725	160 ohm 5 watt 10% resistor
R7	A60-722	470 ohm ½ watt 10% resistor
R8, S1	A24-178	Volume control, with switch
R10	A60-757	2000 ohm 10 watt 10% resistor
R11	A60-724	3300 ohm 1 watt 10% resistor
R12	A60-665	390 ohm ½ watt 10% resistor
R13	A60-756	1200 ohm ½ watt 10% resistor
R14, 15, 16	A17-100	2.2 megohm, 1 megohm, 4.7 megohm. See note below.

NOTE: C15, C16, C17, R14, R15, R16 are contained in the Ceramic Coupling Unit Part No. A17-100

CODE NO.	PART NO.	DESCRIPTION
R17	A60-668	1 megohm, ½ watt 20% resistor
R18	A60-758	560 ohm ½ watt 10% resistor
L1	A10-514	Oscillator coil
T1, T2	C10-475	1st and 2nd I.F. transformer
T3	B80-245	Output transformer
S2	A69-182	Switch, AC-DC, battery
	S84-242	Bracket, "A" battery retainer
	S84-278	Cover, front, grey (with loop)
	S84-281	Cover, front, maroon (with loop)
	S84-128	Cover, rear, grey
	S84-169	Cover, rear, maroon
	D21-108	End-cap, for handle
	A83-421	Clip, I.F. transformer mounting
	B83-442	Handle, rubber, grey
	A83-494	Handle, rubber, black
	S84-243	Hub and pointer assembly
	C52-216	Knob, tuning, grey
	A52-229	Knob, tuning, maroon
	B52-217	Knob, volume control, grey
	A52-232	Knob, volume control, maroon
	A83-568	Rectifier, selenium
	B79-364	Speaker, 4" P.M.
	A76-49	Terminal, for "B" battery

(See schematic diagram.)

ALIGNMENT PROCEDURE

The following alignment procedure is for use only by competent servicemen having the proper equipment.

The alignment should be made with volume control fully on, and the output from the signal generator as low as possible, to prevent A.V.C. action from interfering with correct alignment.

With the output meter connected across the voice coil of the speaker; the output meter reading for 50 milliwatts is .4 volts using a signal which is modulated 400 c.p.s.

Adjust all trimmers for maximum output. Repeat alignment procedure given below as a final check.

For alignment points refer to Figure No. 1.

CAUTION: This is an A.C.-D.C. receiver and if alignment is made with the receiver connected to 117 volts A.C. or D.C., it is necessary to isolate the signal generator or the receiver from the line by use of a transformer, or place a .2 M.F.D. condenser in both test leads of the Signal Generator.

1R5—Mixer, Oscillator
1U4—I.F. Amplifier
1S5—Detector and 1st Audio
3V4—Power output

Position of Variable	Generator Frequency	Dummy Ant. Mfd.	Generator Connections	Trimmer Adjustment	Trimmer Function
Fully open	455 KC	.1	*1R5 Grid (Stator of C1A)	T2	Output I.F.
Fully open	455 KC	.1	*1R5 Grid (Stator of C1A)	T1	Input I.F.
Fully open	1600 KC	.1	*1R5 Grid (Stator of C1A)	C1B	Oscillator
Tune in signal from generator	1400 KC	—	Loosely coupled to loop	C1A	Antenna

*Connect ground lead of signal generator to common negative.

WARWICK MFG. CORP.

MODEL 149 Series

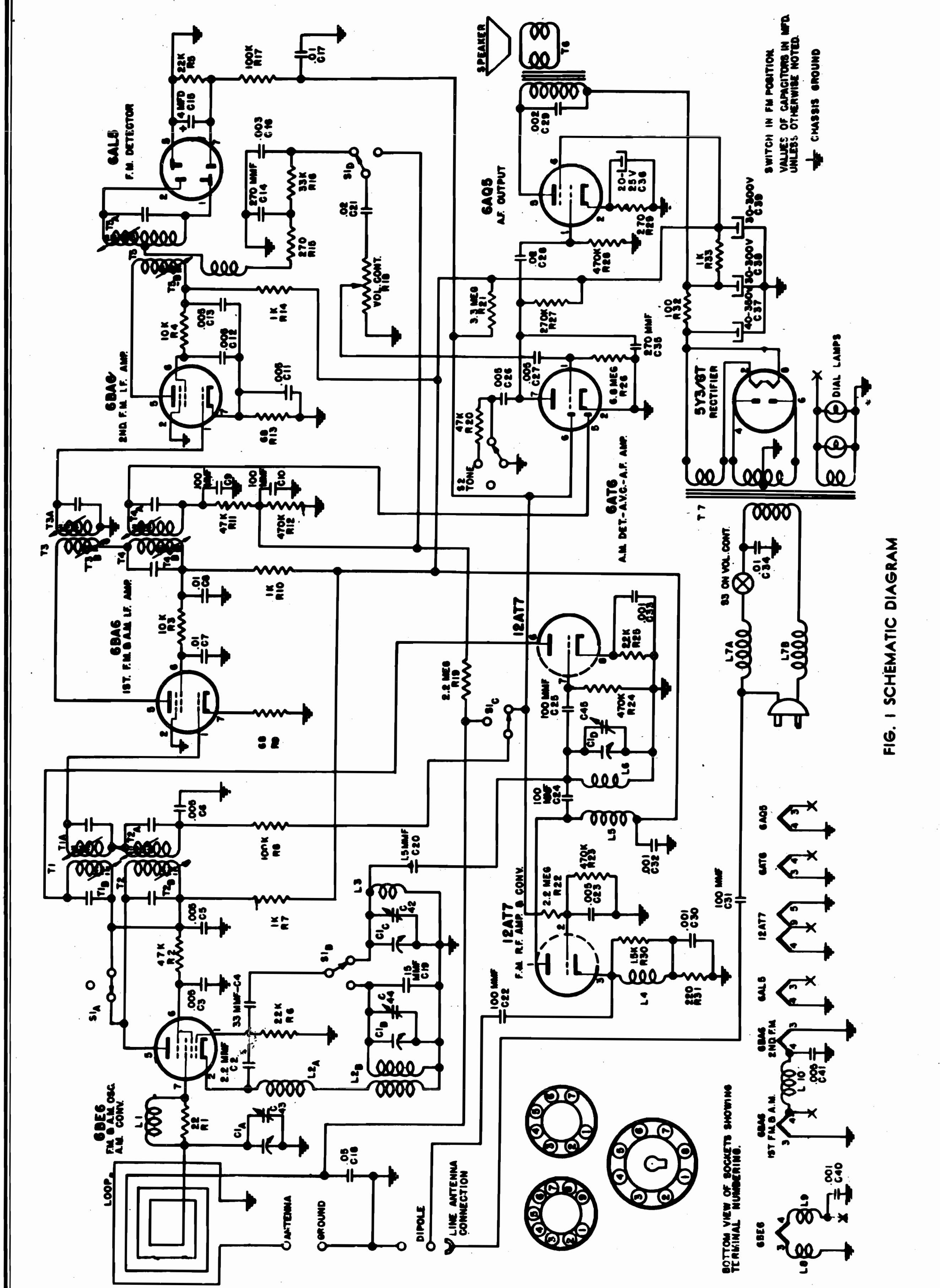


FIG. 1 SCHEMATIC DIAGRAM

MODEL 149 Series WARWICK MFG. CORP.

SPECIFICATIONS

Power Supply	105-125 volts 60 cycle AC only.
Power Consumption	65 Watts
Frequency Range FM	88 to 108 MC.
Frequency Range AM	540 to 1600 KC.
I.F. Frequency FM	10.7 MC.
I.F. Frequency AM	455 KC.
Band width, FM, Ratio Detector	330 KC.
Band width, FM, 1st I.F.	280 KC.
Band width, FM, Converter	220 KC.
Speaker	6¼" P.M.

The tubes used are as follows:

12AT7	FM RF Amplifier, Converter
6BE6	FM Osc, Am Osc, Converter
6BA6	FM-AM, 1st I.F. Amplifier
6BA6	FM-AM, 2nd I.F. Amplifier
6AL5	FM Detector
6AT6	AM Detector, AVC, Audio
6AQ5	Power Output
5Y3	Power Rectifier
No. 47	Pilot Lights (2)

SERVICE NOTES

INSTALLATION

This receiver is shipped from the factory complete with a built-in loop antenna for standard AM broadcast reception. A power-line antenna is used for the reception of FM stations. These antennas will be satisfactory for good reception under normal conditions. Terminals are provided at the back of the radio for connecting external AM and FM antennas, wherever this is found to be desirable as explained below.

When the receiver is to be used under difficult conditions, such as in buildings constructed mainly of steel, or those with steel lath, or, when large buildings, mountains or other objects are between the receiver and the station to be received, it may be necessary to use an external dipole antenna. Remember too, FM reception is limited as to distance and when used outside the primary service area of the transmitter, an outside antenna is very necessary.

The type of dipole to be used depends upon the signal strength of the station in that particular area, as well as conditions of reception as outlined above. There are three types of FM dipole antenna available, the single dipole, the folded dipole, and the non-directional dipole. When the stations to be received are in one general direction, a reflector may be added to either of the first two types to increase their efficiency.

GENERAL

Due to the high frequencies at which FM signals are received the service man must use great care when servicing these sets. Extreme caution must be used regarding the moving of component parts in the R.F. and oscillator circuits of the receiver as those circuits can be detuned in this manner.

If it becomes necessary to replace components such as resistors and condensers they must be replaced with parts of the same size, type, voltage rating and tolerance as called for in the parts list.

When installing new parts they should be placed in the same position as the original, and the leads should be cut to the same length.

ALIGNMENT NOTES

This receiver has been thoroughly inspected and tested at the factory, using the most modern test equipment available, such as FM sweep generators and oscilloscopes. All R.F. and I.F. circuits have been accurately adjusted at the factory and no attempt should be made to realign these circuits unless it is absolutely necessary.

CAUTION: If realignment is necessary be sure the proper test equipment is available, as listed below, before proceeding with the alignment procedure as given

EQUIPMENT USED FOR ALIGNMENT

Vacuum tube voltmeter.

AM Signal generator

FM Sweep generator.

Oscilloscope.

Insulated screw driver.

Dummy antenna:
- .1 MFD condenser
- .00025 MFD mica condenser
- 150 ohm resistor (2)

Output meter.

WARWICK MFG. CORP.

MODEL 149 Series

ALIGNMENT PROCEDURE

STEPS	RECEIVER DIAL SETTING	BAND SWITCH POSITION	SIGNAL GENERATOR FREQUENCY	DUMMY ANTENNA	SIGNAL GENERATOR CONNECTIONS	OUTPUT INDICATOR	TRIMMER ADJUSTMENT	TRIMMER FUNCTION	REMARKS
1	Minimum capacity	AM	455 KC 400 cycle AM	.1 MFD	High side—grid of AM converter tube (6BE6) Low side—chassis	Output Meter across voice coil	T4A, T4B T2A, T2B	AM I.F.	Adjust for maximum output
2	"	"	1600 KC 400 cycle AM	"	"	"	C44	AM Oscillator	"
3	1400 KC	"	1400 KC 400 cycle AM	.00025 MFD	High side—One ant. terminal Low side—Other ant. terminal	"	C43	AM Antenna	"
4	Any position where there is no station interference.	FM	10.7 MC unmodulated .1 volt output.	.1 MFD	High side—grid of 2nd I.F. amplifier tube (6BA6) Low side—chassis	Connect V.T.V.M. to plate of Ratio Detector tube, pin 7 (6AL5)	T5B	Ratio detector primary	Adjust for maximum negative voltage, about —5 volts
5	"	"	10.7 MC 400 cycle 30% Modulation. (See note A)	"	"	Connect scope to audio take-off point (across C16)	T5A	Ratio detector secondary	Adjust for a balanced pattern on scope. See Fig. 2
6	"	"	"	"	High side—grid of 1st I.F. amplifier tube (6BA6) Low side—chassis	"	T3A T3B	FM 2nd I.F.	Adjust for maximum gain and best pattern on scope. See Fig. 2
7	"	"	"	"	High side—grid (pin 7) of FM converter tube (12AT7) Low side—chassis	"	T1A T1B	FM 1st I.F.	"
8	108.5 MC	"	108.5 MC 400 cycle 30% modulation (22.5 KC deviation)	300 ohms in high side	High side—ant. terminal Low side—chassis	Connect output meter across voice coil	C42	FM oscillator	Adjust for maximum output
9	105 MC	"	105 MC 400 cycle 30% modulation (22.5 KC deviation)	"	"	"	C45	FM R.F.	"

NOTE A: When aligning the FM I.F. circuits, keep the out put from the signal generator as low as possible.

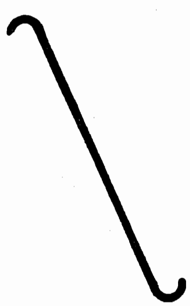


FIGURE 2

MODEL 149 Series

WARWICK MFG. CORP.

RESISTANCE CHART

	PIN 1	PIN 2	PIN 3	PIN 4	PIN 5	PIN 6	PIN 7	PIN 8	PIN 9
6BE6 FM & AM OSC AM CONV	22K	1.5	.5	.5	3.5M	3.5M	2.5M		
12AT7 FM RF AMP & CONV	3.3M	500K	250	0	0	3.5M	500K	2K	0
6BA6 1st IF AM & FM	200K	0	0	0	3.5M	3.5M	70		
6BA6 2nd IF AM & FM	0	0	0	0	3.5M	3.5M	70		
6AL5 FM DETECTOR	OPEN	OPEN	0	0	0	0	22K		
6AT6 AM DETECTOR, AVC, AUDIO	7M	0	0	0	500K	120K	3.5M		
6AQ5 POWER OUTPUT	470K	300	0	0	3.5M	3.5M	0		
5Y3 POWER RECTIFIER		3.5M		0		0		3.5M	

All voltages shown are approximate.

All resistance readings are taken from tube pin to chassis.

Due to manufacturing tolerance on component parts, resistance readings may vary as much as 20%.

All readings are shown in ohms unless otherwise noted.

VOLTAGE CHART

	PIN 1	PIN 2	PIN 3	PIN 4	PIN 5	PIN 6	PIN 7	PIN 8	PIN 9
6BE6 FM & AM OSC AM CONV	0	0	0	6 AC	155	125	0		
12AT7 FM RF AMP & CONV	170	0	1.5	0	0	155	0	1	6 AC
6BA6 1st IF AM & FM	0	0	0	6 AC	150	100	0		
6BA6 2nd IF AM & FM	0	0	0	6 AC	155	110	1		
6AL5 FM DETECTOR	0	0	6 AC	0	0	0	0		
6AT6 AM DETECTOR, AVC, AUDIO	—.5	0	0	6	0	0	60		
6AQ5 POWER OUTPUT	0	7.5	6 AC	0	215	170	0		
5Y3 POWER RECTIFIER		235		230 AC		230 AC		235	

All voltage readings are taken from tube pin to chassis.

All measurements are made with no signal, using a 20,000 ohm per volt meter.

AC input voltage must be maintained at 117 volts for accurate readings.

AC voltages shown are at 1000 ohms per volt.

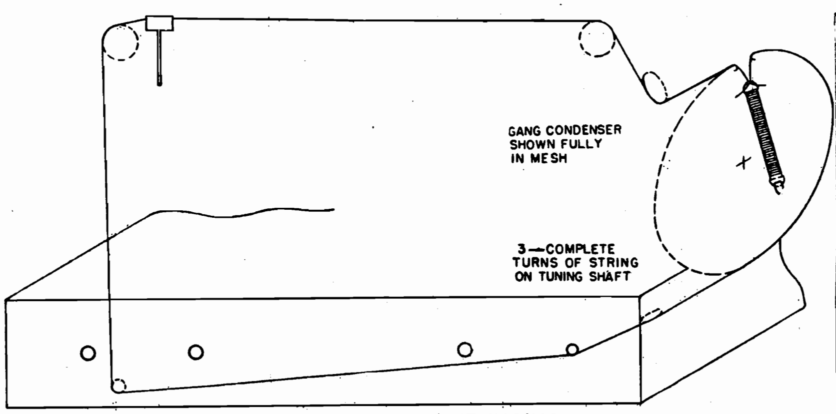


FIG. 4 DIAL CORD STRINGING

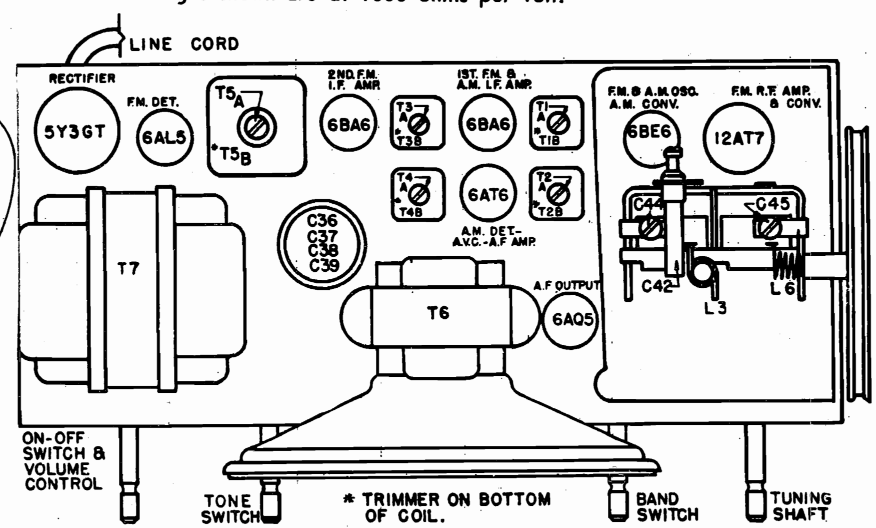


FIG. 3 TUBE AND TRIMMER LOCATIONS

WARWICK MFG. CORP.

MODEL 149 Series

PARTS LIST

Schematic Diagram Reference	Part No.	Description
C1A, C1B, C1C, C1D	C19-200	Variable Condenser
C2	A83-376	2.2 MMF, gimmick
C3, C5, C6, C23, C41	A16-177	.005 MFD ceramic (Centralab NO. DAO48 or equiv.)
C4	A15-210	33 MMF ceramic, 20%, (Erie Style "A" N1400)
C7, C8, C34	A16-192	.01-400 volts, paper tubular
C9, C10, R11	A17-101	100 MMF, 100 MMF, 47K ohms (Diode filter unit, Herlec F06-001)
C11, C12, C13	A17-102	3 x .005 MFD Herlec B34-005
C14, C35	A15-208	270 MMF ceramic, 20%, (Erie Style "K" or equiv.)
C15	A18-292	4 MFD—50 volt electrolytic
C16	A16-180	.003-200 volts, paper tubular
C17	A16-165	.01-200 volts, paper tubular
C18	A16-197	.05-200 volts, paper tubular
C19	A15-209	15 MMF ceramic, 10%, (Erie Style "A" or equiv.)
C20	A15-206	1.5 MMF ceramic, 33%, (Erie Style "A" or equiv.)
C21, C28	A16-196	.02-400 volts, paper tubular
C22, C24, C25, C31	A15-196	100 MMF 20% Ceramic Condenser (Erie Style K or Equiv.)
C26, C27	A16-199	.005-400 volts, paper tubular
C29	A16-198	.002-600 volts, paper tubular
C30, C32, C33, C40	A16-195	.001 MMF ceramic (Centralab NO. BC20A or equiv.)
C36, C37, C38, C39	A18-291	20-25 volts, 40-350 volts, 30-300 volts, 30-300 volts electrolytic
C42	A20-146	FM oscillator trimmer
R1	A33-231	See L1.
R2	A60-759	4.7 K ohms, ½ watt, 10%
R3, R4	A60-760	10 K ohms, ½ watt, 10%
R5, R6	A60-744	22 K ohms, ½ watt, 10%
R7, R10, R14	A60-675	1 K ohms, ½ watt, 20%
R8, R17	A60-727	100 K ohms, ½ watt, 20%
R9, R13	A60-742	68 ohms, ½ watt, 10%
R11, C9, C10	A17-101	47 K ohms, 100 MMF, 100 MMF (Diode filter unit, Herlec FO6-001)
R12, R23, R24, R28	A60-731	470 K ohms, ½ watt, 20%
R15	A60-723	270 ohms, ½ watt, 20%
R16	A60-748	33 K ohms, ½ watt, 10%
R18	B24-181	Volume control and switch S3
R19, R22	A60-726	2.2 Megohms, ½ watt, 20%
R20	A60-730	47 K ohms, ½ watt, 20%
R21	A60-761	3.3 Megohms, ½ watt, 20%
R25	A60-714	2.2 K ohms, ½ watt, 10%
R26	A60-762	6.8 Megohms, ½ watt, 20%

Schematic Diagram Reference	Part No.	Description
R27	A60-747	270 K ohms, ½ watt, 20%
R29	A60-754	270 ohms, ½ watt, 10%
R30	A10-516	See L4
R31	A60-753	220 ohms, ½ watt, 10%
R32	A60-755	100 ohms, 1 watt, 10%
R33	A60-763	1 K ohms, 4 watts, 10%
R34	A60-667	220 K ohms ½ watt 20%
L1	A33-231	Choke, wound on R1, 22 ohms
L2A, L2B	A10-515	Oscillator coil, AM
L3	A10-517	Oscillator coil, FM
L4	A10-516	Antenna coil, FM, wound on R30, 1.5 K ohms
L5	A33-233	Plate choke, FM RF
L6	A10-518	RF coil, FM
L7A, L7B	A33-230	Line choke
L8, L9	A33-232	FM oscillator filament choke
L10	A33-227	Filament choke
S1A, S1B, S1C, S1D	A69-183	Band switch
S2	A26-125	Tone control
S3	B24-181	ON-OFF SWITCH, on volume control
T1	A10-519	1st I.F., FM
T2	A10-521	1st I.F., AM
T3	A10-520	2nd I.F., FM
T4	A10-522	2nd I.F., AM
T5	SC10-492	Ratio detector, FM
T6	A80-247	Output transformer
T7	C80-246	Power transformer
	A23-153	Line cord and plug
	B79-351	Speaker, 6¼", P.M.
	B79-342	Speaker, 6¼", P.M. Alternate
	B79-341	Speaker, 6¼", P.M. Alternate
	SC84-292	Back and loop
	D42-379	Cabinet, walnut
	A42-401	Cabinet, ivory
	C67-537	Dial scale, glass
	A52-284	Knob, FM-AM, walnut
	A52-285	Knob, FM-AM, ivory
	A52-250	Knob, ON-OFF-VOL, ivory
	A52-253	Knob, ON-OFF-VOL, walnut
	A52-249	Knob, TONE 1-2-3, ivory
	A52-254	Knob, TONE 1-2-3, walnut
	A52-248	Knob, TUNING, ivory
	A52-255	Knob, Walnut
	A58-65	Pointer, slide type
	A83-292	Retainer, dial scale, RH
	A83-293	Retainer, dial scale, LH
	A87-31	Socket, pilot light
	A70-122	Spring, string tension
	A51-105	String, pointer travel, 42"

MODEL 150 Series

WARWICK MFG. CORP.

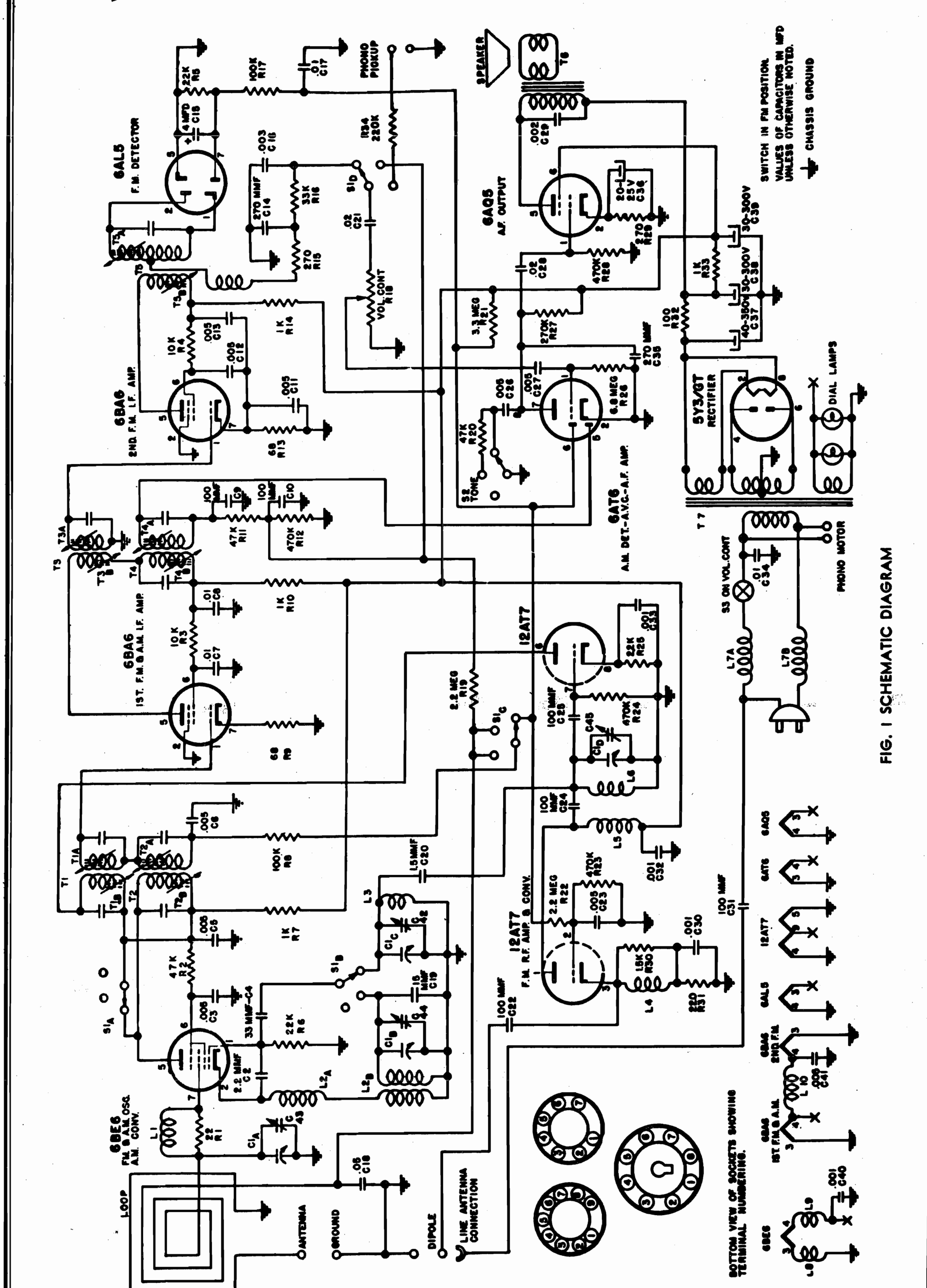


FIG. 1 SCHEMATIC DIAGRAM

SPECIFICATIONS

Power Supply............105-125 volts 60 cycle AC only.
Power Consumption..........................65 Watts
Frequency Range FM...................88 to 108 MC.
Frequency Range AM................540 to 1600 KC.
I.F. Frequency FM..........................10.7 MC.
I.F. Frequency AM ....455 KC.
Band width, FM, Ratio Detector................330 KC.
Band width, FM, 1st I.F.......................280 KC.
Band width, FM, Converter....................220 KC.
Speaker ....6¼" P.M.

The tubes used are as follows:

12AT7	FM RF Amplifier, Converter
6BE6	FM Osc, Am Osc, Converter
6BA6	FM-AM, 1st I.F. Amplifier
6BA6	FM-AM, 2nd I.F. Amplifier
6AL5	FM Detector
6AT6	AM Detector, AVC, Audio
6AQ5	Power Output
5Y3	Power Rectifier
No. 47	Pilot Lights (2)

SERVICE NOTES

INSTALLATION

This receiver is shipped from the factory complete with a built-in loop antenna for standard AM broadcast reception. A power-line antenna is used for the reception of FM stations. These antennas will be satisfactory for good reception under normal conditions. Terminals are provided at the back of the radio for connecting external AM and FM antennas, wherever this is found to be desirable as explained below.

When the receiver is to be used under difficult conditions, such as in buildings constructed mainly of steel, or those with steel lath, or, when large buildings, mountains or other objects are between the receiver and the station to be received, it may be necessary to use an external dipole antenna. Remember too, FM reception is limited as to distance and when used outside the primary service area of the transmitter, an outside antenna is very necessary.

The type of dipole to be used depends upon the signal strength of the station in that particular area, as well as conditions of reception as outlined above. There are three types of FM dipole antenna available, the single dipole, the folded dipole, and the non-directional dipole. When the stations to be received are in one general direction, a reflector may be added to either of the first two types to increase their efficiency.

GENERAL

Due to the high frequencies at which FM signals are received the service man must use great care when servicing these sets. Extreme caution must be used regarding the moving of component parts in the R.F. and oscillator circuits of the receiver as those circuits can be detuned in this manner.

If it becomes necessary to replace components such as resistors and condensers they must be replaced with parts of the same size, type, voltage rating and tolerance as called for in the parts list.

When installing new parts they should be placed in the same position as the original, and the leads should be cut to the same length.

ALIGNMENT NOTES

This receiver has been thoroughly inspected and tested at the factory, using the most modern test equipment available, such as FM sweep generators and oscilloscopes. All R.F. and I.F. circuits have been accurately adjusted at the factory and no attempt should be made to realign these circuits unless it is absolutely necessary.

CAUTION: If realignment is necessary be sure the proper test equipment is available, as listed below, before proceeding with the alignment procedure as given

EQUIPMENT USED FOR ALIGNMENT

- Vacuum tube voltmeter.
- AM Signal generator
- FM Sweep generator.
- Oscilloscope.
- Insulated screw driver.
- Dummy antenna:
  - .1 MFD condenser
  - .00025 MFD mica condenser
  - 150 ohm resistor (2)
- Output meter.

MODEL 150 Series

WARWICK MFG. CORP.

ALIGNMENT PROCEDURE

STEPS	RECEIVER DIAL SETTING	BAND SWITCH POSITION	SIGNAL GENERATOR FREQUENCY	DUMMY ANTENNA	SIGNAL GENERATOR CONNECTIONS	OUTPUT INDICATOR	TRIMMER ADJUSTMENT	TRIMMER FUNCTION	REMARKS
1	Minimum capacity	AM	455 KC 400 cycle AM	.1 MFD	High side—grid of AM converter tube (6BE6) Low side—chassis	Output Meter across voice coil	T4A, T4B T2A, T2B	AM I.F.	Adjust for maximum output
2	"	"	1600 KC 400 cycle AM	"	"	"	C44	AM Oscillator	"
3	1400 KC	"	1400 KC 400 cycle AM	.00025 MFD	High side—One ant. terminal Low side—Other ant. terminal	"	C43	AM Antenna	"
4	Any position where there is no station interference.	FM	10.7 MC unmodulated .1 volt output.	.1 MFD	High side—grid of 2nd I.F. amplifier tube*(6BA6) Low side—chassis	Connect V.T.V.M. to plate of Ratio Detector tube, pin 7 (6AL5)	T5B	Ratio detector primary	Adjust for maximum negative voltage, about —5 volts
5	"	"	10.7 MC 400 cycle 30% Modulation. (See note A)	"	"	Connect scope to audio take-off point (across C16)	T5A	Ratio detector secondary	Adjust for a balanced pattern on scope. See Fig. 2
6	"	"	"	"	High side—grid of 1st I.F. amplifier tube (6BA6) Low side—chassis	"	T3A T3B	FM 2nd I.F.	Adjust for maximum gain and best pattern on scope. See Fig. 2
7	"	"	"	"	High side—grid (pin 7) of FM converter tube (12AT7) Low side—chassis	"	T1A T1B	FM 1st I.F.	"
8	108.5 MC	"	108.5 MC 400 cycle 30% modulation (22.5 KC deviation)	300 ohms in high side	High side—ant. terminal Low side—chassis	Connect output meter across voice coil	C42	FM oscillator	Adjust for maximum output
9	105 MC	"	105 MC 400 cycle 30% modulation (22.5 KC deviation)	"	"	"	C45	FM R.F.	"

NOTE A: When aligning the FM I.F. circuits, keep the out put from the signal generator as low as possible.

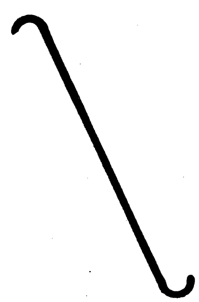


FIGURE 2

WARWICK MFG. CORP.

MODEL 150 Series

VOLTAGE CHART

	PIN 1	PIN 2	PIN 3	PIN 4	PIN 5	PIN 6	PIN 7	PIN 8	PIN 9
6BE6 FM & AM OSC AM CONV	0	0	0	6 AC	155	125	0		
12AT7 FM RF AMP & CONV	170	0	1.5	0	0	155	0	1	6 AC
6BA6 1st IF AM & FM	0	0	0	6 AC	150	100	0		
6BA6 2nd IF AM & FM	0	0	0	6 AC	155	110	1		
6AL5 FM DETECTOR	0	0	6 AC	0	0	0	0		
6AT6 AM DETECTOR, AVC, AUDIO	—.5	0	0	6	0	0	60		
6AQ5 POWER OUTPUT	0	7.5	6 AC	0	215	170	0		
5Y3 POWER RECTIFIER		235		230 AC		230 AC		235	

All voltage readings are taken from tube pin to chassis.

All measurements are made with no signal, using a 20,000 ohm per volt meter.

AC input voltage must be maintained at 117 volts for accurate readings.

AC voltages shown are at 1000 ohms per volt.

RESISTANCE CHART

	PIN 1	PIN 2	PIN 3	PIN 4	PIN 5	PIN 6	PIN 7	PIN 8	PIN 9
6BE6 FM & AM OSC AM CONV	22K	1.5	.5	.5	3.5M	3.5M	2.5M		
12AT7 FM RF AMP & CONV	3.3M	500K	250	0	0	3.5M	500K	2K	0
6BA6 1st IF AM & FM	200K	0	0	0	3.5M	3.5M	70		
6BA6 2nd IF AM & FM	0	0	0	0	3.5M	3.5M	70		
6AL5 FM DETECTOR	OPEN	OPEN	0	0	0	0	22K		
6AT6 AM DETECTOR, AVC, AUDIO	7M	0	0	0	500K	120K	3.5M		
6AQ5 POWER OUTPUT	470K	300	0	0	3.5M	3.5M	0		
5Y3 POWER RECTIFIER		3.5M		0		0		3.5M	

All voltages shown are approximate.

All resistance readings are taken from tube pin to chassis.

Due to manufacturing tolerance on component parts, resistance readings may vary as much as 20%.

All readings are shown in ohms unless otherwise noted.

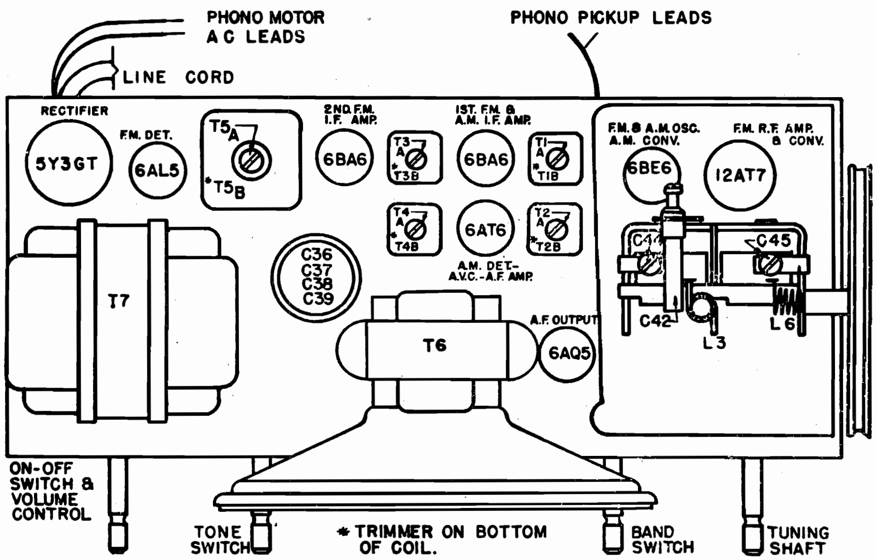


FIG. 3 TUBE AND TRIMMER LOCATIONS

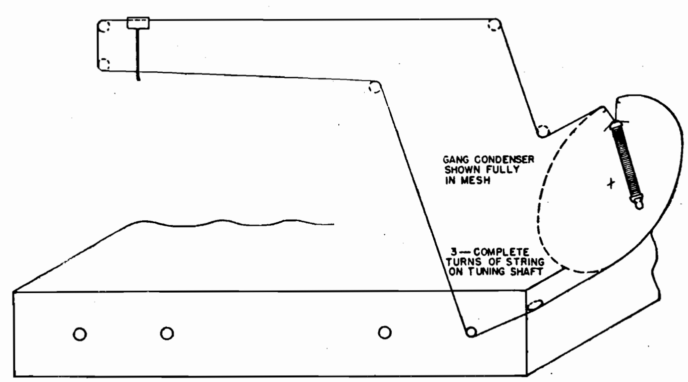


FIG. 4 DIAL CORD STRINGING

PARTS LIST

Schematic Diagram Reference	Part No.	Description
C1A, C1B, C1C, C1D	C19-200	Variable Condenser
C2	A83-376	2.2 MMF, gimmick
C3, C5, C6, C23, C41	A16-177	.005 MFD ceramic (Centralab NO. DA048 or equiv.)
C4	A15-210	33 MMF ceramic, 20%, (Erie Style "A" N1400)
C7, C8, C34	A16-192	.01-400 volts, paper tubular
C9, C10, R11	A17-101	100 MMF, 100 MMF, 47K ohms (Diode filter unit, Herlec F06-001)
C11, C12, C13	A17-102	3 x .005 MFD Herlec B34-005
C14, C35	A15-208	270 MMF ceramic, 20%, (Erie Style "K" or equiv.)
C15	A18-292	4 MFD—50 volt electrolytic
C16	A16-180	.003-200 volts, paper tubular
C17	A16-165	.01-200 volts, paper tubular
C18	A16-197	.05-200 volts, paper tubular
C19	A15-209	15 MMF ceramic, 10%, (Erie Style "A" or equiv.)
C20	A15-206	1.5 MMF ceramic, 33%, (Erie Style "A" or equiv.)
C21, C28	A16-196	.02-400 volts, paper tubular
C22, C24, C25, C31	A15-196	100 MMF 20% Ceramic Condenser (Erie Style K or Equiv.)
C26, C27	A16-199	.005-400 volts, paper tubular
C29	A16-198	.002-600 volts, paper tubular
C30, C32, C33, C40	A16-195	.001 MMF ceramic (Centralab NO. BC20A or equiv.)
C36, C37, C38, C39	A18-291	20-25 volts, 40-350 volts, 30-300 volts, 30-300 volts electrolytic
C42	A20-146	FM oscillator trimmer
R1	A33-231	See L1.
R2	A60-759	4.7 K ohms, 1/2 watt, 10%
R3, R4	A60-760	10 K ohms, 1/2 watt, 10%
R5, R6	A60-744	22 K ohms, 1/2 watt, 10%
R7, R10, R14	A60-675	1 K ohms, 1/2 watt, 20%
R8, R17	A60-727	100 K ohms, 1/2 watt, 20%
R9, R13	A60-742	68 ohms, 1/2 watt, 10%
R11, C9, C10	A17-101	47 K ohms, 100 MMF, 100 MMF (Diode filter unit, Herlec F06-001)
R12, R23, R24, R28	A60-731	470 K ohms, 1/2 watt, 20%
R15	A60-723	270 ohms, 1/2 watt, 20%
R16	A60-748	33 K ohms, 1/2 watt, 10%
R18	B24-181	Volume control and switch S3
R19, R22	A60-726	2.2 Megohms, 1/2 watt, 20%
R20	A60-730	47 K ohms, 1/2 watt, 20%
R21	A60-761	3.3 Megohms, 1/2 watt, 20%
R25	A60-714	2.2 K ohms, 1/2 watt, 10%
R26	A60-762	6.8 Megohms, 1/2 watt, 20%

Schematic Diagram Reference	Part No.	Description
R27	A60-747	270 K ohms, 1/2 watt, 20%
R29	A60-754	270 ohms, 1/2 watt, 10%
R30	A10-516	See L4
R31	A60-753	220 ohms, 1/2 watt, 10%
R32	A60-755	100 ohms, 1 watt, 10%
R33	A60-763	1 K ohms, 4 watts, 10%
R34	A60-667	220 K ohms 1/2 watt 20%
L1	A33-231	Choke, wound on R1, 22 ohms
L2A, L2B	A10-515	Oscillator coil, AM
L3	A10-517	Oscillator coil, FM
L4	A10-516	Antenna coil, FM, wound on R30, 1.5 K ohms
L5	A33-233	Plate choke, FM RF
L6	A10-518	RF coil, FM
L7A, L7B	A33-230	Line choke
L8, L9	A33-232	FM oscillator filament choke
L10	A33-227	Filament choke
S1A, S1B, S1C, S1D	A69-184	Band switch
S2	A26-125	Tone control
S3	B24-181	ON-OFF SWITCH, on volume control
T1	A10-519	1st I.F., FM
T2	A10-521	1st I.F., AM
T3	A10-520	2nd I.F., FM
T4	A10-522	2nd I.F., AM
T5	SC10-492	Ratio detector, FM
T6	A80-247	Output transformer
T7	C80-246	Power transformer
	A23-153	Line cord and plug
	B79-351	Speaker, 6¼", P.M.
	B79-342	Speaker, 6¼", P.M. Alternate
	B79-341	Speaker, 6¼", P.M. Alternate
	S84-299	Back and loop
	C67-539	Dial scale, glass
	A52-260	Knob, TONE 1-2-3
	A52-261	Knob, ON-OFF-VOL
	A52-263	Knob, TUNING
	A52-286	Knob, FM-AM-PH
	A58-53	Pointer, slide type
	A83-429	Retainer, dial scale
	A70-122	Spring, string tension
	A87-29	Socket, pilot light
	A51-105	String, pointer travel
	B59-16	Record changer, General Instrument No. 205

WARWICK MFG. CORP.

MODEL 155 Series

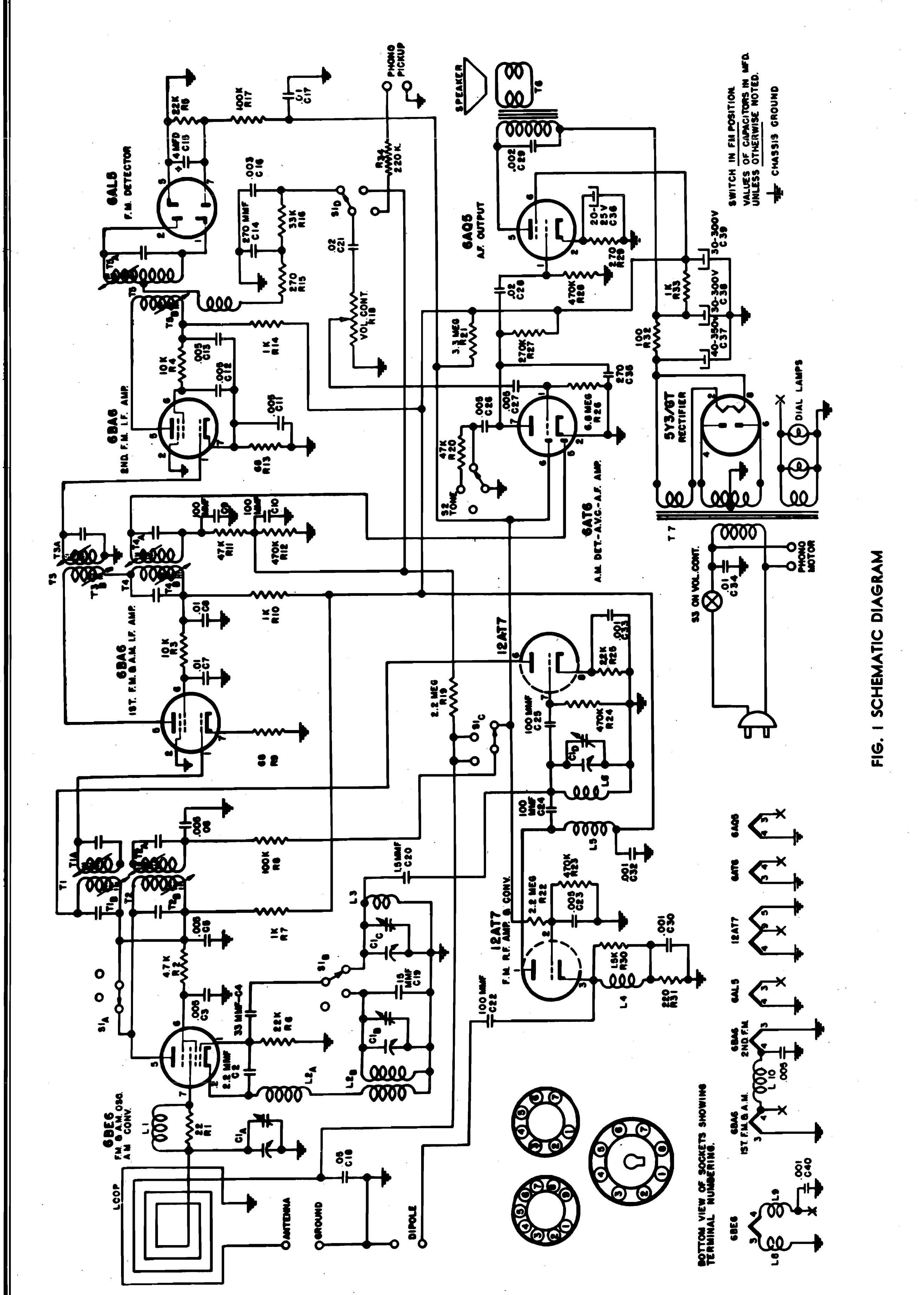


FIG. 1 SCHEMATIC DIAGRAM

RECORD CHANGER: Webster Model 50, RCD.CH.15-1

SPECIFICATIONS

Power Supply............105-125 volts 60 cycle AC only.
Power Consumption..........................65 Watts
Frequency Range FM..................88 to 108 MC.
Frequency Range AM.................540 to 1600 KC.
I.F. Frequency FM...........................10.7 MC.
I.F. Frequency AM...........................455 KC.
Band width, FM, Ratio Detector................330 KC.
Band width, FM, 1st I.F......................280 KC.
Band width, FM, Converter....................220 KC.
Speaker ....6¼" P.M.

The tubes used are as follows:

12AT7	FM RF Amplifier, Converter
6BE6	FM Osc, Am Osc, Converter
6BA6	FM-AM, 1st I.F. Amplifier
6BA6	FM-AM, 2nd I.F. Amplifier
6AL5	FM Detector
6AT6	AM Detector, AVC, Audio
6AQ5	Power Output
5Y3	Power Rectifier
No. 47	Pilot Lights (2)

SERVICE NOTES

INSTALLATION

This receiver is shipped from the factory complete with a built-in loop antenna for standard AM broadcast reception. A power-line antenna is used for the reception of FM stations. These antennas will be satisfactory for good reception under normal conditions. Terminals are provided at the back of the radio for connecting external AM and FM antennas, wherever this is found to be desirable as explained below.

When the receiver is to be used under difficult conditions, such as in buildings constructed mainly of steel, or those with steel lath, or, when large buildings, mountains or other objects are between the receiver and the station to be received, it may be necessary to use an external dipole antenna. Remember too, FM reception is limited as to distance and when used outside the primary service area of the transmitter, an outside antenna is very necessary.

The type of dipole to be used depends upon the signal strength of the station in that particular area, as well as conditions of reception as outlined above. There are three types of FM dipole antenna available, the single dipole, the folded dipole, and the non-directional dipole. When the stations to be received are in one general direction, a reflector may be added to either of the first two types to increase their efficiency.

GENERAL

Due to the high frequencies at which FM signals are received the service man must use great care when servicing these sets. Extreme caution must be used regarding the moving of component parts in the R.F. and oscillator circuits of the receiver as those circuits can be detuned in this manner.

If it becomes necessary to replace components such as resistors and condensers they must be replaced with parts of the same size, type, voltage rating and tolerance as called for in the parts list.

When installing new parts they should be placed in the same position as the original, and the leads should be cut to the same length.

ALIGNMENT NOTES

This receiver has been thoroughly inspected and tested at the factory, using the most modern test equipment available, such as FM sweep generators and oscilloscopes. All R.F. and I.F. circuits have been accurately adjusted at the factory and no attempt should be made to realign these circuits unless it is absolutely necessary.

CAUTION: If realignment is necessary be sure the proper test equipment is available, as listed below, before proceeding with the alignment procedure as given on page 5.

EQUIPMENT USED FOR ALIGNMENT

Vacuum tube voltmeter.
AM Signal generator
FM Sweep generator.
Oscilloscope.
Insulated screw driver.
Dummy antenna:
 .1 MFD condenser
 .00025 MFD mica condenser
 150 ohm resistor (2)
Output meter.

ALIGNMENT PROCEDURE

STEPS	RECEIVER DIAL SETTING	BAND SWITCH POSITION	SIGNAL GENERATOR FREQUENCY	DUMMY ANTENNA	SIGNAL GENERATOR CONNECTIONS	OUTPUT INDICATOR	TRIMMER ADJUSTMENT	TRIMMER FUNCTION	REMARKS
1	Minimum capacity	AM	455 KC 400 cycle AM	.1 MFD	High side—grid of AM converter tube (6BE6) Low side—chassis	Output Meter across voice coil	T4A, T4B T2A, T2B	AM I.F.	Adjust for maximum output
2	"	"	1600 KC 400 cycle AM	"	"	"	C44	AM Oscillator	"
3	1400 KC	"	1400 KC 400 cycle AM	.00025 MFD	High side—One ant. terminal Low side—Other ant. terminal	"	C43	AM Antenna	"
4	Any position where there is no station interference.	FM	10.7 MC unmodulated .1 volt output.	.1 MFD	High side—grid of 2nd I.F. amplifier tube (6BA6) Low side—chassis	Connect V.T.V.M. to plate of Ratio Detector tube, pin 7 (6AL5)	T5B	Ratio detector primary	Adjust for maximum negative voltage, about —5 volts
5	"	"	10.7 MC 400 cycle 30% Modulation. (See note A)	"	"	Connect scope to audio take-off point (across C16)	T5A	Ratio detector secondary	Adjust for a balanced pattern on scope. See Fig. 2
6	"	"	"	"	High side—grid of 1st I.F. amplifier tube (6BA6) Low side—chassis	"	T3A T3B	FM 2nd I.F.	Adjust for maximum gain and best pattern on scope. See Fig. 2
7	"	"	"	"	High side—grid (pin 7) of FM converter tube (12AT7) Low side—chassis	"	T1A T1B	FM 1st I.F.	"
8	108.5 MC	"	108.5 MC 400 cycle 30% modulation (22.5 KC deviation)	300 ohms in high side	High side—ant. terminal Low side—chassis	Connect output meter across voice coil	C42	FM oscillator	Adjust for maximum output
9	105 MC	"	105 MC 400 cycle 30% modulation (22.5 KC deviation)	"	"	"	C45	FM R.F.	"

NOTE A: When aligning the FM I.F. circuits, keep the out put from the signal generator as low as possible.

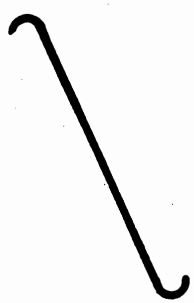


FIGURE 2

MODEL 155 Series

WARWICK MFG. CORP.

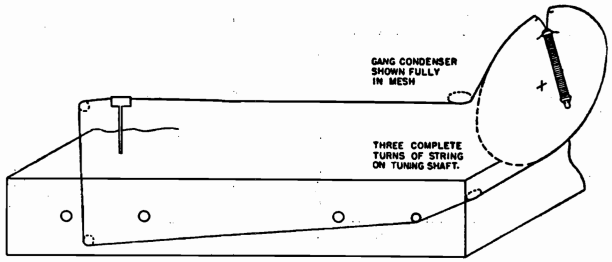


FIG. 4 DIAL CORD STRINGING

VOLTAGE CHART

	PIN 1	PIN 2	PIN 3	PIN 4	PIN 5	PIN 6	PIN 7	PIN 8	PIN 9
6BE6 FM & AM OSC AM CONV	0	0	0	6 AC	155	125	0		
12AT7 FM RF AMP & CONV	170	0	1.5	0	0	155	0	1	6 AC
6BA6 1st IF AM & FM	0	0	0	6 AC	150	100	0		
6BA6 2nd IF AM & FM	0	0	0	6 AC	155	110	1		
6AL5 FM DETECTOR	0	0	6 AC	0	0	0	0		
6AT6 AM DETECTOR, AVC, AUDIO	—.5	0	0	6	0	0	60		
6AQ5 POWER OUTPUT	0	7.5	6 AC	0	215	170	0		
5Y3 POWER RECTIFIER		235		230 AC		230 AC		235	

All voltage readings are taken from tube pin to chassis.

All measurements are made with no signal, using a 20,000 ohm per volt meter.

AC input voltage must be maintained at 117 volts for accurate readings.

AC voltages shown are at 1000 ohms per volt.

RESISTANCE CHART

	PIN 1	PIN 2	PIN 3	PIN 4	PIN 5	PIN 6	PIN 7	PIN 8	PIN 9
6BE6 FM & AM OSC AM CONV	22K	1.5	.5	.5	3.5M	3.5M	2.5M		
12AT7 FM RF AMP & CONV	3.3M	500K	250	0	0	3.5M	500K	2K	0
6BA6 1st IF AM & FM	200K	0	0	0	3.5M	3.5M	70		
6BA6 2nd IF AM & FM	0	0	0	0	3.5M	3.5M	70		
6AL5 FM DETECTOR	OPEN	OPEN	0	0	0	0	22K		
6AT6 AM DETECTOR, AVC, AUDIO	7M	0	0	0	500K	120K	3.5M		
6AQ5 POWER OUTPUT	470K	300	0	0	3.5M	3.5M	0		
5Y3 POWER RECTIFIER		3.5M		0		0		3.5M	

All voltages shown are approximate.

All resistance readings are taken from tube pin to chassis.

Due to manufacturing tolerance on component parts, resistance readings may vary as much as 20%.

All readings are shown in ohms unless otherwise noted.

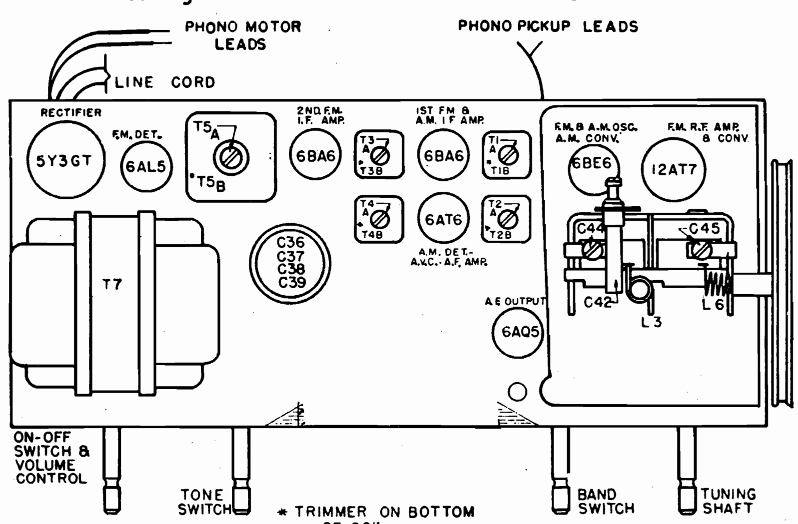


FIG. 3 TUBE AND TRIMMER LOCATIONS

WARWICK MFG. CORP.

MODEL 155 Series

PARTS LIST

Schematic Diagram Reference	Part No.	Description
C1A, C1B, C1C, C1D	C19-200	Variable Condenser
C2	A83-376	2.2 MMF, gimmick
C3, C5, C6, C23, C41	A16-177	.005 MFD ceramic (Centralab NO. DAO48 or equiv.)
C4	A15-210	33 MMF ceramic, 20%, (Erie Style "A" N1400)
C7, C8, C34	A16-192	.01-400 volts, paper tubular
C9, C10, R11	A17-101	100 MMF, 100 MMF, 47K ohms (Diode filter unit, Herlec F06-001)
C11, C12, C13	A17-102	3 x .005 MFD Herlec B34-005
C14, C35	A15-208	270 MMF ceramic, 20%, (Erie Style "K" or equiv.)
C15	A18-292	4 MFD—50 volt electrolytic
C16	A16-180	.003-200 volts, paper tubular
C17	A16-165	.01-200 volts, paper tubular
C18	A16-197	.05-200 volts, paper tubular
C19	A15-209	15 MMF ceramic, 10%, (Erie Style "A" or equiv.)
C20	A15-206	1.5 MMF ceramic, 33%, (Erie Style "A" or equiv.)
C21, C28	A16-196	.02-400 volts, paper tubular
C22, C24, C25,	A15-196	100 MMF 20% Ceramic Condenser (Erie Style K or Equiv.)
C26, C27	A16-199	.005-400 volts, paper tubular
C29	A16-198	.002-600 volts, paper tubular
C30, C32, C33, C40	A16-195	.001 MMF ceramic (Centralab NO. BC20A or equiv.)
C36, C37, C38, C39	A18-291	20-25 volts, 40-350 volts, 30-300 volts, 30-300 volts electrolytic
C42	A20-146	FM oscillator trimmer
R1	A33-231	See L1.
R2	A60-759	4.7 K ohms, ½ watt, 10%
R3, R4	A60-760	10 K ohms, ½ watt, 10%
R5, R6	A60-744	22 K ohms, ½ watt, 10%
R7, R10, R14	A60-675	1 K ohms, ½ watt, 20%
R8, R17	A60-727	100 K ohms, ½ watt, 20%
R9, R13	A60-742	68 ohms, ½ watt, 10%
R11, C9, C10	A17-101	47 K ohms, 100 MMF, 100 MMF (Diode filter unit, Herlec FO6-001)
R12, R23, R24, R28	A60-731	470 K ohms, ½ watt, 20%
R15	A60-723	270 ohms, ½ watt, 20%
R16	A60-748	33 K ohms, ½ watt, 10%
R18	B24-181	Volume control and switch S3
R19, R22	A60-726	2.2 Megohms, ½ watt, 20%
R20	A60-730	47 K ohms, ½ watt, 20%
R21	A60-761	3.3 Megohms, ½ watt, 20%
R25	A60-714	2.2 K ohms, ½ watt, 10%
R26	A60-762	6.8 Megohms, ½ watt, 20%
R27	A60-747	270 K ohms, ½ watt, 20%
R29	A60-754	270 ohms, ½ watt, 10%
R30	A10-516	See L4
R31	A60-753	220 ohms, ½ watt, 10%
R32	A60-755	100 ohms, 1 watt, 10%
R33	A60-763	1 K ohms, 4 watts, 10%
R34	A60-667	220 K ohms ½ watt 20%
L1	A33-231	Choke, wound on R1, 22 ohms
L2A, L2B	A10-515	Oscillator coil, AM
L3	A10-517	Oscillator coil, FM
L4	A10-516	Antenna coil, FM, wound on R30, 1.5 K ohms
L5	A33-233	Plate choke, FM RF
L6	A10-518	RF coil, FM
L8, L9	A33-232	FM oscillator filament choke
L10	A33-227	Filament choke
S1A, S1B, S1C, S1D	A69-184	Band switch
S2	A26-125	Tone control
S3	B24-181	ON-OFF SWITCH, on volume control
T1	A10-519	1st I.F., FM
T2	A10-521	1st I.F., AM
T3	A10-520	2nd I.F., FM
T4	A10-522	2nd I.F., AM
T5	SC10-492	Ratio detector, FM
T6	A80-247	Output transformer
T7	C80-246	Power transformer
	S84-302	Antenna assembly, AM loop
	SB82-53	Antenna asembly, FM dipole
	C67-539	Dial scale, glass
	A52-203	Knob, TUNING
	A52-236	Knob, TONE 1-2-3
	A52-237	Knob, ON-OFF-VOL
	A52-288	Knob, FM-AM-PH
	23-153	Line cord and plug
	A58-68	Pointer, slide type
	C83-429	Retainer, dial scale
	A87-29	Socket, pilot light
	C79-358	Speaker, 10" P.M.
	A59-22	Record changer, Webster No. 50-1

MODEL 11901

WARWICK MFG. CORP.

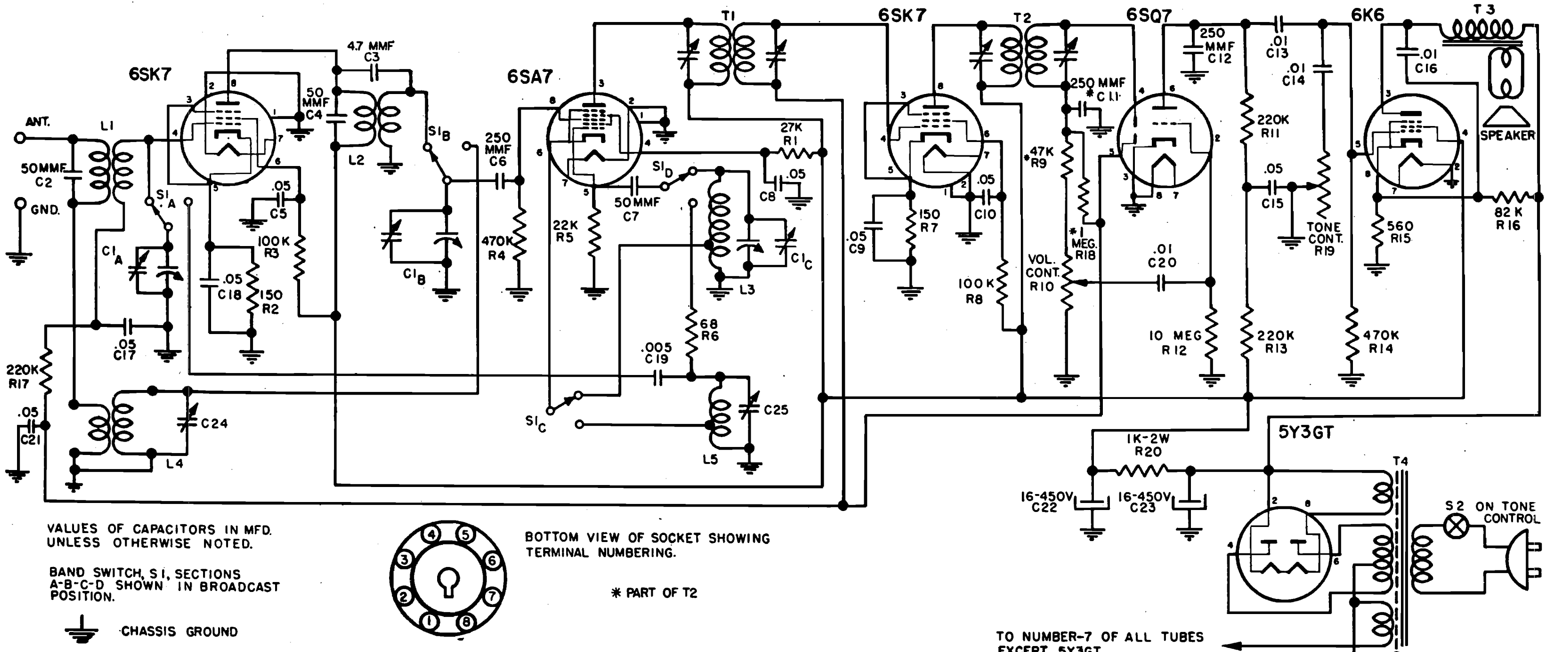


Fig. 1 Schematic Program

CODE	PART NO.	DESCRIPTION	CODE	PART NO.	DESCRIPTION	CODE	PART NO.	DESCRIPTION
C1A, C1B C1C	B19-186	Variable Condenser	R2, R7	A60-686	150 ohm ½ watt resistor..		A84-41	Dial drive shaft assembly
C2, C4, C7	A15-175	50 MMFD Mica condenser	R3, R8	A60-671	100K ohm ½ watt resistor		B79-341	Speaker, 6¼" P.M.
C3	A83-355	4.7 MMFD condenser	R4, R14	A60-662	470K ohm ½ watt resistor		B79-342	Alternate Speaker, 6¼" P.M.
C5, C8, C10, C15	A16-158	.05 MFD 400 volt condenser	R5	A60-659	22K ohm ½ watt resistor		D83-453	Cabinet back
C6, C12	A15-176	250 MMFD Mica condenser	R6	A60-733	68 ohm ½ watt resistor		B83-325	Baffle speaker
C9, C17, C18, C21	A16-152	.05 MFD 200 Volt condenser	R10	A24-169	Volume control, 500,000 ohm		D42-379	Cabinet, mahogany
C13, C14, C20	A16-156	.01 MFD 400 Volt condenser	R11, R13, R17	A60-667	220K ohm ½ watt resistor		A42-401	Cabinet, Ivory
C16	A16-168	.01 MFD 1000 Volt condenser	R12	A60-663	10 megohm ½ watt resistor		B67-503	Dial Glass
C19	A15-181	.005 MFD Mica condenser	R15	A60-701	560 ohm 1 watt resistor		A52-187	Knob, mahogany
C22	A18-279	16 MFD 450 Volt electrolytic condenser	R16	A60-700	82K ohm 1 watt resistor		A52-191	Knob, ivory
C23	A18-274	16 MFD 450 Volt Electrolytic condenser	R19	A26-124	Tone control, 2 megohm, with switch		A58-65	Dial pointer
C24	A20-143	S.W. Antenna trimner	R20	A60-699	1K ohm 2 watt resistor		A83-292	Dial glass retainer, right
C25	A20-143	S.W. Oscillator trimner	L1	A10-486	B.C. Antenna coil		A83-293	Dial glass retainer, left
R1	A60-692	27K ohm 1 watt resistor	L2	B10-452	R.F. Coil		A69-176	Band switch
			L3	B10-446	B.C. Oscillator coil		B79-351	Alternate Speaker, 6¼" P.M.
			L4	A10-482	S. W. Antenna coil			
			L5	A10-481	S. W. Oscillator coil			
			T1	B10-412	1st I. F. Transformer			
			T2	B10-444	2nd. I. F. Transformer			
			T3	A80-222	Output Transformer			
			T4	C80-223	Power Transformer			

WARWICK MFG. CORP. MODEL 11901

DESCRIPTION

Model 11901 is a 6 tube (including rectifier) superhetrodyne radio receiver designed for operation on 50-60 cycle 105-125 volt, AC current.

The tubes used are:

6SK7	R.F. Amplifier	6SQ7	Det, AVC, audio
6SA7	Mixer, Osc.	6K6GT	Power Output
6SK7	I.F. Amplifier	5Y3GT	Rectifier

This receiver covers the standard broadcast frequency range from 535 to 1725 kilocycles (K.C.) and the shortwave frequency range from 6 to 18.2 Megocycles (MC).

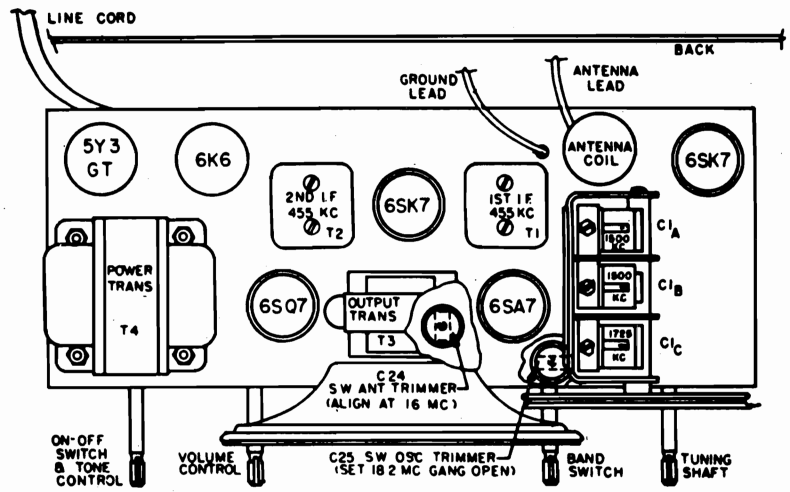


Fig. 2 Tube Positions and Alignment Points

ALIGNMENT PROCEDURE

The following alignment procedure is for use only by competent servicemen having the proper equipment.

With an output meter connected across the voice coil of the speaker, the output meter reading for ½ watt is 1.25 volts, using a signal which is modulated 400 C.P.S. Follow through the procedure as outlined below for proper alignment.

The alignment should be made with volume control fully on, and the output from the signal generator as low as possible, for accurate alignment.

Position of Variable	Band Switch Position	Generator Frequency	Dummy Ant.	Generator Connections	Trimmer Adjustment	Trimmer Function
Fully open	BC	455 KC	.1 MFD.	6SA7 Grid (stator of C1B)	T1 T2	I. F.
Fully open	BC	1725 KC	.00025 MFD.	Ant. lead	C1C	BC Osc.
Tune in signal from generator	BC	1500 KC	.00025 MFD.	Ant. lead	C1B	R. F.
Tune in signal from generator	BC	1500 KC	.00025 MFD.	Ant. lead	C1A	BC Ant.
Fully open	SW	18.2 MC	400 ohms	Ant. lead	C25	SW Osc.
Tune in signal from generator	SW	16 MC	400 ohms	Ant. lead	C24	SW Ant.

GROUND lead of generator should be attached to the chassis for all adjustments

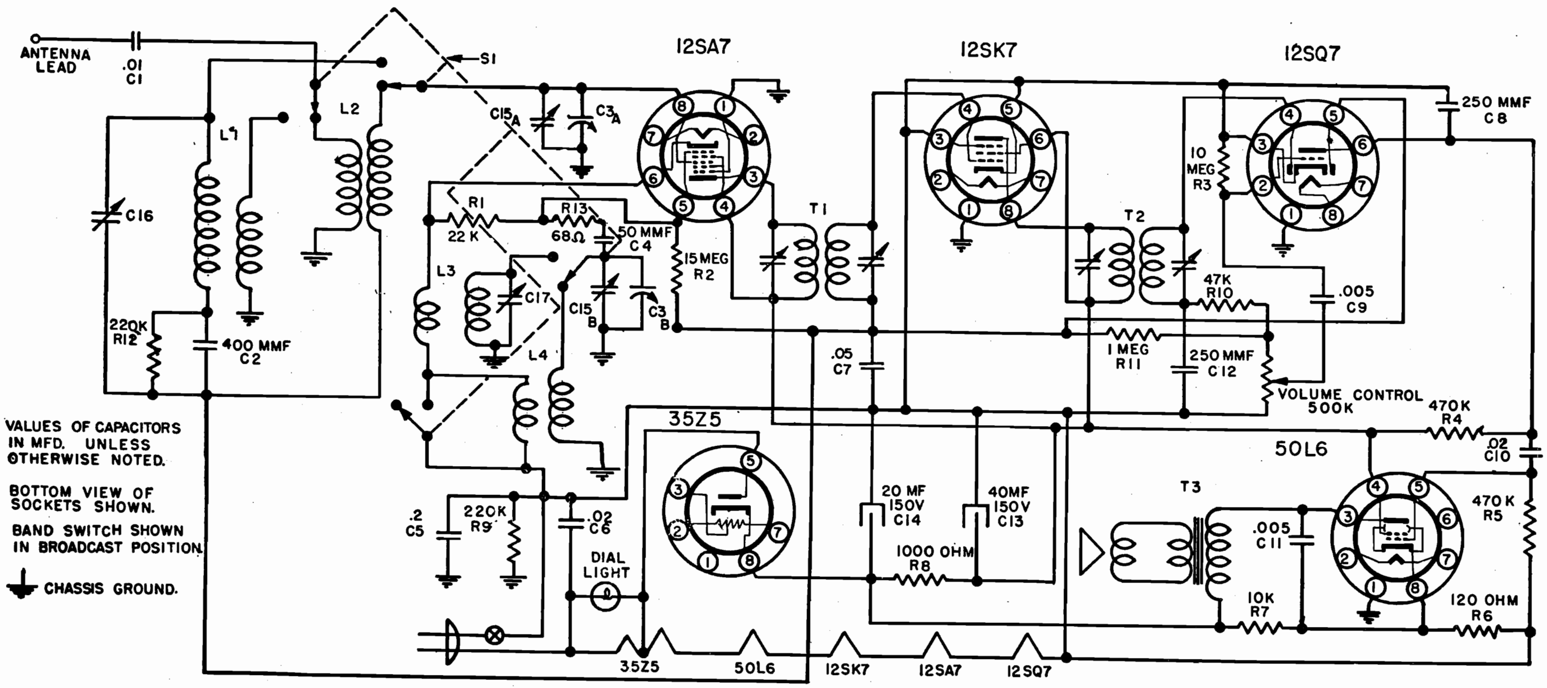
C24 and C25 are located under the chassis

For alignment points refer to Figure 2

Repeat alignment procedure as a final check

MODEL 12001

WARWICK MFG. CORP.



VALUES OF CAPACITORS IN MFD. UNLESS OTHERWISE NOTED.

BOTTOM VIEW OF SOCKETS SHOWN.

BAND SWITCH SHOWN IN BROADCAST POSITION.

CHASSIS GROUND.

PARTS LIST

CODE	PART NO.	DESCRIPTION
C1	A16-156	.01 MFD 400 volt condenser
C2	A15-192	400 MMF mica condenser
C3A, C3B	B19-180	Variable condenser
C4	A15-175	50 MMF mica condenser
C5	A16-154	.2 MFD 400 volt condenser
C6	A16-151	.02 MFD 600 volt condenser
C7	A16-152	.05 MFD 200 volt condenser
C8, C12	A15-176	250 MMF mica condenser
C9, C11	A16-153	.005 MFD 600 volt condenser
C10	A16-150	.02 MFD 400 volt condenser
C13	A18-280	40 MFD 150 volt electrolytic condenser
C14	A18-272	20 MFD 150 volt electrolytic condenser
C15A		B.C. antenna trimmer (on variable condenser)
C15B		B.C. oscillator trimmer (on variable condenser)
C16	A20-143	S.W. antenna trimmer condenser
C17	A20-143	S.W. oscillator trimmer condenser
R1	A60-659	22K ohm 1/3 watt resistor

CODE	PART NO.	DESCRIPTION
R2	A60-664	15 megohm 1/3 watt resistor
R3	A60-663	10 megohm 1/3 watt resistor
R4, R5	A60-662	470K ohm 1/3 watt resistor
R6	A60-658	120 ohm 1/3 watt resistor
R7	A60-698	10K ohm 1 watt resistor
R8	A60-198	1000 ohm 1/2 watt resistor
R9, R12	A60-660	220K ohm 1/3 watt resistor
R10	A60-685	47K ohm 1/3 watt resistor
R11	A60-668	1 megohm 1/3 watt resistor
R13	A60-733	68 ohm 1/2 watt resistor
T1	B10-453	1st I.F. transformer
T2	B10-454	2nd I.F. transformer
T3		Output transformer (part of speaker)
L1	A10-483	S.W. antenna coil
L2	A10-485	B.C. antenna coil
L3	A10-484	S.W. oscillator coil
L4	A10-411	B.C. oscillator coil

CODE	PART NO.	DESCRIPTION
	A71-22	Cover for volume control
	A75-52	Dial drive shaft
	A24-164	Volume control and switch
	B79-340	5" P.M. speaker with output transformer
	D83-452	Cabinet back
	D42-376	Cabinet, Mahogany
	A42-398	Cabinet, Ivory
	B67-504	Dial scale
	A52-181	Knobs, Mahogany
	A52-189	Knobs, Ivory
	A52-223	Knobs, Band switch
	A58-46	Dial pointer
	A83-279	Dial scale retainer, left
	A83-280	Dial scale retainer, right
	A69-177	Band switch

WARWICK MFG. CORP. MODEL 12001

DESCRIPTION

Model 12001 is a 5 tube (including rectifier) super-heterodyne radio receiver. designed for use on 105-125 volt A.C., 60 cycle, or 117 volt D.C. current.

The tubes are:—

1—12SA7 Oscillator, converter
1—12SK7 I.F. Amplifier
1—12SQ7 AVC, Detector, 1st audio
1—50L6GT Power Output
1—35Z5GT Rectifier

This receiver covers the standard broadcast frequency range of 535 to 1725 K.C. (560 to 174 meters), and the Short Wave frequency range of 9 to 18.2 Megacycles (33 to 16.5 meters).

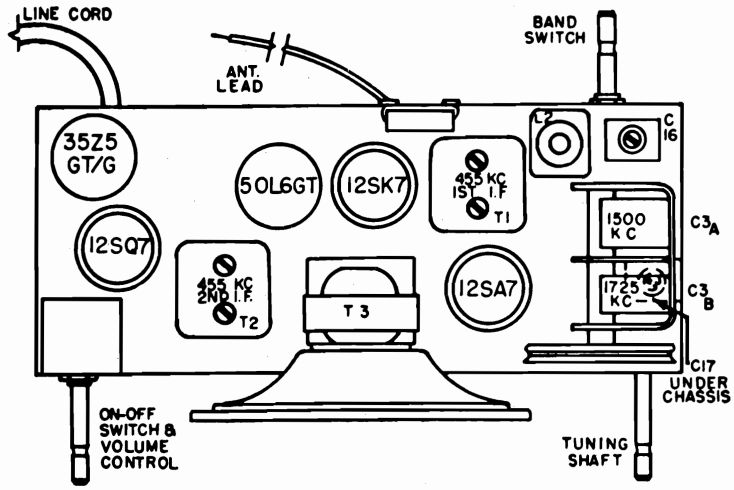
ALIGNMENT PROCEDURE

The following alignment procedure is for use only by competent servicemen having the proper equipment.

The alignment should be made with volume control full on and the output from the signal generator as low as possible to prevent AVC action from interfering with correct alignment.

With the output meter connected across the voice coil of the speaker, the output meter reading for 50 milliwatts is .4 volts, using a signal which is modulated 400 c.p.s.

Adjust all trimmers for maximum output. Repeat alignment procedure as a final check.



ALIGNMENT PROCEDURE—Continued

CAUTION: This is an AC-DC receiver and when aligning the set it is necessary to isolate the signal generator or the receiver from the line by use of a transformer, or place a .2 MFD condenser in both test leads of the signal generator.

Before proceeding with actual alignment the dial pointer must be set to the proper position. With the variable condenser fully open the dial pointer should read 1725 K.C.

Position of Variable	Band Switch Position	Generator Frequency	Dummy Ant.	Generator Connections	Trimmer Adjustment	Trimmer Function
Fully open	B. C.	455 KC	.1 MFD	*12SA7 Grid (Stator of C3A)	T1 - T2	I. F.
Fully open	B. C.	1725 KC	.00025 MFD	*Ant. lead	**C3B	B. C. Oscillator
Tune in signal from generator	B. C.	1400 KC	.00025 MFD	*Ant. lead	**C3A	B. C. Antenna
16 MC	S. W.	16 MC	400 ohms	*Ant. lead	C17	S. W. Oscillator
16 MC	S. W.	16 MC	400 ohms	*Ant. lead	C16	S. W. Antenna

* Connect ground lead of signal generator to "Common B."

** C3A, C3B, are located on variable condenser

NOTE: The above procedure must be followed in exact sequence for proper alignment.

MODEL 12110 WARWICK MFG. CORP.

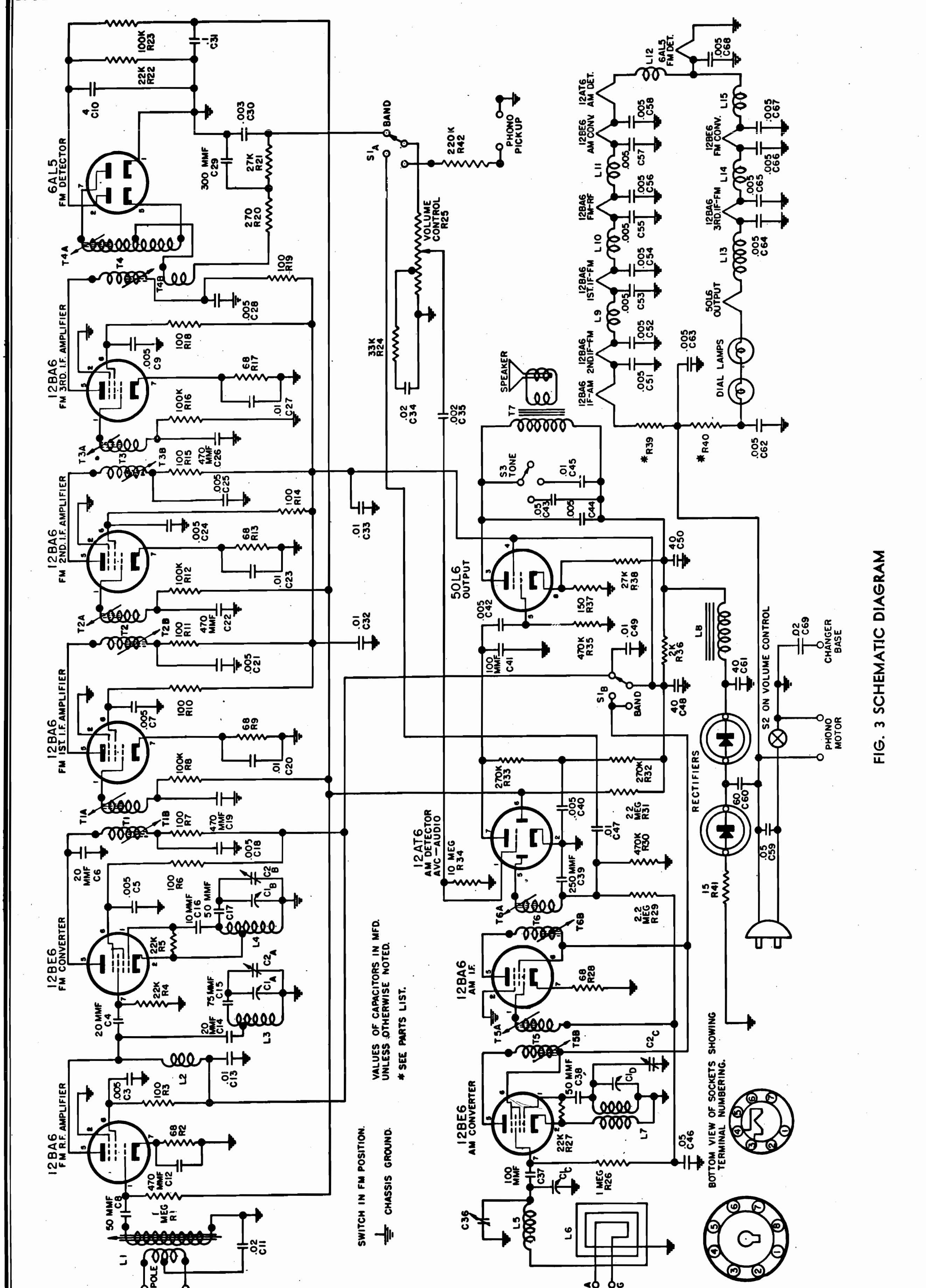


FIG. 3 SCHEMATIC DIAGRAM

SPECIFICATIONS

Power Supply	117 volts AC 60 cycle
Power Consumption	95 Watts
Frequency Range FM	88 to 108 MC.
Frequency Range AM	540 to 1600 KC.
I.F. frequency FM	10.7 MC.
I.F. frequency AM	455 KC.
Band width, FM, Ratio detector	360 KC.
Band width, FM, 2nd I.F.	280 KC.
Band width, FM, 1st I.F.	240 KC.
Band width, FM, Converter	180 KC.
Tubes	10
Rectifiers	Selenium, 150 ma.
Speaker	10" P.M.

The tubes used are as follows:

12BA6	FM, R.F. Amplifier
12BE6	FM, Converter
12BA6	FM, 1st I.F. Amplifier
12BA6	FM, 2nd I.F. Amplifier
12BA6	FM, 3rd I.F. Amplifier
6AL5	FM, Ratio detector
12BE6	AM, Converter
12BA6	AM, I.F. Amplifier
12AT6	AM, Detector-AVC-1st audio
50L6GT	Power output
A83-463	Selenium rectifier (2)
No. 47	Pilot lights (2)

SERVICE NOTES

INSTALLATION

The loop antenna provided with the receiver will prove adequate for the reception of all AM stations under normal operating conditions. The flexible folded dipole antenna will be adequate for the reception of powerful or near-by FM stations except when the set is used in a building constructed mainly of steel or where FM reception is otherwise difficult. When the radio is used with the inside antenna as provided, it is suggested that you try placing the set in different locations in the room. FM reception especially will vary greatly according to the location of the antenna within the room.

When it is desired to receive FM stations outside of the primary service area, or if the receiver is being used under difficult conditions, the use of an outside dipole antenna is recommended. There are three types of such aerials, namely single dipole, the folded dipole, and the non-directional dipole. To increase the "pick-up" or sensitivity, a reflector may be used with either of the first two types. The proper type of antenna as well as its location are determined by the terrain and distance from the station to be received, the direction, etc. Your local service man will advise you of the proper antenna installation, for your particular area. Two terminals are provided on the back of the set for connecting the outside dipole antenna leads.

FM reception is very directional, and even when using the FM antenna furnished with the receiver, reception can sometimes be very much improved by turning the receiver in a different direction. Be careful not to place the radio close to large metal objects as this might tend to cause reflections or otherwise interfere with good reception.

CAUTION: Always disconnect the line cord before removing the back for tube replacement, etc.

GENERAL

Due to the high frequencies at which FM signals are received the service man must use great care when servicing these sets. Extreme caution must be used regarding the moving of component parts in the R.F. and oscillator circuits of the receiver as those circuits can be detuned in this manner.

If it becomes necessary to replace components such as resistors and condensers they must be replaced with parts of the same size, type, voltage rating and tolerance as called for in the parts list.

When installing new parts they should be placed in the same position as the original, and the leads should be cut to the same length.

ALIGNMENT NOTES

This receiver has been thoroughly inspected and tested at the factory, using the most modern test equipment available, such as FM sweep generators and Oscilloscopes. All I.F. circuit adjustments have been sealed at the factory and no attempt should be made to realign these circuits unless it is absolutely necessary.

CAUTION: If realignment is necessary be sure the proper test equipment is available, as listed below, before proceeding with the alignment procedure as given on page 5. This receiver employs the "double peak" type of I.F. circuits, and can not be satisfactorily aligned with conventional AM equipment. Visual alignment procedures must be used.

EQUIPMENT USED FOR ALIGNMENT

- AM Signal generator
- FM Sweep generator.
- Oscilloscope.
- Vacuum tube voltmeter.
- Insulated screw driver.
- Dummy antenna:
  - .1 MFD condenser
  - .00025 MFD mica condenser
  - 150 ohm resistor (2)
- Output meter.

MODEL 12110 WARWICK MFG. CORP.

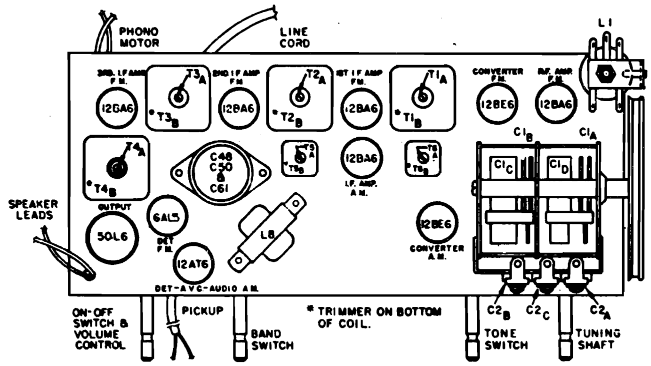


FIG. 1 TUBE AND TRIMMER LOCATIONS

VOLTAGE CHART

TUBE No.	PIN 1	PIN 2	PIN 3	PIN 4	PIN 5	PIN 6	PIN 7	PIN 8
12BE6 AM—Converter	—6	0	29ac	17ac	100	100	0	
12BA6 AM—I.F. Amp.	0	0	75ac	63ac	100	100	1	
12AT6 AM—Det.-AVC-Audio	0	0	17ac	6ac	0	0	30	
12BA6 FM—R.F. Amp.	0	0	29ac	39ac	100	95	1	
12BE6 FM—Converter	0	0	6ac	18ac	95	95	0	
12BA6 FM—1st I.F. Amp.	0	0	39ac	50ac	95	95	1	
12BA6 FM—2nd I.F. Amp.	0	0	50ac	63ac	95	95	1	
12BA6 FM—3rd I.F. Amp.	0	0	18ac	31ac	95	95	1	
6AL5 FM—Ratio detector	0	—3	0	6ac	—4	0	0	
50L6GT Power output	0	31ac	225	100	0	30	80ac	6.5

All voltage readings are taken from tube pin to chassis.

All measurements are made with no signal, using a 20,000 ohm per volt meter.

AC input voltage must be maintained at 117 volts for accurate readings.

AC voltages shown are at 1000 ohms per volt.

All voltages shown are approximate.

RESISTANCE CHART

TUBE No.	PIN 1	PIN 2	PIN 3	PIN 4	PIN 5	PIN 6	PIN 7	PIN 8
12BE6 AM—Converter	20K	1	27	18	25K	25K	3 meg.	
12BA6 AM—I. F. Amp.	2 meg.	0	70	62	25K	25K	70	
12AT6 AM—Det.-AVC-Audio	10 meg.	0	18	5	470K	120K	540K	
12BA6 FM—R.F. Amp.	1 meg.	0	27	40	25K	25K	70	
12BE6 FM—Converter	20K	0	5	18	25K	25K	22K	
12BA6 FM—1st I.F. Amp.	220K	0	40	50	25K	25K	70	
12BA6 FM—2nd I.F. Amp.	220K	0	50	62	25K	25K	70	
12BA6 FM—3rd I.F. Amp.	100K	0	18	28	25K	25K	70	
6AL5 FM—Ratio Detector	0	25K	0	5	750K	0	750K	
50L6GT Power output	0	28	25K	25K	450K	250K	70	150

All resistance readings are taken from tube pin to chassis.

Due to manufacturing tolerance on component parts, resistance readings may vary as much as 20%.

All readings are shown in ohms unless otherwise noted.

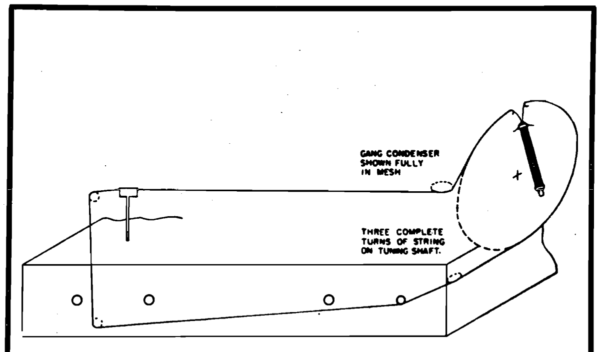


FIG. 2 DIAL CORD STRINGING

WARWICK MFG. CORP.

MODEL 12110

ALIGNMENT PROCEDURE

STEPS	RECEIVER DIAL SETTING	BAND SWITCH POSITION	SIGNAL GENERATOR FREQUENCY	DUMMY ANTENNA	SIGNAL GENERATOR CONNECTIONS	OUTPUT INDICATOR	TRIMMER ADJUSTMENT	TRIMMER FUNCTION	REMARKS
1	Minimum capacity	AM	455 KC 400 cycle AM	.1 MFD	High side—Grid of AM converter tube (12BE6) Low side—Chassis	Output Meter across voice coil	T5A, T5B T6A, T6B	AM I.F.	Adjust for maximum output
2	"	"	1600 KC 400 cycle AM	.00025 MFD	"	"	C2C	AM Oscillator	Adjust for maximum output
3	1400 KC	"	1400 KC 400 cycle AM	"	High side—One ant. terminal Low side—Other ant. terminal	"	C36 (on back)	AM Antenna	Adjust for maximum output
4	Any position where there is no station interference.	FM	10.7 MC unmodulated .1 volt output.	.1 MFD	High side—Grid of 3rd I.F. amplifier tube (12BA6) Low side—Chassis	Connect V.T.V.M. to plate of Ratio detector tube, pin 2 (6AL5)	T4B	Ratio detector primary	Adjust for maximum negative voltage, about —5 volts
5	"	"	10.7 MC 400 cycle 30% Modulation. (See note A)	"	"	Connect scope to audio take off point (across C30)	T4A	Ratio detector secondary	Adjust for a balanced pattern on scope. See Fig. 4.
6	"	"	"	"	High side—Grid of 2nd I.F. amplifier tube (12BA6) Low side—Chassis	Connect scope across 100K ohm grid return resistor of 3rd I.F. (R16)	T3A, T3B	FM 3rd I.F.	Adjust for maximum gain and best pattern on scope. See Fig. 5 (See note "B" below)
7	"	"	"	"	High side—Grid of 1st I.F. amplifier tube (12BA6) Low side—Chassis	"	T2A, T2B	FM 2nd I.F.	Adjust for maximum gain and best pattern on scope. See Fig. 6.
8	"	"	"	"	High side—Plate of FM R.F. tube, pin 5 (12BA6) Low side—Chassis	"	T1A, T2B	FM 1st I.F.	Adjust for maximum gain and best pattern on scope. See Fig. 7.
9	109 MC	"	109 MC 400 cycle 30% modulation. (22.5 KC Deviation)	150 ohms in each lead.	High side—One ant. terminal Low side—Other ant. terminal	Connect output meter across voice coil	C2B	FM Oscillator	Adjust for maximum output (remove AVC ground)
10	103 MC	"	103 MC 400 cycle 30% modulation. (22.5 KC Deviation)	"	"	"	C2A	FM R.F.	Adjust for maximum output
11	100 MC	"	100 MC 400 cycle 30% modulation. (22.5 KC Deviation)	"	"	"	L1	FM Antenna	Adjust for maximum output

NOTE A: When aligning the FM I.F. circuits, keep the out put from the signal generator as low as possible.

NOTE B: The AVC circuit must be grounded to the chassis when aligning the FM I.F. circuits.

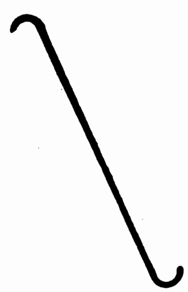


FIGURE 4

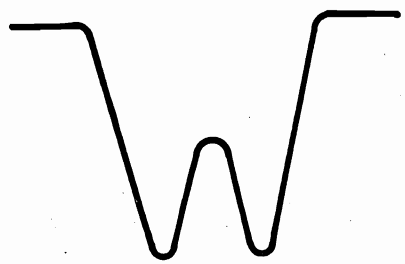


FIGURE 5

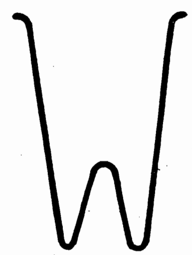


FIGURE 6

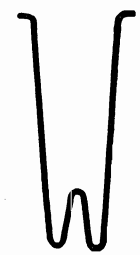


FIGURE 7

WARWICK MFG. CORP.

Schematic Diagram Reference	Part No.	Description
C1A, C1B, C1C, C1D	C19-191	Variable Condenser
C2A, C2B, C2C	A20-144	FM—R.F. Trimmer; FM—Oscillator Trimmer; AM—Oscillator Trimmer
C3, C5, C7, C9, C18, C21, C23, C24, C25, C28, C40, C51, C52, C53, C54, C55, C56, C57, C58, C62, C64, C65, C66, C67, C68	A16-177	005 MFD Ceramic Condenser (Centralab No. DA048 or Equiv.)
C4, C14	A15-198	20 MMF 20% Ceramic Condenser (Erie Style "A" or Equiv.)
C6	A15-193	20 MMF 20% Ceramic Condenser (Erie Style K or Equiv.)
C8, C17	A15-194	50 MMF 10% Ceramic Condenser (Erie Style K or Equiv.)
C10	A18-273	4 MFD 150 Volt Elec. Condenser
C34, C69	A16-150	.02 MFD 400 Volt Tubular Condenser
C12, C19, C22, C26	A15-200	470 MMF 20% Mica Condenser
C13, C32, C33, C47 C49	A16-165	.01 MFD 200 V Tubular Condenser
C15	A15-195	75 MMF 10% Ceramic Condenser (Erie Style K or Equiv.)
C16	A15-197	10 MMF 10% Ceramic Condenser (Erie Style A or Equiv.)
C20, C23, C27	A16-163	.01 MFD 120 V Molded Paper Condenser
C42, C44	A16-153	.005 MFD 600 Volt Tubular Condenser
C29	A15-199	300 MMF 20% Mica Condenser
C30	A16-180	.003 MFD 200 V Molded Paper Condenser
C31	A16-157	.1 MFD 200 V Tubular Condenser
C35	A16-178	.002 MFD 200 V Molded Paper Condenser
C36	A20-139	AM Antenna Trimmer
C37	A15-190	100 MMF 20% Mica Condenser
C38	A15-191	50 MMF 20% Mica Condenser
C39	A15-176	250 MMF 20% Mica Condenser
C41	A15-196	100 MMF 20% Ceramic Condenser (Erie Style K or Equiv.)
C46, C69, C43, C59	A16-158	.05 MFD 400 V Tubular Condenser
C45	A16-156	.01 MFD 400 V Tubular Condenser
C48, C50, C61	A18-284	40 MFD 150 Volt Electrolytic Condenser; 40 MFD 300 Volt Electrolytic Condenser; 40 MFD 300 Volt Electrolytic Condenser
C60	A18-285	60 MFD 150 Volt Electrolytic Condenser
R1, R26	A60-668	1 Megohm Resistor 20% ½ Watt
R2, R13, R17, R28, R9	A60-742	68 Ohm Resistor 10% ½ Watt
R3, R6, R7, R10, R19, R11, R14, R15, R18	A60-743	100 Ohm Resistor 20% ½ Watt

Schematic Diagram Reference	Part No.	Description
R4, R5, R22, R27	A60-744	22 K Ohm Resistor 10% ½ Watt
R8, R12, R16, R23	A60-727	100 K Ohm 20% ½ Watt
R20	A60-723	270 Ohm 20% ½ Watt Resistor
R21	A60-745	27 K Ohm 10% ½ Watt Resistor
R24	A60-748	33 K Ohm 10% ½ Watt Resistor
R25	B24-173	Volume Control with Switch
R29, R31	A60-726	2.2 Megohm 20% ½ Watt
R30, R35	A60-731	470K Ohm ½ Watt Resistor 20%
R32, R33	A60-747	270K Ohm 20% ½ Watt
R34	A60-728	10 Megohm 20% ½ Watt
R36	A60-739	2K Ohm Resistor 5% 10 Watt
R37	A60-741	150 Ohm 10% 1 Watt Resistor
R38	A60-740	27K Ohm Resistor 10% 2 Watt
R39	A60-734	Special Compensating Resistor (Order from MFG.)
R40	A60-735	Special Compensating Resistor (Order from MFG.)
R41	A60-738	15 Ohm — Glassohm 10% 3 Watt Resistor
R42	A60-667	220K Ohm Resistor 20% ½ Watt
L1	SB10-488	Antenna Coil, FM
L3	B10-489	R. F. Coil, F.M.
L4	B10-490	Oscillator Coil, F. M.
L5	A10-504	Antenna Loading Coil
L6	S84-166	Loop Antenna Assembly
L7	B10-491	Oscillator Coil, A. M.
L8	A33-225	Filter Choke
L2, L9, L10, L11, L12, L14, L15	A33-226	Filament Choke, 11 mh.
L13	A33-227	Filament Choke
S1A, S1B	A69-178	Switch, FM-AM-PHONO
S2		Switch, ON-OFF, (on volume control)
S3	A26-125	Tone Control
T1	SA10-493	1st I. F. Transformer, F. M.
T2, T3	SC10-494	2nd & 3rd I. F. Transformer, F.M.
T4	SC10-492	Ratio detector transformer, F.M.
T5	A10-499	1st I. F. transformer, A. M.
T6	A10-500	2nd I. F. transformer, A. M.
T7	A80-241	Output Transformer
	B39-285	Drum, for Variable Condenser
	A23-153	Line Cord
	A83-463	Selenium rectifier, 150 ma.
	A75-63	Tuning shaft
	C79-358	Speaker, 10" P.M.
	A21-111	Cover, for Compensating Resistors
	SB82-53	FM Antenna Assembly, Dipole
	C67-503	Dial Scale
	C83-471	Retainer, Dial Scale
	B83-482	Dial Diffusing Plate
	A58-68	Dial Pointer
	A52-203	Knob, Tuning
	A52-236	Knob, Tone
	A52-237	Knob, ON-OFF-VOLUME
	A52-238	Knob, PH-AM-FM

NOTE: Model 12110M uses a Webster Record Changer No. 50-1

WARWICK MFG. CORP. MODEL 13101

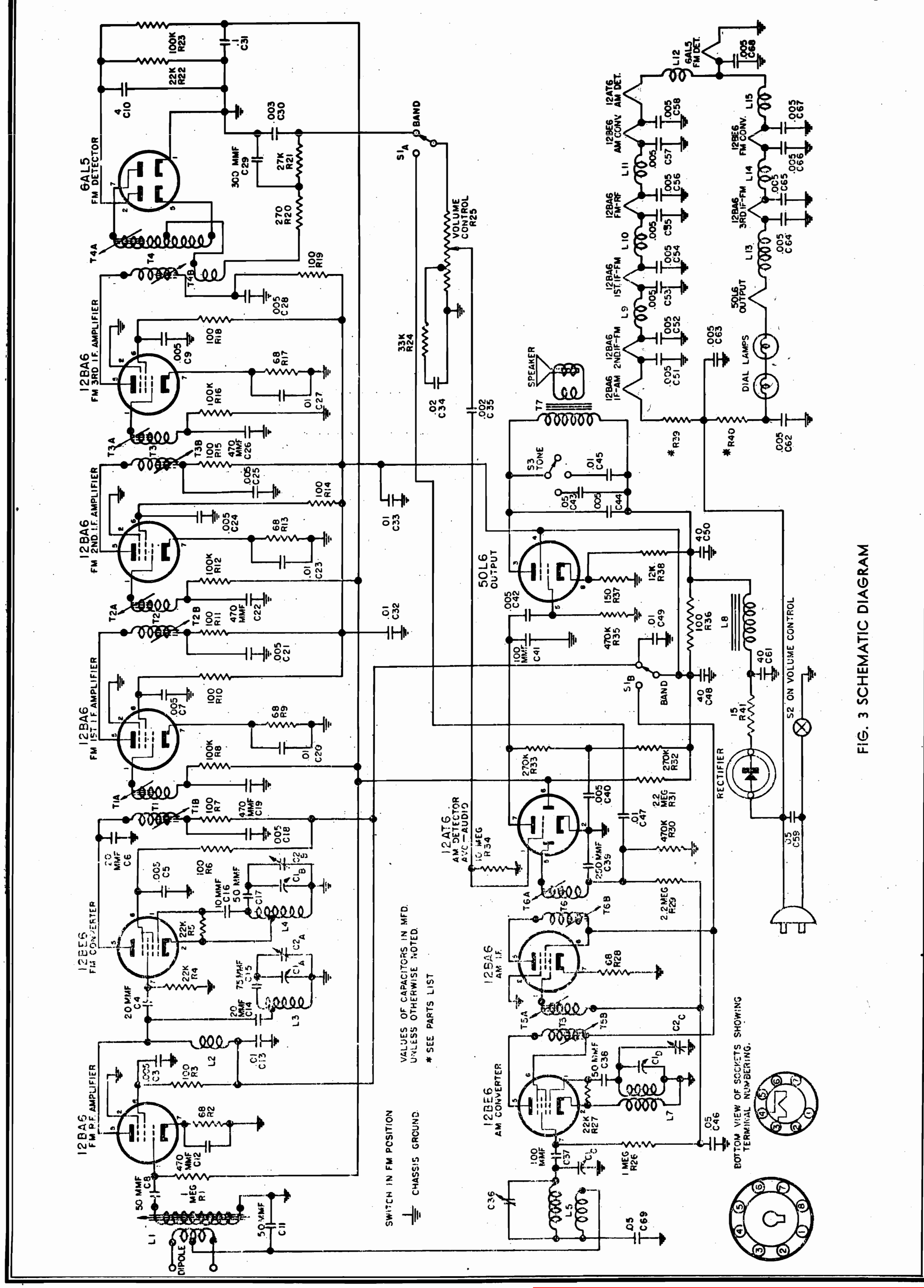


FIG. 3 SCHEMATIC DIAGRAM

WARWICK MFG. CORP.

SPECIFICATIONS

Power Supply	117 volts AC-DC
Power Consumption	55 Watts
Frequency Range FM	88 to 108 MC.
Frequency Range AM	540 to 1600 KC.
I.F. frequency FM	10.7 MC.
I.F. frequency AM	455 KC.
Band width, FM, Ratio detector	360 KC.
Band width, FM, 2nd I.F.	280 KC.
Band width, FM, 1st I.F.	240 KC.
Band width, FM, Converter	180 KC.
Tubes	10
Rectifier	Selenium, 150 ma.
Speaker	6" P.M.

The tubes used are as follows:

12BA6	FM, R.F. Amplifier
12BE6	FM, Converter
12BA6	FM, 1st I.F. Amplifier
12BA6	FM, 2nd I.F. Amplifier
12BA6	FM, 3rd I.F. Amplifier
6AL5	FM, Ratio detector
12BE6	AM, Converter
12BA6	AM, I.F. Amplifier
12AT6	AM, Detector-AVC-1st audio
50L6GT	Power output
A83-463	Selenium rectifier
No. 47	Pilot lights (2)

GENERAL SERVICE INFORMATION

INSTALLATION

This receiver is shipped from the factory complete with a flexible, folded dipole antenna. This antenna will be satisfactory for good reception under normal conditions. It should be connected to the two (2) dipole terminals on the back of the cabinet, and then extended to its full length. Since FM signals are directional, reception may be sometimes improved by rotating the extended sections of the flexible antenna in different directions.

This antenna is also used in conjunction with the AM antenna coil for standard AM broadcast reception, and therefore must be connected as described above for reception of standard broadcast stations.

When the receiver is to be used under difficult conditions, such as in buildings constructed mainly of steel, or those with steel lath, or, when large buildings, mountains or other objects are between the receiver and the station to be received, it may be necessary to use an external dipol antenna. Remember too, FM reception is limited as to distance and when used outside the primary service area of the transmitter, an outside antenna is very necessary.

The type of dipole to be used depends upon the signal strength of the station in that particular area, as well as conditions of reception as outlined above. There are three types of FM dipole antenna available, the single dipole, the folded dipole, and the non-directional dipole. When the stations to be received are in one general direction, a reflector may be added to either of the first two types to increase their efficiency.

GENERAL

Due to the high frequencies at which FM signals are received the service man must use great care when servicing these sets. Extreme caution must be used regarding the moving of component parts in the R.F. and oscillator circuits of the receiver as those circuits can be detuned in this manner.

If it becomes necessary to replace components such as resistors and condensers they must be replaced with parts of the same size, type, voltage rating and tolerance as called for in the parts list.

When installing new parts they should be placed in the same position as the original, and the leads should be cut to the same length.

ALIGNMENT NOTES

This receiver has been thoroughly inspected and tested at the factory, using the most modern test equipment available, such as FM sweep generators and Oscilloscopes. All I.F. circuit adjustments have been sealed at the factory and no attempt should be made to realign these circuits unless it is absolutely necessary.

CAUTION: If realignment is necessary be sure the proper test equipment is available, as listed below, before proceeding with the alignment procedure as given on page 5. This receiver employs the "double peak" type of I.F. circuits, and can not be satisfactorily aligned with conventional AM equipment. Visual alignment procedures must be used.

EQUIPMENT USED FOR ALIGNMENT

Vacuum tube voltmeter.

AM Signal generator

FM Sweep generator.

Oscilloscope.

Insulated screw driver.

Dummy antenna:
- .1 MFD condenser
- .00025 MFD mica condenser
- 150 ohm resistor (2)

Output meter.

WARWICK MFG. CORP.

MODEL 13101

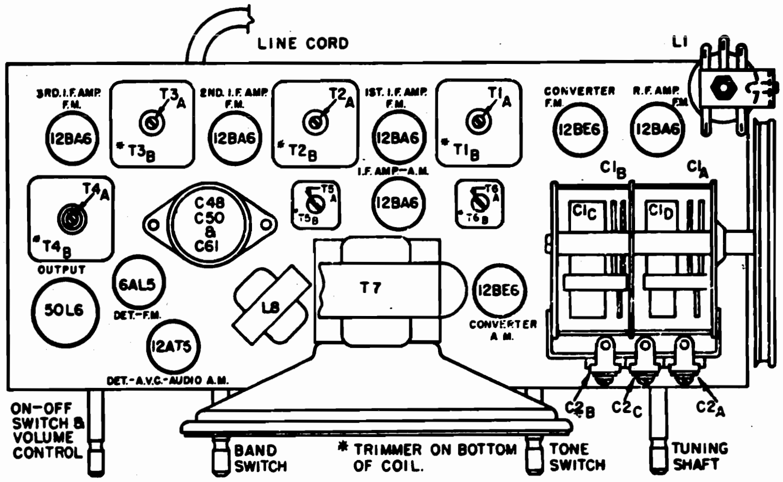


FIG. 1 TUBE AND TRIMMER LOCATIONS

VOLTAGE CHART

TUBE No.	PIN 1	PIN 2	PIN 3	PIN 4	PIN 5	PIN 6	PIN 7	PIN 8
12BE6 AM—Converter	—6	0	29ac	17ac	100	100	0	
12BA6 AM—I.F. Amp.	0	0	75ac	63ac	100	100	1	
12AT6 AM—Det.-AVC-Audio	0	0	17ac	6ac	0	0	30	
12BA6 FM—R.F. Amp.	0	0	29ac	39ac	100	95	1	
12BE6 FM—Converter	0	0	6ac	18ac	95	95	0	
12BA6 FM—1st I.F. Amp.	0	0	39ac	50ac	95	95	1	
12BA6 FM—2nd I.F. Amp.	0	0	50ac	63ac	95	95	1	
12BA6 FM—3rd I.F. Amp.	0	0	18ac	31ac	95	95	1	
6AL5 FM—Ratio detector	0	—3	0	6ac	—4	0	0	
50L6GT Power output	0	31ac	85	95	0	30	80ac	6.5

All voltage readings are taken from tube pin to chassis.

All measurements are made with no signal, using a 20,000 ohm per volt meter.

AC input voltage must be maintained at 117 volts for accurate readings.

AC voltages shown are at 1000 ohms per volt.

All voltages shown are approximate.

RESISTANCE CHART

TUBE No.	PIN 1	PIN 2	PIN 3	PIN 4	PIN 5	PIN 6	PIN 7	PIN 8
12BE6 AM—Converter	20K	1	27	18	25K	25K	3 meg.	
12BA6 AM—I. F. Amp.	2 meg.	0	70	62	25K	25K	70	
12AT6 AM—Det.-AVC-Audio	10 meg.	0	18	5	470K	120K	540K	
12BA6 FM—R.F. Amp.	1 meg.	0	27	40	25K	25K	70	
12BE6 FM—Converter	20K	0	5	18	25K	25K	22K	
12BA6 FM—1st I.F. Amp.	220K	0	40	50	25K	25K	70	
12BA6 FM—2nd I.F. Amp.	220K	0	50	62	25K	25K	70	
12BA6 FM—3rd I.F. Amp.	100K	0	18	28	25K	25K	70	
6AL5 FM—Ratio Detector	0	25K	0	5	750K	0	750K	
50L6GT Power output	0	28	25K	25K	450K	250K	70	150

All resistance readings are taken from tube pin to chassis.

Due to manufacturing tolerance on component parts, resistance readings may vary as much as 20%.

All readings are shown in ohms unless otherwise noted.

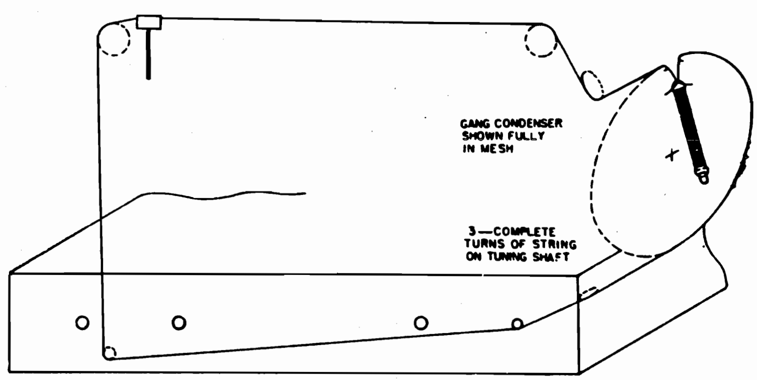


FIG. 2 DIAL CORD STRINGING

MODEL 13101

WARWICK MFG. CORP.

ALIGNMENT PROCEDURE

STEPS	RECEIVER DIAL SETTING	BAND SWITCH POSITION	SIGNAL GENERATOR FREQUENCY	DUMMY ANTENNA	SIGNAL GENERATOR CONNECTIONS	OUTPUT INDICATOR	TRIMMER ADJUSTMENT	TRIMMER FUNCTION	REMARKS
1	Minimum capacity	AM	455 KC 400 cycle AM	.1 MFD	High side—Grid of AM converter tube (12BE6) Low side—Chassis	Output Meter across voice coil	T5A, T5B T6A, T6B	AM I.F.	Adjust for maximum output
2	"	"	1600 KC 400 cycle AM	.00025 MFD	"	"	C2C	AM Oscillator	Adjust for maximum output
3	1400 KC	"	1400 KC 400 cycle AM	"	High side—One ant. terminal Low side—Other ant. terminal	"	C36 (on back)	AM Antenna	Adjust for maximum output
4	Any position where there is no station interference.	FM	10.7 MC unmodulated .1 volt output.	.1 MFD	High side—Grid of 3rd I.F. amplifier tube (12BA6) Low side—Chassis	Connect V.T.V.M. to plate of Ratio detector tube, pin 2 (6AL5)	T4B	Ratio detector primary	Adjust for maximum negative voltage, about —5 volts
5	"	"	10.7 MC 400 cycle 30% Modulation. (See note A)	"	"	Connect scope to audio take off point (across C30)	T4A	Ratio detector secondary	Adjust for a balanced pattern on scope. See Fig. 4.
6	"	"	"	"	High side—Grid of 2nd I.F. amplifier tube (12BA6) Low side—Chassis	Connect scope across 100K ohm grid return resistor of 3rd I.F. (R16)	T3A, T3B	FM 3rd I.F.	Adjust for maximum gain and best pattern on scope. See Fig. 5 (See note "B" below)
7	"	"	"	"	High side—Grid of 1st I.F. amplifier tube (12BA6) Low side—Chassis	"	T2A, T2B	FM 2nd I.F.	Adjust for maximum gain and best pattern on scope. See Fig. 6
8	"	"	"	"	High side—Plate of FM R.F. tube, pin 5 (12BA6) Low side—Chassis	"	T1A, T2B	FM 1st I.F.	Adjust for maximum gain and best pattern on scope. See Fig. 7.
9	109 MC	"	109 MC 400 cycle 30% modulation. (22.5 KC Deviation)	150 ohms in each lead.	High side—One ant. terminal Low side—Other ant. terminal	Connect output meter across voice coil	C2B	FM Oscillator	Adjust for maximum output (remove AVC ground)
10	103 MC	"	103 MC 400 cycle 30% modulation. (22.5 KC Deviation)	"	"	"	C2A	FM R.F.	Adjust for maximum output
11	100 MC	"	100 MC 400 cycle 30% modulation. (22.5 KC Deviation)	"	"	"	L1	FM Antenna	Adjust for maximum output

NOTE A: When aligning the FM I.F. circuits, keep the out put from the signal generator as low as possible.

NOTE B: The AVC circuit mus tbe grounded to the chassis when aligning the FM I.F. circuits.

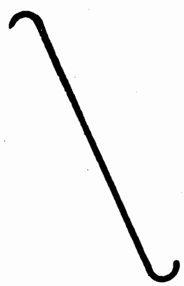


FIGURE 4

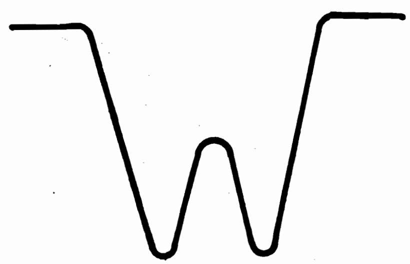


FIGURE 5

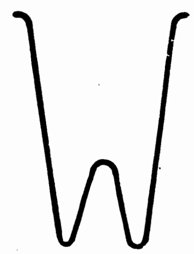


FIGURE 6

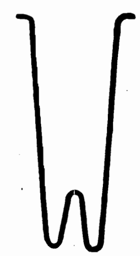


FIGURE 7

WARWICK MFG. CORP. MODEL 13101

PARTS LIST

Schematic Diagram Reference	Part No.	Description
C1A, C1B, C1C, C1D	C19-191	Variable Condenser
C2A	A20-144	FM—R.F. Trimmer
C2B	A20-144	FM—Oscillator Trimmer
C2C	A20-144	AM—Oscillator Trimmer
C3, C5, C7, C9, C18, C21, C24, C25, C28, C40, C51, C52, C53, C54, C55, C56, C57, C58, C62, C23, C64, C65, C66, C67, C68	A16-177	.005 MFD Ceramic Condenser (Centralab No. DA048 or Equiv.)
C4, C14	A15-198	20 MMF 20% Ceramic Condenser (Erie Style "A" or Equiv.)
C6	A15-193	20 MMF 20% Ceramic Condenser (Erie Style K or Equiv.)
C8, C17	A15-194	50 MMF 10% Ceramic Condenser (Erie Style K or Equiv.)
C10	A18-273	4 MFD 150 Volt Elec. Condenser
C34	A16-150	.02 MFD 400 Volt Tubular Condenser
C12, C19, C22, C26	A15-200	470 MMF 20% Mica Condenser
C13, C32, C33, C47 C49	A16-165	.01 MFD 200 V Tubular Condenser
C15	A15-195	75 MMF 10% Ceramic Condenser (Erie Style K or Equiv.)
C16	A15-197	10 MMF 10% Ceramic Condenser (Erie Style A or Equiv.)
C20, C23, C27	A16-163	.01 MFD 120 V Molded Paper Condenser
C42, C44	A16-153	.005 MFD 600 Volt Tubular Condenser
C29	A15-199	300 MMF 20% Mica Condenser
C30	A16-180	.003 MFD 200 V Molded Paper Condenser
C31	A16-157	.1 MFD 200 V Tubular Condenser
C35	A16-178	.002 MFD 200 V Molded Paper Condenser
C36	A20-139	AM Antenna Trimmer
C37	A15-190	100 MMF 20% Mica Condenser
C11, C38	A15-191	50 MMF 20% Mica Condenser
C39	A15-176	250 MMF 20% Mica Condenser
C41	A15-196	100 MMF 20% Ceramic Condenser (Erie Style K or Equiv.)
C46, C69, C43, C59	A16-158	.05 MFD 400 V Tubular Condenser
C45	A16-156	.01 MFD 400 V Tubular Condenser
C43	A18-284	40 MFD 150 Volt Electrolytic Condenser
C50	A18-284	40 MFD 300 Volt Electrolytic Condenser
C61	A18-284	40 MFD 300 Volt Electrolytic Condenser
R1, R26	A60-688	1 Megohm Resistor 20% ½ Watt
R2, R13, R17, R28, R9	A60-742	68 Ohm Resistor 10% ½ Watt
R3, R6, R7, R10, R19, R11, R14, R15, R18	A60-743	100 Ohm Resistor 20% ½ Watt
R4, R5, R22, R27	A60-744	22 K Ohm Resistor 10% ½ Watt

Schematic Diagram Reference	Part No.	Description
R8, R12, R16, R23	A60-727	100 K Ohm 20% ½ Watt
R20	A60-723	270 Ohm 20% ½ Watt Resistor
R21	A60-745	27 K Ohm 10% ½ Watt Resistor
R24	A60-748	33 K Ohm 10% ½ Watt Resistor
R25	B24-173	Volume Control with Switch
R29, R31	A60-726	2.2 Megohm 20% ½ Watt
R30, R35	A60-731	470K Ohm ½ Watt Resistor 20%
R32, R33	A60-747	270K Ohm 20% ½ Watt
R34	A60-728	10 Megohm 20% ½ Watt
R36	A60-755	100 Ohm 1 Watt 10% Resistor
R37	A60-741	150 Ohm 10% 1 Watt Resistor
R38	A60-751	12K Ohm 10% 1 Watt Resistor
R39	A60-734	Special Compensating Resistor (Order from Mfg.)
R40	A60-735	Special Compensating Resistor (Order from Mfg.)
R41	A60-738	15 Ohm — Glassohm 10% 3 Watt Resistor
L1	SB10-488	Antenna Coil, FM
L3	B10-489	R. F. Coil, F.M.
L4	B10-490	Oscillator Coil, F. M.
L5	A10-507	Antenna Coil, A. M.
L7	B10-491	Oscillator Coil, A. M.
L8	A33-225	Filter Choke
L2, L9, L10, L11, L12, L14, L15	A33-226	Filament Choke, 11 mh.
L13	A33-227	Filament Choke
S1A, S1B	A69-181	Switch, F.M.—A.M.
S2		Switch, ON-OFF, (on volume control)
S3	A26-125	Tone Control
T1	SA10-493	1st I. F. Transformer, F. M.
T2, T3	SC10-494	2nd & 3rd I. F. Transformer, F.M.
T4	SC10-492	Ratio detector transformer, F.M.
T5	A10-499	1st I. F. transformer, A. M.
T6	A10-500	2nd I. F. transformer, A. M.
T7	A80-234	Output transformer
	B39-285	Drum, for variable condenser
	A23-151	Line cord
	A83-463	Selenium rectifier, 150 ma.
	A75-63	Tuning shaft
	B79-354	Speaker, 6¼" P. M.
	A21-111	Cover, for compensating resistors
	SB82-49	F. M. antenna assembly, Dipole
	B83-325	Speaker baffle
	A42-401	Cabinet, Ivory
	D42-379	Cabinet, Walnut
	C67-511	Dial Scale
	A98-4	Grille Cloth
	A52-191	Knob, Ivory
	A52-187	Knob, Walnut
	A83-292	Retainer, dial scale, right
	A83-293	Retainer, dial scale, left
	C83-502	Cabinet back
	B83-503	Dial diffusing plate
	A58-65	Dial pointer

MODEL 13915

WARWICK MFG. CORP.

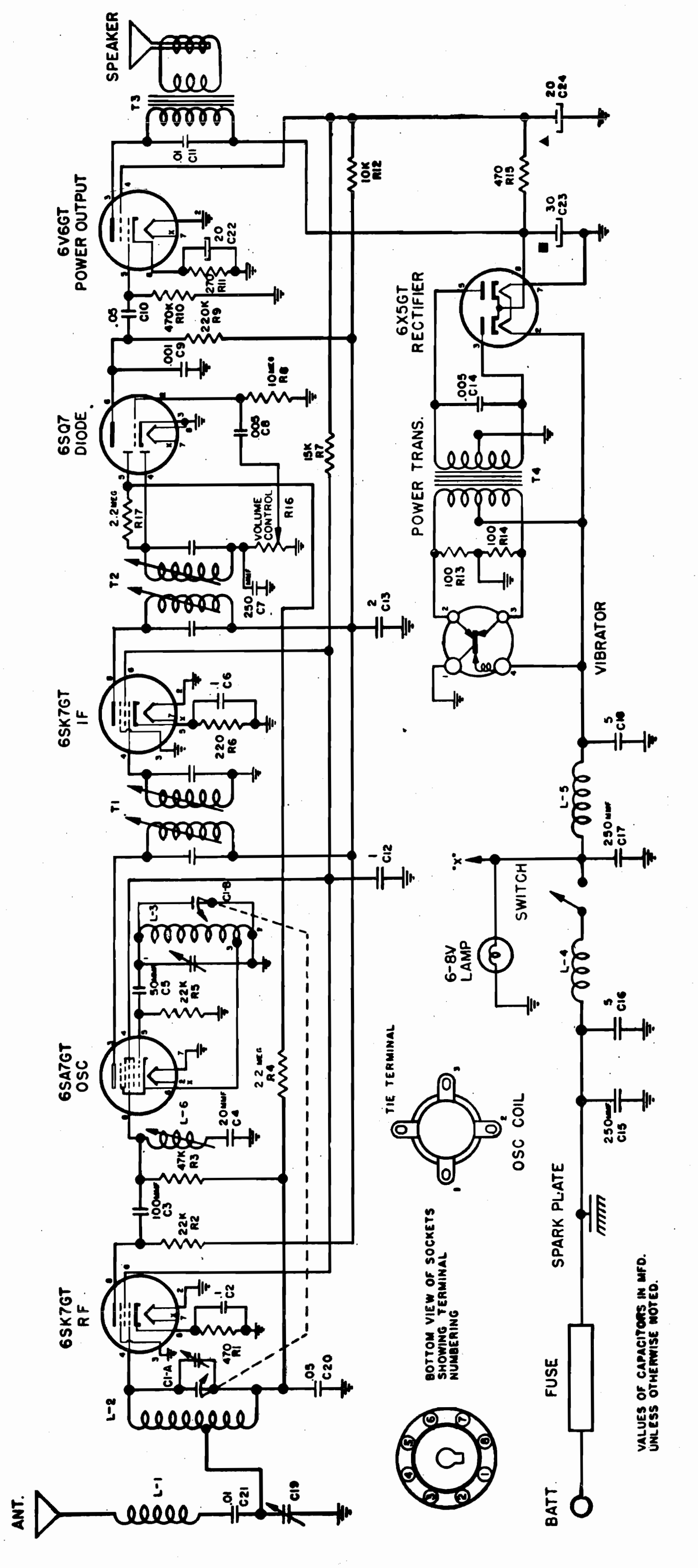


Fig. 3 Schematic Diagram

WARWICK MFG. CORP. MODEL 13915

INSTALLATION

This radio comes to you complete with all hardware necessary for mounting, and also with a distributor suppressor, ammeter condenser and generator condenser. By referring to Figures 1 and 2, and following the instructions outlined below, you will find that it is very simple to install.

First determine where the receiver is to be mounted by holding it with the hands in the approximate location in the car. Using the front mounting bracket as a template, mark and drill two 5/8" holes in the instrument panel flange. Now secure the mounting bracket to the radio receiver with the screws provided, and then mount the front of the radio to the instrument panel, using the bolts, lock washers and nuts provided for this purpose. The back of the radio is supported by means of the rear mounting strap. The mounting strap should be formed to the correct angles, as illustrated in Figure 2, so that it can then be fastened to the fire wall. After marking and center-punching the fire wall at the correct location, drill with a 3/8" drill. The mounting strap is then secured to the radio and fastened to the fire wall of the car with the 1/4" bolt, lock washer and nut furnished with the receiver.

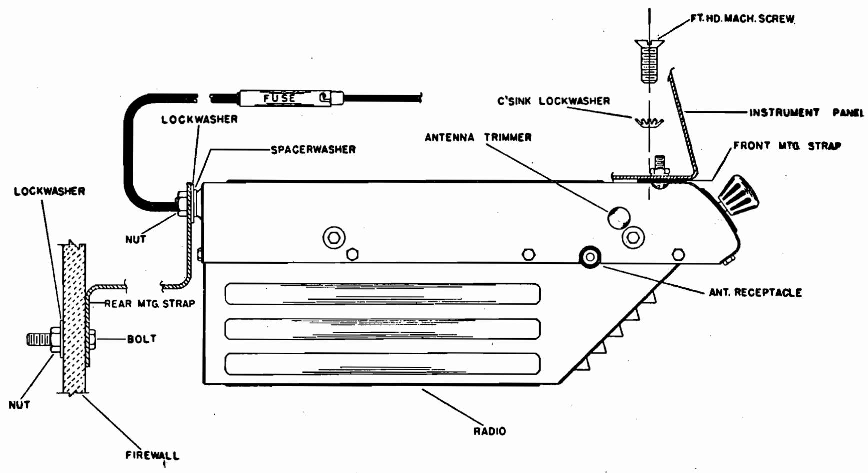


Fig. 2 Side View, Showing Mounting

CONNECTING THE RADIO

The antenna cable should be connected to the radio by inserting the jack into the socket provided on the side of the radio. Connect the battery cable to the hot side of the ammeter behind the instrument panel. The fuse should then be inserted into the cable receptor.

FINAL ADJUSTMENTS

The input circuit has been especially designed to be used with a low capacity antenna, of the fish pole or whip type.

To adjust the antenna trimmer condenser, carefully tune the receiver to a weak station at approximately 600 kilocycles (K.C.). Remove the snap button covering the antenna trimmer (See Figure 2) and adjust the trimmer for maximum volume. A small screw driver will be needed for this purpose.

ACCESSORIES FURNISHED FOR INSTALLATION

All of the parts that are needed for installing this receiver are furnished in the Mounting Parts Kit, part No. S84-192, and the Suppression and Misc. Parts Kit, part No. S84-230, as listed below. Also supplied are the rear mounting strap, part No. B31-134, and the front mounting plate, part No. A31-138.

NOTE: For shipping, the two control knobs have been removed from the tuning and volume control shafts. To install the knobs, line up the flat side of the knob spring, (inside knob) with the flat side of the control shaft and push the knob forward until it stops.

S84-192 MOUNTING PARTS KIT

1 1/4" Bolt
2 1/4" Lock Washers
2 1/4" Hexagon Nuts
2 10-32 x 5/8" Screws
2 External Tooth Lock Washers
2 Internal Tooth Lock Washers
2 10-32 Hexagon Nuts

S84-230 SUPPRESSION KIT & MISC. PARTS

1 S84-233 "A" lead assem.
1 A43-10 Fuse
2 A52-256 Control knobs
1 A81-13 Sleeve (for fuse)
1 S84-193 Suppression Kit consisting of:
2 .5 MFD Condensers
1 Distributor Suppressor
20" Wire Braid

ELIMINATING MOTOR NOISE

IMPORTANT: Special care should be taken when mounting the radio to make sure all paint, grease, rust, etc., is removed from all three mounting points. A good electrical contact at these points will aid materially in eliminating motor noise.

GENERATOR CONDENSER

The generator condenser must be connected to the battery terminal of the generator in all cases. If your car is equipped with a generator using an automatic regulator, make sure the condenser IS NOT fastened to the field winding terminal. If in doubt, your local car dealer can advise you as to where the car manufacturer recommends connecting it.

DISTRIBUTOR SUPPRESSOR

Remove the coil to distributor high tension lead from the distributor. Cut the lead two inches from the end, and screw the distributor resistor on to the coil lead, then screw the short length into the resistor and plug the cable into the distributor cap.

AMMETER CONDENSER

A .5 MFD bypass condenser is furnished for attaching to the ammeter. This should be connected to either side of the ammeter with the ground lug fastened to a good ground nearby. In most cases the use of this condenser, the distributor suppressor, and the generator condenser, will eliminate all objectionable ignition interference.

ELECTRICAL ACCESSORIES

In some cases, it may be found that car accessories such as electric heaters, lighters, automatic relays, or gauges, may cause interference while in operation. Proper procedure in such cases is to try another by-pass condenser from ground to the suspected accessory until the source of the interference is found. The condenser then should be permanently mounted in this location.

HIGH AND LOW TENSION LEADS

In many cases the low tension battery leads, etc., are grouped together with the high tension wires. These leads will very often pick up motor noise and feed it into the receiver through the battery circuit. In cases such as these it will be necessary to separate the low tension from the high tension wires and run them through another hole if they run from the engine compartment up to the instrument panel. This condition is particularly true on the V-8 Ford, as the battery and primary leads run through a special tube which also houses the high tension leads. Shield and ground these leads.

IGNITION COILS

In cars where the ignition coil is located on the back side of the instrument panel it is often necessary to use an additional condenser. It must be installed from the battery side of the ignition coil to the closest ground on the instrument panel.

Short leads are very important. Where coils are mounted either on the instrument panel or in the driver's compartment, it may be necessary to shield the high tension lead from the coil to the distributor.

WHEEL STATIC

Wheel Static is a form of interference caused by the rotation of the front wheels of the car, and it is, of course, only noticed when the car is in motion. If this form of interference is present it can be eliminated by installing wheel static collector springs between the inner hub cap and the spindle shaft.

BONDING OF FIRE WALL TUBES

Bonding the steering column to the fire wall with a short braid may also be effective. Clean the paint from the steering column at the fire wall where the column enters the motor compartment, and solder on a short piece of braid. Ground the end of the braid to the fire wall.

In some cases it may be necessary to ground the tubes and rods coming through the fire wall in order to reduce the interference. Clean them with emery cloth and spot-solder the braid, fastening the end under a convenient screw. A 1/4" piece of wire braid 20 inches long is furnished in the suppression kit assembly for this purpose.

WARWICK MFG. CORP. MODEL 13915

ELECTRICAL SPECIFICATIONS

Power Supply	6.3 volts DC
Current	4.8 amp. average
Frequency Range	540 to 1600 KC
I. F. Frequency	455 KC
Speaker	4" P. M.
Power Output	1.2 watts, undistorted 2.5 watts, maximum
Sensitivity	10 microvolts average for 1 watt output
Selectivity	20 KC broad at 1000 times signal, at 1000 KC

The tube compliment of this receiver is as follows:

1—6SK7GT—R. F. Amplifier.

1—6SA7GT—Converter.

1—6SK7GT—I.F. Amplifier.

1—6SQ7—Detector—AVC—1st audio.

1—6V6GT—Power output.

1—6X5GT—Rectifier.

SERVICE NOTES

Voltages taken from the different points of the circuit to the chassis are measured with volume control in maximum position, all tubes in their sockets, no signal applied, and with a volt meter having a resistance of 20,000 ohms per volt. These voltages are clearly shown on the voltage chart, (Fig. 4).

All voltages should be measured with an input voltage of 6.3 volts DC.

To check for open by-pass condensers, shunt each condenser with another one having the same capacity and voltage rating which is known to be good until the defective unit is located.

ALIGNING INSTRUCTION

Never attempt any adjustments on this receiver unless it becomes necessary to replace a coil or transformer, or the adjustments have been tampered with in the field. Always make certain that other circuit components, such as tubes, condensers, resistors, etc., are normal before proceeding with realignment.

If realignment is necessary follow the instructions given under the heading "ALIGNMENT PROCEDURE". After realignment has been completed repeat the procedure as a final check.

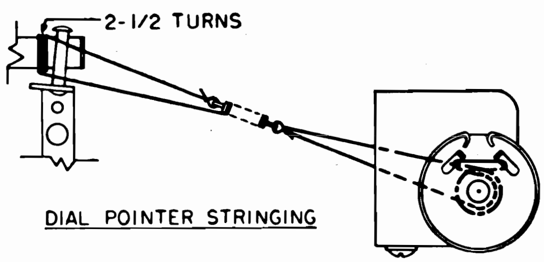
INSTRUCTIONS FOR REMOVING CHASSIS FROM THE CASE

The bottom cover (the one with the speaker louvers) can be removed to permit servicing of major components, such as tubes and vibrator, by removing the eight (8) screws holding it to the top cover. There are three (3) screws on each side, one (1) in the rear, and one (1) in the front.

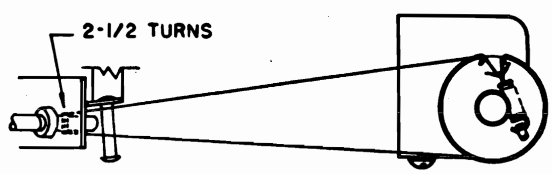
CAUTION: Before attempting to remove the top cover, to service condensers, resistors, etc., the screw connecting the spark plate to the "A" terminal (inside case) must be removed. This is a round head screw, and is located on the rear of the case, close to the mounting stud bolt. It is recessed in a ½ inch hole in the case itself, thereby permitting contact with the spark plate.

After removing the spark plate screw, remove the two knobs by pulling forward and remove the eight (8) screws securing the cover to the chassis. Lift the chassis at the rear, at the same time moving it away from the front of the case so that the volume and tuning shafts will clear the holes in the cover.

NOTE: When reinstalling the chassis into the case, be sure the screw connecting the spark plate to the "A" terminal (inside case) is tightened very securely, otherwise the receiver will not operate properly.



DIAL POINTER STRINGING



DIAL DRIVE STRINGING

WARWICK MFG. CORP.

ALIGNMENT PROCEDURE

Volume control—Maximum, all adjustments.
No signal applied to antenna.
Power input—6.3 volts.
Connect dummy antenna in series with output lead of signal generator.
Connect output meter across voice coil.
Connect ground lead of signal generator to chassis.
Repeat alignment procedure as a final check.

The following equipment is necessary for proper alignment:
- Signal generator that will provide the test frequencies as listed.
- Non-metallic screwdriver.
- Output meter.
- Dummy antennas—.1 MFD., .00025 MFD.

For alignment points refer to Figures 4 ad 5.

Dial Setting	Generator Frequency	Dummy Ant.	Generator Connections	Trimmer Reference	Trimmer Adjustment	Trimmer Function
Fully Open	455 KC	.1 MFD.	6SA7 Grid	T2	Maximum	Output I.F.
Fully Open	455 KC	.1 MFD.	6SA7 Grid	T1	Maximum	Input I.F.
Fully Open	455 KC	.00025 MFD.	Ant. lead	L6	Minimum	Wave trap
Fully Open	1600 KC	.00025 MFD.	Ant. lead	C1B	Maximum	Oscillator
Tune in signal from generator	1400 KC	.00025 MFD.	Ant. lead	C1A	Maximum	Antenna

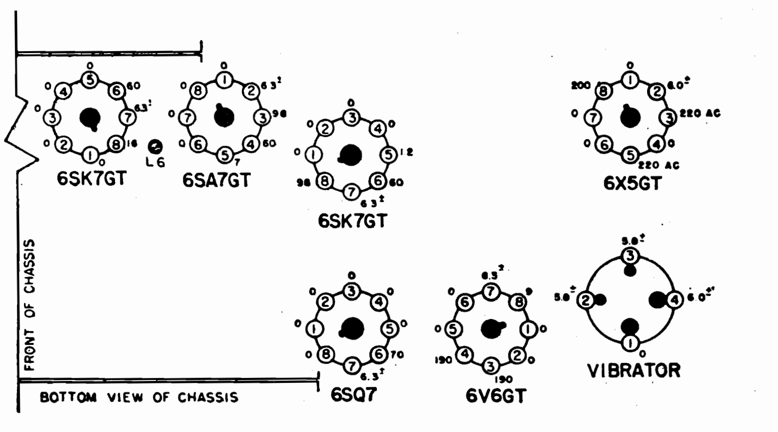


Fig. 4 Socket Voltages

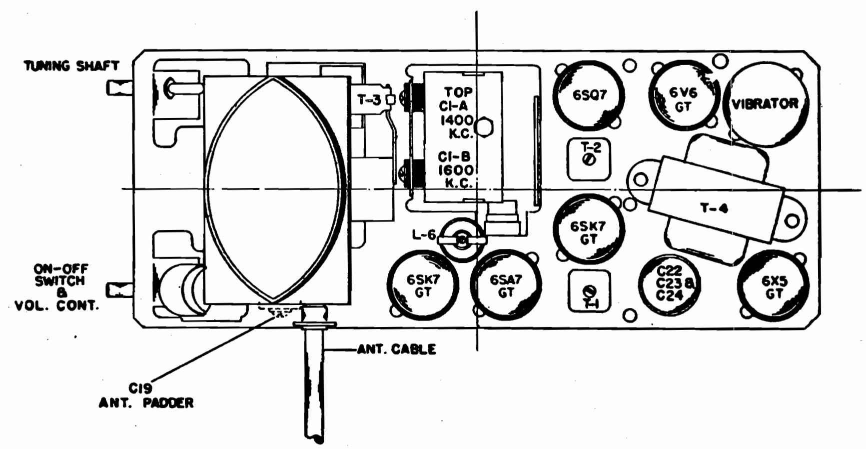


Fig. 5 Tube and Trimmer Locations

WARWICK MFG. CORP. MODEL 13915

CONDENSERS

Schematic Diagram Reference	Part No.	Description
C1A, C1B	B19-196	Variable Condenser
C2, C6, C12	A16-187	.1 MFD. 400 Volt Condenser
C3	A15-196	100 MMFD Ceramic Condenser
C4	A15-202	20 MMFD Ceramic Condenser
C5	A15-204	50 MMFD Ceramic Condenser
C7, C15, C17	A15-176	250 MMFD Mica Condenser
C8	A16-190	.005 MFD. 600 Volt Condenser
C9	A16-195	.001 MFD. Ceramic Condenser
C10	A16-193	.05 MFD. 600 Volt Condenser
C11, C21	A16-192	.01 MFD. 400 Volt Condenser
C13	A16-188	.2 MFD. 400 Volt Condenser
C14	A16-185	.005 MFD. 1600 Volt Oil Filled Condenser
C16, C18	A16-184	.5 MFD. 100 Volt Condenser
C19	A20-145	Trimmer Condenser
C20	A16-189	.05 MFD. 400 Volt Condenser
C22, C23, C24	A18-289	20 MFD 25 Volt Electrolytic Condenser; 30 MFD 350 Volt Electrolytic Condenser; 20 MFD. 350 Volt Electrolytic Condenser

RESISTORS

Schematic Diagram Reference	Part No.	Description
R1	A60-722	470 Ohm ½ Watt 20% Resistor
R13, R14	A60-752	100 Ohm ½ Watt 10% Resistor
R2, R5	A60-744	22K Ohm ½ Watt 10% Resistor
R3	A60-685	47K Ohm ½ Watt 20% Resistor
R4, R17	A60-726	2.2 Megohm ½ Watt 20% Resistor
R6	A60-753	220 Ohm ½ Watt 10% Resistor
R7	A60-716	15K Ohm 1 Watt 10% Resistor
R8	A60-728	10 Megohm ½ Watt 20% Resistor
R9	A60-667	220K Ohm ½ Watt 20% Resistor
R10	A60-731	470K Ohm ½ Watt 20% Resistor
R11	A60-754	270 Ohm 1 Watt 10% Resistor
R12	A60-698	10K Ohm 1 Watt 10% Resistor
R15	A60-694	470 Ohm 1 Watt 10% Resistor
R16	A24-177	Volume Control, 500,000 Ohms, with Switch

COILS

Schematic Diagram Reference	Part No.	Description
L1	A10-513	Antenna Loading Coil
L2	B10-511	Antenna Coil
L3	A10-512	Oscillator Coil
L4	A33-229	Choke, "A" Line
L5	A33-228	Choke, Vibrator Hash
L6	A10-510	I.F. Trap Coil
T1	A10-508	1st I.F. Transformer
T2	A10-509	2nd I.F. Transformer

TRANSFORMERS

Schematic Diagram Reference	Part No.	Description
T3	B80-242	Output Transformer (Part of Speaker)
T4	B80-243	Power Transformer

DIAL PARTS

Schematic Diagram Reference	Part No.	Description
	A11-303	Bracket, Dial Scale
	A11-304	Bracket, String Guide
	A72-29	Bushing, Tuning Shaft Bearing
	A70-130	Clip, Spring, for Tuning Shaft
	B48-44	Dial Crystal
	A58-55	Dial Pointer
	B67-525	Dial Scale
	A28-101	Gasket for Speaker
	A52-256	Knob
	A89-10	Pilot Light, Type G.E. No. 422
	A65-37	Rivet, Shoulder, for String Guide Bracket
	A75-68	Shaft, Tuning
	A75-67	Shaft, for Dial Pointer
	A70-132	Spring, for Pilot Light Socket
	A70-133	Spring, String Tension, Pointer Drive, and Tuning

MISCELLANEOUS

Schematic Diagram Reference	Part No.	Description
	A83-421	Clip, I.F. Transformer Mounting
	A83-517	Clip, Oscillator Coil Mounting
	A43-10	Fuse, 15 Amp.
	A47-112	Grommet, Rubber (for Mounting Speaker and Variable Condenser)
	B31-134	Mounting Strap, Rear
	A31-138	Mounting Plate, Front
	S84-192	Mounting Parts Kit
	A87-38	Receptacle, Antenna Cable
	B79-362	Speaker, 4" P.M. (includes Output Transformer)
	S84-193	Suppression Kit Assembly
	A34-105	Vibrator
	A83-519	Wiper, Grounding, for Case Covers

MODEL 14515

WARWICK MFG. CORP.

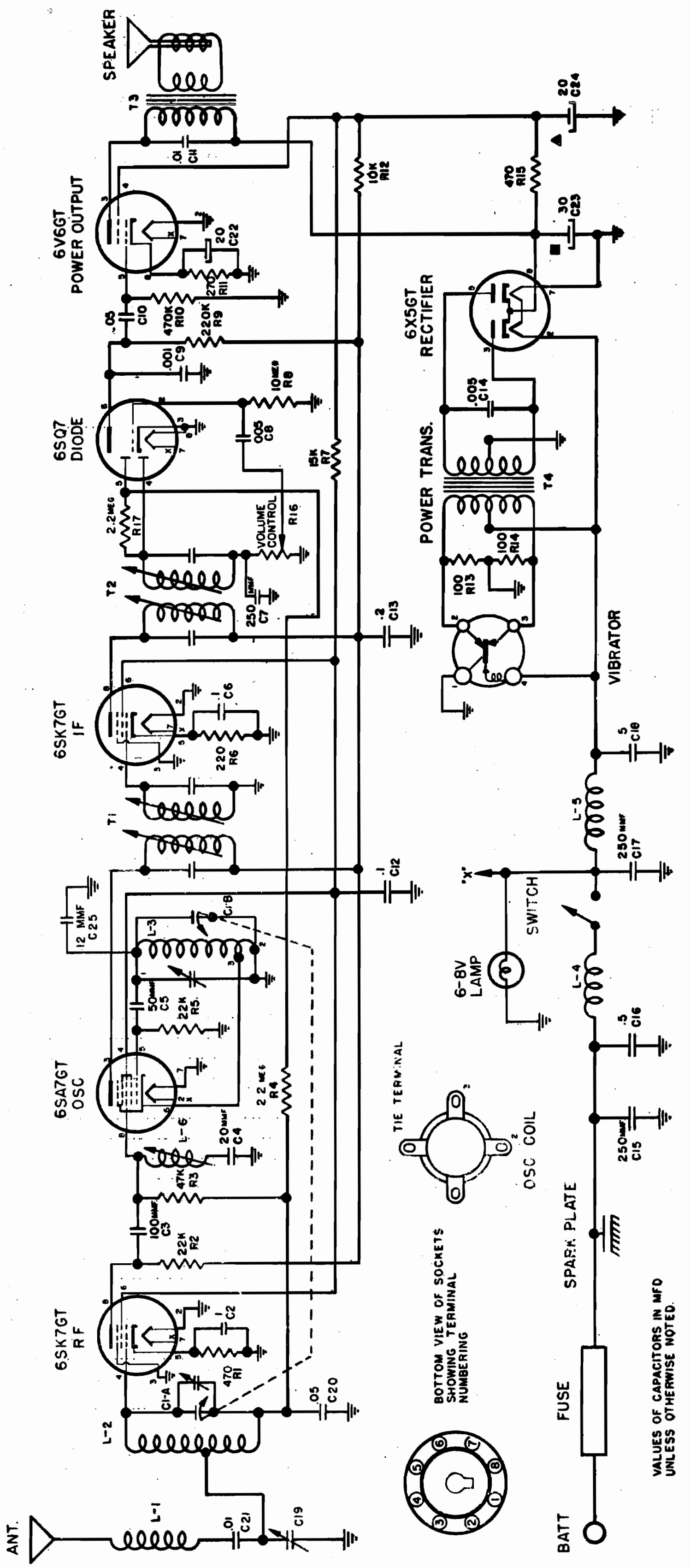


Fig. 3 **Schematic Diagram**

INSTALLATION

This radio comes to you complete with all hardware necessary for mounting, and also with a distributor suppressor, ammeter condenser and generator condenser. By referring to Figures 1 and 2, and following the instructions outlined below, you will find that it is very simple to install.

First determine where the receiver is to be mounted by holding it with the hands in the approximate location in the car. Using the front mounting bracket as a template, mark and drill two 5/8" holes in the instrument panel flange. Now secure the mounting bracket to the radio receiver with the screws provided, and then mount the front of the radio to the instrument panel, using the bolts, lock washers and nuts provided for this purpose. The back of the radio is supported by means of the rear mounting strap. The mounting strap should be formed to the correct angles, as illustrated in Figure 2, so that it can then be fastened to the fire wall. After marking and center-punching the fire wall at the correct location, drill with a 3/8" drill. The mounting strap is then secured to the radio and fastened to the fire wall of the car with the 1/4" bolt, lock washer and nut furnished with the receiver.

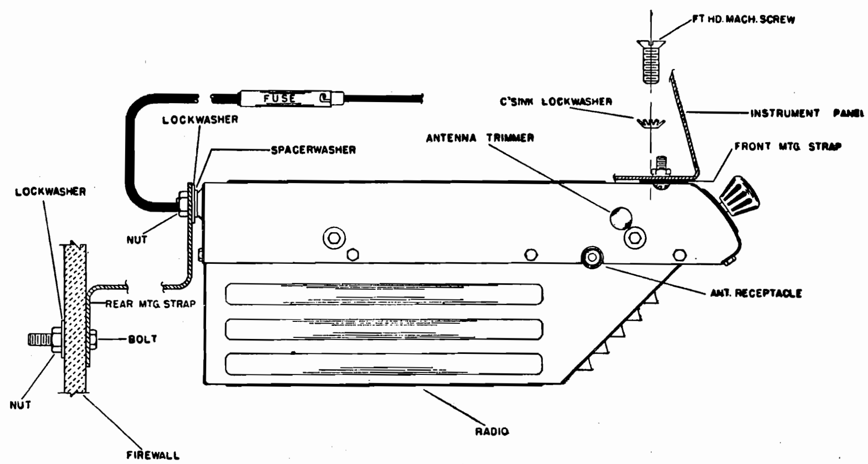


Fig. 2 Side View, Showing Mounting

CONNECTING THE RADIO

The antenna cable should be connected to the radio by inserting the jack into the socket provided on the side of the radio. Connect the battery cable to the hot side of the ammeter behind the instrument panel. The fuse should then be inserted into the cable receptor.

FINAL ADJUSTMENTS

The input circuit has been especially designed to be used with a low capacity antenna, of the fish pole or whip type.

To adjust the antenna trimmer condenser, carefully tune the receiver to a weak station at approximately 600 kilocycles (K.C.). Remove the snap button covering the antenna trimmer (See Figure 2) and adjust the trimmer for maximum volume. A small screw driver will be needed for this purpose.

ACCESSORIES FURNISHED FOR INSTALLATION

All of the parts that are needed for installing this receiver are furnished in the Mounting Parts Kit, part No. S84-192, and the Suppression and Misc. Parts Kit, part No. S84-230, as listed below. Also supplied are the rear mounting strap, part No. B31-134, and the front mounting plate, part No. A31-138.

NOTE: For shipping, the two control knobs have been removed from the tuning and volume control shafts. To install the knobs, line up the flat side of the knob spring, (inside knob) with the flat side of the control shaft and push the knob forward until it stops.

S84-192 MOUNTING PARTS KIT

1 1/4" Bolt
2 1/4" Lock Washers
2 1/4" Hexagon Nuts
2 10-32 x 5/8" Screws
2 10-32 x 3/8" Screws
2 External Tooth Lock Washers
2 Internal Tooth Lock Washers
2 10-32 Hexagon Nuts
1 Washer Spacer

S84-230 SUPPRESSION KIT & MISC. PARTS

1 S84-233 "A" lead assem.
1 A43-10 Fuse
2 A52-256 Control knobs
1 A81-13 Sleeve (for fuse)
1 S84-193 Suppression Kit consisting of:
2 .5 MFD Condensers
1 Distributor Suppressor
20" Wire Braid

MODEL 14515 WARWICK MFG. CORP.

ELIMINATING MOTOR NOISE

IMPORTANT: Special care should be taken when mounting the radio to make sure all paint, grease, rust, etc., is removed from all three mounting points. A good electrical contact at these points will aid materially in eliminating motor noise.

GENERATOR CONDENSER

The generator condenser must be connected to the battery terminal of the generator in all cases. If your car is equipped with a generator using an automatic regulator, make sure the condenser IS NOT fastened to the field winding terminal. If in doubt, your local car dealer can advise you as to where the car manufacturer recommends connecting it.

DISTRIBUTOR SUPPRESSOR

Remove the coil to distributor high tension lead from the distributor. Cut the lead two inches from the end, and screw the distributor resistor on to the coil lead, then screw the short length into the resistor and plug the cable into the distributor cap.

AMMETER CONDENSER

A .5 MFD bypass condenser is furnished for attaching to the ammeter. This should be connected to either side of the ammeter with the ground lug fastened to a good ground nearby. In most cases the use of this condenser, the distributor suppressor, and the generator condenser, will eliminate all objectionable ignition interference.

ELECTRICAL ACCESSORIES

In some cases, it may be found that car accessories such as electric heaters, lighters, automatic relays, or gauges, may cause interference while in operation. Proper procedure in such cases is to try another by-pass condenser from ground to the suspected accessory until the source of the interference is found. The condenser then should be permanently mounted in this location.

HIGH AND LOW TENSION LEADS

In many cases the low tension battery leads, etc., are grouped together with the high tension wires. These leads will very often pick up motor noise and feed it into the receiver through the battery circuit. In cases such as these it will be necessary to separate the low tension from the high tension wires and run them through another hole if they run from the engine compartment up to the instrument panel. This condition is particularly true on the V-8 Ford, as the battery and primary leads run through a special tube which also houses the high tension leads. Shield and ground these leads.

IGNITION COILS

In cars where the ignition coil is located on the back side of the instrument panel it is often necessary to use an additional condenser. It must be installed from the battery side of the ignition coil to the closest ground on the instrument panel.

Short leads are very important. Where coils are mounted either on the instrument panel or in the driver's compartment, it may be necessary to shield the high tension lead from the coil to the distributor.

WHEEL STATIC

Wheel Static is a form of interference caused by the rotation of the front wheels of the car, and it is, of course, only noticed when the car is in motion. If this form of interference is present it can be eliminated by installing wheel static collector springs between the inner hub cap and the spindle shaft.

BONDING OF FIRE WALL TUBES

Bonding the steering column to the fire wall with a short braid may also be effective. Clean the paint from the steering column at the fire wall where the column enters the motor compartment, and solder on a short piece of braid. Ground the end of the braid to the fire wall.

In some cases it may be necessary to ground the tubes and rods coming through the fire wall in order to reduce the interference. Clean them with emery cloth and spot-solder the braid, fastening the end under a convenient screw. A 1/4″ piece of wire braid 20 inches long is furnished in the suppression kit assembly for this purpose.

WARWICK MFG. CORP.

MODEL 14515

ELECTRICAL SPECIFICATIONS

Power Supply....................................6.3 volts DC
Current ....4.8 amp. average
Frequency Range..............................540 to 1600 KC
I. F. Frequency......................................455 KC
Speaker..4" P. M.
Power Output....................1.2 watts, undistorted
2.5 watts, maximum
Sensitivity.......10 microvolts average for 1 watt output
Selectivity...20 KC broad at 1000 times signal, at 1000 KC

The tube compliment of this receiver is as follows:

1—6SK7GT—R. F. Amplifier.

1—6SA7GT—Converter.

1—6SK7GT—I.F. Amplifier.

1—6SQ7—Detector—AVC—1st audio.

1—6V6GT—Power output.

1—6X5GT—Rectifier.

SERVICE NOTES

Voltages taken from the different points of the circuit to the chassis are measured with volume control in maximum position, all tubes in their sockets, no signal applied, and with a volt meter having a resistance of 20,000 ohms per volt. These voltages are clearly shown on the voltage chart, (Fig. 4).

All voltages should be measured with an input voltage of 6.3 volts DC.

To check for open by-pass condensers, shunt each condenser with another one having the same capacity and voltage rating which is known to be good until the defective unit is located.

ALIGNING INSTRUCTION

Never attempt any adjustments on this receiver unless it becomes necessary to replace a coil or transformer, or the adjustments have been tampered with in the field. Always make certain that other circuit components, such as tubes, condensers, resistors, etc., are normal before proceeding with realignment.

If realignment is necessary follow the instructions given under the heading "ALIGNMENT PROCEDURE". After realignment has been completed repeat the procedure as a final check.

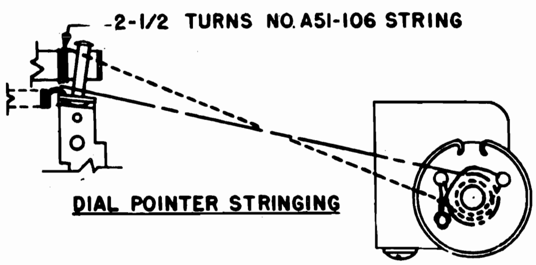
INSTRUCTIONS FOR REMOVING CHASSIS FROM THE CASE

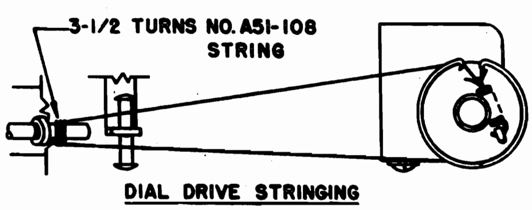
The bottom cover (the one with the speaker louvers) can be removed to permit servicing of major components, such as tubes and vibrator, by removing the eight (8) screws holding it to the top cover. There are three (3) screws on each side, one (1) in the rear, and one (1) in the front.

CAUTION: Before attempting to remove the top cover, to service condensers, resistors, etc., the screw connecting the spark plate to the "A" terminal (inside case) must be removed. This is a round head screw, and is located on the rear of the case, close to the mounting stud bolt. It is recessed in a ½ inch hole in the case itself, thereby permitting contact with the spark plate.

After removing the spark plate screw, remove the two knobs by pulling forward and remove the eight (8) screws securing the cover to the chassis. Lift the chassis at the rear, at the same time moving it away from the front of the case so that the volume and tuning shafts will clear the holes in the cover.

NOTE: When reinstalling the chassis into the case, be sure the screw connecting the spark plate to the "A" terminal (inside case) is tightened very securely, otherwise the receiver will not operate properly.





MODEL 14515

WARWICK MFG. CORP.

ALIGNMENT PROCEDURE

Volume control—Maximum, all adjustments.

No signal applied to antenna.

Power input—6.3 volts.

Connect dummy antenna in series with output lead of signal generator.

Connect output meter across voice coil.

Connect ground lead of signal generator to chassis.

Repeat alignment procedure as a final check.

The following equipment is necessary for proper alignment:

- Signal generator that will provide the test frequencies as listed.
- Non-metallic screwdriver.
- Output meter.
- Dummy antennas—.1 MFD., .00025 MFD.

For alignment points refer to Figures 4 ad 5.

Dial Setting	Generator Frequency	Dummy Ant.	Generator Connections	Trimmer Reference	Trimmer Adjustment	Trimmer Function
Fully Open	455 KC	.1 MFD.	6SA7 Grid	T2	Maximum	Output I.F.
Fully Open	455 KC	.1 MFD.	6SA7 Grid	T1	Maximum	Input I.F.
Fully Open	455 KC	.00025 MFD.	Ant. lead	L6	Minimum	Wave trap
Fully Open	1600 KC	.00025 MFD.	Ant. lead	C1B	Maximum	Oscillator
Tune in signal from generator	1400 KC	.00025 MFD.	Ant. lead	C1A	Maximum	Antenna

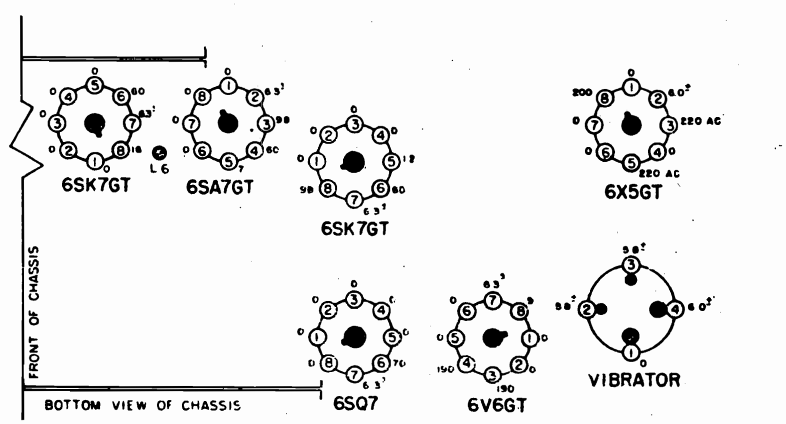


Fig 4 Socket Voltages

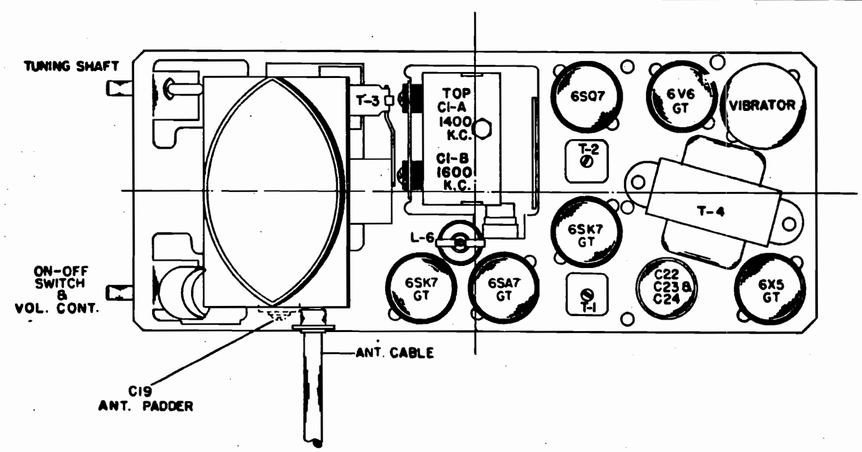


Fig. 5 Tube and Trimmer Locations

WARWICK MFG. CORP. MODEL 14515

CONDENSERS

Schematic Diagram Reference	Part No.	Description
C1A, C1B	B19-196	Variable Condenser
C2, C6, C12	A16-187	.1 MFD. 400 Volt Condenser
C3	A15-196	100 MMFD Ceramic Condenser
C4	A15-202	20 MMFD Ceramic Condenser
C5	A15-204	50 MMFD Ceramic Condenser
C7, C15, C17	A15-176	250 MMFD Mica Condenser
C8	A16-190	.005 MFD. 600 Volt Condenser
C9	A16-195	.001 MFD. Ceramic Condenser
C10	A16-193	.05 MFD. 600 Volt Condenser
C11, C21	A16-192	.01 MFD. 400 Volt Condenser
C13	A16-188	.2 MFD. 400 Volt Condenser
C14	A16-185	.005 MFD. 1600 Volt Oil Filled Condenser
C16, C18	A16-184	.5 MFD. 100 Volt Condenser
C19	A20-145	Trimmer Condenser
C20	A16-189	.05 MFD. 400 Volt Condenser
C22	A18-289	20 MFD 25 Volt Electrolytic Condenser
C23		30 MFD 350 Volt Electrolytic Condenser
C24		20 MFD. 350 Volt Electrolytic Condenser
C25	A15-205	12 MMFD ceramic condenser, temp. comp.

RESISTORS

Schematic Diagram Reference	Part No.	Description
R1	A60-722	470 Ohm ½ Watt 20% Resistor
R13, R14	A60-752	100 Ohm ½ Watt 10% Resistor
R2, R5	A60-744	22K Ohm ½ Watt 10% Resistor
R3	A60-685	47K Ohm ½ Watt 20% Resistor
R4, R17	A60-726	2.2 Megohm ½ Watt 20% Resistor
R6	A60-753	220 Ohm ½ Watt 10% Resistor
R7	A60-716	15K Ohm 1 Watt 10% Resistor
R8	A60-728	10 Megohm ½ Watt 20% Resistor
R9	A60-667	220K Ohm ½ Watt 20% Resistor
R10	A60-731	470K Ohm ½ Watt 20% Resistor
R11	A60-754	270 Ohm 1 Watt 10% Resistor
R12	A60-698	10K Ohm 1 Watt 10% Resistor
R15	A60-694	470 Ohm 1 Watt 10% Resistor
R16	A24-177	Volume Control, 500,000 Ohms, with Switch

COILS

Schematic Diagram Reference	Part No.	Description
L1	A10-513	Antenna Loading Coil
L2	B10-511	Antenna Coil
L3	A10-512	Oscillator Coil
L4	A33-229	Choke, "A" Line
L5	A33-228	Choke, Vibrator Hash
L6	A10-510	I.F. Trap Coil
T1	A10-508	1st I.F. Transformer
T2	A10-509	2nd I.F. Transformer

TRANSFORMERS

Schematic Diagram Reference	Part No.	Description
T3	B80-242	Output Transformer (Part of Speaker, not furnished separately)
T4	B80-243	Power Transformer

DIAL PARTS

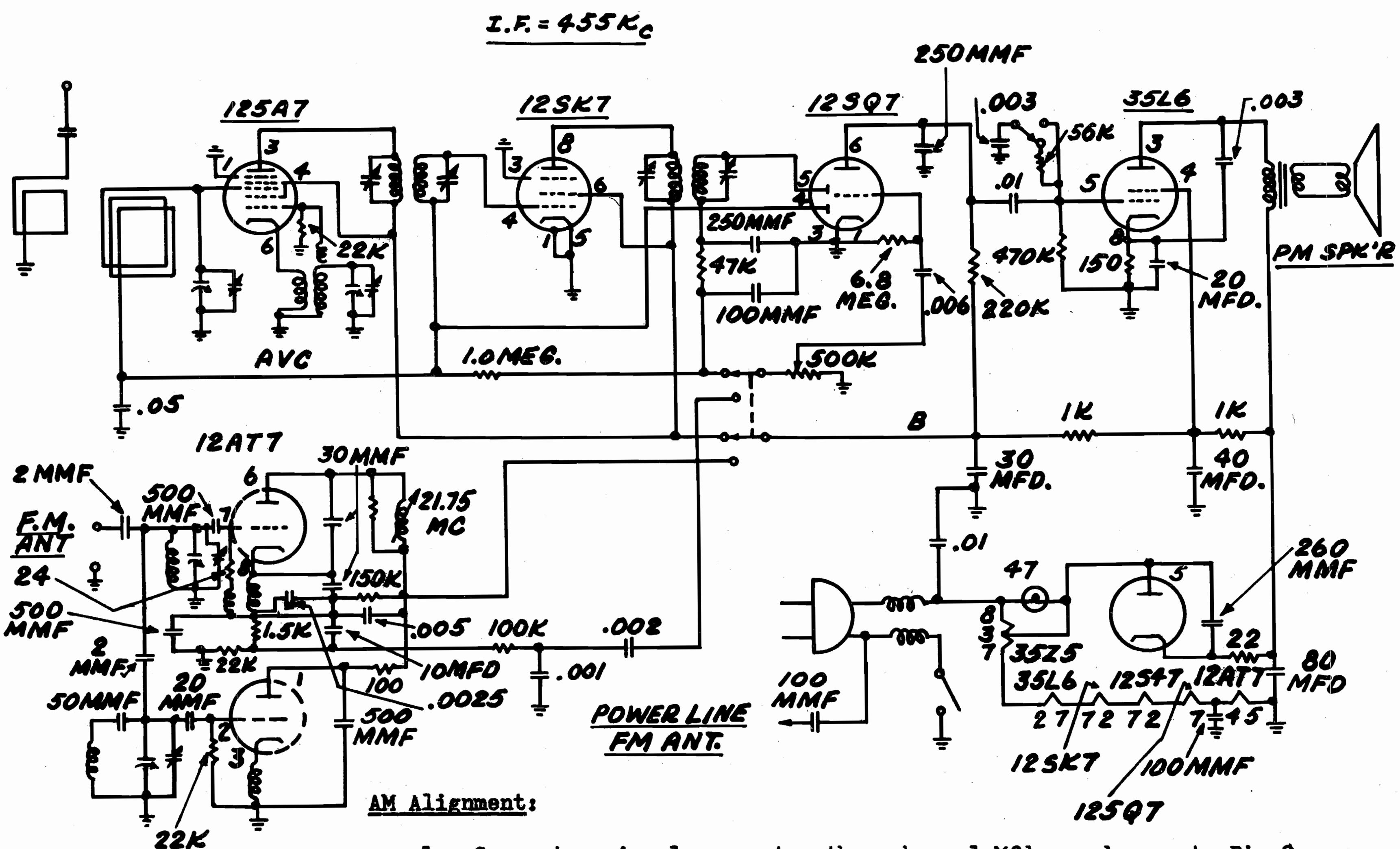
Schematic Diagram Reference	Part No.	Description
	A11-303	Bracket, Dial Scale
	B11-328	Bracket, String Guide
	A72-29	Bushing, Tuning Shaft Bearing
	A70-130	Clip, Spring, for Tuning Shaft
	B48-44	Dial Crystal
	A58-55	Dial Pointer
	B67-525	Dial Scale
	A28-101	Gasket for Speaker
	A52-256	Knob
	A11-329	Link, String Guide
	A89-10	Pilot Light, Type G. E. No. 422
	A65-37	Rivet, Shoulder, for Dial Pointer Stringing
	A65-41	Rivet, Shoulder, for String Guide Brkt. and Link
	A65-12	Rivet, Shoulder, for Dial Drive Stringing
	A75-70	Shaft, Tuning
	A75-67	Shaft, for Dial Pointer
	A70-132	Spring, for Pilot Light Socket
	A70-133	Spring, Dial Drive String Tension
	A70-142	Spring, Pointer Drive String Tension

MISCELLANEOUS

Schematic Diagram Reference	Part No.	Description
	S84-233	"A" Lead Assembly
	A83-421	Clip, I.F. Transformer Mounting
	A83-517	Clip, Oscillator Coil Mounting
	A43-10	Fuse, 15 Amp.
	A47-112	Grommet, Rubber (for Mounting Speaker and Variable Condenser)
	B31-134	Mounting Strap, Rear
	A31-138	Mounting Plate, Front
	S84-192	Mounting Parts Kit
	A87-38	Receptacle, Antenna Cable
	B79-362	Speaker, 4" P.M. (includes Output Transformer)
	S84-193	Suppression Kit Assembly
	A34-105	Vibrator
	A83-519	Wiper, Grounding, for Case Covers

WATTERSON RADIO MFG. CORP.

MODEL 4800



AM Alignment:

1. Connect a signal generator through a .1 Mfd. condenser to Pin 8 of the 12SA7. With only enough signal to give a good indication, peak the IF trimmers at 455Kc.

2. With the generator connected to a transmitting loop near the receiver, peak the osc. trimmer at 1620 Kc. with the receiver gang full open. Next, set the signal generator at 1400 Kc. and tune in this signal on the receiver. Peak the antenna trimmer.

MODELS 4800, 4802

WATTERSON RADIO MFG. CORP.

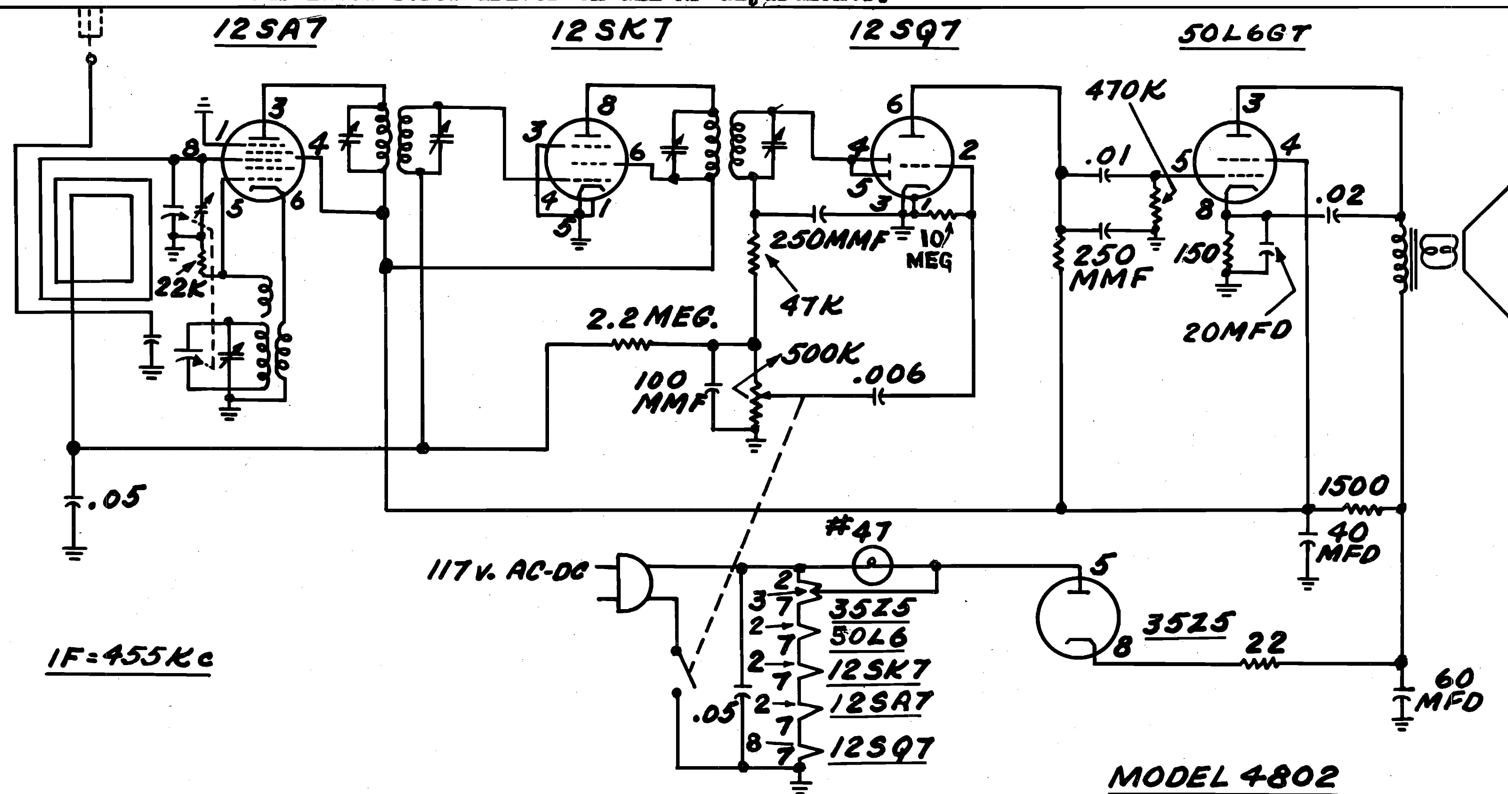
FM Alignment:

MODEL 4800 AM/FM

Use an unmodulated signal and tune for minimum noise in all FM adjustments.

1. Connect a signal generator to the FM ant. terminals. Using a 21.75 Mc. signal, tune the IF slug adjustment for minimum noise making sure slug is at the tuning point nearest top of can. There is another tuning point with the slug screwed farther down into the coil which produces unwanted coupling.

2. With a 150 ohm resistor in each lead, connect a high frequency generator to the FM ant. Terminals. Set ant. trimmer to maximum capacity. Use enough signal to give a definite dip in noise but do not block the receiver. Set the osc. section to track from 87.5 Mc. to 108.5 Mc. by trimming on the high end and adjusting the osc. coil spacing on the low end. Check each of these adjustments several times. Next, with the generator set at 103 Mc. Tune in this signal on the receiver. While rocking the dial slightly, tune the ant. trimmer for minimum noise. Use an insulated screw driver on all RF adjustments.



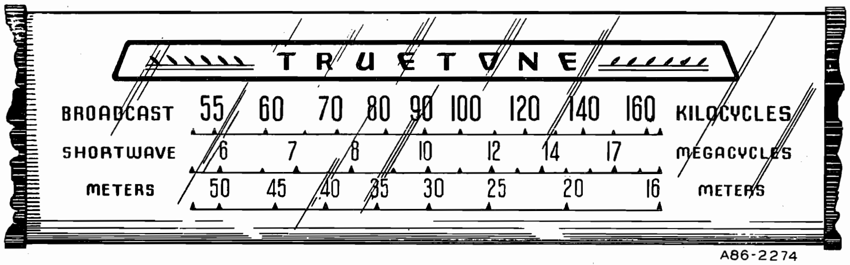
WESTERN AUTO SUPPLY CO.

MODEL D1835B

SHORT WAVE BAND

5.75 to 18.3 Megacycles

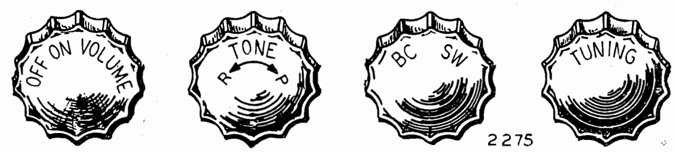
This band is calibrated in both megacycles and meters. The principal international short wave stations will be found in the 16, 19, 25, 31 and 49 meter bands.



BROADCAST BAND

540 to 1600 ← Kilocycles

This band is calibrated in channel numbers. Add a zero to the dial number to get the kilocycle number.



ON-OFF SWITCH AND VOLUME CONTROL

Turn radio on by turning knob to the right. A click will be heard—wait 30 seconds for tubes to heat. Continuing to turn the knob to the right will increase the volume.

TUNING KNOB

Turn until desired station is heard. Then slowly rotate back and forth until signal is clearest and strongest. If signal is too strong, reduce it by means of the volume control, not by using the tuning knob.

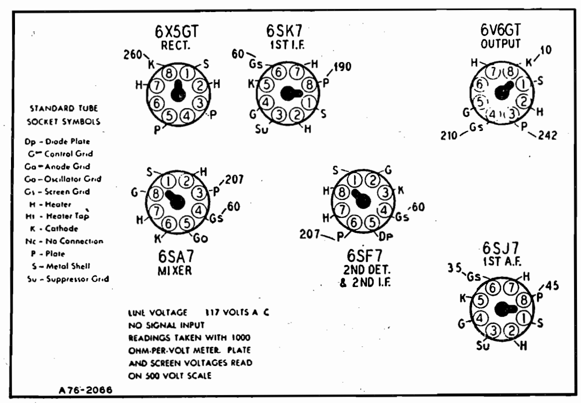
TONE CONTROL AND PHONO-RADIO SWITCH

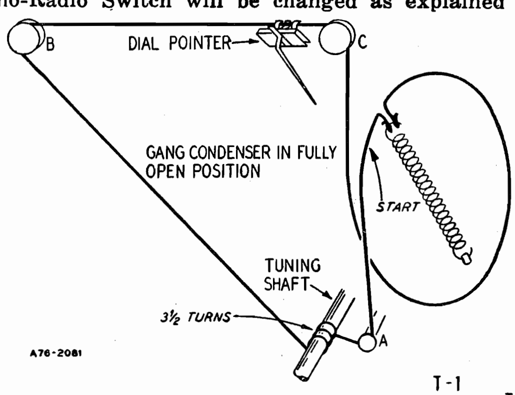
PHONO-RADIO SWITCH—For radio reception, turn knob completely to the left. A click will be heard, if the knob was in the phono position. For phonograph reproduction, turn knob completely to the right. (See page 2 for Record Player Connections). A click will be heard, if the knob was in the radio position.

TONE CONTROL—When knob is turned to the right, a brilliant tone is obtained and when turned to the left, a deep bass effect is produced. Do not turn knob past the stop position when adjusting the tone or the position of the Phono-Radio Switch will be changed as explained above.

BAND SWITCH

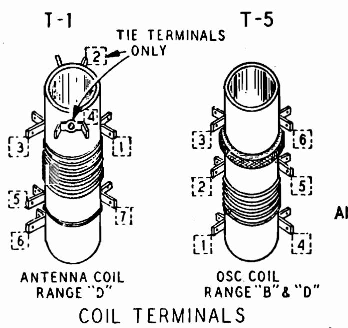
This knob has two positions. The position to the left provides reception on the standard Broadcast Band. The position to the right switches the tuning to the Short Wave Band.

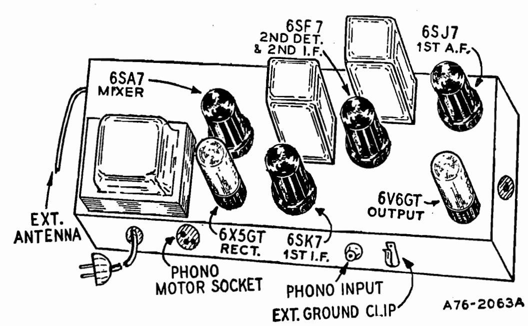




DRIVE CORD REPLACEMENT

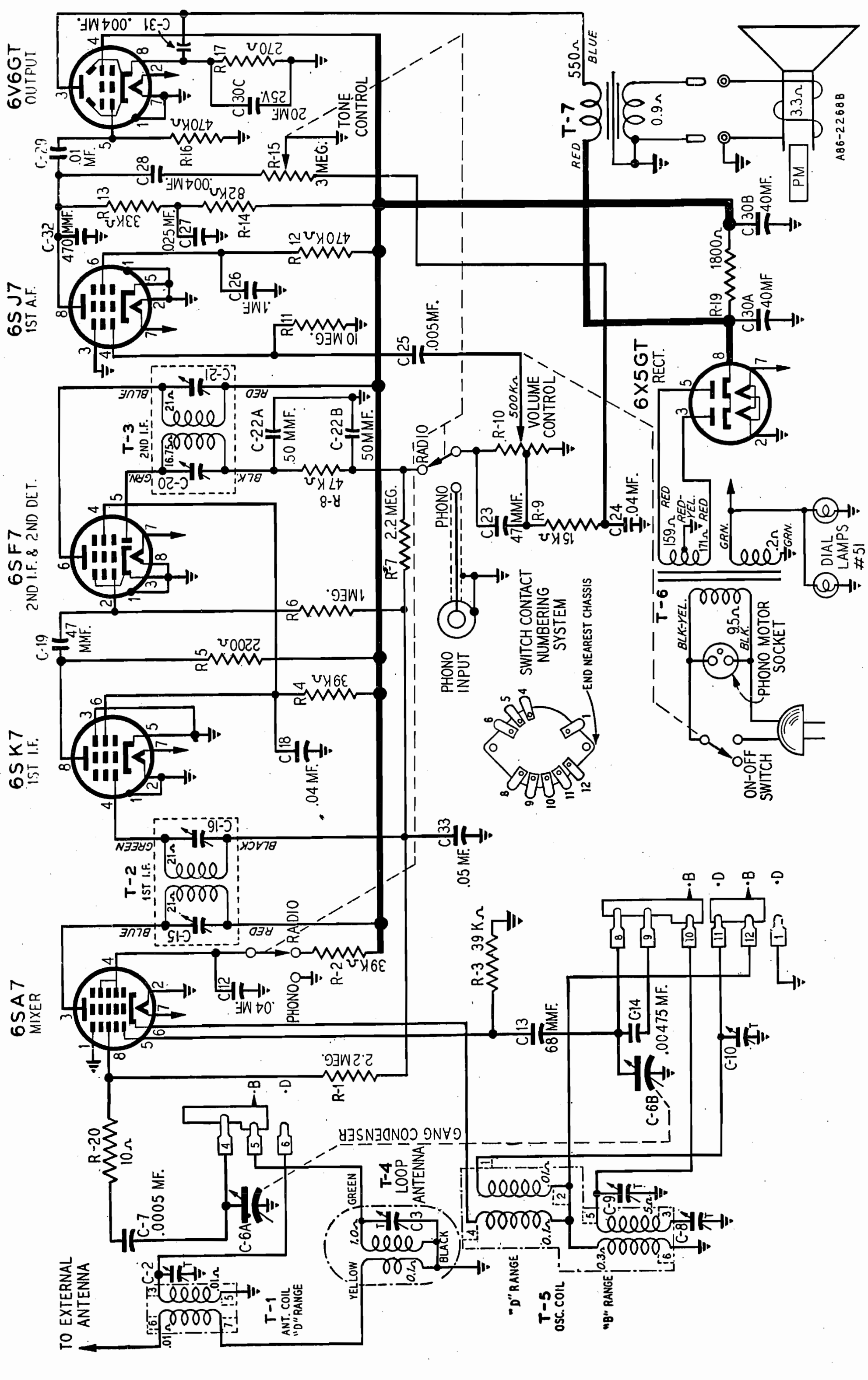
The drive cord should be replaced as shown on the accompanying illustration using a new 10X66 drive cord assembly for the purpose. After the cord has been installed, stretch the tension spring and fasten the free end of the cord to it.





MODEL D1835B

WESTERN AUTO SUPPLY CO.



WESTERN AUTO SUPPLY CO.

MODEL D1835B

ALIGNMENT PROCEDURE

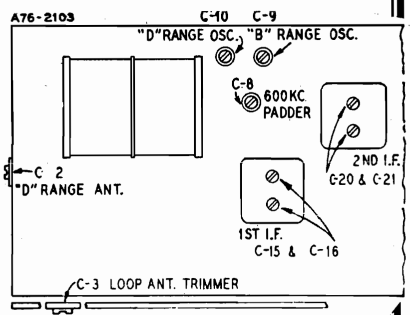
Volume Control—Maximum All Adjustments.

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 ... accurately calibrated signal at the test frequencies as listed.
Output Indicating Meter—Non-Metallic Screwdriver.
Dummy Antennas—.1 mf., 50 mmf., and 400 ohms.

	SIGNAL GENERATOR FREQUENCY SETTING	CONNECTION AT RADIO	DUMMY ANTENNA	BAND SWITCH SETTING	CONDENSER SETTING	ADJUST TRIMMERS TO MAXIMUM
I.F.	455 KC	Grid of 6SA7 Pin 8	.1 mf.	B Range	Turn Rotor to Full Open	1st I.F. (C15) & (C16) 2nd I.F. (C20) & (C21)
RANGE B	1620 KC	Antenna Lead	50 mmf.	B Range	Turn Rotor to Full Open	Oscillator Range B (C9)
	1400 KC	Antenna Lead	50 mmf.	B Range	Tune Rotor to Max. Output	Ant. Range B (C3)
	600 KC	Antenna Lead	50 mmf.	B Range	Tune Rotor to Max. Output	600 KC (C8) See Note B
Repeat above steps at 1620 and 600 KC until readjusting the oscillator Range B Trimmer (C9) causes no further improvement in output.						
RANGE D	18.3 MC	Antenna Lead	400 Ohm	D Range	Turn Rotor to Full Open	Oscillator Range D (C10)
	16 MC	Antenna Lead	400 Ohm	D Range	Tune Rotor to Max. Output	Ant. Range D (C2) Rock Rotor—See Note B
LOOP RANGE B	Reassemble chassis in cabinet.					
	1400 KC	Antenna Lead	50 mmf.	B Range	Tune Rotor to Max. Output See Note A	Ant. Range B (C3)



NOTE A—Set pointer at the 1400 KC mark on the dial scale. Attach pointer to drive cord.

NOTE B—Turn rotor back and forth, and adjust the trimmer until peak of greatest intensity is obtained.

SPECIFICATIONS

Power Consumption ....45 Watts (At 117 volts AC)

Power Output ....4 Watts Maximum
2.3 Watt 10% Harmonics

Selectivity ....40KC Broad at 1000 times Signal

Intermediate Frequency ....455 KC

Speaker ....12" PM Dynamic

Tuning Frequency Range
B Range ....540 to 1600 KC
D Range ....5.75 to18.3 MC

Sensitivity (For .05 watt output—External Antenna).
B Range ....9 Microvolts Average
D Range ....20 Microvolts Average

REMOVAL OF CHASSIS FROM CABINET

Before removing the chassis from the cabinet it will be necessary to detach the dial pointer from the dial string. To do this, spread the tabs on the pointer and pull the dial string off the pointer.

The dial lamp socket assemblies may be disengaged from the cabinet mounting by squeezing together and pulling away from the cabinet mounting, the spring bracket to which the dial lamp socket is mounted. Take care not to bend or damage the large drive pulley on the gang condenser while doing this.

When replacing the chassis in the cabinet it will be necessary to tune in a station of a known frequency and move the dial pointer until that frequency is indicated on the dial and then attach the pointer to the dial string. Take care not to scuff or cut the dial string or bend the pointer during this operation.

REPLACEMENT PARTS LIST

NOTICE: There is a model number label on the chassis. This label identifies the radio as to chassis, dial and issue letter. When ordering parts or writing, give ALL information appearing on this label.

MISCELLANEOUS

12A486	12" P.M. Speaker
3A303	Tube Socket—Octal (8 prong) Moulded
3A304	Phono Motor Socket
3A305	Phono Socket—Single Pin Tip
10A689	Knob (Tuning)
10A690	Knob (Off-On Volume)
10A687	Knob (SW-BC)
10A688	Knob (Tone—R.P.)
2A372	Band Change Switch
13X328	Line Cord and Plug Assembly
	No. 856 Console Cabinet

TRANSFORMERS AND COILS

T-1	9A1917	"D" Range Antenna Coil Assembly
T-2	9A1814	1st I-F Coil Assembly
T-3	9A1815	2nd I-F Coil Assembly
T-4	26A474	"B" Range Loop Antenna
T-5	9A1918	Oscillator Coil Assembly
T-6	53X282	Power Transformer
T-7	51X134	Output Transformer

CAPACITORS

C-2	17A164	5-50 mmf		Trimmer
C-3	17A235	2-24 mmf		Trimmer
C-6A, C-6B	14A184	Gang Condenser with Drive Pulley		
C-7	B66501	.0005 mf	200 V	Tubular
C-8	17A155	350-430 mmf		Trimmer
C-9, C-10	17A109	2.5-35 mmf		Dual Trimmer
C-12, C-18	D66403	.04 mf	400 V	Tubular
C-13	47X466	68 mmf		Moulded
C-14	46X289	.00475 mf	180 V	Tubular
C-15, C-16	Part of T-2 (1st I-F Coil Assembly)			
C-19, C-23	47X463	47 mmf		Moulded
C-20, C-21	Part of T-3 (2nd I-F Coil Assembly)			
C-22A, C-22B	47X112	50-50 mmf		Dual Mica
C-24	D64403	.04 mf	400 V	Tubular
C-25	D66502	.005 mf	400 V	Tubular
C-26	D67104	.10 mf	400 V	Tubular
C-27	D64253	.025 mf	400 V	Tubular
C-28	D66402	.004 mf	400 V	Tubular
C-29	D66103	.01 mf	400 V	Tubular
C-30A, C-30B, C-30C	45X346	40 mf, 40 mf, 20 mf	450 V, 450 V, 25 V	3 Section Electrolytic
C-31	H66402	.004	800 V	Tubular
C-32	47X467	470 mmf		Moulded
C-33	B66503	.05 mf	200 V	Tubular

RESISTORS

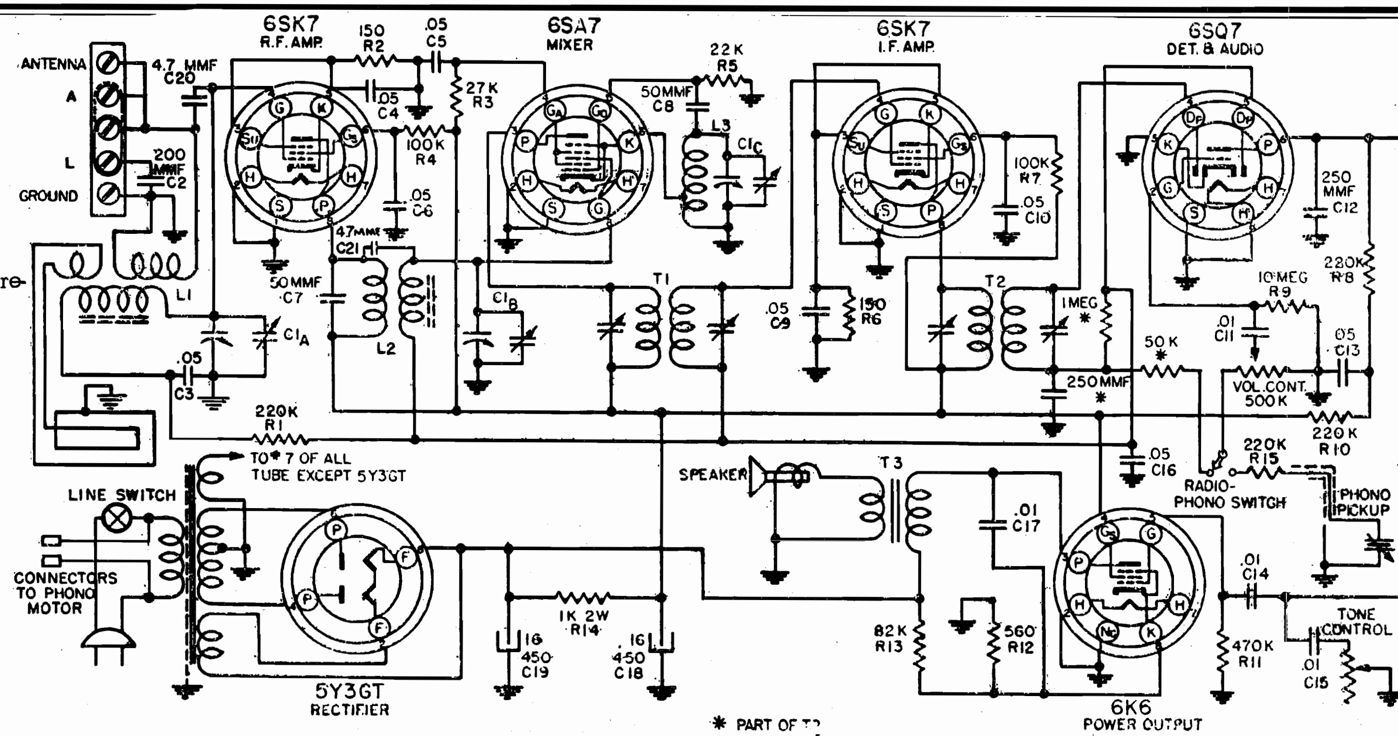
B85225	R-1, R-7	2.2 megohms	0.5 W	Carbon
C84393	R-2, R-4	39 K ohms	1.0 W	Carbon
B84393	R-3	39 K ohms	0.5 W	Carbon
B84222	R-5	2200 ohms	0.5 W	Carbon
B85105	R-6	1 megohm	0.5 W	Carbon
B85473	R-8	47 K ohms	0.5 W	Carbon
B84153	R-9	15 K ohms	0.5 W	Carbon
36X358	R-10	500 K ohms		Volume Control and Line Switch
B85106	R-11	10 megohms	0.5 W	Carbon
B85474	R-12, R-16	470 K ohms	0.5 W	Carbon
B84333	R-13	33 K ohms	0.5 W	Carbon
B84823	R-14	82 K ohms	0.5 W	Carbon
40X276	R-15	3.0 megohms		Tone Control & Radio Phono Switch
C84271	R-17	270 ohms	1.0 W	Carbon
D84182	R-19	1800 ohms	2.0 W	Carbon
B85100	R-20	10 ohms	0.5 W	Carbon

DIAL AND DRIVE ASSEMBLY

6X21	Rubber Grommet } Mtg. Gang Condenser
20X329	Cond. Cushion Stud } Mtg. Gang Condenser
25X1489	Pulley Bracket (Right)
25X1490	Pulley Bracket (Left)
26X485	Drive Shaft
19X192	"C" Washer
25X1491	Pointer Bracket
15X229	Pointer
10X66	Drive Cord Assembly
28X113	Drive Cord Tension Spring
30X517	Dial Clamp
4X915	Escutcheon, Dial (Right)
4X916	Escutcheon, Dial (Left)
4X931	Escutcheon Insert
58X694	Dial Glass
7A200	Pilot Light Socket Assembly
7A32	Pilot Light Bulb No. 51

MODEL D1840

WESTERN AUTO SUPPLY CO.



TUBE COMPLEMENT

The tube complement of this receiver consists of the following:

1—6SK7—R.F. Amplifier
1—6SA7—Mixer—OSC.
1—6SK7—I.F. Amplifier
1—6SQ7—Det. AVC—Audio
1—6K6—Power Output
1—5Y3—Rectifier

SOCKET VOLTAGES

All voltages are measured with a 1000 ohm per volt meter on the 150 volt scale, with no signal. To obtain an accurate voltage check the A.C. line voltage must be 117 volts. Where no voltage is shown the voltage is O or cannot be read with this type of voltmeter.

SERVICE NOTES

Voltages taken from the different points of the circuit to the chassis are measured with volume control in maximum position, all tubes in their sockets and with a volt meter having a resistance of 1000 ohms per volt, using the 150 volt scale. These voltages are clearly indicated on the voltage chart. (Fig. 2).

All voltages should be measured with an A.C. line voltage of 117 volts.

To check for open by-pass condensers, shunt each condenser with another one having the same capacity and voltage rating which is known to be good until the defective unit is located.

ALIGNING INSTRUCTIONS

Never attempt any adjustments on this receiver unless it becomes necessary to replace a coil or transformer, or the adjustments have been tampered with in the field. Always make certain that other circuit components, such as tubes, condensers, resistors, etc., are normal before proceeding with realignment.

If realignment is necessary follow the instructions given under the heading "ALIGNMENT PROCEDURE" on the next page. After realignment has been completed repeat the procedure as a final check.

REMOVING CHASSIS FROM CABINET

The dial pointer must be removed from the pointer rail assembly, and cabinet before the chassis can be taken from the cabinet. This can be done by detaching the dial cord from the pointer and sliding the pointer to the right (viewed from the rear of the cabinet) as far as it will go. The dial pointer can now be removed from the cabinet.

The chassis can now be removed in the conventional manner by taking out the four chassis mounting bolts after disconnecting the speaker and phono leads.

WESTERN AUTO SUPPLY CO. MODEL D1840

ALIGNMENT PROCEDURE

Volume control—Maximum: all adjustments.
Tone Control—Treble: Full Clockwise Rotation.
Connect ground lead of signal generator to radio chassis.

Connect dummy antenna in series with output lead of signal generator.

Connect output meter across voice coil of speaker.

The following equipment is necessary for proper alignment

Signal generator that will provide the test frequencies as listed.

Output meter.

Non-metallic screwdriver.

Dummy antennas—.1 mfd., 00025 mfd.

Position of Variable	Generator Frequency	Dummy Ant. mfd.	Generator Connections	Trimmer Adjustment	Trimmer Function
Minimum Capacity (Fully Opened)	455 K.C.	.1	6SA7 Grid (Stator of C1B)	T1 T2	I. F.
Minimum Capacity (Fully Opened)	1725 K.C.	.00025	*Ant. Terminal on Loop	C1C	Osc.
Tune in signal From Generator	1500 K.C.	.00025	*Ant. Terminal on Loop	C1B	R. F.
Tune in signal From Generator	1500 K.C.	.00025	*Ant. Terminal on Loop	C1A	Ant.

*Be sure coupling link is in correct position for external antenna operation. See illustration below (Fig. 4).

Repeat the above alignment procedure as a final check.

With an output meter connected across the voice coil of the speaker, the output meter reading for ½ watt is 1.25 volts using a signal which is modulated 400 c.p.s.

ANTENNA and GROUND CONNECTIONS

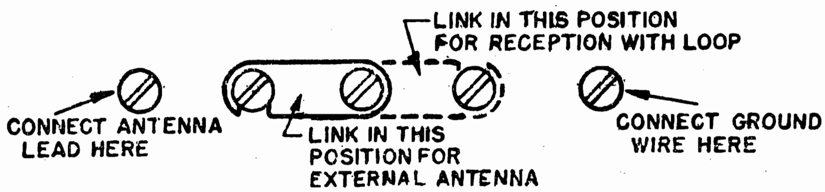
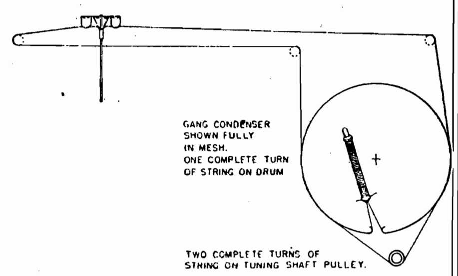


Fig. 4



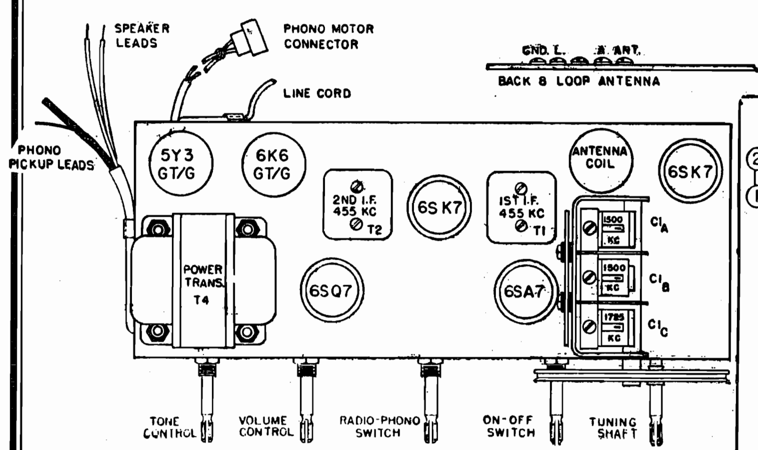


Fig. 1 Chassis, Top View

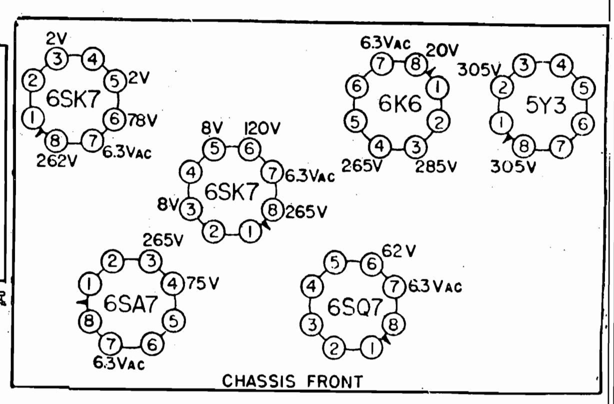


Fig. 2 Chassis, Bottom View

MODEL D1840

WESTERN AUTO SUPPLY CO.

CONDENSERS

Circuit Reference	Part No.	Description
C1A, C1B, C1C	B19-186	Variable condenser
C2	B15-189	200 MMF Mica condenser (on loop)
C3, C4, C9, C16	A16-152	.05 MFD 200 volt condenser
C5, C6, C10, C13	A16-158	.05 MFD 400 volt condenser
C7, C8	A15-175	50 MMF mica condenser
C11, C14, C15	A16-156	.01 MFD 400 volt condenser
C12	A15-176	250 MMF mica condenser
C17	A16-168	.01 MFD 1000 volt condenser
C18	A18-279	16 MFD 450 volt electrolytic condenser
C19	A18-274	16 MFD 450 volt electrolytic condenser
C20, C21	A83-355	4.7 MMF condenser

RESISTORS

Circuit Reference	Part No.	Description
R1, R8, R10, R15	A60-667	220K ohm ½ watt resistor
R2, R6	A60-686	150 ohm ½ watt resistor
R3	A60-692	27K ohm 1 watt resistor
R4, R7	A60-671	100K ohm ½ watt resistor
R5	A60-659	22K ohm ½ watt resistor
R9	A60-663	10 megohm ½ watt resistor
R11	A60-662	470K ohm ½ watt resistor
R12	A60-701	560 ohm 1 watt resistor
R13	A60-700	82K ohm 1 watt resistor
R14	A60-699	1000 ohm 2 watt resistor

COILS

Circuit Reference	Part No.	Description
L1	C10-459	Antenna coil
L2	B10-452	R. F. coil
L3	B10-446	Oscillator coil
T1	B10-412	1st I.F. transformer
T2	B10-444	2nd I.F. transformer

MISCELLANEOUS

Circuit Reference	Part No.	Description
T3	A80-222	Output transformer
T4	C80-223	Power transformer
	A69-169	Switch, on-off
	A26-123	Tone control
	A24-169	Volume control
	A84-41	Dial drive shaft and pulley assembly
	B79-359	Speaker, 10" P. M.
	S84-204	Loop antenna and Back assembly
	C67-520	Dial scale
	A52-203	Knob, (tuning)
	A52-207	Knob, (tone)
	A52-208	Knob, (volume)
	A52-209	Knob, (on-off)
	A52-242	Knob, (radio-phono)
	B58-70	Dial pointer
	A83-532	Retainer, dial scale, right
	A83-533	Retainer, dial scale, left
	A69-180	Switch, radio-phono

WESTERN AUTO SUPPLY CO. MODEL D1850

ELECTRICAL SPECIFICATIONS

Power Supply..........105 to 125 volts, AC, 60-cycles; Chassis only 122 watts. With phono operation 150 watts.

Frequency Range....Broadcast Band—535 to 1620 kc. FM Band—88 to 108 mc.

Intermediate Freq...AM-455 kc; FM-10.7 mc.

Selectivity................AM-48 kc. broad at 1000 times signal, measured at 1000 kc.
I.F. FM-180 kc. broad at 2 times down.
I.F. FM-320 kc. broad at 10 times down.

AM Sensitivity.........(For .5 watt output with external antenna)—3 microvolts average.

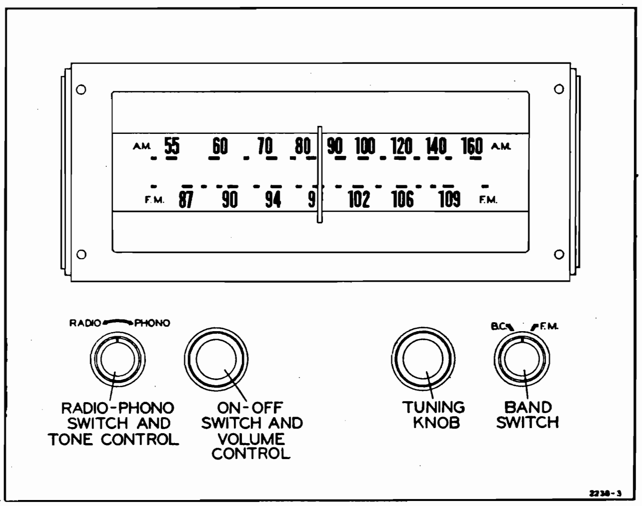
FM Sensitivity..........(For .5 watt output)—10 microvolts average.

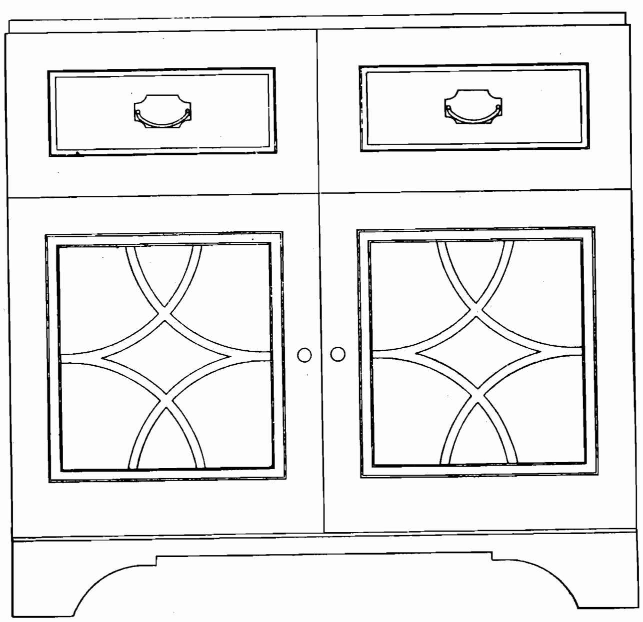
Power Output..........8 watts. 10% distortion. 10 watts maximum.

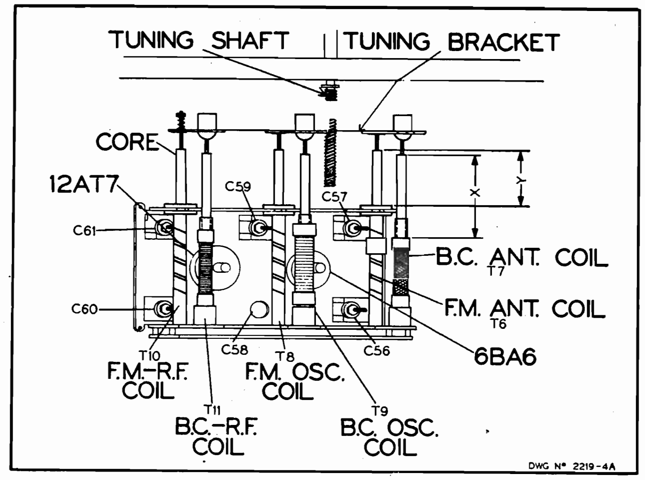
Loud Speaker...........12" electrodynamic. Voice coil impedance 3.2 ohms, 400 cycles.

Tube and Lamp Complement..........6BA6, FM—AM R.F. stage.
12AT7, FM—AM oscillator and mixer.
6BA6, FM—AM—1st I.F.
6BA6, FM—2nd I.F.
6AL5, FM—ratio detector.
6AT6, AM detector. A. F. AMP. and A.V.C.
6SN7, Push-Pull. Driver and phase-inverter.
5U4G, rectifier.
6V6, output.
6V6, output.
T-44 dial lamp (2 used).

Automatic changer..Oak 6666 with P-93 Cartridge.

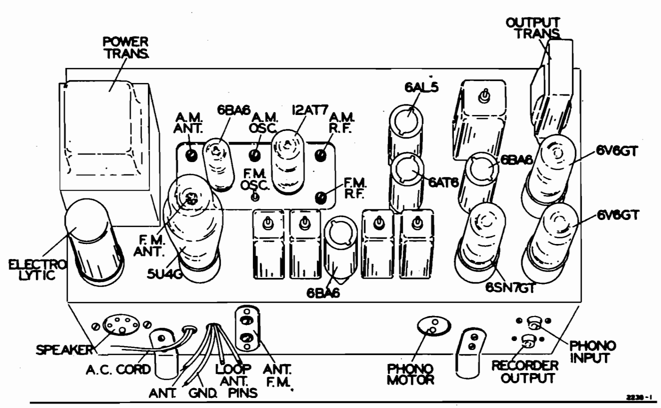






TUNER ADJUSTMENT

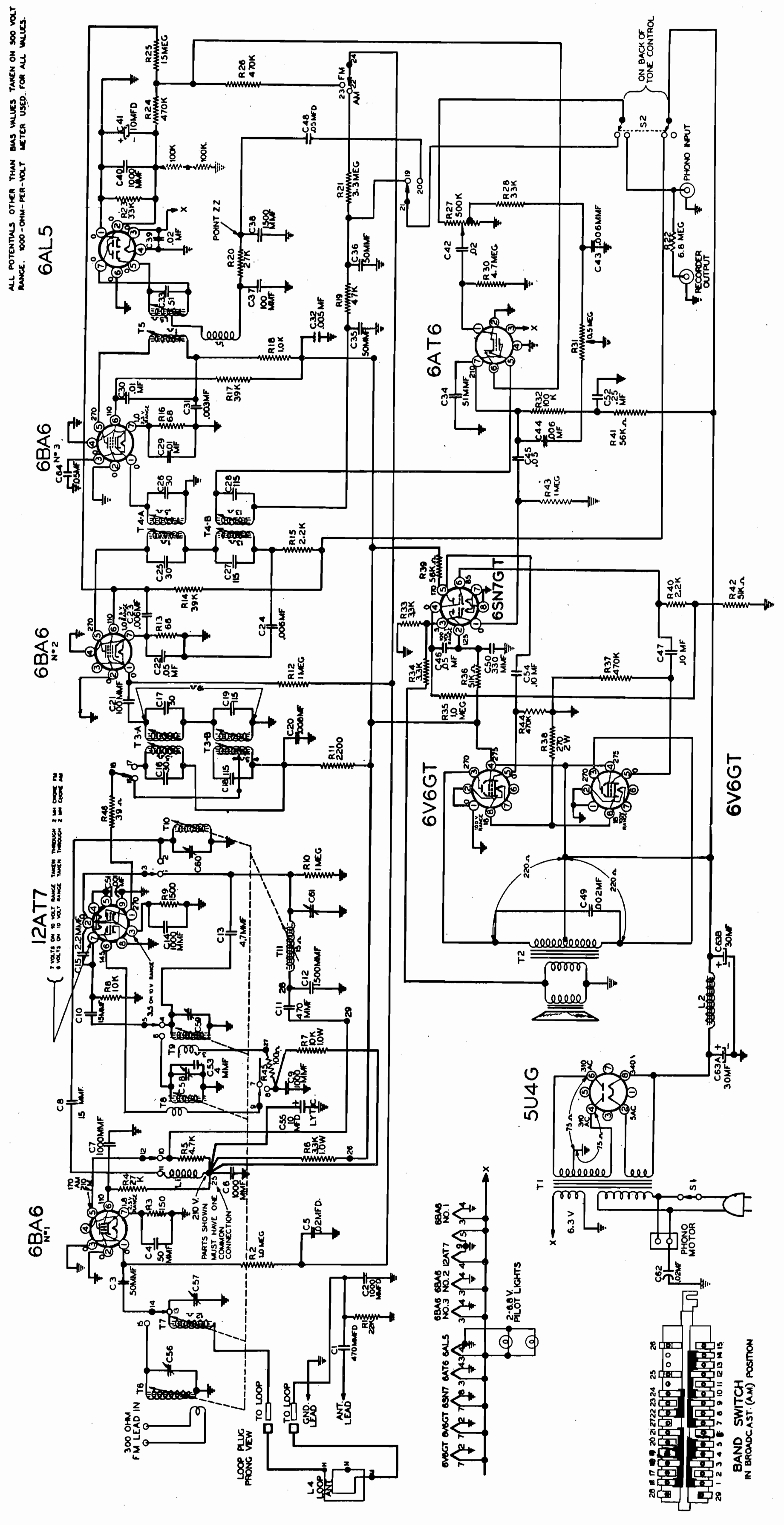
With tuner all the way out, dimension "X" should be 1½ inches. "Y" should be 1-1/32 inches. "X" is from the end of the slug to edge of the coil winding. Check these dimensions before R.F. alignment is attempted of either the AM or FM Band. No slug adjustment should be necessary since the slugs are properly set at the factory.



Chassis — top view

MODEL D1850

WESTERN AUTO SUPPLY CO.



NOTE: Two 100K ohm resistors in series from Pin No. 2 of the 6AL5 to ground are connected as shown only when aligning the FM I.F. Refer to FM I.F. alignment procedure.

NOTE: B.C. Oscillator Coil T9 and number 7 terminal of slide switch should be connected together.

NOTE: Resistor R22 removed; with shielded wire from recorder output jack to radio side of radio-phono switch S2 added.

WESTERN AUTO SUPPLY CO. MODEL D1850

ALIGNMENT PROCEDURE

Broadcast Band Section I.F. and R.F.

The alignment procedure below includes the sensitivities at the inputs of various stages. All signal input values are based on an output of ½ watt. This may be measured by disconnecting the speaker voice coil and substituting a 3.2-ohm resistor across the secondary winding of the output transformer. A reading of 1.3 volts AC across this resistor will be approximately equivalent to a ½-watt output with the speaker connected. The volume control must be set at maximum. The tone control must be set for maximum treble.

The signal source must be an accurately calibrated signal generator capable of supplying the frequencies designated, modulated 30% with a 400-cycle audio signal. A 400 cycle audio signal is required for the audio measurement. Variations in sensitivities of plus or minus 25% are usually permissable.

AM-I.F. ALIGNMENT

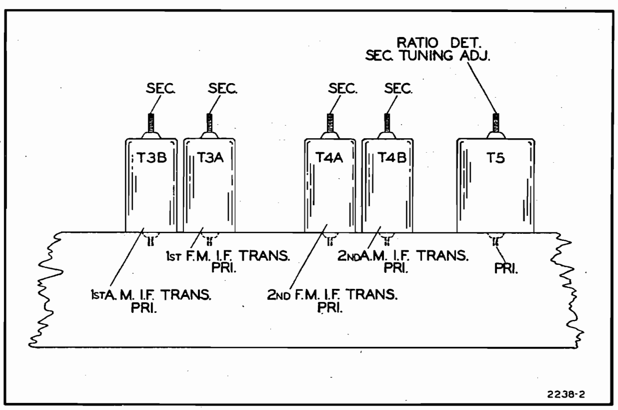
Band Switch in AM Position. Tune Set to 1400 Kc. Dummy Antenna .1 Mfd.

SIGNAL GENERATOR FREQUENCY	CONNECTION TO RADIO	ADJUSTMENTS TO BE MADE	ADJUST FOR
455 Kc. Use 1000 microvolts	Pin No. 1 of 6BA6 No. 2 and ground	Primary and Secondary of T4B AM windings See I. F. view	Maximum output Should be ½ watt.
455 Kc. Use 30 microvolts	Pin No. 2 of 12AT7 and ground	Primary and Secondary of T3B AM windings See I. F. view	Maximum output Should be ½ watt.
400 cycles. Use 28 millivolts	Hot end of volume control and ground	None	Maximum output Should be ½ watt.

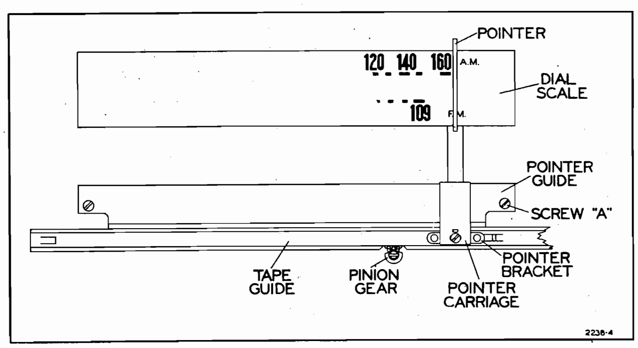
BROADCAST BAND-R.F. ALIGNMENT

Check pointer so that it coincides with the right hand marker to the extreme right when iron cores are all the way out.
For adjustment, see dial mechanism illustration.

SIGNAL GENERATOR FREQ.	CONNECTION TO RADIO	DUMMY ANTENNA	ADJUST
1620 Kc. Use 3 microvolts	AM Antenna and Ground	200 mmf.	C59, C57, C61. For maximum, ½ watt



I. F. VIEW



DIAL ADJUSTMENT VIEW

Loosen screw "A" so that teeth of tape can be properly meshed with pinion gear to give proper pointer travel.

MODEL D1850 WESTERN AUTO SUPPLY CO.

ALIGNMENT PROCEDURE

FM Band Section I.F. and R.F.

A non-metallic alignment tool must be used.

IMPORTANT— No alignment of the FM section of this radio should be attempted unless you are positive that the circuits are in need of adjustment and you have the necessary equipment.

All components used in this radio are extremely stable and the tuned circuits should require no adjustment over a long period of time.

NOTE— The following alignment is based on the use of the new Simpson vacuum tube voltmeter which has a "floating ground". In other words, the meter, when used as a vacuum tube volt-meter, can have both the positive and negative sides connected to points above ground and still give true readings.

A standard AM signal generator is required.

FM-I.F. ALIGNMENT

Band Switch in FM Position. Dummy Antenna .1 Mfd.

SIGNAL GENERATOR FREQUENCY	CONNECTION TO RADIO	VACUUM TUBE VOLT METER CONNECTION TO RADIO	ADJUSTMENT TO BE MADE	ADJUST FOR
10.7 Mc. Use about .1 volt	Pin No. 1 of 6BA6 No. 3 and ground	Pin No. 2 of 6AL5 and ground	Primary of T5	Resonance should be about 3 volts
10.7 Mc. Use about .1 volt	Pin No. 1 of 6BA6 No. 3 and ground	See note "A"	Secondary of T5	Resonance should be about 3 volts
10.7 Mc. Use about 3300 microvolts	Pin No. 1 of 6BA6 No. 2 and ground	Pin No. 2 of 6AL5 and ground	Primary and Secondary of T4A 10.7 m.c. windings See I.F. view	Zero. Use zero center scale See note "B"
10.7 Mc. Use about 200 microvolts	Pin No. 2 of 12AT7 and ground	Pin No. 2 of 6AL5 and ground	Primary and Secondary of 10.7 m.c. windings of T3A See I.F. view	Resonance should be about 3 volts

NOTES ON FM — I. F. ALIGNMENT

NOTE "A" Connect two resistors, 100K OHMS each, from Pin No. 2 of 6AL5 to ground. These resistors must be matched within 5%. Connect as shown in dotted lines on schematic diagram. Connect vacuum tube voltmeter between the mid-point of the resistors and point zz.

NOTE "B" If T5 has been tampered with, it is possible that no crossover point will be found at first. Careful adjustment of both primary and secondary is necessary.

GENERAL: Input signals should be adjusted to give approximately 3 volts. The ratio detector is operating at reasonable level at this point and will give the truest indication of correct alignment with the procedure specified.

FM-R.F. ALIGNMENT

Check pointer so that it coincides with the right hand marker to the extreme right when iron cores are all the way out.

For adjustment, see dial mechanism illustration.

SIGNAL GENERATOR FREQUENCY	CONNECTION TO RADIO	DUMMY ANTENNA	ADJUST	VACUUM TUBE VOLT METER CONNECTION TO RADIO	ADJUST TO
100 Mc. Use about 10 microvolts	FM Antenna Terminals See note	300 ohms	C58 Osc. C60 R. F. C56 Ant.	Pin No. 2 of 6AL5 and Ground	Resonance about 3 volts

NOTE: If a signal generator with the above fundamental frequency is not available, it is sometimes possible to use harmonics. Use extreme care in picking harmonics. An alternate procedure is to use a local station carrier of known frequency to align the FM Band and to use the vacuum tube volt-meter as above for resonance indication. A weak carrier, however, will not produce 3 volts.

NOTE: Connect 300 ohms in series with hot side of generator and connect to one screw. Connect cold side of generator to other screw.

WESTERN AUTO SUPPLY CO.

MODEL D1850

REPLACEMENT PARTS LIST

TUNER PARTS

Condensers

Ref. No.	Part No.	Description	Qty. Used
C58	A-8H-15444	Trimmer, FM oscillator	1
C56, 57, 59, 61	A-2M-12618	Trimmer plate, large	4
C60	A-2M-14368	Trimmer plate, small	1
	A-5M-12615	Locator, for trimmer plates	5
C59, C61	B-6M-12616-S-2	Silvered mica film	2
C56, 57, 60	A-6M-12616	Clear mica film	3
	A-3C-12617	Spacer, for trimmer plates	5
C1, C11	C-8G-11732	470 mmf, ceramic	2
C2	C-8G-13695	1000 mmf, ceramic	1
C6, 7, 9, 14, 51	C-8G-13201	1000 mmf, ceramic	5
C12	C-8G-11731	1500 mmf, ceramic	1
C10, C8	C-8G-13017	15 mmf, ceramic	2
C3, C4	C-8G-11484	50 mmf, ceramic	2
C13	A-8G-12495-6	4.7 mmf, ceramic	1
C15	A-8G-12495-4	2.2 mmf, ceramic	1
C53	C-8G-15859	4 mmf, ceramic	1
C5	C-8D-11304	.02 x 200 volts, paper	1

Resistors

Ref. No.	Part No.	Description	Qty. Used
R4	C-9B2-79	27K ohms, 1 watt	1
R1	C-9B1-21	22K ohms, ½ watt	1
R3	C-9B1-52	150 ohms, ½ watt	1
R5	C-9B1-17	4700 ohms, ½ watt	1
R8	C-9B1-19	10K ohms, ½ watt	1
R2, R10	C-9B1-31	1 megohm, ½ watt	2
R21	C-9B1-34	3.3 megohms, ½ watt	1
R45	C-9B1-50	100 ohms, ½ watt	1
R46	C-9B1-45	39 ohms, ½ watt	1
R9	C-9B1-64	1500 ohms, ½ watt	1
R6	C-9B2-6	3300 ohms, 1 watt	1
R7	C-9B2-74	10K ohms, 1 watt	1

Coils

Ref. No.	Part No.	Description	Qty. Used
T8	B-13D-13027-1	F.M. oscillator coil	1
—	B-51A-13056	Core for F.M. oscillator coil	1
T6	B-13E-13028	FM antenna coil	1
—	B-51A-13058	Core for FM antenna coil	1
T10	B-13C-13029	FM R.F. coil	1
—	B-51A-13057	Core for FM R.F. coil	1
T9	A-13D-15704	B.C. oscillator coil	1
—	B-51A-12722	Core for B.C. oscillator coil	1
T7	B-13E-13031	B.C. Antenna coil	1
T11	B-13C-13032	B.C. R.F. coil	1
—	B-51A-12723	Core for B.C. ant. and R.F. coil	2

Miscellaneous

Ref. No.	Part No.	Description	Qty. Used
	B-20B-15628	Slide switch	1
	A-15B-12997	7-prong min., tube socket	1
	A-15B-13430	9-prong min., tube socket	1
	B-3A-15415	Lead screw	1
	A-3J-12309	Pinion gear	1
	A-49A-14439	Drive pring	2
	A-49A-13228	Tension spring	1
	A-49A-12394	Spiral spring for slugs	3
	B-2J-13006	Rack tape with teeth and pointer bracket	1
	B-2D-15416	Guide for rack tape	1
	B-2D-15649	Pointer carriage	1
	A-5M-13741	Pointer	1
	32F4SE-11488	4-40 x ⅛" screw for pointer	2

MAIN CHASSIS PARTS

Condensers

Ref. No.	Part No.	Description	Qty. Used
C63A, C63B	B-8C-11629	Electrolytic filter condenser, 30—30 x 450 volts	1
C52	C-8D-13439	.25 mfd x 400 volts	1
C54, C47	C-8D-10760	.1 mfd x 400 volts	2
C31	C-8D-11013	.003 x 600 volts	1
C44, 43, 24, 23, 20	C-8D-10785	.006 x 600 volts	5
C29, C30	C-8D-10761	.01 x 400 volts	2
C46, C45	C-8D-10813	.05 x 400 volts	2
C49	C-8D-10789	.002 x 600 volts	1
C48, C22	C-8D-10770	.05 x 200 volts	2
C64	C-8D-15860	.05 x 200 volts	1
C41	A-8C-13132	Electrolytic, 10 mfd x 50 volts	1
C62	C-8J-11321	.02 x 600 volts, molded case	1
C35	A-8G-13962	.005 x 500 volts, ceramic	1
C21	C-8G-11734	100 mmf, ceramic	1
C38	C-8G-13059	1500 mmf, ceramic	1
C34	C-8G-13060	51 mmf, ceramic	1
C40	C-8G-13201	1000 mmf, ceramic	1
C50	C-8G-11741	330 mmf, ceramic	1
C37	C-8F3-225	100 mmf, mica	1
C39, C42	C-8D-11304	.02 x 200 volts, paper	2
C35, C36	A-8F-13047	Mica condenser, 50 mmf, dual	1
C55	A-8C-12154	Electrolytic, 10 mfd, 450 volts	1

Resistors

Ref. No.	Part No.	Description	Qty. Used
R27, S1	A-10A-13114	Volume control and switch, 500K ohms	1
R31, S2	A-11A-15645	Tone control and phono radio switch	1
R22	C-9B1-36	6.8 megohms, ½ watt	1
R32	C-9B1-86	100K ohms, ½ watt	1
R44, R37	C-9B1-94	470K ohms, ½ watt	2
R41, R39	C-9B1-83	56K ohms, ½ watt	2
R33, R34	C-9B1-68	3300 ohms, ½ watt	2
R30	C-9B1-35	4.7 megohms, ½ watt	1
R23, R28	C-9B1-80	33K ohms, ½ watt	2
R20	C-9B1-79	27K ohms, ½ watt	1
R13, R16	C-9B1-48	68 ohms, ½ watt	2
R14, R17	C-9B2-81	39K ohms, 1 watt	2
R24, R26	C-9B1-29	470K ohms, ½ watt	2
R25	C-9B1-302	15 megohms, ½ watt	1
R19	C-9B1-23	47K ohms, ½ watt	1
R12, R43, R35	C-9B1-31	1 megohm, ½ watt	3
R40	C-9B1-66	2200 ohms, ½ watt	1
R36, R42	C-9B1-200	51K ohms, ½ watt	2
R38	C-9B4-55	270 ohms, 2 watts	1
R18	C-9B1-13	1000 ohms, ½ watt	1
R11, R15	C-9B2-15	2200 ohms, 1 watt	2

Coils

Ref. No.	Part No.	Description	Qty. Used
	B-13A-15680	Input I.F. transformer, 455 kc.	1
	B-13B-15681	Output I.F. transformer, 455 kc.	1
	B-13A-15682	Input I.F. transformer, 10.7 megohms	1
	B-13B-15683	Second I.F. transformer, 10.7 megohms	1
	B-13M-15684	Ratio detector, 10.7 megs.	1
	C-13E-15687	Loop antenna assembly	1

Transformers

Ref. No.	Part No.	Description	Qty. Used
T1	B-12A-13038-1	Power transformer, 105-125 volts 50-60 cycles, primary	1
T2	B-12C-13042-1	Output transformer, for speaker	1

Speaker

Ref. No.	Part No.	Description	Qty. Used
	B-18B-13043-1	Electrodynamic speaker, 12-inch, less output transformer	1

Miscellaneous

Ref. No.	Part No.	Description	Qty. Used
	C-30A-15686	Dial scale	1
	B-30B-13943	Dial glass	1
	2G-13696	Escutcheon	1
	56D2-12463	Screws for escutcheon	4
	B-5B-13737-37	Knob, mahogany—small with dot	2
	B-5B-13738-37	Knob, mahogany—large, without dot	2
	B-5B-13737-14	Knob, walnut—small, with dot	2
	B-5B-13738-14	Knob, walnut—large, without dot	2
	A-3A-15630	Shaft for band switch	1
	A-43D-12934	"U" speed clip	1
	A-55C-12935	Ball bearing	1
	B-47A-13801	Pilot lite assembly	1
	A-46A-11739	Pilot lite bulb, 6-8 volts	2
	A-2H-10974	Tube shield	4
	A-15C-13174	7-prong, min., tube socket	4
	A-15B-10440	8-prong, octal, socket	4
	A-7B-13050	FM dipole socket	1
	A-15B-11538	Speaker socket	1
	A-19B-12468	Phono-motor socket	1
	A-19B-11044	Recorder socket	1
	A-19B-12470	Phono input socket	1
	B-14M-11479	AC line cord	1
	32K10-14306	10-32 x 1 inch, chassis mounting screws	4

RECORD CHANGER

Ref. No.	Part No.	Description	Qty. Used
	B-201-15368	6666 Record Changer assembly, with P-93 crystal cartridge	1
	P-93	Crystal cartridge only	1

MODEL D1946

WESTERN AUTO SUPPLY CO.

ELECTRICAL SPECIFICATIONS

Power Consumption—
117 volts AC 60 watts normal
85 watts phono operating

Power Output—
4.5 watts maximum
2.5 watts 10% distortion

Speaker—8" PM dynamic

Frequency Ranges—
Broadcast 540-1600 KC
Frequency Modulation 88-108 MC

Intermediate Frequency—
AM 455 KC — FM 10.7 MC

Selectivity — AM — 45 KC broad at 1000 times signal, measured at 1000 KC

I.F. FM—200 KC broad at 2 times down

I.F. FM—950 KC broad at 200 times down

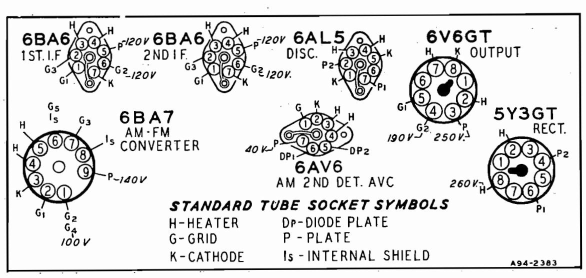
AM Sensitivity—(For .5 watt output with external antenna)
10 microvolts average

FM Sensitivity—(For .5 watt output)
100 microvolts average

TUBE SOCKET VOLTAGES

Socket voltages are shown on the Bottom Socket diagram at the tube socket terminals. All voltages are between the socket terminal and chassis ground. Plate, screen and cathode voltages were taken with a 1000 ohm-per-volt meter with a 300 volt scale used for plate and screen voltages. Audio grid voltages were read with a vacuum tube volt-meter. Conditions of measurement are:

Line voltage ....117 Volts AC
Signal Input ....None
A Variation of ±10% is usually permissible.



REMOVAL OF CHASSIS FROM CABINET

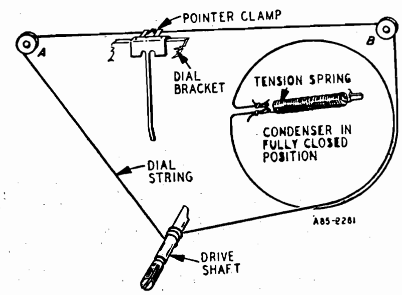
Before removing the chassis from the cabinet it will be necessary to detach the dial pointer from the dial string. To do this, spread the tabs on the pointer and pull the dial string off the pointer.

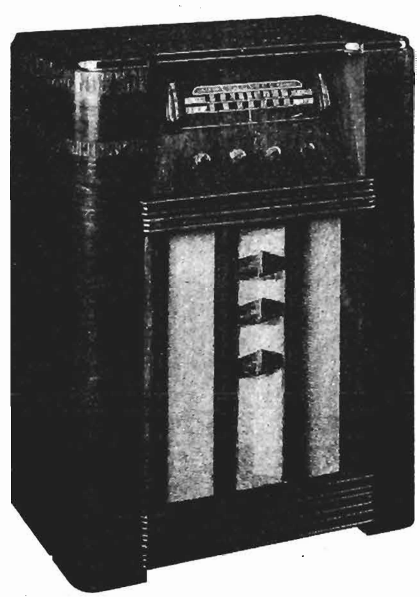
The dial lamp socket assembly may be disengaged from the cabinet mounting by squeezing together and pulling away from the cabinet mounting, the spring bracket to which the dial lamp socket is mounted. Take care not to bend or damage the large drive pulley on the gang condenser while doing this.

When replacing the chassis in the cabinet it will be necessary to tune in a station of a known frequency and move the dial pointer until that frequency is indicated on the dial and then attach the pointer to the dial string. Take care not to scuff or cut the dial string or bend the pointer during this operation.

DRIVE CORD REPLACEMENT

Replacement of the drive cord may be accomplished as shown in the illustration. For this purpose use the new drive cord assembly listed in the Replacement Parts List. Turn the gang condenser until the plates are fully meshed. Then install the string as shown, winding three turns clockwise around the tuning shaft with the turns progressing away from the chassis. After the cord is installed, rotate the tuning shaft several times in order to take up any slack in the cord.





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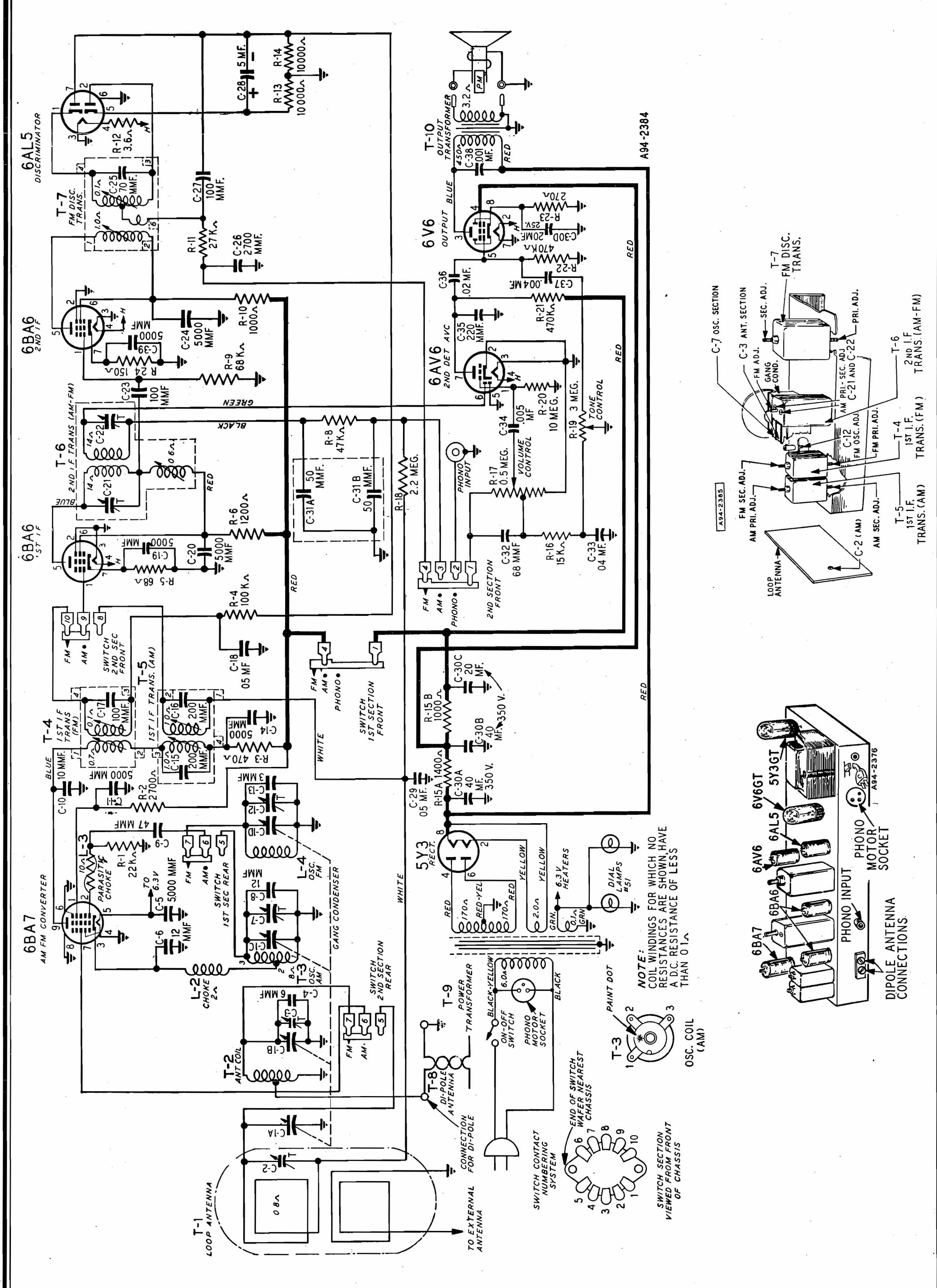


MODEL D1946

WESTERN AUTO SUPPLY CO.

ALIGNMENT PROCEDURES

AM STAGES

Volume Control Maximum 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 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, and 50 mmf.

SIGNAL GENERATOR FREQUENCY SETTING	SIGNAL GENERATOR CONNECTION AT RADIO	GROUND CONNECTION	DUMMY ANTENNA	GANG CONDENSER SETTING	ADJUST TUNING SLUGS AND TRIMMERS
455 KC	Control Grid 1st 6BA6 Pin No. 1	Chassis Base	.1 mf	Turn Rotor to Full Open	2nd I.F. C-21 & C-22
455 KC	Control Grid 6BA7 Pin No. 7 1st Det.	Same as above	.1 mf	Turn Rotor to Full Open	1st I.F. Pri. & Sec.
1620 KC	Control Grid 6BA7 Pin No. 7	Same as above	.1 mf	Turn Rotor to Full Open	Oscillator C-7
1400 KC	External Antenna Lead	Same as above	50 mmf	Turn Dial to 1400 KC. See Note A	Antenna C-2

NOTE A—Set pointer at the 1400 KC mark on the dial scale. Attach pointer to drive cord.

FM STAGES

Allow chassis and signal generator to warm up for several minutes.
The following equipment is required for aligning:
An accurately calibrated signal generator providing unmodulated signals at the test frequencies listed below.
Non-metallic screwdriver.
Dummy Antennas and I-F Loading Resistor—2500 mmf, 300 ohms and a 3300 ohm .5 watt resistor with short leads.

Zero center scale DC vacuum tube voltmeter having a range of approximately 3 volts.

(If a zero center scale meter is not available, a standard scale vacuum tube voltmeter may be used by reversing the meter connections for negative readings.)

	SIGNAL GENERATOR FREQUENCY SETTING	SIGNAL GENERATOR CONNECTION AT RADIO	DUMMY ANTENNA	BAND SWITCH SETTING	CONDENSER SETTING	ADJUSTMENT FOR MAX. METER DEFLECTION
Discriminator	10.7 MC	6BA6 2nd I-F Pin 1 & Chassis	2500 mmf	FM	Rotor Fully Open	Disc. Pri. Note A
	10.7 MC	Same as above	2500 mmf	FM	Rotor Fully Open	Disc. Sec. Note B
	10.7 MC	Same as above	2500 mmf	FM	Rotor Fully Open	Disc. Pri. Note A
	10.7 MC	Same as above	2500 mmf	FM	Rotor Fully Open	Disc. Sec. Note B
I-F	10.7 MC Note E	6BA6 1st I-F Pin 1 & Chassis	2500 mmf	FM	Rotor Fully Open	2nd I-F Note C
Discriminator	10.7 MC	6BA6 2nd I-F Pin 1 & Chassis	2500 mmf	FM	Rotor Fully Open	Disc. Pri. Note A
I-F	10.7 MC	Antenna and Chassis	2500 mmf	FM	Rotor Fully Open	1st. I-F Pri. and Sec. and Note C
	10.7 MC	Antenna and Chassis Solder a 3300 ohm resistor across terminals 3 and 4 of 1st. I-F trans.	2500 mmf	FM	Rotor Fully Open	1st. I-F Pri. Note C
	10.7 MC	Antenna and Chassis Note D	2500 mmf	FM	Rotor Fully Open	1st. I-F Sec. Note C
RECHECK I-F ADJUSTMENTS IN ORDER GIVEN						
Oscillator	108.4 Note F	Disconnect built-in dipole antenna and connect generator to dipole terminals with resistor in series.	300 ohms	FM	Rotor Fully Open	Osc. C-12
Antenna	104.5	Same as above	300 ohms	FM	Tune rotor for max. AVC voltage	Ant. C-3
RECHECK ANTENNA & OSC. ADJUSTMENTS IN ORDER GIVEN						

FM ALIGNMENT NOTES

NOTE A—The zero center scale DC vacuum tube voltmeter is to be connected between chassis ground and the AVC line. A signal of .1 volt must be fed into the receiver for this adjustment.
Note output voltage. on the zero center DC vacuum tube voltmeter.

NOTE B—Disconnect zero center DC vacuum tube voltmeter from AVC and connect it to the audio takeoff point at the 27 K ohm resistor (R-11) and its junction with the terminal strip. Adjust for zero voltage indication.

NOTE C—Connect zero center DC vacuum tube voltmeter as in Note A. Adjust input to give same output on the zero center DC vacuum tube voltmeter as in Note A.

NOTE D—Unsolder 3300 ohm resistor from terminals 3 and 4 of 1st I-F transformer and resolder across terminals 1 and 2.

NOTE E—2nd I-F Trimmers (AM) must be aligned before attempting to adjust 2nd I-F (FM) tuning slug.

NOTE F—Remove the 3300 ohm load resistor before attempting to check the antenna and oscillator adjustments.

WESTERN AUTO SUPPLY CO. MODEL D1946

REPLACEMENT PARTS LIST

NOTICE: There is a Model Number label on the chassis. This label identifies the radio as to chassis, dial and issue letter. When ordering parts or writing, give ALL information appearing on this label.

MISCELLANEOUS

12A477	8″ PM Speaker
2A373	Band Change Switch
3A303	Molded Octal Tube Socket
3A304	Phono Motor Jack
3A305	Phono Input Jack
3A426	Miniature Tube Socket
3A443	Miniature Tube Socket (For AM-FM Converter Tube)
10A691	Knob (Tuning)
10A692	Knob (Off-On Volume)
10A693	Knob (Tone)
10A694	Knob (AM-FM Phono)
13X546	Line Cord and Plug
30X547	Line Cord Clamp

CAPACITORS

C-1A, C-1B, C-1C, C-1D	14A204	Gang Condenser Assembly		
C-2		Part of T-1 (Loop Antenna Assembly)		
C-3, C-7		Part of C-1 (Gang Condenser Assembly)		
C-4	47X521	6 mmf		Ceramic
C-5, C-11, C-14, C-19, C-20, C-24, C-39	47X507	5000 mmf		Silvered Ceramic
C-6, C-8	47X522	12 mmf		Ceramic
C-9	47X517	47 mmf		Ceramic
C-10	47X512	10 mmf		Ceramic
C-12	17A255	1-8 mmf		Trimmer
C-13	47X547	3 mmf		Ceramic
C-15, C-16		Part of T-5 (1st I.F. Transformer AM)		
C-17		Part of T-4 (1st I.F. Transformer FM)		
C-18, C-29	B66503	.05 mf	200 V	Tubular
C-21, C-22		Part of T-6 (2nd I.F. Transformer AM-FM)		
C-23	47X497	100 mmf		Ceramic
C-25		Part of T-7 (Discriminator Coil Assembly)		
C-26	47X492	2700 mmf		Molded
C-27	47X526	100 mmf		Molded
C-28	45X361	5 mf	100 V	Dry Electrolytic
C-30A	45X359	40 mf	350 V	Dry Electrolytic
C-30B		40 mf	350 V	
C-30C		20 mf	350 V	
C-30D		20 mf	25 V	
C-31A, C-31B	47X112	50-50 mmf		Dual Mica
C-32	47X471	68 mmf		Molded
C-33	B66403	.04 mf	200 V	Tubular
C-34	D66502	.005 mf	400 V	Tubular
C-35	47X468	220 mmf		Ceramic
C-36	D66203	.02 mf	400 V	Tubular
C-37	B66402	.004 mf	200 V	Tubular
C-38	H66102	.001 mf	800 V	Tubular

RESISTORS

		Ohms	Watts	
R-1	B84223	22 K	.5	Carbon
R-2	B83272	2700	.5	Carbon
R-3	B84471	470	.5	Carbon
R-4	B85104	100 K	.5	Carbon
R-5	B83680	68	.5	Carbon
R-6	B84122	1200	.5	Carbon
R-8	B85473	47 K	.5	Carbon
R-9	B85683	68 K	.5	Carbon
R-10	B84102	1000	.5	Carbon
R-11	B84273	27 K	.5	Carbon
R-12	43X233	3.6	.5	Wire Wound
R-13, R-14	B84103	10K	.5	Carbon
R-15A	43X224	1000	6.0	Wire Wound
R-15B		1400	4.0	
R-16	B84153	15 K	.5	Carbon
R-17	36X371	.5 meg		Volume Control
R-18	B85225	2.2 meg.	.5	Carbon
R-19	40X284	3 meg.		Tone Control
R-20	B85106	10 meg.	.5	Carbon
R-21, R-22	B85474	470 K	.5	Carbon
R-23	B84271	270	.5	Carbon
R-24	B84151	150	.5	Carbon

TRANSFORMERS AND COILS

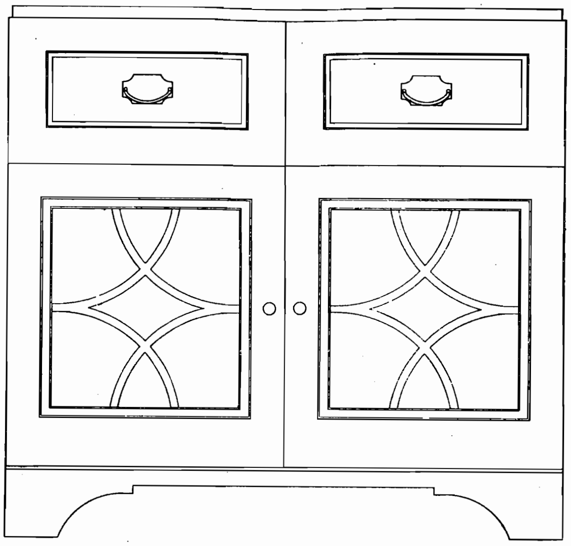
L-2	35A1	Insulated Choke
L-3	9A1940	Parasitic Choke Assembly
L-4	9A2021	Oscillator Coil Assembly (FM)
T-1	9A1972	"B" Range Loop Antenna Assembly
T-2	9A1956	Antenna Coil Assembly
T-3	9A1997	Oscillator Coil (AM)
T-4	9A1932	1st I.F. Transformer (FM)
T-5	9A1998	1st I.F. Transformer (AM)
T-6	9A1999	2nd I.F. Transformer (AM-FM)
T-7	9A1970	Discriminator Coil Assembly
T-8	9A2003	Dipole Antenna Assembly
T-9	53X290	Power Transformer
T-10	51X134	Output Transformer

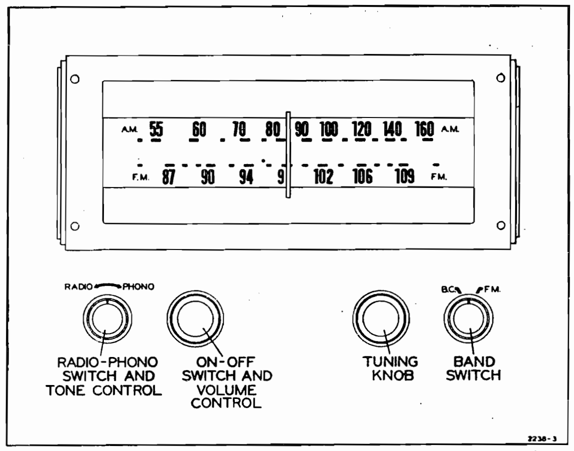
DIAL AND DRIVE ASSEMBLY

15X229	Pointer
6X21	Rubber Grommet } Mtg. Gang Condenser
20X260	Condenser Cushion Stud } Mtg. Gang Condenser
58X717	Dial
28X113	Drive Cord Tension Spring
26X507	Drive Shaft
19X192	"C" Washer (For drive shaft)
10X66	Drive Cord Assembly
7A215	Pilot Light Socket Assembly
7A32	No. 51 Pilot Light
25X1491	Pointer Bracket
4X915	Escutcheon (Right)
4X916	Escutcheon (Left)
30X517	Dial Clamp
25X1571	Idler Bracket
4X931	Escutcheon Inserts

MODEL D1950

WESTERN AUTO SUPPLY CO.





ELECTRICAL SPECIFICATIONS

Power Supply..........105 to 125 volts, AC, 60-cycles; Chassis only 122 watts. With phono operation 150 watts.

Frequency Range....Broadcast Band—535 to 1620 kc. FM Band—88 to 108 mc.

Intermediate Freq...AM-455 kc; FM-10.7 mc.

Selectivity................AM-48 kc. broad at 1000 times signal, measured at 1000 kc.
I.F. FM-180 kc. broad at 2 times down.
I.F. FM-320 kc. broad at 10 times down.

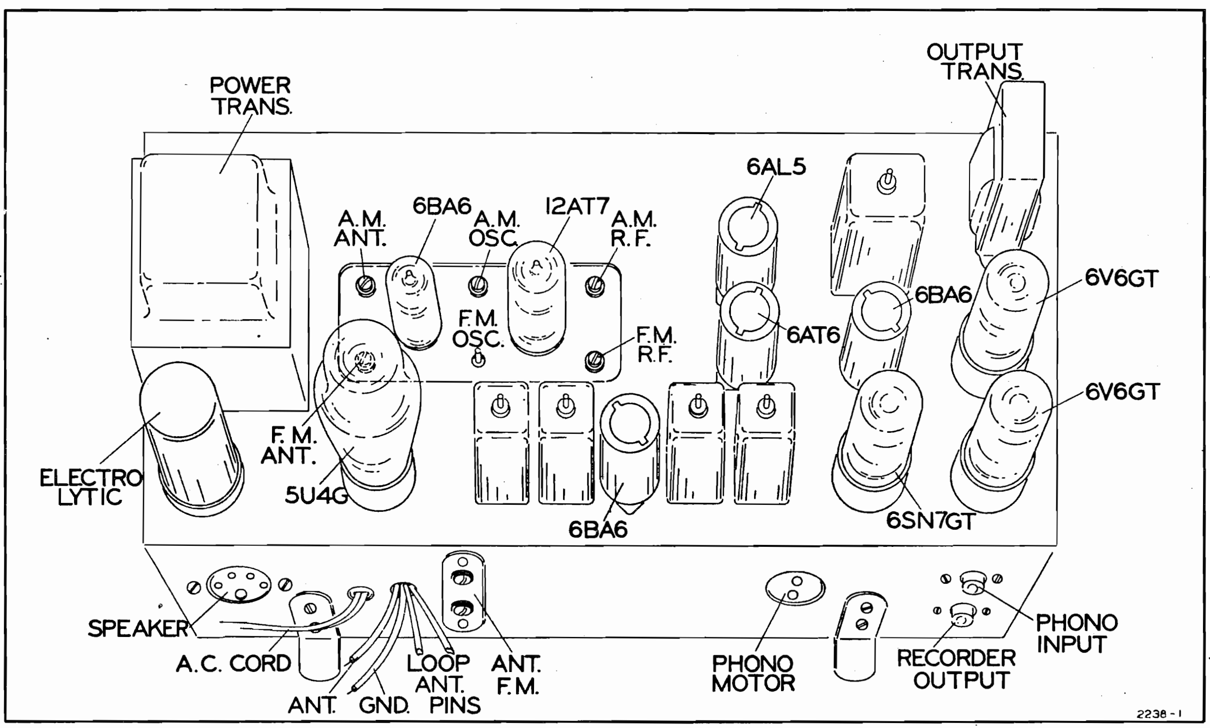
AM Sensitivity.........(For .5 watt output with external antenna)—3 microvolts average.

FM Sensitivity.........(For .5 watt output)—10 microvolts average.

Power Output.........8 watts. 10% distortion. 10 watts maximum.

Loud Speaker...........12" electrodynamic. Voice coil impedance 3.2 ohms, 400 cycles.

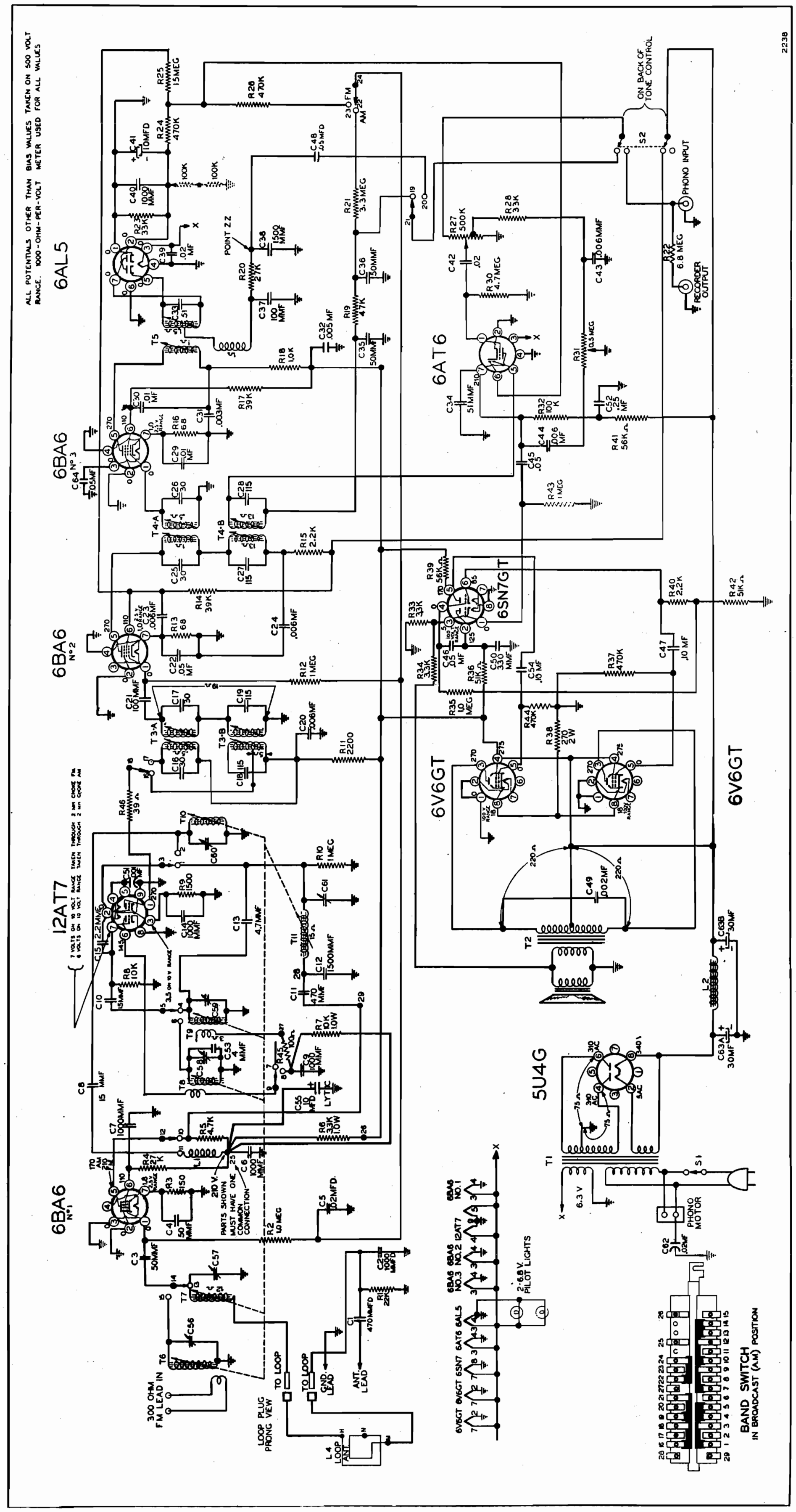
Tube and Lamp Complement.........6BA6, FM—AM R.F. stage.
12AT7, FM—AM oscillator and mixer.
6BA6, FM—AM—1st I.F.
6BA6, FM—2nd I.F.
6AL5, FM—ratio detector.
6AT6, AM detector. A. F. AMP. and A.V.C.
6SN7, Push-Pull. Driver and phase-inverter.
5U4G, rectifier.
6V6, output.
6V6, output.
T-44 dial lamp (2 used).



Chassis — top view

WESTERN AUTO SUPPLY CO.

MODEL D1950



NOTE: Two 100K ohm resistors in series from Pin No. 2 of the 6AL5 to ground are connected as shown only when aligning the FM I. F. Refer to FM I. F. alignment procedure.

NOTE: B.C. Oscillator Coil T9 and number 7 terminal of slide switch should be connected together.

NOTE: A 3.3 ohm resistor C-9B1-1069 is connected between Pin 3 of 6AL5 and the filament line (X) in some productions.

MODEL D1950

WESTERN AUTO SUPPLY CO.

ALIGNMENT PROCEDURE

Broadcast Band Section I.F. and R.F.

The alignment procedure below includes the sensitivities at the inputs of various stages. All signal input values are based on an output of ½ watt. This may be measured by disconnecting the speaker voice coil and substituting a 3.2-ohm resistor across the secondary winding of the output transformer. A reading of 1.3 volts AC across this resistor will be approximately equivalent to a ½-watt output with the speaker connected. The volume control must be set at maximum. The tone control must be set for maximum treble.

The signal source must be an accurately calibrated signal generator capable of supplying the frequencies designated, modulated 30% with a 400-cycle audio signal. A 400 cycle audio signal is required for the audio measurement. Variations in sensitivities of plus or minus 25% are usually permissable.

AM-I.F. ALIGNMENT

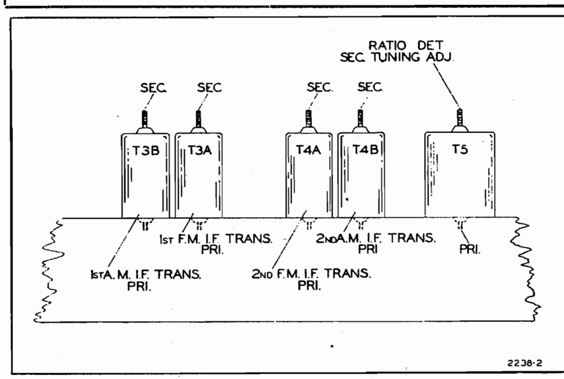
Band Switch in AM Position. Tune Set to 1400 Kc. Dummy Antenna .1 Mfd.

SIGNAL GENERATOR FREQUENCY	CONNECTION TO RADIO	ADJUSTMENTS TO BE MADE	ADJUST FOR
455 Kc. Use 1000 microvolts	Pin No. 1 of 6BA6 No. 2 and ground	Primary and Secondary of T4B AM windings See I. F. view	Maximum output Should be ½ watt.
455 Kc. Use 30 microvolts	Pin No. 2 of 12AT7 and ground	Primary and Secondary of T3B AM windings See I. F. view	Maximum output Should be ½ watt.
400 cycles. Use 28 millivolts	Hot end of volume control and ground	None	Maximum output Should be ½ watt.

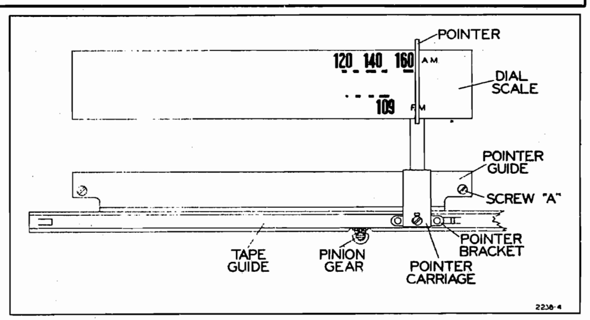
BROADCAST BAND-R.F. ALIGNMENT

Check pointer so that it coincides with the right hand marker to the extreme right when iron cores are all the way out.
For adjustment, see dial mechanism illustration.

SIGNAL GENERATOR FREQ.	CONNECTION TO RADIO	DUMMY ANTENNA	ADJUST
1620 Kc. Use 3 microvolts	AM Antenna and Ground	200 mmf.	C59, C57, C61. For maximum, ½ watt

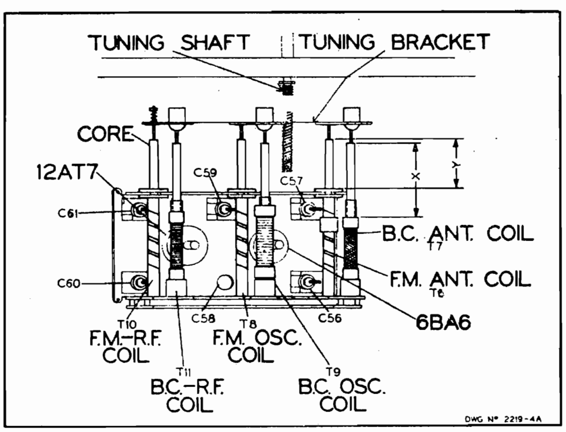


I. F. VIEW



DIAL ADJUSTMENT VIEW

Loosen screw "A" so that teeth of tape can be properly meshed with pinion gear to give proper pointer travel.



TUNER ADJUSTMENT

With tuner all the way out, dimension "X" should be 1½ inches. "Y" should be 1-1/32 inches. "X" is from the end of the slug to edge of the coil winding. Check these dimensions before R.F. alignment is attempted of either the AM or FM Band. No slug adjustment should be necessary since the slugs are properly set at the factory.

ALIGNMENT PROCEDURE

FM Band Section I.F. and R.F.

A non-metallic alignment tool must be used.

IMPORTANT— No alignment of the FM section of this radio should be attempted unless you are positive that the circuits are in need of adjustment and you have the necessary equipment.

All components used in this radio are extremely stable and the tuned circuits should require no adjustment over a long period of time.

NOTE— The following alignment is based on the use of the new Simpson vacuum tube voltmeter which has a "floating ground". In other words, the meter, when used as a vacuum tube volt-meter, can have both the positive and negative sides connected to points above ground and still give true readings.

A standard AM signal generator is required.

FM-I.F. ALIGNMENT

Band Switch in FM Position. Dummy Antenna .1 Mfd.

SIGNAL GENERATOR FREQUENCY	CONNECTION TO RADIO	VACUUM TUBE VOLT METER CONNECTION TO RADIO	ADJUSTMENT TO BE MADE	ADJUST FOR
10.7 Mc. Use about .1 volt	Pin No. 1 of 6BA6 No. 3 and ground	Pin No. 2 of 6AL5 and ground	Primary of T5	Resonance should be about 3 volts
10.7 Mc. Use about .1 volt	Pin No. 1 of 6BA6 No. 3 and ground	See note "A"	Secondary of T5	Zero. Use zero center scale See note "B"
10.7 Mc. Use about 3300 microvolts	Pin No. 1 of 6BA6 No. 2 and ground	Pin No. 2 of 6AL5 and ground	Primary and Secondary of T4A 10.7 m.c. windings See I.F. view	Resonance should be about 3 volts
10.7 Mc. Use about 200 microvolts	Pin No. 2 of 12AT7 and ground	Pin No. 2 of 6AL5 and ground	Primary and Secondary of 10.7 m.c. windings of T3A See I.F. view	Resonance should be about 3 volts

NOTES ON FM—I. F. ALIGNMENT

NOTE "A" Connect two resistors, 100K OHMS each, from Pin No. 2 of 6AL5 to ground. These resistors must be matched within 5%. Connect as shown in dotted lines on schematic diagram. Connect vacuum tube voltmeter between the mid-point of the resistors and point zz.

NOTE "B" If T5 has been tampered with, it is possible that no crossover point will be found at first. Careful adjustment of both primary and secondary is necessary.

GENERAL: Input signals should be adjusted to give approximately 3 volts. The ratio detector is operating at reasonable level at this point and will give the truest indication of correct alignment with the procedure specified.

FM-R.F. ALIGNMENT

Check pointer so that it coincides with the right hand marker to the extreme right when iron cores are all the way out.
For adjustment, see dial mechanism illustration.

SIGNAL GENERATOR FREQUENCY	CONNECTION TO RADIO	DUMMY ANTENNA	ADJUST	VACUUM TUBE VOLT METER CONNECTION TO RADIO	ADJUST TO
100 Mc. Use about 10 microvolts	FM Antenna Terminals See note	300 ohms	C58 Osc. C60 R. F. C56 Ant.	Pin No. 2 of 6AL5 and Ground	Resonance about 3 volts

NOTE: If a signal generator with the above fundamental frequency is not available, it is sometimes possible to use harmonics. Use extreme care in picking harmonics. An alternate procedure is to use a local station carrier of known frequency to align the FM Band and to use the vacuum tube volt-meter as above for resonance indication. A weak carrier, however, will not produce 3 volts.

NOTE: Connect 300 ohms in series with hot side of generator and connect to one screw. Connect cold side of generator to other screw.

MODEL D1950

WESTERN AUTO SUPPLY CO.

REPLACEMENT PARTS LIST

Ref. No.	Part No.	Description	Qty. Used
		TUNER PARTS	
		Condensers	
C58	A-8H-15444	Trimmer, FM oscillator	1
C56, 57, 59, 61	A-2M-12618	Trimmer plate, large	4
C60	A-2M-14368	Trimmer plate, small	1
	A-5M-12615	Locator, for trimmer plates	5
C59, C61	B-6M-12616-S-2	Silvered mica film	2
C56, 57, 60	A-6M-12616	Clear mica film	3
	A-3C-12617	Spacer, for trimmer plates	5
C1, C11	C-8G-11732	470 mmf, ceramic	2
C2	C-8G-13695	1000 mmf, ceramic	1
C6, 7, 9, 14, 51	C-8G-13201	1000 mmf, ceramic	5
C12	C-8G-11731	1500 mmf, ceramic	1
C10, C8	C-8G-13017	15 mmf, ceramic	2
C3, C4	C-8G-11484	50 mmf, ceramic	2
C13	A-8G-12495-6	4.7 mmf, ceramic	1
C15	A-8G-12495-4	2.2 mmf, ceramic	1
C53	C-8G-15859	4 mmf, ceramic	1
C5	C-8D-11304	.02 x 200 volts, paper	1
		Resistors	
R4	C-9B2-79	27K ohms, 1 watt	1
R1	C-9B1-21	22K ohms, ½ watt	1
R3	C-9B1-52	150 ohms, ½ watt	1
R5	C-9B1-17	4700 ohms, ½ watt	1
R8	C-9B1-19	10K ohms, ½ watt	1
R2, R10	C-9B1-31	1 megohm, ½ watt	2
R21	C-9B1-34	3.3 megohms, ½ watt	1
R45	C-9B1-50	100 ohms, ½ watt	1
R46	C-9B1-45	39 ohms, ½ watt	1
R9	C-9B1-64	1500 ohms, ½ watt	1
R6	C-9B2-6	3300 ohms, 1 watt	1
R7	C-9B2-74	10K ohms, 1 watt	1
		Coils	
T8	B-13D-13027-1	F.M. oscillator coil	1
—	B-51A-13056	Core for F.M. oscillator coil	1
T6	B-13E-13028	FM antenna coil	1
—	B-51A-13058	Core for FM antenna coil	1
T10	B-13C-13029	FM R.F. coil	1
—	B-51A-13057	Core for FM R.F. coil	1
T9	A-13D-15704	B.C. oscillator coil	1
—	B-51A-12722	Core for B.C. oscillator coil	1
T7	B-13E-13031	B.C. Antenna coil	1
T11	B-13C-13032	B.C. R.F. coil	1
—	B-51A-12723	Core for B.C. ant. and R.F. coil	2
		Miscellaneous	
	B-20B-15628	Slide switch	1
	A-15B-12997	7-prong min., tube socket	1
	A-15B-13430	9-prong min., tube socket	1
	B-3A-15415	Lead screw	1
	A-3J-12309	Pinion gear	1
	A-49A-14439	Drive pring	2
	A-49A-13228	Tension spring	1
	A-49A-12394	Spiral spring for slugs	3
	B-2J-13006	Rack tape with teeth and pointer bracket	1
	B-2D-15416	Guide for rack tape	1
	B-2D-15649	Pointer carriage	1
	A-5M-13741	Pointer	1
	32F4SE-11488	4-40 x ⅛" screw for pointer	2
		MAIN CHASSIS PARTS	
		Condensers	
C63A, C63B	B-8C-11629	Electrolytic filter condenser, 30 — 30 x 450 volts	1
C52	C-8D-13439	.25 mfd x 400 volts	1
C54, C47	C-8D-10760	.1 mfd x 400 volts	2
C31	C-8D-11013	.003 x 600 volts	1
C44, 43, 24, 23, 20	C-8D-10785	.006 x 600 volts	5
C29, C30	C-8D-10761	.01 x 400 volts	2
C46, C45	C-8D-10813	.05 x 400 volts	2
C49	C-8D-10789	.002 x 600 volts	1
C48, C22	C-8D-10770	.05 x 200 volts	2
C64	C-8D-15860	.05 x 200 volts	1
C41	A-8C-13132	Electrolytic, 10 mfd x 50 volts	1
C62	C-8J-11321	.02 x 600 volts, molded case	1
C35	A-8G-13962	.005 x 500 volts, ceramic	1
C21	C-8G-11734	100 mmf, ceramic	1
C38	C-8G-13059	1500 mmf, ceramic	1
C34	C-8G-13060	51 mmf, ceramic	1
C40	C-8G-13201	1000 mmf, ceramic	1
C50	C-8G-11741	330 mmf, ceramic	1
C37	C-8F3-225	100 mmf, mica	1
C39, C42	C-8D-11304	.02 x 200 volts, paper	2
C35, C36	A-8F-13047	Mica condenser, 50 mmf, dual	1
C55	A-8C-12154	Electrolytic, 10 mfd, 450 volts	1
		Resistors	
R27, S1	A-10A-13114	Volume control and switch, 500K ohms	1
R31, S2	A-11A-15645	Tone control and phono radio switch	1
R22	C-9B1-36	6.8 megohms, ½ watt	1
R32	C-9B1-86	100K ohms, ½ watt	1
R44, R37	C-9B1-94	470K ohms, ½ watt	2
R41, R39	C-9B1-83	56K ohms, ½ watt	2
R33, R34	C-9B1-68	3300 ohms, ½ watt	2
R30	C-9B1-35	4.7 megohms, ½ watt	1
R23, R28	C-9B1-80	33K ohms, ½ watt	2
R20	C-9B1-79	27K ohms, ½ watt	1
R13, R16	C-9B1-48	68 ohms, ½ watt	2
R14, R17	C-9B2-81	39K ohms, 1 watt	2
R24, R26	C-9B1-29	470K ohms, ½ watt	2
R25	C-9B1-302	15 megohms, ½ watt	1
R19	C-9B1-23	47K ohms, ½ watt	1
R12, R43, R35	C-9B1-31	1 megohm, ½ watt	3
R40	C-9B1-66	2200 ohms, ½ watt	1
R36, R42	C-9B1-200	51K ohms, ½ watt	2
R38	C-9B4-55	270 ohms, 2 watts	1
R18	C-9B1-13	1000 ohms, ½ watt	1
R11, R15	C-9B2-15	2200 ohms, 1 watt	2
	C-9B1-1069	3.3 ohms, ½ watt	1
		Coils	
	B-13A-15680	Input I.F. transformer, 455 kc.	1
	B-13B-15681	Output I.F. transformer, 455 kc.	1
	B-13A-15682	Input I.F. transformer, 10.7 megohms	1
	B-13B-15683	Second I.F. transformer, 10.7 megohms	1
	B-13M-15684	Ratio detector, 10.7 megs.	1
	C-13E-15687	Loop antenna assembly	1
		Transformers	
T1	B-12A-13038-1	Power transformer, 105-125 volts, 50-60 cycles, primary	1
T2	B-12C-13042-1	Output transformer, for speaker	1
		Speaker	
	B-18B-13043-1	Electrodynamic speaker, 12-inch, less output transformer	1
		Miscellaneous	
	C-30A-15686	Dial scale	1
	B-30B-13943	Dial glass	1
	2G-13696	Escutcheon	1
	56D2-12463	Screws for escutcheon	4
	B-5B-13737-37	Knob, mahogany—small with dot	2
	A-15B-11538	Speaker socket	1
	A-19B-12468	Phono-motor socket	1
	A-19B-11044	Recorder socket	1
	A-19B-12170	Phono input socket	1
	B-14M-11479	AC line cord	1
	32K10-14306	10-32 x 1 inch, chassis mounting screws	4
	B-5B-13738-37	Knob, mahogany—large, without dot	2
	B-5B-13737-14	Knob, walnut—small, with dot	2
	B-5B-13738-14	Knob, walnut—large, without dot	2
	A-3A-15630	Shaft for band switch	1
	A-43D-12934	"U" speed clip	1
	A-55C-12935	Ball bearing	1
	B-47A-13801	Pilot lite assembly	1
	A-46A-11739	Pilot lite bulb, 6-8 volts	2
	A-2H-10974	Tube shield	4
	A-15C-13174	7-prong, min., tube socket	4
	A-15B-10440	8-prong, octal, socket	4
	A-7B-13050	FM dipole socket	1

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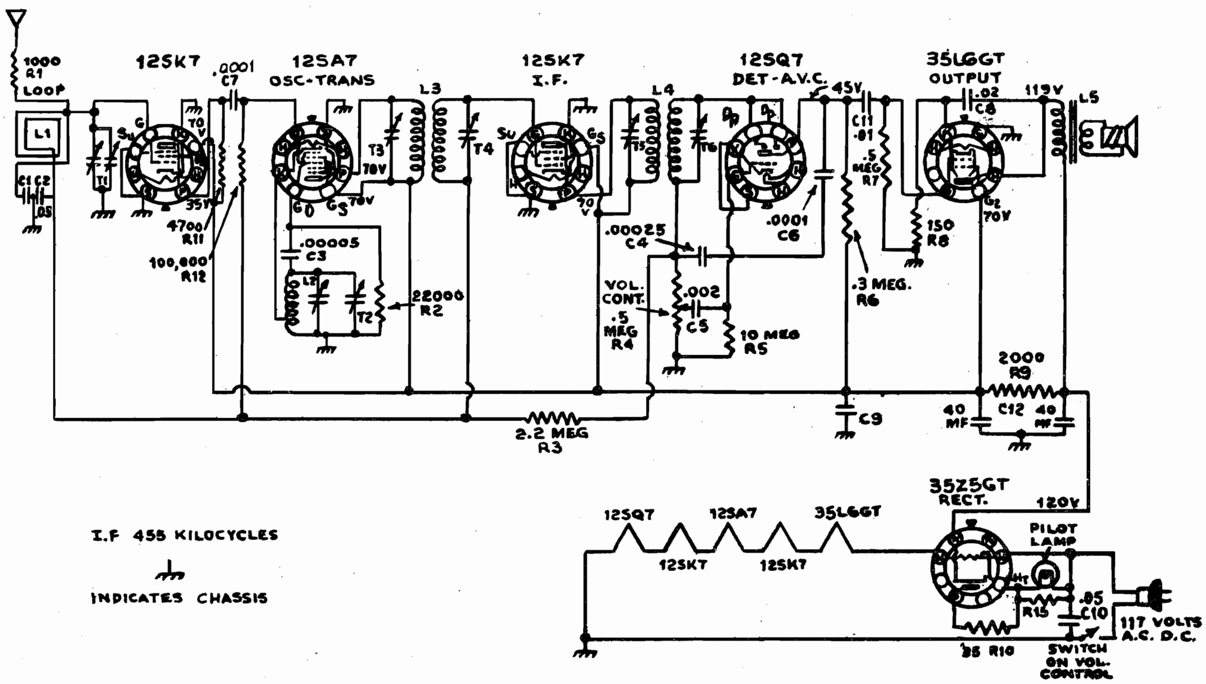
MODEL D2690, 1st Type



ALIGNMENT PROCEDURE

Output meter connections.....................................Across primary output transformer

Connection of generator ground..Chassis

Generator modulation...App. 30% @ 400 cycles

Position of volume control...Fully Clockwise

POSITION OF DIAL POINTER	GENERATOR FREQUENCY	GENERATOR CONNECTION	TRIMMERS ADJUSTED	TRIMMER FUNCTION
540 kc	455 kc	12SA7GT	T3, T4, T5, T6	I. F.
1500 kc	1500 kc	* * * See Note Below	T2, T1	Osc., R. F.

IMPORTANT ALIGNMENT NOTES

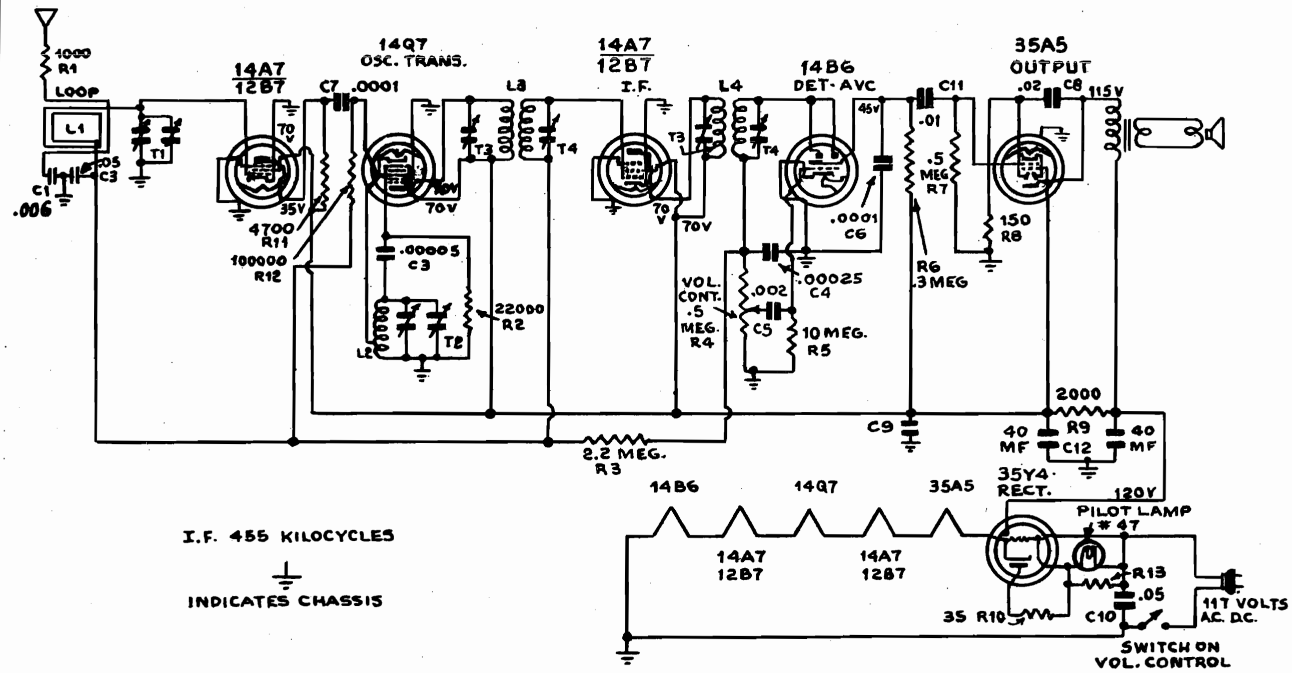
It is advisable to repeat the entire alignment procedure in the original order to insure greater accuracy.

Always keep the output from the test oscillator at its lowest possible value. As the sensitivity is increased by alignment, the generator output should be reduced correspondingly.

***Run a wire from the output terminal of the generator near the receiver. However, no connection is made between the signal generator and the receiver.

MODEL D2690,
2nd Type

WESTERN AUTO SUPPLY CO.



ALIGNMENT PROCEDURE

Output meter connections.......................................Across primary output transformer

Connection of generator ground...Chassis

Generator modulation...App. 30% @ 400 cycles

Position of volume control...Fully Clockwise

POSITION OF DIAL POINTER	GENERATOR FREQUENCY	GENERATOR CONNECTION	TRIMMERS ADJUSTED	TRIMMER FUNCTION
540 kc	455 kc	14Q7	T3, T4, T5, T6	I. F.
1500 kc	1500 kc	* * * See Note Below	T2, T1	Osc., R. F.

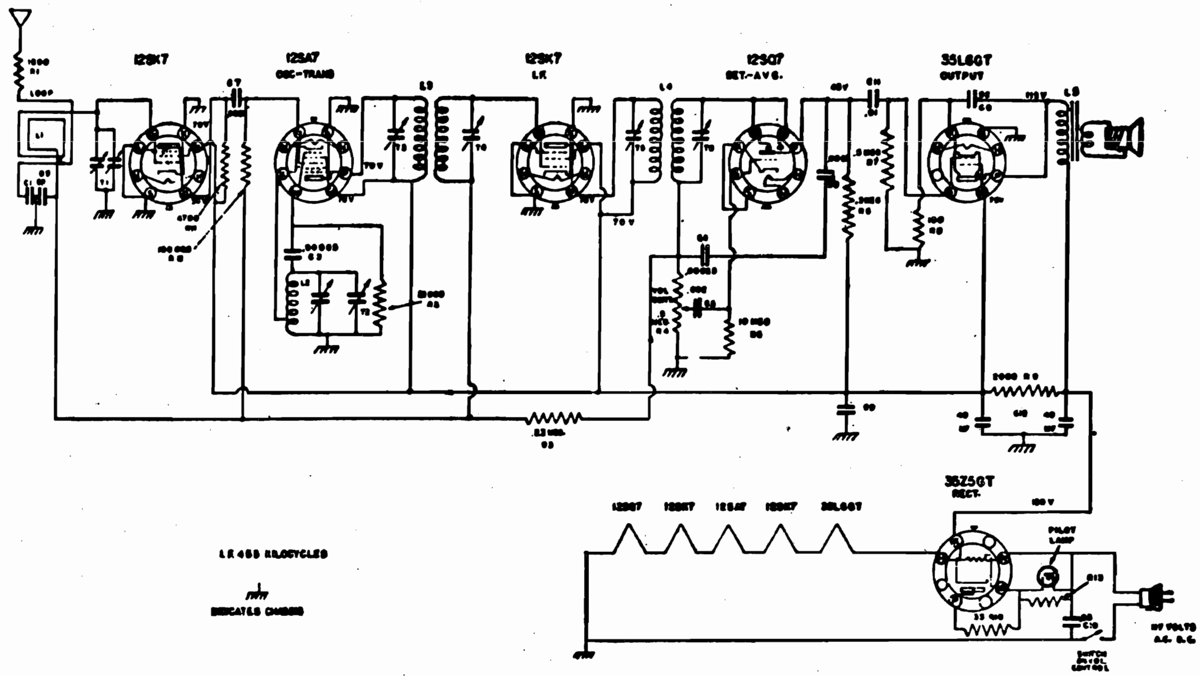
IMPORTANT ALIGNMENT NOTES

It is advisable to repeat the entire alignment procedure in the original order to insure greater accuracy.

Always keep the output from the test oscillator at its lowest possible value. As the sensitivity is increased by alignment, the generator output should be reduced correspondingly.

***Run a wire from the output terminal of the generator near the receiver. However, no connection is made between the signal generator and the receiver.

WESTERN AUTO SUPPLY CO. MODEL D2692



ALIGNMENT PROCEDURE

Output meter connections..................................Across primary output transformer

Connection of generator ground..................................Chassis

Generator modulation..................................App. 30% @ 400 cycles

Position of volume control..................................Fully Clockwise

POSITION OF DIAL POINTER	GENERATOR FREQUENCY	GENERATOR CONNECTION	TRIMMERS ADJUSTED	TRIMMER FUNCTION
540 kc	455 kc	12SA7GT	T3, T4, T5, T6	I. F.
1500 kc	1500 kc	* * * See Note Below	T2, T1	Osc., R. F.

IMPORTANT ALIGNMENT NOTES

It is advisable to repeat the entire alignment procedure in the original order to insure greater accuracy.

Always keep the output from the test oscillator at its lowest possible value. As the sensitivity is increased by alignment, the generator output should be reduced correspondingly.

***Run a wire from the output terminal of the generator near the receiver. However, no connection is made between the signal generator and the receiver.

MODEL D2718B

WESTERN AUTO SUPPLY CO.

BROADCAST AND SHORT WAVE RADIO WITH BUILT-IN LOOP AERIAL

7 TUBE AC-DC (Including Rectifier) 2 BANDS

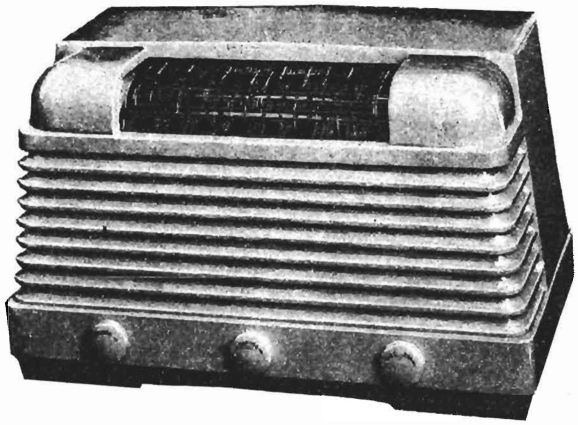
SHORT WAVE BAND

6 to 18 Megacycles

This band is calibrated in megacycles. The 16, 19, 25, 31 and 49 meter bands, in which the principal international short wave broadcasts will be heard, are located in this band.

These bands will be found on the dial as follows:

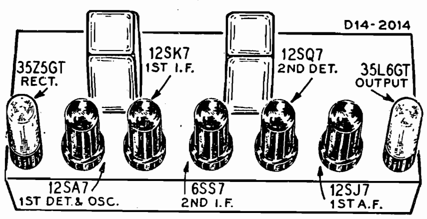
16 Meter Band...17.7—17.9 MC
19 Meter Band...15.1—15.3 MC
25 Meter Band...11.7—11.9 MC
31 Meter Band... 9.5— 9.7 MC
49 Meter Band... 6— 6.2 MC



BROADCAST BAND

540 to 1600 Kilocycles

This band is calibrated in channel numbers. Add a zero to the dial number to get the kilocycle number.



CHECK YOUR LINE VOLTAGE

Unless otherwise marked, this radio must be operated on a power supply of 105-125 volts AC, 50 to 60 cycles only, or 105-125 volts DC.

REPLACEMENT PARTS LIST

MISCELLANEOUS

12A464	4" x 6" P.M. Speaker, Complete with Mtg. Bracket	
3A303	Tube socket—Octal (8 prong) Molded	
2A206	Band change switch	
10A601	Knob—Tuning	For Ivory Cabinet
10A602	Knob—Volume	For Ivory Cabinet
10A603	Knob—Band	For Ivory Cabinet
10A604	Knob—Tuning	For Brown Cabinet
10A605	Knob—Volume	For Brown Cabinet
10A606	Knob—Band	For Brown Cabinet
13X546	Line Cord and Plug Assembly	
55X292	Cabinet, Ivory Plastic	
55X296	Cabinet, Brown Plastic	
28X292	Snap Button (Mtg. Antenna to cabinet)	
6X53	Rubber Bumpers (Mtd. to bottom of cabinet)	

TRANSFORMERS AND COILS

T-1	9A1443	"D" Range Antenna Coil Assembly
T-2	26A451	"B" Band Loop Antenna Assembly (For Ivory Cabinet)
T-2	26A452	"B" Band Loop Antenna Assembly (For Brown Cabinet)
T-3	9A1444	"D" Range Oscillator Coil Assembly
T-4	9A1442	"B" Band Oscillator Coil Assembly
T-5	9A1793	1st I-F Coil Assembly
T-6	9A1794	2nd I-F Coil Assembly
T-7	51X118	Output Transformer

CAPACITORS

C-1	B67102	.001 mf	200 V	Tubular
C-2, C-9	17A152	2-25 mmf		Trimmer strip
C-3A, C-3B	14A148	Gang Condenser Assembly		
C-4	46X289	.00475 mf	180 V	Tubular
C-5	17A174	2-25 mmf		Trimmer
C-6		Part of C-3 (Gang Condenser Assembly)		
C-7, C-16, C-21	47X463	47 mmf		Molded
C-8	47X466	68 mmf		Molded
C-10	17A234	300-450 mmf		Trimmer
C-11, C-23	B66104	.1 mf	200 V	Tubular
C-12, C-15, C-22	B66403	.04 mf	200 V	Tubular
C-13, C-14		Part of T-5 (1st I-F Coil Assembly)		
C-17, C-18		Part of T-6 (2nd I-F Coil Assembly)		
C-19	47X476	100 mmf		Molded
C-20	B66502	.005 mf	200 V	Tubular
C-25, C-28	B66103	.01 mf	200 V	Tubular
C-26	B67253	.025 mf	200 V	Tubular
C-27A	45X342	50 mf	150 V	Dry Electrolytic
C-27B	45X342	50 mf	150 V	Dry Electrolytic
C-27C	45X342	20 mf	25 V	Dry Electrolytic
C-29	D67204	.2 mf	400 V	Tubular
C-30	D67104	.1 mf	400 V	Tubular
C-31	17A123	1.5-12 mmf		Trimmer

RESISTORS

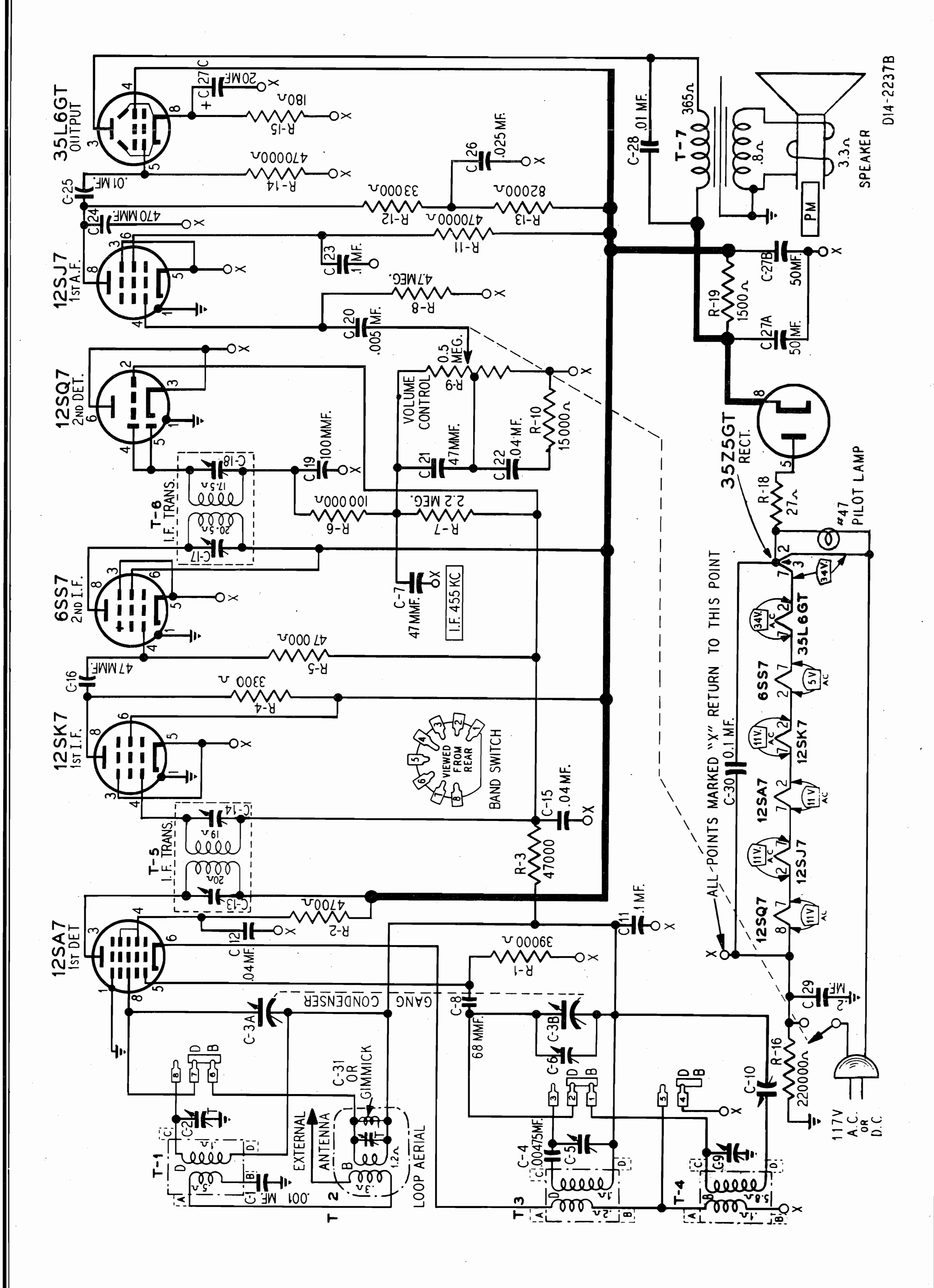
		Ohms	Watts	
R-1	B84393	39K	0.5	Carbon
R-2	B84472	4700	0.5	Carbon
R-3, R-5	B85473	47K	0.5	Carbon
R-4	B84332	3300	0.5	Carbon
R-6	B85104	100K	0.5	Carbon
R-7	B85225	2.2 meg	0.5	Carbon
R-8	B85475	4.7 meg	0.5	Carbon
R-9	36X309	.5 meg	Volume control and switch	
R-10	B84153	15K	0.5	Carbon
R-11, R-14	B85474	470K	0.5	Carbon
R-12	B84333	33K	0.5	Carbon
R-13	B84823	82K	0.5	Carbon
R-15	B84181	180	0.5	Carbon
R-16	B85224	220K	0.5	Carbon
R-18	B84270	27	0.5	Carbon
R-19	C85152	1500	1.0	Carbon

DIAL AND DRIVE ASSEMBLY

20X329	Cond. Cushion Stud, (Mtg. Gang Cond.)
6X21	Rubber Grommet, (Mtg. Gang Cond.)
26A450	Dial Bracket Assembly
25A1044	Diffuser and Clamp Assembly
58X671	Dial (for Ivory Cabinet)
30X532	Dial Clamps
15X236	Pointer
25X580	Drive Shaft Bracket
26X465	Drive Shaft
19X192	"C" Washer (for drive shaft)
24X564	Drive Shaft Spool
10X51	Drive Cord Assembly
28X113	Drive Cord Tension Spring
7A185	Pilot Light Socket Assembly
7A103	No. 47 Pilot Light Bulb
17X96	Celluloid Crystal

WESTERN AUTO SUPPLY CO.

MODEL D2718B



MODEL D2718B

WESTERN AUTO SUPPLY CO.

ALIGNMENT PROCEDURE

Volume Control—Maximum All Adjustments.

Allow Chassis and Signal Generator to "Heat Up" for several minutes.

The equipment in column at right is required for Aligning:

Signal Generator which will provide an accurately calibrated signal at test frequencies as listed.

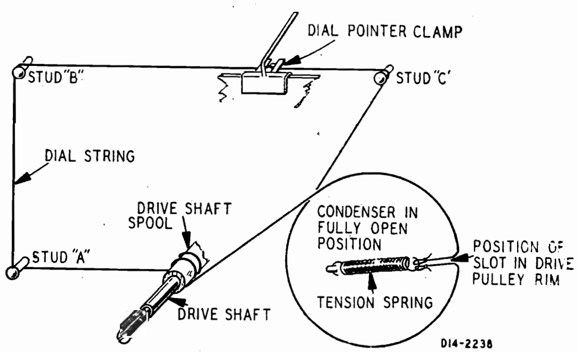
Output indicating Meter; Non-Metallic Screwdriver.

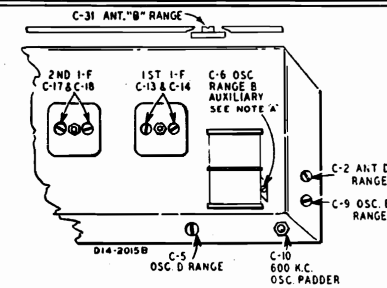
Dummy Antennas—.1 mf., 50 mmf., and 400 ohm.

SIGNAL GENERATOR						
FREQUENCY SETTING	ANTENNA CONNECTION	GROUND CONNECTION	DUMMY ANTENNA	BAND SWITCH SETTING	CONDENSER SETTING	ADJUST TRIMMERS TO MAXIMUM (See Trimmer Illustration)
I.F. 455 KC	Signal Grid of 1st Det. Connect at Stator of Large Gang Section.	Point "X" 12SK7—1st I-F Prong No. 3	.1 mf.	B Range	Turn Rotor to Fully Open Position	1st I.F. (C13) & (C14) 2nd I.F. (C17) & (C18)
RANGE B 1600 KC	External Antenna Clip	Point "X"	50 mmf.	B Range	Turn Rotor to Fully Open Position	Oscillator Range B (C9) See Note A
1400 KC Note D	External Antenna Clip	Point "X"	50 mmf.	B Range	Turn Rotor to Max. Output. Set pointer to 1400 KC See Note C	Antenna Range B (C-31)
600 KC	External Antenna Clip	Point "X"	50 mmf.	B Range	Turn Rotor to Max. Output and Rock	600 KC Padder (C10) Rock Rotor See Note B
Repeat above oscillator adjustments at 1600 and 600 KC until readjusting the oscillator Range B Trimmer (C9) causes no further improvement of output.						
RANGE D 18.3 MC	External Antenna Clip	Point "X"	400 Ohm	D Range	Turn Rotor to Fully Open Position	Oscillator Range D (C5)
17 MC	External Antenna Clip	Point "X"	400 Ohm	D Range	Turn Rotor to Max. Output	Ant. Range D (C2)
Loop Range B 1400 KC Note D	Reassemble chassis in cabinet External Antenna Clip	Chassis	50 mmf.	B Range	Turn Rotor to Max. Output	Ant. Range B (C-31)

DRIVE CORD REPLACEMENT

Use a new 10X51 drive cord assembly or a piece of new cord 45" long for this installation. Turn the large drive pulley counterclockwise until the gang condenser is in the fully open position, then fasten one end of the new drive cord to one end of the tension spring. Hook the other end of the tension spring over the tab on the drive pulley, pass the drive cord through the slot in the drive pulley rim and wind it ½ turn counterclockwise around the top of the drive pulley. Wind 2 turns around the drive shaft spool with the turns progressing towards the chassis. Continue with the cord around idler studs A, B and C as shown in the illustration. Wind the cord ¾ turn counterclockwise around the large drive pulley, pass it through the slot in the pulley rim and fasten the end to the tension spring. Rotate the tuning shaft several turns to take up any slack in the drive cord, then attach the dial pointer to the cord.





ALIGNMENT NOTES

NOTE A—Adjust Oscillator Range B (C9) trimmer on side of chassis. Oscillator Range B (C6) auxiliary trimmer on gang condenser is adjusted at factory and ordinarily need not be readjusted in the field.

NOTE B—Turn the rotor back and forth and adjust the trimmer until the peak of greatest intensity is obtained.

NOTE C—Attach pointer to drive cord and position at 1400 KC mark on dial scale.

NOTE D—Some receivers have a "gimmick" capacity formed by twisting two wires together on the loop antenna in place of the Antenna Range B Trimmer, C-31. When aligning receivers having the "gimmick" capacity, proceed as instructed in the Alignment Procedure Table but omit the steps at 1400 KC involving C-31.

The "gimmick" capacity is set at the factory and normally will not require adjustments when realigning the receiver. Adjustment is obtained by twisting or untwisting the wires.

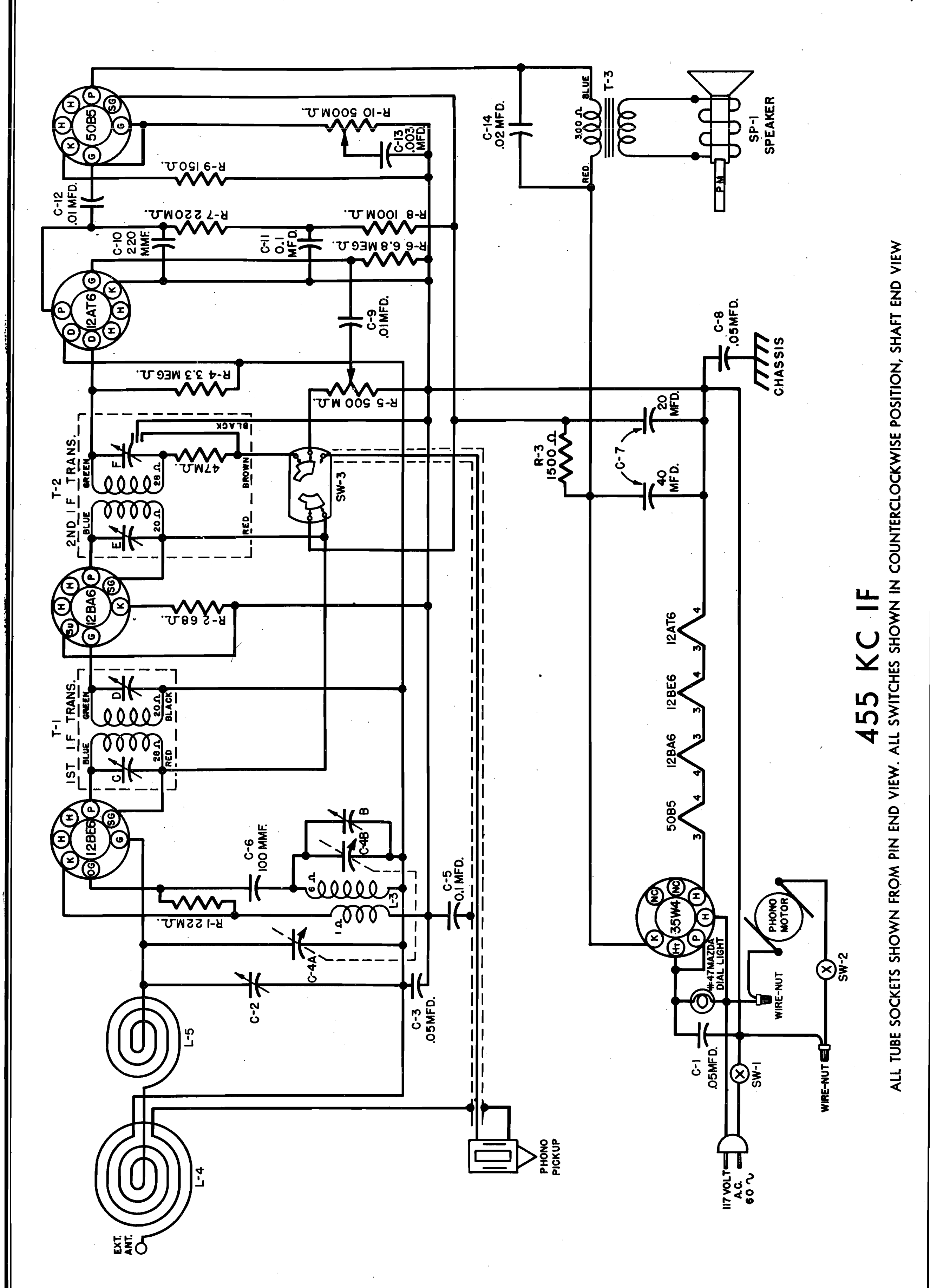
On receivers having the "gimmick" the dial pointer should be set at 1600 KC rather than as instructed in Note C.

On receivers having neither a trimmer or a "gimmick", the dial pointer should also be set at 1600 KC.

SPECIFICATIONS

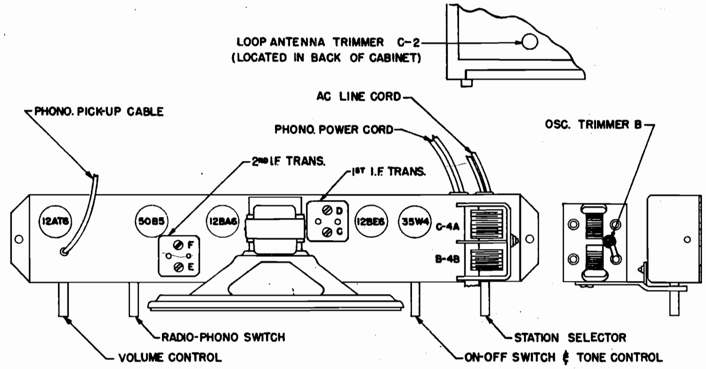
Power Consumption..............................42 Watts (At 117 volts AC)
Power Output......................1.5 Watts Maximum .9 Watt 10% Harmonics
Selectivity......49KC Broad at 1000 times Signal
Intermediate Frequency..........................455 KC
Speaker........................4"x6" oval PM Dynamic
Tuning Frequency Range
B Range..............................540 to 1600 KC
D Range........................6000 to 18,000 KC
Sensitivity (For .05 watt output—External Antenna).
B range......................9 Microvolts Average
D Range..................30 Microvolts Average

WESTERN AUTO SUPPLY CO. MODEL D2748

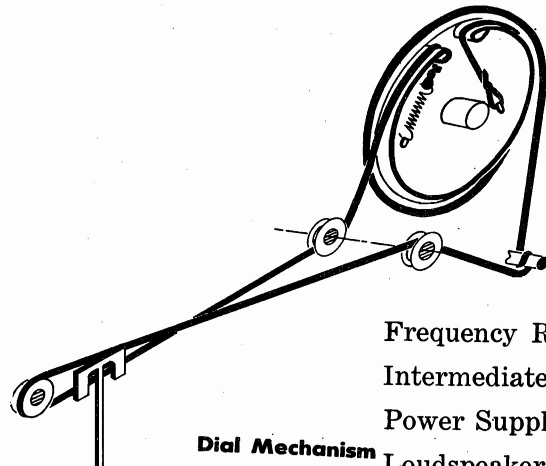


MODEL D2748

WESTERN AUTO SUPPLY CO.



Tube Layout



Dial Mechanism

Frequency Range........540-1600 kc.
Intermediate Frequency........455 kc.
Power Supply........117 volts AC, 60 cycle
Loudspeaker........5x7 elliptical type PM
V.C. Impedance........3.2 ohms at 400 cycles
Power Output (Undistorted)........8 watt
Power Output (Maximum)........1.5 watts
Tuning Drive Ratio........7 to 1

TUBE COMPLEMENT

1—12BE6 Converter tube
1—12BA6 IF Amplifier tube
1—12AT6 Detector—AVC—First Audio tube
1—50B5 Power Output tube
1—35W4 Rectifier tube

ALIGNMENT PROCEDURE

The following equipment is necessary to properly align this chassis:

1. A signal generator which will provide an accurately calibrated signal at the frequencies listed.
2. An output meter.
3. A non-metallic screwdriver.
4. Dummy antenna: — .1 mfd. — RMA loop.

NOTE: Intermediate Frequency and Oscillator adjustments may be made with the loop disconnected provided a resistor of 10,000 to 50,000 ohms is substituted to close the 12BE6 grid circuit. The loop alignment must be done with the loop and chassis mounted in operating position in the cabinet. A single turn loosely coupled to loop may be substituted for RMA loop.

* Loop trimmer accessible through back of cabinet.

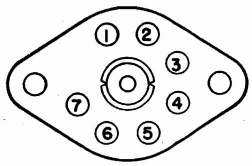
GENERATOR	CONNECTION AT RADIO	DUMMY ANTENNA	DIAL	TO TUNE TRIMMERS	REMARKS
IF 455 kc.	12BE6 grid	.1 mfd.	HF end	IF trimmers C D E F	Tune to max.
1620 kc.	12BE6 grid	RMA loop	HF end	Osc. trimmer B	Set limit of band
1400 kc.	Through loop*	RMA loop	1400 kc.	Ant. trimmer C-2	Tune to max.

WESTERN AUTO SUPPLY CO.

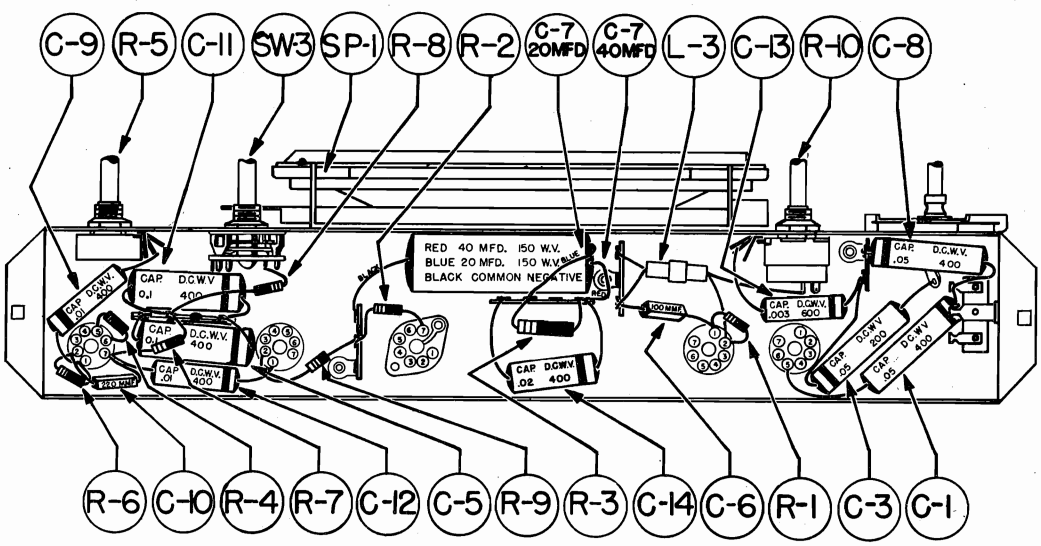
MODEL D2748

SOCKET VOLTAGES

TUBE	POSITION	1	2	3	4	5	6	7
12BE6	Converter	-5	0	24 AC	12 AC	88	88	0
12BA6	I.F. Amplifier	0	0	24 AC	35 AC	88	88	0.7
12AT6	2nd DET.—1st AF—AVC	0	0	12 AC	0	0	0	12
50B5	Power Output	0	5	85 AC	35 AC	115	88	0
35W4	Rectifier	0	0	85 AC	117 AC	112 AC	112 AC	122



NOTE: All DC voltages measured with a 1000 ohm-per-volt meter from ON-OFF switch (—B) to socket contact indicated. All AC voltages are measured from ON-OFF switch (—B) to socket contact indicated. All voltages are positive DC unless otherwise marked. Volume Control full on. No signal input. Line voltage 117 volts AC.



Parts Layout—Chassis Model 7156

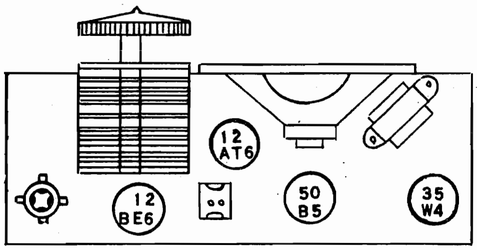
SERVICE PARTS LIST

Symbol	Part No.	Description
C-3	BD210503	Capacitor, Paper, .05 mfd., 200 v.
C-9, C-12	BD410103	Capacitor, Paper, .01 mfd., 400 v.
C-5, C-11	BD410104	Capacitor, Paper, 0.1 mfd., 400 v.
C-14	BD410203	Capacitor, Paper, .02 mfd., 400 v.
C-1, C-8	BD410503	Capacitor, Paper, .05 mfd., 400 v.
C-13	BD610302	Capacitor, Paper, .003 mfd., 600 v.
C-6	BM74A101	Capacitor, Mica, 100 mmf.
C-10	BM74A221	Capacitor, Mica, 220 mmf.
R-2	BR16B680	Resistor, 68 ohm, ⅓ w.
R-9	BR16C151	Resistor, 150 ohm, ½ w.
R-8	BR17B104	Resistor, 100,000 ohm, ⅓ w.
R-1	BR17B223	Resistor, 22,000 ohm, ⅓ w.
R-7	BR17B224	Resistor, 220,000 ohm, ⅓ w.
R-4	BR17B335	Resistor, 3.3 megohm, ⅓ w.
R-6	BR17B685	Resistor, 6.8 megohm, ⅓ w.
R-3	BR17E152	Resistor, 1500 ohm, 1 w.
	A-2163	Cable, Drive
	A-6158	Lamp, Pilot, No. 47 Mazda, 6.3 v.
	A-6182-1	Socket, Dial Light
C-7	B-9564-1	Cap., Electro., 40-20 mfd., 150 v.
	A-51163	Clip, Spring
	B-51427-5	Grommet (large)
	B-51427-8	Grommet (small)

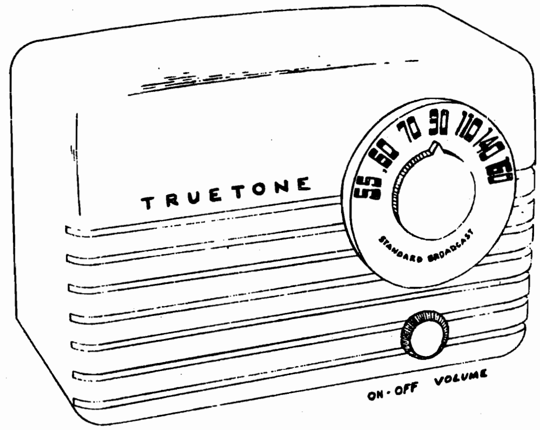
Symbol	Part No.	Description
SW-3	B-51576-2	Switch, Radio-Phono
	A-51787	Spring, for Dial Cable
	A-54122	Button, Plug
R-5	B-54466-2	Control, Volume, 500,000 ohm
T-2	B-56718-1	Transformer Assembly, 2nd IF
T-1	B-56722-1	Transformer Assembly, 1st IF
	B-57262-6	Cord, AC Phono.
R-10	B-57841-1	Control, Tone & Switch, 500,000 ohm
	B-57842	Coil Assembly, Oscillator
SP-1	C-57843	Speaker, 5x7 PM
	B-57848-1	Shaft, Tuning Drive
	B-57857-1	Pointer, Dial
	B-57858-1	Strip Assembly, Light Diffusing
C-4	C-57859-1	Capacitor, Variable
	A-57891	Sheet, Operating and Service
L-4 & L-5	D-57870	Coil Assembly, Loop
	C-57872-1	Knob
	E-57873-1	Cabinet
	A-57878	Clip, Gang Mounting
C-2	B-57879-1	Capacitor Assembly, Trimmer
	C-57862-1	Crystal and Indicator, Dial
	B-58069-1	Cord, AC Power

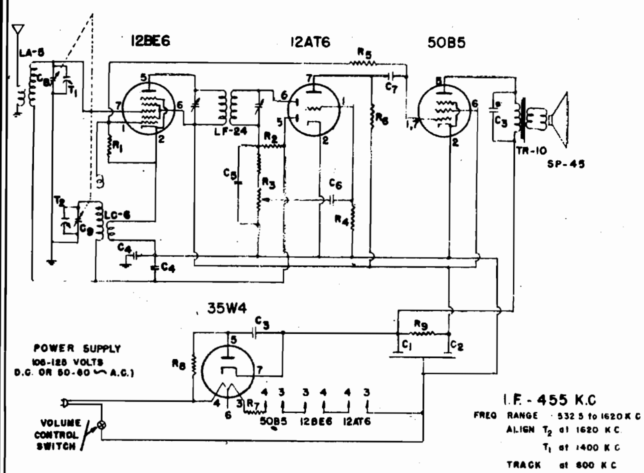
MODELS D2806, D2807

WESTERN AUTO SUPPLY CO.



Remove back to replace tubes





CHASSIS SERIES "AG"

ELECTRICAL SPECIFICATIONS

Power Supply .... 105-125 Volts D.C. or 50-60 Cycles A.C. 30 Watts

Frequency Range .... 532.5 to 1620 kc.

Intermediate Freq. ...... 455 kc.

Tuning .... Two gang capacitor

Speaker .... 4 inch PM 3.5 ohm voice coil impedance

Power Output .... 1 watt undistorted 1.5 watt maximum

Sensitivity .... 800 Microvolts at 50 milliwatts Output

Selectivity .... 120 kc broad at 1000 times signal at 1000 kc.

REPLACEMENT PARTS LIST

Ref. No.	*Part No.*	*Description*
		CAPACITORS
C1, C2	CE-15	2 x 40 mfd V. Elect
C3	CP203-1	.02 mfd 400V paper cond.
C4	CP503-4	.05 mfd 200V paper cond.
C5	CM151-1	.00015 mfd 500V paper cond.
C6	CP202-2	.002 mfd 400V paper cond.
C7	CP502-3	.005 mfd 200V paper cond.
C8, C9	CV-14	Variable Condenser (2 gang)
		RESISTORS
R1	RC183-2	18,000 ohms ½W 10%
R2	RC475-1	4.7 megohms ½W 20%
R3	VC-11	2 meg. vol. cont., 100 K Stop
R4	RC106-1	10 megohms ½W 20%
R5	RC334-1	330,000 ohms ½W 20%
R6	RC224-1	220,000 ohms ½W 20%
R7	RC390-4	39 ohms 1W 20%
R8	RC180-1	18 ohms ½W 20%
R9	RC222-4	2200 ohms 1W 20%
		COILS & TRANSFORMERS
	LA-5	Antenna Coil
	LC-6	Oscillator Coil
	LF-24	I.F. Transformer
	TR-10	Output Transformer
		MISCELLANEOUS
	CB-106	Cabinet (specify Ivory or Walnut)
	KN-20	Knob
	KN-21	Pointer Knob
	SP-45	4" PM Speaker

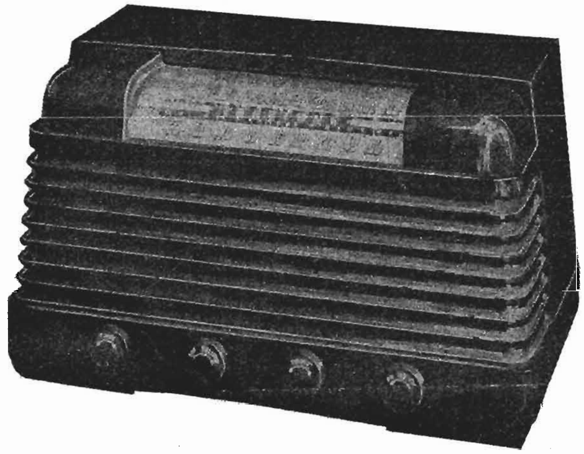
ALIGNMENT PROCEDURE

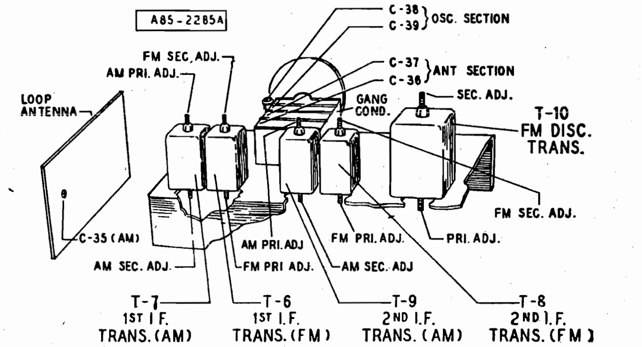
- Output meter across 3.5 ohm output load.
- Volume control at maximum for all adjustments.
- Align for maximum output. Reduce input as needed to keep output near 0.4 volts.

SIGNAL GENERATOR				*SETTING TUNER*	*ADJUST TRIMMERS TO MAXIMUM OUTPUT (in order shown)*
Frequency	*Coupling Factor*	*Connection to Receiver*	*Ground Connection*		
455 kc	.1 mfd	12BE6 Grid	B—	Rotor full open (Plates out of mesh)	Input and output trimmers on IF cans
1620 kc	.1 mfd	12BE6 Grid	B—	Rotor full open (Plates out of mesh)	Oscillator trimmer T2
1400 kc	75 mmf	Hank	B—	1400 kc	Antenna trimmer T1

WESTERN AUTO SUPPLY CO.

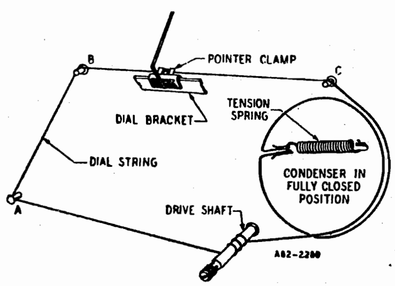
MODELS D2819A, D2819B, D2819C, D2819D, D2819E

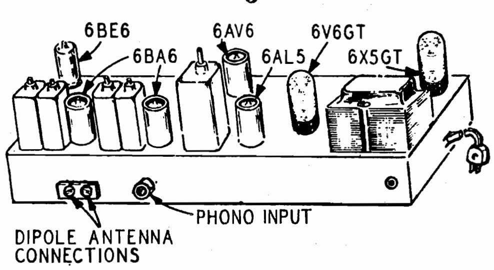


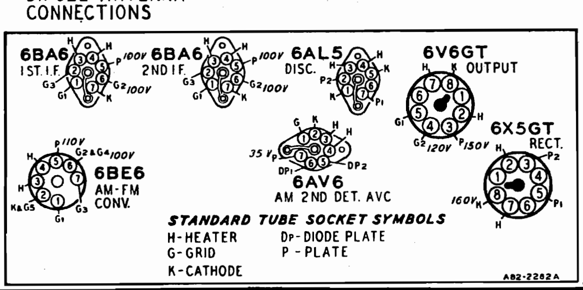


DRIVE CORD REPLACEMENT

Replacement of the drive cord may be accomplished as shown in the illustration. For this purpose use the new drive cord assembly listed in the Replacement Parts List. Turn the gang condenser until the plates are fully meshed. Then install the string as shown, winding three turns clockwise around the tuning shaft with the turns progressing away from the chassis. After the cord is installed, rotate the tuning shaft several times in order to take up any slack in the cord.







RECORD PLAYER AND TELEVISION SOUND CONNECTIONS

For models not equipped with built-in record player, a socket marked PHONO is provided on the back of the chassis for connections to an external record player or automatic record changer. When it is desired to play records through the radio, insert the connector on the cable of any standard record player into this socket. Turn the phono-radio switch to the phono position and use the volume control to adjust the sound level.

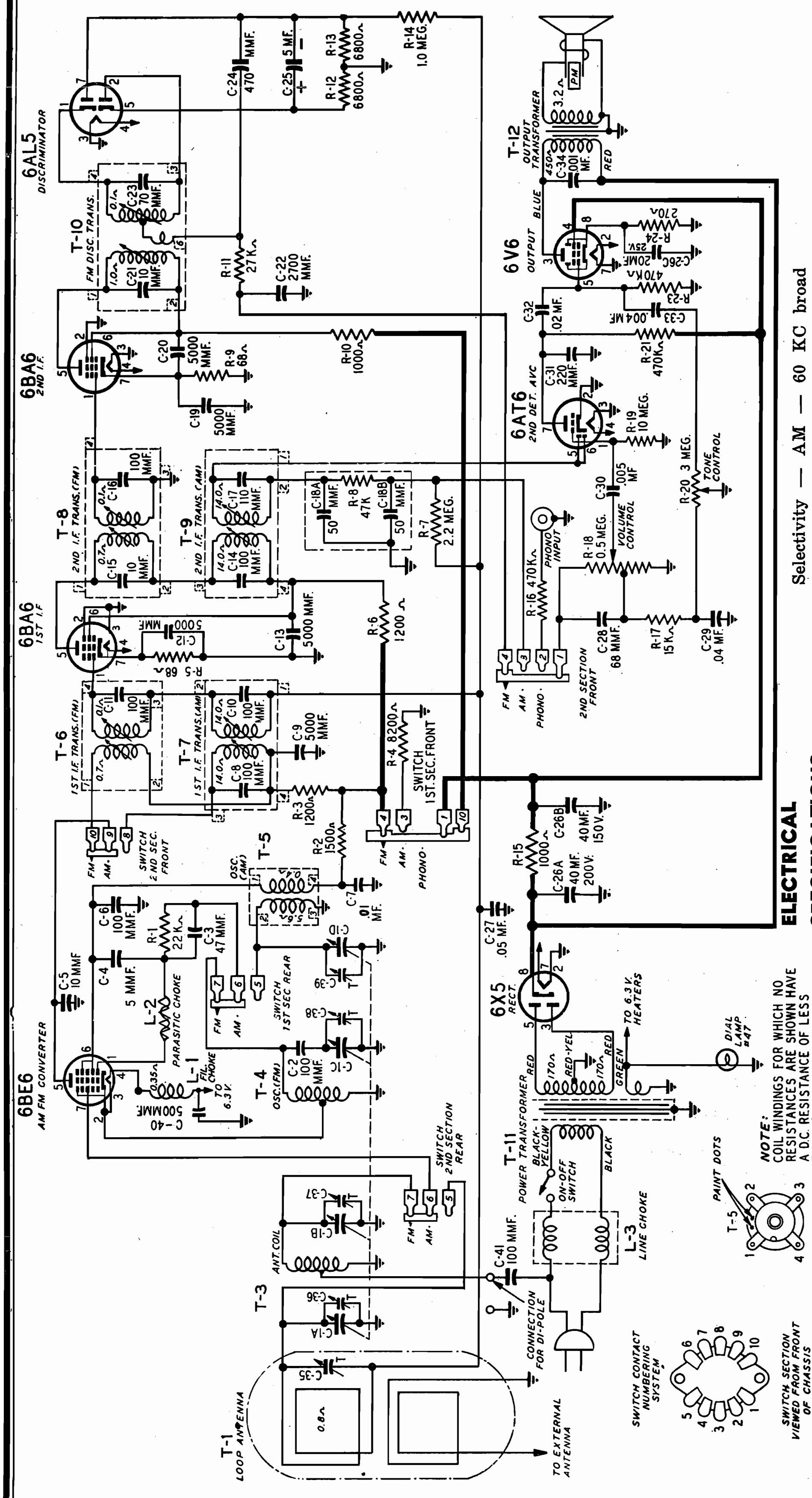
When television programs become available in your community, the audio amplifier and speaker of this radio may be used in conjunction with a Television Picture Receiver and sound converter to reproduce the sound portion of the television programs. Simply insert the connector on the cable of the Television Converter into the socket marked PHONO and operate the receiver in the same manner as described in the foregoing paragraph.

TUBE SOCKET VOLTAGES

Socket voltages are shown on the Bottom Socket diagram at the tube socket terminals. All voltages are between the socket terminal and chassis ground. Plate, screen and cathode voltages were taken with a 1000 ohm-per-volt meter with a 300 volt scale used for plate and screen voltages. Audio grid voltages were read with a vacuum tube volt-meter. Conditions of measurement are:

Line voltage ....117 Volts AC
Signal Input ....None
A Variation of ±10% is usually permissible.

MODEL D2819A WESTERN AUTO SUPPLY CO.



ELECTRICAL SPECIFICATIONS

Power Consumption—
117 volts AC—35 watts

Power Output—
1.5 watts maximum
.9 watts 10% distortion

Speaker—4 x 6 inch oval PM dynamic

Frequency Ranges—
Broadcast 540-1600 KC
Frequency modulation 88-108 MC

Intermediate Frequency—
AM 455 KC — FM 10.7 MC

Selectivity — AM — 60 KC broad at 1000 times signal, measured at 1000 KC

I.F. FM—200 KC broad at 2 times down

I.F. FM—800 KC broad at 200 times down

AM Sensitivity—(For .5 watt output with external antenna) 40 microvolts average

FM Sensitivity—(For .5 watt output) 300 microvolts average

WESTERN AUTO SUPPLY CO.

MODELS D2819B, D2819C

SUPPLEMENTARY SERVICE DATA

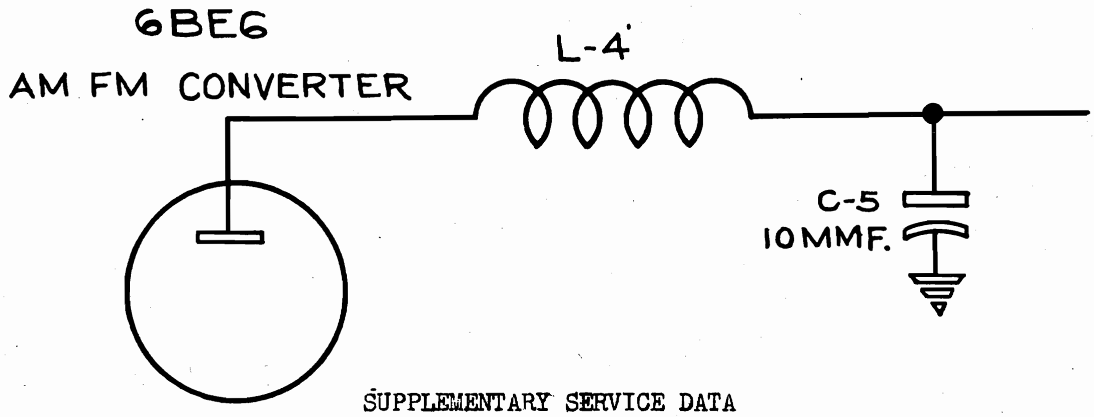
TRUETONE MODEL D2819B

Model "B" chassis differ from the model "A" chassis as follows:

PARTS LIST ADDITION:

L-4	9A1882	Choke

SCHEMATIC DIAGRAM CHANGE:



SUPPLEMENTARY SERVICE DATA

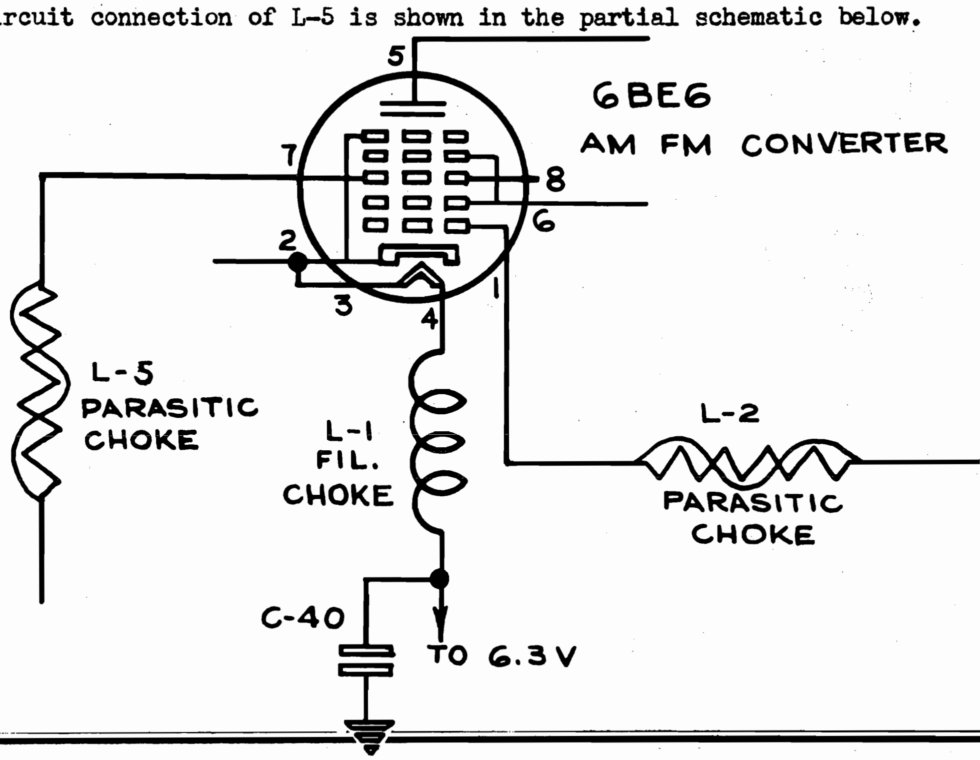
TRUETONE MODEL D2819C

A choke has been added to the circuit to eliminate parasitic oscillation on the FM Band.

PARTS LIST ADDITION

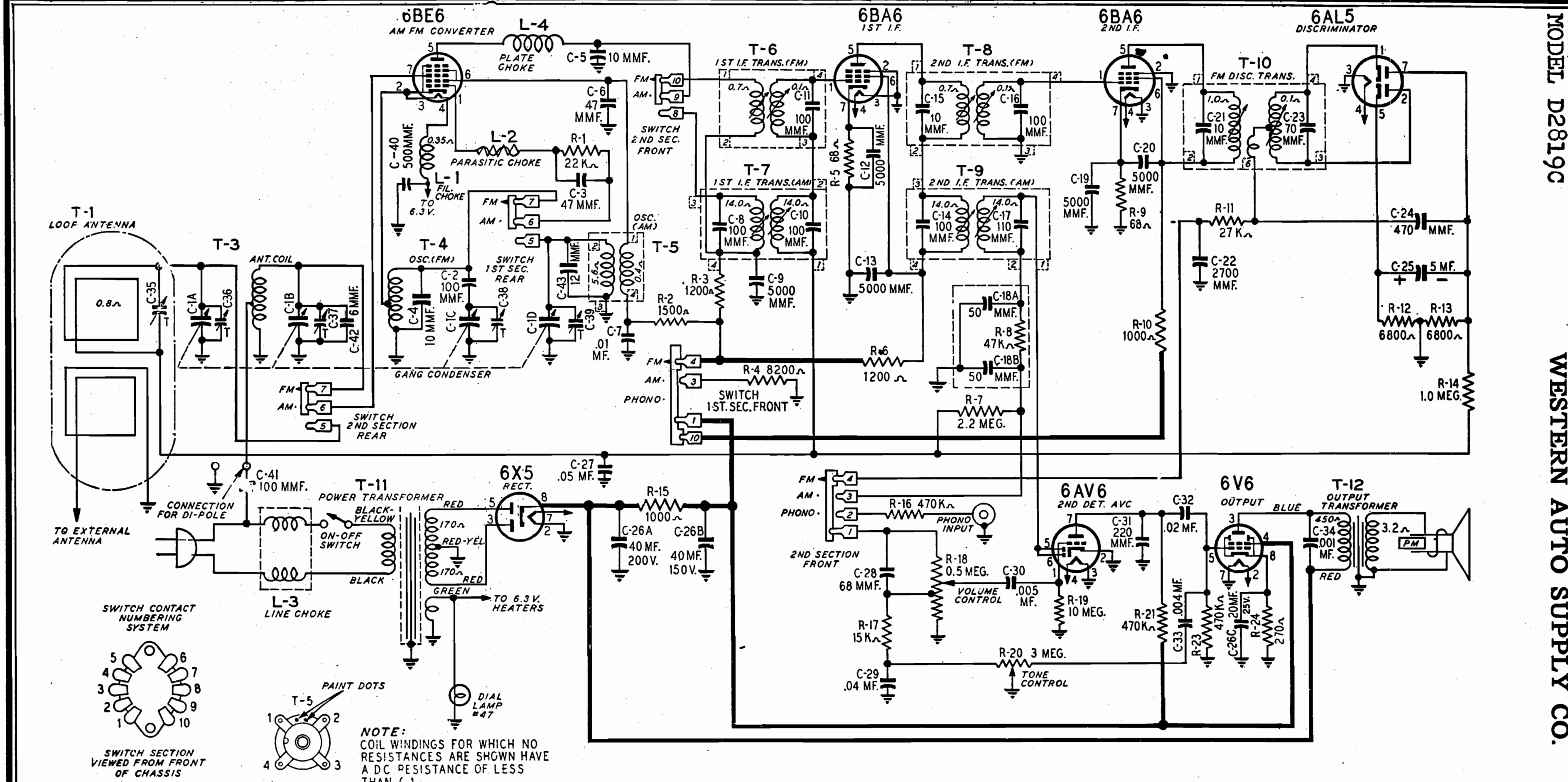
Ref. #	Part #	Description
L-5	9A1967	Parasitic Choke

The circuit connection of L-5 is shown in the partial schematic below.



MODEL D2819C

WESTERN AUTO SUPPLY CO.



ELECTRICAL SPECIFICATIONS

Power Consumption—
117 volts AC—35 watts

Power Output—
1.5 watts maximum
.9 watts 10% distortion

Speaker—4 x 6 inch oval PM dynamic

Frequency Ranges—
Broadcast 540-1600 KC
Frequency modulation 88-108 MC

Intermediate Frequency—
AM 455 KC — FM 10.7 MC

Selectivity — AM — 60 KC broad at 1000 times signal, measured at 1000 KC

I.F. FM—200 KC broad at 2 times down

I.F. FM—800 KC broad at 200 times down

AM Sensitivity—(For .5 watt output with external antenna)
40 microvolts average

FM Sensitivity—(For .5 watt output)
300 microvolts average

WESTERN AUTO SUPPLY CO.

MODELS D2819D, D2819E

SUPPLEMENTARY SERVICE DATA

TRUETONE MODEL D2819D

Model "D" receivers differ from the model "C" receivers by the change in value of resistors R-12 and R-13 from 6800 ohms to 15,000 ohms.

The new part number and description follows:

R-12, R-13	B84153	15,000 ohms	0.5 W

SCHEMATIC DIAGRAM CHANGE:

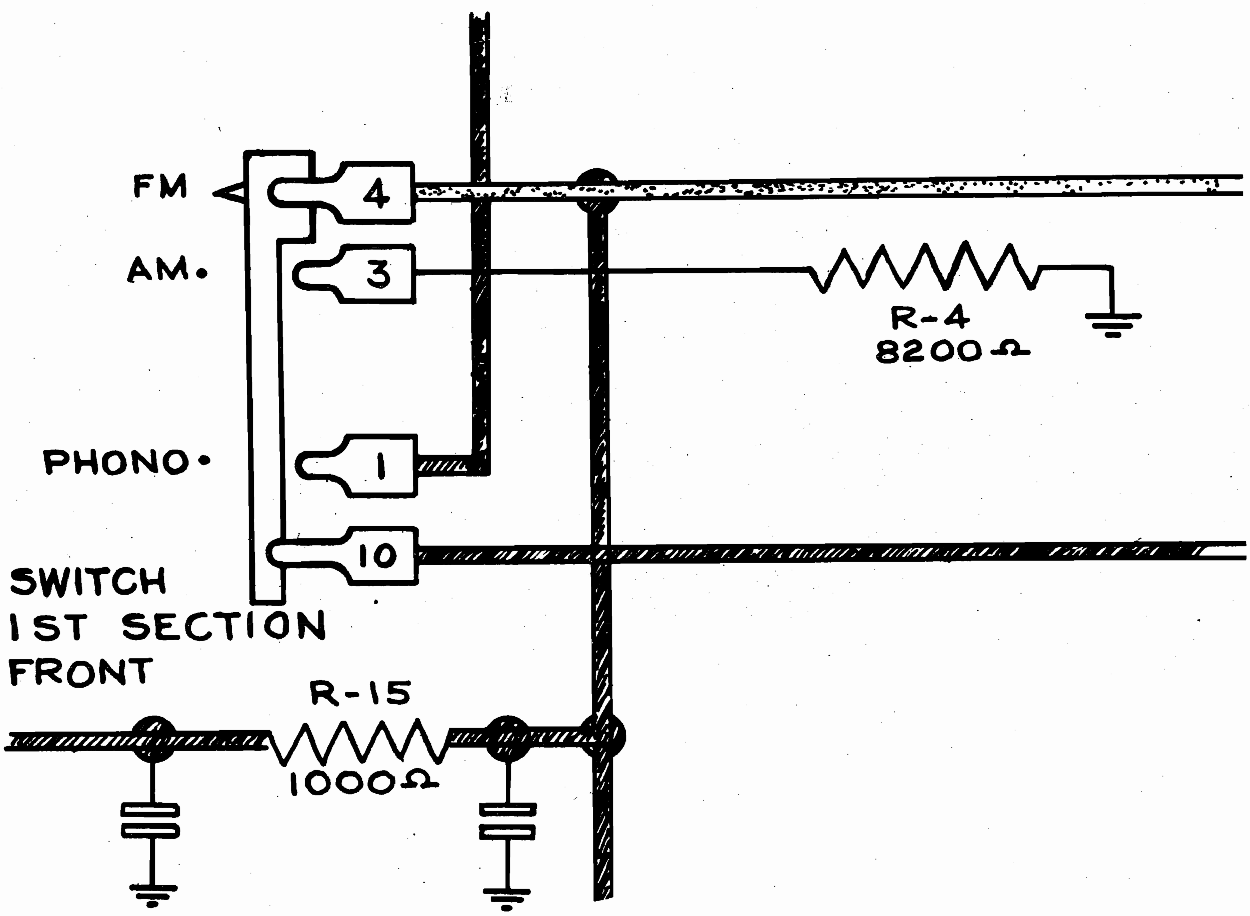
The wires on lugs 1 and 4 of "SWITCH 1ST SEC. FRONT" view have been interchanged. This change is shown on the partial schematic below.

SUPPLEMENTARY SERVICE DATA

TRUETONE MODEL D2819E

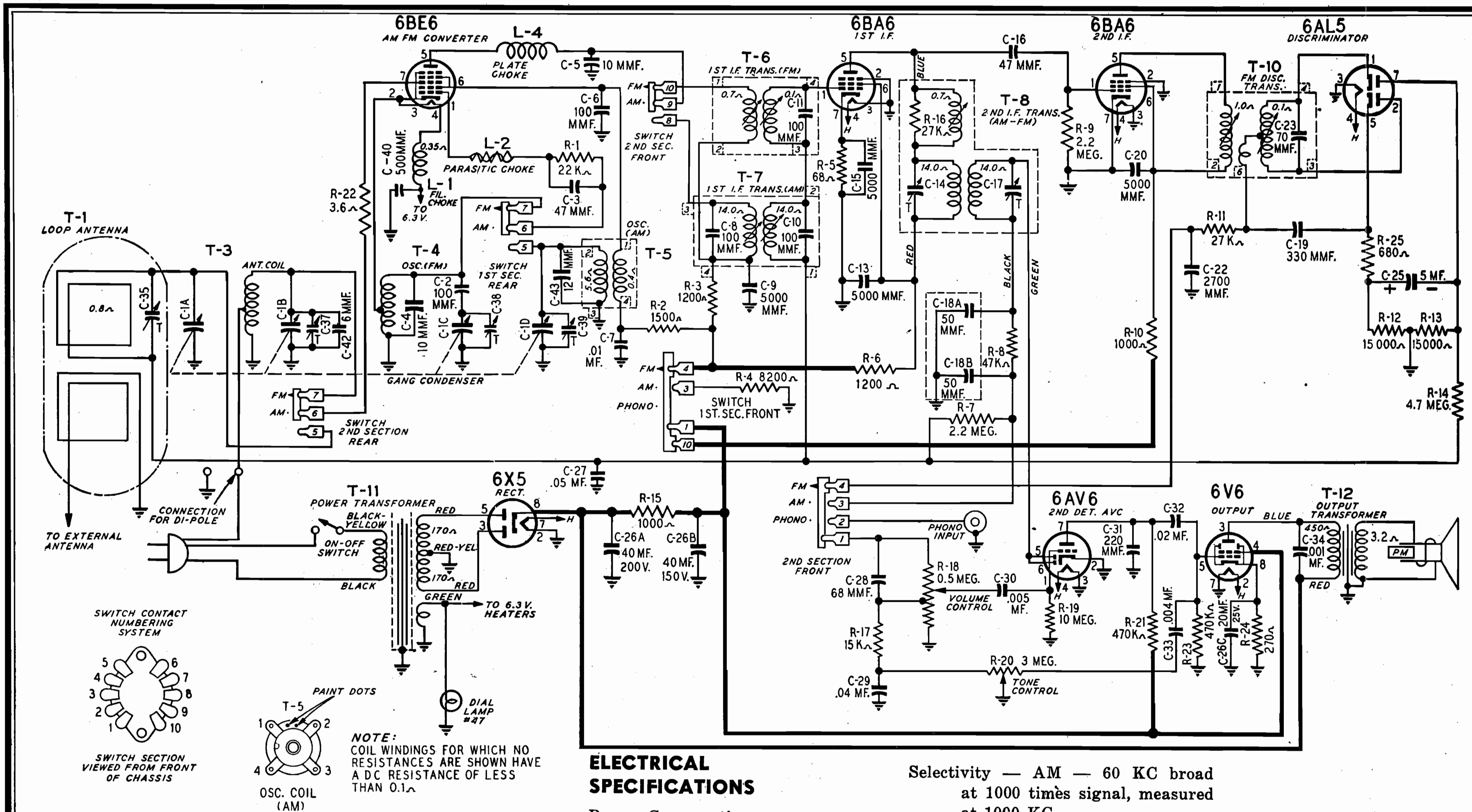
SCHEMATIC DIAGRAM CHANGE

The wires on lugs 1 and 4 of "SWITCH 1st SEC. FRONT" view has been interchanged. This change is shown on the partial schematic below.



MODEL D2819E

WESTERN AUTO SUPPLY CO.



ELECTRICAL SPECIFICATIONS

Power Consumption—
117 volts AC—35 watts

Power Output—
1.5 watts maximum
.9 watts 10% distortion

Speaker—4 x 6 inch oval PM dynamic

Frequency Ranges—
Broadcast 540-1600 KC
Frequency modulation 88-108 MC

Intermediate Frequency—
AM 455 KC — FM 10.7 MC

Selectivity — AM — 60 KC broad at 1000 times signal, measured at 1000 KC
I.F. FM—200 KC broad at 2 times down
I.F. FM—700 KC broad at 200 times down

AM Sensitivity—(For .5 watt output with external antenna)
60 microvolts average

FM Sensitivity—(For .5 watt output)
150 microvolts average

WESTERN AUTO SUPPLY CO.

MODELS D2819A, D2819B, D2819C, D2819D

ALIGNMENT PROCEDURES

AM STAGES

Volume Control Maximum 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 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, and 50 mmf.

SIGNAL GENERATOR FREQUENCY SETTING	SIGNAL GENERATOR CONNECTION AT RADIO	GROUND CONNECTION	DUMMY ANTENNA	GANG CONDENSER SETTING	ADJUST TUNING SLUGS (I-F ONLY) TRIMMERS (OSC. & ANT.)
455 KC	Control Grid 1st 6BA6 Pin No. 1	Chassis Base	.1 mf	Turn Rotor to Full Open	2nd I.F. Pri. & Sec.
455 KC	Control Grid 6BE6 Pin No. 7 1st Det.	Same as above	.1 mf	Turn Rotor to Full Open	1st I.F. Pri. & Sec.
1620 KC	Control Grid 6BE6 Pin No. 7	Same as above	.1 mf	Turn Rotor to Full Open	Oscillator C-39
1400 KC	External Antenna Lead	Same as above	50 mmf	Turn Dial to 1400 KC. See Note A	Antenna C-35

NOTE A—Attach pointer to drive cord and position at 1400 KC mark on dial scale.

FM STAGES

Allow chassis and signal generator to warm up for several minutes. The following equipment is required for aligning:

An accurately calibrated signal generator providing unmodulated signals at the test frequencies listed below.

Non-metallic screwdriver.

Dummy Antennas and I-F Loading Resistor—.01 mf, 300 ohms and 100 K ohms.

Zero center scale DC vaccum tube voltmeter having a range of approximately 3 volts.

(If a zero center scale meter is not available, a standard scale vacuum tube voltmeter may be used by reversing the meter connections for negative readings.)

	SIGNAL GENERATOR FREQUENCY SETTING	SIGNAL GENERATOR CONNECTION AT RADIO	DUMMY ANTENNA	BAND SWITCH SETTING	CONDENSER SETTING	ADJUSTMENT FOR MAX. METER DEFLECTION
Discriminator	10.7 MC	6BA6 2nd I-F Pin 1 & Chassis	.01 mf	FM	Rotor to Full Open	Disc. Pri. Note A
	10.7 MC	Same as above	.01 mf	FM	Same as above	Disc. Sec. Note B
	10.7 MC	Same as above	.01 mf	FM	Same as above	Disc. Pri. Note A
	10.7 MC	Same as above	.01 mf	FM	Same as above	Disc. Sec. Note B
I-F	10.7 MC	6BA6 1st IF Pin 1 & Chassis	.01 mf	FM	Same as above	2nd I-F Pri. 2nd I-F Sec. Note C
	10.7 MC	Unsolder lead from Pin 7 to band switch. Insert 100K ohm resistor between Pin 7 & Ground and feed signal into Pin 7 of 6BE6	.01 mf	FM	Same as above	1st I-F Pri. Note C
	10.7 MC	Same as above	.01 mf	FM	Same as above	1st I-F Sec. Note C
	RECHECK I-F ADJUSTMENTS IN ORDER GIVEN					
Ant. & Osc.	108.5 Note D	Disconnect built-in line antenna and connect generator to dipole terminals with resistor in series.	300 ohms	FM	Rotor to Full Open	Osc. C-38
	104.5	Same as above	300 ohms	FM	Tune rotor for max. AVC voltage	Ant. C-37

RECHECK ANTENNA & OSC. ADJUSTMENTS IN ORDER GIVEN

FM ALIGNMENT NOTES

NOTE A—The zero center scale DC vacuum tube voltmeter is to be connected between chassis ground and the A.V.C. line at the 27 K. ohm resistor (R-11) and its junction with terminal strip. A signal of .1 volt must be fed into the receiver for this adjustment.

Note output voltage on the zero center DC vacuum tube voltmeter.

NOTE B—Disconnect zero center DC vacuum tube voltmeter from A.V.C. and connect it to the audio takeoff point at the 1 megohm resistor (R-14) and its junction with the terminal strip. Adjust for zero voltage indication.

NOTE C—Connect zero center DC vacuum tube voltmeter as in Note A. Adjust input to give same output on the zero center DC vacuum tube voltmeter as in Note A.

NOTE D—Remove the 100 K ohm load resistor and solder the lead from pin 7 of 6BE6 tube to the band switch before attempting to check the antenna and oscillator coil adjustments.

MODEL D2819E

WESTERN AUTO SUPPLY CO.

ALIGNMENT PROCEDURES

AM STAGES

Volume Control Maximum 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 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, and 50 mmf.

SIGNAL GENERATOR FREQUENCY SETTING	SIGNAL GENERATOR CONNECTION AT RADIO	SIGNAL GENERATOR GROUND CONNECTION	DUMMY ANTENNA	GANG CONDENSER SETTING	ADJUST TUNING SLUGS AND TRIMMERS
455 KC	Control Grid 1st 6BA6 Pin No. 1	Chassis Base	.1 mf	Turn Rotor to Full Open	2nd I.F. C-14 & C-17
455 KC	Control Grid 6BE6 Pin No. 7 1st Det.	Same as above	.1 mf	Turn Rotor to Full Open	1st I.F. Pri. & Sec.
1620 KC	Control Grid 6BE6 Pin No. 7	Same as above	.1 mf	Turn Rotor to Full Open	Oscillator C-39
1400 KC	External Antenna Clip	Same as above	50 mmf	Turn Dial to 1400 KC. See Note A	Antenna C-35

NOTE A—Attach pointer to drive cord and position at 1400 KC mark on dial scale.

FM STAGES

Allow chassis and signal generator to warm up for several minutes.
The following equipment is required for aligning:

An accurately calibrated signal generator providing unmodulated signals at the test frequencies listed below.

Non-metallic screwdriver.

Dummy Antennas and I-F Loading Resistor—.01 mf, 300 ohms and 100 K ohms.

Zero center scale DC vaccum tube voltmeter having a range of approximately 3 volts.

(If a zero center scale meter is not available, a standard scale vacuum tube voltmeter may be used by reversing the meter connections for negative readings.)

	SIGNAL GENERATOR FREQUENCY SETTING	SIGNAL GENERATOR CONNECTION AT RADIO	DUMMY ANTENNA	BAND SWITCH SETTING	CONDENSER SETTING	ADJUSTMENT FOR MAX. METER DEFLECTION
Discriminator	10.7 MC	6BA6 2nd I-F Pin 1 & Chassis	.01 mf	FM	Rotor to Full Open	Disc. Pri. Note A
	10.7 MC	Same as above	.01 mf	FM	Same as above	Disc. Sec. Note B
	10.7 MC	Same as above	.01 mf	FM	Same as above	Disc. Pri. Note A
	10.7 MC	Same as above	.01 mf	FM	Same as above	Disc. Sec. Note B
I-F	10.7 MC Note E	6BA6 1st IF Pin 1 & Chassis	.01 mf	FM	Same as above	2nd I-F Note C
	10.7 MC	Unsolder lead from Pin 7 to band switch. Insert 100K ohm resistor between Pin 7 & Ground and feed signal into Pin 7 of 6BE6	.01 mf	FM	Same as above	1st I-F Pri. Note C
	10.7 MC	Same as above	.01 mf	FM	Same as above	1st I-F Sec. Note C
	RECHECK I-F ADJUSTMENTS IN ORDER GIVEN					
Ant. & Osc.	108.5 Note D	Disconnect built-in line antenna and connect generator to dipole terminals with resistor in series.	300 ohms	FM	Rotor to Full Open	Osc. C-38
	104.5	Same as above	300 ohms	FM	Tune rotor for max. AVC voltage	Ant. C-37
	RECHECK ANTENNA & OSC. ADJUSTMENTS IN ORDER GIVEN					

FM ALIGNMENT NOTES

NOTE A—The zero center scale DC vacuum tube voltmeter is to be connected between chassis ground and the A.V.C. line at the 27 K. ohm resistor (R-11) and its junction with terminal strip. A signal of .1 volt must be fed into the receiver for this adjustment.
Note output voltage on the zero center DC vacuum tube voltmeter.

NOTE B—Disconnect zero center DC vacuum tube voltmeter from A.V.C. and connect it to the audio takeoff point at the 4.7 megohm resistor (R-14) and its junction with the terminal strip. Adjust for zero voltage indication.

NOTE C—Connect zero center DC vacuum tube voltmeter as in Note A. Adjust input to give same output on the zero center DC vacuum tube voltmeter as in Note A.

NOTE D—Remove the 100 K ohm load resistor and solder the lead from pin 7 of 6BE6 tube to the band switch before attempting to check the antenna and oscillator adjustments.

NOTE E—2nd I-F trimmers (AM) must be aligned before attempting to adjust 2nd I-F (FM) tuning slug.

WESTERN AUTO SUPPLY CO. MODEL D2819A

REPLACEMENT PARTS LIST

NOTICE: There is a Model Number label on the chassis. This label identifies the radio as to chassis, dial and issue letter. When ordering parts or writing, give ALL information appearing on this label.

MISCELLANEOUS

12A478	Speaker, 4" x 6" PM with Output Transformer
2A374	Band Change Switch
3A303	Molded Octal Tube Socket
3A304	Phono Socket - Single Pin
3A427	Tube Socket, Miniature (For AM-FM Converter Tube)
3A312	Tube Socket, Miniature
32X221	Tube Shield, Miniature
10A639	Knob, Tuning
10A640	Knob (Off-On-Volume)
10A641	Knob (Tone)
10A642	Knob (AM-FM-Phono)
13X546	Line Cord and Plug
76X1	Resistor-Capacitor Combination
55X318	Plastic Cabinet

CAPACITORS

C-1A, C-1B, C-1C, C-1D	14A198	Gang Condenser Assembly		
C-6, C-41	47X476	100 mmf		Molded
C-3	47X517	47 mmf		Ceramic
C-4	47X513	5 mmf		Ceramic
C-5	47X512	10 mmf		Ceramic
C-2	47X511	100 mmf		Ceramic
C-9, C-12, C-13, C-19, C-20	47X507	5000 mmf		Silvered Mica
C-8, C-10		Part of T-7 (1st I-F Trans. AM)		
C-7	D66103	.01 mf	400 V	Tubular
C-11		Part of T-6 (1st I-F Trans. FM)		
C-14, C-17		Part of T-9 (2nd I-F Trans. AM)		
C-15, C-16		Part of T-8 (2nd I-F Trans. FM)		
C-18A, C-18B		Part of 76X1 Resistor-Capacitor Combination		
C-21, C-23		Part of T-10 Discriminator Coil Assem.		
C-22	47X492	2700 mmf		Molded
C-24	47X510	470 mmf		Silvered Mica
C-25	45X361	5 mf	100 V	Dry Electrolytic
C-26A, C-26B, C-26C	45X360	40 mf / 40 mf / 20 mf	200 V / 150 V / 25 V	Dry Electrolytic
C-27	B66503	.05 mf	200 V	Tubular
C-28	47X471	68 mm		Molded
C-29	B66403	.04 mf	200 V	Tubular
C-30	D66502	.005 mf	400 V	Tubular
C-31	47X468	220 mmf		Ceramic
C-32	D66203	.02 mf	400 V	Tubular
C-33	B66402	.004 mf	200 V	Tubular
C-34	H66102	.001 mf	800 V	Tubular
C-35	17A123	1.5-12 mmf		Trimmer
C-36, C-37, C-39		Part of C-1 Gang Condenser		
C-38	17A247	3-12 mmf		Trimmer
C-40	47X508	500 mmf		Ceramic

RESISTORS

		Ohms	Watts	
R-1	B84223	22 K	0.5	Carbon
R-2	B84152	1500	0.5	Carbon
R-3, R-6	B84122	1200	0.5	Carbon
R-4	D84822	8200	2.0	Carbon
R-5, R-9	B83680	68	0.5	Carbon
R-7	B85225	2.2 meg	0.5	Carbon
R-8		47 K	Part of 76X1 Resistor—Capacitor Combination	
R-10	B85102	1000	0.5	Carbon
R-11	B84273	27 K	0.5	Carbon
R-12, R-13	B84682	6800	0.5	Carbon
R-14	B85105	1 meg	0.5	Carbon
R-15	D84102	1000	2.0	Carbon
R-16, R-21, R-23	B85474	470 K	0.5	Carbon
R-17	B84153	15 K	0.5	Carbon
R-18	36X347	.5 meg	Volume Control & Switch	
R-19	B85106	10 meg	0.5	Carbon
R-20	40X254	3 meg		Tone Control
R-24	B84271	270	0.5	Carbon

TRANSFORMERS AND COILS

L-1	9A1882	Filament Choke Assembly
L-2	9A1940	Parasitic Choke Assembly
L-3	9A1930	Line Choke Assembly
T-1	9A1931	"B" Range Loop Antenna Assembly
T-3	9A1937	Antenna Coil Assembly
T-4	9A1938	Oscillator Coil Assembly (FM)
T-5	9A1929	Oscillator Coil Assembly (AM)
T-6	9A1932	1st I.F. Transformer (FM)
T-7	9A1934	1st I.F. Transformer (AM)
T-8	9A1933	2nd I.F. Transformer (FM)
T-9	9A1935	2nd I.F. Transformer (AM)
T-10	9A1936	Discriminator Coil Assembly
T-11	53X291	Power Transformer
T-12		Output Transformer (See Miscellaneous)

DIAL AND DRIVE ASSEMBLY

15X236	Pointer
6X21	Rubber Grommet } Mtg. Gang Condenser
20X260	Condenser Cushion Stud } Mtg. Gang Condenser
10X68	Drive Cord Assembly
19X192	"C" Washer
26X506	Drive Shaft
58X698	Dial Scale
17X96	Dial Crystal
7A103	No. 47 Pilot Light
7A216	Pilot Light Socket Assembly
25X1573	Dial Bracket
25A1044	Diffuser and Clamp Assembly
28X113	Drive Cord Tension Spring

MODEL D2819C

WESTERN AUTO SUPPLY CO.

REPLACEMENT PARTS LIST

NOTICE: There is a Model Number label on the chassis. This label identifies the radio as to chassis, dial and issue letter. When ordering parts or writing, give ALL information appearing on this label.

MISCELLANEOUS

12A478	Speaker, 4" x 6" PM with Output Transformer
2A374	Band Change Switch
3A303	Molded Octal Tube Socket
3A305	Phono Socket - Single Pin
3A427	Tube Socket, Miniature (For AM-FM Converter Tube)
3A426	Tube Socket, Miniature
32X386	Tube Shield, Miniature
10A683	Knob, Tuning
10A684	Knob (Off-On-Volume)
10A685	Knob (Tone)
10A686	Knob (AM-FM-Phono)
13X546	Line Cord and Plug
76X1	Resistor-Capacitor Combination
55X318	Plastic Cabinet

CAPACITORS

C-1A, C-1B, C-1C, C-1D	14A204	Gang Condenser Assembly		
C-2	47X511	100 mmf		Ceramic
C-3	47X517	47 mmf		Ceramic
C-4	47X523	10 mmf		Ceramic
C-5	47X512	10 mmf		Ceramic
C-6	47X463	47 mmf		Ceramic
C-9, C-12, C-13, C-19, C-20	47X507	5000 mmf		Silvered Ceramic
C-8, C-10		Part of T-7 (1st I-F Trans. AM)		
C-7	D66103	.01 mf	400 V	Tubular
C-11		Part of T-6 (1st I-F Trans. FM)		
C-14, C-17		Part of T-9 (2nd I-F Trans. AM)		
C-15, C-16		Part of T-8 (2nd I-F Trans. FM)		
C-18A, C-18B		Part of 76X1 Resistor-Capacitor Combination		
C-21, C-23		Part of T-10 Discriminator Coil Assem.		
C-22	47X492	2700 mmf		Molded
C-24	47X510	470 mmf		Silvered Mica
C-25	45X361	5 mf	100 V	Dry Electrolytic
C-26A	45X360	40 mf	200 V	Dry Electrolytic
C-26B		40 mf	150 V	
C-26C		20 mf	25 V	
C-27	B66503	.05 mf	200 V	Tubular
C-28	47X471	68 mmf		Molded
C-29	B66403	.04 mf	200 V	Tubular
C-30	D66502	.005 mf	400 V	Tubular
C-31	47X468	220 mmf		Ceramic
C-32	D66203	.02 mf	400 V	Tubular
C-33	B66402	.004 mf	200 V	Tubular
C-34	H66102	.001 mf	800 V	Tubular
C-35	17A256	2-24 mmf		Trimmer
C-36, C-37, C-39		Part of C-1 Gang Condenser		
C-38	26A489	1-8 mmf		Trimmer Assy
C-40	47X508	500 mmf		Ceramic
C-41	47X476	100 mmf		Molded
C-42	47X521	6 mmf		Ceramic
C-43	47X522	12 mmf		Ceramic

RESISTORS

		Ohms	Watts	
R-1	B84223	22 K	0.5	Carbon
R-2	B84152	1500	0.5	Carbon
R-3, R-6	B84122	1200	0.5	Carbon
R-4	D84822	8200	2.0	Carbon
R-5, R-9	B83680	68	0.5	Carbon
R-7	B85225	2.2 meg	0.5	Carbon
R-8		47 K	Part of 76X1 Resistor—Capacitor Combination	
R-10	B84102	1000	0.5	Carbon
R-11	B84273	27 K	0.5	Carbon
R-12, R-13	B84682	6800	0.5	Carbon
R-14	B85105	1 meg	0.5	Carbon
R-15	D84102	1000	2.0	Carbon
R-16, R-21, R-23	B85474	470 K	0.5	Carbon
R-17	B84153	15 K	0.5	Carbon
R-18	36X347	.5 meg	Volume Control & Switch	
R-19	B85106	10 meg	0.5	Carbon
R-20	40X287	3 meg		Tone Control
R-24	B84271	270	0.5	Carbon

TRANSFORMERS AND COILS

L-1, L-4	9A1882	Choke Assembly
L-2	9A1940	Parasitic Choke Assembly
L-3	9A1930	Line Choke Assembly
T-1	9A1931	"B" Range Loop Antenna Assembly
T-3	9A1956	Antenna Coil Assembly
T-4	9A1938	Oscillator Coil Assembly (FM)
T-5	9A1929	Oscillator Coil Assembly (AM)
T-6	9A1932	1st I.F. Transformer (FM)
T-7	9A1934	1st I.F. Transformer (AM)
T-8	9A1933	2nd I.F. Transformer (FM)
T-9	9A1935	2nd I.F. Transformer (AM)
T-10	9A1936	Discriminator Coil Assembly
T-11	53X291	Power Transformer
T-12		Output Transformer (See Miscellaneous)

DIAL AND DRIVE ASSEMBLY

15X236	Pointer
6X21	Rubber Grommet } Mtg. Gang Condenser
20X260	Condenser Cushion Stud } Mtg. Gang Condenser
10X68	Drive Cord Assembly
19X192	"C" Washer
26X506	Drive Shaft
58X698	Dial Scale
17X96	Dial Crystal
7A103	No. 47 Pilot Light
7A216	Pilot Light Socket Assembly
25X1573	Dial Bracket
25A1044	Diffuser and Clamp Assembly
28X113	Drive Cord Tension Spring

WESTERN AUTO SUPPLY CO. MODEL D2819E

REPLACEMENT PARTS LIST

NOTICE: There is a model number label on the chassis. This label identifies the radio as to chassis, dial and issue letter. When ordering parts or writing, give ALL information on this label.

MISCELLANEOUS

12A478	Speaker, 4" x 6" PM with Output Transformer
2A374	Band Change Switch
3A303	Molded Octal Tube Socket
3A305	Phono Socket - Single Pin
3A427	Tube Socket, Miniature (For AM-FM Converter Tube)
3A426	Tube Socket, Miniature
10A683	Knob, Tuning
10A684	Knob (Off-On-Volume)
10A685	Knob (Tone)
10A686	Knob (AM-FM-Phono)
13X612	Line Cord and Plug
55X318	Plastic Cabinet

CAPACITORS

C-1A, C-1B, C-1C, C-1D	14A204	Gang Condenser Assembly		
C-2	47X511	100 mmf		Ceramic
C-3	47X517	47 mmf		Ceramic
C-4	47X523	10 mmf		Ceramic
C-5	47X512	10 mmf		Ceramic
C-6	47X476	100 mmf		Ceramic
C-7	D66103	.01 mf	400 V	Tubular
C-8, C-10	Part of T-7 (1st I.F. Trans. AM)			
C-?, C-13, C-15, C-20	47X507	5000 mmf		Silvered Ceramic
C-11	Part of T-6 (1st I.F. Trans. FM)			
C-14, C-17	Part of T-8 (2nd I.F. Trans. AM-FM)			
C-16	47X463	47 mmf		Ceramic
C-18A, C-18B	47X112	50-50 mmf		Dual Mica
C-19	47X529	330 mmf		Silvered Ceramic
C-22	47X492	2700 mmf		Molded
C-23	Part of T-10 (Discriminator Coil Assembly)			
C-25	45X361	5 mf	100 V	Dry Electrolytic
C-26A, C-26B, C-26C	45X360	40 mf / 40 mf / 20 mf	200 V / 150 V / 25 V	Dry Electrolytic
C-27	B66503	.05 mf	200 V	Tubular
C-28	47X471	68 mmf		Molded
C-29	B66403	.04 mf	200 V	Tubular
C-30	D66502	.005 mf	400 V	Tubular
C-31	47X468	220 mmf		Ceramic
C-32	D66203	.02 mf	400 V	Tubular
C-33	B66402	.004 mf	200 V	Tubular
C-34	H66102	.001 mf	800 V	Tubular
C-35	17A256	2-24 mmf		Trimmer
C-37, C-39	Part of C-1 Gang Condenser			
C-38	26A489	1-8 mmf		Trimmer Assy.
C-40	47X508	500 mmf		Ceramic
C-42	47X521	6 mmf		Ceramic
C-43	47X522	12 mmf		Ceramic

RESISTORS

		Ohms	Watts	
R-1	B84223	22 K	0.5	Carbon
R-2	B84152	1500	0.5	Carbon
R-3, R-6	B84122	1200	0.5	Carbon
R-4	D84822	8200	2.0	Carbon
R-5	B83680	68	0.5	Carbon
R-7, R-9	B85225	2.2 meg	0.5	Carbon
R-8	B85473	47 K	0.5	Carbon
R-10	B84102	1000	0.5	Carbon
R-11	B84273	27 K	0.5	Carbon
R-12, R-13, R-17	B84153	15 K	0.5	Carbon
R-14	B85475	4.7 meg.	0.5	Carbon
R-15	D84102	1000	2.0	Carbon
R-16	Part of T-8 (2nd I-F Trans. AM-FM)			
R-18	36X347	.5 meg		Volume Control & Switch
R-19	B85106	10 meg	0.5	Carbon
R-20	40X287	3 meg		Tone Control
R-21, R-23	B85474	470 K	0.5	Carbon
R-22	43X233	3.6	0.5	Wire Wound
R-24	B84271	270	0.5	Carbon
R-25	B84681	680	0.5	Carbon

TRANSFORMERS AND COILS

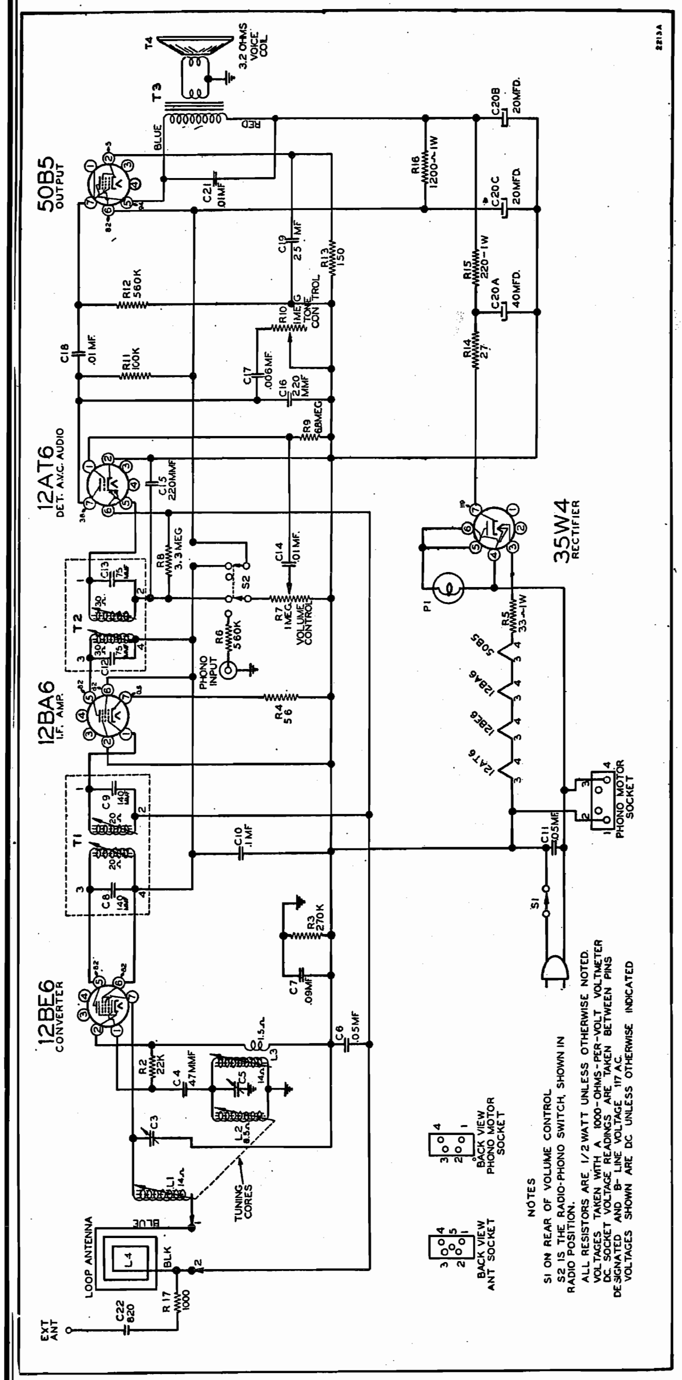
L-1, L-4	9A1882	Choke Assembly
L-2	9A1940	Parasitic Choke Assembly
T-1	9A1931	"B" Range Loop Antenna Assembly
T-3	9A1956	Antenna Coil Assembly
T-4	9A1938	Oscillator Coil Assembly (FM)
T-5	9A1929	Oscillator Coil Assembly (AM)
T-6	9A1932	1st I.F. Transformer (FM)
T-7	9A1934	1st I.F. Transformer (AM)
T-8	9A1973	2nd I.F. Transformer (AM-FM)
T-10	9A1970	Discriminator Coil Assembly
T-11	53X291	Power Transformer
T-12		Output Transformer (See Miscellaneous)

DIAL AND DRIVE ASSEMBLY

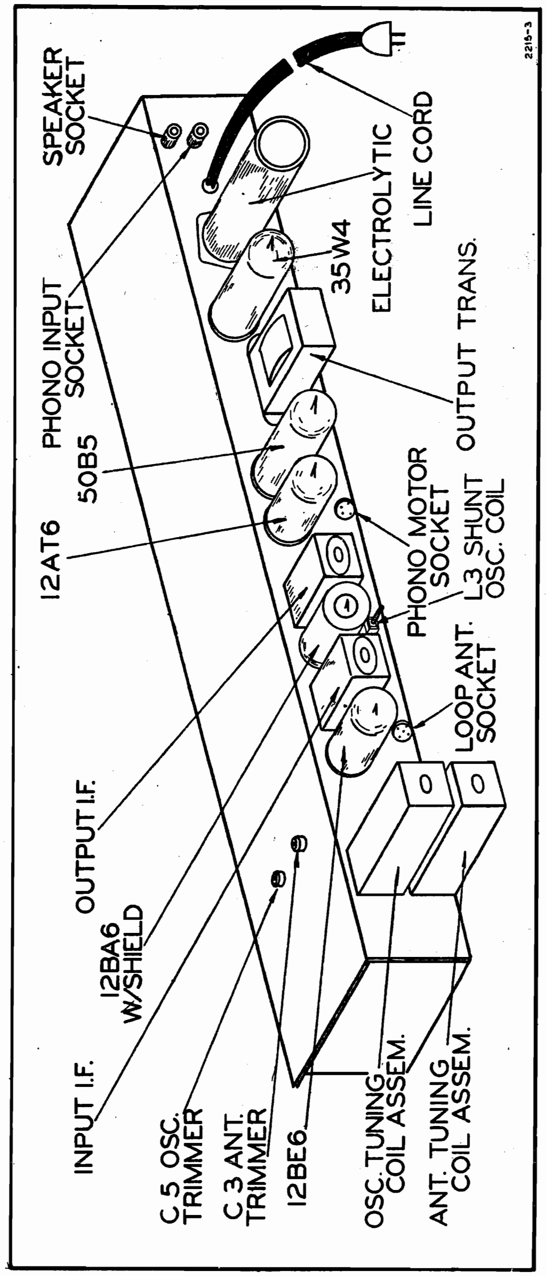
15X236	Pointer
6X21	Rubber Grommet (Mtg. Gang Condenser)
20X260	Condenser Cushion Stud (Mtg. Gang Condenser)
10X68	Drive Cord Assembly
19X192	"C" Washer
26X506	Drive Shaft
58X698	Dial Scale
17X96	Dial Crystal
7A103	No. 47 Pilot Light
7A216	Pilot Light Socket Assembly
25X1573	Dial Bracket
25A1044	Diffuser and Clamp Assembly
28X113	Drive Cord Tension Spring

MODEL D2851

WESTERN AUTO SUPPLY CO.



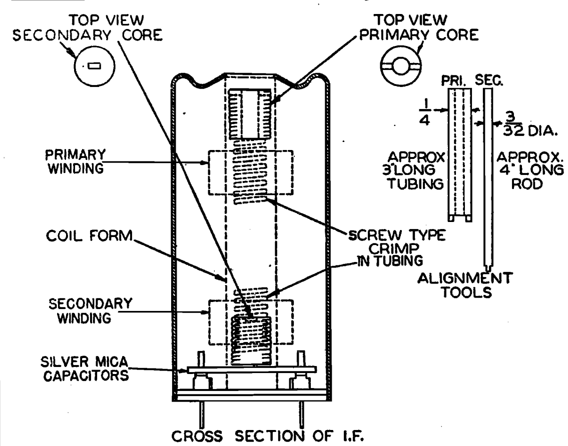
On some sets a 100M ohm resistor is in series with the high side of volume control. On some sets R5 is eliminated.



WESTERN AUTO SUPPLY CO.

MODEL D2851

SIGNAL GENERATOR				TUNER SETTING	ADJUST FOR MAXIMUM OUTPUT	INPUT FOR 50 MILLIWATT OUTPUT
Frequency	Coupling Capacitor	Connection to Radio	Ground Connection			
455 kc.	.1 mf.	12BE6, Pin 7	12AT6, Pin 2	Iron cores all the way out	Cores in output and input I.F. cans	28 microvolts
1620 kc.	.1 mf.	12BE6, Pin 7	12AT6, Pin 2	Iron cores all the way out	Oscillator trimmer C5	———
535 kc.	200 mmf	External antenna clip	12AT6, Pin 2	Iron cores all the way in	Shunt osc. coil L3	11 microvolts
1620 kc.	200 mmf	External antenna clip	12AT6, Pin 2	1620 kc.	Antenna trimmer C3*	8 microvolts
1400 kc.	200 mmf	External antenna clip	12AT6, Pin 2	1400 kc.	Adjust position of ant. core (see coil illustration view)	8 microvolts
400 cycles	.1 mf.	12AT6, Pin 1	12AT6, Pin 2	———	———	.03 volts

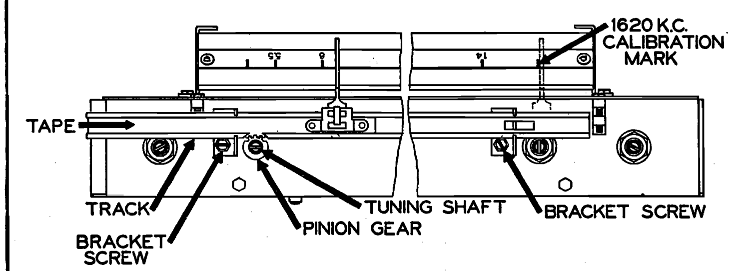


CROSS SECTION OF I.F.

PRIMARY CORE HAS HOLE THRU THE CENTER TO ALLOW SMALL FIBRE TOOL TO PASS THRU AND ADJUST THE SECONDARY CORE. THE PRIMARY CORE HAS A COMPLETE SLOTTED TOP FOR ADJUSTMENT; SECONDARY CORE HAS A SMALL NITCH IN TOP. BOTH WINDINGS ARE TOP TUNED.

THE SECONDARY ALIGNMENT TOOL PASSES THRU THE CENTER OF THE PRIMARY TOOL, FOR SIZE SEE DETAIL DRAWING.

2213-3

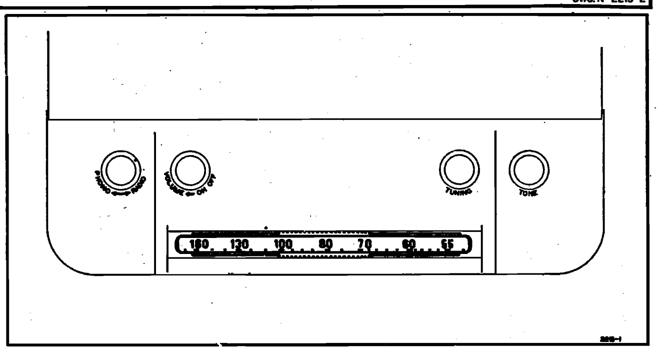


POINTER ADJUSTMENT

ROTATE TUNING SHAFT FULLY CLOCKWISE SO THAT POINTER IS AT RIGHT SIDE OF DIAL. LOOSEN BRACKET SCREWS AND LIFT UP TRACK. SLIDE POINTER SO THAT LEFT EDGE OF THE POINTER COINCIDES WITH RIGHT EDGE OF 1620 K.C. CALIBRATION MARK.

PULL TRACK DOWN SO THAT TAPE TEETH ENGAGE PINION GEAR AND TIGHTEN BRACKET SCREWS. CAREFULL ADJUSTMENT OF TAPE PRESSURE ON PINION GEAR TEETH WILL GIVE A SMOOTH MOTION TO THE TUNING SHAFT. IF IT FEELS "GEARY" DECREASE PRESSURE OF TAPE ON GEAR TEETH SLIGHTLY. IF THERE IS LOST MOTION BETWEEN TAPE TEETH AND GEAR TEETH INCREASE PRESSURE SLIGHTLY.

DWG. Nº 2215-2



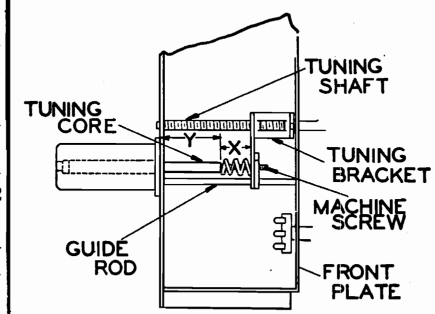
Tube Complement....12BE6, converter
12BA6, I.F. amplifier.
12AT6, detector, AVC, audio amplifier.
50B5, output amplifier.
35W4, rectifier.
Pilot lite, 6-8 volts, T-47.

MODEL D2851

WESTERN AUTO SUPPLY CO.

Ref. No.	Part No.	Description	Qty. Used In Set
		COILS AND TRANSFORMERS	
T1, C8, 9	B-13A-13071	Input I.F. coil	1
T2, C12, 13	B-13B-13072	Output I.F. coil	1
L4	C-13E-13305-1	Loop antenna assembly	1
L3	B-13D-12371	Osc. shunt coil assembly	1
L2	A-23D-12667	Osc. tuning coil	1
L1	A-13E-12668	Antenna tuning coil	1
T3	B-12C-12356	Output transformer for speaker	1
		SPEAKER	
T4	B-18A-13369	4"x 6", P.M. speaker, less output transformer	1
		PHONO PARTS	
	D-21H-12439	Record changer, Detrola 650	1
	L70	Crystal cartridge,	1
		DIAL AND TUNING PARTS	
	B-30A-13408	Dial scale	1
	B-5B-13391-60	Knob	4
	A-2G-13404	Pointer	1
	B-2J-13292	Rack tape, with teeth and pointer bracket	1
	A-200-13288	Tuning shaft assembly	1
	B-6B-13407	Diffuser	1
	B-2M-7758	Snap-pin rivets to fasten diffuser	4
	A-47A-13468	Pilot lite and bracket assembly	1
P1	A-46A-10793	Pilot lite bulb, 6-8 volt, type T-47	1
	5C-13400	Escutcheon	1
		MISCELLANEOUS	
	A-15C-10717	Miniature 7 prong tube socket	5
	B-15B-10076	Mounting plate for lytic	1
	A-19B-12644	Phono motor socket	1
	A-19B-12645	Loop antenna socket	1
	A-19B-12170	Speaker socket	1
	A-19B-11044	Pick-up socket	1
	A-23A-10344	Line cord lock	1
S2	A-20A-12653	Radio-phono switch	1

Ref. No.	Part No.	Description	Qty.
		CONDENSERS	
C20A, B, C	A-8C-10077 or	40 mf; 20 mf; 20 mf; 150 volts Electrolytic filter condenser	1
	A-8C-10937	40 mf; 20 mf; 20 mf; 150 volts Electrolytic filter condenser	1
C3, 5	A-2M-12618	Trimmer plate	2
	A-6M-12616	Insulator for trimmer	2
C3	A-2M-14054	Trimmer plate	1
	A-6M-14203	Insulator for trimmer (laminated)	1
C10	C-8D-10771	.1 mf x 200 volts, 20%	1
C14, 18, 21	C-8D-10761	.01 mf x 400 volts, 20%	3
C11	C-8D-10813	.05 mf x 400 volts, 20%	1
C6	C-8D-10770	.05 mf x 200 volts, 20%	1
C7	C-8D-11251	.09 mf x 400 volts, 10%	1
C17	C-8D-12243	.006 mf x 600 volts, 10%	1
C19	A-8C-11678	Electrolytic condenser, 25 mf x 25 volts	1
C15, C16	C-8G-11733	220 mmf x 500 volts, 20%	2
C22	C-8F3-124	820 mmf x 300 volts, 10%, mica	1
C4	C-8G-12198	47 mmf, 10%, ceramic	1
		RESISTORS	
R7, S1	A-10A-12654	Volume (1 megohm) control and switch	1
R10	A-11B-12659	Tone control, 1 megohm	1
R3	C-9B1-91	270K ohms, 1/2 watt, 10%	1
R4	C-9B1-47	56 ohms, 1/2 watt, 10%	1
R14	C-9B1-43	27 ohms, 1/2 watt, 10%	1
R5	C-9B2-44	33 ohms, 1 watt, 10%	1
R11	C-9B1-86	100K ohms, 1/2 watt, 10%	1
R13	C-9B1-52	150 ohms, 1/2 watt, 10%	1
R15	C-9B2-54	220 ohms, 1 watt, 10%	1
R16	C-9B2-63	1200 ohms, 1 watt, 10%	1
R2	C-9B1-78	22K ohms, 1/2 watt, 10%	1
R17	C-9B1-62	1000 ohms, 1/2 watt, 10%	1
R6, R12	C-9B1-95	560K ohms, 1/2 watt, 10%	2
R8	C-9B1-34	3.3 megohms, 1/2 watt, 20%	1
R9	C-9B1-36	6.8 megohms, 1/2 watt, 20%	1

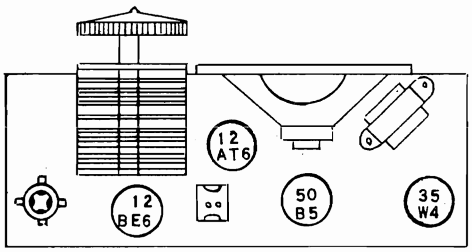


BOTH TUNING CORES PROTRUDE 19/32" OUT OF BASE OF TUNING COIL ASSEMBLIES, WHEN THE TUNING BRACKET IS AGAINST THE FRONT PLATE AS SHOWN IN DRAWING, (DIMENSION Y.)
THE TOTAL LENGTH OF MACHINE SCREW IS 3/4 IN. DIMENSION X: APPROX. 7/16 IN.

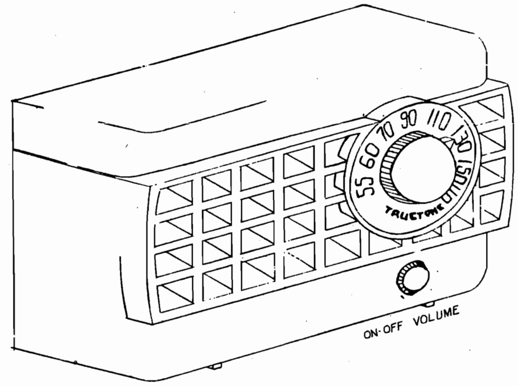
2213-5

WESTERN AUTO SUPPLY CO.

MODELS D2906, D2907



Remove back to replace tubes



ELECTRICAL SPECIFICATIONS

Power Supply ....105-125 Volts D.C. or 50-60 Cycles A.C. 30 Watts

Frequency Range ....532.5 to 1620 kc.

Intermediate Freq. ......455 kc.

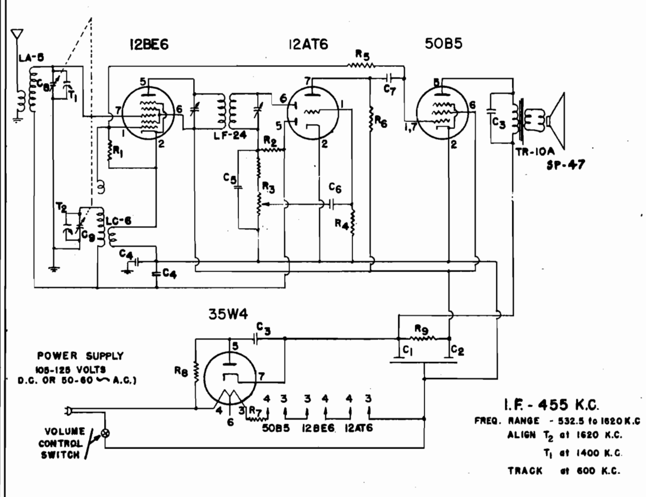
Tuning ....Two gang capacitor

Speaker ....4 inch PM 3.5 ohm voice coil impedance

Power Output ....1 watt undistorted 1.5 watt maximum

Sensitivity ....800 Microvolts at 50 milli-watts Output

Selectivity ....120 kc broad at 1000 times signal at 1000 kc.



CHASSIS SERIES "AG"

REPLACEMENT PARTS LIST

Ref. No.	*Part No.*	*Description*
		CAPACITORS
C1, C2	CE-15	2 x 40 mfd V. Elect ....
C3	CP203-1	.02 mfd 400V paper cond.....
C4	CP503-4	.05 mfd 200V paper cond.....
C5	CM151-1	.00015 mfd 500V paper cond.
C6	CP202-2	.002 mfd 400V paper cond.....
C7	CP502-3	.005 mfd 200V paper cond.....
C8, C9	CV-14	Variable Condenser (2 gang)
		RESISTORS
R1	RC183-2	18,000 ohms ½W 10% ....
R2	RC475-1	4.7 megohms ½W 20% ......
R3	VC-11	2 meg. vol. cont., 100 K Stop
R4	RC106-1	10 megohms ½W 20% ....
R5	RC334-1	330,000 ohms ½W 20% ......
R6	RC224-1	220,000 ohms ½W 20% ......
R7	RC390-4	39 ohms 1W 20% ....
R8	RC180-1	18 ohms ½W 20% ....
R9	RC222-4	2200 ohms 1W 20% ....
		COILS & TRANSFORMERS
	LA-5	Antenna Coil ....
	LC-6	Oscillator Coil ....
	LF-24	I.F. Transformer ....
	TR-10	Output Transformer ....
		MISCELLANEOUS
	CB-106	Cabinet (specify Ivory or Walnut) ....
	KN-20	Knob ....
	KN-21	Pointer Knob ....
	SP-45	4" PM Speaker ....

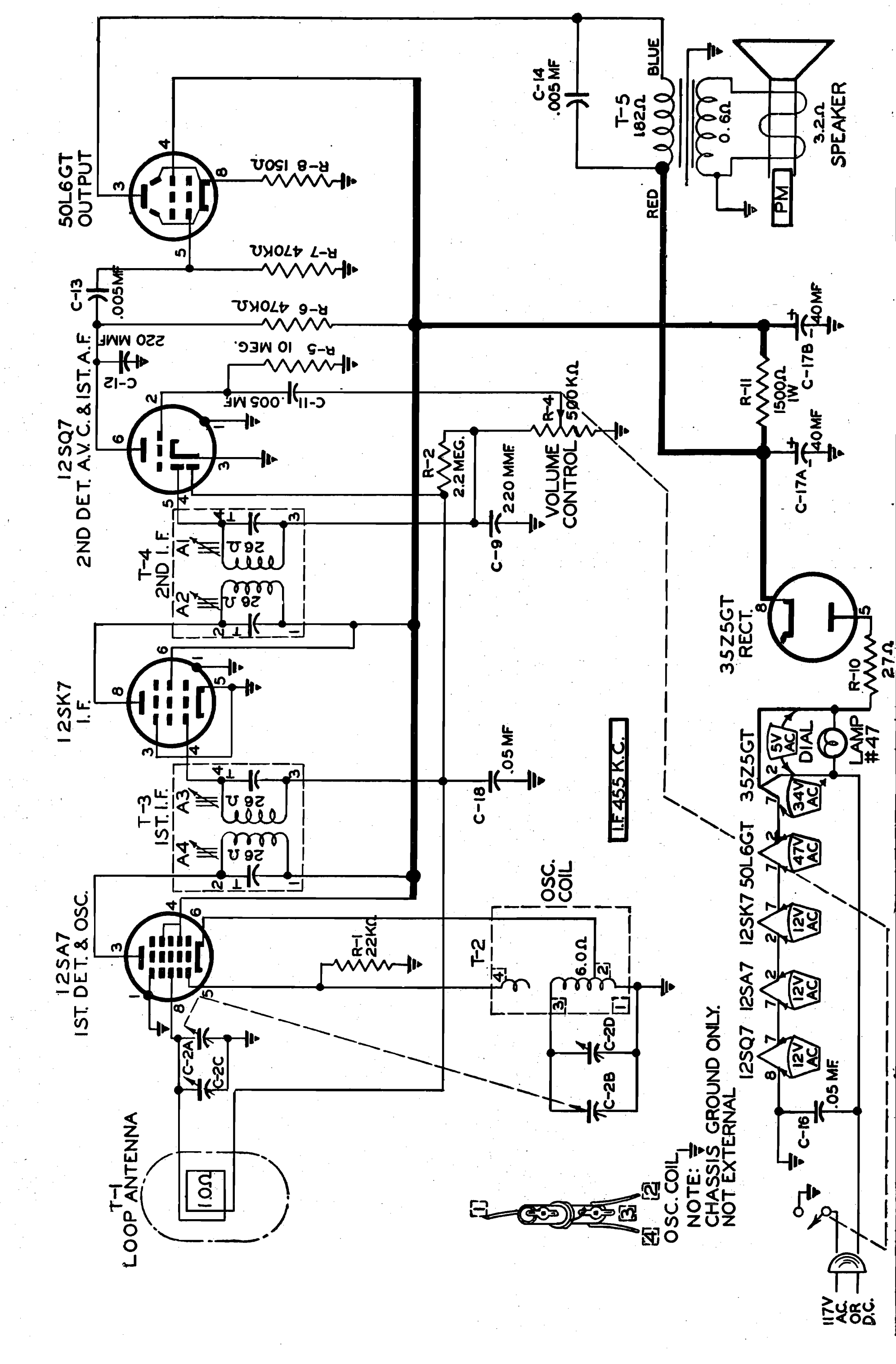
ALIGNMENT PROCEDURE

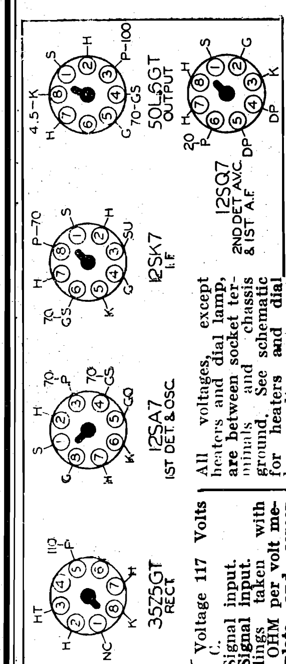
- Output meter across 3.5 ohm output load.
- Volume control at maximum for all adjustments.
- Align for maximum output. Reduce input as needed to keep output near 0.4 volts.

SIGNAL GENERATOR				*SETTING TUNER*	*ADJUST TRIMMERS TO MAXIMUM OUTPUT (in order shown)*
Frequency	*Coupling Factor*	*Connection to Receiver*	*Ground Connection*		
455 kc	.1 mfd	12BE6 Grid	B—	Rotor full open (Plates out of mesh)	Input and output trimmers on IF cans
1620 kc	.1 mfd	12BE6 Grid	B—	Rotor full open (Plates out of mesh)	Oscillator trimmer T2
1400 kc	75 mmf	Hank	B—	1400 kc	Antenna trimmer T1

MODEL D2910

WESTERN AUTO SUPPLY CO.





Line Voltage 117 Volts A. C.
No Signal input.
Readings taken with 1000 OHM per volt meter plate and screen voltages read on 500 volt scale.

All voltages, except heaters and dial lamp, are between socket terminals and chassis ground. See schematic for heaters and dial lamp voltages.

E. W. Mc2910 818

WESTERN AUTO SUPPLY CO.

MODEL D2910

SPECIFICATIONS

5 Tube Superheterodyne, including Rectifier Tube

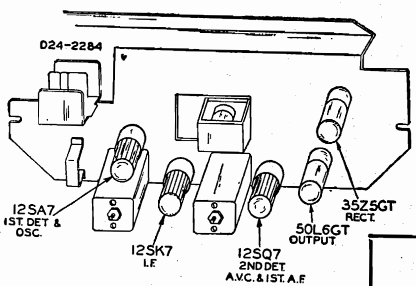
Tuning Frequency Range .... 540 to 1600 KC

Power Consumption .... 30 watts (At 117 volts AC

Power Output....1.5 watt maximum, 9 watt (10% distortion)

Intermediate Frequency .... 455 KC

Speaker .... 5" PM Dynamic



CHECK YOUR LINE VOLTAGE

Unless otherwise marked, this radio must be operated on a power supply of 105-125 volts AC, 50 to 60 cycles only, or 105-125 volts DC.

ALIGNMENT PROCEDURE

Volume Control—Maximum All Adjustments.

Allow Chassis and Signal Generator to "Heat Up" for several Minutes.

The equipment in column at right is required for aligning:

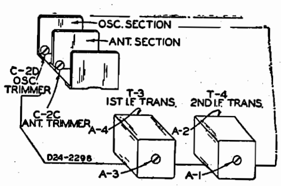
Signal Generator which will provide an accurately calibrated signal at the test frequencies as listed.

Output Indicating Meter: Non-Metalic Screwdriver.

Dummy Antennas—.1 mf., 50 mmf.

Blocking Condenser—.1 mf.

SIGNAL GENERATOR FREQUENCY SETTING	ANTENNA CONNECTION	GROUND CONNECTION	DUMMY ANTENNA	GANG CONDENSER SETTING	ADJUST TRIMMERS TO MAXIMUM (See Trimmer Illustration)
455 K C	Control Grid 12SK7—I. F. Prong No. 4	Chassis Base Through .1 mf. Condenser	.1 mf.	Turn Rotor to full open	2nd I. F. A2 & A1
455 K C	Control Grid 12SA7—1st Det. Prong No. 8	Same As Above	.1 mf.	Turn Rotor to full open	1st I. F. A4 & A3
1620 KC	Control Grid 12SA7—1st Det. Prong No. 8	Same As Above	.1 mf.	Turn Rotor to full open	Oscillator (C-2D)
1400 KC	Reassemble chassis in cabinet See Note B	Same As Above	50 mmf.	Set pointer to 1400 KC. See Note A	Antenna (C-2C)

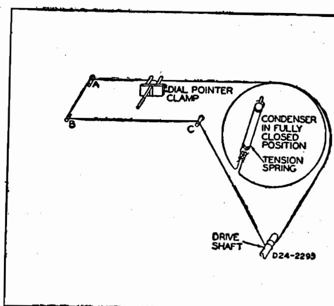


NOTE—Attach pointer to drive cord and position at 1400 KC mark on dial scale.

NOTE B—Wind 2 turn loop of heavy enameled wire 6" diameter connect to signal generator Place loop of wire 6" from loop on set and in the same plane.

DRIVE CORD REPLACEMENT

Turn the large drive pulley to the fully closed position. Use a new 10x66 drive cord assembly or a piece of cord 43 inches long and fasten one end to the tension spring and fasten the other end of the spring to the drive pulley. Install the cord as shown in the illustration. Wind 2¾ turns counterclockwise around the tuning shaft with the turns progressing toward the front of the chassis. After string is installed, stretch the tension spring and fasten free end of cord to spring.



Replacement Parts List

MISCELLANEOUS

2A479 5" PM Speaker ....
3A435 Molded Octal Tube Socket ....
55X321 Cabinet, Plastic ....
14x411 Grille Cloth ....
10A297 Knob ....
13x328 Line Cord and Plug Assembly.

TRANSFORMERS AND COILS

T-1 9A1943 Loop Antenna Assembly ...
T-2 9A1914 Oscillat r Coil Assembly ...
T-3 X-1295 1st I-F Trans. Assembly ...
T-4 X-1296 2nd I-F Trans. Assembly ...
T-5 X-507 Output Transformer ....

CAPACITATORS

C-2A, C-2B
C-2C, C-2D—14A199 Gang Condenser Assembly ....
C-9, C-12 47x468 220 mmfd ....
C-11, C13 B66502 .005 mf 200 V Tubular..
C-14 D66502 .005 mf 400 V Tubular
C-16 D66503 .05 mf 400 V Tubular....
C-17A, C-17B 45x363 50 mf 150 V Dry 50 mf 150 V Electrolytic Con. ....
C-18 B66503 .05 mf. 200 V Tubular....

RESISTORS

		OHMS	WATTS	
R-1	P81223	22K	0.5	Carbon
R-2	B85225	2.2 meg	0.5	Carbon
R-4	36x373	500K Volume Control & Switch		
R-5	B85106	10 meg.	0.5	Carbon
R-6, R-7	B84474	470K	0.5	Carbon
R-8	B83151	150	0.5	Carbon
R-10	B83270	27	0.5	Carbon
R-11	C85152	1500	1.0	Carbon

DIAL AND DRIVE ASSEMBLY

15x242 Pointer ....
26x508 Drive Shaft ....
19x192 "C" Washer .... doz
10x66 Drive Cord Assembly ....
28x113 Drive Cord Tension Spring ....doz.
7A217 Pilot Light Socket Assembly ....
7A103 No. 47 Pilot Light ....
58x701 Dial Glass ....

MODEL D2923

WESTERN AUTO SUPPLY CO.

TUBE COMPLEMENT

The tube complement of this receiver consists of the following:

1—6SK7—R.F. Amplifier

1—6SA7—Mixer—OSC.

1—6SK7—I.F. Amplifier

1—6SQ7—Det. AVC—Audio

1—6K6—Power Output

1—5Y3—Rectifier

POWER SUPPLY

This receiver is designed to operate from a power source of 117 volts A.C. 60 cycle current

Frequency - Range
535-1725 KC

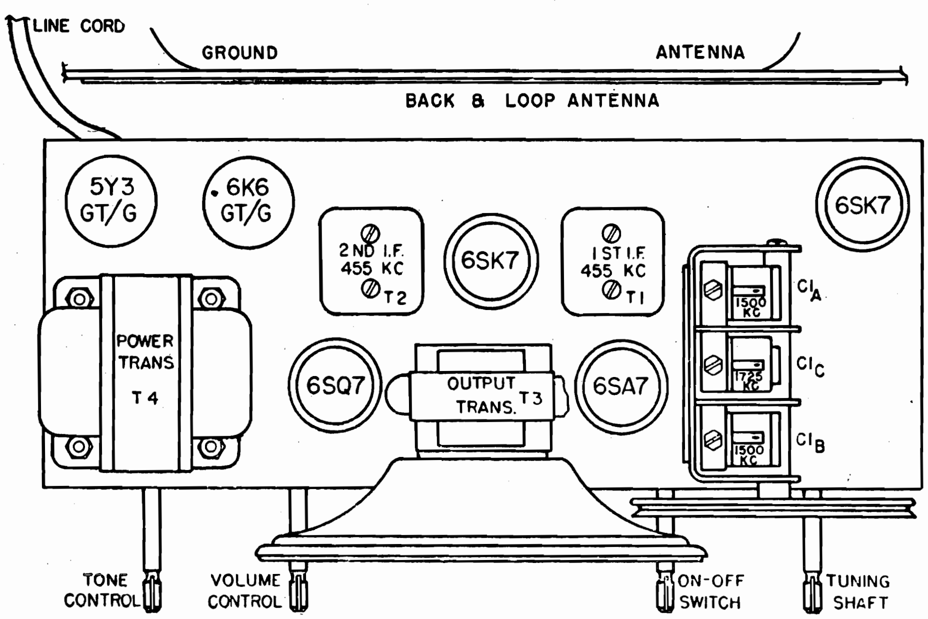


Fig 1 Chassis, Top View

WESTERN AUTO SUPPLY CO. MODEL D2923

SERVICE NOTES

Voltages taken from the different points of the circuit to the chassis are measured with volume control in maximum position, all tubes in their sockets and with a volt meter having a resistance of 1000 ohms per volt, using the 150 volt scale. These voltages are clearly indicated on the voltage chart. (Fig. 2).

All voltages should be measured with an A.C. line voltage of 117 volts.

To check for open by-pass condensers, shunt each condenser with another one having the same capacity and voltage rating which is known to be good until the defective unit is located.

ALIGNING INSTRUCTIONS

Never attempt any adjustments on this receiver unless it becomes necessary to replace a coil or transformer, or the adjustments have been tampered with in the field. Always make certain that other circuit components, such as tubes, condensers, resistors, etc., are normal before proceeding with realignment.

If realignment is necessary follow the instructions given under the heading "ALIGNMENT PROCEDURE" on the nert page. After realignment has been completed repeat the procedure as a final check.

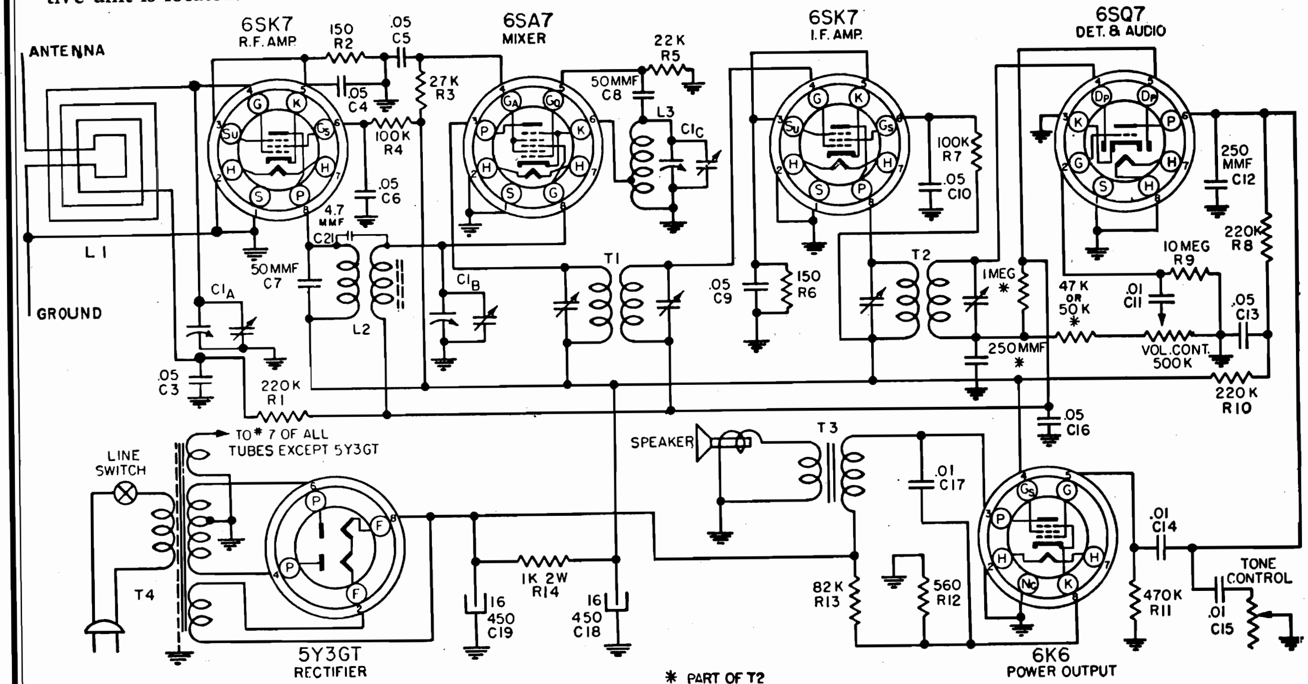


Fig. 3 Schematic Diagram

ALIGNMENT PROCEDURE

Volume control—Maximum: all adjustments.

Tone Control—Treble: Full Clockwise Rotation.

Connect dummy antenna in series with output lead of signal generator.

Connect output meter across voice coil of speaker.

The following equipment is necessary for proper alignment:

- Signal generator that will provide the test frequencies as listed.
- Output meter.
- Non-metallic screwdriver.
- Dummy antennas—.1 mfd., .00025 mfd.

Position of Variable	Generator Frequency	Dummy Ant. mfd.	Generator Connections	Trimmer Adjustment	Trimmer Function
Minimum Capacity (Fully Opened)	455 K.C.	.1	High side to 6SA7 grid Low side to chassis	T1 T2	I. F.
Minimum Capacity (Fully Opened)	1725 K.C.	.00025	High side to ant. lead Low side to ground lead	C1C	Osc.
Tune in signal From Generator	1500 K.C.	.00025	High side to ant. lead Low side to ground lead	C1B	R. F.
Tune in signal from Generator	1500 K.C.	.00025	High side to ant. lead Low side to ground lead	C1A	Ant.

Repeat the above alignment procedure as a final check.

With an output meter connected across the voice coil of the speaker, the output meter reading for ½ watt is 1.25 volts using a signal which is modulated 400 c.p.s.

MODEL D2923

WESTERN AUTO SUPPLY CO.

PARTS LIST

CONDENSERS

Circuit Reference	Part No.	Description
C1A, C1B, C1C	B19-186	Variable condenser
C3, C4, C9, C16	A16-152	.05 MFD 200 volt condenser
C5, C6, C10, C13	A16-158	.05 MFD 400 volt condenser
C7, C8	A15-175	50 MMF mica condenser
C11, C14, C15	A16-156	.01 MD 400 volt condenser
C12	A15-176	250 MMF mica condenser
C17	A16-168	.01 MFD 1000 volt condenser
C18	A18-279	16 MFD 450 volt electrolytic condenser
C19	A18-274	16 MFD 450 volt electrolytic condenser
C21	A83-355	4.7 MMF condenser

RESISTORS

Circuit Reference	Part No.	Description
R1, R8, R10	A60-667	220K ohm ½ watt resistor
R2, R6	A60-686	150 ohm ½ watt resistor
R3	A60-692	27K ohm 1 watt resistor
R4, R7	A60-671	100K ohm ½ watt resistor
R5	A60-659	22K ohm ½ watt resistor
R9	A60-663	10 megohm ½ watt resistor
R11	A60-662	470K ohm ½ watt resistor
R12	A60-701	560 ohm 1 watt resistor
R13	A60-700	82K ohm 1 watt resistor
R14	A60-699	1000 ohm 2 watt resistor

COILS

Circuit Reference	Part No.	Description
L2	B10-452	R. F. coil
L3	A10-446	Oscillator coil
T1	B10-412	1st I.F. transformer
T2	B10-444	2nd I.F. transformer

MISCELLANEOUS

Circuit Reference	Part No.	Description
T3	A80-222	Output transformer
T4	C80-223	Power transformer
	A69-169	On-Off Switch
	A26-123	Tone Control
	A24-169	Volume Control
	A84-41	Dial drive shaft and pulley assembly
	B79-341	6¼" P.M. Speaker
	C83-323	Baffle Board and Grille Cloth
	D42-400	Wood cabinet
	C67-493	Dial glass
	A52-193	Knob
	A58-60	Dial pointer
	C82-59	Loop antenna
	D83-602	Cabinet back

SOCKET VOLTAGES

All voltages are measured with a 1000 ohm per volt meter on the 150 volt scale, with no signal. To obtain an accurate voltage check the A.C. line voltage must be 117 volts. Where no voltage is shown the voltage is O or cannot be read with this type of voltmeter.

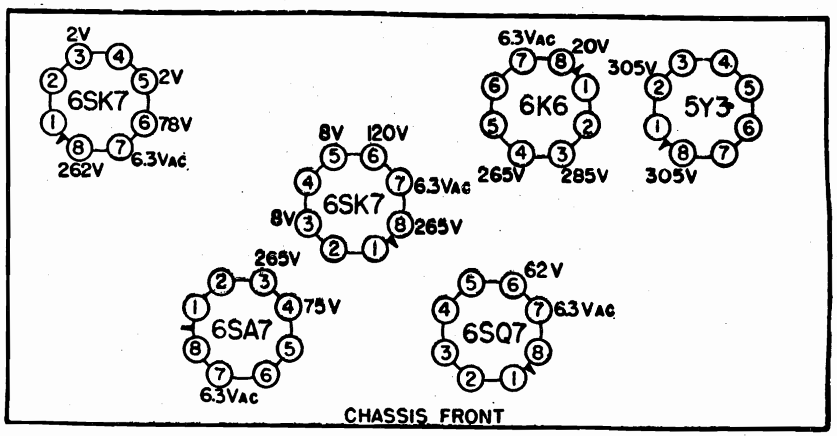
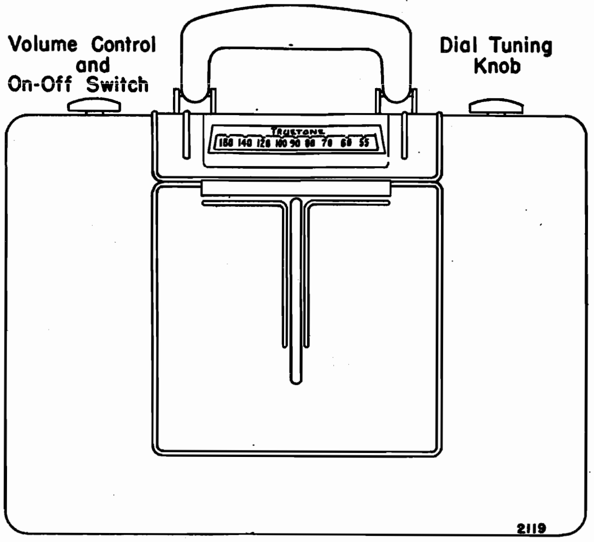
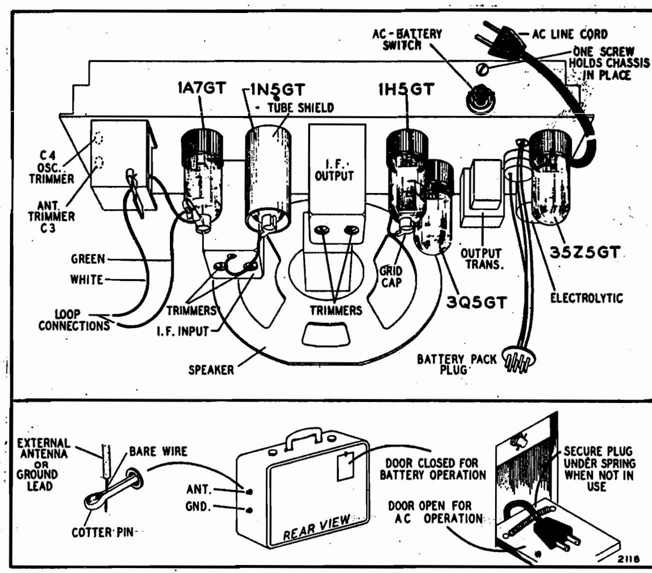


Fig. 2—Chassis, Bottom View

WESTERN AUTO SUPPLY CO. MODEL D3619





Chassis View

LINE VOLTAGE

If the set is to be operated from a house receptacle, the voltage, unless otherwise indicated, must be 105-125-volt DC (direct current) or 105-125-volt, 50-60 cycle AC (alternating current). If you are in doubt as to the voltage of the power supply, consult your local power company.

BATTERY PACK

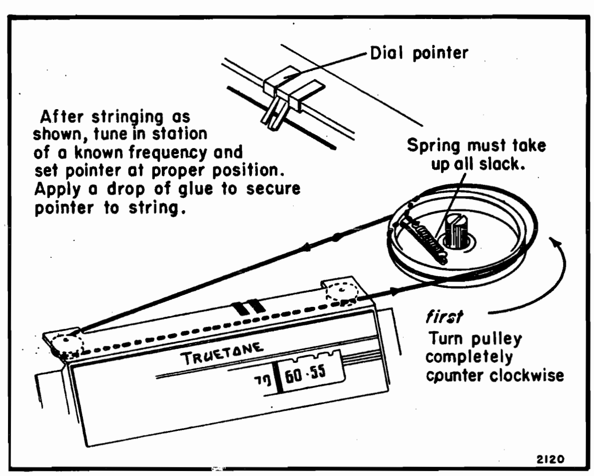
The battery pack used with this radio must contain a 7½-volt "A" battery and a 90-volt "B" battery. Use Wizard Battery Pack No. B6460 or No. B6470.

PILOT LIGHT

If the pilot lamp burns out, the set should not be operated on AC or DC power until a new lamp has been installed. Failure to heed this caution may result in a burned-out 35Z5GT tube.

ELECTRICAL SPECIFICATIONS

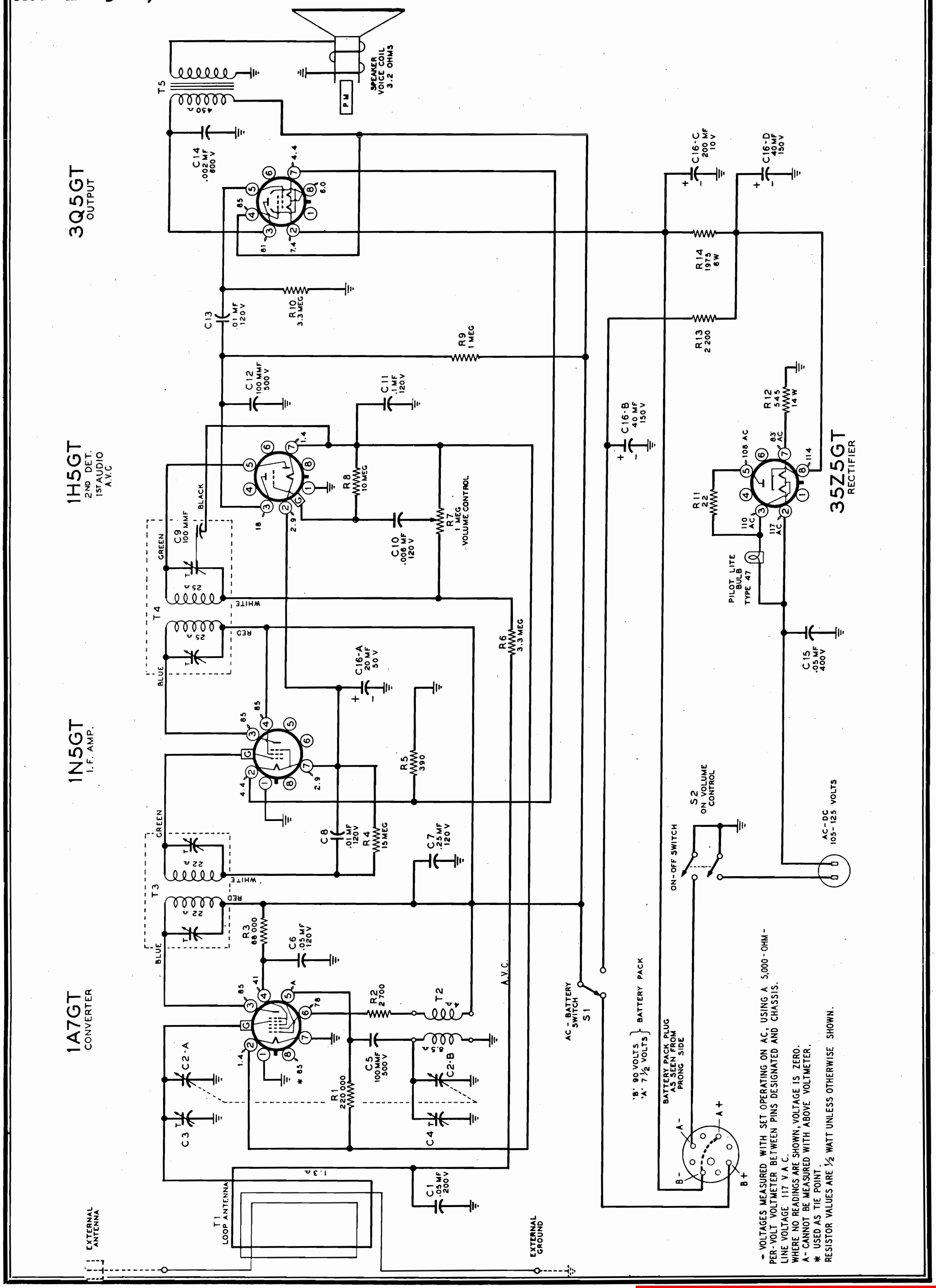
Power Supply	105 to 125 volts DC or 50-60 cycle AC, 29 watts. Battery: A—7½ volts, 50 ma. B—90 volts, 11 ma.
Frequency Range	530 to 1650 kc.
Intermediate Freq.	455 kc.
Tuning	Two-gang capacitor
Antenna	Built-in loop. Provisions also for external antenna and ground.
Speaker	5-inch; P.M.; voice coil impedance 3.2 ohms.
Power Output	150 milliwatts undistorted. 250 milliwatts maximum.
Sensitivity	30 microvolts average for 50-milliwatt output.
Selectivity	43 kc broad at 1000 times signal at 1000 kc.



Replacement of Dial Pointer Drive Cord

MODEL D3619

WESTERN AUTO SUPPLY CO.



WESTERN AUTO SUPPLY CO.

MODEL D3619

ALIGNMENT PROCEDURE

- Output meter across 3.2-ohm output load.
- Volume control at maximum for all adjustments.
- Align for maximum output. Reduce input as needed to keep output near 0.4 volts.

SIGNAL GENERATOR				SETTING TUNER	ADJUST TRIMMERS TO MAXIMUM OUTPUT (in order shown)
Frequency	*Coupling Capacitor*	*Connection to Radio*	*Ground Connection*		
455 kc	.1 mf	1A7GT grid cap*	Chassis	Rotor full open (plates out of mesh)	Input and output trimmers on IF cans
1650 kc	.1 mf	1A7GT grid cap*	Chassis	Rotor full open (plates out of mesh)	Oscillator trimmer C4
1400 kc†	200 mmf	External antenna clip	External ground clip	1400 kc	Antenna trimmer C3

*If loop is not connected when making this adjustment, substitute a 1-megohm resistor across the loop leads.

† For this adjustment chassis should be remounted in cabinet and loop connected. Antenna trimmer can be reached through a hole in the side of the cabinet.

REPLACEMENT PARTS LIST

Ref. No.	*Part No.*	*Description*
	CAPACITORS	
C1	1009	.05 mf, 200 volts, 25%
C2-A, C2-B, C3, C4	B-8A-10246	Two-gang, including antenna and oscillator trimmers. Range of gang: 14-452 mmf (ant) and 10-198 mmf (osc)
C5, C12	1295	100 mmf, 20%, mica
C6	100128	.05 mf, 120 volts, 25%
C7	100135	.25 mf, 120 volts, 25%
C8, C13	100127	.01 mf, 120 volts, 25%
C9		Approx. 100 mmf. Part of I.F. can.
C10	100134	.006 mf, 120 volts, 25%
C11	100133	.1 mf, 120 volts, 25%
C14	10025	.002 mf, 600 volts, 25%
C15	10013	.05 mf, 400 volts, 25%
C16-A, -B, -C, -D	119123	Electrolytic; 20 mf x 50 volts, 40 mf x 150 volts, 200 mf x 10 volts, 40 mf x 150 volts
	RESISTORS*	
R1	C-9B1-27	220,000 ohms, ½ watt, 20%
R2	C-9B1-67	2700 ohms, ½ watt, 10%
R3	C-9B1-84	68,000 ohms, ½ watt, 10%
R4	C-9B1-302	15 megohms, ½ watt, 20%
R5	C-9B1-57	390 ohms, ½ watt, 10%
R6, R10	C-9B1-34	3.3 megohms, ½ watt, 20%
R7, S2	101252	Volume control (1 megohm) and on-off switch
R8	C-9B1-37	10 megohms, ½ watt, 20%
R9	C-9B1-31	1 megohm, ½ watt, 20%
R11	C-9B1-42	22 ohms, ½ watt, 10%
R12	130343	545 ohms, 14 watts, 5%
R13	C-9B1-66	2200 ohms, ½ watt, 10%
R14	130344	1975 ohms, 6 watts, 5%

Ref. No.	*Part No.*	*Description*
	COILS AND TRANSFORMERS	
T1	B-13E-10184	Loop antenna assembly
T2	A-13D-10239	Oscillator coil
T3	108201	Input I.F. coil complete in can. Range of trimmers: 53-97 mmf each
T4, C9	108200	Output I.F. coil complete in can. Range of trimmers: 39-71 mmf each
T5	105119C	Output transformer
	MISCELLANEOUS	
	114241B	Speaker, 5-inch P.M.
	B-14A-10145	Battery cable assembly
	121171	Tube socket, octal
S1	A-20F-10247	Line-battery switch
	107363	Line cord and plug
	115396B	Tube shield
	112922	Dial pointer
	B-53A-11340	Drive cord for dial pointer
	120197	Spring for drive cord
	B-6D-10244	Dial scale
	112925	Diffuser
	A-2M-7758	Snap-in rivets (4 for diffuser, 2 for dial scale)
	107249	Dial lamp, 6-8 volts, type T-47
	107362	Socket assembly for dial lamp
	112910	Escutcheon for dial
	128634	Escutcheon for grille
	128645-8	Knob, tuning
	128647-8	Knob, volume

MODELS D3630, D3630N

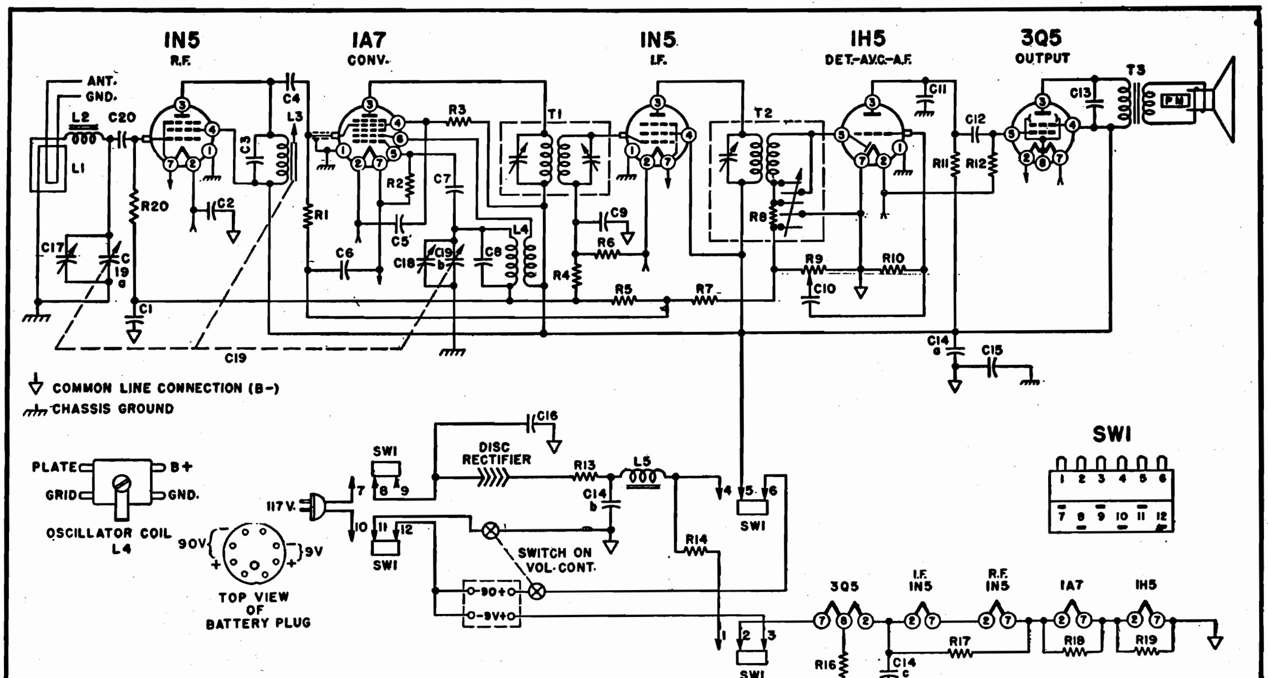
WESTERN AUTO SUPPLY CO.

POWER SUPPLY

This receiver is designed to operate on either a Battery Pack: or any AC (Alternating Current) power supply line of 105 to 125 volts, 50 to 60 cycles: or DC (Direct Current) power supply line of 105 to 125 volts.

BATTERY

Any one of the following battery packs may be used in this portable radio: Western Auto Supply Wizard B6460 or B6470, Ensign AB50, Ensign AB49, General 60A-6F6-5, General 60B-6F6-5, Burgess F6A60, Burgess G6M60, Eveready 754, Ray-O-Vac AB878 or Ray-O-Vac AB994. For best results, use Western Auto Supply Wizard B6460 (Standard) or B6470 (Deluxe) battery packs for replacement.

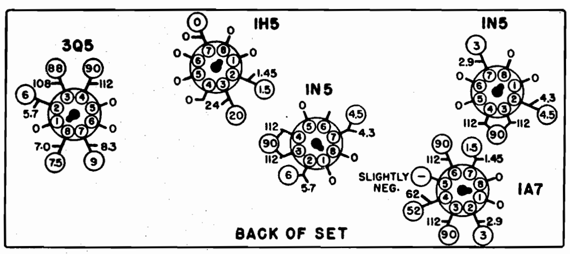


DIAL SCALE NUMBERS

The dial scale numbers are calibrated in kilocycles provided one zero is added to the numbers indicated. For example, if the dial pointer is at 70, the radio is tuned to 700 kilocycles. The tuning range of this set is 535 to 1620 kilocycles.

NOTES:
I.F.=455 KILOCYCLES
POWER CHANGE SWITCH (SWI) SHOWN IN BATTERY OPERATING POSITION.
IN SOME MODELS LOOP LOADING COIL (L2) WAS FIXED.

VOLTAGE CHART



VOLTAGE DATA

1. Voltage readings circled (O) are for Battery Operation.
2. All readings made between Tube Socket Terminals and Pin No. 7 on the 1H5.
3. A.C. Voltages measured on a 117 Volt A.C. line.
4. Battery Voltages measured with a fresh battery.
5. Dial turned to low frequency end, no signal.
6. All Voltages measured with a 1000 ohm-per-volt meter.

REPLACEMENT PARTS

CONDENSERS

Symbol	Description	Part No.
C1	.05 Mfd., 200 Volt, Paper	64B1-32
C2	.25 Mfd., 200 Volt, Paper	64B1-28
C3	.00042 Mfd., Mica	65B1-13
C4, C11	.00025 Mfd., Mica	65B5-22
C5, C6, C9, C10, C12	.01 Mfd., 400 Volt, Paper	64B1-25
C7	.00005 Mfd., Mica	65B5-11
C8	.000015 Mfd., Mica	65B5-3
C13	.002 Mfd., 600 Volt, Paper	64B1-14
C14a	50 Mfd., 150 Volt Elect.	67C7-42
C14b	30 Mfd., 150 Volt	67C7-42
C14c	100 Mfd., 25 Volt Cond.	67C7-42
C15	.2 Mfd., 400 Volt, Paper	64A2-1
C16	.05 Mfd., 400 Volt, Paper	64B1-22
C17	Antenna Trimmer	66A12-5
C18	Oscillator Trimmer (Part of Gang)	
C19 (C19a, C19b)	Condenser, Gang	68B4
C20	.00025 Mfd. Mica	65B7-22

RESISTORS

Symbol	Description	Part No.
R1	100,000 Ohms, ½ Watt, Carbon	60B8-104
R2	220,000 Ohms, ½ Watt, Carbon	60B8-224
R3	47,000 Ohms, ½ Watt, Carbon	60B8-473

RESISTORS

Symbol	Description	Part No.
R4, R5	4.7 Megohms, ¼ Watt, Carbon	60B2-475
R6	4.7 Megohms, ¼ Watt, Carbon	60B2-475
R7	3.3 Megohms, ¼ Watt, Carbon	60B2-335
R8	47,000 Ohms, ½ Watt, Carbon	60B8-473
R9	1 Megohm Volume Control	75B1-10C
R10	15 Megohms, ¼ Watt, Carbon	60B2-156
R11, R20	1 Megohm, ¼ Watt, Carbon	60B2-105
R12	2.2 Megohms, ¼ Watt, Carbon	60B2-225
R13	68 Ohms, Wire Wound, 1 Watt	60B28-4
R14	2,275 Ohms, Wire Wound, 5 Watt	61A3-6
R16	1,500 Ohms, ½ Watt, Carbon	60B8-152
R17	560 Ohms, ½ Watt, Carbon	60B8-561
R18	220 Ohms, ½ Watt, Carbon	60B8-221
R19	120 Ohms, ½ Watt, Carbon	60B8-121

COILS and TRANSFORMERS

Symbol	Description	Part No.
L2	Coil, Loop Loading, (fixed)	AA114
L2	Coil, Loop Loading, (variable)	AA115
L3	Iron Slug for plate coil	71B1-3
L3	Coil, Plate	AB100-5
L4	Oscillator Coil	69A7
L5	Choke Filter	74A5
T1	1st I.F. Transformer	72B9-2

COILS and TRANSFORMERS

Symbol	Description	Part No.
T2	2nd I.F. Tranformer	72B10-2
T3	Transformer, Output	*
SW1	Switch, Power Change D3630	77A6
SW1	Switch, Power Change D3630N	77A10

* When ordering, specify all numbers on the speaker and transformer.

MISCELLANEOUS

Description	Part No.
Dial Background	21A18-2
Dial Cord, 12"	50A1-3
Dial Cord Tension Spring	19A1-2
Escutcheon and Dial Scale	23C14
Knob, Tuning	33A14-6
Knob, Volume	33A14-5
Plug, Battery (9 prong)	88A3-3
Pointer, Cream Tenite	25A15-1
Rectifier, Selenium	93A1-2
Speaker and Output Transformer	78B8
Tube Shields	87A8

WESTERN AUTO SUPPLY CO.

MODELS D3630, D3630N

1. Be sure both set and signal generator are thoroughly warmed up before starting alignment.
2. Make alignment, using a battery whenever possible.
3. Disconnect Loop Antenna leads from clips on set and remove chassis from cabinet.
4. Connect a 50,000 ohm carbon resistor across the two clips from which the Loop Antenna was removed.
5. Connect Output Meter across the Voice Coil.
6. Connect a fresh battery to the set.
7. Turn receiver Volume Control full on.

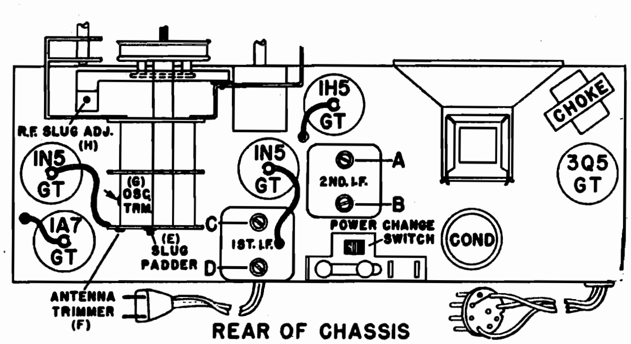
Step	Dummy Antenna Used in Series with Signal Generator	Connect High Side Signal Generator to	Signal Generator Frequency	Gang Condenser Setting	Trimmer Description and Designation	Type of Adjustment
1	.00025 Mfd. when using A.C. .1 Mfd. when using Battery	Grid Cap 1A7	455 K.C.	Any point where it does not affect Signal	2nd I.F. (A), (B). 1st I.F. (C), (D).	Maximum Deflection. Then repeat
2	.00025 Mfd. when using A.C. .1 Mfd. when using Battery	Grid Cap 1N5	1620 K.C.	Rotor full open (Plates out of mesh)	Oscillator Trimmer (G)	Maximum Deflection.
3	.00025 Mfd. when using A.C. .1 Mfd. when using Battery	Grid Cap 1N5	1400 K.C.	Tune in Generator Signal	R.F. Slug (H)	Maximum Deflection.
4	Replace Set in Cabinet					
5	.00025 Mfd.	Antenna and Ground Leads	1400 K.C.	Tune in Generator Signal	Antenna Trimmer (F)	Maximum Deflection.
6	Disregard the next two steps if the set being aligned is a model with a fixed loop loading coil (L2).					
7	.00025 Mfd.	Antenna and Ground Leads	600 K.C.	Tune in Generator Signal	Loop Loading Coil Slug (E)	Maximum Deflection.
8	.00025 Mfd.	Antenna and Ground Leads	1400 K.C.	Tune in Generator Signal	Reset Antenna Trimmer (F)	Maximum Deflection.

Seal adjusting screw on the loop loading coil with any quick drying cement.

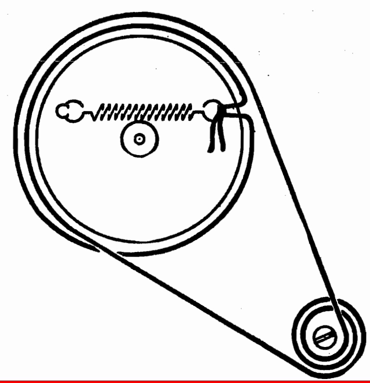
REPLACING R.F. TUNING SLUG

If the R.F. Tuning Slug has to be changed, use the following procedure. Set the gang condenser to the point where the plates are fully meshed. Screw the slug adjusting screw about halfway down. Place the slug in the coil in such a position that the top of the slug is flush with the top of the Coil. Solder the slug wire to the adjusting screw. Be sure that the position of the slug does not change during the soldering and that the slug wire is straight. Proceed to re-align the set as shown in the chart.

TUBE AND TRIMMER LAYOUT

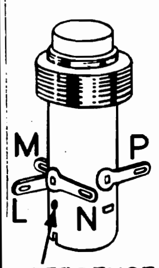


DIAL CORD STRINGING



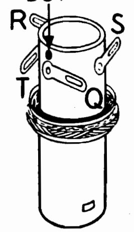
MODEL D3635

WESTERN AUTO SUPPLY CO.



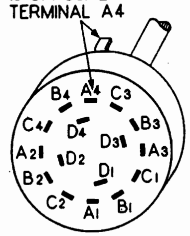
ANTENNA COIL
502499

Lettered terminals in illustrations correspond to similarly lettered terminals on the circuit diagram.

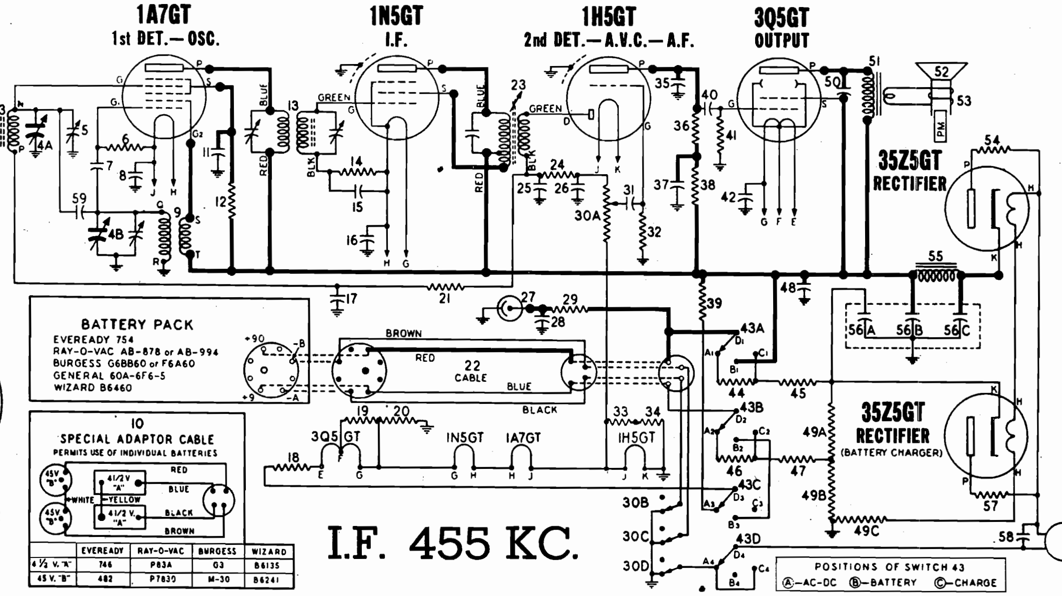


OSC. COIL
502498

NOTE THAT LUG IS OPPOSITE TERMINAL A4



AC-DC-BAT.-CHARGE SWITCH
502526



	EVEREADY	RAY-O-VAC	BURGESS	WIZARD
4½ V. "A"	746	P83A	G3	B6135
45 V. "B"	482	P7830	M-30	B6241

I.F. 455 KC.

PARTS LIST

DIAGRAM NO.	PART NO.	DESCRIPTION
		CONDENSERS
2	502150	Condenser—.004 Mfd. 600 volt
4-A, B	502494	Condenser—variable gang
5	119132	Condenser—trimmer 2 to 15 Mmfd.
7	502159	Condenser—mica 50 Mmfd. 500 volt
8	502153	Condenser—.05 Mfd. 200 volt
11	502547	Condenser—electrolytic 4 Mfd. 150 volt
15	502153	Condenser—.05 Mfd. 200 volt
16	502155	Condenser—.1 Mfd. 200 volt
17	502153	Condenser—.05 Mfd. 200 volt
25, 26	502159	Condenser—mica 50 Mmfd. 500 volt
28	502155	Condenser—.1 Mfd. 200 volt
31	502156	Condenser—.004 Mfd. 400 volt
35	502160	Condenser—mica 110 Mmfd. 500 volt
37	502155	Condenser—.1 Mfd. 200 volt
40	502151	Condenser—.01 Mfd. 400 volt
42	502527	Condenser—electrolytic 50 Mfd. 25 volt
48	502155	Condenser—.1 Mfd. 200 volt
50	502453	Condenser—.002 Mfd. 400 volt
56-A,B,C	500714	Condenser—electrolytic A—20 Mfd. 150 volt; B—20 Mfd. 200 volt; C—20 Mfd. 200 volt
58	502153	Condenser—.05 Mfd. 200 volt
59	502411	Condenser—2 Mmfd. 500 volt
		RESISTORS
6	502133	Resistor—carbon 220,000 ohms ¼ watt
12	502466	Resistor—carbon 33,000 ohms 1 watt
14	502136	Resistor—carbon 10 Meg. ¼ watt
18	502455	Resistor—carbon 27 ohms ¼ watt
19	502457	Resistor—carbon 330 ohms ¼ watt
20	502458	Resistor—carbon 430 ohms ¼ watt
21	502269	Resistor—carbon 3.3 Meg. ¼ watt
24	502132	Resistor—carbon 100,000 ohms ¼ watt
29	502269	Resistor—carbon 3.3 Meg. ¼ watt
30-A,B,C,D.	502525	Volume control (with switch) 1 Meg.
32	502269	Resistor—carbon 3.3 Meg. ¼ watt
33, 34	502456	Resistor—carbon 220 ohms ¼ watt
36	502268	Resistor—carbon 1 Meg. ¼ watt
38	502134	Resistor—carbon 470,000 ohms ¼ watt
39	500712	Resistor—wire wound 1830 ohms 5 watt
41	502135	Resistor—carbon 2.2 Meg. ¼ watt
44	502266	Resistor—carbon 15,000 ohms ¼ watt
45	502459	Resistor—carbon 6800 ohms ¼ watt
46	502457	Resistor—carbon 330 ohms ¼ watt
47	502455	Resistor—carbon 27 ohms ¼ watt
49-A,B,C	500715	Resistor—wire wound A—1460 ohms 10 watt; B— 155 ohms 1 watt; C— 310 ohms 10 watt
54	502454	Resistor—wire wound 47 ohms 1 watt
57	502454	Resistor—wire wound 47 ohms 1 watt

DIAGRAM NO.	PART NO.	DESCRIPTION
		COILS AND TRANSFORMERS
3	502499	Coil—antenna coupling
9	502498	Coil—oscillator
13	502495	Transformer—1st I.F.
23	500749	Transformer—2nd I.F.
51	502902	Trans.—output for A-502491 speaker
51	502492	Trans.—output for R-502491 speaker
55	502528	Filter choke
		OTHER ELECTRICAL PARTS
10	500746	Cable—for use with individ. batteries
22	502536	Cable—for use with battery pack
27	500713	Neon indicator lamp
43-A,B,C,D.	502526	Switch—"AC-DC—BAT.—CHARGE"
52	502901	Cone & voice coil for A-502491 speaker
52	502493	Cone & voice coil for R-502491 speaker
53	502491	Speaker—P.M. dynamic (5 inch)
		MISCELLANEOUS PARTS
	160026	Base for mtg. electrolytic condenser
	112745	Clip—coil mtg.
	114955	Clip—retainer on end of dial cord
	117057	Cord—dial drive (28" required) per ft.
	502780	Escutcheon plate
	502784	Knob—volume or tuning
	502785	Knob—"AC-DC—BAT.—CHARGE"
	500747	Plug for battery cable (fits chassis)
	502537	Plug for battery cable (fits batt. pack)
	502786	Pointer
	81145	Retaining ring for tuning shaft
	119087	Ring for dial cord
	79894	Screw—No. 8x⅝"; for mtg. chassis
	502524	Shaft—tuning control
	117716	Shield—tube
	116690	Socket—octal base
	500681	Socket—for battery cable
	161384	Spring—dial cord tension
	502533	Terminal strip for antenna
	111456	Washer—spring washer for tuning shaft
	502534	Washer—felt: for knobs

SOCKET VOLTAGES

Measured with voltmeter having sensitivity of 1000 ohms per volt except where indicated by (*).

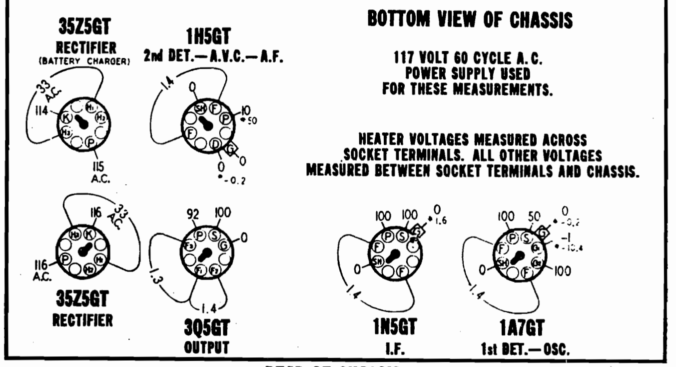
VOLUME ON FULL WITH NO SIGNAL — DIAL TUNED TO 540 KC.

"AC-DC—BAT.—CHARGE" SWITCH IN "AC-DC" POSITION

BOTTOM VIEW OF CHASSIS

117 VOLT 60 CYCLE A.C. POWER SUPPLY USED FOR THESE MEASUREMENTS.

HEATER VOLTAGES MEASURED ACROSS SOCKET TERMINALS. ALL OTHER VOLTAGES MEASURED BETWEEN SOCKET TERMINALS AND CHASSIS.



REAR OF CHASSIS

*—Measured with vacuum tube voltmeter.

WESTERN AUTO SUPPLY CO.

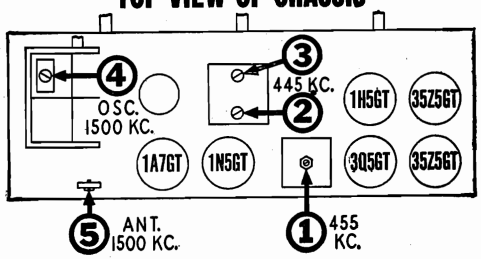
MODEL D3635

ALIGNMENT PROCEDURE

1. Slide chassis partially out of cabinet by removing staples at each side of wood shelf and pulling entire shelf back about 2 inches. Do not disturb connections to loop antenna.
2. Connect an output meter across the voice coil of the speaker or between the plate of the 3Q5GT output tube and chassis through a .1 mfd. condenser.
3. Connect the ground lead of the signal generator to chassis through a .25 mfd. condenser.
4. Set the volume control in the maximum position and use a weak signal from the generator.
5. Set "AC-DC—BAT.—CHARGE" Switch in "AC-DC" position.

DUMMY ANT. IN SERIES WITH SIGNAL GENERATOR	CONNECT HIGH SIDE OF SIG. GENERATOR TO	SIGNAL GENERATOR FRE-QUENCY	RECEIVER DIAL SETTING	TRIMMER NUMBER	TRIMMER DESCRIPTION	TYPE OF ADJUSTMENT
300 MMFD. Condenser	Grid Cap of 1A7GT Tube	455 KC.	Any Point Where It Does Not Affect Signal	1	2nd I.F.	Loosen lock nut. Adjust screw for maximum output.
				2-3	1st I.F.	Adjust for maximum output. Re-check 1, 2 and 3 for maximum output and tighten lock nut on 1.
300 MMFD. Condenser	Center Terminal on Antenna Terminal Strip at bottom of cabinet.	1500 KC.	1500 KC. (Slide set into cabinet and re-place pointer to set dial.)	4	Broadcast Oscillator (Shunt)	Adjust trimmer for maximum output.
300 MMFD. Condenser	Center Terminal on Antenna Terminal Strip at bottom of cabinet.	1500 KC.	Tune to 1500 KC. Generator Signal	5	Broadcast Antenna	Adjust for maximum output. Slide chassis all the way into cabinet when making this ad-justment.

TOP VIEW OF CHASSIS



INDICATOR LAMP

The flashing neon lamp on the dial face indicates condition of batteries. This lamp is included in an oscillating (R-C) circuit which is designed to oscillate at approximately 3 pulses per second when batteries are in a fully charged condition. As the battery voltage decreases with use, number of pulses per second decreases.

This lamp will only show the true condition of the batteries when the Selector Switch is in the "Battery" position. Lamp flashes more rapidly during charging or "AC-DC" operation.

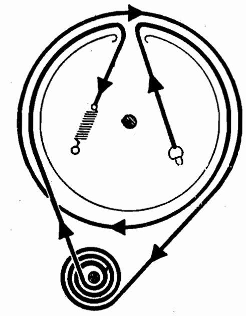
When battery voltage is low (approximately 72 volts) the lamp flashes more slowly (about once per second). The set should not be operated from battery power after this point is reached and batteries should be recharged imme-diately. Charge for at least twice the time they were used and as soon as possible after they are run down. As batteries age it is necessary to charge for a longer period. For longest battery life, charge immediately after using.

IMPORTANT: 1. Completely dead batteries cannot be re-charged.

2. When set is connected to a DC line, check for correct polarity by operating it before attempting to charge the batteries.
3. Batteries will be discharged if ON-OFF switch is left ON when power cord is not connected to wall outlet.

CHARGING CIRCUIT

The battery charging circuit consists of a 35Z5GT rectifier and a suitable resistor voltage dividing network. This cir-cuit provides a very low charging current when the re-ceiver is operated on AC-DC and is just enough to main-tain the batteries but will not charge them. A separate charging position is provided for the regular charging operation. A charging rate of approximately ⅓ the dis-charge rate is used to give best results.



DIAL DRIVE CORD ARRANGEMENT

To string dial cord, set gang condenser to fully meshed position and use following parts:

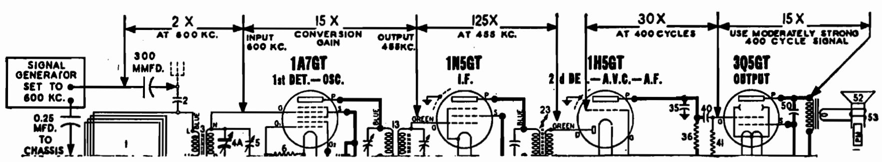
114955	Clip on end of cord
117057	Cord (28 inches)
119087	Ring for dial cord
161384	Tension Spring

APPROXIMATE STAGE GAIN DATA

Be sure R.F. and I.F. stages are accurately aligned before measuring gain. R.F. gains can be measured with a "channel" type instrument con-taining a tuned and calibrated R.F. amplifier. A vacuum tube voltmeter may be used for audio gain measurements.

1. For all gain measurements connect signal generator as shown. Use 600 KC. signal with 400 cycle modulation (use nearby frequency if local station interferes).
2. For R.F. and I.F. measurements con-nect negative terminal of a 1½-volt battery to A.V.C. lead and positive terminal to chassis. This provides a definite operating point.
3. Be sure radio is carefully tuned to generator sig-nal (use weak signal for sharp tuning).
4. When using a "channel" type instrument carefully tune it for maximum out-put at desired frequency before making measure-ments.

The R.F. and I.F. stage gains shown below are less than under normal operating conditions due to the use of 1½ volts fixed bias in order to establish a definite operating point. Therefore, these values are not intended to indicate the full capability of a stage.



Differences in tube characteristics, tolerance of parts, adjustment of tuned circuits, and variations of line voltage will influence stage gain. Accuracy of measurements is dependent upon careful tuning of receiver to generator signal and experience in using your test equipment. These factors may create considerable variation in gain measurements.

CHARGING THE BATTERY

The specially developed electronic circuit used for charging the battery will produce best results if battery deterioration has not progressed too far. Check the battery frequently as described in the previous section. To use the built-in charger proceed as follows:

1. Plug the power cord into wall outlet.
2. Turn Selector Switch to "AC-DC" position and turn On-Off Switch to "ON" position.
3. Make sure that radio operates properly before attempting to use the charger. This is especially important when the radio power cord is connected to a D.C. (Direct Current) power supply. After you are sure the radio operates properly, turn the Selector Switch to the "CHARGE" position.
4. Allow the set to operate in this manner and charge the battery for at least twice as many hours as battery was previously used.
5. **After charging is completed be sure to turn the radio On-Off Switch to the "OFF" position. If this switch is left on and the power cord is disconnected from the wall outlet, the battery will discharge.**

If the receiver is equipped with individual "A" and "B" batteries instead of a single unit battery pack, the built-in charging circuits will recharge all four batteries.

THE DIAL SCALE is calibrated to cover frequencies between 540 Kc and 1600 Kc. Add a zero to dial number to obtain the frequency in kilocycles (Kc). Examples: When pointer is set to 90, radio is tuned to 900 Kc. See your newspaper for frequencies of local stations.

INSTALLATION

The bottom compartment of the cabinet provides adequate space to accommodate a single unit battery pack (or individual "A" and "B" batteries if desired). **Any of the following single unit type battery packs may be used as a suitable power supply for this receiver.**

WIZARD B6460
EVEREADY 754
GENERAL 60A-6F6-5
RAY-O-VAC AB-878 or AB-994
BURGESS G6BB60 or F6A60

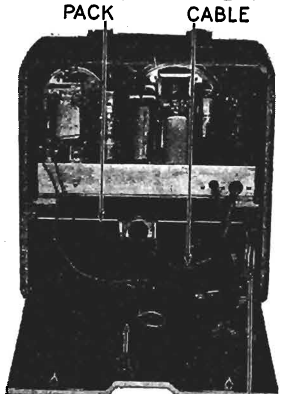


FIG. 1

Place the battery in the bottom compartment of the cabinet and wedge a piece of corrugated paperboard between the battery and the wall of the cabinet (see Fig. 1). The paperboard serves to hold the battery in a fixed position.

After the battery is installed in the cabinet it must be connected to the cable extending from the rear of the radio chassis. This cable is equipped with a special plug that will fit the receptacle in any of the single unit battery packs whose type numbers are listed above.

Where it is desired to use individual "A" and "B" batteries instead of the single unit battery pack, it will be necessary to obtain a special adapter cable (part 500746) in order to connect the separate batteries to the radio. Four batteries (two 4½ volt "A" batteries and two 45 volt "B" batteries) would be required for this type of installation. The following batteries will satisfactorily fit in the space provided:

4½ Volt "A" Battery (2 required)
Wizard B6135
Ray-O-Vac P83A
Eveready 746
Burgess G3

45 Volt "B" Battery (2 required)
Wizard B6241
Ray-O-Vac P7830
Eveready 482
Burgess M-30

CONNECTING RADIO TO ELECTRIC POWER SUPPLY: The rubber covered power cord and plug, which is coiled up and placed inside the cabinet when the radio is battery operated, must be connected to an electric power outlet if you wish to operate the radio from the power line. The power cord must also be connected to the electric power outlet when using the special battery charger in this receiver.

IMPORTANT: Before connecting the power cord to the electric power outlet, close the back of the cabinet. Do not handle the metal chassis or attempt to remove tubes after the power cord is connected.

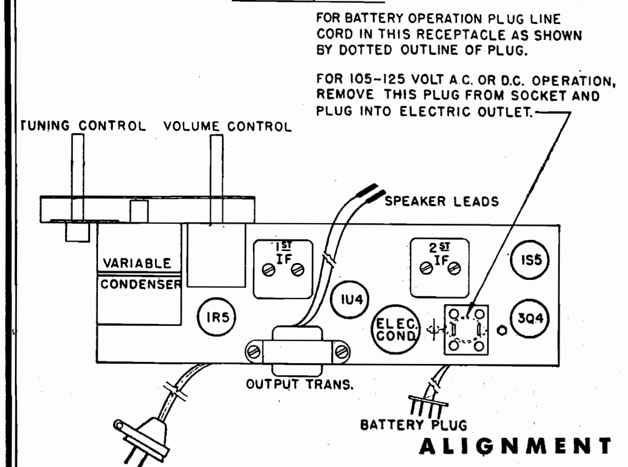
When connecting the radio to the electric power outlet be sure that outlet will supply the proper current and voltage. This radio may be connected to either 50 or 60 cycle Alternating Current (A.C.) at 105 to 125 volts or Direct Current (D.C.) at 105 to 125 volts. If in doubt as to the voltage and type of current which is supplied by an electric power outlet, call local power company.

If a Direct Current power supply is used and the radio does not operate after it has been turned on for approximately one minute, reverse plug connection at wall outlet.

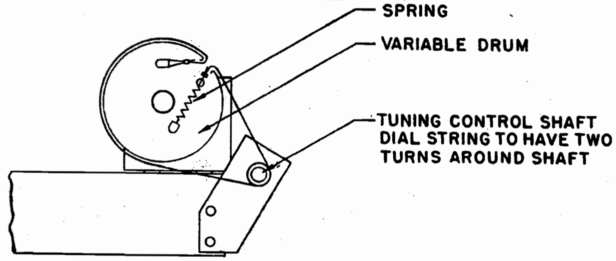
WESTERN AUTO SUPPLY CO.

MODEL D3722

TUBE LOCATION



DIAL STRINGING DIAGRAM

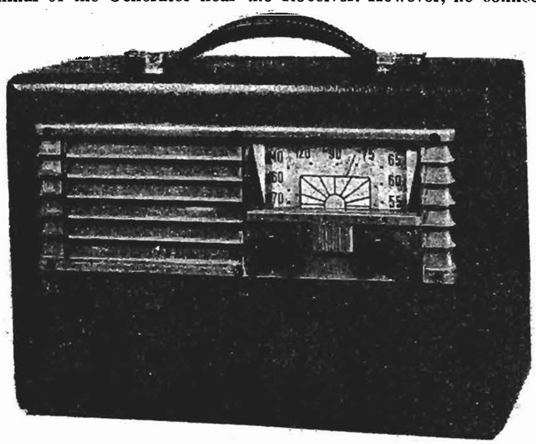


ALIGNMENT PROCEDURE

- Output Meter across 3.2 ohm output load
- Volume control at maximum
- Align for maximum output. Reduce input as needed to keep ouput near 0.05 watts
- Connect ground post of signal generator to chassis

Frequency	SIGNAL GENERATOR Connection to Radio	Dummy Antenna	Tuner Setting	Adjust for Maximum Output (in order shown)
455 KC	Center of antenna section of Gang	0.2 mf	Any	Trimmers on I.F. Can
1500 KC	* *	* *	Set pointer at second dot from end. On dial pan	Oscillator Trimmer on Gang.
1500 KC	* *	* *	Set pointer at second dot from end. On dial pan	R.F. Trimmer on Gang

** Run a wire from Output Terminal of the Generator near the Receiver. However, no connection is made between the signal generator and the Receiver.



REPLACEMENT PARTS LIST

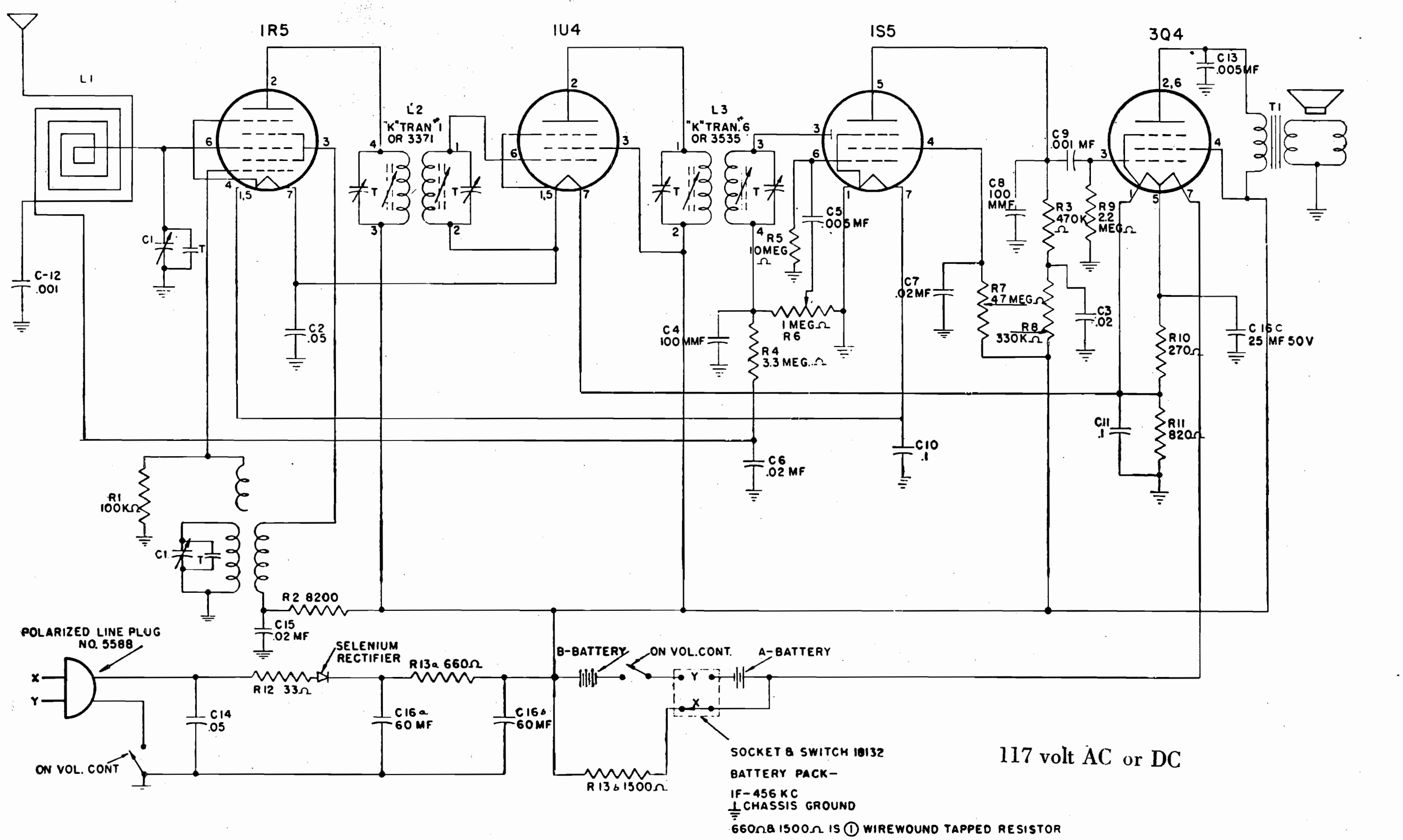
Ref. No.	Part No.	Description
		CAPACITORS
C1	1694	Variable
C2, C14		Paper, .05 MFD 200 volts
C3		Paper, .2 MFD 200 volts
C4, C8		Mica or ceramic, 100 MMFD
C5, C13		Paper, .005 MFD 200 volts
C6, C7, C15		Paper, .02 MFD 200 volts
C9, C12		Paper, .001 MFD 200 volts
C10, C11		Paper, .1 MFD 200 volts
C16 A.B.C.	2075	Electrolytic
		RESISTORS
R1		100,000 ohms, 1/4 watt
R2		8200 ohms, 1/4 watt
R3		470,000 ohms, 1/4 watt
R4		3.3 meg ohms, 1/4 watt
R5		10 meg ohms, 1/4 watt
R6		Control, volume, DPST Switch, 1 meg ohm
R7		4.7 meg ohms, 1/4 watt
R8		330,000 ohms, 1/4 watt
		RESISTORS
R9		2.2 meg ohms, 1/4 watt
R10		270 ohms, 1/4 watt
R11		820 ohms, 1/4 watt
R12		33 ohms, 1 watt
R13		Filter and Filament, dropping
		COILS AND TRANSFORMERS
	28197	Oscillator coil
L2	3371	Input IF Transformer
L3	3535	Output IF Transformer
T1	1337	Output transformer
L1	28190	Loop
		MISCELLANEOUS
	5588	Cord, Line (Polarized)
	39164	Knobs
	5899	Loud Speaker 4"
	472	Cabinet
	18132	Wafer, Switch—Battery A.C.

MODEL D3722

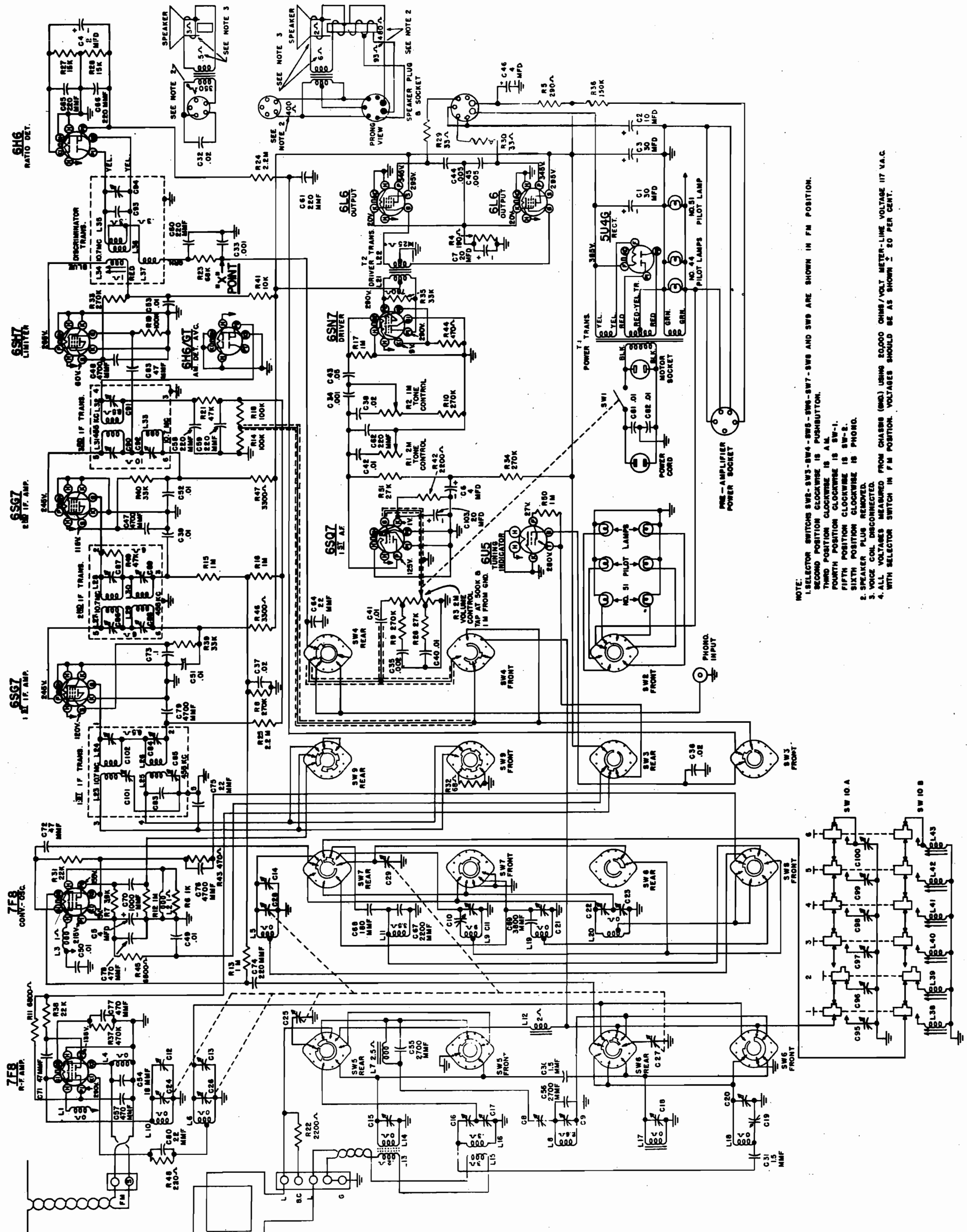
WESTERN AUTO SUPPLY CO.

TECHNICAL DATA

Tuning Range	540-1600	Sensitivity (For 0.05 Watt Output)	300 Microvolts per Meter Average
Intermediate Frequency	455 KC	Power Output (in voice coil):	
Power Consumption	15 Watts	Undistorted	.130 Watts
Selectivity	A.C.A. 12-1	Maximum	.300 Watts



WESTINGHOUSE ELECTRIC CORP. MODEL H-169



CLARI-SKEMATIX

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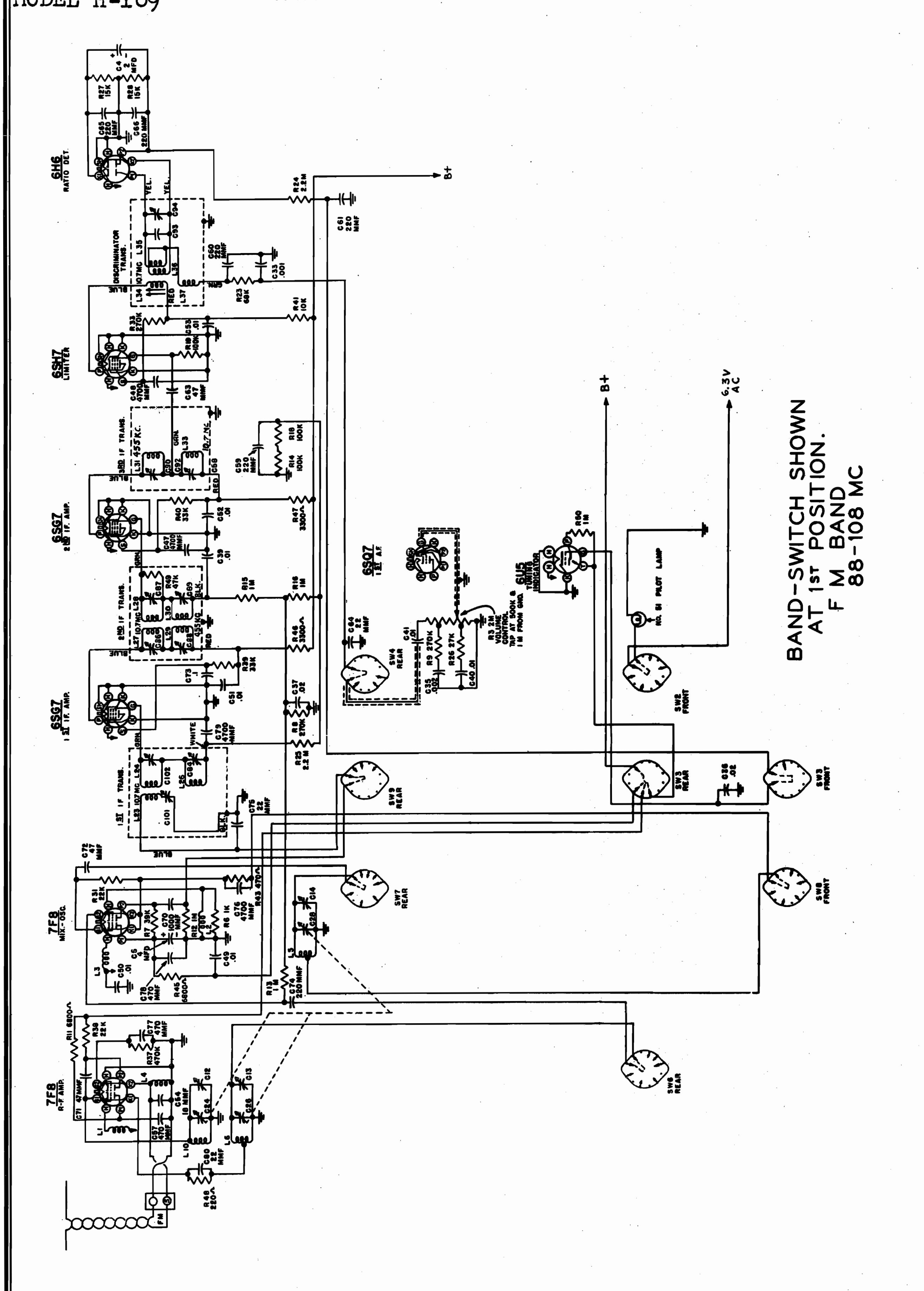
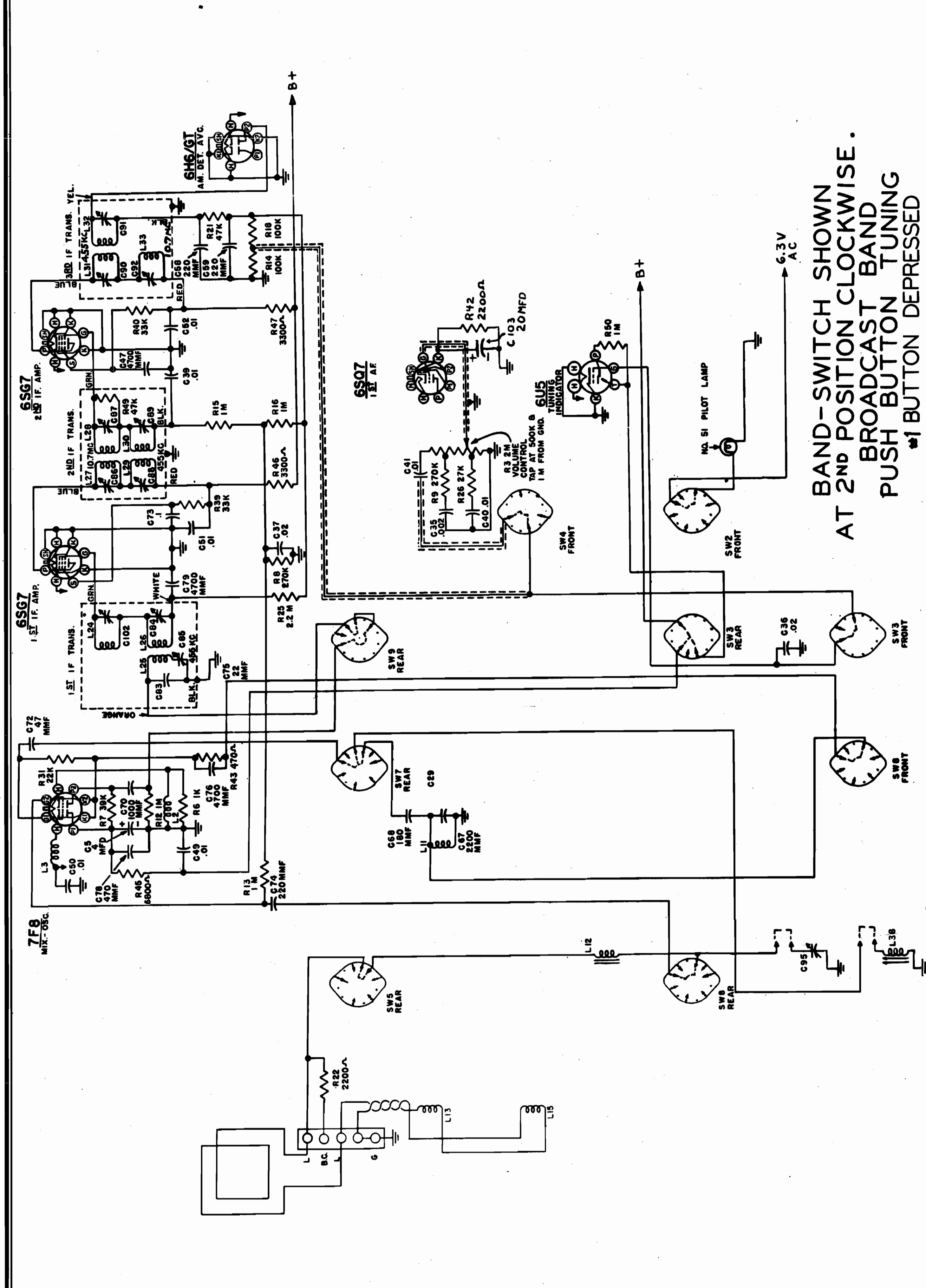
MODEL H-169

WESTINGHOUSE ELECTRIC CORP.



WESTINGHOUSE ELECTRIC CORP.

MODEL H-169



CLARI-SKEMATIX

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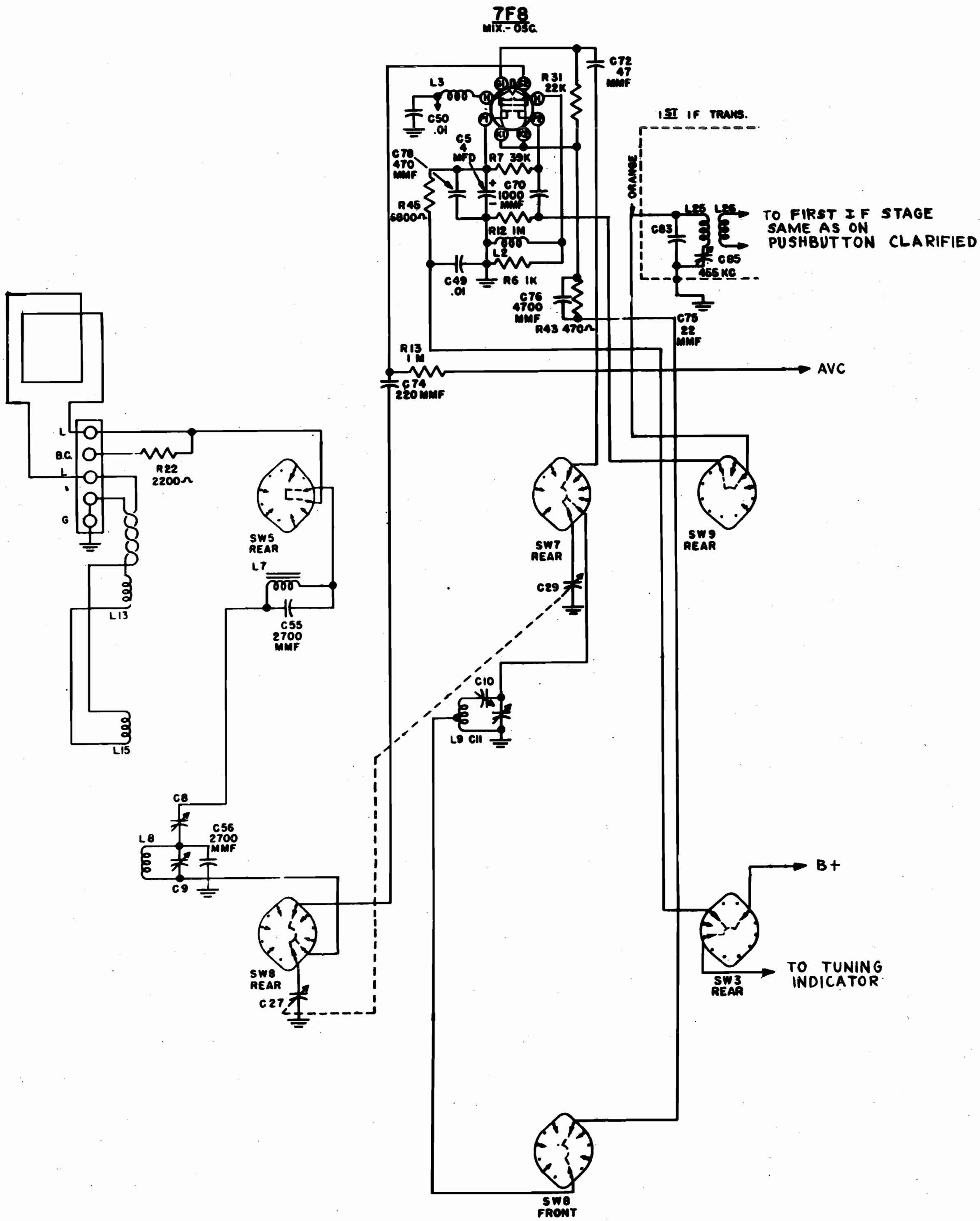
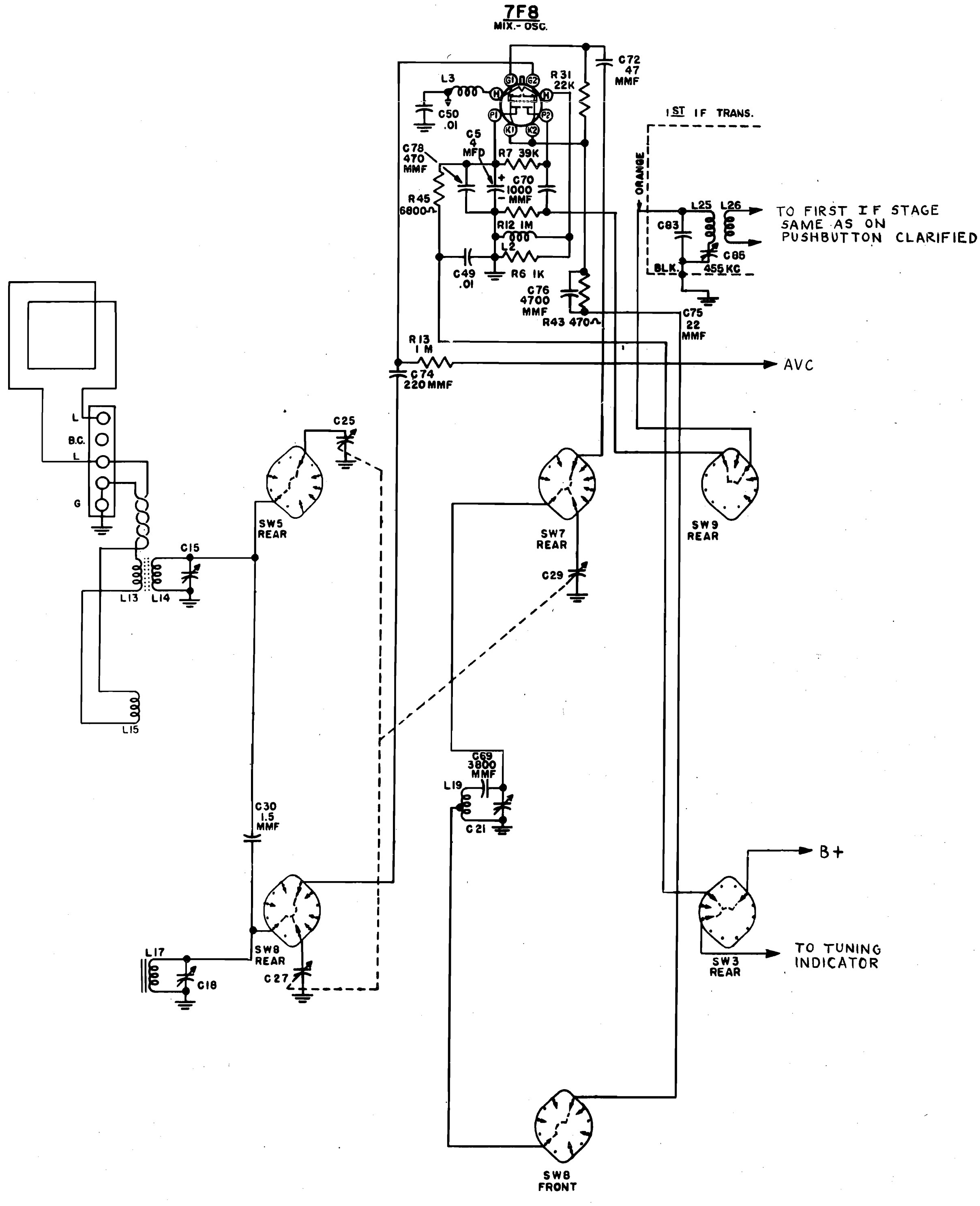
MODEL H-169

WESTINGHOUSE ELECTRIC CORP.



BAND-SWITCH SHOWN
AT 3RD POSITION CLOCKWISE
BROADCAST BAND
MANUAL TUNING
540- 1615 KC

WESTINGHOUSE ELECTRIC CORP. MODEL H-169

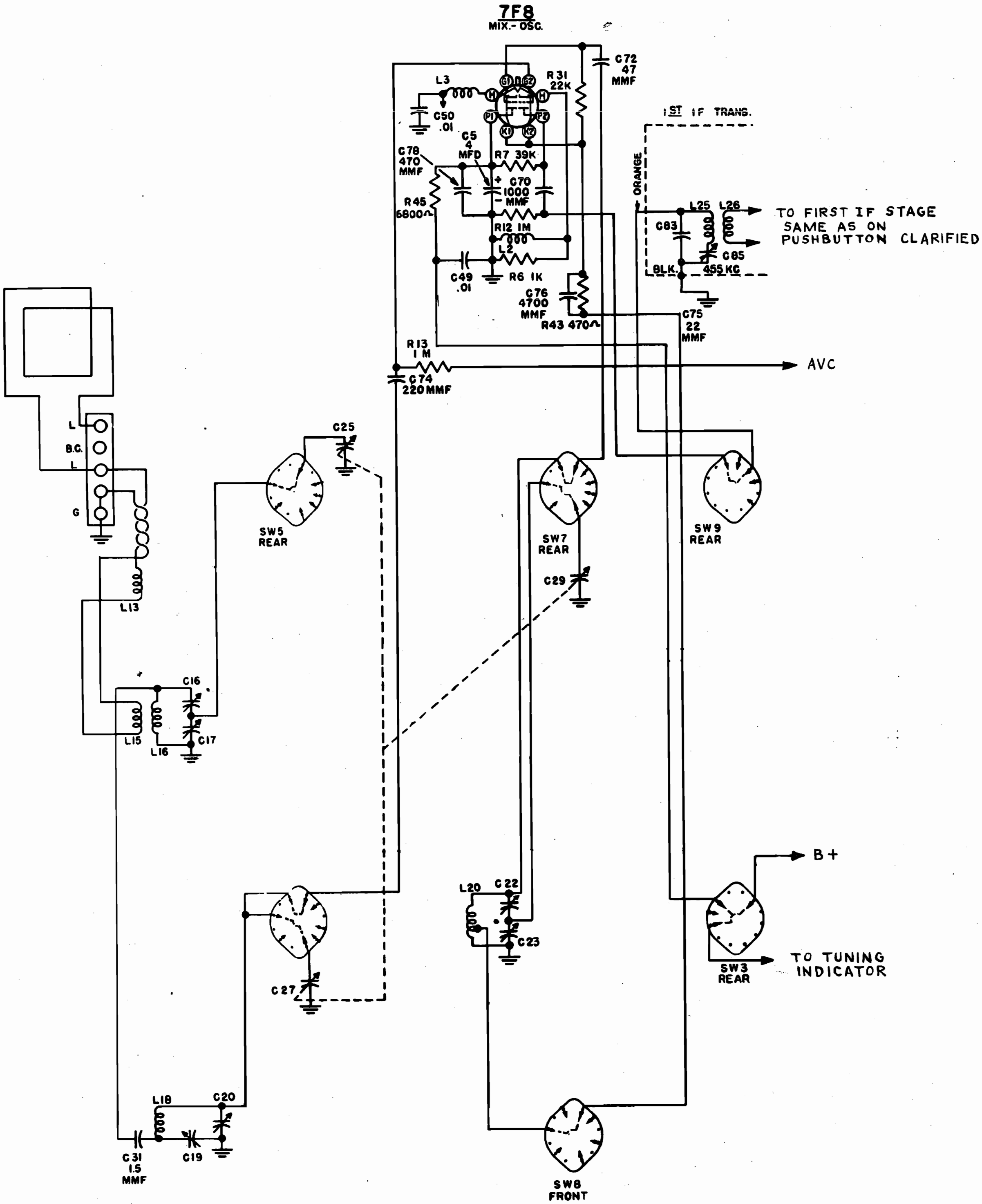


BAND-SWITCH SHOWN
AT 4TH POSITION CLOCKWISE.
SHORT WAVE-1BAND
5-10 MC

CLARI-SKEMATIX
Registered Trademark

MODEL H-169

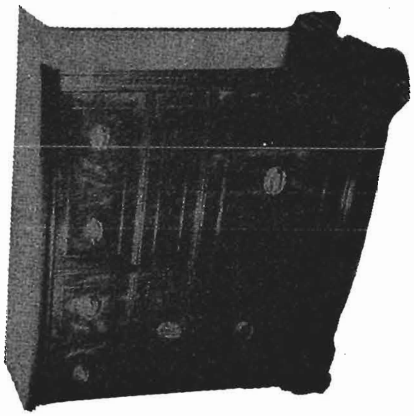
WESTINGHOUSE ELECTRIC CORP.

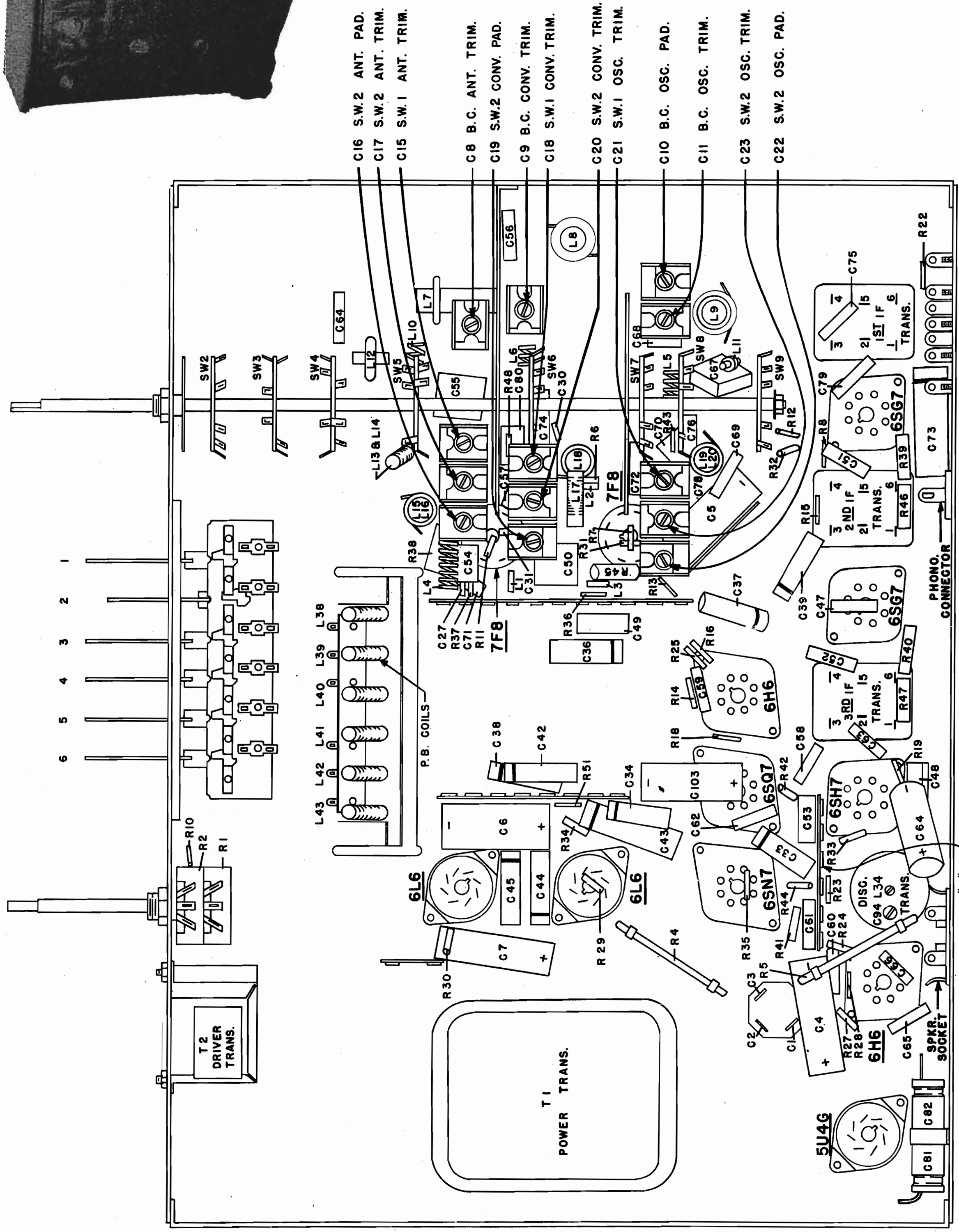


BAND-SWITCH SHOWN
AT 5TH POSITION CLOCKWISE.
SHORT WAVE 2ND BAND
12-20 MC

WESTINGHOUSE ELECTRIC CORP.

MODEL H-169





RECORD CHANGER: V-M Model 400, RCD.CH.15-1

MODEL H-169 WESTINGHOUSE ELECTRIC CORP.

ALIGNMENT PROCEDURE

BROADCAST AND SHORT WAVE BANDS

Connect an output meter across the speaker voice coil.

With the volume control set for maximum output and the signal from the generator attenuated to avoid A.V.C. action, proceed as follows:

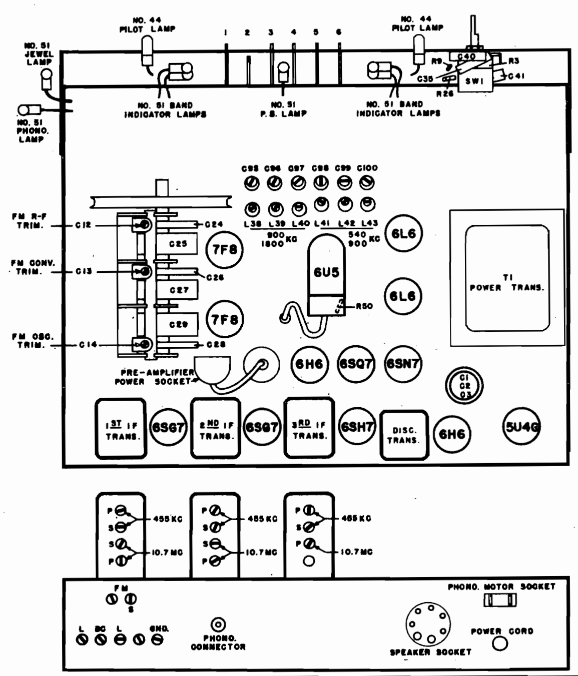
Step	Connect Signal Generator to —	Signal Generator Frequency	Radio Dial Setting	Adjust
1.	Set selector switch to "AM"			
2.	Pin #4 on 6SG7, 2nd I-F amplifier tube through a 0.1 mfd capacitor	455 kc	550 kc	455 kc secondary and primary trimmers of 3rd I-F for max. output.
3.	Pin #4 on 6SG7, 1st I-F amplifier tube through a 0.1 mfd capacitor	455 kc	550 kc	455 kc secondary and primary trimmers of 2nd I-F for max. output.
4.	Pin #1 on 7F8, converter tube through a 0.1 mfd capacitor	455 kc	550 kc	455 kc secondary and primary trimmers of 1st I-F for max. output.
5.	Converter section of gang (C27) through a 0.1 mfd capacitor	455 kc	550 kc	Carefully "peak" all 455 kc I-F transformers for max. output.
6.	B.C. antenna terminal through a 200 mmf capacitor	1500 kc	1500 kc	B.C. oscillator trimmer (C11) for max. output.
7.	Radiated signal (no actual connection)	1400 kc	1400 kc	B.C. converter (C9) and antenna (C8) trimmers for max. output.
8.	B.C. antenna terminal through a 200 mmf capacitor	600 kc	600 kc	B.C. oscillator padder (C10) for max. output. Rock gang while aligning padder.
9.	Recheck steps 6, 7, and 8.			
10.	Set selector switch to "SW-1"			
11.	Short wave antenna terminal through a 400 ohm resistor (center terminal marked "L")	9 mc	9 mc	Short Wave #1 oscillator trimmer (C21) for max. output.*
12.	Short wave antenna terminal through a 400 ohm resistor (center terminal marked "L")	9 mc	9 mc	Short Wave #1 converter (C18) and antenna (C15) trimmers for max. output. Rock gang while adjusting trimmers.
13.	Set selector switch to "SW-2"			
14.	Short wave antenna terminal through a 400 ohm resistor (center terminal marked "L")	18 mc	18 mc	Short Wave #2 oscillator trimmer (C23) for max. output.*

FREQUENCY RANGES:

Standard Broadcast	540 to 1615 kc.
Short Wave 1	5 to 10 mc.
Short Wave 2	12 to 20 mc.
Frequency Modulation	88 to 108 mc.

TUBE COMPLEMENT:

1	7F8	R-F Amp.
1	7F8	Conv.-Osc.
2	6SG7	1st and 2nd I-F Amp.
1	6SH7	Limiter (FM)
1	6H6	Ratio Det. (FM)
1	6H6 or 6H6GT	Det. and AVC (AM)
1	6SQ7	A-F Amp.
1	6SN7 or 6SN7GT	Driver
2	6L6 or 6L6GA	Power Output Amp.
1	6U5	Tuning Indicator
1	5U4G	Rectifier
1	6SC7	Phono. Pre-Amp.



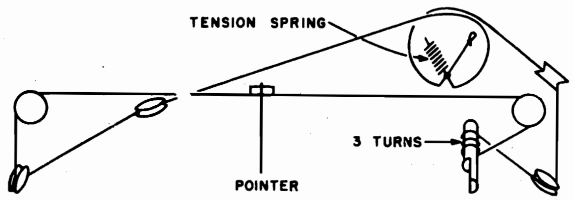
WESTINGHOUSE ELECTRIC CORP. MODEL H-169

PUSH BUTTONS

Push buttons 1 to 3 are designed to receive stations from 900 to 1600 kc; push buttons 4 to 6 receive stations from 540 to 900 kc.

Refer to Fig. 3 for adjustor locations, and then proceed as follows:

1. Turn on radio and allow it to warm for five minutes.
2. Set the selector on AM, and tune in the desired station of the highest frequency (900 to 1600 kc).
3. Re-set the selector to PUSH BUTTONS and depress No. 1 push button (right button viewed from the front).
4. Adjust C95 for maximum receiver output (either a station or static will be heard depending on the setting of L38). Now adjust L38 until the desired station is heard. It may be necessary to re-adjust C95 at intervals to maintain receiver sensitivity.
5. Make a final adjustment of L38 for correct tuning and C95 for maximum output.
6. Return the selector to AM to make certain that the push button has been set on the desired station.
7. Adjust the remaining push buttons in the same manner.



BROADCAST AND SHORT WAVE BANDS

Step	Connect Signal Generator to —	Signal Generator Frequency	Radio Dial Setting	Adjust
15.	Short wave antenna terminal through a 400 ohm resistor (center terminal marked "L")	18 mc	18 mc	Short Wave #2 converter (C20) and antenna (C17) trimmers for max. output.
16.	Short wave antenna terminal through a 400 ohm resistor (center terminal marked "L")	12 mc	12 mc	Short Wave #2 oscillator padder (C22) to receive 12 mc signal.
17.	Short wave antenna terminal through a 400 ohm resistor (center terminal marked "L")	12 mc	12 mc	Short Wave #2 converter (C19) and antenna (C16) padders for max. output.
18.	Repeat steps 14, 15, 16 and 17 until calibration and tracking is correct.			

FM BAND

Do not align the 10.7 mc I-F circuits until all 455 kc I-F adjustments have been completed.

Step	Connect Signal Generator to —	Signal Generator Frequency	Radio Dial Setting	Adjust
1.	Set selector switch to "FM"			
2.	Connect a vacuum tube voltmeter between point X (see Figs. 1 and 2) and ground (chassis).			
3.	Pin #4 on 6SH7 limiter tube through a .001 mfd capacitor	UNMODULATED 10.7 mc	88 mc	Secondary of discriminator transformer (C94) for *zero* voltage.
4.	Re-connect the vacuum tube voltmeter to pin #3 on the 6H6 ratio detector tube.			
5.	Pin #4 on 6SH7 limiter tube through a .001 mfd capacitor	UNMODULATED 10.7 mc	88 mc	Primary of discriminator transformer (L34) for max. voltage.
6.	Pin #4 on 6SG7 2nd I-F tube through a .001 mfd capacitor	UNMODULATED 10.7 mc	88 mc	10.7 mc. pri. of 3rd I-F trans. for max. voltage.
7.	Pin #4 on 6SG7 1st I-F tube through a .001 mfd capacitor	UNMODULATED 10.7 mc	88 mc	10.7 mc. pri. and sec. of 2nd I-F trans. for max. voltage.
8.	Pin #1 of 7F8 converter tube through a .001 mfd capacitor	UNMODULATED 10.7 mc	88 mc	10.7 mc. pri. and sec. of 1st I-F trans. for max. voltage.
9.	Pin #1 of 7F8 converter tube through a .001 mfd capacitor	UNMODULATED 10.7 mc	88 mc	Recheck all 10.7 mc. I-F adjustments and discriminator primary (L34) adjustment.
10.	Re-connect the vacuum tube voltmeter to point X.			
11.	Stator of FM tuning capacitor (C26) through a .001 mfd capacitor	UNMODULATED 10.7 mc	88 mc	Secondary of discriminator trans. (C94) for *zero* voltage.
12.	Re-connect the vacuum tube voltmeter to pin #3 on the 6H6 ratio detector.			
13.	FM antenna terminals through a 72 ohm resistor (low side of generator to "S" terminal)	UNMODULATED 105 mc	105 mc	FM oscillator trimmer (C14) for max. voltage.
14.	FM antenna terminals through a 72 ohm resistor (low side of generator to "S" terminal)	UNMODULATED 105 mc	105 mc	FM converter (C13) and R-F (C12) trimmers for max. voltage.
15.	Re-check steps 13 and 14.			

MODEL H-169 WESTINGHOUSE ELECTRIC CORP.

Part No.	Description
V-4777-1	Antenna Assembly, FM dipole
V-5104	Background, dial
V-5224	Bearing, ball, for speaker turntable
V-5223	Bearing, sleeve, for speaker turntable
V-3507	Bracket and Clip Assembly, for tuning eye
V-4893	Bumper, recessed, for doors
V-5225	Bumper, speaker turntable
V-5189	Button, hole plug
V-5191	Cable and Socket, for eye tube
V-4931	Cable, output for pre-amplifier
V-4965-1	Cable, phono input
V-4930	Cable, power for pre-amplifier
V-5115	Capacitor, electrolytic 30-10-30 mfd 450 v. (C1, C2, C3)
V-5311	Capacitor, electrolytic 2 mfd 450 v. (C4)
V-4885	Capacitor, electrolytic 4 mfd 450 v. (C5, C6, C46)
V-3236	Capacitor, electrolytic cartridge, 20 mfd 25 v. (C7, C93)
V-5159	Capacitor, trimmer, B.C. antenna (C8)
V-5208	Capacitor, trimmer, B.C. converter (C9)
V-5143	Capacitor, trimmer, 2-gang (C10, C11)
V-3713-1	Capacitor, ceramic variable, F.M. (C12, C13, C14)
V-5219	Capacitor, trimmer, SW1 and SW2 antenna (C15, C16, C17)
V-5220	Capacitor, trimmer, SW1 and SW2 converter (C18, C19 C20)
V-5221	Capacitor, trimmer, SW1 and SW2 oscillator (C21, C22, C23)
V-3296	Capacitor, variable 3-gang (C24, C25, C26, C27, C28, C29)
V-5362	Capacitor, 1.5 mmf (C30, C31)
RCP10W6102M	Capacitor, .001 mfd 600 v. (C33, C34)
RCP10W6202M	Capacitor, .002 mfd 600 v. (C35)
RCP10W4203A	Capacitor, .02 mfd 400 v. (C36, C37, C38)
RCP10W4103A	Capacitor, .01 mfd 400 v. (C39, C40, C41, C42)
RCP10W4503A	Capacitor, .05 mfd 400 v. (C43)
RCP10W6502A	Capacitor, .005 mfd 600 v. (C44, C45)
RCM30B472M	Capacitor, 4700 mmf mica (C47, C48)
RCM30B103M	Capacitor, .01 mfd mica (C49, C50, C51, C52, C53)
RCM20B180K	Capacitor, 18 mmf mica (C54)
RCM30B292H	Capacitor, 2700 mmf mica (C55, C56)
RCM20B471M	Capacitor, 470 mmf mica (C57)
RCM20B221M	Capacitor, 220 mmf mica (C58, C59, C60, C61, C62)
RCM20B470M	Capacitor, 47 mmf mica (C63)
RCM20B220M	Capacitor, 22 mmf mica (C64)
RCM20B221K	Capacitor, 220 mmf mica (C65,

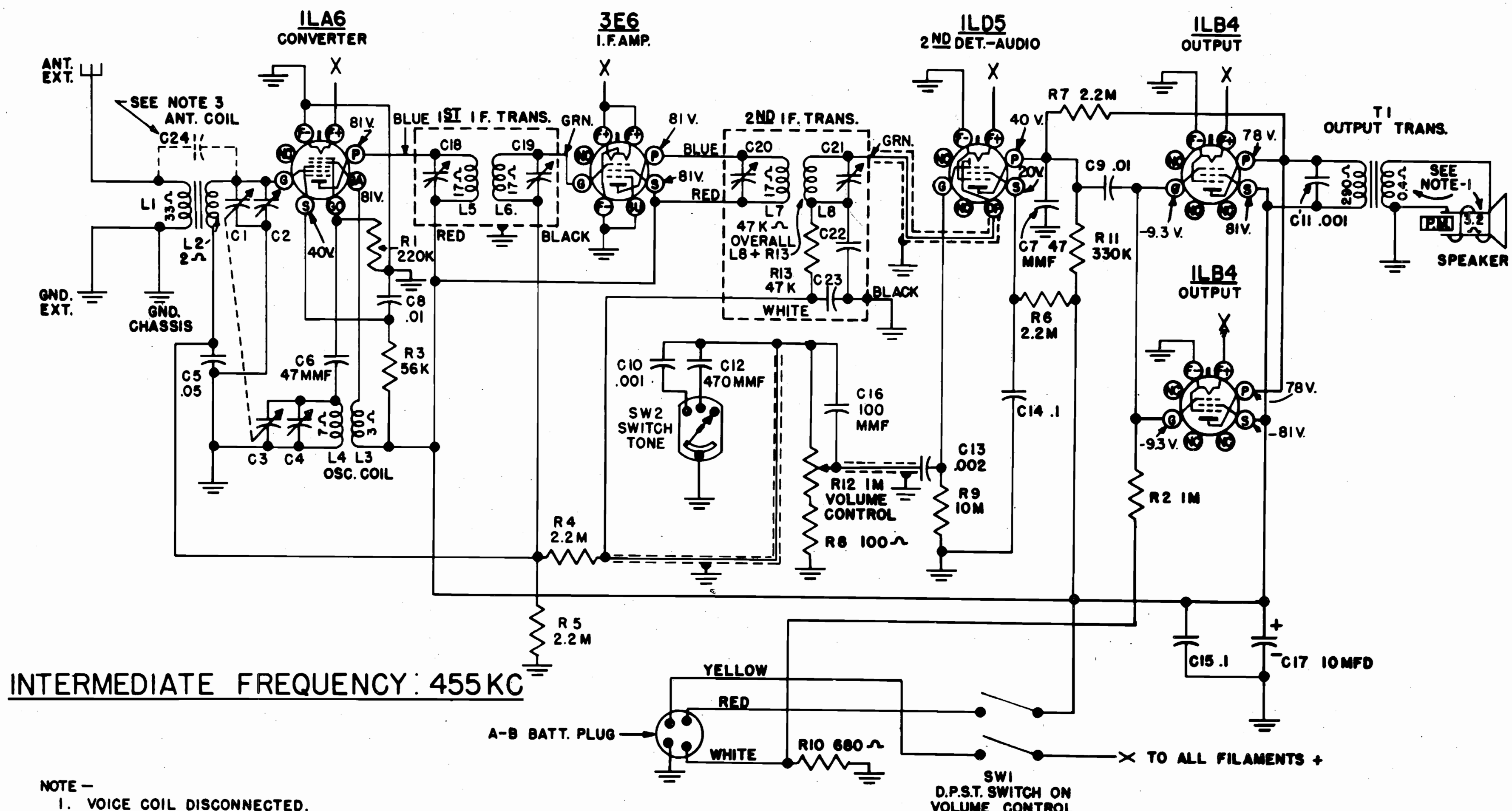
Part No.	Description
RCM30B222M	Capacitor, 2200 mmf mica (C67)
RCM20C181J	Capacitor, 180 mmf mica (C68)
RCM30B382J	Capacitor, 3800 mmf mica (C69)
R5CC26ZY102M	Capacitor, 1000 mmf ceramic (C70)
R2CC26PJ470K	Capacitor, 47 mmf ceramic (C71, C72)
RCP10W4104A	Capacitor, 0.1 mfd 400 v. (C73)
R2CC36SL221M	Capacitor, 220 mmf ceramic (C74)
R2CC21PJ220K	Capacitor, 22 mmf ceramic (C75)
R5CC36ZY472M	Capacitor, 4700 mmf ceramic (C76)
R5CC21ZY471M	Capacitor, 470 mmf ceramic (C77, C78)
R5CC35ZY472M	Capacitor, 4700 mmf ceramic (C79)
RCM20B220K	Capacitor, 22 mmf mica (C80)
V-4634	Capacitor, dual line filter (C81, C82)
V-5064-1	Catch, bullet (mahogany)
V-5064-2	Catch, bullet (blonde)
V-4638	Choke, filament, R-F amplifier tube (L1)
V-4886	Choke, filament, converter tube (L2, L3)
V-5261	Choke, FM antenna input (L4)
V-4763	Clamp, dial
V-5139	Coil, FM oscillator (L5)
V-5140	Coil, FM converter (L6)
V-5129	Coil, BC antenna (L7)
V-5149	Coil, BC converter (L8)
V-5127	Coil, BC oscillator (L9)
V-5140	Coil, FM antenna (L10)
V-3313	Coil, oscillator cathode (L11)
V-5128	Coil, push button converter (L12)
V-5125	Coil, SW1 antenna (L13, L14)
V-5147	Coil, SW2 antenna (L15, L16)
V-5126	Coil, SW1 converter (L17)
V-5148	Coil, SW2 converter (L18)
V-5124	Coil, SW1 and SW2 oscillator (L19, L20)
V-3254S	Connector, phono
V-5130	Control, tone, dual 2.0 megohms (R1) and 1.0 megohms (R2)
V-5111	Control, volume 2.0 megohms (R3) and switch (SW1)
V-4304-12	Cord Assembly, dial drive
V-3239	Cord, power A-C
V-4966-1	Cord, record changer power
V-4525-3	Cushion, chassis mounting
V-5109	Dial Background, rivet assembly
V-5112	Dial, glass
V-5171	Escutcheon, push button
V-4902	Glide, furniture
V-5060-1	Grille Cloth Assembly, speaker box (mahogany)
V-5060-2	Grille Cloth Assembly, speaker box (blonde)
V-5059-1	Grille Cloth, top (mahogany)
V-5074	Grille Cloth, top (blonde)
V-5123	Grille, metal, speaker
V-3345S-4	Grommet, variable capacitor mounting
V-5067-1	Hinge, center, split door (mahogany)
V-5067-2	Hinge, center, split door (blonde)
V-5363-1	Hinge, lower left hand(mahogany)

WESTINGHOUSE ELECTRIC CORP. MODEL H-169

Part No.	Description
V-5170	Retainer, molding for V-5169
V-5188	Rosette, brass
V-5173	Screw, #2-56, for front glass plate
V-3429-8	Screw, #10-32 Hex Head, chassis mounting
V-5187-1	Screw, mounting, for front glass plate
V-5110	Shaft, tuning
V-3344S-2	Sleeve, spacer, variable capacitor mounting
V-3353-5	Slide Mechanism, left hand
V-3353-6	Slide Mechanism, right hand
V-3393-4	Socket, A-C power, phono
V-5117-2	Socket Assembly, tube (7F8)
V-4933	Socket, molded octal, for pre-amplifier
V-4195	Socket, molded octal tube (6L6)
V-3275S	Socket, molded octal tube (5U4G)
V-3246	Socket, octal tube (wafer)
V-5181	Socket, pilot light, jewel
V-5237	Socket, pilot light, phono
V-5183	Socket, pilot light, push buttons
V-5180-3	Socket, pilot light, (SW1, SW2, BC, FM)
V-5192	Socket, 7 contact for speaker
V-5193	Socket, tuning eye (plus R50)
V-5182	Sockets, pilot light, edge lights
V-5354	Spacer, Neoprene, for speaker turntable
V-5160	Speaker, 12" Electro-Dynamic
V-5161	Speaker, 5" x 7" P.M. (plus C32)
V-3248S	Spring, dial drive
V-3258S	Spring, knob
V-5233	Spring, speaker turntable
V-5065-1	Strike, bullet catch (mahogany)
V-5065-2	Strike, bullet catch (blonde)
V-5168-1	Strip, felt, 5/16" x 15" (mahogany)
V-5168-2	Strip, felt, 5/16" x 15" (blonde)
V-5234	Stud, bearing, for speaker turntable
V-3167S-1	Stud, pulley, threaded
V-5235	Stud, threaded, for speaker turntable
V-3261-3	Switch, push button (SW10A, SW10B)
V-5135	Switch, selector, (SW2, SW3, SW4, SW5, SW6, SW7, SW8, SW9)
V-5152	Tab, AM and SW1
V-5185	Tab, FM and SW2
V-5174	Tabs, station
V-3482	Teenut, for speaker box
V-5144	Terminal Board, ANT-GND
V-3417	Terminal Board, FM antenna
V-5136	Transformer, driver (L21, L22)
V-5373	Transformer, 1st I-F (C83, C84, C85, C101, C102, L23, L24, L25, L26)
V-5374	Transformer, 2nd I-F (C86, C87, C88, C89, R49, L27, L28, L29, L30)
V-5375	Transformer, 3rd I-F (C90, C91, C92, L31, L32, L33)
V-5212	Transformer, discriminator (C93, C94, L34, L35, L36, L37)
V-5137	Transformer, power
V-3274S	Tube Holder
V-3317	Tuner, push button
V-5222	Turntable Assembly, for speaker box
V-3506S-1	Washer, chassis mounting, Neoprene
V-3752S	Washer, felt, for knobs
V-3267S-3	Washer, flat, chassis mounting
V-3267S-10	Washer, flat, record changer mounting
V-3215S	Washer, spring, for tuning shaft
V-5175	Windows, station tab

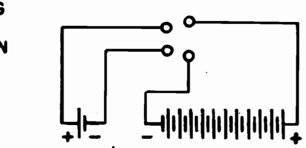
Part No.	Description
V-5363-2	Hinge, lower right hand (mahogany)
V-5363-3	Hinge, lower left hand (blonde)
V-5363-4	Hinge, lower right hand (blonde)
V-5179-1	Jewel, pilot light
V-5155-1	Knob, band (mahogany)
V-5155-2	Knob, band (blonde)
V-4362-4	Knob, tone, front (mahogany)
V-4362-5	Knob, tone, front (blonde)
V-5028-2	Knob, tone, rear
V-5095-1	Knob, volume and tuning (mahogany)
V-5095-2	Knob, volume and tuning (blonde)
No. 44	Lamp, pilot light
No. 51	Lamp, pilot light
V-3283-4	Loop Assembly
V-5169	Molding, bronze strip, front
V-5365-1	Molding, plastic, for lower doors (mahogany)
V-5365-2	Molding, plastic, for lower doors (blonde)
V-5205	Nut, speed, for front glass plate
V-5236	Plate, anchor, 1½" x 1½"
V-5158-1	Plate Assembly, front glass (mahogany)
V-5158-2	Plate Assembly, front glass(blonde)
V-5229	Plate, bottom, for speaker turntable
V-5230	Plate, mounting, for speaker turntable
V-5231	Plate, top, for speaker turntable
V-5133	Pointer
V-5062	Pull, door, lower (mahogany)
V-5305	Pull, door, lower (blonde)
V-5061	Pull, door, upper (mahogany)
V-5306	Pull, door, upper (blonde)
V-3166S	Pulley, 7/16 dia.
V-5166-1	Push button
V-5232	Race, bearing, for speaker turntable
V-5203	Reflector, dial
V-5134	Resistor, 190 ohms 4 w. (R4)
V-5340	Resistor, 290 ohms 2.3 w. (R5)
RC10AE102M	Resistor, 1000 ohms 1/4 w. (R6)
RC20AE393K	Resistor, 39K ½ w. (R7)
RC10AE274M	Resistor, 270K 1/4 w. (R8, R9, R10)
RC20AE682K	Resistor, 6800 ohms ½ w. (R11)
RC10AE105M	Resistor, 1.0 megohm 1/4 w. (R12, R13, R15, R16, R17)
RC10AE104K	Resistor, 100K 1/4 w. (R14, R18, R19)
RC10AE273K	Resistor, 27K 1/4 w. (R20)
RC10AE473M	Resistor, 47K 1/4 w. (R21)
RC10AE222M	Resistor, 2200 ohms 1/4 w. (R22)
RC10AE683M	Resistor, 68K 1/4 w. (R23)
RC10AE225M	Resistor, 2.2 megohms 1/4 w. (R24, R25)
RC10AE273M	Resistor, 27K 1/4 w. (R26)
RC10AE153J	Resistor, 15K 1/4 w. (R27, R28)
RC20AE330K	Resistor, 33 ohms ½ w. (R29, R30)
RC10AE223K	Resistor, 22K 1/4 w. (R31)
RC10AE680M	Resistor, 68 ohms 1/4 w. (R32)
RC10AE274K	Resistor, 270K 1/4 w. (R33, R34)
RC20AE333M	Resistor, 33K ½ w. (R35)
RC10AE154K	Resistor, 150K 1/4 w. (R36)
RC10AE474M	Resistor, 470K 1/4 w. (R37)
RC40AE223K	Resistor, 22K 2 w. (R38)
RC30AE333K	Resistor, 33K 1 w. (R39, R40)
RC20AE103K	Resistor, 10K ½ w. (R41)
RC10AE222K	Resistor, 2200 ohms 1/4 w. (R42)
RC20AE471K	Resistor, 470 ohms ½ w. (R43, R44)
RC40AE682K	Resistor, 6800 ohms 2 w. (R45)
RC30AE332K	Resistor, 3300 ohms 1 w. (R46, R47)
RC10AE221K	Resistor, 220 ohms ½ w. (R48)

MODEL H-178 WESTINGHOUSE ELECTRIC CORP.



INTERMEDIATE FREQUENCY: 455 KC

NOTE –
1. VOICE COIL DISCONNECTED.
2. ALL VOLTAGES MEASURED FROM CHASSIS (GND) USING 20,000 OHMS/VOLT METER. READINGS SHOULD APPROXIMATE THE VALUES SHOWN WITHIN 20 PERCENT.
3. NOT USED ON ALL CHASSIS.



FREQUENCY RANGE:

Standard Broadcast and Police ....550 to 1700 kc

POWER OUTPUT:

Undistorted ....140 milliwatts
Maximum ....350 milliwatts

LOUDSPEAKER:

Size and Type ....5¼" P. M.
Voice Coil Impedance ....3.2 ohms

POWER SUPPLY:

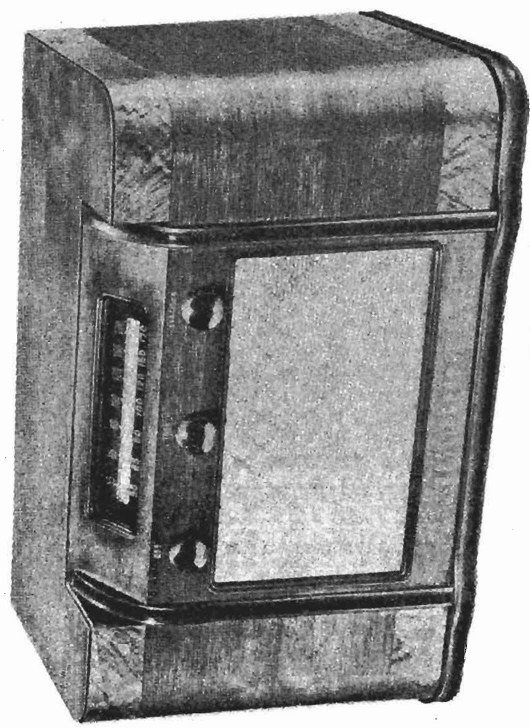
1 Westinghouse V-3594 "AB" Battery Pack (1½ v. "A" and 90 v. "B")

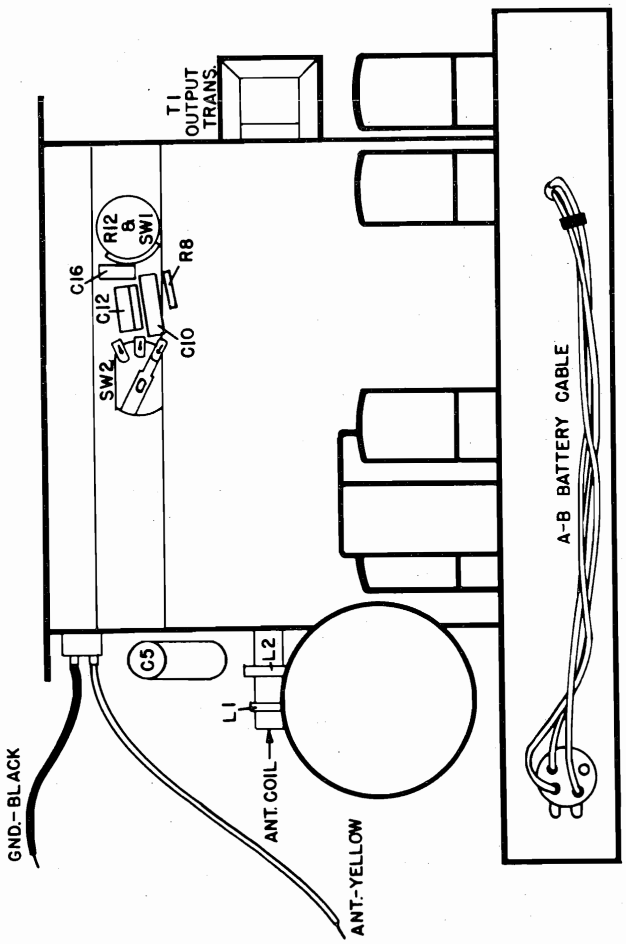
CURRENT CONSUMPTION:

"A" Section of "AB" Battery ....260 ma.
"B" Section of "AB" Battery ....16 ma.

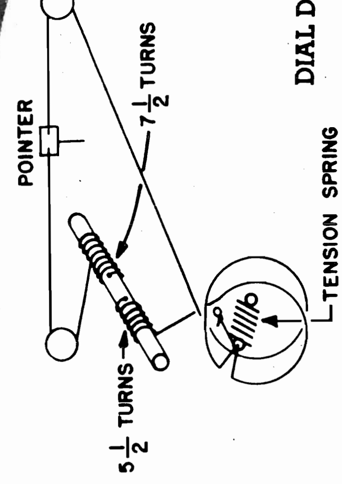
WESTINGHOUSE ELECTRIC CORP.

MODEL H-178

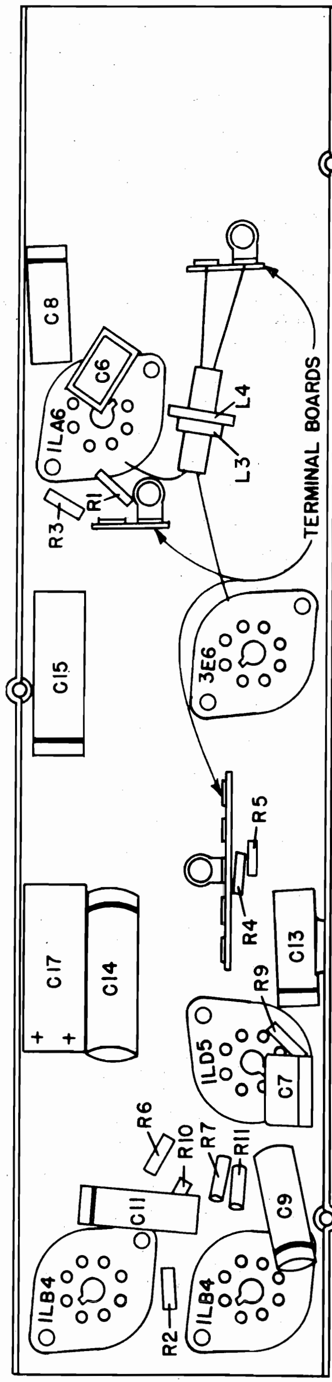




REAR VIEW OF CHASSIS

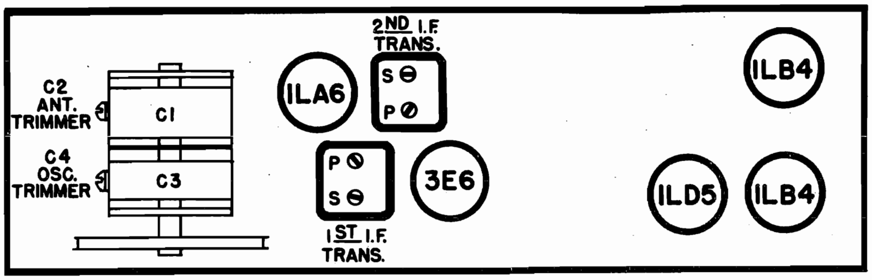


DIAL DRIVE MECHANISM



BOTTOM VIEW OF CHASSIS

MODEL H-178 WESTINGHOUSE ELECTRIC CORP.



CHASSIS LAYOUT

ALIGNMENT

Before beginning alignment, make certain that the dial pointer aligns with the dot on the extreme high-frequency end of the dial when the tuning capacitor is set for minimum capacity.

Connect an output meter across the speaker voice coil.

While making the following adjustments, keep the volume control set for maximum output and the signal generator output attenuated to avoid A. V. C. action.

Step	Connect Signal Generator to—	Signal Generator Frequency	Radio Dial Setting	Adjust
1	3E6 control grid through 0.1 mfd capacitor	455 kc	550 kc	Secondary and Primary trimmers of 2nd I-F trans. for max. output.
2	1LA6 control grid through 0.1 mfd capacitor	455 kc	550 kc	Secondary and Primary trimmers of 1st I-F trans. for max. output.
3	Antenna terminal through 200 mmf capacitor	455 kc	550 kc	"Peak" all I-F trimmers.
4	Antenna terminal through 200 mmf capacitor	1500 kc	1500 kc	Oscillator trimmer for max. output.
5	Antenna terminal through 200 mmf capacitor	1500 kc	1500 kc	Antenna trimmer for max. output.

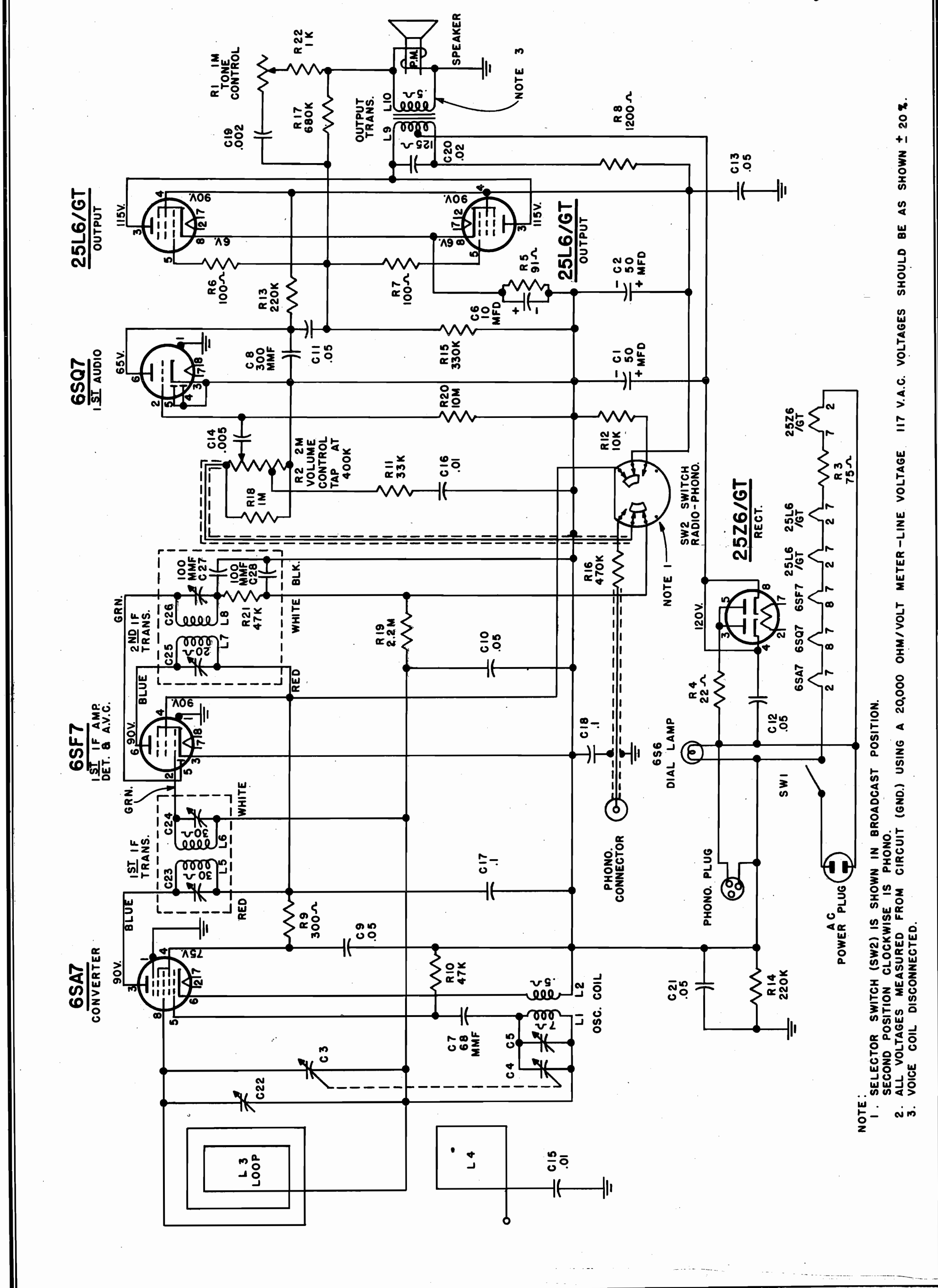
PARTS LIST FOR MODEL H-178

When ordering parts specify model number of set in addition to part number and description of part.

Part No.	Description
V-3603	Background, dial
V-3593	Baffle, speaker
V-3594	Battery, "A-B"
V-3550	Bracket, dial mounting
V-3551	Bracket, pulley stud assembly
V-3600	Bracket, speaker mounting
V-3555	Bracket, tuning shaft mounting
V-3580	Bracket, variable capacitor
V-1147-1	Cabinet
V-5324	Cable Assembly, battery
V-3569	Capacitor, variable 2 gang (C1, C2, C3, C4)
RCP10W2503A	Capacitor, .05 mfd 200 v. (C5)
RCM20A470K	Capacitor, 47 mmf mica (C6, C7)
RCP10W4103A	Capacitor, .01 mfd 400 v. (C8, C9)
RCP10W6102K	Capacitor, .001 mfd 600 v. (C10, C11)
RCM20A471K	Capacitor, 470 mmf mica (C12)
RCP10W6202A	Capacitor, .002 mfd 600 v. (C13)
RCP10W2104A	Capacitor, 0.1 mfd 200 v. (C14, C15)
RCM20A101M	Capacitor, 100 mmf mica (C16)
V-3581	Capacitor, electrolytic, tubular 10 mfd 150 v. (C17)
V-3562	Clamp, dial
V-3567	Coil, antenna (L1, L2, C24)
V-3582	Coil, oscillator (L3, L4)
V-3564	Control, volume, 2 meg. (R12) with switch (SW1)
V-4157S-66	Cord, dial drive
V-3596	Decal, OFF
V-3662	Decal, STATIONS
V-3660	Decal, TONE
V-3665	Decal, WESTINGHOUSE
V-3559	Dial, glass
V-3489S-1	Foot, rubber
V-3592-2	Grille Cloth
V-3268	Grommet, variable condenser mounting
V-3331-1	Knob, volume-switch
V-3331-3	Knob, tone
V-3331-2	Knob, tuning
V-3585	Plug, battery cable
V-3558	Pointer Assembly
V-3166S	Pulley, 7/16" dia.
RC10AE224M	Resistor, 220K ¼ w. (R1)
RC10AE105M	Resistor, 1.0 meg. ¼ w. (R2)
RC10AE563M	Resistor, 56K ¼ w. (R3)
RC10AE225M	Resistor, 2.2 meg. ¼ w. (R4, R5, R6, R7)
RC10AE101M	Resistor, 100 ohms ¼ w. (R8)
RC10AE106M	Resistor, 10.0 meg. ¼ w. (R9)
RC10AE681K	Resistor, 680 ohms ¼ w. (R10)
RC10AE334M	Resistor, 330K ¼ W. (R11)
V-3573	Socket, loktal, miniature tube
V-3601	Speaker, 5¼" P. M.
V-3248S	Spring, dial drive
V-3258S	Spring, knobs
V-3563	Switch, tone (SW2)
V-3574	Terminal Board, 2 lugs
V-3575	Terminal Board, 5 lugs
V-3576	Transformer, output (T1)
V-3577	Transformer, 1st I-F (L5, L6, C18, C19)
V-3578	Transformer, 2nd I-F (L7, L8, C20, C21, C22, C23, R13)
V-3556	Tuning Shaft Assembly
V-3752S	Washer, felt
V-3267S-4	Washer, flat, chassis mounting
V-3237	Washer, cup, variable capacitor Mounting

WESTINGHOUSE ELECTRIC CORP.

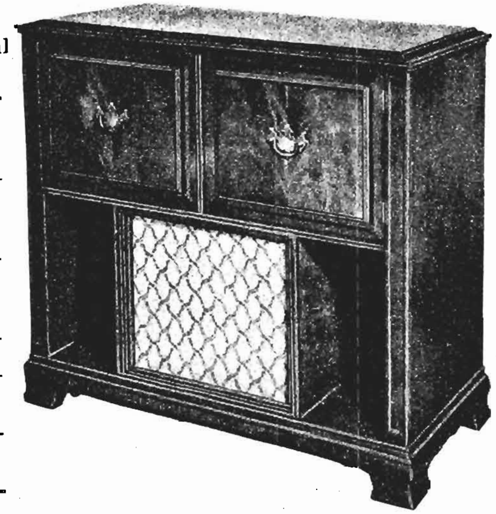
MODELS H-183, H-183A



RECORD CHANGERS: For H-183, Gen. Ins. Model 205, RCD.CH. 15-5; For H-183A, Gen Ins. Model 700, RCD.CH. 19-1

MODELS H-183, H-183A

WESTINGHOUSE ELECTRIC CORP.



ALIGNMENT

The use of an isolation transformer in the power line is recommended.

Connect an output meter across the speaker voice coil.

While making the following adjustments, keep the volume control set for maximum output and the signal generator output attenuated to avoid A. V. C. action.

Step	Connect Signal Generator to—	Signal Generator Frequency	Radio Dial Setting	Adjust
1	Pin No. 2 of 6SF7 tube through a 200 mmf capacitor	455 kc	540 kc	Secondary and primary of 2nd I-F transformer for maximum output.
2	Stator of tuning capacitor (C3) through a 200 mmf capacitor	455 kc	540 kc	Secondary and primary of 1st I-F transformer for maximum output.
3	Recheck 1st and 2nd I-F transformers.			
4	Antenna terminal through a 200 mmf capacitor	1615 kc	1615 kc	Oscillator trimmer (C5) for maximum output.
5	Radiated signal (no actual connection)	1400 kc	1400 kc	Antenna trimmer (C22) for maximum output.

FREQUENCY RANGE ....540 to 1615 kc.

INTERMEDIATE FREQUENCY ....455 kc.

TUBE COMPLEMENT:

- 1 6SA7 ....Converter
- 1 6SF7 ....1st I-F Amp., Det., and AVC
- 1 6SQ7 ....1st Audio
- 2 25L6GT ....Output
- 1 25Z6GT ....Rectifier

PILOT LAMP ....Westinghouse No. 6S6 120 v., .05 amp.

POWER OUTPUT:

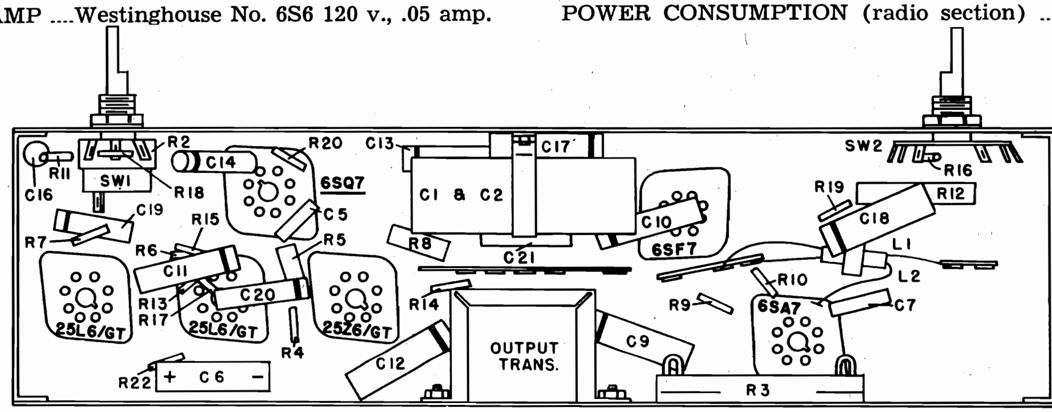
- Undistorted ....2 watts
- Maximum ....2.5 watts

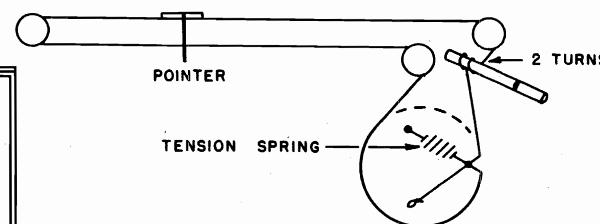
LOUDSPEAKER ....10″ PM

OPERATING VOLTAGES (radio section only):

105 to 120 volts, 50-60 cycles or 105 to 120 volts, D.C.

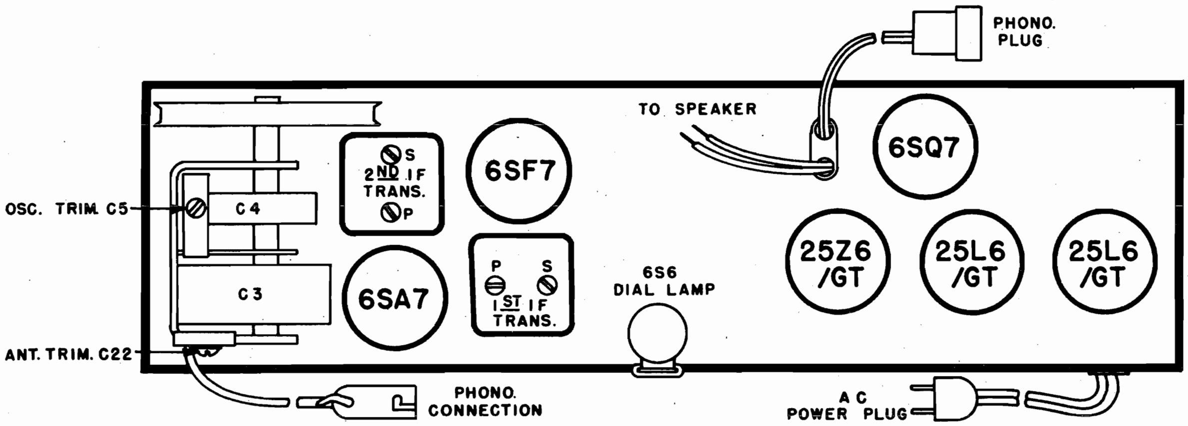
POWER CONSUMPTION (radio section) ......35 watts





WESTINGHOUSE ELECTRIC CORP.

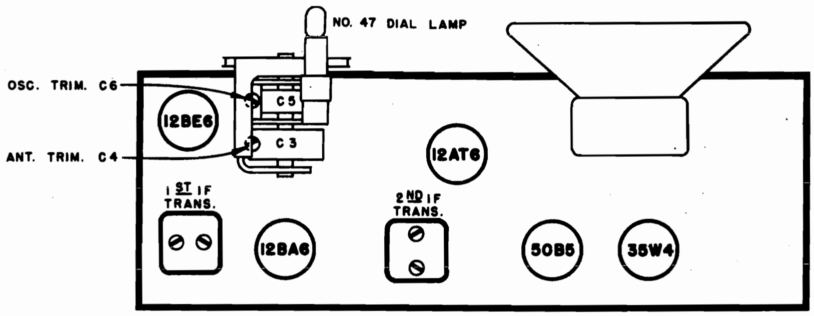
MODELS H-183, H-183A



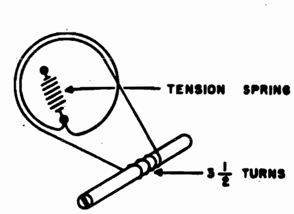
Part No.	Description
V-3166S	Pulley, 7/16 dia.
V-3321	Rail, pointer
V-4994	Resistor, 75 ohms 2 w. (R3)
RC20AE220M	Resistor, 22 ohms ½ w. (R4)
RC30AE910J	Resistor, 91 ohms 1 w. (R5)
RC10AE101M	Resistor, 100 ohms ¼ w. (R6, R7)
RC40AE122K	Resistor, 1200 ohms 2 w. (R8)
RC10AE332M	Resistor, 3300 ohms ¼ w. (R9)
RC10AE473M	Resistor, 47,000 ohms ¼ w. (R10)
RC10AE333M	Resistor, 33,000 ohms ¼ w. (R11)
RC40AE103M	Resistor, 10,000 ohms 2 w. (R12)
RC10AE224M	Resistor, 220,000 ohms ¼ w. (R13, R14)
RC10AE334M	Resistor, 330,000 ohms ¼ w. (R15)
RC10AE474M	Resistor, 470,000 ohms ¼ w. (R16)
RC10AE684M	Resistor, 680,000 ohms ¼ w. (R17)
RC10AE105M	Resistor, 1 megohm ¼ w. (R18)
RC10AE225M	Resistor, 2.2 megohms ¼ w. (R19)
RC10AE106M	Resistor, 10M ¼ w. (R20)
RC10AE102M	Resistor, 1000 ohms ¼ w. (R22)
V-3322	Shaft, tuning
V-5620	Shield, light
V-3344-1	Sleeve, spacer
V-5631-1	Slide Mechanism, left hand
V-5631-2	Slide Mechanism, right hand
V-5619-1	Socket, dial lamp
V-3163	Socket, octal No. 1 ground
V-3246S	Socket, octal tube
V-5571	Speaker, 10" P. M.
V-3248S	Spring, dial drive
V-3258S	Spring, knob
V-5628-1	Strike, bullet catch
V-3301	Switch, radio-phono (SW2)
V-3482	Teenut, phono mounting (H-183)
V-3328	Transformer, 1st I-F (C23, C24, L5, L6)
V-3329	Transformer, 2nd I-F (R21, C25, C26, C27, C28, L7, L8)
V-5430	Transformer, output (L9, L10)
V-3668S	Washer, felt (knobs)
V-3267S-10	Washer, flat (record changer mounting for H-183A)
V-3267S-4	Washer, flat (chassis and record changer mounting for H-183 and chassis mounting for H-183A)

Part No.	Description
V-5580	Bracket, dial lamp
V-5584	Cable and Socket, phono power
V-5593	Capacitor, electrolytic 50-50 mfd (C1, C2)
V-5586	Capacitor, variable 2-gang (C3, C4, C5)
V-5621	Capacitor, electrolytic cartridge 10 mfd (C6)
RCM20A680M	Capacitor, 68 mmf mica (C7)
RCM20A301M	Capacitor, 300 mmf mica (C8)
RCP10W4503A	Capacitor, .05 mfd 400 v. (C9, C10, C11, C12, C13)
RCP10W6502A	Capacitor, .005 mfd 600 v. (C14)
RCP10W4103A	Capacitor, .01 mfd 400 v. (C15, C16)
RCP10W4104A	Capacitor, .1 mfd 400 v. (C17, C18)
RCP10W4202A	Capacitor, .002 mfd 400 v. (C19)
RCP10W4203A	Capacitor, .02 mfd 400 v. (C20)
V-5618-1	Capacitor, .05 mfd 400 v. (C21)
V-4992	Capacitor, trimmer, antenna (C22)
V-5627-1	Catch, bullet
V-5622	Clip, dial mounting
V-3473	Coil, oscillator (L1, L2)
V-5585	Connector, phono, female
V-3303	Control, tone (R1)
V-5617	Control, volume (R2) and switch (SW1)
V-4304-15	Cord Assembly, dial drive
V-3663	Decal, radio-phono
V-3662	Decal, stations
V-3660	Decal, tone
V-3661	Decal, volume
V-5567	Dial, plastic
V-5569	Escutcheon
V-5629	Glide, furniture
V-5625-1	Grille Cloth
V-3766	Grommet, fibre
V-3345-7	Grommet, phono mounting (H-183)
V-5630-1	Hinge, door
V-3667-6	Knob, radio-phono
V-3262-5	Knob, tone and band
V-3667-5	Knob, volume
No. 6S6	Lamp, dial
V-5583	Loop, antenna
V-5632-1	Nameplate
V-3712S	Needle, phono
V-3366-2	Pin, escutcheon-nameplate mounting
V-5577	Pointer, dial
V-5626-1	Pull, door

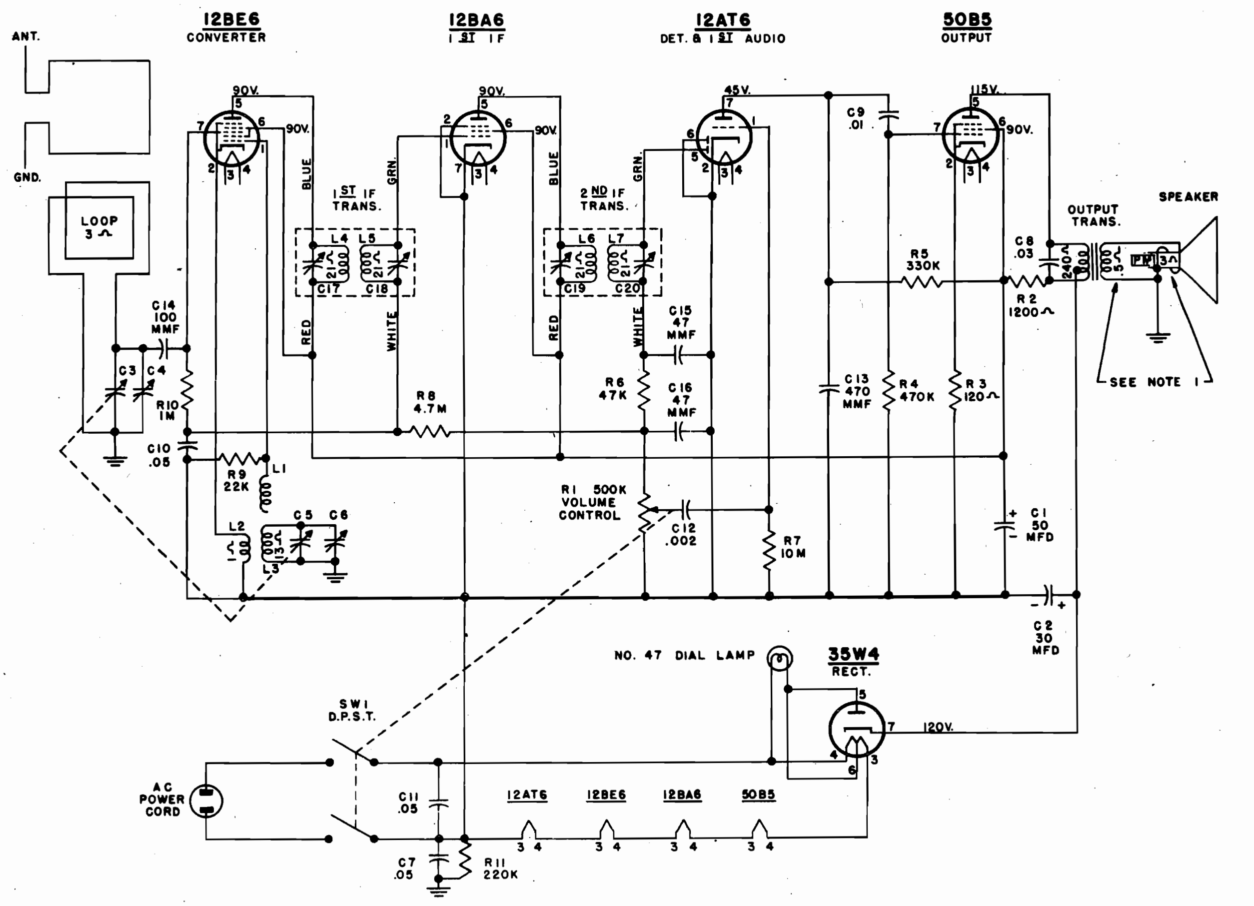
MODEL H-188 WESTINGHOUSE ELECTRIC CORP.



CHASSIS NO. V-2133



Step	Connect Signal Generator to —	Signal Generator Frequency	Radio Dial Setting	Adjust
1.	Stator of antenna tuning capacitor (C3) through a 0.1 mfd capacitor	455 kc	minimum capacity	Trimmers in 1st and 2nd I-F trans. for max. output
	NOTE: If the I-F transformers are badly mis-aligned, it may be impossible to obtain sufficient output using the above system. In this event, it will be necessary to align each transformer separately. Start with the last I-F transformer and work forward, connecting the signal generator to the control grid of the tube preceding the transformer under alignment.			
2.	Recheck Step 1 adjustments.			
3.	Radiated signal (no actual connection)	1615 kc	minimum capacity	Osc. trimmer (C6) for max. output
4.	Radiated signal (no actual connection)	1400 kc	tune to signal	Ant. trimmer (C4) for max. output (rock-in adjustment)

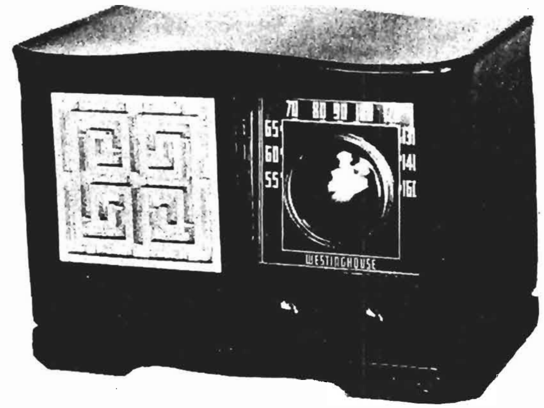


NOTE:
1. VOICE COIL DISCONNECTED.
2. ALL VOLTAGES MEASURED FROM CIRCUIT (GND.) USING 20,000 OHM/VOLT METER-LINE VOLTAGE 117 V.A.C. VOLTAGES SHOULD BE AS SHOWN ± 20 PER CENT.

CHASSIS NO. V-2133

WESTINGHOUSE ELECTRIC CORP. MODEL H-188

Part No.	Description
V-5778-1	Baffle and Grille Cloth Assembly
**V-1160-1	Cabinet
V-4044	Capacitor, electrolytic 50 mfd 150 v. (C1) 30 mfd 150 v. (C2)
V-5819	Capacitor, variable, 2 gang Tuner, antenna (C3) Trimmer, antenna (C4) Tuner, oscillator (C5) Trimmer, oscillator (C6)
V-5618-1	Capacitor, .05 resonant 400 v. (C7)
RCP10W4303A	Capacitor, .03 mfd 400 v. (C8)
RCP10W4103A	Capacitor, .01 mfd 400 v. (C9)
RCP10W4503A	Capacitor, .05 mfd 400 v. (C10, C11)
RCP10W6202A	Capacitor, .002 mfd 600 v. (C12)
RCM20A471M	Capacitor, 470 mmf mica (C13)
RCM20A101M	Capacitor, 100 mmf mica (C14)
RCM20A470M	Capacitor, 47 mmf mica (C15, C16)
V-5851	Coil, oscillator (L1, L2, L3)
V-5833	Control, volume, variable resistor 500K (R1) and switch D.P.S.T. (SW1)
V-4304-18	Cord, dial drive
V-5679-1	Cover, back
V-5777	Dial
V-5784	Disc, pointer
V-5785-1	Hub, pointer
V-5780-1	Knob
No. 47	Lamp, pilot light
RC30AE122K	Resistor, 1200 ohms 1 w. (R2)
RC20AE121K	Resistor, 120 ohms ½ w. (R3)
RC20AE474M	Resistor, 470,000 ohms ½ w. (R4)
RC20AE334M	Resistor, 330,000 ohms ½ w. (R5)
RC20AE473M	Resistor, 47,000 ohms ½ w. (R6)
RC20AE106M	Resistor, 10 megohms ½ w. (R7)
RC20AE475M	Resistor, 4.7 megohms ½ w. (R8)
RC20AE223M	Resistor, 22,000 ohms ½ w. (R9)
RC20AE105M	Resistor, 1 megohm ½ w. (R10)
RC20AE224M	Resistor, 220,000 ohms ½ w. (R11)
V-4053	Socket, dial light
V-5852-2	Socket, miniature wafer
V-5852-1	Socket, miniature wafer (shielded)
**V-5682	Speaker, 5" P.M.
V-4057	Spring, dial drive
V-5685	Transformer, 1st I-F (L4, L5, C17, C18)
V-5686	Transformer, 2nd I-F (L6, L7, C19, C20)
V-5775-1	Transformer, output
V-5421-3	Washer, felt, knob
V-5776	Window, dial



ALIGNMENT

It is recommended that the chassis be isolated from the power line by means of an isolation transformer.

Connect an output meter across the speaker voice coil.

While making the following adjustments, keep the volume control set for maximum output and the signal generator attenuated to avoid AVC action.

SPECIFICATIONS

FREQUENCY RANGE: .... 540 to 1600 kc.

INTERMEDIATE FREQUENCY: .... 455 kc.

TUBE COMPLEMENT:

1	12BE6	Converter
1	12BA6	I-F Amp.
1	12AT6	Det., AVC, and 1st Audio
1	50B5	Output Amp.
1	35W4	Rectifier

PILOT LAMP: .... Westinghouse No. 47, 6.3 v., 0.15 a.

POWER OUTPUT:

Undistorted .... 0.8 watts
Maximum .... 1.3 watts

LOUDSPEAKER: .... 5" P.M.

OPERATING VOLTAGE: .... 105 to 120 volts 50-60 cycles A-C or D-C

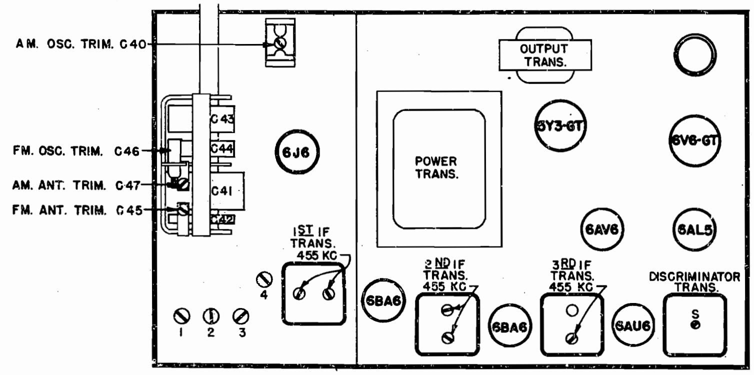
POWER CONSUMPTION: .... 35 watts at 117 volts

MODELS H-190, H-191, H-191A

WESTINGHOUSE ELECTRIC CORP.

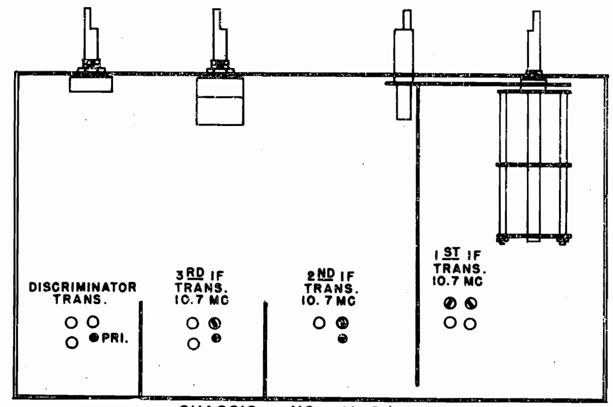
H-190

H-191 & H-191A



CHASSIS NO. V-2134

— TOP VIEW



CHASSIS NO. V-2134 BOTTOM VIEW

BOTTOM VIEW

SPECIFICATIONS

FREQUENCY RANGES:

Standard Broadcast .... 540 - 1600 kc.
Frequency Modulation .... 88 - 108 mc.

INTERMEDIATE FREQUENCIES:

Amplitude Modulation .... 455 kc.
Frequency Modulation .... 10.7 mc.

TUBE COMPLEMENT:

1	6J6	Osc. - Converter
2	6BA6	1st and 2nd I-F Amp.
1	6AU6	Limiter (FM)
1	6AV6	Det. (AM) and 1st A-F Amp.
1	6AL5	Ratio Det. (FM)
1	6V6GT	Output Amp.
1	5Y3GT	Rectifier

PILOT LAMPS:

...2 Westinghouse No. 44, 6.3 v., 0.25 amp.

POWER OUTPUT:

Undistorted .... 3.5 watts
Maximum .... 5 watts

LOUDSPEAKER:

H-190 .... 8" P.M.
H-191 and H-191A .... 10" P.M.

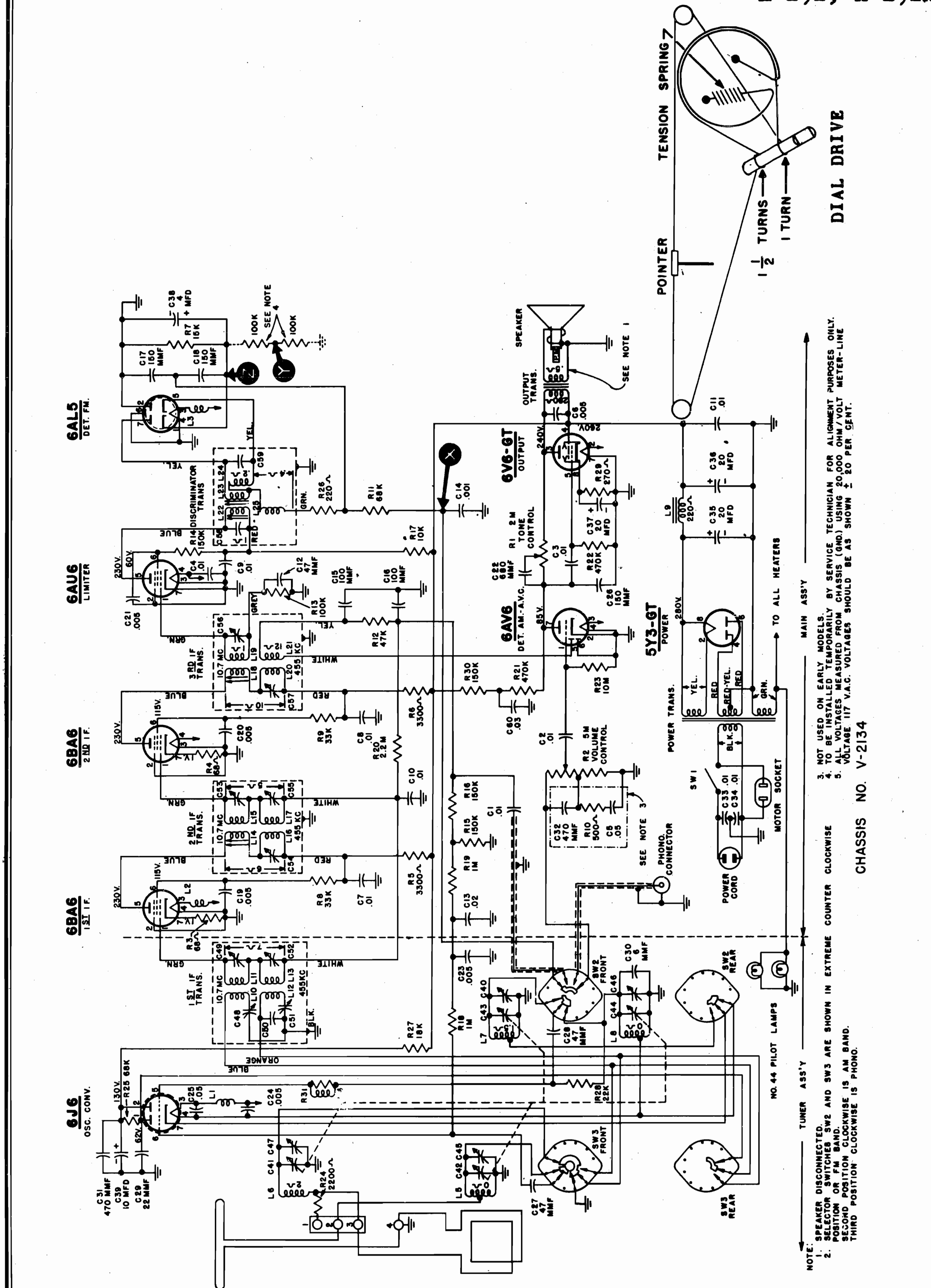
OPERATING VOLTAGE:

.... 105 to 120 volts, 60 cycles A-C

POWER CONSUMPTION .... 150 watts

WESTINGHOUSE ELECTRIC CORP.

MODELS H-190, H-191, H-191A



MODELS H-190, H-191, H-191A

WESTINGHOUSE ELECTRIC CORP.

ALIGNMENT

BROADCAST BAND

Completely mesh the tuning capacitor plates and set the dial pointer to the end mark on the dial scale.

Connect an output meter across the speaker voice coil.

While making the following adjustments, keep the volume control set for maximum output, the tone control set for maximum treble, and the signal generator output attenuated to avoid A.V.C. action.

Step	Connect Signal Generator to —	Signal Generator Frequency	Radio Dial Setting	Adjust
1	Set the band switch to AM.			
2	Stator of tuning capacitor (C41) through a 0.1 mfd capacitor	455 kc	maximum capacity	455 kc. pri. of 3rd I-F trans., sec. and pri. of 2nd I-F trans., and sec. and pri. of 1st I-F trans. for max. output
	NOTE: If the I-F transformers are badly mis-aligned, it may be impossible to obtain sufficient output using the above system. In this event, it will be necessary to align each transformer separately. Start with the last I-F transformer and work forward, connecting the signal generator to the control grid of the tube preceding the transformer under alignment.			
3	Radiated signal (no actual connection)	1600 kc	1600 kc	AM osc. trimmer (C40) for max. output
4	Radiated signal (no actual connection)	1400 kc	tune to signal	AM ant. trimmer (C47) for max. output (rock-in adjustment)

FM BAND

Do not align the 10.7 mc. I-F circuits until all 455 kc. I-F adjustments have been completed.

Step	Connect Signal Generator to —	Signal Generator Frequency	Radio Dial Setting	Adjust
1	Set the band switch to FM.			
2	Connect two 100,000 ohm resistors (the resistances must be equal within 5 percent) between pin #1 of the 6AL5 tube and ground as shown in Fig. 4.			
3	Connect a V.T.V.M. between points "X" and "Y" (see Fig. 4).			
4	Pin #1 of the 6BA6, 1st I-F amp. through a .001 mfd mica capacitor	10.7 mc	maximum capacity	Sec. of discriminator trans. for *zero* voltage (the voltage will go positive on one side of the correct setting and negative on the other side)
5	Connect the V.T.V.M. between point "Z" and ground.			
6	Pin #1 of the 6BA6, 1st I-F amp. through a .001 mfd mica capacitor	10.7 mc	maximum capacity	Pri. of discriminator trans., 10.7 mc. sec. and pri. of 3rd I-F trans., and 10.7 mc. sec. and pri. of 2nd I-F trans. for max. voltage
7	Using the same sig. generator and V.T.V.M. connections as in Step 6, adjust the sig. generator output until the V.T.V.M. indicates 4 volts. Use this sig. generator setting to perform Step 9.			
8	Reconnect the V.T.V.M. between points "X" and "Y".			
9	Pin #1 of the 6BA6, 1st I-F amp. through a .001 mfd mica capacitor	10.7 mc	maximum capacity	Sec. of discriminator trans. for *zero* voltage. The voltage will change polarity as the sec. is tuned through resonance — tune carefully for exact zero
10	Remove the two 100,000 ohm resistors which were inserted in Step 2.			
11	Reconnect the V.T.V.M. between point "Z" and ground.			
12	Pin #1 of the 6BA6, 1st I-F amp. through a .001 mfd mica capacitor	10.7 mc	maximum capacity	Recheck pri. of discriminator trans. for max. voltage
13	Stator of FM tuning capacitor (C42) through a .01 mfd mica capacitor	10.7 mc	maximum capacity	Sec. and pri. of 10.7 mc. 1st I-F trans. for max. voltage
14	Ant. terminal #2 through a 300 ohm resistor	108 mc	108 mc	FM osc. trimmer (C46) for max. voltage*
15	Ant. terminal #2 through a 300 ohm resistor	105 mc	tune to signal	FM ant. trimmer (C45) for max. voltage (rock-in adjustment)**

*After adjusting the oscillator trimmer at 108 mc., check dial calibration by tuning the receiver to an 88 mc. signal from the generator. If the dial pointer indicates 88 mc., no further oscillator adjustments are necessary. If the pointer is on the high frequency side of 88 mc., slightly expand the length of the oscillator coil (L8); if the pointer is on the low frequency side of 88 mc., slightly compress the oscillator coil. Re-adjust the oscillator trimmer at 108 mc., and again check the calibration. Repeat this process until calibration is correct.

**After adjusting the antenna trimmer at 105 mc., check tracking by tuning to a 90 mc. signal from the generator and re-adjusting the antenna trimmer for max. output. If the peak setting is the same at 90 mc. as it was at 105 mc., no further adjustments are necessary. If the trimmer capacitance must be increased to obtain max. output at 90 mc., slightly compress the antenna coil (L5); if the capacitance must be decreased, slightly expand the coil. Re-adjust the antenna trimmer at 105 mc., and again check the tracking. Repeat this process until tracking is correct.

WESTINGHOUSE ELECTRIC CORP.

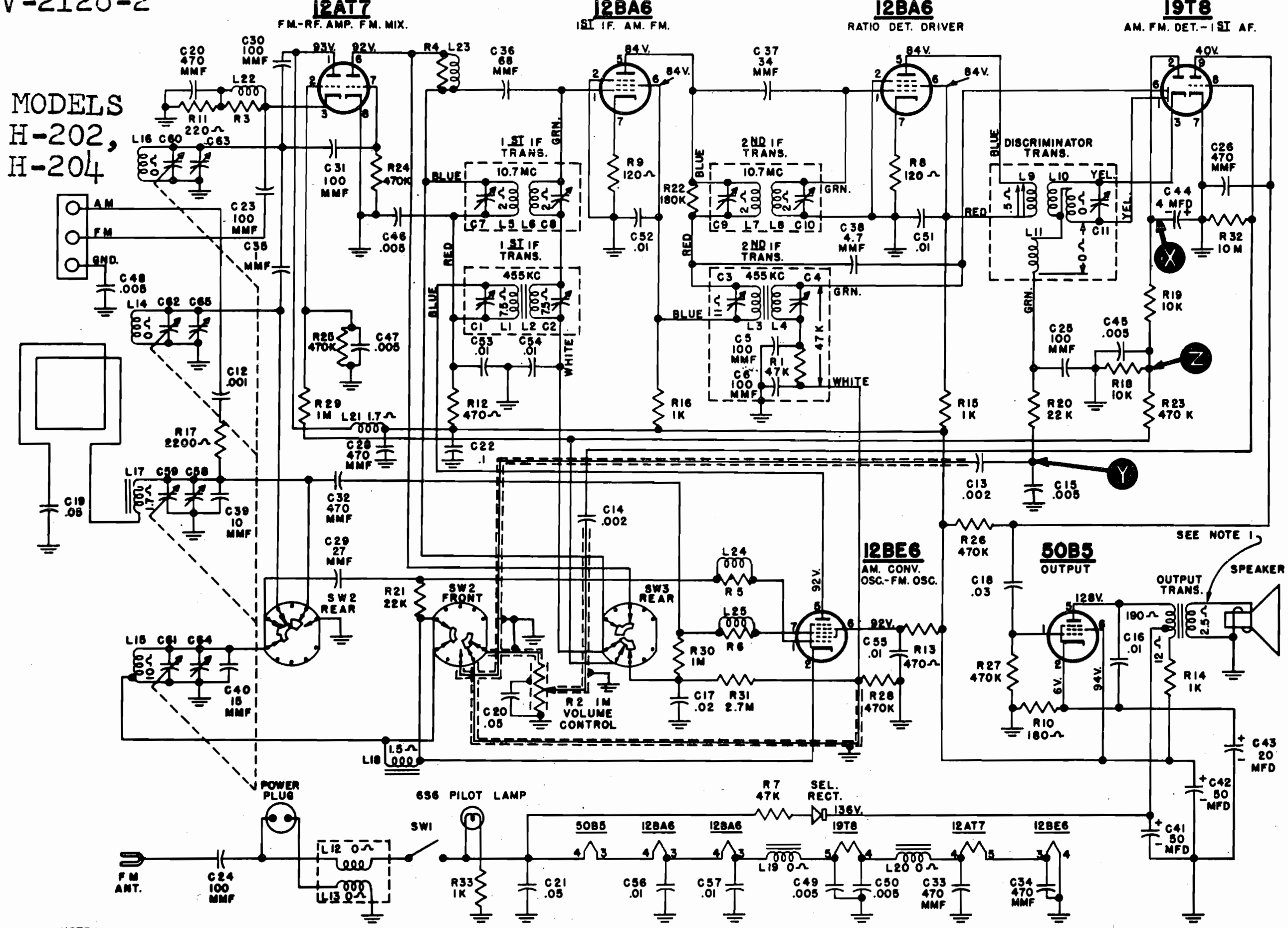
MODELS H-190, H-191, H-191A

Part No.	Description
V-5803	Coil, antenna loading (L6)
V-5804	Coil, oscillator (L7)
V-4674	Coil, FM antenna (L5)
V-6076	Coil, FM oscillator (L8)
V-3254S	Connector, phono
V-5790	Control, tone, 2 megohms (R1)
V-5791	Control, volume-off-on, .5 megohm (R2) and switch (SW1)
V-4304-17	Cord, dial drive
V-7[illegible]	Crystal Cartridge (Shure P-93) (H-190)
V-7689	Crystal Cartridge (Shure P-30) (H-191 and H-191A)
V-4690	Decal, band
V-4691	Decal, tone
V-4692	Decal, tuning
V-4693	Decal, volume
V-4474	Decal, Westinghouse (H-190)
V-5820	Dial
V-5998-1	Grille Cloth, speaker (H-190)
V-5363-1	Hinge, L.H.
V-5363-2	Hinge, R.H.
V-3667-7	Knob Assembly, band switch
V-3667-5	Knob Assembly, tone-volume-tuning
No. 44	Lamp, pilot light
V-5869	Molding, decals
V-7682	Motorboard (H-190)
V-4696	Nameplate, Westinghouse-FM (H-191 and H-191A
V-3712	Needle, phono (H-190)
V-7690	Needle, phono (H-191 and H-191A)
V-5793	Pointer, dial
V-6000-1	Pull, door, phono (H-190)
V-5877-2	Pull, door, phono (H-191 and H-191A)
V-5999-1	Pull, door, record compartment (H-190)
V-5877-1	Pull, door, record compartment (H-191 and H-191A)
V-4886-3	Reactor, R-F (L1, L2, L3)
V-4886-7	Reactor, R-F (L4, R31)
V-5794	Reactor, filter choke (L9)
RC10AE680K	Resistor, 68 ohms ½ w. (R3, R4)
RC30AE332K	Resistor, 3300 ohms 1 w. (R5, R6)
RC10AE153K	Resistor, 15,000 ohms ½ w. (R7)
RC30AE333K	Resistor, 33,000 ohms 1 w. (R8, R9)
RC10AE152M	Resistor, 1500 ohms ½ w. (R10)
RC10AE683M	Resistor, 68,000 ohms ½ w. (R11)
RC10AE473M	Resistor, 47,000 ohms ½ w. (R12)
RC10AE104K	Resistor, 100,000 ohms ½ w. (R13)
RC20AE154K	Resistor, 150,000 ohms ½ w. (R14)
RC10AE154M	Resistor, 150,000 ohms ½ w. (R15, R16, R30)
RC30AE103K	Resistor, 10,000 ohms 1 w. (R17)
RC10AE105M	Resistor, 1 megohm ½ w. (R18, R19)

Part No.	Description
**V-5982-1	Antenna Assembly, AM loop (H-190)
**V-5875-1	Antenna Assembly, AM loop (H-191 and H-191A)
**V-5986-1	Antenna Assembly, FM dipole (H-190)
**V-5986-2	Antenna Assembly, FM dipole (H-191 and H-191A)
V-5812	Background, dial
V-5860-2	Cable Assembly, speaker (H-190)
V-5860-1	Cable Assembly, speaker (H-191 and H-191A)
V-4965-2	Cable, phono input (H-191 only)
RCP10W4103A	Capacitor, .01 mfd 400 v. (C1, C2, C3)
V-5040-13	Capacitor, .01 mfd 200 v. (C4)
RCP10W2503M	Capacitor, .05 mfd 200 v. (C5)
RCP10M6502A	Capacitor, .005 mfd 600 v. (C6)
V-5040-15	Capacitor, .01 mfd 600 v. (C7, C8, C9, C10, C11)
RCM20A470M	Capacitor, 47 mmf mica (C12)
RCP10W4203A	Capacitor, .02 mfd 400 v. (C13)
RCP10W6102A	Capacitor, .001 mfd 600 v. (C14)
RCM20A101M	Capacitor, 100 mmf mica (C15, C16)
RCM20A151J	Capacitor, 150 mmf mica (C17, C18)
V-5040-11	Capacitor, .005 mfd 600 v. (C19, C20, C21)
R5CC25ZY681M	Capacitor, 680 mmf ceramicon (C22)
V-5596	Capacitor, .005 mfd 450 v. (C23, C24, C25)
RCM20A151M	Capacitor, 150 mmf mica (C26)
R3CC21SL470K	Capacitor, 47 mmf ceramicon (C27, C28)
RCM20B220K	Capacitor, 22 mmf mica (C29)
R3CC20UK060G	Capacitor, 6 mmf ceramicon (C30)
R5CC20ZY471M	Capacitor, 470 mmf ceramicon (C31)
RCM20A471M	Capacitor, 470 mmf mica (C32)
V-4634	Capacitor, dual line filter (C33, C34)
V-5821	Capacitor, electrolytic 20-20 mfd 400 v. (C35, C36)
V-3236	Capacitor, electrolytic 20 mfd 25 v. (Cathode bypass - C37)
V-4885	Capacitor, electrolytic 4 mfd 450 v. (C38)
V-5985	Capacitor, electrolytic 10 mfd 350 v. (C39)
V-4672	Capacitor, trimmer, AM oscillator (C40)
V-5802	Capacitor, variable AM antenna (C41) FM antenna (C42) AM oscillator (C43) FM oscillator (C44) Trimmer FM antenna (C45) Trimmer FM oscillator (C46) Trimmer AM antenna (C47)
RCP10W4303M	Capacitor, .03 mfd 400 v. (C60)

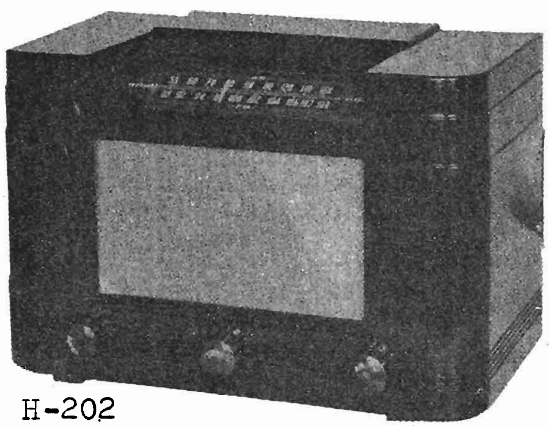
Part No.	Description
RC10AE225M	Resistor, 2.2 megohms ½ w. (R20)
RC10AE474K	Resistor, 470,000 ohms ½ w. (R21, R22)
RC10AE106M	Resistor, 10 megohms ½ w. (R23)
RC10AE222M	Resistor, 2200 ohms ½ w. (R24)
RC20AE683K	Resistor, 68,000 ohms ½ w. (R25)
RC10AE221M	Resistor, 220 ohms ½ w. (R26)
RC30AE183K	Resistor, 18,000 ohms 1 w. (R27)
RC10AE223K	Resistor, 22,000 ohms ½ w. (R28)
RC30AE271K	Resistor, 270 ohms 1 w. (R29)
V-4169-1	Shield Base, miniature tube (6J6)
V-4169-2	Shield, miniature tube (6J6)
V-5795-1	Socket, dial light
V-4292S-2	Socket, miniature molded (6J6)
V-5670	Socket, miniature wafer (4)
V-5673	Socket, miniature wafer (unshielded) (6AV6)
V-3275S	Socket, molded octal tube (5Y3G)
V-4195	Socket, molded octal tube (6V6)
V-5405	Socket, molded power (phono A-C)
**V-5981	Speaker, 8" P.M. (H-190)
**V-5571	Speaker, 10" P.M. (H-191 and H-191A)
V-3248S	Spring, dial drive
V-3258S	Spring, knob
V-4491-5	Strip, dial
V-6017-2	Support and Grille Cloth Assembly, L.H. Door (H-191 and H-191A)
V-6017-1	Support and Grille Cloth Assembly, R.H. Door (H-191 and H-191A)
V-5878-1	Support and Grille Cloth Assembly, speaker (H-191 and H-191A)
V-5806	Switch, selector
V-4627	Transformer, 1st I-F (C48, C49, C50, C51, C52, L10, L11, L12, L13)
V-4628	Transformer, 2nd I-F (C53, C54, C55, L14, L15, L16, L17)
V-4629	Transformer, 3rd I-F (C56, C57, L18, L19, L20, L21)
V-5796	Transformer, discriminator (C58, C59, L22, L23, L24, L25)
V-5798	Transformer, audio output
V-5797	Transformer, power
V-3668S	Washer, felt, for knobs

MODELS H-202, H-204, H-204A, CHASSIS V-2128-2 WESTINGHOUSE ELECTRIC CORP.

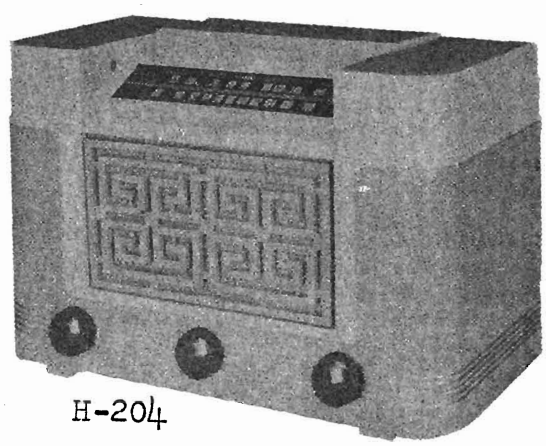


NOTE:
1. VOICE COIL DISCONNECTED.
2. SELECTOR SWITCH SW2-SW3 SHOWN IN EXTREME COUNTER CLOCKWISE POSITION OR AM BAND. SECOND POSITION CLOCKWISE IS FM BAND.
3. ALL VOLTAGES MEASURED FROM CHASSIS (GND.) USING 20,000 OHM/VOLT METER-LINE VOLTAGE 117 V.A.C. VOLTAGES SHOULD BE AS SHOWN ± 20 PER CENT.

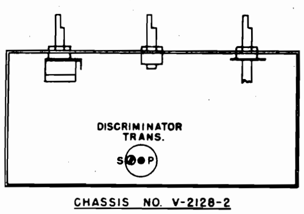
CHASSIS NO. V-2128-2



H-202

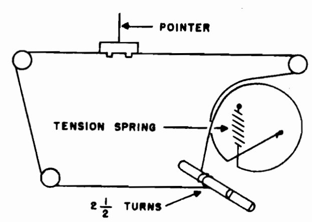


H-204



UNDER CHASSIS ADJUSTMENT

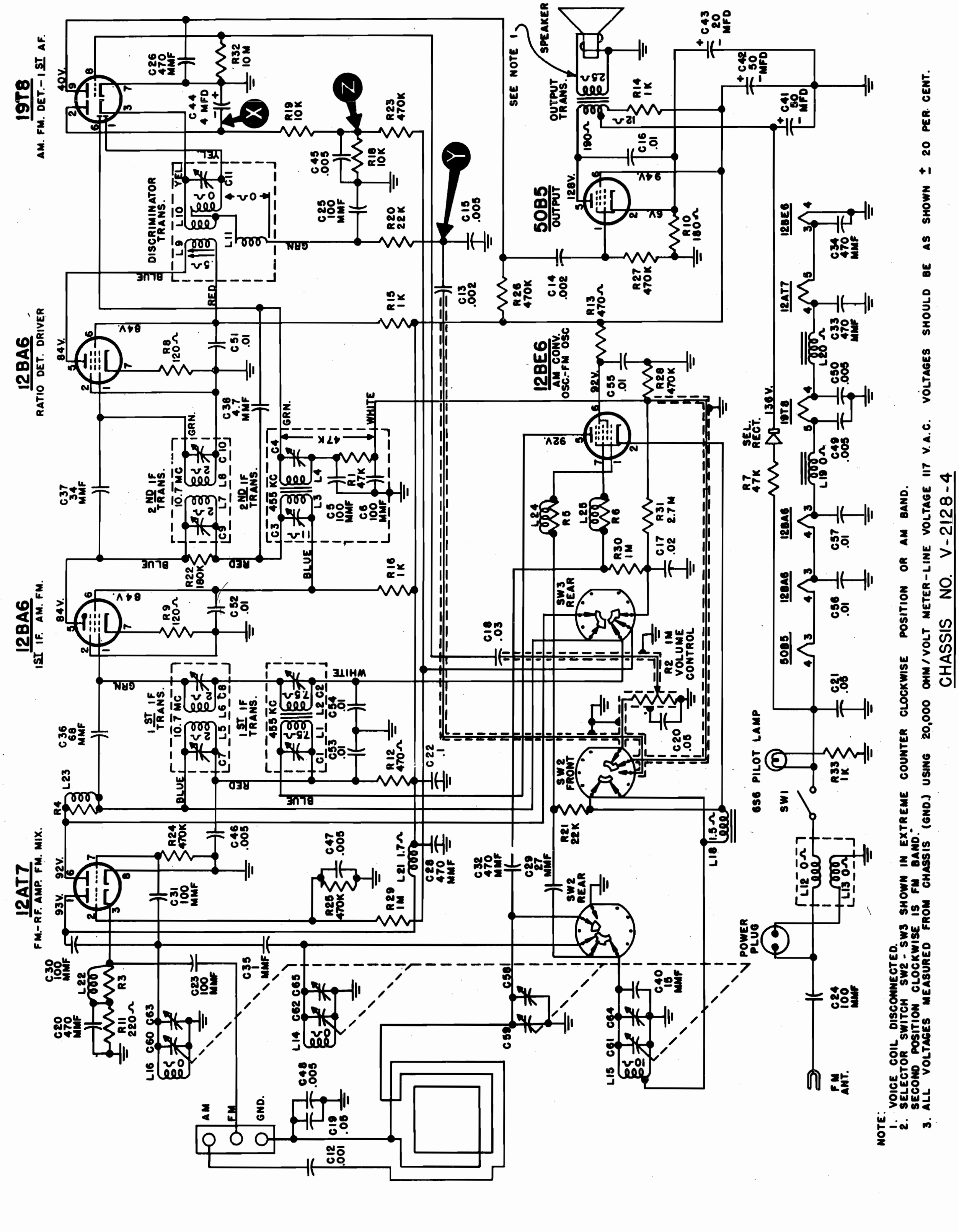
MODELS
H-202,
H-204,
H-204A



DIAL DRIVE

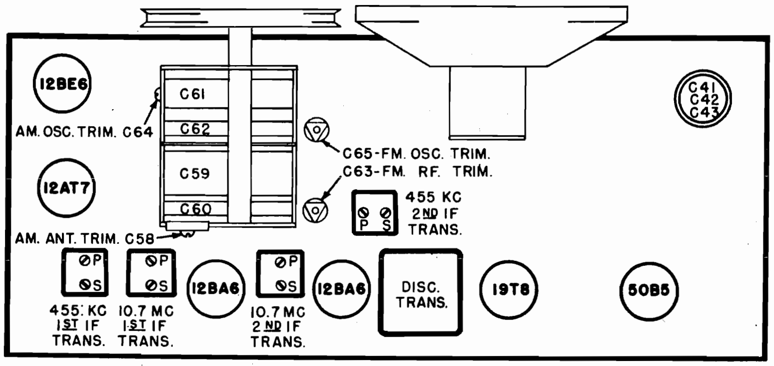
WESTINGHOUSE ELECTRIC CORP.

MODEL H-204A, CHASSIS V-2128-4



MODELS H-202, H-204, H-204A, CHASSIS V-2128-2

WESTINGHOUSE ELECTRIC CORP.



CHASSIS NO. V-2128-2

TOP VIEW

SPECIFICATIONS

FREQUENCY RANGES:

Standard Broadcast ... 540 to 1600 kc.
Frequency Modulation ... 88 to 108 mc.

INTERMEDIATE FREQUENCIES:

Amplitude Modulation .... 455 kc.
Frequency Modulation .... 10.7 mc.

TUBE COMPLEMENT:

1 12AT7 ..... R-F Amp. and Mixer (FM)
1 12BE6 ... Converter (AM), Osc. (FM)
1 12BA6 .... I-F Amp.
1 12BA6 ...... Ratio Det. Driver (FM)
1 19T8 .... Det., AVC, A-F Amp.
1 50B5 .... Output Amp.

PILOT LAMP: ... Westinghouse #6S6, 120 volts, .05 amp.

POWER OUTPUT:

Undistorted .... 1 watt
Maximum .... 2.1 watts

LOUDSPEAKER: .... 5" P.M.

OPERATING VOLTAGE:

105 to 120 volts 50 - 60 cycles A-C or 105 to 120 volts D-C.

POWER CONSUMPTION: ..... 40 watts

Model H-204A is identical in external appearance with Model H-204. The similarity of these models extends also to the chassis, where the same chassis layout, adjustment points, and basic circuit exist. However, a low-impedance loop antenna is used in Model H-204, while the H-204A incorporates a high-impedance loop with a slightly different input circuit.

The service notes for Models H-202 and H-204, with the exception of the schematic diagram and a few of the items on the parts list, apply to the Model H-204A. The necessary parts information is given below,

With the exception of items that are equivalent to those listed below, all items that apply to the Model H-204, as listed in the H-202 and H-204 service notes, apply also to the Model H-204A.

The parts listed below apply only to Model H-204A.

Part No.	Description
V-6168-1	Cover Rivet Assembly, back (H-204A brown) ....
V-6168-2	Cover Rivet Assembly, back (H-204A ivory and green)
V-6061	Loop, antenna (H-204A) ....

WESTINGHOUSE ELECTRIC CORP.

MODELS H-202, H-204, H-204A, CHASSIS V-2128-2

CAUTION: One side of the power line is connected directly to the chassis in this model. Care must be exercised to avoid contacting the radio chassis and ground at the same time — ***SERIOUS SHOCK MAY RESULT.*** When making repairs or adjustments to the radio, it is recommended that the chassis be isolated from the power line by means of an isolation transformer.

ALIGNMENT

BROADCAST BAND

Connect an output meter across the speaker voice coil.

While making the following adjustments, keep the volume control set for maximum output and the signal generator output attenuated to avoid AVC action.

Step	Connect Signal Generator to —	Signal Generator Frequency	Radio Dial Setting	Adjust
1	Set band switch to AM.			
2	Pin #1 of 12BA6 (1st I-F) tube through a 0.1 mfd capacitor	455 kc	minimum capacity	Sec. and pri. of 455 kc 2nd I-F trans. for max. output
3	Stator of tuning capacitor (C59) through a 0.1 mfd capacitor	455 kc	minimum capacity	Sec. and pri. of 455 kc 1st I-F 1st I-F trans. for max. output
4	Radiated signal (no actual connection)	1615 kc	minimum capacity	AM osc. trimmer (C64) for max. output
5	Radiated signal (no actual connection)	1400 kc	1400 kc	AM ant. trimmer (C58) for max. output

FM BAND

Do not align 10.7 mc. I-F circuits until 455 kc I-F adjustments have been completed.

Step	Connect Signal Generator to —	Signal Generator Frequency	Radio Dial Setting	Adjust
1	Set band switch to FM.			
2	Connect a V.T.V.M. between point "X" and ground (See Fig. 4).			
3	Pin #1 of 12BA6 (Ratio det. driver) tube through a .002 mfd capacitor	10.7 mc	minimum capacity	Pri. of discriminator trans. for max. voltage
4	With the V.T.V.M. and signal generator connected as in Step 3, adjust the output of the signal generator until a reading of 2.5 volts is obtained on the V.T.V.M. Use this signal generator setting when performing Step 6.			
5	Connect the V.T.V.M. between points "Y" and "Z" (See Fig. 4).			
6	Same as Step 3.	10.7 mc	minimum capacity	Sec. of discriminator trans. for *zero* voltage. The voltage will change polarity as the trimmer is tuned through resonance — tune carefully for zero
7	Reconnect the V.T.V.M. between point "X" and ground.			
8	Same as Step 3.	10.7 mc	minimum capacity	Pri. of discriminator trans. for max. voltage
9	Pin #1 of 12BA6 (1st I-F) tube through a .002 mfd capacitor	10.7 mc	minimum capacity	Sec. and pri. of 10.7 mc 2nd I-F trans. for max. voltage
10	Pin #7 of 12AT7 tube through a .002 mfd capacitor	10.7 mc	minimum capacity	Sec. and pri. of 10.7 mc 1st I-F trans. for max. voltage
NOTE:	*Do not attempt to peak the 2nd I-F transformer or discriminator transformer with the signal generator connected as in Step 10.*			
11	FM ant. terminals through a 300 ohm non-inductive resistor	108 mc	minimum capacity	FM osc. trimmer (C65) for max. voltage
12	Check calibration as explained below*.			
13	Same as Step 11.	105 mc	105 mc	FM R-F trimmer (C63) for max. voltage (rock in adjustment)
14	Check tracking as explained below**.			

*To check dial calibration, completely mesh the tuning capacitor plates and vary the signal generator frequency until the signal is maximum on the V.T.V.M. If at this setting, the generator frequency is 88 mc., no further oscillator adjustments are required. If the generator is higher in frequency than 88 mc., slightly compress the FM oscillator coil (L14); if the generator frequency is lower than 88 mc., slightly expand the FM oscillator coil (L14). Repeat Steps 11 and 12 until the receiver tunes to 108 mc. with the tuning capacitor fully open and 88 mc. with the tuning capacitor fully closed.

**Tune the receiver to a 90 mc. signal from the generator and adjust the FM R-F trimmer for maximum voltage. If the "peak" setting is the same at 90 mc. as it was at 105 mc., no further adjustment is necessary. If the trimmer capacitance must be increased for maximum voltage at 90 mc., slightly compress the FM R-F coil (L16); if the trimmer capacitance must be decreased for maximum voltage at 90 mc., slightly expand the FM R-F coil (L16). Re-adjust the FM R-F trimmer at 105 mc., and again check the tracking. Repeat this process until the tracking is correct.

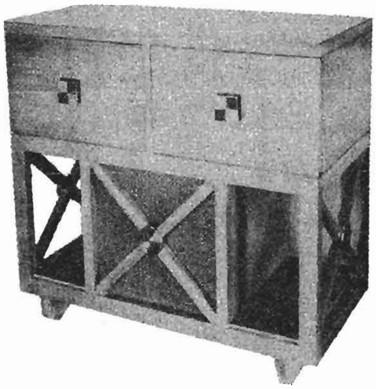
MODELS H-202, H-204, H-204A | WESTINGHOUSE ELECTRIC CORP. | CHASSIS V-2128-2

Part No.	Description
V-5608	Background, dial
V-5528-1	Baffle and grille cloth assembly (H-202)
V-5527	Bushing, insulator, control
*V-1153-1	Cabinet (H-202 Ivory)
*V-1153-2	Cabinet (H-202 Brown)
*V-1153-3	Cabinet (H-204 Green)
RCP10M6102A	Capacitor, .001 mfd 600 v.(C12)
RCP10M6202M	Capacitor, .002 mfd 600 v. (C13, C14)
RCP10M6502A	Capacitor, .005 mfd 600 v.(C15)
RCP10M2103M	Capacitor, .01 mfd 200 v. (C16)
RCP10M2203A	Capacitor, .02 mfd 200 v. (C17)
RCP10M2303M	Capacitor, .03 mfd 200 v. (C18)
RCP10M2503A	Capacitor, .05 mfd 200 v. (C19, C20, C21)
RCP10M2104A	Capacitor, .1 mfd 200 v. (C22)
RCM20A101K	Capacitor, mica 100 mmf (C23, C24)
RCM20A101M	Capacitor, mica 100 mmf (C25)
RCM20A471M	Capacitor, mica 470 mmf (C26, C27, C28)
R2CC25HK270K	Capacitor, ceramicon 27 mmf (C29)
R2CC32CF101K	Capacitor, ceramicon 100 mmf (C30, C31)
R5CC20ZY471M	Capacitor, ceramicon 470 mmf (C32)
R5CC21ZY471M	Capacitor, ceramicon 470 mmf (C33, C34)
V-5658-1	Capacitor, 1 mmf (C35)
V-5658-4	Capacitor, 0.68 mmf (C36)
V-5658-5	Capacitor, 0.34 mmf (C37)
V-5658-6	Capacitor, 4.7 mmf (C38)
V-5658-7	Capacitor, 10 mmf (C39)
V-5658-8	Capacitor, 15 mmf (C40)
V-5493	Capacitor, dry electrolytic 50 mfd 150 v. (C41) 50 mfd 150 v. (C42) 20 mfd 25 v. (C43)
V-4637	Capacitor, electrolytic 4 mfd 50 v. (C44)
V-5596	Capacitor, Hi-kaps 5000 mmf (C45, C46, C47, C48, C49, C50)
V-5040-13	Capacitor, paper molded .01 mfd 200 v. (C51, C52, C53, C54, C55, C56, C57)
V-4992	Capacitor, trimmer (C58)
V-5494	Capacitor, variable 2-gang AM antenna (C59) FM antenna (C60) AM oscillator (C61) FM oscillator (C62) Trimmer, FM antenna (C63) Trimmer, AM oscillator (C64) Trimmer, FM oscillator (C65)
V-5743	Coil, choke antenna (line) (L12, L13)
V-5545	Coil, oscillator FM (L14)
V-6078-1	Coil, oscillator AM (L15)
V-5546	Coil, R-F FM (L16)
V-5605	Coil, antenna loading AM (L17)
V-5517	Control, volume, 1 megohm (R2) and switch (SW1)
V-4304-19	Cord assembly, dial
V-5522	Cord, power A-C
V-5610-1	Cover rivet assembly, back (H-202 brown, H-204 green)
V-5523	Dial
V-6092-1	Grille (H-204 green)
V-5560-1	Knob, AM-FM (H-202)
V-5560-2	Knob, AM-FM (H-204)
V-5558-1	Knob, tuning (H-202)
V-5558-2	Knob, tuning (H-204)
V-5559-1	Knob, volume (H-202)
V-5559-2	Knob, volume (H-204)
No. 6S6	Lamp, pilot light
*V-5638	Loop assembly, antenna
V-6119	Pointer
V-6096-1	Pulley (metal)
V-3166S	Pulley (wood)
V-4886-1	Reactor, R-F (L18)
V-4886-2	Reactor, R-F (L19, L20)
V-4886-4	Reactor, R-F (L21)
V-4886-5	Reactor, R-F (L22, R3)
V-4886-6	Reactor, R-F (L23, R4)
V-4886-7	Reactor, R-F (L24, R5)
V-4886-8	Reactor, R-F (L25, R6)
V-6070	Rectifier, selenium (100 milliamperes)
V-6067-2	Resistor, glasohm 47 ohms (R7)
RC20AE121K	Resistor, 120 ohms ½ w.(R8, R9)
RC20AE181K	Resistor, 180 ohms ½ w. (R10).
RC20AE221K	Resistor, 220 ohms ½ w. (R11).
RC20AE471K	Resistor, 470 ohms ½ w.(R12, R13)
RC40AE102K	Resistor, 1000 ohms 2 w. (R14, R33)
RC20AE102K	Resistor, 1000 ohms ½ w. (R15, R16)
RC20AE222M	Resistor, 2200 ohms ½ w. (R17)
RC20AE103J	Resistor, 10,000 ohms ½ w. (R18, R19)
RC20AE223M	Resistor, 22,000 ohms ½ w.(R20)
RC20AE223K	Resistor, 22,000 ohms ½ w.(R21)
RC20AE184K	Resistor, 180,000 ohms ½ w. (R22)
RC20AE474M	Resistor, 470,000 ohms ½ w. (R23, R24, R25, R26, R27, R28)
RC20AE105M	Resistor, 1 megohm ½ w. (R29, R30)
RC20AE275M	Resistor, 2.7 megohms ½ w. (R31)
RC20AE106M	Resistor, 10 megohms ½ w. (R32)
V-5601-1	Screw, #6-32 rosette head (H-202 brown, H-204 green)
V-5601-2	Screw, #6-32 rosette head (H-202 ivory)
V-4292S	Socket, miniature molded (7 prong)
V-5673	Socket, miniature wafer (7 prong)
V-5670	Socket, miniature wafer (7 prong)
V-6072-1	Socket, miniature wafer(9 prong)
V-4989	Socket, pilot light
*V-5533	Speaker, 5" P.M.
V-3248S	Spring, dial drive
V-7332	Spring, knob
V-5534	Switch, selector, (SW2, SW3)
V-5723	Transformer, 1st I-F AM (C1, C2, L1, L2)
V-5539	Transformer, 2nd I-F AM (C3, C4, C5, C6, R1, L3, L4)
V-5540	Transformer, 1st and 2nd I-F FM 1st (C7, C8, L5, L6) 2nd (C9, C10, L7, L8)
V-5538	Transformer, discriminator (C11, L9, L10, L11)
V-5537	Transformer, output
V-5606-1	Washer, felt

When ordering parts, specify model number of set in addition to part number and description of part.

WESTINGHOUSE ELECTRIC CORP.

MODELS H-203, H-212



H-203

H-212

SPECIFICATIONS

FREQUENCY RANGES:

Amplitude Modulation .... 540 to 1600 kc.
Frequency Modulation ..... 88 to 108 mc.

INTERMEDIATE FREQUENCIES:

Amplitude Modulation .... 455 kc.
Frequency Modulation .... 10.7 mc.

TUBE COMPLEMENT:

1 12AT7 .... R-F Amp. and Mixer (FM)
1 6BE6 H-F Osc. (AM/FM) and converter(AM)
1 6BA6 .... I-F Amp.
1 6BA6 .... I-F Driver (FM)
1 6AL5 .... Ratio Det. (FM)
1 6AV6 ..... Det. & AVC (AM) and A-F Amp.
1 6V6GT .... Output Amp.
1 5Y3GT .... Rectifier

PILOT LAMPS:

2 Westinghouse No. 47 ... 6.3 v., 0.15 a.

POWER OUTPUT:

Undistorted .... 3.5 watts
Maximum .... 6 watts

LOUDSPEAKER:

H-203 .... 10" P.M.
H-212 .... 8" P.M.

OPERATING VOLTAGE:

.... 105 to 120 volts, 60 cycles A-C

POWER CONSUMPTION:

H-203 .... 110 watts
H-212 .... 85 watts

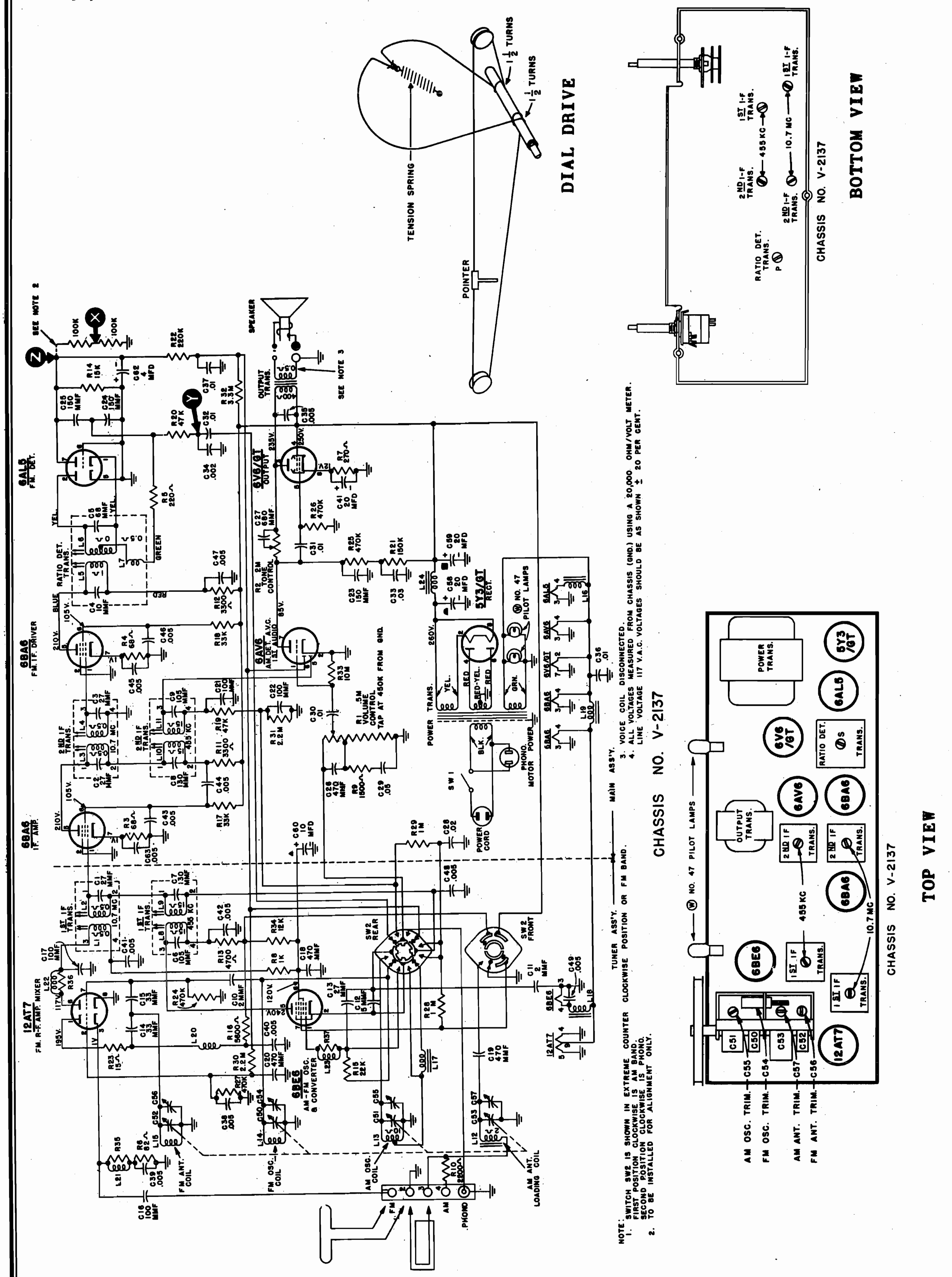
SERVICE NOTES

For information on the V-4944-2 record changer used with Model H-203, refer to the V-4944 Automatic Record Changer Service Notes. However, when ordering replacement parts, specify the items listed below rather than the corresponding parts as listed in the V-4944 Service Notes. The following parts are for the V-4944-2 changer only.

Loc.	Part No.	Description
9	V-7962	Pickup Cable with Connector (28")
13	V-7689	Cartridge, crystal (P-30)
15	V-7963	Nut, needle retaining (for P-30 cartridge)
(Last item on parts list)	V-7964	Needle, phonograph (for P-30 cartridge)

MODELS H-203, H-212, CHASSIS V-2137

WESTINGHOUSE ELECTRIC CORP.



RECORD CHANGER: V-M Model 800, RCD.CH.17-1

WESTINGHOUSE ELECTRIC CORP. MODELS H-203, H-212, CHASSIS V-2137

ALIGNMENT

BROADCAST BAND

Connect an output meter across the speaker voice coil.

While making the following adjustments, keep the volume control set for maximum output, the tone control set for maximum treble, and the signal generator output attenuated to avoid A.V.C. action.

Step	Connect Signal Generator to —	Signal Generator Frequency	Radio Dial Setting	Adjust
1	Set the band switch to AM.			
2	Stator of tuning capacitor (C51) through a 0.1 mfd capacitor	455 kc.	maximum capacity	455 kc. pri. and sec. of 1st and 2nd I-F trans. for max. output
	***NOTE:** If the I-F transformers are badly mis-aligned, it may be impossible to obtain sufficient output using the above system. In this event, it will be necessary to align each transformer separately. Start with the last I-F transformer and work forward, connecting the signal generator to the control grid of the tube preceding the transformer under alignment.*			
3	Radiated signal (no actual connection)	1600 kc.	1600 kc.	AM osc. trimmer (C55) for max. output
4	Radiated signal (no actual connection)	1400 kc.	tune to signal	AM ant. trimmer (C57) for max. output (rock-in adjustment)

FM BAND

Do not align the FM circuits until all AM adjustments have been completed.

Step	Connect Signal Generator to —	Signal Generator Frequency	Radio Dial Setting	Adjust
1	Set the band switch to FM.			
2	Connect two 100,000 ohm resistors (the resistances must be equal within 5 percent) between pin #7 of the 6AL5 tube and ground as shown on the schematic diagram.			
3	Connect a V.T.V.M. between points "X" and "Y" (see schematic diagram).			
4	Stator of FM osc. section (C50) on tuning capacitor through a .01 mfd mica capacitor	10.7 mc.	maximum capacity	Sec. of ratio det. trans. for *zero* (use medium strength signal)
5	Connect the V.T.V.M. between point "Z" and ground.			
6	Same as step 4	10.7 mc.	maximum capacity	Pri. of ratio det. trans. and pri. and sec. of 10.7 mc. 1st and 2nd I-F trans. for max.
	***NOTE:** The pri. of the ratio det. trans. peaks in two places. Use the peak with the slug farthest out.*			
7	Reconnect the V.T.V.M. between points "X" and "Y", and increase the signal strength 2 times.			
8	Same as step 4	10.7 mc.	maximum capacity	Recheck sec. of ratio det. trans. for *zero* voltage
9	Reconnect the V.T.V.M. between point "Z" and ground.			
10	Same as step 4	10.7 mc.	maximum capacity	Pri. of ratio det. trans. for maximum voltage
11	Remove the two 100,000 ohm resistors that were inserted in step 2.			
12	FM ant. terminal through a 300 ohm non-inductive resistor	105 mc.	105 mc.	FM osc. trimmer (C54) for maximum output
13	Same as step 12	105 mc.	105 mc.	FM ant. trimmer (C56) for maximum output

MODELS H-203, H-212,
CHASSIS V-2137

WESTINGHOUSE ELECTRIC CORP.

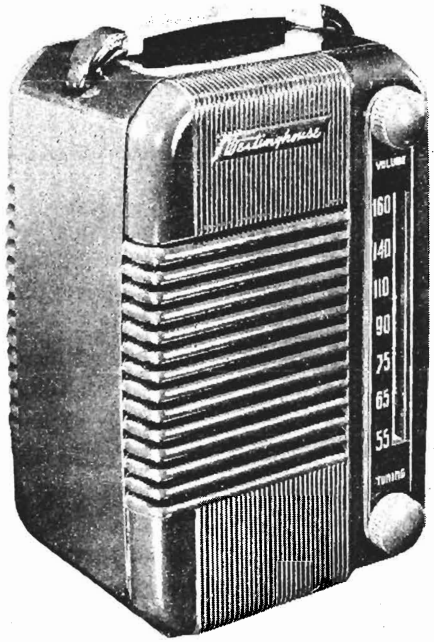
PARTS LIST FOR MODELS H-203 AND H-212

When ordering parts, specify model number of set in addition to part number and description of part.

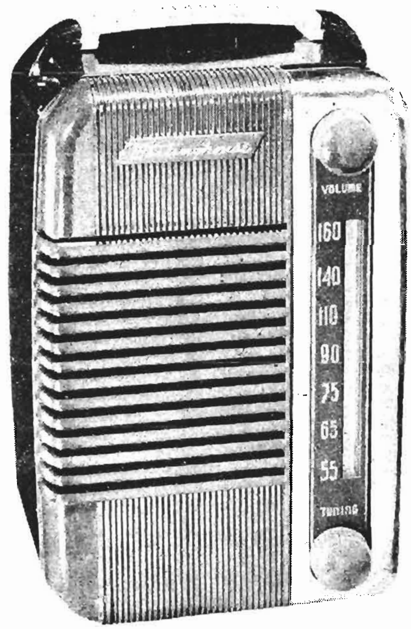
Part No.	Description
V-5982-2	Antenna Assembly, AM loop .....
V-5986-3	Antenna Assembly, FM dipole(H-203)
V-5986-4	Antenna Assembly, FM dipole(H-212)
V-6120	Background, dial ....
V-5860-3	Cable Assembly, speaker ....
R2CC30CK020D	Capacitor, 2 mmf (C10) ....
R2CC30UK020D	Capacitor, 2 mmf (C11) ....
R2CC30CK050D	Capacitor, 5 mmf (C12) ....
R3CC30CK270K	Capacitor, 27 mmf (C13) ....
R3CC26CK330M	Capacitor, 33 mmf (C14, C15) ....
R3CC30SL101M	Capacitor, 100 mmf (C16) ....
R3CC30SL101J	Capacitor, 100 mmf (C17) ....
R5CC21ZY471M	Capacitor, 470 mmf (C18, C19, C20)
RCM20A101M	Capacitor, 100 mmf (C21, C22) ....
RCM20A151M	Capacitor, 150 mmf (C23) ....
RCM20A151J	Capacitor, 150 mmf (C24, C25) ....
RCM20A471M	Capacitor, 470 mmf (C26) ....
RCM20A681M	Capacitor, 680 mmf (C27) ....
RCP10W2203A	Capacitor, .02 mfd 200 v. (C28) ..
RCP10W2503A	Capacitor, .05 mfd 200 v. (C29) ..
RCP10W4103A	Capacitor, .01 mfd 400 v. (C30, C31, C32) ....
RCP10W4303A	Capacitor, .03 mfd 400 v. (C33) ..
RCP10W6202A	Capacitor, .002 mfd 600 v. (C34) .
RCP10M6502A	Capacitor, .005 mfd 600 v. (C35) .
V-5040-13	Capacitor, molded paper .01 mfd 200 v. (C36, C37) ....
V-5596	Capacitor, Hi-Kaps .005 mfd (C38, C39, C40 C41, C42, C43, C44, C45, C46, C47, C48, C49) ....
V-6137	Capacitor, variable (C50, C51, C52, C53, C54, C55, C56, C57) ....
V-6121	Capacitor, electrolytic .... 20 mfd 400 v. (C58) 20 mfd 400 v. (C59) 10 mfd 350 v. (C60) 20 mfd 25 v. (C61)
V-4885	Capacitor, electrolytic 4 mfd 450 v. (C62) ....
V-4898-1	Catch, bullet (H-203 mahogany) ..
V-4898-2	Catch, bullet (H-203 blond) .....
V-5637	Clip, tubular ....
V-6164	Coil, AM oscillator (L13) ....
V-6157	Coil, antenna loading (L12) .....
V-6139	Coil, FM antenna (L15) ....
V-6138	Coil, FM oscillator (L14) ....
V-6122	Control, volume - 0.5 megohm (R1), tone - 2.0 megohms (R2) and switch (SW1) ....
V-6123	Dial ....
V-6155	Fastener ....
V-5998-2	Grille Cloth, speaker (H-203 mahogany) ....
V-6148-1	Grille Cloth, speaker (H-203 blond) ....
V-6246-1	Grille Cloth Assembly (H-212) ...
V-5066-5	Hinge, L.H. (H-203 mahogany) ....
V-5066-3	Hinge, L.H. (H-203 blond) ....
V-5066-6	Hinge, R.H. (H-203 mahogany) ....
V-5066-4	Hinge, R.H. (H-203 blond) ....
V-6146-2	Knob, band (H-212 and H-203 mahogany ....
V-6146-4	Knob, band (blond) ....
V-6147-2	Knob, rear (tuning) ....
V-6146-1	Knob, OFF-ON-TONE (H-212 and H-203 mahogany) ....
V-6146-3	Knob, OFF-ON-TONE (blond) ....
V-6147-1	Knob, rear (volume) ....
No. 47	Lamp, pilot light ....
V-6160	Molding ....
V-4696	Nameplate, Westinghouse FM ......
V-6154-1	Panel, control ....
V-6125	Pointer ....
V-6150-1	Pull, door (H-203 mahogany) .....
V-6150-2	Pull, door (H-203 blond) ....
V-3166S	Pulley, 7/16 dia. ....

Part No.	Description
V-4886-1	Reactor, R-F 14 microhenries (L16)
V-4886-2	Reactor, R-F 1.1 microhenries (L17, L18, L19) ....
V-4886-4	Reactor, R-F (L20) ....
V-4886-10	Reactor, R-F (L21, R35) ....
V-4886-6	Reactor, R-F (L22, R36) ....
V-4886-7	Reactor, R-F (L23, R37) ....
V-6161	Reactor, filter choke (L24) ....
RC10AE680K	Resistor, 68 ohms ¼ w. (R3, R4)
RC10AE221M	Resistor, 220 ohms ¼ w. (R5) .....
RC10AE820K	Resistor, 82 ohms ¼ w. (R6) ......
RC30AE271K	Resistor, 270 ohms 1 w. (R7) .....
RC10AE102K	Resistor, 1000 ohms ¼ w. (R8) ....
RC10AE152M	Resistor, 1500 ohms ¼ w. (R9) ....
RC10AE222K	Resistor, 2200 ohms, ¼ w. (R10) ..
RC30AE332K	Resistor, 3300 ohms 1 w. (R11, R12) ....
RC10AE472K	Resistor, 4700 ohms ¼ w. (R13) ...
RC10AE153K	Resistor, 15,000 ohms ¼ w. (R14) .
RC10AE223K	Resistor, 22,000 ohms ¼ w. (R15) .
RC30AE562K	Resistor, 5600 ohms 1 w. (R16) ...
RC30AE333K	Resistor, 33,000 ohms 1 w. (R17, R18) ....
RC10AE473M	Resistor, 47,000 ohms ¼ w. (R19, R20) ....
RC10AE154M	Resistor, 150,000 ohms ¼ w. (R21)
RC10AE224M	Resistor, 220,000 ohms ¼ w. (R22)
RC10AE150M	Resistor, 15 ohms ¼ w. (R23) .....
RC10AE474M	Resistor, 470,000 ohms ¼ w. (R24, R25, R26, R27) ....
RC10AE105M	Resistor, 1.0 megohm ¼ w. (R28, R29) ....
RC10AE225M	Resistor, 2.2 megohms ¼ w. (R30, R31) ....
RC10AE335M	Resistor, 3.3 megohms ¼ w. (R32) .
RC10AE106M	Resistor, 10.0 megohms ¼ w. (R33)
RC41AE123K	Resistor, 12,000 ohms 2 w. (R34) .
V-6151-1	Rosette (H-203 mahogany) ....
V-6151-2	Rosette (H-203 blond) ....
V-6126-1	Shockmount ....
V-6127	Sleeve, dial drive ....
V-3353-3	Slide Mechanism, L.H. (H-203) ....
V-3353-4	Slide Mechanism, R.H. (H-203) ....
V-6165-1	Socket, dial light, 5" leads .....
V-6165-2	Socket, dial light, 7" leads .....
V-5670	Socket, miniature wafer ....
V-5673	Socket, miniature wafer (unshielded) ....
V-4195	Socket, molded octal tube ....
V-5405	Socket, molded power ....
V-3246S	Socket, octal tube ....
V-5571	Speaker, 10" P.M. (H-203) ....
V-6251	Speaker, 8" P.M. (H-212) ....
V-3248S	Spring, dial drive ....
V-4900-1	Strike, bullet catch (H-203 mahogany) ....
V-4900-2	Strike, bullet catch (H-203 blonde) ....
V-6140	Switch, selector .... Front wafer - SW2 Rear wafer - SW2
V-6136	Terminal Board, PHONO-ANT-GND ....
V-6130	Transformer, AM 1st and 2nd I-F (455 kc.) (L8, L9, C6, C7, and L10, L11, C8, C9) ....
V-5798	Transformer, audio output ....
V-6142	Transformer, FM 1st I-F (10.7 mc.) (L1, L2, C1) ....
V-6129	Transformer, FM 2nd I-F (10.7 mc.) (L3, L4, C2, C3) ....
V-6131	Transformer, power ....
V-6128	Transformer, ratio detector (L5, L6, L7, C4, C5) ....

WESTINGHOUSE ELECTRIC CORP. MODELS H-210, H-211,
CHASSIS V-2144,
V-2144-1



H-210



H-211

SPECIFICATIONS

FREQUENCY RANGE: .... 540 to 1600 kc.

INTERMEDIATE FREQUENCY: .... 455 kc.

TUBE COMPLEMENT:

1	12BE6	Converter
1	12BA6	I-F Amp.
1	12AT6	Det. and 1st A-F Amp.
1	50C5	Output Amp.
1	35W4	Rectifier

PILOT LAMP (H-211 only): .... Westinghouse No. 47

POWER OUTPUT:

Undistorted .... 1 watt
Maximum .... 1.5 watts

LOUDSPEAKER: .... 4" P.M.

OPERATING VOLTAGE: .... 105 to 125 volts 50 - 60 cycles A-C or D-C

POWER CONSUMPTION: .... 35 watts

MODELS H-210, H-211, WESTINGHOUSE ELECTRIC CORP.
CHASSIS V-2144,
V-2144-1

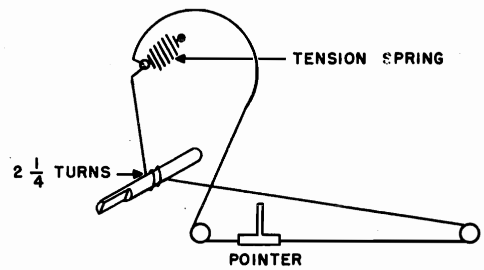
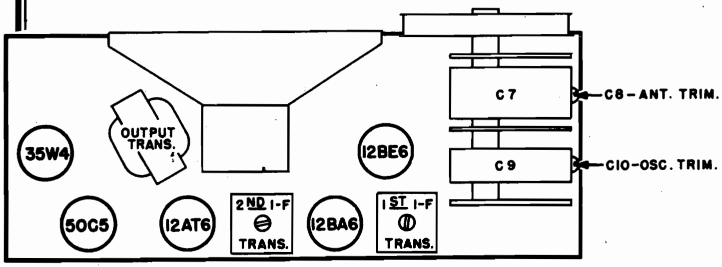
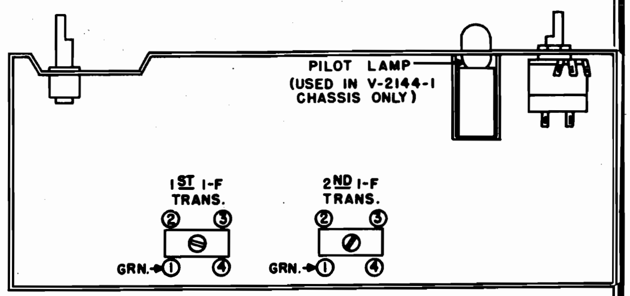


FIG. 1 — DIAL DRIVE



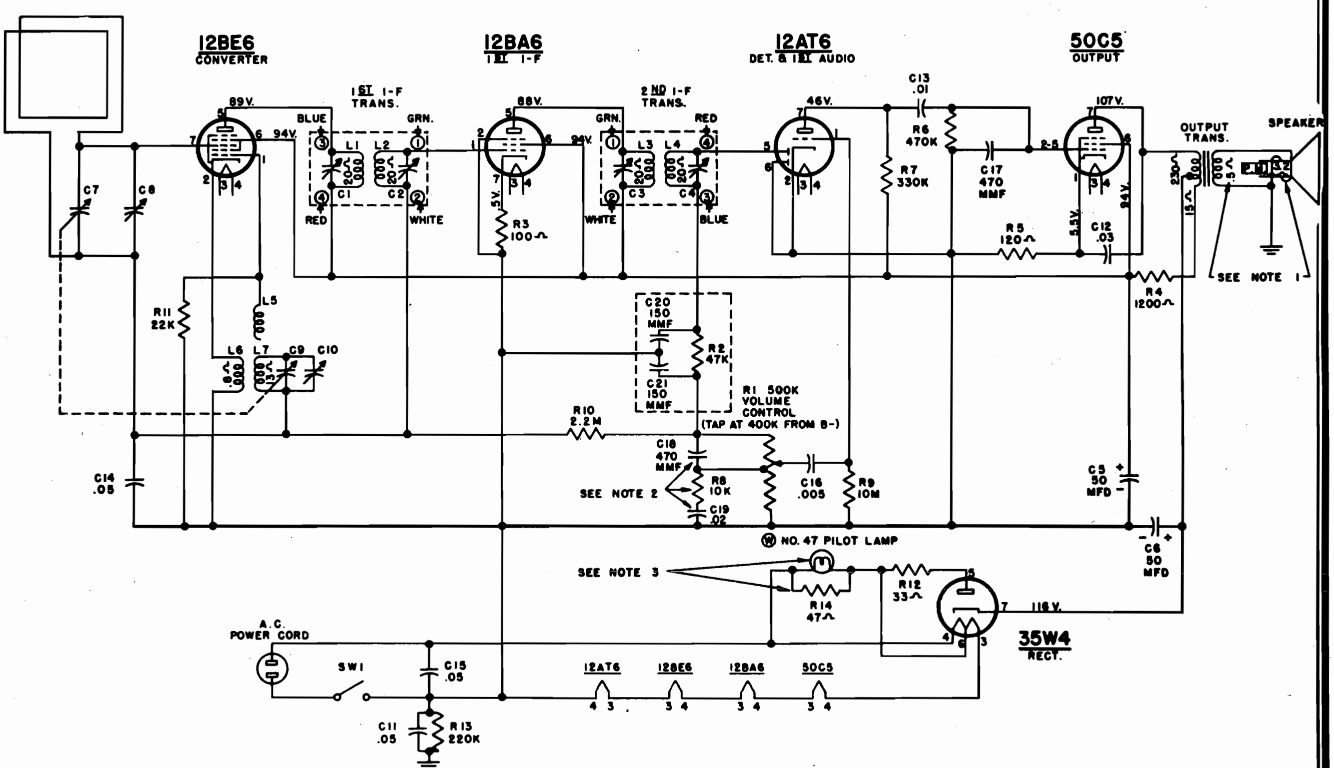
CHASSIS V-2144 and V-2144-1

FIG. 2 — TOP VIEW



CHASSIS V-2144 and V-2144-1

FIG. 3 — BOTTOM VIEW



NOTE:
1. VOICE COIL DISCONNECTED FOR RESISTANCE MEASUREMENT.
2. C18, C19 AND R8 ARE NOT USED IN V-2144 CHASSIS (H-210).
3. THE PILOT LAMP IS USED IN THE V-2144-1 CHASSIS (H-211) ONLY. R14 IS USED IN THE V-2144 CHASSIS (H-210) IN PLACE OF THE PILOT LAMP.
4. ALL VOLTAGES MEASURED FROM COMMON NEGATIVE LINE USING A 20,000 OHMS PER VOLT METER. LINE VOLTAGE 117 V.A.C. VOLTAGES SHOULD BE AS SHOWN ± 20 PER CENT.

WESTINGHOUSE ELECTRIC CORP. MODELS H-210, H-211, CHASSIS V-2144, V-2144-1

ALIGNMENT

It is recommended that the chassis be isolated from the power line by means of an isolation transformer.

Make certain that the dial pointer is correctly positioned on the dial cord.

While making the following adjustments, keep the volume control set for maximum output and the signal generator output attenuated to avoid AVC action.

Step	Connect Signal Generator to —	Signal Generator Frequency	Radio Dial Setting	Adjust
1.	Stator of R-F tuning capacitor (C7) through a 0.1 mfd capacitor	455 kc.	maximum capacity	Pri. and sec. of 1st and 2nd I-F transformers for max. output
	NOTE: If the I-F transformers are badly mis-aligned, it may be impossible to obtain sufficient output to use the above system. In this event, it will be necessary to align each transformer separately. Start with the last I-F transformer and work forward, connecting the signal generator to the control grid of the tube preceding the transformer under alignment.			
2.	Radiated signal (no actual connection)	1615 kc.	minimum capacity	Osc. trimmer (C10) for max. output
3.	Radiated signal (no actual connection	1400 kc.	1400 kc.	Ant. trimmer (C8) for max. output

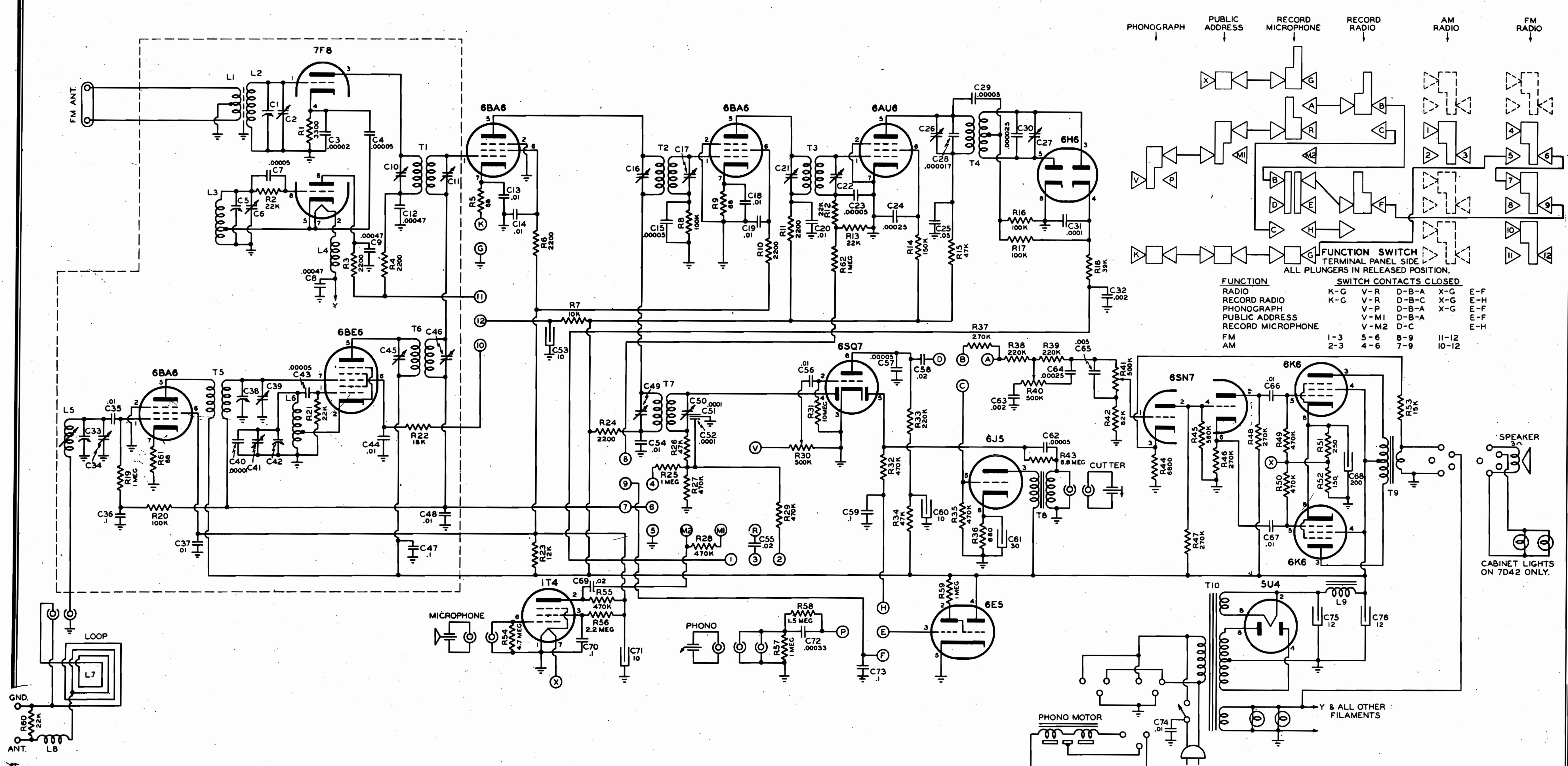
PARTS LIST FOR MODELS H-210 AND H-211

When ordering parts, specify model number of set in addition to part number and description of part.

Part No.	Description
V-6188	Background Rivet Assembly, dial
V-1168-1	Cabinet (H-210 Maroon)
V-1168-2	Cabinet (H-211 Grey)
V-6230	Capacitor, electrolytic: 50 mfd 150 v. (C5); 50 mfd 150 v. (C6)
V-6231	Capacitor, variable 2-gang: Tuner, antenna (C7); Trimmer, antenna (C8); Tuner, oscillator (C9); Trimmer, oscillator (C10)
V-5618-1	Capacitor, .05 resonant (C11)
RCP10W4303A	Capacitor, .03 mfd 400 v. (C12)
RCP10W4103A	Capacitor, .01 mfd 400 v. (C13)
RCP10W4503A	Capacitor, .05 mfd 400 v. (C14, C15)
RCP10W4502A	Capacitor, .005 mfd 400 v. (C16)
RCM20A471M	Capacitor, 470 mmf (C17, C18)
RCP10W4203A	Capacitor, .02 mfd 400 v. (C19)
V-5426	Clip, I-F mounting
V-5684	Clip, tubular (Back cover clamp)
V-6182	Clip, spring (Back cover catch)
V-5851	Coil, oscillator (L5, L6, L7)
V-6198-1	Control, volume, 500 K (R1, SW1) (H-210)
V-6198-2	Control, volume, 500 K (R1, SW1) (H-211)
V-6242-1	Cover Plate, trim (H-211)
V-6232-1	Filter, diode (C20, C21, R2)
V-6184-1	Knob (H-210)
V-6184-2	Knob (H-211)
#47	Lamp, pilot (H-211)
V-6186	Loop, antenna
V-6190	Pointer
RC10AE101J	Resistor, 100 ohms ¼ w. (R3)
RC30AE122M	Resistor, 1200 ohms 1 w. (R4)
RC20AE121J	Resistor, 120 ohms ½ w. (R5)
RC10AE474M	Resistor, 470,000 ohms ¼ w. (R6)
RC10AE334M	Resistor, 330,000 ohms ¼ w. (R7)
RC10AE103M	Resistor, 10,000 ohms ¼ w. (R8) (H-211)
RC10AE106M	Resistor, 10 megohms ¼ w. (R9)
RC10AE225M	Resistor, 2.2 megohms ¼ w. (R10)
RC10AE223M	Resistor, 22,000 ohms ¼ w. (R11)
RC20AE330M	Resistor, 33 ohms ½ w. (R12)
RC10AE224M	Resistor, 220,000 ohms ¼ w. (R13)
RC30AE470M	Resistor, 47 ohms 1 w. (R14) (H-210)
V-5673	Socket, miniature wafer, unshielded (50C5,35W4)
V-5852-1	Socket, miniature wafer (12AT6, 12BA6)
V-5852-3	Socket, miniature wafer (12BE6)
V-6193	Speaker, 4" P.M.
V-4057	Spring, dial drive
V-6199-2	Transformer, 1st and 2nd I-F (C1, C2, L1, L2, and C3, C4, L3, L4)
V-6233-1	Transformer, output

WILCOX-GAY CORP.

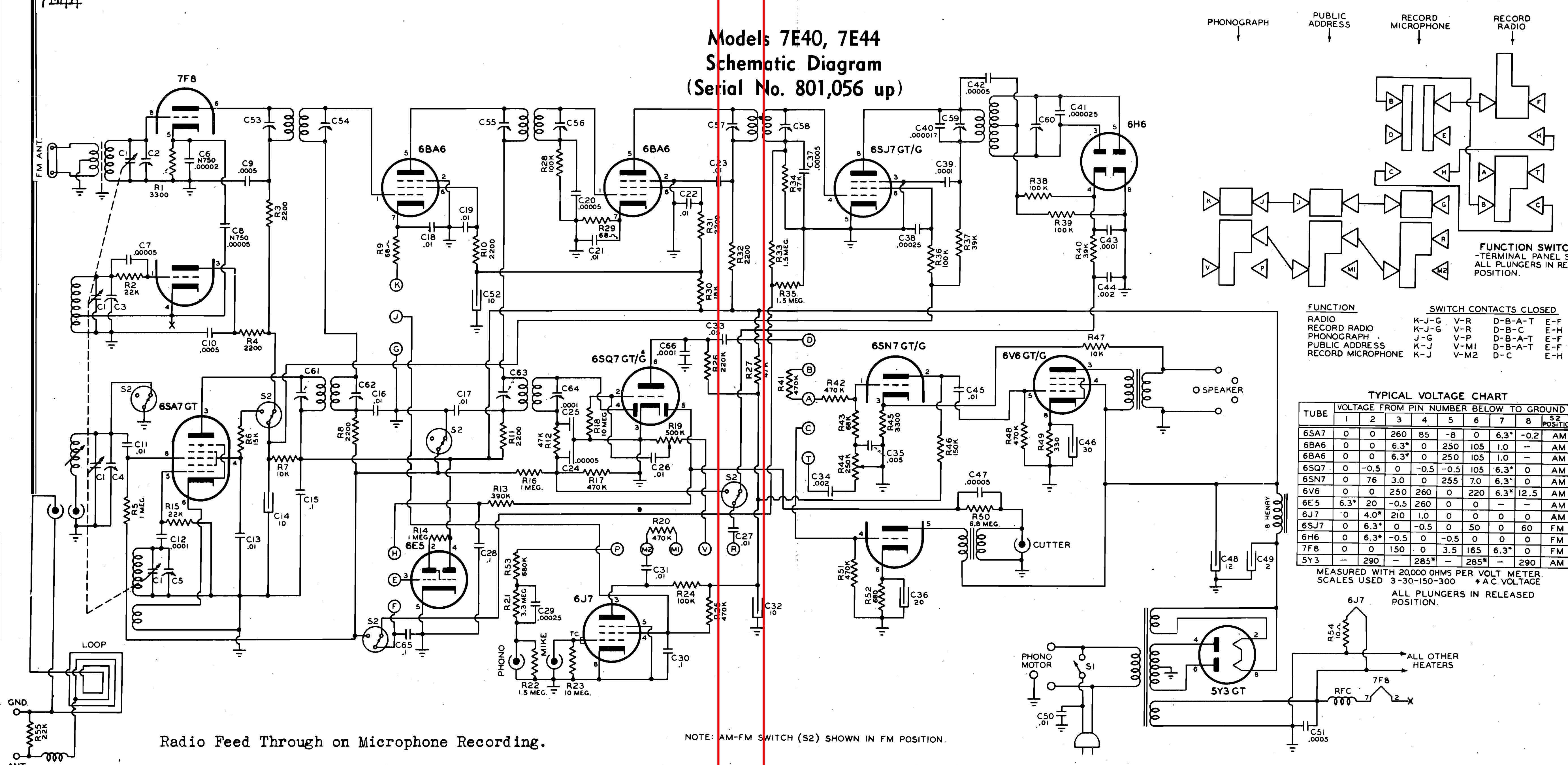
MODELS 7D42, 7D44



MODELS 7E40, 7E44

WILCOX-GAY CORP.

Models 7E40, 7E44 Schematic Diagram (Serial No. 801,056 up)



FUNCTION SWITCH
-TERMINAL PANEL SIDE
ALL PLUNGERS IN RELEASED POSITION.

FUNCTION	SWITCH CONTACTS CLOSED			
RADIO	K-J-G	V-R	D-B-A-T	E-F
RECORD RADIO	K-J-G	V-R	D-B-C	E-H
PHONOGRAPH	J-G	V-P	D-B-A-T	E-F
PUBLIC ADDRESS	K-J	V-M1	D-B-A-T	E-F
RECORD MICROPHONE	K-J	V-M2	D-C	E-H

TYPICAL VOLTAGE CHART

TUBE	VOLTAGE FROM PIN NUMBER BELOW TO GROUND								
	1	2	3	4	5	6	7	8	S2 POSITION
6SA7	0	0	260	85	-8	0	6.3*	-0.2	AM
6BA6	0	0	6.3*	0	250	105	1.0	—	AM
6BA6	0	0	6.3*	0	250	105	1.0	—	AM
6SQ7	0	-0.5	0	-0.5	-0.5	105	6.3*	0	AM
6SN7	0	76	3.0	0	255	7.0	6.3*	0	AM
6V6	0	0	250	260	0	220	6.3*	12.5	AM
6E5	6.3*	20	-0.5	260	0	0	—	—	AM
6J7	0	4.0*	210	1.0	0	0	0	0	AM
6SJ7	0	6.3*	0	-0.5	0	50	0	60	FM
6H6	0	6.3*	-0.5	0	-0.5	0	0	0	FM
7F8	0	0	150	0	3.5	165	6.3*	0	FM
5Y3	—	290	—	285*	—	285*	—	290	AM

MEASURED WITH 20,000 OHMS PER VOLT METER.
SCALES USED 3-30-150-300 * A.C. VOLTAGE

ALL PLUNGERS IN RELEASED POSITION.

Radio Feed Through on Microphone Recording.

In some localities where signal strength is great, difficulty has been encountered with the radio signal "leaking through" on Microphone Recording. This trouble is eliminated by removing the orange wire connecting pin No. 4 on the 6J7 tube socket to terminal J on the push-button switch.

All 7E40 and 7E44 models with serial numbers above 803,108 will have this lead removed.

On all chassis with serial number 804,045 and up, R53 in the phono circuit has been changed from 820 K to 470 K. This compensates for variance in values of the volume control and provides greater voltage to the audio section of the 6SQ7 phono amplifier tube.

If low phonograph gain is encountered on chassis with serial numbers below 804,045, R53 should be changed to 470 K to increase the gain.

WILCOX-GAY CORP.

MODELS 7E40, 7E44

Alignment Data

An OUTPUT METER or other indication device should be used for accuracy in making ganging adjustments. If an output meter is not available, the tuning indicator may be used as an output indicator. Resonance of the circuits will be indicated by the maximum closing of the tuning eye.

ALIGNMENT OF STANDARD BROADCAST (AM) BAND.

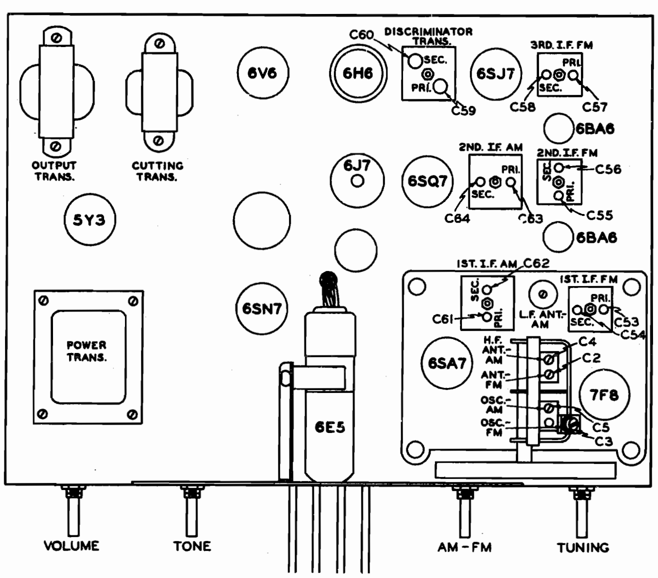
1. Connect signal generator to lug on-ANT. AM section of variable condenser.
2. Set volume control to near maximum.
3. Set tuning dial at 1500 K.C.
4. Set signal generator at 456 K.C.
5. Align trimmers in the following order:

1. Secondary 2nd. I.F. (C-64)
2. Primary 2nd. I.F. (C-63)
3. Secondary 1st. I.F. (C-62)
4. Primary 1st. I.F. (C-61)

Note: Repeat procedure to obtain greatest accuracy in the adjustment of the trimmer condensers.

6. Turn condenser gang to full maximum capacity and check position of dial pointer with reference line on the scale which is the second graduation to the left of the 550 K.C. calibration.
7. If chassis is out of the cabinet, signal generator should be connected across the loop antenna socket when adjusting AM oscillator trimmer C-5, and for an approximate adjustment of trimmer C-4 and L.F. antenna iron core. Final adjustment must be made with the chassis in cabinet and with loop plugged in.

   Signal generator is then connected to antenna and ground terminals on cabinet. Trimmer C-4 and antenna coil slug are adjusted for maximum indication of the tuning eye at the frequencies listed below.



MODELS 7E40, 7E44

WILCOX-GAY CORP.

A loading coil, can be substituted for the loop for bench alignment but the final adjustment of trimmer C-4 and L.F. antenna coil slug should be made with the chassis in cabinet. To make this loading coil, close wind 50 turns of #24 enamel wire on a 3/4" O.D. bakelite form. An antenna can be coupled to the ungrounded side of this coil through a .0001 mfd. condenser.

SIGNAL GENERATOR FREQUENCY	DIAL SETTING	TRIMMER
1400 K.C.	1400 K.C.	Osc. (C-5)
1400 K.C.	1400 K.C.	Det. (C-4)
600 K.C.	600 K.C.	L.F. ANT.-AM

Note: Repeat procedure to obtain greatest accuracy in the adjustment of the trimmer condensers.

ALIGNMENT OF FREQUENCY MODULATION (FM) BAND.

An unmodulated signal generator with output at 10.7 MC and 100 MC is required for FM alignment. A vacuum tube voltmeter or a high resistance voltmeter, at least 20,000 OHMS per volt, is required to measure limiter grid voltage and discriminator output voltage.

FM alignment can be accomplished with an FM signal generator and oscilloscope. Instructions for this type of alignment are furnished by the manufacturers of FM signal generators.

I.F. SECTION

1. Connect 10.7 MC Signal Generator across ANT.FM section, (copper plates), of tuning condenser gang.

2. Connect VTVM or high resistance voltmeter across R-34 with positive terminal to ground.

3. Adjust trimmers C58, C57, C56, C55, C54 and C53 in order listed for maximum voltmeter reading.

Note: Reduce output from signal generator as alignment progresses so that the limiter grid voltage does not exceed 5 volts.

4. With signal generator connected as above, remove voltmeter from limiter grid and connect across discriminator load resistor, R39.

5. Adjust trimmer C-59 on Disc. Transformer for maximum voltmeter reading.

6. Connect voltmeter from 6H6 pin #4 to ground.

7. Adjust trimmer C-60 on Disc. Transformer for zero reading on voltmeter.

Note: When trimmer C-60 is adjusted correctly, slight detuning will give a positive voltage reading in one direction and a negative reading in the other.

R.F. SECTION

1. Disconnect FM antenna and connect signal generator with 150 ohm resistor in each lead to FM ANT terminals.

2. Connect voltmeter across R-34.

3. Set signal generator and radio dial pointer at 100 MC.

4. Adjust trimmer C-3 (OSC FM) to bring in signal.

Note: Two settings of this trimmer will give a response. The correct adjustment is the one for least capacity.

5. Adjust trimmer C-2 (ANT FM) for maximum voltmeter reading.

WILCOX-GAY CORP.

MODELS 7E40, 7E44

PART NO.	NAME
17-3026-A	Antenna Coupling Coil Assembly
59-2128	Cap Shield for metal 6J7 tube
147-1	Capristor .01 mfd. and 10 meg ohm res. Cap. 20-.50 Res. 20%
78-2053	Condenser, trimmer
77-2096	Condenser, variable, 2 gang
81-2096	Cutter Transformer
56-2220	Dial Background
20-2002	Dial Cord 54" long
62-2134	Dial Light Socket Assembly
56-2221	Dial Scale
68-3007-A	Discriminator Transformer Assembly FM
27-2034-A	Drive Drum Assembly
18-2040	Electrolytic Capacitor 10-400V . . 20-25V
18-2049	Electrolytic Capacitor 12-450V . . 30-25V
9-2195	F.M. Transmission line
14-2101	Filter Choke
68-3005-A	I.F. Transformer 10.7 K.C.
68-3001-C	I.F. Transformer 456 K.C.
68-3006-A	I.F. Transformer Assembly AM 2nd
68-3005-A	I.F. Transformer Assembly FM 3rd
68-3005-B	I.F. Transformer Assembly FM 2nd
59-2106-1	Loctal Tube Shield
17-3015-A	Loop Loading Coil Assembly
62-2135	Magic eye socket and cable
59-3002	Mike Socket Shield
17-3028	Mixer Coil, F.M.
81-2095	Output Transformer
17-3023-A	Osc. Coil Assembly A.M.
17-3029	Osc. Coil, F.M.
45-2003	Pilot Lamp
39-2022-3	Pointer
20-2038	Power Cord
80-2182	Power Transformer
40-2043	Push Button
66-2173	Push Button Switch
17-3025-A	R.F. Choke Coil Assembly
59-3020	R.F. Coil Shield
66-3016	Switch
19-2193	Tone Control
97-3005	Tension Spring—Dial Cord
19-2188-1	Volume Control

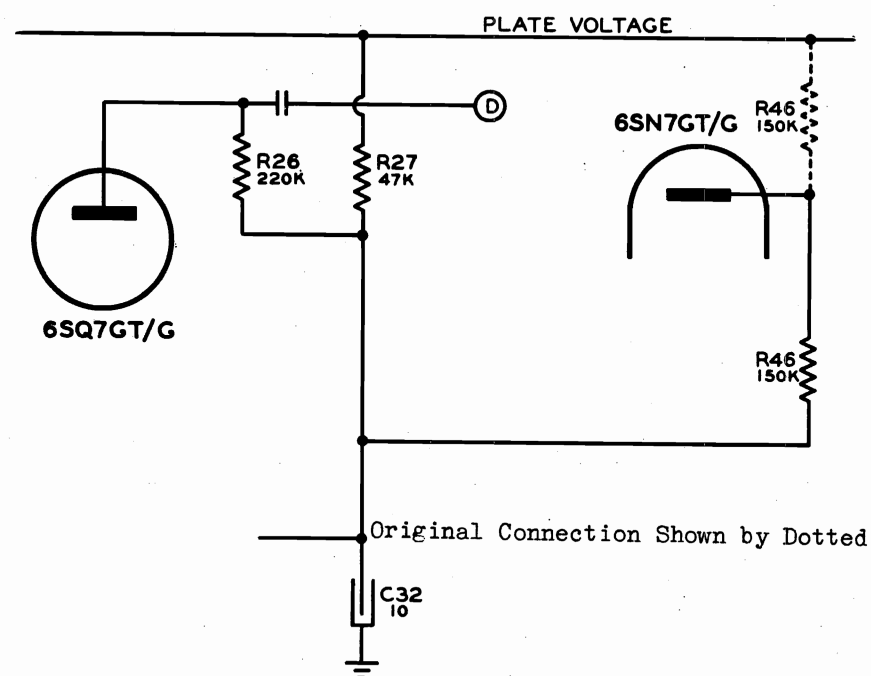
CORRECTION FOR EXCESSIVE AC HUM ON 7E MODELS

(Serial Nos. 800,000 to 801,055 Incl.)

Due to variance in tube characteristics, AC hum in some cases was objectionable on the first production run on 7E Models.

On all chassis with serial numbers above 801,055 the plate resistor (R46) of the audio section of the 6SN7 GT/G tube is connected to the junction of Resistor (R27) and Filter Capacitor (C32) instead of directly to the plate supply.

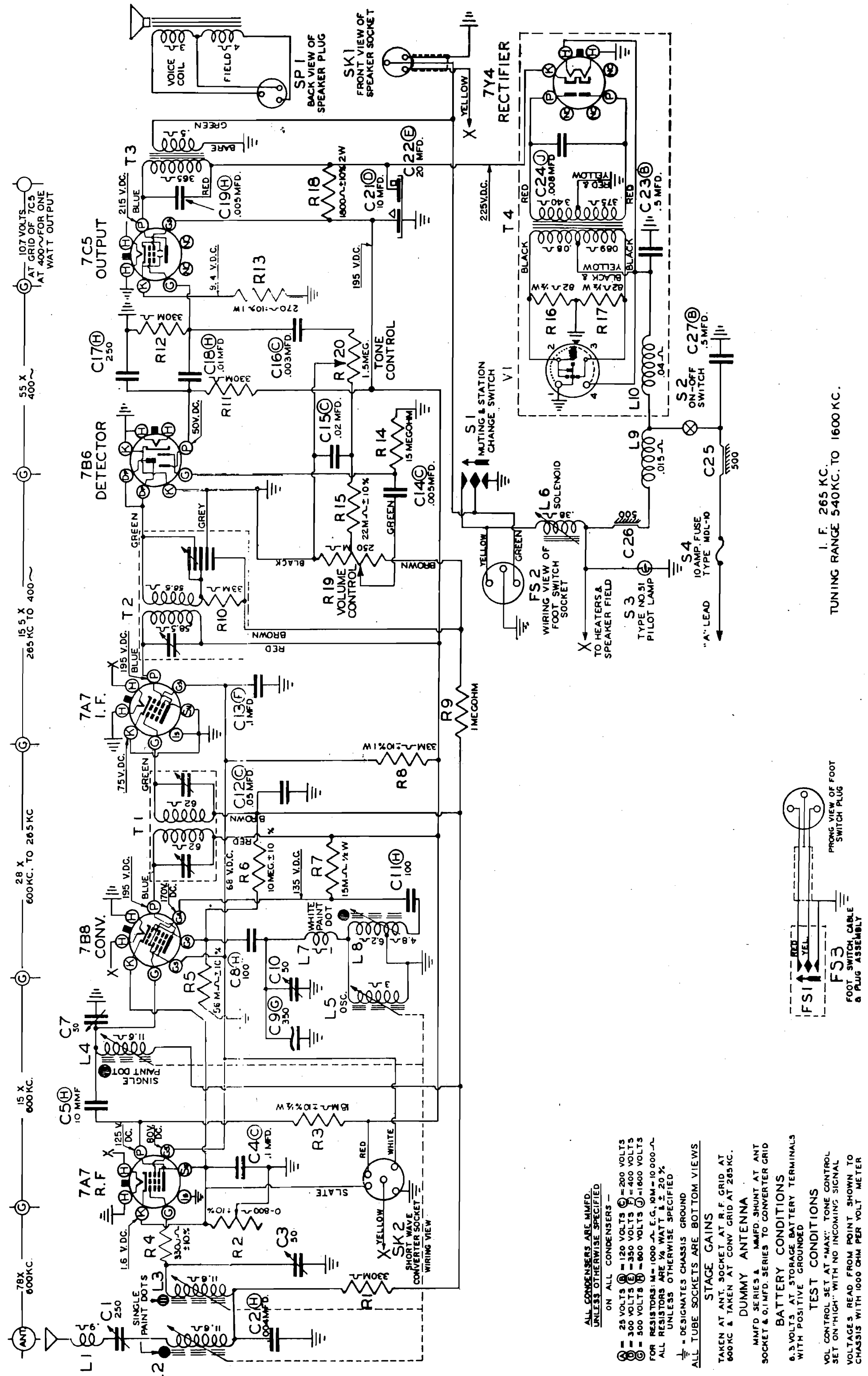
This change, shown below, takes care of tube variances and should be made, when necessary, in the field.



Original Connection Shown by Dotted Lines.

ZENITH RADIO CORP.

MODEL 6MN788E, Nash



MODEL 6MN788E, Nash

ZENITH RADIO CORP.

SETTING THE AUTOMATIC TUNER

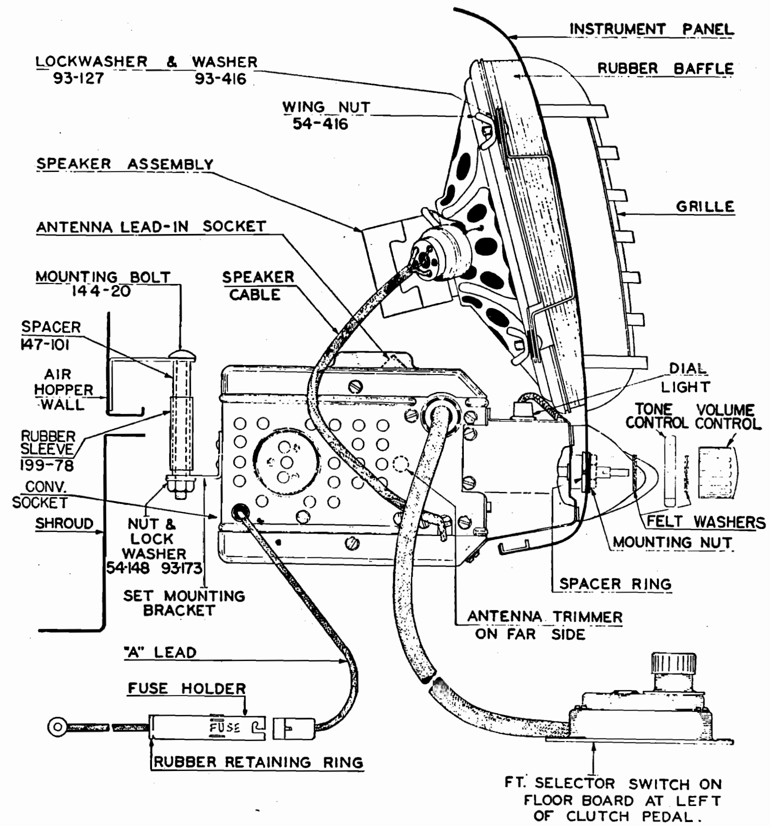
Pressing the Push-Bar at the right below the dial repeatedly will cause the tuning mechanism to change through a cycle of six positions. Five of the automatic positions may be set for favorite local stations while the sixth position, at which "M" appears on the indicator drum, is used for selecting stations manually.

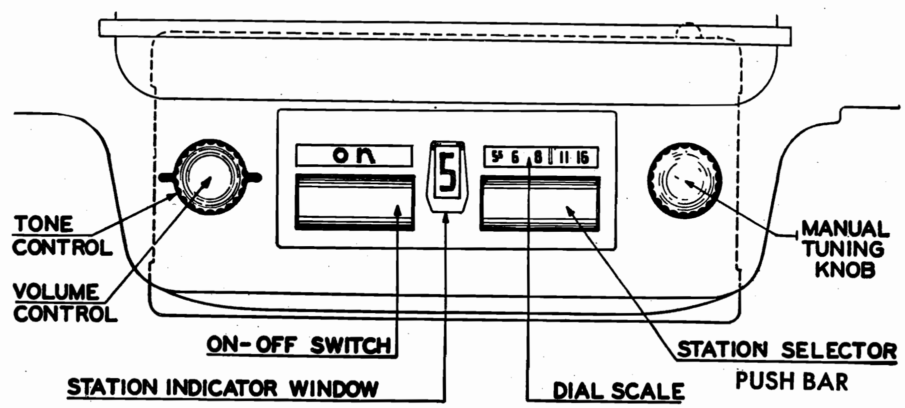
Allow the receiver to operate for at least fifteen minutes to bring the operating temperature up to normal before making the following automatic tuning settings.

Using "M" position as a reference point, the remaining five positions may be adjusted in succession to any desired dial setting. Setting these stations in sequence according to their frequencies beginning at the lowest frequency for number 1, and progressing through to the high frequency end of the dial for number 5 is the recommended practice to simplify the identification of each automatic tuned station.

1. Press station selector bar until number 1 appears in station indicator window.
2. Pull manual tuning knob outward to engage the automatic mechanism.
3. Select the station desired and tune to its frequency by turning tuning knob. Tune very carefully for clearest reception.
4. Press station selector bar, pull manual tuning knob outward, and tune in station desired for No. 2 position. Use same procedure for positions No. 3, 4 and 5.

NOTE: When "M" appears in the station indicator window, the manual tuning knob must be pulled outward and rotated to select the stations manually.

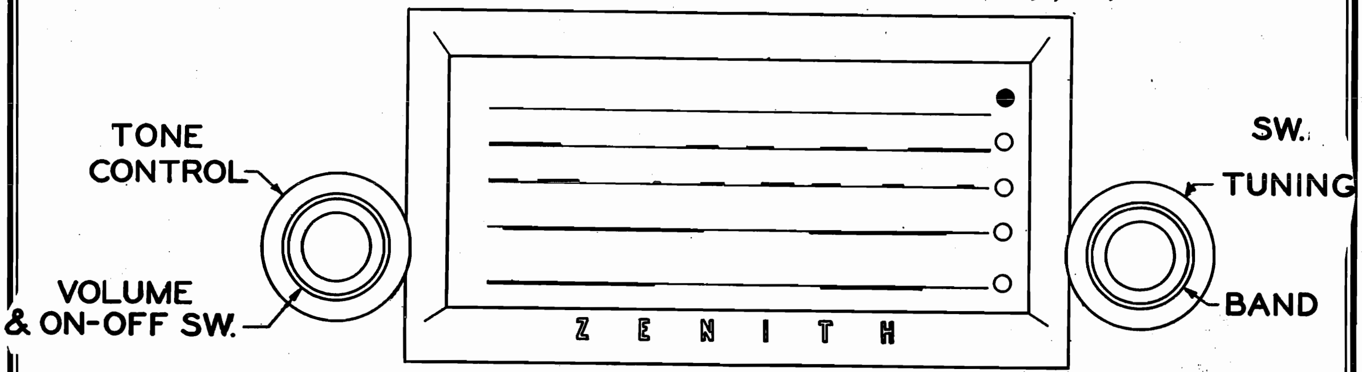


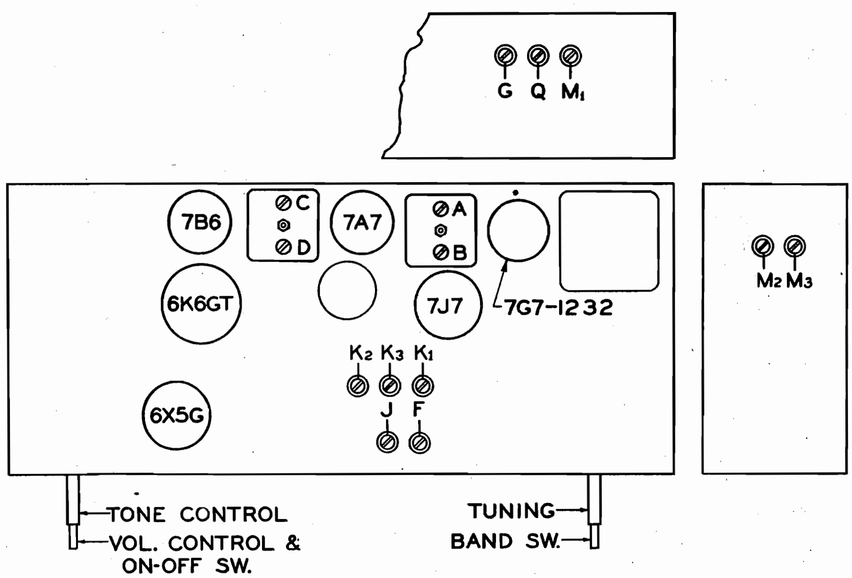


MODELS 6S624CT, 6S643CT, Ch.6B16CT

ZENITH RADIO CORP.

MODELS 6S643AT, 6S659AT, Ch. 6B16AT; 6S624BT, 6S643BT, 6S659BT, Ch. 6B16BT





Operation	Connect test osc. to	Dummy Ant.	Input signal frequency	Band	Set Dial	Adjust Trim	Purpose
1	1st det. Gnd.	.1 mfd.	455 kc.	BC	600 kc.	ABCD	Align IF
2	Ant. Gnd.	200 mmf.	1400 kc.	BC	1400 kc.	F	Set osc. to scale
3	Ant. Gnd.	200 mmf.	1400 kc.	BC	1400 kc.	G	Align Ant.
4	Ant. Gnd.	200 mmf.	600 kc.	BC	Rock at 600 kc.	J	Set Padder
5	Ant. Gnd.	400 ohm	6.5 mc.	SW2	6.5 mc.	Q	Align SW2
6	Ant. Gnd.	400 ohm	18.0 mc.	SW1	18.0 mc.	K1	Set osc. to scale
7	Ant. Gnd.	400 ohm	18.0 mc.	SW1	18.0 mc.	M1	Align Ant.
8	Ant. Gnd.	400 ohm	17.8 mc.	19-16m	17.8 mc.	K3	Set osc. to scale
9	Ant. Gnd.	400 ohm	17.8 mc.	19-16m	17.8 mc.	M3	Align Ant.
10	Ant. Gnd.	400 ohm	11.8 mc.	25-31m	11.8 mc.	K2	Set osc. to scale
11	Ant. Gnd.	400 ohm	11.8 mc.	25-31m	11.8 mc.	M2	Align Ant.

POWER

Under no circumstances should this receiver be connected to direct current (D.C.).

6B16AT — This chassis is designed to operate on 25 cycles alternating current (A.C.) and may be adjusted for use on 110–125–190–220 or 240 volts by means of the switch on top of the transformer.

6B16BT — This chassis is designed to operate on 50 to 100 cycle alternating current (A.C.) and may be adjusted for use on either 115 or 225 volts by means of the switch on the power transformer.

6B16CT — This chassis is designed to operate on 50 to 60 cycle alternating current (A.C.) and may be adjusted for use on either 95, 115 or 150 volts by means of the switch on the power transformer.

The total power consumption is 50 watts.

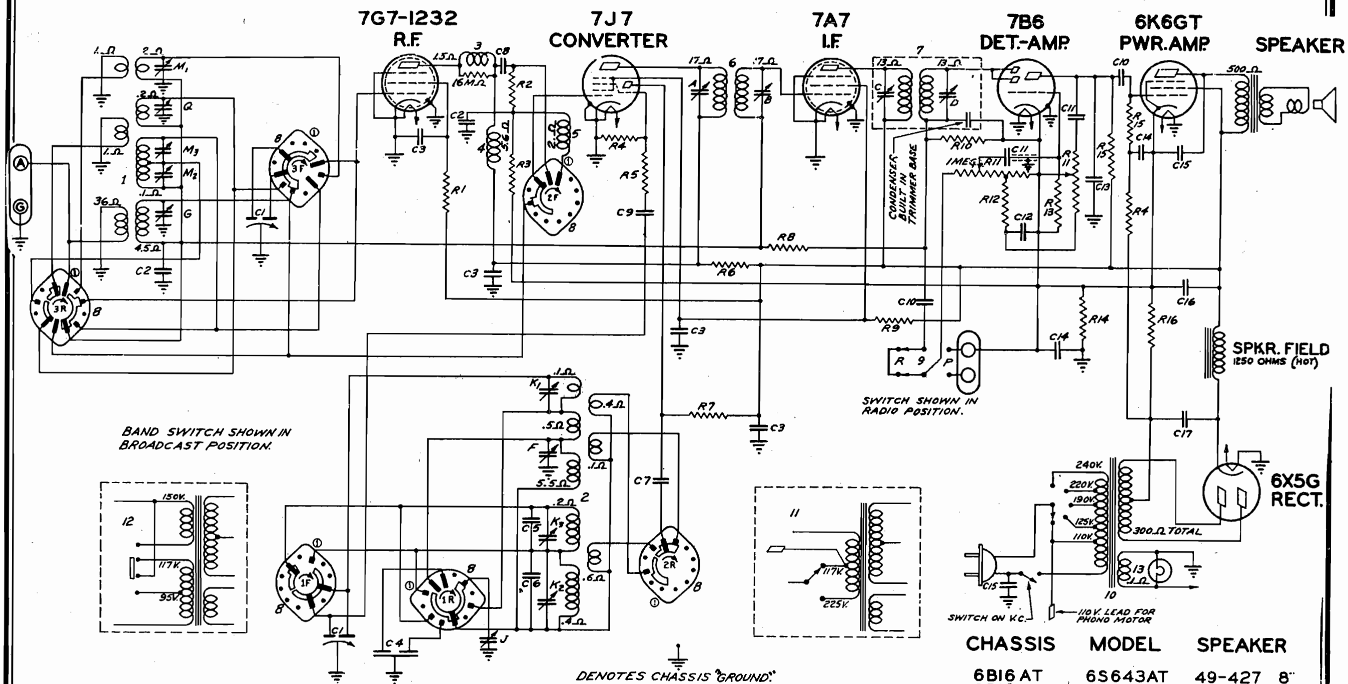
TUBES

The following tubes are used — (see Fig. 2):

7G7/1232 – 7J7 – 7A7 – 7B6 – 6K6GT – 6X5G

MODELS 6S643AT, 6S659AT, Ch. 6B16AT; 6S624BT, 6S643BT, 6S659BT, Ch. 6B16BT; 6S624CT, 6S643CT, Ch. 6B16CT

ZENITH RADIO CORP.



CHASSIS	MODEL	SPEAKER
6B16AT	6S643AT	49-427 8"
6B16AT	6S659AT	49-498 12"
6B16BT	6S624BT	49-419 6½"
6B16BT	6S643BT	49-427 8"
6B16BT	6S659BT	49-498 12"
6B16CT	6S624CT	49-419 6½"
6B16CT	6S643CT	49-427 8"

I.F. FREQUENCY 455 KC.
6 TUBE SUPERHETERODYNE
95-240V. A.C. 5-BAND
CHASSIS Nº 6B16 AT-BT-CT

DIAG. Nº	PART Nº	DESCRIPTION	
C1	22-1092	TWO GANG VARIABLE	
C2	22-818	.05 MFD.	400V.
C3	22-819	.05 MFD.	600V.
C4	22-708	DUAL PADDER	
C5	22-1142	45 MMFD. COMP.	
C6	22-1162	40 MMFD. COMP.	
C7	22-716	.0005 MFD.	600V.
C8	22-162	.0001 MFD.	600V.
C9	22-289	50 MMFD.	600V.
C10	22-815	.02 MFD.	600V.
C11	22-805	.004 MFD.	600V.
C12	22-1120	.015 MFD.	400V.
C13	22-1117	.0005 MFD.	600V.
C14	22-821	.1 MFD.	400V.
C15	22-806	.004 MFD.	1000V.
C16	22-719	16 MFD. ELECTROLYTIC	350V.
C17	22-1097	20 MFD. "	450V.

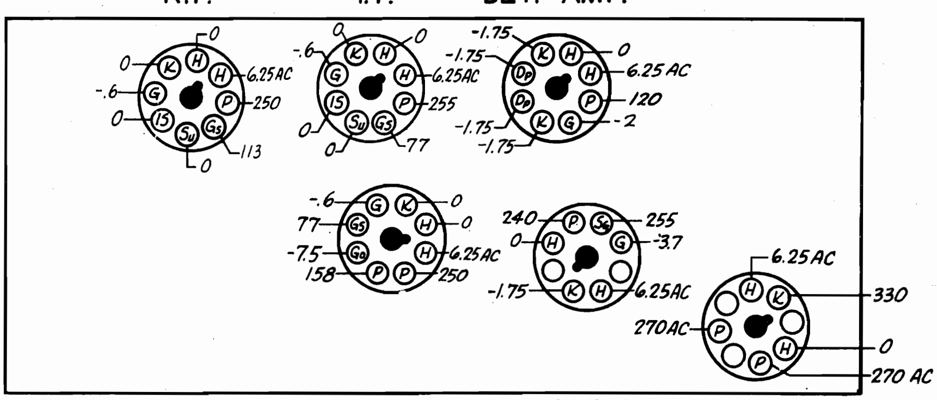
DIAG. Nº	PART Nº	DESCRIPTION	
R1	63-595	100 M OHM	¼ W.
R2	63-706	3300 OHM	¼ W.
R3	63-585	2200 OHM	¼ W.
R4	63-593	47 M OHM	¼ W.
R5	63-621	39 OHM	¼ W.
R6	63-605	1000 OHM	½ W.
R7	63-958	22 M OHM	1 W.
R8	63-271	1 MEGOHM	¼ W.
R9	63-1157	47 M OHM	1½ W.
R10	63-597	470 M OHM	¼ W.
R11	63-1136	VOLUME & TONE CONTROL	
R12	63-712	33 M OHM	¼ W.
R13	63-604	10 MEGOHM	¼ W.
R14	63-975	82 OHM WIREWOUND	½ W.
R15	63-296	220 M OHM	¼ W.
R16	63-1056	280 OHM WIREWOUND	2 W.
1	S 8909	ANTENNA COIL ASSEMBLY	

DIAG. Nº	PART Nº	DESCRIPTION
2	S 9347	OSCILLATOR COIL ASSEMBLY
3	S 8905	CHOKE & RES. "
4	S 8907	PLATE CHOKE "
5	S 8908	GRID CHOKE "
6	95-757	1ST I.F. TRANSFORMER
7	95-758	2ND I.F. "
8	85-245	BAND SELECTOR SWITCH
9	85-214	PHONO-RADIO SWITCH
10	95-857	PWR. TRANS. 110-125-190-220-240V. 25~ 6B16 AT
11	95-858	PWR. TRANS. 115-225V. 50-60~ 6B16BT
12	95-859	PWR. TRANS. 95-115-150V. 50-60~ 6B16 CT
13	100-36	DIAL LIGHT 6.3 V. .25 A.
A		1ST I.F. TRANS. PRI.
B		1ST I.F. " SEC.

DIAG. Nº	DESCRIPTION
C	2ND I.F. TRANS. PRI.
D	2ND I.F. " SEC.
F	BROADCAST OSC. (NOTE 1)
G	BROADCAST ANT. (NOTE 2)
J	BROADCAST PADDER (NOTE 1)
K_1	SHORTWAVE₁ OSC. (NOTE 3)
K_2	31-25 M. OSC. (NOTE 3)
K_3	19-16 M. OSC. (NOTE 3)
M_1	SHORTWAVE₁ ANT. (NOTE 2)
M_2	31-25 M. ANT. (NOTE 4)
M_3	19-16 M. ANT. (NOTE 4)
Q	SHORTWAVE₂ ANT. (NOTE 2)

NOTE: (1) TRIMMERS F & J ARE MOUNTED ON STRIP #22-1088
(2) TRIMMERS G, M & Q ARE MOUNTED ON STRIP #22-1090
(3) TRIMMERS K_1, K_2 & K_3 ARE MOUNTED ON STRIP #22-1091
(4) TRIMMERS M_2 & M_3 ARE MOUNTED ON STRIP #22-1089

1232 R.F. 7A7 I.F. 7B6 DET.-AMP.

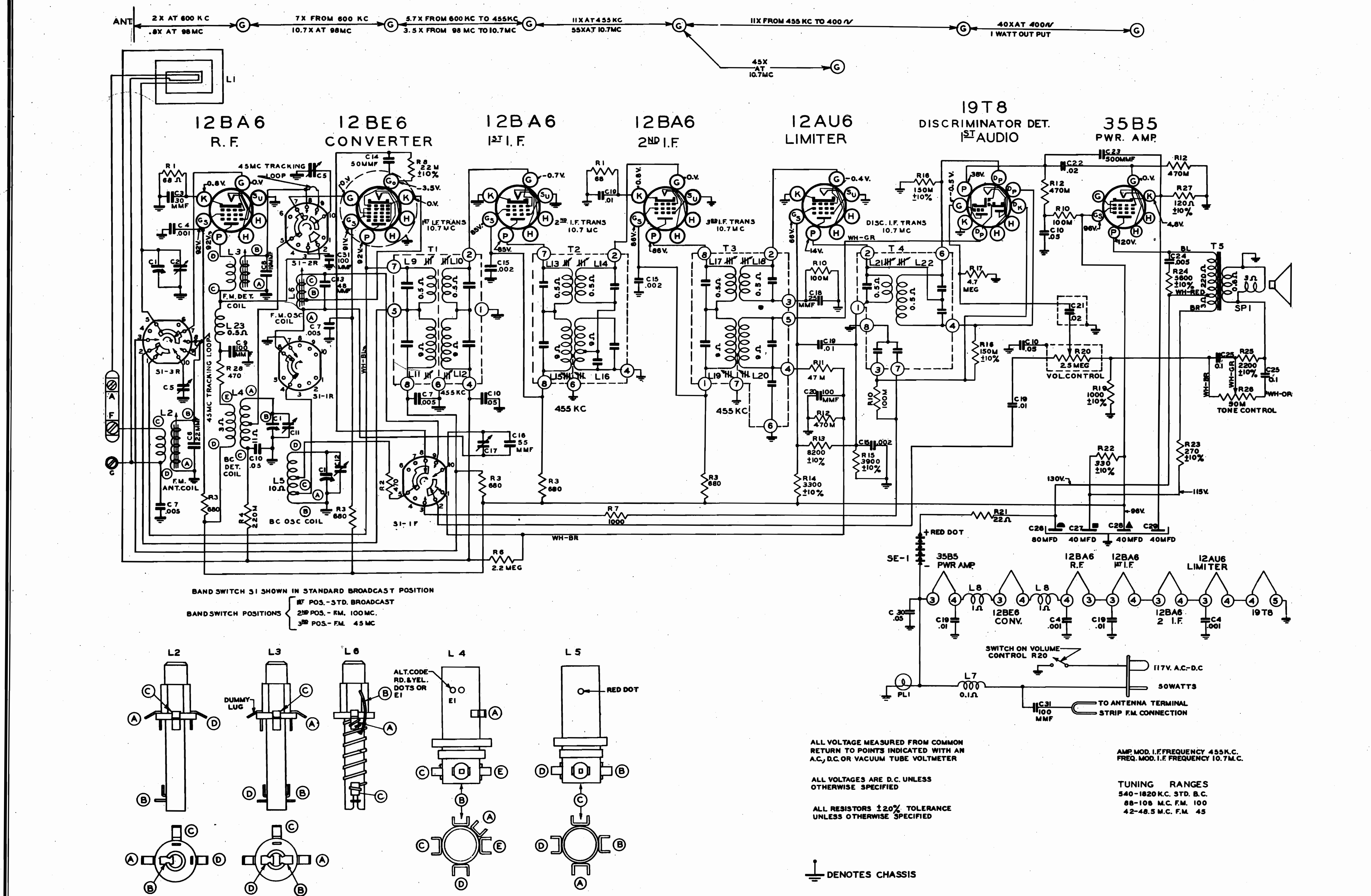


7J7 CONVERTER 6K6GT PWR. AMP. 6X5G RECT.

SOCKET VOLTAGES — BOTTOM VIEW

ZENITH RADIO CORP.

MODEL 7H820,
CHASSIS 7E01



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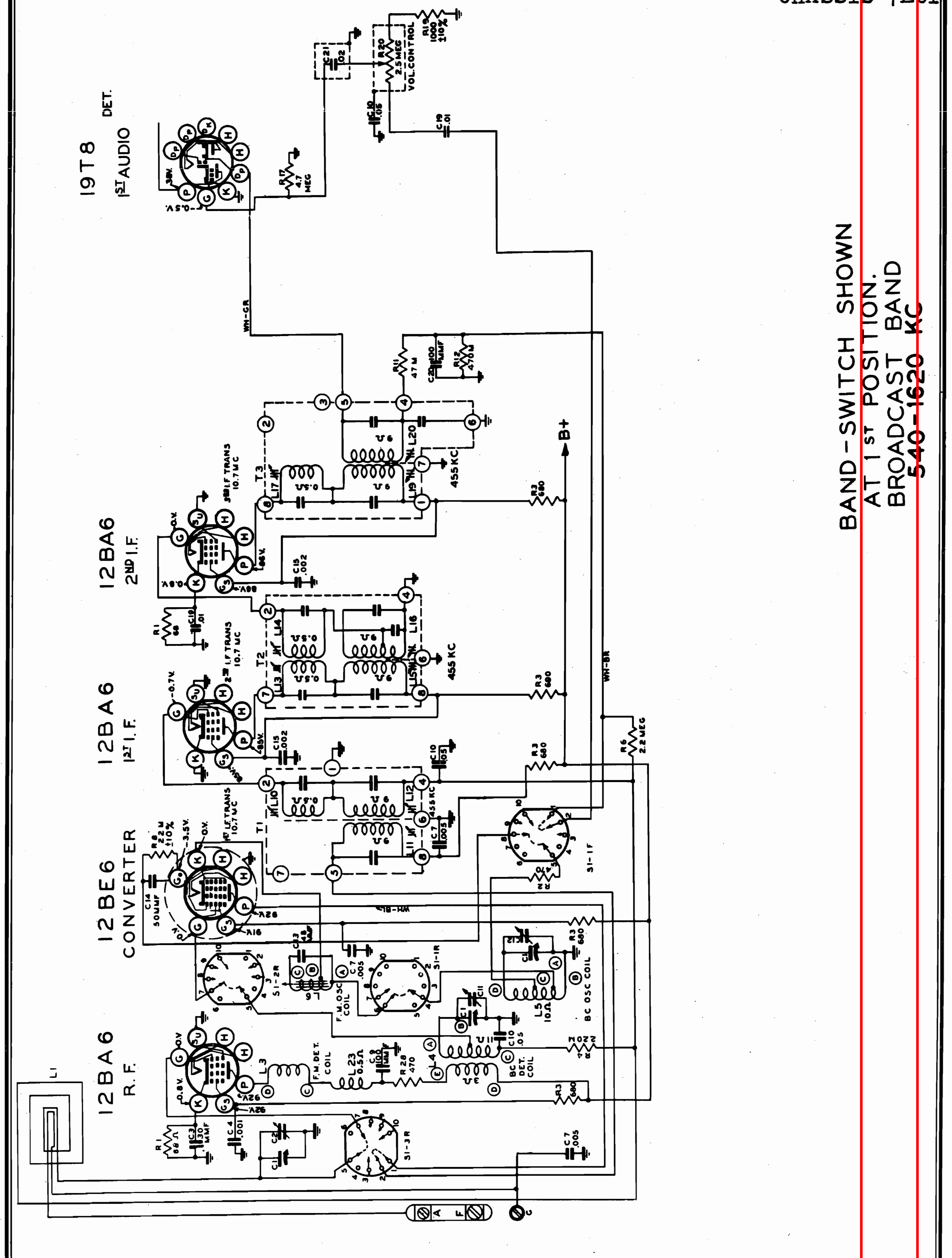
MODEL 7H820,
CHASSIS 7E01



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MODEL 7H820,
CHASSIS 7E01

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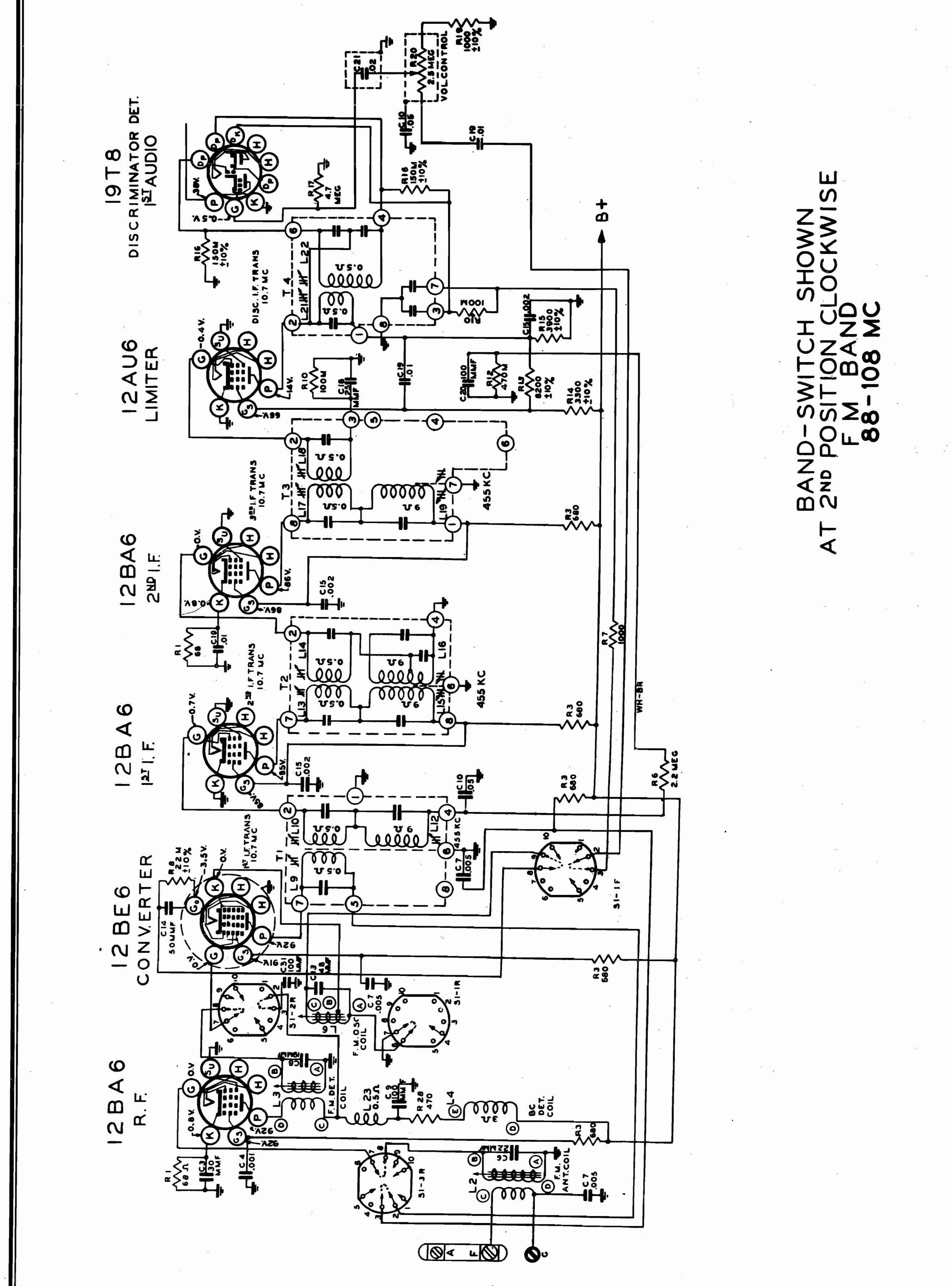
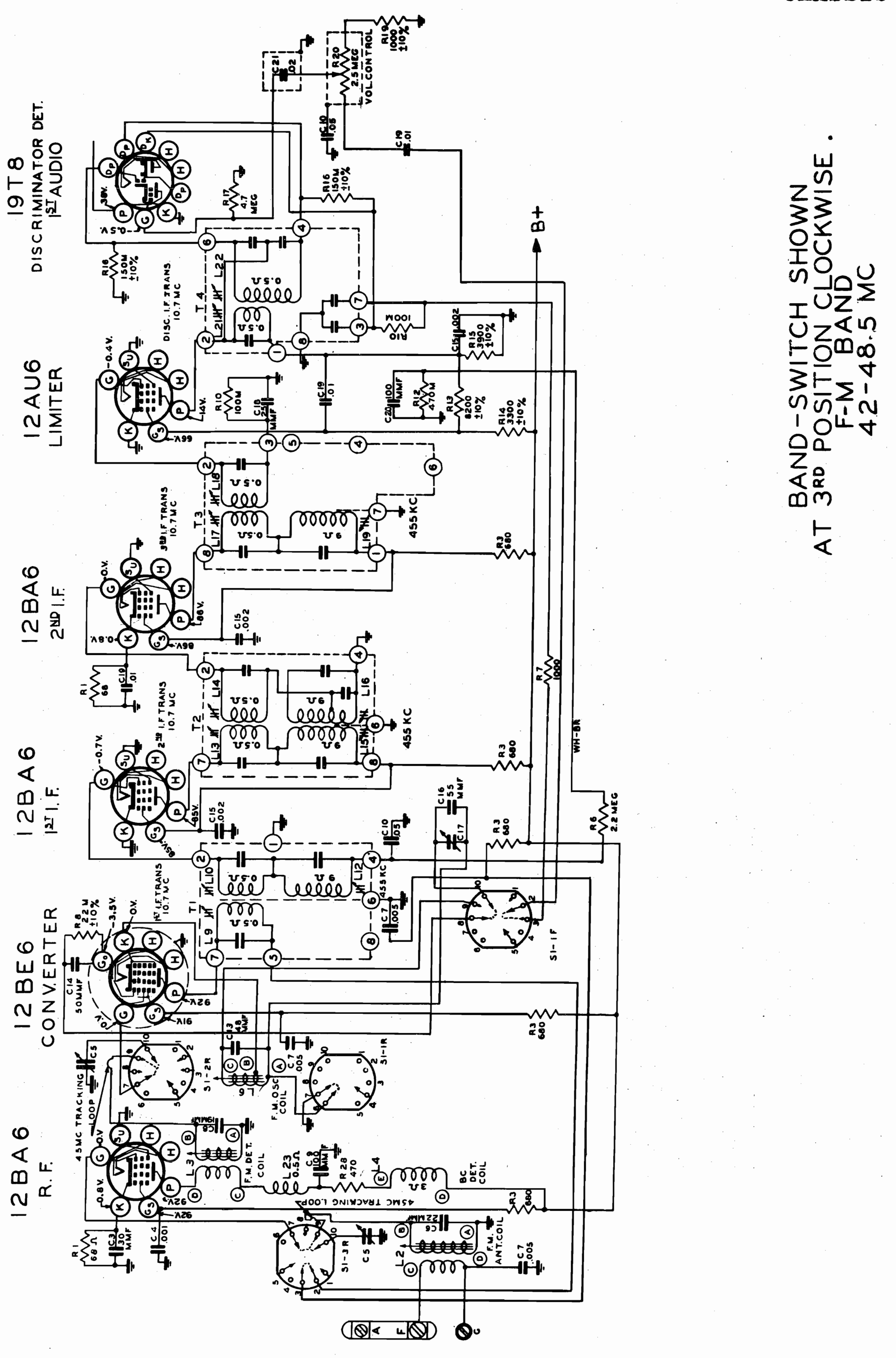


CLARI-SKEMATIX

Registered Trademark

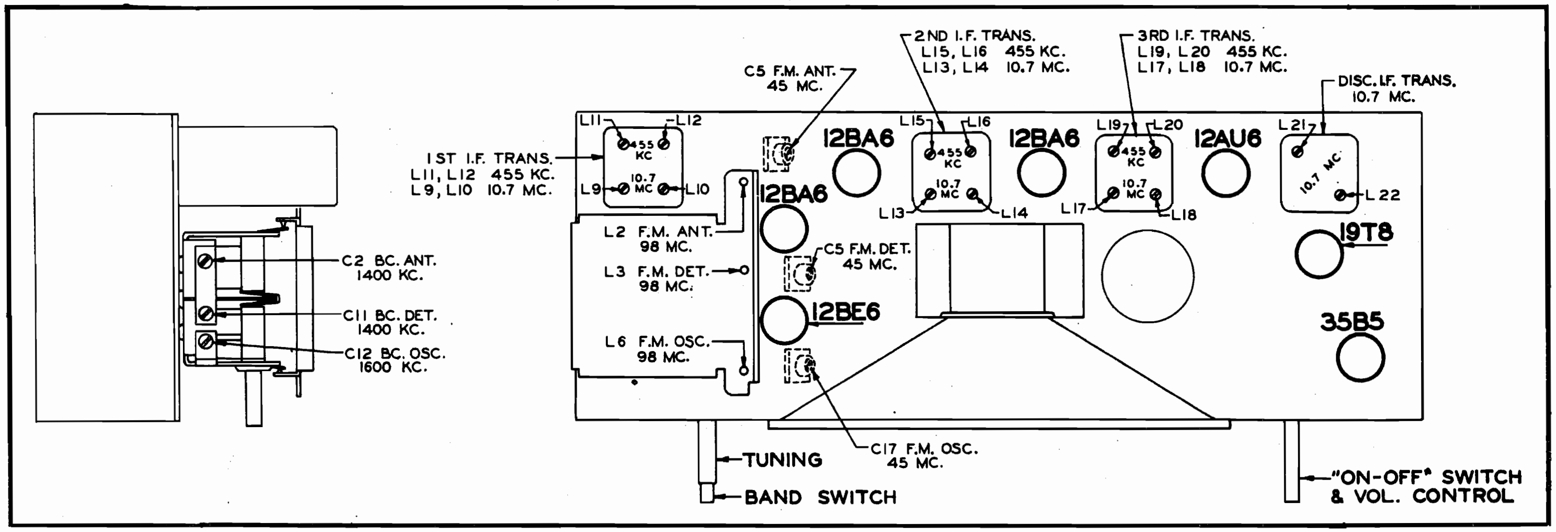
ZENITH RADIO CORP.

MODEL 7H820,
CHASSIS 7E01



MODEL 7H820,
CHASSIS 7E01

ZENITH RADIO CORP.



TUBE AND TRIMMER LOCATION

The 7E01 chassis incorporates a superheterodyne circuit with two stages of IF, and one stage of RF amplification on all bands.

When adjustments are made on the 7E01 or any AC-DC chassis, a line isolation transformer (110 V input to 110 V output) is recommended in order to avoid a "hot" chassis. If an isolation transformer is not available, check the AC voltage between chassis and bench ground, and if there is any indication of voltage, reverse the plug before handling the set.

AM Alignment: The alignment of this chassis on the standard broadcast band is conventional. The alignment slugs in the IF transformers are threaded and screw into the coil forms. The slugs are slotted for a small size fiber screw driver. Do not press hard on the aligning tool or the threads in the coil forms will strip and adjustment will be impossible.

FM RF Alignment: The same coil slug arrangement which tunes the 100 MC FM band also tunes the 45 MC band. However, on 45 MC the band switch connects trimmer condensers in parallel and padding wires in series with the 100 MC coils. The tuning slugs are attached to threaded shafts and the slugs are varied in the field of the coils by turning the shafts clockwise or counter-clockwise. After adjustment the shafts must be secured with a drop of speaker cement.

FM IF Alignment: The same type of tuning slugs for aligning the AM IF Amplifier are used for the FM I.F.'s. Observe the same precautions when making adjustments.

FM Discriminator Alignment: When the secondary of the discriminator is aligned (operation 5) use sufficient signal input to get a good positive and negative indication before setting the slug for zero reading. A center zero indicating meter is recommended for this adjustment, but is not absolutely necessary. Reversing the leads of a non-zero center meter, or observing closely when the meter starts to go to the left (negative) of zero will give the same results.

The tone control is of the low impedance type in which a portion of the audio voltage is taken from the voice coil and fed back into the grid of the first audio. The voltage is fed back out of phase. R25, 26 and C25 determine the characteristic of the feed back voltage. A much greater varation of tone can be had by this system.

The filter circuits of chassis 7E01 incorporate new features. An examination of the schematic drawing will show the output transformer tapped slightly off center. This tap is the B + connection from filter capacitor C26 off the selenium nectifier to the 35B5 plate. The lower connection of the output transformer feeds B + to the rest of the tubes in the receiver. Current flowing through the upper windings of the output transformer to the 35B5 produces a magnetic field which is 180° out of phase with the magnetic field produced by current flowing in the opposite direction through the output transformer to the rest of the receiver, therefore, most of the AC hum is cancelled. Further reductoon of hum is accomplished by filtering through resistors R22 and R23 capacitors C27 and C28.

This development in filtering systems allows a higher effective plate voltage on the 35B5 for increased power output.

NOTE: The output transformer must be replaced with an exact duplicate, Part No. 95-1035 be sure to add the speaker code letter to the transformer Part Number when ordering replacements.

ALIGNMENT PROCEDURE

Operation	Connect Oscillator to	Dummy Antenna	Input Signal Frequency	Band	Set Dial To	Adj. Trimmers	Purpose
1	Pin 7 12BE6 Converter	.05 Mfd.	455 KC. Modulated	BC	600 Kc.	L-11, 12, 15, 16, 19 and 20	Align I. F. channel for maximum output.
2	2 turns loosely cpld. to wavemagnet		1600 Kc. Modulated	BC	1600 Kc.	C12	Set oscillator to dial scale.
3	2 turns loosely cpld. cpld. to wavemagnet		1400 Kc. Modulated	BC	1400 Kc.	C11 and C2	Align det. and ant. stages.
4 (a)	Pin 1 (grid) on 12AU6 limiter.	.05 Mfd.	10.7 Mc. Unmodulated	FM 45		L21 coil slug Primary discr.	Align primary of discriminator for maximum reading.
5 (b)	Pin 1 (grid) on 12AU6 limiter.	.05 Mfd.	10.7 Mc. Unmodulated	FM 45		L22 coil slug sec. of discr.	Adjust secondary of discriminator for zero reading.
6 (c)	Pin 1 (grid) on 12BA6 2nd IF.	.05 Mfd.	10.7 Mc. Unmodulated	FM 45		L17 and L18 Prim. and Sec. of 3rd IF trans.	Align 3rd IF transformer for maximum reading.
7 (c)	Pin 1 (grid) on 12BA6 1st IF.	.05 Mfd.	10.7 Mc. Unmodulated	FM 45		L13 and L14 Prim. and Sec. of 2nd IF transformer	Align 2nd IF transformer for maximum reading.
8 (c)	Pin 7 (grid) on 12BE6 converter tube socket	.05 Mfd.	10.7 Mc. Unmodulated	FM 45		L9 and L10 Prim. and Sec. of 1st IF transformer	Align 1st IF transformer for maximum reading.
9 (c)(d)	Antenna Post F (Remove line ant.)	270 ohms	98 Mc. Unmodulated	FM 100	98 Mc.	L6 Osc. Coil Slug	Set Oscillator to dial scale.
10 (c)(d)		270 ohms	98 Mc. Unmodulated	FM 100	98 Mc.	L3 and L2 Det. and RF coil Slugs	Align det. and ant. stages to maximum reading.
11 (c)		270 ohms	45 Mc. Unmodulated	FM 45	45 Mc.	C17	Set oscillator to dial scale.
12 (c)		270 ohms	45 Mc. Unmodulated	FM 45	45 Mc.	C5 Det., C5 Ant.	Align detector and ant. stages for maximum reading.

IMPORTANT

Alignment of this chassis will in most cases be unnecessary unless an IF or RF transformer is replaced or the adjustments have been tampered with.

Correct alignment can only be made if the following procedure is followed:

A vacuum tube voltmeter with an isolation resistor of 2000,000 ohms in series with the hot lead will serve for FM adjustments. This lead should be shielded.

An AC output meter connected across the primary or secondary of the output transformer will be satisfactory for all AM adjustments.

The signal generator output should be kept just high enough to get an indication on the meter.

(a) Vacuum Tube Voltmeter Lug 6 on discriminator transformer to chassis (half discriminator load).
(b) Vacuum Tube Voltmeter Lug 3 on discriminator transformer to chassis (full discriminator load).
(c) Vacuum Tube Voltmeter Lug 3 on 3rd IF transformer (Limiter Grid).
(d) Loosen Slugs by applying a hot iron to the cement.

MODEL 7H820,
CHASSIS 7E01

ZENITH RADIO CORP.

PARTS LIST

DIAL ASSEMBLY

PART NO.	REF. NO.	DESCRIPTION
12-1407		Dial Light Socket Mounting Bracket
26-389		Louvre Dial
46-538		Tuning Control Knob
46-688		Tone Control Knob
46-718		Band Switch Knob
54-211		Speed Nut (Dial Scale Mtg.)
57-1335		Tone Knob Escutcheon
76-493		Tuning Shaft
78-786		Dial Light Socket
80-69		Dial Cord Spring
80-209		Dial Cord Spring
80-444		Tuner Arm Tension Spring
80-580		Tuner Arm Stop Spring
80-581		Tuner Arm Pressure Spring
83-1504		Dial Light Shield
93-475		Felt Washer
94-371		Pointer Pulley Bushing (S13944)
97-284		Dial Cord Guide Stud
100-97		Dial Light Bulb - 115 V. - 10 W.
188-30		Retaining Ring (76-493)
188-102		Clamping Ring (46-538)
S-13944		Pointer Pulley and Bushing Assembly (59-205)
S-13945		Cam, Pulley and Bushing Assembly
S-13981		Tone Control Mtg. Bracket and Lug Assem. (12-1404)
S-13982		Dial Cord and Eyelet Assembly (Short)
S-13983		Dial Cord and Eyelet Assembly (Long)
S-14129		Volume Control Knob Assembly (46-522-697)
S-14429		Tuner Arm Assembly

COILS AND CHOKES

PART NO.	REF. NO.	DESCRIPTION
S-11157	L5	Broadcast Oscillator Coil Assembly
S-12256	L7	A.C. Line Choke Coil Assembly
S-12259	L6	F.M. Oscillator Coil Assembly
S-13871	L3	F.M. Detector Coil Assembly
S-13970	T1	1st I.F. Transformer Assembly
S-13971	T2	2nd I.F. Transformer Assembly
S-13972	T3	3rd I.F. Transformer Assembly
S-13973	T4	Discriminator Transformer Assembly
S-13974	L4	Broadcast Detector Coil Assembly
S-13997	L8	Filament Choke Coil Assembly
S-14126	L23	R.F. Choke Coil Assembly
S-14192	L2	F.M. Antenna Coil Assembly
93-125		#6 Internal Shakeproof Lockwasher #1206
93-126		#8 Internal Shakeproof Lockwasher #1208
93-665		Fibre Washer
93-735		.012 x .093 x 11/64" Steel Washer - Cadmium
93-889		Insulating Washer
94-334		Speaker Mtg. Bushing
94-485		Fibre Bushing
94-598		R.F. Plate Mtg. Bushing
95-1035		Output Transformer
97-293		Insulating Stud (Chassis Mtg. Stud) (4 used)
102-466		Dial Calibration Label
110-130		Grille Cloth
112-281		#10 x 3/4" Oval Binding Hd. Self Tapping Screw Type Z - Stat. Bronze
114-26		#8 x 1/4" Hex Hd. Self Tapping Screw - Type Z - Cad.
114-48		#6-32 x 1/4" Hex Acorn Hd. M.S., Steel N.P. (9 used)
114-78		#8 x 5/16" Hex Hd. Slotted Self Tapping Screw (Wavemagnet Mtg.)
114-92		#6 x 1-1/8" Hex Hd. Slotted Self Tapping Screw Type Z - Cad.
114-157		#6 x 1/2" Hex Hd. Self Tapping Screw - Stan-Tap. Cad
114-218		#10 x 7/8" Slotted Washer Hd. Self Tapping Screw (Chassis Mtg.)
114-291		#8-32 x 7/16" Hex Hd. Slotted M. Screw - Steel, N.P
114-292		#6 x 5/8" Hex Hd. Slotted Self Tapping Screw Stan-Tap. - Cad.
125-17		Rubber Grommet (4 used) (49-608)
125-62		Rubber Grommet (Used on R.F. Plate) (4 used)
126-554		Miniature Tube Shield
139-69		Speaker Baffle
149-39		Iron Core (Used on all I.F. and Discriminator Transf.)
149-64		Tuning Core
188-34		Retaining Ring
202-506		F.M. Instruction Book
202-553		Instruction Book
212-3		Selenium Rectifier (or 212-4)
S-13977		Wavemagnet Assembly - Type 29D
S-14128		Cabinet Back, A.C. Plug and Cord Assembly (7H820)
S-14168		Bandswitch and Terminal Strip Assembly
S-14358		Wavemagnet Cable Assembly
S-14562		Cabinet Back, A.C. Plug and Cord Assembly (7H820W)

CONDENSERS

PART NO.	REF. NO.	DESCRIPTION	
22-162	C31	100 Mmfd. (or 22-1669)	.500 V.
22-365	C20	100 Mmfd. (or 22-1701)	.500 V.
22-829	C10	.05 Mfd.	.200 V.
22-830	C22	.02 Mfd.	.600 V.
22-1017	C30	.05 Mfd.	.400 V.
22-1138	C23	500 Mmfd. (or 22-1703)	.500 V.
22-1220	C15	.002 Mfd	.600 V.
22-1367	C14	50 Mmfd.	.500 V.
22-1385	C19	.01 Mfd.	.200 V.
22-1418	C25	.1 Mfd	.200 V.
22-1506	C6	22 Mmfd. (Ceramic)	.500 V.
22-1507	C18	25 Mmfd. (Ceramic)	.500 V.
22-1661	C26, C27, C28, C29	Dry Electrolytic 80-40-40 Mfd. 150 V. X 40 Mfd. - 25 V	
22-1669	C9	100 Mmfd. (Ceramic)	.500 V.
22-1676	C4	.001 Mfd. (Ceramic)	.500 V.
22-1677	C1	Three Gang Variable	
22-1683	C21	.02 Mfd. (Shielded)	.400 V.
22-1685	C5	Single Section Trimmer	
22-1686	C17	Single Section Trimmer	
22-1688	C8	19 Mmfd. (Ceramic)	.500 V.
22-1689	C13	48 Mmfd. (Ceramic)	.500 V.
22-1691	C16	55 Mmfd. (Silver on Ceramic)	
22-1702	C24	.005 Mfd	.400 V.
22-1705	C2	30 Mmfd. (Ceramic)	.500 V.
22-1706	C7	.005 Mfd. (Ceramic) (Disc Type)	.450 V.

RESISTORS

PART NO.	REF. NO.	DESCRIPTION	
63-1202	R22	330 Ohm (Wirewound)	.2 W.
63-1450	R21	22 Ohm (Wirewound)	.1 W.
63-1452	R23	270 Ohm (Wirewound)	.2 W.
63-1582	R26	50M Ohm Tone Control	
63-1584	R20	Volume Control and Switch	
63-1737	R1	68 Ohm (Insulated)	.1/2 W.
63-1747	R27	120 Ohm (Insulated)	.1/2 W.
63-1772	R2	470 Ohm (Insulated)	.1/2 W.
63-1779	R3	680 Ohm (Insulated)	.1/2 W.
63-1765	R19	1M Ohm (Insulated)	.1/2 W.
63-1786	R7	1000 Ohm (Insulated)	.1/2 W.
63-1799	R25	2200 Ohm (Insulated)	.1/2 W.
63-1806	R14	3300 Ohm (Insulated)	.1/2 W.
63-1810	R15	3900 Ohm (Insulated)	.1/2 W.
63-1871	R29	5600 Ohm (Insulated)	.1/2 W.
63-1824	R13	8200 Ohm (Insulated)	.1/2 W.
63-1841	R8	22M Ohm (Insulated)	.1/2 W.
63-1856	R11	47M Ohm (Insulated)	.1/2 W.
63-1870	R10	100M Ohm (Insulated)	.1/2 W.
63-1876	R16	150M Ohm (Insulated)	.1/2 W.
63-1884	R4	220M Ohm (Insulated)	.1/2 W.
63-1898	R12	470M Ohm (Insulated)	.1/2 W.
63-1926	R6	2.2 Megohm (Insulated)	.1/2 W.
63-1940	R17	4.7 Megohm (Insulated)	.1/2 W.

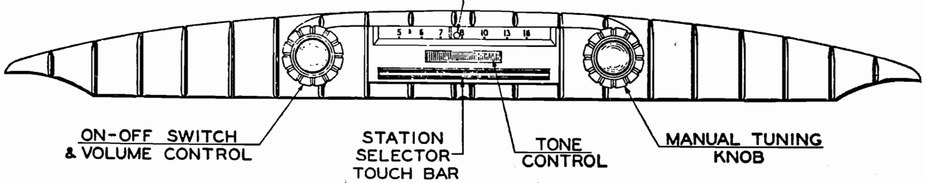
MISCELLANEOUS

PART NO.	DESCRIPTION
12-1070	Wavemagnet Mounting Bracket
14-848	Model 820W - Plastic Cabinet (7H820W)
14-1020	Model 820 - Bakelite Cabinet (7H820)
19-139	Cabinet Back Retaining Clip (4 used)
49-608	7½" P. M. Speaker 208-608 and Voice Coil
54-30	#8-32 x 5/16" x 7/64" Hex Nut - Steel N.P. (6 used)
54-139	#3/8-32 x 9/16" Palnut - Type 9N-Steel-Cad. (2 used)
54-226	Speed Nut - Tinnerman #C518B-014-27 (3 used)
57-1269	I.F. Transformer Terminal Plate
58-168	Two Prong Plug
73-30	#6-32 x 1/4" Hex Hd. Set Screw - Cuppoint (2 used)
78-782	Socket - Miniature Tube (7 Contact) (2 used)
78-788	Socket - Miniature Tube (9 Contact)
78-794	Socket - Miniature Tube (7 Contact) (3 used)
78-795	Socket - Miniature Tube (7 Contact)
83-1063	Threaded Insert (used on all I.F. Transformers)
83-1064	Threaded Insert (used on all I.F. and Discriminator Transformers)
83-1090	Insulating Strip (58-168)
83-1479	Insulating Strip
83-1480	Insulating Strip
83-1503	Tone Arm Insulating Strip
85-417	Band Switch (use S-14168)
93-2	.016 x .134 x 1/4" Brass Washer
93-94	Bakelite Shoulder Washer

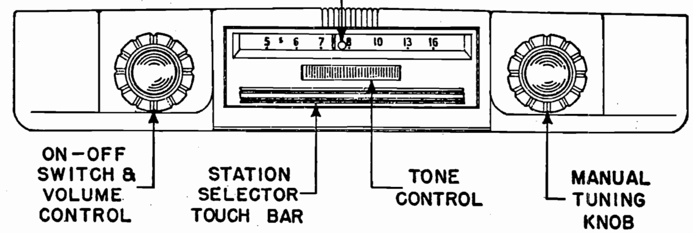
ZENITH RADIO CORP.

MODEL 7ML780E, Lincoln

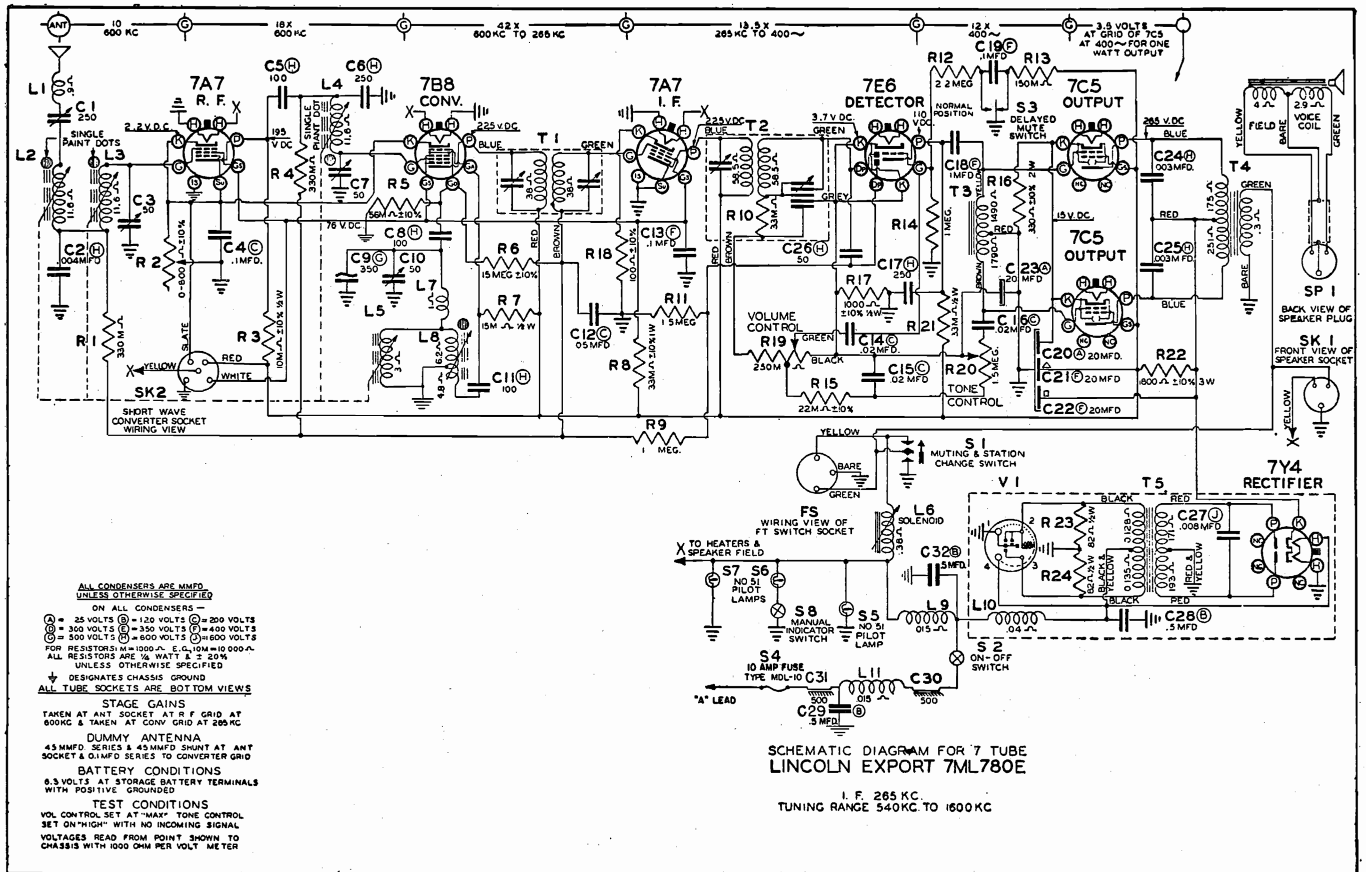
OPERATING INSTRUCTIONS



LINCOLN FIG. 1A



LINCOLN CONTINENTAL FIG. 1B



ALL CONDENSERS ARE MMFD.
UNLESS OTHERWISE SPECIFIED

ON ALL CONDENSERS —
A = 25 VOLTS B = 120 VOLTS C = 200 VOLTS
D = 300 VOLTS E = 350 VOLTS F = 400 VOLTS
G = 500 VOLTS H = 600 VOLTS J = 600 VOLTS

FOR RESISTORS: I M = 1000 Ω, E.G. 10M = 10 000 Ω.
ALL RESISTORS ARE ½ WATT & ± 20%
UNLESS OTHERWISE SPECIFIED

⏚ DESIGNATES CHASSIS GROUND
ALL TUBE SOCKETS ARE BOTTOM VIEWS

STAGE GAINS
TAKEN AT ANT SOCKET AT R F GRID AT 600KC & TAKEN AT CONV GRID AT 265 KC

DUMMY ANTENNA
45 MMFD SERIES & 45 MMFD SHUNT AT ANT SOCKET & 0.1 MFD SERIES TO CONVERTER GRID

BATTERY CONDITIONS
6.3 VOLTS AT STORAGE BATTERY TERMINALS WITH POSITIVE GROUNDED

TEST CONDITIONS
VOL CONTROL SET AT "MAX" TONE CONTROL SET ON "HIGH" WITH NO INCOMING SIGNAL
VOLTAGES READ FROM POINT SHOWN TO CHASSIS WITH 1000 OHM PER VOLT METER

SCHEMATIC DIAGRAM FOR 7 TUBE
LINCOLN EXPORT 7ML780E

I. F. 265 KC.
TUNING RANGE 540KC TO 1600KC

Lincoln Receiver Installation

1—Remove the cardboard cover from the speaker hole in the center of the instrument panel. Do not discard the nuts. Remove the bezel from the instrument panel by loosening the nuts on the underside.

2—Remove the protective cover from the speaker. Install the speaker on the rear of the grille so the cable is toward the left. Use the nuts that held the instrument panel hole cover in place.

3—Hang the hook bolts "A" in the holes provided for them in the dash so that the hooks are turned away from the receiver.

4—Place the receiver in position and slip the threaded end of the hook bolts through the upper hanger brackets.

5—Apply lock washers "B" and wing nuts "C" to the hook bolts and tighten them sufficiently to hold the receiver in place while installing the lower support brackets "D." Fasten the tapped end of the brackets to the instrument panel, using spacer washers "F," lock washers "B", and oval head screws "E." Fasten the other end of the bracket to the lower angle bracket of the receiver. Tighten all screws and nuts so that the receiver is held firmly in place (Fig. 2).

6—Connect the "A" lead to the battery terminal of the circuit breaker on the firewall. (Fig. 3.)

7—Connect the speaker cable and the antenna lead-in cable to the receiver and turn the power on.

8—Place the escutcheon plate, furnished with the receiver, over the tuning and volume control shafts and fasten it in place with the two 8/32" flat head screws furnished in the installation kit.

9—Fit tuning and volume control knobs to their respective shafts.

NOTE: Tuning control knob is fastened to the shaft with a set screw. Shaft has a milled recess for the screw.

4—Cut a hole in the floor mat for the foot switch button. Install the foot switch eyelet (furnished in the installation kit) in the hole. Replace the floor mat. A piece of 1⅛" pipe that has been sharpened on the inside of one end may be used to cut the hole.

ANTENNA. The new Lincoln antenna is especially designed to work satisfactorily with this receiver. The installation instructions are included with the antenna.

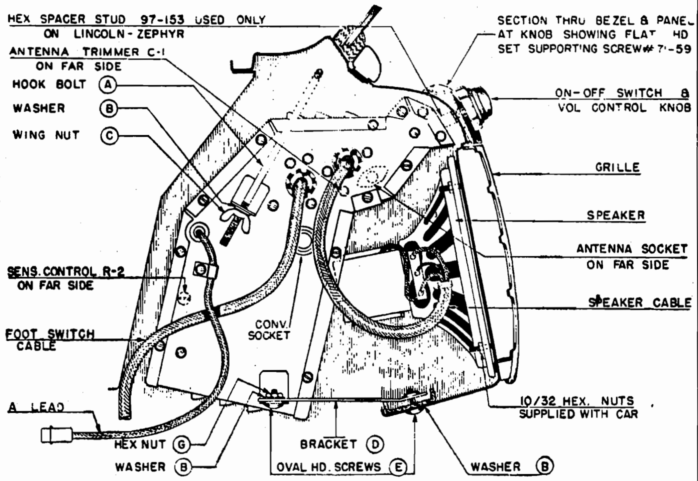


FIG. 2

Lincoln Continental Receiver Installation

The Continental Radio installation is similar to the Lincoln installation with the exception of the speaker.

To install the Continental speaker, remove the speaker grille which is held in place by four nuts on the back of the instrument panel. Place the speaker in position through the front of instrument panel so the cable is to the left. Fasten securely with the four No. 10/32 machine screws and lock washers. Replace the grille and proceed with the installation of the receiver as instructed under Lincoln Receiver installation. Note position of bracket D in figure 2A.

Foot Control Switch Installation

1—Remove the floor mat around the clutch and brake pedals.

2—Drill a hole in each of the three extrusions in the floor, between the clutch and brake pedals, with a No. 27 drill. (Fig. 3.)

3—Fasten the foot control switch in place with the sheet metal screws furnished. Dress the cable so that the plug can be inserted into the foot switch cable receptacle at the left side of the receiver as shown in figure 2.

IMPORTANT: 1200 K.C. ANTENNA ADJUSTMENT. After the receiver has operated for approximately 15 minutes, tune in a weak station near 1200 Kc. Adjust the antenna trimmer (C1, Fig. 2) for maximum signal.

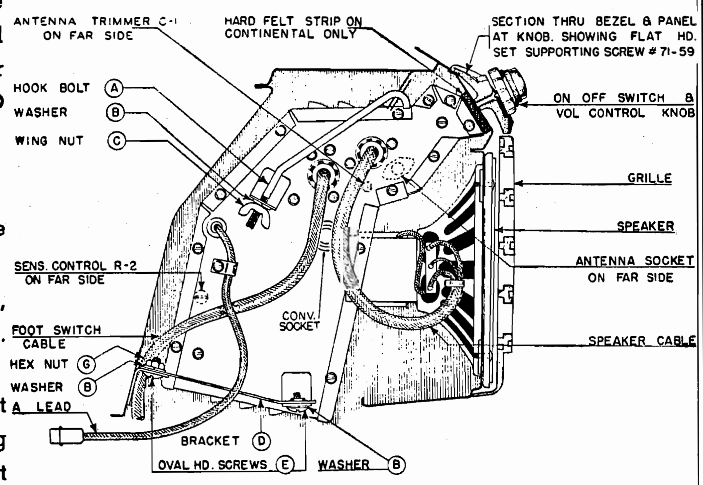


FIG. 2A

ZENITH RADIO CORP.

MODEL 7ML780E, Lincoln

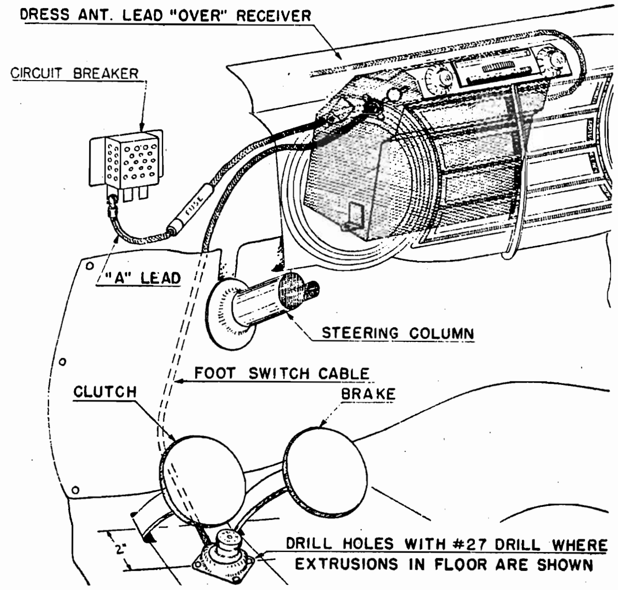


FIG. 3

Setting the Touch-Bar Tuning

Pressing the station selector touch-bar six times will cause the tuning mechanism to change through a cycle of six positions. Five of the Adjust-O-Matic positions may be set for favorite local stations. A red dot will appear in the tuning scale background when the Adjust-O-Matic is in the sixth position. This position may be used for selecting stations manually.

Using the manual (DIAL) position as a reference point, the remaining five positions may be adjusted in succession to any desired dial settings. Setting the stations in sequence according to their frequencies, beginning at the low frequency and progressing through to the high frequency end of the dial, is the recommended practice for simplifying the identification of each Adjust-O-Matic station.

Turn the receiver on and allow it to operate for at least fifteen minutes to bring the temperature up to normal before making the following Adjust-O-Matic settings.

1—Press station selector touch-bar (Figs. 1A and 1B) until red dot appears in dial scale background. Press the touch-bar once more to advance Adjust-O-Matic mechanism to No. 1 position.

2—Pull manual tuning knob outward to engage the Adjust-O-Matic mechanism.

3—Select the station desired and tune to its frequency by turning the tuning knob. Tune very carefully for clearest reception.

CAUTION: DO NOT ATTEMPT TO FORCE THE KNOB IN. The knob will automatically return to the "IN" position when the station selector touch bar or the foot switch is operated.

4—Press station selector bar, pull tuning knob outward, and tune in station desired for No. 2 position. Use same procedure for positions No. 3, 4 and 5. Note: When the red dot appears in the tuning scale background, the manual tuning knob must be pulled outward and rotated to select the stations manually.

Interference Elimination

IMPORTANT: Use the utmost care in the following operations to insure freedom from interference. Be sure that clean contacts are made when connecting condensers in the car. If necessary, clean away paint or dirt with emery paper to make good ground. Tighten all bolts and nuts securely.

1. Mount the voltage regulator condenser No. 22-1192 and the ground strap No. S-9343 on "ground" terminal of the voltage regulator. (Fig. 4.) Connect the lead of the condenser to the ARM. terminal of the voltage regulator. Connect the end of the ground strap to the lower, left hand voltage regulator mounting screw. (Fig. 4.)

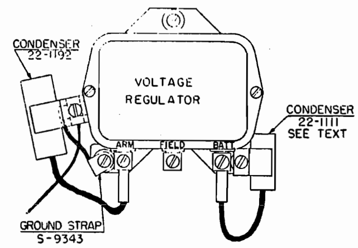


FIG. 4

2. Mount condenser No. 22-1111 under the lower right hand voltage regulator mounting bolt, and connect the lead to the BATT. terminal of the voltage regulator. (Fig. 4).

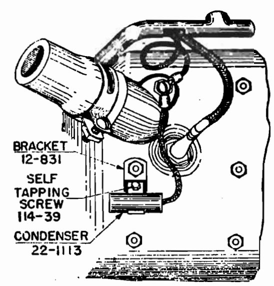


FIG. 5

3. Install the water temperature gauge condenser No. 22-1113 with its separate bracket (which fastens under one of the cylinder head nuts.) (Fig. 5.)

4. Install the condenser No. 22-1113 on the oil gauge unit. (Fig. 6.)

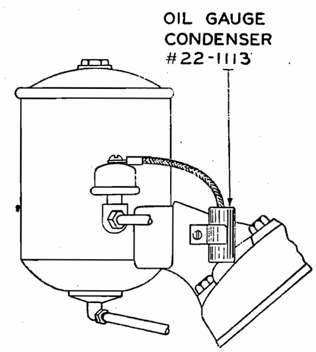


FIG. 6

5. Install the motor hood grounding spring. (Fig. 7.)

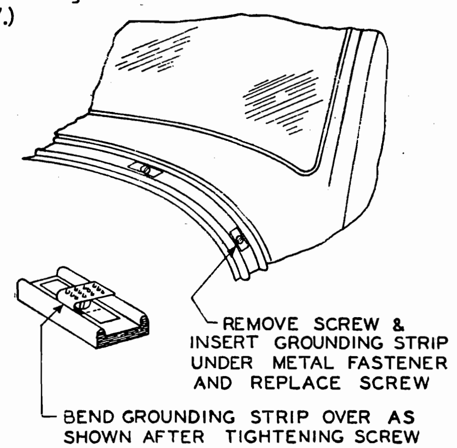
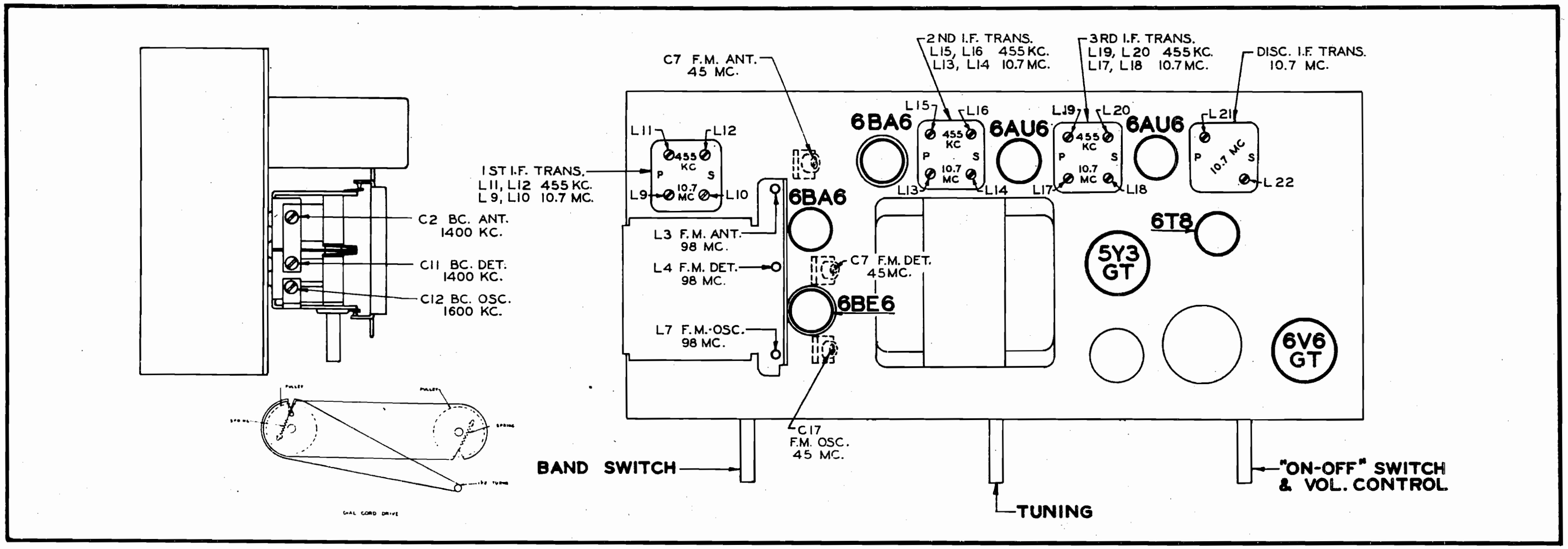


FIG. 7

MODELS 8H832, 8H861,
CHASSIS 8E20

ZENITH RADIO CORP.



TUBE, TRIMMER LOCATION AND DIAL CABLE DRAWING

The 8E20 chassis incorporates a superheterodyne circuit with two stages of IF, and one stage of RF amplification on all bands.

The Radiorgan tone control is of the low impedance type in which a portion of the audio voltage is taken from the speaker voice coil and fed back out of phase into the grid of the first audio. The characteristic of the feedback voltage is determined by the setting of the Radiorgan buttons. To attenuate the high notes, more highs are fed back. To attenuate the low notes, more lows are fed back. For normal reproduction, both highs and lows are fed back and results in no overall change in tone.

AM Alignment: The alignment of this chassis on the standard broadcast band is conventional. The alignment slugs in the IF transformers are threaded and screw into the coil forms.. The slugs are slotted for a small size fiber screw driver. Do not press hard on the aligning tool or the threads in the coil forms will strip and adjustment will be impossible.

FM RF Alignment: The same coil slug arrangement which tunes the 100 MC FM band also tunes the 45 MC band. However, on 45 MC the band switch connects trimmer condensers in parallel and padding wires in series with the 100 MC coils. The tuning slugs are attached to threaded shafts and the slugs are varied in the field of the coils by turning the shafts clockwise or counter-clockwise. After adjustment the shafts must be secured with a drop of speaker cement.

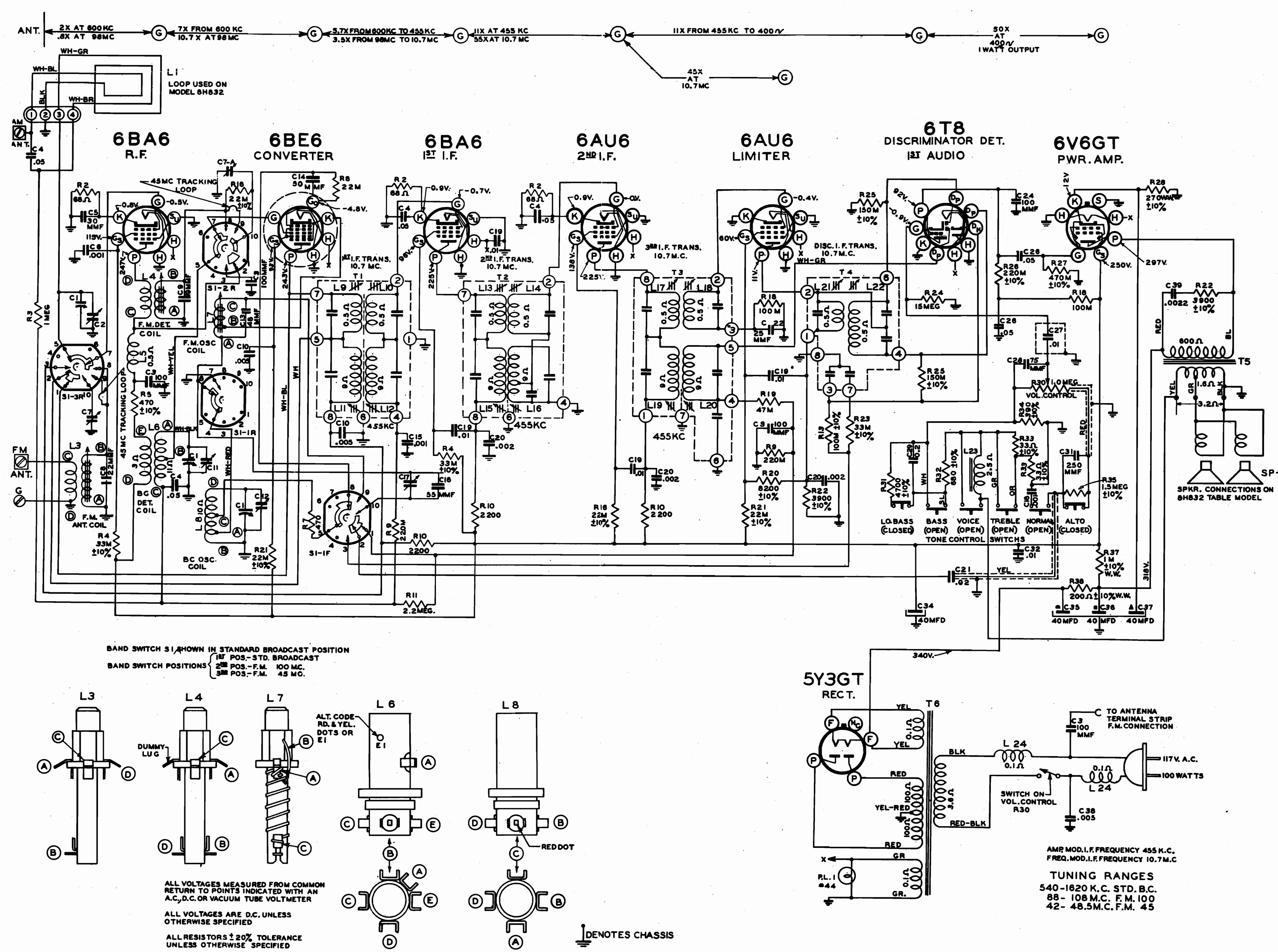
FM IF Alighment: Because of the wide band pass, it is desirable to use a FM signal generator and a cathode ray oscilloscope when aligning the FM IF channel. The instruction book for the Zenith Model 800 Signal Generator (Form Z800I) covers complete FM alignment procedure. If visual alignment equipment is unavailable, reasonably accurate alignment can be made by following the procedure outlined below.

FM Discriminator Alignment: When the secondary of the discriminator is aligned (operation 5) use sufficient signal input to get a good positive and negative indication before setting the slug for zero reading. A center zero indicating meter is recommended for this adjustment, but is not absolutely necessary. Reversing the leads of a non-zero center meter, or observing closely when the meter starts to go to the left (negative) of zero will give the same results.

NOTE: The output transformer must be replaced with an exact duplicate, Part No. 95-1096. Be sure to add the speaker code letter to the transformer Part Number when ordering replacements.

ZENITH RADIO CORP.

MODELS 8H832, 8H861,
CHASSIS 8E20



ZENITH RADIO CORP.

MODELS 8H832, 8H861,
CHASSIS 8E20

ALIGNMENT PROCEDURE

Operation	Connect Oscillator to	Dummy Antenna	Input Signal Frequency	Band	Set Dial To	Adj. Trimmers	Purpose
1	Pin 7 6BE6 Converter	.05 Mfd.	455 KC. Modulated	BC	600 Kc.	L-11, 12, 15, 16, 19 and 20.	Align I. F. channel for maximum output
2	2 turns loosely cpld. to wavemagnet.		1600 Kc. Modulated	BC	1600 Kc.	C12	Set oscillator to dial scale.
3			1400 Kc. Modulated	BC	1400 Kc.	C11 and C2	Align det. and ant. stages.
4 (a)	Pin 1 (grid) on 6AU6 Limiter	.05 Mfd.	10.7 Mc Unmodulated	FM 45		L21 coil slug Primary discr.	Align primary of discriminator for maximum reading.
5 (b)		.05 Mfd.	10.7 Mc Unmodulated	FM 45		L22 coil slug sec. of discr.	Adjust secondary of discriminator for zero reading.
6 (c)	Pin 1 (grid) on 6AU6 2nd IF.	.05 Mfd.	10.7 Mc. Unmodulated	FM 45		L17 and L18 Prim. and Sec. of 3rd IF trans.	Align 3rd IF transformer for maximum reading.
7 (c)	Pin 1 (grid) on 6BA6 1st IF.	.05 Mfd	10.7 Mc Unmodulated	FM 45		L13 and L14 Prim. and Sec. of 2nd IF transformer	Align 2nd IF transformer for maximum reading.
8 (c)	Pin 7 (grid) on 6BE6 converter tube	.05 Mfd.	10.7 Mc. Unmodulated	FM 45		L9 and L10 Prim. and Sec. of 1st IF transformer	Align 1st IF transformer for maximum reading
9 (c)(d)	FM Antenna Post (Remove line ant.)	270 ohms	98 Mc. Unmodulated	FM 100	98 Mc.	L7 Osc. Coil Slug	Set Oscillator to dial scale.
10 (c)(d)		270 ohms	98 Mc. Unmodulated	FM 100	98 Mc.	L4 and L3 Det. and RF coil Slugs	Align det. and ant. stages to maximum reading.
11 (c)		270 ohms	45 Mc. Unmodulated	FM 45	45 Mc.	C17	Set oscillator to dial scale.
12 (c)		270 ohms	45 Mc. Unmodulated	FM 45	45 Mc.	C7 Det., C7 Ant.	Align detector and ant. stages for maximum reading.

IMPORTANT

Alignment of this chassis will in most cases be unnecessary unless an IF or RF transformer is replaced or the adjustments have been tampered with.

Correct alignment can only be made if the following procedure is followed:

A vacuum tube voltmeter with an isolation resistor of 200,000 ohms in series with the hot lead will serve for FM adjustments. This lead should be shielded.

An AC output meter connected across the primary or secondary of the output transformer will be satisfactory for all AM adjustments.

The signal generator output should be kept just high enough to get an indication on the meter.

(a) Vacuum Tube Voltmeter Lug 6 on discriminator transformer to chassis (half discriminator load).

(b) Vacuum Tube Voltmeter Lug 3 on discriminator transformer to chassis (full discriminator load).

(c) Vacuum Tube Voltmeter Lug 3 on 3rd IF transformer (Limiter Grid).

(d) Loosen Slugs by applying a hot iron to the cement.

MODELS 8H832, 8H861,
CHASSIS 8E20

ZENITH RADIO CORP.

PART NO.	REF. NO.	DESCRIPTION
		DIAL ASSEMBLY
26-396		Dial Scale
59-209		Dial Pointer
76-498		Pointer Shaft
76-499		Tuning Control Shaft
78-797		Dial Light Socket
80-69		Dial Cord Tension Spring
80-209		Dial Cord Tension Spring
80-444		Tuner Arm Tension Spring
80-580		Tuner Arm Stop Spring
80-581		Tuner Arm Pressure Spring
93-721		Black Felt Dial Washer
100-36	PL-1	Dial Light Bulb Mazda #44
149-64		Tuning Core & Spring
188-32		Retaining Ring (76-499)
S-14254		Pointer Pulley Assembly
S-14256		Pulley & Bushing Assembly
S-14268		Dial Cord & Eyelet Assembly (Short)
S-14269		Dial Cord & Eyelet Assembly (Long)
S-14270		Dial Scale & Strip Assembly (26-396)
S-14429		Tuner Arm Assembly
		COILS AND CHOKES
S-11157	L8	Broadcast Oscillator Coil Assembly
S-12256	L24	A. C. Line Choke Coil Assembly
S-12259	L7	F. M. Oscillator Coil Assembly
S-13800	L23	Tone Choke Assembly
S-13871	L4	F. M. Detector Coil Assembly
S-13970	T1	1st. I. F. Transformer Assembly
S-13971	T2	2nd. I. F. Transformer Assembly
S-13972	T3	3rd. I. F. Transformer Assembly
S-13973	T4	Discriminator Transformer Assembly
S-13974	L6	Broadcast Detector Coil Assembly
S-14126	L5	R. F. Choke Coil Assembly
S-14192	L3	F. M. Antenna Coil Assembly
		CONDENSERS
22-171	C26	.05 MFD. .600 V.
22-196	C32	.01 MFD. .600 V.
22-348	C15	.001 MFD .500 V.
22-365	C24	100 MMFD. (or 22-1670) .500 V.
22-829	C4	.05 MFD. .200 V.
22-830	C21	.02 MFD. .600 V.
22-1041	C38	.005 MFD .400 V.
22-1136	C31	250 MMFD. (or 22-1745) .500 V.
22-1220	C20	.002 MFD. .600 V.
22-1256	C28	75 MMFD. (or 22-1746) .500 V.
22-1367	C14	50 MMFD. (Ceramic) .500 V.
22-1385	C19	.01 MFD. .200 V.
22-1506	C8	22 MMFD. (Ceramic) .500 V.
22-1507	C22	25 MMFD. (Ceramic) .500 V.
22-1531	C29	.2 MFD .200 V.
22-1573	C34	40 MFD. Electrolytic .450 V.
22-1669	C3	100 MMFD (Ceramic) .500 V.
22-1676	C6	.001 MFD (Ceramic) .500 V.
22-1678	C1	Three Gang Variable
22-1685	C7	Single Section Trimmer
22-1686	C17	Single Section Trimmer
22-1688	C9	19 MMFD. (Ceramic) .500 V.
22-1689	C13	48 MMFD. (Ceramic) .500 V.
22-1691	C16	55 MMfD. (Silver on Ceramic)
22-1705	C5	30 MMFD. (Ceramic) .500 V.
22-1706	C10	.005 MMFD. (Ceramic) (Disc Type) .450 V.
22-1717	C18	.001 MFD .200 V.
22-1718	C27	.01 MFD. (Shielded) .400 V.
22-1720	C35,36,37	Three Section Electrolytic 40 MFD.-25V x 40-40 MFD. .450 V.
22-1754	C39	.0022 MFD. .600 V.
		RESISTORS
63-957	R4	33M Ohm (Insulated) .1 W.
63-1369	R28	270 Ohm (Insulated) W. W .1 W.
63-1566	R21	22M Ohm (Insulated) .2 W.
63-1588	R30	Volume Control & switch
63-1589	R37,B8	Two Section Candohm
63-1722	R33	33 Ohm (Insulated) ½ W.
63-1737	R2	68 Ohm (Insulated) ½ W.
63-1768	R34	390 Ohm (Insulated) ½ W.
63-1771	R5	470 Ohm (Insulated) 10% ½ W.
63-1772	R7	470 Ohm (Insulated) 20% ½ W.
63-1778	R32	680 Ohm (Insulated) ½ W.
63-1800	R10	2200 Ohm (Insulated) ½ W.

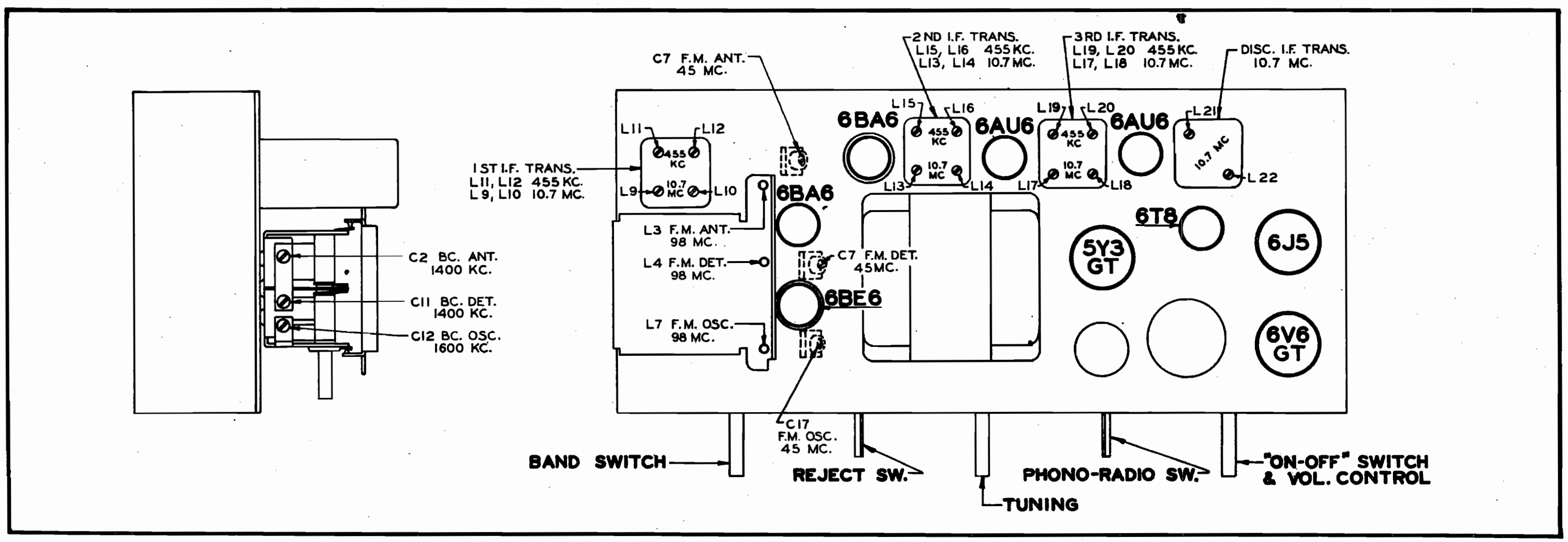
ZENITH RADIO CORP.

MODELS 8H832, 8H861, CHASSIS 8E20

PART NO.	REF. NO.	DESCRIPTION
		RESISTORS--Continued
63-1810	R22	3900 Ohm . (Insulated) . . . . ½ W.
63-1813	R31	4700 Ohm . (Insulated) . . . . ½ W.
63-1824	R20	8200 Ohm . (Insulated) . . . . ½ W.
63-1841	R16	22K Ohm. . (Insulated) 10% . . . . ½ W.
63-1842	R8	22K Ohm. . (Insulated) 20% . . . . ½ W.
63-1848	R23	33K Ohm. . (Insulated) . . . . ½ W.
63-1856	R19	47K Ohm. . (Insulated) . . . . ½ W.
63-1869	R13	100K Ohm . (Insulated) 10% . . . . ½ W.
63-1870	R18	100K Ohm . (Insulated) 20% . . . . ½ W.
63-1876	R25	150K Ohm . (Insulated) . . . . ½ W.
63-1883	R26	220K Ohm . (Insulated) 10% . . . . ½ W.
63-1884	R9	220K Ohm . (Insulated) 20% . . . . ½ W.
63-1897	R28	470K Ohm . (Insulated) . . . . ½ W.
63-1912	R3	1 Megohm . (Insulated) . . . . ½ W.
63-1918	R35	1.5 Megohm (Insulated) . . . . ½ W.
63-1926	R11	2.2 Megohm (Insulated) . . . . ½ W.
63-1961	R24	15 Megohm (Insulated) . . . . ½ W.
		MISCELLANEOUS
2-134		Cabinet Back . . . .
11-104		Line Cord & Plug (7 ft.) . . . .
46-697		Volume & Tuning Control Knob (2 used). . . .
46-718		Bandswitch Knob. . . .
49-641	SP-1	5¼" P. M. Speaker (2 used) . . . .
		208-641 Cone & Voice Coil. . . .
54-30		#8-32 x 5/16" Hex Nut - Steel - N.P. (4 used). . . .
54-31		#10-32 x 3/8" x 1/8" Hex Nut (4 used on 95-1062) . . . .
54-139		#3/8-32 x 9/16" Palnut-Cads (used on 63-1588). . . .
54-226		Speed Nut (3 used) . . . .
54-262		Speed Nut . . . .
57-1353		Diffusing Plate. . . .
57-1386		Dial Escutcheon. . . .
70-83		#6 x ½" Washer Hd. Wood Screw (8 used) (Cabt. Back Mtg.) . .
72-58		#2 x 3/8" Phillips Flat Hd. Wood Screw (6 used) (Escutcheon Mtg.) . . . .
78-250		Electrolytic Capacitor Socket. . . .
78-782		Miniature Tube Socket (2 used) . . . .
78-788		Miniature Tube Socket (9 Contact). . . .
78-793		Octal Tube Socket (2 used) . . . .
78-794		Miniature Tube Socket (3 used) (7 Contact) . . . .
85-424	S1	Bandswitch . . . .
93-125		#6 Int. Lockwasher . . . .
93-127		#10 Int. Lockwasher (4 used on 95-1062). . . .
93-392		3/32" x 33/64" x 1 Brown Felt Washer . . . .
93-719		.031 x 3/16" x 7/16" Steel Washer. . . .
95-1062		Pwr. Transformer . . . .
95-1096		Output Transformer . . . .
112-56		#6 x 1/4" Hex. Hd. Self Tapping Screw. . . .
112-142		#8-32 x 1-1/8" Swedged Hd. M.S. (4 used) . . . .
114-43		#10-32 x 3/8" Hex. Washer Hd. M.S.-Steel-N.P . . . .
114-128		#10 x 1-1/16" Hex. Washer Hd. Self Tapping Screw (4 used) . . (Chassis Mtg.) . . . .
114-159		#6 x 1/4" Hex. Hd. Self Tapping Screw-Type A-Cad. Pl. . . .
114-270		#8 x 1/2" Hex. Hd. Slotted Self Tapping Screw. . . .
114-292		#6 x 5/8" Hex. Hd. Slotted Self Tapping Screw. . . .
125-62		Rubber Grommet (4 used). . . .
166-46		Rubber Bumper (4 used) (Rubber Feet) . . . .
192-115		Dial Glass . . . .
196-109		Dial Dust Gasket . . . .
202-506		F. M. Instruction Book . . . .
202-610		Instruction Book . . . .
S-14647	L1	Wavemagnet Assembly Type 29E . . . .
S-14648		Wavemagnet and Back Assembly . . . .
		RADIORGAN PARTS
57-1351		Radiorgan Escutcheon (L.H.). . . .
57-1352		Radiorgan Escutcheon (R.H.). . . .
76-444		Radiorgan Knob Retaining Shaft (2 Used). . . .
80-595		Radiorgan Mounting Spring (2 Used) . . . .
S-13800		Tone Choke Assembly. . . .
S-14255		Radiorgan Mounting Bracket Assembly (2 Used) . . . .
S-14260		Radiorgan Strip and Contact Assembly (R.H.). . . .
S-14261		Radiorgan Strip and Contact Assembly (L.H.). . . .
S-14273		Radiorgan Knob and Eyelet Assembly (Lo-Bass) . . . .
S-14274		Radiorgan Knob and Eyelet Assembly (Bass). . . .
S-14275		Radiorgan Knob and Eyelet Assembly (Voice) . . . .
S-14276		Radiorgan Knob and Eyelet Assembly (Treble). . . .
S-14277		Radiorgan Knob and Eyelet Assembly (Alto). . . .
S-14278		Radiorgan Knob and Eyelet Assembly (Normal). . . .
S-14310		Radiorgan Escutcheon and Knob Assembly (L. H.) (Lo-Bass, Bass, Voice) . . . .
S-14311		Radiorgan Escutcheon and Knob Assembly (R.H.) (Treble, Alto, Normal). . . .

MODELS 9H881, 9H882R, 9H885, 9H888R, CHASSIS 9E21

ZENITH RADIO CORP.



TUBE AND TRIMMER LOCATION

TO THE SERVICE MAN:

The 9E21 chassis incorporates a superheterodyne circuit with two stages of IF, and one stage of RF amplification on all bands.

The Radiorgan tone control is of the low impedance type in which a portion of the audio voltage is taken from the speaker voice coil and fed back out of phase into the grid of the first audio. The characteristic of the feedback voltage is determined by the setting of the Radiorgan buttons. To attenuate the high notes, more highs are fed back. To attenuate the low notes, more lows are fed back. For normal reproduction, both highs and lows are fed back and results in no overall change in tone.

The 6BA6 1st IF tube is also the phono pre-amplifier. The output from the phono oscillator is fed to the grid of the 6BA6 through C21 and R14. The amplified output is taken from the screen grid and fed back through R12 and C20 into the volume control circuit and the grid of the 6T8 1st audio amplifier.

AM Alignment: The alignment of this chassis on the standard broadcast band is conventional. The alignment slugs in the IF transformers are threaded and screw into the coil forms. The slugs are slotted for a small size fiber screw driver. Do not press hard on the aligning tool or the threads in the coil forms will strip and adjustment will be impossible.

FM RF Alignment: The same coil slug arrangement which tunes the 100 MC FM band also tunes the 45 MC band. However, on 45 MC the band switch connects trimmer condensers in parallel and padding wires in series with the 100 MC coils. The tuning slugs are attached to threaded shafts and the slugs are varied in the field of the coils by turning the shafts clockwise or counter-clockwise. After adjustment the shafts must be secured with a drop of speaker cement.

FM IF Alignment: The same type of tuning slugs for aligning the AM IF Amplifier are used for the FM IF's. Observe the same precautions when making adjustments.

FM Discriminator Alignment: When the secondary of the discriminator is aligned (operation 5) use sufficient signal input to get a good positive and negative indication before setting the slug for zero reading. A center zero indicating meter is recommended for this adjustment, but is not absolutely necessary. Reversing the leads of a non-zero center meter, or observing closely when the meter starts to go to the left (negative) of zero will give the same results.

NOTE: The output transformer must be replaced with an exact duplicate, Part No. 95-1063. Be sure to add the speaker code letter to the tranformer Part Number when ordering replacements.

ZENITH RADIO CORP.

MODELS 9H881, 9H882R, 9H885, 9H888R, CHASSIS 9E21

ALIGNMENT PROCEDURE

Operation	Connect Oscillator to	Dummy Antenna	Input Signal Frequency	Band	Set Dial To	Adj. Trimmers	Purpose
1	Pin 7 6BE6 Converter	.05 Mfd.	455 KC. Modulated	BC	600 Kc.	L-11, 12, 15, 16, 19 and 20.	Align I. F. channel for maximum output
2	2 turns loosely cpld. to wavemagnet.		1600 Kc. Modulated	BC	1600 Kc.	C12	Set oscillator to dial scale.
3			1400 Kc. Modulated	BC	1400 Kc.	C11 and C2	Align det. and ant. stages.
4 (a)	Pin 1 (grid) on 6AU6 Limiter	.05 Mfd.	10.7 Mc Unmodulated	FM 45		L21 coil slug Primary discr.	Align primary of discriminator for maximum reading.
5 (b)		.05 Mfd.	10.7 Mc Unmodulated	FM 45		L22 coil slug sec. of discr.	Adjust secondary of discriminator for zero reading.
6 (c)	Pin 1 (grid) on 6AU6 2nd IF.	.05 Mfd.	10.7 Mc. Unmodulated	FM 45		L17 and L18 Prim. and Sec. of 3rd IF trans.	Align 3rd IF transformer for maximum reading.
7 (c)	Pin 1 (grid) on 6BA6 1st IF.	.05 Mfd	10.7 Mc Unmodulated	FM 45		L13 and L14 Prim. and Sec. of 2nd IF transformer	Align 2nd IF transformer for maximum reading.
8 (c)	Pin 7 (grid) on 6BE6 converter tube	.05 Mfd.	10.7 Mc. Unmodulated	FM 45		L9 and L10 Prim. and Sec. of 1st IF transformer	Align 1st IF transformer for maximum reading
9 (c)(d)	FM Antenna Post (Remove, line ant.)	270 ohms	98 Mc. Unmodulated	FM 100	98 Mc.	L7 Osc. Coil Slug	Set Oscillator to dial scale.
10 (c)(d)		270 ohms	98 Mc. Unmodulated	FM 100	98 Mc.	L4 and L3 Det. and RF coil Slugs	Align det. and ant. stages to maximum reading.
11 (c)		270 ohms	45 Mc. Unmodulated	FM 45	45 Mc.	C17	Set oscillator to dial scale.
12 (c)		270 ohms	45 Mc. Unmodulated	FM 45	45 Mc.	C7 Det., C7 Ant.	Align detector and ant. stages for maximum reading.

IMPORTANT

Alignment of this chassis will in most cases be unnecessary unless a IF or RF transformer is replaced or the adjustments have been tampered with.

Correct alignment can only be made if the following procedure is followed:

A vacuum tube voltmeter with an isolation resistor of 200,000 ohms in series with the hot lead will serve for FM adjustments. This lead should be shielded.

An AC output meter connected across the primary or secondary of the output transformer will be satisfactory for all AM adjustments.

The signal generator output should be kept just high enough to get an indication on the meter.

(a) Vacuum Tube Voltmeter Lug 6 on discriminator transformer to chassis (half discriminator load).
(b) Vacuum Tube Voltmeter Lug 3 on discriminator transformer to chassis (full discriminator load).
(c) Vacuum Tube Voltmeter Lug 3 on 3rd IF transformer (Limiter Grid).
(d) Loosen Slugs by applying a hot iron to the cement.

MODELS 9H881, 9H882R, 9H885, 9H888R — ZENITH RADIO CORP. — CHASSIS 9E21

PARTS LIST

DIAL ASSEMBLY

PART NUMBER	REF. NUMBER	DESCRIPTION
12-1434		Dial Light Mounting Bracket. . . . .
26-396		Dial Scale (use S-14270) . . . . . .
59-209		Dial Pointer . . . .
76-499		Tuning Control Shaft . . . .
78-797		Dial Light Socket. . . . .
80-69		Dial Cord Tension Spring . . . . . .
80-209		Dial Cord Tension Spring . . . . . .
80-444		Tuner Arm Tension Spring . . . . . .
80-580		Tuner Arm Stop Spring. . . . .
80-581		Tuner Arm Pressure Spring. . . . . .
100-36		Dial Light Bulb-Mazda 44 . . . . . .
188-32		Retaining Ring (76-499). . . . . . .
196-109		Dial Dust Gasket . . . .
S14254		Pointer Pulley Assembly. . . . . . .
S14256		Cam Pulley and Bushing Assembly (Gang Cond). . . . .
S14268		Dial Cord & Eyelet Assembly (Short).
S14269		Dial Cord & Eyelet Assembly (Long) .
S14270		Dial Scale and Strip Assembly (26-396) . . . .
S14429		Tuner Arm Assembly . . . .

COILS AND CHOKES

PART NUMBER	REF. NUMBER	DESCRIPTION
S11157	L8	Broadcast Oscillator Coil Assembly .
S12256	L24	A.C. Line Choke Coil Assembly. . . .
S12259	L7	F.M. Oscillator Coil Assembly. . . .
S12603	L25	Phono Oscillator Coil Assembly . . .
S13800	L23	Tone Choke Assembly. . . . .
S13871	L4	F.M. Detector Coil Assembly. . . . .
S13970	T1	1st I.F. Transformer Assembly. . . .
S13971	T2	2nd I.F. Transformer Assembly. . . .
S13972	T3	3rd I.F. Transformer Assembly. . . .
S13973	T4	Discriminator Transformer Assembly. .
S13974	L6	Broadcast Detector Coil Assembly . .
S14126	L5	R.F. Choke Coil Assembly . . . . . .
S14192	L3	F.M. Antenna Coil Assembly . . . . .

CONDENSERS

PART NUMBER	REF. NUMBER	DESCRIPTION
22-171	C26	.05MFD. . . . .
22-196	C32	.01MFD . . . . 600V.
22-348	C15	.001MFD. (Mica) . . . . 500V.
22-365	C24	100MMFD. (or 22-1670). . . . . . 500V.
22-829	C4	.05MFD . . . . 200V.
22-830	C21	.02MFD . . . . 600V.
22-1041	C42	.005MFD. . . . . 400V.
22-1136	C31	250MMFD. (or 22-1745). . . . . . 500V.
22-1220	C20	.002MFD. . . . . 600V.
22-1256	C28	75MMFD. (or 22-1746). . . . . . 500V.
22-1367	C14	50MMFD. (Ceramic). . . . . 500V.
22-1385	C19	.01MFD . . . . 200V.
22-1418	C38	.1MFD. . . . . 200V.
22-1489	C30	10MMFD (Ceramic) . . . . 500V.
22-1506	C8	22MMFD. (Ceramic). . . . . 500V.
22-1507	C22	25MMFD. (Ceramic). . . . . 500V.
22-1531	C29	.2MFD. . . . . 200V.
22-1532	C40	50MMFD (or 22-1674). . . . . . . 500V.
22-1664	C39	50MMFD. (Ceramic). . . . . 500V.
22-1669	C3	100MMFD. (Ceramic) . . . . 500V.
22-1676	C6	.001MFD. (Ceramic) . . . . 500V.
22-1678	C1	Three Gang Variable. . . . .
22-1685	C7	Single Section Trimmer . . . .
22-1686	C17	Single Section Trimmer . . . .
22-1688	C9	19MMFD. (Ceramic). . . . . 500V.
22-1689	C13	48MMFD. (Ceramic). . . . . 500V.
22-1691	C16	55MMFD. (Silver on Ceramic). . . .
22-1705	C5	30MMFD. (Ceramic). . . . . 500V.
22-1706	C10	.005MFD. (Ceramic Disc Type) . 450V.
22-1717	C18	.001MFD. . . . . 200V.
22-1718	C27	.01MFD. (Shielded) . . . . 400V.
22-1719	C33,C34	Two Section Electrolytic 15-40MFD . . . . 450V.
22-1720	C35,C36 C37	Three Section Electrolytic . . . . 40MFD.-25V.x40-40MFD.-450. . . 450V.
22-1754	C43	.0022MFD . . . . 600V.

RESISTORS

PART NUMBER	REF. NUMBER	DESCRIPTION
63-957	R4	33M ohm (Insulated). . . . . . . .1 W.
63-1065	R6	15M ohm (Insulated). . . . . . . .1 W.
63-1369	R28	270 ohm (Insulated-WW) . . . . . .1 W.
63-1565	R36	4700 ohm (Insulated) . . . . . . .1 W.
63-1566	R21	22M ohm (Insulated). . . . . . . .2 W.
63-1588	R30	Volume Control and Switch. . . . . .
63-1589	R37,R38	Two Section Candohm (1000 ohm WW 5W., 200 ohm WW 3W). . . . . .1/2 W.
63-1722	R33	33 ohm (Insulated) . . . . . . .1/2 W.
63-1737	R2	68 ohm (Insulated) . . . . . . .1/2 W.
63-1768	R34	390 ohm (Insulated). . . . . . .1/2 W.
63-1771	R5	470 ohm (Insulated). . . . . . .1/2 W
63-1772	R7	470 ohm (Insulated). . . . . . .1/2 W.
63-1778	R32	680 ohm (Insulated). . . . . . .1/2 W
63-1779	R12	680 ohm (Insulated). . . . . . .1/2 W.
63-1800	R10	2200 ohm (Insulated) . . . . . .1/2 W
63-1810	R22	3900 ohm (Insulated) . . . . . .1/2 W
63-1813	R31	4700 ohm (Insulated) . . . . . .1/2 W
63-1824	R20	8200 ohm (Insulated) . . . . . .1/2 W.
63-1827	R14	10M ohm (Insulated). . . . . . .1/2 W.
63-1841	R16	22M ohm (Insulated). . . . . . .1/2 W.
63-1842	R8	22M ohm (Insulated). . . . . . .1/2 W.
63-1848	R23	33M ohm (Insulated). . . . . . .1/2 W.
63-1856	R19	47M ohm (Insulated). . . . . . .1/2 W.
63-1869	R13	100M ohm (Insulated) . . . . . .1/2 W.
63-1870	R18	100M ohm (Insulated) . . . . . .1/2 W.
63-1876	R25	150M ohm (Insulated) . . . . . .1/2 W.
63-1883	R26	220M ohm (Insulated) . . . . . .1/2 W.
63-1884	R9	220M ohm (Insulated) . . . . . .1/2 W.
63-1897	R27	470M ohm (Insulated) . . . . . .1/2 W.
63-1911	R17	1 Megohm (Insulated) . . . . . .1/2 W.
63-1912	R3	1 Megohm (Insulated) . . . . . .1/2 W.
63-1918	R35	15 Megohm (Insulated). . . . . .1/2 W.
63-1926	R11	2.2 Megohm (Insulated) . . . . .1/2 W.
63-1961	R24	15 Megohm (Insulated). . . . . .1/2 W.

MISCELLANEOUS

PART NUMBER	REF. NUMBER	DESCRIPTION
11-106		Line Cord and Plug (9 ft. long) (or 11-101). . . . .
54-226		Speed Nut-Tinnerman. . . . .
78-709		Socket-Octal Tube. . . . .
78-782		Socket-Miniature Tube (2 used) . . .
78-788		Socket-Noval Miniature (9 contact) .
78-791		Socket-Phono Cable (7 contact) . . .
78-793		Socket-Octal Tube (2 used) . . . . .
78-794		Socket-Miniature Tube (7 contact). .
85-421	S2	Phono-Radio Switch . . . .
85-422	S3	Phono-Reject Switch. . . . .
85-424	S1	Band Switch. . . . .
94-295		Phono Switch Mounting Bushing. . . .
94-598		R.F. Plate Mounting Bushing (4 used)
95-1062	T6	Power Transformer. . . . .
95-1063	T5	Output Transformer . . . .
125-17		Rubber Grommet (2 used (1 on 85-421) (1 on 85-422). . . . .
125-62		Rubber Grommet (4 used). . . . . . .
126-553		Miniature Tube Shield (Metal). . . .
126-554		Miniature Tube Shield (Paper). . . .
126-569		Heat Shield. . . . .
149-64		Tuning Core and Spring (3 used). . .

RADIORGAN ESCUTCHEON PARTS

PART NUMBER	REF. NUMBER	DESCRIPTION
57-1351		Radiorgan Escutcheon (L.H.). . . . .
57-1352		Radiorgan Escutcheon (R.H.). . . . .
76-444		Radiorgan Knob Retaining Shaft (2 used). . . . .
80-595		Radiorgan Mounting Spring (2 used) .
114-159		#6x1/4 Hex.Hd. Self Tapping Screw (2 used) . . . .
S14255		Radiorgan Mounting Bracket Assembly (2 used) . . . .
S14260		Radiorgan Strip and Contact Assembly (R.H.) . . . .
S14261		Radiorgan Strip and Contact Assembly (L.H.) . . . .
S14274		Radiorgan Knob and Eyelet Assembly (Bass) . . . .
S14273		Radiorgan Knob and Eyelet Assembly (Lo-Bass). . . . .
S14275		Radiorgan Knob and Eyelet Assembly (Voice). . . . .
S14276		Radiorgan Knob and Eyelet Assembly (Treble) . . . .
S14277		Radiorgan Knob and Eyelet Assembly (Alto) . . . .
S14278		Radiorgan Knob and Eyelet Assembly (Normal) . . . .
S14310		Radiorgan Escutcheon & Knob Assembly (L.H.) (Lo-Bass--Bass-Voice) . . .
S14311		Radiogran Escutcheon and Knob Assembly (R.H.) (Treble-Alto-Normal). . . . .

MODEL 9H881 CABINET PARTS

PART NUMBER	REF. NUMBER	DESCRIPTION
15-82		Plug Cap and Insulator (used on S14353). . . . .
19-123		Record Changer Mounting Clip (3 used). . . . .
27-81		Shaft Bearing Disc . . . .
36-39		Record Changer Frame Handle. . . . .
40-43		Cabinet Hinge (R.H.) . . . .
40-44		Cabinet Hinge (L.H.) . . . .
46-648		Door Pull (2 used) . . . .
46-697		Volume and Tuning Control Knob (2 used). . . . .
46-718		Band Switch Knob . . . .
46-726		Phono Switch Knob. . . . .
49-624		12" P.M. Speaker . . . . 208-624 Cone and Voice Coil. . . . .
57-1336		Dial Escutcheon. . . . .
57-1353		Diffusing Plate. . . . .
58-169		Seven Prong Plug (used on S-14353) .
72-58		#2 x 3/8 Phillips Flat Hd. Wood Screw-Steel Brass Plate (Esc.Mtg.)
78-798		Seven Contact Socket (used on S-14353) . . . .
80-463		Record Changer Mounting Spring (4 used). . . . .
83-1244		Record Changer Trim Strip. . . . . .
93-392		3/32 x 33/64" Brown Felt Washer (3 used) . . . .
112-489		#8 x 1/2" Phillips R.H. Self Tapping Screw-cad. (Handle Mtg. Screw) . .
112-682		Record changer Mounting Screw (4 used). . . . .

ZENITH RADIO CORP. MODELS 9H881, 9H882R, 9H885, 9H888R, CHASSIS 9E21

PART NUMBER	REF. NUMBER	DESCRIPTION
114-148		#10 x 7/8" Hex Washer Hd. Self-Tapping Screw (4 used) (Chassis Mtg.)
114-233		#14 x 1-1/4" Slotted Hex Washer Hd. Self-Tapping Screw, Cad.
125-56		Rubber Grommer (4 used) (Spk. Mtg.)
138-25		Metal Grille
159-52		Plug Button (4 used)
165-13		Metal Glide (4 used)
166-31		Rubber Bumper
188-91		Rubber Ring (2 used)
192-115		Dial Glass
202-506		F. M. Instruction Book
202-566		Instruction Book
S12864		Drive Wheel & Pin Assembly (2 used).
S14002		Intermixer Record Changer
S14195		Loading Coil Assembly (9H881, 9H885, 9H888)
S14305	L1	Low Impedance Loop Assembly (9H881, 9H885, 9H888)
S14352		Record Changer Mtg. Frame Assembly (complete)
S14353		Interconnecting Cable Assembly

MODEL 9H882R CABINET PARTS

PART NUMBER	REF. NUMBER	DESCRIPTION
12-1183		Door Stop Bracket
15-64		Pin Plate Plug
15-65		Plug Cap & Insulator (used on S12591)
15-82		Plug Cap & Insulator (used on S14539)
19-123		Record Changer Mounting Clip
22-1240		Wavemagnet Trimmer Condenser
22-1501		Electrolytic Capacitor, 150 Mfd, 60V.
36-39		Record Changer Frame Handle
40-54		Cabinet Hinge
46-697		Volume & Tuning Control Knob (2used)
46-718		Band Switch Knob
46-726		Phono Switch Knob (2 used)
49-637		10" P.M. Speaker
		208-637 Cone & Voice Coil
52-188		Plug & Wire (used on S14539)
57-1336		Dial Escutcheon
57-1353		Diffusing Plate
58-86		Two Prong Plug (used on S12591)
58-132		6 Prong Plug
58-169		7 Prong Plug (used on S14539)
70-126		#10 x 1-7/8" R.H. Wood Screw-Steel N.P.
72-58		#2 x 3/8" Phillips Flat Hds. Wood Screw (Esc. Mtg.) (6 used)
78-555		Six Contact Socket (used on S12591).
78-798		Seven Contact Phono Socket (used on S14539)
80-407		Motor Mounting Spring (8 used)
80-443		Cabinet Door Return Spring
80-463		Record Changer Mtg. Spring (4 used).
80-570		Shaft Tension Spring
83-1244		Record Changer Trim Strip
83-1431		Plastic Strip
85-351		Drive Out Control Switch (used on S12591)
85-382		S.P.D.T. Switch (used on S12591)
93-168		Rubber Shoulder Washer (6 used)
93-392		Brown Felt Washer (3 used)
93-540		Rubber Washer (4 used)
94-502		Motor Mounting Bushing
112-490		#8 x 5/8" Phillips R.H. Self Tapping Screw (Handle Mtg.)
112-611		Record Changer Mtg. Screw (3 used)
112-682		Record Changer Mtg. Screw (1 used)
114-132		#10 x 1-5/8" Hex Washer Hd. Self-Tapping Screw (Chassis Mtg.)
125-50		Rubber Grommet (2 used)
125-51		Rubber Grommet (8 used)
125-56		Rubber Grommet (4 used) (Spk. Mtg.).
143-44		Drive Out Coupling
165-12		Ball Bearing Caster (4 used)
192-115		Dial Glass
202-506		F. M. Instruction Book
202-566		Instruction Book (Radio & Phono)
S-12389	L2	Wavemagnet Loading Coil Assembly
S-12411		Ball Bearing Shaft & Washer Assembly
S-12412		Phono Drive Out Motor, Mtg. Brkt. & Cable Assembly
S-12591		Drive Out Switch, Plug & Cable Assembly
S-14002		Intermixer Record Changer
S-14445	L1	Wavemagnet Assembly-Type 30N
S-14538		Record Changer Mounting Frame Assembly
S-14539		Interconnecting Cable Assembly
S-12583		Phono Drive Out Motor & Plug (141-91) Induction Motor)

MODEL 9H885 CABINET PARTS

PART NUMBER	REF. NUMBER	DESCRIPTION
15-82		Plug Cap & Insulator (used on S-14306)
19-123		Record Changer Mounting Clip (3 used)
40-42		Knife Hinge (R.H.)
40-65		Knife Hinge (L.H.)
46-662		Key Escutcheon (2 used)
46-697		Volume & Tuning Knob (2 used)
46-718		Band Switch Knob
46-725		Door Pull (2 used)
46-726		Phono Switch Knob (2 used)
49-624		12" P.M. Speaker
		208-624 Cone & Voice Coil
57-1336		Dial Escutcheon
57-1353		Diffusing Plate
58-169		Seven Prong Plug (7 used on S-14306)
70-96		#10 x 1-3/4 R.H.W.S. Steel N.P. (6 used)
72-58		#2 x 3/8" Phillips Flat Hd. Wood Screw-(Esc. Mtg.) (6 used)
78-798		Seven Contact Socket (used on S-14306)
80-423		Chassis Lift Spring (2 used)
80-463		Record Changer Mounting Spring (4 used)
83-1244		Record Changer Trim Strip
93-392		3/32" x 33/64" x 1" Brown Felt Washer (3 used)
112-558		#10-32 x 7/8 Flat Phillips Hd. M.S. Steel-Statuary Bronze (Pinch Pt.).
112-611		Record Changer Mtg. Screw (3 used)
112-682		Record Changer Mtg. Screw (1 used)
114-257		#10 x 1-3/8" Hex Slotted Washer Hd. Sheet, Metal Screw
125-49		Rubber Grommet (4 used)
125-56		Rubber Grommet (4 used) (49-624)
159-61		Plug Button-Statuary Bronze
165-9		Metal Glides
192-115		Dial Glass
202-506		F. M. Instruction Book
202-566		Instruction Book (Radio & Phono)
S-10796		Lid Support Arm, Hinge Plate & Brkt. (R.H.)
S-10797		Lid Support Arm, Hinge Plate & Brkt. (L.H.)
S-11429		Record Changer Mounting Frame Assembly
S-12545		Phono Lift Spring & Bushing Assembly
S-14002		Intermixer Record Changer Assembly
S-14195		Loop Loading Coil Assembly
S-14305		Low Impedance Loop Assembly
S-14306		Interconnecting Cable Assembly (Phono)
S-14433		Chassis Compartment Hinge Assembly (R.H.)
S-14434		Chassis Compartment Hinge Assembly (L.H.)

MODEL 9H888R CABINET PARTS

PART NUMBER	REF. NUMBER	DESCRIPTION
15-82		Plug Cap & Insulator (used on S-14306 S-14306)
19-123		Record Changer Mounting Clip (3 used)
40-42		Knife Hinge (R.H.)
40-65		Knife Hinge (L.H.)
46-648		Door Pull (2 used)
46-659		Key Escutcheon
46-697		Volume & Tuning Control Knob (2 used)
46-718		Band Switch Knob
46-726		Phono Switch Knob
49-624		12" P.M. Speaker
		208-624 Cone & Voice Coil
57-1336		Dial Escutcheon
57-1353		Diffusing Plate
58-169		Seven Prong Plug (used on S14306)
70-96		#10 x 1-3/4" R.H.W.S.-Steel N.P. (6 used)
72-58		#2-3/8" Phillips Flat Hds. Wood Screw
78-798		Seven Contact Socket (used on S14306)
80-423		Chassis Lift Spring (2 used)
80-463		Record Changer Mtg. Screw (4 used)
83-1244		Record Chnager Trim Strip
93-392		3/32" x 33/64" x 1 Brown Felt Washer (3 used)
112-558		#10-32 x 7/8I Flat Phillips Hd. M. Screw-Steel-Statuary-Bronze (Pinch Pt.)
112-611		Record Changer Mounting Screw (3 used)
112-682		Record Changer Mounting Screw (1 used)
114-257		#10 x 1-3/8" Hex Slotted Washer Hd. Sheet Metal Screw
125-49		Rubber Grommet
125-56		Rubber Grommet
138-26		Metal Grille
159-61		Plug Button-Statuary Bronze
165-9		Metal Glides (4 used)
192-115		Dial Glass
202-506		F.M. Instruction Book
202-566		Instruction Book (Radio & Phono)
S-10796		Lid Support Arm, Hinge Plate & Brkt. (R.H.)
S-10797		Lid Support Arm, Hinge Plate & Brkt. (L.H.)
S-11429		Record Changer Mtg. Frame Assembly
S-12545		Phono Lift Spring & Bushing Assembly
S-14002		Intermixer Record Changer
S-14195		Loop Loading Coil Assembly
S-14305		Low Impedance Loop Assembly
S-14306		Interconnecting Cable Assembly (Phono)
S-14433		Chassis Compartment Hinge Assembly (R.H.)
S-14434		Chassis Compartment Hinge Assembly (L.H.)

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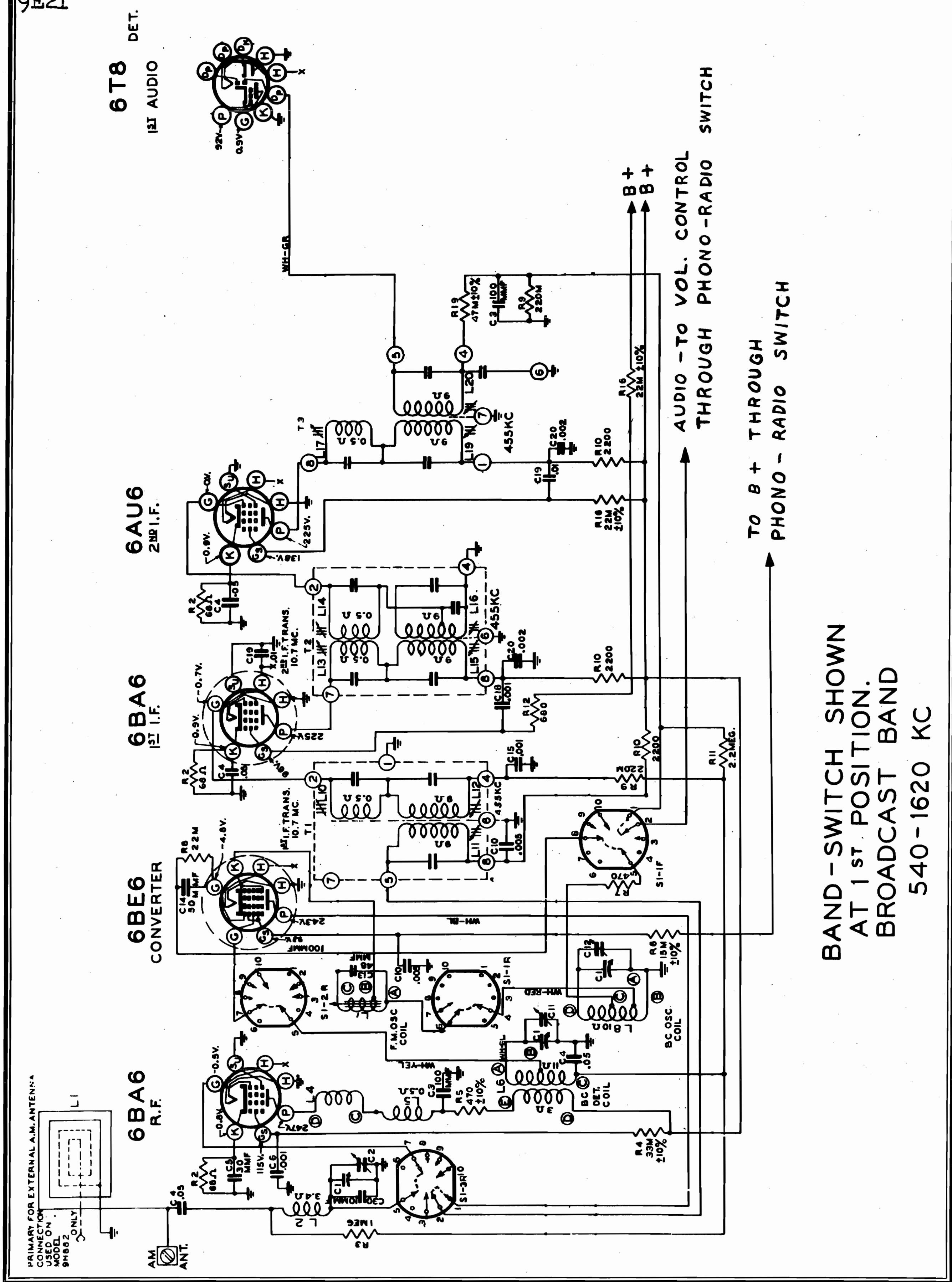
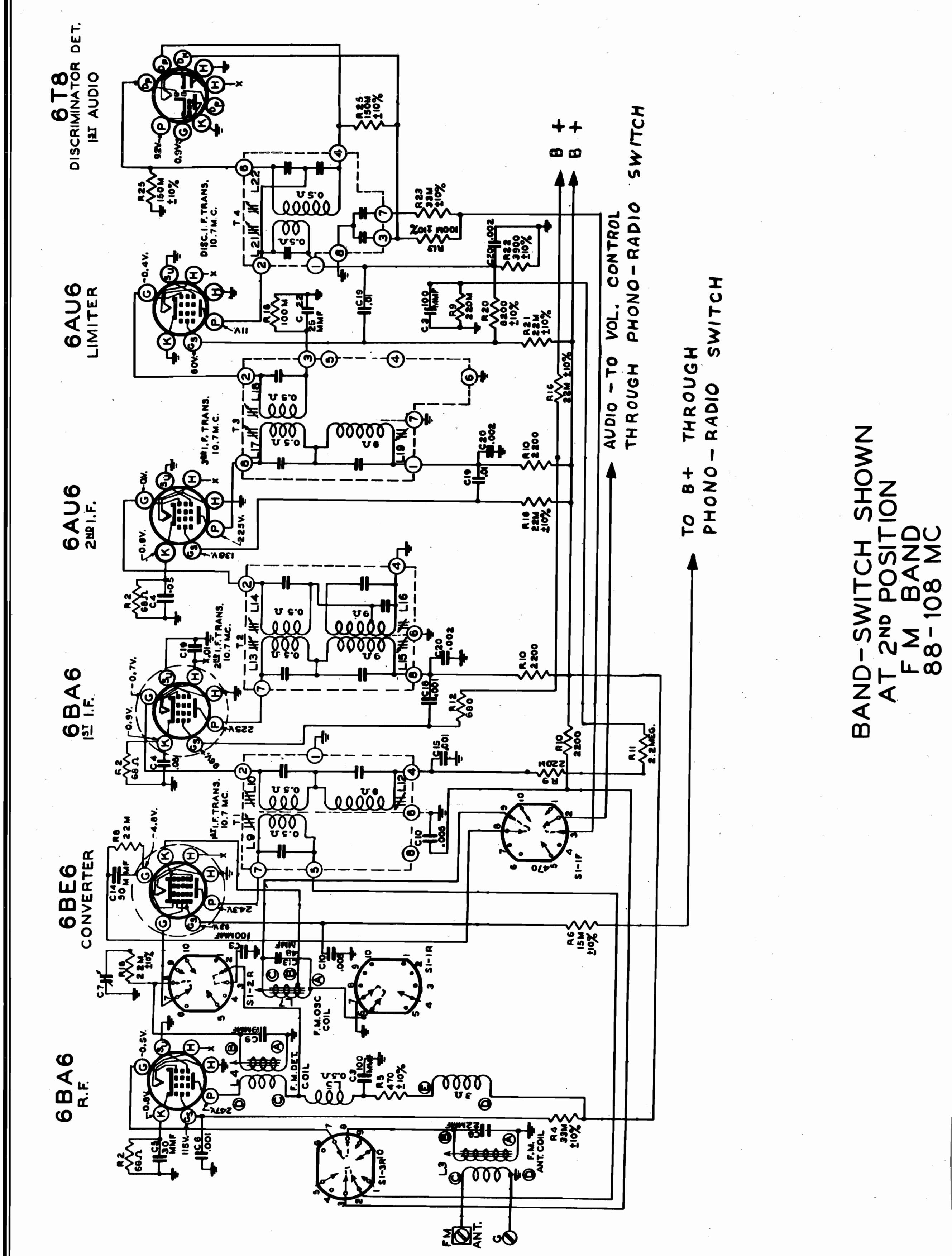
MODELS 9H881, 9H882R, 9H885, 9H888R, CHASSIS 9E21

ZENITH RADIO CORP.



ZENITH RADIO CORP. MODELS 9H881, 9H882R, 9H885, 9H888R, CHASSIS 9E21



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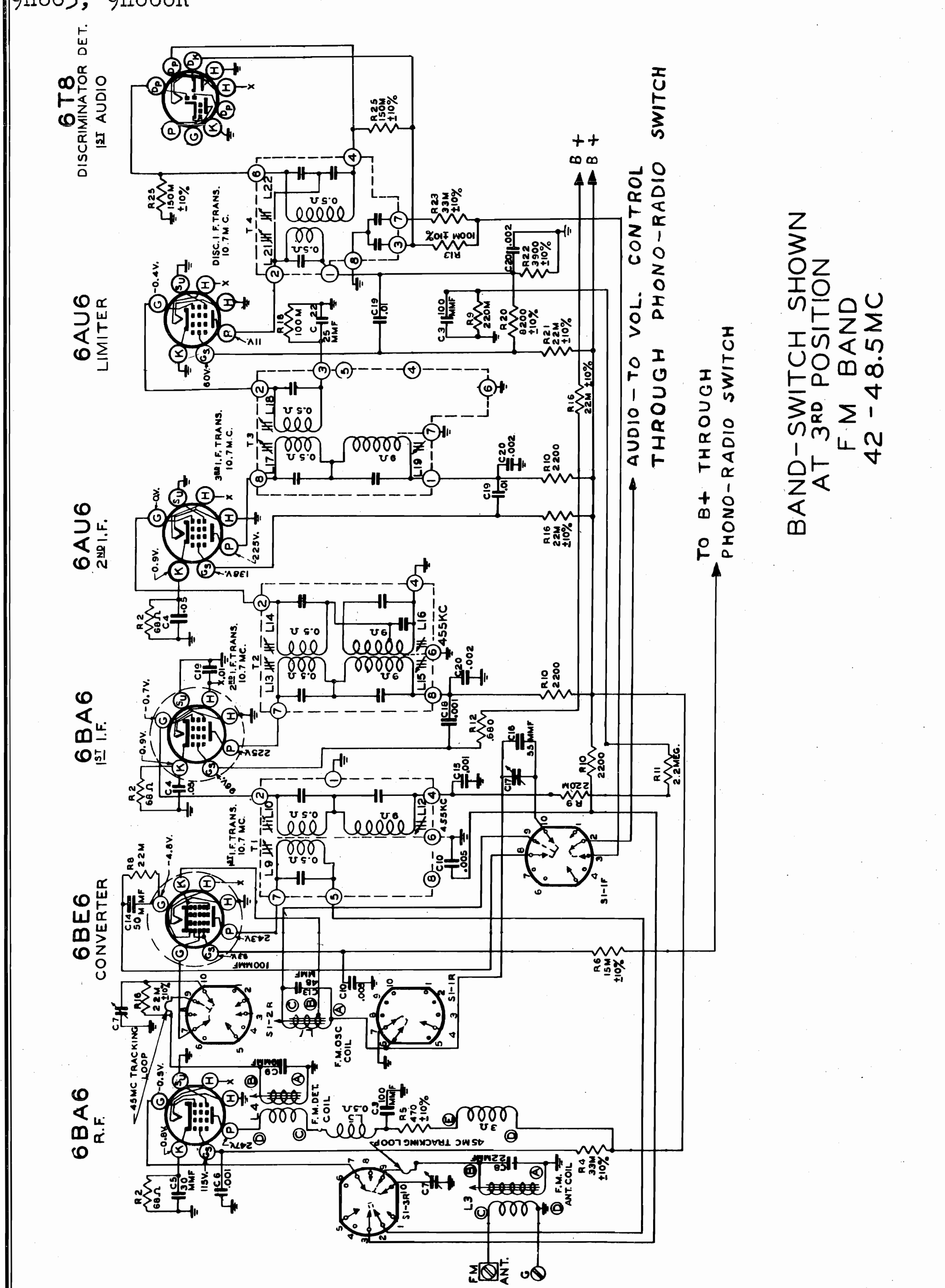
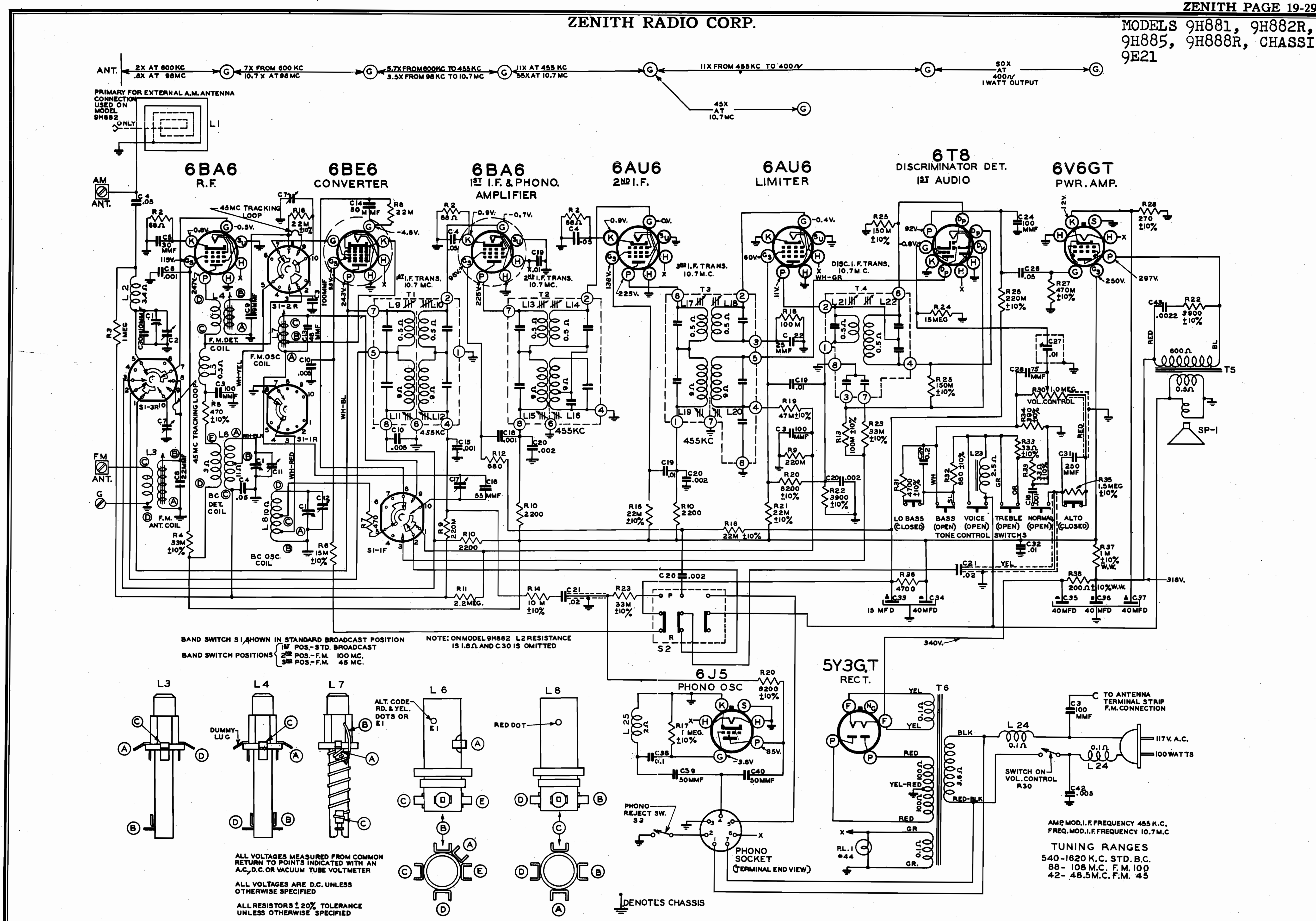
MODELS 9H881, 9H882R, 9H885, 9H888R

ZENITH RADIO CORP.

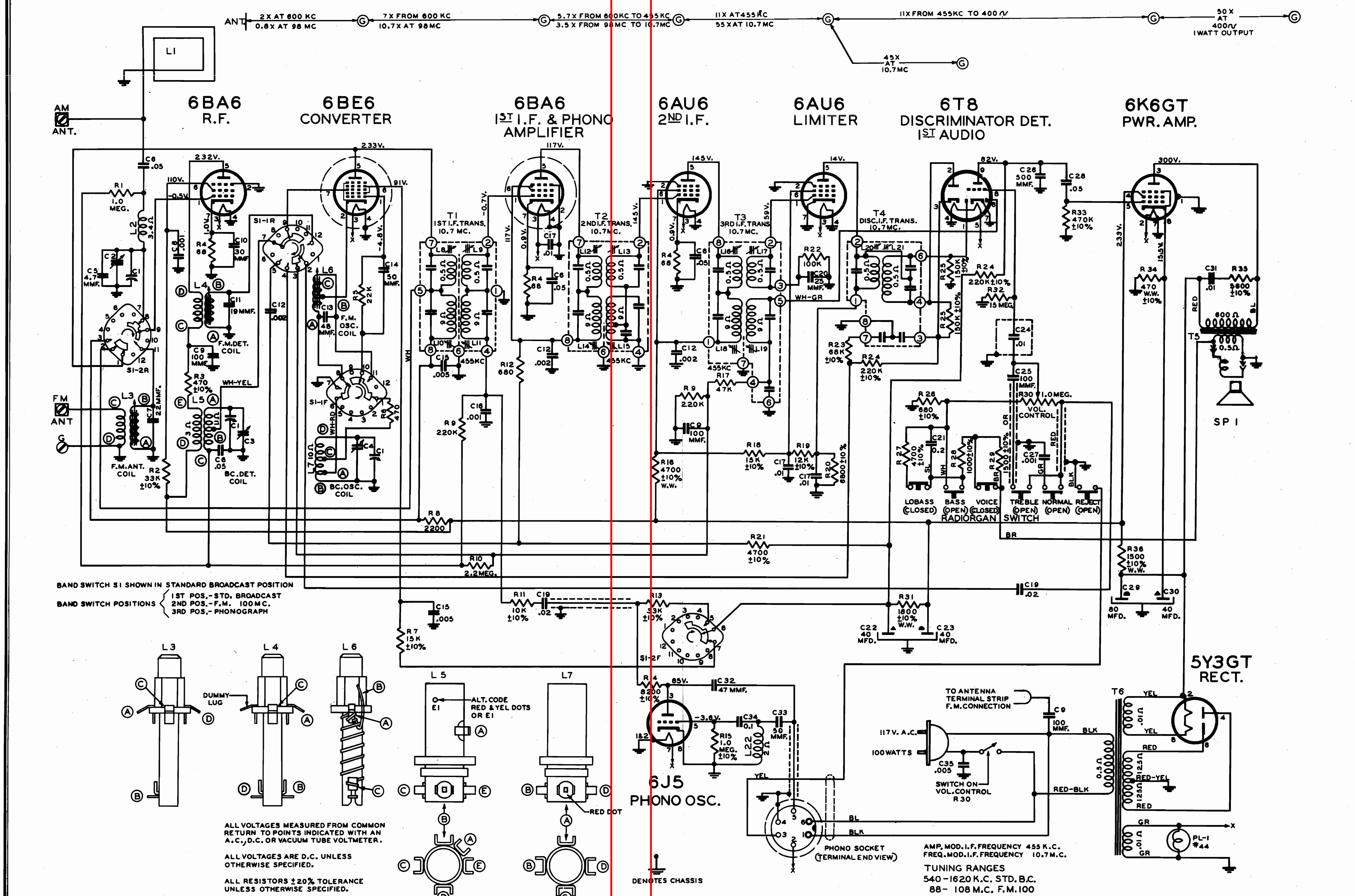
CHASSIS 9E21




ZENITH RADIO CORP.
MODELS 9H881, 9H882R, 9H885, 9H888R, CHASSIS 9E21
6BA6 R.F.
6BE6 CONVERTER
6BA6 1ST I.F. & PHONO. AMPLIFIER
6AU6 2ND I.F.
6AU6 LIMITER
6T8 DISCRIMINATOR DET. 1ST AUDIO
6V6GT PWR. AMP.
5Y3GT REC T.
6J5 PHONO OSC
PRIMARY FOR EXTERNAL A.M. ANTENNA CONNECTION USED ON MODEL 9H882 ONLY
BAND SWITCH S1 SHOWN IN STANDARD BROADCAST POSITION
BAND SWITCH POSITIONS 1ST POS.-STD. BROADCAST 2ND POS.-F.M. 100 MC. 3RD POS.-F.M. 45 MC.
NOTE: ON MODEL 9H882 L2 RESISTANCE IS 1.8Ω AND C30 IS OMITTED
ALL VOLTAGES MEASURED FROM COMMON RETURN TO POINTS INDICATED WITH AN A.C., D.C. OR VACUUM TUBE VOLTMETER
ALL VOLTAGES ARE D.C. UNLESS OTHERWISE SPECIFIED
ALL RESISTORS ±20% TOLERANCE UNLESS OTHERWISE SPECIFIED
DENOTES CHASSIS
AMP. MOD. I.F. FREQUENCY 455 K.C.
FREQ. MOD. I.F. FREQUENCY 10.7 M.C.
TUNING RANGES
540-1620 K.C. STD. B.C.
88-108 M.C. F.M. 100
42-48.5 M.C. F.M. 45
PHONO SOCKET (TERMINAL END VIEW)
PHONO-REJECT SW. S3
TO ANTENNA TERMINAL STRIP F.M. CONNECTION
117V. A.C. 100 WATTS
SWITCH ON-VOL. CONTROL R30
LO BASS (CLOSED) BASS (OPEN) VOICE (OPEN) TREBLE (OPEN) NORMAL (OPEN) ALTO (CLOSED)
TONE CONTROL SWITCHS

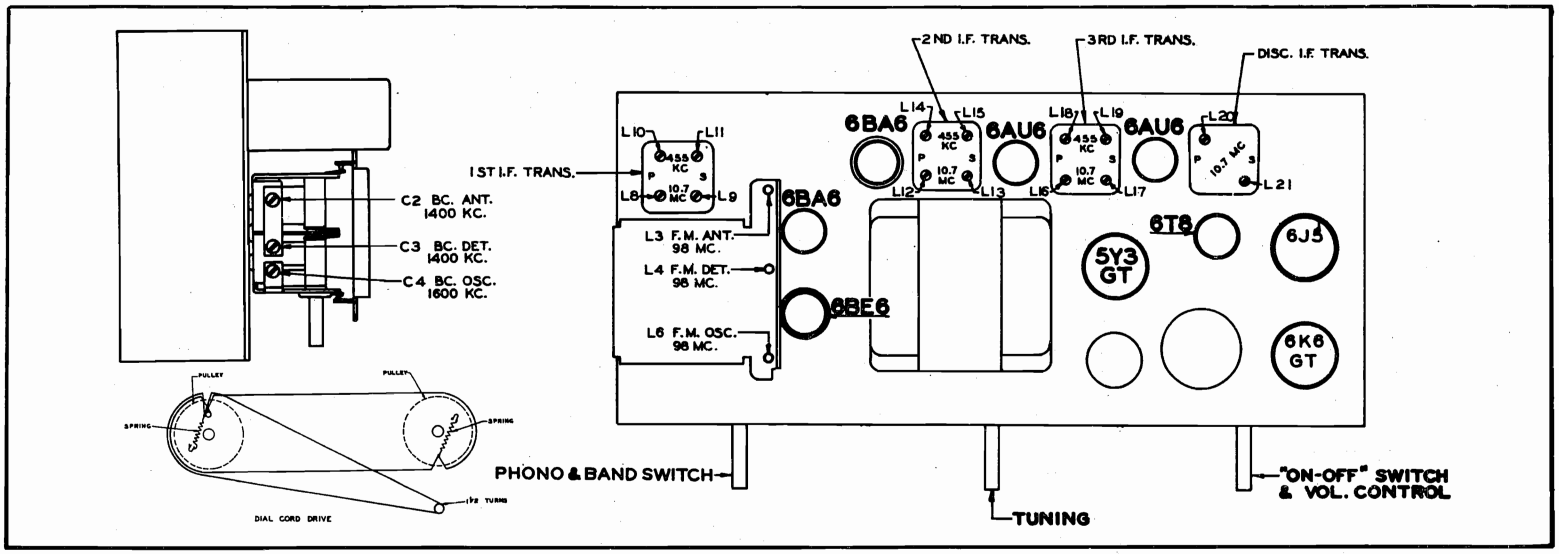
MODELS 9H984, 9H984LP,
CHASSIS 9F22

ZENITH RADIO CORP.



ZENITH RADIO CORP.

MODELS 9H984, 9H984LP, CHASSIS 9F22



TUBE TRIMMER LOCATION AND DIAL CABLE DRAWING

The 9F22 chassis incorporates a superheterodyne circuit with two stages of IF, and one stage of RF amplification on all bands.

The Radiorgan tone control is of the low impedance type in which a portion of the audio voltage is taken from the speaker voice coil and fed back out of phase into the grid of the first audio. The characteristic of the feedback voltage is determined by the setting of the Radiorgan buttons. To attenuate the high notes, more highs are fed back. To attenuate the low notes, more lows are fed back. For normal reproduction, both highs and lows are fed back and results in no overall change in tone.

The 6BA6 1st IF tube is also the phono pre-amplifier. The output from the phono oscillator is fed to the grid of the 6BA6 through C19 and R11. The amplified output is taken from the screen grid and fed back through R12, and C12 into the volume control circuit and the grid of the 6T8 1st audio amplifier.

AM Alignment: The alignment of this chassis on the standard broadcast band is conventional. The alignment slugs in the IF transformers are threaded and screw into the coil forms. The slugs are slotted for a small size fiber screw driver. Do not press hard on the aligning tool or the threads in the coil forms will strip and adjustment will be impossible.

FM RF Alignment: A coil slug arrangement tunes the 100 MC FM band. The tuning slugs are attached to threaded shafts and the slugs are varied in the field of the coils by turning the shafts clockwise or counter clockwise. After adjustment the shafts must be secured with a drop of speaker cement.

FM IF Alignment: The same type of tuning slugs for aligning the AM IF Amplifier are used for the FM IF's. Observe the same precautions when making adjustments.

FM Discriminator Alignment: When the secondary of the discriminator is aligned (operation 5) use sufficient signal input to get a good positive and negative indication before setting the slug for zero reading. A center zero indicating meter is recommended for this adjustment, but is not absolutely necessary. Reversing the leads of a non-zero center meter, or observing closely when the meter starts to go to the left (negative) of zero will give the same results.

NOTE: The output transformer must be replaced with an exact duplicate. Part No. 95-1063. Be sure to add the speaker code letter to the transformer Part Number when ordering replacements.

FM IF Alignment: Because of the wide band pass, it is desirable to use a FM signal generator and a cathode ray oscilloscope when aligning the FM IF channel. The instruction book for the Zenith Model 800 Signal Generator (Form Z800I) covers complete FM alignment procedure. If visual alignment equipment is unavailable, reasonably accurate alignment can be made by following the procedure outlined below.

MODELS 9H984, 9H984LP, CHASSIS 9F22

ZENITH RADIO CORP.

ALIGNMENT PROCEDURE

Operation	Connect Oscillator to	Dummy Antenna	Input Signal Frequency	Band	Set Dial To	Adj. Trimmers	Purpose
1	Pin 7 6BE6 Converter	.05 Mfd.	455 Kc. Modulated	BC	600 Kc.	L-10, 11, 14, 15 16, 18 and 19.	Align I. F. channel for maximum output.
2	2 turns loosely cpld. to wavemagnet.		1600 Kc Modulated	BC	1600 Kc.	C4	Set oscillator to dial scale.
3			1400 Kc. Modulated	BC	1400 Kc.	C3 and C2	Align det. and ant. stages.
4 (a)	Pin 1 (arid) on 6AU6 Limiter	.05 Mfd.	10.7 Mc Unmodulated	FM 100		L20 coil slug Primary discr.	Align primary of discriminator for maximum reading.
5 (b)		.05 Mfd.	10.7 Mc Unmodulated	FM 100		L21 coil slug sec. of discr.	Adjust secondary of discrimina-or for zero reading.
6 (c)	Pin 1 (grid) on 6AU6 2nd IF.	.05 Mfd.	10.7 Mc Unmodulated	FM 100		L16 and L17 Prim. and Sec. of 3rd IF trans.	Align 3rd IF transformer for maximum reading.
7 (c)	Pin 1 (grid) on 6BA6 1st IF.	.05 Mfd.	10.7 Mc Unmodulated	FM 100		L12 and L13 Prim. and Sec. of 2nd IF transformer	Align 2nd IF transformer for maximum reading.
8 (c)	Pin 7 (grid) on 6BE6 converter tube	.05 Mfd.	10.7 Mc Unmodulated	FM 100		L8 and L9 Prim. and Sec. of 1st IF transformer	Align 1st IF transformer for maximum reading.
9 (c)(d)	FM Antenna Post (Re-move line ant.)	270 ohms	98 Mc. Unmodulated	FM 100	98 Mc.	L6 Osc. Coil Slug	Set Oscillator to dial scale.
10 (c)(d)		270 ohms	98 Mc. Unmodulated	FM 100	98 Mc.	L4 and L3 Det. and RF coil Slugs	Align det. and ant. stages to maximum reading.

IMPORTANT

Alignment of this chassis will in most cases be unnecessary unless an IF or RF transformer is replaced or the adjustments have been tampered with.

Correct alignment can only be made if the following procedure is followed:

A vacuum tube voltmeter with an isolation resistor of 200,000 ohms in series with the hot lead will serve for FM adjustments. This lead should be shielded.

An AC output meter connected across the primary or secondary of the output transformer will be satisfactory for all AM adjustments.

The signal generator output should be kept just high enough to get an indication on the meter.

(a) Vacuum Tube Voltmeter Lug 6 on discriminator transformer to chassis (half discriminator load).
(b) Vacuum Tube Voltmeter Lug 3 on discriminator transformer to chassis (full discriminator load).
(c) Vacuum Tube Voltmeter Lug 3 on 3rd IF transformer (Limiter Grid).
(d) Loosen Slugs by applying a hot iron to the cement.

ZENITH RADIO CORP.

MODELS 9H984, 9H984LP, CHASSIS 9F22

DIAL ASSEMBLY

PART NUMBER	REF. NUMBER	DESCRIPTION
12-1434		Dial Light Mtg. Bracket
26-418		Dial Scale use S 15394
59-209		Dial Pointer
76-499		Tuning Control Shaft
78-797		Dial Light Socket
80-69		Dial Cord Tension Spring
80-209		Dial Cord Tension Spring
80-444		Tuner Arm Tension Spring
80-581		Pressure Arm Tension Spring
93-721		Black Felt Washer (used on 59-209)
100-36	PL-1	Dial Light Bulb
188-32		Retaining Ring
S-14254		Pointer Pulley Assy (76-498)
S-14256		Pulley & Bushing Assy.
S-14268		Dial Cord & Eyelet Assy (short)
S-14269		Dial Cord & Eyelet Assy (long)
S-14429		Tuner Arm Assy
S-15394		Dial Scale & Strip Assy. (26-418)

COILS & CHOKES

PART NUMBER	REF. NUMBER	DESCRIPTION
S-11157	L7	B.C. Oscillator Coil Assy.
S-12259	L6	F.M. Oscillator Coil Assy.
S-12603	L22	Phono Oscillator Coil Assy.
S-13871	L4	F.M. Detector Coil Assy.
S-13970	T1	1st I.F. Transformer Assy.
S-13971	T2	2nd I.F. Transformer Assy.
S-13972	T3	3rd I.F. Transformer Assy.
S-13974	L5	B.C. Detector Coil Assy.
S-14192	L3	F.M. Antenna Coil Assy.
S-14984	T4	Discriminator Trans. Assy.

CONDENSERS

PART NUMBER	REF. NUMBER	DESCRIPTION	
22-171	C28	.05 Mfd.	600 V.
22-348	C16	.001 Mfd.	500 V.
22-365	C25	100 MMFD (or 22-1670)	500 V.
22-829	C6	.05 Mfd.	200 V.
22-830	C19	.02 Mfd.	600 V.
22-854	C26	.0005 Mfd.	600 V.
22-1041	C35	.005 Mfd. (molded)	400 V.
22-1220	C12	.002 Mfd.	600 V.
22-1367	C14	50 MMFD (ceramic)	500 V.
22-1385	C17	.01 Mfd.	200 V.
22-1418	C34	.1 Mfd.	200 V.
22-1506	C7	22 MMFD (ceramic)	500 V.
22-1507	C20	25 MMFD (ceramic)	500 V.
22-1516	C5	4.7 MMFD (molded)	500 V.
22-1531	C21	.2 Mfd.	200 V.
22-1532	C32	50 MMFD. (or 22-1674)	500 V.
22-1627	C31	.01 Mfd. (or 22-1651)	600 V.
22-1664	C33	50 MMFD (ceramic)	500 V.
22-1669	C9	100 MMFD (ceramic)	500 V.
22-1676	C8	.001 MMFD (ceramic)	500 V.
22-1677	C1	Three gang variable	
22-1688	C11	19 MMFD (ceramic)	500 V.
22-1689	C13	48 MMFD (ceramic)	500 V.
22-1705	C10	30 MMFD (ceramic)	500 V.
22-1706	C15	.005 Mfd. (ceramic)(disc type)	450 V.
22-1717	C27	.001 Mfd.	200 V.
22-1718	C24	.01 Mfd. (shielded)	400 V.
22-1884	C22.23	Two Sect. Electrolytic 40 Mfd. / 40 Mfd.	350VX. / 450 V.
22-1885	C29.30	Two Sect. Electrolytic 40 Mfd.-25VX 80 Mfd.-450 V.	

RESISTORS

PART NUMBER	REF. NUMBER	DESCRIPTION	
63-943	R21	4700 Ohm Insulated Resistor 10%	.1 W.
63-957	R2	33K Ohm Insulated Resistor 10%	.1 W.
63-1065	R7	15K Ohm Insulated Resistor 10%	.1 W.
63-1222	R34	470 Ohm Insulated W. W. Resistor 10%	.1 W.
63-1588	R30	Volume Control & Switch	
63-1681	R36	Two Section Candohm	
63-1691	R31	1800 Ohm W.W. Zipohm 10%	.2 W.
63-1737	R4	68 Ohm Ins. Res. 20%	.1/2 W.
63-1771	R3	470 Ohm Ins. Res. 10%	.1/2 W.
63-1772	R6	470 Ohm Ins. Res. 20%	.1/2 W.
63-1778	R26	680 Ohm Ins. Res. 10%	.1/2 W.
63-1779	R12	680 Ohm Ins. Res. 20%	.1/2 W.
63-1785	R28	1 K Ohm Ins. Res. 10%	.1/2 W.
63-1792	R29	1500 Ohm Ins. Res. 10%	.1/2 W.
63-1800	R8	2200 Ohm Ins. Res. 20%	.1/2 W.
63-1813	R27	4700 Ohm Ins. Res. 10%	.1/2 W.
63-1817	R35	5600 Ohm Ins. Res. 10%	.1/2 W.
63-1820	R20	6800 Ohm Ins. Res. 10%	.1/2 W.
63-1824	R14	8200 Ohm Ins. Res. 10%	.1/2 W.
63-1827	R11	10K Ohm Ins. Res. 10%	.1/2 W.
63-1831	R19	12K Ohm Ins. Res. 10%	.1/2 W.
63-1834	R18	15K Ohm Ins. Res. 20%	.1/2 W.
63-1842	R5	22K Ohm Ins. Res. 20%	.1/2 W.
63-1848	R13	33K Ohm Ins. Res. 10%	.1/2 W.
63-1856	R17	47K Ohm Ins. Res. 20%	.1/2 W.
63-1862	R23	68K Ohm Ins. Res. 10%	.1/2 W.
63-1870	R22	100K Ohm Ins. Res. 20%	.1/2 W.
63-1876	R25	150K Ohm Ins. Res. 10%	.1/2 W.
63-1883	R24	220K Ohm Ins. Res. 10%	.1/2 W.
63-1884	R9	220K Ohm Ins. Res. 20%	.1/2 W.
63-1897	R33	470K Ohm Ins. Res. 10%	.1/2 W.
63-1911	R15	1 Megohm Ins. Res. 10%	.1/2 W.
63-1912	R1	1 Megohm Ins. Res. 20%	.1/2 W.
63-1926	R10	2.2 Megohm Ins. Res. 20%	.1/2 W.
63-1961	R32	15 Megohm Ins. Res. 20%	.1/2 W.
63-1998	R16	4700 Ohm W.W. Ins. Res. 10%	.2 W.

MISCELLANEOUS

PART NUMBER	REF. NUMBER	DESCRIPTION
11-108		Line Cord and Plug (9 ft. long)
54-226		Speed Nut - Tinnerman
57-1269		I.F. Trans. Terminal Plate
78-709		Octal Tube Socket
78-750		Six Contact Socket
78-782		Miniature Tube Socket (2 used)
78-788		Noval Miniature Socket
78-793		Octal Tube Socket (2 used)
78-794		Miniature Tube Socket (3 used)
83-1545		Insulating Strip (4 used)
85-442	S1	Band Switch
95-1063	T5	Output Transformer
95-1117	T6	Power Transformer
125-26		Rubber Grommet (2 used) (mts. 78-709)
125-62		Rubber Grommet (4 used)
126-553		Metal Tube Shield
126-569		Heat Shield
149-64		Tuning Core & Spring (3 used)
S-15193		Phono Cable Assy. (or S-15467)

RADIORGAN ESC. ASSEMBLY

PART NUMBER	REF. NUMBER	DESCRIPTION
57-1351		Radiorgan Esc.
57-1352		Radiorgan Esc.
76-444		Radiorgan Knob Retaining Shaft (2 used)
80-595		Radiorgan Mtg. Spring (2 used)
80-695		Knob Tension Spring
112-533		#6 x 1/4" Rd. Phill. Hd. S.T. Screw Type #25 CAD. (2 each used with S-15449 & S-15397)
114-159		#6 x 1/4" Hex. Hd. S.T. Screw Type A CAD (2 each used with S-15449 & S-15397)
S-14255		Radiorgan Mtg. Bracket Assy
S-14261		Radiorgan Strip & Contact Assy.
S-14273		Radiorgan Knob & Eyelet Assy. (Lo-Bass)
S-14274		Radiorgan Knob & Eyelet Assy. (Bass)
S-14663		Radiorgan Knob & Eyelet Assy. (Voice)
S-14276		Radiorgan Knob & Eyelet Assy. (Treble)
S-14278		Radiorgan Knob & Eyelet Assy. (Normal)
S-15397		Radiorgan Esc. & Knob Assy. (R.H.)
S-15449		Radiorgan Esc. & Knob Assy. (L.H.)

TUBES

2	6BA6
1	6BE6
2	6AU6
1	6T8
1	6K6GT
1	6J5
1	5Y3GT

CABINET PARTS

PART NUMBER	REF. NUMBER	DESCRIPTION
2-139		Cabinet Back
12-1547		Tone Arm Rest Bracket
19-9		Cable Clip
19-88		Cable Clip
19-169		Record Changer Mtg. Clip (4 used)
19-171		Loop Connector Clip (2 used)
27-81		Shaft Bearing Disc
36-39		Record Changer Frame Handle
46-697		Tuning Control Knob (2 used)
46-718		Band Switch Knob
46-786		Band Switch Knob
49-624	SP1	Speaker 12" P.M.
		208-624 Cone & Voice Coil
57-1353		Diffusing Plate
57-1469		Dial Escutcheon
70-83		6 x 1/2" Washer Hd. Wood Screw Steel Stat.Br (10 used to mount cab. back)
72-55		#6 x 3/8" Phill. Fl-Hd. Wood Screw Steel N.P. (2 used with 27-81)
72-58		#2 x 3/8" Phill. Fl. Hd. Wood Screw Steel Brass Pl. (6 used to mount 57-1469)
80-678		Record Changer Mtg. Spring (4 used)
83-1247		Trim Strip
93-392		Brown Felt Washer - 3/32 x 33/64 x 1" (used with 46-697 & 46-718)
112-489		#8 x 1/2" Phill. R.H.S.T. ShakeProof #25 Cad. Pl. (Handle Mtg. Screw)
112-712		Record Changer Mtg. Screw (4 used)
113-17		6-32 x 1/4" R.H.M.S. Steel N.P. Lockwasher Attached (2 used to mount 12-1547 on L.P. only)
114-78		#8 x 5/16 Hex. Hd. Slotted S.T. Type Z N.P. (used with 19-88)
114-148		#10 x 7/8" Hex. Washer Hd. S.T. Type Z CAD. Pl. (4 used chassis mtg.)
114-233		#14 x 1-1/4" Slotted Hex. Washer Hd. S.T. Type Z CAD
159-52		Plug Button (4 used)
188-91		Rubber Ring (2 used)
192-115		Dial Glass
196-109		Dial Glass Dust Gasket
202-683		Radio Instruction Book
202-684		Phono Instruction Book
202-685		Phono Instruction Book (L.P. Only)
S-12864		Drive Wheel & Pin Assy.
S-14004		Non-Intermixer Record Changer
S-14012		Non-Intermixer Record Changer (9H984L.P. only)
S-14305		Low Impedance Loop
S-15386		Knob & Eyelet Assy (46-776)
S-15395		Record Changer Mtg. Frame Assy (complete)
S-15396	L2	Loading Coil Assy.

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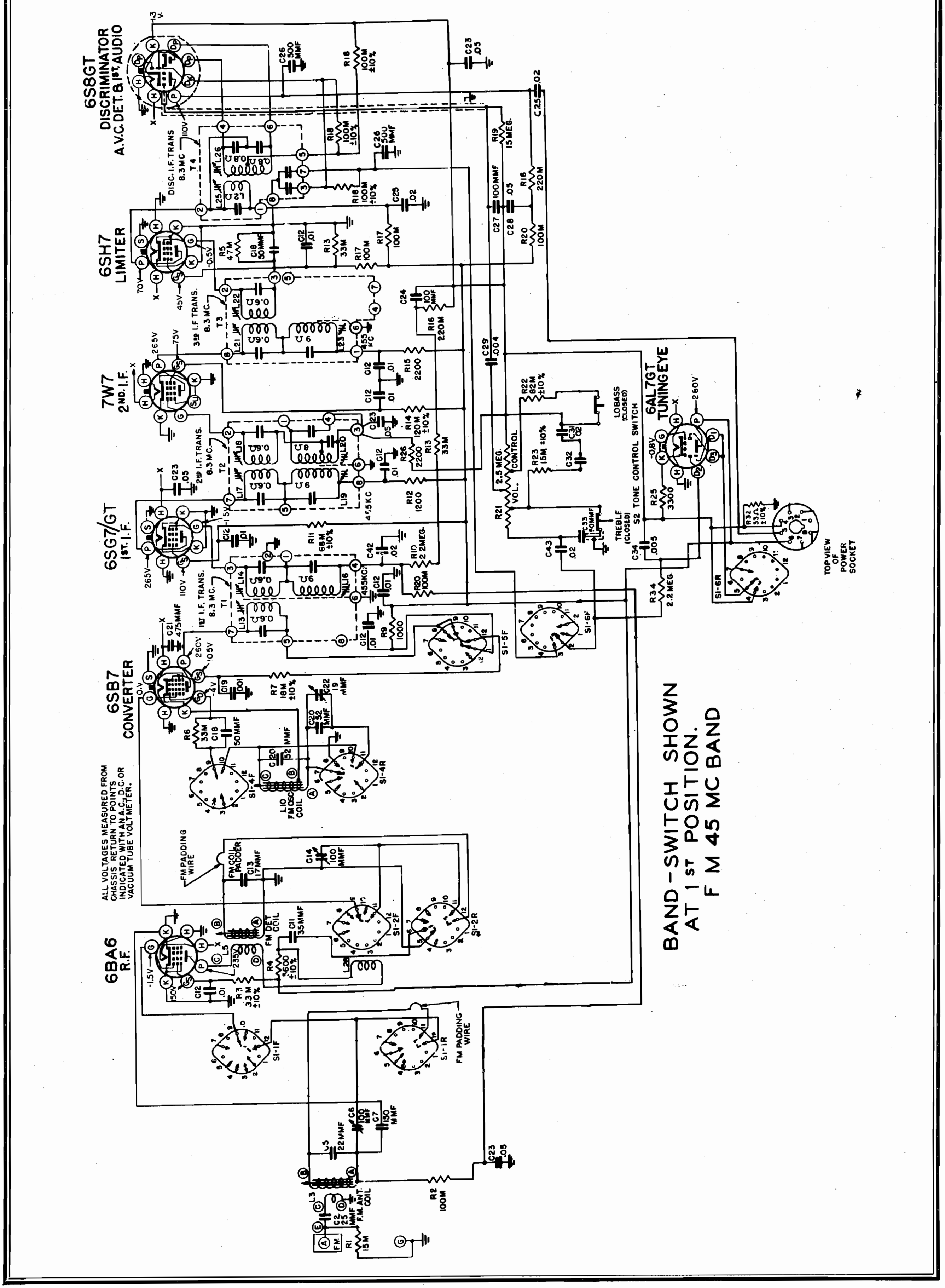
ZENITH RADIO CORP.

MODEL 14H789,
CHASSIS 13D22



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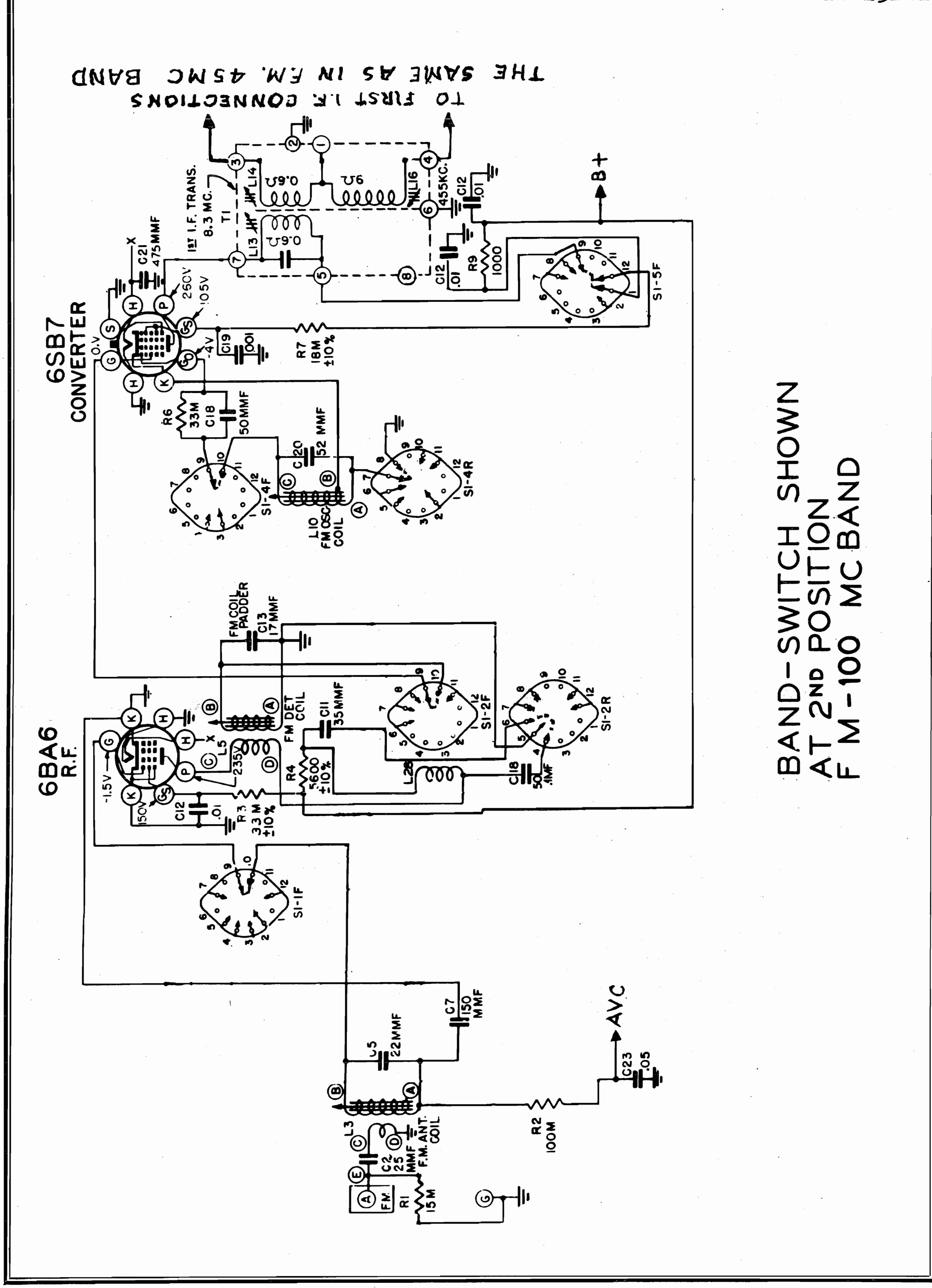
MODEL 14H789,
CHASSIS 13D22



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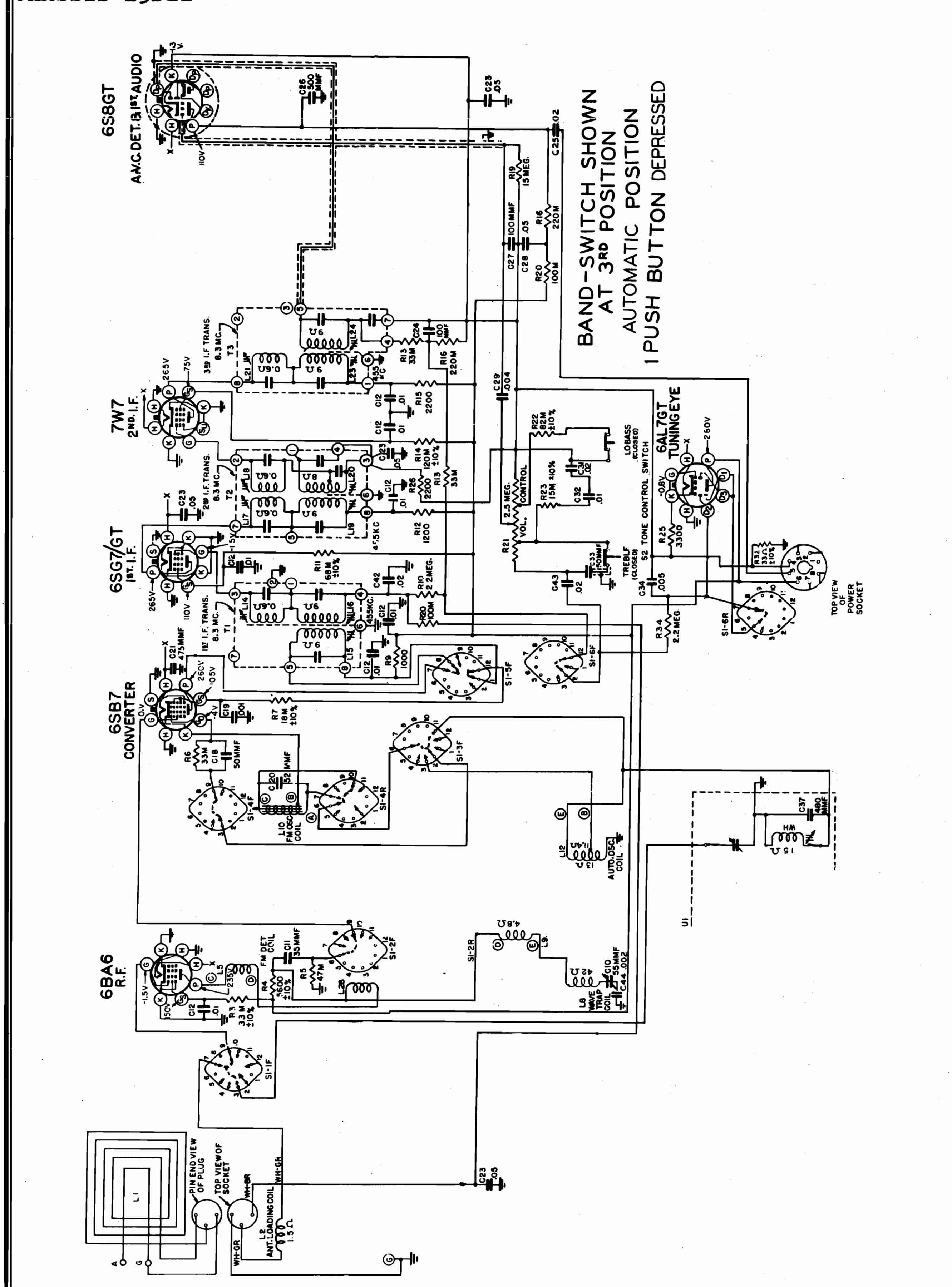

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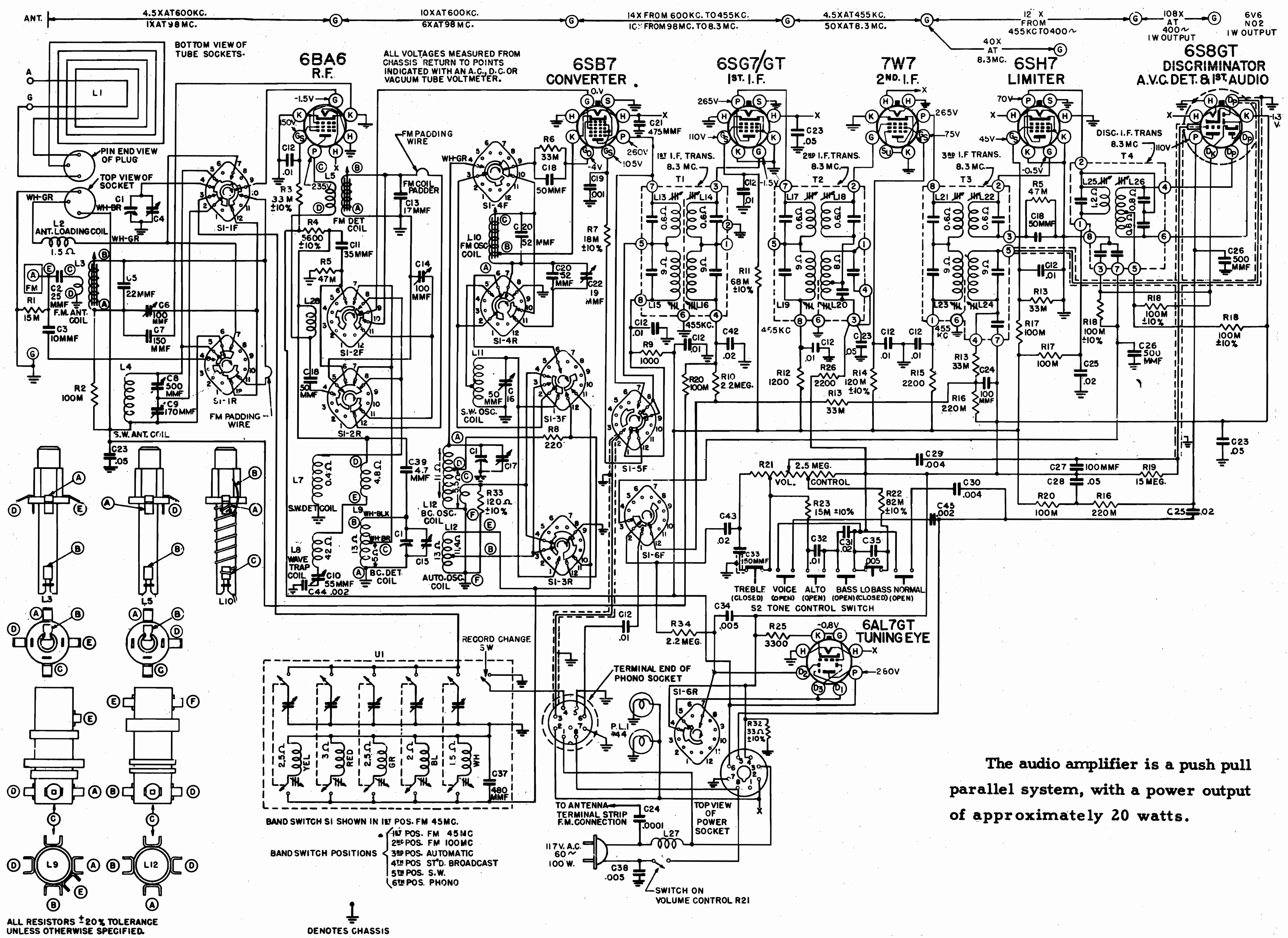
CHASSIS 13D22



The audio amplifier is a push pull parallel system, with a power output of approximately 20 watts.

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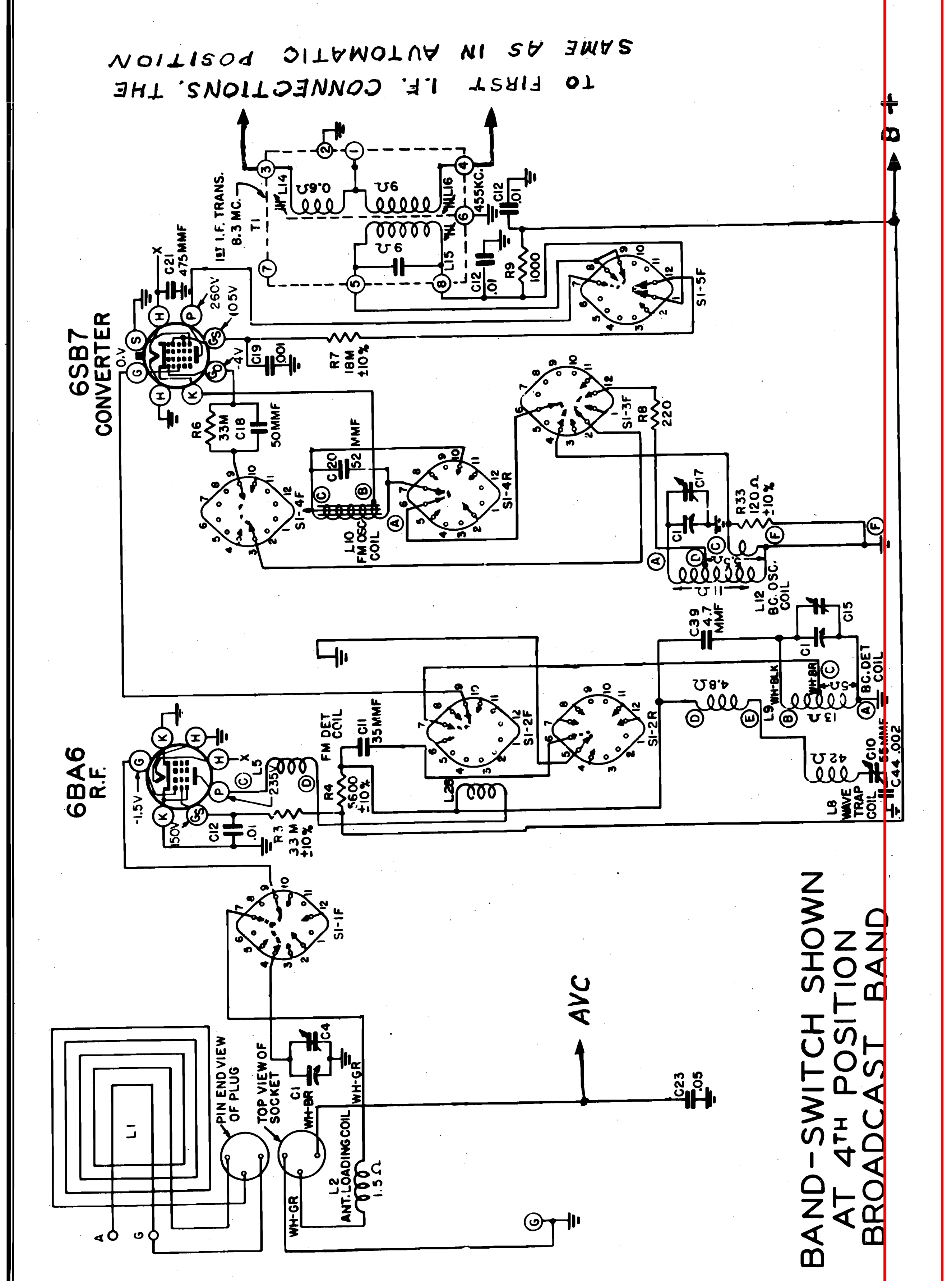

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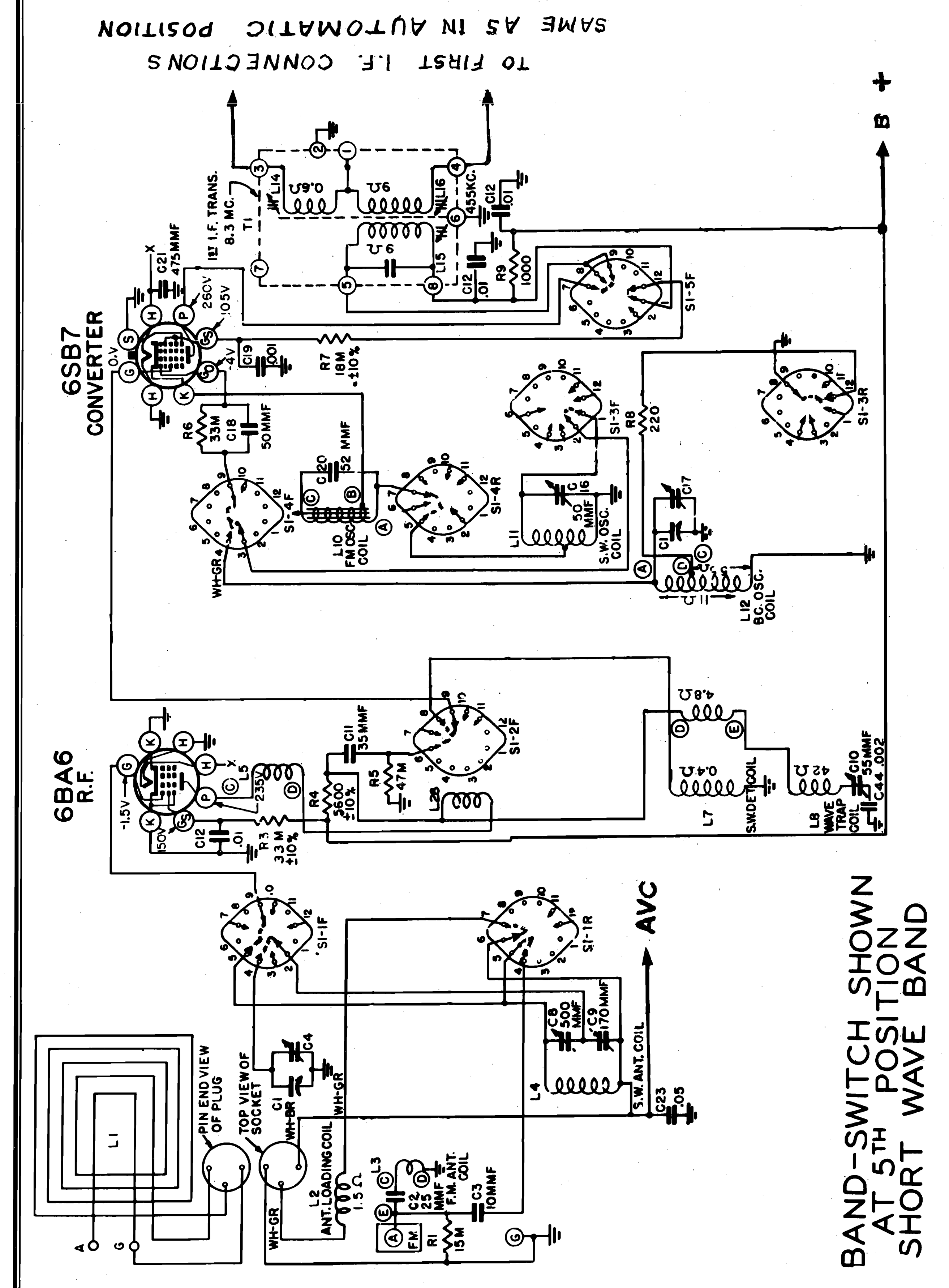
MODEL 14H789, CHASSIS 13D22



ZENITH RADIO CORP.

MODEL 14H789, CHASSIS 13D22

The 11C21 chassis incorporate a superheterodyne circuit with two stages of IF, and one stage of RF amplification on all hands.

AM Alignment: The alignment of this chassis on the short wave and standard broadcast band is conventional. The alignment slugs in the IF transformers are threaded and screw into the coil forms. The slugs are slotted for a small size fiber screw driver. Do not press hard on the aligning tool (fiber screw driver) or the threads in the coil forms will strip and adjustment will be impossible.

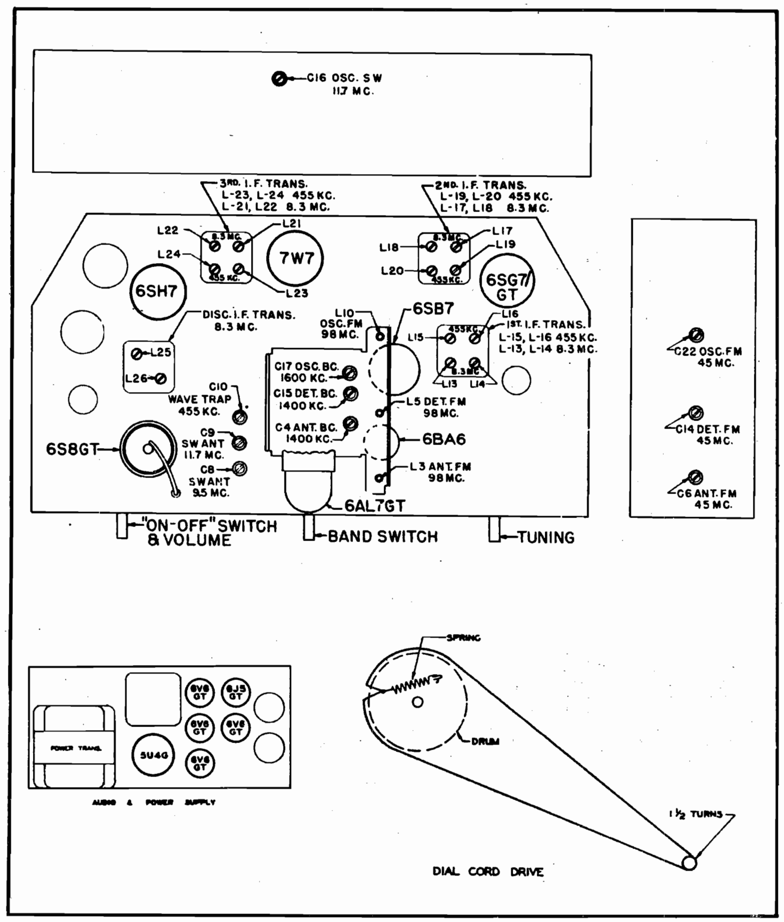
FM RF Alignment: The same coil slug arrangement which tunes the 100 MC FM band also tunes the 45 MC band. However, on 45 MC the band switch connects trimmer condensers in parallel and padding wires in series with the 100 MC coils. The tuning slugs are attached to threaded shafts and the slugs are varied in the field of the coils by turning the shafts clockwise or counter-clockwise. After adjustments the shafts must be secured with a drop of speaker cement.

FM IF Alignment: The same type of tuning slugs for aligning the AM IF Amplifier are used for the FM I.F. s. Observe the same precautions when making adjustments. The second 8.3 Mc IF stage is overcoupled. Overcoupling gives a wide band pass with good sensitivity. When an overcoupled stage is aligned with an unmodulated signal, the stage must be loaded. A 300 ohm carbon resistor soldered across the secondary of the second IF transformer provides a satisfactory load for this circuit. The resistor leads must be kept short to reduce the distributed capacity of the circuit.

When aligning a loaded stage, it will be found that considerable signal from the generator will be required, and that it will tune broadly. THE LOAD RESISTOR MUST BE REMOVED AFTER ALIGNMENT.

If the signal generator used does not have sufficient output to overcome the temporary loss caused by the load resistor, the load resistance may be increased or the signal fed into the preceding stage.

FM Discriminator Alignment: When the secondary of the discriminator is aligned (operation 9) use sufficient signal input to get a good positive and negative indication before setting the slug for zero reading. A center zero indicating meter is recommended for this adjustment, but is not absolutely necessary. Reversing the leads of a non-zero center meter, or observing closely when this meter starts to go to the left (negative) of zero will give the same results.



TUBE TRIMMER LOCATION AND DIAL CABLE DRAWING

MODEL 14H789,
CHASSIS 13D22

ZENITH RADIO CORP.

ALIGNMENT PROCEDURE

Operation	Connect Oscillator to	Dummy Antenna	Input Signal Frequency	Band	Set Dial To	Adj. Trimmers	Purpose
1	Pin 8 on Converter Tube 6SB7 socket	.05 Mfd.	455 Kc. Modulated	BC	600 Kc.	L15,16,19,20,23 and 24	Align I.F. channel for maximum output
2	Pin 1 on R.F. tube 6AG5 socket	.05 Mfd.	455 Kc. Modulated	Aut.	Press any button on Auto.	C10	Adjust wavetrap to minimum
3	2 Turns loosely coupled to wavemag.		1600 Kc. Modulated	BC	1600 Kc.	C17	Set oscillator to dial scale
4	2 Turns loosely coupled to wavemag.		1400 Kc. Modulated	BC	1400 Kc.	C15 & C4	Align det. and ant. stages.
5	Antenna Post (Remove line ant.)	400 ohms	11.7 Mc. Modulated	SW	11.7 Mc.	C16	Set oscillator to dial scale
6	Antenna Post (Remove line ant.)	400 ohms	11.7 Mc. Modulated	SW	11.7 Mc.	C9	Align ant. stage
7	Antenna Post (Remove line ant.)	400 ohms	9.7 Mc. Modulated	SW	9.7 Mc.	C8	Align ant. stage Repeat Oper. 6 for maximum output
8 (a)	Pin 4 grid on 6SH7 limiter socket	.05 Mfd.	8.3 Mc. Unmodulated	FM 45		L25 coil slug primary disc.	Align primary of discriminator for maximum reading
9 (b)	Pin 4 grid on 6SH7 limiter socket	.05 Mfd.	8.3 Mc. Unmodulated	FM 45		L26 coil slug sec. of discr.	Adjust secondary of discr. for zero reading
10 (c)	Pin 6 (grid) on 7W7 2nd IF tube socket	.05 Mfd.	8.3 Mc. Unmodulated	FM 45		L21 & L22 prim. & sec. of 3rd IF transformer	Align 3rd IF transformer for maximum reading
11 (c) (d)	Pin 4 (grid) on 6SG7 1st IF tube socket	.05 Mfd.	8.3 Mc. Unmodulated	FM 45		L17 & L18 prim. & sec. of 2nd IF transformer	Align 2nd IF transformer for maximum reading
12 (c) (d)	Pin 8 (grid) on 6SB7 converter tube socket	.05 Mfd.	8.3 Mc. Unmodulated	FM 45		L13 & L14 prim. & sec. of 1st IF transformer	Align 1st IF transformer for maximum reading
13 (c)	Antenna Post (Remove line ant.)	270 ohms	98 Mc. Unmodulated	FM 100	98 Mc.	L10 Osc. coil Slug	Set oscillator to dial scale
14 (c)	Antenna Post (Remove line ant.)	270 ohms	98 Mc. Unmodulated	FM 100	98 Mc.	L5 and L3 Det. and RF coil slugs	Align det. and Ant. stage to maximum reading
15 (c)	Antenna Post (Remove line ant.)	270 ohms	45 Mc. Unmodulated	FM 45	45 Mc.	C22	Set oscillator to dial scale
16 (c)	Antenna Post (Remove line ant.)	270 ohms	45 Mc. Unmodulated	FM 45	45 Mc.	C14 and C6	Align detector and ant. stages for maximum reading

IMPORTANT: Alignment of this chassis will in most cases be unnecessary unless an IF or RF transformer is replaced or the adjustments have been tampered with.

A correct alignment can only be made if the following procedure is followed.

A vacuum tube voltmeter with an isolation resistor of 200,000 ohms in series with the hot lead will serve for FM adjustments. This lead must be shielded

An ordinary AC output meter connected across the primary or secondary of the output transformer will be satisfactory for all AM adjustments.

The signal generator output should be kept just high enough to get an indication on the meter.

(a) Vacuum Tube Voltmeter pin 5 on discriminator transformer to chassis (half discriminator load.)
(b) Vacuum Tube Voltmeter pin 7 on discriminator transformer to chassis (full discriminator load.)
(c) Vacuum Tube Voltmeter 6SH7 limiter grid (pin 4 to chassis).
(d) 300 ohm ½ watt carbon resistor soldered across the secondary L18 (pin 2 and 3 of 2nd IF trans.). The leads to the resistor must be as short as possible and the resistor removed before operation 13 is started.

ZENITH RADIO CORP.

MODEL 14H789,
CHASSIS 13D22

PARTS LIST

DIAL ASSEMBLY

PART NO.	REF. NO.	DESCRIPTION
59-159		Dial Pointer. . . . .
76-417		Band Switch Drive Shaft . . .
76-418		Tuning Control Shaft. . . . .
78-585		Dial Light Socket and Wire Assembly. . . . .
78-586		Dial Light Socket and Wire Assembly. . . . .
80-85		Indicator Tension Spring. . .
80-402		Dial Cord Tension Spring. . .
80-445		Tuner Arm Pressure Spring . .
80-446		Tuner Arm Tension Spring. . .
100-36		Dial Light Bulb . . . .
188-32		Retaining Ring. . . . .
S-11330		Dial Cord and Eyelet Assembly
S-12242		Idler Bracket and Shaft Assembly. . . . .
S-12243		Bushing, Gear and Indicator Assembly. . . . .
S-12245		Gear and Bushing Assembly . .
S-12248		Capacitor Pulley Bushing and Cam Assembly. . . . .
S-12266		Idler Wheel and Rubber Ring Assembly. . . . .
S-12294		Dial Scale and Bracing Strip Assembly (26-338) . . . . .
S-12296		Tuner Arm Assembly. . . . . .
S-12297		Resonance Indicator Socket and Cable Assembly. . . . .

COILS AND CHOKES

PART NO.	REF. NO.	DESCRIPTION
S-11344	L12	Oscillator Coupler Coil Assem. (B.C. and Automatic)
S-11591		Wavemagnet Loading Coil Assem. (Used on S-12356). .
S-12249	T1	1st I.F. Transformer Assembly
S-12250	T2	2nd I.F. Transformer Assembly
S-12251	T3	3rd I.F. Transformer Assembly
S-12252	T4	Discriminator Transformer Assembly. . . . .
S-12256	L27	A.C. Line Choke Coil Assembly
S-12281	L8	Wavetrap Coil Assembly. . . .
S-12282	L4	S.W. Antenna Coil Assembly. .
S-12291	L7	S.W. Detector Coil Assembly .
S-12292	L11	S.W. Oscillator Coil Assembly
S-12293	L9	Broadcast Detector Coil Assembly. . . . .
S-12301	L3	F.M. Antenna Coil Assembly. .
S-12302	L5	F.M. Detector Coil Assembly .
S-12303	L10	F.M. Oscillator Coil Assembly
S-12529	L2	Antenna Loading Coil Assembly

CONDENSERS

PART NO.	REF. NO.	DESCRIPTION
22-162	C24	100 Mmfd. . . . . .600 V.
22-171	C28	.05 Mfd . . . . .600 V.
22-188		.02 Mfd . . . . .400 V.
22-196	C12	.01 Mfd . . . . .600 V.
22-242	C36	750 Mmfd. . . . . .500 V.
22-289	C33	50 Mmfd . . . . .600 V.
22-319	C34	.005 Mfd. . . . . .200 V.
22-365	C27	100 Mmfd. . . . . .600 V.
22-448	C30	.004 Mfd. . . . . .600 V.
22-829	C23	.05 Mfd . . . . .200 V.
22-830	C25	.02 Mfd . . . . .600 V.
22-912		.002 Mfd. . . . . .600 V.
22-1041	C38	.005 Mfd. . . . . .600 V.
22-1126	C32	.01 Mfd . . . . .400 V.
22-1127	C31	.02 Mfd . . . . .400 V.
22-1135	C35	.005 Mfd. . . . . .600 V.
22-1138	C26	500 Mmfd. . . . . .600 V.
22-1169	C19	.001 Mfd. . . . . .600 V.
22-1257		.005 Mfd. . . . . 1000 V.
22-1362	C29	.004 Mfd. . . . . .600 V.
22-1363	C1	Three Gang Variable . . . . .
22-1367	C18	50 Mmfd. (Ceramic). . . .500 V.
22-1386		.02 Mfd . . . . .200 V.
22-1431		.001 Mfd. . . . . .600 V.
22-1493	C6	Trimmer (F.M. Ant.) . . . . .
22-1494	C14	Trimmer (F.M. Det.) . . . . .
22-1497	C-8-9-10	Trimmer (S.W. Antenna and Wave Trap . . . .
22-1502	C16	Trimmer (S.W. Osc.) . . . . .
22-1503	C7	150 Mmfd. . . . . .300 V.
22-1504	C3	10 Mmfd. (Ceramic). . . .500 V.
22-1505	C13	17 Mmfd. (Ceramic). . . .500 V.
22-1506	C5	22 Mmfd. (Ceramic). . . .500 V.
22-1507	C2	25 Mmfd. (Ceramic). . . .500 V.
22-1508	C11	35 Mmfd. (Ceramic). . . .500 V.
22-1509	C20	52 Mmfd. (Ceramic). . . .500 V.
22-1514	C22	Trimmer (F.M. Osc.) . . . . .

RESISTORS

PART NO.	REF. NO.	DESCRIPTION
63-260	R18	100M Ohm. . . . . .1/4 W.
63-296	R16	220M Ohm. . . . . .1/4 W.
63-380	R17	100M Ohm. . . . . 1 W.
63-441		1 Megohm. . . . . .1/4 W.
63-503	R23	15M Ohm (Insulated) . . .1/4 W.
63-510	R7	18M Ohm (Insulated) . . . 2 W.
63-579	R8	220 Ohm . . . . .1/4 W.
63-585	R26	2200 Ohm. . . . . .1/4 W.
63-586	R25	3300 Ohm. . . . . .1/4 W.
63-592	R13	33M Ohm . . . . .1/4 W.
63-593	R5	47M Ohm . . . . .1/4 W.
63-595	R20	100M Ohm. . . . . .1/4 W.
63-600	R10	2.2 Megohm. . . . . . . .1/4 W.
63-605	R9	1M Ohm. . . . . .1/2 W.
63-607	R1	15M Ohm . . . . .1/2 W.
63-620		33 Ohm. . . . . .1/4 W.
63-626		120 Ohm . . . . .1/4 W.
63-651	R22	82M Ohm . . . . .1/4 W.
63-712	R6	33M Ohm (Insulated) . . .1/4 W.
63-715	R2	100M Ohm. (Insulated). .1/4 W.
63-752		1800 Ohm (Insulated). .1/4 W.
63-803	R15	2200 Ohm. . . . . .1/2 W.
63-1166	R3	33M Ohm . . . . .1/2 W.
63-960	R11	68M Ohm . . . . .1/2 W.
63-976	R19	15 Megohm . . . . .1/4 W.
63-1349	R21	Volume Control and Switch. . . . .
63-1446	R12	1200 Ohm. . . . . .1/2 W.
63-1447	R14	120 Ohm . . . . .1/2 W.
63-1448	R4	5600 Ohm. . . . . .1/2 W.

AUDIO POWER SUPPLY

PART NO.	REF. NO.	DESCRIPTION
22-1128	C2	.02 Mfd . . . . .600 V.
22-1134	C1	.002 Mfd. . . . . 1000 V.
22-1515	C3, C4	Two Section Electrolytic 15 Mfd.-30 Mfd. . . . .450 V.
58-149	P1	Moulded Plug - 7 Prong (Power Cable) . . . . .
63-577	R5	100 Ohm . . . . .1/4 W.
63-648	R2	47M Ohm . . . . .1/4 W.
63-776		330M Ohm. (Insulated). .1/4 W.
63-797		2200 Ohm. . . . . .1/2 W.
63-1551		Candohm Resistor. . . . . .
63-1848	R8	33M Ohm . . . . .1/2 W.
63-1880		180M Ohm (Insulated). .1/2 W.
63-1883		220M Ohm (Insulated). .1/2 W.
78-274		Socket - Electrolytic Capacitor (2 used). . . . .
78-611		Socket - Octal Tube (6 used).
78-644	P.L.I.	Socket - Single Contact . . .
78-732	SO1	Socket - Speaker Plug . . . .
95-956	T1	Power Transformer . . . . . .
95-957	L1	Filter Choke. . . . .
S-13489		Internal Cable Assembly . . .
S-13490		External Cable Assembly . . .

AUTOMATIC TUNING UNIT

PART NO.	REF. NO.	DESCRIPTION
12-900		Automatic Tuning Unit Mtg. Brkt. . . . .
22-846		Automatic Tuning Unit Trimmer
22-847		Automatic Tuning Unit Trimmer
22-848		Automatic Tuning Unit Trimmer
22-859		Automatic Tuning Unit Trimmer
22-868	C37	480 Mmfd. Silver Mica . . . .
22-873		Automatic Tuning Unit Trimmer
24-287		Automatic Tuning Unit Cardboard Cover . . . . . .
85-370		Automatic Tuning Unit Switch.
112-223		Adjusting Screw and Core (4 used). . . . .
112-292		Adjusting Screw and Core (1 used). . . . .
S-6928		Automatic Tuning Coil (Red)
S-6929		Automatic Tuning Coil (Green)
S-7021		Automatic Tuning Coil (Yellow). . . . .
S-7859		Automatic Tuning Coil (Blue).
S-10100		Automatic Tuning Coil (White)
S-12331		Automatic Tuning Unit Complete. . . . .

AUTOMATIC ESCUTCHEON PARTS

PART NO.	REF. NO.	DESCRIPTION
46-674		Automatic Station Selector Knob (5 used) . . . . . .
46-681		Phono Reject Knob . . . . . .
57-1293		Automatic Plastic Escutcheon Plate only. . . . .
76-342		Automatic Knob Retaining Shaft . . . .
83-984		Rubber Strip. . . . .
83-1112		Trim Strip. . . . .
S-12399		Automatic Bracket and Latch Assembly. . . . .
S-13671		Automatic Tuning Knob and Escutcheon Assembly Complete. . . . .

MODEL 14H789,
CHASSIS 13D22

ZENITH RADIO CORP.

PARTS LIST--Continued

RADIORGAN ESCUTCHEON PARTS

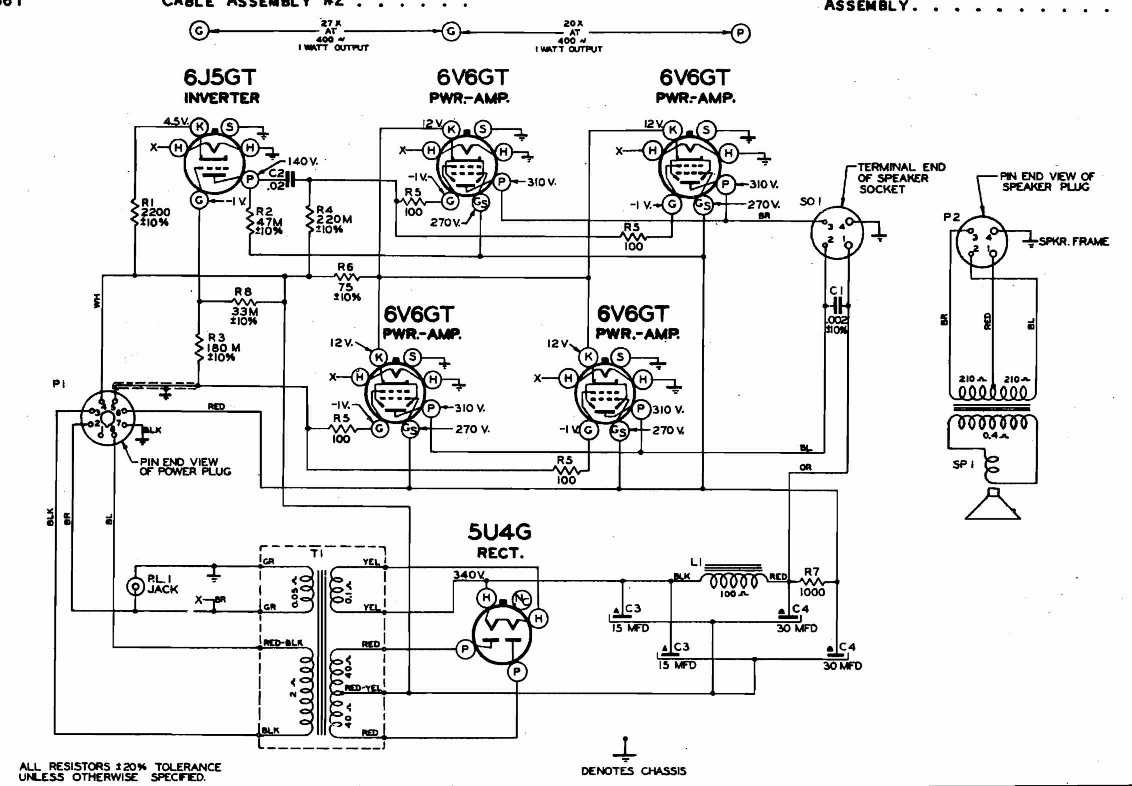
PART NO.	REF. NO.	DESCRIPTION
57-1294		Radiorgan Escutcheon plate only
76-342		Radiorgan Knob Shaft
83-1112		Radiorgan Escutcheon Trim Strip
S-9606		Radiorgan Strip and Contact Assembly
S-12397		Radiorgan Escutcheon Bracket and Latch Assembly
S-13472		Radiorgan Knob and Eyelet Assembly - Normal
S-13475		Radiorgan Knob and Eyelet Assembly - Alto
S-13476		Radiorgan Knob and Eyelet Assembly - Voice
S-13667		Radiorgan Escutcheon and Knob Assembly Complete
S-13668		Radiorgan Knob and Eyelet Assembly - Lo-Bass
S-13669		Radiorgan Knob and Eyelet Assembly - Bass
S-13670		Radiorgan Knob and Eyelet Assembly - Treble

MISCELLANEOUS

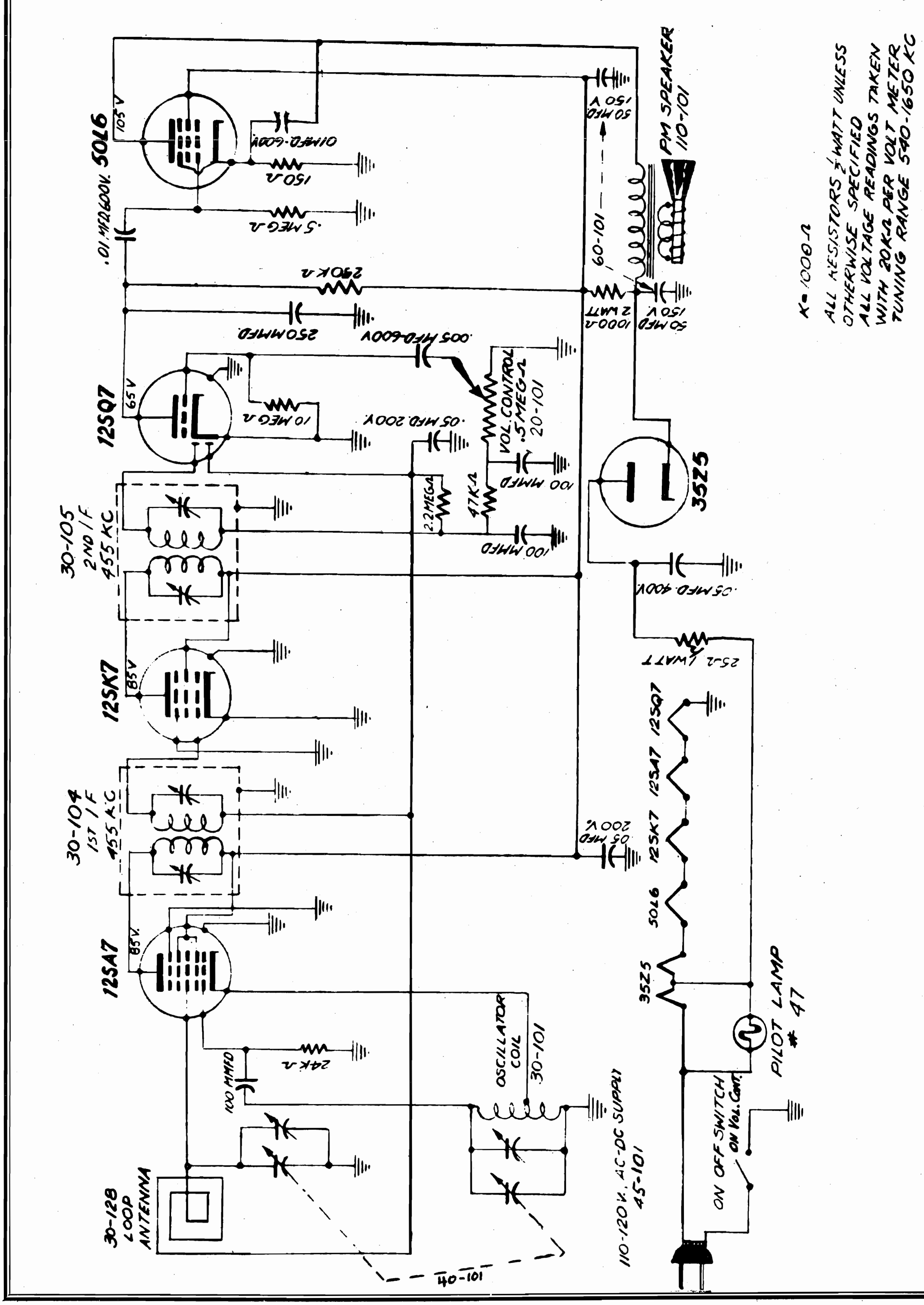
PART NO.	REF. NO.	DESCRIPTION
11-87		Line Cord and Plug
27-87	C21	Silver Mica Disc (475 MMF.)
57-1054		Spark Plate
58-133		Nine Prong Plug (used on S-13677)
78-363		Socket - Wavemagnet Plug
78-376		Socket - Octal Base Tube (8 Contact)
78-580		Socket - Nine Contact (Phono)
78-582		Socket - Nine Contact (2 used on S-13677)
78-684		Socket - Octal Base Tube (Moulded)
78-685		Socket - Miniature Tube
80-451		Tube Retaining Ring
125-49		Chassis Mtg. Rubber Grommet
126-379		Loktal Tube Shield
149-54		F.M. Iron Core and Spring (3 used)
197-15		Light Diffusing Cup
S-12356	S1	Band Switch and Shield Assembly (85-340)
S-12360		Filament Cable Assembly #1
S-12361		Cable Assembly #2

CABINET PARTS

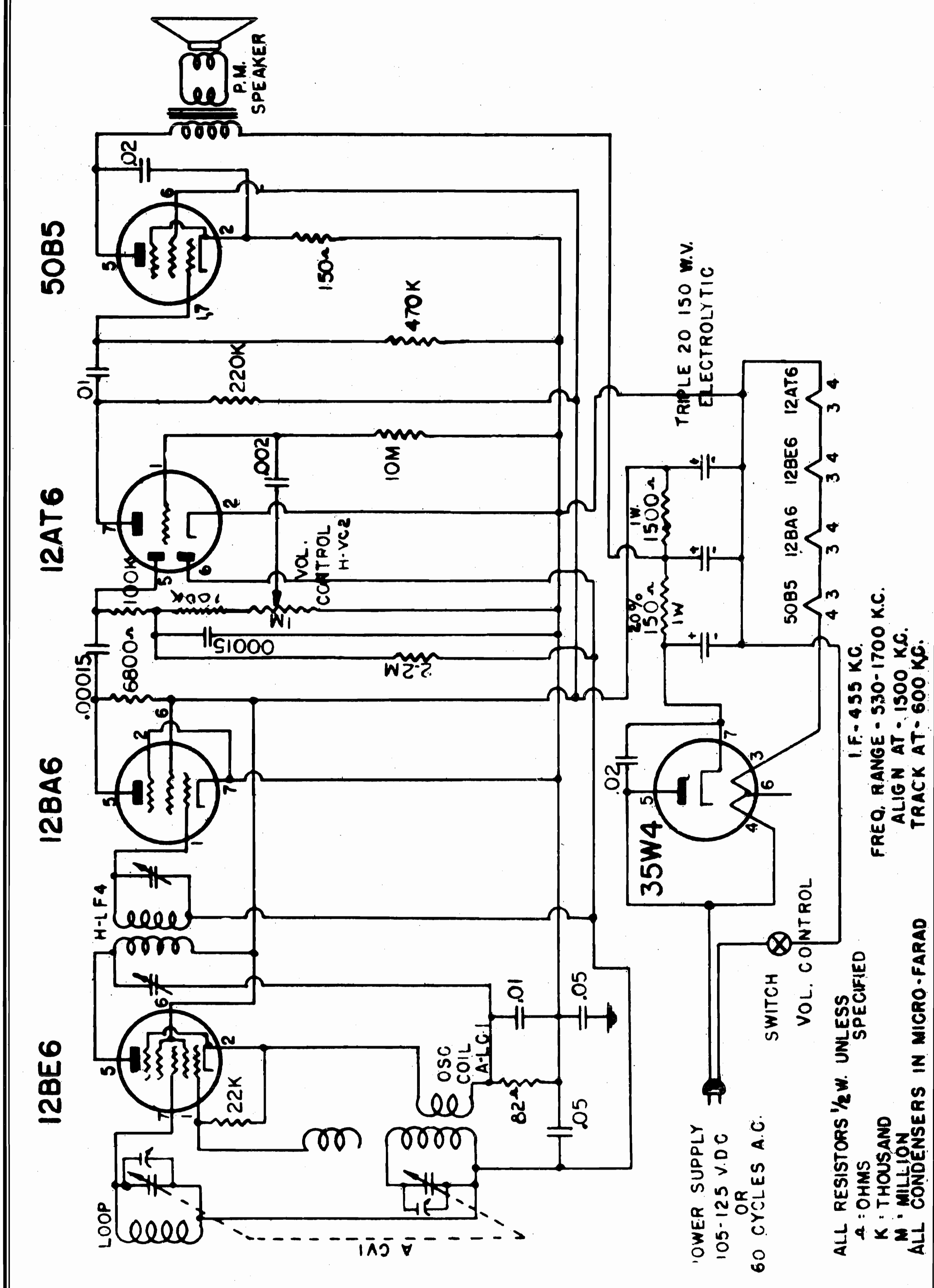
PART NO.	REF. NO.	DESCRIPTION
19-123		Phono Unit Mtg. Clip (3 used)
24-388		Record Changer Compartment Cover
49-600	SP1	12" P.M. Speaker
		206-600 Output Transformer
		208-600 Cone and Voice Coil
57-1066		Dial Escutcheon Plate
57-1289		Ornamental Plate (Zenith) (used on S-13484)
69-193		1/4-20 x 2" R.H.M.S. (2 used on S-12545)
78-761		Pilot Light Socket
80-423		Chassis Lift Spring (2 used)
80-463		Phono Unit Mtg. Spring (4 used)
83-1244		Record Changer Trim Strip
90-367		Pilot Light Tube
93-392		3-32 x 33/64 x 1" Brown Felt Washer (3 used)
100-36		Pilot Light Bulb Hd
112-558		#10-32 x 7/8" Phillips Flat Hd. M.S. (Chassis Mtg.) (4 used)
112-670		Record Changer Mtg. Screw (1 used)
112-671		Record Changer Mtg. Screw (3 used)
114-257		#10 x 1-3/8" Slotted Hex Hd. Self Tapping Screw (2 used on S-13675)
171-7		Pilot Light Lens
192-96		Dial Crystal
202-506		F.M. Instruction Book
202-512		Phono Instruction Book
202-514		Unpacking Instructions
202-515		Instruction Book
202-517		Station Identification Tabs
S-12545		Phono Lift Spring and Bushing Assembly (2 used)
S-13058		F.M. Dipole and Short Wave Antenna Assembly
S-13484		Record Changer Support Frame and Arm Assembly
S-13672		Tuning Knob and Ring Assembly (46-680) (3 used)
S-13673		Wavemagnet and Hinge Assembly (Complete) (Type 36A)
S-13675		Record Changer (Intermixer)
S-13677		Interconnecting Cable Assembly



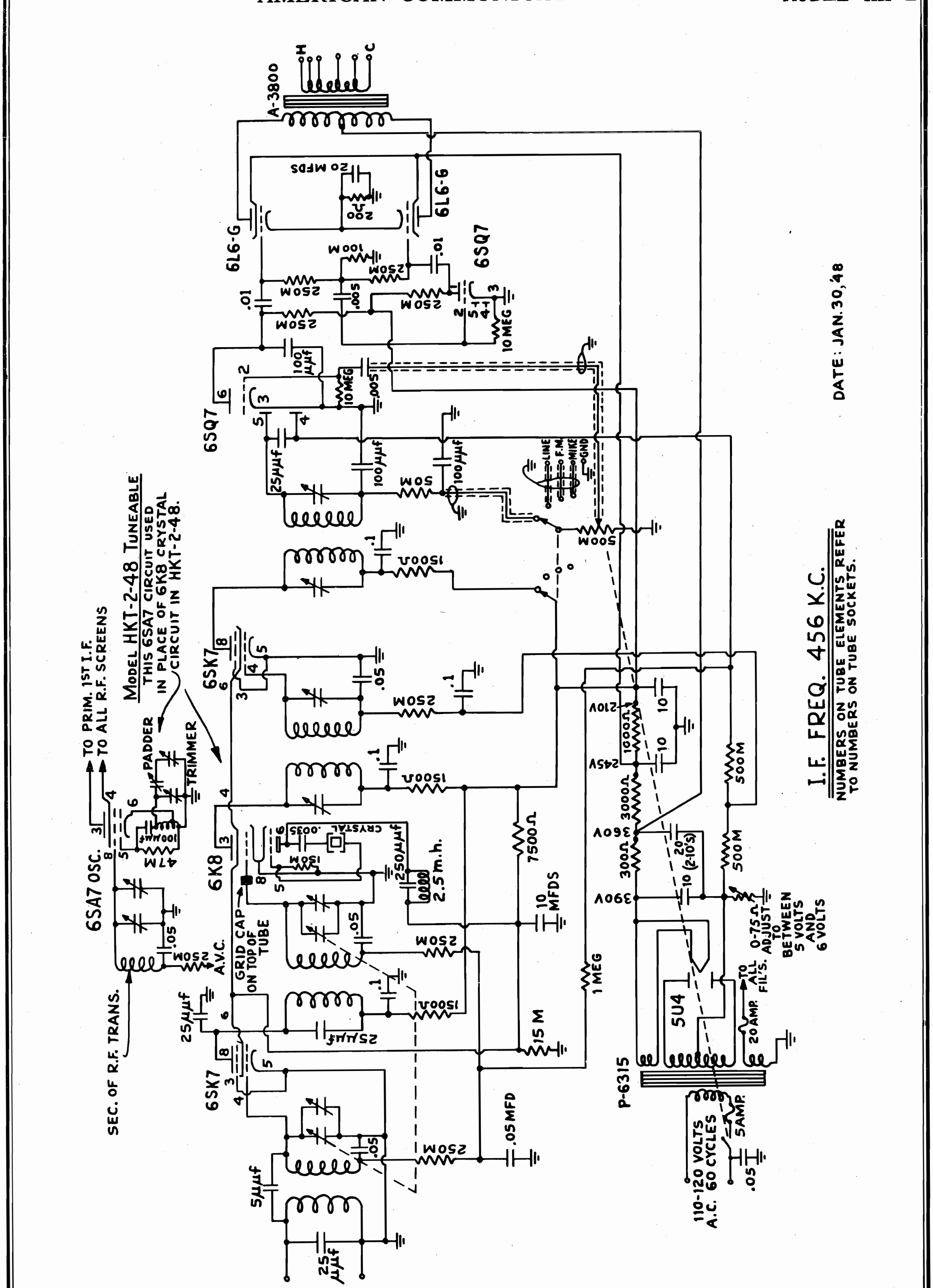
AFFILIATED RETAILERS, INC. MODEL AR-205



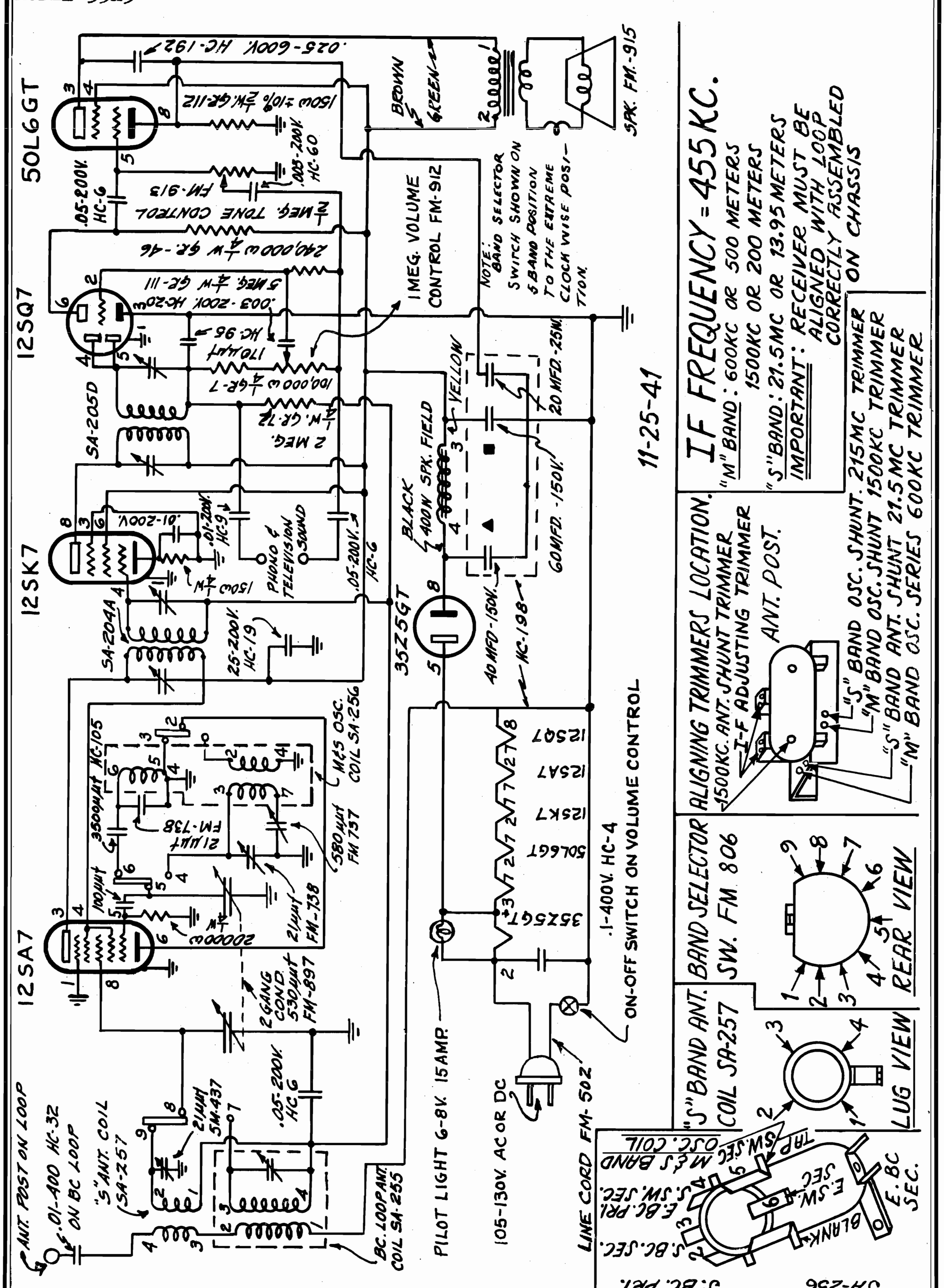
MODEL 701 ALLIED PURCHASING, INC.



AMERICAN COMMUNICATIONS CORP. MODEL HK-2

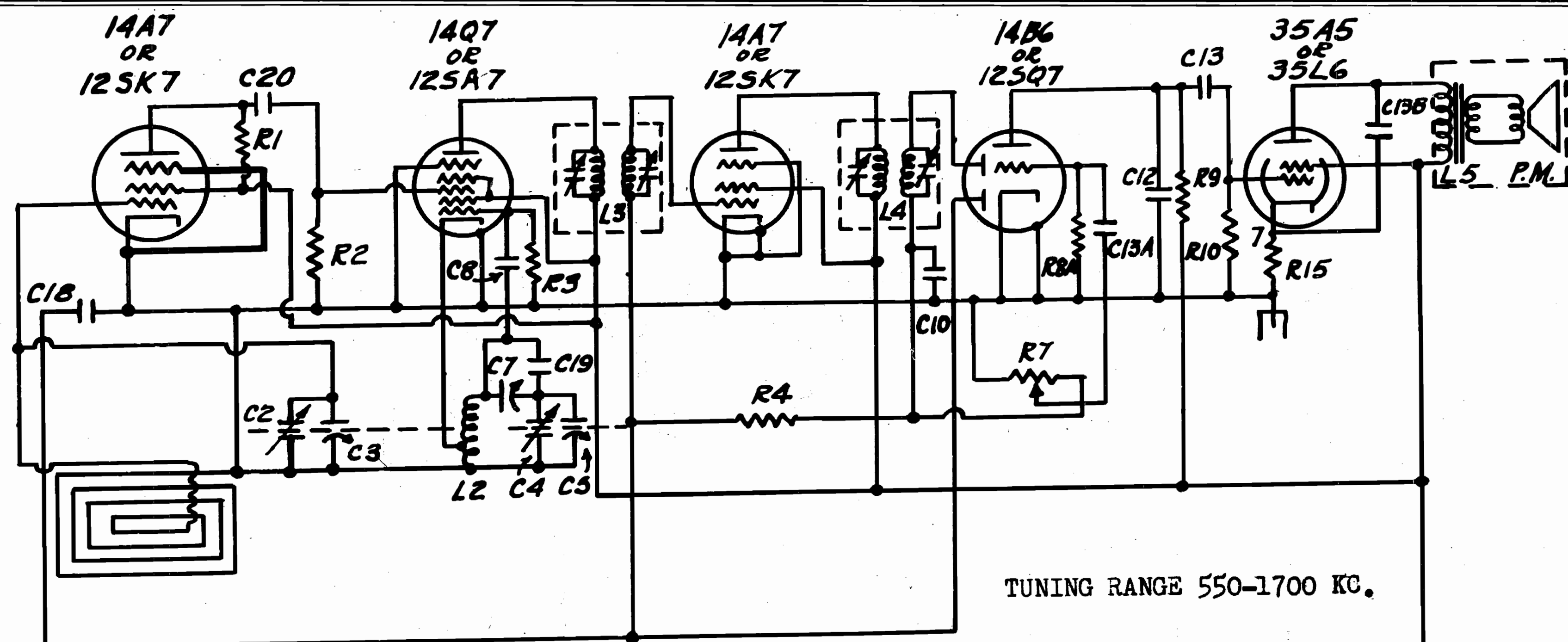


MODEL 35H5 ANDREA RADIO CORP.

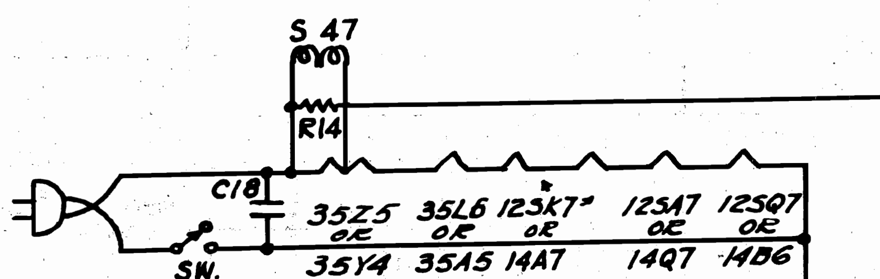


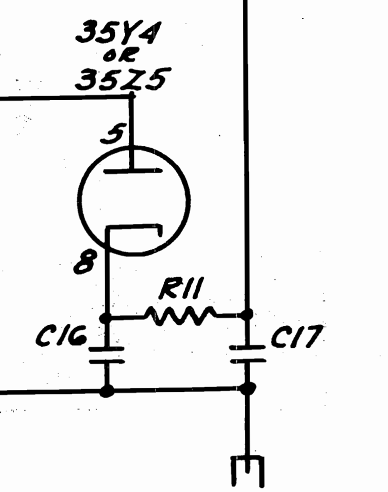
ART RADIO CO.

MODEL 6 tube



TUNING RANGE 550-1700 KC.



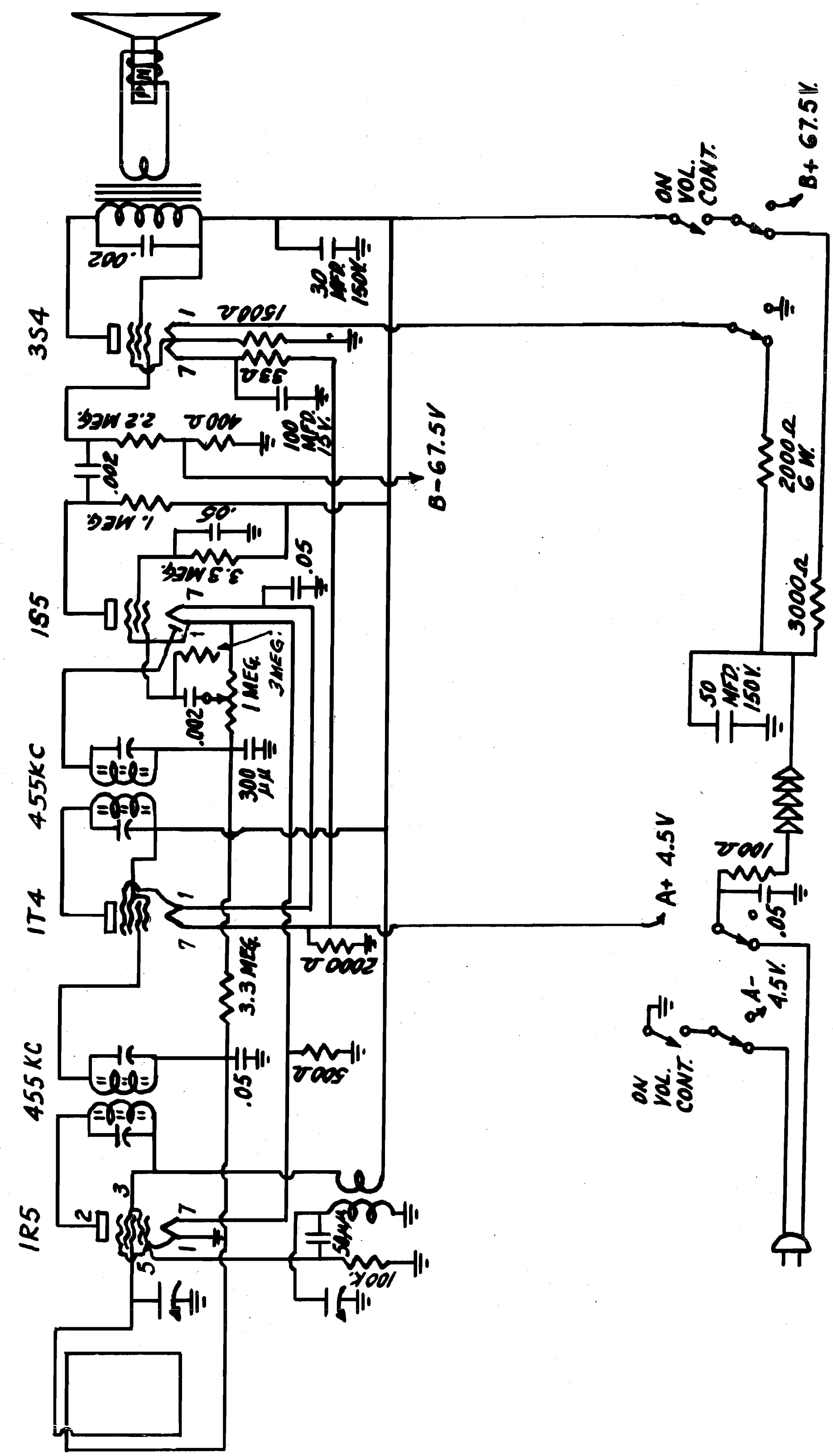


ITEM	DESCRIPTION				
L 1	Antenna Loop				
L 2	Oscillator Coil				
L 3	Input I.F. Coil 455 K.C.				
L 4	Output I.F. Coil 455 K.C.				
L 5	Output Transformer				
C-2	Ant. Sect. 2 Gang Cond.				
C-3	Antenna Trimmer				
C-4	Osc. Sect. 2 Gang Cond.				
C-5	Oscillator Trimmer				
C-7	Oscillator Padder	C-18	.05 Mfd - 200 W.V.	R-14	200Ω - 3 Watt
C-8	100 MMfd- Mica	C-19	250 MMf - Mica.	R-15	175Ω - 1/2 Watt
C-10	250 MMfd- Mica	C-20	300 MMf - Mica	R-1	2500Ω - 1/2 Watt
C-12	350 MMfd- Mica	R-3	20,000Ω - 1/2 Watt	R-2	50,000Ω - 1/2 Watt
C-13	.01 Mfd - 400 W.V.	R-4	2 MegΩ - 1/2 Watt		
C-13A	.01 Mfd - 400 W.V.	R-7	.5 MegΩ - Pot.	SW.	A.C. Switch on Volume Control
C-13B	.01 Mfd - 400 W.V.	R-8A	4.7 MegΩ - 1/2 Watt		
C-16	40 Mfd - 150 W.V.	R-9	350,000Ω - 1/2 Watt		
C-17	40 Mfd - 150 W.V.	R-10	500,000Ω - 1/2 Watt	S-47	Brown Bead-Bayonet-150 Ma.
		R-11	470Ω - 5 Watt		

= CHASSIS GROUND

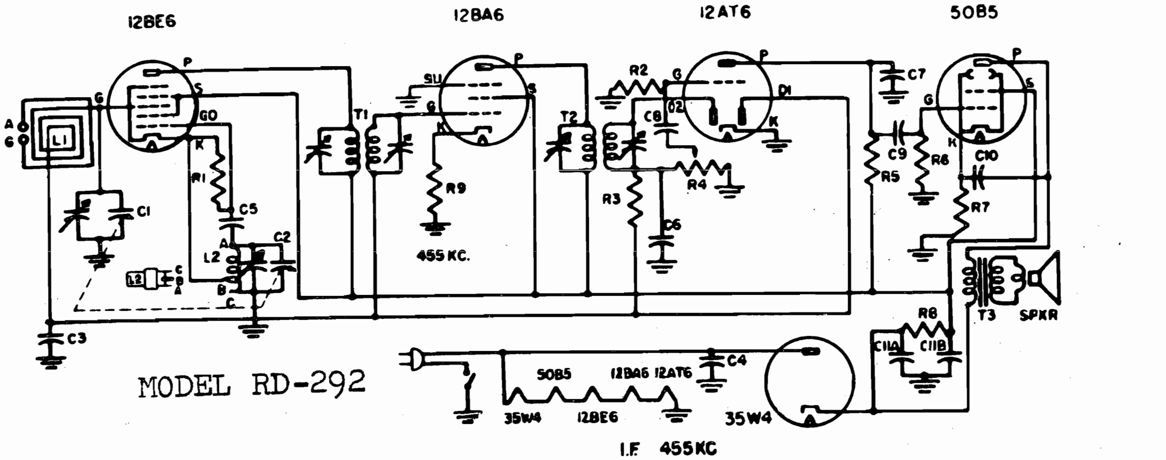
MODEL 4 Tube
AC-DC

AVALON RADIO CO.



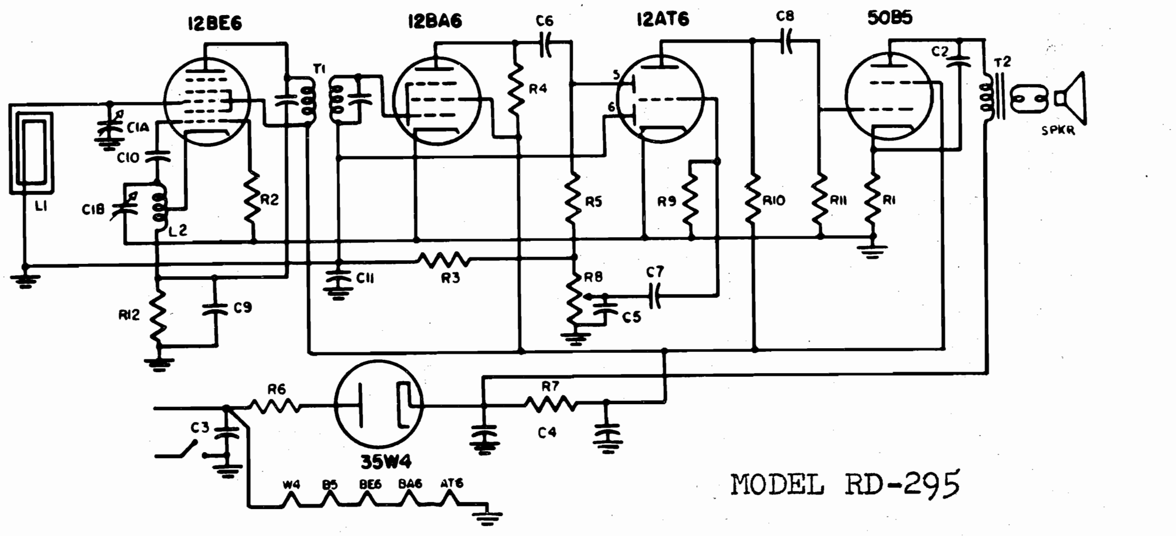
BUTLER BROTHERS

MODELS RD-292, RD-295



MODEL RD-292

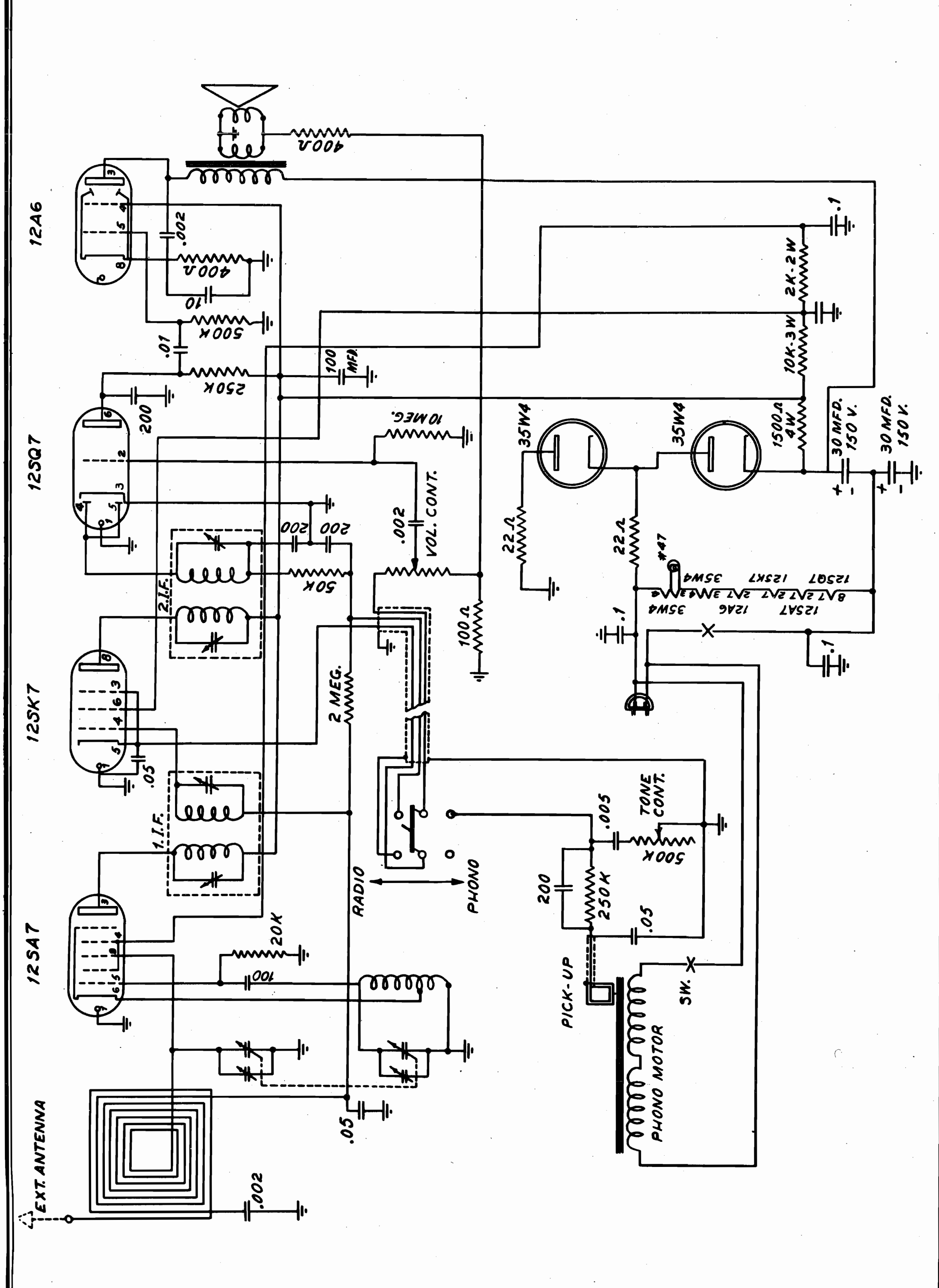
PART NO.	CIRC. SYM.	DESCRIPTION	PART NO.	CIRC. SYM.	DESCRIPTION
CV-10002-E	C1,C2	Condenser - Variable Tuning with Drum	RC-32503	R5	Resistor-Carbon 250,000 Ohms ½ watt
CP-14503	C3,C4	Condenser - .05 Mfd. 400 Volt	RC-35003	R6	Resistor-Carbon 500,000 Ohms ½ watt
CM-15500	C5	Condenser - .00005 Mfd. Mica	RC-31500	R7	Resistor-Carbon 150 Ohms ½ watt
CM-15251	C6,C7	Condenser - .00025 Mfd. Mica	RC-32000	R8	Resistor-Carbon 200 Ohms ½ watt
CP-14103	C8,C9	Condenser - .01 Mfd. 400 Volt	RC-31500	R9	Resistor-Carbon 150 Ohms ½ watt
CP-14503	C10	Condenser - .05 Mfd. 400 Volt	AL-10004	L1	Loop Antenna
CL-10001	C11A,C11B	Condenser - 20/20 Mfd. 150 Volt Elect.	TRC-10000-D	L2	Coil Oscillator
RC-32002	R1	Resistor-Carbon 20,000 ohms ½ watt	TS-10000	T1	Transformer 1st. I.F.
RC-31005	R2	Resistor-Carbon 10 Meg. ½ watt	TS-10001	T2	Transformer 2nd. I.F.
RC-32004	R3	Resistor-Carbon 2 Meg. ½ watt	TO-10000	T3	Transformer-Output for speaker
VC-10105	R4	Volume Control - 1 Meg. (with switch)	SR-10000	SPKR	Speaker, 4" P.M.



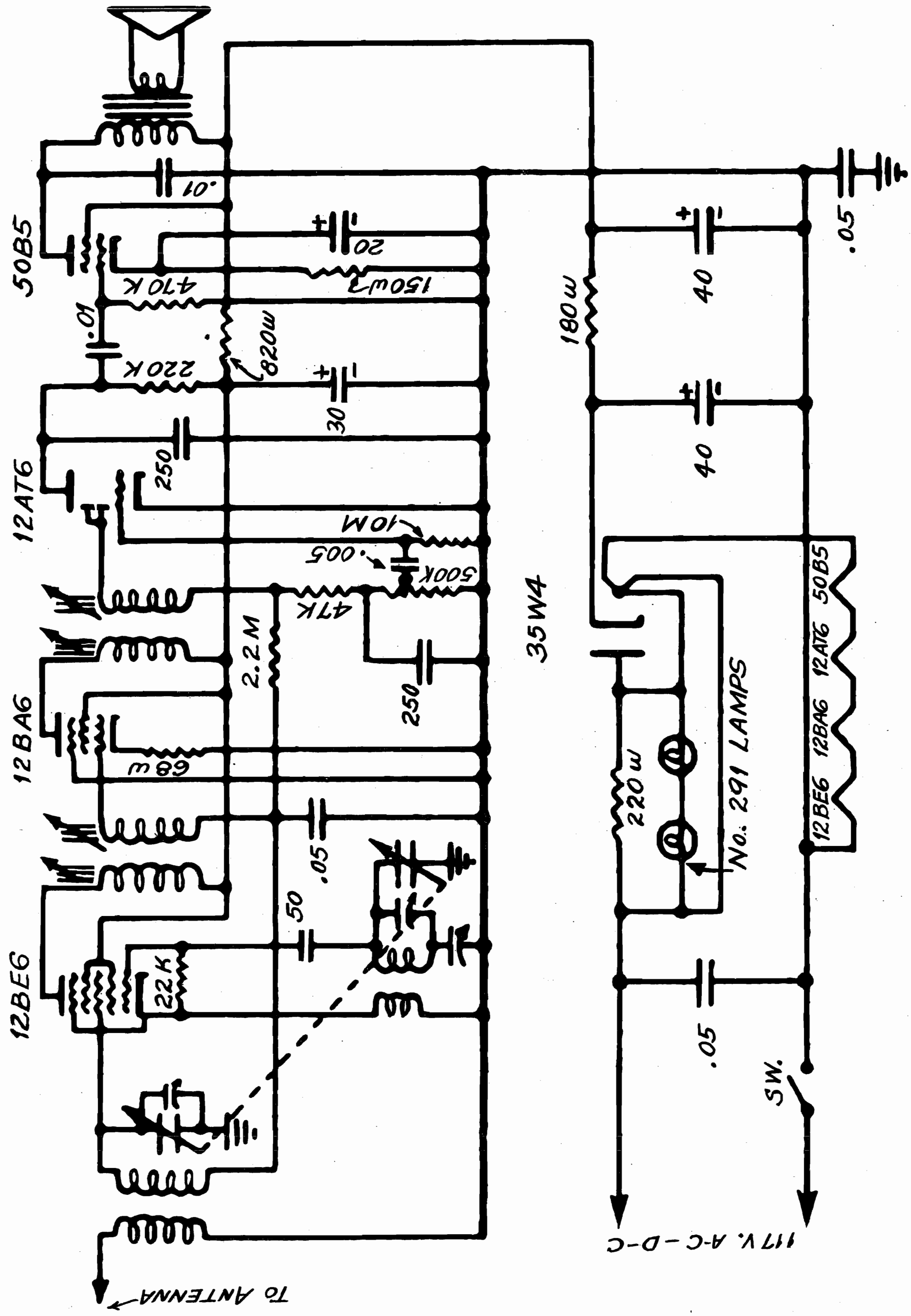
MODEL RD-295

Part No.	Circuit Symbol	Description	Part No.	Circuit Symbol	Description
CV-10008	C1	Variable condenser for Model 5A7	RCP-30220	R6	Resistor carbon 22 ohm ½ watt
CPP-14203	C2	Condenser paper tub .02 mfd-400V	RCP-41001	R7	Resistor carbon 1000 ohm 1 watt
CPP-14503	C3	Condenser paper tub .05 mfd-400V	VCP-10105	R8	Volume control 1 megohm and switch
CLP-10007	C4	Condenser electrolytic 50-30 mfd-150V	VCP-12105	R8	Volume control for Model 5A7- 1 megohm
CMP-15251	C5, C6	Condenser mica 250 mmf-500V	RCP-31005	R9	Resistor carbon 10 megohm ½ watt
CPP-12103	C7, C8	Condenser paper tub .01 mfd-200V	RCP-32203	R10	Resistor carbon 220,000 ohm ½ watt
CPP-11103	C9	Condenser paper tub .01 mfd-150V	RCP-34703	R11	Resistor carbon 470,000 ohm ½ watt
CMP-15500	C10	Condenser mica 50 mmf-500V	ALP-10013	L1	Loop antenna
CPP-12203	C11	Condenser paper .02 mfd-200V	TRCP-10000-D	L2	Oscillator coil
RCP-31500	R1, R12	Resistor carbon 150 ohm ½ watt	TSP-10002	T1	I.F. Transformer
RCP-31002	R2	Resistor carbon 10,000 ohm ½ watt	TOP-10000	T2	Output transformer
RCP-32204	R3	Resistor carbon 2.2 megohm ½ watt	SRP-10005	SPKR	Speaker P.M. 3" round for Model 5A7
RCP-36801	R4	Resistor carbon 6800 ohm ½ watt			
RCP-31003	R5	Resistor carbon 100,000 ohm ½ watt			

MODEL 607AC ELECTROMATIC MFG. CORP.

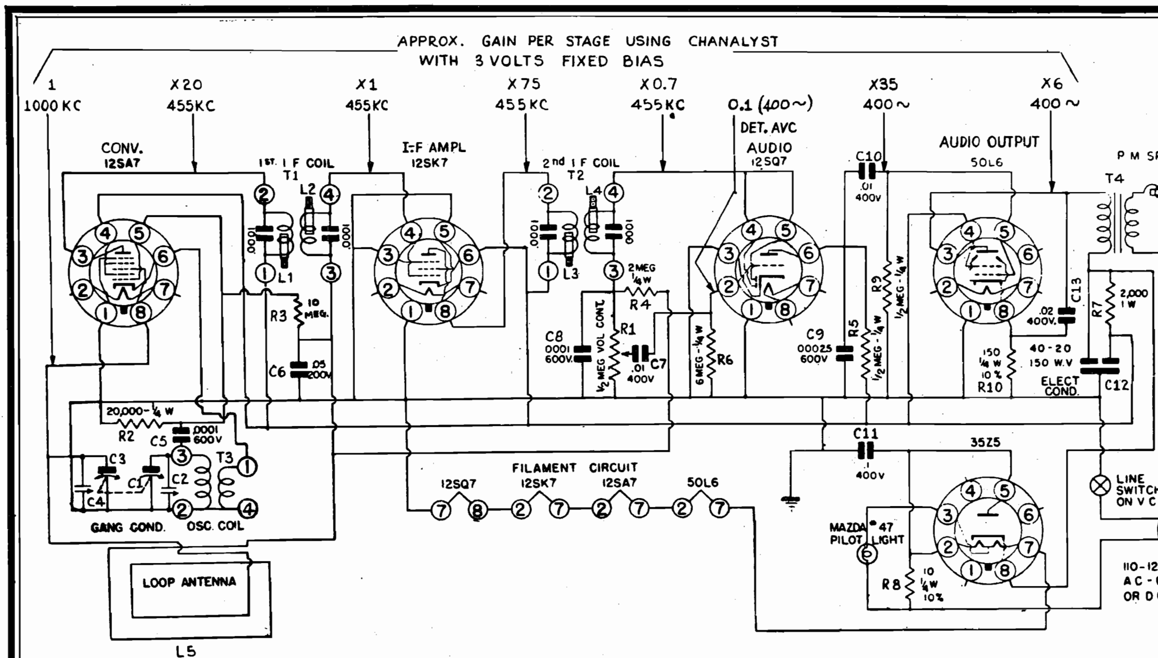


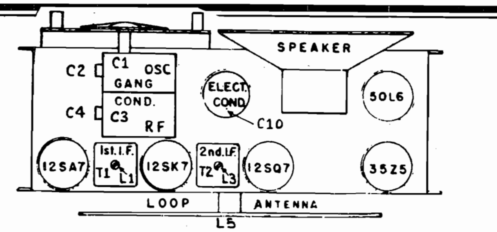
EMPIRE MFG. CO. MODEL G7-801

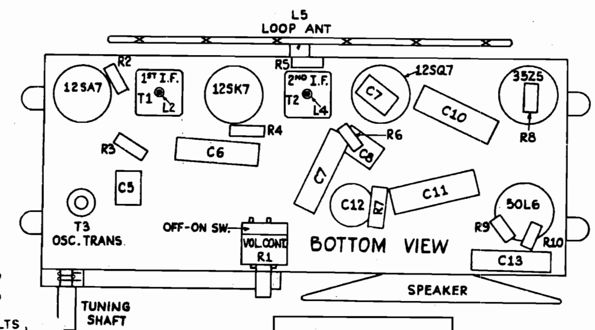


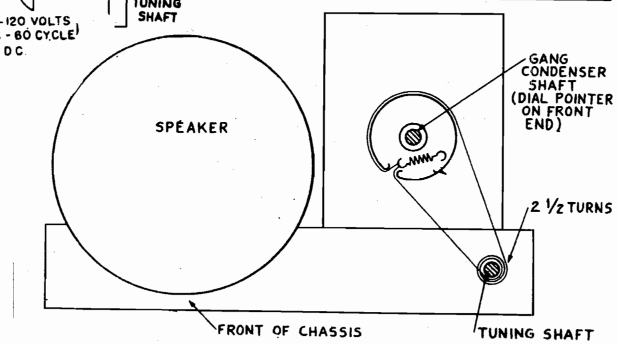
MODEL 9A5

GENERAL IMPLEMENT CORP.









DIAL CORD DRIVE

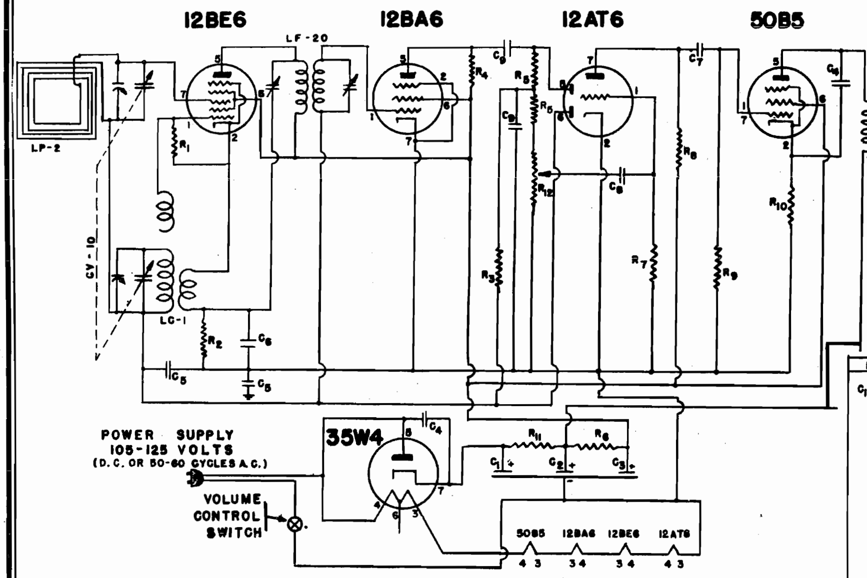
SOCKET	PIN	VTVM	20,000Ω/P2	1,000Ω/P2	RESISTANCE
12SA7GT CONV	1	0	0	0	0
	2	AC	AC	AC	25Ω
	3	+78	+78	+76	OVER 5 MEGS
	4	+78	+78	+76	OVER 5 MEGS
	5	-9	-8	-4.5	17K
	6	0	0	0	1Ω
	7	AC	AC	AC	40Ω
	8	-6	-2	-0.5	1.3 MEGS
12SK7GT I-F AMPL.	1	0	0	0	0
	2	AC	AC	AC	15Ω
	3	0	0	0	0
	4	-2	-0.8	-0.4	1.3 MEGS
	5	0	0	0	0
	6	+78	+78	+76	OVER 5 MEGS
	7	AC	AC	AC	25Ω
	8	+78	+78	+76	OVER 5 MEGS
12SQ7GT DET. AVC AUDIO	1	0	0	0	0
	2	-1	-0.8	-0.4	6MEGS
	3	0	0	0	0
	4	-1.5	-0.4	-0.2	400K
	5	-1.5	-0.4	-0.2	400K
	6	+48	+46	+12	OVER 5 MEGS
	7	AC	AC	AC	15Ω
	8	AC	AC	AC	0
50L6GT AUDIO OUTPUT	1	0	0	0	0
	2	AC	AC	AC	40Ω
	3	+115	+115	+115	OVER 5 MEGS
	4	+75	+75	+75	OVER 5 MEGS
	5	0	0	0	550K
	6	--	--	--	--
	7	AC	AC	AC	80Ω
	8	+5	+5	+5	150Ω
35Z5GT	1	--	--	--	--
	2	AC	AC	AC	120Ω
	3	AC	AC	AC	110Ω
	4	--	--	--	--
	5	AC	AC	AC	120Ω
	6	AC	AC	AC	120Ω
	7	AC	AC	AC	90Ω
	8	+115	+115	+115	OVER 5 MEGS

"NOTE" ALL VOLTAGE AND RESISTANCE MEASUREMENTS MADE WITH RESPECT TO CHASSIS GROUND AND WITH A LINE VOLTAGE OF 116 V. A. C.

ALIGNMENT

THE CHASSIS MUST BE REMOVED FROM THE CABINET IN ORDER TO ALIGN THE RECEIVER. CONNECT THE OUTPUT METER ACROSS THE VOICE COIL. CONNECT THE SIGNAL GENERATOR TO THE STANDARD HAZELTINE MODEL 1150 LOOP, AND COUPLE LOOSELY TO THE RECEIVER LOOP. SET THE RECEIVER VOLUME CONTROL AT MAXIMUM. THE TUNING CONDENSER PLATES SHOULD BE FULLY MESHED WHEN THE DIAL POINTER IS AT THE INDEX MARK AT THE LOW FREQUENCY END OF THE DIAL. THE SIGNAL GENERATOR OUTPUT SHOULD BE JUST SUFFICIENT TO OBTAIN HALF SCALE DEFLECTION ON THE LOWEST SCALE OF THE OUTPUT METER. SET THE SIGNAL GENERATOR TO 455 KC. ADJUST THE I.F. TUNING SLUGS FOR MAXIMUM OUTPUT IN THE FOLLOWING SEQUENCE: L4, L3, L2, L1. SET THE GENERATOR AND RECEIVER TO 1600 KC AND ADJUST OSCILLATOR TRIMMER C2 FOR MAXIMUM OUTPUT. SET THE GENERATOR AND RECEIVER TO 1400 KC AND ADJUST R.F. TRIMMER C4 FOR MAXIMUM OUTPUT

W. T. GRANT COMPANY — CHASSIS Series H, R

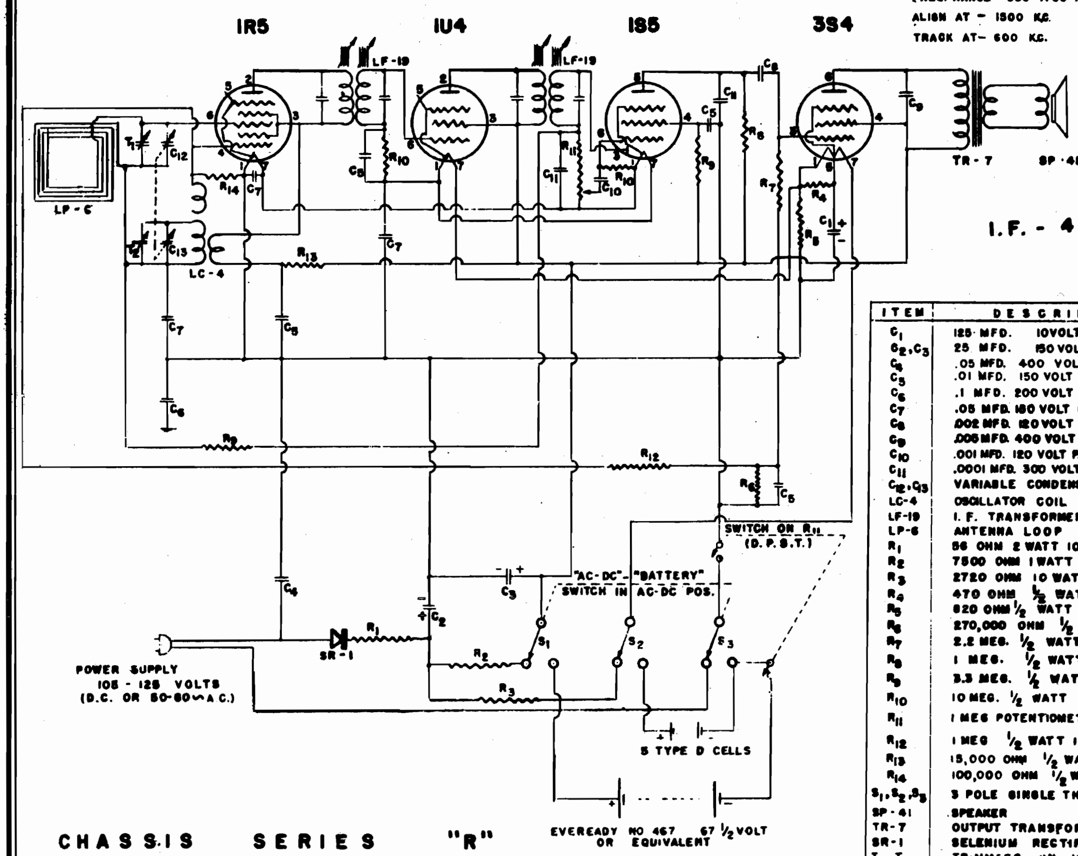


I. F. - 455 K.C.

CHASSIS SERIES "H"

ITEM	DESCRIPTION	PART NO.
C_1, C_2, C_3	3 X 20 MFD - 150 VOLT ELECTROLYTIC	CE - 11
C_4	.02 MFD - 400 VOLT PAPER CONDENSER	CP-203-1
C_5	.05 MFD - 200 VOLT PAPER CONDENSER	CP-503-4
C_6	.01 MFD - 400 VOLT PAPER CONDENSER	CP-103-1
C_7	.01 MFD - 150 VOLT PAPER CONDENSER	CP-103-2
C_8	.002 MFD - 400 VOLT PAPER CONDENSER	CP-202-2
C_9	.00015 MFD - 500 VOLT MICA CONDENSER	CM-151-1
CV-10	VARIABLE CONDENSER	CV-10
LF-20	I. F. TRANSFORMER	LF-20
LP-2	LOOP	LP-2
R_1	22,000 OHMS ½ WATT RESISTOR	RC-223-1
R_2	82 OHMS ½ WATT 10 % RESISTOR	RC-820-2
R_3	2.2 MEG. ½ WATT RESISTOR	RC-225-1
R_4	6800 OHMS ½ WATT RESISTOR	RC-682-1
R_5	100,000 OHMS ½ WATT RESISTOR	RC-104-1
R_6	1500 OHMS 1 WATT RESISTOR	RC-152-4
R_7	10 MEG. ½ WATT RESISTOR	RC-106-1
R_8	220,000 OHMS ½ WATT RESISTOR	RC-224-1
R_9	470,000 OHMS ½ WATT RESISTOR	RC-474-1
R_{10}	150 OHMS ½ WATT RESISTOR	RC-151-1
R_{11}	150 OHMS 1 WATT RESISTOR	RC-151-4
R_{12}	VOLUME CONTROL 1 MEG. WITH S.P.S.T. SW	VC-5
SP-40	SPEAKER	SP-40
LC-1	OSCILLATOR COIL	LC-1
TR-6	OUTPUT TRANSFORMER	TR-6

FREQ. RANGE - 530-1700 KC.
ALIGN AT - 1500 KC.
TRACK AT - 600 KC.



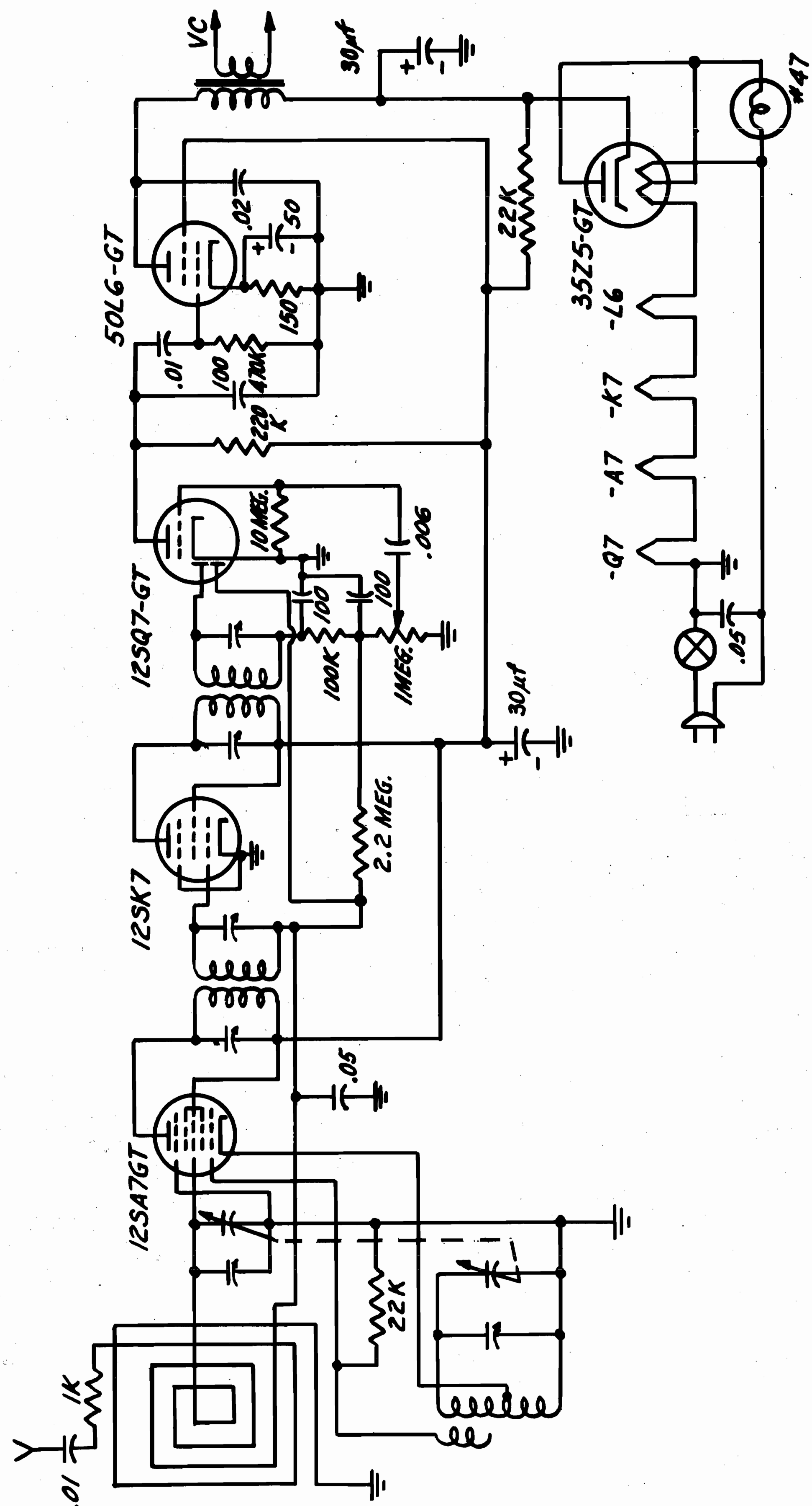
I. F. - 455 K.C.

CHASSIS SERIES "R"

ITEM	DESCRIPTION	PART NUMBER
C_1 C_2, C_3	125 MFD. 10 VOLT } ELECTROLYTIC 25 MFD. 150 VOLT } CONDENSER	CE-12
C_4	.05 MFD. 400 VOLT PAPER CONDENSER	CP 503-1
C_5	.01 MFD. 150 VOLT PAPER CONDENSER	CP 103-2
C_6	.1 MFD. 200 VOLT PAPER CONDENSER	CP 104-2
C_7	.05 MFD. 150 VOLT PAPER CONDENSER	CP 503-2
C_8	.002 MFD. 120 VOLT PAPER CONDENSER	CP 202-1
C_9	.005 MFD. 400 VOLT PAPER CONDENSER	CP 502-2
C_{10}	.001 MFD. 120 VOLT PAPER CONDENSER	CP 102-1
C_{11}	.0001 MFD. 300 VOLT MICA CONDENSER	CM 101-1
C_{12}, C_{13}	VARIABLE CONDENSER	CV 10
LC-4	OSCILLATOR COIL	LC - 4
LF-19	I. F. TRANSFORMER	LF -19
LP-6	ANTENNA LOOP	LP-6
R_1	56 OHM 2 WATT 10% W.W. RESISTOR	RW 560-8
R_2	7500 OHM 1 WATT 10% RESISTOR	RC 752-5
R_3	2720 OHM 10 WATT 5% RESISTOR	RP - 1
R_4	470 OHM ½ WATT RESISTOR	RC 471-1
R_5	820 OHM ½ WATT 10 % RESISTOR	RC 821-2
R_6	270,000 OHM ½ WATT 10% RESISTOR	RC 274-2
R_7	2.2 MEG. ½ WATT RESISTOR	RC 225-1
R_8	1 MEG. ½ WATT RESISTOR	RC 105-1
R_9	3.3 MEG. ½ WATT RESISTOR	RC 335-1
R_{10}	10 MEG. ½ WATT RESISTOR	RC 106-1
R_{11}	1 MEG POTENTIOMETER WITH SWITCH	VC - 6
R_{12}	1 MEG ½ WATT 10% RESISTOR	RC 105-2
R_{13}	15,000 OHM ½ WATT RESISTOR	RC 153-1
R_{14}	100,000 OHM ½ WATT 10% RESISTOR	RC 104-2
S_1, S_2, S_3	3 POLE SINGLE THROW SWITCH	SW - 3
SP-41	SPEAKER	SP - 41
TR-7	OUTPUT TRANSFORMER	TR - 7
SR-1	SELENIUM RECTIFIER	SR-1
T_1, T_2	TRIMMERS ON VARIABLE	

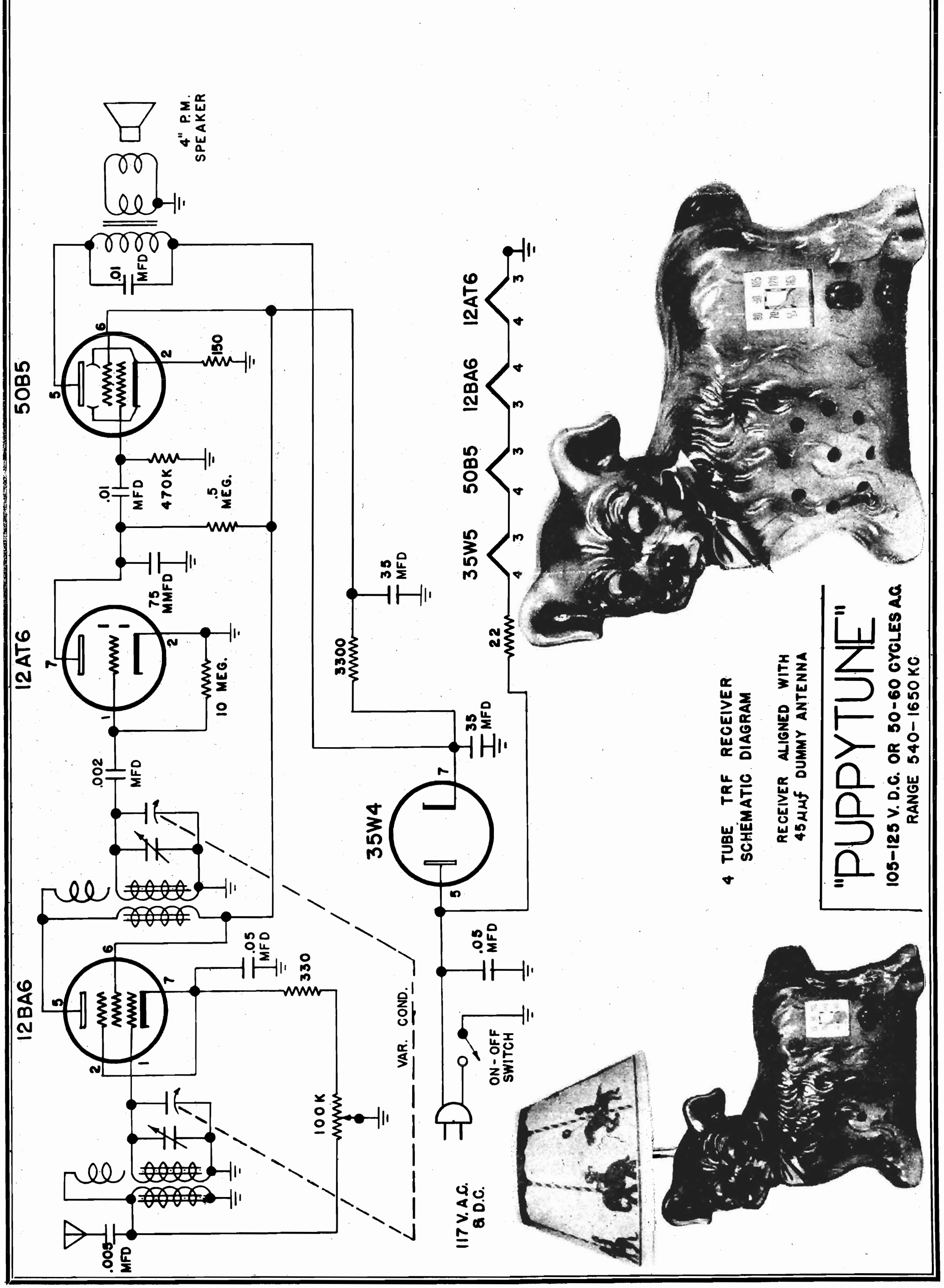
MODEL 5 tube,
AC-DC

KERNWOOD RADIO CORP.



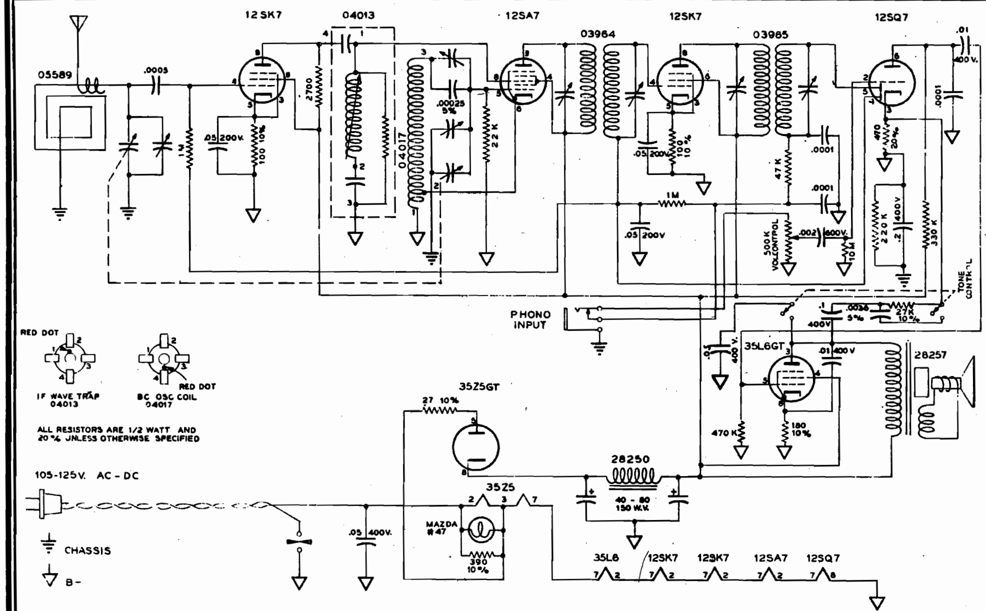
KRAFT MFG. & DIST. CO.

MODEL Puppytune

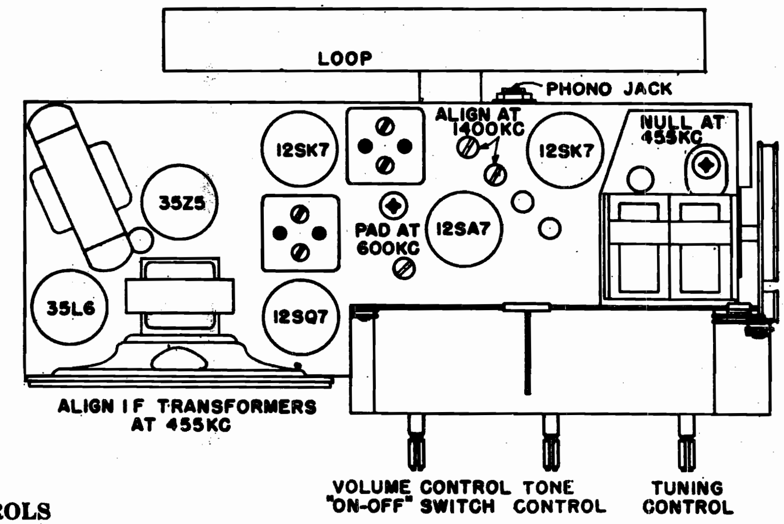


MODEL 6K

MAGUIRE INDUSTRIES, INC.



TUBE LAYOUT



CONTROLS

TONE CONTROL: (Center knob).
Turn knob counter-clockwise for maximum bass and clockwise for maximum treble response.

VOLUME CONTROL: (Left-hand knob).
Turning knob clockwise turns the receiver on and turning further increases the volume.

TUNING CONTROL: (Right-hand knob).
This knob is used to select stations. Tune station until it is at maximum clearness. Never attempt to reduce the volume by detuning the station—always use the volume control.

OPERATION

Turn the "On-Off" switch and volume control clockwise about half its range. This supplies power to the receiver. After allowing the tubes to warm up, tune in the desired station by rotating the tuning control. For best results, tune the desired station with the volume turned low. This enables you to get the exact point where the station comes in best. Then adjust the volume control

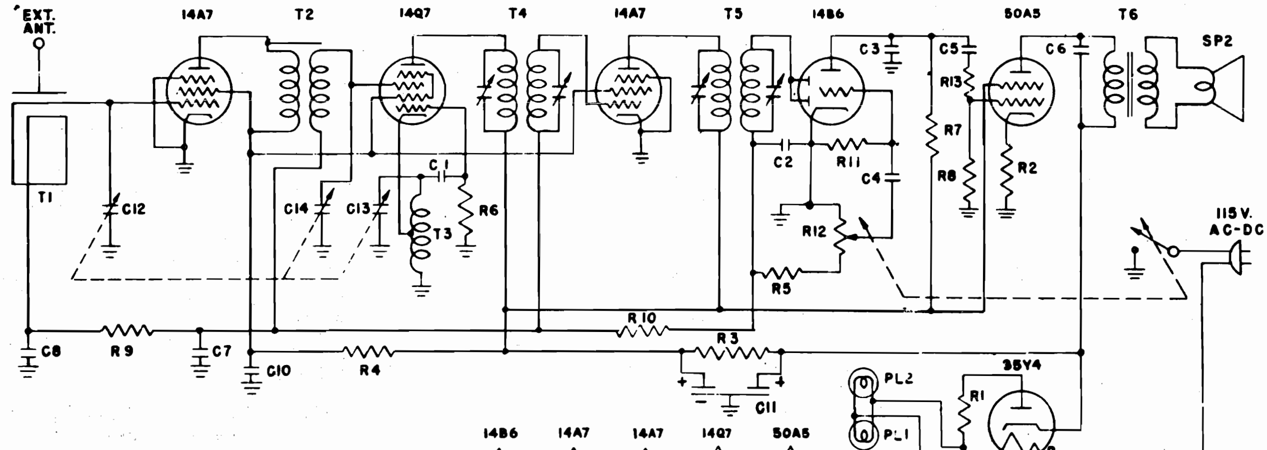
To operate the receiver as a phonograph amplifier, insert phonograph plug in jack on rear of chassis. Turn "On-Off" switch and volume control clockwise about half its range and adjust tone control to desired position. For normal radio reception the phono plug must be withdrawn from the jack.

This is a 6-tube superheterodyne radio receiver, with provision for phonograph input, for operation on 105-125 volt AC or DC power supply. The tubes used are a 12SK7 as an R.F. amplifier, a 12SA7 as an oscillator-converter, a 12SK7 as an I.F. amplifier, a 12SQ7 as an AVC, detector, and 1st audio amplifier, a 35L6 as an output, and a 35Z5 as a power rectifier.

The broadcast band covers a frequency range from 535 to 1620 kilocycles. The dial is calibrated in kilocycles (KC) (less the final zero).

NATIONAL COOPERATIVES, INC.

MODEL R-646



R1 - 25 OHMS 1/2 WATT RESISTOR TOL. 10%
R2 - 180 " " " " "
R3 - 1200 " " " " "
R4 - 15M " " " " "
R5 - 50M " 1/3 " " " "
R6 - 50M " " " " "
R7 - 500M " " " " "
R8 - 1 MEG " " " " "
R9 - 1 MEG " " " " "
R10 - 2 MEG " " " " "
R11 - 5 MEG " " " " "
R12 - 500M " POT WITH SWITCH
R13 - 100M " 1/3 WATT RESISTOR TOL. 10%

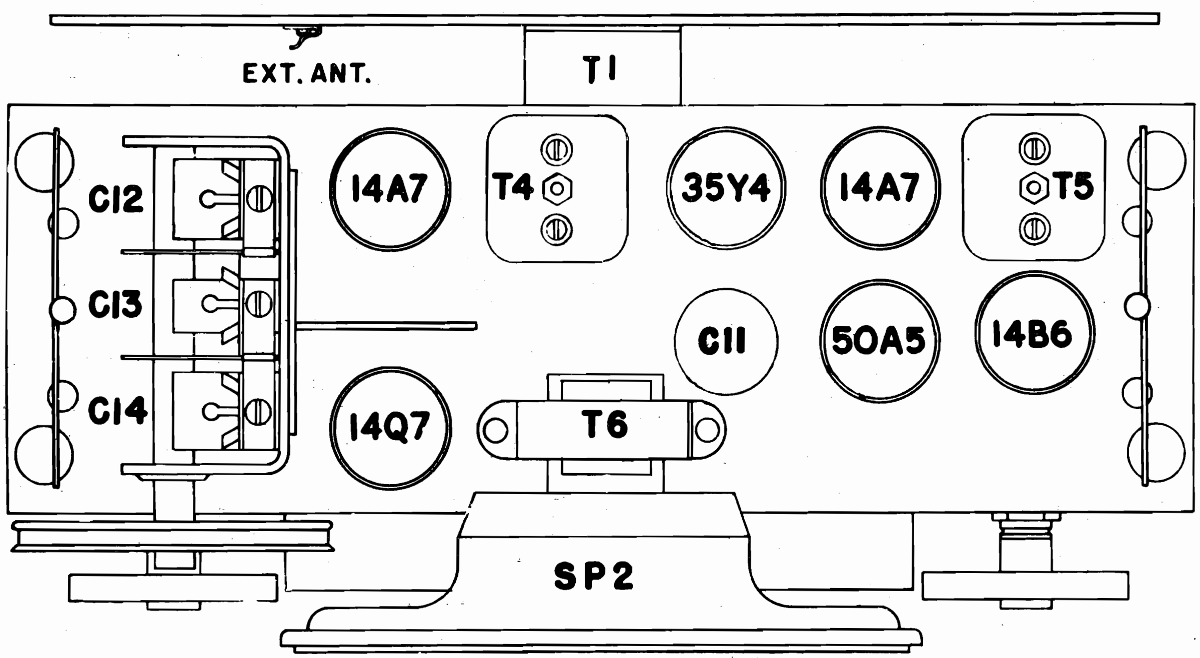
C1 - .0001 MFD. 400V. CONDENSER TOL. 10%
C2 - .0001 " " " " "
C3 - .0001 " " " " "
C4 - .006 " " " " "
C5 - .01 " " " " "
C6 - .02 " " " " "
C7 - .05 " 200V " " "
C8 - .05 " " " " "
C9 - .05 " 400V " " "
C10 - .1 " 200V " " "
C11 - 50+50 " 150V " " "

C12 - ANT. SECTION OF GANG CONDENSER
C13 - OSC. " " "
C14 - R.F. " " "

T1 - LOOP ANTENNA
T2 - R F COIL
T3 - OSC. COIL
T4 - INPUT IF COIL 392 KC
T5 - OUTPUT IF COIL 392 KC
T6 - O.P. TRANSFORMER

PL1 - NO. 47 PILOT LAMP
PL2 - " " " "
SP2 - 6" P.M. DYNAMIC SPEAKER

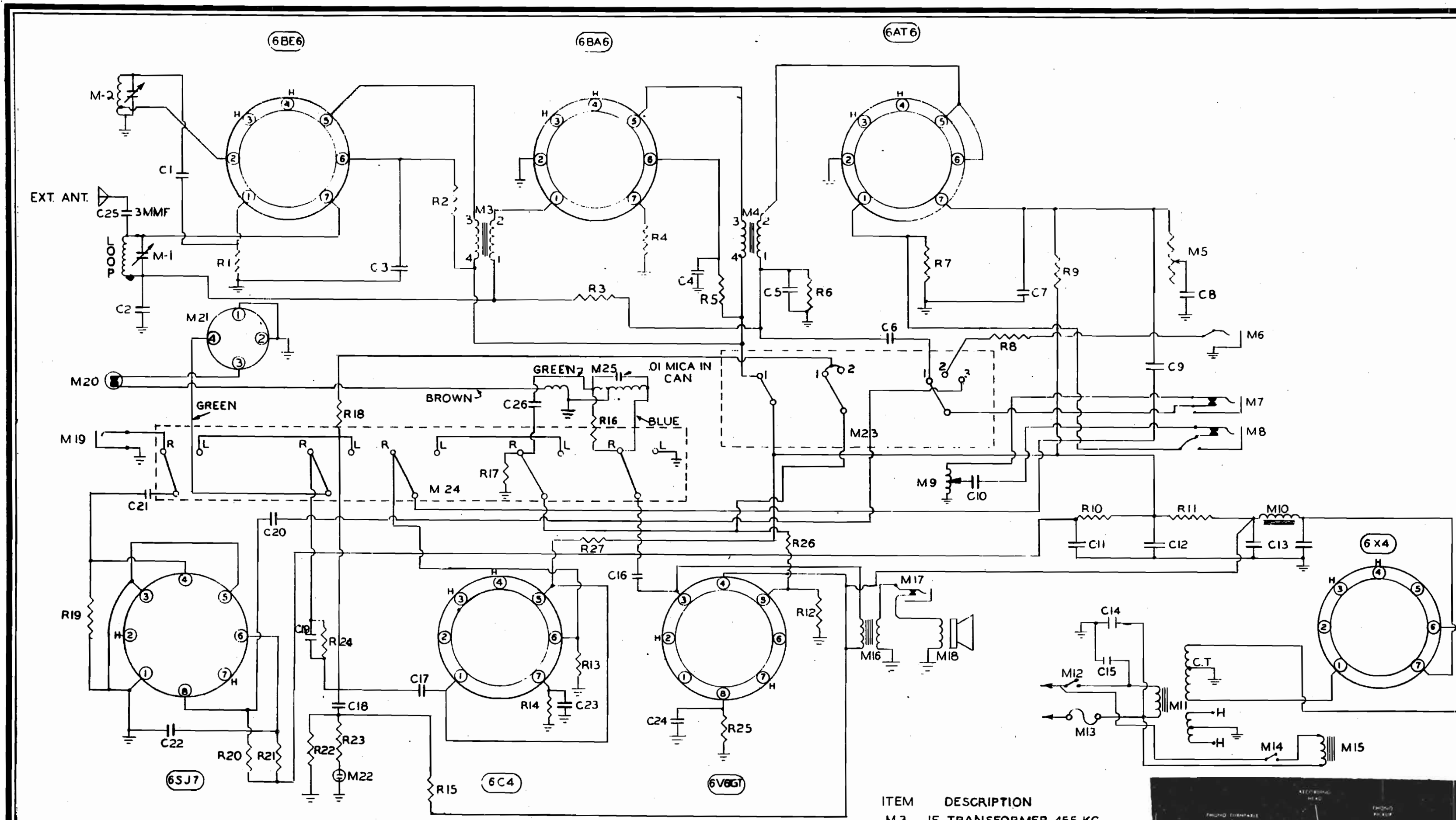
IF Alignment--465 KC (connect to ant. connector on loop).
Loop Alignment--1500, 1000, and 550 KC.
Dial Pointer Alignment--538 with fully closed condenser.



Top view of chassis showing tubes and parts

MODEL 748,
Astra-Sonic

PENTRON CORPORATION

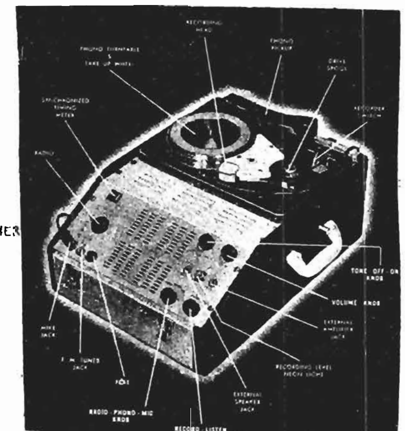


ITEM	DESCRIPTION
R1	22,000 OHM 1/2 WATT
R2	10,000 OHM 1 WATT
R3	2.2 MEG. OHM 1/2 WATT
R4	100 OHM 1/2 WATT
R5	100,000 OHM 1/2 WATT
R6	470,000 OHM 1/2 WATT
R7	10 MEG. OHM 1/2 WATT
R8	220,000 OHM 1/2 WATT
R9	100,000 OHM 1/2 WATT
R10	4700 OHM 1/2 WATT
R11	4700 OHM 2 WATT
R12	220,000 OHM 1/2 WATT
R13	470,000 OHM 1/2 WATT
R14	1500 OHM 1 WATT
R15	1 MEG. OHM 1/2 WATT
R16	10,000 OHM 1 WATT
R17	100,000 OHM 1/2 WATT
R18	470,000 OHM 1/2 WATT
R19	10 MEG. OHM 1/2 WATT
R20	470,000 OHM 1/2 WATT

ITEM	DESCRIPTION
R21	2.2 MEG. OHM 1/2 WATT
R22	220,000 OHM 1/2 WATT
R23	200,000 OHM 1/2 WATT
R24	100,000 OHM 1/2 WATT
R25	270 OHM 1 WATT
R26	4700 OHM 1/2 WATT
R27	47,000 OHM 1 WATT
C1	50 MMF 400 VOLT CONDENSER
C2	.05 MFD 200 VOLT CONDENSER
C3	.05 MFD 400 VOLT CONDENSER
C4	.05 MFD 400 VOLT CONDENSER
C5	170 MMF 400 VOLT CONDENSER
C6	.01 MFD 400 VOLT CONDENSER
C7	500 MMF 400 VOLT CONDENSER
C8	.02 MFD 400 VOLT CONDENSER
C9	.01 MFD 400 VOLT CONDENSER
C10	.01 MFD 400 VOLT CONDENSER
C11	10 MFD 350 VOLT CONDENSER

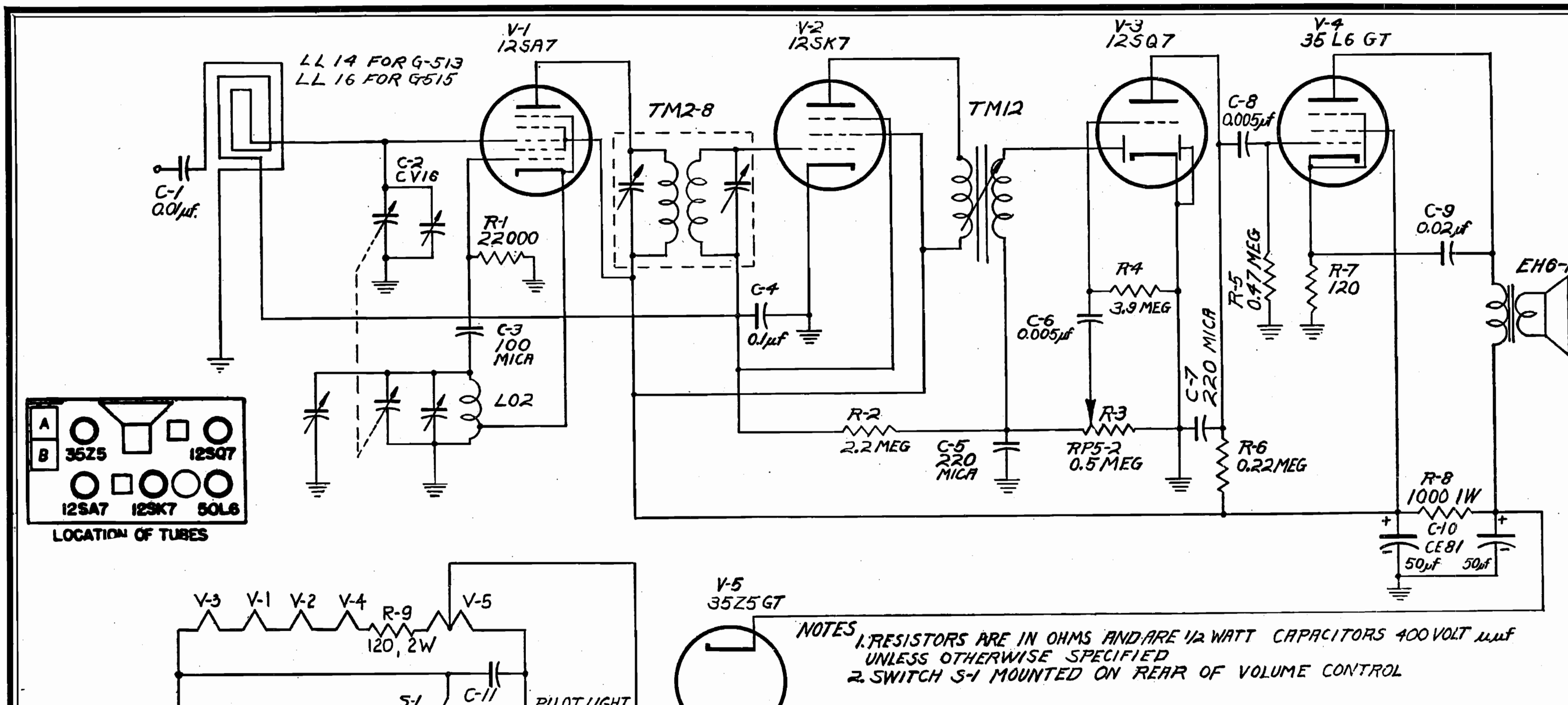
ITEM	DESCRIPTION
C12	10 MFD 350 VOLT CONDENSER
C13	DUAL 30 MFD 350 VOLT CONDENSER
C14	.1 MFD 400 VOLT CONDENSER
C15	.1 MFD 400 VOLT CONDENSER
C16	MICA CONDENSER .003 MFD 400 VOLT
C17	.1 MFD 400 VOLT CONDENSER
C18	.01 MFD 400 VOLT CONDENSER
C19	.001 MFD 400 VOLT CONDENSER
C20	.01 MFD 400 VOLT CONDENSER
C21	.01 MFD 400 VOLT CONDENSER
C22	.1 MFD 400 VOLT CONDENSER
C23	20 MFD 25 VOLT CONDENSER
C24	20 MFD 25 VOLT CONDENSER
C25	3 MMF CONDENSER
C26	MICA CONDENSER .003 MFD
M1	LOOP ANTENNA
M2	OSC. COIL 455 KC

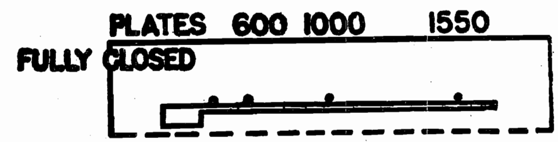
ITEM	DESCRIPTION
M3	IF TRANSFORMER 455 KC
M4	IF TRANSFORMER 455 KC
M5	50,000 OHM TONE CONTROL
M6	PHONO JACK
M7	F. M. JACK
M8	EXT. AMP. JACK
M9	500,000 OHM VOLUME CONTROL
M10	200 OHM 60 MA CHOKE
M11	POWER TRANSFORMER
M12	TONE SWITCH
M13	1.5AMP. FUSE
M14	MOTOR SWITCH
M15	RECORDING MOTOR
M16	5000 OHM OUTPUT TRANSFORMER
M17	EXT. SPEAKER JACK
M18	SPEAKER (3.2 VOICE COIL)
M19	MIC. JACK
M20	RECORDER SWITCH
M21	RECORDING HEAD PLUG
M22	N.E. 51 NEON LIGHT
M23	RADIO PHONO. MIC. SWITCH
M24	RECORD-LISTEN SWITCH
M25	30-40 KC OSC COIL



PURE OIL CO., U.S.A.

MODEL 515





DIAL PLATE MARKINGS

Alignment: No attempt should be made to realign this receiver until it has been determined that a poor tube, or some local condition is not responsible for faulty reception. An output meter may be clipped directly across the voice coil lugs.

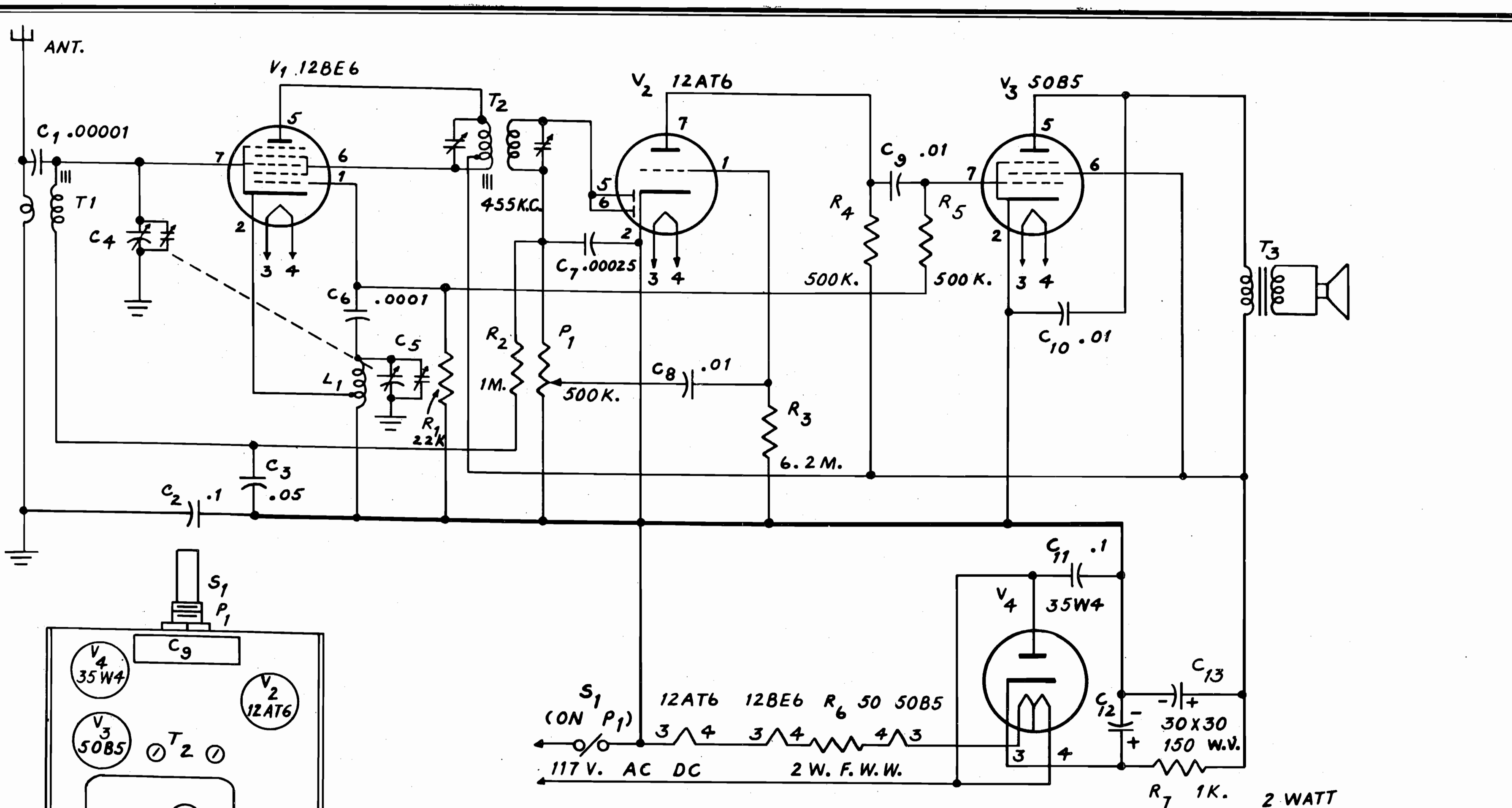
The Signal Generator may be connected through a 0.01 mf capacitor (used as dummy antenna) to the lug on RF section (B) of tuning capacitor. Connect ground clip of generator directly to chassis. Align the I. F. trimmers to 455 kc, using least possible input from Signal Generator to avoid developing A.V.C. voltage which would make the tuning adjustments very broad.

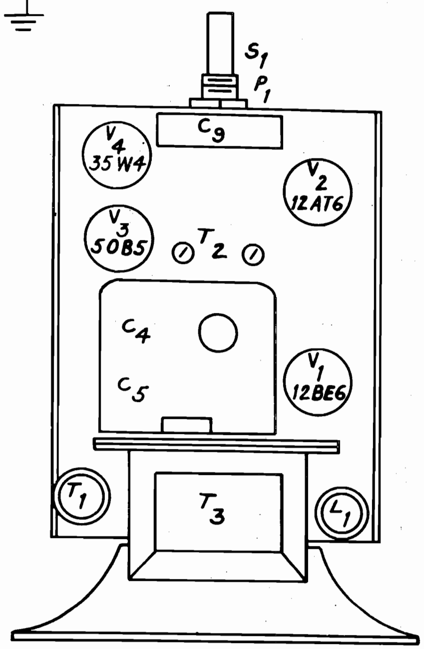
Range: Model G-515 covers the broadcast band from 540 to 1620 kilocycles. Since the scale is calibrated 54 to 160, the actual frequency of the station received is obtained by adding a zero to the dial calibration.

To align RF trimmers remove the 0.01 mf capacitor and connect the Signal Generator leads or two or three turns of heavy wire, forming a self-supporting loop of about 7 or 8 inches diameter, placed about a foot away from the receiver's loop antenna. Again, use the least possible input from the Signal Generator. With the tuning capacitor plates completely out of mesh, and pointer at extreme right end of travel, adjust the oscillator trimmer (A) (on front section of tuning capacitor) to 1700 kc. Readjust both Signal Generator and tuning capacitor to 1550 kc and adjust the RF trimmer (B) (on rear section) for maximum response.. With tuning capacitor plates fully meshed, the receiver should tune to 532 kc; however, no adjustment is required at this point. For checking purposes, four fine marks are engraved on the dial plate. These represent, in order, the pointer position with capacitor plates fully meshed, and the pointer settings for 600, 1000 and 1550 kc.

MODELS 508, 900

RADIO DEVELOPMENT & RESEARCH CORP.





CHASSIS LAYOUT

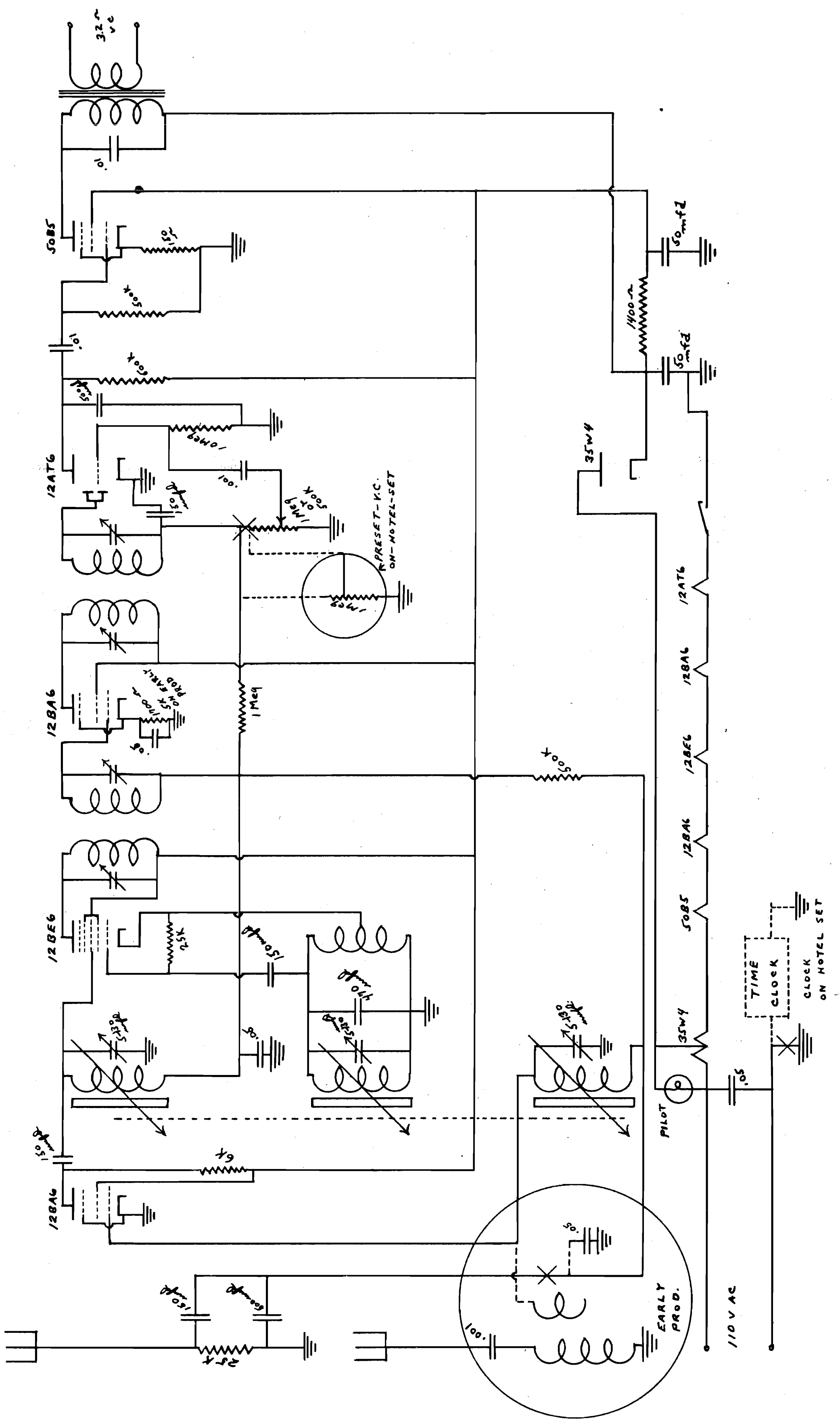
DATE:- 1-12-48

R.D.R. PART NO.	SYMBOL	CAP.	RATING VOLT.	RES.	WATT.	ITEM
10011	C1	00001				CERAMIC COND.
10012	C2 C11	0.1	400			PAPER "
10013	C3	0.05	200			" "
10014	C4 C5	420 MMF. ANT.SECTION 162 " OSC. "				DUAL TUNING CONDENSER
10015	C6	.0001	500			MICA COND.
10016	C7	.00025	500			" "
10017	C8 C9 C10	0.01	400			PAPER "
10018	C12 C13	30 X 30	150 W.V. 225 V.P.			DUAL ELEC.COND.
10019	R1			22 K.	1/2	CARBON RESISTOR
10020	R2			1 M.	"	" "
10021	R3			6.2 M.	"	" "
10022	R4 R5			500K.	"	" "
10023	R6			50	2	FLEX.WIRE WOUND
10024	R7			1 K.	"	CARBON RESISTOR
10025A	P1 (MODEL 508)			500 K.AUDIO		POTENTIOMETER
10025B	P1 (MODEL 900)			"	"	"
10026	T1 (MFR'S SPECIAL)					ANTENNA COIL
10027	T2 (MFR'S SPECIAL)					I.F.TRANSF.
10028	T3 PRI 2000 OHMS			SEC.3		OUTPUT TRANSF.
10029	L1 (MFR'S SPECIAL)					OSCILLATOR COIL

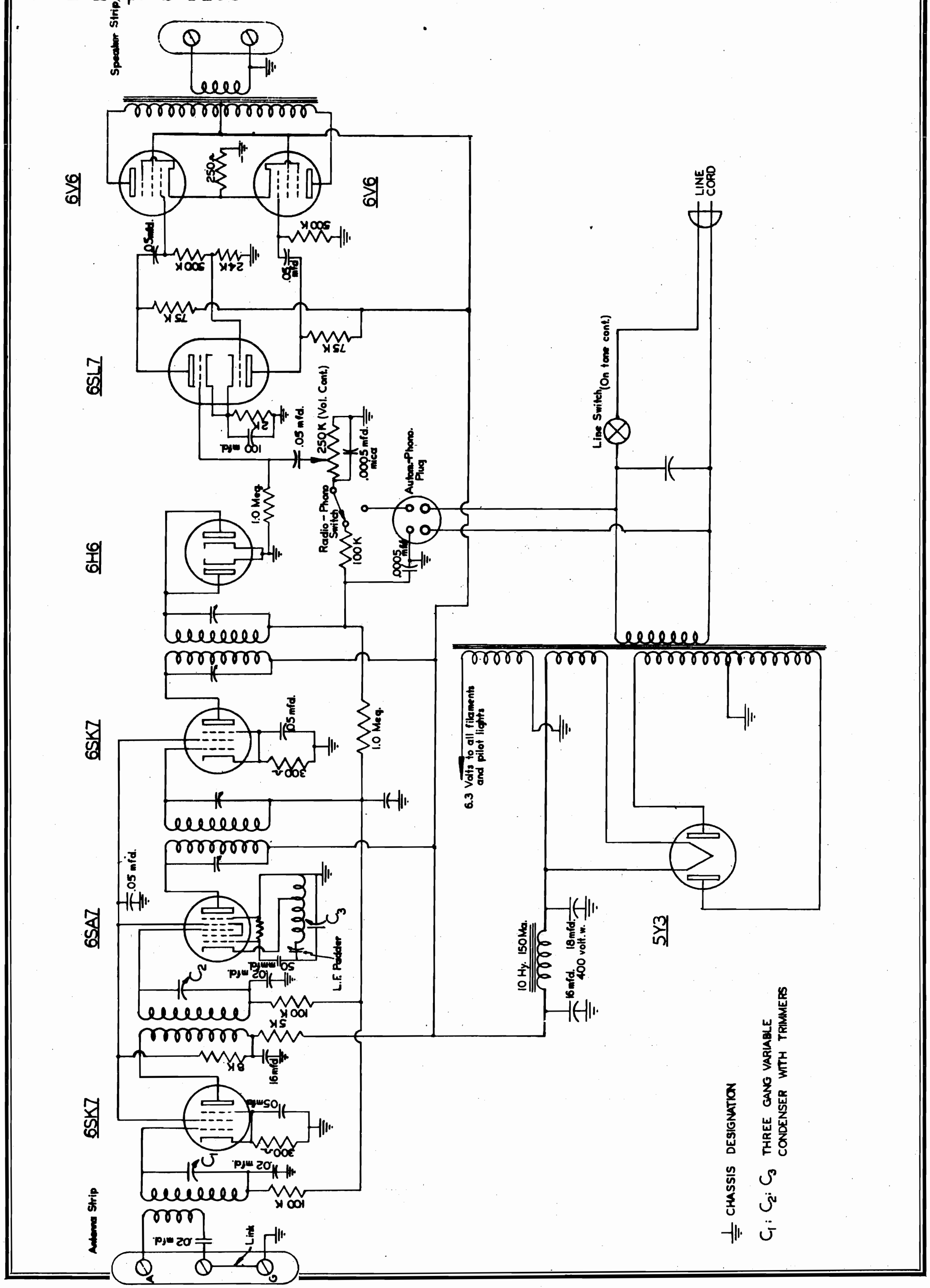
R.D.R. PART NO.	SYMBOL	DESCRIPTION	ITEM
10030	S1	S.P.S.T.	SWITCH
10031A	(MODEL 508)	4 IN.RD.BASKET	3 OHM V.C.SPEAKER
10031B	(MODEL 900)	" SQ. "	" " "
10032			LINE CORD
10033			ANTENNA HANK
10034			MOUNTING BUSHING
10035		TUNING CALIBRATION	DECALCOMANIA
10036			TUNING KNOB
10037			STAND
10038	MODEL 508 KEG RADIO ONLY		GLASSES
10039			VOLUME KNOB
10040			SPEAKER GRILL
10041			LAMP SHADE
10042	MODEL 900 KEG LAMP RADIO ONLY		LAMP SOCKET
10043			VOLUME KNOB
10044			BASE
10045			CARDBOARD COVER

RADIO & TELEV. PRODUCTS CO.

MODEL 47-601

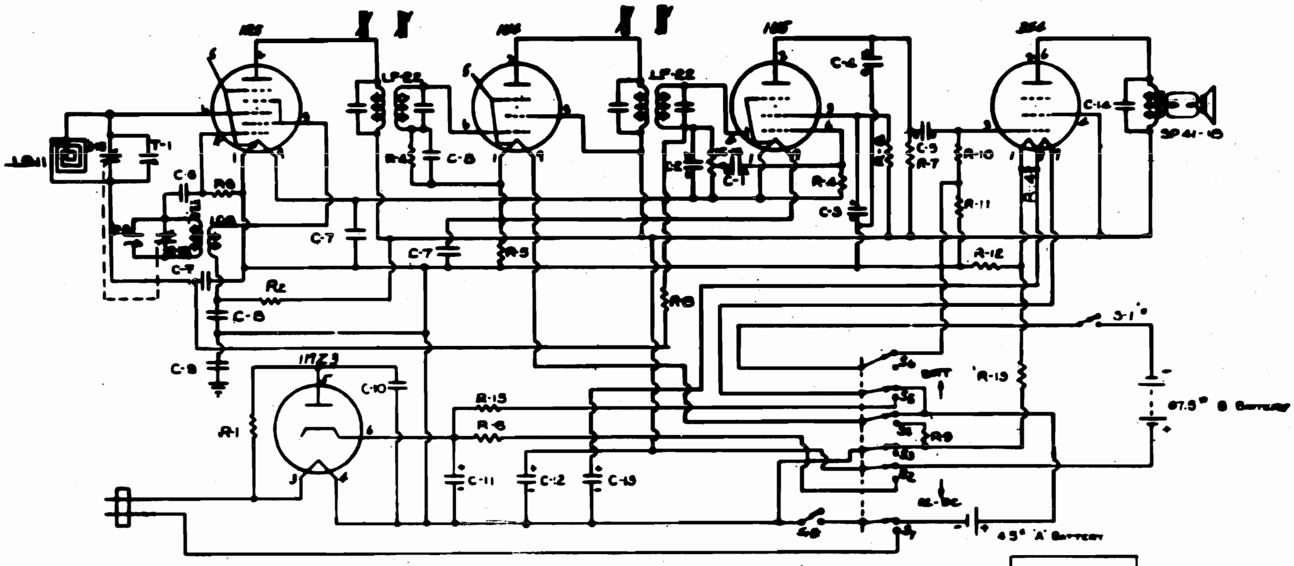


MODEL A-46 Series TAFFET RADIO & TELEV. CO.



TELE-TONE RADIO CORP.

MODEL 185, CHASSIS AH

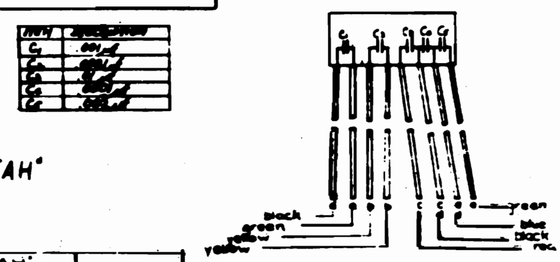


BS₁ · DPST SW. ON VOLUME CONTROL

POWER SUPPLY

105-125 VDC
50-60 CYCLES AC

ALIGNMENT DATA
IF 455 KC
PEAK T_2 1620 KC
T_1 1600 KC
FREQ RANGE · 1620-532.5 KC



CHASSIS SERIES 'AH'

CHASSIS SERIES 'AH'		
ITEM	DESCRIPTION	PART NO.
C1 C2, C3, C4, C5	Ceramic Condenser Block	CC-3-1
C-6	.000047 MF Mica Condenser	CM 470-1
C-7	.05 MF 150 V Paper	CP-503-2
C-8	.01 MF 150 V. Paper	CP-103-2
C-9	.1 MF 200 V Paper	CP-104-1
C-10	.05 MF 400 V. Paper	CP-503-1
C-11	Elect Cond 40 MF 150 V	CE 17V
C-12	40 MF 150 V	
C-13	200 MF 10 V	
C-14	.005 MF 400 V Paper	CP-502-2
C-15, C16	Variable Condenser	CV-15
T-1, T-2	Trimmers On Variable	
R-1	18Ω ½ W ±20% Carbon Res	RC-180-1
R-2	15,000Ω ½ W. ±20% " "	RC-153-1
R-3	100,000Ω ½ W ±20% " "	RC-104-1
R-4	10 Meg ½ W ±20% " "	RC-106-1
R-5	2200Ω ½ W. ±10% " "	RC-222-2
R-6	6800Ω 1 W ±10% " "	RC 682-5
R-7	1 Meg ½ W. ±20% " "	RC-105-1
R-8	3.3 Meg ½ W ±20% " "	RC-335-1
R-9	39Ω ½ W. ±10% " "	RC-390-2
R-10	2.2 Meg ½ W. ±20% " "	RC-225-1
R-11	680Ω ½ W ±10% " "	RC-681-2
R-12	1500Ω ½ W ±10% " "	RC-152-2
R-13	27Ω ½ W ±5% " "	RC 270-3
R-14	390Ω ½ W ±10% " "	RC-391-2
R-15	Candohm Res 2550Ω ±5%	RP-5
VC-16	Vol. Control 1 Meg with DPST switch	VC-16
SP-41-18	4" Spkr 1 oz. magnet with O.T.	SP-41-18
LF-22	I.F. Transformer	LF-22
LP-11	Antenna Loop	LP-11
LC-8	Osc. Coil	LC-8
S-2,3,4,5,6,7	Battery Switch 6 Pole DT	SW-H

Late series have C removed from ceramic condenser block, paper condenser of same paper value used.

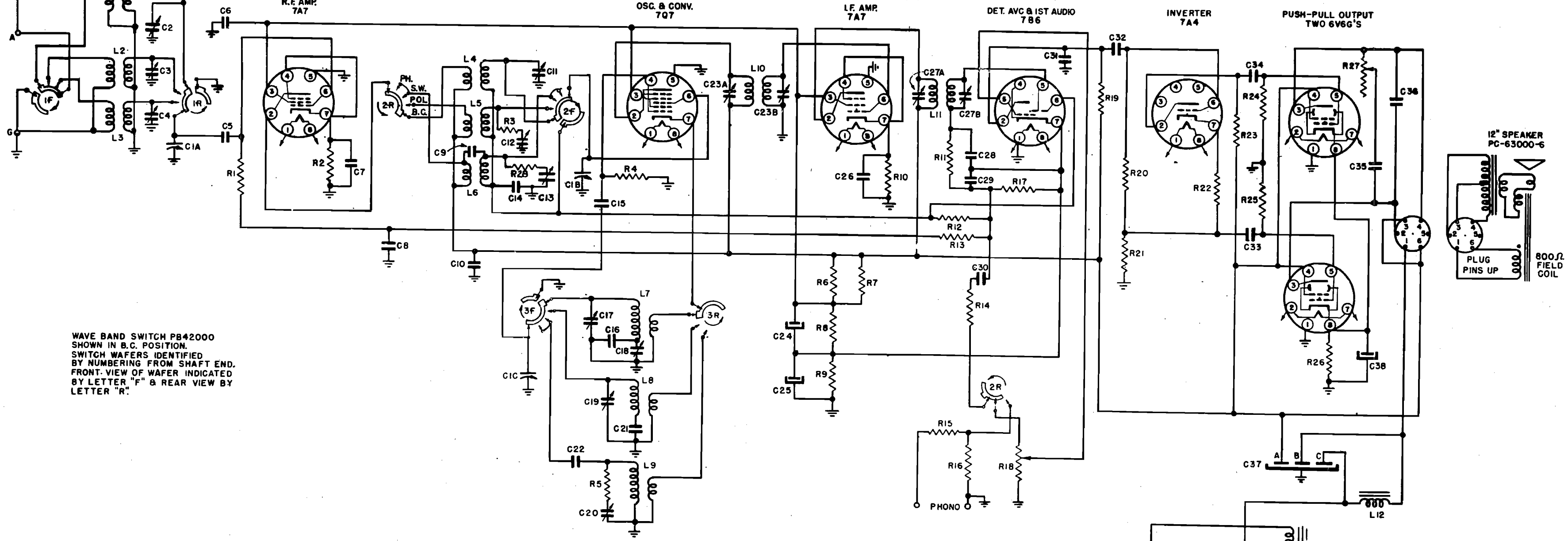
MODEL 8-16

U.S. TELEVISION MFG. CORP.

UST SUPERHETERODYNE MODEL 8-16

INTERMEDIATE FREQUENCY 455 K.C.

BOTTOM VIEWS OF ALL SOCKET CONNECTIONS



C1ABC	VARIABLE CONDENSER	PB-40400
C2	B.C. ANT. TRIMMER	PA-4374-1
C3	POLICE ANT. TRIMMER	PA-4374-1
C4	S.W. ANT. TRIMMER	PA-4374-1
C5	240 MMF. MICA	MC60G-241
C6	.05 MFD. 400V.	PC40GL-503
C7	.05 MFD. 200V.	PC40GK-503
C8	.05 MFD. 200V.	PC40GK-503
C9	5 MMF. MICA	MC60F-050
C10	.05 MFD. 400V.	PC40GL-503
C11	B.C. DET. TRIMMER	PA-4374-2
C12	POLICE DET. TRIMMER	PA-4374-2
C13	S.W. DET. TRIMMER	PA-4374-2
C14	.05 MFD. 200V.	PC40GK-503
C15	51 MMF. MICA	MC60F-510
C16	100 MMF. MICA	MC60G-101
C17	B.C. OSC. TRIMMER	PA-4370
C18	B.C. OSC. PADDER	PA-4370
C19	POLICE OSC. TRIMMER	PA-4375-1
C20	S.W. OSC. TRIMMER	PA-4375-1
C21	1130 MMF. MICA	PA-4387-1
C22	2925 MMF. MICA	PA-4387-2
C23A & B	NO. 1 I.F. TRIMMER	PA-4370-1
C24	4 MFD. 450V.	PA-4300-3
C25	50 MFD. 25V. ELECT.	PA-4386-2
C26	.05 MFD. 200V.	PC40GK-503
C27	NO.2 I.F. TRIMMER	PA-4370-2
C28	100 MMF. MICA	MC60G-101
C29	100 MMF. MICA	MC60G-101
C30	.02 MFD. 200V.	PC40GK-203
C31	100 MMF. MICA	MC60G-101
C32	.05 MFD. 400V.	PC40GL-503
C33	.05 MFD. 400V.	PC40GL-503
C34	.05 MFD. 400V.	PC40GL-503
C35	.02 MFD. 600V.	PC40GM-203
C36	.002 MFD. 600V.	PC40GM-202
C37A	15 MFD. 450V. ELECT.	PA4311-1
C37B	10 MFD. 450V. ELECT.	PA4311-1
C37C	15 MFD. 450V. ELECT.	PA4311-1
C38	20 MFD. 25 V. ELECT.	PA-4386-3

R1	1 MEGOHM .5W.	R1S-105
R2	820 Ω .5W.	R1S-821
R3	330 Ω .5W.	R1S-331
R4	20,000 Ω .5W.	R1G-203
R5	30 Ω .5W.	R1G-300
R6	30,000 Ω 2W.	R4G-303
R7	30,000 Ω 2W.	R4G-303
R8	22,000 Ω 1W.	R2S-223
R9	300 Ω .5W.	R1G-301
R10	620 Ω .5W.	R1G-621
R11	18,000 Ω .5W.	R1S-183
R12	3.3 MEGOHM .5W.	R1S-335
R13	3.3 MEGOHM .5W.	R1S-335
R14	330,000 Ω .5W.	R1S-334
R15	1 MEGOHM .5W.	R1S-105
R16	68,000 Ω .5W.	R1S-683
R17	180,000 Ω .5W.	R1S-184
R18	2 MEGOHM VOL. CONT.	PA-4403
R19	270,000 Ω .5W.	R1S-274
R20	470,000 Ω .5W.	R1S-474
R21	22,000 Ω .5W.	R1S-223
R22	2,700 Ω .5W.	R1S-272
R23	22,000 Ω .5W.	R1S-223
R24	47,000 Ω .5W.	R1S-473
R25	47,000 Ω .5W.	R1S-473
R26	220 Ω 2W.	R4G-221
R27	.25 MEGOHM TONE CONTROL & SW.	PA-4402
R28	15 Ω .5W	R1S-150

L1	B.C. ANT. COIL	AB-42230
L2	POL. ANT. COIL	AB-42233
L3	S.W. ANT. COIL	AB-42236
L4	B.C. DET. COIL	AB-42231
L5	POL. DET. COIL	AB-42234
L6	S.W. DET. COIL	AB-42237
L7	B.C. OSC. COIL	AB-42232
L8	POL. OSC. COIL	AB-42235
L9	S.W. OSC. COIL	AB-42238
L10	NO.1 I.F. COIL	AB-42216-1
L11	NO.2 I.F. COIL	AB-42216-2
L12	B+ FILTER CHOKE	PA-7353

Bendix Par 80

This model appears on *pages 18-1 through 18-5 of Rider's Volume XVIII.* On late production model PAR 80 receivers, a rubber grommet has been added over the battery switch lead at the metal shield to prevent eventual wear and shorting of the lead. If servicing of this receiver indicates excessive wear of the battery switch lead, a small standard grommet of suitable size may be added at point where the lead enters the switch shield.

Bendix 110, 110W, 111, 111W, 112, 114, and 115

These models appear on *pages 18-6 through 18-8 of Rider's Volume XVIII.* On recent models of this series a circuit change has been made which adds a coupling plate, stock number AC0C00, between the first audio tube, 12SQ7, and the output tube, 50L6, in lieu of the following components used on earlier receivers:

Plate-load resistor, R5, stock no. RC1H54; grid resistor, R7, stock no. RC1H58; Plate r-f bypass capacitor, C8 stock CP4T20.

These parts are eliminated when coupling plate, stock no. AC0C00 is used, although installation is otherwise interchangeable. To use the coupling plate may cause a slight increase in the plate voltage of the 12SQ7 tube, but no adverse effect is made on the receiver. The resistance measured from the grid of the 50L6 tube to common B- is approximately 450K, while the resistance measured from the plate of the 12SQ7 tube to common B- will give a reading which increases approximately 10 megohms in magnitude, caused by the charging of the filter capacitors since the receivers have no d-c return to ground.

Bendix 626

This model appears on *pages 16-1 through 16-3 of Rider's Volume XVI.* Either of two coils may be found in this model. In some, an r-f coil making use of a small capacitor (3.3 $\mu\mu f$) between the start of the secondary winding and the finish of the primary winding is used, while in others an r-f coil with an added tertiary winding is used in lieu of the capacitor. These coils, when properly used, are interchangeable, and in the future only r-f coils with the tertiary winding will be provided as replacements.

If, in the receiver to be repaired, the coil requiring the 3.3-$\mu\mu f$ capacitor is replaced with the other type, eliminate the 3.3-$\mu\mu f$ capacitor from the circuit.

Bendix 646A

This model appears on *pages 15-5 and 15-6 of Rider's Volume XV.* The change involves a revision in the replacement parts list as follows:

In the cabinet components section of the parts list on *page 15-6,* substitute the stock number HZ0S04 for the existing stock number HZ0L01 which is incorrect. The nomenclature and identification of the component part is correct as listed.

Crosley 9-101

This model appears on *pages 18-1 through 18-3 of Rider's Volume XVIII.* Recently it was discovered that in some areas, the oscillator coil (Part No. 142975) developed trouble due to corrosive tape. To avoid possible complaints in the field, it is recommended that the coil be replaced with a new coil (Part No. 145105).

Bendix 847B

This model appears on *pages 17-7 through 17-14 of Rider's Volume XVII.* The replacement parts list on *page 17-13* should be revised as follows:

The r-f oscillator chassis assembly bearing the stock number AR0B00 is no longer stocked as a complete replacement assembly. This chassis can be repaired satisfactorily in the field and the necessary component parts may be obtained as separate stock items, when desired.

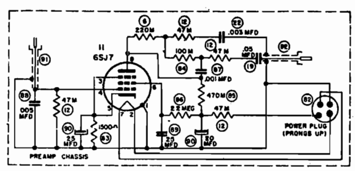
Crosley 9-201, 9-202M, 9-203B

These models appear on *pages 18-14 through 18-19 of Rider's Volume XVIII.* The part number of item 83 (volume control) was shown on *page 18-19* as 39368-14. This number should be 39368-18. To use the No. 39368-18 control on these models, it will be necessary also to use a No. 39-370-2 plug-in type knurled shaft.

Farnsworth GK-111, GK-112, GK-114, GK-115

These models are the same as model GK-100, appearing on *pages 17-3 through 17-10 of Rider's Volume XVII,* except that they employ the P56MP record changer instead of the P56.

The P56MP record changer is a reluctance type pickup and, therefore, additional amplification in the phono circuit is necessary. A 6SJ7 tube has been added to the phono circuit, as shown in the accompanying diagram.



The circuit of the 6SJ7 tube that was added so that a reluctance pickup could be used in Farnsworth Models GK-111,-112, -114,-115.

The following parts should be added to the parts list:

Part No.	*Description*
78057	Volume control, 3 megohms
94204	Power transformer
94239	Output transformer
13772	Speaker
38696	Loop antenna for GK-111, GK-112
38859	Loop antenna for GK-114
26032	Loop antenna trimmer, GK-114
22169	Pickup cable
22170	Output cable
22171	Power adapter cable
25431	Capacitor, electrolytic, 20 μf, 450 v, 25 μf, 25 v
25432	Capacitor, 0.001 μf, 200 v
25433	Capacitor, 0.25 μf, 600 v
H-273	Cabinet for GK-114
H-291	Cabinet for GK-111 Mah.
H-292-1	Cabinet for GK-112 C
H-292-2	Cabinet for GK-112 Bl.

Federal 1027, 1035

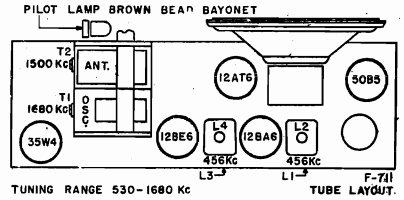
Basically, these models are the same both in chassis and cabinet as model 1025 which appears on *pages 16-1 through 16-4 of Rider's Volume XVI.* However, differences exist in the exterior cabinet finish and color of these models.

Federal 1034

This model is essentially the same as model 1024 which appears on *pages 16-1 through 16-4 of Rider's Volume XVI.* The only modification has been in the cabinet

Fada 711, 740

These models appear on *pages 17-15, 17-20, and 17-24 of Rider's Volume XVII.* The socket layout on *page 17-15* applies only to model 740. The socket layout for model 711 is shown herewith. The schematic and parts list refer to both models.



Socket layout for the Fada model 711.

Firestone R3157A

This model is the same as Model S7427-2 appearing on *pages 12-19,20, 12-21, 12-6, and C.S. 12-4 and C.S. 12-5 of Rider's Volume XII.*

General Electric P4

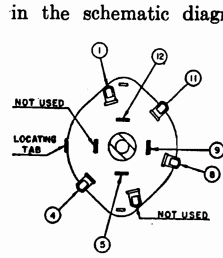
This model appears on *RCD. CH. Pages 17-5 through 17-9 of Rider's Volume XVII.* The sound of a metallic click and audible thump through the receiver speaker is usually traced to the operation of the velocity trip mechanism. This is caused by too much tension of the Clutch Tension Spring (reference 29 in Fig. 3 on *RCD. CH. Page 17-7*) binding the velocity trip lever. Adjustment may be made, reducing spring tension to prevent binding and still maintain normal operation.

In earlier production, a limited quantity of record changers employed a flat spring type clip fitted over the pickup arm pivot shaft. The clip was brought to bear upon the clutch tension spring, compressing the spring to the proper friction upon the velocity trip lever as was necessary for proper changer operation. To provide a more positive adjustment, later productions use a Clutch Spring Tension Collar, in lieu of the original clip, which makes a more convenient, accurate, and more permanent adjustment.

If extreme difficulty is experienced in proper adjustment of the earlier production changers, the spring clip may be replaced with the collar, Cat. No. RMX-080. A detailed view of the later version of record adjustment is shown in Fig. 6 on *RCD. CH. 17-8.*

GE 250

This model appears on *pages 15-32 through 15-36 of Rider's Volume XV.* The switch that is supplied under the number RSW-009 is of a different construction than the original flat-wafer switch. The accompanying figure shows the numbers which correspond to those in the schematic diagram.



Construction of the wafer switch replacement for the General Electric 250.

GE 41, 42, 43

These models appear on *pages 17-1,2 through 17-15 of Rider's Volume XVII.* The following changes should be made. Add Cat. No. REF-003, line fuse F201, 3AG, 5 amp., 250 volts, to the parts list and add this to the schematic diagram of the Special Power Unit on *page 17-3.* The fuse should be placed in series with the power transformer primary and the power cord. Besides the addition of a fuse, the safety will be further increased by placing a sheet of asbestos underneath the power unit to cover the ventilation slots. Thus, even in the case of overload, the hot tar of the over-heated transformer is prevented from dropping on the floor.

Add Cat. No. RSV-001, Switch—power ON-OFF switch to the parts list. Replacement is readily made by merely bending the mounting taps.

To adjust for minimum hum level, turn the volume control until the audio output is zero and vary resistor R201 (which is parallel to the filaments and center-tapped to the chassis, forming an effective hum balancing circuit).

General Electric 41, 42, 43, 44, 45

These models appear on *pages 17-1,2 through 17-15 of Rider's Volume XVII.* A sliding type switch has been added in series with R67 (8200 ohms) connecting the resistor to the phonograph pickup input jack, J3. This switch is on the receiver chassis back apron with its respective label indicating High Fidelity and Normal, the open and closed positions, respectively.

In the replacement parts list under Cat. No. RSS-003, add the item: High Fidelity-Normal switch.

General Electric 50

This model will be found on *pages 15-1 through 15-4 of Rider's Volume XV.* This change covers a correction to the original parts list in the model 50 where Cat. No. RHS-001 was changed to RMX-006 for a tuning assembly and spacer.

A further correction is necessary in the item description since only the tuning shaft and drive pulley (assembled) is supplied under RMX-006. The spacer is the tuning shaft bearing, and is catalogued as a separate item under RHJ-001. The original parts listing of the drive pulley under this number has been deleted.

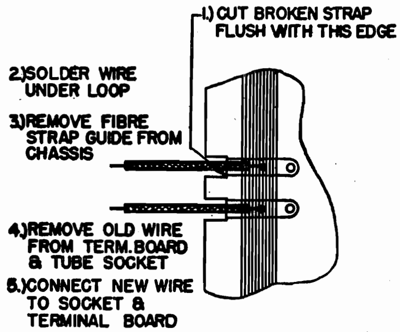
GE 140

This model appears on *pages 17-21 through 17-23 of Rider's Volume XVII.* The following changes should be made in the parts list: From Cat. No. RAD-027 remove the statement "(with loop connecting strips only)." Change Cat. No. RCC-075 to read RCC-080. Delete Cat. Nos. RDK-098, RHC-008, and RMX-103. Add the following parts.

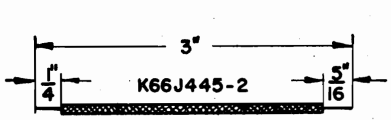
RDK-106	Knob—door catch knob
RCE-002	Strap—loop contact strap
RHE-002	Eyelets—spacer eyelets for escutcheon screws RHS-016
RHE-003	Eyelet—used for loop contact strap
RHR-002	Rivets—door hinge rivets (power cord access)
RHS-015	Screw—self tapping (used for cabinet door cover)
RHS-016	Screw—Phillips, flat-head, mounts bottom of escutcheon

The following procedure is recommended for repairing broken antenna loop connecting straps.

The broken straps should be cut back flush with the inside edge of the notch on the loop. The flexible wire is then used to make connections from the loop to the inside of the receiver. Consult the accompanying diagrams for loop connecting details and wire specifications. Carefully lift the section of the loop to allow connecting the specified pieces of wire and solder



WIRE DETAILS



2 REQUIRED PER SET

Above, the loop connecting details of the General Electric Model 140. The wire details for the antenna loop connections are shown in the lower figure.

wires to remainder of loose straps. Remove the fibre strap guide which originally insulated the loop straps within the cabinet. Remove original wire leads and pieces of loop strap connected inside the cabinet to the chassis terminal strip and pin 6 of the 1R5 oscillator-converter tube socket. Solder the new leads from the antenna loop directly to the terminal board and tube socket. Make certain that the inside of the loop is connected to pin 6 of the 1R5 tube socket. The following procedure is recommended to replace a speaker in this model.

1—Unsolder leads on speaker, using small tip iron.
2—Unsolder 90-μf capacitor (C14) at terminal strip.
3—Without unsoldering, remove dual 40-μf capacitor (C20) from mounting clip.
4—Using long screwdriver (8 inches or longer) loosen screws holding speaker to chassis.
5—Remove nuts holding speaker to front panel.
6—Lift up left end of resistor mounting plate and then lift out speaker.

If the antenna straps which interconnect the antenna in the receiver cover with the radio chassis circuit break, the following replacement procedure is recommended:

1—Bend up insulating material covering set end of antenna strips by inserting the tip of a long-nose pliers and twisting gently so as not to tear material.
2—Unsolder wires from loop strips in receiver.
3—Remove screws holding door cover.
4—Lift loop at point midway between hinges to expose strip rivets and unsolder loop from loop strips.
5—Remove rivet or rivets as needed, taking care not to damage loop or loop back.
6—Replace broken straps by new members, Cat. No. RCE-002, and rivet it in place with eyelets, Cat. No. RHE-003.

In order to replace the rectifier disc assembly, SR, proceed as follows:

1—Remove two mounting screws from the power switch, S1 (door switch).
2—Dress power switch away from mounting plate, providing more access to underside of top chassis deck.
3—Unsolder leads to rectifier disc assembly.
4—Push aside components underneath rectifier assembly mounting screw until screw can be loosened.

General Electric 210, 211, 212

These models appear on *pages 18-21 through 18-25 of Rider's Volume XVIII.* Change the third column (Signal Input Point) of the alignment charts on *page 18-23* to read: 12BE6 grid (pin 7 of V2). See note 7.

The parts list on *page 18-25* should be changed as follows: Change catalogue number UOP-557 to UOP-558 for Speaker 5¼-inch PM. Add the reference symbol R32 to Cat. No. URD-141—Resistor—6.8 meg., ½w., carbon.

The following changes have been made in the schematic diagram on *page 18-21.* Where capacitor C38 is shown terminating at ground on this schematic, later model receivers have this ground connection removed and the capacitor is terminated at the junction of the antenna input and capacitor C14. Capacitor C36 should be added and connected from the junction point of R29, pilot lamp I1, and pin 4 of V7 to ground. Resistor R32, which has been added to replacement parts list above, is connected from the junction of R8 and C4 (AVC filter) to the cathode, pin 2, of output tube V6.

This resistor, R32, has been added to increase the converter stage gain when operating in the A-M position because of a change in performance characteristics relative to grid cut-off of the 12BE6 tube.

General Electric 230 Kaiser-Frazer

This model appears on *pages 18-26 through 18-28 of Rider's Volume XVIII.* The change involves a substitution of catalog numbers in the replacement parts list as follows:

Cat. No. URE-035 and URF-055 are catalogued for carbon-type resistors. These numbers are to be replaced for numbers specifying wirewound resistors, RRW-037 becoming the Cat. No. for R13 and RRW-036 the number for R18.

General Electric 502

This model appears on *pages 17-4 through 17-8 and pages 17-39,40 through 17-47 of Rider's Volume XVII.* The changes involve a schematic correcton and a correction in the value of a component in the replacement parts list.

The schematic diagram which shows an open circuit in the screen grids of the 6V6 tubes, V10 and V11, should be corrected to show the screen grids connected to the 260-volt B-plus line.

In the listing of Cat. No. RCW-1028, the capacitor value was mistakenly given as 22-μμf. The capacitors listed are actually 100-μμf and RCW-1028 should be changed to read 100-μμf.

Hallicrafters SX-42

This model appears on *pages 17-6 through 17-13 of Rider's Volume XVII.* The following service hints apply to the S-Meter operation.

SYMPTOM NO. 1:
Meter fails to zero on AM.

ANALYSIS:
Assuming that all connections and other circuits, including AVC, are normal . . .
1) The line voltage is low, or
2) The first RF tube is weak

SYMPTOM NO. 2:
Zero adjustment appears too critical. Does not hold.

ANALYSIS:
The leads to the outside terminals of the "Zero Set" potentiometer should be disconnected, reversed, and reconnected.

SYMPTOM NO. 3:
Meter fails to zero on FM

ANALYSIS:
1) Adjust meter indicator mechanically with zero set on the meter.
2) Replace 7A4 tube
3) Replace R-68 with lower resistance if indicator remains on right side of FM zero
4) Replace R-68 with higher resistance if indicator remains on left side of FM zero

REMARKS:
The internal resistance of the meters is not specified, and depends on the supplier. The resistance ranges from 12 to 50 ohms.
The meter has a range of 5 ma. on a linear scale. The FM zero is arbitrarily calibrated at 1.4 ma.
An arbitrary figure of 60 m.v. to the antenna terminal was used for S-9 on the 20 meter band. Each S-unit represents 6 db variation.
60 m.v. to the antenna terminal of the receiver represents roughly a field strength of 15 m.v. per meter.

Hoffman C504, C514

These models are the same as model B504 appearing on *pages 17-1 and pages 17-3,4 through 17-7 of Rider's Volume XVII,* except for the following. Push-pull parallel 6K6 tubes are used in the output instead of push-pull 6V6 tubes. See Fig. 1.

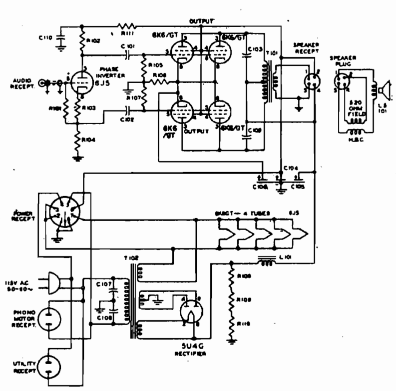


Fig. 1. Changes in the output stages of the Hoffman Models C504 and C514.

A resistance-capacitance filter (R-111 and C110) has been inserted in the B-plus line feeding the phase inverter stage in order to reduce the inherent hum level of the receiver to a satisfactory level. See Fig. 1.

An "entertainment panel" has been wired into the tuner chassis to provide microphone input, a speaker on-off switch, a pillow speaker plug, and an auxilliary phono input to be used either for television sound or wire recorder input. See Fig. 2.

On the recorder amplifier, the screen-dropping resistor (R11) has been changed from 0.1 megohm to 2.2 megohms and the cathode resistor (R2) changed from 2200

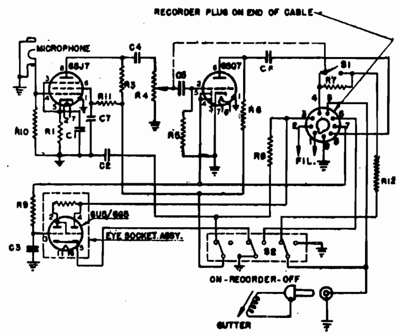


Fig. 2. Changes made to accomodate the "entertainment panel" of the Hoffman C504.

ohms to 4700 ohms. This change allows the screen current of the 6SJ7 to be self-regulating to eliminate variations in gain between various 6SJ7 tubes.

Several changes were made in the late production. A 270,000-ohm resistor was added across the phono input jack of the radio chassis. This resistor was on the record changer (960260-2) in the early production (Serial Nos. B-1001 to B-6000 and B-28,500 to B-30,000).

The location of the resistor may be checked by measuring the shunt resistance across the phono input jack of the radio chassis and across the phono output cable of the changer mechanism.

Hoffman C502 and C512, Chassis 113

These models are the same as Model B502, Chassis 113, appearing on *pages 17-1 to 17-6 of Rider's Volume XVII,* except for the following changes. Four 6K6-GT tubes are used in push-pull parallel in the output stage instead of the 6V6 tubes in push-pull.

An "entertainment panel" has been wired into the tuner chassis to provide microphone input, a speaker off-on switch, a pillow speaker plug, and an auxiliary phono input to be used either for television sound or wire recorder input. See Fig. 1.

A resistance-capacity filter R111 and C110, has been inserted in the B-plus line of the phase inverter stage in order to reduce the inherent hum level of the receiver, as shown in Fig. 2.

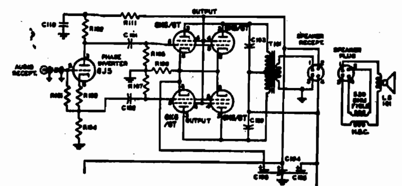


Fig. 2. The resistance-capacity filter in the Hoffman models C502 and C512.

The following changes should be made in the parts list:

Symbol	Description	Hoff. No.
C60	0.005 μf, 600 V, tubular, paper	4102
R16, R20, R50	100,000 ohms $\pm$ 20%, ½ watt	4511
R21, R48	47,000 ohms, $\pm$ 20%, ½ watt	4504
R49	10 megohms, $\pm$ 20%, ½ watt	4506
R27, R46	0.22 megohm, $\pm$ 20%, ½ watt	4500
R47, R51	0.47 megohm, $\pm$ 20%, ½ watt	4506
C110	10 μf, 450 V, electrolytic	4203
R111	10,000 ohms, $\pm$ 20%, ½ watt	4515

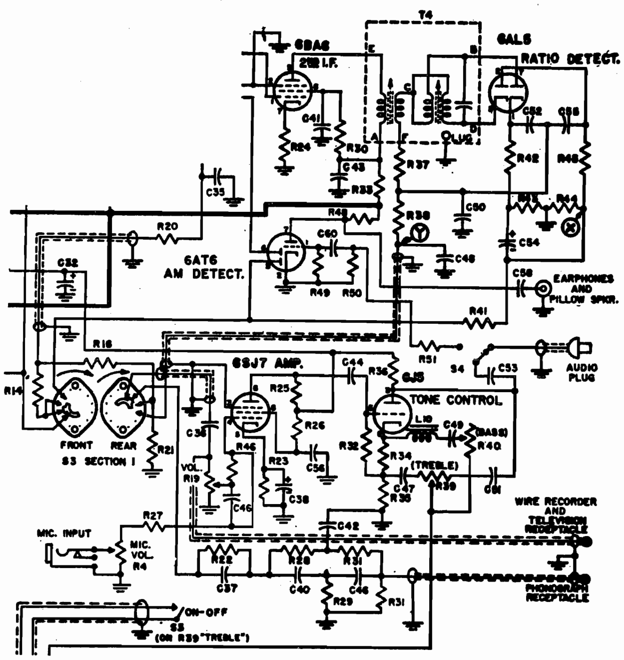


Fig. 1. The entertainment panel that is wired into the Hoffman models C502 and C512.

Majestic 5AK781

This model is the same as model 5AK731 found on *pages 17-3 and 17-4 of Rider's Volume XVII,* except for the following changes in the parts list.

Part No.	Description
S-1441	Dial cord assembly
S-1448	Output transformer
21-29	Aero record changer
115-49-1	Cabinet, (Aero cut out) Blonde, walnut, or mahogany
122-47	Escutcheon plate, metal
128-62	Knobs, tuning and volume
128-80	Knob, phono - radio
101-485	Screw, mounting chassis
106-124	Washer, mounting chassis

Majestic 7BK758

This model is the same as Model 7JK777R appearing on *pages 17-5 and 17-6 of Rider's Volume XVII,* except for the dial scale. The dial scale used is part no. 117-78.

Majestic 12FM782, Chassis 12C20E

This model is the same as Model 12FM778, Chassis 12B26E, appearing on *pages 17-27, 28 to 17-33 of Rider's Volume* XVII, except that it does not have push-buttons and indicator lights for "Records and "F.M."

The following additions should be made to the parts list.

Part #	Description
115-45-2	Cabinet—console combination
21-32	Changer, oak
22-43	Speaker, 12" including output transformer
20-27	A-m loop antenna (less cover)
122-20	Escutcheon glass (large)
122-44	Dial grill
128-37	Knob (vol-tuning-tone)
128-85	Knob (band switch)
128-46	Spring insert for above knob

Midwest 98

This model is the same as model RM-8, appearing on *pages 18-1 through 18-3 of Rider's Volume XVIII,* except that two pilot lamps have been added. Each #46 pilot lamp is in series with a 10-ohm resistor, and each series combination is in parallel with the other. One end of the parallel combination is connected to the 6.3-volt filament line and the other end is grounded.

Noblitt-Sparks 182TFM, Chassis RE-237

This model appears in *Rider's Volume XVII, pages 17-9,10 through 17-15.* At the start of production, the glass oscillator trimmer "14" was mounted to the bracket on the variable capacitor with a brass nut and had a locking nut to hold tension on the adjusting screw. When this locking nut was tightened down enough to prevent it from working loose while adjusting the trimmer, the tension on the screw was too great for production alignment. To correct this trouble, the locking nut was tightened down to give the proper tension and then soldered to the bracket to prevent it from working loose. This was a difficult solder operation, and the trimmer screw would still work loose after being run in and out a few times, due to a cutting action between the lock nut and the threads on the screw. To correct this trouble, the locking nut was removed and the bracket revised to use a piece of No. 14 music wire to apply tension to the adjusting screw. (See Fig. 1.) The trimmer is much more stable with the new arrangement

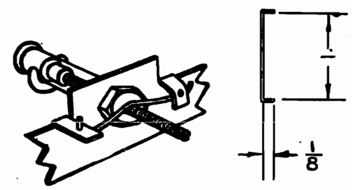


Fig. 1, left, shows the music wire spring applied to the adjusting screw.
Fig. 2, right, shows the music wire spring.

On some trimmers, the threads for the mounting nut did not go down far enough to allow the nut to tighten down against the bracket. A No. 12 lockwasher has been added under the mounting nut to assure a good tight contact between the trimmer and the bracket. If a set is found where the capacity of the oscillator trimmer changes or the trimmer is noisy, the following procedure is recommended:

See that the trimmer mounting to the bracket is tight. Since the trimmer glass is almost sure to break if an attempt is made to tighten the mounting nut after the opposite end of the trimmer has been soldered in place, it is suggested that the trimmer be soldered to the back side of the bracket before attempting to tighten the nut (use care in soldering, apply heat from soldering iron to the bracket to prevent breaking trimmer glass).

Remove the locking nut and replace it with the music wire spring, part number A21902, Fig. 3, by soldering the two metal lugs, part number A21889, Fig. 2 on the present bracket, as shown in Fig. 1.

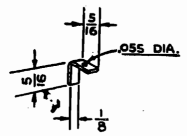


Fig. 3. Two lugs of this type are used as shown in Fig. 1 above.

AM-IF Alignment

Two peaks may be obtained with the 455 i-f slugs; one with the slug tuned almost all the way in and another with the slug tuned almost all the way out. When such is the case, the peak with the slug tuned out should be used.

Noisy F-M Reception

If the set is noisy on f.m., check the six ground leads from the variable capacitor to the chassis to make sure none of them are broken. One broken ground lead will not only make the set noisy, but can also effect the alignment of the set.

Ceramic Capacitors

Care must be taken in placement of ceramic capacitors to prevent shorts which would occur if any part of the capacitor touched other metal parts.

FADING . . . If fading occurs, check the shielded audio leads. One lead should be connected from the center lug of the volume control to the audio coupling capacitor on the stand-off insulator. The other lead should be connected from the right-hand terminal of the control to the band-change switch. If these two leads are reversed, the AVC will be ineffective.

ANTENNA . . . On some of the first sets produced, the primary and secondary windings of the antenna-coupling transformers T1, were shorted together, causing the antenna terminals on the back of the set to be grounded to the chassis. This should be carefully checked before connecting an external antenna to the set, because one position of the a-c plug in the outlet will place 110 volts between the antenna and any grounded object. This would be a shock hazard, and if the antenna became grounded the r-f choke in the a-c leads in the set would burn out.

OSCILLATION . . . If oscillation is encountered, try dressing the yellow filament leads, in the i-f section of the receiver, down against the chassis and away from the tube sockets. Also, see that all grounded leads on the variable capacitor are soldered and not broken.

Some cases of regeneration in the FM i-f circuit have been encountered. This can be detected by a high discriminator voltage, and also a high avc voltage with no signal input. Replacing the 0.005-µf 2nd i-f cathode-bypass capacitor, C32, with a 0.002-µf 350-volt ceramic capacitor will correct this in most cases.

22-OHM RESISTOR BURNS . . . Some receivers have a ¼-watt 22-ohm fusing resistor in the B-plus circuit. If this resistor burns, replace it with a 1-watt resistor. CAUTION . . . First check the B-plus current to see that it does not exceed approximately 100 milliamperes. If the current is greater than this value, some other trouble exists in the receiver and this must be corrected in order to prevent damage to other parts in the receiver.

FLOATING R-F UNIT . . . On some sets the complete r-f assembly is mounted on rubber to prevent microphonics. When servicing these sets, be sure that the ground leads between the r-f assembly and the chassis are securely soldered.

INSULATING CONTROL SHAFTS . . . Some sets have been found with the flat metal washer under the insulating fibre washer on the tone control, volume control and band switch. This would be a shock hazard if a knob was left off the shaft and should be corrected by removing the metal washer and placing it on top of the fibre washer.

The following changes should be made on the schematic diagram:

1. A B- connection was added between R10 and L15.
2. A 220-ohm resistor, R15, has been added across the antenna terminals.
3. Antenna coil L4 has been relocated. In the original schematic it was in series with C1, and the series combination was shunted by C1A. The modification consists of placing C1 and C1A in shunt with each other, and placing L4 in series with this shunt combination and the top connection of L1, the point which is connected to the AM terminal of the selector switch.

The following changes should be made in the parts list:

1. R5 should be C20060-221 resistor, 220 ohms, ¼ watt
2. P.S. — A21709 parasitic suppressor should be added
3. C10 should be C20204-500 capacitor, 0.00005-µf., 500 V, ceramic
4. R8, 22-ohm fusing resistor should be 1 watt, C20103-220
5. A19328-4 grommet, rubber, Mtg., RF Assy.
6. A19138-3 eyelet spacer, Mtg., RF Assy.

Montgomery Ward 64WG-1050B, 1050D, 74WG-1050D

These models are the same as Model 64WG-1050A on *pages 15-75 to 15-77 of Rider's Volume XV,* except for the following changes. The 0.1-μf capacitor C-11, is connected between pin 1 of the 1R5 oscillator-detector tube and the common negative circuit instead of the chassis ground.

In the D models, a 1000-ohm resistor, R-13, is connected between pin 7 of the 3S4 output tube and the common negative circuit. The following should be added to the parts list.

Ref. No.	Part No.	Description
R-13	B84102	100 ohms, 0.05 watt, carbon

Montgomery Ward 64WG-1050C

This model is the same as Model 64WG-1050A on *pages 15-75 to 15-77 of Rider's Volume XV,* except for the following changes. The 1500-ohm resistor R-3 is now connected from the center tap of the filament of the 3S4 output tube to the common negative circuit, lug 4 on the changeover switch, instead of to the positive filament lead (pin 7) of the 1S5 oscillator-detector tube, lug 9 of the changeover switch.

A 100-ohm resistor R-12 has been connected between R-11 and the selenium rectifier.

Ref. No.	Part No.	Description
R-12	D84101	100 ohms, 2.0 watt, carbon

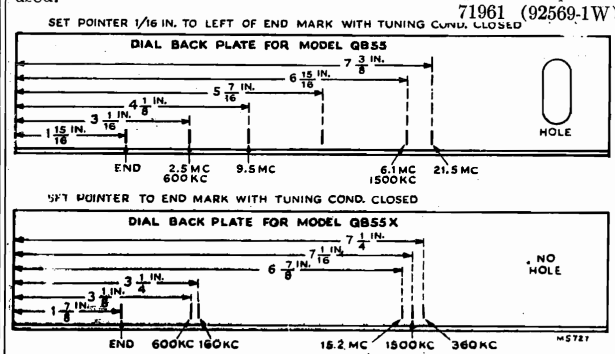
RCA QB55X Chassis RC-563-K

This model appears on *pages 17-9 through 17-11 of Rider's Volume XVII.* In some chassis two 2000-$\mu\mu f$ capacitors in parallel are used in place of the specified 3900-$\mu\mu f$ capacitor C7.

RCA QB55, QB55X

Model QB55, chassis RC-563A, appears *on pages 15-27 through 15-29 of Rider's Volume XV.* Model QB55X, chassis RC-563K, appears on *pages 17-9 through 17-11 of Rider's Volume XVII.* A viscoloid damper has been added to the stator plates of the oscillator section of the tuning capacitor to reduce microphonics on short wave reception.

Some of these sets have dial back plates without the score marks which may be used as a reference during alignment. The glass dial scale may be removed from the cabinet and used as a reference during alignment, or the check points indicated in the accompanying diagram may be used.



Check points to be used when aligning the RCA models QB55 and QB55X

RCA Q109 (RC-602), Q109X (RC-602A)

The following voltage - current table should be added to the service data appearing in *Rider's Manual Volume 18, pages RCA 18-8 through 18-10.*

Socket Voltages — Cathode Currents Local-Phono-Distant Switch in Distant Position.

Tube		Plate Volts	Screen Volts	Cathode Volts	Cathode Current
1	6SG7	137	112	0	13.1 ma
2	6SA7	260	103	0	12.2
3	6SK7	235	103	1.3	13.3
4	6SQ7	86*	......	0	0.4
5	6F6G	257	260	19.2	23.5
6	6F6G	257	260	19.2	23.5
7	6AT6	90*	......	0	0.7
8	6U5	260	21*	0	2.1
9	5Y3G	.....	......	355.	90.0

*Measured with Chanalyst or Voltohmyst

In LOCAL position the cathode circuit of the 6SG7, the RF amplifier, is opened ("A" Band only) and the voltages are correspondingly higher due to the absence of cathode current in this tube.

The stock number of the speaker cone should be changed to read:

No. 70972 Cone — Cone and voice coil assembly

RCA Q10, Q10A, Q10A2, Q10-2, Q10-3, Q110

This material appears in *Rider's Manual Volume 15, pages 15-5 through 15-7.* In the event that regeneration develops in the receiver, it may be due to a resonant condition due to electrolytic capacitor C21 being parallel with capacitor C11 (0.1-μf). Three methods have been used at the factory to correct this condition. These are:

(1) C11 may be 0.05-μf instead of 0.1-μf
(2) An additional 0.1-μf capacitor may be added in parallel with C11
(3) The RED and GREEN leads of the electrolytic capacitor (C21 and C22) may be interchanged
In some chassis, R1 may be 2.0 megohms instead of 2.2 megohms.

RCA 8V7, 67V1, 67AV1, 710V2

Model 8V7 appears on *pages 18-15 through 18-16 of Rider's Volume XVIII.* Models 67V1, 67AV1 appear on *pages 16-35 through 16-39 of Rider's Volume XVI.* Model 710V2 appears on *pages 18-55 through 18-60 of Rider's Volume XVIII.* An alternate Speaker (stamped 92569-1K) has been used as a substitute for the listed speaker (or speakers) in these models.

Add the following to the parts list: Under "Speaker Assemblies" add the following: 92569-1K.

70574 Cone—Cone and voice coil assembly.
31539 Plug—5 prong male plug for speaker.
37899 Transformer—Output transformer.
Replace complete speaker with Stock No. 71961 (92569-1W).

RCA 66X11, 66X12, 66X13

These models appear on *pages 17-29 through 17-30 of Rider's Volume XVII.* Some oscillator coils which were specified for the first production (RC-1046A, RC-1046, RC-1046B) of these models have been used on the second production (RC-1046C, RC-1046D, RC-1046E).

Some oscillator coils and associated coupling capacitors (C19) which were specified for the second production have been used on the first production.

If replacement is necessary — use the specified parts — the range of inductance adjustment may be insufficient if used otherwise.

RCA QU-62

This model appears on *pages 17-13,14 through 17-20 of Rider's Volume XVII.* In some instruments the speakers listed following have been used as alternates for the speakers listed in the parts list.

Speaker Assemblies 92520-1K

70574 Cone—cone and voice coil assembly
5118 Plug — 3 prong male plug for speaker
70686 Speaker—12" PM speaker complete with cone and voice coil less plug
(Used as alternate for PM speaker stamped 92469-4W)

Speaker Assemblies 92516-2K

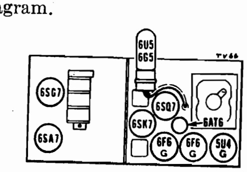
70574 Cone—cone and voice coil assembly
5119 Plug—3 contact female plug for speaker
31539 Plug — 5 prong male plug for speaker
70573 Speaker—12" EM speaker complete with cone and voice coil less output transformer and plugs
70688 Transformer—output transformer (T4)
(Used as alternate for EM speaker stamped 92566-3W)

The alternate speakers will not fit on the mounting bolts used with the original speakers. If a replacement which differs from the original equipment speaker becomes necessary, it is suggested that the mounting bolts be cut off and the replacement speaker mounted using rubber grommets, spacers, and wood screws.

The top view of this model is shown on *page 17-18 of Rider's Volume XVII.* The tuning capacitor has six sections—C1 and C2 Ant, C14 and C15 R.F., and C11 and C31 Osc. The tube and trimmer location view shows only C1, C14 and C31, which are used on the "A" and "B" bands only.

The following change should be made in the parts list on *page 17-20.* Replace Stock No. 31970 spring with Stock No. 31418 spring—Drive or indicator cord spring.

The instrument label used on some instruments is incorrect in showing tube locations. The r-f shelf assembly should be turned 90° clockwise. The correct tube locations are illustrated in the accompanying diagram.



The correct tube locations for the RCA Model QU-62.

RCA QU-61

This was published in *Rider's Manual Volume 15, page 15-55.* The following pertains to the power-supply ratings for this receiver.

Only one power-supply rating (Symbol Rating D) is applicable to QU-61. As manufactured it may be operated on 100 to 260 volts, 50-60 cycles. A universal type of transformer having five voltage ranges is used. The desired range may be selected by the proper positioning of a link beneath a cover on the top of the power transformer as follows:

110 position	100 to 115 volts
125 position	115 to 135 volts
150 position	135 to 165 volts
210 position	165 to 230 volts
240 position	230 to 260 volts

The receiver is shipped with this link in the 240-volt position.

CAUTION . . . Remove the power cord from the line receptacle before changing the position of the link.

The record changer is made for operation on a 60-cycle power supply but may be converted to 50-cycle operation by the addition of a conversion spring to the motor shaft.

Change in Replacement Parts:
Stock No. 34183 Transformer
Delete "For Specification Ratings A and C"
Add "For Specification Rating "D"
Stock No. 39786 Transformer
(No phonograph motors are available to permit operation of this instrument on 25-cycle current. However, this transformer may be used for operation on 105 to 125 volts, 50-60 cycles.)

RCA 8X521, 8X522

These models appear on *pages 18-43 through 18-44 of Rider's Volume XVIII.* On late production sets, slotted holes are provided in the tuning capacitor mounting bracket, and washers (maximum of five required) are used on the tuning capacitor shaft (between dial knob and capacitor) to permit adjustment of the dial. If the cabinet or tuning capacitor should be replaced, it may be necessary to adjust the mounting of the tuning capacitor or change the number of washers to prevent rubbing of the dial on the cabinet.

The following changes should be made in the parts list:
Delete: 70601 Capacitor — tubular, 0.002 μf (C9)
Add: 74063 Capacitor — ceramic 200 μμf (C9)
74183 Washer — vellutex washer for dial knob clearance

RCA 54B5

This model appears on *pages 16-28 through 16-30 of Rider's Volume XVI.*

The following addition should be made to the parts list.

70708 Lead—battery lead assembly

RCA Radiola 61-10 (RC-1023A and RC-1023C)

This material appears in *Rider's Manual Volume 15, pages 15-33, 15-51, and 15-52.* In some of the 1023A chassis, two 10-μμf capacitors are used in parallel in place of the specified 22-μμf capacitor, C-15.

In the case of the 1023C chassis, service data given for the 1023A chassis will apply in toto.

RCA 711V2

This model appears on *pages 17-44 to 17-55 of Rider's Volume XVII.* Interference has been noted on the broadcast band in certain localities. This interference appears in the background of certain stations or between stations, and generally takes the form of code or amateur voice. An abnormal quantity of whistles when tuning across the band is also present. Connecting an external antenna to the set merely makes the condition worse.

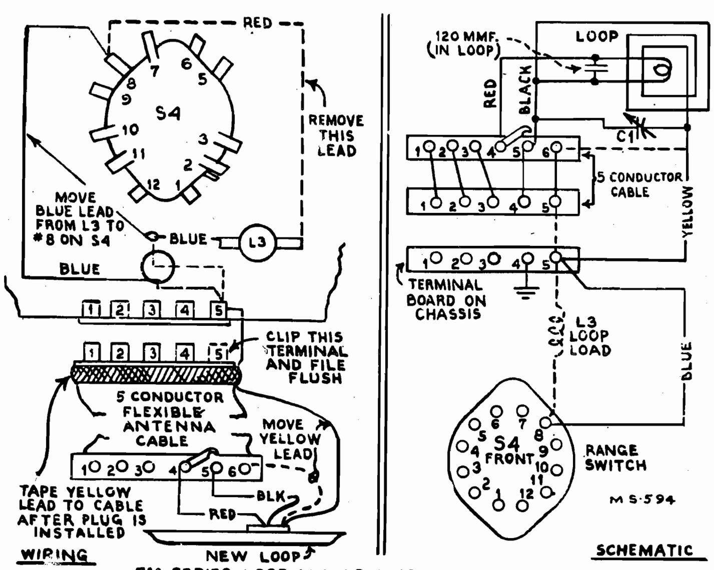
A production change has been made to overcome this condition. Receivers having this change may be identified by the letter L following the serial number on the radio chassis. The antenna coil L3 has been removed and a different loop antenna installed. These changes may be made as follows.

1. Remove radio chassis.
2. Refer to illustration and remove the red lead connected from the loop loading coil L3 to terminal 8 of S4.
3. Unsolder the blue lead from loop loading coil L3 and connect this lead to terminal 8 of S4. L3 may be left in the chassis without leads connected to it.
4. Remove the loop cable from loop and from the terminal board on the rear of the cabinet.
5. Remove the lug from the end of the yellow loop lead and solder this lead to terminal 5 on the antenna terminal board on the radio chassis.
6. Re-install the radio chassis.
7. Clip off pin 5 on chassis end of the five-conductor flexible antenna cable and file the remainder of the pin smoth with surface of plug.
8. Plug the five-conductor cable into the antenna terminal board on chassis (see sketch). Note that with one pin removed, the plug can be moved one pin to the right and plugged in, making incorrect contact.
9. Carefully pull the yellow lead down ward along the five-conductor cable far enough to permit taping it to the plug portion of this cable to prevent the yellow lead from breaking at the soldered joint at terminal 5 when flexed by opening of the radio door.
10. Connect the red and black loop leads to the rear terminals 4 and 5 respectively from which they were originally removed. Close link from 4 to 5 if an external antenna is not used. If an external antenna is used, it may be connected as described on *page 17-54 of Rider's Volume XVII.*
11. Remove the screw from terminal 6 in the antenna board on rear of cabinet to avoid improper connection in the future.
12. Remove the old loop and install the new loop in its place.
13. Plug the loop cable into the new loop.
14. Peak the loop trimmer on a weak station around 1400 kc.
15. If a test oscillator is available, the low-frequency oscillator core (L12) adjustment should be made while rocking the gang through 600 kc, to obtain maximum output. Repeak loop trimmer again at 1400 kc.
16. Grounding one of the the f-m antenna terminals (connect terminal 1 to 5) on the board on the rear of the cabinet may prove advantageous to reduce excess signals if an external f-m antenna is used.

NOTE: The new loop referred to above may be identified by a green paint dot on one metal mounting bracket. Also, the large coil has 20 turns of wire with only a few turns, or no turns, visible through the holes near the edge of the loop frame. The original loop contains 13 turns, all of which are visible through the holes near the edge.

The leads which are not shown in the accompanying diagrams need no change.

Delete 71863 cable from the parts list and add the following.
73250 Cable—five-conductor molded antenna lead in cable
71614 Capacitor—120 μμf, ceramic — in shunt with the loop primary
73480 Loop—antenna loop complete. For receivers without loop loading coil.



711 SERIES LOOP AND LOADING COIL WIRING CHANGE
(BROKEN LINES INDICATE ORIGINAL WIRING REMOVED)

Necessary connections for the new loop for the RCA model 711V2

RCA 66BX, Chassis RC-1040B

This model is the same as model 66BX, Chassis RC-1040 appearing *on pages 15-87 and 15-88 of Rider's Volume XV*, except for the following changes:

Chassis RC-1040B uses a 3V4 output tube and a selenium rectifier. Resistor R3 and capacitor C8 in the converter stage are omitted.

Resistor R17 in the power supply has been changed in value to 2650 ohms. Resistor R20 (2700 ohms) replaces resistor R18 in the power-supply circuit. A 33-ohm resistor (R31) has been added between the selenium rectifier and the "hot" side of capacitor C33. Capacitor C33 is now grounded. See Fig. 1.

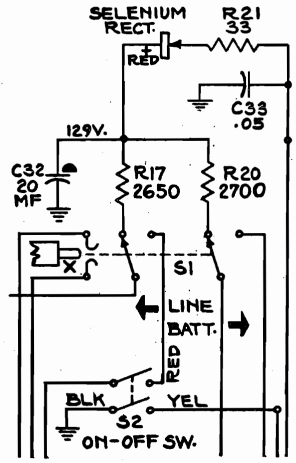
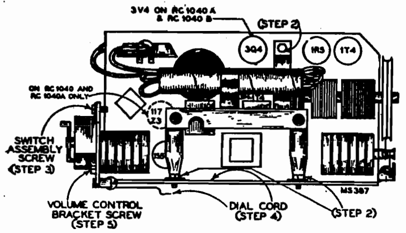


Fig. 1. Power supply of the RCA Chassis RC-1040B.

If the volume control needs replacement, the following steps should be followed. See Figs. 2 and 3.

1. Remove the 3V4 power output tube.
2. Remove the three screws holding the power cord bracket assembly. (Do not damage insulating washers.)
3. Remove the screw holding the switch assembly and remove the switch.
4. Remove the dial cord from the pulley.
5. Remove the screw holding the volume control bracket assembly.
6. Loosen the screw which maintains pressure on the expansion assembly.
7. Remove the drum.
8. Remove the expansion assembly from the volume control shaft.
9. Remove the nut holding the volume control to the bracket.

The following changes should be made in the parts list. Delete the following:



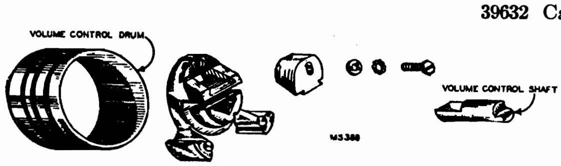


Fig. 2, above. Parts layout of RCA chassis RC-1040B. Fig. 3, left. Volume control dissassembly.

Stock No.	Description
38875	Resistor—1800 ohms, 1 watt (R18)
71038	Resistor — ballast resistor, 2300 ohms, 6 watt (R17)
30649	Resistor — 2.2 megohms, ¼ watt (R3)
70392	Cord — power cord
31709	Capacitor — ceramic 6.8-$\mu\mu f$ (C7)

Add the following parts to the parts list.

Stock No.	Description
39043	Capacitor—Ceramic, 6.8-$\mu\mu f$ (C7)
70022	Cord — power cord
72283	Grommet — rubber grommet to mount tuning capacitor (4 required)
72543	Rectifier — selenium rectifier
71290	Resistor—33 ohms, 1 watt (R21)
30930	Resistor — 1800 ohms, ¼ watt (R6, R15)
72760	Resistor — ballast resistor, 2650 ohms, 7 watt (R17)
14421	Resistor—2700 ohms, 1 watt (R20)
72541	Socket — tube socket - miniature - 7 prong bottom mounted with shield
72980	Side — case side — l.h. with decorative ribs at top, bottom, and both sides.
72979	Side — case side — r.h. (loop side) less capacitor assembly with decorative ribs at top, bottom, and both sides.

RCA Radiola 62-1 (RC-1017A)

This appeared in *Rider's Manual Volume 16, pages RCA 16-33 and 16-34*. A 270,000-ohm resistor, R12, is connected across the phono input between the center contact of the phono jack. One lead of the resistor joins the contact which goes to switch S1 and the other lead joins the jack at the point where C4 is connected to it.

RCA 65U-1

Rider's Volume 15, pages RCA 15-85 and 15-86 list models 65U and 65AU. These are the same as model 65U-1. The difference is found in the cabinets. The U and AU models have a rounded top at the front and the U-1 has a beveled top in front.

RCA 67V1, Chassis RC-606C

This model appears on *pages 16-35 through 16-39 of Rider's Volume XVI*. Resistor R18 which was originally 470,000 ohms, appears in some chassis as 330,000 ohms and in some chassis as 220,000 ohms.

RCA 67V1, 67AV1

These models appear on *pages 16-35 to 16-39 of Rider's Volume XVI*. In late production models, resistor R18 connected from the phono jack to ground has been changed from 120,000 ohms to 330,000 ohms.

RCA 75X11, 75X12 (RC-1050)

The following changes have been made in the wiring. The circuit appears in *Rider's Manual Volume 18 pages RCA 18-49 and 18-50.*

Capacitor C18 is now connected between pin #3 and pin #8 of the 35Z5GT rectifier. The service data indicates that it is connected between pin #3 of the above rectifier tube and the junction of R17 and C19.

Add to the parts list the following; under the heading of Chassis Assemblies:

39632 Capacitor-Mica 150-$\mu\mu f$ (C13)

RCA 75X11, 75X12 (RC-1050A)

These models are the same as models 75X11 and 75X12, chassis RC-1050, appearing in *Rider's Volume 18 on pages RCA 18-49 and 18-50* except for differences in the i-f transformers. Here are the listing of the i-f transformer part numbers for the two different chassis.

Chassis RC-1050 uses:

1st IF trans. stamped 922246-7, Stock No. 71558

2nd IF trans. stamped 940351-2, Stock No. 71631

Chassis RC-1050A uses:

1st IF trans. stamped 922246-11, Stock No. 70128

2nd IF trans. stamped 922246-12, Stock No. 70129

Connections to the i-f transformers are identical for both chassis. Capacitors C8 and C9 of the 2nd i-f transformer stamped 922246-12 (RC-1050A) are 122-$\mu\mu f$ each; the windings of this transformer have a d-c resistance of 13 ohms each.

RCA 76ZX12

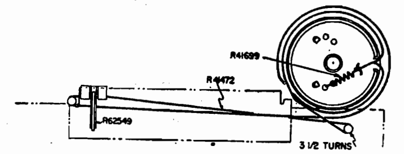
This receiver is in *Rider's Manual Volume 18, pages RCA 18-51, 18-52*. The following corrections are made in the parts lists. Under the miscellaneous heading

Delete No. 36886 Knob and

Add No. 70414 Knob—control knob ivory for 76ZX12

Sears 6686, Chassis 101.851

This model appears on *page 17-1 of Rider's Volume XVII*. It has been found that the dial cord slips on some of these models. To help correct this condition, it will be necessary to replace the present dial cord with a longer dial cord to change the pointer hookup. The new cord should be cut about 40 inches long and should measure 16¾ inches folded after assembly to the dial string tension spring. See the accompanying diagram for correct hookup.



Dial cord hookup for Sears chassis 101.831

Dial slippage may be due to a tight ganged tuning capacitor. If light lubrication does not correct the condition, the thrust adjusting screw on the rear of the tuning gang may be backed off very slightly and securely locked in the new adjustment. Use great care to avoid excessive loosening as the rotor and stator plates may short. The set may require realignment after this adjustment.

If frequency shift occurs, the following change is recommended to correct the condition:

1. Remove the screw and mica and bend up the leaf of the capacitor shunted across the a-m oscillator trimmer capacitor, C23.
2. Replace this part with a 15-$\mu\mu f$ ± 10% ceramic capacitor.
3. Realign the a-m band of the radio receiver.

This change is being incorporated in production and will be effective on all sets shipped after September 30, 1948.

Sears 6230A, Ch. 101.802-1

This model is the same as model 6230, ch. 101.802, which appears on *pages 15-15 through 15-18 of Rider's Volume XV*, except for the following change.

A phono jack has been added to the circuit. This phono jack is connected to the control grid (pin 6) of the 1LB4 output tube. Physically, the jack is located on the top of the chassis in the rear left corner near transformer T3.

Sears Roebuck 6362, 6363, 6364, Chassis 101.581

These models appear on *pages 11-64, 11-80, and 11-82 of Rider's Volume XI*. If frequency shift in the a-m band occurs, the following should be done. Remove the screw and mica and bend up the leaf of the capacitor shunted across the a-m oscillator trimmer capacitor C23. Replace this part with a 15-$\mu\mu f$, 10% ceramic capacitor. Then realign the a-m band as outlined on *page 11-82 of Rider's Volume XI*. This change is being incorporated in the present production of these models.

Sears Roebuck 7054, 8052, 8053

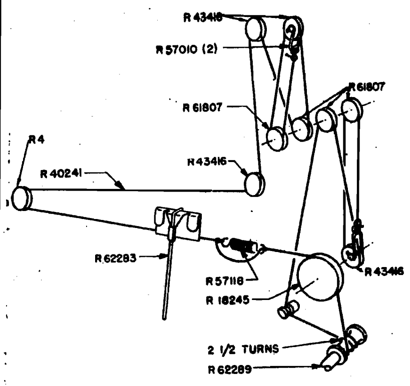
Models 8052 and 8053 are similar to Model 7054, but include the change shown on page 3 of the September issue of *Successful Servicing*. Model 7054 appears on *pages 16-1 through 16-3 of Rider's Volume XVI*. It has been found that some of the failures of the 35Y4 rectifier tube in these models can be prevented by adding a shunt resistor of 270 ohms across pins number 1 and 4 of the 35Y4 tube. This change was not made in production, so it is suggested that it be made in service when this type of failure is encountered.

Sears 7230, Ch. 101.802A

Basically, this model is the same as model 6230, ch. 101.802, which appears on *pages 15-15 through 15-18 of Rider's Volume XV*. However, it differs in the following respects.

A phono jack has been mounted on the top of the chassis in the left rear corner near transformer T3. This jack is connected to the grid (pin 6) of the 1LB4 output tube.

Also, the dial cord and pointer arrangement has been changed to the hookup shown in the accompanying diagram.



Dial cord arrangement for the Sears Model 7230

The battery supply used with this model is Cat. No. 6306 Battery Pack.

Sparks Withington 1005,6,7,8

These models appear in *Rider's Manual Volume XVIII, pages 18-3 through 18-10*. The signal generator frequency in operation 9 in the alignment chart on *page 18-5* should be changed to read 10.7 megacycles.

Sears 7100, Ch. 101.811-1

Model 7100, Ch. 101.811, appears on *pages 16-1, 16-4, 16-5, and 16-8 of Rider's Volume XVI*. A change has been made in the circuit as follows:

A tone-control network consisting of resistor R16 and capacitor C24 has been connected from the plate (pin 2) to the cathode (pin 7) of the 7C6 tube. In order to accommodate this added circuit, some rearrangement has been made in the position of parts on the bottom of the chassis.

Stromberg-Carlson 1204

This 1949 model is similar to the previously manufactured Model 1204, appearing on *pages 18-4 through 18-6 of Rider's Volume XVIII*. The following changes provide complete servicing information:

Remove C-4 and R-5 and ground the cathode of the r-f amplifier (Pin 7).

Remove C-29 and R-20 and ground the cathode of the 1st i-f amplifier (Pin 7).

Remove C-37 and R-22 and ground the cathode of the 2nd i-f amplifier (Pin 7).

Short out L-18 and R-7 in the screen of the r-f amplifier (Pin 6).

Change R-9 from 680 ohms to 2200 ohms with an r-f choke wound on the resistor and connected in parallel with it.

Remove C-30 and short out R-34 in the screen of the 1st i-f amplifier (Pin 6).

Remove C-38 and short out R-24 in the screen of the 2nd i-f amplifier (Pin 6).

Add a 0.1-μf capacitor from Pin 8 to ground and from pin 3 to ground on the 12H6 f-m detector.

Add a 10-megohm, ½-watt resistor from the grid (Pin 7) of the converter to the avc string.

Add a 220,000-ohm, ½-watt resistor from terminal 5 to terminal 7 of 1st i-f transformer.

Disconnect Pin 5 of 2nd i-f transformer from ground and insert a 0.01-μf capacitor from Pin 5 to ground. Connect Pin 5 to the avc string through a 100,000-ohm, ½-watt resistor.

Change the converter, 1st i-f amplifier, and 2nd i-f amplifier B-plus line to feed from the low side of the filter choke.

Stromberg-Carlson 1210, 1408

The information for Model 1210 appears on *pages 17-1 through 17-7 of Rider's Volume XVII*. The 1408 is the same except that it is being manufactured in two cabinet styles, the blonde 1408 M6A (108119) and the mahogany 1408 PLM (10811), both equipped with the VM-800 record changer and the 1210 radio chassis.

Now that the low-frequency f-m band is practically non-existent, these two models can be modified to give greater sensitivity on the high-frequency f-m band at the sacrifice of the low-frequency f-m sensitivity. This is done by changing the built-in f-m dipole on the back of the cabinet. Use the following procedure:

Remove the original dipole attached to the rear of the cabinet.

Cut a piece of 300-ohm transmission line to 57 inches in length. This will be the new dipole.

Short the two parallel leads together at each lend of this transmission line and solder.

At the center of *one* of the wires in the 300-ohm line, break the lead and connect another piece of 300-ohm line long enough to reach from the top of the cabinet to the dipole antenna terminals on the 1210 chassis. Solder the connection.

Attach the 57-inch length of line to the cabinet, dressing it so that it is kept away from the a-m loop and so that the center of the dipole is at the center of the cabinet at the top.

Connect the other end of the lead-in to the f-m antenna terminals of the 1210 chassis.

Stromberg-Carlson 1400, 1400 Special

These models are the same as Model 1200, appearing on *pages 18-1 through 18-3 of Rider's Volume XVIII*, except for the following changes. Omit R-9 (220 ohms) and connect the screen grid of the converter (12BA6, Pin 6) to the screen grid i-f amplifier (12BE6, Pin 6).

Omit C-2 (.05 μf). Omit the dial lamp. Omit R-14 (120 ohms 2 watt) and jumper the former terminals of the resistor to make the heater string continuous.

The difference between these models is that Model 1400 has a dial with the numbers on the curved lens while Model 1400 Special has a dial with numbers on the flat glass plate behind the curved lens.

Teletone 149, 157

These models are the same as model 135 which appears on *page Misc. 16-11 of Rider's Volume XVI*.

United Motors R-705

Add to the material on this model appearing in *Rider's Volume XVII, pages 17-1 through 17-6* (the Electro-Tuner in *Volume XVIII, pages 18-6 and 18-7*), the Service Part #7256226, Fuse Block.

Ignition interference on an R-705 recently installed in a new convertible Studebaker Commander has been suppressed through the following procedure.

To eliminate chassis pickup:

Sand edges of the case and cover the chassis unit and install additional cinch clips to insure a tight cover to case fit. Bond motor to firewall with part #6022 Braid. Bond heater control wire sheath to firewall at entrance point of firewall. Use one-inch braid. Soldering the braid to control wire sheath is not recommended. A mechanical connection is more desirable since there is less danger of soldering the control wire and sheath together.

To eliminate antenna pickup:

Bond antenna base to instrument panel using as short a length of braid as possible. Install a choke coil in antenna circuit. This may be accomplished by wiring choke part #1214382 into the chassis at the antenna connector or using part #555382 adapter. This latter part is available only through the Oldsmobile Lansing Parts Department Stores "A", Lansing, Michigan.

Westinghouse H-124

This model is the same as Model H-125 which appears on *pages 15-8 through 15-10 of Rider's Volume XV*, except that the side panels of the H-124 cabinet are a darker shade of green. The following items have been added to the parts list:

Part No.	Description
V-3461-3	Cover, left hand
V-3459-3	Cover, right hand

Westinghouse H-186, H-187

This model appears on *pages 18-26 through 18-30 of Rider's Volume XVIII*. The 0.1-μf resonant-type capacitor (C33) is not used on late production chassis. This capacitor is shown connected between the B-plus line and ground in the schematic diagram on *page 18-26*.

Westinghouse H-164, H-166, H-166A, H-167

These models appear on *pages 18-12 through 18-19 of Rider's Volume XVIII.* The changes are as follows:

The notes under Figs. 1 and 4 should be revised to read: "All V-2119 chassis have 1st and 2nd i-f transformer adjustments as shown by the dotted line." The dotted-line adjusting points apply to current production chassis as well as to early models. The adjusting points shown in Fig. 3 apply to the V-2119-1 chassis which was also used in the above models.

Early models of the V-2119 chassis used a V-3295 power transformer which required a voltage-dropping resistor (R50) between the rectifier tube and the filter input to provide the correct voltage at the input to the filter. The V-2119-1 chassis and late models of the V-2119 chassis use a different power transformer (stock numbered V-4761) and the voltage-dropping resistor, R50, is no longer required.

Capacitor C76, which is shown connected between the B-plus line and ground in the schematic diagram on page 18-13, is not being used on late production chassis.

The items listed below are incorrectly listed in the replacement parts list. They should be changed to read as follows:

RC30AE332K	Resistor, 3,300 ohms, 1 w. (R31)
V-4886-1	Choke, filament (L2, L3)

Westinghouse H-165

This model appears on *pages 17-12 through 17-14 of Rider's Volume XVII.* The switch for this model was listed as a complete assembly including a wafer section (SW1) and an a-c switch section (SW2). In cases where the a-c switch is defective, but the remainder of the switch is not damaged, repairs can most easily be made by replacing the a-c section only. For this reason, the a-c section of the switch assembly is listed below as an addition to the parts list.

Part No.	Description
V-4803-1	Switch, a-c (SW2) and mounting plate

Westinghouse H-185 and H-195

These models appear on *pages 18-23 through 18-25 of Rider's Volume XVIII.* The changes are as follows:

The value of R3 on the schematic diagram should read 220 ohms instead of 220K ohms as shown.

The 220K resistor, R7, which was previously connected between the common negative line and the chassis, is not being used in late production chassis. Also in later production chassis, the value of R9 was changed from 3,300 ohms to 1,800 ohms.

In later production receivers, an adjustment hole was provided in the right side of the model H-185 cabinet. It is recommended that the r-f trimmer (C6) be adjusted with the chassis in the cabinet and the rear cover closed. The plug that fits this hole is listed below.

The following items should be added to the parts lists:

RC20AE182K	Resistor, 1,800 ohms, ½ w. (R9)
V-1157-4	Cabinet, plastic (H-185 grey)
V-4836-6	Plug, button (H-185 grey cabinet)
V-4836-5	Plug, button (H-185 maroon cabinet)

Westinghouse H-153, H-155, H-156, H-171, H-171A, H-171C, H-184

These models are electrically the same as Model H-122, appearing on *pages 15-5 through 15-7 of Rider's Volume XV.* The cabinets differ from that of Model H-122.

The parts list should be changed to include the following:

Item	*Part No.*	*Description*
31	V-3360	Loop, antenna (H-171 Mah., H-171A, H-171C, H-184)
31	V-4364	Loop, antenna (H-153, H-171 Blonde and Limed Oak)
31	V-4373	Loop, antenna (H-156)
35	V-4079	Receptacle (H-153, H-171)
65	V-5405	Socket, molded power (H-171, H-171C)
65	V-3393-1	Socket, receiver, a-c power (H-153)
	V-3412	Background, dial (H-153, H-171, H-171A, H-171C, H-184)
	V-4376	Background, dial (H-156)
	V-4891	Baffle and grill cloth assembly (H-155)
	V-3677	Baffle, cardboard (H-156)
	V-3532	Bar, flat, record changer mounting (H-153, H-171, H-171C)
	V-3489S-1	Bumper (cabinet foot for H-153, H-155, H-156)
	V-6021-1	Bumper, ⅝" dia., self-adhering (H-184)
	V-6021-2	Bumper, ½" x 2", self-adhering (H-184)
	V-5725	Bumper, bottom cover mounting (H-184)
	V-1125-1	Cabinet (radio section — H-153, H-171 Blonde and Limed Oak)
	V-1126	Cabinet (H-155)
	V-1128	Cabinet (H-156)
	V-1158-1	Cabinet, less radio section (H-184)
	V-5056	Catch, bullet (H-171 Blonde and Limed Oak)
	V-5286	Catch, bullet (H-171 Mah., H-171A, H-171C)
	V-3219S-1	Cord, dial drive (spool)
	V-5047	Cover, back (H-171 Blonde and Limed Oak)
	V-5287	Cover, back (H-171 Mahogany)
	V-5734	Cover, bottom (H-184)
	V-3663	Decal, radio-phono (H-155, H-156)
	V-3662	Decal, stations (H-155, H-156)
	V-3660	Decal, tone (H-155, H-156)
	V-3661	Decal, volume (H-155, H-156)
	V-3665	Decal, Westinghouse (H-155, H-156)
	V-3647	Dial (H-155)
	V-4344	Dial (H-156)
	V-7009-1	Door, front (H-171 Limed Oak)
	V-7009-2	Door, front (H-171 Blonde)
	V-7011	Door, front (H-171 Mah., H-171A, H-171C)
	V-3829	Felt Strip, ¼" x 1/16" x 8⅜" (H-153, H-171, H-171A, H-171C, H-184)
	V-4902	Glide, furniture (H-171, H-171A, H-171C)
	V-4228	Grille Cloth (H-156)
	V-3345-5	Grommet, variable capacitor mounting.
	V-4973	Hinge, door (H-171 Blonde and Limed Oak)
	V-5355-1	Hinge, door (H-171 Mah., H-171A, H-171C)
	V-3510	Hinge, lid (H-171 Mah., H-171A, H-171C)
	V-4321	Hinge, lid (H-153, H-171 Blonde and Limed Oak)
	V-5836	Knob, door (H-171A, H-171C)
	V-4362-2	Knob, radio-phono (H-153, H-171 Blonde and Limed Oak)
	V-4371-2	Knob, radio-phono (H-156)
	V-4361	Knob, tuning and tone (H-153, H-171 Blonde and Limed Oak)
	V-4697-3	Knob, tuning and tone (H-156)
	V-4362-1	Knob, volume (H-153, H-171 Blonde and Limed Oak)
	V-4371-1	Knob, volume (H-156)
	V-3333S-2	Medallion (H-153, H-155, H-171 Blonde and Limed Oak)
	V-3894	Nameplate, Westinghouse (H-153, H-171, H-171A, H-171C)
	V-6024-1	Plate, hinge (H-184)
	V-4365	Pointer, (H-153, H-171 Blonde and Limed Oak)
	V-4384	Pointer (H-156)
	V-3836-1	Pointer assembly, including pointer, mount and slide (H-171 Mah., H-171A, H-171C, H-184)
	V-3836-2	Pointer assembly, including pointer, mount and slide (H-155)
	V-3370	Pointer slide assembly, including pointer mount and pointer slide (H-153, H-171 Blonde and Limed Oak)
	V-3166S	Pulley, 7/16" dia.
	V-4379	Rail assembly, pointer (H-156)
	RC20AE334M	Resistor, 330K ½ w. (part of record changer)
	V-3322	Shaft, tuning
	V-3530	Spacer, felt, 1/16" x ⅜" x 1" (H-171A, H-171C)
	V-4323	Spacer, felt, 1/16" x ⅜" x 1" (H-153, H-171 Blonde and Limed Oak)
	V-5057	Strike, bullet catch (H-171 Blonde and Limed Oak)
	V-5290	Strike, bullet catch (H-171 Mah., H-171A, H-171C)
	V-4324	Support, lid (H-153, H-171 Blonde and Limed Oak)
	V-5291	Support, lid (H-171 Mah., H-171A, H-171C)
	V-3752S	Washer, felt, for small knobs (H-171 Mah., H-171A, H-171C, H-184)
	V-4366	Washer, felt, for small knobs (H-153, H-171 Blonde and Limed Oak)
	V-3668S	Washer, felt, for knobs (H-155)
	V-5277-1	Washer, felt, for knobs (H-156)
	V-5762	Washer, fibre, phono mounting (H-171A, H-184)
	V-3267S-4	Washer, flat, chassis mounting
	V-3215S	Washer, spring
	V-3356	Window, dial (H-153, H-171, H-171A, H-171C, H-184)

Wilcox-Gay 8J10

This model appears on *pages 18-1 and 18-2 of Rider's Volume XVIII.* Several changes have been made in late production receivers. For receivers with serial numbers 14,940 and up, the grid of the 6B36 tube is grounded when the function switch is set in the "RECORD MIKE" position. This helps eliminate high-frequency noise disturbances when recording from the microphone. On receivers with serial numbers 14,939 and below, the yellow wire connected to pin #2 on the 6B36 socket should be moved to pin #7.

The output transformer (81-2106) on all receivers with serial numbers 25,001 and up, has been replaced by a tapped primary transformer (81-2109-1) with a neon limiter lamp (45-2023) connected across the yellow and red primary leads, as shown in Fig. 1.

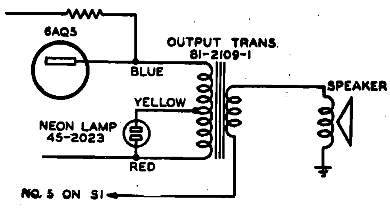


Fig. 1. New output transformer and limiter circuit of the Wilcox-Gay 8J10.

This supersedes the previous limiting circuit using two neon lamps across the secondary leads of the output transformer.

The single neon lamp limits the amount of voltage to the crystal so that the crystal will not be damaged by the application of excessively strong signals.

Several cases have been reported where the coupling capacitor C13 has shorted due to excessive peak voltages. The shorting of this capacitor places the d-c plate voltage directly across the crystal record-playback head, resulting in "burned-out" or cracked crystals.

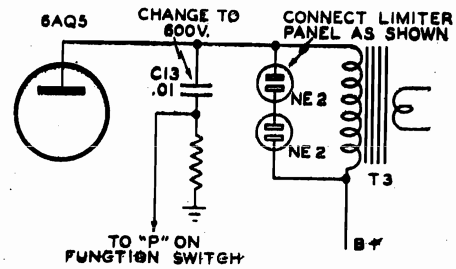


Fig. 2. To eliminate crystal failure, these changes should be made.

To eliminate crystal failure from this source, on all chassis having the double neon bulb limiter panel and the 400-volt coupling capacitor, the capacitor should be changed to one having a 600-volt rating and the dual limiter panel should be connected directly across the primary of the output transformer. See Fig. 2. Every set with the dual limiter that is returned for service should have this change made. Failure of C13 is eliminated on late models by using the tapped-primary transformer described previously.

Wilcox-Gay 6B10, 6B20, 6B30, 6B40, and 6B42

These models are the same as Model 6B10, Late, *on page 15-4 of Rider's Volume XV*, except for the following changes. a 0.00005-μf capacitor (C34) has been connected across R38.

A 6E5 tube has been substituted for the 6U5; the socket connections are the same. A 6SJ7GT tube has been substituted for the 6J7GT formerly used. The socket connections for the 6SJ7GT are:

1 No connection	5 Cathode
2 Heater	6 Screen Grid
3 Suppressor Grid	7 Heater
4 Grid	8 Plate

Tie points are utilized for voltage measurements, see the accompanying voltage chart.

Zenith S 13200

This model is the same as Model S-11468 on *RCD. CH. Pages 15-1 through 15-8 of Rider's Volume XV*, except that the Model S 13200 has a Cobra tone arm and a muting switch.

Zenith 6R886, Chassis 6E02

This model appears on *pages 17-16 and 17-17 of Rider's Volume XVII*. In some cases when microphonics are encountered, replacing the 6C4 tube mounted at the top of the chassis alleviates this condition. The 6C4 tube is easily accessible after the screen in the record changer compartment is removed.

Zenith 7R887, Chassis 7E22

This model appears on *pages 18-33,34 through 18-36 of Rider's Volume XVIII*. When replacing defective or burned out tubes in this receiver, care must be taken that the 6SK7 i-f amplifier tube be replaced only with another 6SK7. Use of a 6SK7GT or G tube will result in extreme oscillation which can be controlled only by the use of the 6SK7 metal tube.

TYPICAL VOLTAGE CHART

TUBE	VOLTAGE TO GROUND PIN NO.							
	1	2	3	4	5	6	7	8
6A8	0	13	240	80	-10	156	13	2.6
6SK7	0	13	3.3		3.3	80	13	240
6SN7	0	232	6.5	0	55	1.6	13	13
6SQ7	0	0	1.5	0	0	68	13	13
6V6	0	13	225	240	0	240	13	13
6SJ7	0	13	0	0	0	3.3	13	80
5Y3	0	280		275AC		275AC		280
6E5	13	6	0	240	1	13		

MEASURED WITH 1000 OHMS PER VOLT METER.
SCALES USED-3-30-150-300

ALL PLUNGERS IN RELEASED POSITION.

Typical voltage chart for the Wilcox-Gay 6B10, 6B20, 6B30, 6B40, and 6B42.

FARNSWORTH TELEV. & RADIO CORP. MODEL P71, Capehart

SETTING UP CHANGER FOR OPERATION

Section 2

UNPACKING

Before operating the record changer, the following procedure should be followed:

Remove all packing material and pieces of tape from changer compartment.

Remove locking screw from back side of changer compartment.

Remove the cardboard spacers between turntable and cabinet shelf.

Remove shipping bolts from floating panel.

See that changer and mounting panel float upon the spring mountings.

See that gears and cam tracks are lubricated (can be checked by observation while in cabinet).

See that levers have not been displaced during transit.

Check needle and pickup for damage.

Run changer by hand through cycle to discover any binding.

See that the changer is level.

CHECKING THE CHANGER

Check the needle landing with full stack of records, intermixed. This is done by loading the spindle shelf with 10 records, both 10″ and 12″ and pressing the control button to reject a record and put the changer into operation. The stabilizer arms must be moved into the recess in the spindle to prevent interference in loading the records. Allow the first record to play through and trip, observing the needle landing on several 10″ and 12″ records, then trip records up to and including nine. Allow the ninth record to play through and feed number ten automatically, observe needle landing, automatic trip and automatic shut-off.

Check electrical operation by turning radio program switch to phono position and playing a record. The noise eliminator should be checked in each position by listening to reproduction. As a rule, old worn records should be played while the switch is in the No. 1 position. Position 2 is for normal records, while No. 3 gives wide-range reproduction from the new high-fidelity recordings.

DEFECTIVE RECORDS

This record changer is adjusted to operate with standard records. Records that are undersized, too thick, or with deformed center holes, cannot be expected to operate properly on this or any other changer. Trip grooves that are not standard may result in erratic tripping. Records should be examined for faults before making adjustments to the changer.

DESCRIPTION AND OPERATION OF THE CHANGER

Section 3

RECORD LOADING

The record spindle shelf is to be loaded to a maximum of 12 ten inch, 10 twelve inch, or to the red line on the spindle with both sizes, intermixed. The stabilizer arms must be moved into the recess of the spindle to prevent interference in loading the records.

The tone arm set-down is always in 10″ position unless a 12″ record has just been dropped from the spindle shelf. In dropping to the turntable, the 12″ record strikes the intercepter lever #58698, contacting the tone arm swing lever #58698, imparting movement to the tone arm lift lever #58694 and causing the tone arm to be set down to 12″ position.

RECORD CHANGING

After the changer is loaded with records, the control button is pressed to start the record change cycle. Rotation of the main cam will actuate the compression lever causing the compression rod to depress the inner-spindle assembly. The four-prong spring support (spindle shelf) has receded into the outer spindle and the rubber sleeve on the spindle, being compressed, has expanded, and therefore holds all but the bottom record which descends to the turntable. Then the tone arm return lever moves the tone arm into position to be lowered to the record by following the cam track. The tone arm moves across the record until the selection is finished and the trip mechanism functions. Finally, the tone arm is lifted and carried over the record until clear of the record stack and the next record is released, completing one change cycle. In this manner all the records in the stack are played.

AUTOMATIC STOP

The weight of the records on the spindle allows the record lift lever to follow the contour of the main cam. When the last selection is played, a spring lifts the record lift lever into position to move the automatic stop pawl inward. The main cam carries the stop pawl into engagement with the switch lever, thus stopping the changer.

SPRING MOUNTING

The changer is solidly mounted on a panel which is floated upon spring mountings. These spring mountings eliminate rumble or feedback and insulate the changer from any cabinet vibration occasioned by the sound waves emanating from the speaker. This vibration, if transmitted through the tone arm to the pickup, would be amplified in the audio system of the radio and passed into the speaker again. The spring mountings also cushion the changer from sudden jars or shocks.

To remove the changer from the cabinet, remove four acorn nuts located on the corners of the mounting panel and lift panel out of cabinet. In some cases it is necessary to remove the cabinet drawer before removing the mounting panel.

On the underside of changer loosen screw next to spindle (paragraph B, section 7), and turn lock so that turntable may be removed from changer. Remove three screws and lift changer out of mounting panel.

CYCLE OF OPERATION

Section 4

STUDYING THE CYCLE

The record change cycle consists of the sequence of motions required to move the pickup into position on a record, play the record, remove the pickup and place a record into position. Since movements of various parts are being performed simultaneously, it is impossible to follow all of the actions at one time. A suggested method is to select one certain cycle of operation. For example the raising of the tone arm, moving it over the record and the replacement on the record may be studied while running the changer slowly by hand. After the motions associated with the tone arm are understood, another portion of the changer may be observed.

TRIP ASSEMBLY

Motion of the tone arm is transmitted through the tone arm crank to the tone arm lever and pin assembly #15194 which is secured to the tone arm support tube with lever #58695. When the needle enters the trip grooves of a record, the increased velocity of movement impels the tone arm lever against the starting reset lever #58853. The starting reset lever then engages the starting pawl on the turntable hub.

THE CHANGE CYCLE

The turntable is driven through an idler pulley by the electric motor, the turntable being free on the spindle. A gear on the turntable hub meshes with the main cam gear. Several teeth are left off the main cam to stop it in playing position. After a selection has been played, the trip mechanism moves the starting reset lever, which is part of the main cam assembly #13672, forward at the right speed and correct distance to permit it to mesh properly with the starting pawl on the turntable hub. As the main cam rotates, the tone arm lift lever #58694 lifts the tone arm upward and the tone arm return lever moves the tone arm over the record. The compression lever #57240 will actuate the compression rod #55424, which will in turn depress the inner-spindle assembly #11379. During this cycle the rubber sleeve #62152 has expanded and is holding all but the bottom record. At the same time the spindle shelf recedes into the outer spindle #55334, dropping the bottom record to the turntable. By following the cam track the tone arm return lever moves the tone arm into position to lower the pickup needle to the starting groove in the record. The main cam is now in playing position, disengaged from the turntable hub gear. One change cycle has been completed.

PICTORIAL REPRESENTATION

The following series of photographs, with a corresponding brief explanation of each phase, are inserted to illustrate the movements of pertinent parts of the changer during a change of record cycle.

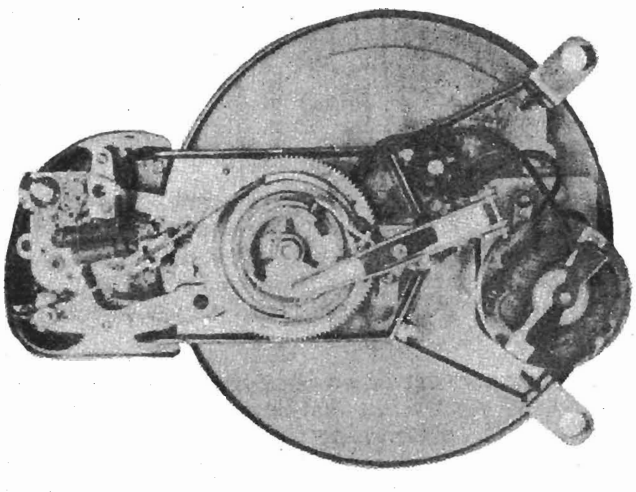


FIGURE A

The main cam is driven through the gear on the turntable hub. When a change cycle is completed, the main cam disengages from the turntable gear because several teeth are left off the main cam gear. The tone arm is in position on the record and free to follow the playing groove. This phase of cycle is called the playing position.

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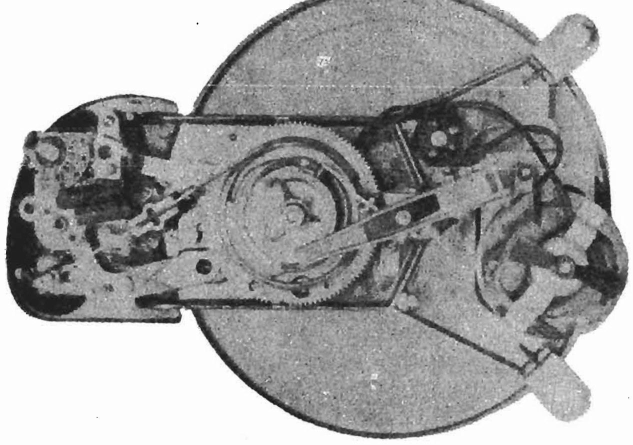

FIGURE B

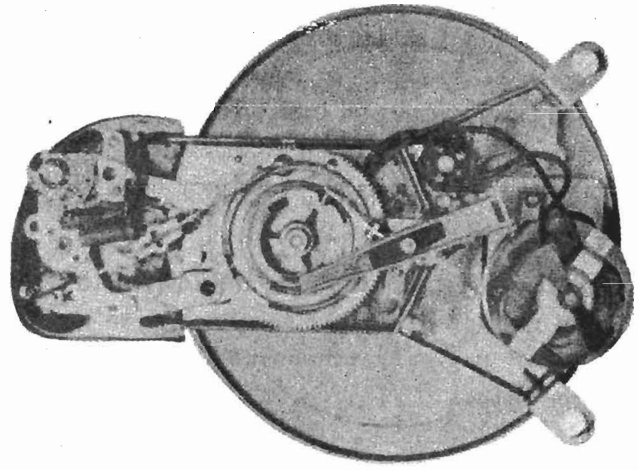

FIGURE C

The change cycle has just begun. The tone arm lift lever has raised the tone arm from the record and the tone arm return lever has started to move the tone arm away from the turntable. The compression lever assembly has started to pull the compression rod, thus beginning to recede the spindle shelf into the outer spindle and expanding the rubber sleeve on the spindle.

The tone arm has moved outward, clear of the turntable, and the spindle shelf has fully receded into the outer spindle, dropping the bottom record to the turntable. The rest of the record stack is held by the expanded rubber sleeve. The spindle shelf has started to return to its former position.

CHANGER LUBRICATION

Section 5

The record changer should be lubricated and cleaned periodically or when a major part or assembly is replaced. Dirt, old oil, or grease may be removed with carbon tetrachloride or other similar cleaning fluid.

Use only a good grade of electric motor oil.

Care should be exercised to prevent an excess of oil being used on any part and that no oil gets on the velocity trip assembly, motor pulley, idler pulley or turntable rim. There is a self-lubricating type bearing in the turntable with an oil reservoir which may be filled through the four holes in the turntable hub.

Once a year a thin coat of light grease of the vaseline type may be applied to all surfaces of the main cam that contact lift levers and record lift lever roller. Also grease all working parts on the main cam and oil other moving parts (see figures D & E) except those that rely upon friction, i.e., contact surfaces being dry.

PRECAUTIONS

With mechanical devices, much information pertinent to lubrication can be obtained by observation. Obviously, it will be seen that certain parts of rotating or sliding machinery must be lubricated,

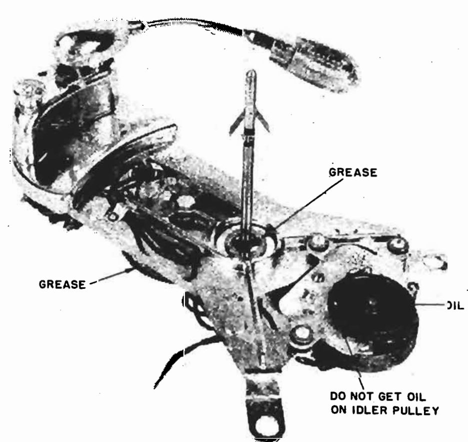

FIGURE D

MODEL P71,
Capehart

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but that other parts depend upon contact surfaces being dry and free from foreign substances, such as grease, so that proper friction exists. Where lubrication is indicated, it should be applied judiciously, avoiding any excess lubricant that may be transferred or thrown to some part designed for dry operation.

Inspect parts not requiring lubrication to make certain they are clean. Always be sure to use the type of oil or grease recommended for lubricating specified items.

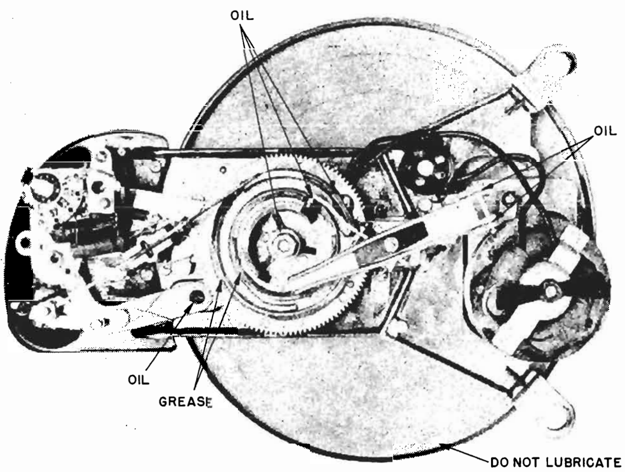

FIGURE E

PARTS IDENTIFICATION

Section 6

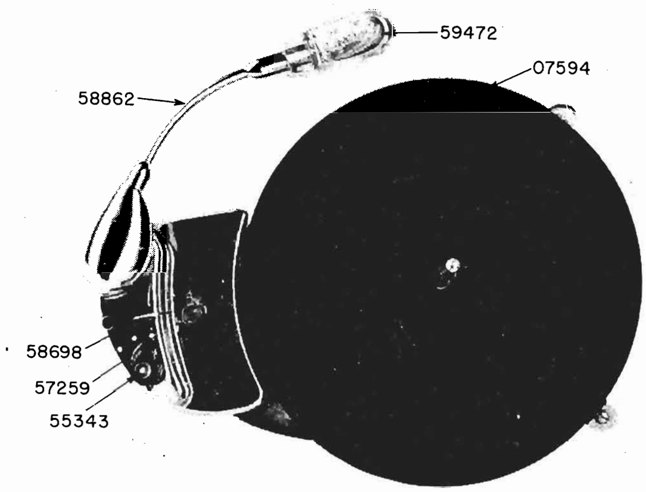

FIGURE 1—Top View

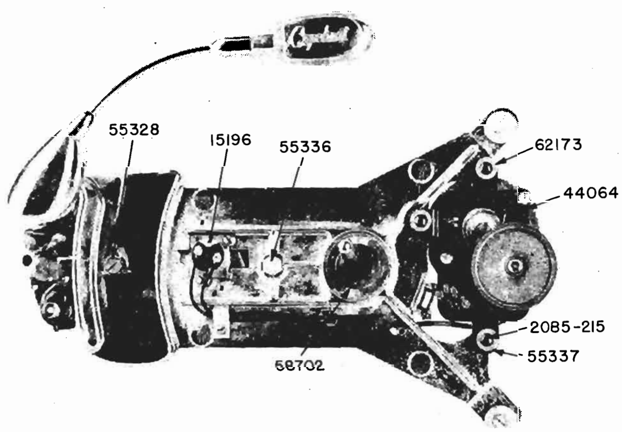

FIGURE 2—Top View with Turntable Removed

FIGURE 1

Part No.	*Description*
55343	— Reject Plunger.
57259	— Noise Eliminator Knob.
58698	— Tone Arm Interceptor Lever.
58862	— Tone Arm Tube only.
59472	— Plastic Pickup Housing only.

FIGURE 2

Part No.	*Description*
15196	— Automatic Stop Switch Assy.
44064	— Phono Motor.
55328	— Tone Arm Adjusting Stud.
55336	— Mounting Bolt For Main Cam.
55337	— Motor Mounting Spacer.
58702	— Bearing Support Washer.
62173	— Rubber Motor Mounting Grommets.
2085-215	— Motor Mounting Bolt (#6-32 x ⅝")

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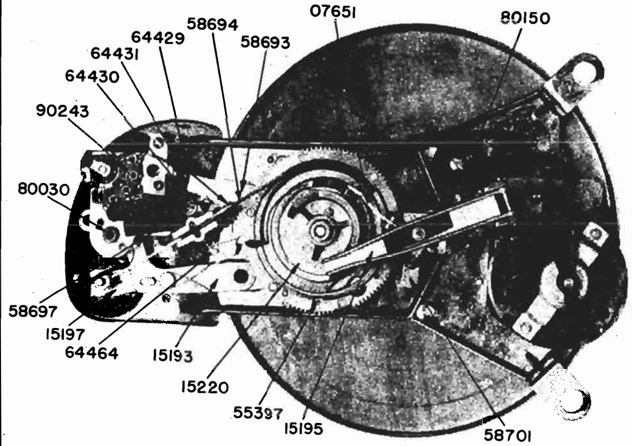

FIGURE 3—Bottom View

FIGURE 3

Part No.	*Description*
07651	— Record Lift Lever Assy.
15193	— Tone Arm Swing Lever Assy.
15195	— Compression Lever Assy.
15197	— Tone Arm Crank and Pin Assy.
15220	— Main Cam.
55397	— Trip Adjustment Screw.
58693	— Switch and Reject Lever.
58694	— Tone Arm Lift Lever.
58697	— Tone Arm Adjusting Lever.
58701	— Turntable Hold-Down.
64429	— Reset Spring.
64430	— Reject Spring.
64431	— Lift Lever Spring.
64464	— Switch Release Spring.
80030	— Phono Output Jack.
80150	— 4 Prong Motor Plug (Male).
90243	— Tone Switch.

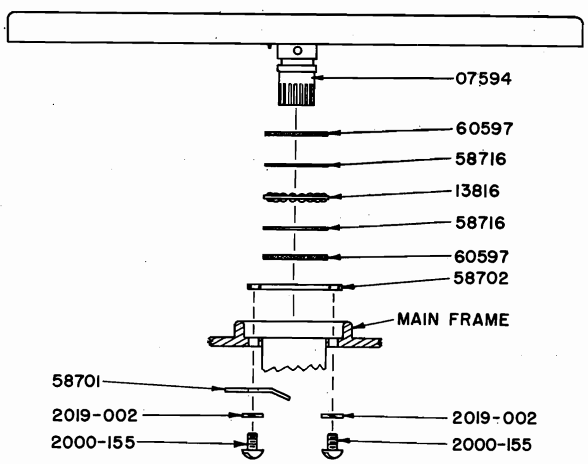

FIGURE 4—Turntable and Bearing Assembly

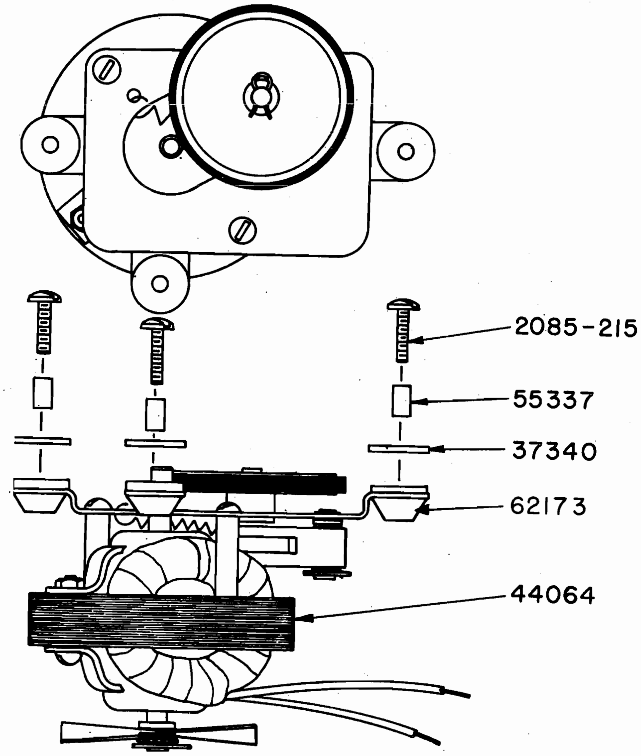

FIGURE 5—Phono Motor Assembly

FIGURE 5

Part No.	*Description*
37340	— Brass Washer.
44064	— Phono Motor.
55337	— Motor Mtg. Spacer.
62173	— Rubber Motor Mtg. Grommet.
2085-215	— Motor Mtg. Bolt (#6-32 x 5/8").
11437	— Phono Motor Assy. Complete.
13819	— Idler Pulley.
15237	— Idler Brkt. and stud assy.
37421	— "E" washer (to mount idler pulley, idler pulley brkt., and ventilator fan).
54308	— Fibre thrust washer (to mount idler pulley and idler pulley brkt.)
54309	— Fibre thrust washer (to mount ventilator fan).
64471	— Spring for idler pulley.
80150	— 4 prong motor A. C. plug (male).
92335	— Felt washer (for ventilator fan).
62190	— Alternate rubber motor mounting.

FIGURE 4

Part No.	*Description*
07594	— Turntable Assy.
13816	— Ball Bearing and Retainer.
58701	— Turntable Hold Down.
58702	— Bearing Support Washer.
58716	— Bearing Race Washer.
60597	— Cork Washer for Turntable Bearing.

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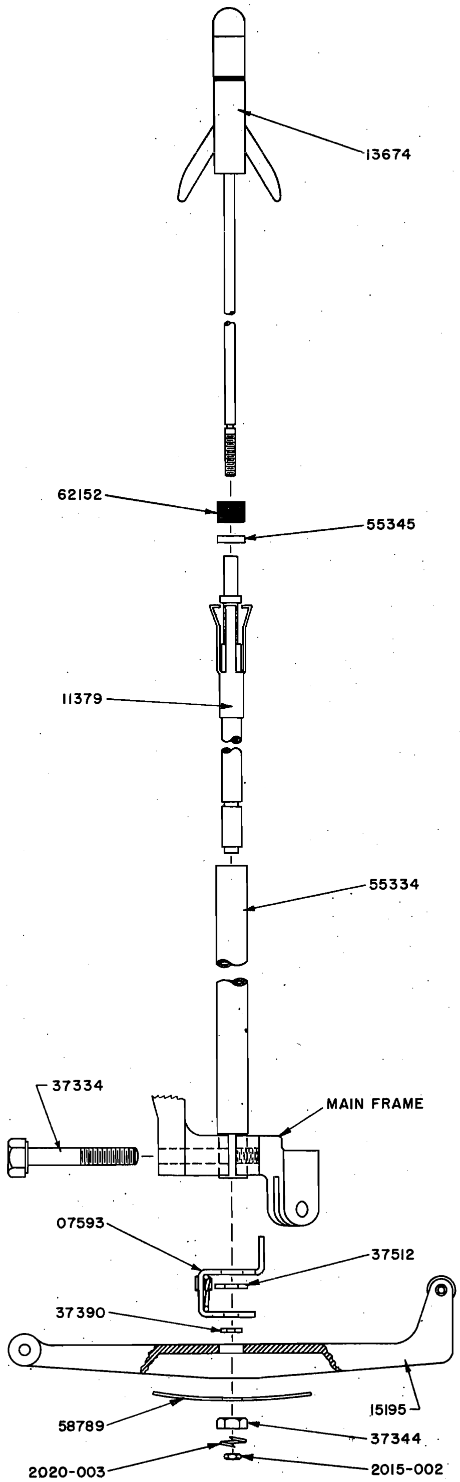

FIGURE 6—Spindle Assembly

FIGURE 6

Part No.	*Description*
07593	— Record Lift Lever Bracket Assy.
11379	— Inner Spindle Assy.
13674	— Upper Spindle Assy.
15195	— Compression Lever Assy.
37334	— H. H. Bolt (#10-32 x 7/8").
37344	— Special Hex Nut (#3-48).
37390	— "E" Washer (small) for Record Spindle.
37512	— "E" Washer (large) for Record Spindle.
55334	— Outer Spindle.
55345	— Sleeve Support Washer.
58789	— Compression Spring.
62152	— Rubber Sleeve for Record Spindle
2015-002	— Hex Nut (#3-48).
2020-003	— Split Lockwasher (#3)

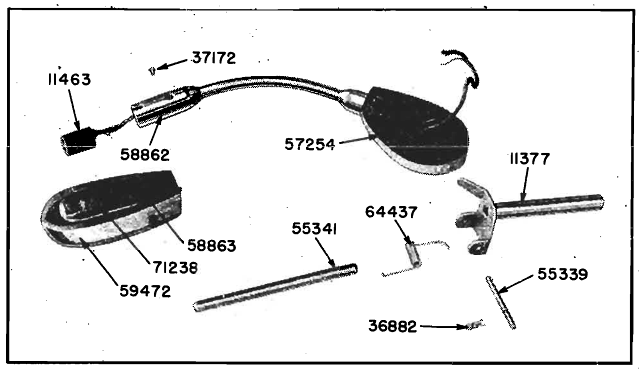

FIGURE 7—Tone Arm Assembly

FIGURE 7

Part No.	*Description*
11377	— Tone Arm Tube & Bracket Assy.
11463	— Pickup Lead Assy.
36882	— H.P. Cotter.
37172	— #4-36 x 1/8" Special Flat H.M.S.
55339	— Hinge Pin.
55341	— Tone Arm Lift Rod.
57254	— Tone Arm End.
58862	— Tone Arm Tube Assy.
58863	— Spring Clip.
59472	— Pickup Housing.
64437	— Tone Arm Spring.
71238	— Variable Reluctance Pickup.

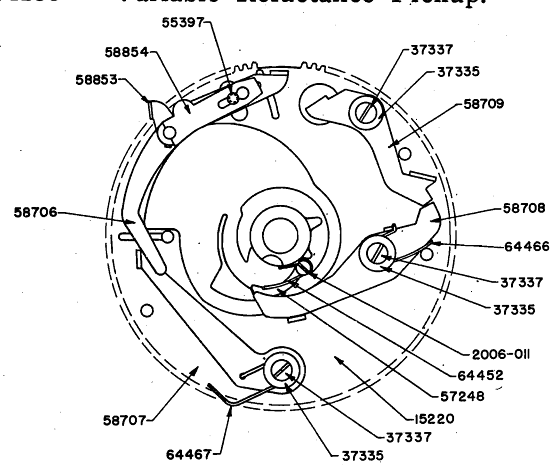

FIGURE 8—Main Cam Assembly

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FIGURE 8

Part No.	*Description*
15220	— Main Cam and Pin Assy.
37335	— Washer (#4 x 3/8" o.d).
37337	— Mtg. Screw for Levers (H.M.S #4-36 x 1/4").
55397	— Trip Adjustment Screw.
57248	— Main Cam Switch.
58706	— Starting Lever.
58707	— Reject Lever.
58708	— Tone Arm Hold Out Lever.
58709	— Hold Out Locking Lever.
58853	— Starting Reset Lever.
58854	— Starting Lever Spring.
64452	— Cam Switch Spring.
64466	— Spring for Hold Out Lever.
64467	— Trip Spring.
2006-011	— #2-56 x 7/16" Fil. M.M.S.

FIGURE 10

Part No.	*Description*
36857	— 1/4-28 Hex. Nut (To Mount Main Cam)
37338	— Shim Washer.
37339	— Flat Washer (1/4" i.d. x 5/8" o.d. x 1/16" thick).
55335	— Cam Spacer (Inside Main Cam Hub).
55336	— Mtg. Bolt for Main Cam.
2019-007	— 1/4" S.P. Int. Lockwasher.

Inspect parts not requiring lubrication to make certain they are clean. Always be sure to use the type of oil or grease recommended for lubricating specified items.

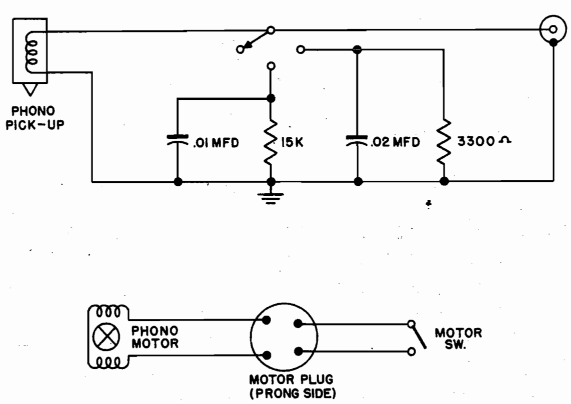

FIGURE 9—Circuit Diagrams

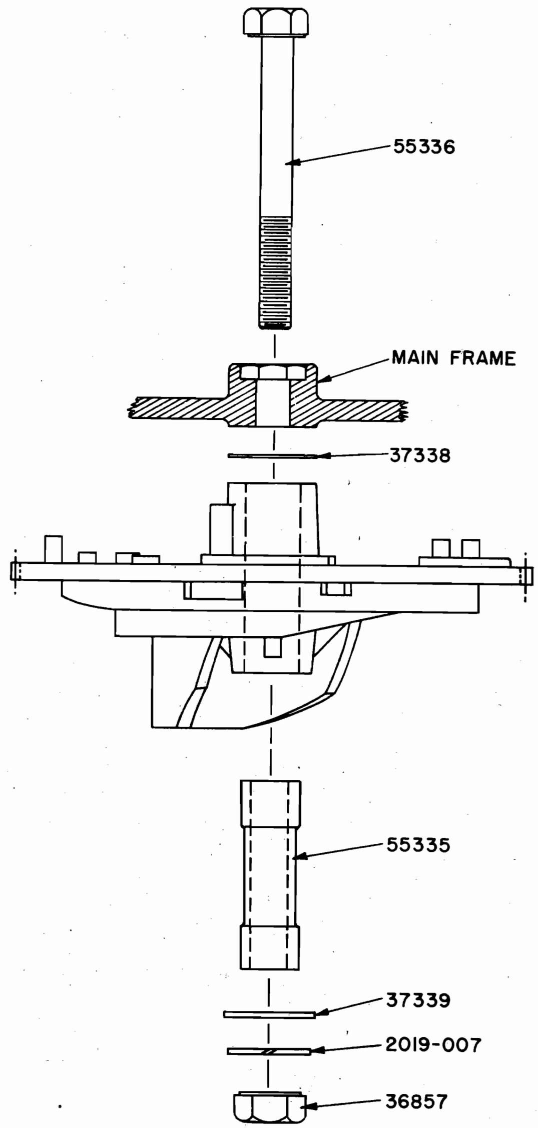

FIGURE 10—Cam Mounting Assembly

PARTS REPLACEMENT

Section 7

A. REASSEMBLING PARTS

When repairs are being made, a careful check should be made of all moving parts in order to make sure that no binding occurs. Check all moving parts for binding before springs are connected.

All levers which operate on shoulder studs should be assembled with the burred side of the retaining washer away from the lever to prevent the washer from binding on the lever.

B. TO REMOVE AND REPLACE TURNTABLE

Remove the changer from the cabinet, and from the bottom side of the main frame (near the spindle) loosen the screw which holds the turntable down, so that it is clear of the pinion gear. The turntable may then be raised from the top side of the changer. Care must be taken not to damage the cork washers next to the bearing.

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When replacing the turntable, see that the cork washer 60597, then the bearing race 58716, bearing retainer 13816, and another bearing race and cork washer are installed in this sequence (see Figure 1). Align these parts with the center spindle. When pushing the turntable over the spring assembly, push firmly but cautiously, avoiding too much pressure which may damage the springs. When the turntable is in place, move hold-down into groove in turntable hub and tighten screw.

C. TO REMOVE IDLER PULLEY

After the turntable has been removed, the idler pulley can be removed by slipping off the small hairpin cotter on the end of the idler pulley shaft.

When replacing the pulley a single drop of oil should be used on the pulley shaft.

CAUTION:

Do not allow oil to get on either the idler pulley or the turntable rim.

D. TO REMOVE AND REPLACE SPINDLE ASSEMBLY

Remove nuts from bottom of compression rod. Lift compression lever 57240 out of position. Remove E washers and record lift bracket 58700. Pull spindle assembly out from top side. Do not attempt to repair assemblies but replace with new parts. To reassemble, push assembly inside of outer spindle from the top. Put record lift bracket in place and install E washers. Swing compression lever into position and install flat spring 58789, nuts 37344 and 2015-002 and No. 3 lockwasher. Tighten nuts on compression lever until rubber sleeve on spindle reaches .330″ to .337″ diameter when fully compressed. Use Glyptal to secure lock nuts.

E. TO REMOVE AND INSTALL MAIN CAM ASSEMBLY (Fig. 1)

Remove turntable (paragraph B). Remove nuts from bottom of spindle and turn compression lever back to clear cam. Disconnect spring from tone arm lift lever 58694. Remove nut 36857 from under side of cam and withdraw bolt 55336 from top side of changer. Slide cam out carefully so as not to bend any levers on baseplate side. Adjust screw 55397 so that tension on starting reset lever 58853 is 6 to 8 grams. Use Glyptal on bottom side of screw. To reinstall the cam replace cam shim 37338, slide bolt through from top side of changer and slide cam into place being sure that spacing shim 37338 is not lost. Cam should have insert spacer 55335. Use flat washer 37339, lockwasher 2019-007 and hex nut 36857. Reinstall tone arm lift lever 58694 and attach spring 64431. Swing compression lever into place and install flat spring, two nuts and lockwasher. Secure these nuts with Glyptal after spindle assembly has been adjusted. Reassemble turntable (paragraph B.)

F. TO REMOVE AND INSTALL TONE SWITCH & BRACKET ASS'Y 13825

Disconnect pickup lead wires from socket 80030. Remove two screws which hold bracket to baseplate. Lift bracket from assembly.

To reinstall, insert tone switch coupling 64464 between rejects plunger 55420 and switch 90243. Replace screws 2000-157 and lock washers 2019-004. Resolder pickup wires to socket; the black wire should be connected to the center terminal.

G. TO REMOVE AND REPLACE TONE KNOB & PLUNGER ASSEMBLY 09353

Remove Tone Switch and bracket assembly 13825 (paragraph F). Lift plunger assembly out from top side. Unscrew reject knob 59486 while holding shaft 55420 rigid. Remove spring 64474 and knob 57262 by lifting over top of shaft. To reassemble, place knob 57262 on shaft. Drop spring into knob and screw reject knob onto shaft. Push assembly in from top side of changer so that pointer is on markings on baseplate. Reinstall tone switch and bracket assembly (paragraph F).

H. SHIPPING CHANGER

The changer is solidly mounted on a mounting board. The mounting board is mounted upon free-floating springs.

When shipping the changer, a hold-down bolt should always be used on each side of the changer mounting board to hold the changer securely in the cabinet. A cardboard spacer ⅛" thick should be placed adjacent to the shipping bolts between the mounting board and the cabinet. The tone arm may be held securely to the outer edge of the turntable by arranging a cardboard strip to fit over the spindle and hold the tone arm down.

I. INSERTING PHONO PLUG

The phono input plug must be inserted into the phono socket as far as possible to avoid "grid hum". If hum presists, check ground connection of socket.

OPERATIONAL ADJUSTMENTS

Section 8

J. TONE ARM HEIGHT ADJUSTMENT

Load a 10″ record on the spindle and turn the turntable by hand through cycle until the tone arm is at its highest point. From bottom side of changer, loosen hex nut 2015-007 and adjust screw 37511 to tone arm height desired. Tighten locknut on lift lever.

To remove lift lever 58694, release spring 54431 and withdraw lever from slot. To reinstall, insert pin 55325 in lift lever. Insert lift lever in slot and connect spring.

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K. NEEDLE LANDING ADJUSTMENT

Place a 10″ record on spindle and press reject button. Changer should continue in cycle until coming into playing position. Observe whether or not the needle lands in starting groove (about 3/32″ from outside edge of record). If needle lands too close to outer edge of record, turn top tone arm adjusting screw 55328 with coin in direction indicated on baseplate. If needle landing was too far from outer edge of record, turn adjusting screw in opposite direction. Hold top of spindle down and press reject button to check needle landing.

12″ needle landing will usually not require adjustment. If required, it should be made only after 10″ adjustment has been corrected. For erratic needle landing, check the wire leads to see that they do not bind or interfer with the tone arm.

L. VELOCITY TRIP ADJUSTMENT

Break the seal on the adjustment screw 55397 which is located in hole in bottom of cam near spindle. Turn to the left to tighten until the tone arm will trip on the record. To check adjustment lever 58706 on cam should contact both lugs on turntable hub when tone arm is in last playing grooves of record before tripping. Seal screw thread with Glyptal to prevent screw from coming out of adjustment.

M. RECORD FEED

1. DOES NOT DROP RECORDS
   a. See that stabilizer arms are not down under the record stack.
   b. Check vertical clearance in spindle. Should be approx. 1/64″.
   c. Check the records to see that the label is not extended into the center hole.
2. DROPS MORE THAN ONE RECORD
   a. Check center hole of record for being chipped or oversized. (This changer will not chip or break records).
   b. If 12″ record hangs on interceptor lever 58698, check slot in changer head for burrs. This lever should move freely with a slight drag on the side of the slot.
3. CHANGER DOES NOT START
   a. If changer does not start immediately, press reject button a second time.

N. REPRODUCTION

1. No response.
   a. Audio system. Check with radio reception.
   b. Pickup leads shorted.
   c. Pickup cartridge dead. Try new cartridge.
2. Distorted tone.
   a. Worn needle.
   b. "WOWS" or variance in speed.
      (1) Oil on idler pulley and turntable rim.
   c. Warped records.
   d. Defective pickup cartridge.
      1. Use of badly chipped records or records with breaks.
      2. Dropping tone arm on record.
3. Thumping noise.
   a. Groove in idler pulley worn by motor drive pulley. Result of idler pulley being held stationary with motor running.
      1. Sand idler pulley smooth or replace pulley.
4. "Grid Hum".
   a. Insert phono input plug into phono socket as far as possible.
   b. Check electrical ground connection of phono socket.
5. Mechanical Hum.
   Check alignment of turntable motor armature.
   b. Check if phono plug and line cord are in their respective sockets.
   c. If further trouble, turn turntable several revolutions to be sure that changer was not shut off during cycle. Press reject button to start.

4. CHANGER SHUT-OFF

Changer should shut off after last record is played. Spindle should have approx. 3/32″ vertical motion when no records are on spindle. One 10″ record should be sufficient weight to depress spindle so that changer will not shut off. If changer does not shut off or if it shuts off before last record is played, see that spindle is not sticking. It should have a free vertical motion. Also check stop pawl for binding.

PARTS

Part No.	*Description*	*Part No.*	*Description*
57262	Noise Eliminator Selector knob	13816	Ball Bearing & Retainer (for turntable)
07593	Record Lift Lever Bracket Assy.	13819	Idler Pulley
07594	Turntable Assembly	13825	Tone Switch & Brkt. Assy. Complete
07651	Record Lift Lever Assy.	15193	Tone Arm Swing Lever Assy.
09271	Mtg. Spring Assy. for 21P-4, 24P-4, 26P-4, 29P-4 and 30P-4	15194	Tone Arm Lever & Pin Assy.
		15195	Compression Lever Assy.
09362	Mtg. Spring Assy. (used on late 31P-4 and all other not previously listed)	15196	Automatic Stop Switch Assy.
		15197	Tone Arm Crank & Pin Assy.
09365	Mtg. Spring Assy. (used on early 31P-4	15220	Main Cam (casting only)
11377	Tone Arm Support Tube & Brkt. Assy.	15237	Idler Brkt. and Stud Assy. (on phono motor)
11378	Magnetic Pickup and Housing Assy. Complete	25112	.01 mfd. 200 volt Condenser
11379	Inner Spindle Assy.	25276	.02 mfd. 200 volt Condenser
11437	Phono Motor Assy.	36857	¼-28 Hex Nut (to mount main cam)
11463	Pickup Lead Assy.	36882	H. P. Cotter
13674	Upper Spindle Assy.	37066	Acorn Palnut

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Part No.	Description
37155	Spade Lug (for tone arm lift lever spring)
37332	#6 Special Flat Washer (to mount reject lever Assy.)
37333	"E" Washer (for tone arm adjusting stud)
37334	#10-32 x 7/8" H. H. Bolt (to mount outer spindle)
37335	#4 x 3/8" o.d. washer (for mounting levers on main cam)
37337	#4-36 x 1¼" bdg. H.M.S. (mtg. screws for levers on main cam—reject, tone arm hold out)
37338	Shim Washer (to mount Main Cam)
37339	Flat Washer ¼" i.d. x 5/8" o.d. x 1/16 thick To Mount Main Cam)
37340	Brass Washer (to Mount Motor)
37341	#8-32 x 7/8" Hex Head Bolt (for tone arm crank assy.)
37343	#3 x 5/16" o.d. flat washer (on bottom of record spindle)
37344	#3-48 Special Hex Nut (Spindle Height Adj. nut)
37390	"E" Washer (small) for record spindle
37421	"E" Washer (to mount idler pulley, idler pulley Brkt. and Ventilator Fan)
37511	#10-32 x 5/8" H.H.M.S. (on tone arm lift lever)
37512	"E" Washer (large) for record spindle
37646	Mounting Bolt (for mtg. changer to mtg. board) (two required)
54308	Thrust Washer for Idler Pulley and Idler pulley Brkt.
54309	Thrust Washer for Motor Ventilator Fan
55325	Lift Lever Pin
55328	Tone Arm Set Down Adjustment Stud
55329	Pin For Tone Arm Interceptor Lever
55332	Pin For Compression Lever
55333	Pin For Record Lift Lever
55334	Outer Spindle
55335	Cam Spacer (inside Main Cam Hub)
55336	Mounting Bolt for Main Cam
55337	Motor Mtg. Spacer
55339	Tone Arm Hinge Pin
55341	Tone Arm Lift Rod
55345	Sleeve Support Washer For Record Spindle
55395	Hinge Pin for Reject Link
55396	Mounting Pin For Starting Lever
55397	Trip Adjustment Screw
55416	Mounting Bolt (One required to mount changer to mounting board)
55420	Manual Reject Plunger Rod
57248	Main Cam Switch
57254	Tone arm end housing
58863	Retainer Spring for Pickup
58692	Interceptor Reset Lever
58693	Switch & Reject Lever
58694	Tone Arm Lift Lever
58697	Tone arm adjustment lever
58698	Tone Arm Interceptor lever
58701	Turntable Hold Down Brkt.
58702	Bearing Support Washer (Under Turntable Bearing)
58706	Starting Lever
58707	Reject lever (on main cam)
58708	Tone Arm Hold Out Lever
58709	Hold Out Locking Lever
58716	Bearing Race Washer (for turntable)
58789	Compression Spring
58851	Tone Switch Bracket
58852	Manual Reject Link
58853	Starting Reset Lever
58854	Starting Lever Spring
58862	Tone Arm Tube Only (Chrome)
58971	Ventilator Fan for phono motor
59486	Reject Button for P-71
60597	Cork Washer for Turntable Bearing (for turntable)
62152	Rubber Sleeve for Record Spindle
62173	Rubber Motor Mtg. Grommets
64429	Reset Spring
64430	Reject Spring
64431	Lift Lever Spring
64433	Spring For Tone Arm Adjusjtmnet
64434	Spring For Tone Arm Interceptor Lever
64437	Tone Arm Counterbalance Spring
64452	Cam switch spring
64464	Switch Release Spring
64465	Tone Switch Coupling Link
64466	Spring For Tone Arm Hold Out Lever
64467	Trip Spring
64471	Spring For Idler Pulley
64474	Spring For Reject Button
64476	Lead-in Spring
71238	Magnetic Pickup (Less Housing)
77240	3300 ohm ½ watt resistor
77426	15K ohm ½ watt resistor
80030	Phono Output Jack
80150	4 Prong Motor Plug (male)
80327	2 Prong Molded Pickup Socket
90243	Tone Selector Switch
92256	Felt Washer For Turntable Bearing
92335	Felt Washer For Motor Ventilator Fan
2003-155	#6-32 x ¼" F H.M.S. (to mount tone arm adjusting lever)
2006-011	#2-56 x 7/16 Fil. H.M.S. (to mount cam switch)
2015-001	#2-56 Std. Hex nut (to mount cam switch)
2015-002	#3-48 Std. Hex nut (lock nut for spindle height adj.)
2015-007	#10-32 Std. Hex Nut
2017-004	#8 i.d. x 3/8" o.d. flat washer (for tone arm crank assy.)
2019-007	¼" S.P. Int. Lockwasher (to mount main cam)
2085-205	#6-32 x ¼" Truss H.M.S. (for mtg. reject lever)
2085-215	Motor Mtg. Bolt #6-32 x 5/8"

SPECIFICATIONS

Power Consumption at 117 volts ....18 watts Type of Pickup..........................Variable Reluctance

Voltage Rating ....105 to 125 volts at 60 cycles Type of Needle ....Permanent Osmium Point

MOUNTING HARDWARE FOR P-71 RECORD CHANGER

09271	Mtg. spring assy. for 21P-4, 24P-4, 26P-4, 29P-4 and 30P-4
09362	Mtg. spring assy. (used on late 31P-4 and all other not previously listed)
09365	Mtg. spring assy. (used on early 31P-4)
37066	Acorn palnut (four required)
37646	Mounting bolt (for mtg. changer to mtg. board) two requred
55416	Mounting bolt (for mtg. changer to mtg. board) one required

ELECTRICAL CIRCUIT

Most service men working on Capehart instruments have had considerable experience with radio and phono radio combinations and can handle both. However, some service men have asked for an explanation of the electrical-mechanical trip system of the 16-E, so a schematic diagram of the changer circuit as used on the 400M is given on page 5.

In the 400M series when the Phono Button on the tuner is pushed, the "Off-On" Relay is actuated as is the "Selector Motor" Relay. These relays are located in the tuner. The "Off-On" Relay holds itself closed until the "Off" button is pushed, this operates the "locking" Relay which opens the "Off-On" Relay Coil Circuit. In the 100 series, the "Off-On" Switch is mechanically operated and is ganged with the volume control shaft.

In the 400M the "Off-On" Relay is used to turn on the power for the entire instrument; except for the 18V transformer in the tuner chassis, which is always connected to the 117 Volt line, so the relays can be operated at will. One set of the "Off-On" relay contacts is used to keep its coil energized until the "Off" button is pressed, at which time the holding circuit is opened and the relay restored to normal. Another set of contacts is used for the 6.3 Volts for the heaters and pilot lights in the tuner. Another set of contacts completes the 117 volt supply for the Amplifiers, Phono Motor (if phono is selected) and the "Reject" Relay (located in the Junction Box). In the 100 series instruments, the AC phono switch is ganged with the program switch. When the program switch is turned to phono position, 117 VAC is supplied to the phono motor and reject relay (located in cabinet junction box). Due to the fact that the contacts of this Relay are closed until the coil is energized, the 117 volts are applied to the clutch Solenoid in the Record Changer. This causes the Record Changer to go through its cycle, unless the Automatic Switch is in "Off" position, before playing a record, thus the tubes are given time to reach operating temperature.

In the 400M models, the "Selector Motor" relay controls the Phono-Radio indicator lights as well as the Dial Scale lights, the "Phono" Relay (in the Junction Box), the Selector Motor and "Mutes" the signal when the program service is changed by a push button.

In the Record Changer the Clutch Solenoid is energized by the Phono Button (the program switch phono position on all 100 K. & M. series), the Reject Button, or the Automatic Trip Switch.

When the Reject Button is pressed, the Clutch Solenoid is energized by the "Remote Reject" Relay (in the Junction Box).

When the needle enters the trip or change groove in the record, the motion of the Tone Arm actuates the Automatic Trip Switch which energizes the Clutch Solenoid.

Whenever the Clutch Solenoid is energized, the changer goes into cycle. As soon as the cycle is started, the solenoid circuit is opened by breaking the top and center contacts of the motor solenoid switch. If the instrument is turned off during the cycle the changer continues to complete the cycle due to the center and bottom contacts of the Motor Solenoid switch by passing the motor switch contacts of the Phono Relay and Off-On Relay.

The Automatic Trip Switch, located under the Turntable, is actuated by the movement of the Stop Trip Lever being transferred by the Tone Arm. On the underside of the turntable there is a fibre pin which moves the Stop Trip Lever back. During each revolution of the turntable, the fibre pin hits the lever, thus resetting the stop trip lever until the needle enters the change groove; this causes the Clutch Solenoid to be energized by closing the Automatic Trip Switch. The automatic "Off-On" switch is used to open the Clutch Solenoid circuit, in the event it is desirable to use the instrument manually.

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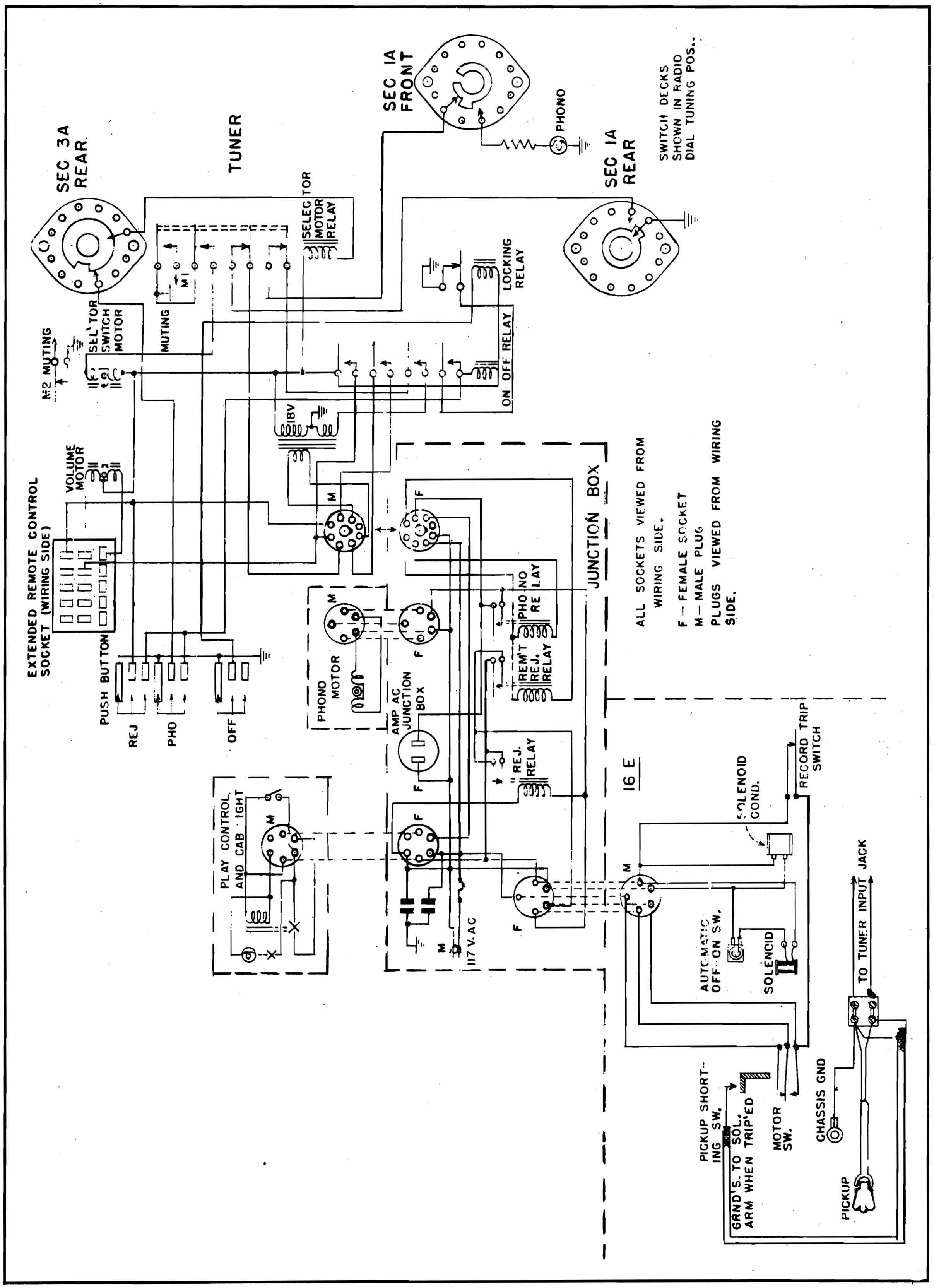

FIGURE B. COMPLETE RECORD REPRODUCING CONTROL CIRCUIT DIAGRAM FOR 400M

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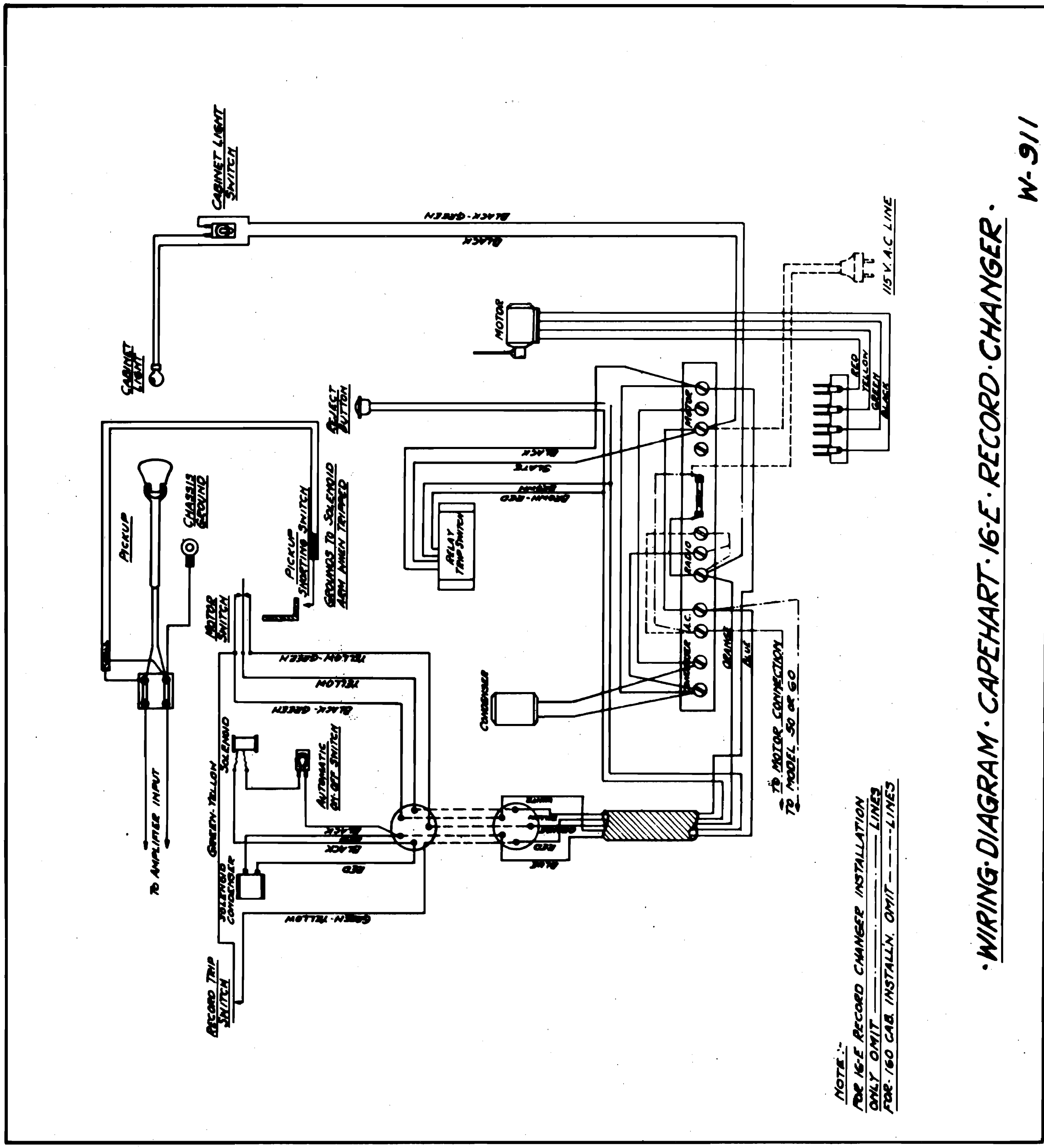

MECHANICAL OPERATION

The best approach to a knowledge of the 16-E changer is to accept it on the basis that it is really "Four Changers in One". A study of each of the four fundamentals will enable a quick analysis of trouble.

The first operation, (Manual), is accomplished by placing the Automatic Switch in the "Off" position, thus opening the Clutch Solenoid circuit so the changer mechanism is not connected to the Drive Shaft at the end of a record.

The second operation, (Repeat), is accomplished by throwing the Automatic Switch to "On" position and the Selector Lever to the "Repeat" Position. Then, at the completion of a record, the Automatic Trip Switch actuates the Clutch Solenoid, thus connecting the changer mechanism to the motor. The steps that follow are:

1. Pickup Arm is elevated.
2. Pickup Arm is swung clear of the Record Tray.
3. The Record Magazine tilts but does not discharge a record.
4. The Record Magazine starts to return, as does the Pickup Arm.
5. While the Record Magazine is completing its return the Pickup Arm engages the Stop Arm, the needle is lowered to the record, and the cycle is complete.
6. No record is released from the record magazine during the repeat cycle since the record release lever has been pulled away from the Main Cam by the Selector Lever.

During the change cycle the Pickup is short-circuited by a muting switch.

The third operation, (Play one side).

1. Pickup Arm is elevated.
2. Pickup Arm swings clear of Record Tray.
3. Record Tray lifts to deliver record to Magazine.
4. As record in Record Tray strikes Record Support Pins, another record is discharged from the Magazine.
5. After record is expelled from the Magazine, the Record Tray returns part way and pauses.
6. Magazine tilts, and waits to deliver record to Record Tray, which starts down again.
7. Record Tray again pauses to allow record to settle over Spindle.
8. Magazine returns to normal position as does Record Tray.
9. Pickup Arm swings in and engages Stop Arm. This positions pickup over record and then needle is lowered to record.

The fourth operation, (Play both sides).

1. Pickup Arm is elevated and swings clear of the Record Tray.
2. The Record Reverse Arm and Guide swing around in front of the magazine.
3. The Record Tray places the record against the Reversing Arm and starts back to normal position, pausing midway.
4. The Magazine tilts to slide the reversed record onto the Record Tray, pauses in its return until the record touches the front of the Tray, and then returns to normal position.
5. The record settles over the spindle.
6. The Tray returns to normal position.
7. Pickup Arm swings against Stop Arm.
8. Needle is lowered on record.

STEP BY STEP DESCRIPTION

REPEAT CYCLE. At the completion of the record the needle enters the change groove, swinging the Pickup Arm, thus closing the Automatic Trip Switch, and energizing the Clutch Solenoid. Energizing of the Clutch Solenoid engages the two clutch sections, starting the change cycle. At the time the Clutch sections are engaged, the Clutch Solenoid Circuit is opened by breaking top and center contacts of the motor solenoid switch. Cycle is completed even though main switch is turned off since the center and bottom contacts of the Motor Solenoid Switch by-passes the motor contacts of the phono-motor relay and main on-off Relay causing the motor to run until cycle is completed.

The Pickup elevation is accomplished by the Pickup Lift Cam raising the Pickup Lift Shaft. As soon as the Pickup is fully elevated, the Pickup Arm is swung clear of the record by the Pickup Swing Cam rotating the Pickup Arm Swing Lever. Due to the fact that the mechanism is in cycle, the Magazine is tilted by the Main Cam operating the Magazine Slide Arm. Just after the Magazine starts to return to the normal position, the Pickup Arm starts to lower and swing into playing position. When moving in, the Pickup Arm Lever Hook engages with the Pickup Arm Stop Lever. With 12" records the Rubber Roller at the end of the Stop Lever touches the edge of the record and stops the inward motion of the Pickup Arm. On 10 inch records this is done by an adjustable machine screw striking a stop which is a part of the baseplate casting. The Pickup Arm is swung against the Stop Lever by the Pickup Arm Friction Cam. The Pickup Arm Stop Lever swings back out of the way after the needle has touched the record, but before the full weight of the pickup is on the needle.

ONE SIDE CYCLE

To play one side of the record, the Selector Lever is moved to the One Side position (middle). This engages the Clutch to allow the Record Tray to be lifted by the Main Cam through the Record Tray Cam Follower. When this Clutch en-

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gages, the Record Separator Hook Arm and Roller Assembly swings over the periphery of the Main Cam.

After playing the record, the needle enters the change groove, thereby closing the Automatic Trip Switch and energizes the Clutch Solenoid. This action engages the Driving Clutch, and the change cycle starts with the Pickup Arm being elevated and swung clear of the Record Tray, which lifts the record off the Turntable and delivers it to the Magazine. Just before the tray with the record reaches the point where the record touches the sloping face of the Record Support Pins, a record is ejected from the Magazine by the Record Separator. When the changer is in cycle, the Main Cam revolves; on its periphery is a raised portion that lifts the Record Separator Hook Arm and Roller Assembly, drawing the Record Separator Hook down, thereby raising the Record Separator and three records. One record is lifted to the shoulder of the Lower Record Support Assembly and the Hook which is part of the Record Separator, and located on the center line of the Lower Record Support Assembly, engages the two bottom records of the stack and lifts them slightly. This assists in the discharge of the record from the Magazine by forcing the second and third record back against the first record, thereby helping to push it off the separator knife into the record well. The record drops to the Rubber Bumpers in the well while the Record Tray is delivering a record to the Magazine. The tray starts downward and its curved tailpiece lifts the record as the Magazine starts to tilt. The Record Tray pauses midway on its downward trip until the Magazine moves to the highest horizontal point, thus allowing the record to slide out; the Magazine then remains stationary until the record slides against the front of the Record Tray which has resumed its downward movement, only pausing to allow the Magazine to lower the center hole of the record over the Spindle. The Record Tray returns to normal position as does the Magazine, the Pickup Arm swings in and is lowered, as in the repeat cycle, and the Clutch is disengaged by the Clutch Throwout Cam striking the Clutch Throwout Lever.

BOTH SIDES CYCLE

To play Both Sides, the Record Reverse Cam Shaft Lever moves the Record Reverse Cam so that it engages with the Record Reverse Cam Pin in the Reverse Cam Shaft. In the other positions, the Reverse Cam floats on the Cam Shaft and does not rotate with the Shaft. The Record Reverse Arm and Roller rides over the face of the reverse cam and operates the reverse arm assembly thru an adjustable drive rod.

After the Pickup is elevated, the Record Reverse Arm and Guide Assembly swings around in front of the Magazine. When it gets to the reversing position and the Tone Arm is clear of the Record Tray, the Tray raises. As the Tray raises, the record slides back against the Rear Rubber Bumpers, and the Tray compresses the spring arms of the Record Reversing Guide. The record hits the slanting face of the Support Pins while the Tray continues up, and the record slides up these faces to the top surface of the Support Pins. When the Record Tray starts to return, the spring tension of the Record Guide pushes the bottom edge of the record off the support pins and as the record Tray pauses midway to the normal or playing position, the Magazine tilts, causing the record to slide down the Record Guide. The Magazine reaches its furthest excursion and returns part way, where it pauses, and the Record Tray continues downward to nearly the normal position. About the time the record hits the front of the Tray, the Magazine returns to the normal position after the record has dropped over the Spindle. The Record Tray then returns to normal, and the Pickup Arm is returned as in the repeat and one side conditions.

If one carefully watches the Magazine in the Both Sides Position, it will be noted the travel of the Magazine is shorter in the "Reversing" cycle than in the change cycle. On the side of the Main Cam, away from the rear of the instrument, there are two cam tracks. On the Magazine Slide Arm there are two rollers on a rocker arm, and when the Repeat, Play One Side and the change cycle of play Both Sides are in use, the outer cam track is engaged. On one side of the Record Reverse Cam is a pin which shifts the arm and moves the rocker so the inner cam track is used to change the Magazine travel. On the arm is another pin, which is struck by the Magazine Slide Arm Cam, changing the roller in use, also the cam track. Due to the fact that the Reverse Cam Shaft runs half as fast as the Main Shaft, the above action occurs every two cycles. The Record Reverse Cam, making only one-half turn per cycle, raises the Reverse Arm and Roller every other cycle, and in raising it, the Reversing Arm and Guide are swung around in front of the Magazine. When the Reversing Arm and Guide swing in front of the Magazine, the Record Separator Hook Arm and Roller are swung away from the Main Cam to prevent discharge of a record from the Magazine in the "Reversing" cycle.

Due to the impossibility of covering the action of each part in the changer in the brief description above, it is essential that every service man spend considerable time observing the action of each part of the changer under each of the four conditions outlined above.

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MOTOR DRIVE
GEAR REDUCTION – DRIVE SHAFT ALIGNMENT

A silent and smooth operating drive motor and gear reduction unit, properly coupled to the record changer, is of utmost importance for perfect reproduction of records. Unless these parts are all functioning properly, there is a possibility that waver or wows may be noticed in the sound reproduction from records. It is also possible that an objectionable hum or rumble may be discernible during low passages in records or the change cycle. If such conditions are apparent, we suggest a careful check and adjustment in accordance with the procedures which follow.

After freeing the record changer by removing the four hold down bolts used in shipment, make certain that the record changer is floating freely on its rubber mounting supports, and that it does not touch the record changer mounting shelf at any point. There should be a feeling of entirely free floating motion when the changer is shaken slightly. If such is the case, it is a good indication of full free floating action. By making sure that the record changer is "Free floating" the possibility of acoustic feed-back, hum, or rumble is eliminated.

Because of the importance for positioning the record changer into a free floating position, it is always advisable to check the alignment of the record changer drive shaft with respect to the gear reduction unit and between this unit and the drive motor. Unless the correct relationship is maintained, excessive hum or rumble may be present as well as the possibility of uneven turntable speed causing waver or wows in the record reproduction.

If the above conditions are apparent with record changer in free floating position, shift the gear reduction unit and motor assembly slightly until a position is found where the difficulty is eliminated or negligible. It may be necessary to enlarge mounting holes in the motor and gear unit assembly mounting board.

NOTE: Drive motors and gear reduction units are "run-in" and aligned on the mounting board at the factory, and will seldom, if ever, require adjustment in the field unless they have been tampered with, or in the event the motor has shifted due to rough handling in transit. If hum or rumble persists after trying previous suggestions, loosen the motor and shift slightly locking it in place when minimum hum position is located.

SAFETY CLUTCH—PURPOSE AND ADJUSTMENT

The purpose of this feature is to uncouple the record changer from the gear reduction unit in the event a faulty record or improper operation of the machine causes the record changer to jam during some portion of the change cycle.

Essentially, this device consists of two metal discs with a leather washer between. The driving power is transmitted from the lower to the upper disc through the leather washer because of the pressure developed by the nut, part 368-2, controlling the pressure of the spring, part 3938. Pressure of the spring determines the amount of back pressure, and by its adjustment, it may be set so as to cause the clutch to slip if more than normal drive tension or load develops somewhere in the record changer during its change cycle, thereby acting as a "safety" feature.

The proper method of checking the adjustment of the safety clutch follows. With the record changer in cycle and the record magazine fully loaded, apply a slight downward pressure on the bottom of the record magazine, while the magazine is tilting backward. When such pressure is applied, it should cause the safety clutch to slip and the turntable should stop revolving. In the event the action of the safety clutch is not as described, loosen nut, part 368-2, thereby releasing pressure on spring, 3938, this will permit safety clutch to unload sooner. After this adjustment is made, the changer should be put through a number of cycles to make certain that the clutch does not slip at any point in the normal change cycle as this would cause the changer to stall.

The action of this safety clutch should always be checked when the instrument is permanently set up in the customer's home since it acts as a safety device to prevent record breakage or damage to changer in the event of a jam because of reasons previously mentioned. CAUTION: The leather clutch facing should be kept free from oil or grease.

NOTE: The Safety Clutch is locked together by use of a "C" washer in the end of the shaft. If unable to make proper adjustment after clutch has been slipping, remove clutch assembly and examine to determine if washer is out of position. If the washer is lost and none is at hand, the end of the shaft may be drilled and a small cotter key used to hold assembly together.

GEAR REDUCTION UNIT

At least once a year the gear reduction unit should be checked to make certain it contains the proper amount of oil. It should contain one-half ounce, No. 10 S.A.E. oil. Stock No. 1315-1.

LUBRICATION

At least every six months a few drops of oil should be applied to the drive motor oil cups. See illustration. For this purpose, use the special electrical motor oil which is carried by most all oil companies for electric fans, sewing machine motor, etc.

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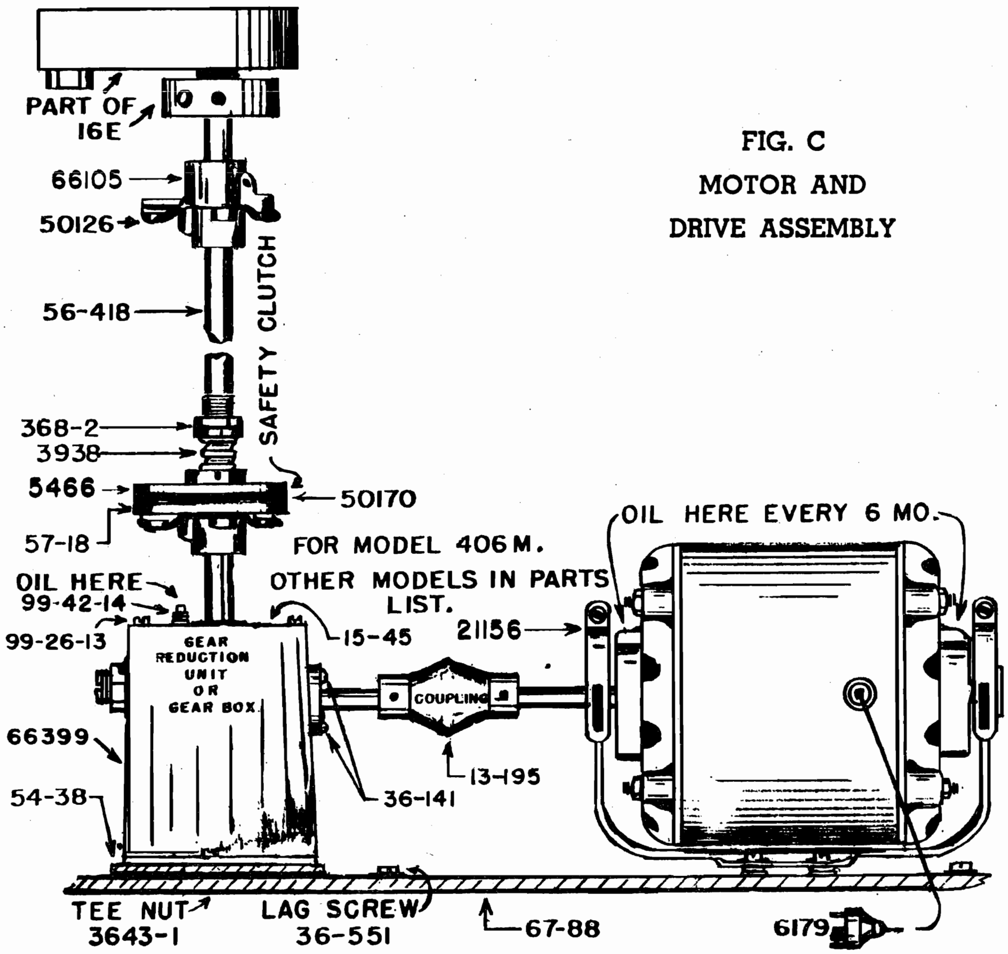

FIG. C
MOTOR AND
DRIVE ASSEMBLY

MOTOR DRIVE PARTS LIST

Part No.	Description
21156	Motor, 60 cycle
21157	Motor, 50 cycle
35107	Gear Box Worm Gear
3938	Spring, Safety Clutch
4067	Bearing
50126	Leather Disc
50170	406M Drive Facing (Leather)
50225	Gear Box Cover Gasket
5466	406M Upper Friction Drive Disc
6019	1/4″ Allen Wrench
6179	5 Prong Motor Plug
66105	Flexible Coupling
66399	Gear Box 60 cycle
66435	Gear Box 50 cycle
99-26-13	10/24 x 3/8″ H. H. M. S.
99-28-13	1/4 x 20 x 1/4″ Allen Set Screw
99-34-7	406M Cotter Pin
99-42-13	1/4″ Steel Ball
99-42-14	1/8″ Pipe Plug
13-148	411M Friction Drive Assembly
13-150	412M Friction Drive Assembly
13-141	406M Friction Drive Assembly
99-28-13	Flexible Coupling Set Screw
13-151	410M Friction Drive Assembly
13-195	Motor Coupling & Set Screw
15-45	Gear Box, Cover, Pinion & Bearing Assembly
36-136	No. 10 Plain Washer
36-141	6/32 x 1/4″ R. H. M. S.
36-258	Spacers
36-501	"C" Washers for Friction Drive
36-550	No. 10/32 x 3/4″ Slotted H. H. M. S.
36-551	Lag Screw
41-89	"C" Washer Pkg. 12
54-38	Reduction Unit Shim
56-419	410M Shaft for Friction Drive
56-415	411M Shaft for Friction Drive
56-417	412M Shaft for Friction Drive
56-418	406M Shaft
57-18	Lower Friction Drive Disc (all models)
60-144	Fibre Washer
62-46	Motor Grommet
67-88	Mtg. Board
368-2	406M 3/8 x 32″ Hex Nut
1315-1	Reduct. Unit Oil S.A.E. 10, 1/2 oz.
3611-4	No. 10 S. P. Lock Washer
3643-1	No. 10/32 Tee Nut

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ELECTRIC PLAY CONTROL
ADJUSTMENTS AND MAINTENANCE
M Series

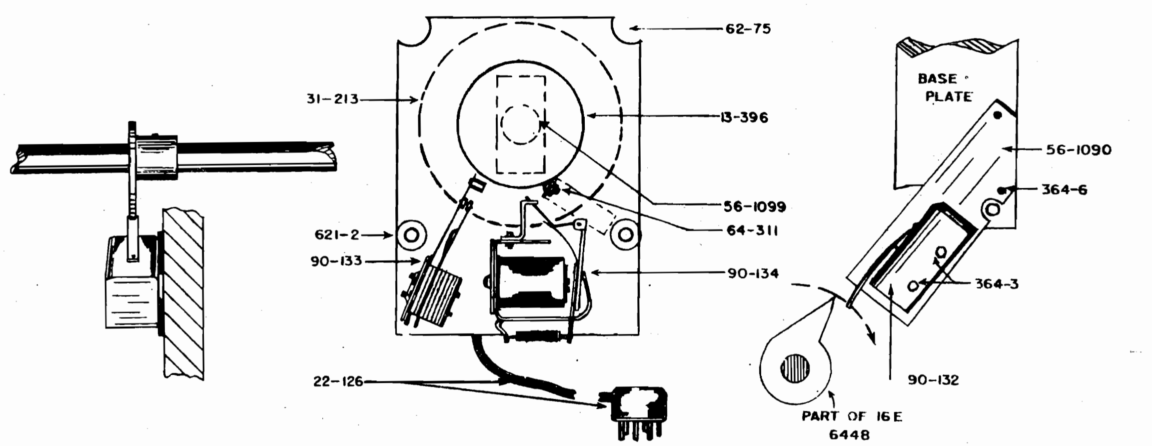

FIGURE D.   M SERIES PLAY CONTROL

PARTS LIST

Stock No.	Description
13-368	Play Control & Cabinet Light Assembly, Complete
13-396	Ratchet Assembly
22-126	Cable and Plug Assembly
31-213	Dial Scale
56-1099	Shaft
56-1100	Steel Ball Bearing
59-142	Knob
59-143	Housing
62-75	Rubber Grommet
64-311	Dog Spring
90-125	Light Switch
90-132	Acro Switch
90-133	Relay (Complete)
90-134	Master Switch
92-140	Back Cushion
621-2	Rubber Grommet
61163	Light Bulb

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ELECTRIC PLAY CONTROL—M SERIES—Cont.

1. The following parts comprise a complete play control installation. Play control with cables, plug and switch, compartment light, mounting bracket, two bracket mounting screws, two switch mounting bolts, and four wood screws. Check packing material so no parts are overlooked.
2. The mounting bracket should be installed on the record changer first, see illustration.
3. The bracket is mounted on the boss which supports the clutch fork shaft and the reverse cam shaft, on the side of the boss away from the main cam, so the clutch fork shaft sets in the cutout. Pass the two screws that fit the tapped holes in the switch bracket through the old play control bracket holes when mounting the bracket.
4. Remove the plug button from the partition between radio and changer, put the six prong plug, the switch and the cables through the holes in the partition. Fasten the play control on the partition by means of the wood screws being careful not to crack the plastic case by drawing the screws too tight or driving the screws in crooked. Also be sure the record tray clears the play control housing before driving any screws.
5. Fasten the switch to the bracket by means of the two bolts. See illustration. This puts the switch in such a position that the throwout cam can actuate the switch. Of course, the switch goes on the bracket with the leads at the bottom and pointing toward the left (when looking in the back of the cabinet), this brings the spring finger in line with the throwout cam.
6. Remove play control shorting plug (six prong) from junction box and plug in cable from play control. Set play control at any number except zero (off) and run changer through several cycles. If the switch is too close to the throwout cam, the relay in the play control will buzz; if not close enough, the action will be erratic. Be sure the bolts holding the switch and the screws holding the bracket are properly tightened.

MECHANICAL PLAY CONTROL
MODELS PRIOR TO M SERIES

TO ADJUST THE PLAY CONTROL

When setting a play control, the counter should reset at Zero just as the needle touches the record. That is, the play control cam, on the record changer main shaft, should be from 1/4″ to 1/2″ beyond the plunger after the main clutch has disengaged. The control cable is put in the hole in the plunger and the set screw tightened, then the cable housing should be held in place by the set screw—do not set the screw tight. Turn the bar knob pointer back and forth over the play control dial, if the pointer catches or binds, slip the cable housing away from the bracket slightly, until the pointer runs free, then run the changer through a cycle to see that the play control resets properly, then tighten the screw.

When adjusting the play control, which is in the record compartment, after removing the wood screws which mount the control to the shelf, remove the clips holding the 110-volt leads to the switch. Then remove the pointer and the two round head machine screws from the back. The stop spring of the stop spring and ball assembly, No. 66324, should be tangent to the gear and the ball should be in the space between the last and the next to the last tooth, before the blank space in the gear tooth. With the ball in this position, the set screw in the collar at the rear of the unit should be firmly against the stop pin. To make this adjustment, loosen the set screw, while holding the gear, move the collar, then tighten the set screw. In this position, the switch pin, No. 48202, should hold the switch open and permit the switch to close when the gear is advanced one tooth. The stop bracket, No. 4450, for the resetting dog, should allow the dog to advance only one tooth at a time, if it picks up more than one tooth, move the stop toward the dog until it advances only one tooth at a time.

The resetting dog, No. 3839, should not ride on the gear tooth, as this will prevent turning the pointer toward one hundred. Shift the stud, No. 4354, until the dog clears the tooth, then check the alignment of the plunger tube and the cable housing stud, for if the cable is bent here, the play control may fail to function.

When replacing the pointer, No. 6062, turn the shaft to the position, where the switch is open, then turn the shaft ONE notch or stop toward the one hundred, at this point, set the indicator on ZERO and set up the set screw, checking to see that the pointer does not ride on the dial at any point.

If trouble is experienced examine the cable for kinks or rust spots, in any case do not substitute music wire as it does not have the proper hardness and probably will not be the correct diameter, if it is too large, it will bind; if too small, it will kink.

Powdered graphite blown in cable or mixed with light oil and run in cable will improve operation.

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MECHANICAL PLAY CONTROL

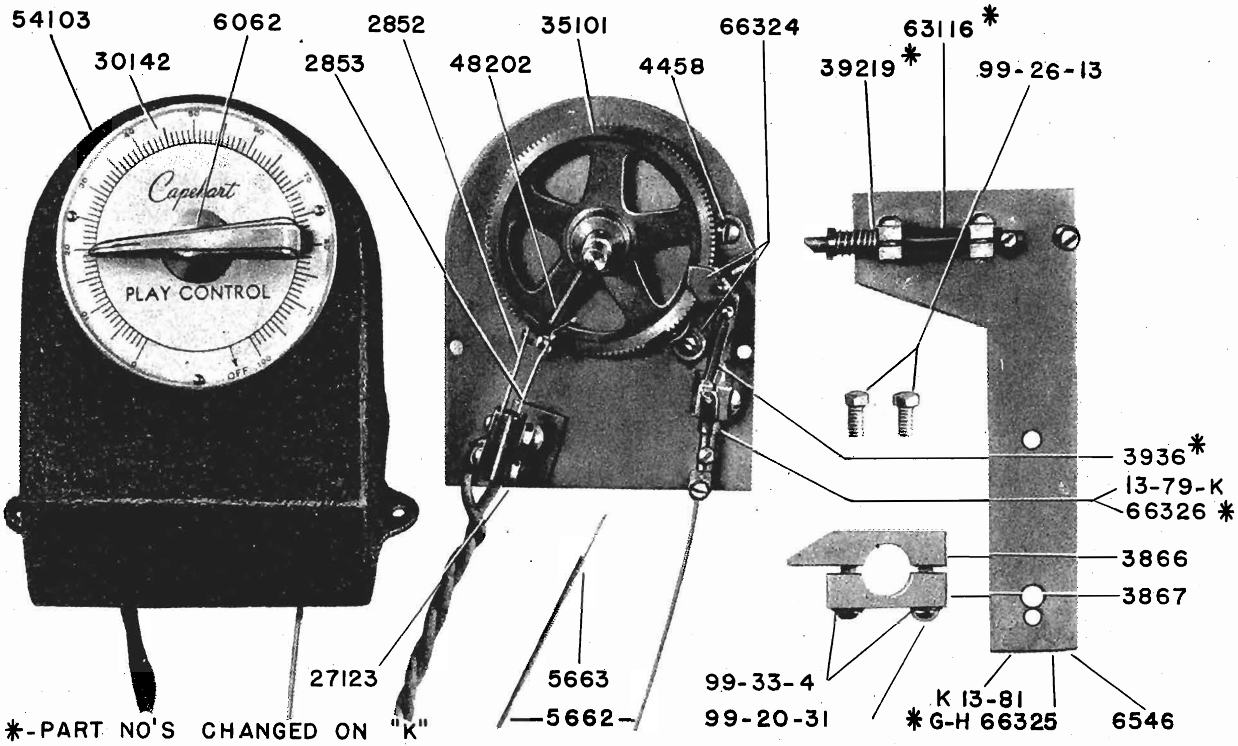

FIGURE E. 16-E MECHANICAL PLAY CONTROL

PARTS LIST

Part No.	Description	Part No.	Description
27123	Switch Assembly	5663	Control Cable
2852	Switch Arm "Straight"	6062	Bar Knob—Pointer
30142	Play Control Dial	63116	Plunger Tube Assembly
35101	Gear	5654	Plunger Tube Assembly, "K" only
3866	Play Control Split Cam, Long	6546	Complete Play Control Bracket for Field Assembly
3867	Play Control Split Cam, Short		
3936	Spring, Dog	66324	Stop Spring and Ball Assembly
64-32	Spring, Dog, "K" only	66325	Bracket Assembly for 16E Chassis, "K" only
39219	Plunger Return Spring		
64-31	Plunger Return Spring, "K" only	66326	Dog Plunger Assembly
4458	Dog, Stop Bracket	13-79	Dog Plunger Assembly, "K" only
48202	Switch Pin	99-20-31	10-32 x 3/8" R. H. M. Screw
54103	Play Control Housing	99-26-13	10-24 x 3/8" Hex Head
5662	Cable Housing	99-33-4	No. 10 Special Shakeproof Washer

QUESTIONS AND ANSWERS

To assist the service men, who have not had the advantage of factory training nor experience servicing the Capehart 16E Record Changer, we have prepared this section, which covers the more common complaints reported by users, dealer's service departments, our salesmen and field engineers.

Of course, there are many factors responsible for the troubles encountered. Below we are listing some of them.

1. Customers—Failure to properly load or operate the instrument. Friends who drop in and think they know all about everything. Owner not having been properly instructed or their general inability nor desire to learn.

2. Records—Variations from standards, rough edges, thickness, warped, etc.

3. Adjustments—Not proper due to:

A. Improper operation of instrument.

B. Misuse and neglect.

C. Wear, due to lack of oil and grease.

D. Improper inter-relation of parts due to adjustments of one section without complete follow through on other related parts.

Below are listed some of the more common complaints, along with some of the possible causes, and reference to the service notes where adjustments may be found. These are not complete as it is impossible to cover every case but we believe they will help the service man over the rough spots.

1. Waver and Wow, poor tone. May be caused by any one or all of the following: Refer motor drive—Gear Reduction Unit—Drive Shaft Alignment section.

A. Loose set screws in motor to turntable shaft and couplings.

B. Loose rivets in flexible couplings.

C. Leather coupling oil soaked and/or soft.

D. Improper alignment of gear reduction shaft with turntable shaft. Must be within ¼ inch. Remove top universal and use shaft for aligning.

E. Lack and grade of oil in gear reduction unit.

F. Defective crystal pickup.

2. Needle drops off edge of record or fails to feed in at times.

A. Instrument not level. Check and level at base plate near tone arm—not cabinet.

B. Pickup brush gone, worn or improperly adjusted. Must extend 1/32 inch below standard length needle and no other length needle should be used.

C. Pickup arm stop lever and/or stop lever hook improperly adjusted. Refer Fig. 9A and 13A.

D. Improper adjustment of Tone Arm feed in cam. Refer Fig. 8.
Clearance between cam and tone arm lift level should be about 1/32 inch when changer is in play position.

E. Tension too great on pickup stop lever spring. Refer Part No. 3984.

F. Pickup stop lever rubber roller worn or out of round. See Part No. 5044.

G. Rough edges on 12″ records causing pickup and tone arm to jerk and jump as rubber roller on stop lever comes in contact with record.

3. Failure to trip properly. (Too soon or too late).

A. Not sufficient tension or too much tension on trip lever friction joint.

B. Movable trip switch arm bearing stuck. This occurs near salt water and in humid climates.

C. Check for dirt and corrosion between trip lever arm and base plate at friction contact mounting. Clean and apply drop of light oil.

D. Check complete adjustment.

4. Excessive amount of tick at end of record.

A. Tension too great on trip arm lever friction. Back off adjusting screw, clean and oil between base plate and lever at point of mounting.

B. Place piece of rubber tubing or tape on end of trip lever where contact is made with tone arm trip bracket.

5. Excessive record wear.

A. Worn needles.

B. Friction on trip switch lever too great causing wear near end of record.

C. Improper adjustment and alignment of True Tangent Tone Arm. Pickup should be in straight alignment with tone arm

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QUESTIONS AND ANSWERS—Cont.

when needle is $1\frac{1}{2}$ inches from center spindle of turntable shaft.

D. Tone arm binding in mounting or resting on tone arm feed in cam due to improper adjustment of cam. Refer Fig. 8.

6. Clutch disengages before completion of cycle.

A. Insufficient tension on Solenoid wedge spring. Refer Fig. 12B.

B. Solenoid Torsion spring in wrong hole for action desired.

C. Improper adjustment motor solenoid switch—Excessive upward tension on clutch lever. Refer Fig. 10.

D. Clearance between drive and driven sections of clutch. Refer Fig. 7.

E. Excessive upward tension from muting switch on clutch lever.

F. Improper adjustment of Clutch Throwout lever. Clutch only partly engaging. Refer Fig. 10.

G. Any binding of clutch action causing clutch to not completely engage or disengage.

7. Changer continues to cycle without playing record.

A. Improper adjustment of clutch throwout lever. Spring part No. 3990, holding clutch throwout lever too high—misses clutch throwout cam.

B. Solenoid Torsion spring in top hole instead of center or bottom. Refer Fig. 10.

C. If buzzing sound is heard at end of cycle look for reject button stuck, trip switch contacts stuck or reject relay contacts closed (should be open during phonograph operation).

8. Record breakage.

A. Clean with oil soaked cloth all polished surfaces on magazine and record tray with which records come in contact.

B. Check adjustment of magazine, especially back stop. Refer "B" Fig. 3.

C. Improper adjustment of vertical bumper guide. Refer Fig. 2.

D. Note—If record break is half moon shape record has stuck on slide rails and came out late. If crack from edge toward center hole, magazine is adjusted too far forward. If chipped on edges, including V shape breaks, damage is caused in turn over position and requires complete cleaning of record tray near lower rubber bumpers and cleaning of reverse arm upright polished surfaces. Also polish and check adjustment record support pins. Refer Fig. 2.

9. Noise when 12" records drop.

A. Record caught between record reverse arm and record tray prohibiting return of reverse arm.

B. Record reverse arm jammed or out of position with reverse arm crank. Refer Fig. G.

C. Excessive records in magazine—not more than 18.

D. Bent reverse arm and roller. Refer Fig. 4.

10. Records fail to unload from magazine occasionally.

A. Insufficient records. Should be 6 or more. Six to fifteen records for best operation.

B. Warped records and/or chips on edges.

C. Improper adjustment of record separator—adjusted too low. Refer Fig. 2.

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MECHANICAL ADJUSTMENTS
16-E RECORD CHANGER

Due to the fact that certain critical shortages have developed in the metals used in the 16-E Record Changer, we are listing in the parts lists the standard parts, which have been used in the past, as well as those parts consisting of the newer metals. Beginning with the Serial Number 20,000, a new base of cast iron was incorporated. A new magazine is now being used, as well as a zinc record tray. With the new tray, because of its extra weight, a counterbalance spring and the necessary fittings are required, these fittings are shown on page 35. A list of these parts is included in the parts price list and these parts are marked with an *.

In making all adjustments of the assemblies on the top of the record changer the turntable is the datum point.

Before attempting any adjustments the service man should learn to disengage clutch while changer is in cycle by placing thumb of left hand on top of clutch fork and forefinger under fork. Lift with finger to disengage clutch and press with thumb to engage clutch. This makes it possible to stop changer in any desired position while motor is running.

ADJUSTMENTS

1. TO LOCATE AND ADJUST THE RECORD TRAY (6687) (Fig. F).

If it becomes necessary to replace a record tray, the first tooth of the driver quadrant (6257) (Fig. F) should mesh with the second tooth of the driven quadrant of the record tray (3515) (Fig. F). This is to permit proper adjustment of the tray height, which adjustment is covered below.

An easy way to locate tray and match with gears is to place selector lever in repeat position. This releases quadrant gear (6257) (Fig. F). Then place selector lever in one side position and lift quadrant until it snaps in male and female clutch position. The tray may then simply be placed around turntable and pins inserted. Place selector lever again in repeat position and lift tray for examination. Teeth should then be properly meshed. Changer should be in play position when this adjustment is made.

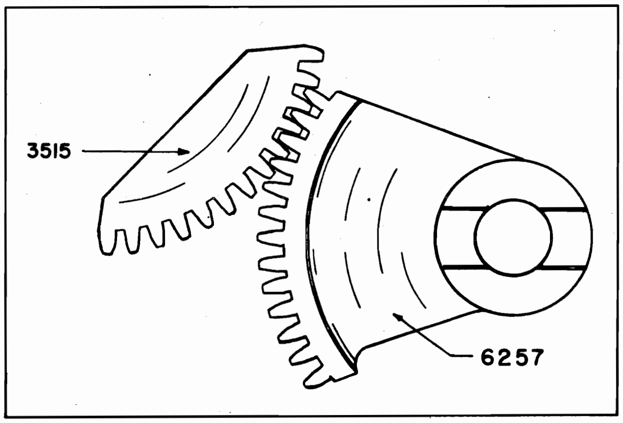

FIGURE F. RECORD TRAY GEARS

After the gears are properly meshed, the record tray should be adjusted sidewise until the turntable is uniformly spaced within the tray at the time when the record tray is raised until the front end of the 10" felts are level with the turntable felt. After the tray has been properly positioned sidewise, tighten the two Allen set screws holding the record tray pivot pins, then check to see that no side play exists.

TO ADJUST THE RECORD TRAY ELEVATION:

With the record control lever (6231) (Fig. 9B) in the "One Side" position, run the record changer thru a cycle until the large hole in the main cam is exactly half way past the upper edge of the record tray cam follower as shown at "A" in Fig. 5. In this position the front points of the 10 inch felts in the record tray should be level with the turntable felt (a straight edge should be used). If the level is not the same, loosen the nut on the back of the eccentric screw (3237) (Fig. 5). Adjust this screw until the felts are the same heights, then while holding the screw to prevent its turning, tighten the nut.

Unless this adjustment is carefully made, the record center hole will miss the spindle, for if the tray is too low the records will slide over the 10" stop in the tray, while if the tray is too high they will land with the spindle hole behind the spindle.

2. TO LOCATE AND ADJUST THE RECORD MAGAZINE (6686) (Fig. 1).

Before attempting any adjustment of the record magazine, make certain that the center of the right hand magazine pivot pin (34132) (Fig. 2) is exactly 8⅜" above the base plate. This is shown in Fig. 2. This height is very critical and may be the cause of records not being properly delivered to the record tray. If this height is found to be incorrect, it can be adjusted by striking the buckhorn with a rubber hammer. Strike the underside if the height is less than 8⅜". If more, strike the upper side of the buckhorn.

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MECHANICAL ADJUSTMENTS—Cont.

TO POSITION RECORD MAGAZINE:

The record magazine may be moved sideways by loosening the two set screws located underneath the magazine pivot pins in the magazine support assembly (Buckhorn) (6684) (Fig. 1). The correct position of the record magazine is determined by the position of the pin in the Record Reverse Crank with respect to the slot in the Record Reverse Fork. The illustration Fig. G, below, shows this clearly. After this position has been reached, the magazine should be securely fastened by the Allen set screws which are located in the Magazine Support Assembly.

Swing the Record Reverse Arm around in front of the magazine to determine if the Record Guide strikes either of the Record Support Pins (34138) (Fig. 12A). If the guide strikes either of the support pins, it will be necessary to bend the interfering pin so that clearance is secured.

Next move the Record Selector Arm to the Repeat Position. This disengages the Record Repeat Sliding Clutch and permits lifting the Record Tray. After placing a 10″ record on the turntable and slowly raising the tray by hand, the record should hit the pins simultaneously about halfway between top and bottom of the angle surface of the pins. If it does not, it will be necessary to bend the pins until the record does. This adjustment is predicated upon the fact that the rear record bumpers are in good shape (not unequally worn). If an adjustment of the pins is made, see that clearance is maintained between the Support Pins and the Record Reversing Arm and Guide, as well as the holes in the Record Tray.

If the magazine has been replaced or moved, the Magazine Stop Screw, "B" Fig. 5, may need readjustment. The correct adjustment is made when the changer is in the playing position. The record separator must be engaged by hook—and should just touch the vertical portion of it. In this position the record reverse arm should rest against the stop tubing, and the record reverse crank should be in the fork of the record reverse arm as shown in the accompanying illustration. This view is shown with reverse arm in Reverse Position and looking down.

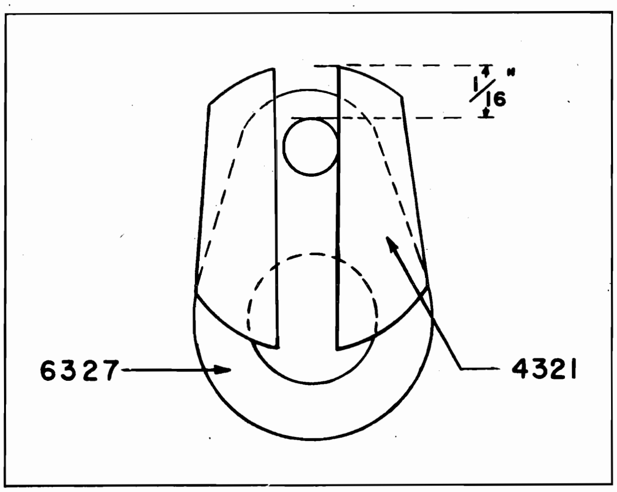

FIGURE G. REVERSE PINION CRANK AND PIN ASSEMBLY

If it is necessary to shift the magazine, the final check should be to determine that the Record Separator Hook (4323) (Fig. 2) does not bind in the slot at the end of the Record Separator Arm, (6445) (Fig. 1). The adjustment of this separator arm is covered in part 5 of this section.

3. MAGAZINE LINK ADJUSTING SCREWS ("A") (Fig. 2).

The Record Magazine should always return snugly against the Magazine Stop Screw ("B") (Fig. 5). If it does not, it is necessary to place selector lever in repeat position and loosen the two adjusting screws on the magazine actuating link to a sliding tension, and run the changer thru its cycle until the magazine attains the position shown in Fig. 2. Stop the cycle either by disengaging the turntable clutch, or by disconnecting the A. C. line cord. Press downward on the lower part of the magazine thus lengthening the Magazine Link Assembly. Now resume the cycle, and when the magazine touches the Magazine Stop Screw, the Magazine Link will adjust itself, after which the adjusting screws on the link assembly should be tightened securely.

4. TO ADJUST AND POSITION THE RECORD REVERSE GUIDE (6444) (Fig. 1).

When a 12″ record is placed in the Magazine, the Record Reverse Guide should be parallel to this record at the time when the guide is swung from its normal resting position to a position in front of the magazine, snugly against the rubber bumper as shown in Fig. 2. This is known as the Reversing Position.

If the guide is parallel with the 12″ record, it should return and rest against the rubber bumper on the Magazine Support Assembly, in such a position as is shown in Fig. 1. If the Eccentric Cam (3825) (Fig. 11) is properly adjusted, the guide will rest against the rubber bumper; however, if the Record Reverse Guide does not properly return, loosen the screw holding the Eccentric Cam and rotate the Cam slightly until the correct position is secured.

If the Reverse Guide does not return to the rubber bumper, check the position of the Crank Pin in the Record Reverse Fork (under Magazine Adjustments and Fig. "B").

If the Eccentric Cam is turned too far, the Reverse Guide will not swing around far enough to rest easily on the rubber bumper (5043) (Fig. 1) while in the playing position.

MECHANICAL ADJUSTMENTS—Cont.

With the Record Selector Lever in the Both Sides position, run the changer thru a cycle until the point is reached where the Record Reverse Guide swings in front of the magazine. In this position the Crank Pin should touch the side of the Record Reverse Fork, that is, toward the magazine without binding. To adjust the position of the Crank Pin, while the Record Reverse Guide is in the reversing position, loosen the lock nut marked "D" Fig. 11. Next, remove the shoulder screw that holds the Reverse Assembly Link Rod to the gear quadrant, (3550) (Fig. 11) and adjust the length of the Link Rod by turning the end which has just been disconnected. After correctly positioning the Crank Pin tighten the lock nut.

5. TO ADJUST RECORD SEPARATOR (Figs. 1 & 2).

With a 10″ record in the magazine, the upper edge of the Record Separator (6445) (Fig. 1) should be flush with the top of the Lower Support. To adjust the position of the Record Separator, move the Record Separator Stop to the position desired by loosening the two screws holding this stop. This stop (4520) is shown clearly in Fig. 2 and is located at the bottom of the right hand side of the magazine. The Record Separator Hook should then be adjusted.

6. TO ADJUST THE RECORD SEPARATOR HOOK (4323) (Fig. 2).

As the Record Separator Hook should enter the slot in the end of the Record Separator without binding, it will be necessary to readjust the Record Separator Hook in the event it has been necessary to adjust the Separator Stop. To adjust the Hook, loosen Nut (99-12-3) (Fig. 2) and turn the Hook, which is threaded, until it enters the slot in the Record Separator freely.

NOTE: IF IT IS EVER NECESSARY TO RE-ADJUST THE HOOK, BE SURE TO CHECK THE HEIGHT OF MAGAZINE PIVOT PIN (SEC. 2).

Be sure the screw marked "E" in Fig. 11 is screwed all the way in and locked with the nut. This prevents the Separator Hook from ejecting a record from the magazine during the Reverse Cycle, allowing the record to be caught under the returning magazine, due to its inability to reach the turntable while another record is being reversed.

7. TO ADJUST TONE ARM HEIGHT

When an unwarped 12″ record is placed on the turntable, the outer edges of this record should coincide with the center of the rubber roller at the end of the Stop Lever (64197) (Fig. 9A). Run the changer through a cycle until the Tone Arm Lever Hook just touches the Stop Lever. The correct tone arm height is secured when the center of the Tone Arm Hook is the same height as the top of the Stop Lever. To effect this adjustment, lift the tone arm by hand, thus making accessible two Allen set screws, normally covered by the Tone Arm Base. After adjustment, and before finally tightening these set screws, check the clearance between the Pickup Head and the Record Tray. This should be 5/8″ while the tray is in the process of raising or lowering with the Pickup Arm swung back by the swing cam, i. e., during either the One Side or Both Sides cycle. The tone arm lever hook should clear through the slot in the stop lever when changer is in play position.

8. TO ADJUST THE PICKUP ELEVATION

After the Pickup Arm Lever Hook has moved the Stop Lever in to the needle landing position, the Hook moves down the Stop Lever. In its downward journey, it pauses momentarily before the Hook, and then enters the Slot in the Stop Lever, thus permitting the Stop Lever to swing to its normal position. If the record changer is stopped at this point in its cycle, it will be found that the ball at the end of the pickup arm lift shaft is at the point marked "F" on the Lift Cam (6449) (Fig. 8).

With the needle, which is to be used in the Pickup, and the Lift Shaft at "F", lift the Pickup and allow the needle to drop off the edge of the Record. The needle point should extend below the playing surface a distance equal to half the thickness of the record.

To make this adjustment, turn screw 99-22-29 (Fig. 13A) until the correct position of the needle is reached. Be sure to retighten the lock nut.

THIS ADJUSTMENT IS IMPORTANT, DUE TO THE VARIOUS LENGTHS OF DIFFERENT BRANDS OF NEEDLES. UNLESS THIS ADJUSTMENT IS CHECKED, IT MAY CAUSE THE NEEDLE TO FALL OFF THE RECORD BEFORE ENTERING THE PLAYING GROOVES.

9. TO ADJUST PICKUP FEED-IN

An examination of the Pickup Friction Cam will disclose the fact that there is a flat leather portion that applies friction to hold the Pickup Arm Lever Hook against the Stop Lever until the weight of the pickup is transferred to the needle. This friction should be applied long enough to prevent the needle falling off the record, but if maintained too long, the needle may skip across the first few playing grooves, and thus miss playing the first portion of the record.

Before adjusting tone arm feed-in cam, be

MECHANICAL ADJUSTMENTS—Cont.

sure no end play exists in main shaft, otherwise position will vary as main shaft shifts position.

In the earlier model changers this Friction Cam is held on the shaft by a taper pin as well as two Allen set screws. However, later models employed the Allen screws only. If it is necessary to advance or retard this Friction Cam, do not tighten BOTH screws until the proper position is secured, as the set screws have cup points, and after being set up tightly, leave an imprint in the shaft and thus have a tendency to "pull back" into the old position. On instruments where the set screws have been tightened, it might be well to remove the main shaft, and smooth out the old screw marks before attempting to reset this cam. Rotating the cam in the direction of its normal rotation relieves the pressure on the pick-up arm earlier.

10. TO ADJUST THE MAGNETIC PICKUP

Remove the Pickup Cover and check the location of the Stylus with respect to the Pole Pieces (569) (Fig. 6). This stylus should be centrally located in respect to these poles. To adjust the stylus the spool assembly may be shifted, after the set screws (99-28-3) have been loosened. When tightening the set screws, exercise care not to crack the bakelite bobbin. When checking the pickup, carefully examine the rubbers as they harden and split. Due to age, the majority of complaints are traceable to this fact. It should not be necessary to caution against steel chips getting into the assembly.

11. TO ADJUST NEEDLE LANDING

The 12″ landing should be adjusted first. In Figs. 5 and 13A the Stop Lever Hook (5658) is shown. In the normal or playing position its flat face is parallel with the bottom of the slot in the Stop Lever, and when engaged with the Stop Lever, the adjacent faces of the Stop Lever and the Lever Hook are parallel. The Lever Hook is adjusted by loosening the Bristol Set Screw No. 99-28-31 (Fig. 6 & 13A) located in the bottom of the Center Bolt, which is the pivot for the Pickup Head Bracket. The Lever Hook should be adjusted to allow the needle to land 3/32″ from the edge of a 12″ record. Be sure the Bristol set screw is retightened. Next, place a 10″ record on the turntable and adjust screw 99-18-20, which is located in the Stop Lever (Fig. 9A) until the needle lands 3/32″ from the edge of the 10″ record.

CAUTION—The Lever Hook should not bind when going through the slot in the stop lever.

12. TO ADJUST CLUTCH THROWOUT LEVER & CAM (6460) (Fig. 10).

The Clutch Throwout Lever & Cam is adjusted by loosening the shoulder screw holding the cam to the lever, and adjusting the cam until it just clears the point of the Clutch Throwout Cam which is located on the main shaft. This adjustment must be made with the changer in the playing position, i. e., when the Pickup Arm Lift Shaft is in its lowest position, as shown in Fig. 8. Unless sufficient clearance is secured, the changer may jam; excess clearance will cause the changer to cycle without playing records.

The wire spring (3990) (Fig. 10) must lift the cam far enough to clear the Clutch Throwout Cam, otherwise the changer will jam; if it holds the cam too high the changer will continue to cycle.

13. TO ADJUST SOLENOID WEDGE SPRING (39132) (Fig. 12B).

The Wedge Spring is located on one of the three spacers used to mount the solenoid plate and is directly over the solenoid coil. Its purpose is to prevent clutch bounce or chatter when the clutch engages. It may be bent to proper tension by means of a long screwdriver. If the clutch disengages before a change cycle is completed, it is advisable to increase the tension of this spring.

14. TO ADJUST REVERSE CAM SHIFT LEVER (5326) (Fig. 3).

When the Record Selector Lever (Fig. 9B) is moved to the "Both Sides" position, the Record Control Rod Pin (34145) (Fig. 9B) moves the Record Control Shaft, which in turn moves the Reverse Cam Shift Lever. This causes the Reverse Cam (6325) (Fig. 4) to engage with the Reverse Cam Pin (34144) (Fig. 4). The Shift Lever should be positioned on the Control Shaft so that the Reverse Cam is free of the Reverse Cam Pin in the "Repeat" and "One Side" cycles, but is firmly engaged in the "Both Sides" cycles. Under no circumstances should the Shift Lever be positioned so as to bind the Reverse Cam.

15. TO ADJUST RECORD REPEAT LOCK LEVER (5334) (Fig. 3).

This lever is to prevent accidental shifting of the Record Selector Lever during the change cycle. In the playing position, the tip of this lever should clear the Clutch to Solenoid Lever by 3/16″ while moving under it. In the "Repeat" cycle, this lever is on the side of the Clutch Solenoid Lever away from the Main Cam. In the other two cycles it encloses the Clutch Solenoid Lever.

16. TO ADJUST REVERSE CAM LOCK LEVER (5339) (Fig. 3).

This lever serves the same purpose as the Record Repeat Lock Lever and should clear the Clutch Solenoid Lever by 1/16″ while moving

MECHANICAL ADJUSTMENTS—Cont.

under it in the playing position. During the "Both Sides" cycle, it is on the side of the Clutch Solenoid Lever, towards the Main Cam, and in the other two cycles it encloses the Clutch Solenoid Lever.

17. TO ADJUST RECORD REPEAT CLUTCH LEVER (5332) (Fig. 3).

The Sliding Clutch permits disengagement of the Record Tray Driving Quadrant during the "Repeat" Cycle, when the same record is used. The Clutch Lever should allow the clutch to engage firmly in the "One Side" and "Both Sides" cycles, but be entirely disengaged in the Repeat Cycle. The Clutch Lever is secured to its shaft by means of an Allen Set Screw.

18. TO LOCATE MAIN CAM SHAFT

Both end bushings of the Main Cam Shaft are movable, and are used to position the Main Cam Shaft. To position this shaft, loosen the H. H. Cap Screws (99-26-9) (Fig. 11) holding the bushings, then move the shaft until the ball in the end of the Tone Arm Lift Rod is exactly centered on the Lift Cam as shown in Fig. 8. When tightening the Cap Screws, be careful not to crush the Durex Bushings or crack the split bearings located near the turntable shaft.

19. TO ADJUST AUTOMATIC TRIP SWITCH (2792) (Fig. 9B)

This switch is located underneath the turntable and is actuated by the motion of the Tone Arm being transmitted to the Trip Arms thru their associated Friction Joint.

To adjust this switch, remove the long trip arm from the Switch Cover and the two F. H. M. S. holding this cover. There should be 1/32" clearance between the switch points. Replace the turntable on its spindle, and move the tone arm toward the turntable spindle so that the trip quadrant moves the trip arm about 1/4", then turn the turntable one complete revolution. This rotation is for the purpose of having the Fibre Trip Pin, at the bottom of the turntable, reset the Trip Arm. Remove the turntable, and check the position of the trip arm in respect to the movable contact arm which should be equidistant from both bakelite insulators. In order to position the trip arm, loosen both screws holding the switch and adjust it until there is approximately 1/32" clearance between each bakelite insulator and the trip arm. Recheck this position before replacing the cover. When replacing the trip arm through the slot in the cover, be sure that it is between the bakelite insulators, otherwise it may make contact with one side of the A. C. line and cause a fuse to blow.

A single strand of wire is soldered from one side of the A. C. line to the movable arm of the switch for the purpose of preventing chattering, which may occur if the current flows only through the bearings to the arm.

20. TO ADJUST SOLENOID MOTOR SWITCH (Fig. 10).

The Solenoid Motor Switch is located underneath the cast cover (5226) (Fig. 3) and is used to disconnect the Solenoid Coil during the change cycle and to shunt the phono relay contacts in order to keep the motor running until the change cycle is completed, even though the instrument is turned off. This switch is actuated by the Clutch to Solenoid Lever.

The cover (5226) is secured by a bolt at one end, and a screw at the other. When the clutch is disengaged, the upper contacts should make good electrical contact, and there should be approximately 3/32" clearance between the bottom contacts. When the clutch engages, the upper contacts should remain closed until the bottom contacts close, after which they should open. When the clutch is fully engaged, the bottom contacts should be closed, and there should be approximately 3/32" clearance between the upper contacts. To adjust the switch, loosen the screw (or screws) holding the bakelite insulator to the solenoid plate.

21. TO ADJUST AUTOMATIC TRIP SWITCH FRICTION JOINT

This friction joint is located underneath the record tray, and is used to transmit the motion of the tone arm to the Automatic Trip Switch by means of the two Trip Arms.

Place the Selector Lever (9B) in the Repeat position and raise the record tray. A flat spring, which can be adjusted by a screw, holds the two trip arms together against a cork washer. The tension of the flat spring determines the friction between the two trip arms. If the tension is too great, the changer will cycle before completing a record, and if not great enough, the changer may not trip at the completion of a record.

On some instruments a "Thump" may be heard through the speakers during each revolution at the time when the Turntable Fibre Pin strikes the Trip Arm. This motion is transmitted to the needle point, and may be reduced or eliminated by proper adjustment of the Friction Joint. In some stubborn cases it may be necessary to place a small piece of surgical rubber tubing over, or to wrap several layers of cellophane tape around the Trip Quadrant where it touches the Trip Arm, which will effectively kill the thump.

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MECHANICAL ADJUSTMENTS—Cont.

22. TO ADJUST VERTICAL BUMPER GUIDE (6693) (Fig. 1).

This Guide, located behind the Lower Support Assembly, is used to guide the record when it drops to the rubber bumpers and also when the record is being raised by the rear of the record tray (elevating hook). The guide should be just far enough back from the lower record support to allow a 12″ record to drop freely upon the rubber bumpers, and the lower points of this guide should be far enough forward to tilt a 12″ record sufficiently to go freely behind the two points of the upper record support. If the lower points of the guide do not extend forward enough, there is danger of the record bouncing against the points of the upper record support and being chipped. When adjusting the Vertical Bumper Guide, make certain that the elevating hook (rear portion of the record tray) has clearance, otherwise the record tray will not return to its correct position.

23. TO ADJUST CLUTCH CLEARANCE.

In order to insure proper disengagement of the Driven Clutch (6326) (Fig. 7) and the Driving Clutch 3630, the clearance should be .020″ when the changer is in the playing position. This clearance is obtained by loosening screw marked "G" Fig. 10 and moving the Clutch Fork. Be sure screw "G" is tightened after correct clearance is obtained.

24. OILING INSTRUCTIONS.

Due to careful design and precision workmanship the Capehart 16-E Record Changer requires a minimum of oiling or mechanical adjustment.

Some 16-E Record Changers produced in the past have had all cams, gears and sliding surfaces coated with graphite grease. These coated surfaces should be greased with white vaseline, which will replace the oil that has been used up during operation.

An occasional LIGHT coat of vaseline should be applied to all faces of the magazine at the points where the records come in sliding contact during the cycle, apply vaseline then wipe off with the fingers.

A good grade of light machine oil should be used on the sliding clutches (except motor slip clutch) reverse cam shaft, and eccentric shoulder screws.

DO NOT OIL DUREX BUSHINGS. DO NOT USE AN EXCESS OF LUBRICANT.

Later production changers used Lubriplate instead of Graphite.

On these, all surfaces of the main cam, the reverse cam, and the tone arm lift cam that come into contact with rollers should be coated with a film of Lubriplate. Lubriplate can be purchased at almost any electrical supply or hardware store.

The drive motor should have its oil cup filled every six months.

The Gear Reduction unit used with the Emerson motor should be checked to make certain it contains the proper amount of No. 10 S.A.E. oil. (Amount required—1/2 oz.).

In the Gear Box of the Bodine Motor, the grease should be replaced each year. This grease may be 75% Vaseline and 25% S.A.E. 40 Motor Oil.

25. TO REPLACE RECORD REVERSE CAM.

There are two methods used in removing a broken Record Reverse Cam, the first being to remove the Turntable Drive Shaft, the second, to drop the Main Cam Shaft.

To remove the Turntable Drive Shaft see Fig. 7.

1. Mark the Drive and Driven Gears in order that they can be again meshed in the same position. (This should be done regardless of which ever method is used).

2. Remove turntable shaft.

3. Knock out the taper pin from the Driven Gear (on Reverse Cam Shaft) also the Reverse Cam Pin.

4. Move the Reverse Cam Shaft away from the Main Cam until the Reverse Cam drops off the shaft.

5. When replacing the Reverse Cam, make certain that the Reverse Cam Shift Lever is properly engaged in the slot in the Reverse Cam, before pinning the Driven Gear to the Shaft. Remember this is a taper pin and only goes in one way. Consequently, the shaft has to be properly aligned or the pin will not enter. Next replace the Reverse Cam Pin. Replace the Turntable Drive Shaft and check. If the Reverse Cam Shaft is only partly withdrawn, the gears will remain properly meshed.

6. Check in order to determine that the Reverse Arm and Roller Assembly does not ride on the Reverse Cam; about 1/16″ clearance should be maintained. The shaft of the Reverse Arm may be shifted by loosening the set screw that holds the end of the shaft nearest the Main Cam.

TO REMOVE THE MAIN SHAFT

Put the instrument in playing position. Remove the Eccentric Shoulder Screw holding the Magazine Slide Arm, and the screw holding the recoil slide arm. Loosen the single H. H. Cap Screw

MECHANICAL ADJUSTMENTS—Cont.

holding the front Durex Bushing; remove this Bushing, and the bearing cap that holds the rear Durex bushing. Work the shaft backwards out of the front bearing hole.

Knock the taper pin out of the Driven Gear, and remove the collar from the front end of the Reverse Cam Shaft. Move this shaft toward the rear until the Reverse Cam drops off the Shaft. Replace with a new cam, put gear on shaft, push shaft through Durex bushing and replace collar. Replace taper pin in gear.

Replace the Main Shaft and put Durex bushing on front end, after which mesh the driver and driven gears in accordance with the guide marks previously made. If the gears are properly meshed, the Reverse Cam will slide under the Reverse Arm and Roller Assembly without binding at the time the selector arm is moved into the "Both Sides" position. Rotate the Reverse Cam 180° with the fingers, and again move the Selector Arm to the "Both Sides" position. It should go in without binding. Replace the rear bushing and bearing cap. Replace the Magazine and Record Tray Slide Arms, and adjust the Record Tray height.

26. TO REMOVE RECORD CHANGER FROM CABINET

As the new series (beginning at 20,000) are equipped with cast iron bases, heavier magazines, and record trays, exceptional care must be exercised when removing a changer to prevent marring the cabinet.

After disconnecting the pickup and shorting leads, the play control cable and the drive shaft, remove the middle screw of the three holding the upper record support, and the shoulder screw 3239 (Fig. 1). Removal of the shoulder screw permits the magazine to be swung parallel with the base. Next, swing the Record Reverse Arm around in front of the magazine by raising the Record Reverse Arm Lock until the Reverse Arm is in front of the magazine. Then, release the Lock which will hold the Record Reverse Arm in place.

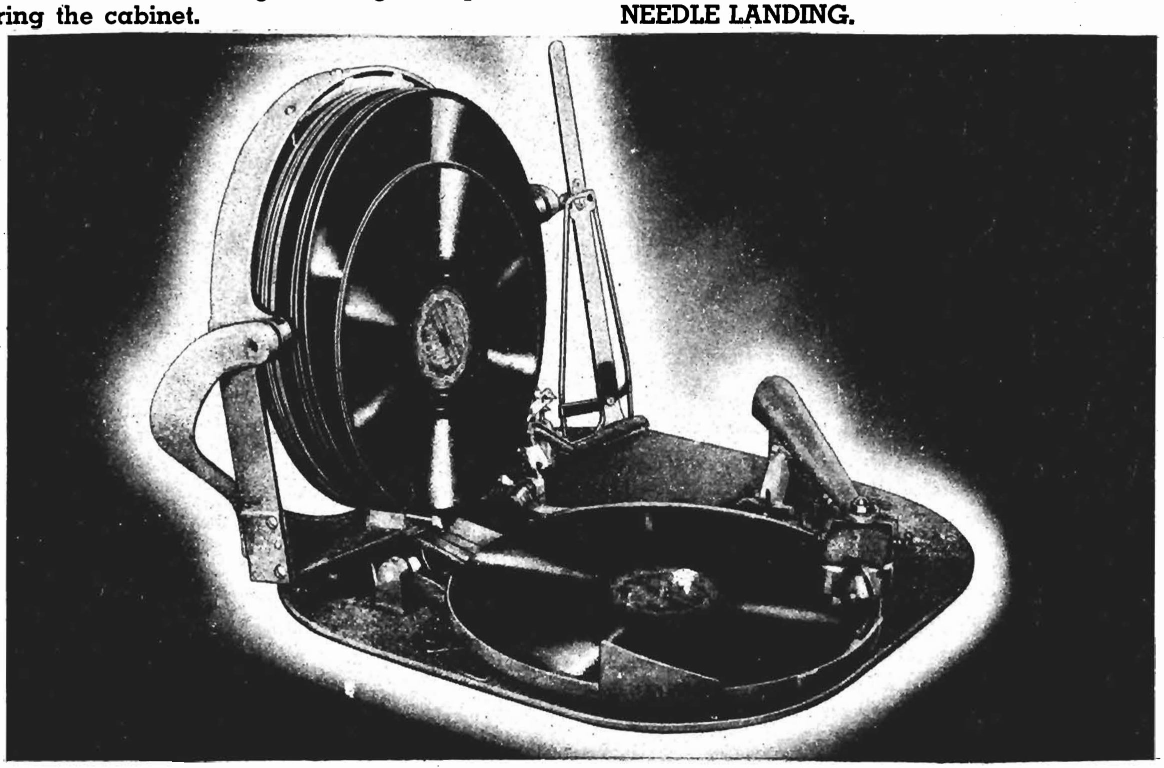
Lift the changer up and tilt it to clear the shelf, then remove it through the back of the cabinet.

As it is possible to mar the cabinet; the shelf, the top, and side of the cabinet, should be protected in some manner while removing and installing the changer.

27. ALIGNMENT OF TRUE TANGENT PICKUP

When properly aligned, the pickup head and the tone arm for a straight line when the needle is 1 1/2" from the center of the turntable drive shaft. To adjust, loosen the nut (43160) (Fig. 14A) and turn the steering rod (43148) until the correct adjustment is secured. After adjusting, determine that there is still 5/8" clearance between the Record Tray and the Pickup Head.

NEVER USE STEERING ARM TO ADJUST NEEDLE LANDING.



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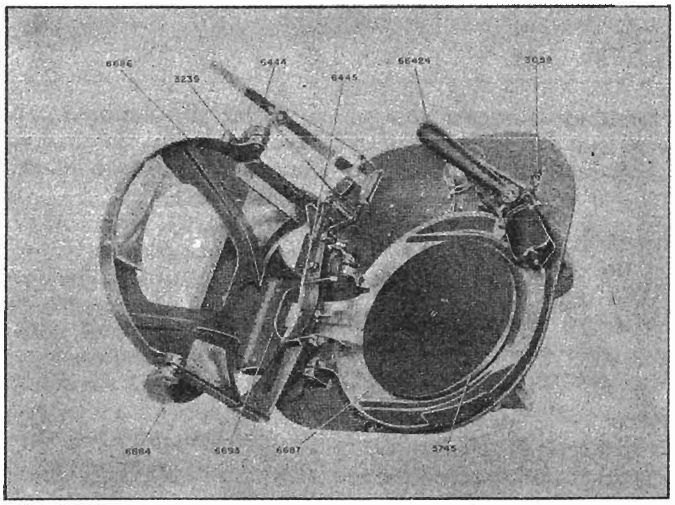

PARTS LIST FIGURE 1

Part No.		Description
3059		Automatic Switch Escutcheon
5745		Complete Turntable Assembly
	4911	Turntable Felt
	34176	Turntable Trip Pin, Fibre
6684		Record Magazine Support Assembly
	34134	Reverse Guide Stop Pin
	5043	Reverse Guide Pin Tubing
	99-20-63	10-20 x 1 1/2″ R. H. M. S.
		—MOUNTING PARTS—
	99-26-5	1/4-20 x 5/8 H. P. Cap Screws
6686		Complete Record Magazine Assy.
		—MOUNTING PARTS—
	34132	Magazine Pivot Pins
	4020	Magazine Bushings, Durex
	5517	Upper Record Support
		—MOUNTING PARTS—
	99-20-6	10-24 x 1/4 R.H.M.S.
	6685	Lower Record Support Assy.
	4916	Felt
	34138	Record Support Pin
	6445	Record Separator & Hub Assembly
		—MOUNTING PARTS—
	3242	Shoulder Screw
	4520	Record Separator Stop
	3982	Record Separator Spring
	34157	Pin for 3982 Spring
5042		Reverse Arm Bumper, Rubber
6228		Record Reversing Arm & Fork
	4321	Record Reversing Fork
	5330	Record Reverse Lever
5615		Record Reverse Guide
	99-35-5	00 x 1/2″ Taper Pin
6444		Record Reverse Guide Assy.
	39130	Record Reverse Guide Spring
	99-41-11	1/8″ x 1/4″ Eyelet
		—MOUNTING PARTS—
	99-18-6	6-32 x 1/4″ R. H. M. S.
4659		Record Reversing Arm Lock
		—MOUNTING PARTS—
	3318	Pivot Set Screw

Part No.		Description
	3982	Spring
	34157	Pin for 3982 Spring
	4923	Magazine Felt—Side
	4915	Magazine Felt—Face
6687		Complete Record Tray & Gear Assy.
	4021	Record Tray Bushing, Durex
	4665	Record Tray Shield
	99-17-20	4-36 x 1/8 R.H.M.S.
	4925	Felt
	4912	Record Tray Felt 12″ Record
	4913	Record Tray Felt 10″ Record
	5036	Record Tray Bumper, Rubber, Front
	5037	Record Tray Bumper, Rubber, Rear
	34133	Record Tray Pivot Pin
6693		Record Bumper Guide Assembly
	4917	Bumper Guide Felt
66424		Complete Tone Arm & Crystal Pickup Assembly
	2333	Complete Crystal Pickup Assy.
		FOR BREAKDOWN OF PARTS SEE FIG. 6
	5769	Tone Arm Assembly
	3653	Ball Bearing
	42129	Spacer
	43147	Pickup Center Bolt
	43159	1/4-28 Cap Nut
	4431	Auto Stop Trip Quadrant Bracket
	5484	Pickup Arm Bracket
	5658	Pickup Lever Hook
	99-28-31	6-32 x 3/16″ Bristol Set Screw
	66254	Ball Crank & Steering Rod Assy.
	43151	Spring Plunger
	39210	Spring
	43192	5/16″ Set Screw
	36-144	Pivot Screw, Pickup
	68285	Pickup Lead Assy.

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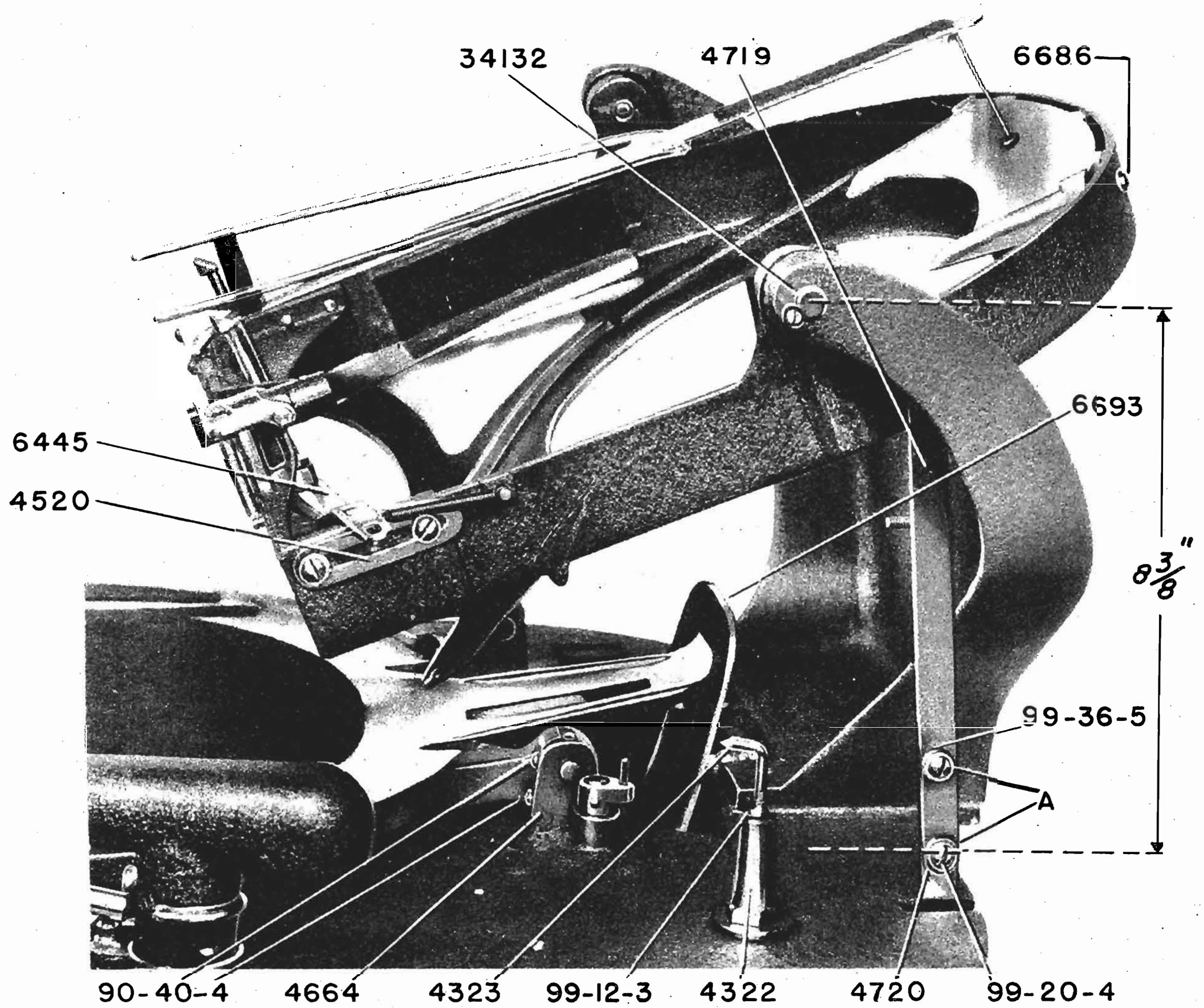

FIGURE 2

PARTS LIST

Part No.			Description
3983			Record Separator Hook Spring
	4322		Record Separator Hook Post
	4323		Record Separator Hook
	99-12-3		8-32 Hex Nut for 4323
	4664		Record Reversing Arm Lock Stop
		99-40-4	No. 4 x 1/4" Drive Screw for 4664
	4719		Magazine Link, Upper
	4720		Magazine Link, Lower
		99-20-4	10-24 x 3/8" R. H. M. S.
		99-36-5	Flat Washer
		3239	Magazine Link -Shoulder Screw, See Fig. 1.
	4520		Record Separator Stop
6230			Reverse Pinion & Crank Assembly
	3552		Reverse Pinion
	6327		Reverse Pinion Crank & Pin Assembly
		99-35-5	00 x 1/2" Taper Pin
6686			Complete Magazine Assembly—See Fig. 1.
6693			Record Bumper Guide Assembly—See Fig. 1.
62-26			Rubber Record Bumper—Left
62-27			Rubber Record Bumper—Right

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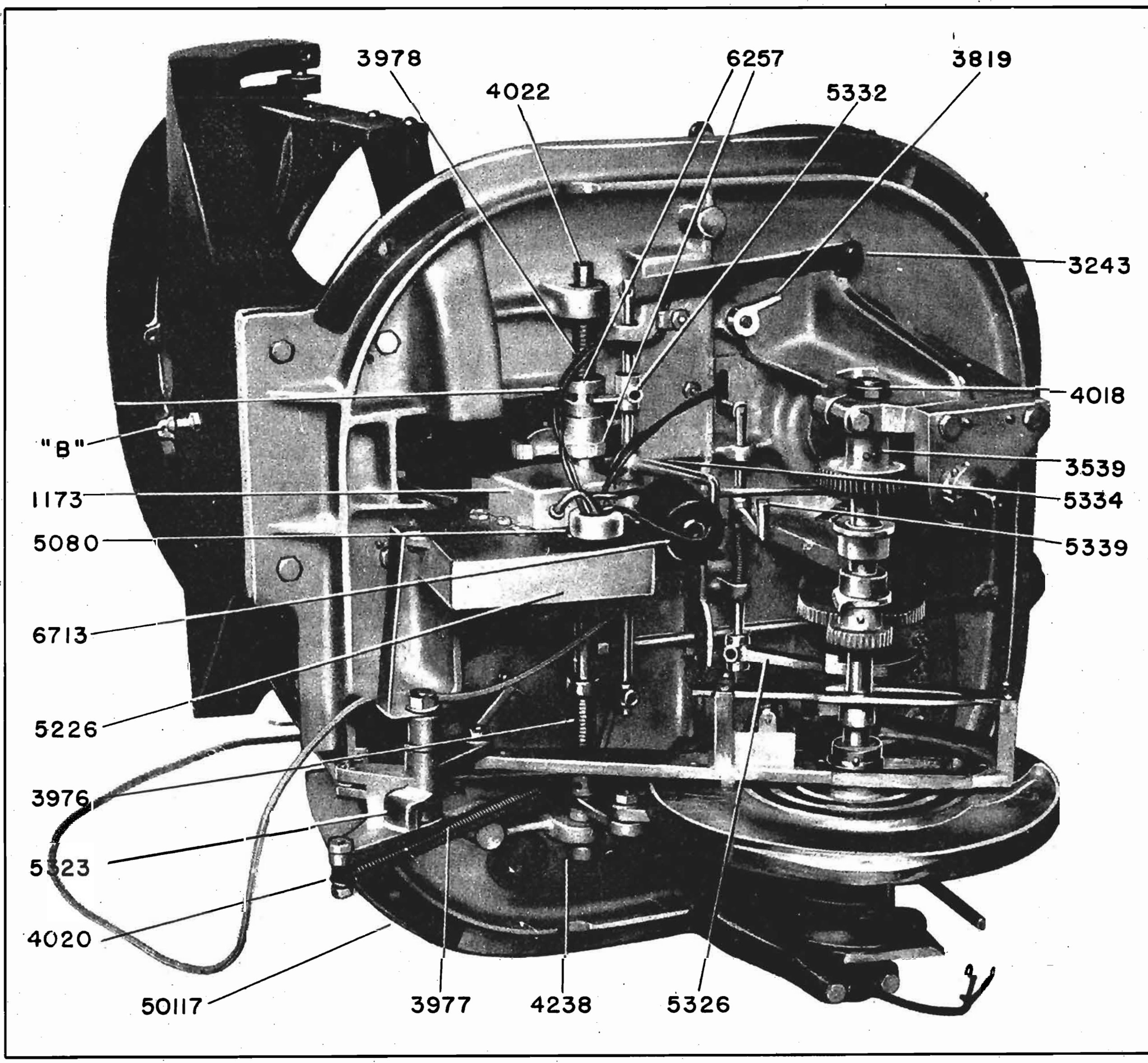

FIGURE 3

PARTS LIST

Part No.	Description	Part No.	Description
1173	Condenser 1 Mfd.—400 Volt	5080	Porcelain Bushing and Nut
3243	Repeat Lever Shoulder Screw	50117	Frame Pad, Rubber
3539	Worm Gear	5226	Solenoid Plate Cover
3819	Record Repeat Throwout Cam	5323	Magazine Slide Arm Lever
3976	Record Separator Hook Lever Spring	5326	Record Reverse Cam Shift Lever
3977	Magazine Slide Arm Spring	5332	Record Repeat Clutch Lever
3978	Record Repeat Clutch Spring	5334	Record Repeat Lock Lever
4018	Main Shaft Bushing Durex	5339	Reverse Cam Lock Lever
4020	Record Magazine Bushing Durex	6257	Record Tray Gear & Sliding Clutch
4022	Record Tray Shaft Bushing	6713	Solenoid Assembly
4238	7/16″ Collar for Taper Pin		

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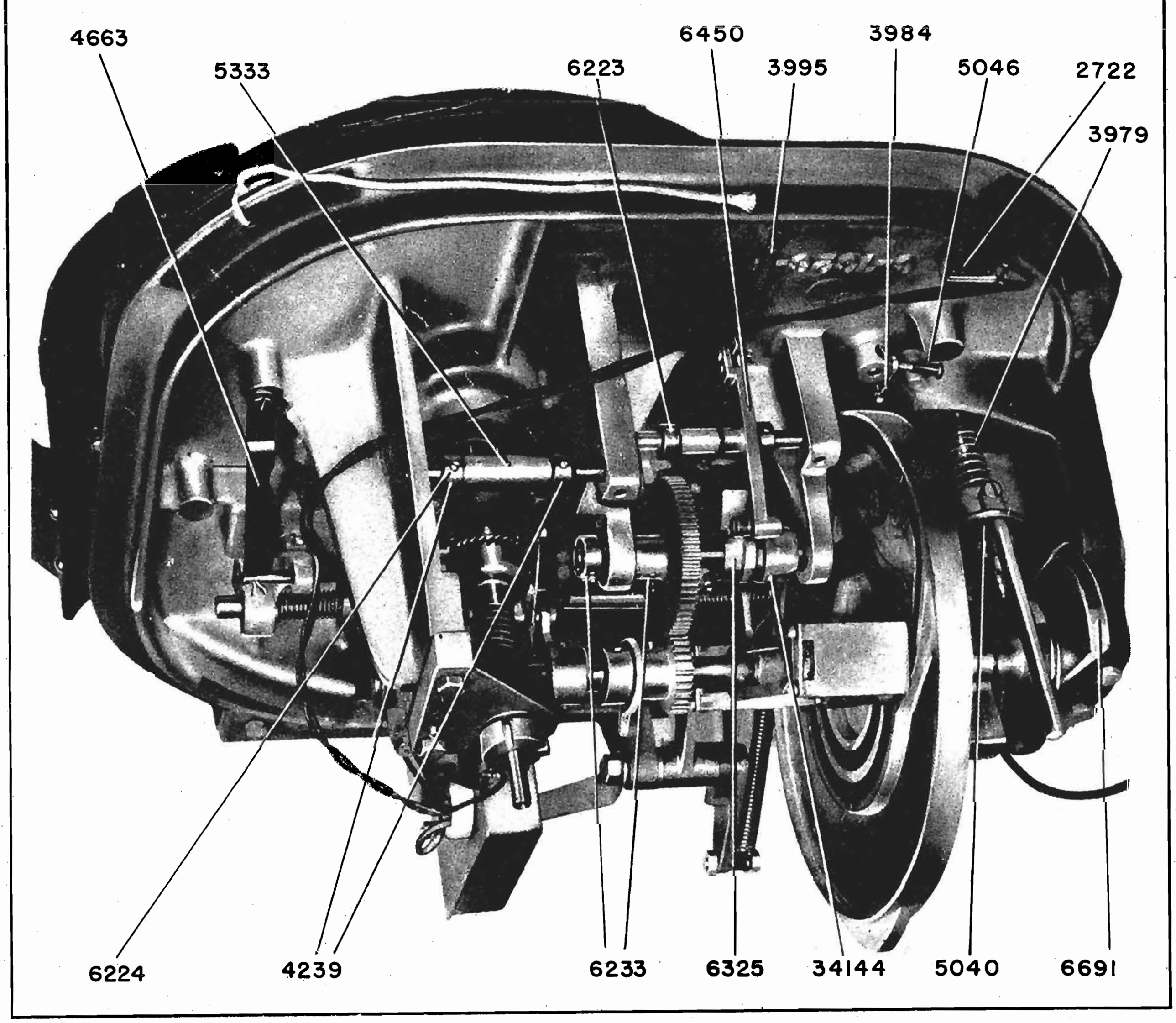

FIGURE 4

PARTS LIST

Part No.	Description
2722	Toggle Switch
3979	Pickup Arm Brake Spring
3984	Tone Arm Stop Lever Spring
3995	Reverse Arm Spring
4663	Record Repeat Throwout Lever
5040	Pickup Arm Brake Facing, Cork
5046	Tone Arm Stop Lever Sleeve, Rubber
5333	Main Clutch Fork Lever
6223	Record Reverse Arm Shaft & Collar Assembly

Part No.	Description
6224	Solenoid Lever Shaft & Collar Assy.
	3239 5/16″ Collar for Taper Pin
6233	Record Reverse Cam Shaft Gear & Collar Assembly
6325	Record Reverse Cam & Pin
	34144 Record Reverse Cam Pin
6450	Reverse Cam Arm & Roller Assembly
6691	Pickup Arm Friction Cam Assembly
	5041 Pickup Arm Friction Cam Facing, Leather

MODEL 16-E,
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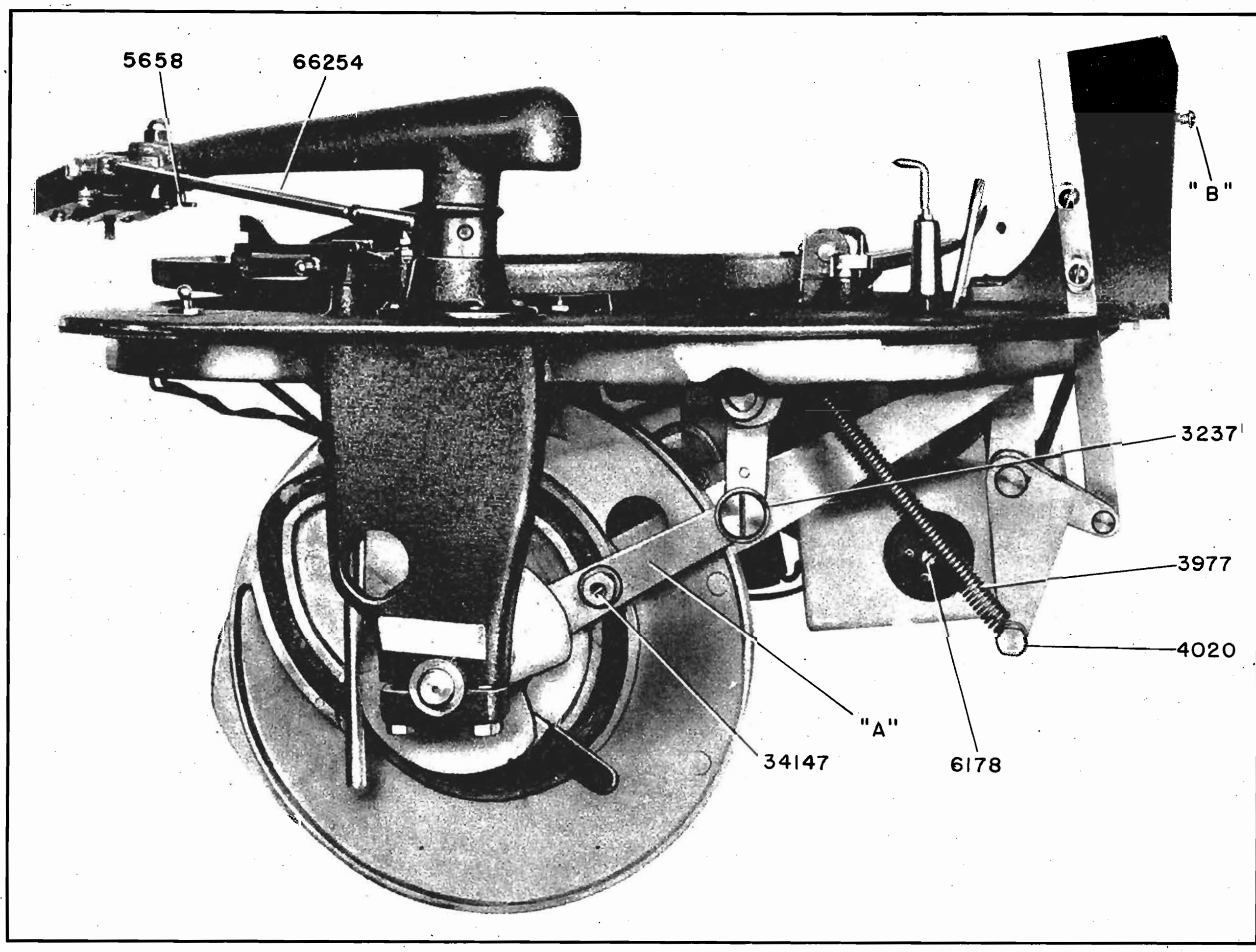

FIGURE 5

PARTS LIST

Part No.	Description
3237	Shoulder Screw, Record Tray Adjusting
34147	Record Tray Slide Pin
3977	Magazine Slide Arm Spring
4020	Record Magazine Bushing
6178	Chassis Plug—5 Prong Male
66254	Steering Arm Assembly—See Fig. 13A

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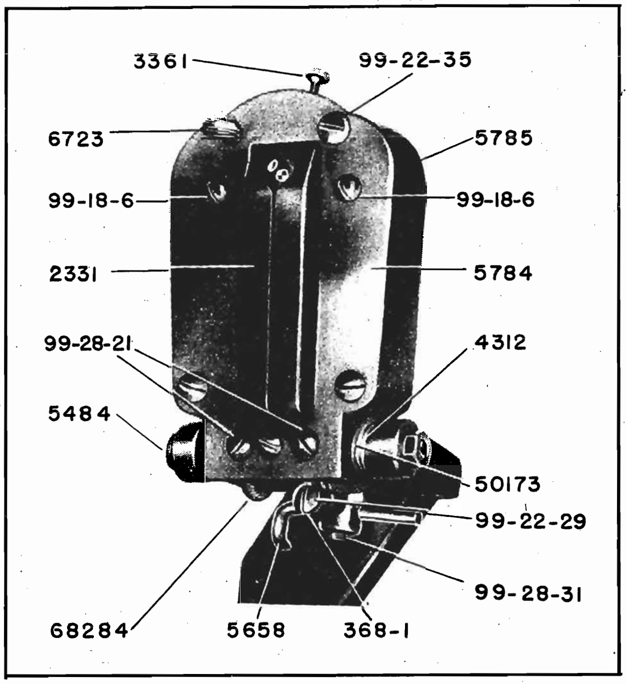

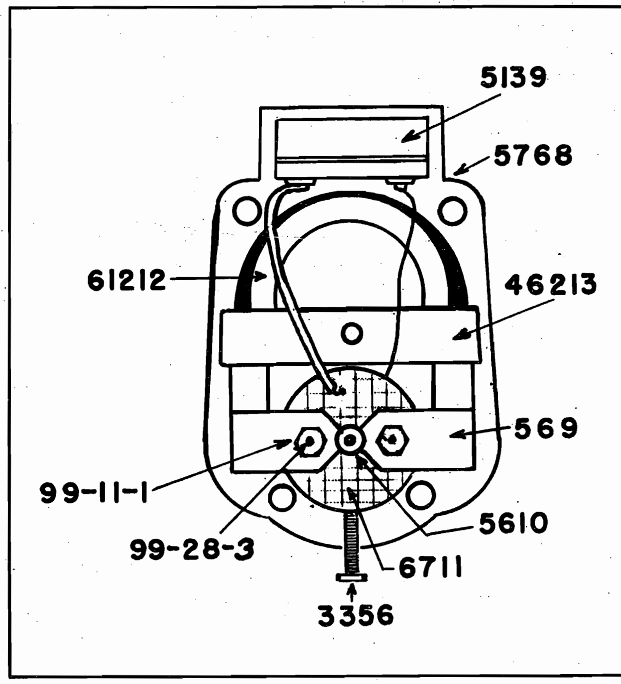

FIGURE 6 PICKUP, CRYSTAL AND MAGNETIC

PARTS FOR CRYSTAL PICKUP

Part No.	Description
2331	Crystal Cartridge
3361	Needle Screw
4312	Bushing
50173	Tone Arm Bushing
5484	Pickup Arm Bracket
5658	Pickup Lever Hook
5784	Pickup Back Crystal
5785	Cover Crystal
6723	Brush Assembly
68285	Pickup Lead
99-18-6	6-32 x 1/4″ R. H. M. S.
99-22-29	6-32 x 3/8″ B. H. M. S.
99-22-35	6-32 x 1/4″ Mch. Screw Oval Hd. Nickel
99-28-21	6-32 x 1/8″ Headless Set Screw
99-28-31	6-32 x 3/16″ Bristol Set Screw
368-1	Adjusting Screw Nut

PARTS FOR MAGNETIC PICKUP

Part No.	Description
3323	Screw, Pickup Hole Piece
3356	Screw, Pickup Pole
46213	Magnet Holder
5033	Rubber Insulating Bushing
5058	Rubber Bumper
5059	Rubber Bearing (2)
5060	Dust Rubber
5139	Terminal Block
569	Pole Piece
5610	Stylus
5765	Pickup Cover
5768	Pickup Back
61212	Pickup Magnet
6711	Spool Assembly
6723	Brush Assembly
68285	Pickup Cord
99-11-1	6-32 Hex Nut
99-18-21	6-32 x 3/8″ R. H. M. S.
99-28-3	6-32 x 1/4″ Headless Set Screw
99-28-21	6-32 x 1/8″ Headless Set Screw

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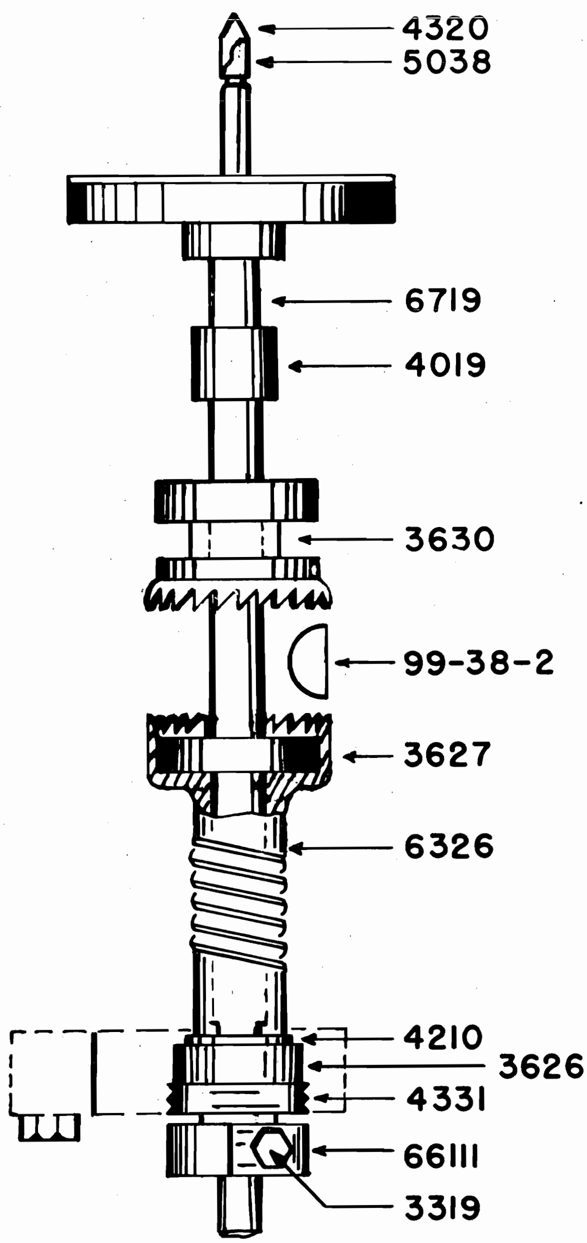

FIGURE 7—TURNTABLE DRIVE SHAFT

PARTS LIST FIGURE 7

Part No.	Description
3626	Ball Bearing
3627	Ball Bearing
3630	Turntable Shaft Clutch
4019	Turntable Shaft Bushing, Durex
4210	Thrust Washer
4320	Turntable Drive Shaft Cap
4331	Bearing Retainer Plug
5038	Turntable Drive Shaft Cap Tubing
6326	Worm & Bushing Assembly
66111	Turntable Shaft Collar & Screw
	4244 Turntable Shaft Collar
	3319 Turntable Shaft Collar Screw
6719	Turntable Shaft Assembly
99-38-2	No. 2 Woodruff Key

TURNTABLE DRIVE SHAFT

When it becomes necessary to remove the turntable drive shaft, it is necessary to remove the upper flexible coupling and the Turntable Collar No. 66111. After the collar is removed, the shaft may be raised until the Woodruff Key (99-38-2) is exposed. Grasp the upper end of the key in a pair of pliers and roll the key out of the driven clutch. After the key is removed, the shaft may be lifted out of the changer. If the Clutch is disassembled, be sure the thrust washer (4210) is not lost.

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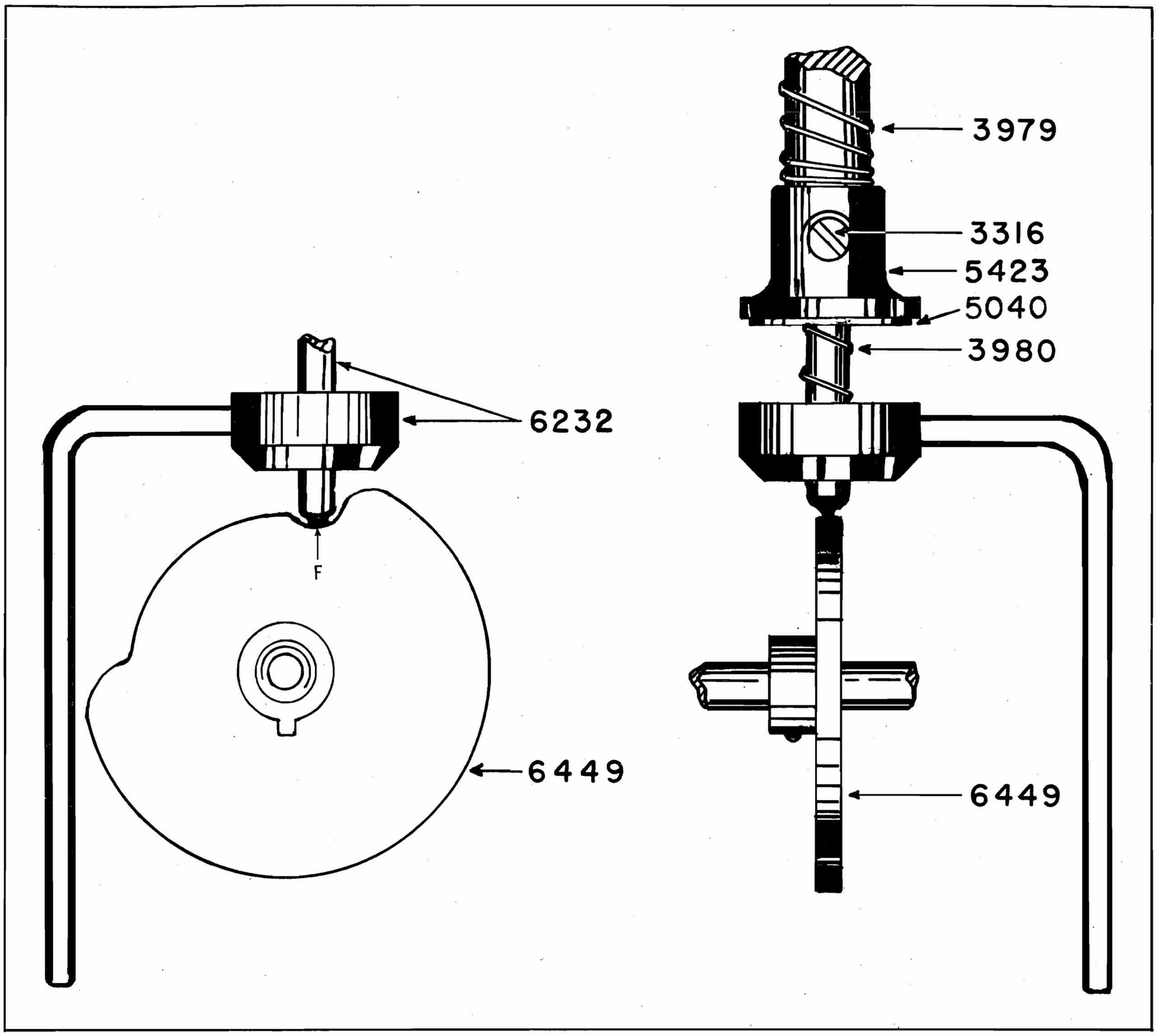

FIGURE 8. TONE ARM LIFT CAM AND LIFT ROD

PARTS LIST

Part No.	Description
3316	10-24 Screw
3979	Pickup Arm Brake Spring
3980	Pickup Arm Lift Spring
5040	Pickup Arm Brake Facing
5423	Pickup Arm Brake
6232	Pickup Swing Lever & Collar Assy.
6449	Pickup Arm Lift Cam & Hub Assy.

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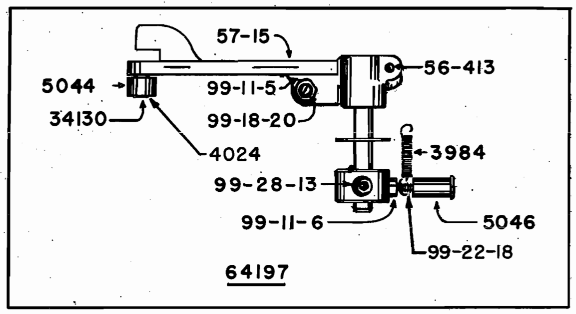

FIGURE 9A—TONE ARM STOP LEVER

PARTS LIST

Part No.	Description
64197	Pickup Arm Stop Lever Assembly
5044	Stop Lever Roller Tubing
34130	Pin Stop Lever Roller Tubing
4024	Stop Lever Roller Bushing
64201	Stop Lever & Bracket Assy.
56-413	Stop Lever Pin
99-11-5	6-32 Hex Nut
99-18-20	6-32 x 5/8″ R. H. M. S.
66107	Stop Lever Collar Assembly
3984	Tone Arm Stop Lever Spring
5046	Bumper—Rubber
99-28-13	1/4-20 x 1/4″ Allen Set Screw
99-11-6	6-32 Hex Nut
99-22-18	6-32 x 1 1/4″ R. H. M. S.

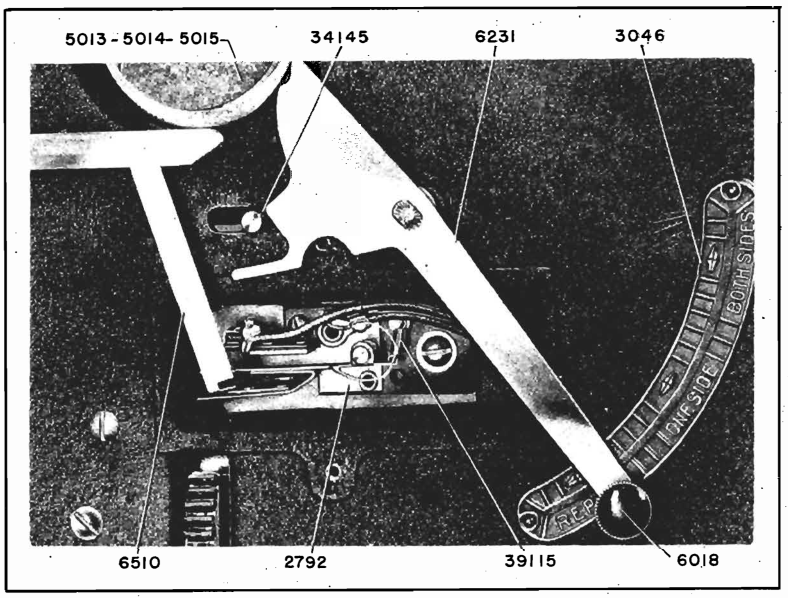

FIGURE 9B. AUTOMATIC TRIP SWITCH

PARTS LIST

Part No.	Description
2792	Record Trip Switch Assembly
3046	Selector Lever Escutcheon
99-40-1	Escutcheon Pin
39115	Trip Switch Spring
2831	Stationary Switch Finger
2846	Movable Switch Finger
6510	Automatic Trip Lever Long Assy.
4533	Automatic Trip Lever Short
3988	Automatic Trip Lever Spring
5013	Heavy, Turntable Drive Facing, Cork
5014	Medium, Turntable Drive Facing, Cork
5015	Light, Turntable Drive Facing, Cork
5051	Automatic Trip Lever Washer
6231	Record Control Lever & Stud Assembly
6018	Record Control Lever Knob
34145	Record Control Rod Pin

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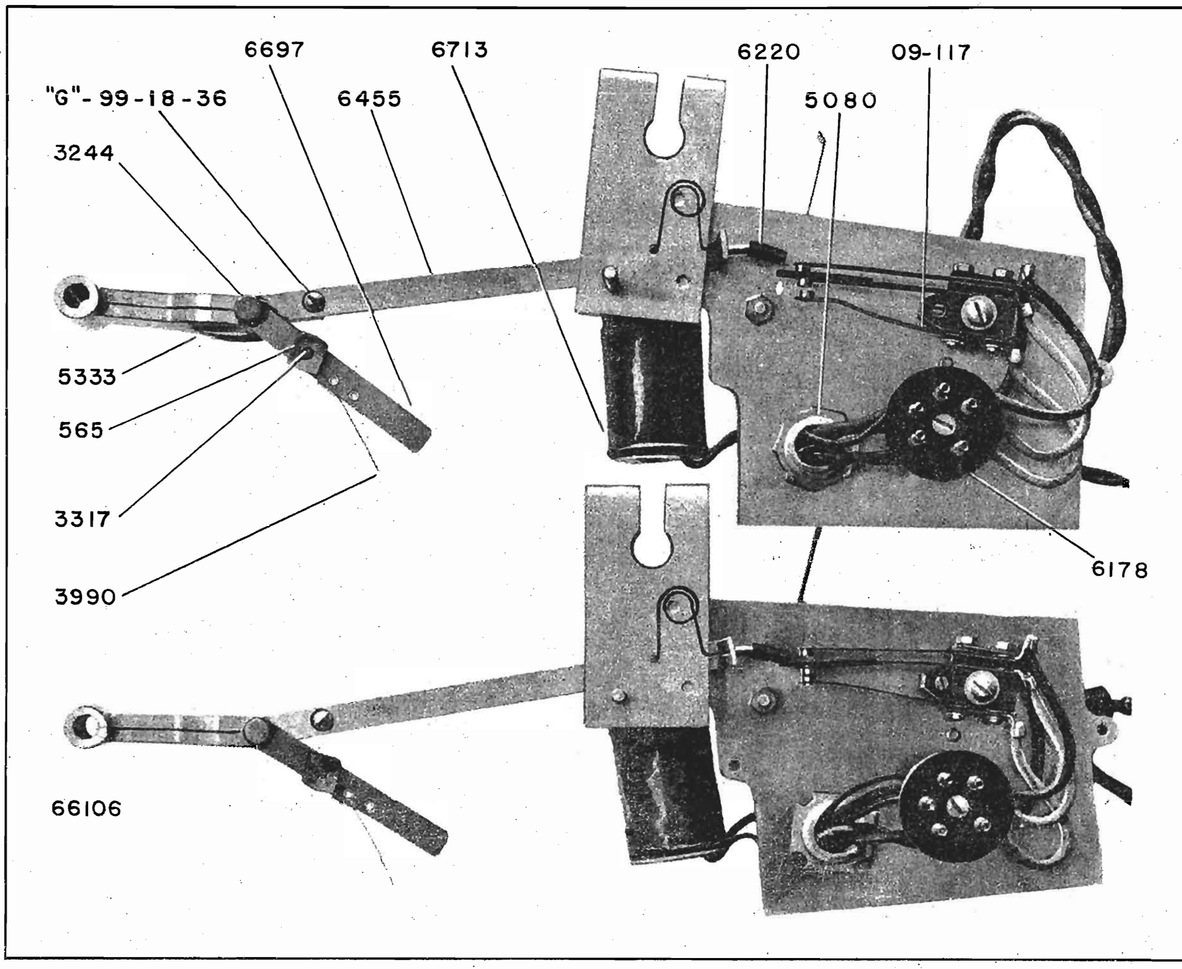

FIGURE 10 SOLENOID CLUTCH LEVER AND MOTOR SOLENOID SWITCH

PARTS LIST

Part No.	Description
6178	Chassis Plug
09-117	Solenoid-Motor Switch
6713	Solenoid Assembly
3986	Solenoid Lever Torsion Spring
66106	Main Clutch Fork & Lever Assembly
3244	Clutch Throwout Lever Throwout Screw
5333	Main Clutch Fork Lever
6455	Solenoid to Clutch Lever
62-20	Lever Bumper—Rubber
6697	Clutch Throwout Lever & Cam Assembly
3317	Clutch Throwout Cam Screw
3990	Clutch Throwout Spring
565	Clutch Throwout Cam

MODEL 16-E, Capehart

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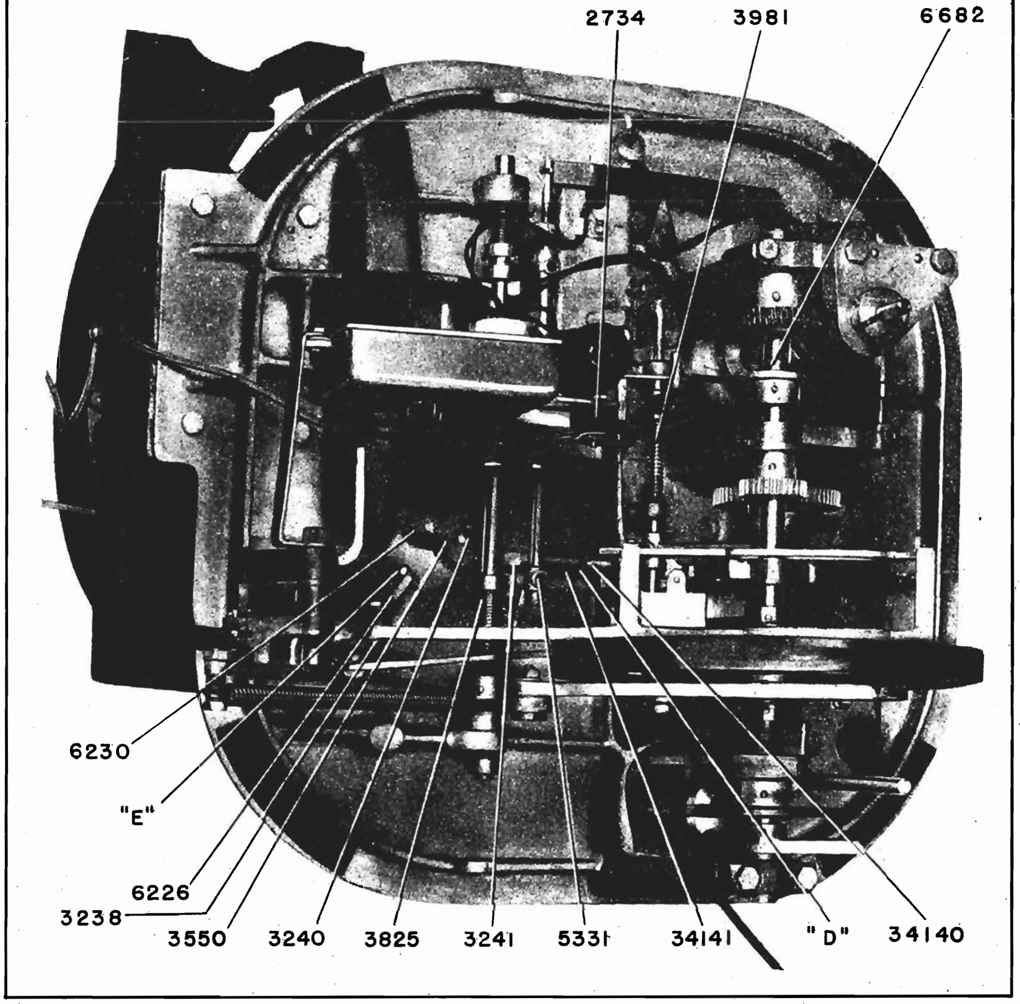

FIGURE 11 BOTTOM VIEW 16-E CHANGER

PARTS LIST

Part No.	Description
2734	Pickup Shorting Switch
3238	Magazine Slide Arm Shoulder Screw
3240	Shoulder Screw, Reverse Segment
3241	Reverse Segment Link Shoulder Screw
34140	Reverse Segment Pin, Long
34141	Reverse Segment Pin, Short
3550	Record Reverse Pinion Segment
3825	Reverse Segment Stop Cam
3981	Record Reverse Cam Control Spring
5331	Record Repeat Throwout Hook Lever
6230	Reverse Pinion & Crank Assembly
6226	Separator Hook & Arm Assembly
6682	Main Shaft Assembly
99-26-9	1/4-20 x 1 1/8″ H. H. Cap Screw

Record Support Pins set 19° angle so as to match angle of record.

1. Record being released.
2. Next Record in line.
3. Second and Third Records being forced against first record, pushing first off record knife.

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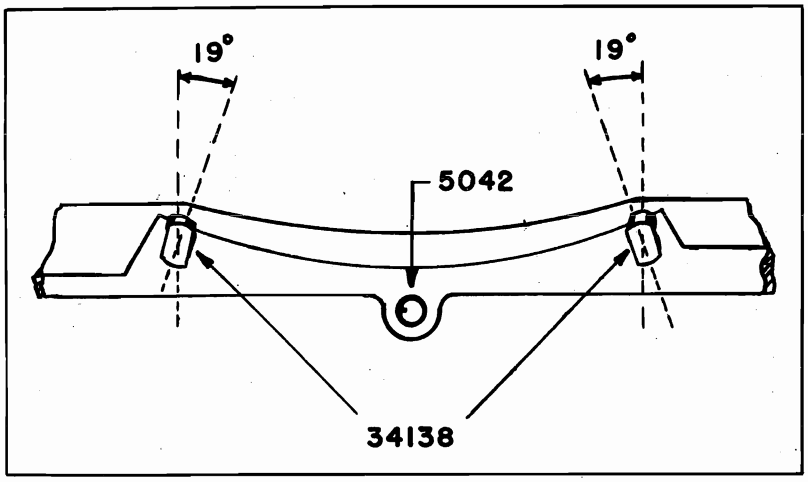

FIGURE 12A LOCATION RECORD SUPPORT PINS

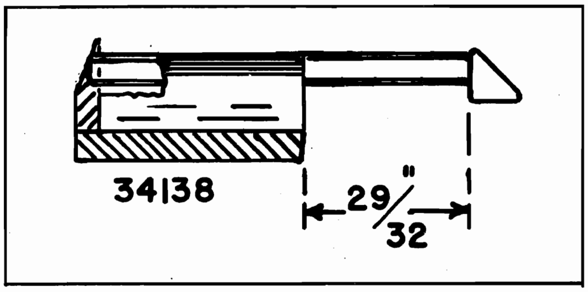

FIGURE 12AA LOCATION RECORD SUPPORT PINS

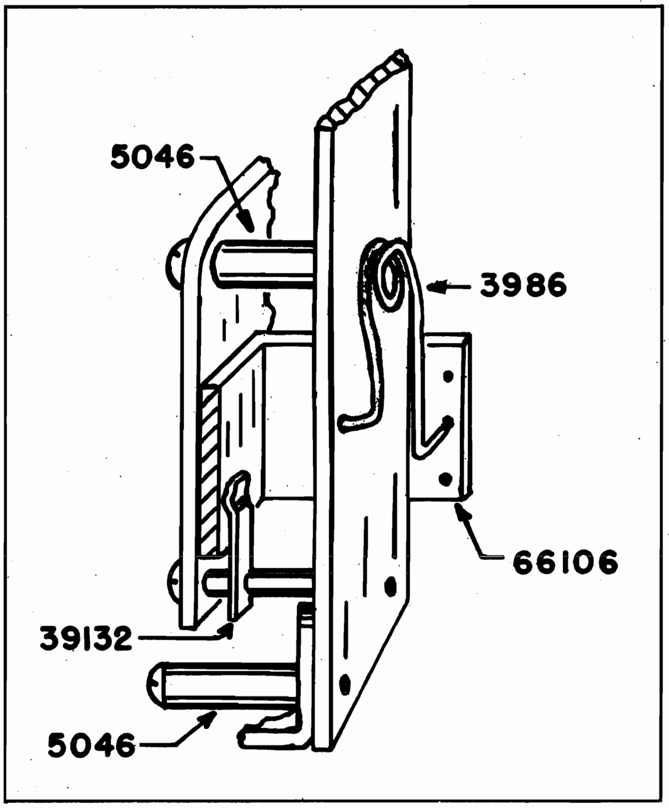

FIGURE 12B SOLENOID TORSION AND WEDGE SPRINGS

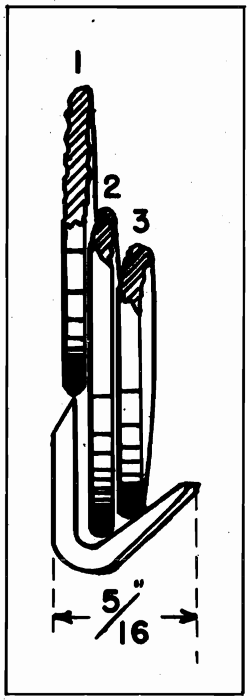

FIGURE 12C RECORD SEPARATOR AND RECORDS EDGE VIEW

MODEL 16-E, Capehart

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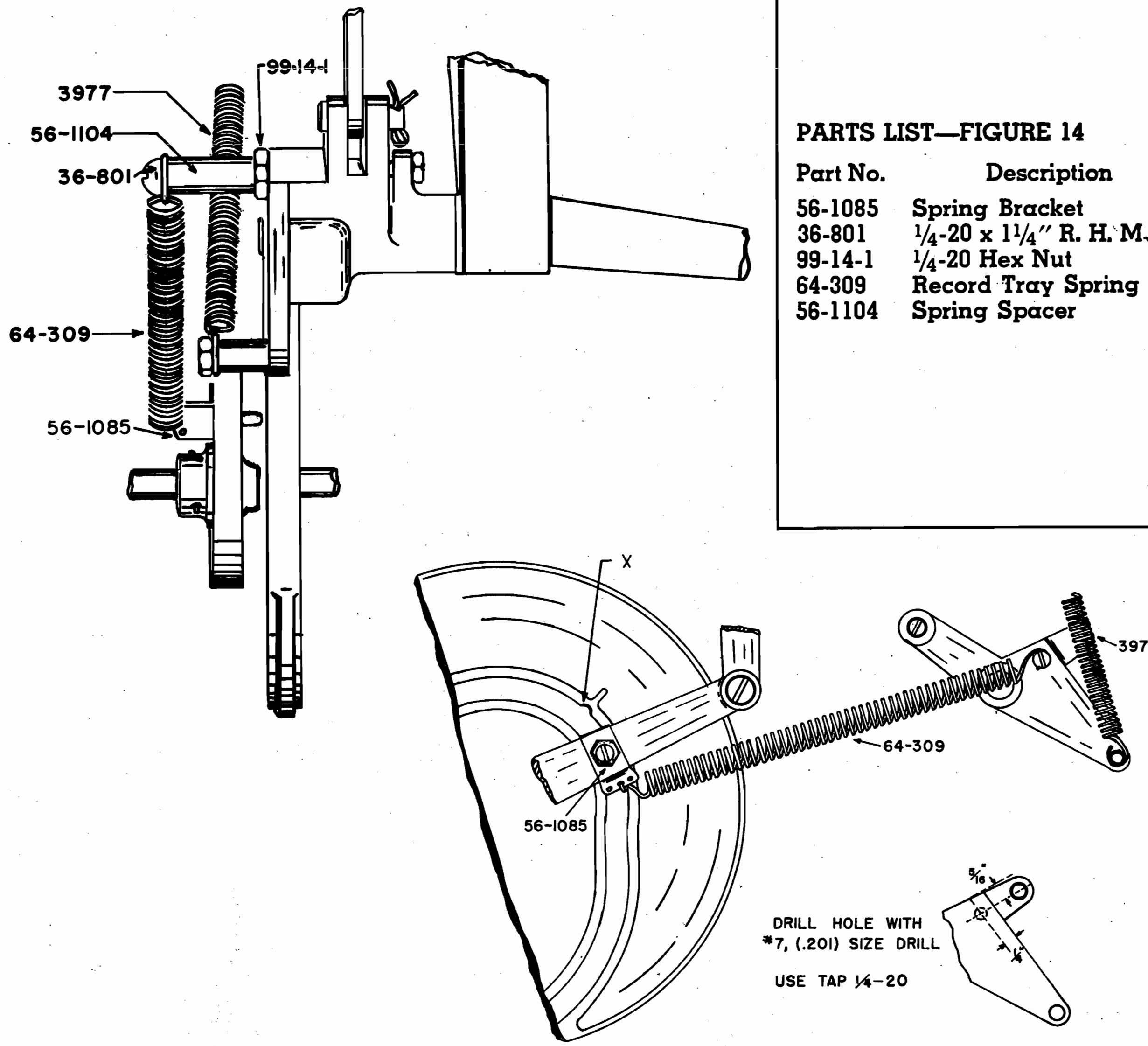

PARTS LIST—FIGURE 14

Part No.	Description
56-1085	Spring Bracket
36-801	1/4-20 x 1 1/4" R. H. M. S.
99-14-1	1/4-20 Hex Nut
64-309	Record Tray Spring
56-1104	Spring Spacer

FIGURE 14—ADDITIONAL PARTS REQUIRED FOR ZINC TRAY

If it is necessary to replace the aluminum tray used on changers having a serial number below 20,000, it is necessary to add the above parts, which are necessary due to the additional weight of the zinc tray which is now available.

The bell crank which is used to swing the magazine must have a 1/4-20 hole tapped in the location shown; 1/4" from one edge and 5/16" from the other edge. A No. 7 drill is used for the hole, and a plug tap should be used for threading the hole.

When assembling the screw (36-801), nut (99-14-1) and spacer (56-1104), 1/16" space should be left between the spacer and screw head to allow free motion of the tray spring (64-309).

Assemble spring bracket (56-1085) under the nut holding the tray slide arm roller, as shown in the illustration above. The spring should be used in the middle hole of the bracket.

At the point marked "X" in the illustration there is a guide mark and a semi-circular spot has been milled in the cam track. It is necessary that this track be bent so the semi-circular spot is flush with the remainder of the cam wall. This can be done best by means of an iron block and heavy hammer. Hit the block with the hammer until the track is straight. This is necessary to prevent the spring holding the tray lift shaft so the sliding clutch cannot be properly engaged when changing from Repeat to One or Both Sides.

FARNSWORTH TELEV. & RADIO CORP. MODEL 16-E, Capehart

GENERAL PARTS LIST

Part No.	Description
565	Clutch Throwout Cam
569	Pole Piece
5610	Stylus
5615	Record Reverse Guide Fork Only
5658	Pickup Lever Hook
5662	Cable Housing
5663	Control Cable
5745	Complete Turntable Assembly
5765	Pickup Cover
5768	Pickup Back
5769	Tone Arm Assembly Less Pickup
5784	Pickup Back-Crystal
5785	Cover-Crystal
6018	Record Control Lever Knob
6019	1/4" Allen Wrench
6062	Bar Knob-Painter
6178	Chassis Plug—5 prong male
6179	5 prong Motor Plug
61163	Light Bulb
61212	Pickup Magnet
6223	Record Reverse Arm Shaft & Collar Assembly
6224	Solenoid Lever Shaft & Collar Assembly
6226	Separator Hook & Arm Assembly
6228	Record Reversing Arm & Fork
6230	Reverse Pinion & Crank Assembly
6231	Record Control Lever & Stud Assembly
6232	Pickup Swing Lever & Collar Assembly
6233	Record Reverse Cam Shaft Gear & Collar Assembly
6257	Record Tray Gear & Sliding Clutch
6325	Record Reverse Cam & Pin
6326	Worm & Bushing Assembly
63116	Plunger Tube Assembly
6444	Record Reverse Guide Assembly
6445	Record Separator & Hub Assembly
6449	Pickup Arm Lift Cam & Hub Assembly
6450	Reverse Cam Arm & Roller Assembly
6455	Solenoid to Clutch Lever
6460	Clutch Throwout Lever & Spring Assembly
64197	Pickup Arm Stop Lever Assembly
6510	Automatic Trip Lever—Long
6682	Main Shaft Assembly
6684	Record Magazine Support Assembly
6685	Lower Record Support Assembly
6686	Complete Record Magazine Assembly
6687	Complete Record Tray & Gear Assembly
6691	Pickup Arm Friction Cam Assembly
6693	Record Bumper Guide Assembly
6697	Clutch Throwout Lever & Cam Assembly
66105	Flexible Coupling—Set Screw No. 99-28-13
66106	Main Clutch Fork & Lever Assembly
66107	Stop Lever Collar Assembly
66111	Turntable Shaft Collar and Screw
66254	Ball Crank & Steering Rod Assembly
66324	Stop Spring and Ball Assembly
66325	Bracket Assembly for 16-E Chassis
66326	Dog Plunger Assembly
66389	Motor Coupling and Set Screw (New No. 13-195)
66399	Gear Box, 60 cycle
66435	Gear Box, 50 cycle
6711	Spool Assembly
6713	Solenoid Assembly
6719	Turntable Shaft Assembly
6723	Brush Assembly
68285	Pickup Lead Assembly
99-11-1	No. 6-32 Hex Nut
99-11-6	No. 6-32 Hex Nut
99-12-3	No. 8-32 Hex Nut for 4323
99-14-1	*No. 1/4-20 Hex Nut
99-18-6	No. 6-32 x 1/4" R. H. M. S.
99-18-21	No. 6-32 x 3/8" R. H. M. S.
99-20-4	No. 10 24 x 3/8" R. H. M. S.
99-20-31	No. 10 32 x 3/8" R. H. M. S.
99-22-29	Screw—Pickup Stop
99-22-35	No. 6-35 x 1/4" M. S. O. H. Nickel
99-26-9	No. 3/4-20 x 1 1/8" H. H. Cap Screw
99-26-13	No. 10/24 x 3/8" H. H. M. S.
99-28-3	No. 6-32 x 1/4" Headless Set Screw
99-28-13	1/4 x 20 1/4" Allen Set Screw
99-28-21	No. 6-32 x 1/8" Headless Set Screw
99-28-31	No. 6-32 x 3/16" Bristol Set Screw
99-33-4	No. 10 Special Shakeproof Washer
99-34-7	Cotter Pin
99-35-5	00 x 1/2" Taper Pin
99-38-2	No. 2 Woodruff Key
99-41-11	1/8" x 1/4" Eyelet
99-42-13	1/4" Steel Ball
99-42-14	1/8" Pipe Plug
13-79	Dog Plunger Assembly—"K" only
13-81	Bracket Assembly for 16E Chassis—"K" only
13-141	406M Friction Drive Assembly
13-148	411M Friction Drive Assembly
13-150	412M Friction Drive Assembly
13-151	410M Friction Drive Assembly
13-195	Flexible Coupling & Set Screw
13-368	Play Control Cabinet & Cabinet Assy., Complete
13-396	Ratchet Assembly
15-45	Gear Box, Cover, Pinion & Bearing Assembly
22-126	Cable and Plug Assembly
31-213	Dial Scale
36-136	No. 10 Plain Washer
36-141	6/32 x 1/4" R. H. M. S.
36-258	Spacers
36-501	"C" Washer for Friction Drive
36-550	No. 10/32 x 3/4" Slotted H. H. M. S.
36-801	*1/4-20 x 1 1/4" R. H. M. S.
41-89	"C" Washer—Package 12
54-38	Reduction Unit Shim
56-415	411M Shaft for Friction Drive
56-416	Shaft for Friction Drive 111 & 112
56-417	412M Shaft for Friction Drive
56-418	406M Shaft
56 1085	*Spring Bracket
56-1099	Shaft
56-1100	Steel Ball Bearing
56-1104	*Spring Spacer
57-18	Lower Friction Drive Disc
59-142	Knob, M Play Control
59-143	Housing, M Play Control
60-144	Fibre Washer
62-26	Rubber Record Bumper—Left
62-27	Rubber Record Bumper, Right
62-46	Motor Grommet
62-75	Rubber Grommet
64-31	Plunger Return Spring, "K" only
64-32	Spring, Dog—"K" only
64-309	*Record Tray Spring
64-311	Dog Spring
67-88	Mounting Board
90-125	Light Switch
90-132	Acro Switch
90-133	Relay (Complete)
90-134	Master Switch
92-140	Back Cushion
368-1	Adjusting Screw Net
368-2	406M 3/8 x 32" Hex Nut
621-2	Rubber Grommet
1315-1	Reduction Unit Oil S.A.E. 10, 1/2 oz.
3611-4	No. 10 S. P. Lockwasher
3643-1	No. 10/32 Tee Nut

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FARNSWORTH TELEV. & RADIO CORP.

GENERAL PARTS LIST

Part No.	Description	Part No.	Description
1173	Condenser, 1 mfd.—400 volt	4020	Magazine Bushings, Durex
21156	Motor, 60 cycle	4021	Record Tray Bushing, Durex
21157	Motor, 50 cycle	4024	Stop Lever Roller Bushing (Metal)
2331	Crystal Cartridge	4067	Bearing, Gear Box
2333	Complete Crystal Pickup Assembly	4210	Thrust Washer, Worm Shaft
2722	Toggle Switch	4238	7/16″ Collar for Taper Pin
2734	Pickup Shorting Switch	42129	Spacer, Pickup
2792	Record Trip Switch Assembly	4312	Bushing, Tone Arm Pivot
27123	Switch Assembly	4320	Turntable Drive Shaft Cap
2852	Switch Arm—Straight	4321	Record Reverse Fork
2853	Switch Arm—Bent	4322	Record Separator Hook Post
3046	Selector Lever Escutcheon	4323	Record Separator Hook
3059	Automatic Switch Escutcheon	4331	Bearing Retainer Plug
30142	Play Control Dial	43147	Pickup Center Bolts
3237	Shoulder Screw, Record Tray Adjusting	43159	1/4-28 Cap Nut
3238	Magazine Slide Arm Shoulder Arm	4431	Auto Stop Trip Quadrant Bracket
3239	Magazine Link	4458	Dog, Stop Bracket
3240	Shoulder Screw, Reverse Segment	4520	Record Separator Stop
3241	Reverse Segment, Link Shoulder Screw	4533	Automatic Trip Lever Short
3242	Shoulder Screw	4659	Record Reversing Arm Lock
3243	Repeat Lever Shoulder Screw	4663	Record Repeat Throwout Lever
3244	Clutch Throwout Lever (Throwout Screw)	4664	Record Reversing Arm Lock Stop
		46213	Magnet Holder
3316	No. 10-24 Screw	4719	Magazine Link, Upper
3317	Clutch Throwout Cam Screw	4720	Magazine Link, Lower
3318	Pivot Set Screw Pole	48202	Switch Pin, Play Control
3323	Screw Pickup Hole Piece	4911	Turntable Felt
3356	Screw, Pickup Needle	4912	Record Tray Felt 12″ Record
3361	Needle Screw	4913	Record Tray Felt, 10″ Record
34130	Stop Lever Roller Pin	4915	Magazine Felt—Face
34132	Magazine Pivot Pin	4916	Felt, Lower Record Support
34133	Record Tray Pivot Pin	4917	Bumper Guide Felt
34134	Reverse Guide Stop Pin	4923	Magazine Felt—Side
34138	Record Support Pin	4925	Felt, Outer Record Way
34140	Reverse Segment Pin, Long	5013	Turntable Drive Facing, Heavy
34141	Reverse Segment Pin, Short	5014	Turntable Drive Facing, Medium
34145	Record Control Rod Pin	5015	Turntable Drive Facing, Light
34147	Record Tray Slide Pin	5033	Rubber Insulating Bushing, Tone Arm
34157	Pin for 3982 Spring	5036	Record Tray Bumper, Rubber, Front
34176	Turntable Trip Pin, Fibre	5037	Record Tray Bumper, Rubber, Rear
3539	Worm Gear	5038	Turntable Drive Shaft Cap Tubing
3550	Record Reverse Pinion Segment	5040	Pickup Arm Brake Facing, Cork
35101	Gear	5041	Pickup Arm Friction Cam Facing, Leather
35107	Gear Box Worm Gear		
3626	Ball Bearing	5042	Reverse Arm Bumper, Rubber
3627	Ball Bearing	5043	Reverse Guide Pin Tubing
3630	Turntable Shift Clutch	5044	Stop Lever, Roller Tubing, Rubber
3653	Ball Bearing	5046	Tone Arm Stop Lever Sleeve, Rubber
3819	Record Repeat Throwout Cam	5051	Automatic Trip Lever Washer
3825	Reverse Segment Stop Cam	5058	Rubber Bumper
3866	Play Control Split Cam, Long	5059	Rubber Bearing (2)
3867	Play Control, Split Cam Short	5060	Dust Rubber
3936	Spring, Dog	5080	Porcelain Bushing and Nut
3938	Spring, Safety Clutch	50117	Frame Pad, Rubber
3976	Record Separator Hook Lever Spring	50126	Leather Disc
3977	Magazine Slide Arm Spring	50170	Clutch Drive Facing (Leather)
3978	Record Repeat Clutch Spring	50173	Tone Arm Bushing
3979	Pickup Arm Brake Spring	50225	Gear Box Cover Gasket
3980	Pickup Arm Lift Spring	5139	Terminal Block
3981	Record Reverse Cam Control Spring	5226	Solenoid Plate Cover
3982	Record Separator Spring	5323	Magazine Slide Arm Lever
3983	Record Separator Hook Spring	5326	Record Reverse Cam Shift Lever
3984	Tone Arm Stop Lever Torsion Spring	5330	Record Reverse Arm
3986	Solenoid Lever Torsion Spring	5331	Record Repeat Throwout Hook Lever
3988	Automatic Trip Lever Spring	5332	Record Repeat Clutch Lever
3990	Clutch Throwout Spring	5333	Main Clutch Fork Lever
3995	Reverse Arm Spring	5334	Record Repeat Lock Lever
39115	Trip Switch Spring	5339	Reverse Cam Lock Lever
39130	Record Reverse Guide Spring	5423	Pickup Arm Brake
39210	Spring for Ball Crank	5466	Upper Friction Drive Disc
39219	Plunger Return Spring	5484	Pickup Arm Bracket
4018	Main Shaft Bushing, Durex	54103	Play Control Housing
4019	Turntable Shaft Bushing, Durex	5517	Upper Record Support

GARRARD ENG. & MFG. CO. LTD.

MODEL 65

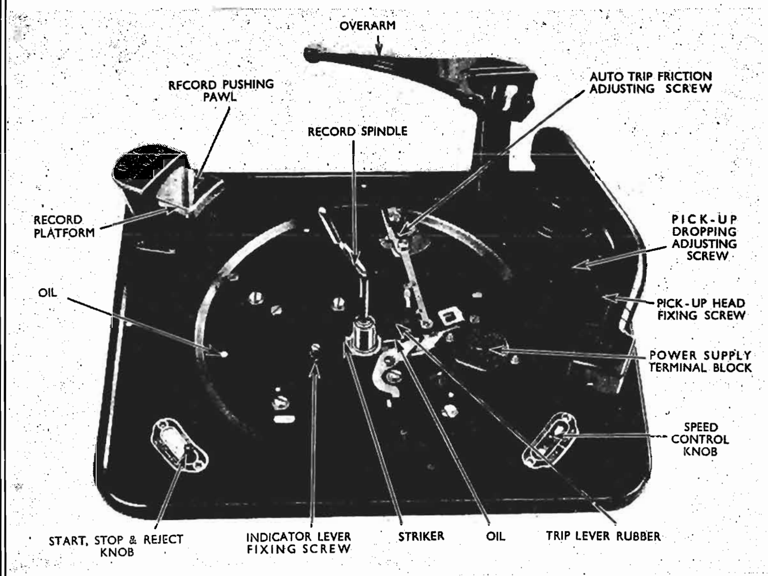
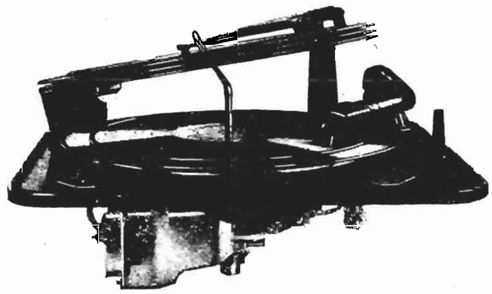


Diagram 1



OPERATING INSTRUCTIONS

The "GARRARD" Record Changer will play any number of records up to eight 10″ and 12″ mixed in any order.

To operate, proceed in the following order:—

1. If a permanent needle is not used insert a needle—the type that will play 10 or more records—in the pick-up; lift the Pick-up Arm to do this.
2. Place the record spindle in position, the sloping part leaning towards the record platform, raise overarm, and place any number up to eight records on the record spindle, their lower edge resting on the record platform, then lower overarm.
3. Move the left-hand knob to "Start." The motor will start and the Changer operate.
   When the last record has been played, the Changer will automatically stop.
   To remove records, raise overarm and withdraw the record spindle.
   To reject a record, move the left-hand knob to the reject position.
   The Changer can be stopped by moving the left-hand knob to the "Stop" position.

If the Changer is switched off while a record is playing, that record will be automatically rejected, and the next record commence when switching on again.

If desired a 10″ record may be repeated any number of times by placing the record on the turntable, raising the overarm and switching on with no records on the record spindle. When it is desired to stop the record, lower the overarm, and the Changer will automatically switch off at the end of the record.

This cannot be done with 12″ records as the pick-up arm will automatically come to the 10″ position when there are no records on the platform.

Should the Record Changer be stopped with the pick-up arm not on its rest, the pick-up should not be handled, but the left-hand knob moved to "Start," the pick-up will then return to its rest.

When the Changer is fitted with a High Fidelity Pick-up of any type, extra care should be taken to avoid accidental damage to the pick-up, and attention should be given to the following points:—

The Changer should not be switched off either by the switch on the Changer, the switch on the set, or the house switch during its changing cycle, as this may lead to the pick-up being lowered on to the turntable covering when the Changer is next used.

If it is suspected that the Changer has been switched off in the wrong position, place a 12″ record on the Turntable before switching on.

Do not use badly warped records, they may not drop and the pick-up will lower on the Turntable covering, also badly warped records will give trouble by slipping during playing. Care should be taken in storing records to prevent contact with dirt and dust which sets up abrasive action and causes rapid wear.

NEEDLES.

It is emphasized that if for any reason the needle, whether of the permanent or semi-permanent type, is taken out of the pick-up head after it has played even only a part of a record, it should be discarded and not used again, as a small flat is worn on the side of the needle tip which rests on the record and as the needle cannot be put back into the pick-up without turning it slightly the flat will not rest on the record in its original position, and will form a cutting edge to tear up the record groove.

MODEL 65

GARRARD ENG. & MFG. CO. LTD.

INSTALLATION

DIMENSIONS.

The cabinet space required for fitting is 15½in. long by 13¼in. with 5½in. clearance above and 4½in. clearance below unit plate.

FITTING TO CABINET.

(i) The "GARRARD" Automatic Record Changer is supplied with Spring Suspension to prevent acoustic feedback occurring between the loud speaker and the pick-up. Ample clearance should be left between the edges of the unit plate and the cabinet to allow the Record Changer to float freely. Diagram 2 illustrates the assembly of the spring suspension.

In cases where there is no possibility of acoustic feed-back occurring such as where the loud speaker is in a separate cabinet, the spring suspension is not necessary and the Changer can be screwed down to the motor board with four of the wood screws supplied for the spring suspension.

Two additional holes will be found in the unit plate, these are for transit fixing screws which should be used to fix the Changer rigid to the cabinet during transit, and removed on final installation. These are only necessary when using the spring suspension.

(ii) If desired, a template for cutting the motor board when fitting the Record Changer into the cabinet may be obtained on application to The Garrard Eng. & Mfg. Co. Ltd. After installation see that the Changer is level by placing a spirit level on a record on the turntable. If not level, adjust by means of the spring suspension fixing nuts. Finally, the nuts and threads of the spring suspension fixing screws should be coated with a locking paint such as shellac varnish to prevent the nuts working loose due to vibration.

VOLTAGE.

The "GARRARD" Model R.C.65 Record Changer is made in two types:—

R.C.65/D.16 Dual Voltage Range 100/130 and 200/250 volts 40/60 cycles.

R.C.65/U.16 Universal Voltage Range 100/130 and 200/250 volts D.C. and A.C. 25/60 cycles.

On installation, the links in the terminal block should be set to the correct position to correspond with the voltage of the power supply, as shown in diagrams 4 to 7.

A red terminal block cover is fitted to the Universal type (R.C. 65/U.16).

A brown terminal block cover is fitted to the A.C. type (R.C. 65/D.16).

The motor should be earthed by connecting a lead from the earthing tag, located under one of the motor end cover screws and a good earth connection.

When adapting an A.C./D.C. (Universal) Radio Receiver, Amplifier or one using a D.C. Power Pack for the reproduction of gramophone records, a pick-up transformer or condensers in series with the pick-up leads should be fitted, otherwise the pick-up circuit becomes alive. Also, the leads from the radio set or amplifier to the pick-up should be as short as possible to prevent picking up mains hum.

SPEED SETTING.

Due to the wide voltage range of the motors it may be necessary on some power supplies when installing the unit to make a slight re-adjustment of the speed Indicator Lever so that the speed of the Turntable corresponds with that shown on the Indicator scale.

To set the speed on alternating current power supply of 50 or 60 cycles use the "GARRARD" Stroboscopic Speed Indicator enclosed with each Record Changer. To set speed on direct current power supply or supplies having frequencies other than those covered by the stroboscope, the turntable should be checked with a watch. Set speed so that turntable revolves at 78 r.p.m., remove the turntable and carefully loosen the screw holding the indicator lever to the vertical brake shaft, move the indicator lever to the centre position on the indicator plate and tighten up the screw (diagram 3). On some models the screw is not accessible from the top of the unit. In this case lift the changer from the cabinet and adjust the screw from underneath the unit plate. The speed should now be correct.

One side of the stroboscopic speed indicator is designed for use in adjusting speed on a 50 cycle, and the other side a 60 cycle power supply.

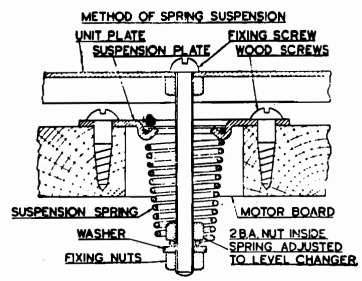


Diagram 2.

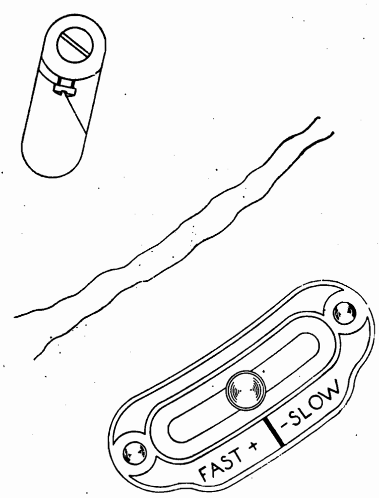


Diagram 3.

CONNECT BOTH BARS THUS
FOR 200/250 VOLTS.

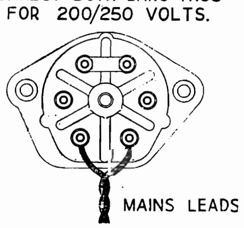


Diagram 4.

Link Connections, RC 65 D 16

CONNECT BARS THUS
FOR 100/130 VOLTS.

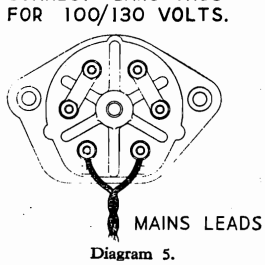


Diagram 5.

CONNECT BOTH BARS THUS
FOR 200/250 VOLTS.

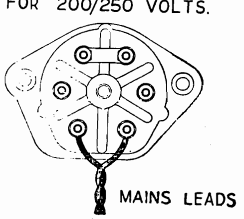


Diagram 6.

Link Connections, RC 65 U 16

CONNECT BOTH BARS THUS
FOR 100/130 VOLTS.

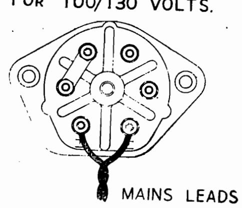


Diagram 7.

GARRARD ENG. & MFG. CO. LTD.

MODEL 65

SERVICE ADJUSTMENTS

MOTORS.

The R.C. 65/D.16 is fitted with a governor controlled Induction Motor for use on A.C. only. The stator coils are connected in series on the high voltage range and in parallel on the low voltage range.

The R.C. 65/U.16 is fitted with a governor controlled series wound universal motor for use on A.C. or D.C., and in this case the windings are connected in series with a voltage dropping resistance, a portion of which is shorted out when the motor is used on the low voltage range. A condenser is connected across a section of the resistance to keep the motor torque constant over the frequency range when on A.C.

OILING.

Due to the oil retaining bearings, the motor only requires oiling at intervals depending upon the length of time the Record Changer is used. Lift off the Turntable and the oil holes (diagram 1) are accessable. A few drops of "GARRARD" or thin lubricating oil are sufficient.

Wavy or watery reproduction of the record is often due to dry governor pads. These should be lubricated by saturating the felt pads with a thin oil. Occasionally the governor will rattle badly and the reproduction will be distorted. This is caused by the surface of the governor spindle, on which the governor sleeve slides as the balls fly outwards, becoming dry, and it should be lubricated with a thick oil.

Thick oil should on no account be used for the motor bearings.

STARTING FAILURES.

If the motor fails to start when the control knob is turned to the Start position, first check the power supply and ascertain that the current is reaching the motor terminals. Give the turntable a turn by hand to help it round, in case, when the Record Changer was last used, the motor was switched off during the changing cycle, in which case it is possible for the motor to be unable to start under the full load of the Record Changing Mechanism.

Disconnect the mains supply and examine the terminal block to see that the leads and nuts are tight, also examine the switch contacts, clean and adjust if necessary. If a thick oil has been used to lubricate the motor bearings, the motor will appear weak, and possibly not start. It will be necessary to dismantle the motor, and clean away all traces of the thick oil, it is, therefore, essential to lubricate the motor bearings with a good quality thin machine oil.

In the case of the U.16 Motor periodical examination of the carbon brushes should be made. If they are allowed to become dirty or worn, brush noises will occur, and occasionally the motor may run unsteadily or stop. The brushes can be cleaned by lightly scraping the contact surface with a penknife. The brushes should be a perfectly free sliding fit in the brush tubes. It is essential the brushes should be replaced in the same holder and in the same way round as originally found.

New brushes are $\frac{9}{16}''$ long under the Springs. When worn down to $\frac{3}{8}''$, they should be replaced. To remove the brushes unscrew the brush caps and the brushes can be withdrawn. If the copper Commutator upon which the brushes rest has become corroded, dirty or greasy, it should be cleaned with a rag damped with petrol or lighter fuel. When finally replacing the brushes always ensure that the brush caps are screwed up tight. Should the motor get too hot first see that the voltage changeover links are set correctly to correspond with the voltage of the power supply. To check the motor windings insert a milliameter in either motor lead. The maximum current should not exceed:—

R.C. 65/D.16	High Range	0.11 amp.
	Low Range 50 cycles	0.22 amp.
	Low Range 60 cycles	0.24 amp.
R.C. 65/U.16	High Range A.C.	0.15 amp.
	Low Range A.C.	0.14 amp.
	High Range D.C.	0.16 amp.
	Low Range D.C.	0.19 amp.

If readings in excess of the above figures are obtained, the motor units or coils should be returned to our Service Department for examination.

If the motor has to be removed from the Record Changer, disconnect the switch leads from the switch and remove the clips holding the leads, then remove the motor fixing screws and the motor can be withdrawn. When withdrawing the motor note carefully how the divided speed control lever parts in two, so that it may be correctly re-assembled when the motor is replaced.

Now refit this screw in an adjacent hole according to the adjustment required. Moving the screw to a hole nearer the platform lengthens the link and increases the inward movement of the platform. By moving the screw in the opposite direction the link is shortened and the outward movement of the platform increased. The permissible adjustment is one hole in either side of existing position of the screw.

RECORDS FAILING TO DROP.

If the records fail to drop correctly, the angle of the record spindle should be checked from the template printed at the end of this manual and corrected it necessary, using great care in doing this as the thin neck of the spindle is very easily broken if unduly bent. If the spindle is correct slide off the name plate on the record platform cover and examine the record pushing pawl (diagram 8). It will be noted that the lower rear tail of this pawl engages a stop at the back of the platform as the platform moves back when a 10" record is to be played. When a 12" record holds the pawl down the lower tip passes over the stop. When the platform is in the playing position, that is, when the changing cycle has finished and the needle is playing the record there should be a gap of approximately $\frac{1}{8}''$ between the rear of the pushing pawl and the front of the stop. If this gap is incorrect, the stop can be adjusted by releasing its two fixing screws and moving it backwards or forwards as necessary, finally re-tightening the screws.

OVERARM.

Note that when a batch of records is on the record spindle and the overarm is lowered thereon, only the pad nearest to the platform should rest on the records. There should be a gap of approximately $\frac{1}{8}''$ between the other pad and the surface of the top record. This side of the overarm only comes into action when the last record is a 10". It then prevents the record tipping as the platform moves back leaving the record balanced on the record spindle.

RECORD SPINDLE.

Should an intermittent squeak develop it is probably due to the anti-slip sleeve on the spindle having become dry and may be cured by putting a spot of thin oil between the sleeve and the spindle.

TEMPLATE FOR R.C.65 RECORD SPINDLE.

Should the record spindle be accidentally bent out of position through being dropped or other reasons, the record dropping will be affected. If trouble is experienced with erratic record dropping, lay the record spindle on template and check that it conforms to the shape thereof.

MODEL 65

GARRARD ENG. & MFG. CO. LTD.

PICK-UP DROPPING POSITION.

The pick-up arm has been finely adjusted so that the needle comes on to 10in. records in a 9⅝in. diameter circle and 12in. records in a 11⅝in. diameter circle. These positions were arrived at after checking a very wide selection of records of various makes.

There may be a few records where the record track starts further away from the centre, (i.e., nearer the edge), and in these exceptional cases the needle may alight on the record a few grooves from the start. If the pick-up dropping position were set for these exceptional discs it would not be suitable for average records.

Should the dropping position of the pick-up require adjustment the pick-up adjusting screw — accessible through a hole in the unit plate (diagram 1)—should be turned with the Changer in its start position; that is, with the pick-up arm on its rest.

The pick-up adjusting screw should be turned either to the right or left, according to requirements. A quarter of a turn in either direction will give you the maximum adjustment. After adjustment, switch on, check the dropping position and re-adjust if necessary.

PICK-UP HEIGHT.

The Pick-up should lift sufficiently high for a long needle to just clear the surface of the eighth record on the turntable when the pick-up returns to its rest. If it is necessary to adjust the amount of lift look for the "Adjustment for pick-up lift" shown on diagram 3.

When viewing from back of the Record Changer, this adjustment is immediately underneath the pick-up arm pivot spindle and appears as two similar screw heads. The left-hand head is the locking screw and the right-hand head is the eccentric adjustment screw. To adjust this, first operate the changer and stop when the pick-up arm is moving back across the record to its rest. Loosen the two nuts on the back of the screws, then turn the eccentric adjustment screw as necessary to give the correct height. One half a turn of this screw will give the maximum amount of adjustment. After making the necessary correction, re-tighten the nuts on the back of the screws.

AUTO-TRIP MECHANISM.

The satisfactory operation of the Record Changer depends upon the operation of the auto trip. Occasional adjustment of the auto trip friction spring may, therefore be necessary.

If, at the end of a record, the auto trip does not operate—that is, the pick-up remains at the end of a record—first see that the record has a run-off groove in its centre (as only records with run-off grooves can be played automatically on Record Changers). If the record is in order in this respect see that the trip lever is clear of the unit plate, since any added friction here will prevent it moving in towards the striker. If it is quite free, increase the tension of the friction spring by turning the auto trip friction adjustment screw (see diagram 1) in a counter-clockwise direction; about half a turn is all that should be necessary. This screw is accessible on removing the turntable. Should the changer operate before the end of a record, or a bumping or tapping noise be audible, first examine the trip lever rubber and if it is worn, give it half a turn to present a new surface to the striker. If badly worn, renew. If trip lever rubber is in good condition, reduce the tension of the friction spring by giving the auto trip friction adjusting screw (see diagram 1) half a turn in a clockwise direction.

RECORD PLATFORM ADJUSTMENT.

When despatched from our Works the record platform is set to accomodate records of average dimensions. Occasionally, however, records may be found outside the normal limits; if necessary, therefore, the platform may be adjusted to take them.

To control the platform movement are two adjustable links, each fitted with two screws. One link, with its pivot at the bottom of the platform lever, controls the platform tilt, whilst the other controls the distance the platform pushes inward (see diagram 8).

It is this latter link which may be adjusted to accept records differing from the normal in diameter. To do this, loosen the screw further away from the platform and remove the other screw.

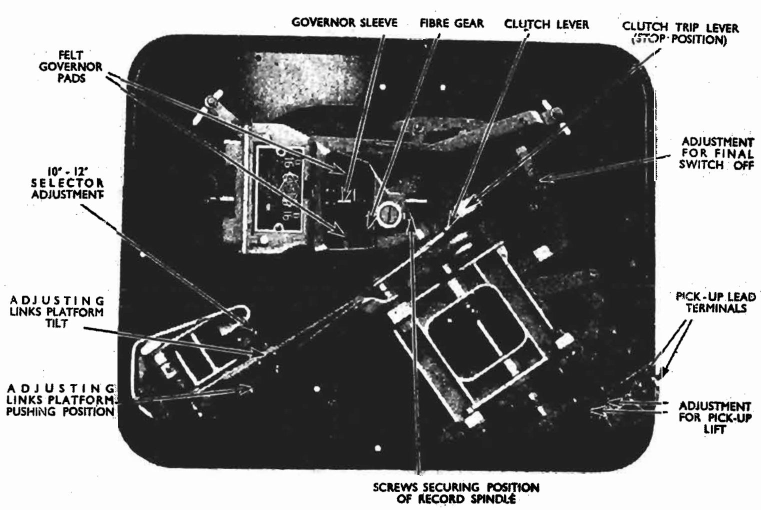


Diagram 8.

GARRARD ENG. & MFG. CO. LTD.

MODEL 65

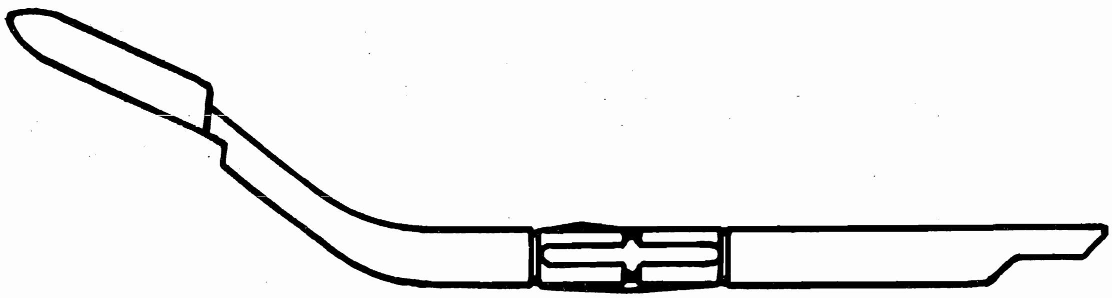


Diagram 9.

ADJUSTMENT TO PICK-UP

"GARRARD" Magnetic types of pick-up are interchangeable with the Crystal type or vice-versa without alteration to the pick-up arm on these Record Changers, provided the pick-up is fitted in a "GARRARD" Head.

All "GARRARD" pick-up heads are of the plug-in type, connections being made by two plugs and sockets at the back of pick-up head.

To remove the pick-up head, unscrew the pick-up fixing screw, withdraw the pick-up, easing the pick-up lead under the arm, and remove the two plug connections from back of pick-up.

If reproduction ceases, or becomes distorted when fitted with a "GARRARD" standard magnetic pick-up, first make sure that the amplifier is in order. Should this be found satisfactory, a slight adjustment to the pick-up may be necessary or the damping rubber may need renewing.

To examine the pick-up proceed as follows: Unscrew the two screws to be found underneath the head, (do not touch the two screws located on each side of the needle), and remove the pick-up unit from the head, then, viewing the front of the pick-up examine the armature to see that it is in the centre of the gap between the pole pieces.

If it is touching one of the pole pieces it must be re-centred. To do this, loosen the two screws holding the adjusting plate, sliding the latter until the armature is in the centre, then retighten the screws.

If the armature will not retain its centre position, it will be necessary to renew the damping rubber. This can be done by removing the adjusting plate, replacing the rubber and re-assembling the plate.

Adjust the plate until the armature is centred before tightening the screws.

The top damping rubber tends to perish in time. It should, therefore, be replaced whenever it appears that the needle stiffness has increased, otherwise excessive record wear may occur.

Distortion may be caused by dirt or foreign matter in the gap between the pole pieces. To remedy, remove the adjusting plate and damping rubber and clean gap.

The pick-up coil winding can be checked for continuity with an ohmmeter.

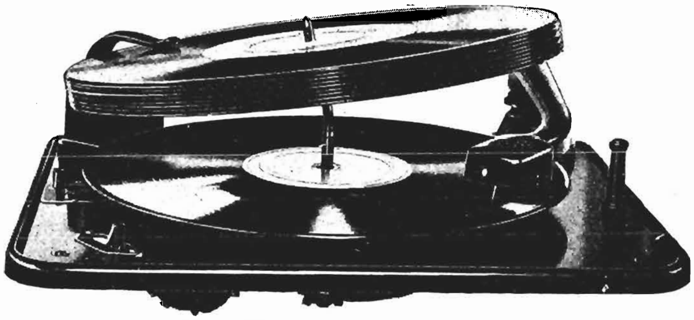
If a Crystal or High Fidelity Pick-up is suspect, the pick-up head should be returned for examination. A continuity test cannot be carried out on Crystal pick-ups with an ohmmeter.

Crystal Cartridges or High Fidelity Pick-ups must not be opened or the manufacturers will disclaim all responsibility.

SPARE PARTS LIST FOR R.C.65

NAME OF PART	NUMBER	NAME OF PART	NUMBER
Record Spindle	A.45380A	Motor Field Coils U.16	A.47775
Turntable	A.45390	Change Over Block Cover D.16 Brown	B.45473
Turntable Cover	A.45395	Change Over Block Cover U.16 Red ...	A.46806
Main Spindle with Fibre Gear ...	A.45348	Motor Resistance complete U.16 ...	A.47778
Pick-up Arm	B.47654	Spring Trip Lever	A.41602
Overarm Bracket	B.47597	Auto Trip Friction Spring	A.41513
Pick-up Connector Assembly	A.47592	Auto Trip Lever Rubber Bush ...	A.47247
Pick-up Lead D.16	A.47786	Switch Contact Spring	A.41597
Pick-up Lead U.16	A.47787	Pick-up Top Damping Rubber ...	A.45303
Platform Bracket	B.47438	Rotor Spindle with Rotor	A.45337
Platform	A.45150	Screw securing Pick-up Head ...	A.40241
Governor Spring D.16	A.41520	Carbon Brush and Spring U.16 ...	A.46319
Governor Spring U.16	A.41572	Brush Cap U.16	A.46409
Motor Stator Coils D.16	A.47750		

MODEL 70 **GARRARD ENG. & MFG. CO. LTD.**



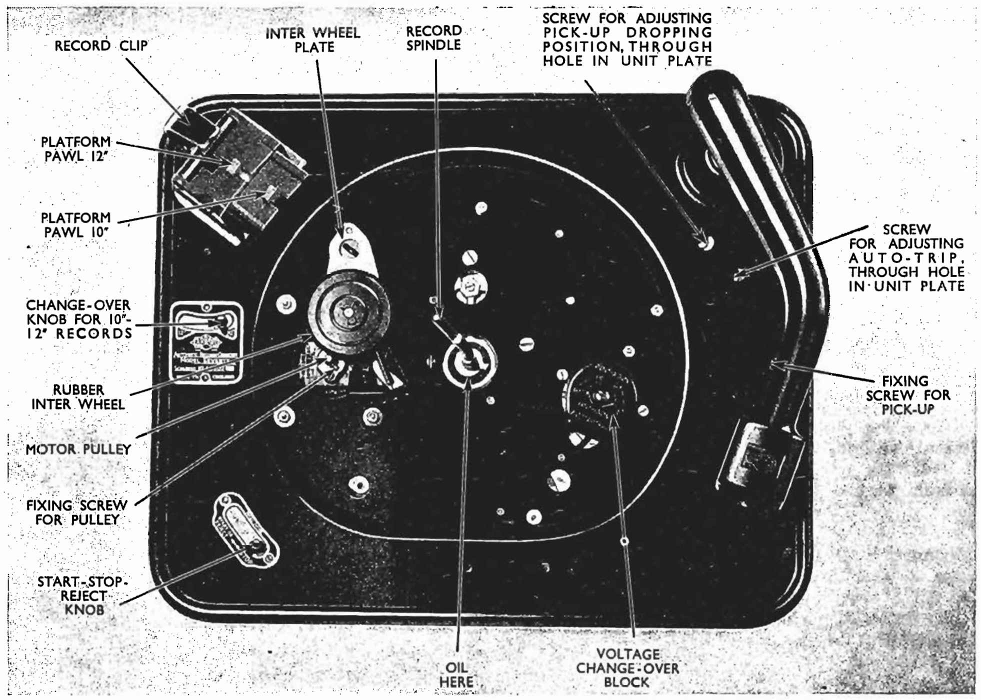


Diagram 1.

OPERATING INSTRUCTIONS

The "GARRARD" Model R.C.70 Automatic Record Changer will play any number of records up to ten 10″ records or ten 12″, not mixed.

To operate the Record Changer proceed in the following order:—

1. If a permanent needle is not used, lift the pick-up head and insert a needle of the type that will play ten or more records. On some models the pick-up head will turn to facilitate needle changing.
2. Place the record spindle in position, the sloping part leaning toward the record platform. Set the record selector knob to 10″ or 12″ according to the size of the records it is desired to play, raise the record clip and place any number up to ten records on the record spindle, their lower edge resting on the record platform, then lower the record clip.
3. Move the front left-hand knob to "Start." The motor will commence to run and the changer operate. When the last record has played, the changer will automatically switch off. To remove the records, raise the record clip and withdraw the record spindle.

   To reject a record, move the left-hand knob to the "Reject" position.

The changer can be switched off by moving the left-hand knob to the "Stop" position. If this is done while a record is playing, that record will be automatically rejected and the next record commenced when switching on again.

If desired, one record may be repeated any number of times by placing the record on the turntable, setting the Selector Knob to the size of the record, and switching on with no records on the record spindle and the record clip raised.

When it is desired to stop the record, lower the Record Clip and the changer will automatically switch off at the end of the record.

NOTE.

Should the record changer be stopped with the Pick-up Arm not on its rest, the pick-up should not be handled but the left-hand knob moved to "Start." The Pick-up Arm will then return to its rest.

When the Changer is fitted with a High Fidelity Pick-up of any type, extra care should be taken to avoid accidental damage to the Pick-up and attention should be given to the following points:—

The Changer should not be switched off, either by the switch on the changer, the switch on the set, or the house switch during its changing cycle as this may lead to the pick-up being lowered on the turntable felt when the changer is next used. If it is suspected that the changer has been switched off in the wrong position, place a 12″ record on the turntable before switching on.

Do not use badly warped records, they may not drop and the pick-up would lower on the turntable felt, also badly warped records will give trouble by slipping during playing.

Care should be taken in storing records to prevent contact with dirt and dust which sets up abrasive action and causes rapid wear.

MAINTENANCE.

The motor and intermediate wheel bearings being the oil retaining type will rarely need lubricating. When the need for oil is apparent a few drops of fine machine oil is all that is necessary.

The rubber rim on the intermediate wheel **must** be kept free of oil.

GARRARD ENG. & MFG. CO. LTD.

INSTALLATION

DIMENSIONS.

The Cabinet space required for fitting is 15½ ins. long by 13 ins. wide with 5½ ins clearance above and 2½ ins. clearance below the plate.

FITTING TO CABINET.

The "GARRARD" Model R.C.70 Automatic Record Changer is supplied with spring suspensions to prevent acoustic feed back occurring between the loudspeaker and pick-up. Ample clearance should be left betweeen the edges of the unit plate and the cabinet to allow the Record Changer to float freely. Diagram 2 illustrates the assembly of the spring suspension.

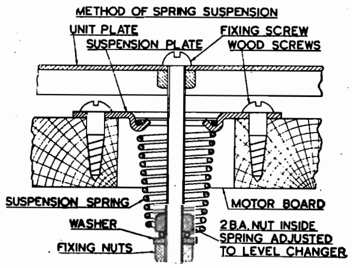


Diagram 2.

In cases where there is no possibility of acoustic feed back occurring, such as where the loud speaker is in a separate cabinet, the spring suspension is not necessary and the changer can be screwed down to the motor board with four of the wood screws supplied for the spring suspension.

Two additional holes will be found in the unit plate; these are for transit fixing screws which should be used to fix the changer rigid to the cabinet during transit and removed on final installation. These are only necessary when using the spring suspension.

If desired, a template for cutting the motor board when fitting the record changer into a cabinet may be obtained on application to The Garrard Engineering & Manufacturing Co. Ltd.

After installation see that the Changer is level by placing a spirit level on a record on the turntable. If not level, adiust by means of the spring suspension fixing nuts. Finally, the nuts and threads of the spring suspension fixing screws should be coated with a locking paint such as shellac varnish to prevent the nuts working loose due to vibration.

VOLTAGE.

The "GARRARD" Model R.C.70 Record Changer is suitable for use on 100/130 and 200/250 volts 50 cycles.

A motor driving pulley can be supplied for 40 or 60 cycle mains if desired.

On installation, the links on the terminal block should be set to the correct position to correspond to the voltage of the power supply as shown in diagrams 3 and 4.

The links are set for operating on the 200/250 volts range when the changer leaves the factory, and need only be altered if it is required for use on the 100/130 volt range.

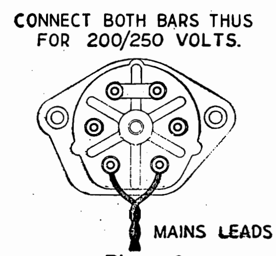


Diagram 3.

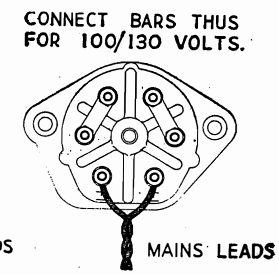


Diagram 4.

The motor should be earthed by connecting a lead from the earthing tag, located under one of the motor end cover screws and a good earth connection.

When adapting an A.C./D.C. (Universal) Radio Receiver, Amplifier or one using a A.C./D.C. Power Pack for the reproduction of gramophone records, a pick-up transformer or condensers in series with the pick-up leads should be fitted, otherwise the pick-up circuit becomes alive. Also the leads from the radio set or amplifier to the pick-up should be as short as possible.

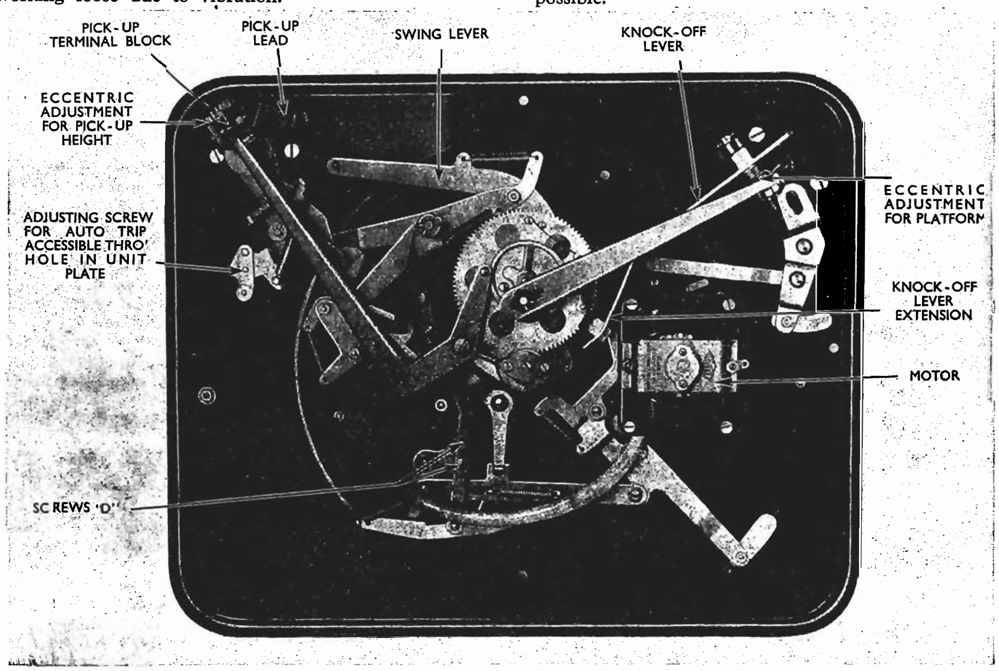


Diagram 5.

SERVICE ADJUSTMENTS

SPEED.

No adjustment for speed is provided on this model, there being no governor, and the motor being of the constant speeed induction type, maintains the turntable at 78 r.p.m.

It is essential that the driving surface of the small brass pulley on the motor spindle, the rubber tyred pulley and the drum of the turntable, be kept absolutely free from all oil or grease. If the speed should become slow or varying, this is the first point that should be checked, and the pulley drum and Intermediate wheel should be cleaned with a rag and a few spots of petrol or lighter fuel.

MOTORS.

If the motor fails to start when the control knob is turned to "start," first check the power supply and ascertain if current is reaching the motor terminals.

Next disconnect the mains supply and examine the terminal block and see that the leads and screws are tight, also examine the switch contacts accessible underneath, clean and adjust if necessary.

If a thick oil has been used to lubricate the motor bearings the motor will appear weak or will not start. It will be necessary to dismantle the motor and clean away all traces of the thick oil. It is, therefore, essential to lubricate the motor bearings with a good quality thin oil.

Should the motor get too hot, see that the voltage change over links are set correctly to correspond with the voltage of the power supply. If correct, check the motor windings by inserting an A.C. milli-ammeter in either motor lead. The maximum current consumption should not exceed 100/130 volts, 50 cycles, 0.26 amp., 200/250 volts, 50 cycles, 0.13 amp.

If readings in excess of the above figures are obtained, the motor unit should be returned for examination.

To remove the motor, first make sure the electricity supply is disconnected, then remove the insulated plate on the underside of the terminal block, underneath the plate will be disclosed the nuts on the screws securing the terminal block to the unit plate—these should be unscrewed and the screws lifted out. The terminal block will then be free from the unit plate and only attached to the motor leads.

Next, while supporting the motor underneath, unscrew the nuts on the three suspension screws, which secure the motor to the unit plate. Before drawing the motor away from the unit plate, make a careful note of the sequence of steel and rubber washers on each suspension screw in order to reassemble correctly when refitting the motor. This is important as the height of the motor in relation to the intermediate wheel is critical.

PICK-UP DROPPING POSITION.

The Pick-up Arm has been finely adjusted so that the needle comes on to 10 in. records in a $9\frac{5}{8}$ in. diameter circle and 12 in. records in a $11\frac{5}{8}$ in. diameter circle. These positions were arrived at after checking a very wide selection of records of various makes.

There may be a few records where the record track starts further away from the centre (i.e., nearer the edge), and in these exceptional cases the needle may alight on the record a few grooves from the start of the record. If the pick-up dropping position were set for these exceptional records it would not be suitable for average records.

Should the dropping position of the pick-up require adjustment, the pick-up adjusting screw — accessible through a hole in the unit plate, see Diagram 1, should be turned with the changer in its start position, that is, with the pick-up arm on its rest.

The pick-up adjusting screw should be turned either to the right or left, according to requirements. A quarter of a turn in either direction will give you the maximum adjustment. After adjustment, switch on, check the dropping position and re-adjust if necessary.

PICK-UP HEIGHT.

If desired the pick-up height can be adjusted by loosening the nut securing the "Eccentric adjustment for pick-up height," Diagram 5, and adjust the eccentric pivot with screwdriver in slot at back. Finally retighten locking nut.

CAUTION.

When making any adjustments to the Pick-up Arm, it should NEVER on any account be forced into position. If the turntable is turned by hand it should NOT be turned backwards.

If the pick-up does not run into the record grooves after alighting on the record edge, see that the record changer is level by placing a spirit level on a record on the turntable. Also make sure that the flexible wire leading to the pick-up is not twisted or held in such a manner as to prevent the free movement of the pick-up arm; also see that the associated levers are free.

AUTO TRIP MECHANISM.

The auto trip mechanism is set to operate when the needle reaches a $1\frac{13}{16}$ in. radius, or if it oscillates in an eccentric groove.

Occasionally records having a smaller or larger radius at the end of the playing grooves, are encountered. If it is desired to adjust the mechanism to take these exceptional records, the screw visible through hole in unit plate (Diagram 1) should be adjusted.

To make the trip operate earlier for larger radius records loosen the screw, and holding the pick-up arm steady, move the screw a shade towards the turntable. To make the trip operate later for small radius records, move the screw away from the turntable.

After each adjustment check with record, and re-adjust if necessary. Finally retighten the screw.

It is emphasised that this screw should be moved a barely visible amount at each adjustment.

RECORD PLATFORM ADJUSTMENT.

When despatched from our Works the record platform is set to accommodate records of average dimensions. Occasionally, however, records may be found outside the normal limits; if necessary, therefore, the platform may be adjusted to take them.

To set the platform, the nut locking the "Eccentric adjustment" for Platform, Diagram 5, should be loosened, and with the mechanism set for 12 inch records, the pick-up arm in the playing position, and the largest 12 inch record available loaded on the platform, turn the "Eccentric Adjustment" until there is a gap of not more than $\frac{1}{8}''$ between the edge of the record and the front edge of the platform pawl. Finally retighten the locking nut.

If the changer fails to drop either 10" or 12" records, the above adjustment should be carried out.

AUTO STOP.

When the last record on the platform drops on to the turntable, it allows the record clip to fall and this unlocks the auto stop which should switch off the motor at the end of the record. If when the last record has been played and the record clip has fallen the mechanism does not automatically stop, the following procedure should be carried out.

1. Compare the underside of the record changer with diagram in the Service Manual and find the "Swing Lever" and the "Knock-off Lever." Note that in the upper edge of the knock-off lever there is a step. With the record clip lowered and the needle removed from the pick-up head, start the changer with a hand on the turntable, slow it down to the slowest possible speed at which the mechanism will operate. Move the control lever to the "Reject" position. The swing lever should now move outwards until it engages the step on the knock-off lever and should remain engaged until the record changer switches off. If the swing lever does not engage the step but passes over it, proceed as at (a) to correct. If the swing lever engages in the step, set as at (b) following.

(a) Load two records on the platform spindle in the usual way. Lower the record clip and start the changer The first record will now drop on to the turntable leaving one remaining on the platform. Again, with the hand operating as a brake to slow down the turntable, move the control lever to the "Reject" position. The tip of the step on the knock-off lever should now clear the surface of the swing lever in its outward movement by 1/64". If this dimension is incorrect, stop the changer when the swing lever is directly over the step in the knock-off lever. The knock-off lever is divided into two parts which are held together by a screw

GARRARD ENG. & MFG. CO. LTD.

MODEL 70

and a rivet. Loosen the screw to adjust the height of the lever until the 1/64″ clearance is obtained, then retighten the screw. Finally re-check the changer with the record clip lowered to ensure that the swing lever engages the step. Should the auto stop still fail to operate, set as at (b) below.

(b) Loosen the screws at D (Diagram 5) and bring the two parts of the lever together in order to shorten slightly the effective length and retighten the screws. Check and repeat the adjustment if necessary until changer operates correctly.

PICK-UP.

"GARRARD" Magnetic types of pick-ups are interchangeable with the Crystal type or vice-versa without alteration to the pick-up arm on these Record Changers, provided the pick-up is fitted in a "GARRARD" head.

All "GARRARD" pick-up heads are of the plug-in type, connections being made by two plugs and sockets at the back of the pick-up head.

To remove the pick-up head, unscrew the pick-up fixing screw, withdraw the pick-up, easing the pick-up lead under the arm, and remove the two plug connections from back of pick-up.

If reproduction ceases, or becomes distorted when fitted with a "GARRARD" standard magnetic pick-up, first make sure that the amplifier is in order. Should this be found satisfactory, a slight adjustment to the pick-up may be necessary or the damping rubber may need renewing.

To examine the pick-up proceed as follows:—

Unscrew the two screws located underneath the Base Plate of the Pick-up Head, when the plate carrying the pick-up unit can be removed from the cover. Be careful not to loosen or disturb the two screws located one each side of the needle holder on the inclined portion of the base plate, otherwise the adjustment of the pole pieces will be upset. By viewing the pick-up unit from the front, examine the armature to see that it is in the centre of the gap between the pole pieces.

If it is touching one of the pole pieces, it must be re-centred.

To do this, loosen the two screws holding the adjusting plate, sliding the latter until the armature is in the centre, then tighten the screws.

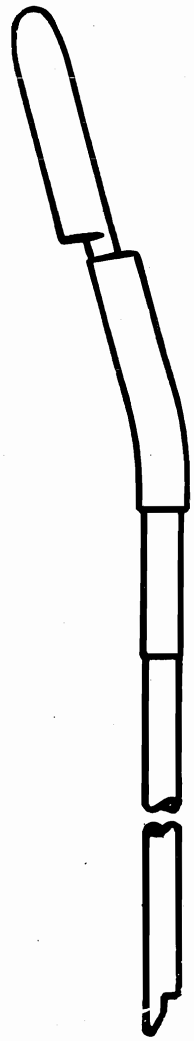


Diagram 6.

If the armature will not retain its centre position, it will be necessary to renew the damping rubber. This can be done by removing the adjusting plate, replacing the rubber and re-assembling of the plate.

Adjust the plate until the armature is centred before tightening the screws.

The top damping rubber tends to perish in time. It should, therefore, be replaced whenever it appears that the needle stiffness has increased, otherwise excessive record wear may occur.

The pick-up coil winding can be checked for continuity with an ohmmeter.

If a Crystal or High Fidelity pick-up is suspect, the pick-up head should be returned for examination. A continuity test cannot be carried out on Crystal pick-ups with an ohmmeter.

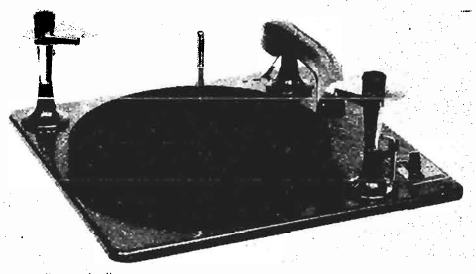
Crystal Cartridges or High Fidelity Pick-ups must not be opened or the manufacturers will disclaim all responsibility.

TEMPLATE FOR RC 70 RECORD SPINDLE.

Should the record spindle be accidentally bent out of position through being dropped or other reasons, the record dropping will be affected. If trouble is experienced with erratic record dropping, lay the record spindle on the template and check that it conforms to the shape thereof.

SPARE PARTS LIST FOR RC 70

Name of Part.	Ref. No.	Name of Part.	Ref. No.
Record Spindle	A.47408	Pulley (50 cycles)	A.47216
Turntable	B.46744	Pulley (60 cycles)	A.47226
Turntable Cover	A.45395	Cover for Change Over Block	B.45473
Main Spindle Unit	A.46509	Screw for Cover	A.40045
Pick-up Arm	B.47654	P.U. Needle Screw	A.40048
Record Clip	A.46582	Trip Pawl	A.47273
Pick-up Spindle Unit	A.46584	Spring for Trip Pawl	A.41602
Pick-up Lead	A.47786	Switch Contact Spring	A.41597
Platform Housing	A.46572	Pick-up Top Damping Rubber	A.45303
Platform	B.46564	Rotor Spindle with Rotor	A.47168
Inter Wheel Unit	A.46529		



GENERAL

This record changer is designed to operate from a power supply of 105-125 volts a-c, 60 cps. It will automatically play twelve 10-inch records or ten 12-inch records at a single loading.

MANUAL OPERATION

1. Turn selector arm knobs so that the blades will permit a record to slip down the spindle onto the turntable.
2. Move the control knob to the MANUAL position.
3. Gently place tone arm on the first groove of record and when finished playing return the tone arm to its rest position.
4. Stop turntable rotation by moving switch plate knob to the OFF position.

AUTOMATIC OPERATION

1. Lift and rotate the selector knobs and position them for 10-inch or 12-inch records, as desired. The arrow should point directly at the spindle.
2. Place up to either twelve 10-inch or ten 12-inch records on selector arms. Do not intermix 10- and 12-inch records.
3. Move control knob on switch plate to REJECT position and release it. The changer will now play the entire stack and repeat the last record.
4. To shut off the record changer before or after all records are played, move control knob to OFF and lift the tone arm and move out to the rest position.
5. If you wish to reject a record before it has finished playing, move the control knob to REJECT and release it. The changer will reject the record and then continue to play the remainder of the stack.
6. To unload records, turn the control knob to OFF. Remove any remaining records on the selector arms. Lift and turn selector arm knob until arm clears records, then remove records from turntable.

OPERATION PRECAUTIONS

1. Use only unwarped records for automatic operation. For warped, odd-size or home-recorded records, play as for manual operation.
2. Never use force to start or stop the motor or any part of the record changing mechanism.
3. Do not store the records on the record post or on the turntable as they may warp, especially if the temperature is high.
4. Do not allow oil or grease to come in contact with the drive wheels or any rubber part.

LUBRICATION

Use light grease (Lubriplate or equivalent) on the following:
1. Cam surfaces.
2. Gear teeth.

Use light machine oil on the following:
1. All shafts.
2. Turntable spindle.

Do not lubricate:
1. Clutch engagement lever (6).
2. Idler wheel rim.
3. Turntable rim.

PICK-UP

A special General Electric magnetic pick-up is used with this changer which will give superior results from the standpoint of high fidelity, low surface noise, and negligible record wear. This pick-up is not replaceable with a crystal pick-up as the ratio of output levels of the two types is at least 70 to 1, the pick-up supplied having an extremely low output.

The pick-up is supplied with a semi-permanent type stylus. Dust and foreign matter should be removed with a soft brush. Make sure the stylus arm is centered between stops. The clearance should be maintained on both sides at 9 to 11 mils.

CYCLE OF OPERATION

NOTE—All reference numbers used in this explanation are shown on an illustration.

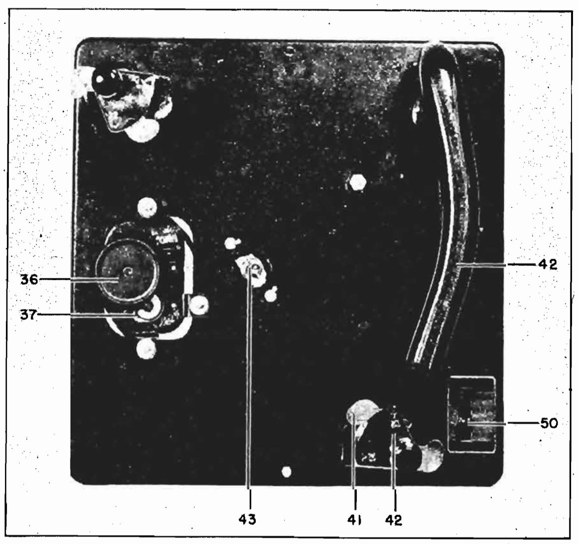
INITIATING THE CYCLE:

Pushing the *control button* (50) from OFF to REJECT positions turns the power ON and starts the changer into automatic operation. This movement transferred to the *control slide* (1) causes the *power switch* (2) to be actuated by its arm which rides in the eccentric groove (A) in the control slide. Simultaneously, the *control slide* (1) moves the *reject slide* (4) towards the center of the record changer, which moves the *trip lever* (5) sufficiently to disengage it from the *clutch engagement lever* (6). This *clutch engagement lever* (6) and *trip lever* (5) are mounted on the *drive gear* (8). When the *control knob* is released, it returns from REJECT to AUTO position.

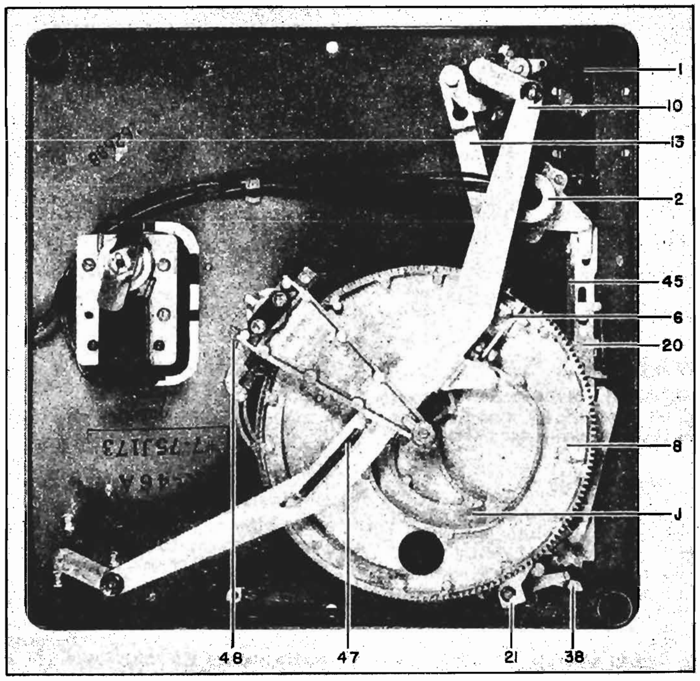
CYCLING:

The release of the *clutch engagement lever* (6) caused the *lug* (D) on the rotating *pinion gear* (7) to strike the extended portion of the *clutch engagement lever* (6) so as to push the *drive gear* (8) sufficiently so that its teeth enmesh with the *pinion gear* (7). (The open section of the *drive gear* (8) permits the pinion gear to rotate freely, except during the change cycle.) The rotation of the *drive gear* (8) results in the following cam actions:

1. The vertical *cam* (E) moves the tone arm *lift pin* (9), thus raising the tone arm.
2. The *cam* (J) actuates the *drive link* (10) that induces a quarter turn by which the *selector arms* (42) release a record.
3. *Surface* (H) on the locked *tone arm lever* (11) resets the trip by latching the *clutch engagement lever* (6) to the *trip lever* (5).
4. *Cam surface* (G) moves the tone arm *latch lever* (21) so as to unlatch the *tone arm lever* (11) at the point of latching. Thereafter the *stud* (K) on the *tone arm lever* (11) follows the receding *cam* (F).



Top View of Record Changer



Bottom View of Record Changer

5. Spring pressure from the ***tone arm locator*** (12) moves the ***tone arm lever*** (11) and tone arm toward the record. Selector arm settings determine the point at which the ***tone arm locator*** (12) stops at the surface on the ***reset slide*** (13).

6. ***Stud*** (K) is contacted by the ***retard lever*** (14) holding it in position during the time of the lowering of the needle on the record.

7. ***Tone arm lift pin*** (9) follows the vertical ***cam*** (E) on the ***drive gear*** (8) and lowers the tone arm to the record. After the needle has touched the record, the ***booster spring*** (15) exerts a slight pressure, causing the needle to enter the starting groove of the record.

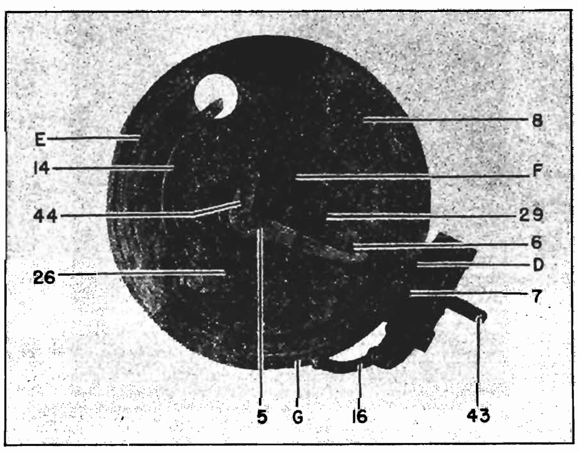
8. As the needle starts in the groove, ***drive gear*** (8) completes its rotation and is locked in open-tooth position by the drive gear ***stop lever*** (16) in the detent in the ***cam*** (G).

TRIP ACTION:

When the record has finished playing, the needle enters a center spiral groove of the record. This starts a new change cycle by either of two actions releasing the ***clutch engagement lever*** (6).

1. Minimum diameter cut-off occurs when the ***trip shoe*** (17) strikes the ***trip lever*** (5).

2. Eccentric groove cut-off occurs when the tone arm is moved away from the ***spindle*** (43). The sawtooth edge of the ***trip plate*** (fastened to tone arm lever, 11) engages and moves the ***trip dog***, causing the ***trip lever*** (5) to function.



Drive Gear Assembly

MANUAL OPERATION:

With the control knob in the MAN position, the ***control slide*** (1) causes four conditions to exist.

1. The ***motor switch*** (2) is turned ON.

2. The end of the ***control slide*** (1) acting through the manual ***latch lock*** (38) partially disengages the ***tone arm latch lever*** (21) from its locked position. It now serves as a detent for the tone arm while in rest position and prevents its movement due to accidental bumping.

3. The ***manual lockout*** (20) on the ***control slide*** prevents the ***tone arm locator*** (12) from moving inward, thereby permitting free movement of the tone arm by hand.

4. The ***reject slide*** (4) is in position so that the ***clutch engagement lever*** (6) is held, preventing tripping.

SERVICE ADJUSTMENTS

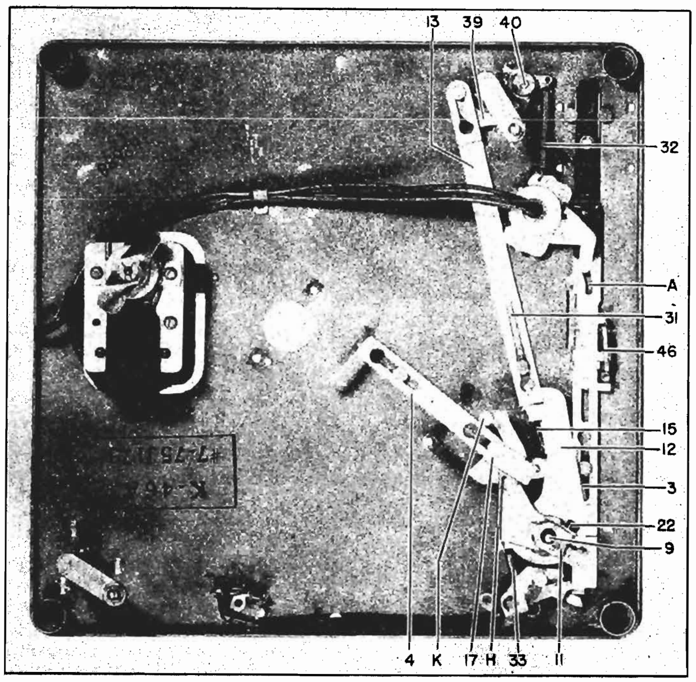
A. SELECTOR ARM AND BLADE (41) (42):

The leading edge of the ***blades*** (41) must be smoothly rounded and well polished. The ***blades*** (41) must be very free in their mounting so that they will return to normal position by their own weight. The ***selector arms*** (42) must be parallel with each other, and must be synchronized so that a record will drop evenly onto the turntable.

If the blades need adjustment, place a 10-inch record of average thickness (.074 in.) on the selector arms and manually rotate the turntable clockwise until the selector blade contacts the record. The blade must rise after it first contacts the edge of the record. This rising action results whenever pressure is applied to the leading edge of the ***selector blade*** (41). The blade may be adjusted by bending, very slightly, to correct position (use pliers with tape-lined jaws). The height to which blades are set must be less than the minimum record thickness, otherwise the blade will attempt to change two records at a time, due to the cam action which ***always*** operates in an ***up direction.*** When necessary, make the same adjustment on the 12-inch selector blades, using a 12-inch record (approx. .090 in. thick).

B. INCORRECT LOCATOR SPRING TENSION (33):

Insufficient tension in the ***locator spring*** (33) will produce erratic or incorrect tone arm landing since the ***locator*** (12) will not seat in the fixed 10-inch or 12-inch indexing position. It will also result in jerky action of the ***tone arm*** (42), since the ***tone arm lever*** (11) will not accurately follow the cam surface of the ***drive gear*** (8).



Bottom View of Record Changer Less Drive Gear

Excessive tension in the *locator spring* (33) will result in a stiff, heavily loaded "feel" as the tone arm is moved into rest position. It may also produce a stiff action of the *control slide* (1) and cause increased wear of the moving parts.

C. TONE ARM HEIGHT:

The height to which the *tone arm* (42) rises is correct when there is an approximate $\frac{1}{16}$-inch clearance between it and the bottom of a 10-inch record on the *selector arms* (42). This clearance is regulated by the tone arm *adjusting screw* (23), see Figure 5.

The down position of the tone arm is fixed by *lug* (**R**) on the tone arm hinge assembly. The correct height is that which will allow the bottom edge of the tone arm and cartridge to clear the turntable surface by approximately $\frac{1}{16}$ inch. This adjustment may be corrected by a slight bend of the *lug* (**R**).

D. TONE ARM POSITIONING:

If the tone arm landing is not corrected by adjustment B, the following procedure may be used: Set the *control knob* (50) in the OFF position with power plug out and place a 10-inch record on the turntable. Set the selector arms (10-inch) so the arrows point directly at the spindle. Loosen the Allen socket *cap screw* (22) just enough to allow the *tone arm lever* (11) to still hold its position. Line up the tone arm's outer edge evenly with the panel edge. This gives the tone arm an approximate setting. Push the control knob to REJECT and release it. Rotate the turntable clockwise and observe where the needle first touches the record. This should be about one-eighth inch from the edge. Variations should be corrected by slipping the *tone arm lever* (11) in the correct direction. *Caution*—Before tightening the Allen screw, make certain that there is enough vertical clearance in the tone arm shaft to avoid binding while the tone arm swings.

E. STYLUS PRESSURE:

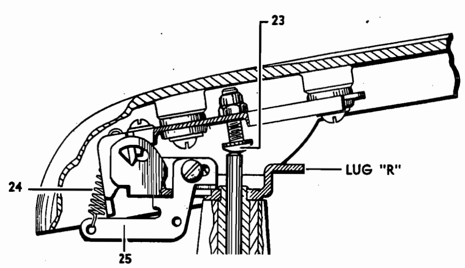
The stylus pressure on the record is controlled by the *counter-balance spring* (24) in back of the tone arm. The pressure is variable through the counter-balance adjusting *slide* (25). The needle pressure should be 1–1½ ozs.

F. TRIP SHOE (17):

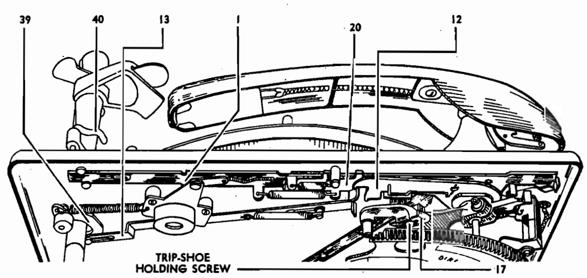
The *trip shoe* (17) located on *tone arm lever* (11) is movable and loosening its holding screw permits it to be adjusted as required. This adjustment is correct when the needle is 1⅞ inches from the record center and the trip shoe pushes the *trip lever* (5) which releases the *clutch engagement lever* (6).

G. TURNTABLE REMOVAL:

The turntable should be removed by lifting carefully, tapping spindle *lightly* if necessary. This will expose top spindle bearing. When replacing turntable, the slot in hub must seat properly over the spindle pin. (Rotate 180 deg for best fit.) Push idler wheel in while lowering, so rubber rim will not be damaged by turntable edge.



Tone Arm Adjustments



Bottom View of Record Changer

MODEL P2 GENERAL ELECTRIC CO.

TROUBLE SHOOTING CHART

SYMPTOMS	REMEDIES OR CAUSES
RECORD SELECTION	
1. Record jams, prevents changer from working.	1. (a) Check adjustment A. (b) Odd-sized, warped, or damaged records. Play in "MAN" position.
2. Record drops from one side only.	2. (a) Check center hole in records—probably too large. (b) Check adjustment A.
3. Records drop more than one at a time.	3. (a) Check adjustment A.
TONE ARM MOVEMENT	
1. Needle lands incorrectly.	1. (a) Check adjustment B. (b) Tone arm *retard lever* (14) binds; check spring. (c) Check adjustment D.
2. Needle fails to feed in after landing.	2. (a) Check *booster spring* (15)—probably too weak.
3. Needle lands properly on record but slides in on record.	3. (a) Check for broken stylus in pick-up. (b) *Booster spring* (15) too strong. (c) Check adjustment C.
4. Tone arm hits bottom record on selector arms during cycling.	4. (a) Check adjustment C.
TRIPPING-CYCLING	
1. Changer fails to trip.	1. (a) Check adjustment F. (b) Tight tone arm lead wire. (c) *Clutch engagement lever* (6) not unlatching. Clean, do not lubricate. (d) *Trip lever* (5) binding at pivot point and failing to unlatch *engagement lever* (6).
2. Changer repeats tripping.	2. (a) *Clutch engagement lever* (6) fails to latch. Examine *trip lever* (5) for bind or weak *trip lever spring* (29). (b) Control knob binding in REJECT position. Check *control slide* (1) or its associated assembly. (c) Failure of *stop lever* (16) to properly detent drive gear.
MOTOR	
1. Change is sluggish or motor overheats.	1. (a) Check lubrication—oil old or gummy. (b) Incorrect line voltage. (c) Defective motor winding. (d) Check binding of moving parts.
2. Motor rumble or "wow" heard in record reproduction.	2. (a) Worn rubber rim on drive wheel. (b) Shipping bolts not removed from motor board. (c) Check for binding of spindle. Oil sparingly if necessary.

REPLACEMENT PARTS LIST

Cat. No.	Symbol	Description
RAC-017		COVER—Switch cover
RAX-009		SELECTOR ARM AND BLADE ASSEMBLY—left rear
RAX-010		BLADE—10-in. selector blade and arm assembly No. 2
RBH-005		MOTOR—Phonomotor, 60 cycle
RDE-023		ESCUTCHEON—Control escutcheon
RDX-029		KNOB—Selector arm knob assembly
RDX-030	50	KNOB—Control knob assembly
RHM-029		BUMPER—Trip dog bumper (rubber)
RHM-030		BUMPER—Trip lever bumper (rubber)
RHS-001	22	SCREW—Allen socket cap screw
RHS-002	23	SCREW—Tone arm adjusting screw
RHX-006	34	HINGE—Tone arm hinge assembly
RHX-007		BUMPER—Retard lever bumper (rubber)
RMC-015		HUB—Tone arm locator hub
RMG-001	8	GEAR—Drive gear
RMG-002	7	GEAR—Pinion gear
RML-001	6	LEVER—Clutch engagement lever
RML-002	21	LEVER—Tone arm latch lever
RML-003	3	LINK—Connecting link
RML-004	14	LEVER—Tone arm retard lever
RML-005	38	LOCK—Manual latch lock
RMM-018	4	SLIDE—Reject slide
RMM-019	13	SLIDE—12-in. reset slide
RMM-020	17	SHOE—Trip shoe
RMM-021	25	SLIDE—Counter-balance adjusting slide
RMM-022	30	SHAFT—Tone arm shaft
RMO-002	41	BLADE—Selector blade and arm assembly
RMO-003	2	SWITCH—Power switch
RMP-006	9	PIN—Tone arm lift pin
RMP-007		PIN—Stop lever pivot pin
RMS-057	24	SPRING—Counter-balance spring
RMS-058	47	SPRING—Drive link spring
RMS-059	46	SPRING—Manual lockout spring (outer)
RMS-060	45	SPRING—Manual lockout spring (inner)
RMS-061	32	SPRING—12-in. reset lever spring
RMS-062	33	SPRING—Tone arm locator and latch spring
RMS-063	15	SPRING—Tone arm booster spring
RMS-064	31	SPRING—12-in. reset slide spring
RMS-065	48	SPRING—Stop lever spring
RMS-066	44	SPRING—Trip dog spring
RMS-067	29	SPRING—Trip lever spring
RMS-068	26	SPRING—Retard lever spring
RMS-071	37	SPRING—Idler wheel spring
RMT-007	49	TURNTABLE—Turntable assembly
RMU-017		SHAFT—Selector shaft assembly
RMU-018	40	ROD—12-in. reset rod
RMU-019		SHAFT—Drive gear shaft
RMW-024	36	WHEEL—Idler wheel
RMX-060	10	LINK—Drive link assembly
RMX-061		ASSEMBLY—Power switch plate assembly
RMX-062		LEVER—Reset lever assembly
RMX-063	12	LOCATOR—Tone arm locator assembly
RMX-064		CRANK—Drive crank assembly
RMX-065	20	LOCKOUT—Manual lockout assembly
RMX-066	11	LEVER—Tone arm lever assembly
RMX-067	16	LEVER—Drive gear stop lever assembly
RMX-068		ASSEMBLY—Spindle and housing assembly
RMX-069	5	LEVER—Trip lever assembly
RMX-070	43	SPINDLE—Turntable spindle assembly
RPX-010		PICK-UP—Magnetic pick-up

All Series 700 Record Changers are of the single post, fully automatic drop type, featuring single button control and eccentric spindle cam record selection. The series 700R Record Changer has the record support platform in the left rear corner. Series 700F has the record support platform in the left front corner.

OPERATION

Starting - when the switch Button (58-73096) is moved to the "ON" position, power is connected to the Motor (56-73555) causing the Turntable Assy. (66A74682) to rotate, and automatic cycling, which is required to drop the first record, is accomplished by pulling the Switch Plate (10-74368) in the direction indicated by the arrow. When automatic cycling is started the Manual Trip Lever (55-73102) is advanced until it contacts the Cam Trip Lever (55A74833) mounted on the Main Cam (43-73159) which moved sufficiently to permit the spring loaded Pinion Actuating Lever (55A74813) to function, which, in turn, lifts the floating brass Pinion Assy. (28A73704) directly beneath the spindle so that a projection on this floating Brass Pinion is caused to engage a finger on the adjustable collar (65-73595) fastened to the Turntable Hub.

The combination of the foregoing causes the turntable to become connected with the Main Cam which through its single revolution performs all of the required change cycle functions. It is to be noted that, except during the change cycle, the motor power is used only to revolve the Turntable.

Cycling - As the Main Cam rotates, the spring loaded lever which actuates the Floating Pinion is automatically depressed and thus reset for the next change cycle.

At the end of the change cycle the Motor power is disconnected from the change mechanism when the Plastic Washer mounted on the Floating Brass Pinion drops into a depression on the top edge of the rim of the Main Cam. This position, called home position of the Main Cam, is retained by a Leaf Spring (33-72963) detented in the cam hub.

Record Selection - Record Selection is accomplished during one complete revolution of the Eccentric Cam Assy (43A72960) at the top of the lower section of the spindle. This portion of the change cycle is accomplished when the extended section of teeth of the Main Cam engages and rotates the Spindle Cam Pinion (28-73084). The home, or in line position of the Record Selection Eccentric Cam is retained by a Leaf Spring (33-73135) which detents into a slot in the underside of the Spindle Cam Pinion. Successive record drops are accomplished by a repetition of this action.

Pickup Arm Movement - The movement of the Tone Arm Ass'y. (69A73087) during cycle is controlled entirely by the surface and grooving of the Main Cam. These movements are picked up by the Sweep Lever Assy. (55A73045). After a record has been played or when it is rejected, the Trip mechanism causes the Main Cam to rotate which, in turn, lifts the Tone Arm off the records sweeping it clear to permit a record to drop and returning it to the edge of the record. The Tone Arm Support mechanism is so designed to permit the Tone Arm to be handled during any part of the change cycle without damage to the mechanism. This is accomplished by two spring loaded Mating Cams (43-73069) (43-73113) which disengage when any restraint prevents it from following the motions of the Sweep Lever. The Tone Arm is also vertically spring loaded allowing it to be lifted upward to an almost vertical position to permit ready changing of needles or cartridge.

Automatic Trip - This trip is so designed that it will start the automatic cycling mechanism when the Tone Arm moves toward the Spindle at a rate of speed greater than 1/8" per revolution of the Turntable. This Trip, therefore, is practically universal as it will operate on any center leading groove or center eccentric circle groove records conformin g to RMA specifications. However, the Trip does not become operative except within a distance of approximately 3" from the Spindle. Thus, manual resetting of the Tone Arm is possible at distances greater than 3" from the Spindle.

The Velocity Trip is composed of three major elements: The Trip Lever Assy (55A73042), the "V" Lever (55-72966) and the Crescent Lever (55-73066). The Trip Lever and "V" Lever work together through a Friction Clutch (10-72953), the tension for which is maintained by a Coil Spring (33-73334) which is one of the elements in the assembly of these two parts. As the Tone Arm moves toward the spindle center, the sickle shaped section of the Sweep Lever comes into contact with one leg of the "V" lever causing the tip of the Trip Lever to move toward the center of the Turntable by energy transmitted through the Friction Clutch. This movement continues until the tip of the Trip Lever is in the range of the Finger of the adjustable Collar mounted on the Turntable H ub. Once this position is attained and so long as the movement of the needle toward the Spindle is less than 1/8" per revolution the tip of the Trip Lever will be retarded from further movement by being pushed away once during each revolution of the Turntable. This retarding movement means that the Friction Clutch slips a corresponding amount. When the needle moves into a fast spiral or an eccentric center groove of the record, the tip of the Trip Lever will move so rapidly toward the center of the Spindle it will allow the tip of the Crescent Lever to slide off the flat surface of the Cam Trip Lever and engage itself behind the Lever. In the next revolution of the Turntable the finger on the adjustable Collar will force the Trip Lever outward causing the Crescent Lever to move the Cam Trip Lever far enough to unlatch the Floating Pinion Actuating Lever, thus setting up the change cycle as previously described.

10" and 12" Operation - The 10" and 12" indexing is determined by the main cam by allowing the sweep lever pin to enter either the 10" or 12" indexing track. This switching is controlled by means of a Frog (12-73060) which is moved from one side to another by the Frog Actuating Lever Assy. (55A73886 Rear) or (55A74605 Front) extending from the Record Support Ass'y. (62A73129 Rear) or 62A74720 Front). This lever shunts the sweep lever pin into the indexing track dependent upon whether the record support is pushed toward or away from the spindle for 10" or 12" records.

ADJUSTMENTS

Tone Arm Index - The tone arm should be indexed at the start of every record approximately 1/8" from the edge for both the 10" and 12". If the needle index is too far in or out, this this may be corrected by loosening one of the two set screws found in the lower cam located in the bottom of the tone arm approximately ½" above the top of the motorboard, and advancing the other set screw sufficiently to bring about proper indexing. The proper setting having been obtained, both screws should be locked tightly. This action is accomplished by means of the two screws contacting a flat on the vertical shaft at an angle that will cause the shaft to turn with any movement of either screw.

Adjustment of Record Support - When the record is centralized with the lower part of the spindle, the record support platform in both 10" and 12" position should clear the edge of the record by approximately .015" (1/64). To move this setting for the 12" record, it is necessary to advance or retract the set screw nearest the spindle on the upper part of the support beneath the motorboard. The screw farthest away from the spindle will adjust the 12" position in a similar manner.

Spindle Alignment - If the spindle eccentric cam is not lined up perfectly with the lower part of the spindle while out of cycle, the main cam should be moved to its home position as determined by its detent spring and the spindle pinion gear should also be moved to its home position as determined by its detent spring. Loosen the set screws in the hub of the spindle pinion gear and line up the eccentric with the spindle, then tighten set screws.

The spindle cap should be positioned so that the slide is pointing towards the center of the record support. This may be positioned by loosening the screws on the square retaining bar found in the lower bracket. There should be approximately .005 total vertical play in the spindle assembly after both adjustments to prevent binding.

Main Cam Frog Movement - When the record support is in the 12" position, the phosphor bronze spring that actuates the 10" or 12" selector Frog pin should be high enough to clear the frog pin. When the record support is in the 10" position this spring should cause an interference with the frog pin enough to move it into position to shunt the sweep lever pin into the 10" indexing track. This spring is slit for the purpose of easy adjustment. If this spring does not move the frog enough, it should be rebent to do this. It should be remembered that the frog is so constructed that as the sweep lever pin goes past it, it will automatically reset the frog in the 12" position, and to play a 10" record this pin must be reset by the spring everytime.

Removing Turntable - To remove the turntable for any reason, remove the small horseshoe-like spring found around the spindle near the turntable top. Then make sure that the trip lever is moved far enough away from the turntable center to allow it to clear the extremities of the bakelite washer of the floating pinion. The turnable may then be removed by lifting up. In replacing the turntable care should be taken to see that the idler tire is properly positioned within the I.D. of the turntable and that the trip lever is also out of the way so that it will not be bent by the bakelite pinion gear washer.

Adjustment of Tone Arm Height - If tone arm needle does not clear a stack of records, loosen the set screw securing the vertical tone arm shaft underneath the motorboard and raise the shaft up. In some extreme cases the zinc sweep lever itself may be bent. If the needle is set too high to play the first record, retract the set screw found on the top of the motorboard directly behind the tone arm.

DIFFICULTIES

Failure to Feed Record - This could be caused by the spindle eccentric cam not lining up with the lower spindle sleeve at the end of its cycle. First determine whether the detent spring is in the pinion depression. If this is so, and it is still out of alignment, loosen the screw and adjust as previously explained under SPINDLE ALIGNMENT. Secondly, check the position of the record support as previously explained. Check the record thickness for a maximum of .10" at center hole (RMA maximum thickness).

Drops two or more Records at Once.- Check thickness of record at center hole. Record should be not less than .070" at this point. If the records are within this RMA minimum, check the spindle slide. It should be flush to .020" below the bottom of the spindle cap. If it is too low file it off, if it is too high remove the pin in the cap and file the slot to get the proper dimension. This pin is held in the cap by a light knurl fit and can be easily replaced. Be careful not to bend the spindle rod during this process.

If two records still drop, check the record support setting (see above). N ote: Proper record diamenter for all settings of the record support should be:

9-7/8" ± 1/32 for the 10" record
11-7/8" ± 1/32 for the 12" record (RMA STANDARDS)

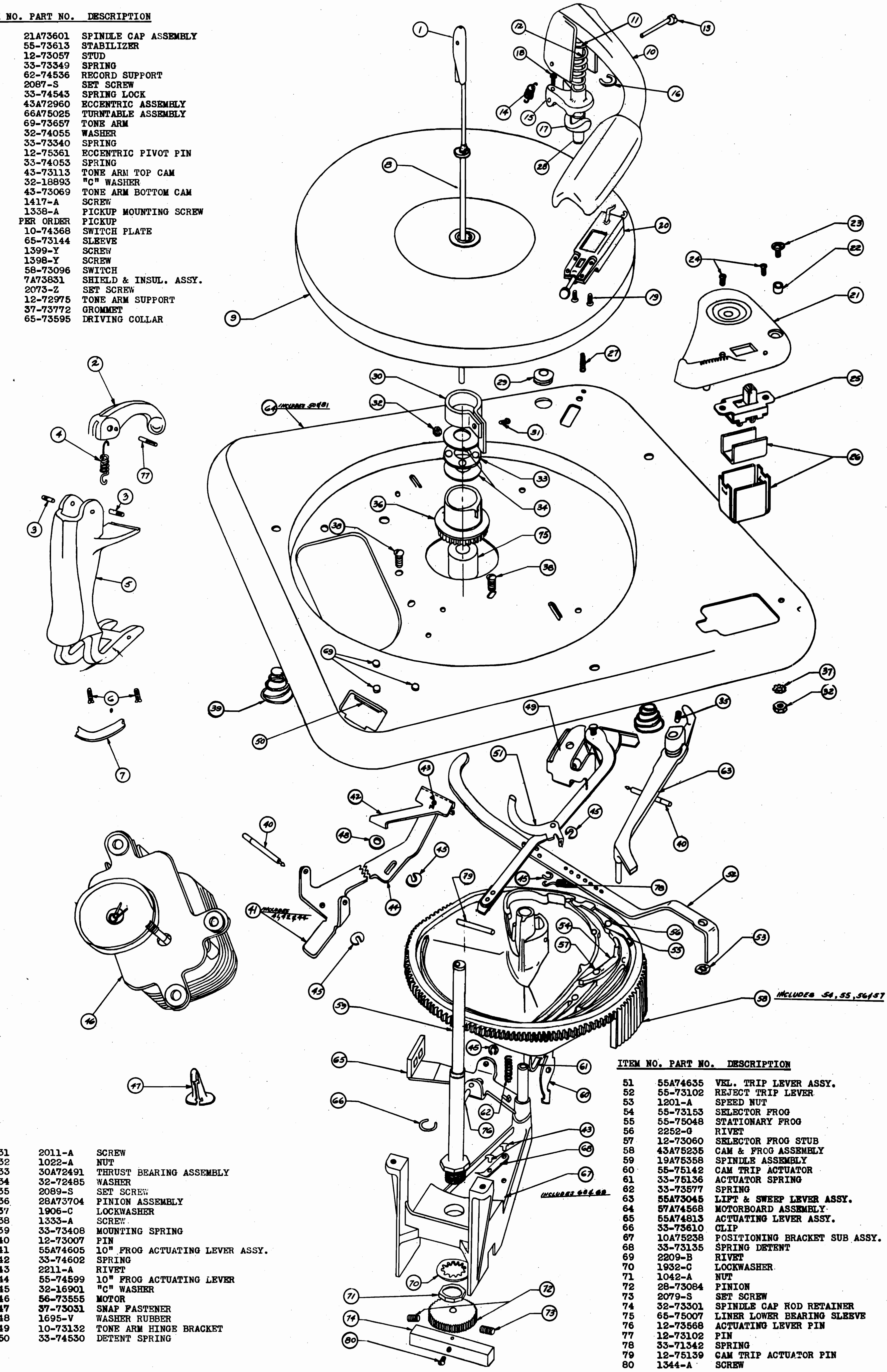
Continuous Trip - This is caused by the floating pinion not dropping far enough away from the projection of the collar on the turntable hub. Make sure the main cam is in home position and that the floating pinion falls in the depression of the cam edge and remains there until the record is completed. Rotate the turntable to make sure that the collar clears it by approximately 1/32. Reject the changer and check to insure approximately 3/64 or better engagement with the collar finger. Check the manual trip lever to make sure it clears the cam trip lever.

No Tripping - If the changer wont trip manually, check the manual trip lever to make sure it moves the cam trip lever enough to unlatch the pinion actuating lever. This action should occur before the switch plate reaches its maximum allowable rotation.

No Automatic Trip - Check the pickup lead to make sure it is not binding the tone arm movement, particularly as the needle approaches the spindle. Check the V lever to make sure it rotates freely and the clutch has movement. Put the cam in home position and make sure the crescent trip lever is free and contacts the flat side of the cam trip lever. Move the V lever and make sure the clutch imparts enough force to the trip lever to allow the crescent lever to move along the flat and drop behind the trip lever. There should be no friction or binds in any of these mechanisms. Non-tripping can be caused by any binds or by too tight or light a spring load on the crescent. This spring load is adjustable by anchoring the crescent lever spring in any one of three holes.

MODEL 700F

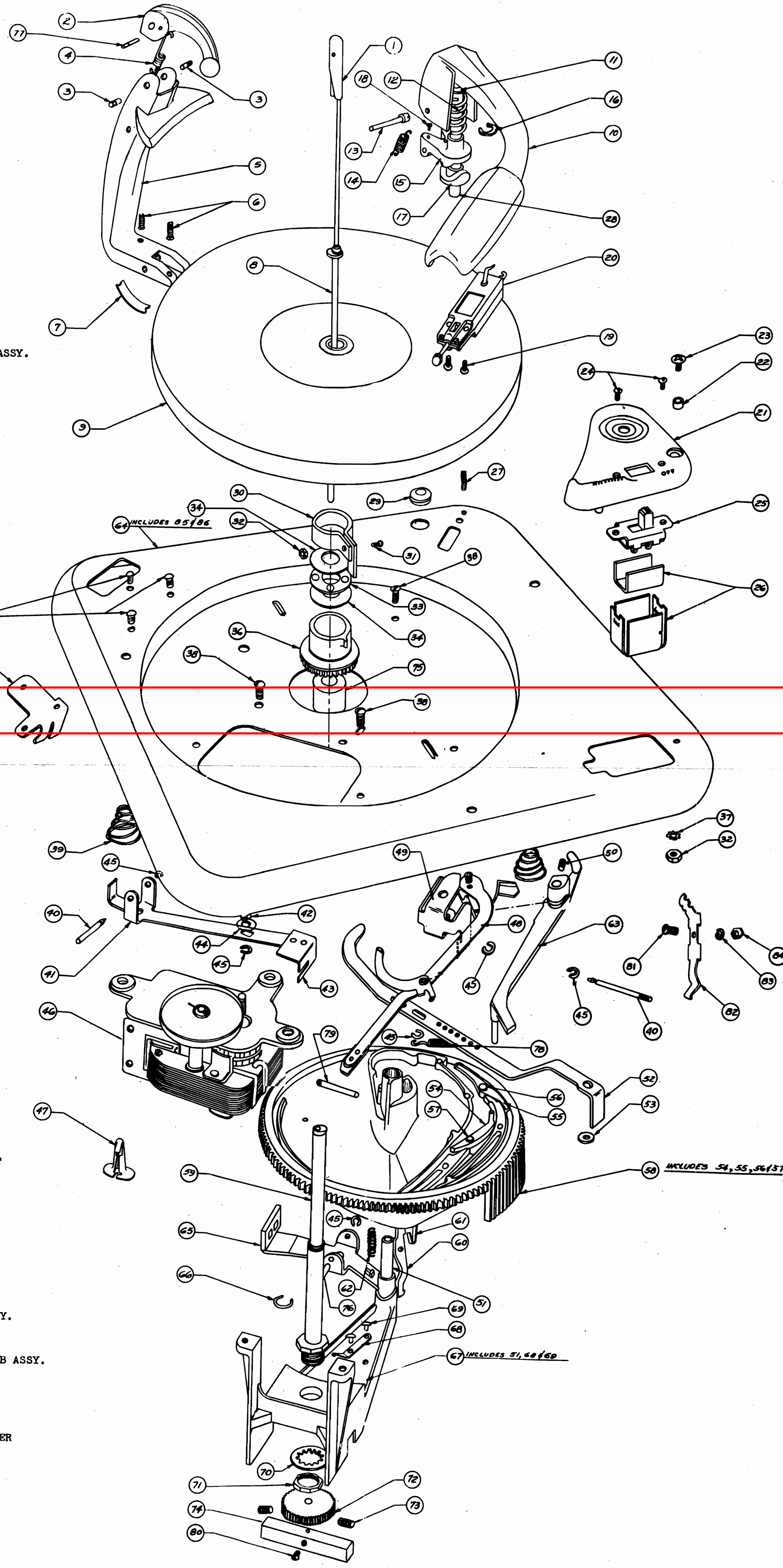
GENERAL INSTRUMENT CORP.



ITEM NO.	PART NO.	DESCRIPTION
1	21A73601	SPINDLE CAP ASSEMBLY
2	55-73613	STABILIZER
3	12-73057	STUD
4	33-73349	SPRING
5	62-74536	RECORD SUPPORT
6	2087-S	SET SCREW
7	33-74543	SPRING LOCK
8	43A72960	ECCENTRIC ASSEMBLY
9	66A75025	TURNTABLE ASSEMBLY
10	69-73657	TONE ARM
11	32-74055	WASHER
12	33-73340	SPRING
13	12-75361	ECCENTRIC PIVOT PIN
14	33-74053	SPRING
15	43-73113	TONE ARM TOP CAM
16	32-18893	"C" WASHER
17	43-73069	TONE ARM BOTTOM CAM
18	1417-A	SCREW
19	1338-A	PICKUP MOUNTING SCREW
20	PER ORDER	PICKUP
21	10-74368	SWITCH PLATE
22	65-73144	SLEEVE
23	1399-Y	SCREW
24	1398-Y	SCREW
25	58-73096	SWITCH
26	7A73831	SHIELD & INSUL. ASSY.
27	2073-Z	SET SCREW
28	12-72975	TONE ARM SUPPORT
29	37-73772	GROMMET
30	65-73595	DRIVING COLLAR
31	2011-A	SCREW
32	1022-A	NUT
33	30A72491	THRUST BEARING ASSEMBLY
34	32-72485	WASHER
35	2089-S	SET SCREW
36	28A73704	PINION ASSEMBLY
37	1906-C	LOCKWASHER
38	1333-A	SCREW
39	33-73408	MOUNTING SPRING
40	12-73007	PIN
41	55A74605	10" FROG ACTUATING LEVER ASSY.
42	33-74602	SPRING
43	2211-A	RIVET
44	55-74599	10" FROG ACTUATING LEVER
45	32-16901	"C" WASHER
46	56-73555	MOTOR
47	37-73031	SNAP FASTENER
48	1695-V	WASHER RUBBER
49	10-73132	TONE ARM HINGE BRACKET
50	33-74530	DETENT SPRING
51	55A74635	VEL. TRIP LEVER ASSY.
52	55-73102	REJECT TRIP LEVER
53	1201-A	SPEED NUT
54	55-75153	SELECTOR FROG
55	55-75048	STATIONARY FROG
56	2252-G	RIVET
57	12-73060	SELECTOR FROG STUB
58	43A75235	CAM & FROG ASSEMBLY
59	19A75358	SPINDLE ASSEMBLY
60	55-75142	CAM TRIP ACTUATOR
61	33-75136	ACTUATOR SPRING
62	33-73577	SPRING
63	55A73045	LIFT & SWEEP LEVER ASSY.
64	57A74568	MOTORBOARD ASSEMBLY
65	55A74813	ACTUATING LEVER ASSY.
66	33-73610	CLIP
67	10A75238	POSITIONING BRACKET SUB ASSY.
68	33-73135	SPRING DETENT
69	2209-B	RIVET
70	1932-C	LOCKWASHER
71	1042-A	NUT
72	28-73084	PINION
73	2079-S	SET SCREW
74	32-73301	SPINDLE CAP ROD RETAINER
75	65-75007	LINER LOWER BEARING SLEEVE
76	12-73568	ACTUATING LEVER PIN
77	12-73102	PIN
78	33-71342	SPRING
79	12-75139	CAM TRIP ACTUATOR PIN
80	1344-A	SCREW

MODEL 700R

GENERAL INSTRUMENT CORP.

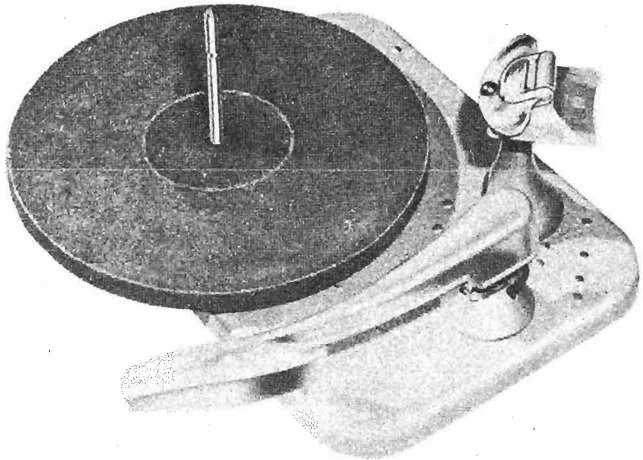


ITEM NO.	PART NO.	DESCRIPTION
1	21A73601	SPINDLE CAP ASSY.
2	55-73613	STABILIZER
3	12-73057	STUD
4	33-73349	SPRING
5	62-73620	RECORD SUPPORT
6	2087-S	SET SCREW
7	33-74543	SPRING LOCK
8	43A72960	ECCENTRIC ASSY.
9	66A75025	TURNTABLE ASSY.
10	69-73657	TONE ARM
11	32-74055	WASHER
12	33-73340	SPRING
13	12-75361	ECCENTRIC PIVOT PIN
14	33-74053	SPRING
15	43-73113	TONE ARM TOP CAM
16	32-18893	"C" WASHER
17	43-73069	TONE ARM BOTTOM CAM
18	1417-A	SCREW
19	1338-A	SCREW
20	PER ORDER	PICKUP CARTRIDGE
21	10-74368	SWITCH PLATE
22	65-73144	SLEEVE
23	1399-Y	SCREW
24	1398-Y	SCREW
25	58-73096	SWITCH
26	7A73831	SHIELD & INSULATOR ASSY.
27	2073-7	SET SCREW
28	12-72975	TONE ARM SUPPORT
29	37-73772	GROMMET
30	65-73595	DRIVING COLLAR
31	2011-A	SCREW
32	1022-A	NUT
33	30A72491	BALL BEARING ASSY.
34	32-72485	WASHER
35	2209-B	RIVET
36	28A73704	PINION ASSY.
37	1906-C	LOCKWASHER
38	1333-A	SCREW
39	33-73408	MOUNTING SPRING
40	12-73007	PIN
41	55-73884	ACTUATING LEVER 10"
42	33-73889	SPRING
43	33-73881	SPRING
44	1612-A	WASHER
45	32-16901	"C" WASHER

ITEM NO.	PART NO.	DESCRIPTION
46	56-73555	MOTOR
47	37-73031	SNAP FASTENER
48	55A74635	VELOCITY TRIP ASSY.
49	10-73132	TONE ARM HINGE BRACKET
50	2089-S	SET SCREW
51	12-72987	CAM PIVOT STUD
52	55-73102	REJECT TRIP LEVER
53	1602-A	WASHER
54	55-73153	SELECTOR FROG
55	55-75048	STATIONARY FROG
56	2252-G	RIVET
57	12-73060	STUD
58	43A75411	CAM & FROG ASSY.
59	19A73025	SPINDLE ASSY.
60	55-75142	CAM TRIP ACTUATOR
61	33-75136	SPRING
62	33-73577	SPRING
63	55A73045	LIFT & SWEEP LEVER ASSY.
64	57A73290	MOTORBOARD ASSEMBLY
65	55A74813	ACTUATING LEVER ASSY.
66	33-73610	CLIP
67	10A75238	POSITIONING BRACKET SUB ASSY.
68	33-73135	SPRING - DETENT
69	2211-A	RIVET
70	1932-C	LOCKWASHER
71	1042-A	NUT
72	28-73084	PINION
73	2079-S	SCREW
74	32-73301	SPINDLE CAP ROD RETAINER
75	65-75007	LINER
76	12-73568	ACTUATING LEVER PIN
77	12-73120	PIN
78	33-71342	SPRING
79	12-75139	CAM TRIP ACTUATING PIN
80	1344-A	SCREW
81	1311-A	SCREW
82	33-72963	GROUND SPRING
83	1900-A	LOCKWASHER
84	1028-A	NUT
85	33-74530	DETENT SPRING

MOTOROLA INC.

MODELS RC-30-A, RC-34, RC-35



GENERAL INFORMATION

RECORD CHANGER RC-30-A. Record Changer RC-30-A is a single-post changer designed to play automatically, 10 ten-inch or 8 twelve-inch records, not intermixed. The "motor" and "reject" switches required to operate this changer are part of the radio receiver. Pushing the "R" button will energize an electro-magnet and start the changing cycle. However, from then on, at the end of each record, the cycle is started mechanically and the trip coil is no longer required.

That method of rejecting records is the essential difference between the RC-30 and the RC-30-A changers. The RC-30 used an electrical solenoid coil each time a record was dropped.

The top appearance of the two changers is identical, but the RC-30-A can easily be identified on the under side by the position of the rejecting coil. The coil is near the gear arm on the RC-30, but it is close to the outer edge of the mounting plate on the RC-30-A.

RECORD CHANGER RC-34. Same as RC-30-A except all painted parts are red mahogany (instead of green) and rubber shock mounts are used in place of spring cushions for mounting changer in radio cabinet.

RECORD CHANGER RC-35. Same as RC-30-A except all painted parts are red mahogany instead of green.

IMPORTANT POINTS TO REMEMBER WHEN SERVICING RECORD CHANGERS

WARNING: Do not lift the record changer by record post or record support platform. Always lift the changer by its base only.

IMPORTANT: Final adjustments on record changer are to be made with the changer horizontal and supported by its 4 corners. AVOID DISTORTING THE BASE WHEN MAKING FINAL ADJUSTMENTS.

CHECK THE RECORD FIRST

Before attempting to service or adjust the record changer, check the records first to make sure they are not causing the trouble. This instrument will handle most of the 10 or 12 inch records available on the market, but it is not guaranteed to handle all of them. Records must be in good mechanical condition and should not be chipped, particularly around the center hole. Do not try to play automatically, records that are too thick, too thin, or that are oversized or undersized, in regard to the diameter of record or center hole. Do not mix 10 and 12 inch records on the changer.

Warped records can slip on the turntable and introduce "WOWS". Such records may be flattened by placing between the two pieces of flat plate glass and then heating in the sun or oven. Do not overheat. Allow record to cool for several hours before removing glass.

Old records, made before the days of automatic record changers, may not change automatically, due to the difference in thickness, or to lack of the proper groove at the finish. Most of the old records, however, may be played one at a time.

RECORD CHANGER OPERATION

(Throughout the following instructions, refer to Figure 1).

WHICH RECORDS CAN BE PLAYED

As many as 10 ten-inch or 8 twelve-inch records may be placed on the record changer which will play them all in sequence, repeating the last record until the instrument is turned "OFF". Do not overload the instrument by attempting to stack more records on it at one time.

This record changer will accommodate most 10 and 12 inch records now available on the market, but is not guaranteed to handle all of them. Records must be in good condition, as no record changer will operate properly with chipped or warped records. Records in which the center hole is worn or chipped should not be played automatically on this changer.

Occasionally, a new record may fit tightly over the center spindle due to the label attached to the record not being properly centered. This condition may be readily remedied by reaming out the center hole with a hexagonal lead pencil.

When operating this automatic record changer, play only the size record for which the adjustment on the record support plate indicates. Do not inter-mix 10 and 12 inch records.

MODELS RC-30-A, RC-34, RC-35

MOTOROLA INC.

TO LOAD RECORDS

1. Adjust the Record Support Plate
The turning of the record support plate automatically adjusts the changer for either ten or twelve-inch records. For playing ten-inch records the numeral (10) will be nearest the record post.

2. Adjust the Record Clamp
This clamp is mounted on the record support plate, and serves to steady the stack of records. Flip it away from the turntable.

3. Turn the record post cap so it is out of line with the record post.

4. Load the Records
Place the records over the record post so they rest on the record support plate and on the small ledge formed by the record release eccentric offset in the spindle. Records may be loaded and played one at a time, or as many as 10 ten-inch or 8 twelve inch records may be loaded at one time. Do not try to play a larger quantity.

5. Readjust the Record Holding Clamp
Flip the record holding clamp back over the record support so it rests on the rim of the top record and holds the stack of records steady.

TO PLAY RECORDS AUTOMATICALLY

1. Turn radio "ON" and set the PHONO-RADIO selector control to PHONO position.

2. Push the "M" button in. The button will lock in and the turntable will now revolve.

3. Momentarily push the "R" button. The first record of the stack will drop to the turntable and be played. After all records have been played in turn, the instrument will repeat the last record until it is turned off. Pushing in the "M" button will now stop the turntable. The "R" button may be pushed in to reject a record before it has been completely played.

NOTE: Never touch the pickup arm when the instrument is in a changing cycle. Should you move it out of adjustment, stop the changer and gently move the pickup arm from side to side until you hear it "snap" back into position.

TO UNLOAD RECORDS

1. Allow the instrument to go through its complete cycle and start to play the last record over.

2. As soon as this occurs, push the "M" button to stop turntable. (Alternate pushes start and stop the motor).

3. Lift the pickup arm off the record and place it on its resting post.

4. Turn the record post cap so it is in line with the record post.

5. Lift the records off.

HOW TO REPLACE NEEDLE

This record player is equipped with a permanent point long-life needle that is good for several thousand plays unless damaged by mishandling. To replace phonograph needle, loosen the small knurled nut that holds the needle in place. The nut is accessible from the bottom of pickup arm. Use a pair of long nose pliers or tweezers to avoid damaging the crystal cartridge. Recommended replacement needle is Motorola Part No. 47K471596.

CAUTION: Standard type needles will not work.

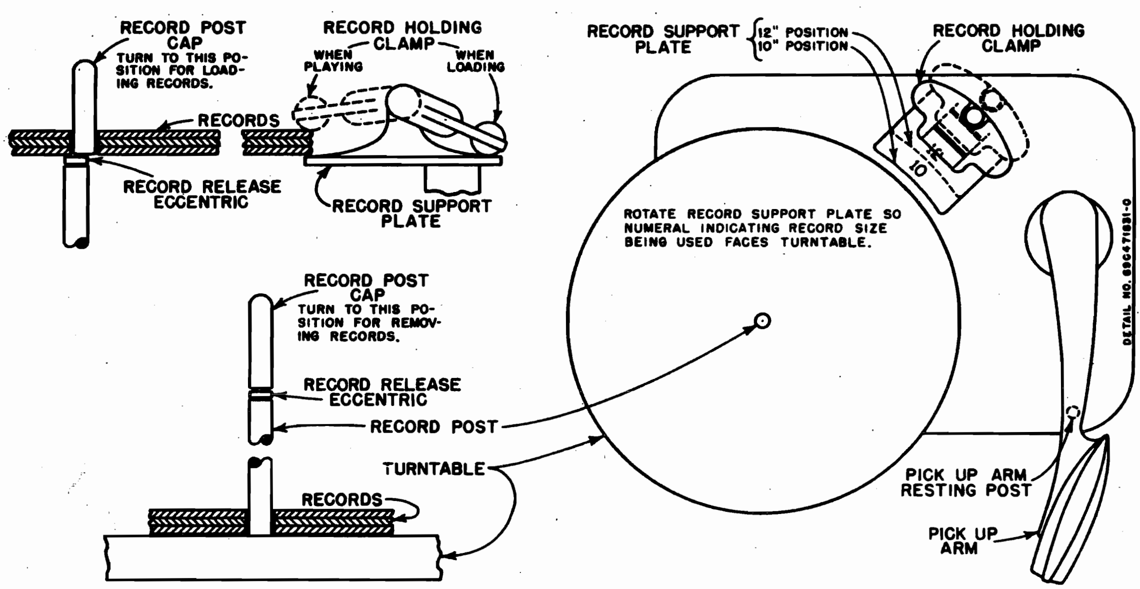


FIGURE 1. OPERATING INSTRUCTION DETAIL

MOTOROLA INC. MODELS RC-30-A, RC-34, RC-35

THEORY OF OPERATION

NOTE: Numbers in parenthesis ( ) refer to parts shown in Figures 2, 3, 4, 5 & 6.

The turntable is rim driven. Power is transmitted to it from the motor shaft by means of a rubber-tired drive wheel (84). The record post (48) does not revolve; it is fixed to the record changer base.

The heart of the record changer is the cam wheel (11). On it are cast all the cams, extrusions, etc., required to perform all the operations during the changing cycle. See Figure 2.

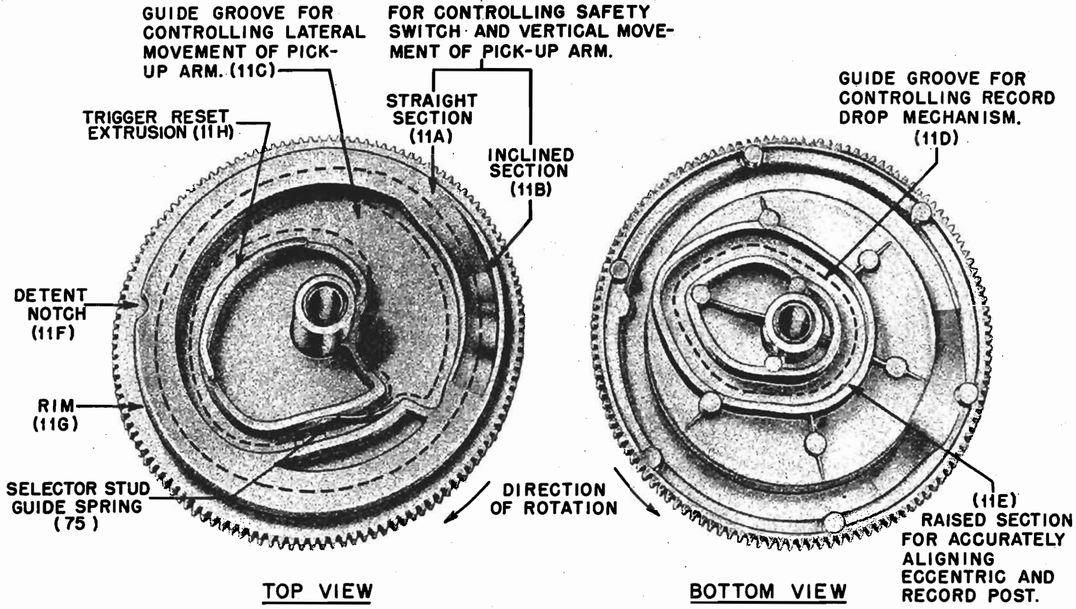


FIGURE 2. CAM WHEEL

The only mechanism that operates during the playing of a record, is the motor and turntable. The changing mechanism is disengaged until the change cycle starts.

The change cycle starts when the phono pickup needle comes within 1-7/8" of the record post. This causes screw (55) on trip arm (82) to actuate trip link (97) which trips the trigger by moving the latch arm (96) and allowing the small trip arm (105) to slip from its notch. Now spring (103) through bell crank lever (94) moves the drive arm (22) so that drive pulley (23) comes in contact with the inside rim of the revolving turntable, starting the change cycle.

With the same motion of the bell crank lever, its roller (94A) leaves the detent notch (11F) in the rim of the cam wheel and the cam wheel revolves. The roller (94A) now rides on the rim (11G) of the cam wheel and in this manner, holds the drive pulley (23) firmly against the turntable. The pressure with which the drive pulley bears against the turntable is adjusted by means of eccentric stud (94B).

As the cam wheel revolves, the pickup lift rod (54) rides up the inclined section (11B), lifting the pickup arm off the record. After the pickup arm is elevated, continued rotation of the cam wheel swings the pickup arm outward. The lateral movement of the arm is controlled by the selector stud (82A) which rides in a specially shaped groove (11C) in the cam wheel.

The gear arm roller (25A), riding in the specially shaped groove (11D) located on the bottom of the cam wheel, controls the dropping of records. Movement of the gear arm (25) causes the eccentric (24) to turn through 180°. When the eccentric (24) is in line with cap (12), it picks up a record and when it rotates back into line with the record post (48), the record is dropped onto the turntable.

Continued rotation of the cam wheel swings the pickup arm (by action of the selector stud (82A) riding in groove 11C) back over the first groove in the record and the arm is gently lowered onto the record when the inclined section (11B) reaches the pickup lift rod (54).

As the cam wheel approaches the full 360 degree point of its rotation, the trigger reset extrusion (11H) pushes against the trigger reset roller (105A) of the small trip arm, causing the trigger to be "cocked" ready for the next cycle, and in the same motion applies spring tension through the torsion spring (103) to the bell crank lever (109) so that when the cam wheel detent notch (11F) reaches the bell crank lever roller (94A), the roller falls into it pulling the cycle drive pulley (23) away from the turntable rim and the cam wheel stops, ending the cycle.

After the drive pulley is pulled away from the turntable, its motion is arrested immediately by a brake (See Figure 3) to prevent re-cycling.

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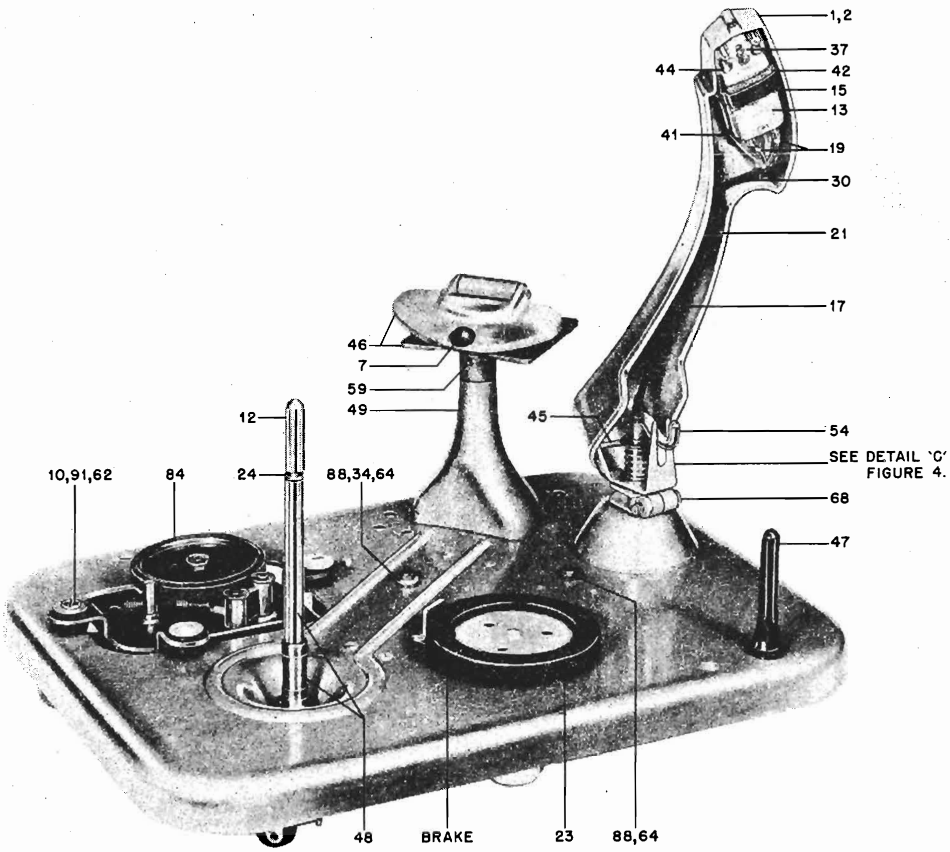

FIGURE 3. PARTS LOCATION - TOP VIEW

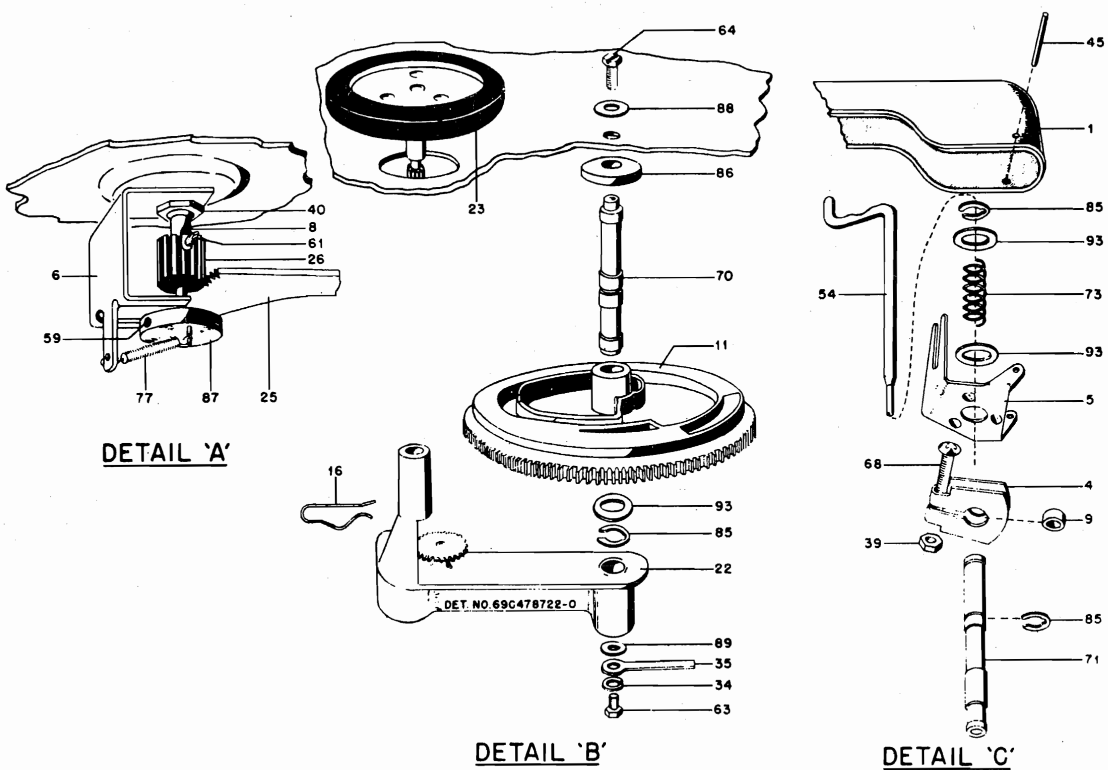

FIGURE 4. PARTS LOCATION - DETAILED ASSEMBLIES

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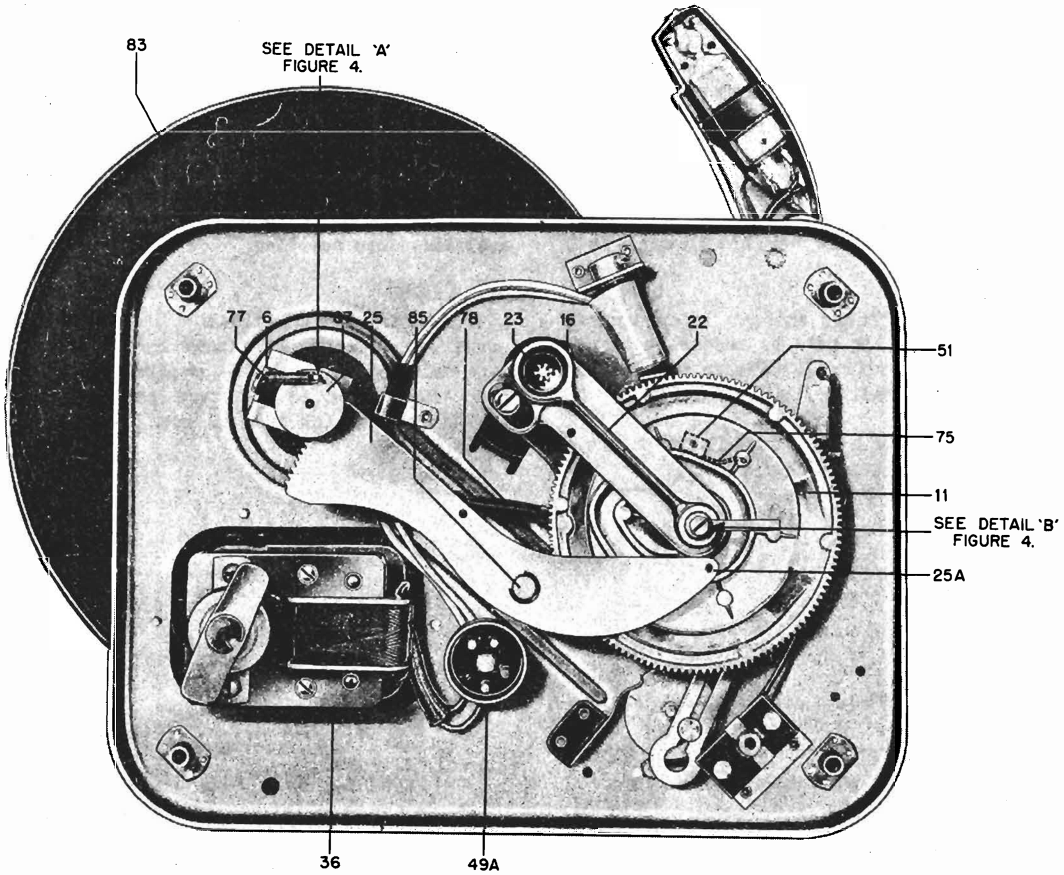

FIGURE 5. PARTS LOCATION - BOTTOM - COMPLETE

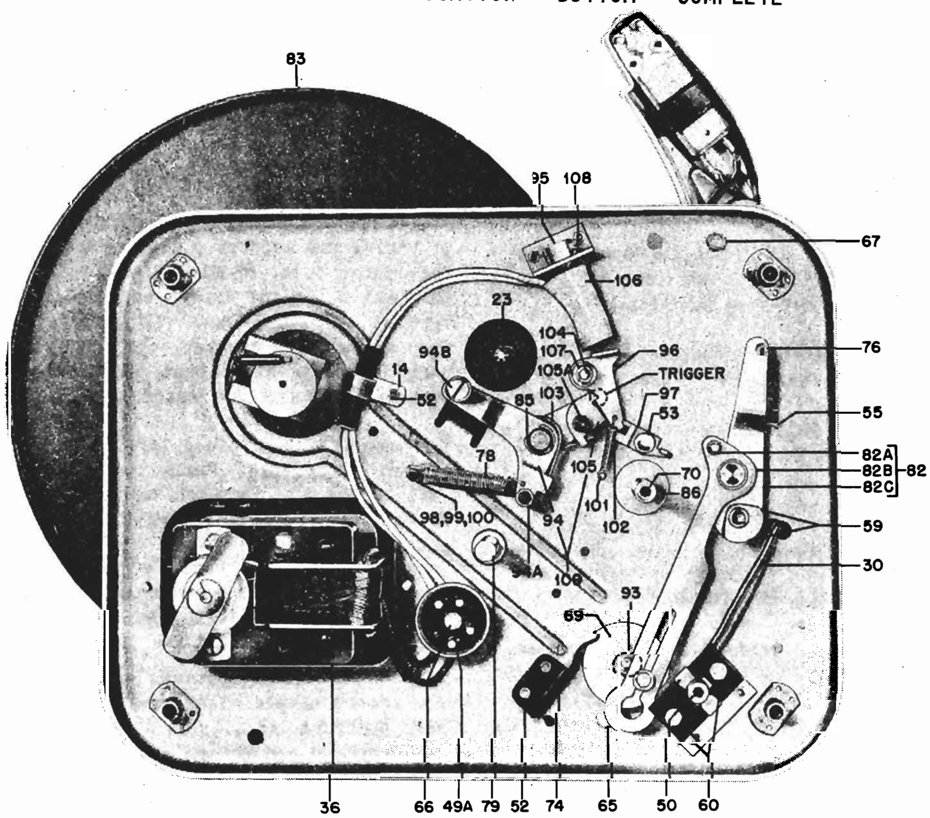

FIGURE 6. PARTS LOCATION - BOTTOM - PARTLY DISASSEMBLED

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Turning the record support plate (46), to accommodate the size record being used, automatically sets the mechanism so the needle set-down point will be correct for the size records being played. Selector lever (82B) is moved by the stud on selector plate (69), changing the angle between trip arm (82C) and selector lever (82B).

An external momentary contact (REJECT) switch is used to manually start the change cycle or to reject a record before it has been completely played. Pushing the "R" button will energize the trip coil (106) and will move the latch arm (96), allowing the changer to cycle as previously described.

A special clutch device, built into the base of the pickup arm, prevents damage to the mechanism should the arm be accidentally touched while the instrument is in cycle. Should the arm be accidentally moved out of adjustment, stop the changer and move the arm from side to side until you hear it snap back into position.

USE OF TEST CORD

To operate this record changer independently of the radio receiver, it will be necessary to obtain or construct a test cord. Figure 8 shows the hookup and parts required.

A ready-made cord can be obtained from Motorola -Order Part No. 1X471448 - List $2.70. It will only be necessary to attach a wall outlet plug to the red and gray leads to prepare this cord for use. The black lead is not used and can be cut off. (This cord is the same as used on some 1947 Motorola home sets).

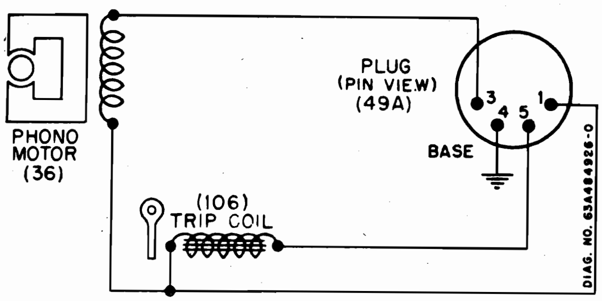

FIGURE 7. RC-30-A WIRING DIAGRAM

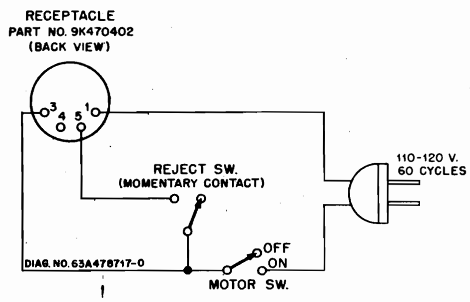

FIGURE 8. TEST CORD WIRING DIAGRAM

ADJUSTMENTS

NOTE: Reference numbers in parenthesis refer to Figures 3, 4, 5 & 6.

ECCENTRIC STUD ADJUSTMENT

This adjustment is one of the most important for dependable cycling of the record changer. It must be followed closely, as too tight an adjustment will cause slow cycling and undue motor wear, or the changer may keep cycling continuously; a loose adjustment may prevent changer from cycling at all.

1. Set changer in cycle and stop turntable when pickup arm comes back to within one inch of right of turntable (almost the set-down position.)

2. Loosen eccentric stud (94B) completely, so drive pulley (23) moves completely free of the turntable.

3. Rotate turntable by hand (counterclockwise) 90° (1/4 turn) and back (clockwise). Pickup arm should not move.

4. With a screwdriver, turn eccentric stud until pickup arm begins to move when rotating turntable by hand clockwise. Do not hold screwdriver on eccentric stud while checking adjustment.

5. When pickup arm moves down with the clockwise rotation of turntable without slipping, but not up with counterclockwise rotation, the critical position of the adjustment has been reached.

6. Then tighten the eccentric just far enough to pick up the pickup arm when rotating the turntable counterclockwise and setting is complete.

7. To check for too tight adjustment, complete cycle of changer with motor operating. Complete change cycle should not take more than 7 seconds; if it takes longer, eccentric stud should be re-adjusted.

RECORD SUPPORT PLATFORM ADJUSTMENT

It is important that all points on the "lip" of the record support platform be equi-distant from the center point of the spindle. This will assure that all points of the record will leave the platform at the same time. If the record support is too far out of alignment, the record would actually hang on the point nearest the spindle and fail to drop properly from the record post.

1. Turn the spindle cap (12) so it is in line with record post (48). Turn record support platform (46) to the 10" position, making sure it is turned so that the selector spring (74) falls into the detent notch.

2. Place a standard 10" record on the record spindle and hold it in line with the record support platform (46) and eccentric (24).

3. If parts are adjusted and aligned correctly, the record should clear the lip of the record support platform equally at all points and the gap between record and record support platform should be just large enough to let the record clear the platform.

NOTE: The 10" record used should have a diameter of 9-7/8" ± 1/64".

4. If one point of the record support platform (46) is nearer the record than the other, the position of the platform may be adjusted after loosening the two Allen head screws (59) located directly under record support platform (46). (Use a #6 Allen head driver -Motorola Part No. 66X10704).

5. Spacing between the record post (48) and record support platform (46) can be varied by loosening the two screws (65) located underneath record support post (49). Correct spacing is indicated as in Step 3 above.

NOTE: A "standard gauge" (Motorola Part Number 66A75278) can be used in place of a record when adjusting the platform.

6. **TEST:** After tightening the setscrews, test the adjustment by running a ten-inch record through a complete cycle and check the point where the needle falls. If the needle misses the record by one inch, the record support platform (46) is 180 degrees out of line with the detent plate (69) and should be turned one-half turn without turning the detent plate.

NEEDLE SET-DOWN POINT

1. Turn the record support to the twelve-inch position.

2. Place a standard twelve-inch record on the turntable.

3. Start the changer and allow it to go through its cycle.

4. Note the point at which the needle contacts the record. It should contact the record in the middle of the area between the first groove and the edge of the record.

5. If the needle doesn't come down at the proper point, cycle the changer and stop it just as the pickup arm is coming down on the record.

6. Place a full stack (eight) of twelve-inch records on the turntable.

IMPORTANT: It is imperative to make this adjustment while the selector stud (82A) is still riding in the groove of the cam wheel (11). If the record player is stopped just before the needle contacts the top record of a full stack of records, the selector stud (82A) will still be in the cam wheel groove and the pickup arm will not be free to move annoyingly about while the adjustment is being made. This is the reason for using a full stack of records on the turntable. If excessive pickup arm side play is noted at this point, check selector stud guide spring (75) on cam wheel. Excessive play between the selector stud (82A) and cam wheel groove will prevent needle from coming down at exactly the same spot on the record each time.

7. Loosen the adjustment lockscrew (68) and then move the pickup arm until phono needle is positioned correctly over the middle of the area between the edge and the first groove in the record.

8. After adjustment, tighten the adjustment lockscrew.

9. Check the adjustment by putting the changer through its cycle.

10. If necessary, repeat above steps.

11. Check adjustment, using a 10 inch record. If necessary, make minor compromise adjustments so needle will come down properly on both ten and twelve-inch records.

TRIP ADJUSTMENT

This adjustment must be made after the needle set-down point has been adjusted.

1. Draw a 3-3/4" diameter circle on a piece of paper, punch out a 1/4" diameter hole in exact center of the circle and slip the paper over the record post.

2. Turn the support platform to 12 inch record position.

3. Cycle the changer once; at end of cycle, pickup arm will rest along side turntable. Do not turn off changer.

4. Grasp the pickup arm and slowly move it towards the record post. As the pickup needle crosses the circle line, a click should be heard, indicating start of change cycle.

5. If change cycle start does not occur as needle crosses circle line, adjust screw (55) on trip arm (82) till cycle starts at correct point. Turn adjustment screw (55) clockwise if change cycle starts after needle crosses circle line, and counterclockwise if change cycle starts too soon.

RECORD DROP MECHANISM

Cycle the record changer once. At the end of the change cycle, stop the changer and carefully observe the position of the eccentric (24) with respect to record post (48). They should line up perfectly. If not, re-adjust as described below:

1. Put the record changer in cycle and slowly revolve the turntable by hand until the gear arm roller (25A) is resting on the raised section (11E) of the record drop groove on the cam wheel. The raised section of the groove is very small and resembles what is often taken for "flash" on castings. It serves to narrow down the groove at this point and in this manner, insures closer alignment of the eccentric (24) and record post (48).

2. Loosen the slab head setscrew (61) in the spindle gear (26). The eccentric (24) will now turn freely.

3. Turn the eccentric (24) so it is in perfect alignment with the record post (48).

4. Tighten slab head setscrew (61) in spindle gear (26). WARNING: DO NOT USE EXCESSIVE PRESSURE WHEN TIGHTENING SLAB HEAD SETSCREW. EXCESSIVE PRESSURE MAY DENT THE ECCENTRIC TUBE AND CAUSE BINDING.

VERTICAL ADJUSTMENT OF PICK-UP ARM

The pickup lift rod (54) controls the vertical movement of the pickup arm. If this adjustment is not correct, the needle may not rest properly on the first record, the needle may not clear a full stack of records, or the pickup arm may rub against the bottom record on the support post.

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1. After the changer has completed its cycle and pickup arm is resting in playing position, stop the changer. The pickup lift rod (54) will now be resting on the bottom of the inclined section (11B) of the cam wheel (11) and the pickup arm will be at its lowest point of vertical travel.

2. The pickup now should be resting by the side of the turntable and the needle should be exactly level with the top of the turntable. If it isn't, lift the pickup arm straight up, exposing the pickup lift rod (54). With long nose pliers, bend the pickup lift rod (along its flat portion) in the required direction till the pickup needle point is exactly level with the top of the turntable.

LUBRICATION

Factory lubrication should be sufficient for a long period of service. However, if the record changer is subjected to severe operation conditions, it is best to clean and re-lubricate all moving parts.

Use Univis P-48 oil (Motorola Part Number 11M2340) on the eccentric and tube assembly (24) and Stay-Put grease (Motorola Part No. 11M476047) on all other moving parts. Use grease and oil sparingly; do not overlubricate.

CAUTION: Do not allow grease or oil to come in contact with any rubber parts. The motor spindle and inside rim of turntable must be perfectly clean of grease. If grease gets on any of these surfaces, it should be removed immediately with carbon-tetra-chloride.

SERVICE INFORMATION

MECHANISM IS SLOW IN STARTING OR MOTOR HEATS UP

1. Check lubrication.

2. Dirt in bearings. Wash dirt out with carbon tetrachloride or similar solvent and re-lubricate. Use Univis P-48 oil in the phono motor and turntable bearings and Stay-Put grease on all other bearings and moving parts.

3. Check line voltage and frequency.

4. Motor damaged. Replace motor.

5. Room temperature abnormally low.

6. Eccentric stud adjustment (94B) set at maximum throw, causing cycle drive wheel to drag on turntable rim. Correct by setting eccentric stud per instructions under ECCENTRIC STUD ADJUSTMENT.

7. Slow motor. Replace motor.

8. Grease on rubber rim idler wheel and/or inner rim of turntable. Clean off with carbon tetrachloride.

MOTOR FAILS TO RUN

1. Check to see that power is being supplied to motor.

2. Trouble in motor winding. If easily seen, repair; otherwise, replace.

3. Damaged or frozen bearings. Replace motor.

4. Gummed oil or foreign material between armature and pole-piece. Clean out.

SQUEAKS OR OTHER NOISES DURING PLAYING OF RECORDS

1. Check lubrication (if squeaks are heard, they will usually be found to come from the records - not from mechanism.)

2. Compare the squeaks with and without a load of records. If squeak disappears when records are removed, then noise is obviously from records. Correct by rubbing a little wax on the record post.

CHANGER IS NOISY WHEN IN CYCLE

1. Check lubrication.

2. See if any part has become loose or bent and is rubbing against a moving part.

3. Check center post eccentric tube (24) lubrication.

"WOW" IN RECORD REPRODUCTION

1. Record is warped or otherwise defective, or the instrument is not being operated at normal room temperature (70°F). See CHECK THE RECORD FIRST.

2. May be caused by slippage due to grease on idler wheel or inside rim of turntable.

PICK-UP ARM TRIPS OUT OF GROOVES

1. Record changer not level.

2. Pickup arm shaft (71) binding in bearing.

(A) Ream out the hole.

(B) Sometimes the trip arm (82) may be too close to the base, causing a bind. To remedy, loosen its two setscrews (59) and space slightly.

3. Selector lever (82B) may be bent out of shape and binding against detent plate (69). Straighten.

4. Selector lever (82B) slot or retaining rivet on detent plate (69) may be undersize or oversize, respectively, effectively causing a binding feeling on the pickup arm. Correct by spreading slot in selector lever (82B).

5. Needle defective. Replace.

CHANGER KEEPS CYCLING

1. Eccentric stud adjustment (94B) set too tight. Correct per instructions found under ECCENTRIC STUD ADJUSTMENT.

2. Defective reject switch on radio. Repair or replace.

3. Bell crank arm (94) or drive arm (22) binding on their shafts.

RECORD WILL NOT DROP WHILE CYCLING

1. Eccentric (24) out of line with record post (48). Correct as shown in ADJUSTMENT OF RECORD DROP MECHANISM.

2. Setscrew (61) loose on spindle gear. Tighten after readjusting.

3. Record platform (46) not set correctly. See RECORD SUPPORT PLATFORM ADJUSTMENT.

CHANGER WILL NOT CYCLE

1. Open trip coil (106). Replace.

2. Defective wiring.

3. Binding drive arm (22), bell crank arm (94) or cam wheel (11) on shafts. Replace parts or remove burrs.

4. Eccentric adjustment stud (94B) set at minimum throw. Cycling drive wheel (23) is not against inner rim of turntable. Correct by setting up as shown under ECCENTRIC STUD ADJUSTMENT.

5. Record finish groove may be too far from center. Trip switch will not be actuated until needle comes within 1-7/8" of record post. Use standard records.

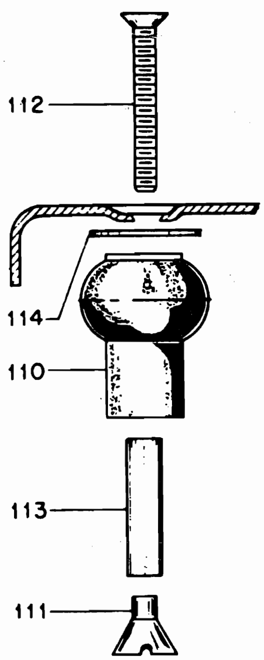

FIGURE 9. RC-34 SHOCK MOUNT ASSEMBLY

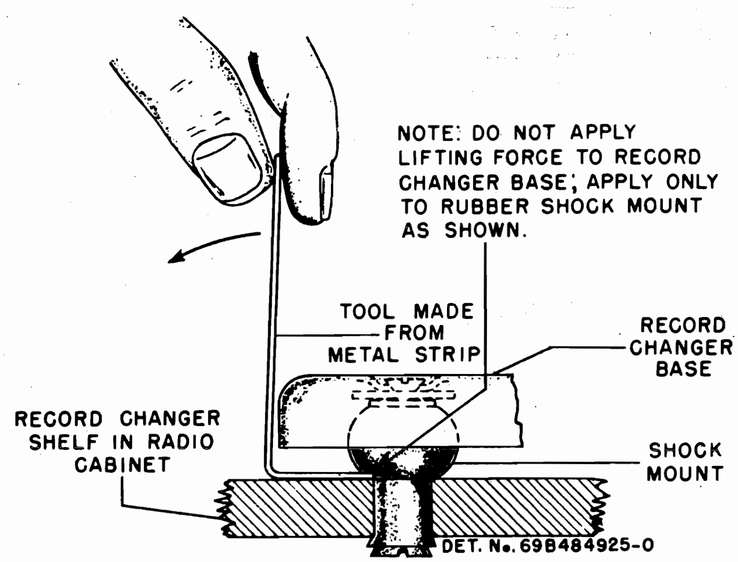

FIGURE 10. HOW TO REMOVE RECORD CHANGER RC-34 FROM RECORD CHANGER SHELF

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REF. NO.	PART NO.	DESCRIPTION
1	45K470538	Arm, pickup: arm only; painted green (RC-30-A)
	45K482820	Arm, pickup: arm only; painted red mahogany (RC-34 & RC-35)
2	1X470570	Arm, pickup: complete; includes crystal cartridge, needle, connecting lead and shaft assembly; arm painted green (RC-30-A
	1X484298	Arm, pickup: complete; includes crystal cartridge, needle, connecting lead and shaft assembly; arm painted red mahogany (RC-34 & RC-35
4	1X478181	Bracket, adjustment: includes screw and nut
5	7B471467	Bracket, pickup arm & guide
6	7B470266	Bracket, spindle
7	35A470831	Bumper, rubber
8	43K4780	Bushing: .250 x .171 x .187
9	43A478167	Bushing, shaft pickup
10	43K71249	Bushing, spacer
11	1X471999	Cam Wheel & Spring Assembly
12	1B470509	Cap & Spindle Assembly
13	59A471595	Cartridge, crystal: needle included
14	42K13135	Clamp, cable: 1/2"
15	42A75809	Clip, cartridge retainer
16	42A76484	Clip, drive wheel retainer
17	42A72314	Clip, retainer: 7/8"; blued
19	9A72670	Contact, pin terminal
21	35A72628	Cushion, pickup arm: 3/8" x 1/2" sponge rubber
22	1X470584	Drive Arm Assembly: complete with bearing and idler gear
23	1X71795	Drive Pulley & Shaft
24	1B470524	Eccentric & Tube Assembly
25	1X470593	Gear Arm & Bushing Assembly
26	44B71634	Gear, spindle
30	1X470532	Lead, pickup connecting
33	4S7657	Lockwasher: #8 external; cadmium plated
34	4S7671	Lockwasher: #8 split; cadmium plated
35	29R5239	Lug, soldering: #8, long tab
36	59K470458	Motor, phono: 105-120V, 60C; complete with rubber tired idler pulley
37	47K471596	Needle, phono: long-life
39	2S1375	Nut: 8-32 x 11/32 hex; cadmium plated
40	2S7004	Nut: 3/8-32 x 9/16 hex; cadmium plated
41	35A74664	Pad, cartridge (large): rubber
42	35A74665	Pad, cartridge (small)
44	47A74666	Pin, cartridge locating: rubber
45	47A71685	Pin, pickup arm support
46	1X470535	Plate & Clamp Assembly; painted green (RC-30-A)
	1X482826	Plate & Clamp Assembly; painted red mahogany (RC-34 & RC-35)
47	46K470827	Post, pickup resting: green plastic (RC-30-A)
	46K482816	Post, pickup resting: red mahogany plastic (RC-34 & RC-35)
48	47B470276	Post, record & bushing
49	46B470931	Post, record support: painted green (RC-30-A)
	46K482817	Post, record support: painted red mahogany (RC-34 & RC-35)
49A	28A470534	Plug, 4 pin
50	9A470260	Receptacle, phono output
51	5S2834	Rivet: .062 x 9/64 brass; nickel plated.
52	5S2824	Rivet: .122 x 5/32 steel; burnished brass finish
53	5K21337	Rivet, shoulder: .130 x .230
54	47A471481	Rod, pickup lift
55	3S2697	Screw: #2 x 5/8 PKZ plain hex head sheet metal screw; cadmium plated
59	3S9700	Setscrew: 6-32 x 3/16 Allen head; cadmium plated
60	3S3376	Screw: #6 x 1/4 PKZ slotted hex head sheet metal screw; cadmium plated
61	3S7109	Screw: 6-32 x 5/16 slab head setscrew; cadmium plated (trip coil)
62	3S7342	Screw: 6-32 x 5/8 slotted binderhead machine screw; cadmium plated
63	3S7374	Screw: 8-32 x 5/16 slotted hex head machine screw; cadmium plated
64	3S2291	Screw: 8-32 x 5/16 slotted hex head machine screw; antique copper finish
65	3S8177	Screw: #8 x 3/8 PKZ slotted hex head sheet metal screw; cadmium plated
66	3S2957	Screw: 8-32 x 1/2 slotted hex head machine screw; cadmium plated
67	3S2678	Screw: #8 x 5/8 plain locking hex head sheet metal screw; cadmium plated
68	3S476110	Screw: 8-32 x 3/4 Phillips round head machine screw; cadmium plated
69	1X470480	Selector Shaft & Plate Assembly
70	47B470269	Shaft, cam
71	47A471471	Shaft, pickup
73	41A471469	Spring, compression
74	41A71635	Spring, selector
75	41A471995	Spring, selector stud guide
76	41A471681	Spring, tension coil
77	41A14244	Spring, tension coil: 1/8 x 23/32
78	41A470592	Spring, tension coil: 1/4" x 1"
79	46A470257	Stud, gear arm
82	1X470539	Trip Arm & Selector Lever Assembly
83	59C470590	Turntable, phono: includes oilite bearing; green (RC-30-A)
	59K482840	Turntable, phono: includes oilite bearing; brown (RC-34 & RC-35)
84		Tire, phono motor idler pulley
85	4A21941	Washer, "C"
86	4A470946	Washer, cam shaft
87	49A470239	Wheel, spindle stop & pin
88	4S7623	Washer: 3/8 x 11/64 x .033 thick; antique copper finish
89	4S7597	Washer: 7/16 x .171 x .033 thick; cadmium plated
91	4S1765	Washer: 1/2 x .147 x 1/64 thick; cadmium plated
92	4K76609	Washer: 9/16 x .315 x .010 thick; brass.
93	4A21491	Washer: 9/16 x .315 x .020 thick; brass.
94	1X481432	Bell Crank Lever Assembly
95	1A481442	Bracket & Bushing; coil mounting
96	1X481447	Latch Arm & Bushing Assembly
97	45A74582	Link, trip
98	4S7695	Lockwasher: #5 internal; cadmium plated (soldering lug)
99	29R3004	Lug, soldering: #6, bent
100	5S7716	Rivet: .122 x 5/32 steel; antique copper (soldering lug)
101	3S2689	Screw: #4 x 5/16; PKZ Phillips binderhead; antique copper
102	41A76681	Spring, ratchet
103	41A71676	Spring, torsion
104	46A71610	Stud, shoulder (latch arm)
105	1X76787	Trip arm, small
106	24B481418	Trip coil & core
107	4K24125	Washer, "C" (latch arm)
108	3S7109	Setscrew: 6-32 x 5/16 slab head, cup point machine screw
109	1X481431	Bell Crank Lever & Arm Assembly: includes 94, 103 & 105
110	35A481870	Mount, shock: rubber
111	2A484296	Nut, shock mount tapered tee
112	3S488108	Screw: 10-32 x 1-3/8 Phillips flathead machine screw; antique copper finish
113	43A484295	Sleeve, shock mount: rolled
114	4S8214	Washer: 7/8 x .203 x .067; cad. pl

DESCRIPTION OF OPERATING CYCLE

Power for the motor is applied through the on-off switch. The turntable is rim-driven by a rubber-tired idler wheel mounted between the motor shaft and the turntable rim.

The turntable hub is a combined shaft and gear (figure 1). This small hub gear engages a large cam gear (figure 2) when the retractable segment of the cam gear is brought into position by the action of the trip mechanism; the cam gear, in turn, operates the changer mechanism.

The tone arm is operated by two link assemblies attached to actuator levers (figure 3) which are in contact with the cam surface of the cam gear.

The record-shelf push-off mechanism is connected, through a series of bars (figure 4), to a push-off actuator; the mechanism is operated when a roller on the cam gear comes in contact with the actuator.

The trip mechanism is operated by a trip finger, riding over a ratchet screw (figure 5), which starts the change cycle when the needle is traveling in the eccentric finish groove of the record. The trip mechanism is locked in a disengaged position when the control button is in the manual position.

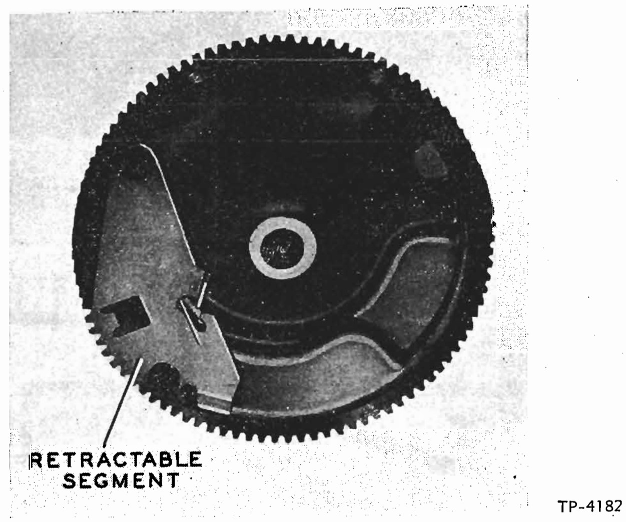
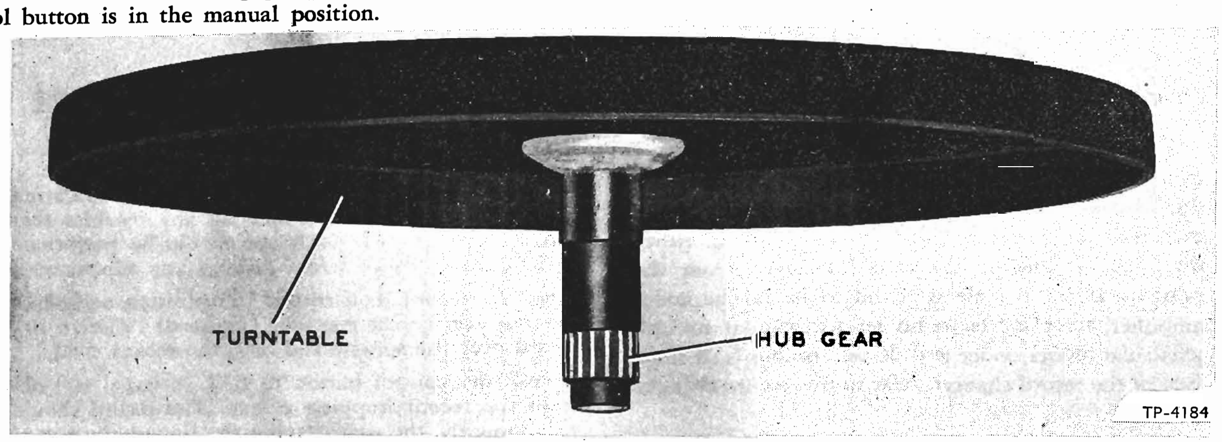


Figure 2—CAM GEAR, SHOWING RETRACTABLE SEGMENT



TP-4101

Figure 1—TURNTABLE AND HUB GEAR

TP-4181

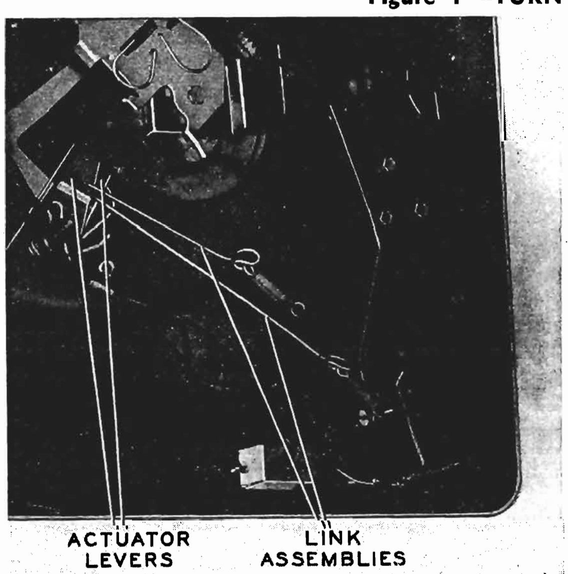


Figure 3—LINK ASSEMBLIES AND ACTUATOR LEVERS

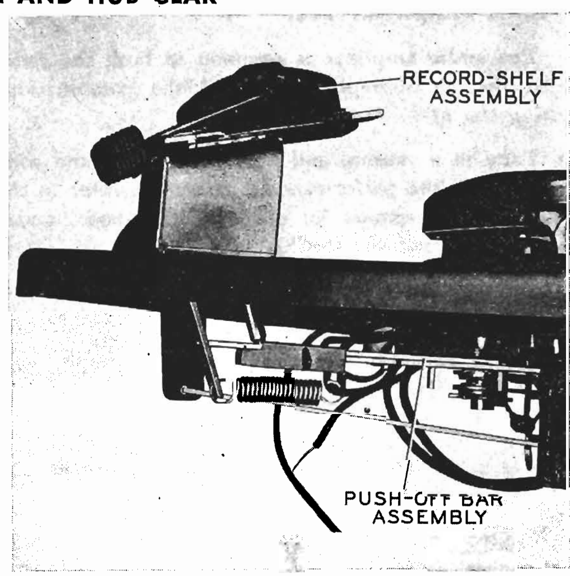


Figure 4—RECORD-SHELF AND PUSH-OFF ASSEMBLIES

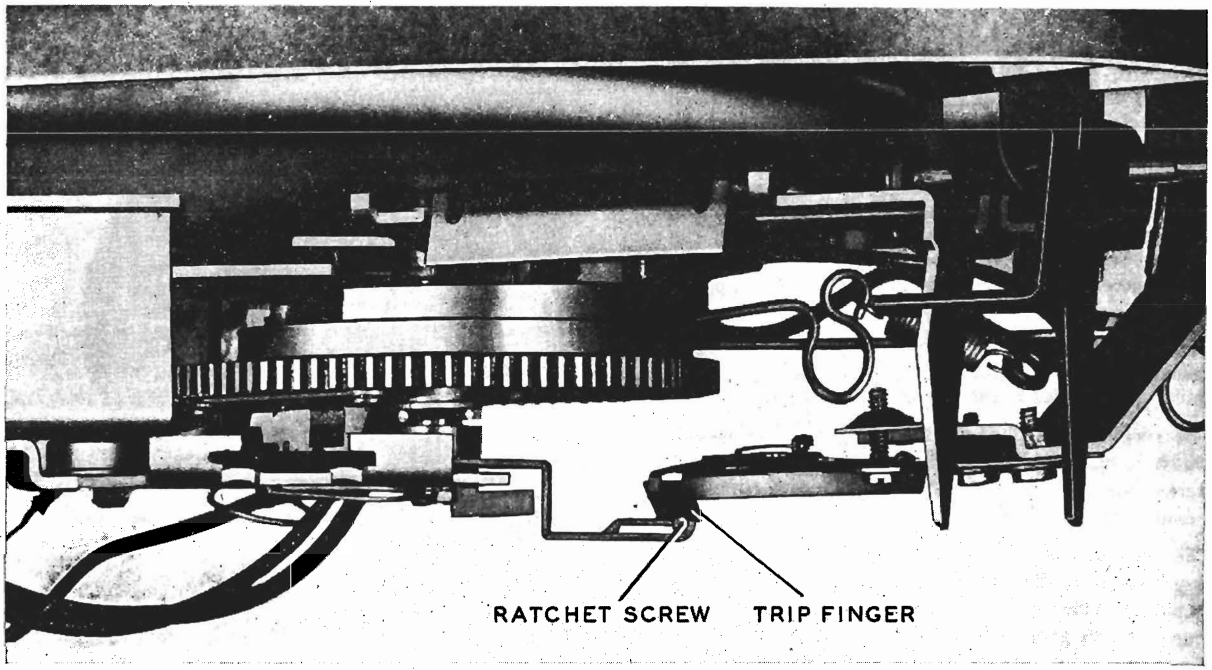


Figure 5—TRIP FINGER AND RATCHET SCREW TP-4135

PHILCO RADIO-PHONOGRAPH TROUBLE-SHOOTING PROCEDURE

The following tests are given for quickly localizing trouble in either the radio or phonograph section of the radio-phonograph combination. Be sure to make each test, in the order given, before removing either the radio chassis or the record changer from the cabinet. If the trouble is found to be in the audio amplifier, refer to the radio service manual for the particular model under test. If the trouble is in some part of the record changer, refer to this record-changer manual.

Audio-Amplifier Test

The audio amplifier is common to both the radio and the phonograph sections of the combinations using the M-8 changer.

Tune in a station, and note the volume and tone quality. If the performance is abnormal, refer to the radio service manual for the particular model under test, and correct the trouble.

Pickup Test

Play a familiar record on the phonograph, and again note the volume and tone quality.

NOTE

It is advisable to carry a familiar record as a part of the service test equipment.

If distortion is noted when playing the record, first try a new needle. If the distortion continues, a faulty crystal pickup is indicated.

Changer-Mechanism Test

The following series of record-changer operating tests is given for quickly locating any troubles that may be encountered. Each test should be performed with several records before making any adjustments.

Set the record shelf to the 10″ position and place the tone arm on the rest post (figure 6). Place a 10″ record over the spindle and onto the record shelf.

Push the control button to REJ (reject), and observe the record-dropping action. The record should fall smoothly, the edge leaving the lips of the record shelf *after* the center has started to fall.

TP-4103

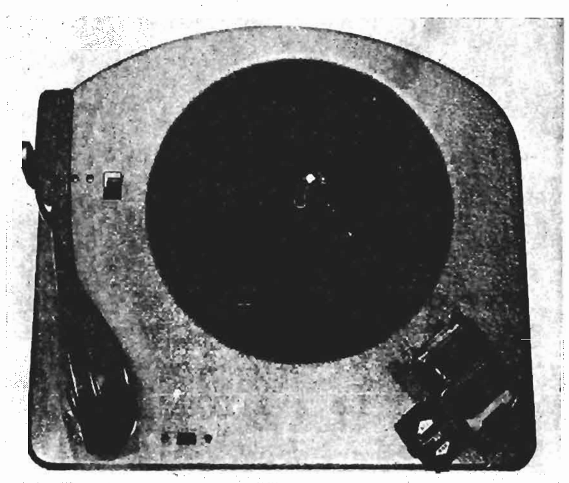
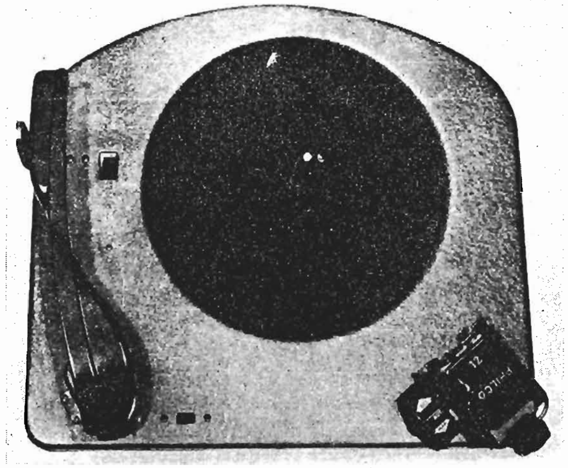


Figure 6—CHANGER, RECORD SHELF IN 10″ POSITION



TP-4105

Figure 7—CHANGER, RECORD SHELF IN 12″ POSITION

The tone arm should rise from the rest post, and the needle should come down on the record, starting about ⅛″ from the outer edge.

Play the record through and observe the tripping action; the trip mechanism should operate within the first two or three revolutions after the needle has entered the eccentric finish groove.

Remove the record from the turntable and set the record shelf to the 12″ position (figure 7). Place a 12″ record over the spindle and onto the record shelf. Push the control button to REJ., and observe the record-dropping action. The record should leave the lips of the record shelf *after* the center has started to fall. Refer to – – – – – the record-shelf adjustment, if needed. The tone arm should rise from the rest post, and the needle should come down on the record, starting about ⅛″ from the outer edge.

Play the record through and observe the tripping action. Trip adjustments are given on page 10.

Observe whether the lower edge of the tone arm, during a change cycle, clears the top of the hook on the tone-arm rest post by a minimum of ⅛″. Take the tone arm off the rest post, and place the pickup over the changer base plate; the needle point should clear the base plate by at least $\frac{1}{16}$″, and should be no higher than the turntable top.

Turntable and Motor Test

NOTE

Before making this test, warm up the motor by allowing it to run for at least ten minutes.

Set the control button to MAN. (manual), load the turntable with ten 12″ records, and place the tone arm on the top record.

Place a stroboscope disc, such as Philco Part No. 45-2900, on the record, and illuminate the disc with a lamp (preferably a neon bulb) operated on 60-cycle a.c. The dots in the row calibrated for 78 r.p.m. should appear to remain stationary, or drift *very* slowly, but smoothly, backward or forward.

If the turntable speed is steady, but is appreciably below 78 r.p.m., refer to the lubrication data on the turntable upper bearing, motor bearings, and motor idler plate, given under CLEANING AND LUBRICATION, – – – – if the lubrication appears to be adequate, the motor is probably defective.

Unsteady drift of the dots on the stroboscope disc indicates uneven turntable speed, the cause of wows; see UNEVEN TURNTABLE SPEED (WOWS),

CLEANING AND LUBRICATION

The M-8 record changer, like any other mechanism, requires lubrication after long periods of use. Whenever a major part or assembly is to be replaced, the changer should be cleaned and lubricated. Carbon tetrachloride or other similar cleaning fluids may be used to remove old gease, oil, and dirt. Apply lubricants sparingly. All lubrication points are shown in figures 8 and 9. It may be necessary to remove some parts and assemblies in order to lubricate their bearings—for example, the actuator and cam gear must be removed to lubricate the actuator stud and the cam-gear spindle.

PARTS NOT TO BE LUBRICATED

The following parts should not be lubricated at any time: Trip receiver; trip finger; ratchet screw on trip plate; selector.

PARTS TO BE GREASED

The following parts are to be lubricated with a grease having the consistency of vaseline:

Record-Shelf Assembly (point A of figure 9)
Four protruding dimples.

Bridge Assembly and Slider Control Bar (point B of figure 8)
Three dimples and four upturned ears.

Cam Gear (point C of figure 8)
Cam-gear teeth, cam surfaces, and cam-gear spindle.

Main Assembly (points D, figures 8, 9, and 13)
Trip-plate ear where contact is made with gear segment.
Actuator stud.
All parts with ears sliding on changer base plate.
Index-lever surface which slides on base plate.
Push-off-actuator dimples which slide on base plate.
Turntable shaft (upper bearing).
Tone-arm shaft.

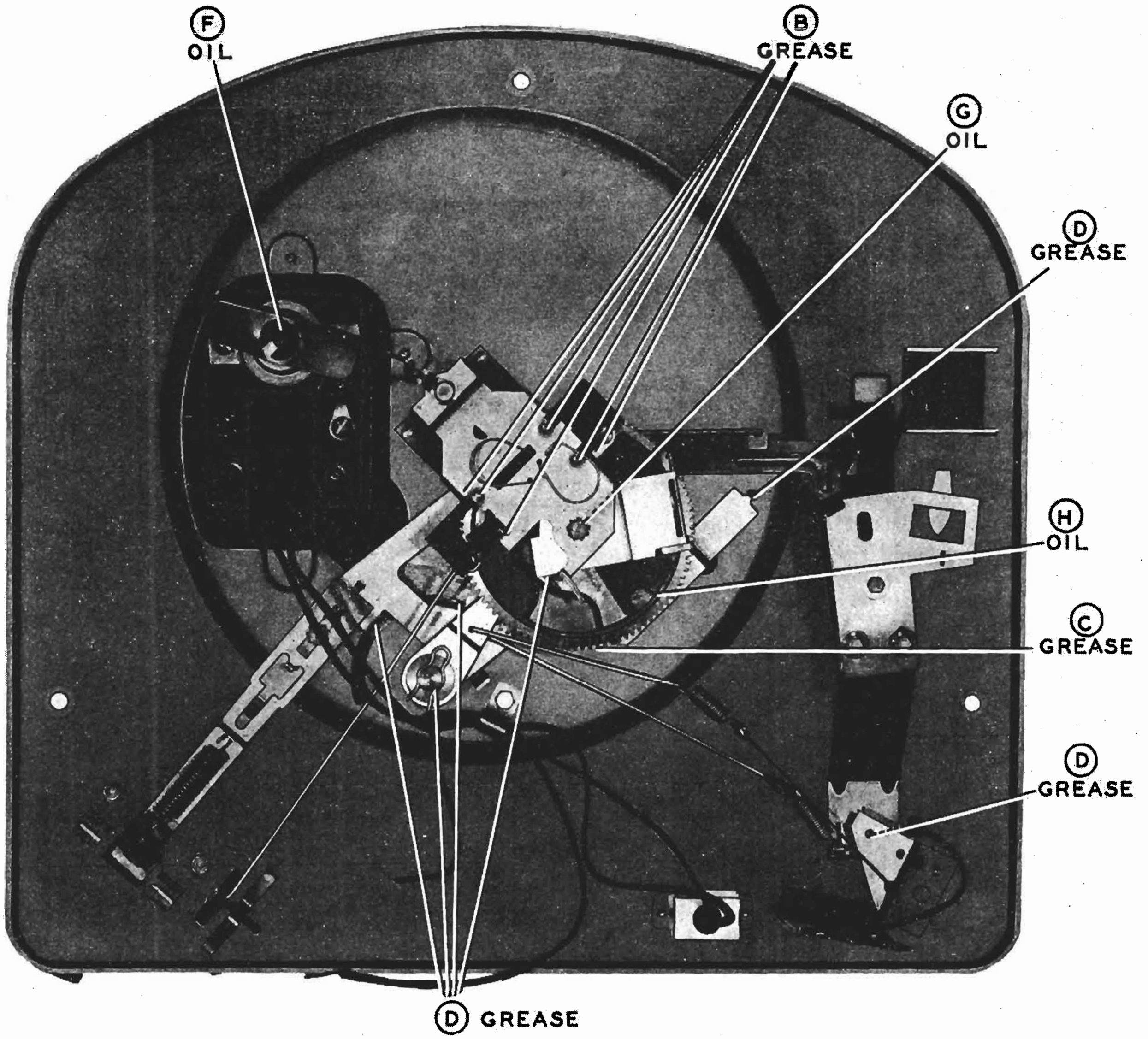


Figure 8—BOTTOM VIEW OF CHANGER, SHOWING LUBRICATION POINTS

PARTS TO BE OILED

The following parts are to be lubricated with S.A.E. 20 oil:

Tone Arm (point E of figure 9)

Tone-arm pivot pin where pin rides in elongated hole of tone arm—apply one drop with a pointed rod.

Motor (points F, figures 8 and 9)

Motor idler plate—one or two drops in each dimple.

Motor bearings.

Trip-Plate Bushings (point G of figure 8)

Cam-Gear Roller (point H of figure 8)

CAUTION

Do not get any oil or grease on the motor shaft or the idler-wheel tire. Should this occur, remove the oil or grease immediately with carbon tetrachloride.

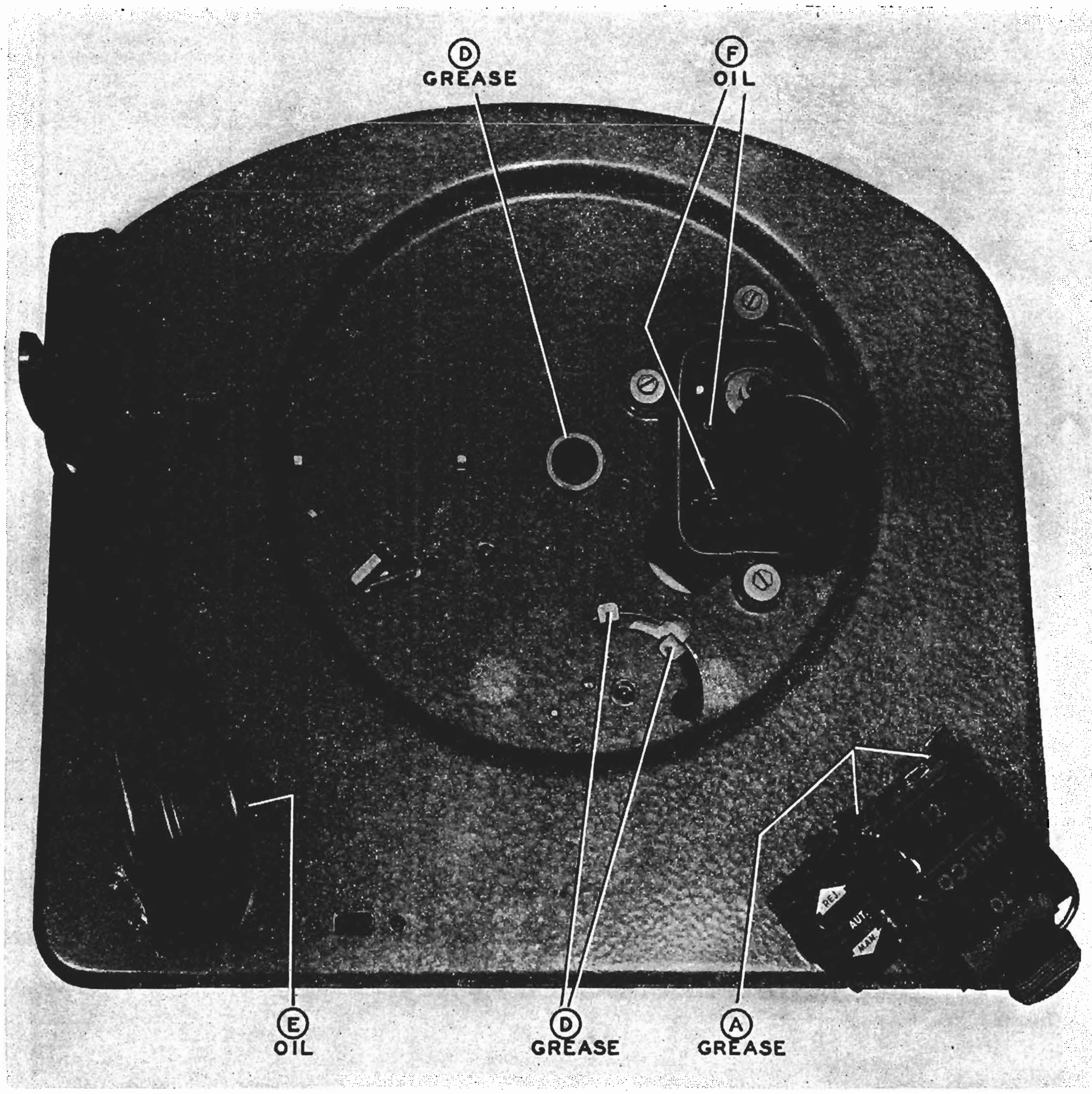


Figure 9—TOP VIEW OF CHANGER, SHOWING LUBRICATION POINTS TP-4106

ADJUSTMENTS

10″ Index Adjustment

Set a 10″ record on the turntable; push the control button to REJ., and rotate the turntable 4½ turns by hand. The tone arm should then be approximately ½″ above the record.

Loosen the clamp screw on the trip arm (figure 10). Hold the tone arm (steady) ⅛″ in from the edge of the record, and set the trip arm so that the trip-arm stop is in contact with the selector hinge. See figure 10.

Tighten the clamp screw, leaving 1/32″ vertical play, or clearance, between the trip arm and the base plate.

12″ Index Adjustment

Make the 10″ index adjustment first. The 12″ indexing will ordinarily be satisfactory after the 10″ adjustment is made; if not, bend the selector, 56-4618FA3, slightly to the right or left as required for proper indexing of the needle on the record, as shown in figure 11.

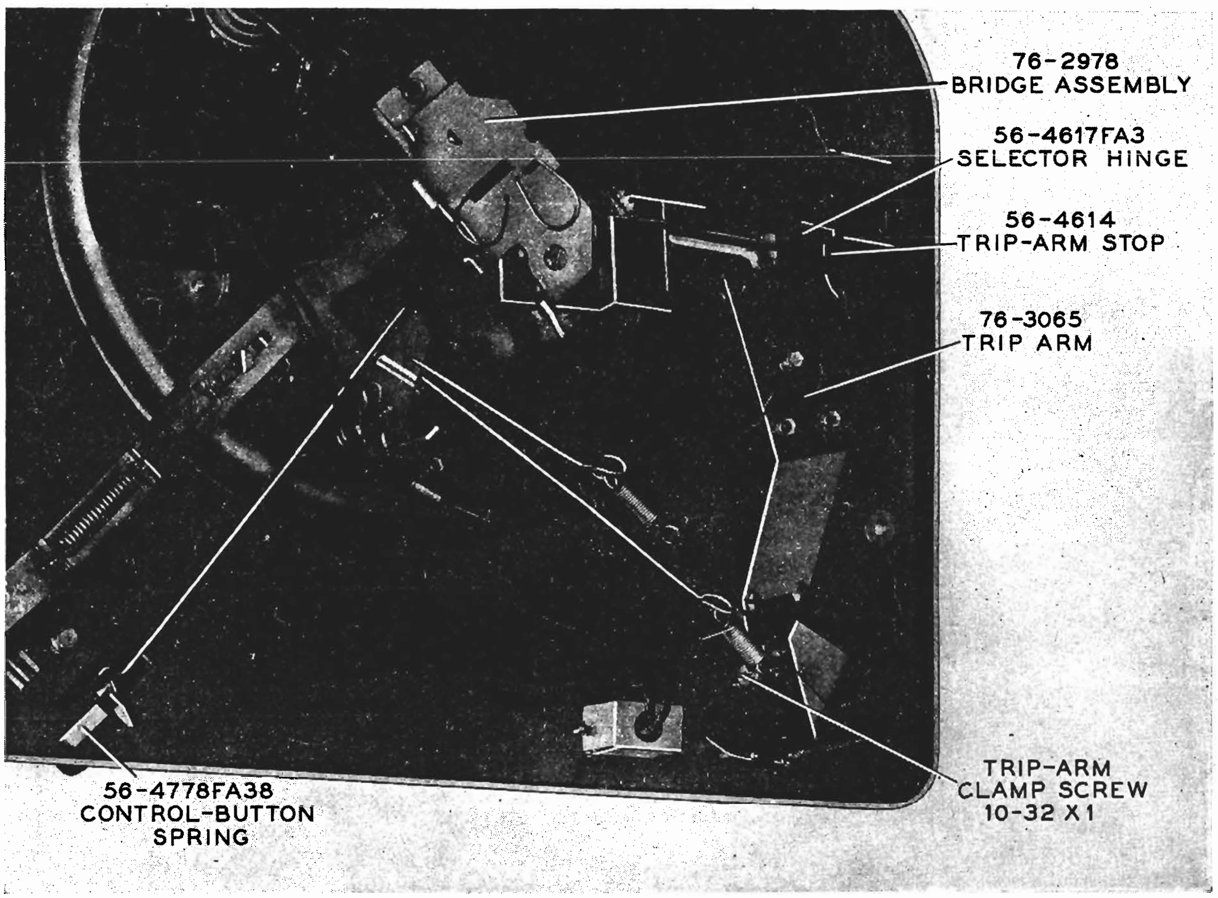
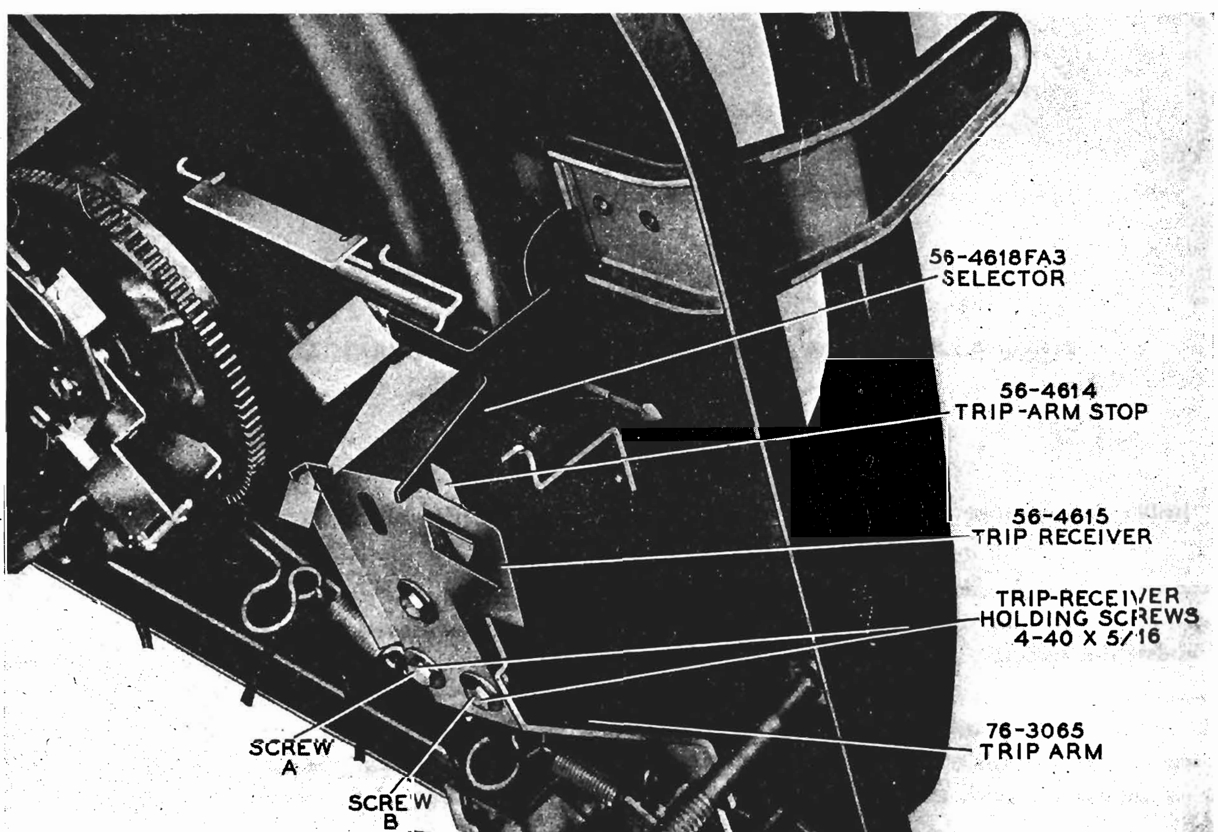


Figure 10—10″ INDEXING ADJUSTMENT TP-4101

Figure 11—12″ INDEXING AND TRIP-RECEIVER ADJUSTMENTS TP-4104



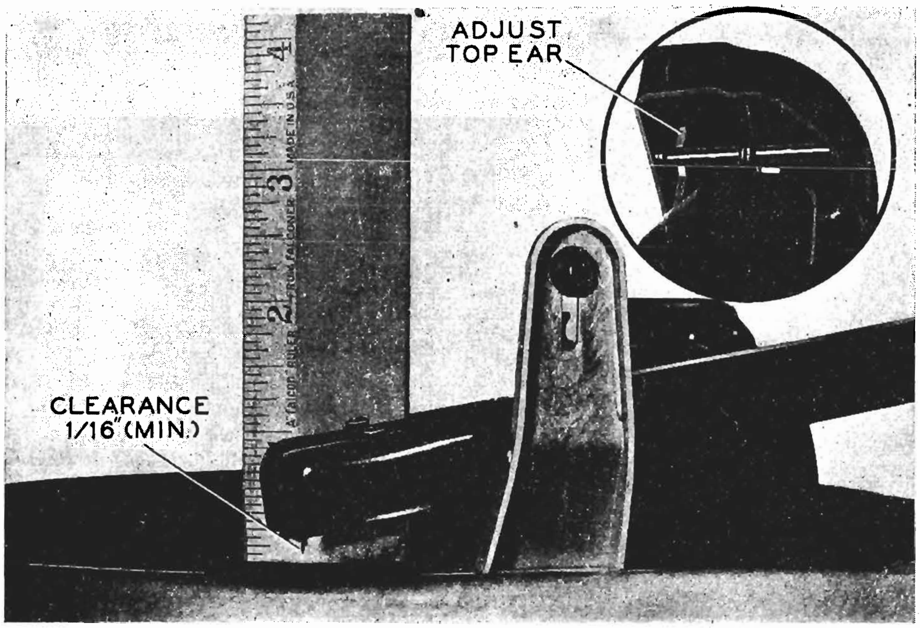


Figure 12—TONE-ARM HEIGHT ADJUSTMENT

Tone-Arm Height and Lift Adjustments

With the changer out of cycle (change cycle completed; tone arm lowered), and the tone arm off the rest post, the needle point should clear the changer base plate by at least 1/16", and should not be higher than the turntable top. See figure 12. To adjust the height, shape the *top* ear of the tone-arm swivel, shown in figure 12 (bending the ear downward raises the tone arm).

To adjust the lift, take the tone arm off the rest post, push the control button to REJ., and rotate the turntable (approximately 1½ turns) by hand until the tone arm comes against the rest post. See figure 13; the lower edge of the tone arm should clear the top of the protruding hook on the rest post by not less than ⅛", and not more than ¼". Adjust by shaping the *lower* ear of the tone-arm swivel (bending the ear downward raises the tone arm).

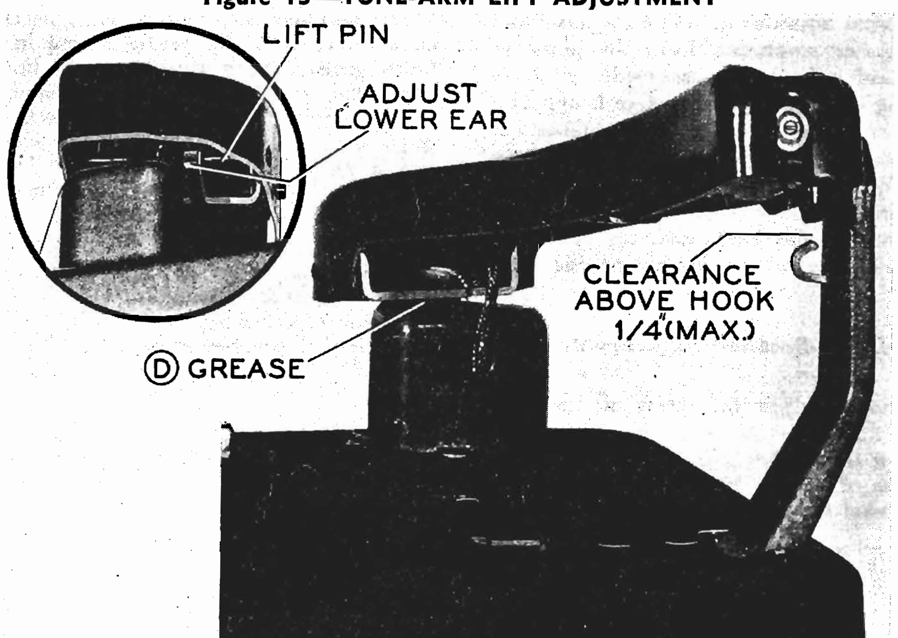
Tone-Arm Vertical and Horizontal Timing Adjustments

NOTE

Before making these adjustments, make the tone-arm height and lift adjustments given above.

For the vertical adjustment, start with the changer out of cycle, push the control button to REJ., and rotate the turntable, by hand, three-quarters of a revolution; this setting can be obtained more accurately by making a mark on the turntable to coincide with some starting point. At the three-quarter-revolution point, the leading edge of the cam surface is approximately ¼" from the end of the lift actuator lever; this is the lower actuator lever, shown in figure 14. Adjust the wire loop of the short link (link, cord, and spring assembly), attached to the tone-arm lift pin, by squeezing or opening the loop until the tone-arm lift pin makes contact with the lower ear of the tone-arm swivel (figure 13).

Figure 13—TONE-ARM LIFT ADJUSTMENT



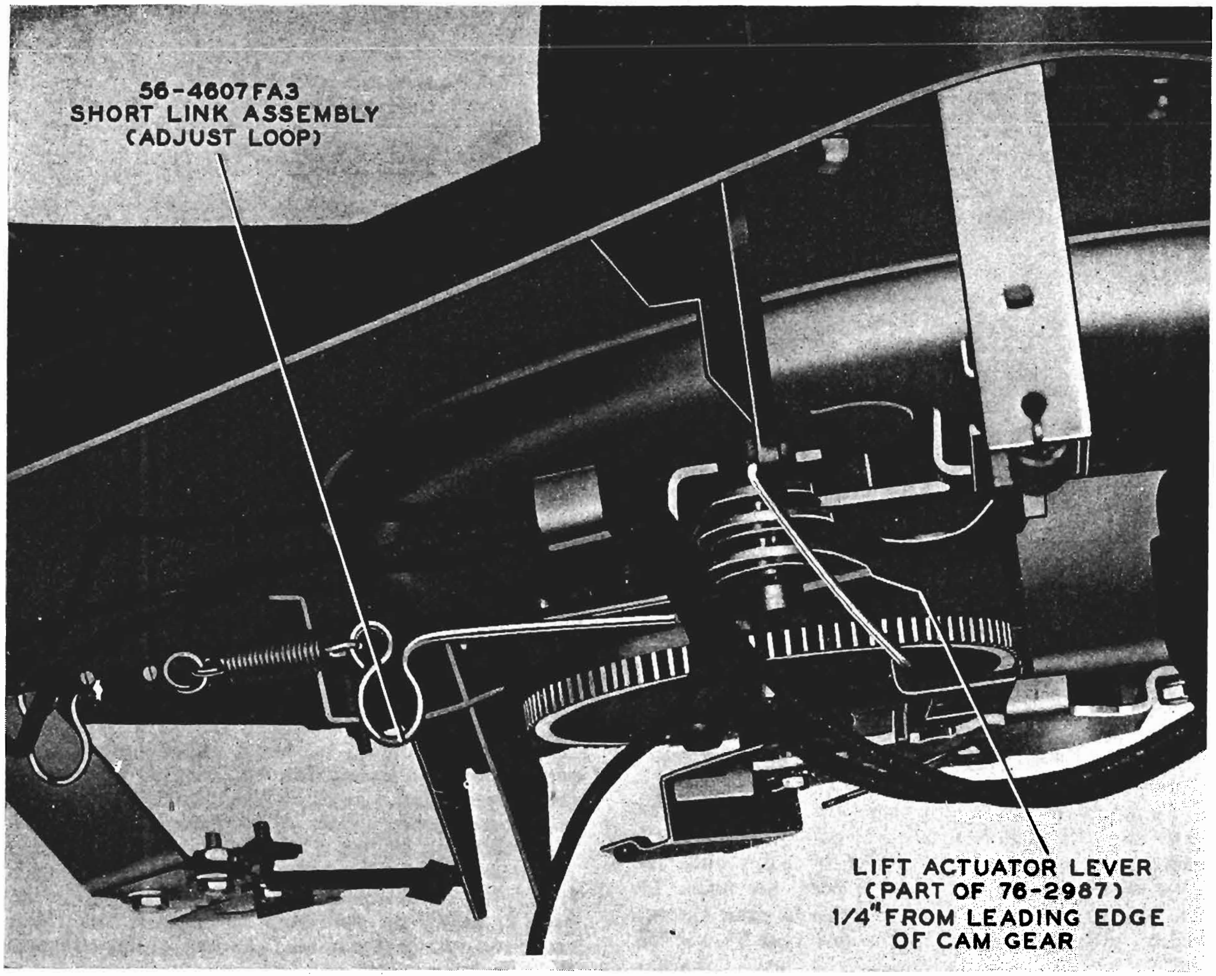


Figure 14—TONE-ARM VERTICAL TIMING ADJUSTMENT TP-4116

For the horizontal adjustment, rotate the turntable another three-quarter revolution from the point at which the vertical adjustment was made. At this point, the leading edge of the cam surface is approximately ¼″ from the end of the horizontal-return actuator lever; this is the upper actuator lever, shown in figure 15. Adjust the wire loop of the long link and spring assembly, attached to the trip arm, by squeezing or opening the loop until the tone arm makes contact with the rubber bumper on the tone-arm rest post.

Trip-Finger and Trip-Receiver Adjustments

For the trip-finger adjustment, move the tone arm toward the spindle. Adjust the screw on the trip-receiver plate (figure 16) so that the trip finger, when riding over the ratchet screw on the trip plate, assumes an angle of 25° to 30° with respect to the screw. Do *not* bend the trip finger to obtain the correct angle.

For the trip-receiver adjustment, place the tone arm on a record with the needle resting in the eccentric finish groove. The vertical center line of the trip finger should coincide with the center line of the ratchet screw. To adjust the centering of the trip finger over the ratchet screw, loosen screw B slightly, and screw A completely (see figure 11). Rotate the trip receiver about screw B, as a center, to obtain the correct adjustment (see figure 16). Tighten the screws.

Approximately ⅛″ of the trip-arm stop should engage the selector (see figure 11). To adjust the engagement of the trip-arm stop, loosen screw A slightly, and screw B completely (see figure 11). Rotate the trip receiver about screw A, as a center, to obtain the correct adjustment. Tighten the screws.

The above adjustments will affect each other slightly; therefore, it may be necessary to repeat each adjustment until both are correct.

After making the above adjustments, it will be necessary to correct the index adjustments.

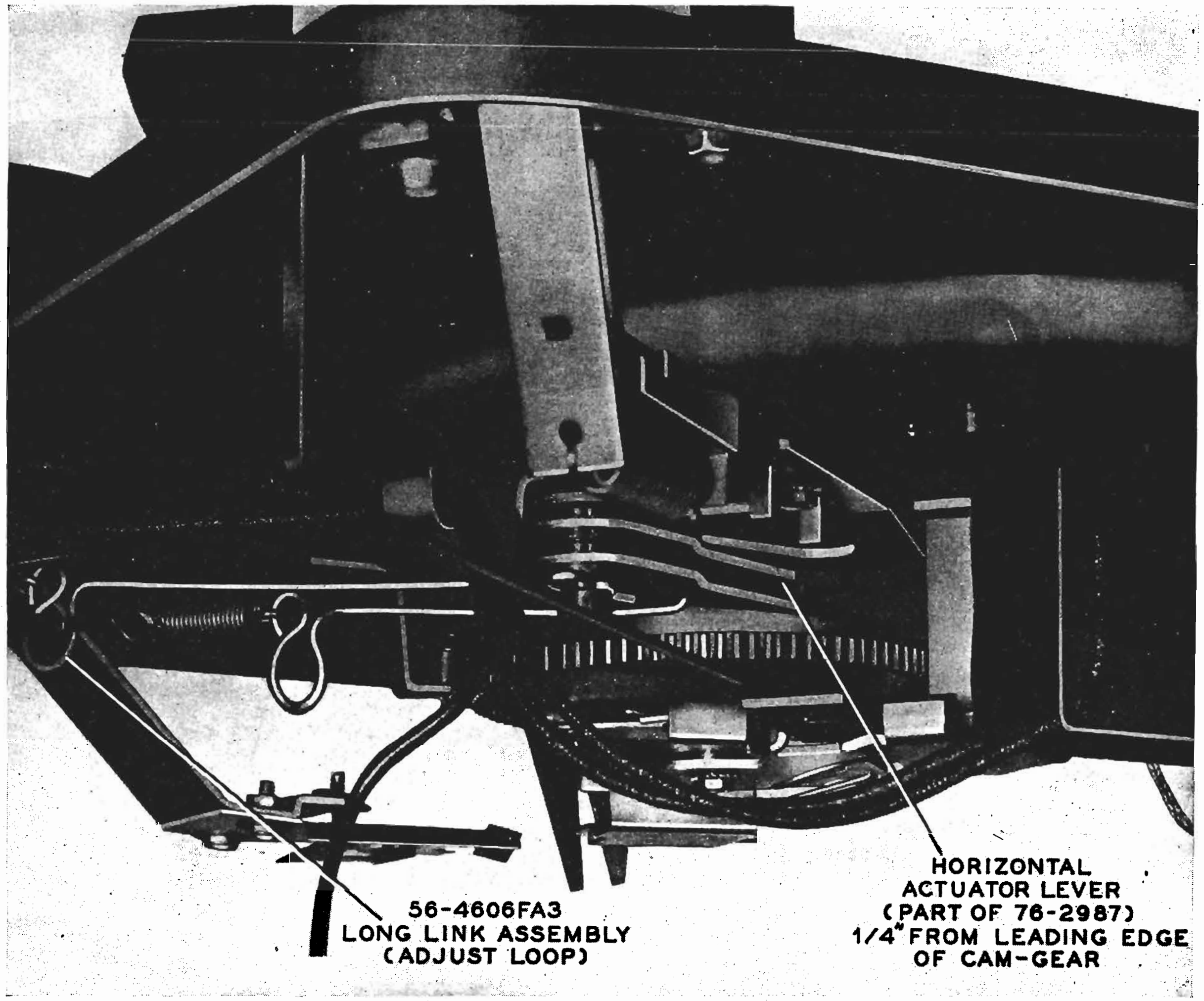


Figure 15—TONE-ARM HORIZONTAL TIMING ADJUSTMENT TP-4129

Record-Shelf Adjustment

Place the shelf in the 10″ position, and the changer out of cycle. Place the Philco record-shelf gauge, 45-1470 (also used for M-4), over the spindle and onto the record shelf, as shown in figure 17. Loosen the two hex-head screws which hold the record-shelf assembly to the changer base plate (figure 18). Move the record-shelf assembly away from the record spindle until the large curved part of the gauge drops even with the record-shelf lips, as shown in figure 17. Now push the record shelf and gauge lightly against the spindle, taking out all play toward the spindle; keep the lips of the record shelf in even contact with the edge of the gauge. Tighten the two hex-head screws.

Push-Off Adjustment

Push the control button to REJ., and rotate the turntable 2½ revolutions, by hand; at this point, the push-off actuator is in its most forward position, in contact with the roller on the cam gear (see figure 19). Loosen the push-off-bar locking screw, shown in figure 18. Squeeze the push-off-bar ears toward each other to the point where the slider blade on the record shelf extends 1/32″ beyond the lips of the shelf. Tighten the hex-head locking screw.

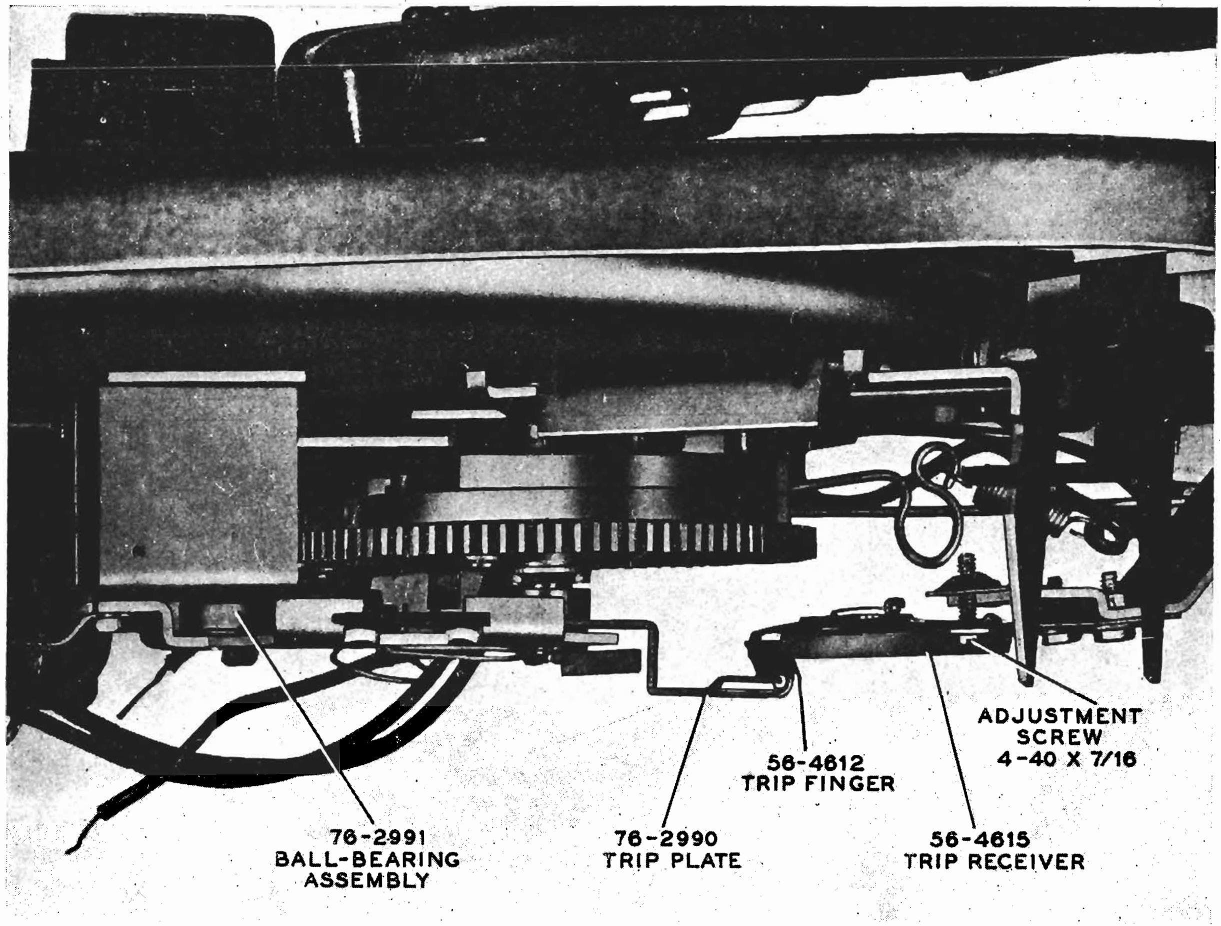
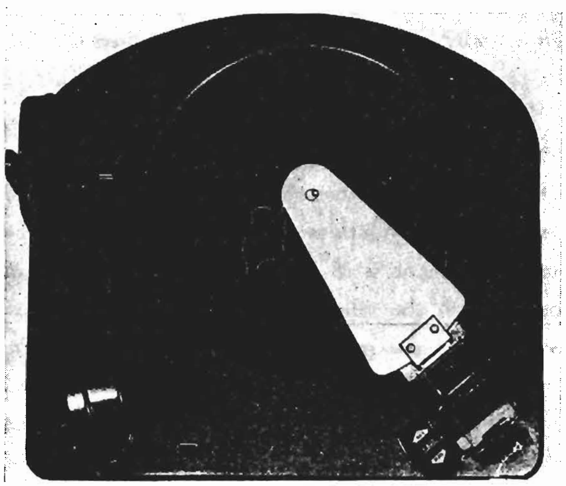


Figure 16—TRIP-FINGER ADJUSTMENT TP-4135

Figure 17—SPECIAL GAUGE, SHOWN IN CORRECT POSITION ON RECORD SHELF AND SPINDLE



TP-4121

Uneven Turntable Speed (Wows)

Uneven turntable speed (wows) may be caused by the following:

Dirt under and around the turntable or idler-wheel assembly. Remove the turntable and clean out the dirt. Be careful to lift the turntable straight up. When replacing the turntable, be sure the idler is behind the turntable rim before the turntable is fully lowered (the spindle may be used to hold the idler back).

Flat or worn spots, or grease, on the rubber tire of the idler wheel.

Defective turntable shaft or bearing assembly.

Replace the defective parts as directed under REPLACEMENT OF PARTS AND ASSEMBLIES.

Lack of lubrication on idler-wheel assembly. Follow the directions under CLEANING AND LUBRICATION

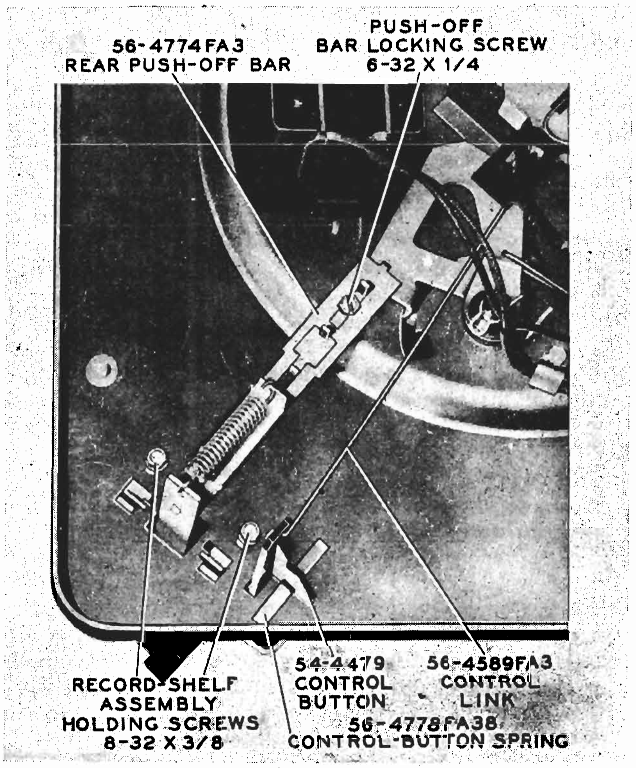
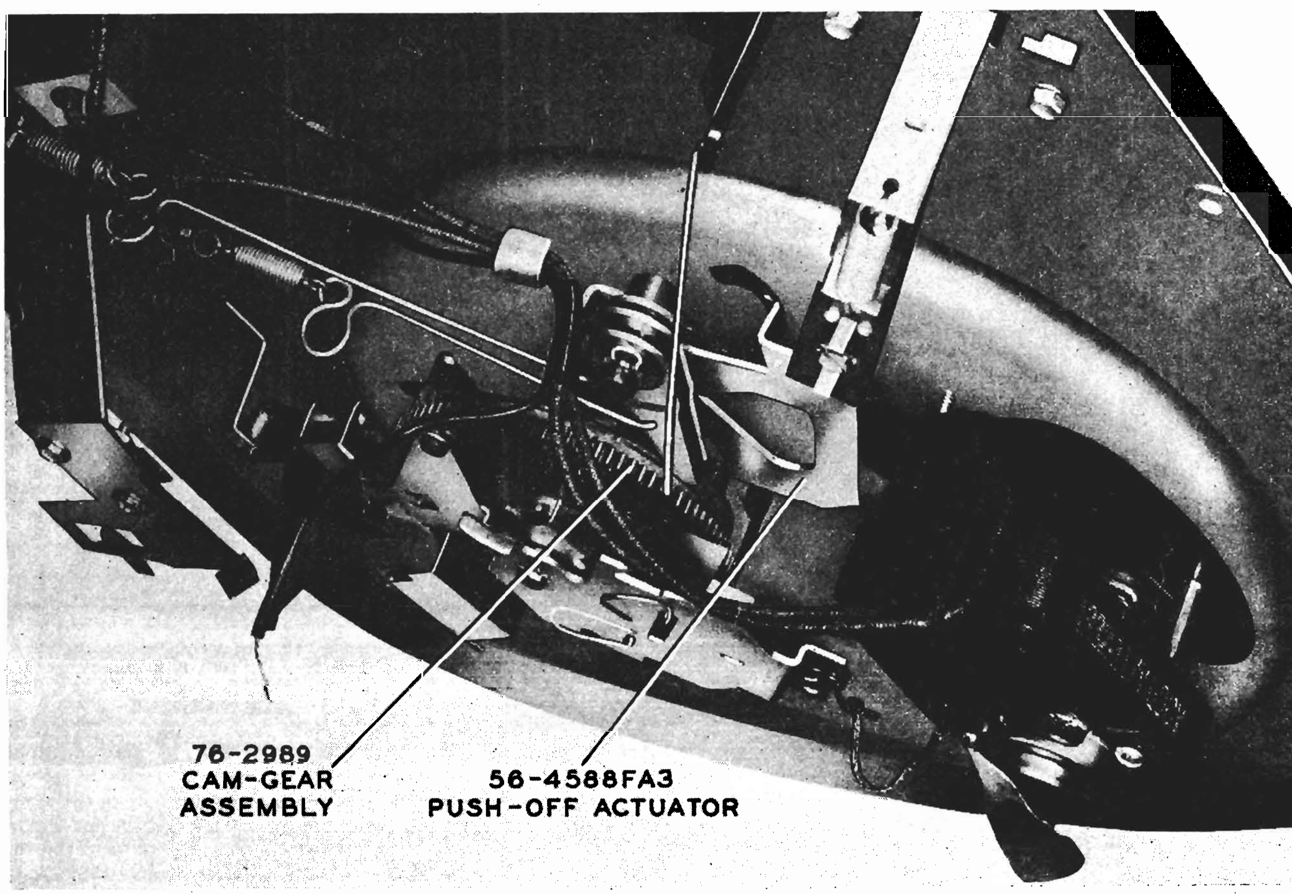


Figure 18—PUSH-OFF-LEVER ADJUSTMENT

Figure 19—PUSH-OFF ACTUATOR AGAINST CAM ROLLER

TP-4134



REPLACEMENT OF PARTS AND ASSEMBLIES

The following procedures are recommended for correct replacement of parts and assemblies. The part should be replaced by reversing the order of removal, and adjusted according to the directions given in the ADJUSTMENTS section of this manual.

When any part is to be removed, the control button should be in the AUT. (automatic) position, and the changer should be out of cycle.

1. Needle

There are two types of needle chucks, depending upon the type of pickup cartridge in the tone arm. One type of chuck has a setscrew, for vertical needle insertion; the other has a knurled nut, for horizontal needle insertion.

To remove needle from tone arm, loosen setscrew or knurled nut in front of crystal cartridge, and pull needle out.

2. Crystal-Pickup Cartridge

At the present time, the pickup cartridge may be either of two types, one identified by vertical needle insertion, and the other by horizontal needle insertion. The cartridge type may be identified by the part number stamped on the bottom of the cartridge. Since the loading circuit in the radio differs for each type of pickup, the two cartridges are not interchangeable.

a. Bring tone arm toward center of turntable.

b. Remove the two screws, nuts, lock washers, and spacers which hold cartridge to tone arm.

c. Drop cartridge below tone arm sufficiently to allow removal of the two clips from cartridge, as shown in figure 20. If pickup leads are shielded, unsolder shield.

NOTE

When mounting cartridge, be sure to insert long spacer in side toward spindle. For cartridge 35-2643, use mounting spacers 56-4601 and 56-4601-1; for cartridge 35-2671-1, use mounting spacers 56-4601-2 and 56-4601-3.

3. Motor

a. Push control button to MAN. position.

b. Remove spindle. Remove turntable by pulling straight out.

c. Remove switch cover, and unsolder motor lead from switch contact.

d. Loosen screw of clamp which holds wire against base plate, and pull wire through clamp.

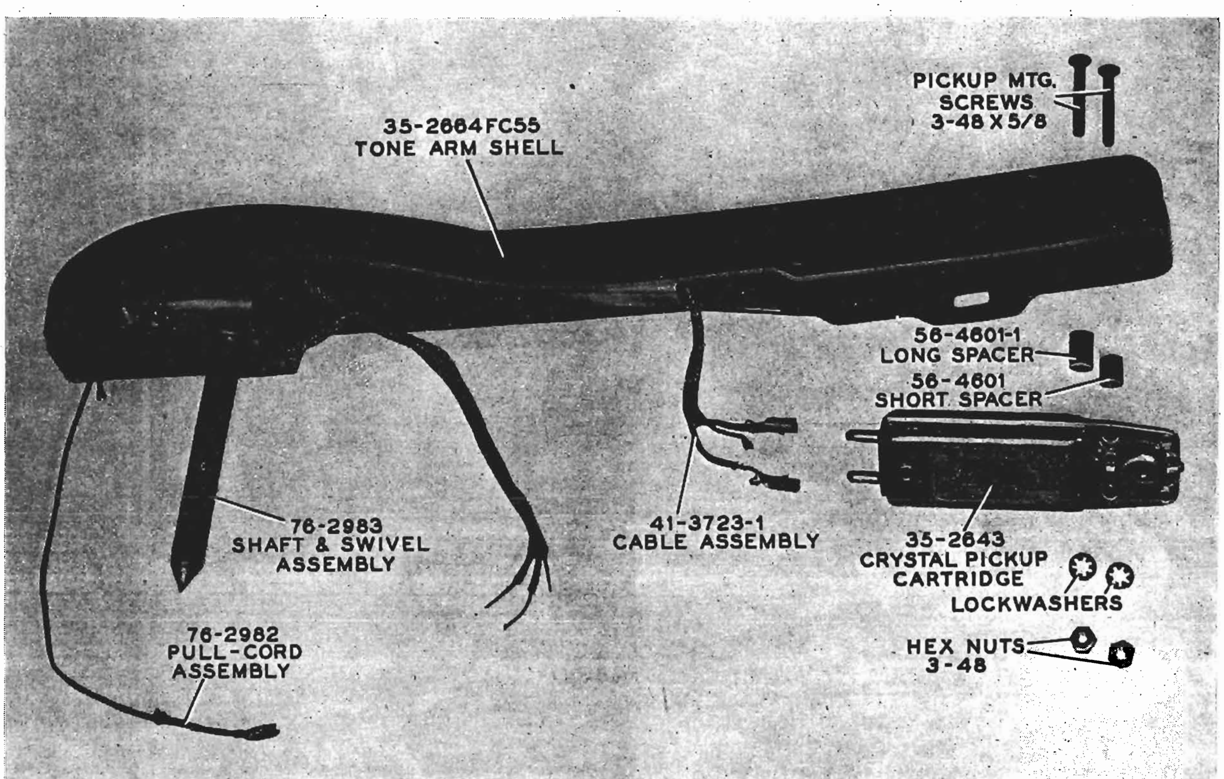
e. Unsolder second motor lead from power plug or disconnect at splice from chassis power lead, whichever is used.

f. Remove ground lead from lug on motor.

g. Remove the three screws, washers, and bushings from motor frame (figure 21), and lift motor out.

Figure 20—TONE ARM (35-2663), CRYSTAL CARTRIDGE (35-2643) REMOVED

TP-4130



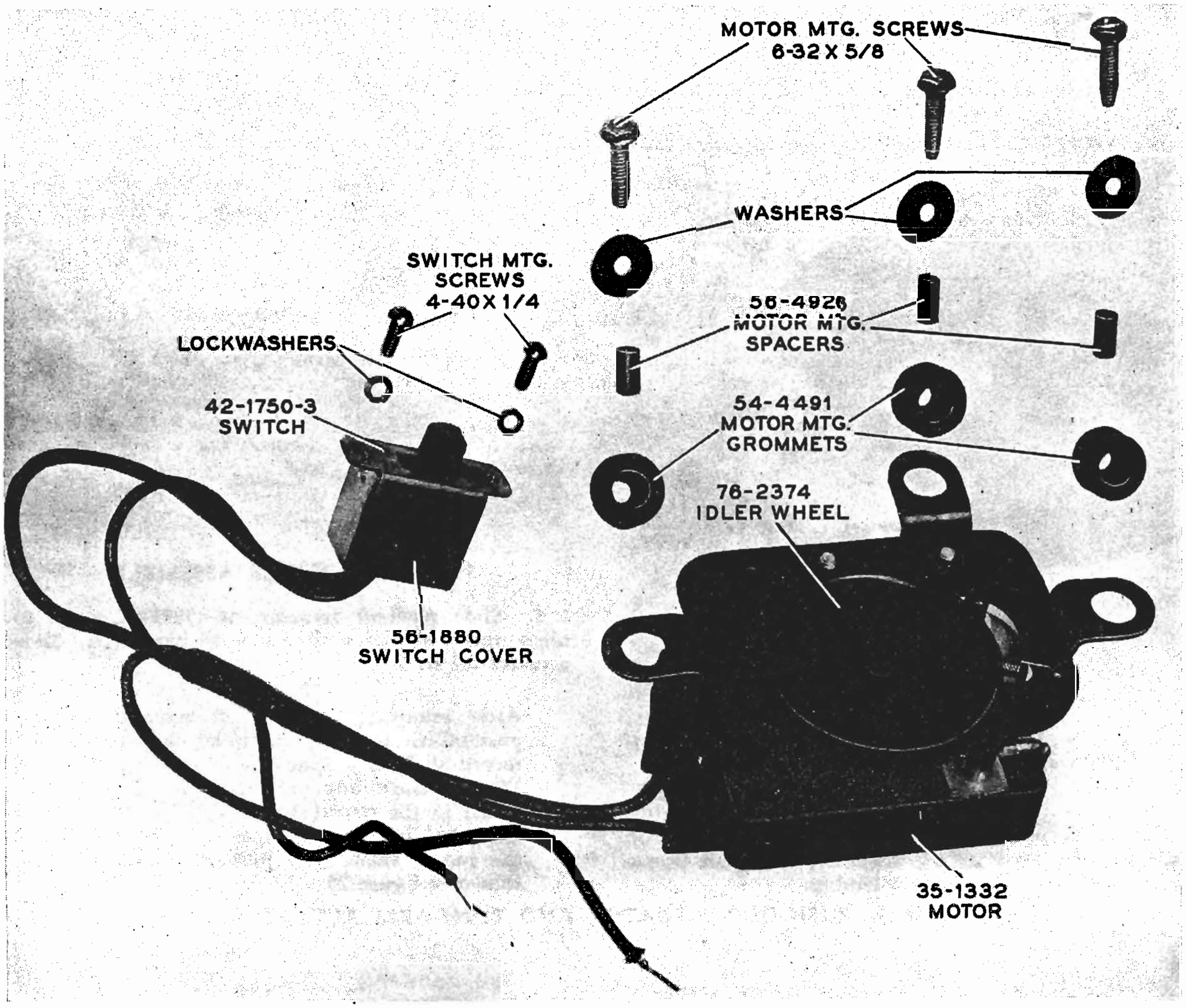


Figure 21—MOTOR, SWITCH, AND MOUNTING HARDWARE TP-4133

4. Tone-Arm Assembly

a. Unsolder tone-arm lead wires from terminal panel on underside of changer base plate.

b. Remove pull cord from spring and short link, 56-4607FA3.

c. Loosen clamp screw which holds trip arm to tone-arm shaft, 76-2983 (figure 22). Lift out tone arm and shaft.

5. Bridge Assembly

a. Remove the two hex-head screws from bridge plate.

b. Remove link rod, 56-4589FA3, from slider control bar. Complete assembly of bridge is shown in figure 23.

6. Trip Plate

a. Remove bridge assembly, 76-2978, as directed in paragraph 5.

b. Slide trip plate, 76-2990, off cam-gear spindle.

7. Cam-Gear Assembly

a. Remove bridge assembly and trip plate, as directed in paragraphs 5 and 6.

b. Remove ball-bearing assembly, 76-2991 (figure 16), by pulling it off.

c. Remove large hairpin, 1W42706FA1, from cam-gear spindle, and slide washer off.

d. Slide cam gear off spindle. Figure 24 shows cam-gear assembly.

8. Tone-Arm Actuator Levers

a. Remove large hairpin, 1W42706FA1, from actuator stud.

b. Slide lower actuator lever from stud, and remove short link, 56-4607FA3.

c. Remove upper actuator lever from stud, and disengage long link, 56-4606FA3. Figure 24 shows actuator-lever assembly.

9. Push-Off Actuator

a. Remove two motor-mounting screws, and loosen the third one; swing motor to one side.

b. Remove tone-arm actuator levers, 76-2987, as directed in paragraph 8.

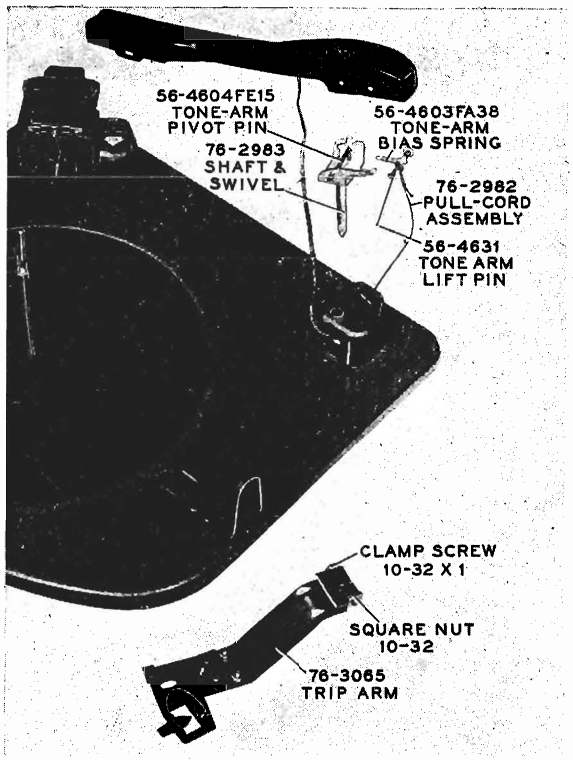


Figure 22—TONE ARM AND TRIP ARM, REMOVED

c. Press push-off rod, 56-4595FA3, and push-off hanger bar, 56-4596FA3, together, and pull downward, releasing the entire assembly.

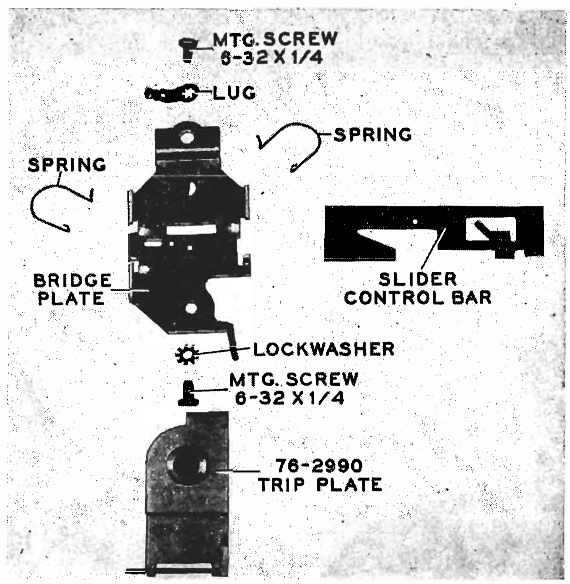


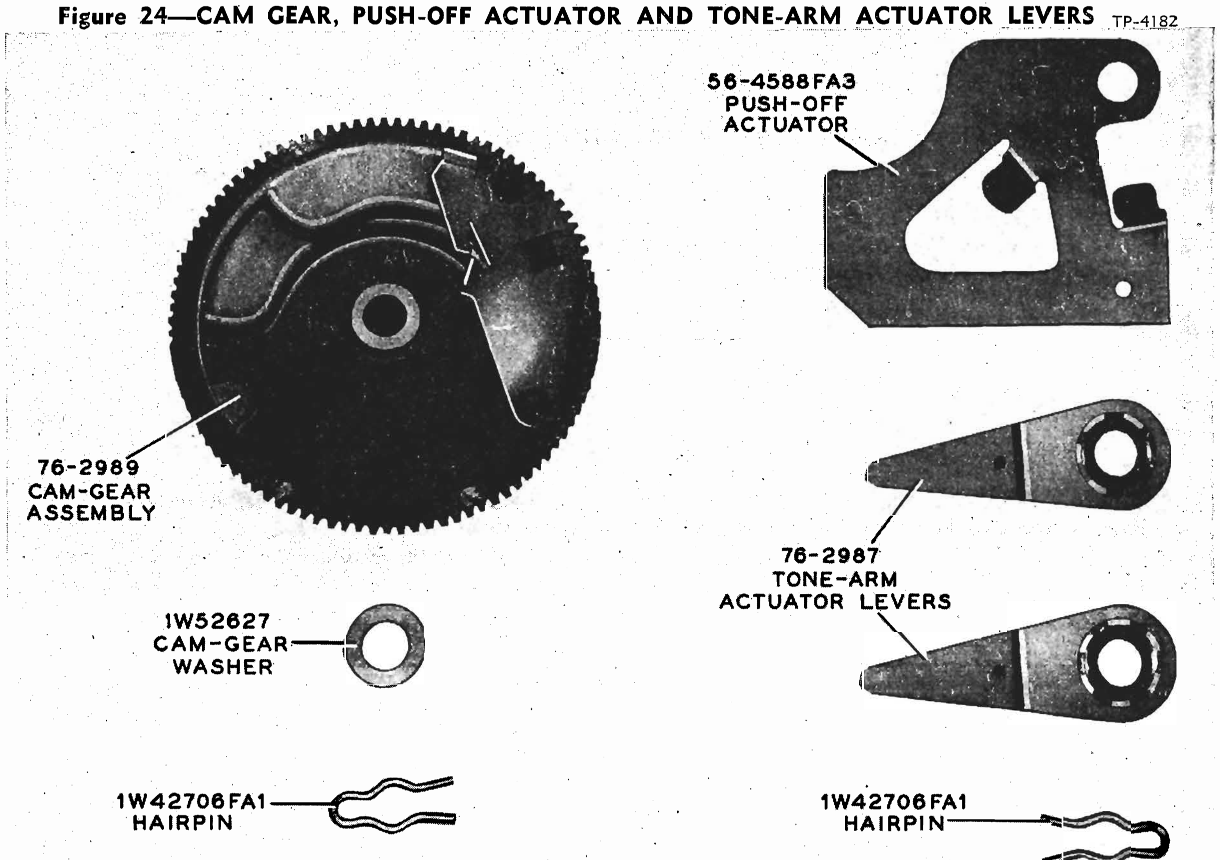
Figure 23—BRIDGE ASSEMBLY TP-4180

d. Slide push-off actuator, 56-4588FA3, over, to align upturned ears with cutout in base plate. Slide actuator off stud.

NOTE

After removing the push-off actuator and push-off-bar assembly, the slider blade on the record shelf may slide out of the assembly. When reassembling, this blade should be inserted in the record-shelf assembly with the elongated hole toward the 12″ position of the record shelf. The push-off assembly is shown in figure 25.

Figure 24—CAM GEAR, PUSH-OFF ACTUATOR AND TONE-ARM ACTUATOR LEVERS TP-4182



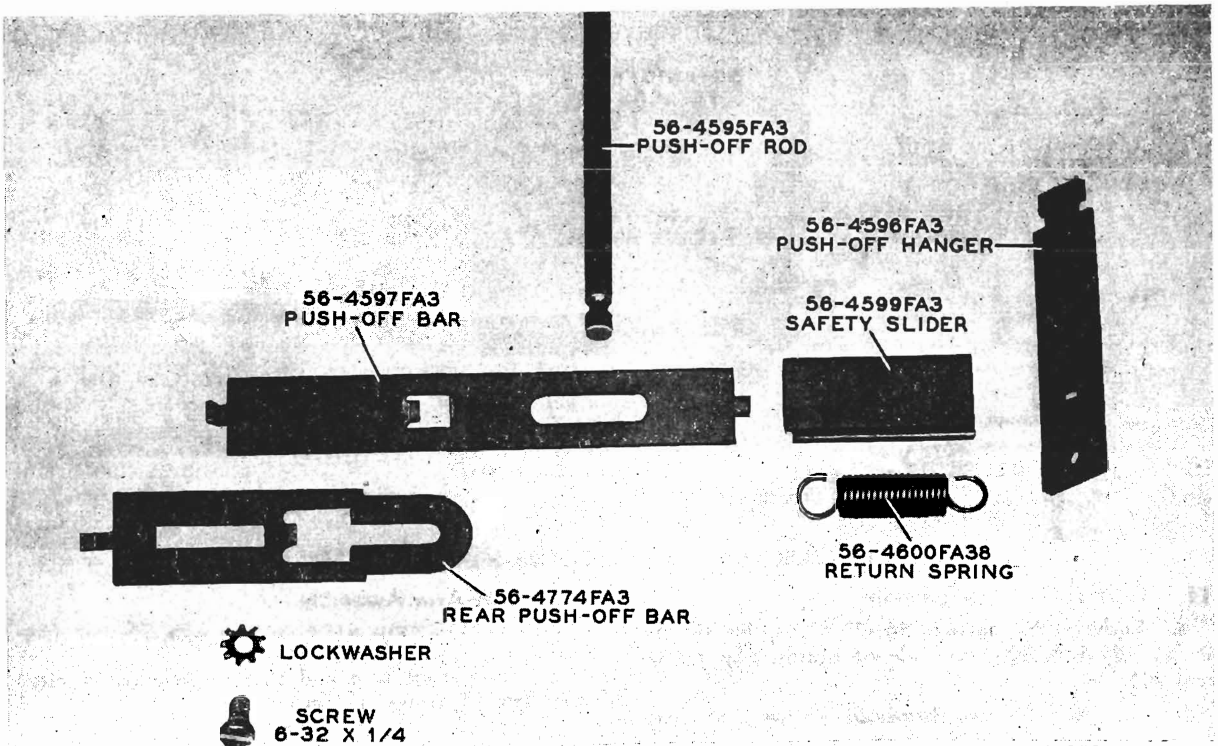


Figure 25—PUSH-OFF ASSEMBLY TP-4183

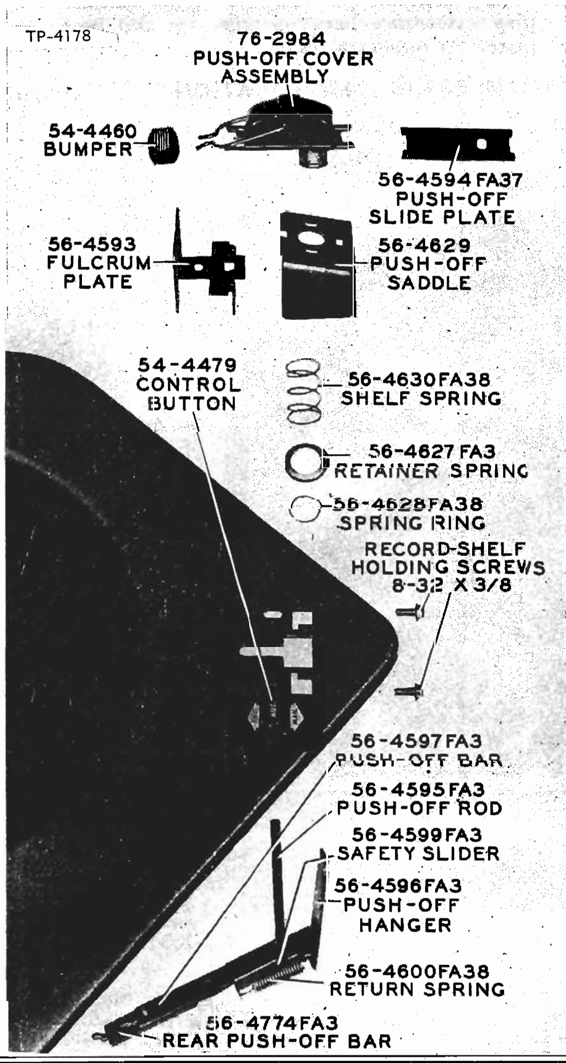


Figure 26—RECORD-SHELF AND PUSH-OFF ASSEMBLIES. REMOVED

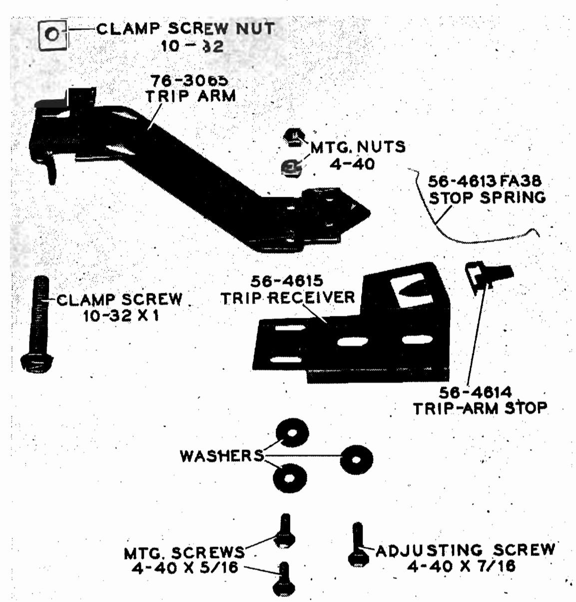
10. Record-Shelf Assembly

a. Remove push-off actuator assembly as directed in paragraph 9.

b. Remove the two hex-head screws which hold record-shelf assembly to base plate (figure 18).

c. Align ears on record-shelf assembly with cut-out on base plate. Lift out record-shelf assembly. Record-shelf assembly is shown in figure 26.

Figure 27—TRIP-ARM AND TRIP-RECEIVER ASSEMBLIES TP-4227



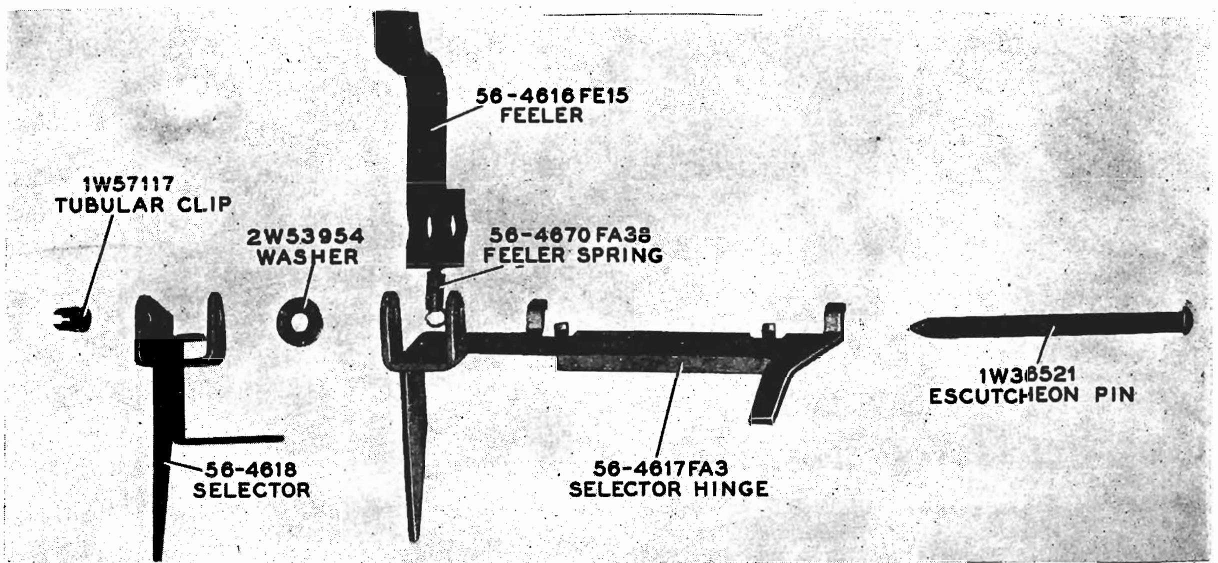


Figure 28—SELECTOR AND SELECTOR-HINGE ASSEMBLY TP-4123

11. Control-Button Assembly

a. Remove flat spring, 56-4778FA38, by sliding it laterally through underside of button (figures 10 and 18).

b. Remove the two hex-head screws and drop bridge assembly, 76-2978 (shown in figure 10).

c. Disengage control link, 56-4589FA3, from underside of control button. Lift out control button.

12. Trip-Arm Assembly

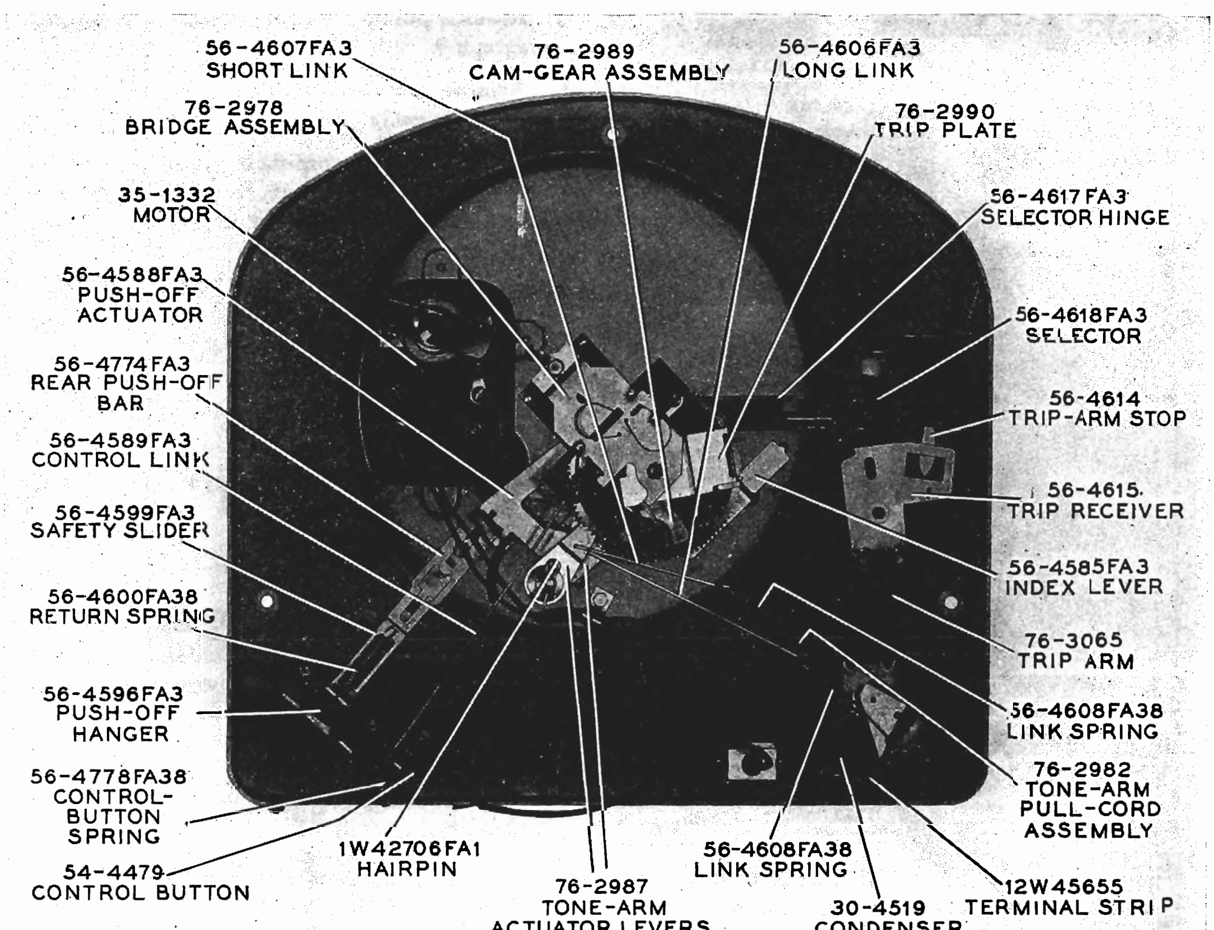
a. Loosen clamp screw on trip arm, 76-3065 (figure 27).

b. Raise tone arm and shaft sufficiently to clear trip arm. Remove trip arm.

NOTE

When assembling, maintain 1/32″ vertical play (clearance between trip arm and base plate) in tone-arm shaft.

Figure 29—BOTTOM VIEW OF CHANGER, WITH PARTS IDENTIFICATION TP-4107



13. Trip-Receiver Assembly

Remove the three screws, washers, and nuts from trip arm (figure 27).

Remove trip receiver.

14. Selector Assembly

Remove cam gear as directed in paragraph 7. Remove feeler spring from attachment point on motor board. Tilt selector assembly, and remove from base plate.

NOTE

When assembling selector assembly, be sure to maintain .005″ clearance between selector hinge, 56-4617FA3, and washer, 2W53954. For correct assembly refer to figures 28 and 11.

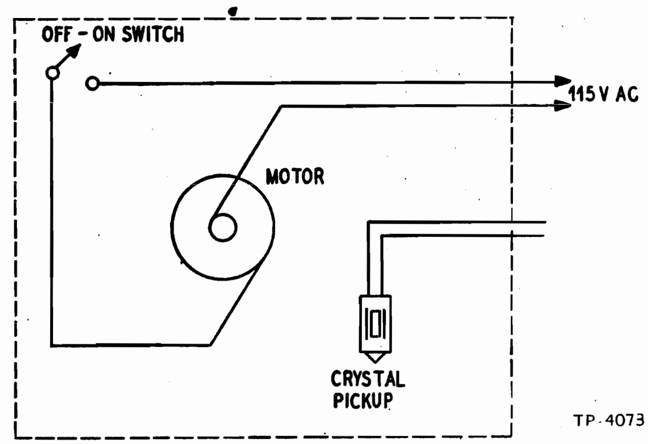


Figure 30—CHANGER WIRING DIAGRAM

REPLACEMENT PARTS LIST

SERVICE PART NO.	DESCRIPTION
35-1332	Motor
35-2643	Crystal - pickup cartridge (vertical needle insertion)
35-2663	Tone-arm assembly (for cartridge 35-2643)
35-2663-2	Tone-arm assembly (for cartridge 35-2671-1)
35-2669	Needle (for pickup cartridge 35-2643)
35-2670	Needle (for pickup cartridge 35-2671-1)
35-2671-1	Crystal - pickup cartridge (horizontal needle insertion)
35-2672	Tone-arm shell
35-3066	Turntable assembly
41-3704	Cable assembly, shielded, tone arm (M-8 console)
42-1750-3	Switch
54-4460	Bumper
54-4479	Button, control
54-4491	Grommet, motor mtg.
56-1880	Cover, switch
56-2027	Plug
56-2071-2	Cover, plug, motor-assembly cable (M-8 console)
56-4585FA3	Lever, index
56-4587FA8	Spindle
56-4588FA3	Actuator, push-off
56-4589FA3	Link, control
56-4593	Plate, fulcrum
56-4594FA37	Plate, push-off slide
56-4595FA3	Rod, push-off
56-4596FA3	Hanger, push-off
56-4597FA3	Bar, push-off
56-4599FA3	Slider, safety
56-4600FA38	Spring, return
56-4601	Spacer, 7/32″ (for cartridge 35-2643)
56-4601-1	Spacer, 9/32″ (for cartridge 35-2643)
56-4601-2	Spacer, 3/8″ (for cartridge 35-2671-1)
56-4601-3	Spacer, 7/16″ (for cartridge 35-2671-1)
56-4603FA38	Spring, tone-arm bias
56-4604FE15	Pin, tone-arm pivot
56-4606FA3	Link, long
56-4607FA3	Link, short
56-4608FA38	Spring, link
56-4612	Finger, trip
56-4613FA38	Spring, stop
56-4614	Stop, trip-arm
56-4615	Trip receiver
56-4616FE15	Feeler
56-4617FA3	Hinge, selector
56-4618FA3	Selector
56-4627FA3	Spring, retainer
56-4628FA38	Spring ring
56-4629	Saddle, push-off
56-4630FA38	Spring, shelf
56-4631	Tone-arm lift pin
56-4670FA38	Spring, feeler
56-4774FA3	Push-off bar, rear
56-4778FA38	Spring, control-button
56-4926	Spacer, motor mtg.
76-1794-1	Plug (M-8 console)
76-2172	Cable, motor assembly
76-2374	Idler wheel (for motor 35-1332)
76-2978	Bridge assembly
76-2982	Pull-cord assembly, tone arm
76-2983	Shaft-and-swivel assembly
76-2984	Push-off cover assembly
76-2987	Levers, tone-arm actuator
76-2988	Base-plate assembly
76-2989	Cam-gear assembly
76-2990	Trip plate
76-2991	Ball-bearing assembly
76-3065	Trip arm
76-3556	Idler wheel (for motor 35-1339)
76-3557	Idler wheel (for motor 35-1341)
1W36521	Escutcheon pin
1W42706FA1	Hairpin
1W52627	Cam-gear washer
1W57117	Clip, tubular
2W53954	Washer, selector
12W45655	Terminal strip

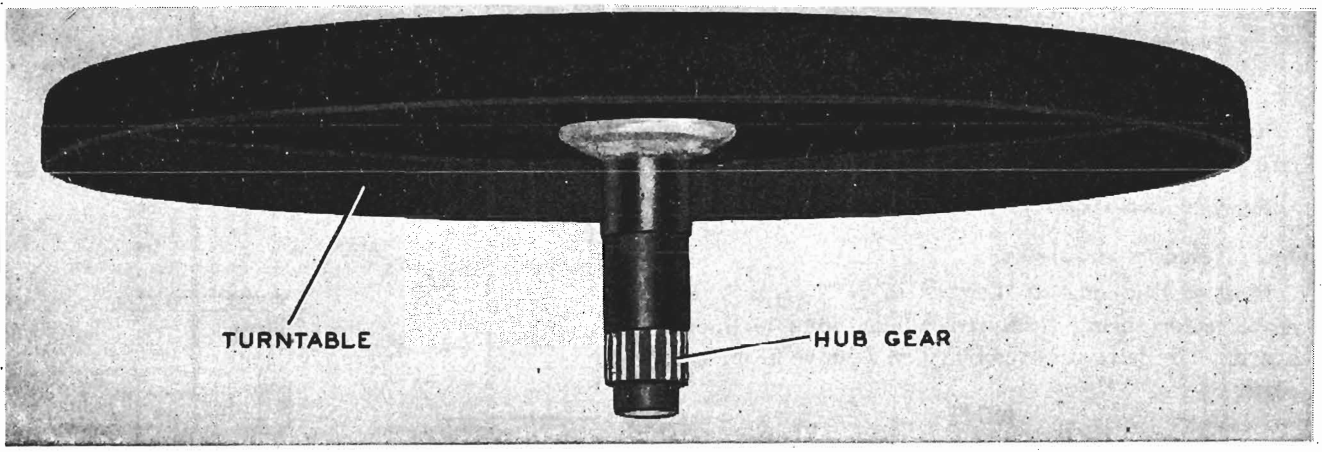
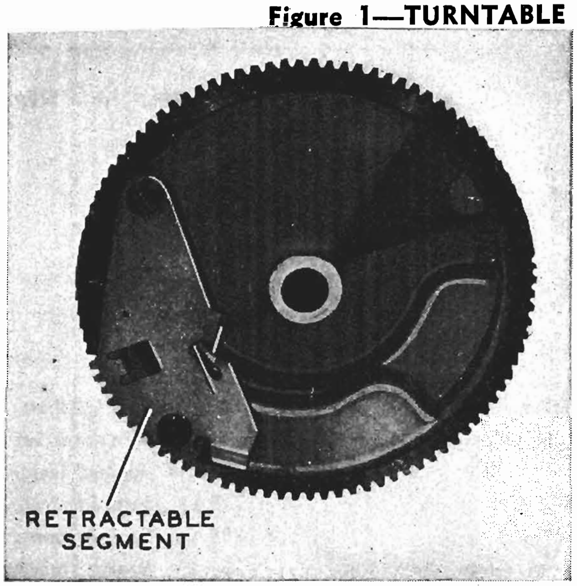
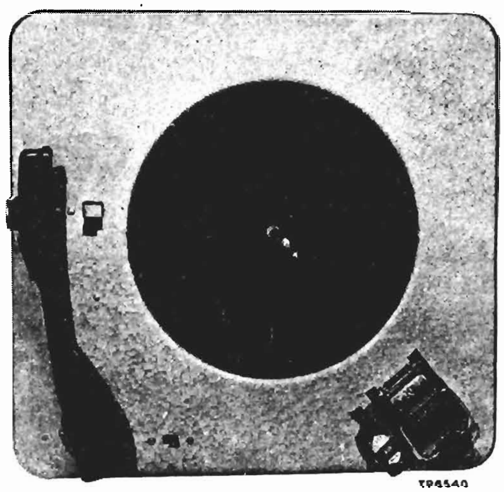


Figure 1—TURNTABLE AND HUB GEAR

TP-4184





TP-4182

Figure 2—CAM GEAR, SHOWING RETRACTABLE SEGMENT

TP-4101A

TP-4181

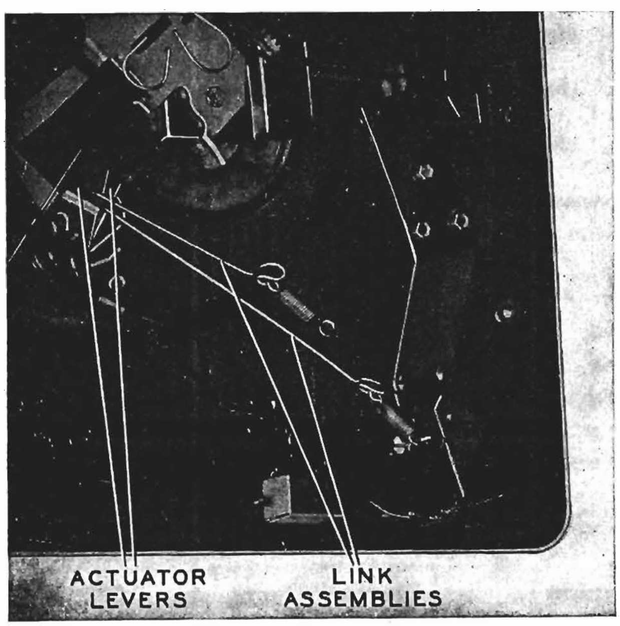


Figure 3—LINK ASSEMBLIES AND ACTUATOR LEVERS

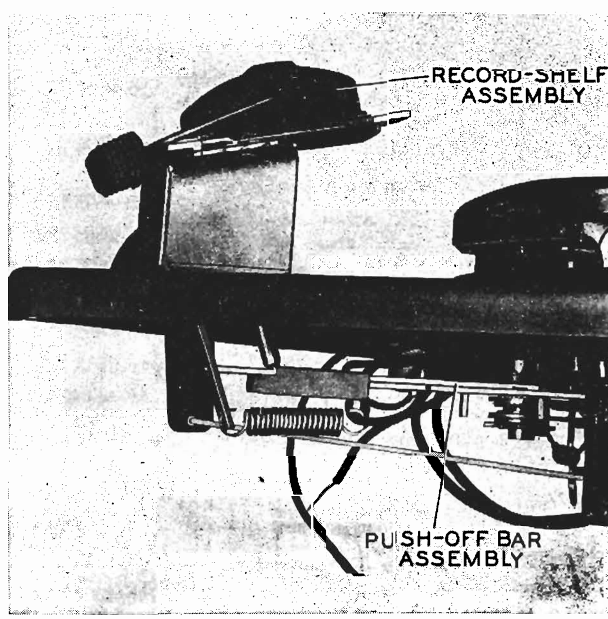


Figure 4—RECORD-SHELF AND PUSH-OFF ASSEMBLIES

DESCRIPTION OF OPERATING CYCLE

Power for the motor is applied through the on-off switch. The turntable is rim-driven by a rubber-tired idler wheel mounted between the motor shaft and the turntable rim.

The turntable hub is a combined shaft and gear (figure 1). This small hub gear engages a large cam gear (figure 2) when the retractable segment of the cam gear is brought into position by the action of the trip mechanism; the cam gear, in turn, operates the changer mechanism.

The tone arm is operated by two link assemblies attached to actuator levers (figure 3) which are in contact with the cam surface of the cam gear.

The record-shelf push-off mechanism is connected, through a series of bars (figure 4), to a push-off actuator; the mechanism is operated when a roller on the cam gear comes in contact with the actuator.

The trip mechanism is operated by a trip finger, riding over a ratchet screw (figure 5), which starts the change cycle when the needle is traveling in the eccentric finish groove of the record. The trip mechanism is locked in a disengaged position when the control button is in the manual position.

PHILCO RADIO-PHONOGRAPH TROUBLE-SHOOTING PROCEDURE

The following tests are given for quickly localizing trouble in either the radio or phonograph section of the radio-phonograph combination. Be sure to make each test, in the order given, before removing either the radio chassis or the record changer from the cabinet. If the trouble is found to be in the audio amplifier, refer to the radio service manual for the particular model under test. If the trouble is in some part of the record changer, refer to this record-changer manual.

Audio-Amplifier Test

The audio amplifier is common to both the radio and the phonograph sections of the combinations using the M-9 changer.

Tune in a station, and note the volume and tone quality. If the performance is abnormal, refer to the radio service manual for the particular model under test, and correct the trouble.

Pickup Test

Play a familiar record on the phonograph, and again note the volume and tone quality.

NOTE

It is advisable to carry a familiar record as a part of the service test equipment.

If distortion is noted when playing the record, first try a new needle. If the distortion continues, a faulty crystal pickup is indicated.

Changer-Mechanism Test

The following series of record-changer operating tests is given for quickly locating any troubles that may be encountered. Each test should be performed with several records before making any adjustments.

Set the record shelf to the 10″ position and place the tone arm on the rest post. Place a 10″ record over the spindle and onto the record shelf.

Push the control button to REJ. (reject), and observe the record-dropping action. The record should fall smoothly, the edge leaving the lips of the record shelf *after* the center has started to fall.

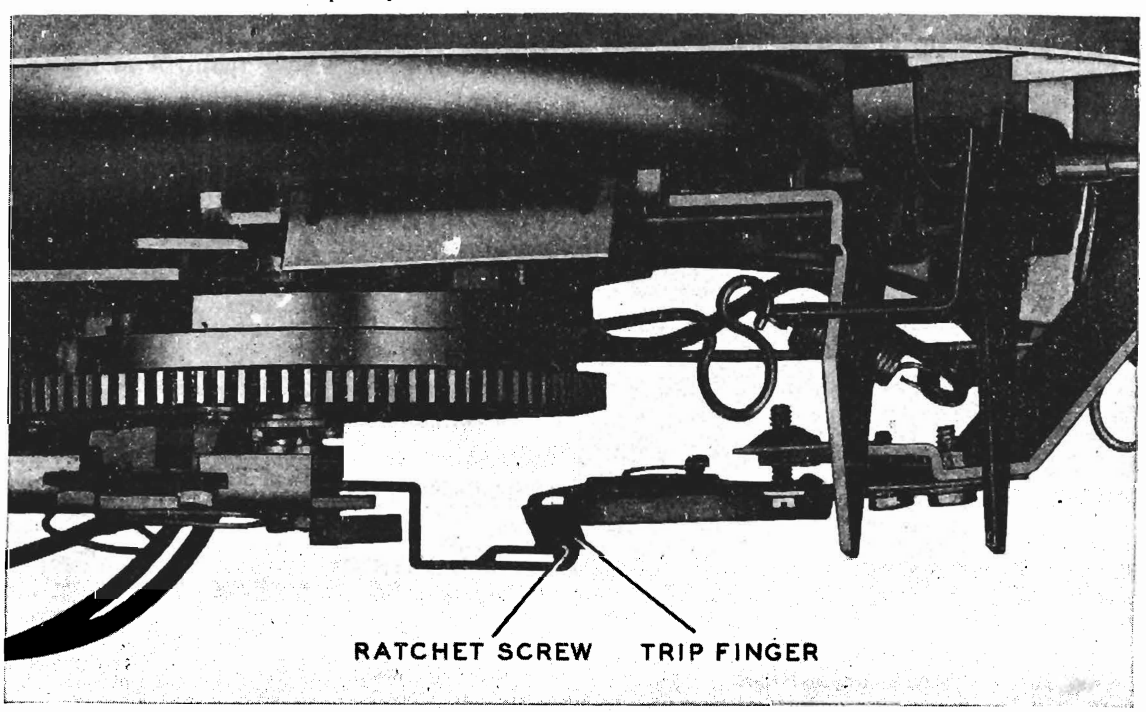


Figure 5—TRIP FINGER AND RATCHET SCREW

TP-4135-1

The tone arm should rise from the rest post, and the needle should come down on the record, starting about 1/8″ from the outer edge.

Play the record through and observe the tripping action; the trip mechanism should operate within the first two or three revolutions after the needle has entered the eccentric finish groove.

Remove the record from the turntable and turn the record shelf to the 12″ position. Place a 12″ record over the spindle and onto the record shelf. Push the control button to REJ., and observe the record-dropping action. The record should leave the lips of the record shelf *after* the center has started to fall. Refer to page 11 for the record-shelf adjustment, if needed. The tone arm should rise from the rest post, and the needle should come down on the record, starting about 1/8″ from the outer edge.

Play the record through and observe the tripping action.

Observe whether the lower edge of the tone arm, during a change cycle, clears the top of the hook on the tone-arm rest post by a minimum of 1/8″. Take the tone arm off the rest post, and place the pickup over the changer base plate; the needle point should clear the base plate by at least 1/16″, and should be no higher than the turntable top.

Turntable and Motor Test

NOTE

Before making this test, warm up the motor by allowing it to run for at least ten minutes.

Set the control button to MAN. (manual), load the turntable with ten 12″ records, and place the tone arm on the top record.

Place a stroboscope disc, such as Philco Part No. 45-2900, on the record, and illuminate the disc with a lamp (preferably a neon bulb) operated on 60-cycle a.c. The dots in the row calibrated for 78 r.p.m. should appear to remain stationary, or drift *very* slowly, but smoothly, backward or forward.

If the turntable speed is steady, but is appreciably below 78 r.p.m., refer to the lubrication data on the turntable upper bearing, motor bearings, and motor idler plate, given under CLEANING AND LUBRICATION, — — — — if the lubrication appears to be adequate, the motor is probably defective.

Unsteady drift of the dots on the stroboscope disc indicates uneven turntable speed, the cause of wows; see UNEVEN TURNTABLE SPEED (WOWS).

CLEANING AND LUBRICATION

The M-9 record changer, like any other mechanism, requires lubrication after long periods of use. Whenever a major part or assembly is to be replaced, the changer should be cleaned and lubricated. Carbon tetrachloride or other similar cleaning fluids may be used to remove old grease, oil, and dirt. Apply lubricants sparingly. All lubrication points are shown in figures 6 and 7. It may be necessary to remove some parts and assemblies in order to lubricate their bearings—for example, the actuator and cam gear must be removed to lubricate the actuator stud and the cam-gear spindle.

PARTS NOT TO BE LUBRICATED

The following parts should not be lubricated at any time: Trip receiver; trip finger; ratchet screw on trip plate; selector.

PARTS TO BE GREASED

The following parts are to be lubricated with a grease having the consistency of vaseline:

Record-Shelf Assembly (point A of figure 7)

Four protruding dimples.

Bridge Assembly and Slider Control Bar (point B of figure 6)

Three dimples and four upturned ears.

Cam Gear (point C of figure 6)

Cam-gear teeth, cam surfaces, and cam-gear spindle.

Main Assembly (points D, figures 6, 7, and 11)

Trip-plate ear where contact is made with gear segment.

Actuator stud.

All parts with ears sliding on changer base plate.

Index-lever surface which slides on base plate.

Push-off-actuator dimples which slide on base plate.

Turntable shaft (upper bearing).

Tone-arm shaft.

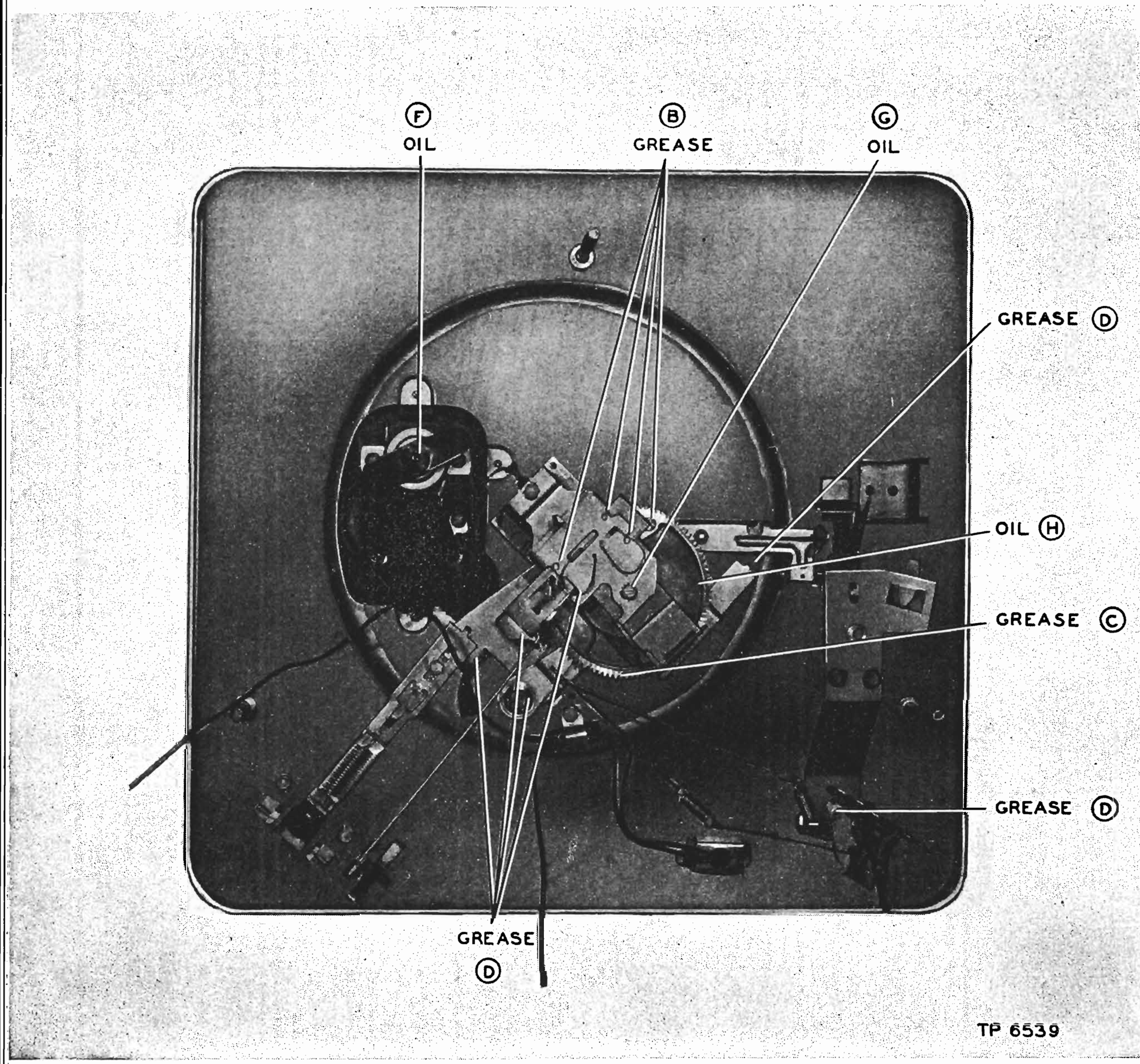


Figure 6—BOTTOM VIEW OF CHANGER, SHOWING LUBRICATION POINTS

PARTS TO BE OILED

The following parts are to be lubricated with S.A.E. 20 oil:

Tone Arm (point E of figure 7)

Tone-arm pivot pin where pin rides in elongated hole of tone arm—apply one drop with a pointed rod.

Motor (points F, figures 6 and 7)

Motor idler plate—one or two drops in each dimple.

Motor bearings.

Trip-Plate Bushings (point G of figure 6)

Cam-Gear Roller (point H of figure 6)

CAUTION

Do not get any oil or grease on the motor shaft or the idler-wheel tire. Should this occur, remove the oil or grease immediately with carbon tetrachloride.

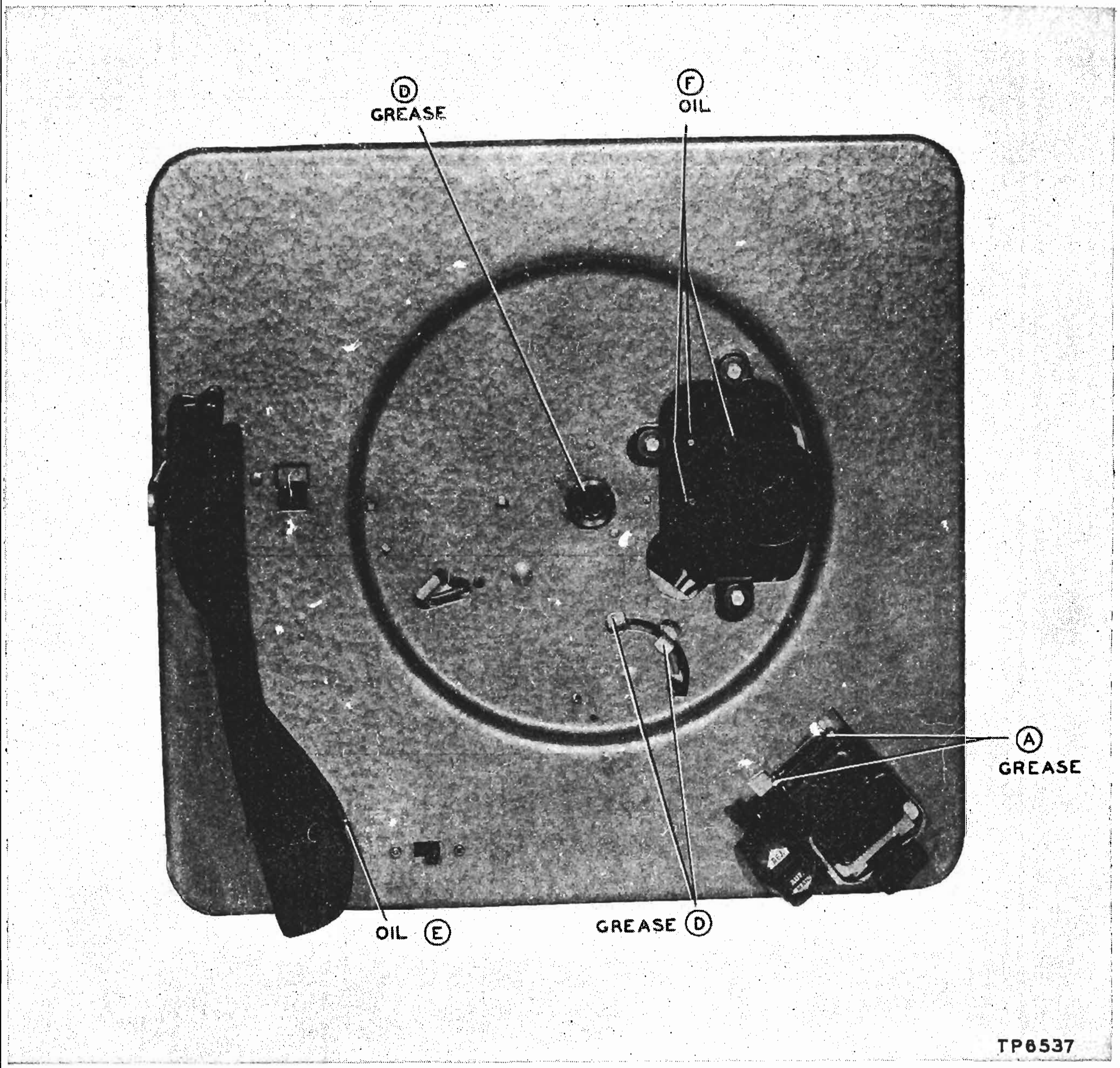


Figure 7—TOP VIEW OF CHANGER, SHOWING LUBRICATION POINTS

ADJUSTMENTS

10″ Index Adjustment

Set a 10″ record on the turntable; push the control button to REJ., and rotate the turntable 4½ turns by hand. The tone arm should then be approximately ½″ above the record.

Loosen the clamp screw on the trip arm (figure 8). Hold the tone arm (steady) ⅛″ in from the edge of the record, and set the trip arm so that the trip-arm stop is in contact with the selector hinge. See figure 8.

Tighten the clamp screw, leaving 1/32″ vertical play, or clearance, between the trip arm and the base plate.

12″ Index Adjustment

Make the 10″ index adjustment first. The 12″ indexing will ordinarily be satisfactory after the 10″ adjustment is made; if not, bend the selector, 56-4618FA3, slightly to the right or left as required for proper indexing of the needle on the record, as shown in figure 9.

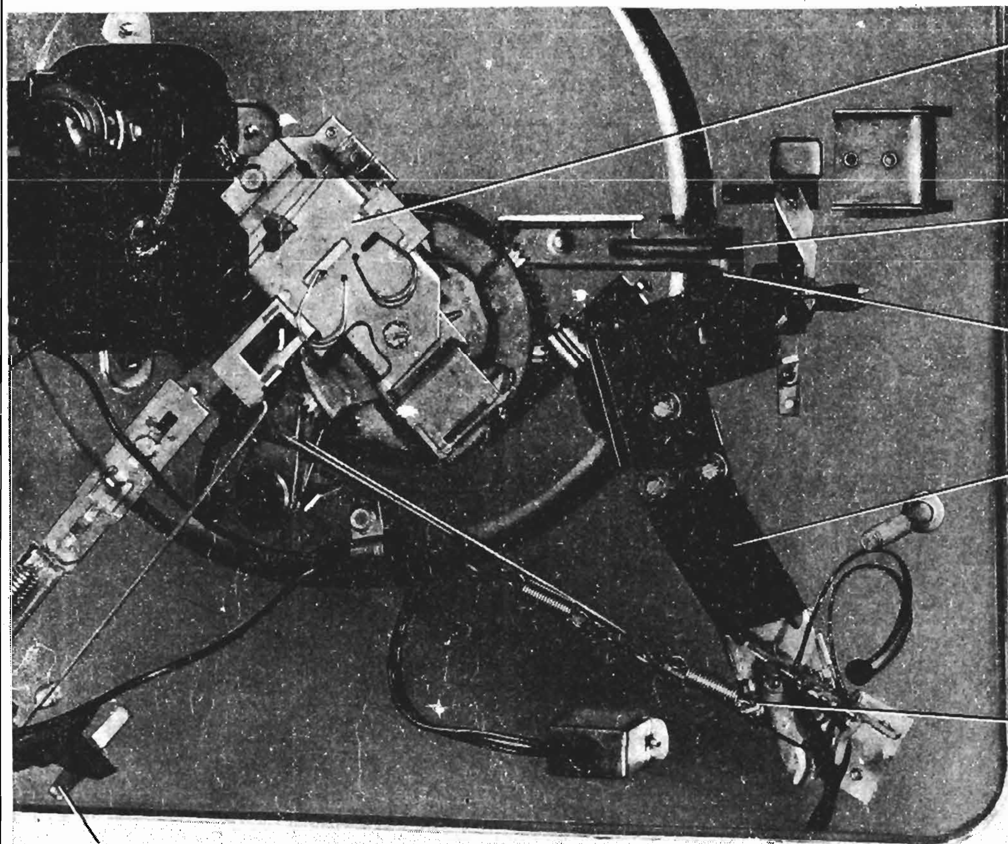


Figure 8—10″ INDEXING ADJUSTMENT TP6534

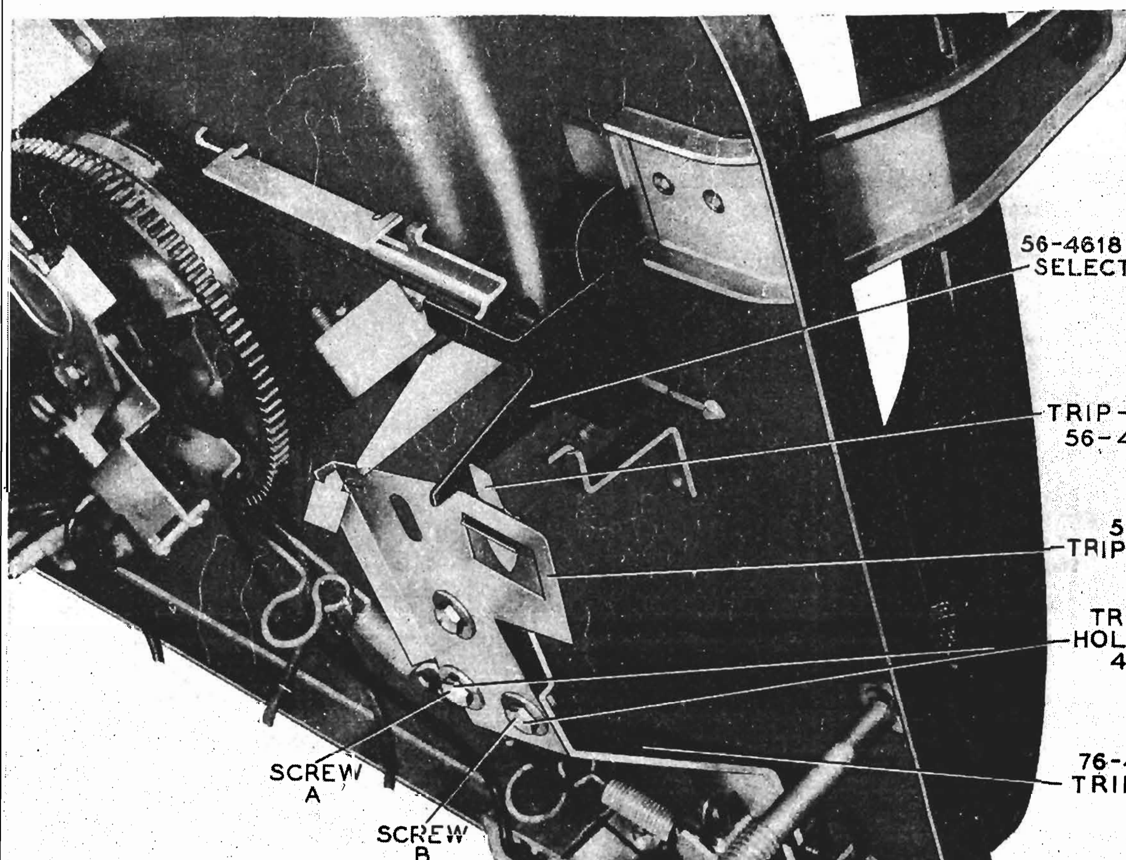


Figure 9—12″ INDEXING AND TRIP-RECEIVER ADJUSTMENTS TP-4104-1

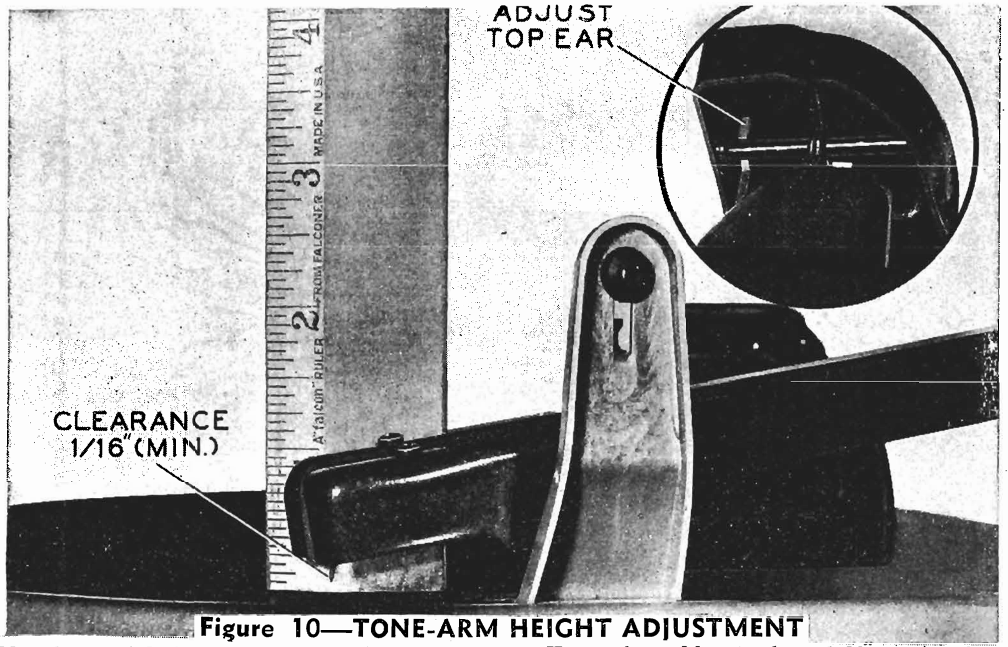


Figure 10—TONE-ARM HEIGHT ADJUSTMENT

TP-4000

Tone-Arm Height and Lift Adjustments

With the changer out of cycle (change cycle completed; tone arm lowered), and the tone arm off the rest post, the needle point should clear the changer base plate by at least 1/16", and should not be higher than the turntable top. See figure 10. To adjust the height, shape the *top* ear of the tone-arm swivel, shown in figure 10 (bending the ear downward raises the tone arm).

To adjust the lift, take the tone arm off the rest post, push the control button to REJ., and rotate the turntable (approximately 1½ turns) by hand until the tone arm comes against the rest post. See figure 11; the lower edge of the tone arm should clear the top of the protruding hook on the rest post by not less than ⅛", and not more than ¼". Adjust by shaping the *lower* ear of the tone-arm swivel (bending the ear downward raises the tone arm).

Tone-Arm Vertical and Horizontal Timing Adjustments

NOTE

Before making these adjustments, make the tone-arm height and lift adjustments given above.

For the vertical adjustment, start with the changer out of cycle, push the control button to REJ., and rotate the turntable, by hand, three-quarters of a revolution; this setting can be obtained more accurately by making a mark on the turntable to coincide with some starting point. At the three-quarter-revolution point, the leading edge of the cam surface is approximately ¼" from the end of the lift actuator lever; this is the lower actuator lever, shown in figure 12. Adjust the wire loop of the short link (link, cord, and spring assembly), attached to the tone-arm lift pin, by squeezing or opening the loop until the tone-arm lift pin makes contact with the lower ear of the tone-arm swivel (figure 11).

TP-4102

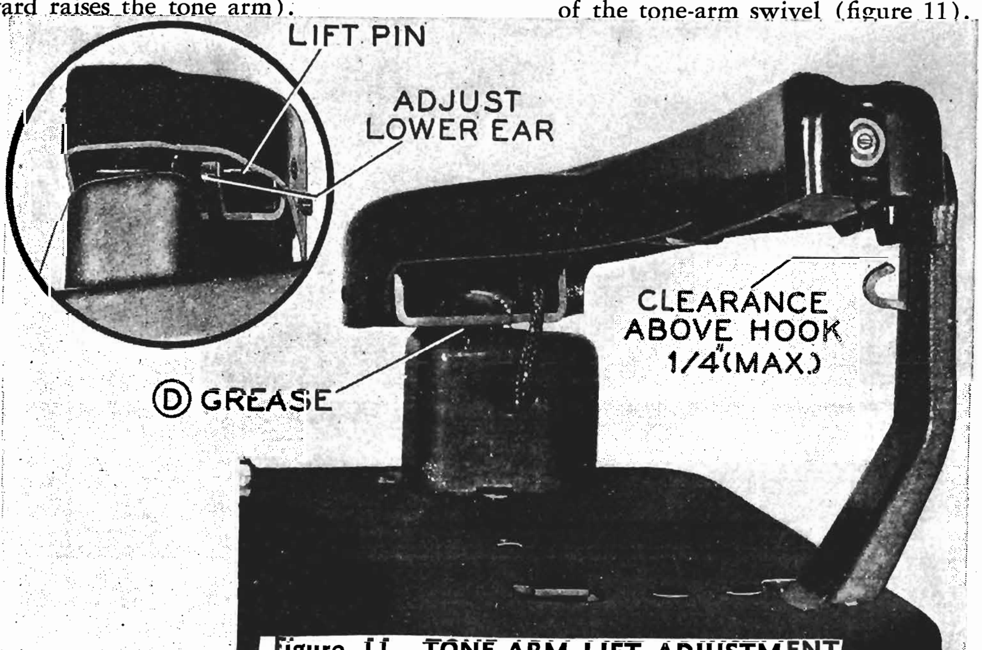


Figure 11—TONE-ARM LIFT ADJUSTMENT

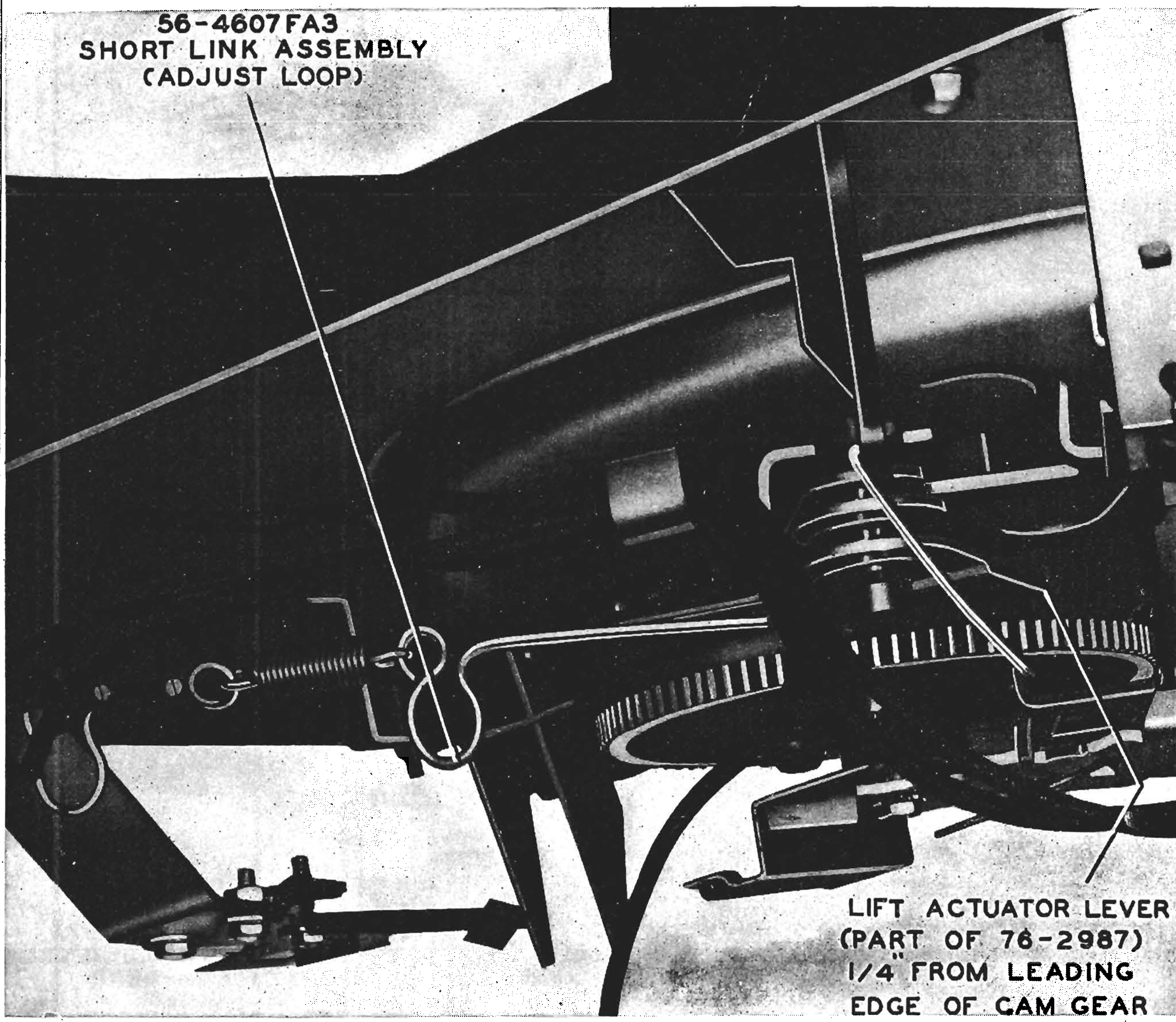


Figure 12—TONE-ARM VERTICAL TIMING ADJUSTMENT TP-4116-1

For the horizontal adjustment, rotate the turntable another three-quarter revolution from the point at which the vertical adjustment was made. At this point, the leading edge of the cam surface is approximately ¼″ from the end of the horizontal-return actuator lever; this is the upper actuator lever, shown in figure 13. Adjust the wire loop of the long link and spring assembly, attached to the trip arm, by squeezing or opening the loop until the tone arm makes contact with the rubber bumper on the tone-arm rest post.

Trip-Finger and Trip-Receiver Adjustments

For the trip-finger adjustment, move the tone arm toward the spindle. Adjust the screw on the trip-receiver plate (figure 14) so that the trip finger, when riding over the ratchet screw on the trip plate, assumes an angle of 25° to 30° with respect to the screw. Do *not* bend the trip finger to obtain the correct angle.

For the trip-receiver adjustment, place the tone arm on a record with the needle resting in the eccentric finish groove. The vertical center line of the trip finger should coincide with the center line of the ratchet screw. To adjust the centering of the trip finger over the ratchet screw, loosen screw B slightly, and screw A completely (see figure 9). Rotate the trip receiver about screw B, as a center, to obtain the correct adjustment (see figure 14). Tighten the screws.

Approximately ⅛″ of the trip-arm stop should engage the selector (see figure 9). To adjust the engagement of the trip-arm stop, loosen screw A slightly, and screw B completely (see figure 9). Rotate the trip receiver about screw A, as a center, to obtain the correct adjustment. Tighten the screws.

The above adjustments will affect each other slightly; therefore, it may be necessary to repeat each adjustment until both are correct.

After making the above adjustments, it will be necessary to correct the index adjustments.

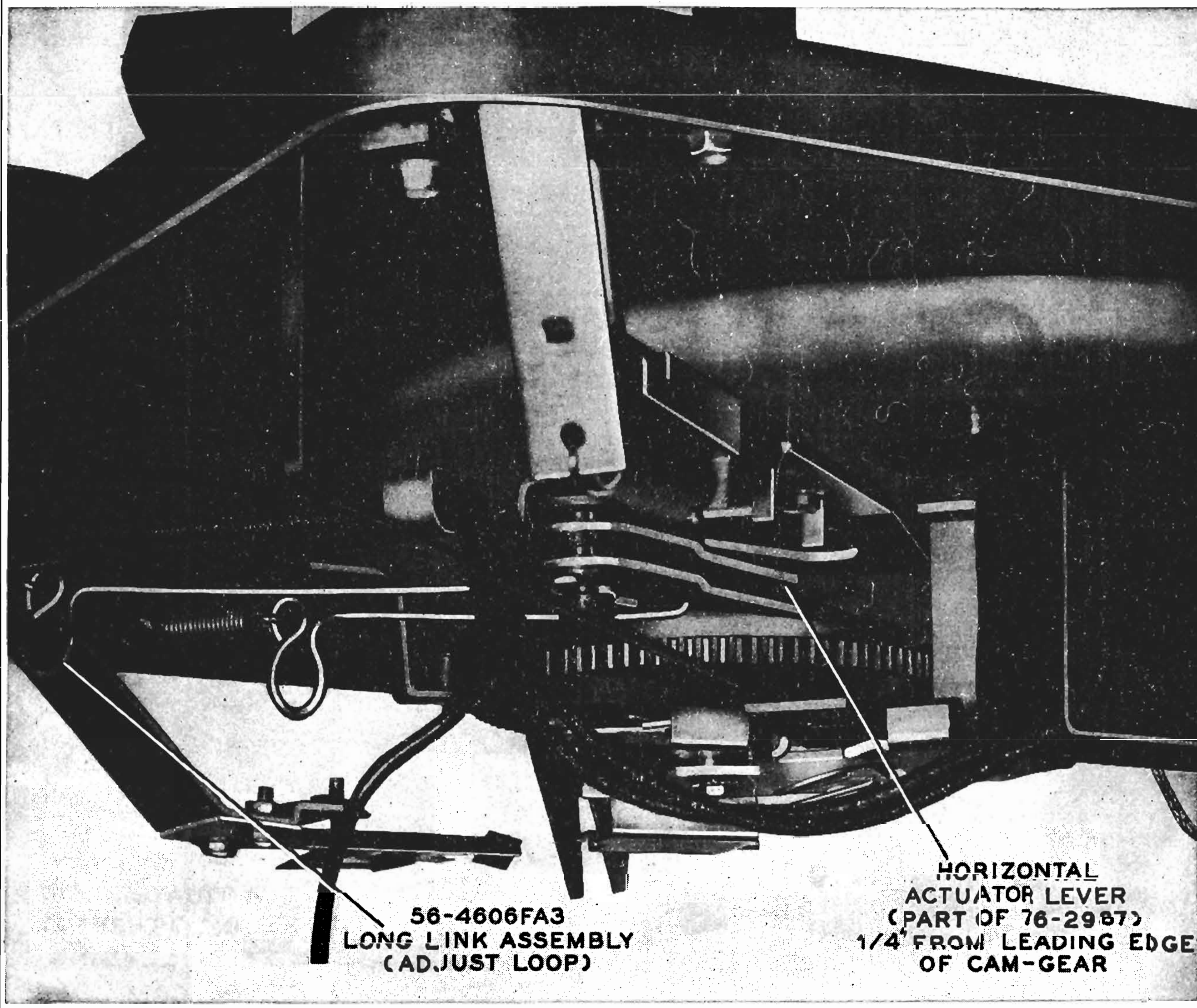


Figure 13—TONE-ARM HORIZONTAL TIMING ADJUSTMENT TP-4129

Record-Shelf Adjustment

Place the shelf in the 10″ position, and the changer out of cycle. Place the Philco record-shelf gauge, 45-1470 (also used for M-4), over the spindle and onto the record shelf, as shown in figure 15. Loosen the two hex-head screws which hold the record-shelf assembly to the changer base plate (figure 16). Move the record-shelf assembly away from the record spindle until the large curved part of the gauge drops even with the record-shelf lips, as shown in figure 15. Now push the record shelf and gauge lightly against the spindle, taking out all play toward the spindle; keep the lips of the record shelf in even contact with the edge of the gauge. Tighten the two hex-head screws.

Push-Off Adjustment

Push the control button to REJ., and rotate the turntable 2½ revolutions, by hand; at this point, the push-off actuator is in its most forward position, in contact with the roller on the cam gear (see figure 17). Loosen the push-off-bar locking screw, shown in figure 16. Squeeze the push-off-bar ears toward each other to the point where the slider blade on the record shelf extends 1/32″ beyond the lips of the shelf. Tighten the hex-head locking screw.

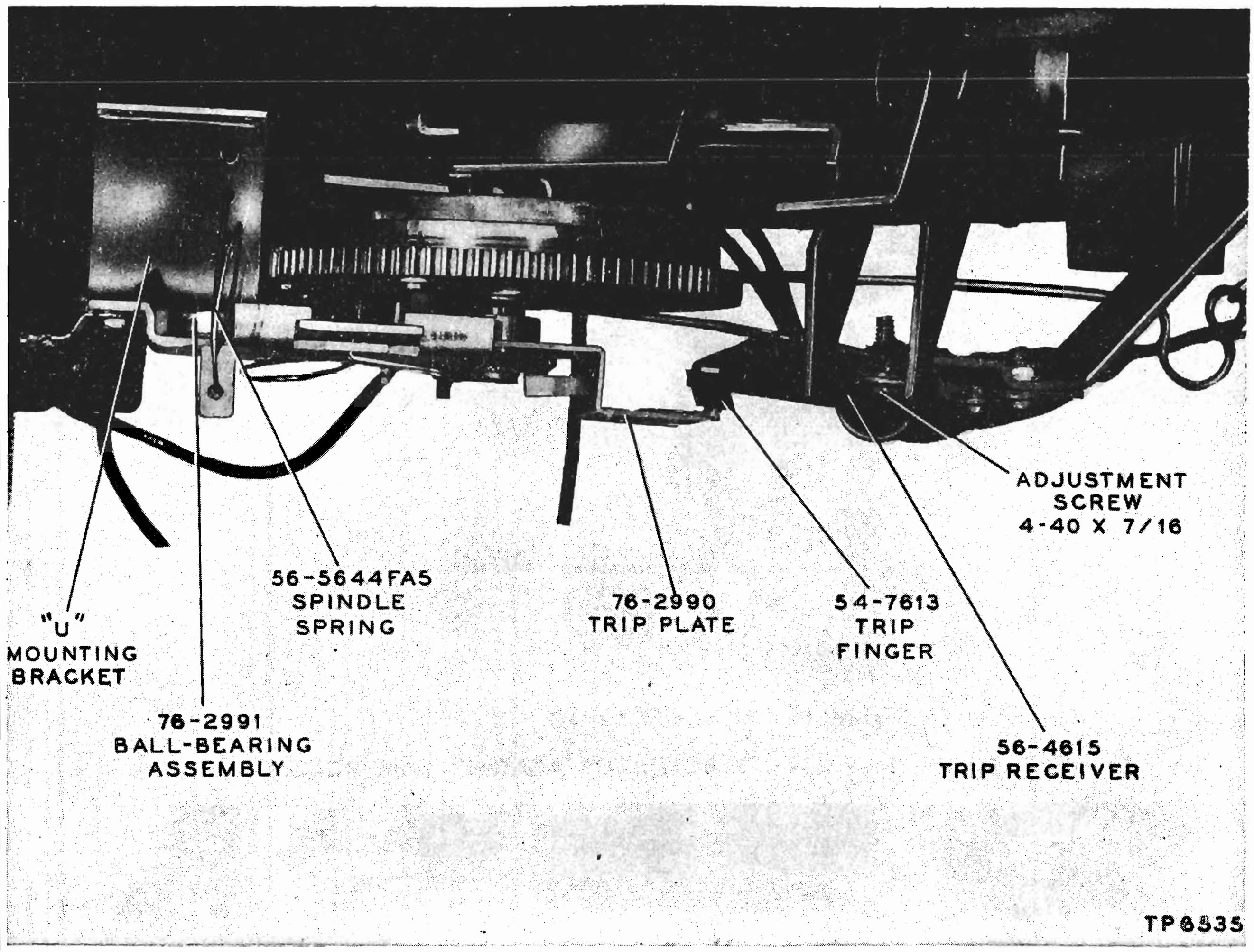
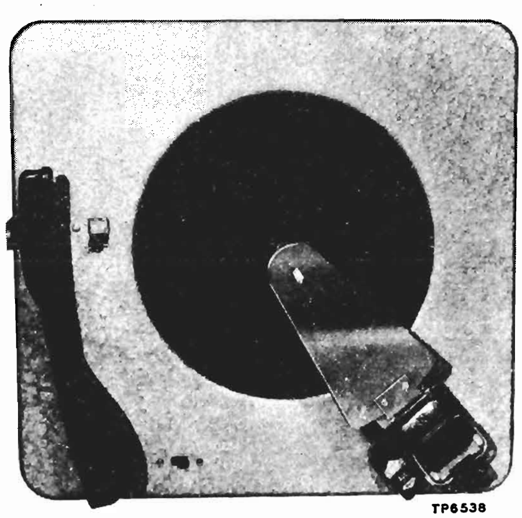


Figure 14—TRIP-FINGER ADJUSTMENT

Figure 15—SPECIAL GAUGE, SHOWN IN CORRECT POSITION ON RECORD SHELF AND SPINDLE



Uneven Turntable Speed (Wows)

Uneven turntable speed (wows) may be caused by the following:

Dirt under and around the turntable or idler-wheel assembly. Remove the turntable (see Spindle and Turntable)----- and clean out the dirt. Be careful to lift the turntable straight up. When replacing the turntable, be sure the idler is behind the turntable rim before the turntable is fully lowered.

Flat or worn spots, or grease, on the rubber tire of the idler wheel.

Defective turntable shaft or bearing assembly.

Replace the defective parts as directed under REPLACEMENT OF PARTS AND ASSEMBLIES.

Lack of lubrication on idler-wheel assembly. Follow the directions under CLEANING AND LUBRICATION.

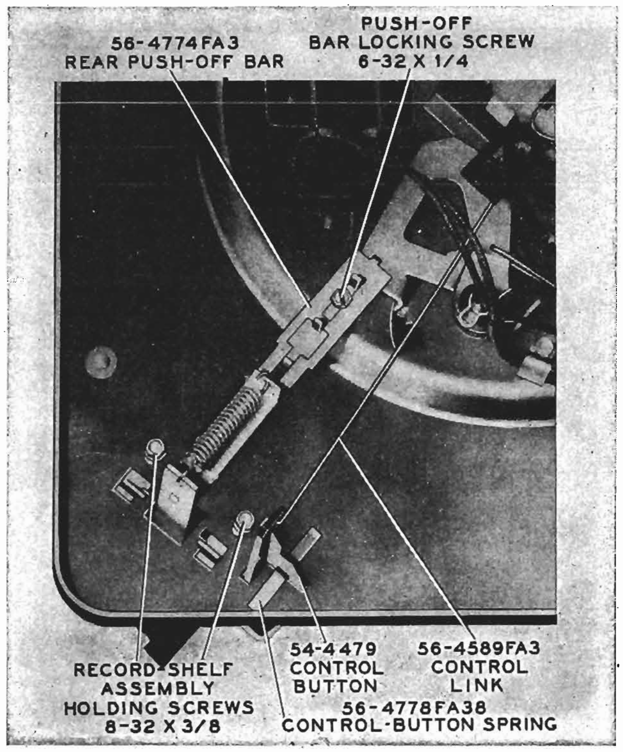
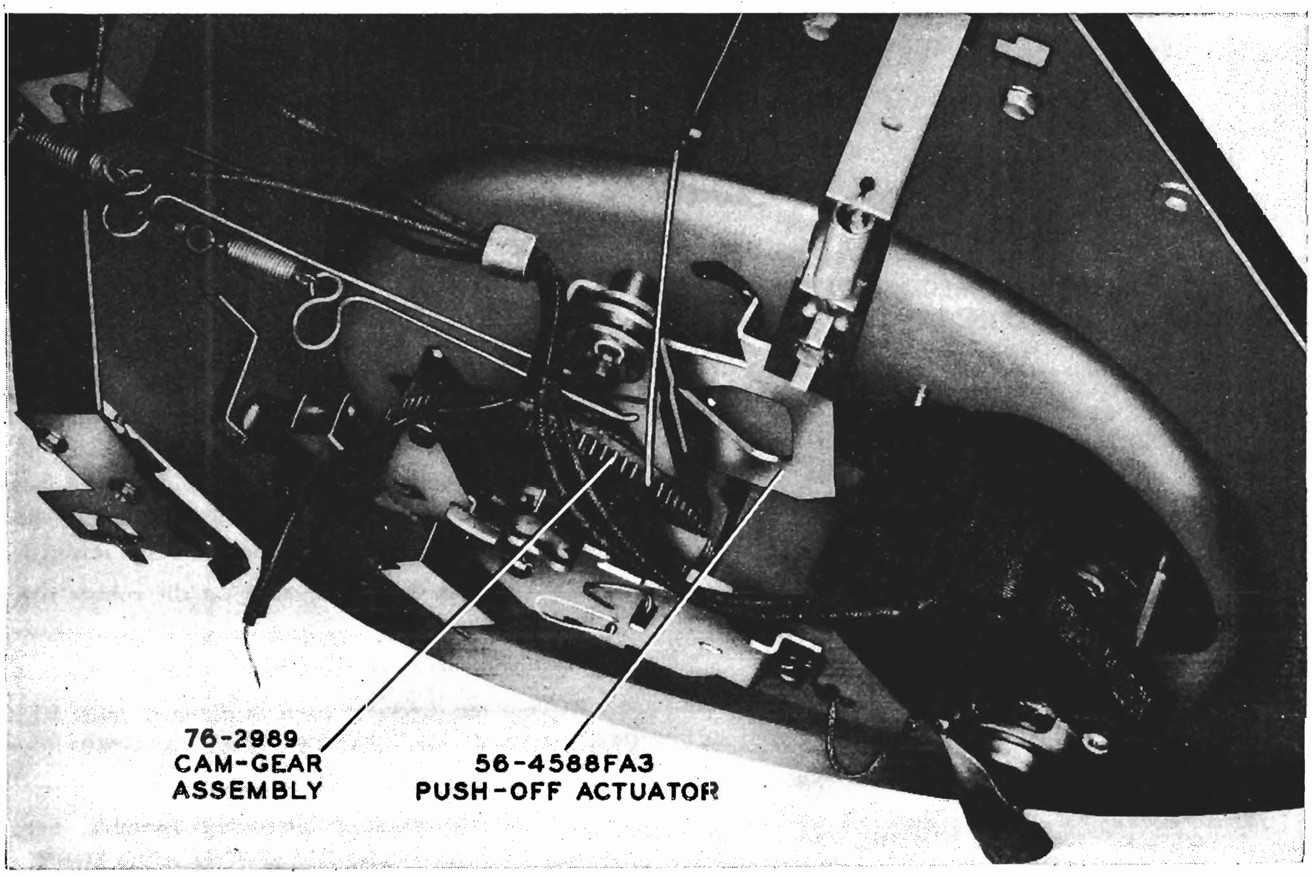


Figure 16—PUSH-OFF-LEVER ADJUSTMENT

Figure 17—PUSH-OFF ACTUATOR AGAINST CAM ROLLER



REPLACEMENT OF PARTS AND ASSEMBLIES

The following procedures are recommended for correct replacement of parts and assemblies. The part should be replaced by reversing the order of removal, and adjusted according to the directions given in the ADJUSTMENTS section of this manual.

When any part is to be removed, the control button should be in the AUT. (automatic) position, and the changer should be out of cycle.

1. Needle

To remove the needle, loosen knurled nut from under front end of crystal cartridge, and slide needle out horizontally.

When replacing needle, tighten thumb nut and add a dab of cement in thumb-nut hole to prevent nut from loosening due to vibration.

2. Crystal Pickup Cartridge

a. Bring tone arm toward center of turntable.

b. Remove the two screws, nuts, lock washers, and spacers which hold cartridge to tone arm.

c. Drop cartridge below tone arm sufficiently to allow removal of the two clips from cartridge, as shown in figure 18. If pickup leads are shielded, unsolder shield.

NOTE

When mounting cartridge, be sure to insert long spacer in side toward spindle.

2A. Spindle and Turntable

a. Unhook both ends of spindle spring from "V" mounting bracket (figure 14).

b. Uncoil spring wire through spindle hole.

c. Pull out spindle.

d. Remove turntable by pulling straight up.

3. Motor

a. Push control button to MAN. position.

b. Remove spindle and turntable, as directed in paragraph 2A.

c. Remove switch cover, and unsolder motor lead from switch contact.

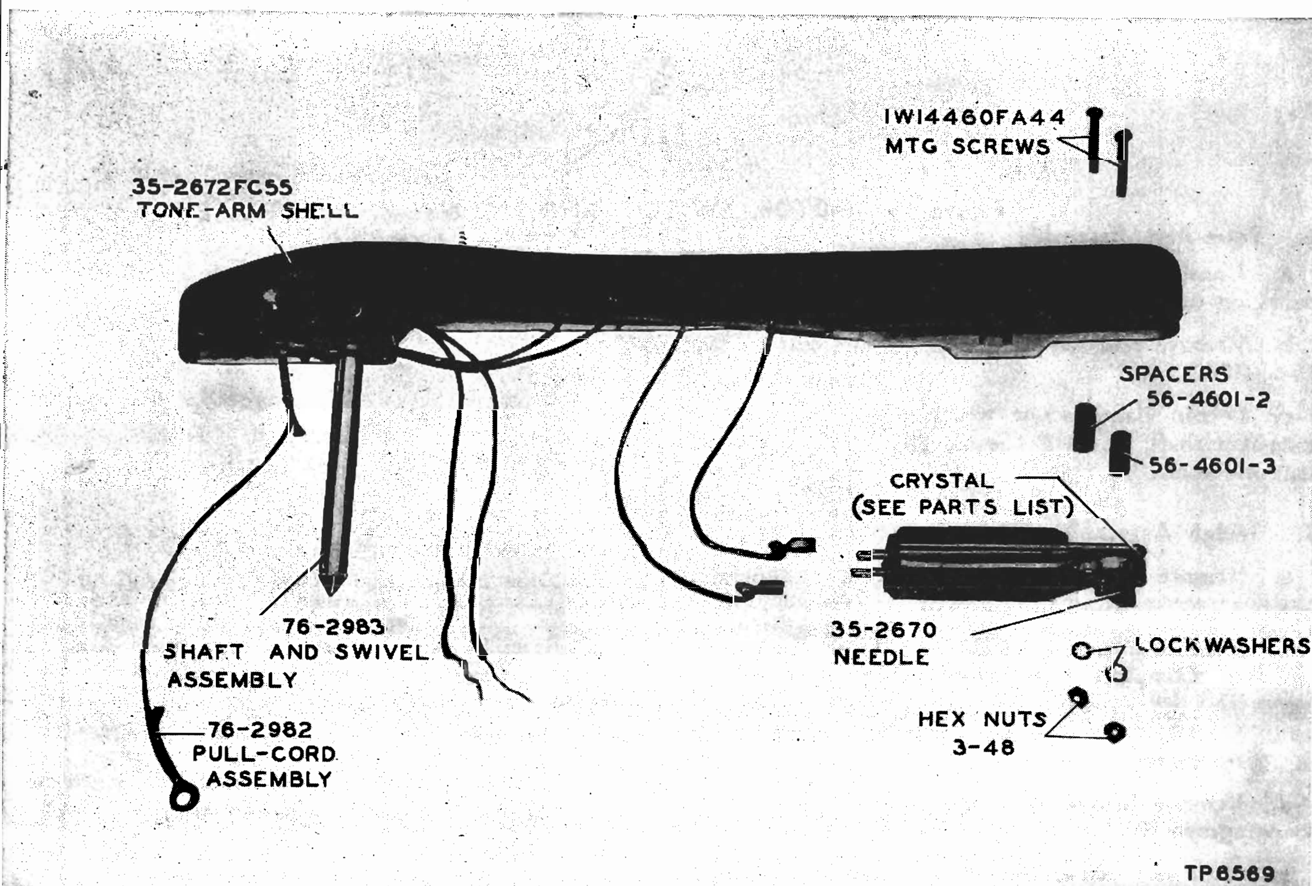
d. Loosen screw of clamp which holds wire against base plate, and pull wire through clamp.

e. Unsolder second motor lead from power plug or disconnect at splice from chassis power lead, whichever is used.

f. Remove ground lead from lug on motor.

g. Remove the three screws, washers, and bushings from motor frame (figure 19), and lift motor out.

Figure 18—TONE ARM (35-2663-2), CRYSTAL CARTRIDGE REMOVED



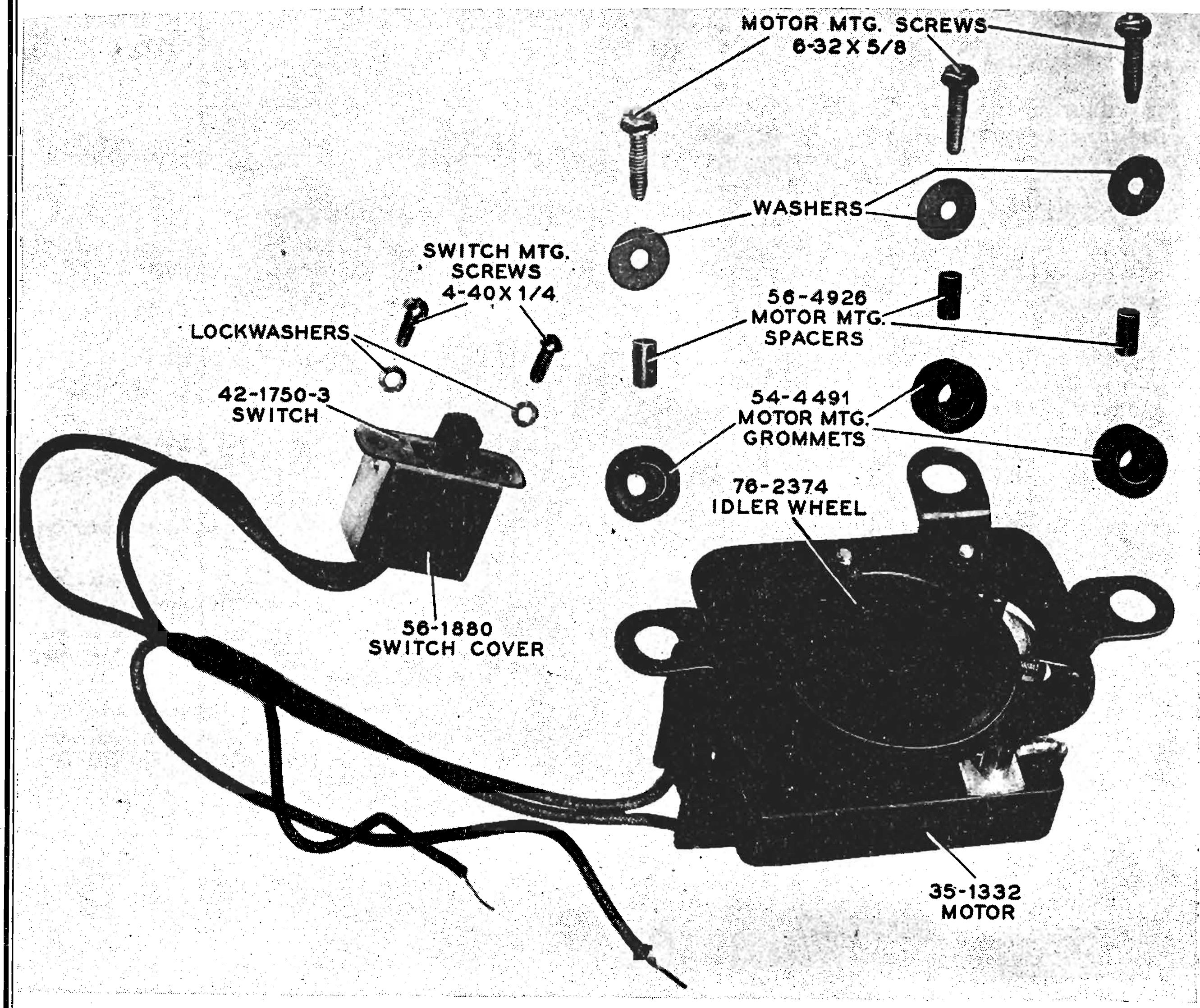


Figure 19—MOTOR, SWITCH, AND MOUNTING HARDWARE TP-4133

4. Tone-Arm Assembly

a. Unsolder tone-arm lead wires from terminal panel on underside of changer base plate.

b. Remove pull cord from spring and short link, 56-4607FA3.

c. Loosen clamp screw which holds trip arm to tone-arm shaft, 76-2983 (figure 20). Lift out tone arm and shaft.

5. Bridge Assembly

a. Remove spindle spring; then remove the two hex-head screws from bridge plate.

b. Remove link rod, 56-4589FA3, from slider control bar. Complete assembly of bridge is shown in figure 21.

6. Trip Plate

a. Remove bridge assembly, 76-2978, as directed in paragraph 5.

b. Slide trip plate, 76-2990, off cam-gear spindle.

7. Cam-Gear Assembly

a. Remove bridge assembly and trip plate, as directed in paragraphs 5 and 6.

b. Remove ball-bearing assembly, 76-2991 (figure 16), by pulling it off.

c. Remove "E" washer, 1W60980FE5.

d. Slide cam gear off spindle. Figure 22 shows cam-gear assembly.

8. Tone-Arm Actuator Levers

a. Remove "E" washer, 1W60980FE5.

b. Slide lower actuator lever from stud, and remove short link, 56-4607FA3.

c. Remove upper actuator lever from stud, and disengage long link, 56-4606FA3. Figure 22 shows actuator-lever assembly.

9. Push-Off Actuator

a. Remove two motor-mounting screws, and loosen the third one; swing motor to one side.

b. Remove tone-arm actuator levers, 76-2987, as directed in paragraph 8.

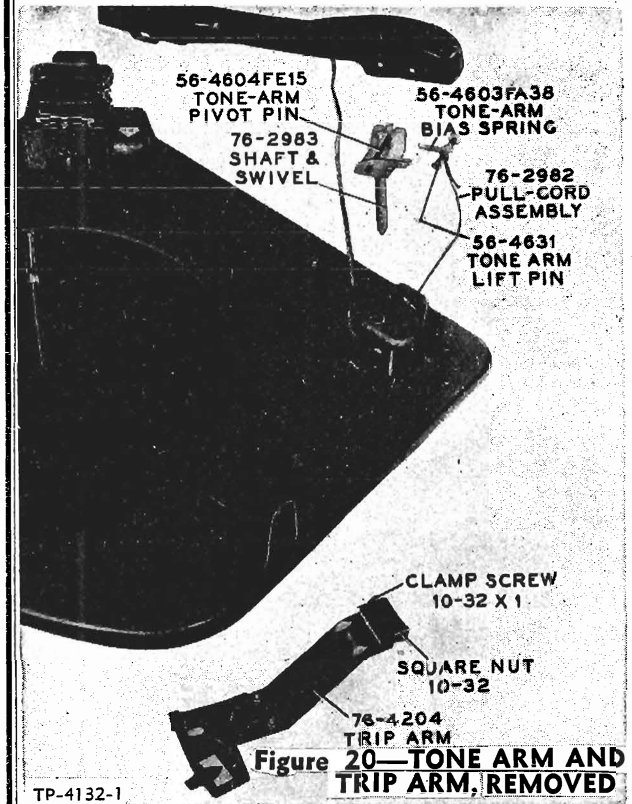


Figure 20—TONE ARM AND TRIP ARM, REMOVED

c. Press push-off rod, 56-4595FA3, and push-off hanger bar, 56-4596FA3, together, and pull downward, releasing the entire assembly.

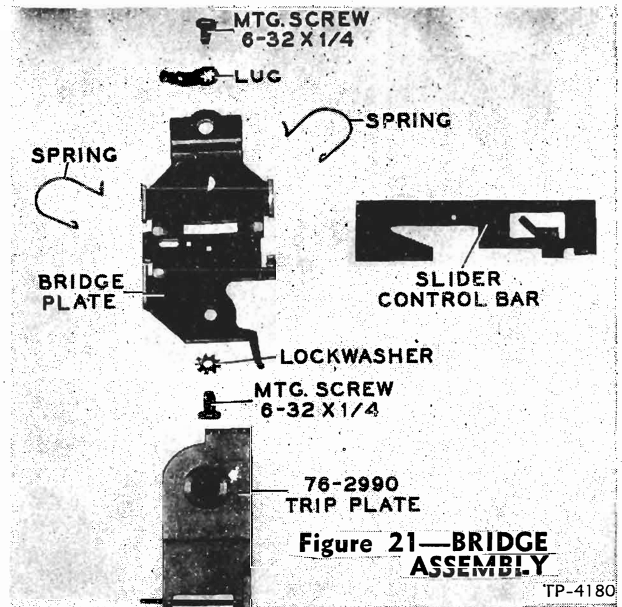
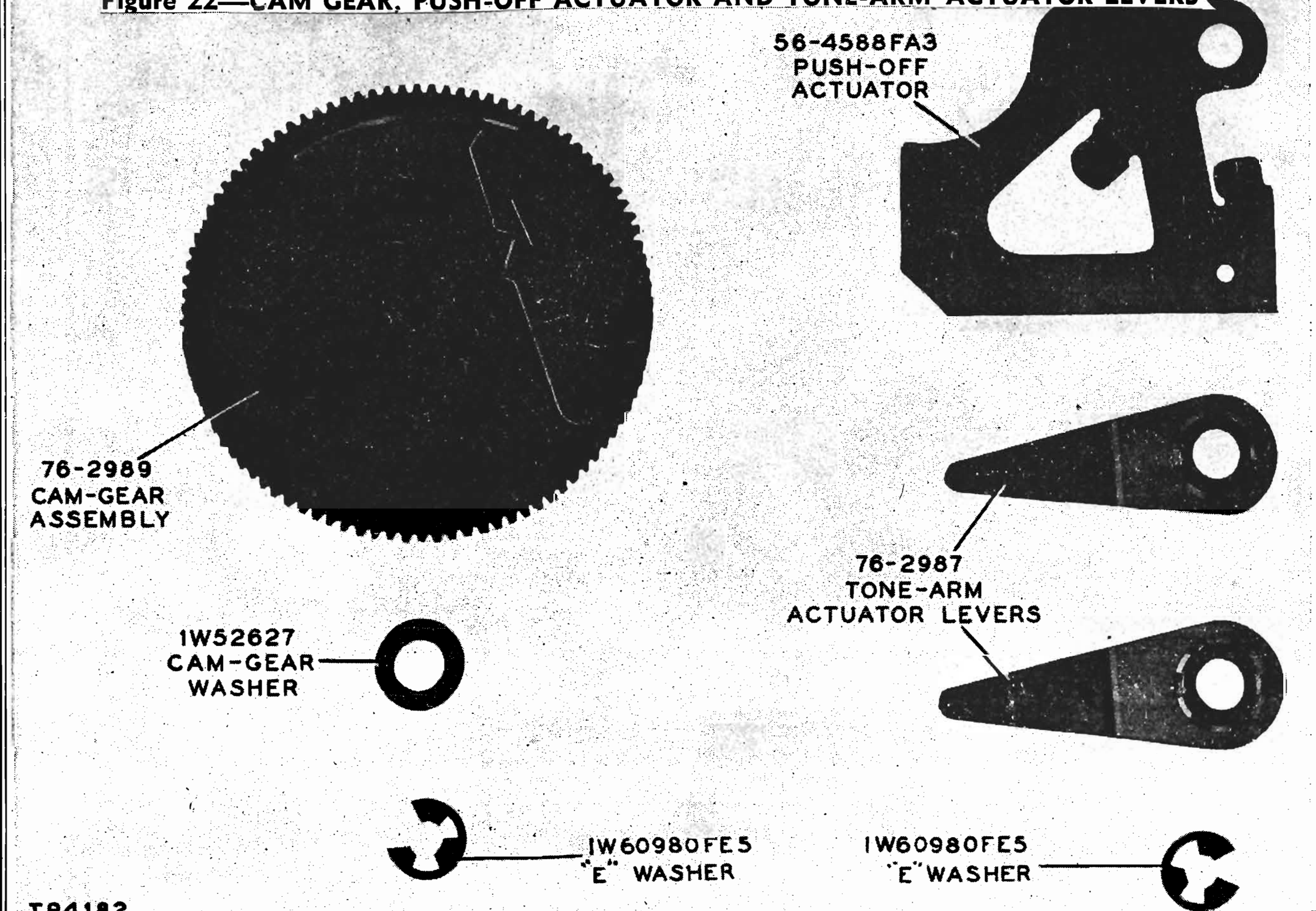


Figure 21—BRIDGE ASSEMBLY

d. Slide push-off actuator, 56-4588FA3, over, to align upturned ears with cutout in base plate. Slide actuator off stud.

NOTE After removing the push-off actuator and push-off-bar assembly, the slider blade on the record shelf may slide out of the assembly. When reassembling, this blade should be inserted in the record-shelf assembly with the elongated hole toward the 12″ position of the record shelf. The push-off assembly is shown in figure 23.

Figure 22—CAM GEAR, PUSH-OFF ACTUATOR AND TONE-ARM ACTUATOR LEVERS



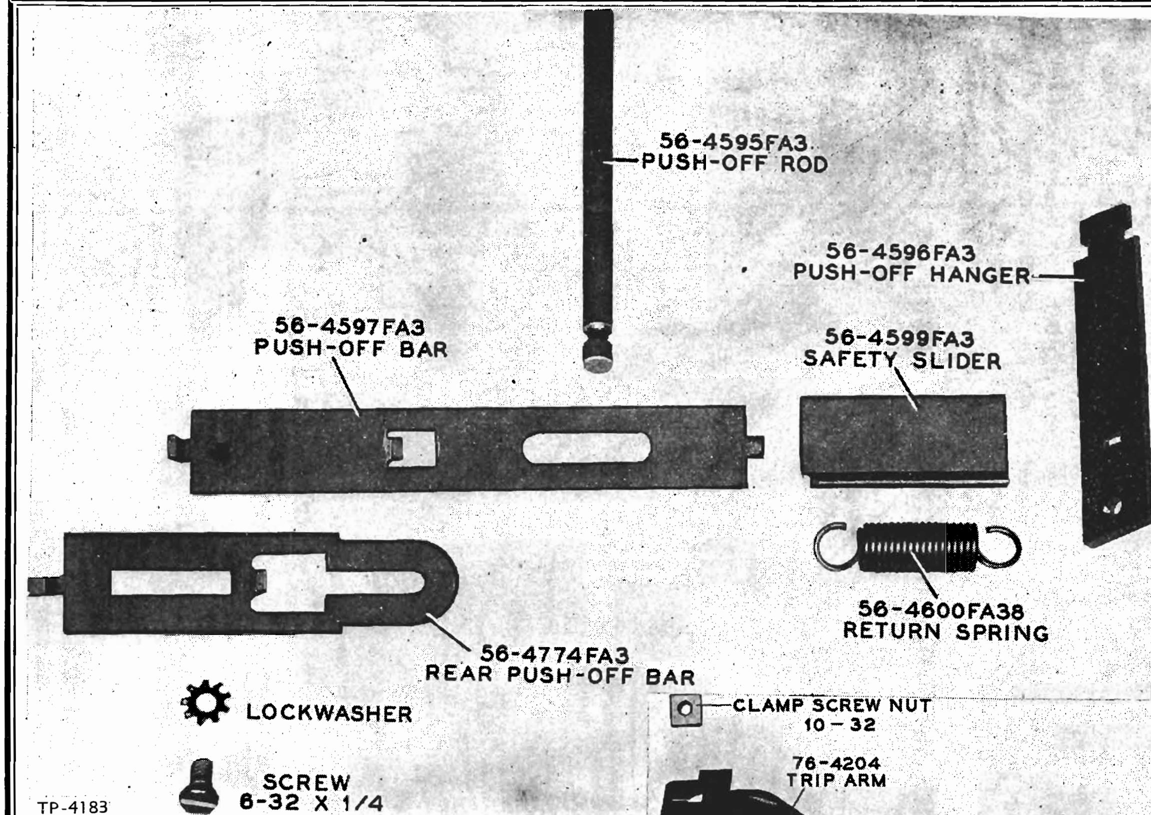


Figure 23—PUSH-OFF ASSEMBLY

10. Record-Shelf Assembly

a. Remove push-off actuator assembly as directed in paragraph 9.

b. Remove the two hex-head screws which hold record-shelf assembly to base plate (figure 16).

c. Align ears on record-shelf assembly with cut-out on base plate. Lift out record-shelf assembly. Record-shelf assembly is shown in figure 24.

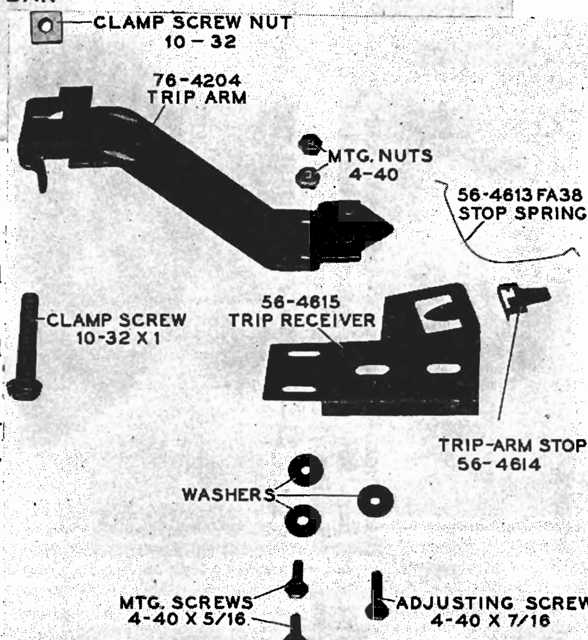


Figure 25—TRIP-ARM AND TRIP-RECEIVER ASSEMBLIES

TP-4227-1

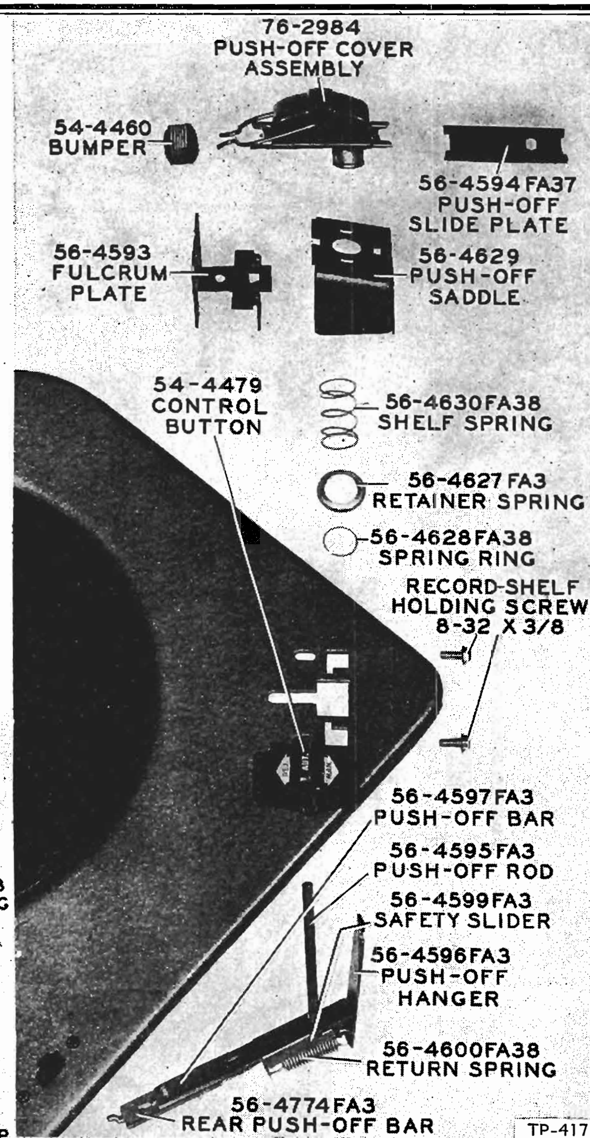


Figure 24—RECORD-SHELF AND PUSH-OFF ASSEMBLIES, REMOVED

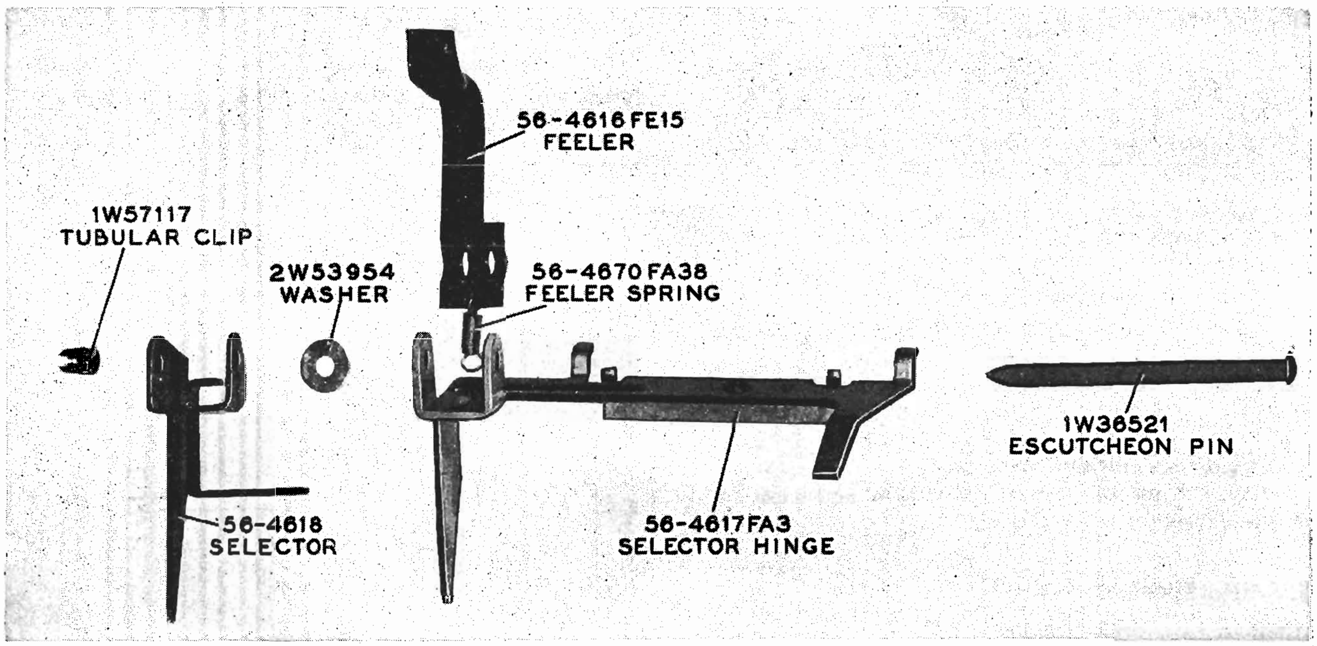
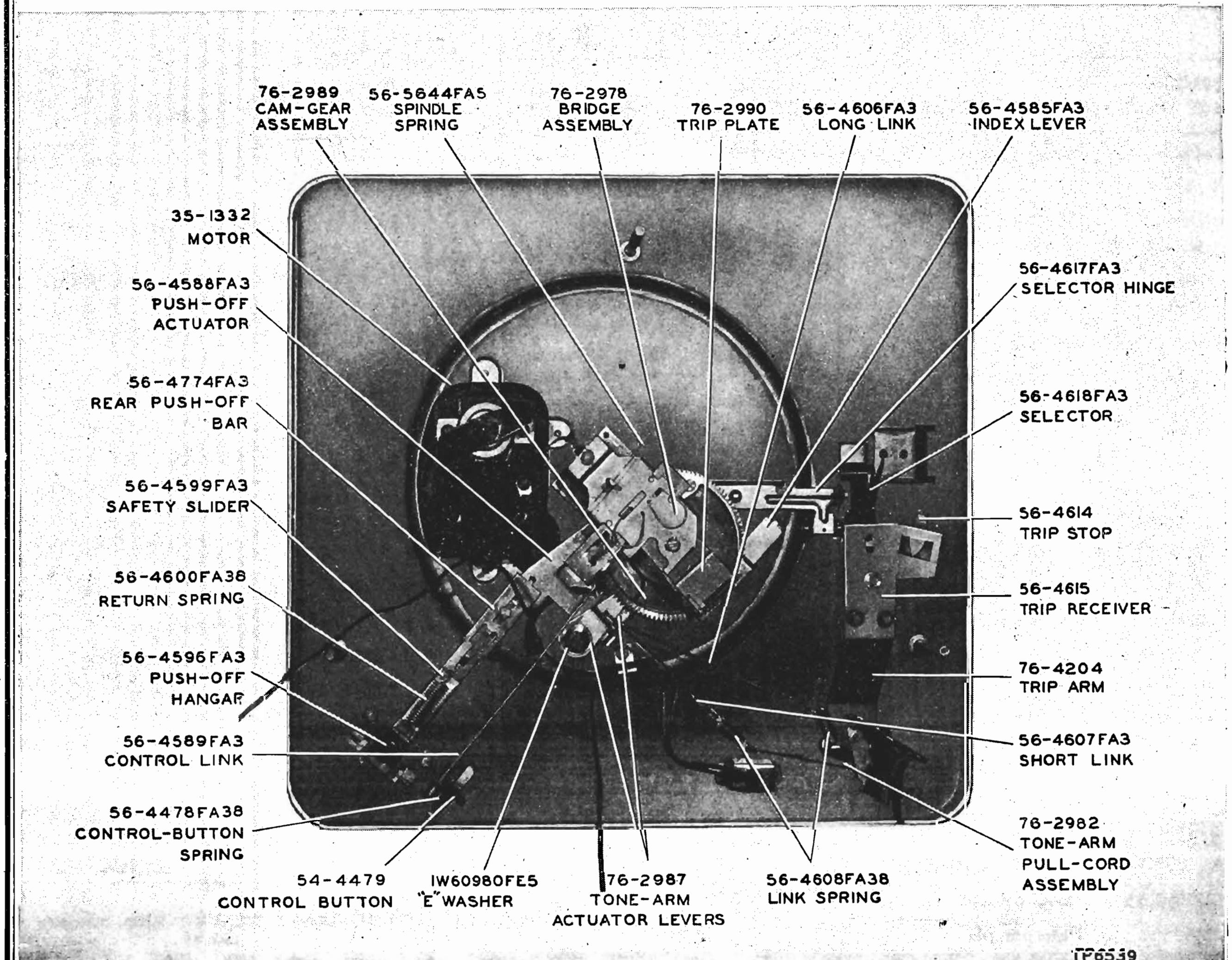


Figure 26—SELECTOR AND SELECTOR-HINGE ASSEMBLY TP-4123

Figure 27—BOTTOM VIEW OF CHANGER, WITH PARTS IDENTIFICATION



11. Control-Button Assembly

a. Remove flat spring, 56-4778FA38, by sliding it laterally through underside of button (figures 8 and 16).

b. Remove the two hex-head screws and drop bridge assembly, 76-2978 (shown in figure 8).

c. Disengage control link, 56-4589FA3, from underside of control button. Lift out control button.

12. Trip-Arm Assembly

a. Loosen clamp screw on trip arm, 76-4204 (figure 25).

b. Raise tone arm and shaft sufficiently to clear trip arm. Remove trip arm.

NOTE

When assembling, maintain $\frac{1}{32}$" vertical play (clearance between trip arm and base plate) in tone-arm shaft.

13. Trip-Receiver Assembly

Remove the three screws, washers, and nuts from trip arm (figure 25).

Remove trip receiver.

14. Selector Assembly

Remove cam gear as directed in paragraph 7. Remove feeler spring from attachment point on motor board. Tilt selector assembly, and remove from base plate.

NOTE

When assembling selector assembly, be sure to maintain .005" clearance between selector hinge, 56-4617FA3, and washer, 2W53954. For correct assembly refer to figures 26 and 9.

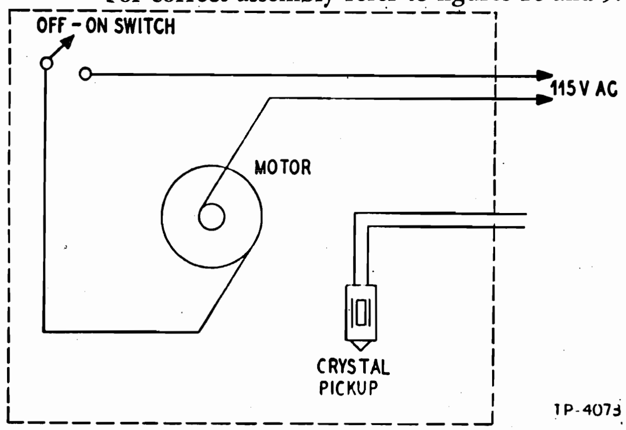
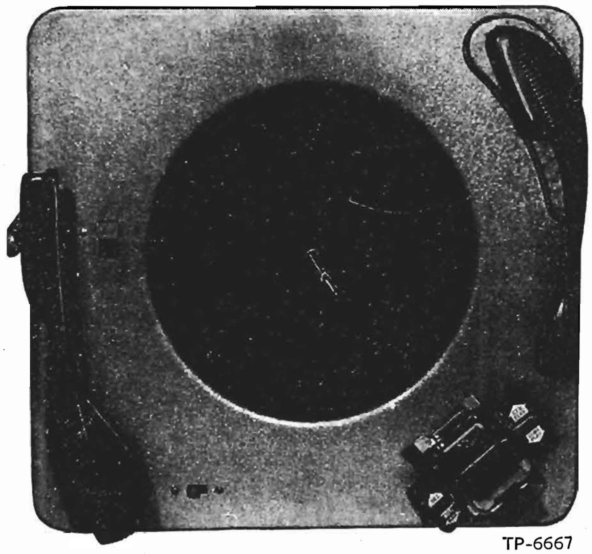


Figure 28—CHANGER WIRING DIAGRAM

REPLACEMENT PARTS LIST

SERVICE PART NO.	DESCRIPTION
27-4787	Plug
35-1332	Motor, 60 cycles
35-1332-2	Motor, 50/60 cycles
35-2663-2	Tone arm
35-2670	Needle
35-2671-1	Crystal
35-2672FC55	Tone-arm shell
35-2674	Crystal (for tropic use only)
35-3066-2	Turntable
41-3869	Cable
41-3869-1	Cable
42-1750-3	Switch, motor, 50 cycles
54-4479-1	Control button
54-7613	Trip finger
56-1146	Cover (plug)
56-1880	Switch cover, 50 cycles
56-2832FA3	Cable clamp
56-3630	Motor conversion spring, 50 cycles (for 35-1332-2 only)
56-4460	Bumper
56-4585FA3	Index lever
56-4588FA3	Actuator, push-off
56-4589FA3	Link, control
56-4593	Fulcrum plate
56-4594FA37	Plate, push-off slide
56-4595FA3	Rod, push-off-link assembly
56-4596FA3	Hanger, push-off-link assembly
56-4597FA3	Bar, push-off-link assembly
56-4599FA3	Slider, safety, push-off-link assembly
56-4600FA38	Spring, return, push-off-link assembly
56-4601-2	Spacer, tone arm
56-4601-3	Spacer, tone arm
56-4603FA38	Spring, index and tone-arm bias
56-4604FE15	Pin, tone-arm pivot
56-4606FA3	Link, long
56-4607FA3	Link, short
56-4608FA38	Spring
56-4613FA38	Spring, stop
56-4614	Stop, trip arm
56-4615	Trip receiver
56-4616FE15	Feeler, selector assembly
56-4617FA3	Hinge, selector assembly
56-4618FA3	Selector
56-4626-1FA7	Record shelf
56-4627FA3	Retainer, spring, record-shelf assembly
56-4628FA38	Spring ring, record-shelf assembly
56-4629	Push-off saddle, record-shelf assembly
56-4630FA38	Spring, record shelf
56-4631FE15	Pin, tone-arm lift
56-4670FA38	Spring, feeler, selector assembly
56-4774FA3	Bar, rear, push-off-link assembly
56-4778FA38	Spring, control knob
56-5644FA5	Spring, spindle
76-2978	Bridge assembly
76-2982	Pull-cord assembly
76-2983FA3	Shaft and swivel
76-2984	Push - off, record - shelf assembly
76-2987	Actuator assembly, tone arm
76-2988-3	Base plate assembly
76-2989	Cam-gear assembly
76-2990	Trip-plate assembly
76-2991	Bearing assembly
76-3556	Idler wheel
76-3926	Spindle
76-4204	Trip arm
1W14460FA44	Screw, crystal mtg.
1W29126FA3	Spacer, selector assembly
1W36521FA3	Pin, escutcheon, selector assembly
1W60980FE5	"E" washer



TP-6667

Figure 1. Philco Record Changer and Record Player Combination, Model M-9C

INTRODUCTION

The Philco Automatic Record Changer and Record Player Model M-9C, figure 1, which is used in several 1949 Philco radio-phonograph combinations, incorporates the use of two tone arms. One tone arm is used in conjunction with the record-changer mechanism, which plays ten 12″ records or twelve 10″ records automatically at the standard speed of 78 r.p.m. The other tone arm is used manually, to play the new Columbia Long Playing Records at a speed of 33-1/3 r.p.m.; the record player shuts off automatically at the end of the Long Playing Record.

DESCRIPTION OF OPERATING CYCLES

Power is applied to the motor through an off-on switch and a mercury switch which is controlled by the position of the record-player tone arm. The two switches are connected in series.

A control is mounted on each side of the record-shelf assembly. The REJ.—AUT.—MAN. control controls the record-changer section of the combination. The STD. PLAY—LONG PLAY control has two functions. When it is pushed to LONG PLAY, a link underneath the base plate pulls a selector lever mounted on the base plate. The selector lever is connected to a shift lever which is part of the motor. On this shift lever is mounted a pulley which is connected by a belt to the motor shaft, as shown in figure 2. When the control is in LONG PLAY position, this pulley, which is larger in diameter than the motor shaft, engages and drives the idler wheel, which in turn drives the turntable at the slow speed of 33-1/3 r.p.m. When the control is at STD. PLAY, the larger pulley is retracted and the motor shaft engages the idler wheel, to provide a turntable speed of 78 r.p.m. By action of the STD. PLAY—LONG PLAY control, the double-pole, single-throw switch, mounted on the base plate under the turntable, is actuated. To this switch are connected the output leads of the two tone arms. When the control is at LONG PLAY position,

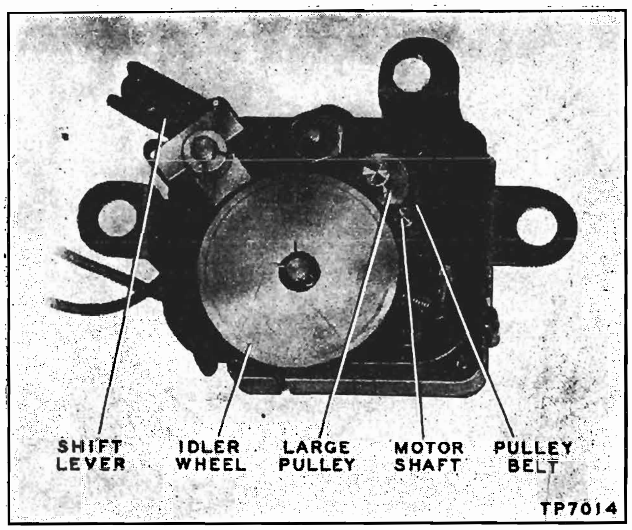


Figure 2. Motor, Showing Pulley, Bolt, and Shift Lever

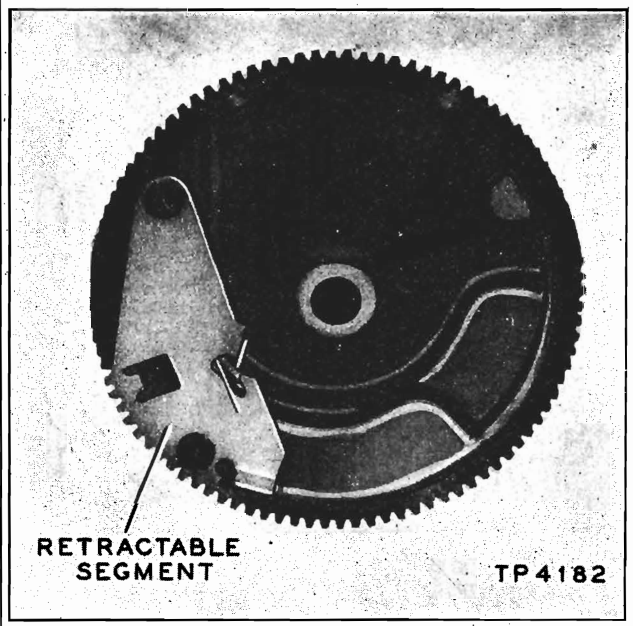


Figure 3. Cam Gear, Showing Retractable Segment

the switch cuts out the output from the record-changer tone arm and closes the circuit for the record-player tone arm. When the control is at STD. PLAY, the reverse action takes place.

The record-changer change cycle takes place when the turntable hub gear, which is part of the turntable shaft, engages the cam gear through a retractable segment mounted on the cam gear; see figure 3. This retractable segment is brought into position by the action of the trip mechanism. The cam then operates the changer mechanism.

The record-changer tone arm is operated by two link assemblies (figure 4) attached to actuator levers,

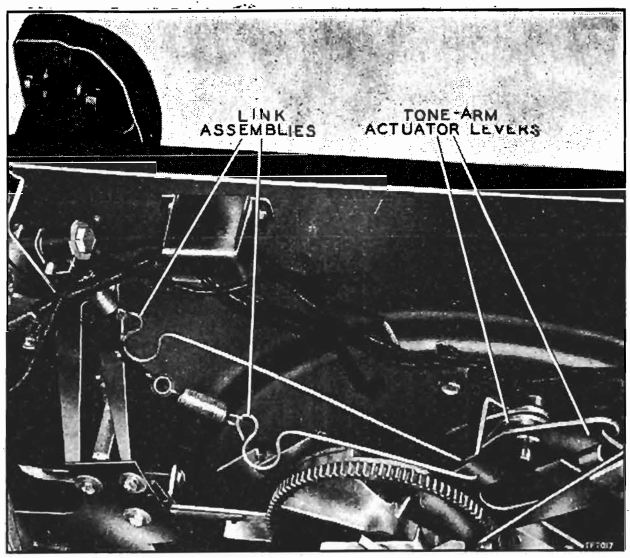


Figure 4. Link Assemblies and Actuator Levers

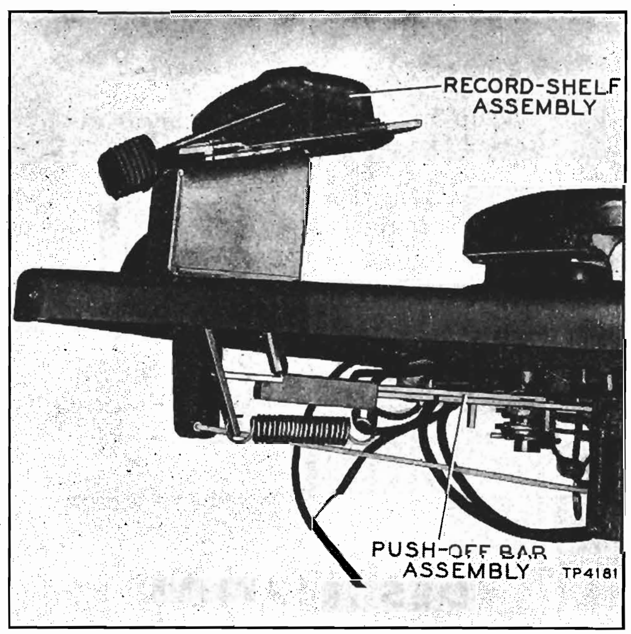


Figure 5. Record-Shelf and Push-Off Assemblies

which are in contact with the cam surface of the cam gear. The record-shelf push-off mechanism is connected through a series of bars, to a push-off actuator (figure 5). The mechanism is operated when a roller, mounted on the cam gear, comes in contact with the actuator. The trip mechanism is operated by a trip finger riding over a ratchet screw (figure 6), which starts the change cycle when the needle is traveling in the eccentric finish groove of the record. The trip mechanism is locked in a disengaged position when the REJ.—AUT.—MAN. control is in the MAN. position.

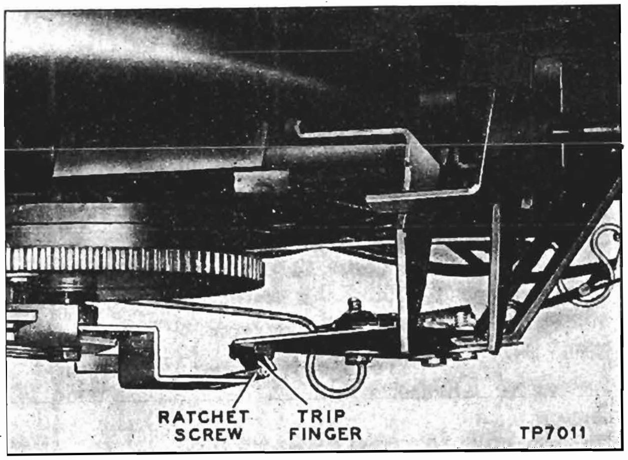


Figure 6. Trip Finger and Ratchet Screw

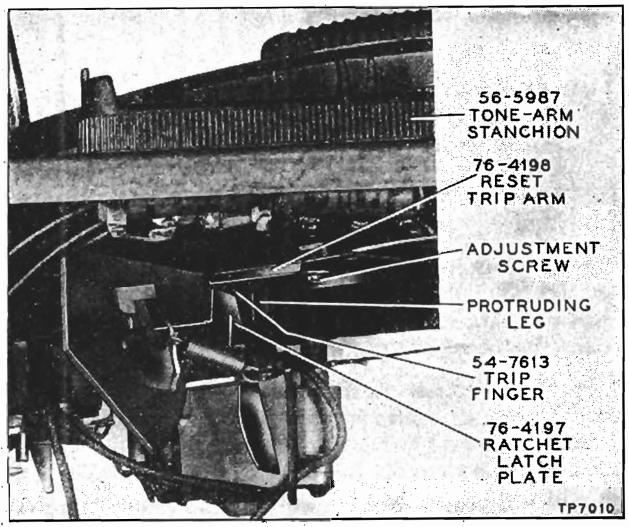


Figure 7. Trip Assembly, Showing Trip Finger Riding Over Ratchet Plate

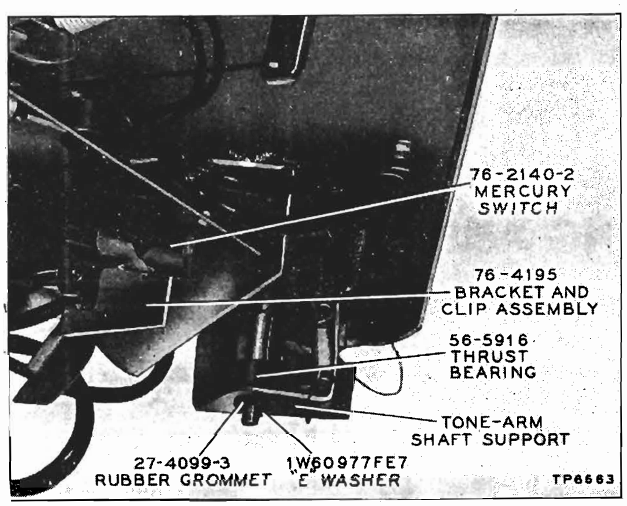


Figure 8. Mercury Switch, Shown in ON Position

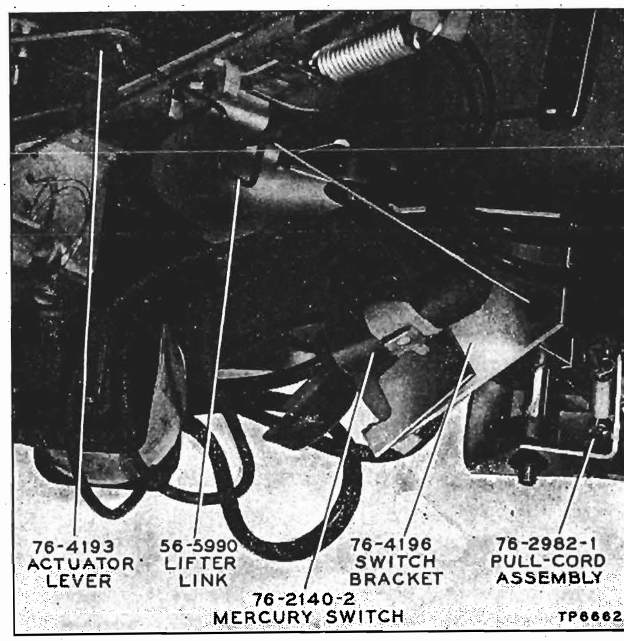


Figure 9. Mercury Switch, Shown in OFF Position

The record-player section contains a separate tone arm. Attached to this tone arm is a reset and trip-arm assembly, which has a protruding leg and trip finger (figure 7). When the tone arm of the record player is resting on the rest post, the leg on the reset trip arm contacts an ear of the bracket-clip assembly (mounted on the switch bracket), and this tips the mercury switch mounted on it to the ON position, (figure 8). The motor circuit is now controlled only by the on-off switch.

When the record-player tone-arm needle is traveling in the eccentric finish groove of the record, the trip finger, which is mounted on the reset trip arm, rides over a ratchet on the ratchet latch plate. The ratchet latch plate is mounted on the switch assembly (figure 7), and trips the latch, causing the bracket-clip assembly to drop and tip the mercury switch to the OFF position (figure 9). This opens the motor circuit and stops the turntable.

A pull cord and link assembly is attached to the record-player tone arm, and is connected to a link-actuator lever. This permits the tone arm to be lifted and set on its rest post if the record changer is put into a change cycle. The pull-cord assembly, Part No. 76-2982-1, and the link-actuator lever, Part No. 76-4193, are shown in figure 9.

RECORD-CHANGER TESTING AND TROUBLE-SHOOTING PROCEDURE

Pickup Test

Play a familiar record on the phonograph and note the volume and tone quality.

NOTE

It is advisable to carry a familiar record as a part of the service test equipment.

If distortion is noted, try a new needle. If the distortion persists, a faulty crystal pickup is indicated; refer to page 12.

Changer-Mechanism Test

The following series of record-changer operating tests is given for quickly locating any trouble that may be encountered. Each test should be performed with several records before making any adjustments.

Set the record shelf to the 10″ position and place the tone arm on the rest post. Place a 10″ record over the spindle and onto the record shelf. Push the STD. PLAY—LONG PLAY control to STD. PLAY.

Push the REJ.—AUT.—MAN. control to REJ. and observe the record-dropping action. The record should fall smoothly, with the edge of the record leaving the lips of the record shelf *after* the center has started to fall. Adjustment of the record shelf is given on page 9.

The tone arm should rise from the rest post, and the needle should come down on the record, about 1/8″ from the outer edge. The index adjustment is given on page 7.

Play the record through and observe the tripping action; the trip mechanism should operate within the first two or three revolutions after the needle has entered the eccentric finish groove. Trip adjustments are given on page 9.

Remove the record from the turntable and set the record shelf to the 12″ position. Place a 12″ record over the spindle and onto the record shelf. Push the REJ.—AUT.—MAN. control to REJ., and observe the record-dropping action. The edge of the record should leave the lips of the record shelf *after* the center has started to fall. (Refer to page 9 for the record-shelf adjustment, if needed.) The tone arm should rise from the rest post and the needle should come down on the record, about 1/8″ from the outer edge. If the index adjustment is required, refer to page 7.

Observe whether the lower edge of the tone arm, during a change cycle, clears the top of the hook on the tone-arm rest post by a minimum of 1/8″. Take the tone arm off the rest post, and place the pickup over the changer base plate; the needle point should clear the base plate by at least 1/16″, and should be no higher than the turntable top. Lift and height adjustments are given on page 7.

Turntable and Motor Test

NOTE

Before making this test, warm up the motor by allowing it to run for at least ten minutes.

Set the REJ.—AUT.—MAN. control to MAN., and set the STD. PLAY—LONG PLAY control to STD. PLAY. Load the turntable with ten 12″ records, and place the tone arm on the top record.

Place a stroboscope disc, such as Philco Part No. 45-1614, on the record, and illuminate the disc with a lamp (preferably a neon bulb) operated on 60-cycle a.c. The dots in the row calibrated for 78 r.p.m. should appear to remain stationary, or to drift very slowly, but smoothly, backward or forward.

If the turntable speed is steady, but is appreciably below 78 r.p.m., refer to the lubrication date on the turntable upper bearing, and check the idler wheel, idler spring, wiring, etc.

Unsteady drift of the dots on the stroboscope disc indicates uneven turntable speed, which is the cause of wows; see UNEVEN TURNTABLE SPEED (WOWS), page 11.

RECORD-CHANGER CLEANING AND LUBRICATION

The Model M-9C record changer, like any other mechanism, requires lubrication after long periods of use. Whenever a major part or an assembly is to be replaced, the changer should be cleaned and lubricated. Carbon tetrachloride or other similar cleaning fluids may be used to remove old grease, oil, and dirt. Apply lubricants sparingly.

All lubrication points are shown in figures 10 and 11. It may be necessary to remove some parts and assemblies in order to lubricate their bearings—for example, the actuator and cam gear must be removed to lubricate the actuator stud and the cam-gear spindle.

PARTS NOT TO BE LUBRICATED

The following parts should not be lubricated at any time: Trip receiver, trip finger, ratchet screw on trip plate, selector, and all parts of the record-player section.

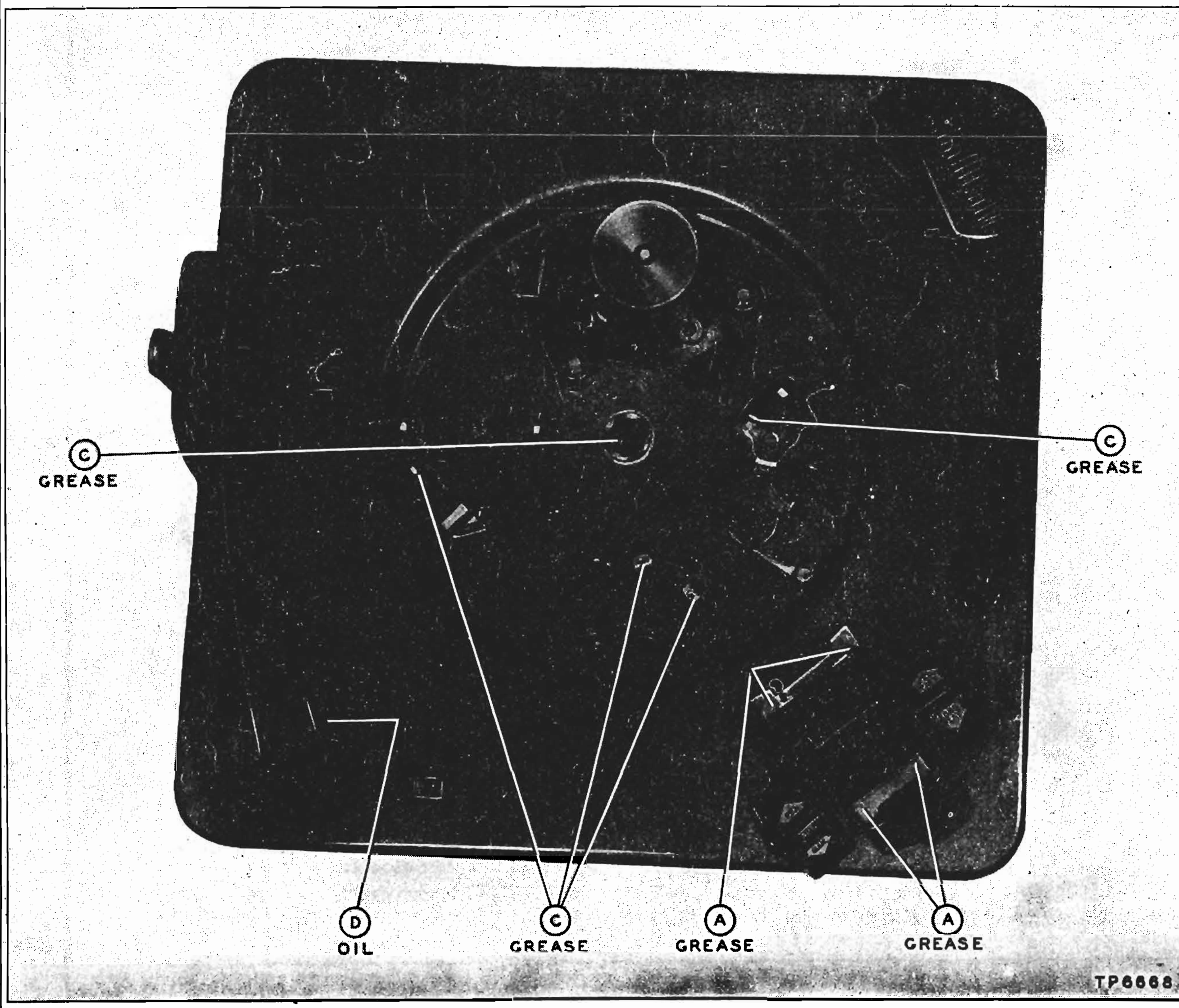


Figure 10. Top View, Showing Lubrication Points

PARTS TO BE GREASED

The following parts are to be lubricated with a grease having the consistency of vaseline:

Record-Shelf Assembly (Point A of Figure 10)
Four protruding dimples.

Bridge Assembly and Slider Control Bar (Point B of Figure 11)
Three dimples and four upturned ears.

Cam Gear (Point C of Figure 11)
Cam-gear teeth, cam surfaces, and cam-gear spindle.

Main Assembly (Points C of Figures 10 and 11)
Trip-plate ear where contact is made with gear segment.
Actuator stud.
All parts with ears sliding on changer base plate.
Index-lever surface which slides on base plate.
Push-off-actuator dimples which slide on base plate.
Turntable shaft (upper bearing).
Tone-arm shaft.

PARTS TO BE OILED

The following parts are to be lubricated with S.A.E. 20 oil:

Tone Arm (Point D of Figure 10)
Tone-arm pivot pin where pin rides in elongated hole of tone arm—apply one drop with a pointed rod.

Trip-Plate Bushings (Point E of Figure 11)

Spindle (Point E of Figure 11)

Cam-Gear Roller (Point E of Figure 11)

CAUTION

Do not get any oil or grease on the motor shaft or the idler-wheel tire. Should this occur, remove the oil or grease immediately with carbon tetrachloride.

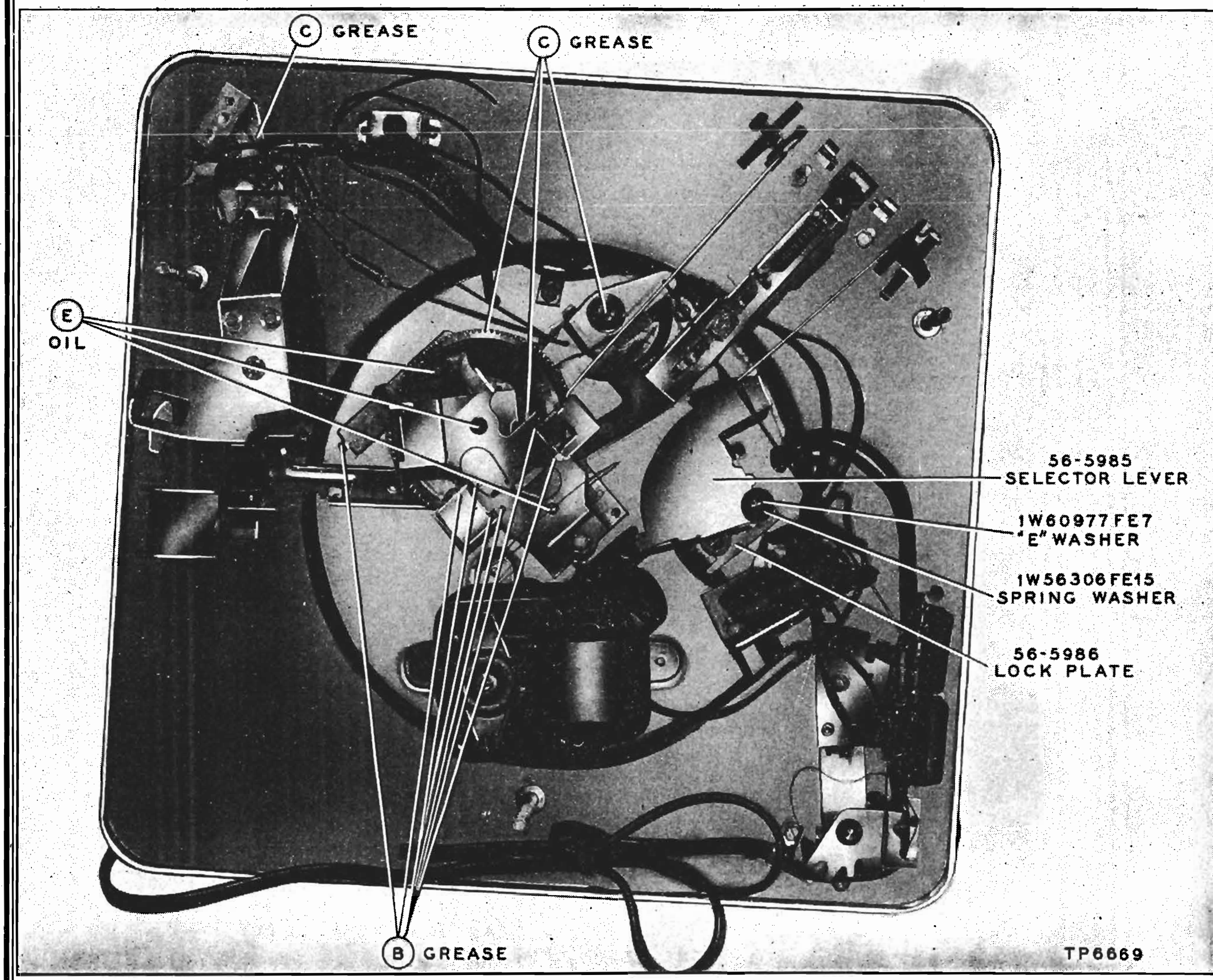


Figure 11. Bottom View, Showing Lubrication Points

RECORD-CHANGER ADJUSTMENTS

10″ Index Adjustment

Place a 10″ record on the turntable, push the REJ.—AUT.—MAN. control to REJ., and rotate the turntable 4½ turns by hand. The tone arm should then be approximately ½″ above the record.

Loosen the clamp screw on the trip arm (figure 12). Hold the tone arm (steady) ⅛″ in from the edge of the record, and set the trip arm so that the trip-arm stop is in contact with the selector hinge (Part No. 56-4617FA3). See figure 13.

Tighten the clamp screw, leaving 1/32″ vertical play, or clearance, between the trip arm and the base plate.

12″ Index Adjustment

Make the 10″ index adjustment first. The 12″ indexing will ordinarily be satisfactory after the 10″ adjustment is made; if not, bend the selector, Part No. 56-4618FE15, slightly to the right or left as required for proper indexing of the needle on the record, as shown in figure 14.

Tone-Arm Height and Lift Adjustments

With the changer out of cycle (change cycle completed; tone arm lowered), and the tone arm off the rest post, the needle point should clear the changer base plate by at least 1/16″, and should not be higher than the turntable top. To adjust the height, shape the top ear of the tone-arm swivel, shown in figure 15 (bending the ear downward raises the tone arm).

To adjust the lift, take the tone arm off the rest post, push the REJ.—AUT.—MAN. control to REJ., and rotate the turntable approximately 1½ turns by

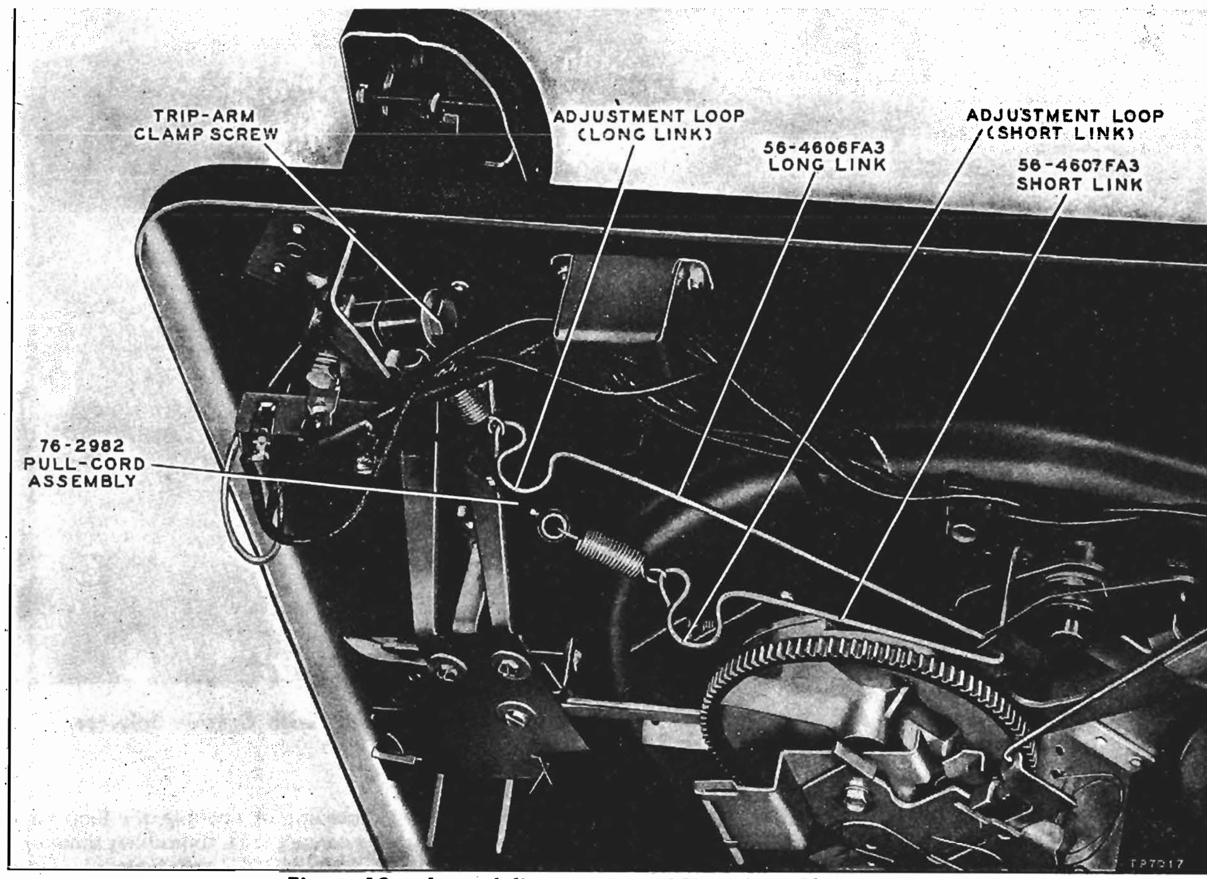


Figure 12. Loop Adjustments and Trip-Arm Clamp Screw

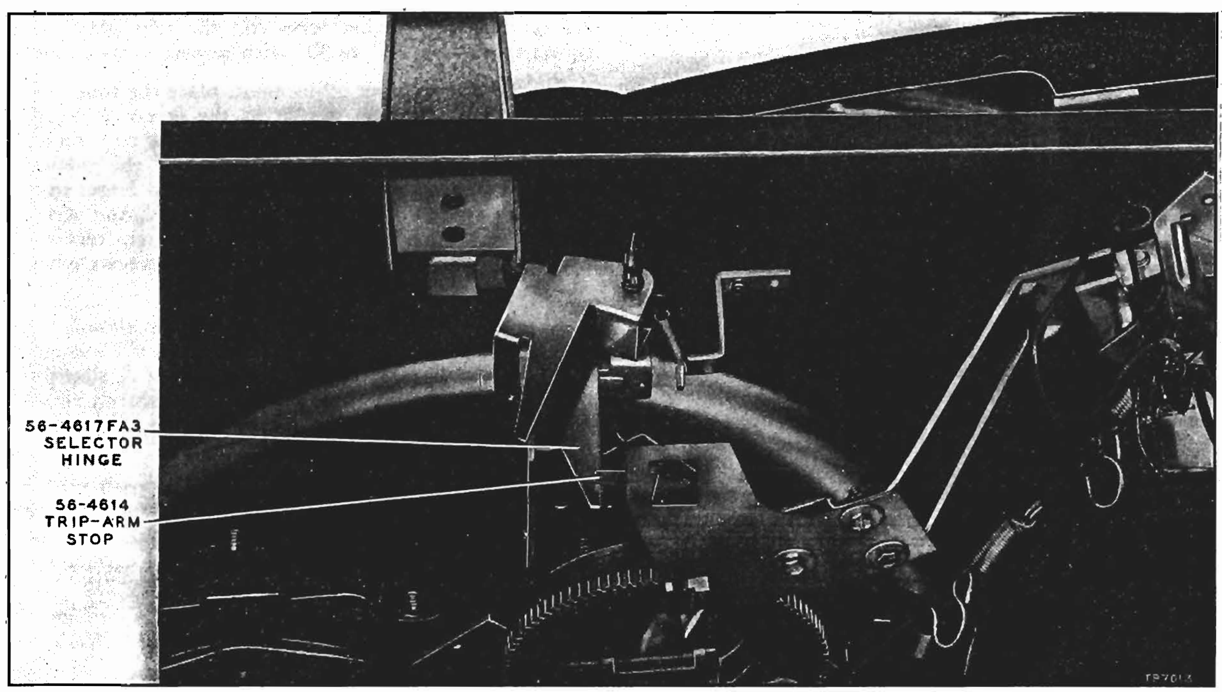


Figure 13. 10″ Indexing Adjustment

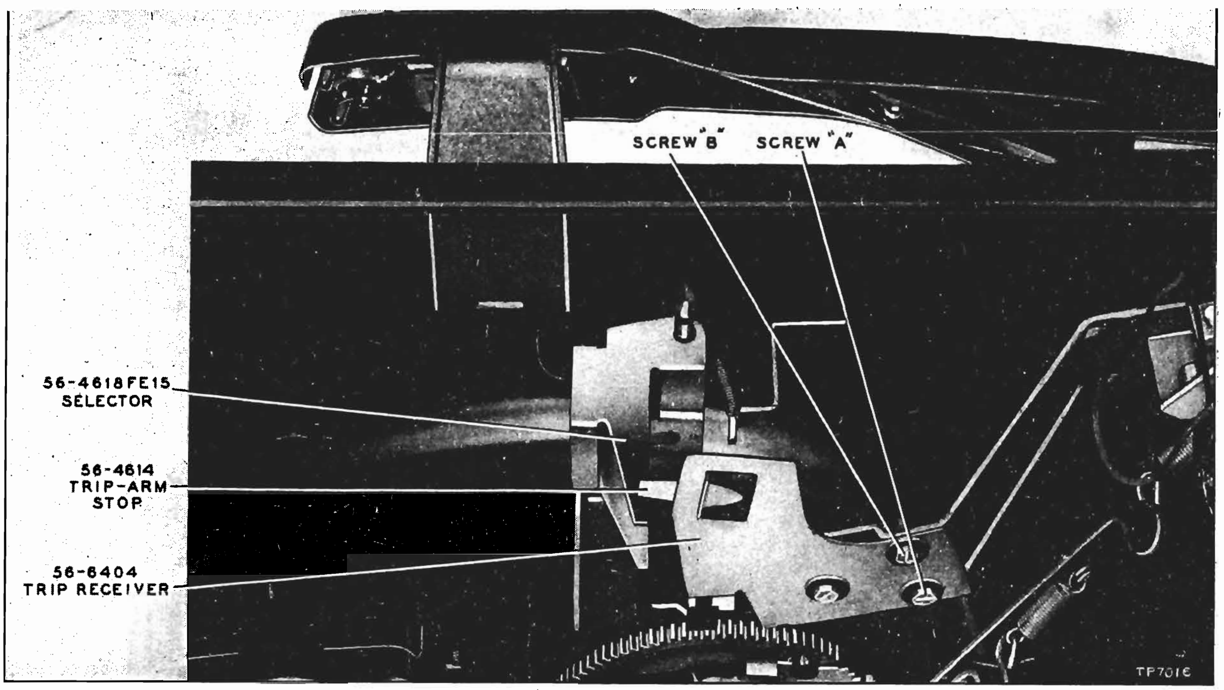


Figure 14. 12″ Indexing Adjustment, Showing Trip Stop Arm in Contact with Outside Selector

hand until the tone arm comes against the rest post. The lower edge of the tone arm should clear the top of the protruding hook on the rest post by not less than 1/8″, and not more than 1/4″. Adjust by shaping the lower ear of the tone-arm swivel, shown in figure 16 (bending the ear downward raises the tone arm).

Tone-Arm Vertical and Horizontal Timing Adjustments

NOTE

Before making these adjustments, make the tone-arm height and lift adjustments given above.

For the vertical adjustment, start with the changer out of cycle. Push the REJ.—AUT.—MAN. control to REJ., and rotate the turntable, by hand, three-quarters of a revolution; this setting can be obtained more accurately by making a mark on the turntable to coincide with some starting point. At the three-quarter-revolution point, the leading edge of the cam surface is approximately 1/4″ from the end of the lift actuator lever, Part No. 76-4193; this is the lower actuator lever, shown in figure 17. Adjust the wire loop of the short link, cord, and spring assembly (figure 12), attached to the tone-arm lift pin, by squeezing or opening the loop until the tone-arm lift pin makes contact with the lower ear of the tone-arm swivel.

For the horizontal adjustment, rotate the turntable another three-quarters revolution from the point at which the vertical adjustment was made. At this point, the leading edge of the cam surface is approximately 1/4″ from the end of the horizontal-return actuator lever; this is the upper actuator lever, Part No. 76-2987, shown in figure 18. Adjust the wire loop of the long link and spring assembly (figure 12), attached to the trip arm, by squeezing or opening the loop until the tone arm makes contact with the rubber bumper on the tone-arm rest post.

Trip-Finger and Trip-Receiver Adjustments

For the trip-finger adjustment, move the tone arm toward the spindle. Adjust the screw on the trip-receiver plate (figure 19) so that the trip finger, when riding over the ratchet screw on the trip plate, assumes an angle of 25° to 30° with respect to the screw.

For the trip-receiver adjustment, place the tone arm on a record with the needle in the eccentric finish groove. The vertical center line of the trip finger should coincide with the center line of the ratchet screw. To adjust the centering of the trip finger over the ratchet screw, loosen screw B slightly, and screw A completely; see figure 19. Rotate the trip receiver about screw B, as a center. Tighten the screws when the trip finger is centered.

Approximately 1/8″ of the trip-arm stop should engage the selector; see figure 19. To adjust the engagement of the trip-arm stop, loosen screw A slightly, and screw B completely. Rotate the trip receiver about screw A, as a center, to obtain the correct adjustment. Tighten the screws.

The above adjustments will affect each other slightly; therefore, it may be necessary to repeat each adjustment until both are correct. After making the above adjustments, it will be necessary to correct the index adjustments.

Record-Shelf Adjustment

Place the shelf in the 10″ position, and the changer out of cycle. Place the Philco record-shelf gauge, Part No. 45-1470 (also used for M-4), over the spindle and

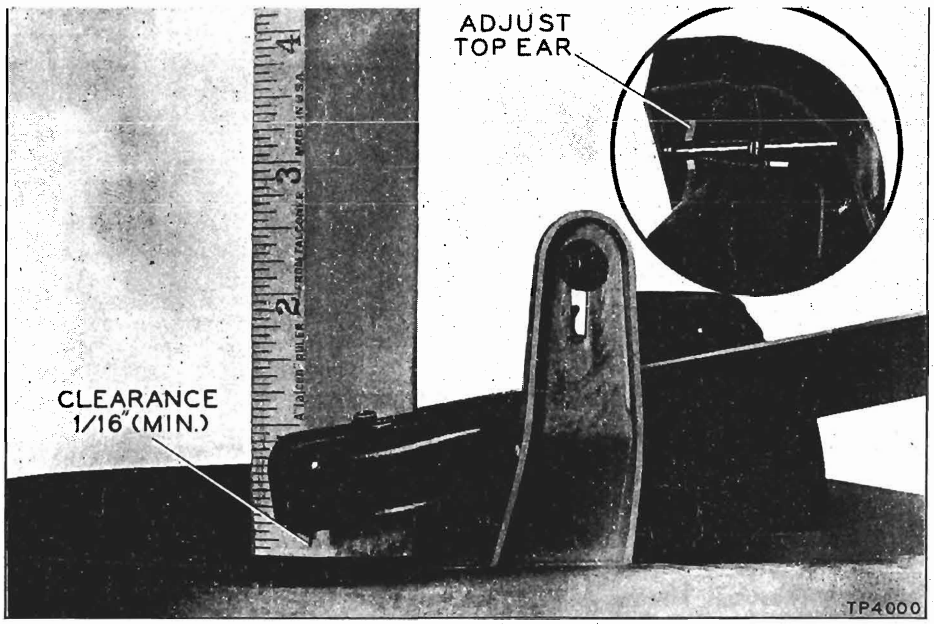


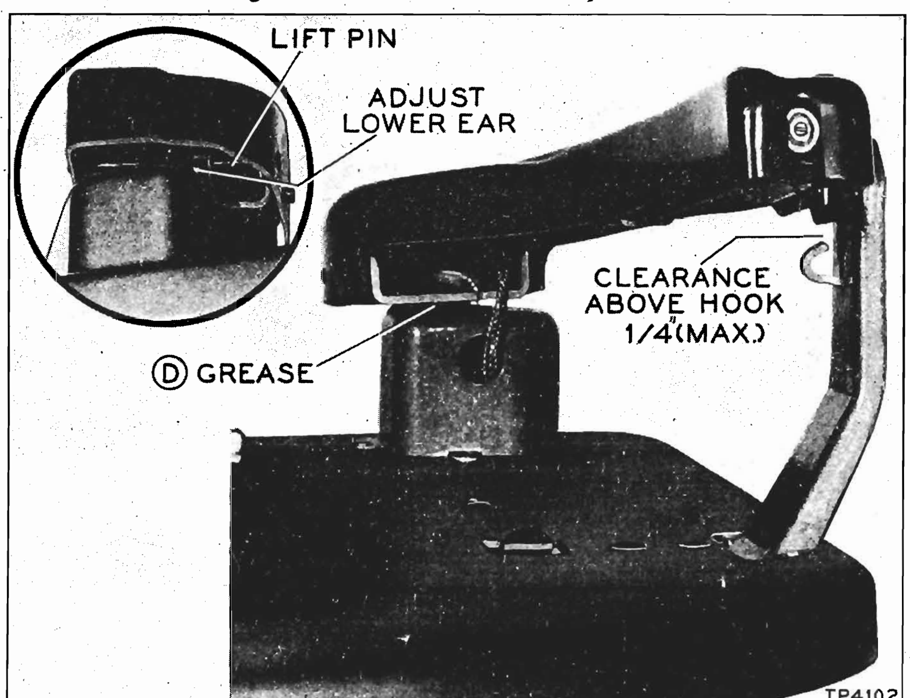
Figure 15. Tone-Arm Height Adjustment

onto the record shelf, as shown in figure 20. Loosen the two hex-head screws which hold the record-shelf assembly to the changer base plate. Move the record-shelf assembly away from the record spindle until the large curved part of the gauge drops even with the record-shelf lips, as shown in figure 20. Now push the record shelf and gauge lightly against the spindle, taking out all play toward the spindle; keep the lips of the record shelf in even contact with the edge of the gauge. Tighten the two hex-head screws.

Push-Off Adjustment

Push the REJ.—AUT.—MAN. control to REJ., and rotate the turntable 2½ revolutions, by hand; at this point, the push-off actuator, Part No. 56-4588FA3, is in its most forward position, in contact with the roller on the cam gear; see figure 21. Loosen the push-off-bar locking screw, shown in figure 21. Squeeze the push-off-bar ears toward each other to the point where the slider blade on the record shelf extends $\frac{1}{32}''$ beyond the lips of the shelf. Tighten the hex-head locking screw.

Figure 16. Tone-Arm Lift Adjustment



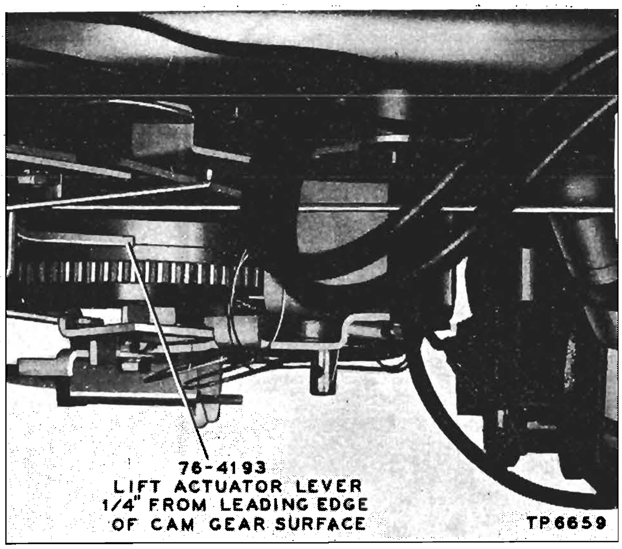


Figure 17. Tone-Arm Vertical Timing Adjustment, Showing Lower Actuator Lever in Contact with Cam Gear

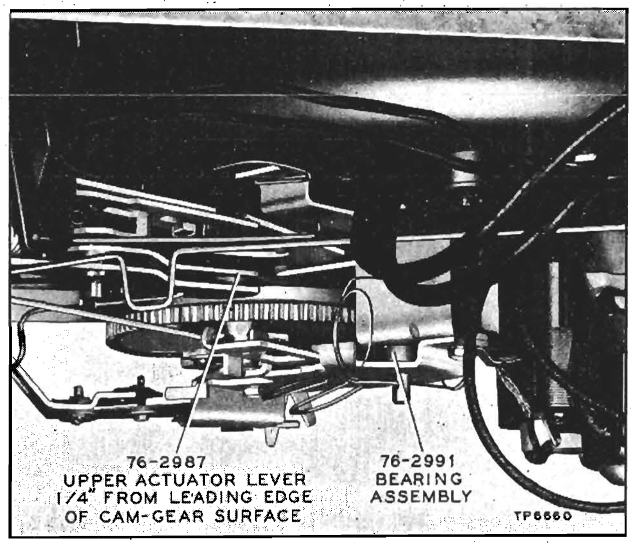


Figure 18. Tone-Arm Horizontal Timing Adjustment, Showing Upper Actuator Lever in Contact with Cam Gear

Uneven Turntable Speed (Wows)

Uneven turntable speed (wows) may be caused by the following:

Dirt under and around the turntable or idler-wheel assembly. Remove the turntable and clean out the dirt. Be careful to lift the turntable straight up after removing the spindle first (see page 12). When replacing the turntable, be sure that the idler is behind the turntable rim before the turntable is fully lowered (the spindle may be used to hold the idler back).

Flat or worn spots, or grease, on the rubber tire of the idler wheel.

Defective turntable shaft or bearing assembly.

Replace the defective parts as directed under REPLACEMENT OF PARTS AND ASSEMBLIES, page 12. If the 33-1/3 r.p.m. speed is incorrect, replace pulley belt, Part No. 45-6479 (remove idler wheel to replace belt).

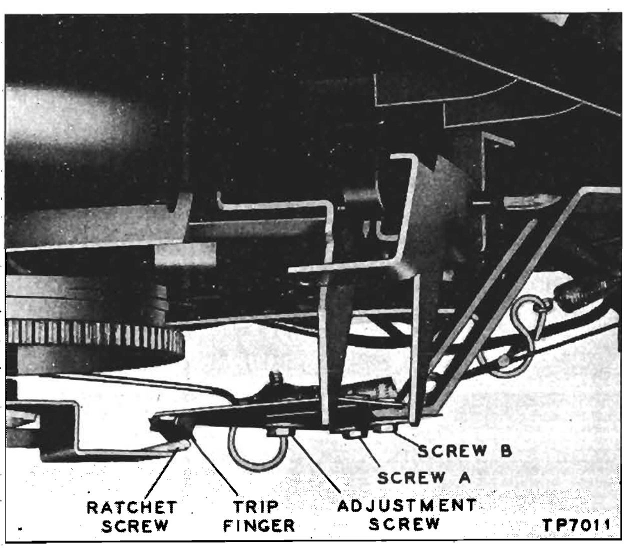


Figure 19. Trip-Finger and Trip-Receiver Adjustments

Figure 20. Shelf Gauge, Shown in Correct Position on Record Shelf and Spindle

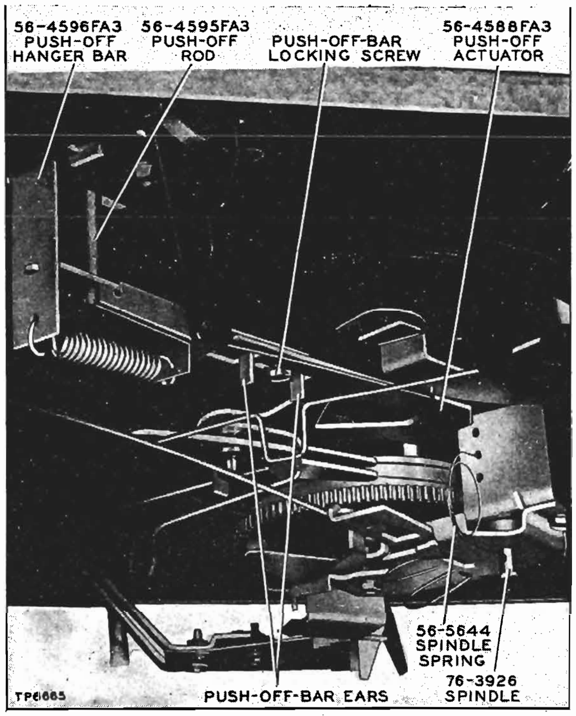


Figure 21. Push-Off Adjustment, Showing Push-Off Actuator in Contact with Roller on Cam Gear

REPLACEMENT OF PARTS AND ASSEMBLIES ON RECORD CHANGER

The following procedures are recommended for correct replacement of parts and assemblies on the record changer. The part should be replaced by reversing the order of removal, and adjusted according to the directions given in the RECORD-CHANGER ADJUSTMENTS section of this manual.

When any part is to be removed, the REJ.—AUT.—MAN. control should be in the AUT. position, and the changer should be out of cycle.

1. Needle, Part No. 45-1597

To remove needle, loosen knurled nut under crystal cartridge, and pull needle out.

2. Crystal-Pickup Cartridge, Part No. 35-2671-1

a. Bring tone arm toward center of turntable.

b. Remove the two screws, nuts, lock washers, and spacers which hold cartridge to tone arm.

c. Drop cartridge below tone arm sufficiently to allow removal of the two clips from cartridge, as shown in figure 22. If pickup leads are shielded, unsolder shield.

NOTE

When mounting cartridge, be sure to insert long spacer in side toward spindle.

3. Spindle, Part No. 76-3926

a. Unhook both ends of spindle spring, Part No. 56-5644, from "U"-shaped bracket mounted under changer base plate (figure 21).

b. Uncoil ends of spring through spindle.

c. Pull out spindle.

4. Motor, Part No. 35-1371

a. Push REJ.—AUT.—MAN. control to MAN. position.

b. Remove spindle as directed in paragraph 3 above.

c. Unsolder motor lead from mercury switch.

d. Disconnect second motor lead by unsoldering it at splice from switch lead. The motor assembly is shown in figure 23.

e. Remove ground lead from lug on motor.

f. Remove the three screws, washers, and bushings from motor frame (figure 23), and lift out motor.

5. Tone-Arm Assembly, Part No. 35-2663-2

a. Unsolder tone-arm leads from terminal panel on underside of changer base plate.

b. Loosen clamp screw which holds trip arm to tone-arm shaft, Part No. 76-2983FA2 (figure 12). Lift out tone arm and shaft. The tone-arm assembly is shown in figure 22.

6. Bridge Assembly, Part No. 76-2978

a. Remove the two hex-head screws from bridge plate.

b. Remove link rod, Part No. 56-4589FA3, from slider control bar. Complete assembly of bridge is shown in figure 24.

7. Trip Plate, Part No. 76-2990

a. Remove bridge assembly, Part No. 76-2978, as directed in paragraph 6 above.

b. Slide trip plate, Part No. 76-2990, off cam-gear spindle.

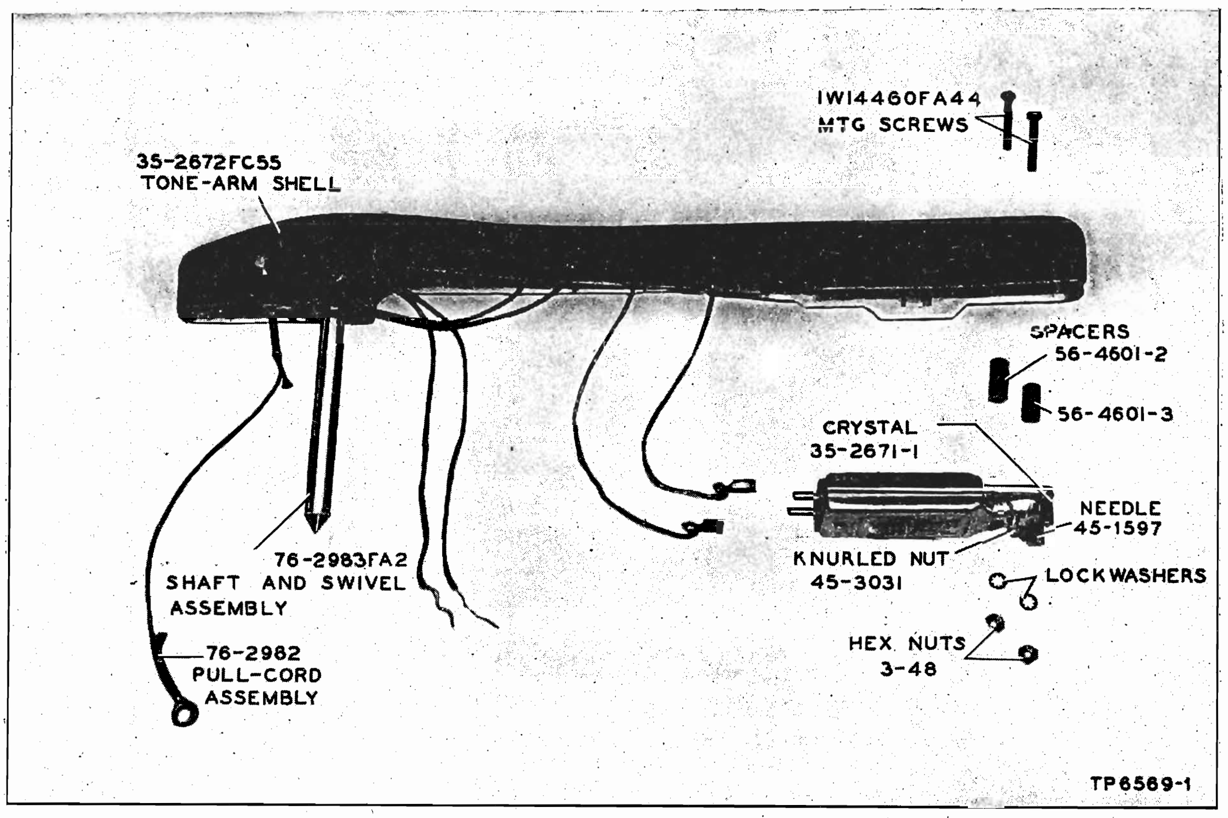


Figure 22. Record-Changer Tone-Arm Assembly, Part No. 35-2663-2

8. Cam-Gear Assembly, Part No. 76-2989

a. Remove bridge assembly and trip plate as directed in paragraphs 6 and 7 above.

b. Remove ball-bearing assembly, Part No. 76-2991 (figure 18), by pulling it off.

c. Remove large "E" washer, Part No. 1W60980FE5, from cam-gear spindle, and slide off cam washer, Part No. 1W52627.

d. Slide cam gear off spindle. The cam-gear assembly is shown in figure 25.

9. Tone-Arm-Actuator Levers, Part No. 76-2987

a. Remove "E" washer, Part No. 1W60980FE5, from actuator stud.

b. Disengage short link, Part No. 56-4607FA3, from link spring.

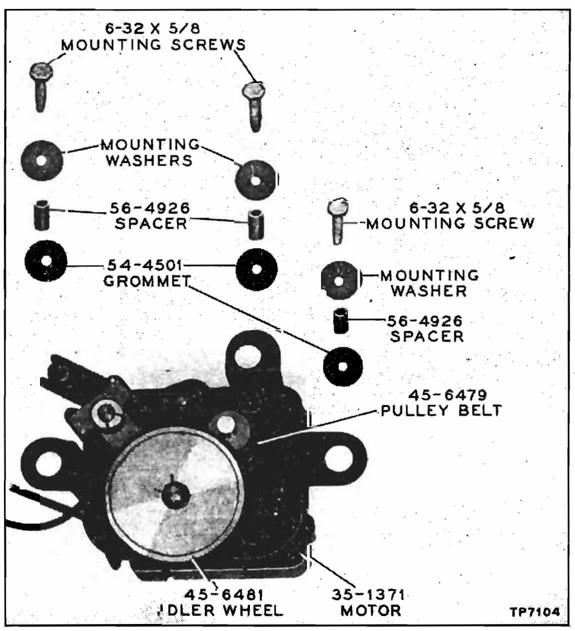


Figure 23. Motor Assembly

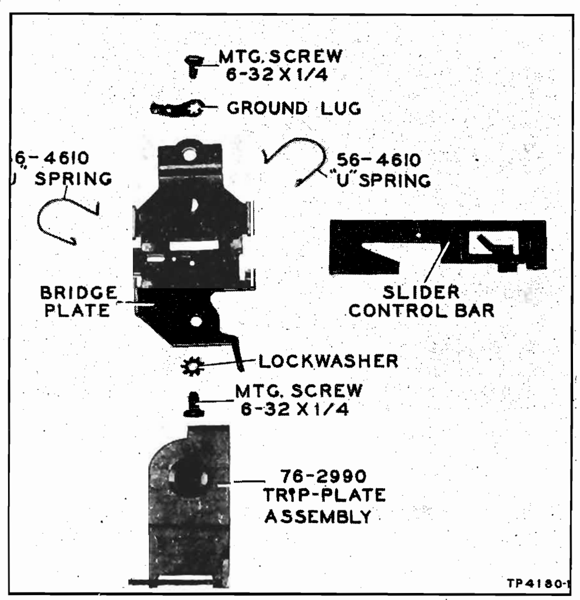


Figure 24. Bridge Assembly

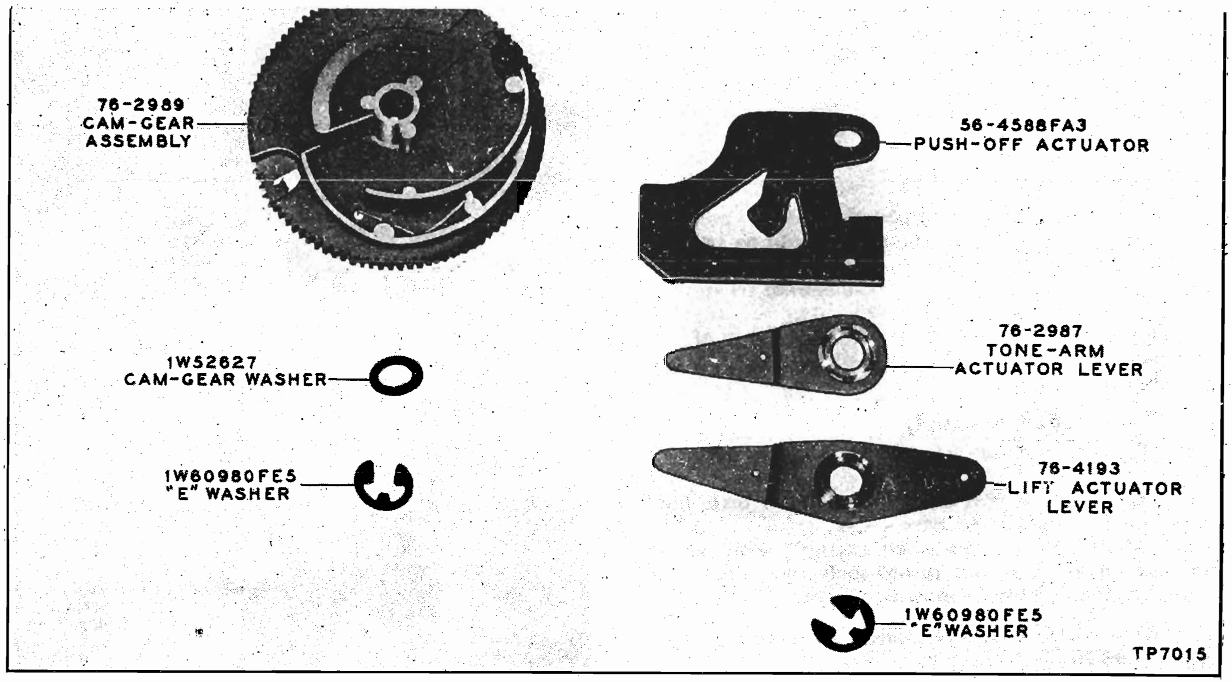


Figure 25. Cam-Gear Assembly and Actuator Levers

c. Slide lower actuator lever from stud.

d. Disengage lifter link, Part No. 56-5990, from actuator lever.

e. Remove upper actuator lever from stud, and disengage long link, Part No. 56-4606FA3. The actuator-lever assembly is shown in figure 25.

10. Push-Off Actuator, Part No. 56-4588FA3

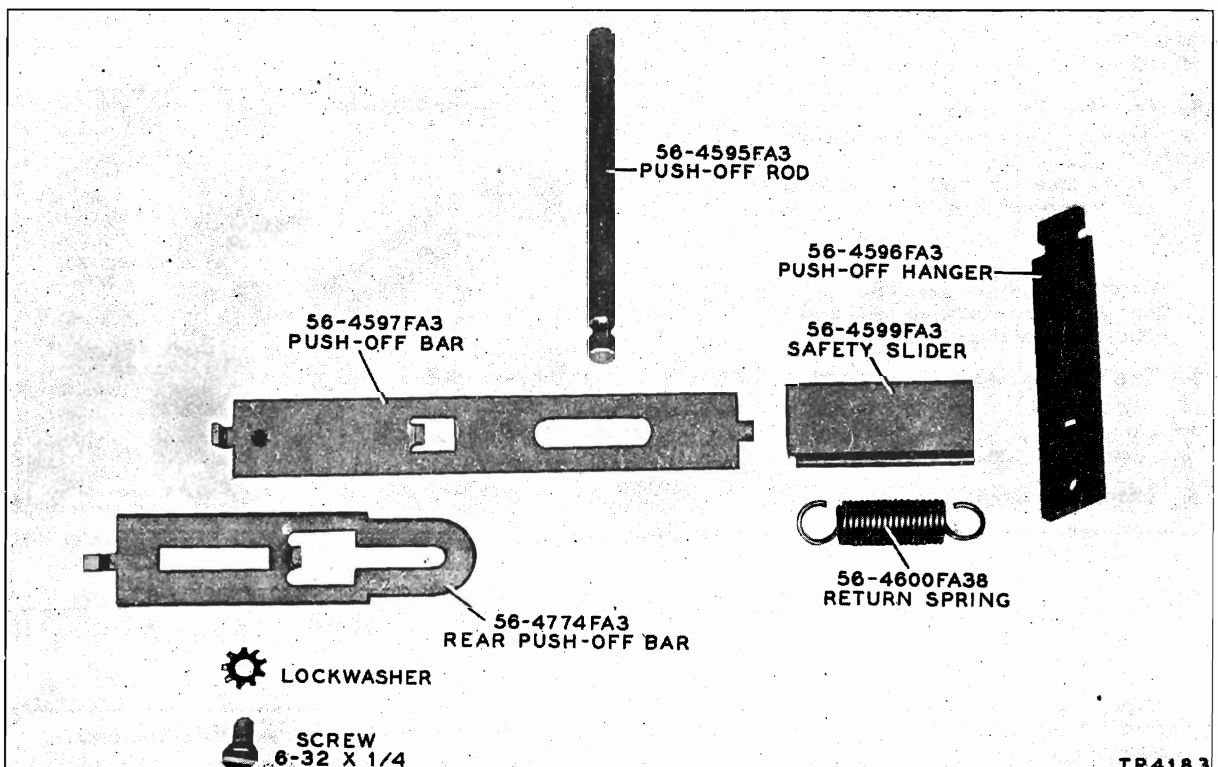
a. Remove selector lever, Part No. 56-5985, as directed on page 20, paragraph 8.

b. Remove tone-arm actuator levers as directed in paragraph 9 above.

c. Press push-off rod, Part No. 56-4595FA3, and push-off hanger bar, Part No. 56-4596FA3 (figure 21), together and pull downward, to release the entire assembly.

d. Slide push-off actuator, Part No. 56-4588FA3, over, to align upturned ears with cut out in base plate. Slide actuator off stud.

Figure 26. Push-Off Assembly



NOTE

After removing the push-off actuator and push-off-bar assembly, the slider blade on the record shelf may slide out of the assembly. When reassembling, this blade should be inserted in the record-shelf assembly, with the elongated hole toward the 12″ position of the record shelf. The push-off assembly is shown in figure 26.

11. Record-Shelf Assembly

a. Remove push-off assembly as directed in step c of paragraph 10.

b. Remove the two hex-head screws which hold record-shelf assembly to base plate.

c. Align ears on record-shelf assembly with cut out on base plate. Lift out record-shelf assembly. The record-shelf assembly is shown in figure 27.

12. REJ.—AUT.—MAN. Control Assembly, Part No. 54-4479-1

a. Remove flat spring, Part No. 56-4778FA38, by sliding it laterally through underside of button (figure 21).

b. Remove the two hex-head screws, and drop bridge assembly, Part No. 76-2978.

c. Disengage control link, Part No. 56-4589FA3, from underside of control button (figure 8). Lift out control button.

13. STD. PLAY—LONG PLAY Control, Part No. 54-4634

a. Remove flat spring, Part No. 56-4778FA38, by sliding it laterally through underside of button.

b. Remove selector lever, Part No. 56-5985, as directed in paragraph 8, page 20.

c. Disengage selector link, Part No. 56-5991, from selector lever (figure 8).

d. Lift out control button.

14. Trip-Arm Assembly

a. Loosen clamp screw on trip arm, Part No. 76-4204 (figure 12).

b. Raise tone arm and shaft sufficiently to clear trip arm. Remove trip arm, and disengage link spring.

NOTE

When assembling, maintain 1/32″ vertical play (clearance between trip arm and base plate) in tone-arm shaft.

15. Trip-Receiver Assembly, Part No. 56-6404

a. Remove the three screws, washers, and nuts from trip arm (figure 28).

b. Remove trip receiver.

16. Selector Assembly

Remove cam gear as directed in paragraph 8. Remove feeler spring from attachment point on motor board. Tilt selector assembly, and remove from base plate.

NOTE

When assembling selector assembly, be sure to maintain .005″ clearance between selector hinge, Part No. 56-4617FA3, and washer, Part No. 2W53954. For correct assembly, refer to figure 29.

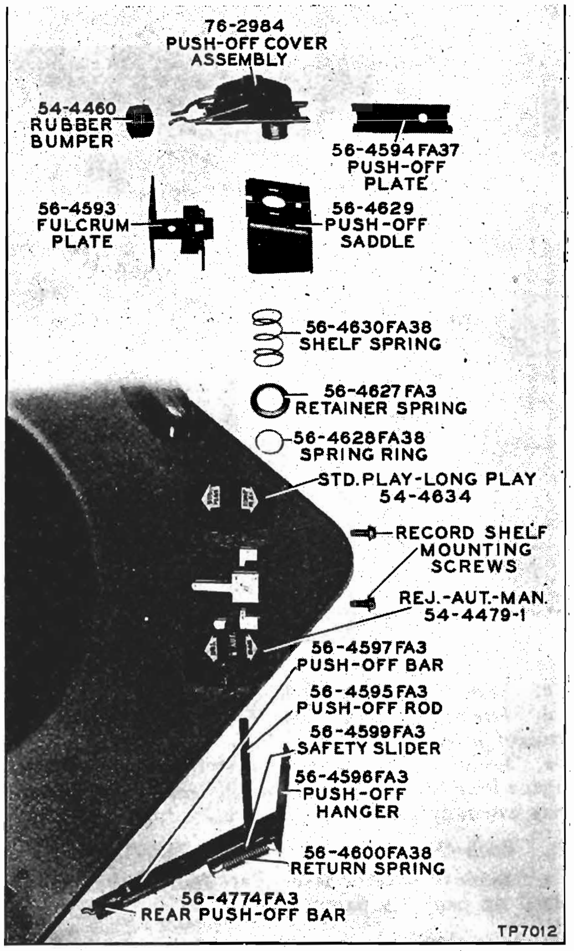


Figure 27. Record-Shelf Assembly

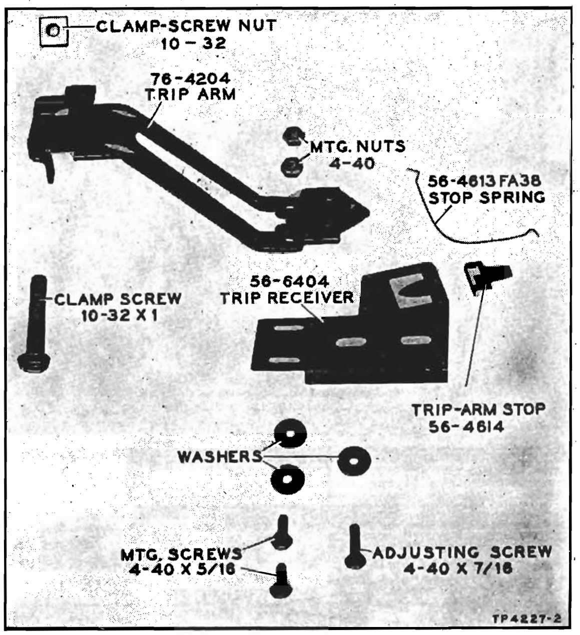


Figure 28. Trip-Arm and Trip-Receiver Assemblies

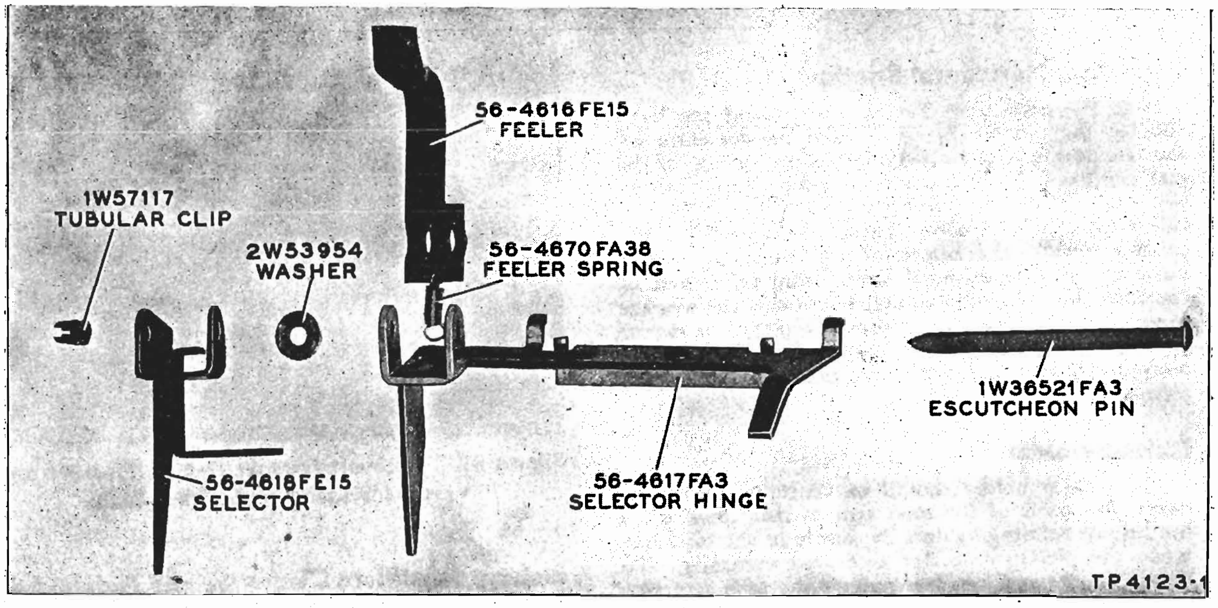


Figure 29. Selector Assembly

RECORD-PLAYER TESTING AND TROUBLE-SHOOTING PROCEDURE

Pick-Up and Needle Test

Place a 12″ Columbia Long Playing Record on the turntable, lift the tone arm from the rest post, and place it on the starting groove of the record. Listen to the tone of the record. If distortion is noted, replace crystal cartridge as directed on page 12. If trouble persists, check for loose wiring, bad contact points, etc.

Shut-Off Test

Place the tone arm in the finish groove of the record and observe the shut-off action. The record player should shut off within three revolutions of the turntable, after the pickup needle has entered the finish groove of the record. The trip adjustments are shown on page 9.

Clearance Test

Remove the record from the turntable and place the tone arm over the base plate. Observe whether there is a minimum of $\frac{1}{16}$″ clearance between the needle point and base plate. Refer to page 7 for adjustment.

Turntable and Motor Test

Allow the motor to run for at least five minutes; then place a stroboscope, such as Philco Part No. 45-1614, on the turntable, and illuminate the disc with a lamp operating on 60-cycle a.c. The dots in the row calibrated for 33⅓ r.p.m. should appear to remain stationary or to drift very slowly, but smoothly, forward and backward. If the dots are moving in either direction very fast or with a jerky motion, refer to UNEVEN TURNTABLE SPEED (WOWS), page 11.

RECORD-PLAYER ADJUSTMENTS

Tone-Arm Needle Pressure and Vertical Friction

Hold the Philco Gram Scale, Part No. 45-9531, on its side and set the pointer to the center line of the scale. This is the 0 point, and each small division on either side of 0 is equal to one gram. After the scale has been set to 0, place it on the turntable with the guard on the scale in an open position, at right angles to the scale, as shown in figure 30. Now set the needle of the tone arm into the hole at the end of the pointer and observe the reading on the scale. This reading is the needle pressure; the correct needle pressure is 6 to 7½ grams.

To determine the vertical friction proceed as follows: Press down on the head of the pickup, then let it return to its normal position, and note the reading. Raise the pickup slightly, then gently lower it to the normal position, and again note the reading. The vertical friction is the difference between the two readings obtained. For example: if the scale reading is 7¼ grams after the pickup is depressed and released, and is 6¾ grams after the pickup is raised and lowered, the vertical friction is 7¼ minus 6¾ or ½ gram. The vertical friction should not exceed 2½ grams.

Tone-Arm Horizontal Friction

Hold the gram scale flat in the palm of the hand and set the pointer to "0". Take the tone-arm off the rest post, and place a counterweight on top of the rear end until the tone arm is balanced in a horizontal position. Place the pointer of the scale against the side of the pickup head (figure 31) and move the pickup toward the center of the turntable. Then move the pickup outward, away from the center of the turntable. The horizontal friction is the average of the two readings taken, when the pickup is moved both inward and outward. At no time should it take more than 2 grams pressure on the pointer to move the tone arm.

Pickup Holder

The pickup holder should be centrally spaced between the walls of the tone arm so that there is no binding or rubbing against the inside of the tone arm when the pickup cartridge is moved vertically. To obtain proper spacing, first remove the tone arm (see page 19); loosen the screw which holds the pickup bracket mounting. Move the mounting until it is centrally spaced between the walls of the tone arm, and maintain $1/32''$ clearance between the tip of the ears on the holder and the inside surface at the front end of the tone arm, as shown in figure 33.

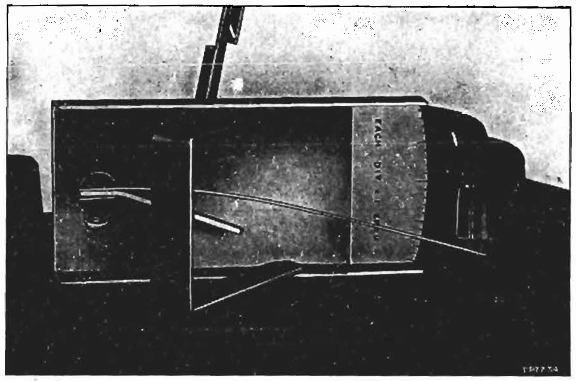


Figure 30. Measurement of Needle Pressure and Vertical Friction with Gram Scale

Pickup-Base-Plate Clearance and Height Adjustment

With the tone arm off the rest post and resting over the base plate, the needle should be at least $1/16''$ and not more than $3/16''$ above the base plate, as shown in figure 34. To adjust, grasp the tone arm and raise or lower (whichever is required) with a little pressure

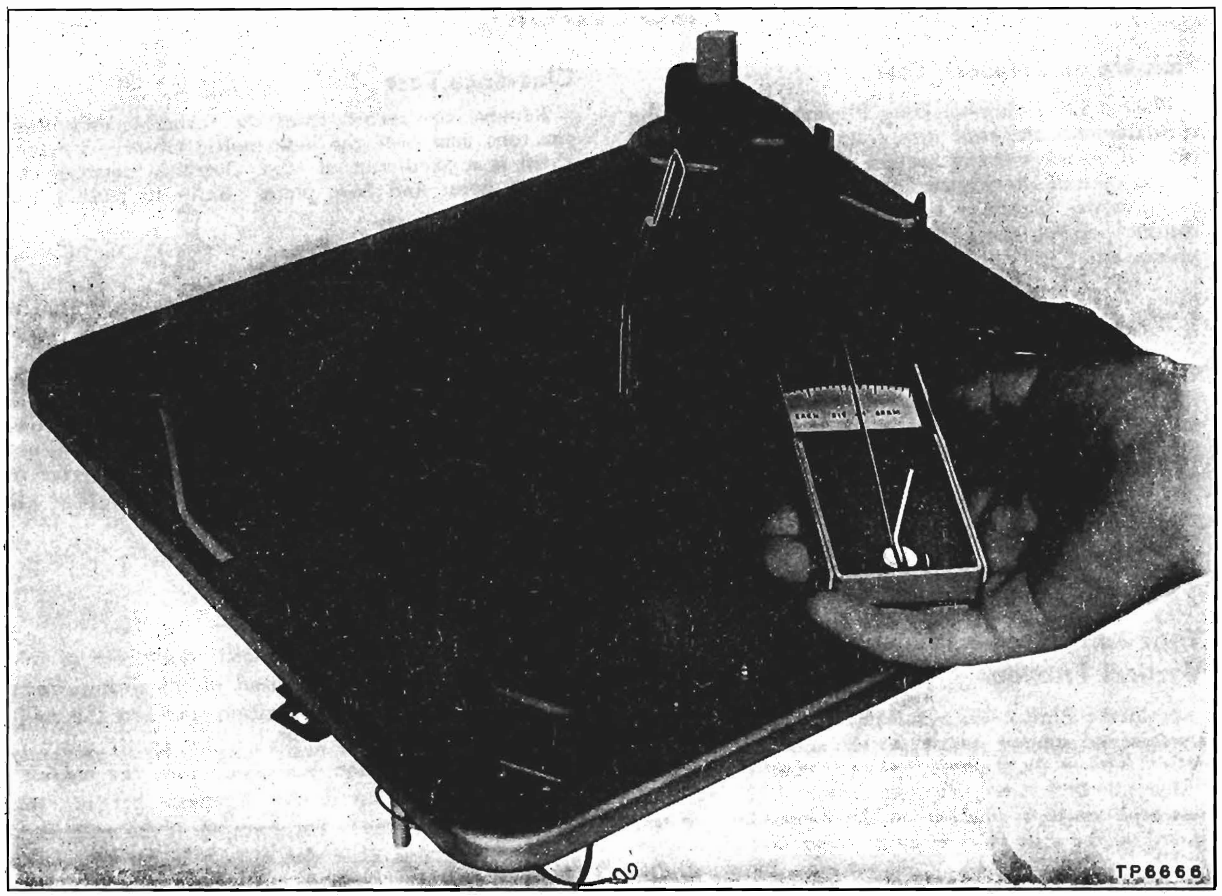


Figure 31. Measurement of Horizontal Pressure

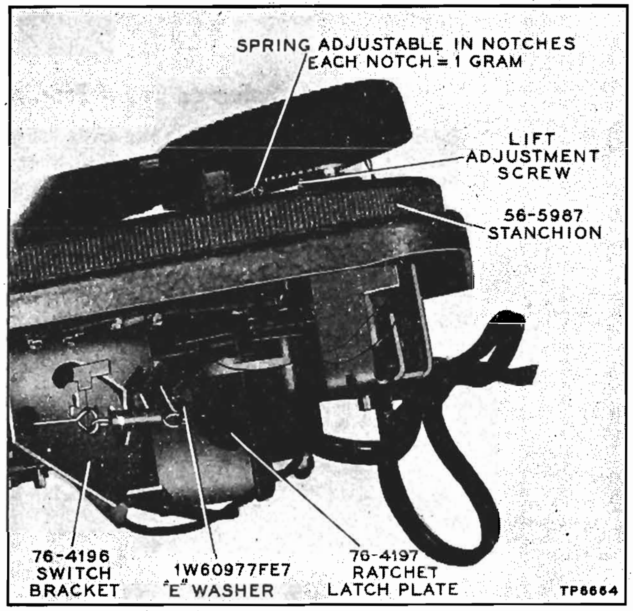


Figure 32. Needle-Pressure Adjustment

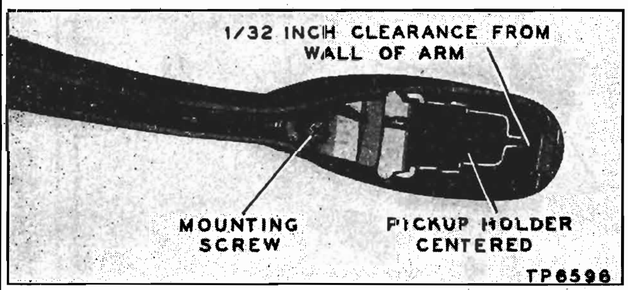


Figure 33. Pickup-Holder Adjustment

to obtain the correct clearance. Then adjust the screw on the pivot assembly (figure 32) so that the tone arm will clear the rest hook on the stanchion, Part No. 56-5987.

Trip-Switch Adjustments

With the tone-arm on the rest post, the mercury switch attached to the bracket-and-clip assembly, Part No. 76-4195, should be in a horizontal or ON position, as shown in figure 8. To adjust, loosen the reset-trip-arm clamp screw (figure 35), and while holding the tone arm on the rest post, move the trip arm until the leg on the reset trip arm engages the bracket-and-clip ear, and at the same time, the long ear of the bracket and clip is approximately $\frac{1}{32}''$ above the cut-out notch on the ratchet-plate assembly, Part No. 76-4197, as shown in figure 35.

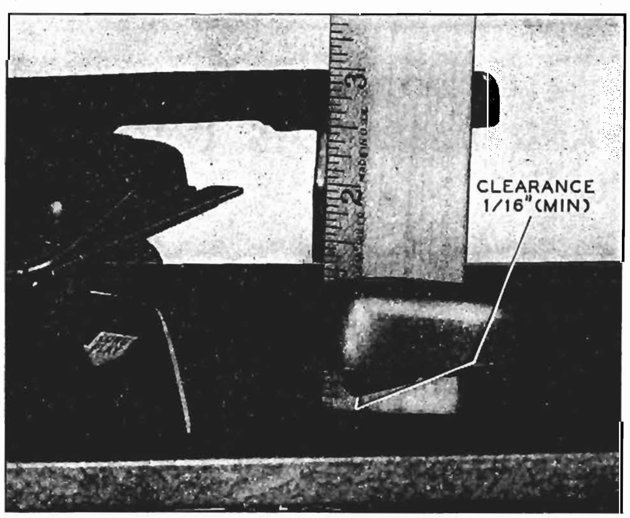


Figure 34. Tone-Arm Height Adjustment

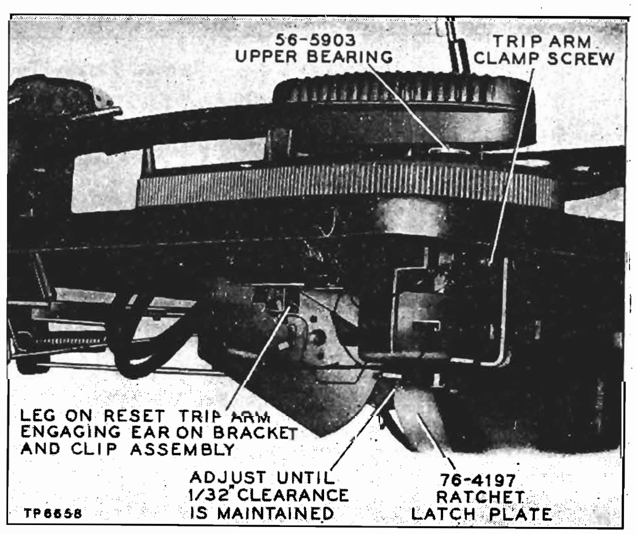


Figure 35. Trip-Switch Adjustment

Trip-Finger Adjustments

Place the tone-arm needle in the finish groove of a record, and observe the trip finger riding over the ratchet on the ratchet-plate assembly, Part No. 76-4197. The trip finger should assume an angle of 25° to 30° while riding over the ratchet, as shown in figure 7. Adjust the screw on the trip-arm receiver to obtain the proper angle.

Selector-Lever Stop Adjustment

The selector-lever "throw" is adjusted by loosening the screw in the lock plate, Part No. 56-5986 (figure 11), and centering the lock plate so that when the STD. PLAY—LONG PLAY control is in either position, the shift lever on the motor will not bind against either side.

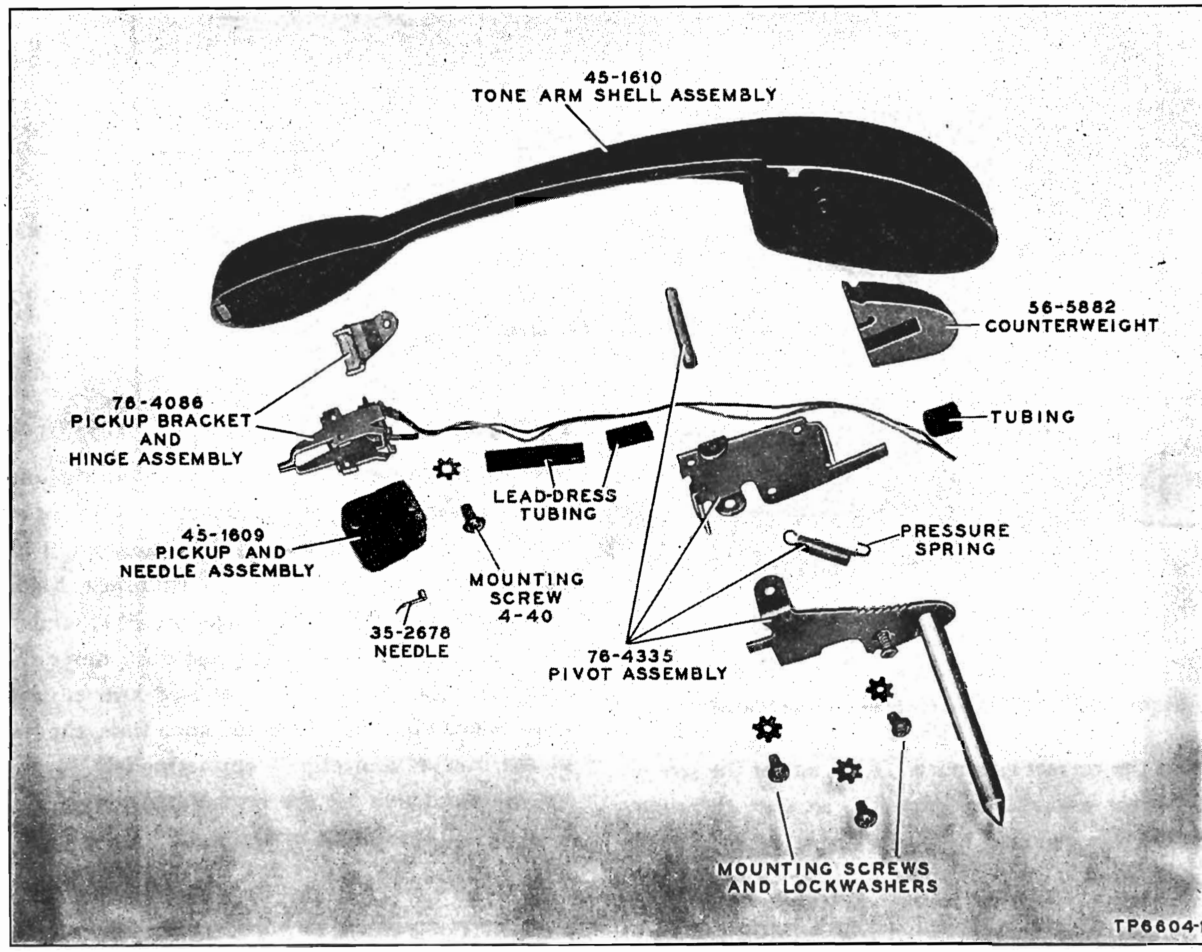


Figure 36. Record-Player Tone-Arm Assembly, Part No. 35-2686

REPLACEMENT OF PARTS AND ASSEMBLIES ON RECORD PLAYER

1. Crystal-Cartridge Assembly, Part No. 45-1609

To remove the crystal cartridge, grasp the crystal by its sides, and pull it down and out. When replacing the cartridge, push it up into the head of the tone arm, until it is seated in position.

2. Tone-Arm Assembly, Part No. 35-2686

a. Unsolder tone-arm leads from terminal panel on underside of changer base plate. The tone-arm assembly is shown in figure 36.

b. Unhook pull cord, Part No. 76-2982-1, from spring and link assembly, Part No. 56-5990 (figure 9).

c. Loosen clamp screw which holds reset trip arm to tone-arm shaft.

d. Lift out tone arm.

3. Tone-Arm Thrust Bearing, Part No. 56-5916

a. Remove tone arm as directed in paragraph 2 above.

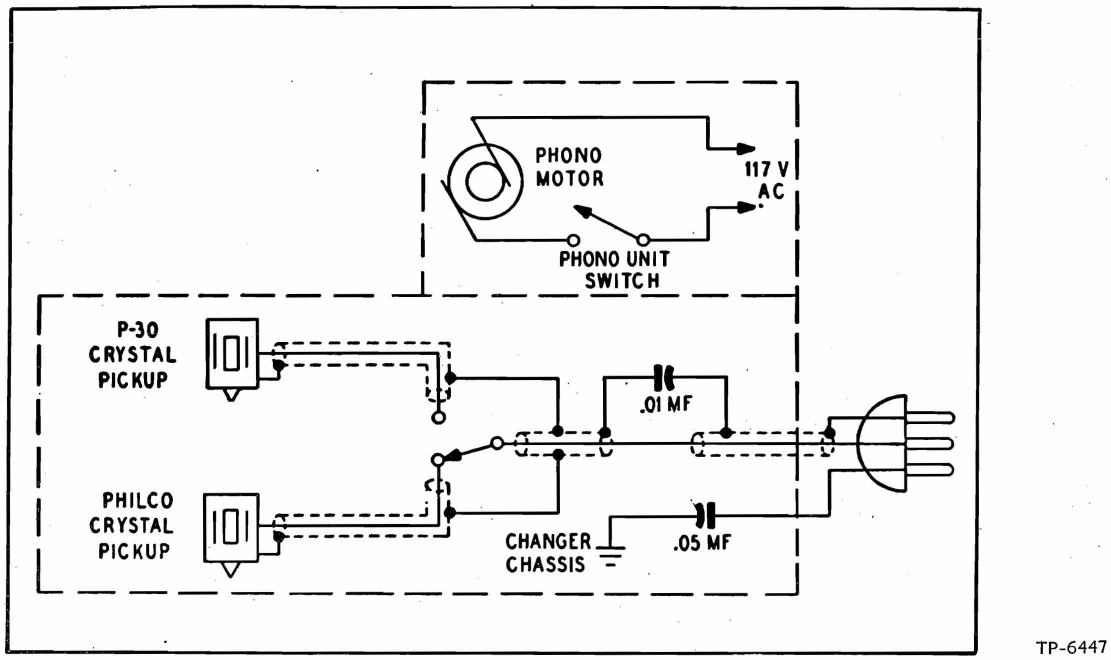


Figure 37. Model M-9C, Wiring Diagram

b. Remove "E" washer, Part No. 1W60977FE7, from bearing shaft (figure 8).

c. Lift bearing out of rubber grommet, Part No. 27-4099-3, mounted on tone-arm-shaft support.

4. Tone-Arm Stanchion, Part No. 56-5987

a. Remove tone arm as directed in paragraph 2 above.

b. Remove hex-head screw from each end of tone-arm stanchion, under changer base plate.

c. Lift out stanchion (figure 7).

5. Tone-Arm Upper Bearing, Part No. 56-5903

a. Remove tone-arm stanchion, Part No. 56-5987, as directed in paragraph 4 above.

b. Remove "E" washer, Part No. 1W60981FE7, from bearing shaft mounted on tone-arm stanchion (figure 35).

c. Remove bearing from grommet, Part No. 54-4624, by sliding it out from underside of stanchion.

6. Ratchet Latch Plate, Part No. 76-4197

a. Remove "E" washer, Part No. 1W60977FE7, from switch bracket, Part No. 76-4196 (figure 32).

b. Slide ratchet plate off switch bracket.

7. Switch Bracket, Part No. 76-4196

a. Remove mercury switch, Part No. 76-2140-2, from clip.

b. Unhook pull-cord spring, Part No. 76-2982-1, from link.

c. Remove two hex-head screws which hold switch bracket to base plate.

d. Unhook link from actuator.

8. Selector Lever, Part No. 56-5985

a. Remove "E" washer, Part No. 1W60977FE7, from stud which mounts selector lever, Part No. 56-5985, underneath base plate (figure 11).

b. Remove spring washer, Part No. 1W56306FE15, from stud.

c. Remove "U"-shaped spring, Part No. 56-5995, between selector lever and base plate.

d. Loosen lock-plate screw (figure 11).

e. Loosen motor-mounting screws and cock motor to one side.

f. Set STD. PLAY—LONG PLAY control to STD. PLAY position.

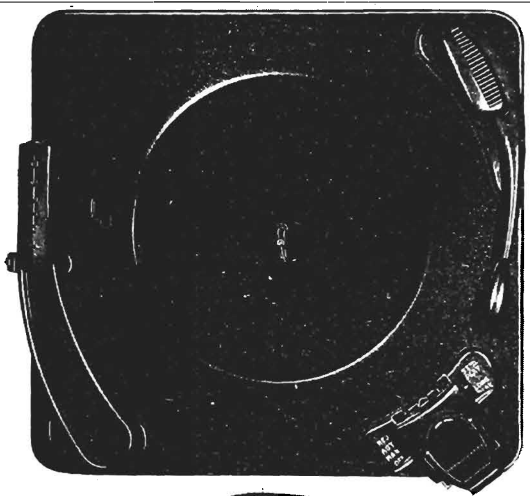
g. Align ears of selector lever with cut out on base plate, and pull out selector lever from stud on underside of base plate.

h. Disengage selector lever from control-button link.

MODEL M-9C PHILCO CORP.

REPLACEMENT PARTS LIST

Service Part No.	Description
35-1371	Motor
35-2663-2	Tone-arm assembly, record changer
35-2671-1	Crystal, standard
35-2672FC55	Tone-arm shell
35-2678	Needle for special crystal
35-2686	Tone-arm assembly, record player
35-3066-2	Turntable
41-3869-2	Cable and plug
42-1750-3	Switch, motor
42-1873	Switch
45-1597	Needle
45-1609	Pickup-and-needle assembly
45-1610	Tone-arm assembly (shell)
45-3031	Nut, knurled
45-6479	Pulley belt
45-6481	Idler wheel
54-4479-1	Control, REJ.—AUT.—MAN.
54-4460	Bumper
54-4501	Motor-mounting grommet
54-4634	Control, STD. PLAY—LONG PLAY
54-7613	Trip finger
56-1880	Cover, switch
56-2832FA3	Clamp, cable
56-4585FA3	Index lever
56-4588FA3	Actuator, push-off
56-4589FA3	Link, control
56-4593	Plate, fulcrum
56-4594FA37	Plate, push-off slide
56-4595FA3	Rod, push-off
56-4596FA3	Hanger, push-off
56-4597FA3	Bar, push-off
56-4599FA3	Slider, safety
56-4600FA38	Spring, return
56-4601-2	Spacer
56-4601-3	Spacer
56-4603FA38	Index spring
56-4604FE15	Pin, tone-arm pivot
56-4606FA3	Link, long
56-4607FA3	Link, short
56-4608FA38	Spring
56-4610	Spring, "U" (bridge assembly)
56-4613FA38	Stop spring
56-4614	Trip-arm stop
56-4616FE15	Feeler (selector assembly)
56-4617FA3	Hinge (selector assembly)
56-4618FE15	Selector
56-4626-1FA7	Record shelf
56-4627FA3	Retainer, spring (record-shelf assembly)
56-4628FA38	Spring, ring
56-4629	Saddle, push-off (record-shelf assembly)
56-4630FA38	Spring, record shelf
56-4631FA15	Pin, tone-arm lift
56-4670FA38	Spring, feeler (selector assembly)
56-4774FA3	Bar, push-off (rear)
56-4778FA38	Spring, control knob
56-4926	Spacer, motor
56-5644	Spring, spindle
56-5882	Counterweight
56-5903	Bearing, upper
56-5916	Thrust bearing
56-5981	Trip receiver, record-player tone arm
56-5985	Lever, selector
56-5986	Plate, lock
56-5987	Stanchion, record-changer tone arm
56-5990	Link, lifter
56-5991	Link, selector
56-5995	Spring, "U" (selector lever)
56-6404	Trip receiver, record-player tone arm
76-2140-2	Switch, mercury
76-2978	Bridge assembly
76-2982	Pull-cord assembly, record-changer tone arm
76-2982-1	Pull-cord assembly, record-player tone arm
76-2983FA2	Shaft and swivel, record-changer tone arm
76-2984	Push-off, cover
76-2987	Actuator lever, record-changer tone arm
76-2989	Cam-gear assembly
76-2990	Trip-plate assembly
76-2991	Bearing assembly
76-3926	Spindle
76-4086	Bracket (pickup and hinge)
76-4192	Base plate
76-4193	Actuator, lift lever
76-4194	Trip-switch assembly
76-4195	Bracket-and-clip assembly
76-4196	Switch-bracket assembly
76-4197	Ratchet latch plate
76-4198	Reset trip arm
76-4204	Trip arm (subassembly)
76-4335	Pivot assembly, record-player tone arm
1W14460FA44	Screw (3-48x5/8"), crystal mounting
1W36521FA3	Pin, escutcheon
1W52627	Cam-gear washer
1W56306FE15	Spring washer, selector-lever assembly
1W57117	Tubular clip
1W60977FE7	"E" washer (for selector lever, ratchet plate, and thrust bearing)
1W60980FE5	"E" washer (for cam and actuator stud)
1W60981FE7	"E" washer (for upper bearing)
2W53954	Washer, selector assembly



INTRODUCTION

The Philco DeLuxe Automatic Record Changer and Record Player Combination, Model M-12C, is used in several Philco Radio-Phonograph combinations. It incorporates two tone arms. The changer tone arm is used with the record-changer mechanism to play ten 12″ records or twelve 10″ records, automatically, at the standard speed of 78 r.p.m. The long-play tone arm is used with the manual record player, which plays the new Columbia Long-Playing Records (33⅓ r.p.m.). This tone arm employs the new Philco Balanced-Fidelity Reproducer, which applies the extremely low needle pressure of ⅕ ounce. The motor is shut off automatically at the end of the record.

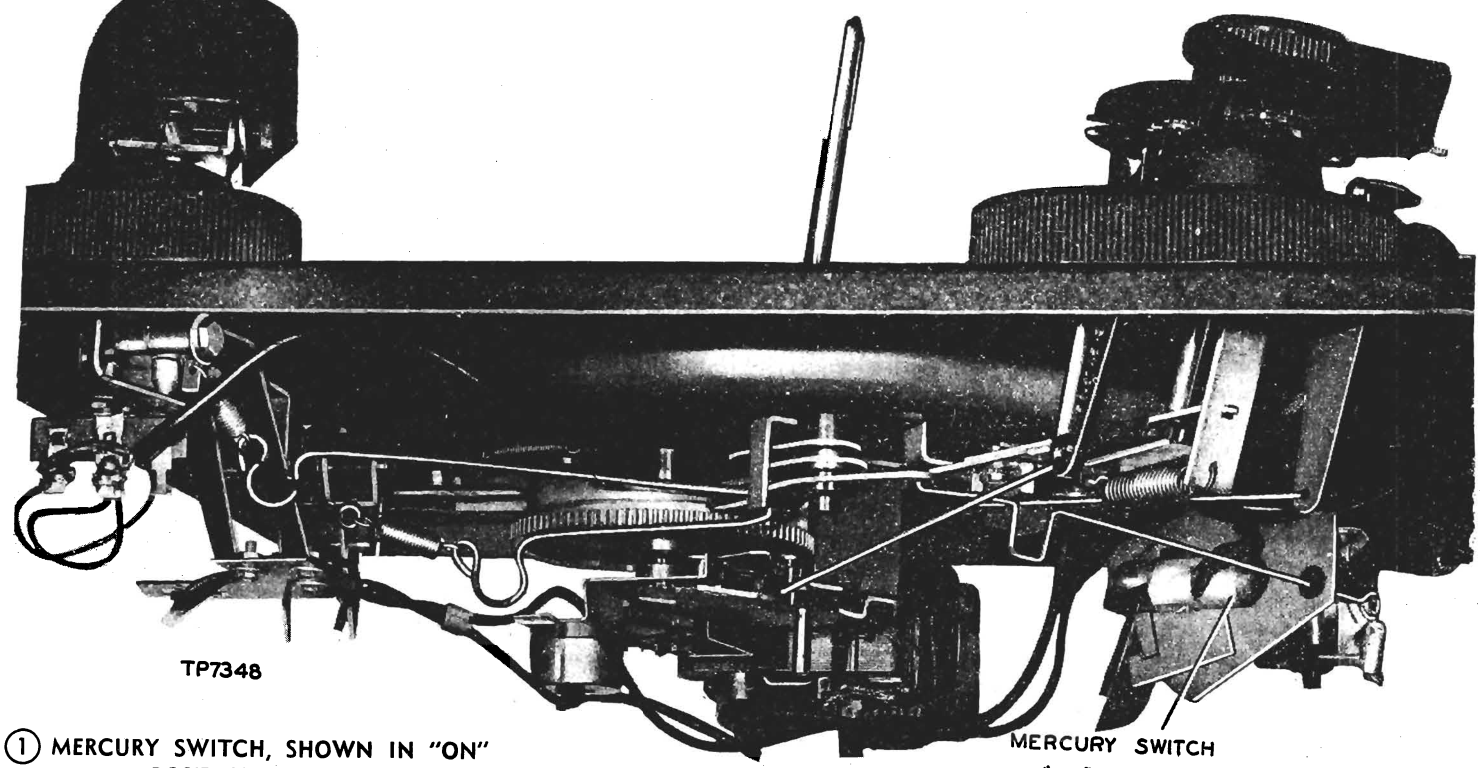


FIGURE 1 MERCURY SWITCH, SHOWN IN "ON" POSITION

DESCRIPTION OF OPERATING CYCLES

Power for the motor is obtained through two switches connected in series electrically. One is an on-off switch mounted on the bridge assembly, Part No. 76-3998 (figure 7), and is operated manually by the control button with positions OFF, MAN, AUT, and REJ. This button is located to the left of the record-shelf assembly on the top of the record changer.

The other switch is a mercury-type switch, mounted on a switch bracket, and is operated by the long-play tone arm. When the tone arm is on the rest post, a leg on the reset trip arm, connected to the tone-arm shaft, is in contact with an ear on the bracket-and-clip assembly to which the mercury switch is attached, and the switch is set in the "on" position (figure 1); when the switch is in this position, the motor circuit is controlled by the OFF-MAN-AUT-REJ control.

When the long-play tone arm is placed on a record, the mercury switch is held in the "on" position by a ratchet latch plate mounted on the switch-bracket assembly (figure 20); this ratchet plate has a cutout, in which rests a protruding ear of the bracket-and-clip assembly which contains the mercury switch. As the tone arm enters the finish groove of a record, a trip finger (attached to the reset trip arm) rides over the ratchet latch plate and trips it; this releases the bracket-and-clip assembly, causing the mercury switch to tip into the "off" position (see figure 2), thus opening the motor circuit and stopping the turntable.

The record changer has two speeds, controlled by the play control button, with positions ST'D PLAY and LONG PLAY. This button is located to the right of the record-shelf assembly on the top of the record changer. When the play control is set to ST'D PLAY, the idler wheel on the motor engages the motor shaft directly, driving the turntable at a speed of 78 r.p.m. When the play control is set to LONG PLAY, a selector link, one end of which is attached to the base of the control under the changer, actuates a selector lever mounted on the changer base plate. This selector lever engages a shift lever mounted on the motor (figure 3). A large pulley on the shift lever is connected to the motor shaft by means of a small rubber belt. The idler wheel engages this large pulley, driving the turntable at a speed of 33⅓ r.p.m. The play control also actuates a single-pole, double-throw switch, which is mounted on the base plate under the turntable (figure 3). The output leads of the two tone arms are connected to this switch. When the play control is set to the LONG PLAY position, the switch cuts off the output of the changer tone arm, and closes the circuit for the long-play tone arm. The reverse of this action takes place when the play control is set to the ST'D PLAY position.

The changer mechanism of the record changer is brought into action when a small retractable gear segment, mounted on the cam gear, is released, and engages the hub gear of the turntable shaft, causing the cam gear to be driven. While a record is playing, the retractable gear segment is held in the retracted position by the trip-plate ear; the segment is released either manually, by pushing the OFF-MAN-AUT-REJ control to REJ, or automatically, when the changer tone arm follows the finish groove of a record; automatic tripping is initiated by the trip arm, which is attached to the tone-arm shaft, and which rides over the trip-plate ratchet screw, causing the cam-gear segment to be released.

The tone arm of the record changer is operated by two link assemblies (figure 12) attached to actuator levers, which are in contact with the cam surface of the cam gear. When the cam gear starts, the lower actuator lever is pushed outward first, and the short link assembly attached to it raises the tone arm off the record. (The same action also raises the long-play tone arm, at the end of a record, by means of the long link assembly, which is also attached to the lower actuator lever.) As the cam gear continues to turn, the upper actuator lever is pushed outward, and its link assembly pulls the tone arm out against the rest post; at this instant, a roller on the cam gear makes contact with the push-off actuator (which is connected to the record-shelf assembly through a series of push-off bars), and operates the record-dropping mechanism.

TESTING AND TROUBLE-SHOOTING PROCEDURE

The following series of operating tests is given to aid in localizing troubles. Each test should be performed with several good records before making any adjustments.

With both tone arms on their rest posts, set the record shelf to the 10″ position, and place a 10″ record over the spindle and onto the record shelf. Set the play control to ST'D PLAY, and push the OFF-MAN-AUT-REJ control knob to REJ. Observe the record-dropping action; the record should fall smoothly onto the turntable. The tone arm should rise from the rest post, and the needle should come down on the record at about ⅛″ from the outer edge. Play the record through, and observe the tripping action; the trip mechanism should operate within the first two or three revolutions after the needle has entered the eccentric finish groove of the record.

Remove the record from the turntable, turn the record shelf to the 12″ position, place a 12″ record on the spindle and record shelf, and repeat the above testing procedure.

During a change cycle, the lower edge of the tone arm should clear the top of the rest-post hook by a minimum of ⅛″.

Remove the record from the turntable, place the changer tone arm over the changer base plate, and observe the clearance between the needle point and the base plate; the clearance should be not less than 1/16″; however, the needle should be no higher than the top of the turntable.

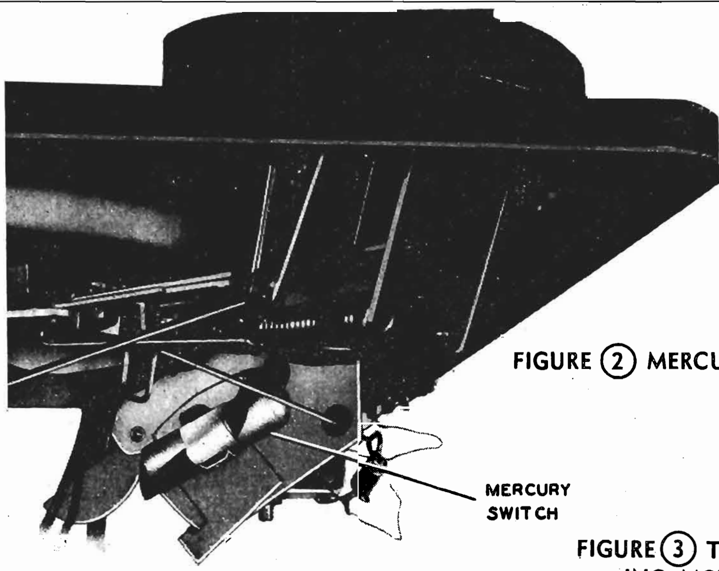


FIGURE (2) MERCURY SWITCH, SHOWN IN "OFF" POSITION

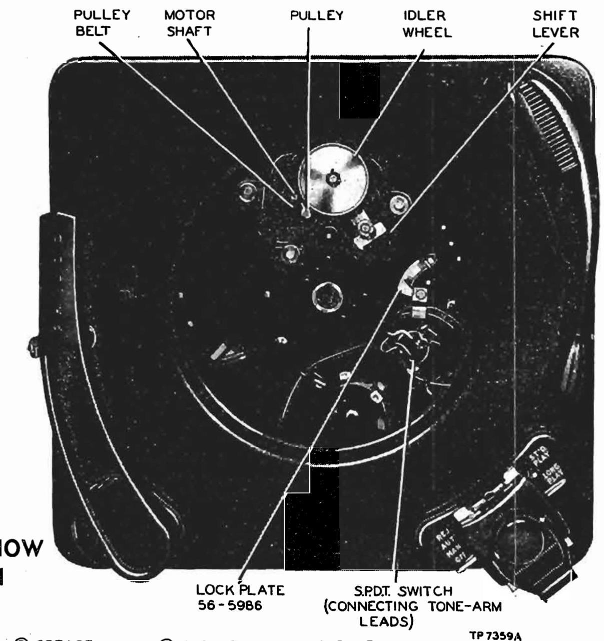


FIGURE (3) TOP VIEW, TURNTABLE REMOVED, SHOWING MOTOR ASSEMBLY AND SPDT SWITCH

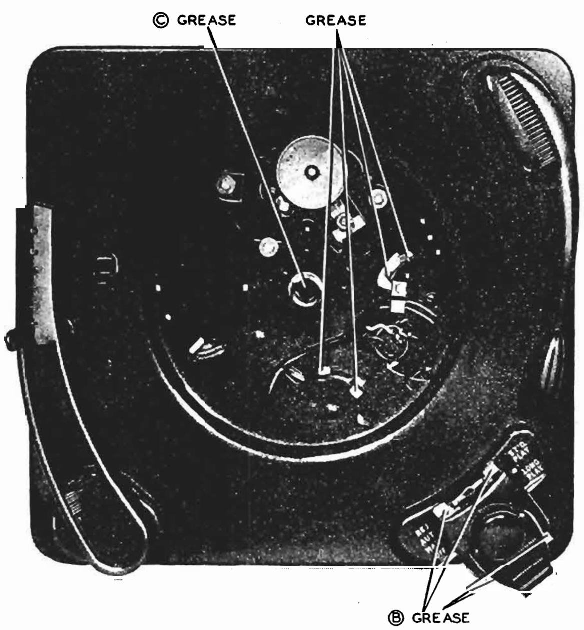


FIGURE (4) TOP VIEW, SHOWING LUBRICATION POINTS

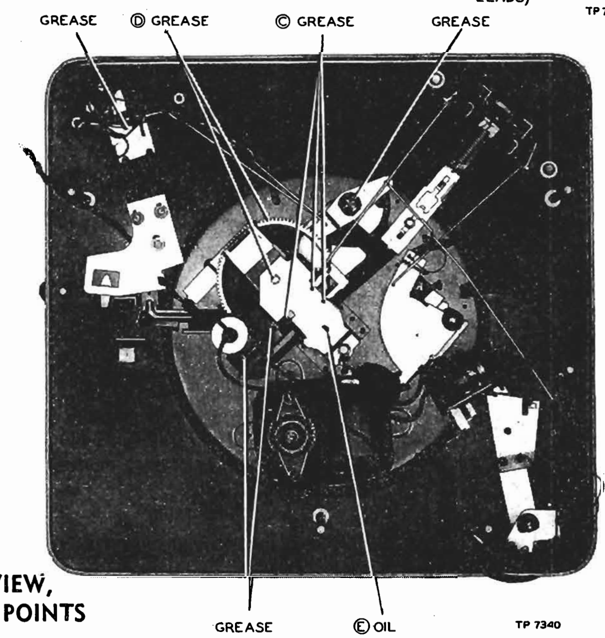


FIGURE (5) BOTTOM VIEW, SHOWING LUBRICATION POINTS

TESTING AND TROUBLE-SHOOTING PROCEDURE (Continued)

Place the tone arm on the rest post, set the OFF-MAN-AUT-REJ control to MAN, and the play control to LONG PLAY. Place a 12″ Columbia Long-Playing (micro-groove) record on the turntable, and set the long-play tone arm on the record. Play the record for a few minutes and listen to its tone, then place the tone arm in the finish groove of the record, and observe the shut-off action. The turntable should stop within three revolutions after the tone arm has entered the finish groove.

Remove the record from the turntable, place the tone arm over the base plate, and observe the clearance between the needle point and the base plate; the clearance should be not less than $\frac{1}{16}$″. Now raise the tone arm over the rest post; it should clear the post by a maximum of $\frac{1}{32}$″.

TURNTABLE AND MOTOR TEST

Place a stroboscope disc, such as the Philco Part No. 45-1614, on the turntable, and illuminate the disc with a lamp operating on 60-cycle a.c. Set the OFF-MAN-AUT-REJ control to MAN, and the play control to LONG PLAY, and observe the dots in the row calibrated for 33⅓ r.p.m. on the stroboscope disc. The dots should appear to remain stationary, or have very little drift, either to the right or to the left.

Remove the stroboscope disc from the turntable, place a stack of ten 12″ records onto the turntable, and place the stroboscope disc on the top record. Set the play control to ST'D PLAY, set the OFF-MAN-AUT-REJ control to MAN, and illuminate the stroboscope with a lamp operating on 60-cycle a.c. Observe the dots in the row calibrated for 78 r.p.m.; they, too, should appear to remain stationary, or have very little drift to the right or left.

CLEANING AND LUBRICATION

When the record changer is brought in for service, it should be well cleaned, by using carbon tetrachloride. Remove all dirt and all grease and oil. When applying new grease and oil, use it sparingly. All lubrication points are shown in figures 4 and 5. It may be necessary to remove some parts and assemblies in order to lubricate them properly. For example, the cam gear and actuator levers should be removed to lubricate the cam-gear spindle and the actuator stud.

PARTS NOT TO BE LUBRICATED

The following parts should not be lubricated at any time:

Both trip receivers and trip fingers.
Ratchet screw on trip plate.
Selector assembly.
All parts of long-play tone arm and its subassemblies
All parts of trip-switch assembly.

PARTS TO BE GREASED

Record-Shelf Assembly

Each of four dimples, and both sides of slide plate (point B of figure 4).

Bridge Assembly

Three dimples (points C of figure 5).

Cam Gear

Cam-gear teeth and all outer surfaces of gear (points D of figure 5).

Main Assembly

Cam-gear spindle.
Actuator stud.
Turntable-shaft upper bearing (point C of figure 4).
Changer tone-arm-shaft base (fill dimple with grease).
All assemblies that have ears, and dimples that slide on the main base plate.

PARTS TO BE OILED

Use S.A.E. 20 oil on the following parts:

Trip-Plate Bushing

Apply one or two drops to inside of bushing.

Spindle

Apply one or two drops to base of spindle where it slides vertically in the bridge plate (point E of figure 5).

SERVICING THE RECORD CHANGER

Some of the record-changer troubles that may be encountered, also the methods of servicing, are given below. The serviceman should become thoroughly familiar with the operation of all parts in the mechanisms before attempting to service the record changer. Some troubles may be caused by a lack of lubrication or an accumulation of dirt. Before making the final tests and adjustments, make sure that the changer is well cleaned and lubricated.

PHILCO CORP.

MODEL M-12C

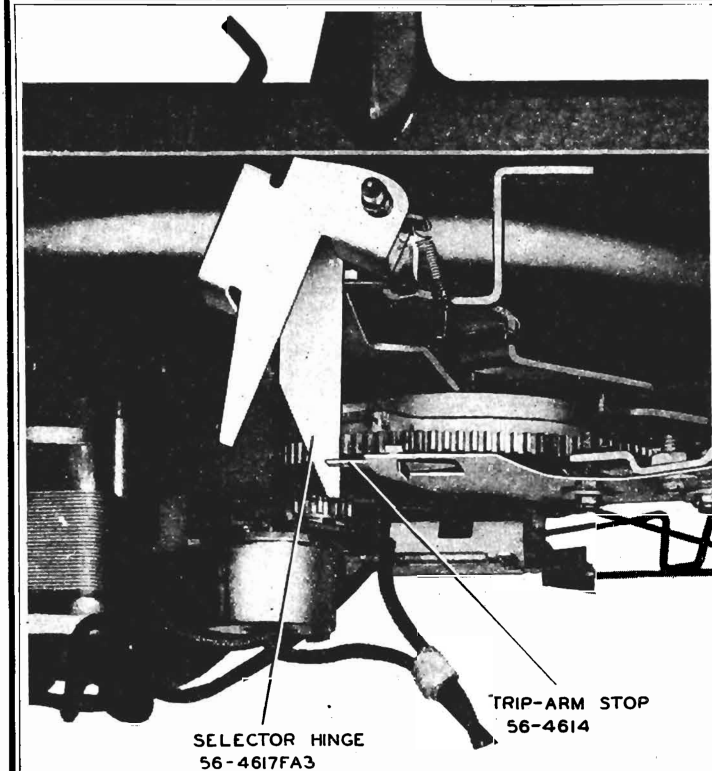


FIGURE 6 10" INDEX SET-DOWN ADJUSTMENT

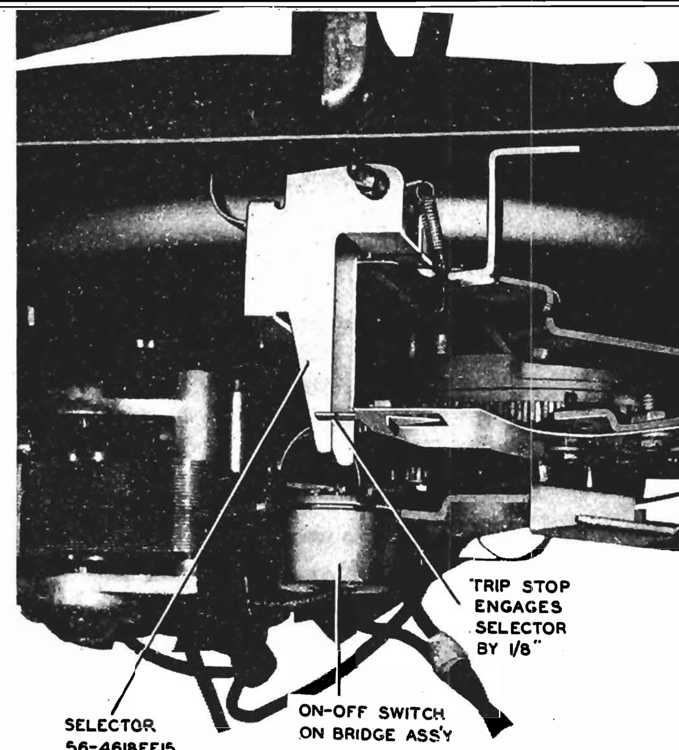
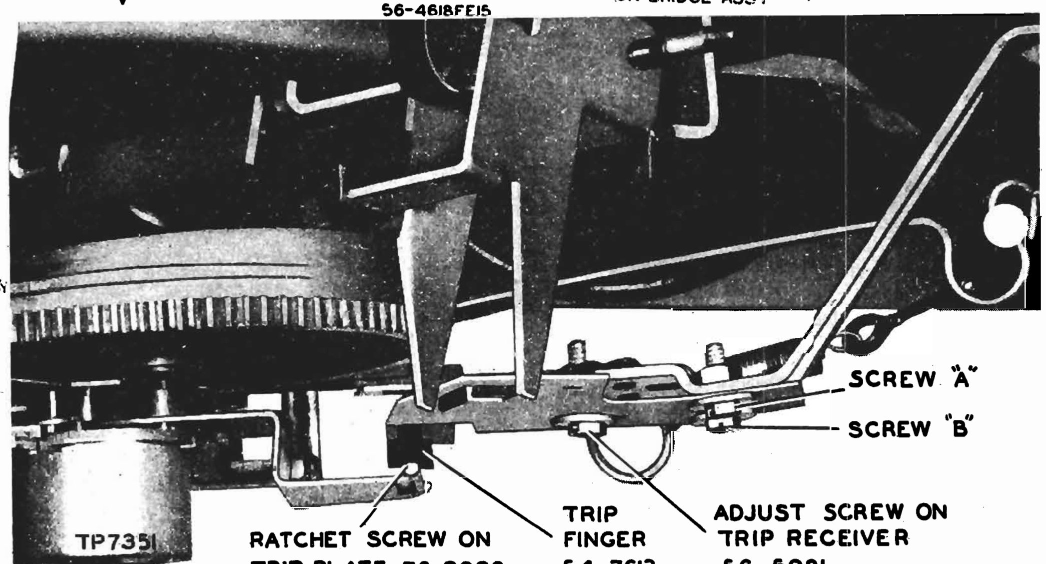


FIGURE 7 12" INDEX SET-DOWN ADJUSTMENT

FIGURE 8 TRIP-FINGER AND TRIP-RECEIVER ADJUSTMENTS



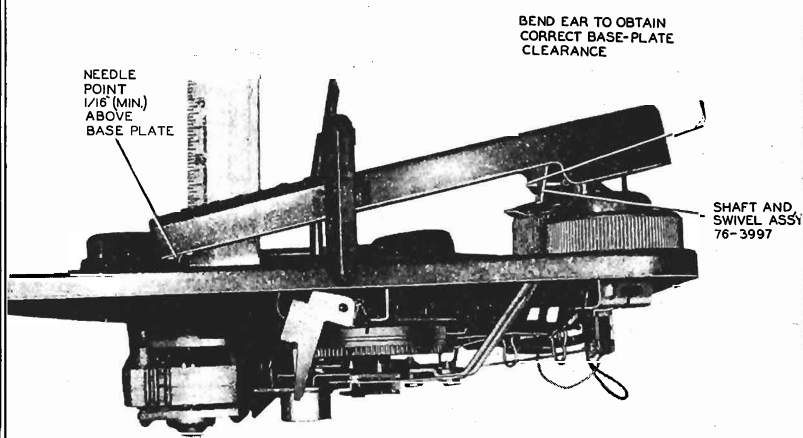


FIGURE 9 BASE PLATE CLEARANCE ADJUSTMENT—CHANGER TONE ARM

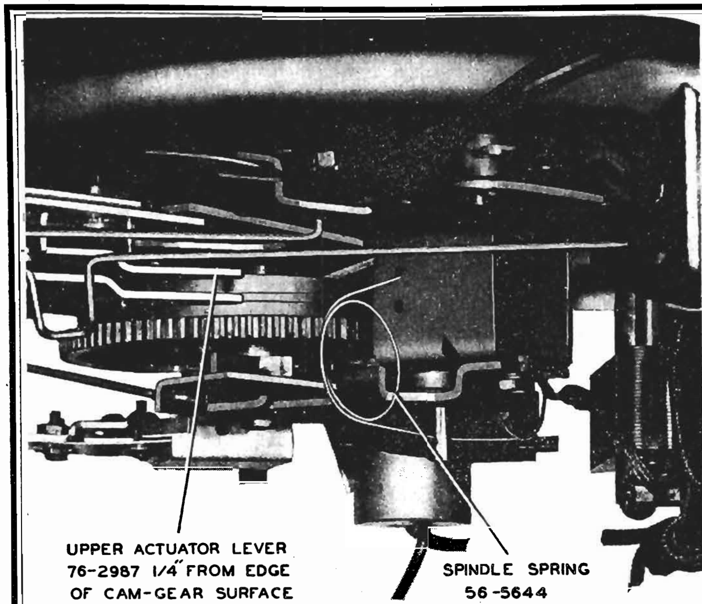


FIGURE (10) VERTICAL TIMING ADJUSTMENT—CHANGER TONE ARM

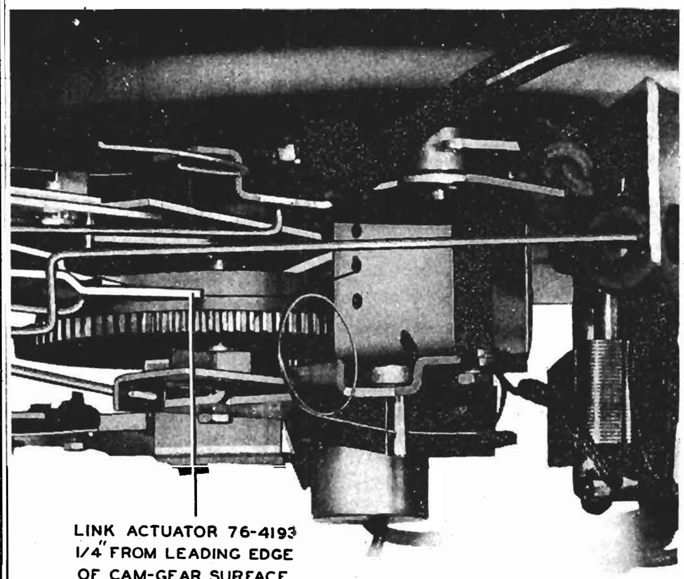


FIGURE (11) HORIZONTAL TIMING ADJUSTMENT—CHANGER TONE ARM

CORRECTION OF TROUBLES

1. **Changer tone arm fails to rise off the rest post when the OFF-MAN-AUT-REJ control is set to REJ.**
   Changer tone arm does not clear the top record when a full stack of records (ten 12", or twelve 10") is on the turntable.
   Check the tone-arm height and lift adjustments, as directed on page 15, and the tone-arm vertical and horizontal timing adjustments, as directed

2. **Changer tone-arm needle does not set down on the record properly.**
   Changer tone arm sets on the record, then falls off.
   Check the 10" and 12" index and set-down adjustments.

   Check to determine whether the changer is level.

3. **Sound is distorted, weak, or intermittent, on the changer tone arm.**
   Replace the needle Make sure that the knurled thumb nut on the chuck is tightened securely.
   Replace the crystal
   Check for bad wiring connections.
   Check the tone arm for binding. Absence of vertical end play in the tone-arm shaft will cause excessive horizontal drag, resulting in distortion or groove jumping.
   Check for uneven turntable speed

4. **Changer fails to cycle at the end of a record.**
   Check the trip-finger adjustment Observe whether the records being used contain an eccentric finish groove in the center.

5. **Changer fails to drop the record automatically.**
   Record holes becoming enlarged.
   Check the record-shelf and push-off adjustments.

6. **Long-play tone arm does not raise and lower on the rest post when the changer is put into cycle, or does not clear the rest post when lifted off the record.**
   Check the tone-arm height clearance and the raise adjustment.

7. **Sound is distorted, weak, or intermittent, on the long-play tone arm.**
   Try a new needle and cartridge
   Check all wiring.
   Make sure that only long-playing records are being used at the slow speed.
   Check the speed with a stroboscope disc, as directed
   Check the selector-lever throw adjustment.
   Check the pulley belt on the motor, as direct
   Check the needle pressure, the horizontal friction, and the pickup holder adjustments

CORRECTION OF TROUBLES (Continued)

8. **Record changer fails to shut off when the long-play tone arm rides the eccentric finish groove of a long-play record.**

Check the trip-finger and the trip-switch adjustments (page 21).

Check the mercury switch; when it is properly set in the clip assembly, the red dot on the switch should be on top.

ADJUSTMENTS FOR THE RECORD CHANGER

10″ Index or Set Down

Set a 10″ record on the turntable, push the OFF-MAN-AUT-REJ control to REJ, and rotate the turntable by hand approximately 4½ turns. The tone-arm needle should be ½″ above the record at this point. Loosen the clamp screw on the trip arm slightly (figure 12); then hold the tone arm steady, ⅛″ in from the edge of the record, and set the trip arm so that the trip-arm stop, 56-4614, is in contact with the inside selector hinge, 56-4617FA3, as shown in figure 6.

Tighten the clamp screw, leaving 1/32″ vertical play, or clearance, between the trip arm and the base plate.

12″ Index or Set Down

Make the 10″ index adjustment first, then remove the 10″ record from the turntable and place a 12″ record in its place. Reject the changer, and rotate the turntable until the needle point is ½″ above the record. The trip-arm stop should be against the outside selector, 56-4618FE15, as shown in figure 7.

Ordinarily, the 12″ index is satisfactory after the 10″ index adjustment is made; if not, bend the selector slightly to the right or left, as required, for the proper set-down of the needle on the record (⅛″ in from the edge of the record).

Trip Finger

With a record on the turntable, place the tone arm in the finish groove of the record. The trip finger, 54-7613, is now riding over the ratchet screw of the trip plate, 76-2990, as shown in figure 8. The trip finger should assume an angle of 25° to 30° with respect to the ratchet screw. To obtain the correct angle, adjust the screw on the trip receiver, 56-5981, as indicated in figure 8. Make certain that the vertical center line of the trip finger coincides with the center line of the ratchet screw. To obtain this alignment, loosen screw "A" slightly, and screw "B" completely, on the trip receiver, 56-5981, and swing the trip receiver to the right or left until the trip finger is centered over the ratchet screw; then tighten the screws

When this adjustment is made, care should be taken to prevent the trip receiver from being pulled in toward the trip arm too far, as this will prevent the trip-arm stop, 56-4614, from engaging the selector hinge by a minimum of ⅛″, as shown in figure 7. A happy medium between the above adjustments should be reached.

Also, the index, or set-down, adjustment may be slightly affected when making the above adjustments, so it is well to remember that these three adjustments are interrelated, and that, when any one of them is made, the other two should be rechecked.

Tone-Arm Height and Lift

With the changer out of cycle, and the tone arm free, set the arm over the base plate. The needle point should be approximately 1/16″ above the base plate. To adjust, bend the protruding ear of the swivel post (bending the ear upward increases the clearance), shown in figure 9. Now raise the tone arm to its maximum height, and place it against the rest post. There should be a minimum of ⅛″ clearance between the lower edge of the tone arm and the top of the rest-post hook. Adjust the ear on the swivel post until a compromise is reached between the correct rest-post clearance and base-plate clearance.

Tone-Arm Vertical and Horizontal Timing

Before making these adjustments, make the tone-arm height and lift adjustments described above.

For the vertical adjustment, start with the changer out of cycle, push the OFF-MAN-AUT-REJ control to REJ, and rotate the turntable ¾ of a revolution by hand. At this point, the leading edge of the cam is approximately ¼″ from the end of the link actuator, 76-4193 (this is the lower actuator lever shown in figure 10). Adjust the wire loop of the *short* link (56-4607FA3 in figure 12) until the ear of the tone-arm swivel post makes contact with the lower end of the cutout on the tone-arm pivot assembly.

For the horizontal adjustment, start with the changer out of cycle, and rotate the turntable 1½ revolutions by hand. At this point, the upper leading edge of the cam gear is approximately ¼″ from the upper actuator lever, 76-2987 (shown in figure 11). Adjust the wire loop of the *long* link (56-4606FA3 in figure 12) by squeezing or spreading it until the tone arm is up against the rubber bumper on the rest post.

Record Shelf

Set the record shelf to the 10″ position, with the changer out of cycle. Place the Philco record-shelf gauge, 45-1470, over the spindle and onto the record shelf, as shown in figure 13. Loosen the two hex-head screws that hold the record-shelf assembly to the changer base plate. Move the record-

MODEL M-12C

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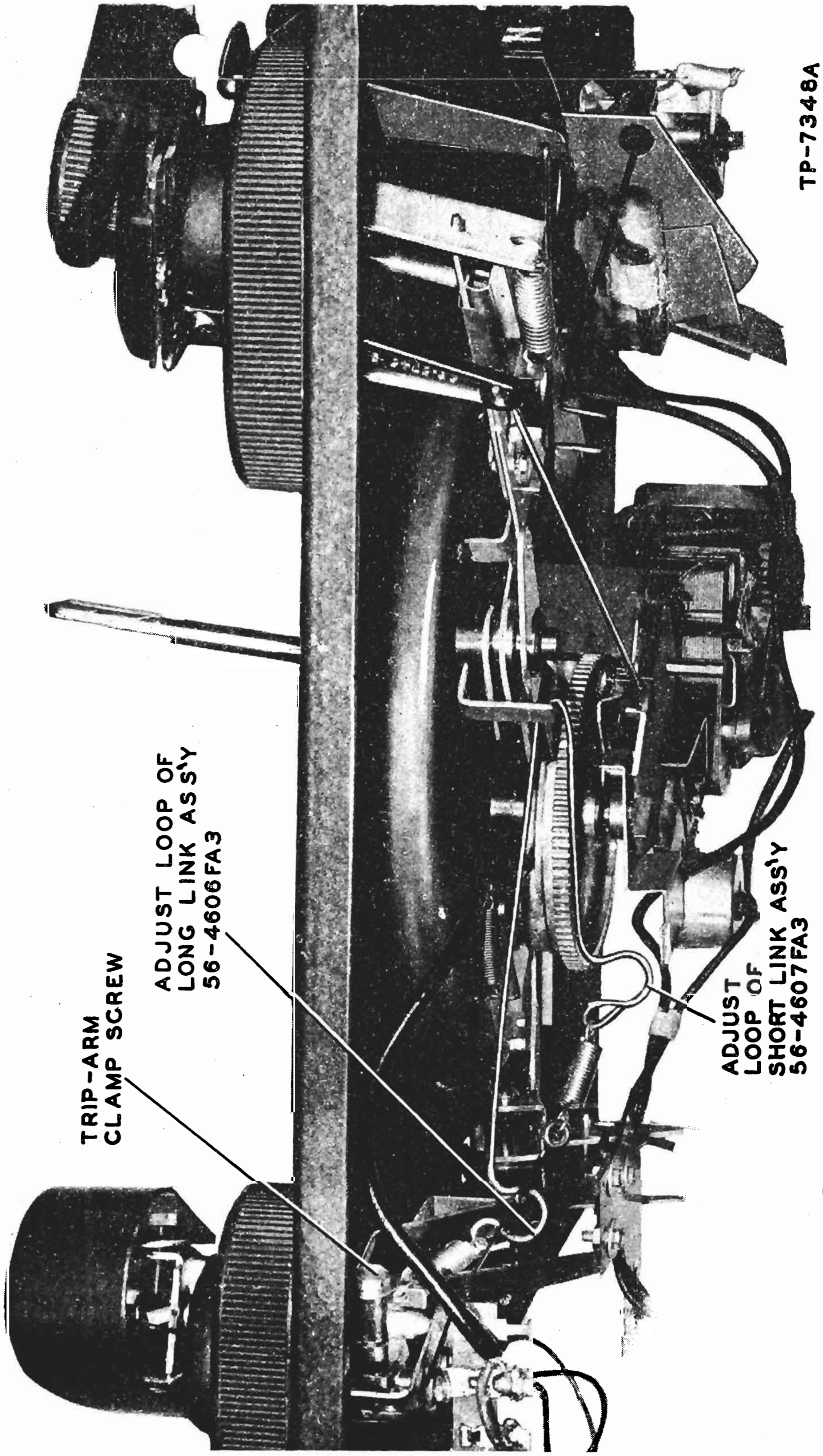


FIGURE 12 LOOP ADJUSTMENTS FOR TONE-ARM VERTICAL AND HORIZONTAL TIMING

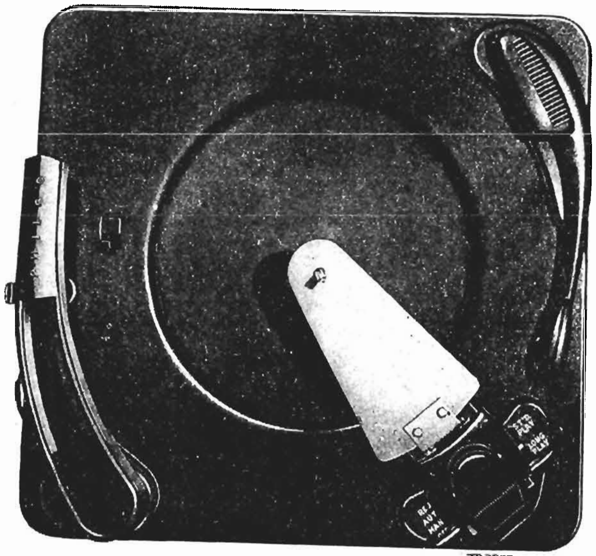


FIGURE (13) SPECIAL PHILCO RECORD-SHELF GAUGE, SHOWN IN CORRECT POSITION

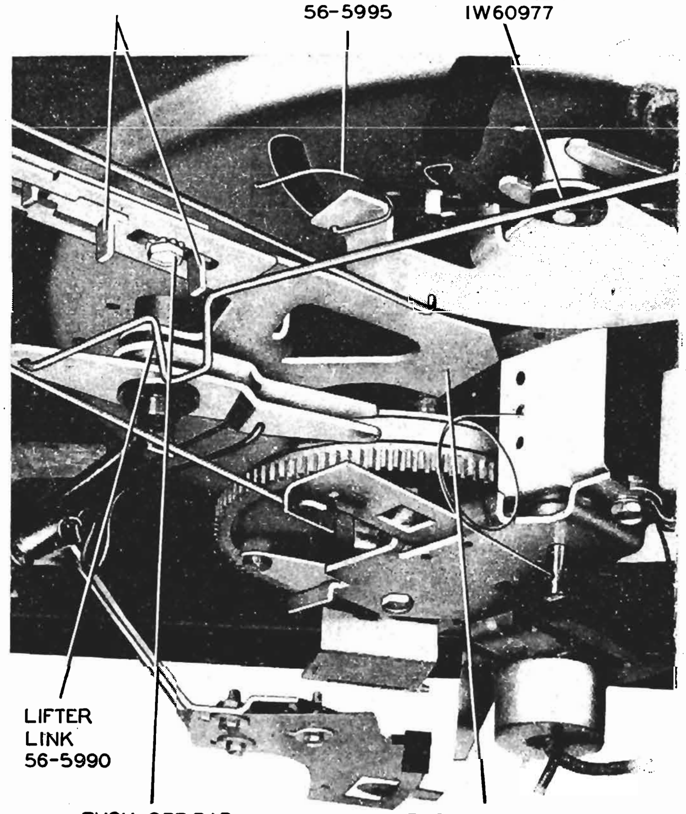
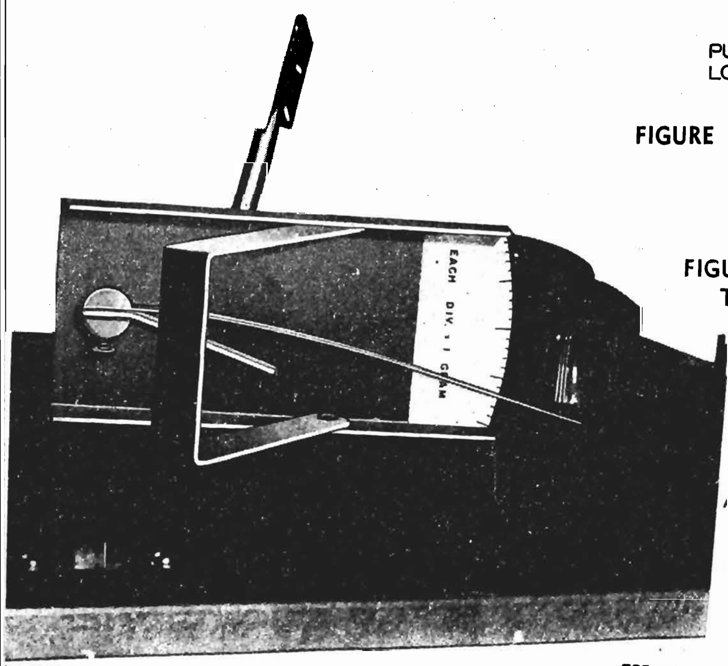


FIGURE (14) PUSH-OFF ADJUSTMENT TP7350



TP7349

FIGURE (15) PHILCO GRAM SCALE, SHOWN IN POSITION FOR MEASURING NEEDLE PRESSURE AND VERTICAL FRICTION

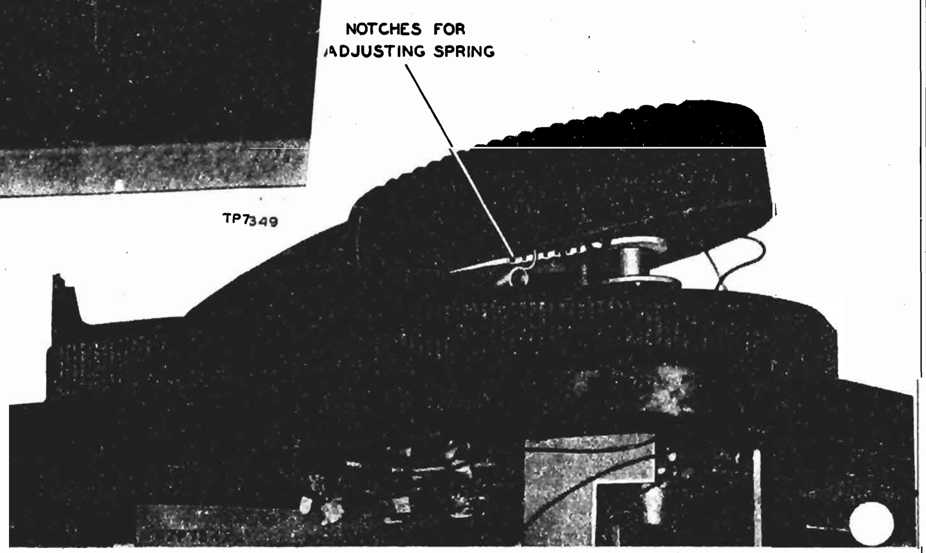


FIGURE (16) NEEDLE-PRESSURE ADJUSTMENT

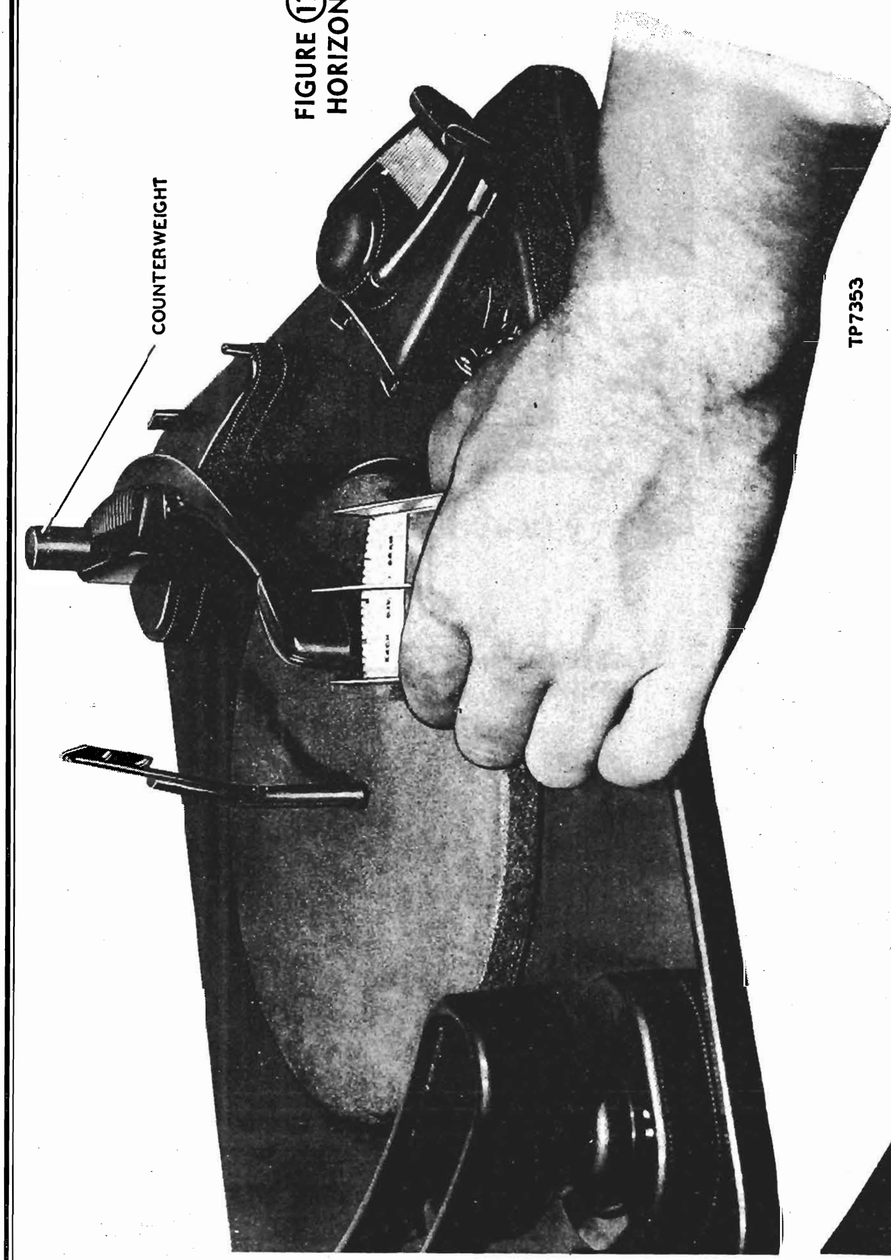


FIGURE 17 MEASURING HORIZONTAL FRICTION

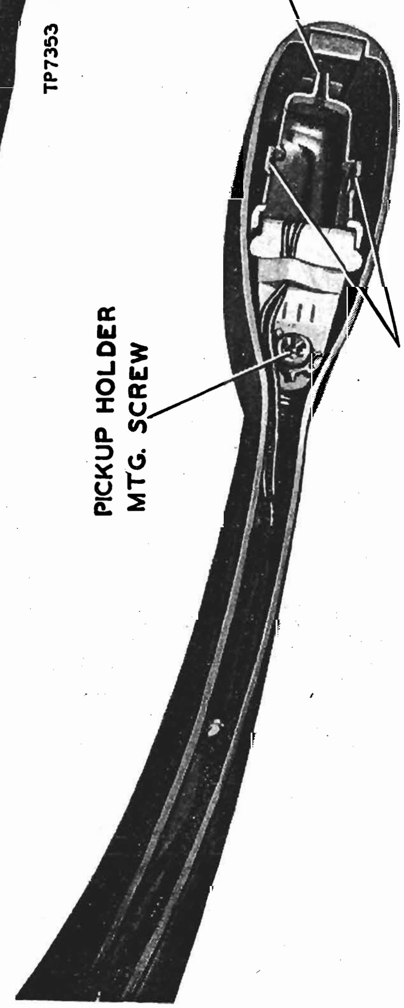


FIGURE 18 PICKUP-HOLDER ADJUSTMENT

PHILCO CORP. MODEL M-12C

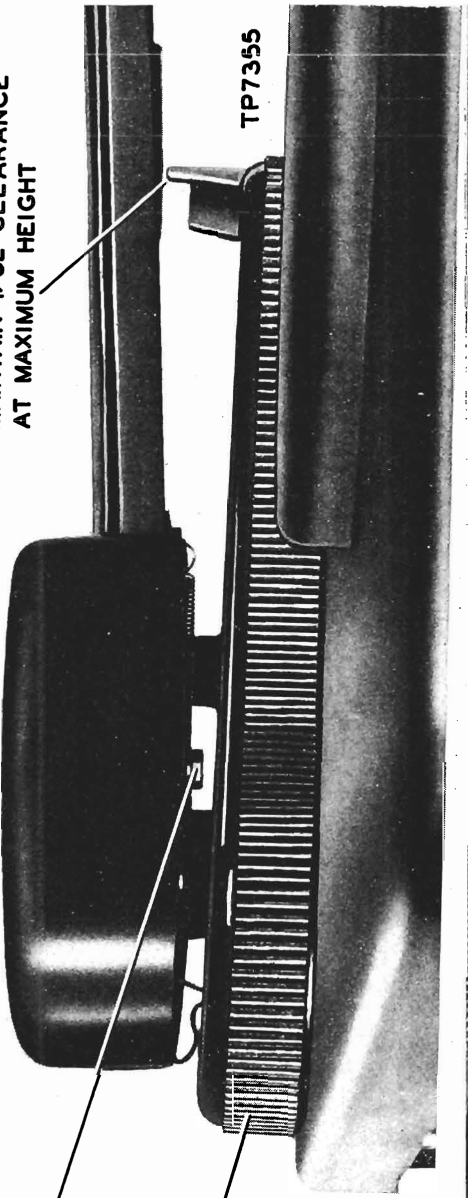


FIGURE 19 HEIGHT ADJUSTMENT—LONG-PLAY TONE ARM

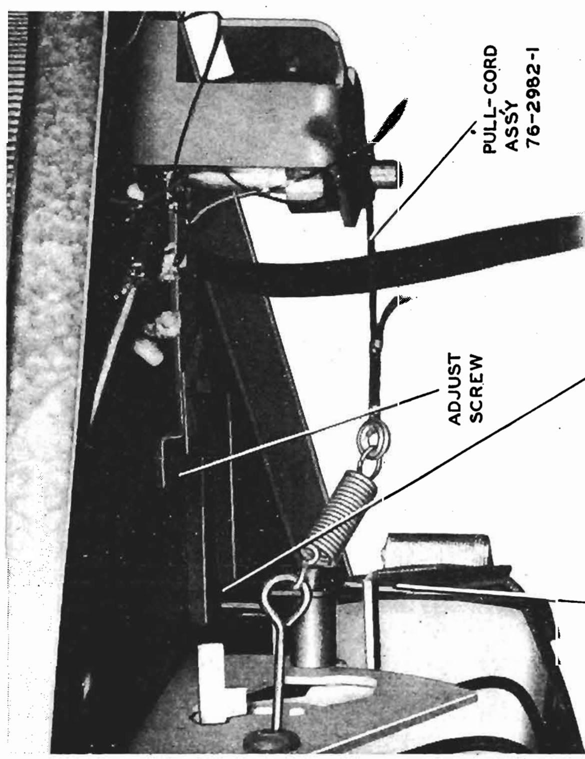


FIGURE 20 TRIP-FINGER ADJUSTMENT

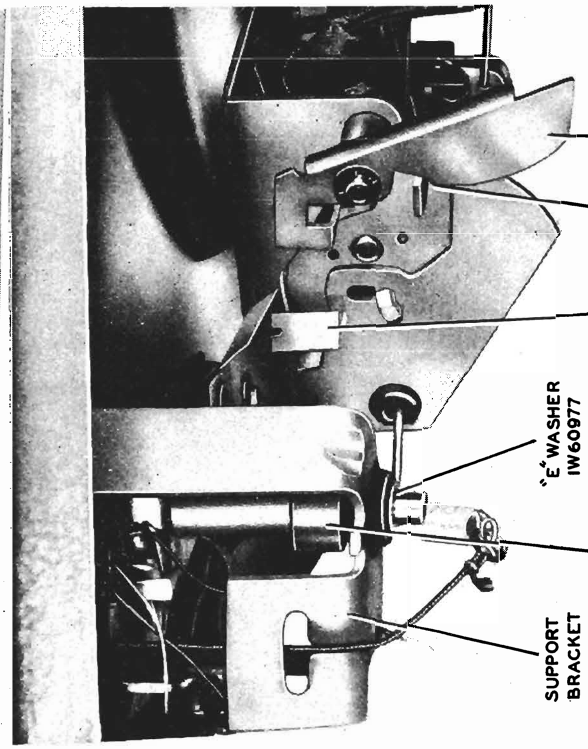


FIGURE 21 TRIP-SWITCH ADJUSTMENT

MODEL M-12C

PHILCO CORP.

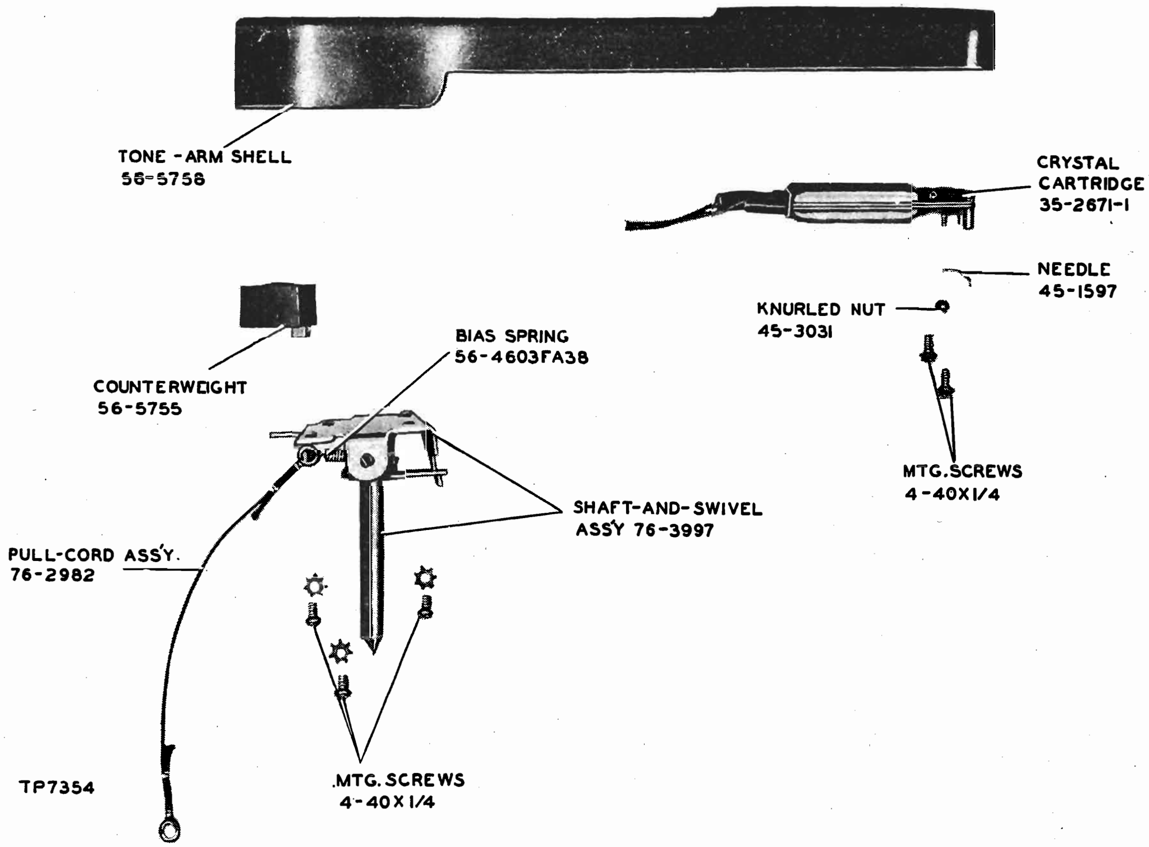


FIGURE 22 CHANGER TONE-ARM ASSEMBLY (35-2675)

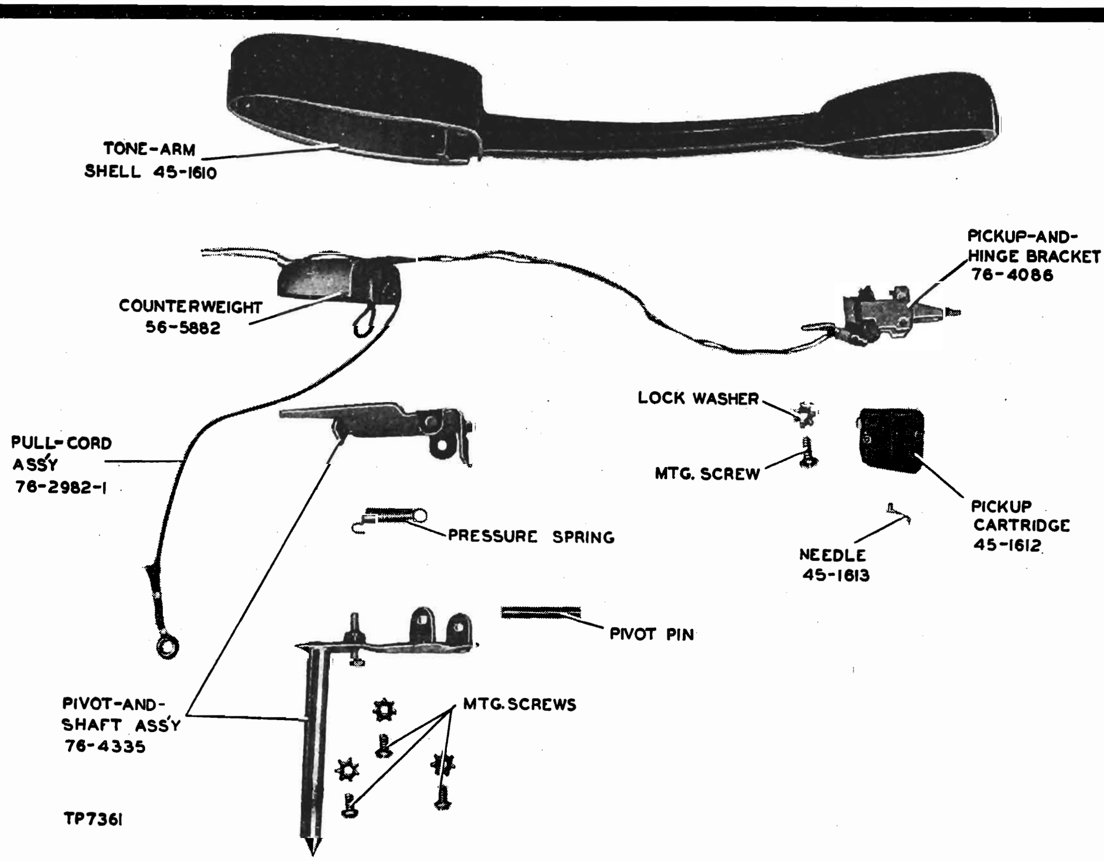


FIGURE 23 LONG-PLAY TONE-ARM ASSEMBLY (35-2686)

ADJUSTMENTS FOR THE RECORD CHANGER (Continued)

shelf assembly away from the spindle until the large curved part of the gauge drops even with the record-shelf lips. Now push the record shelf and gauge lightly against the spindle, taking out all play toward the spindle; keep the lips of the record shelf in even contact with the edge of the gauge. Tighten the two hex-head screws.

Push-Off

With the changer out of cycle, push the OFF-MAN-AUT-REJ control to REJ, and rotate the turntable 2½ revolutions by hand; at this point, the push-off actuator, 56-4588FA3, is in its most forward position, in contact with the roller on the cam gear, as shown in figure 14. Loosen the push-off-bar locking screw and squeeze the push-off ears toward each other until the slide plate on the record shelf extends $\frac{1}{32}''$ beyond the lips of the shelf. Tighten the hex-head push-off-bar screw.

LONG-PLAY TONE ARM ADJUSTMENTS

Vertical Friction

Use the Philco gram scale, 45-9531. Calibrate the scale to zero by holding it on its side and setting the pointer to the center line of the scale. The center is the "0" point, and each small division on either side of "0" is equal to one gram.

After the scale has been calibrated to zero, place the scale on the changer base, with the guard on the scale in an open position, at right angles to the scale, as shown in figure 15. Set the needle of the long-play tone arm into the hole at the end of the pointer. Press down on the head of the pickup, and let it spring back; then note the reading on the scale. Raise the pickup, let it return slowly, and note the reading on the scale. The average of the two readings taken is the needle pressure; the difference between the two readings is the vertical friction. The correct needle pressure is between 6 and 7½ grams. The vertical friction should not exceed 2 grams.

Needle Pressure

To adjust the needle pressure, move the tone arm toward the center of the turntable; unhook the spring from the notch on the pivot assembly (below the rear end of the tone arm), and place the spring into a different notch. Each notch represents a change of one gram in needle pressure. After changing the spring into a different notch, measure the needle pressure again with the gram scale. Figure 16 shows the notches on the pivot assembly.

Horizontal Friction

Calibrate the gram scale by laying it flat, face-up. Set the pointer to zero with the scale in this position.

Place a counterweight on top of the rear end of the tone arm; move the counterweight until the tone arm is balanced horizontally, and the needle point clears the turntable. Hold the gram scale face-up, place its pointer against the side of the pick-up, and push the tone arm horizontally, as shown in figure 17. Note the reading on the gram scale while moving the tone arm throughout its entire travel (outside of the trip range). At no time should it require more than 2 grams of pressure to move the tone arm.

Pickup Holder

The pickup cartridge holder should be centrally spaced between the walls of the tone arm, so that there is no binding or rubbing against the inside of the tone arm when the cartridge is moved vertically.

To obtain the proper spacing, first remove the tone arm, as directed on page 24; loosen the screw which holds the pickup-bracket mounting. Move the mounting until it is centrally spaced between the walls of the tone arm; maintain a $\frac{1}{32}''$ clearance between the tip of the ears on the holder and the inside surface at the front end of the tone arm, as shown in figure 18.

Tone-Arm Base-Plate Clearance

With the tone arm off the rest post and over the base plate, the needle should be at least $\frac{1}{16}''$, and not more than $\frac{3}{16}''$, above the base plate. To adjust, grasp the tone arm and raise or lower it (whichever is required) with a little pressure, to obtain the correct clearance. To lower the tone arm, it may be necessary to remove the turntable and bring the pickup toward the center; this position affords sufficient leverage to permit bending the tone arm downward. (See page 23 for removal of the spindle; remove the turntable by pulling it straight up.)

Tone-Arm Height Clearance

The tone arm should clear the rest-post hook at its highest point by a maximum of $\frac{1}{32}''$. This clearance can be obtained by adjusting the hex-head screw on the pivot assembly, shown in figure 19.

Tone-Arm Raise

Should the record changer be put through a change cycle with the long-play tone arm set on a record, the tone arm should lift from the record automatically, and set down on the rest post; during any further changer cycling, this tone arm should merely raise and lower on its rest post. To obtain the correct action, adjust the square loop of the lifter link, 56-5990, shown in figure 14, so that the tone arm is lifted firmly against the height-adjustment screw when the pickup is at its maximum height over the rest post.

When the changer is out of cycle, the pull-cord assembly, 76-2982-1 (figure 20), should be slack, allowing the tone arm to be freely moved, manually, anywhere on the record.

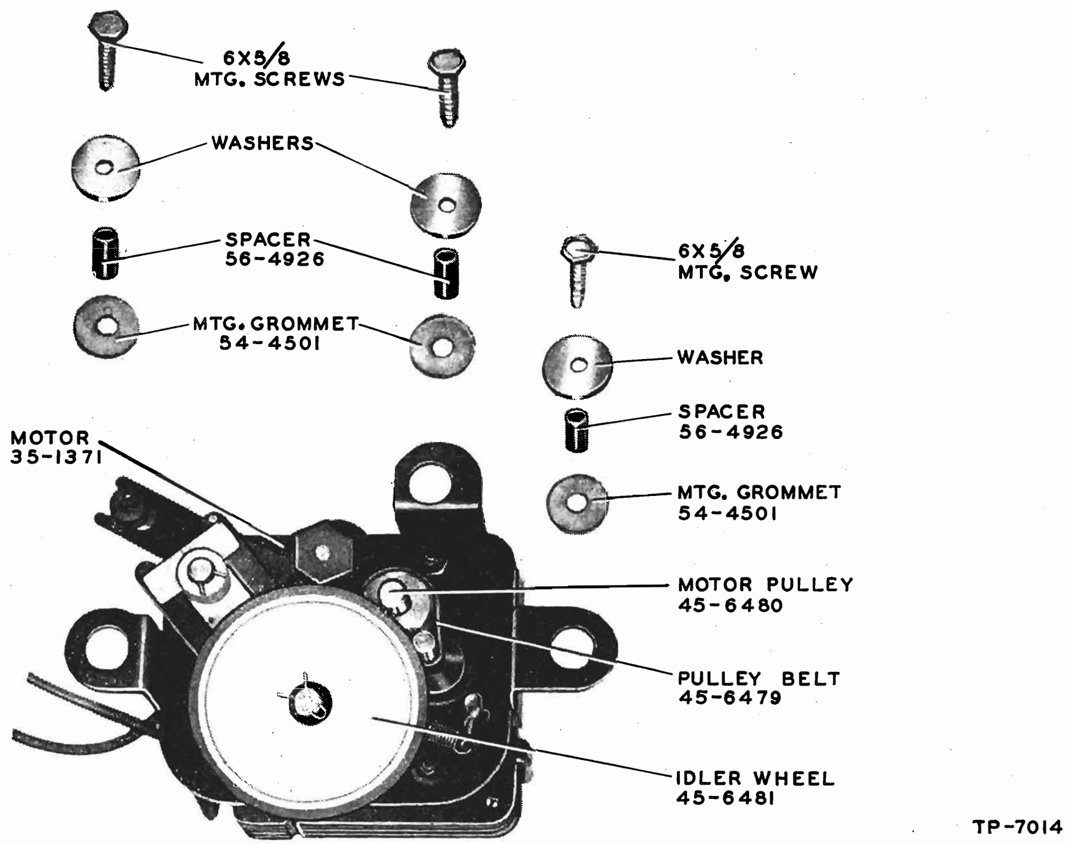


FIGURE 24 MOTOR ASSEMBLY (35-1371)

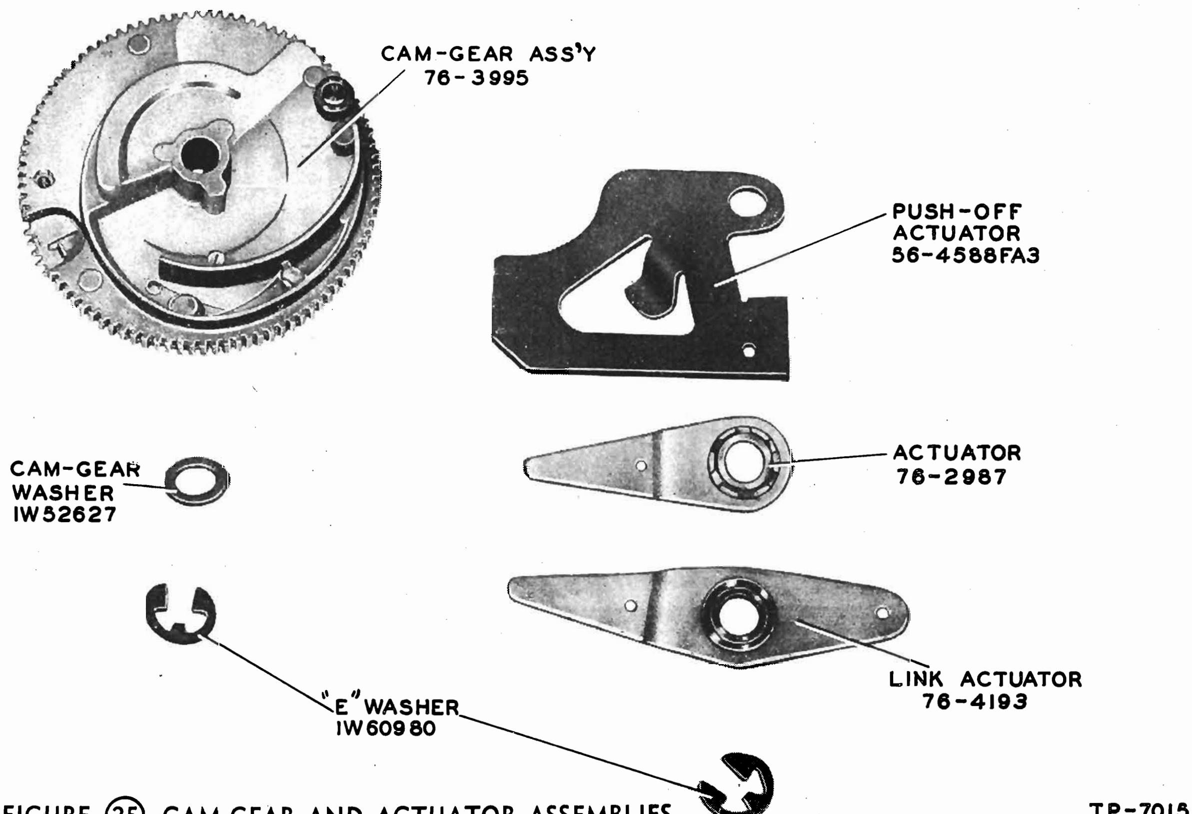


FIGURE 25 CAM-GEAR AND ACTUATOR ASSEMBLIES

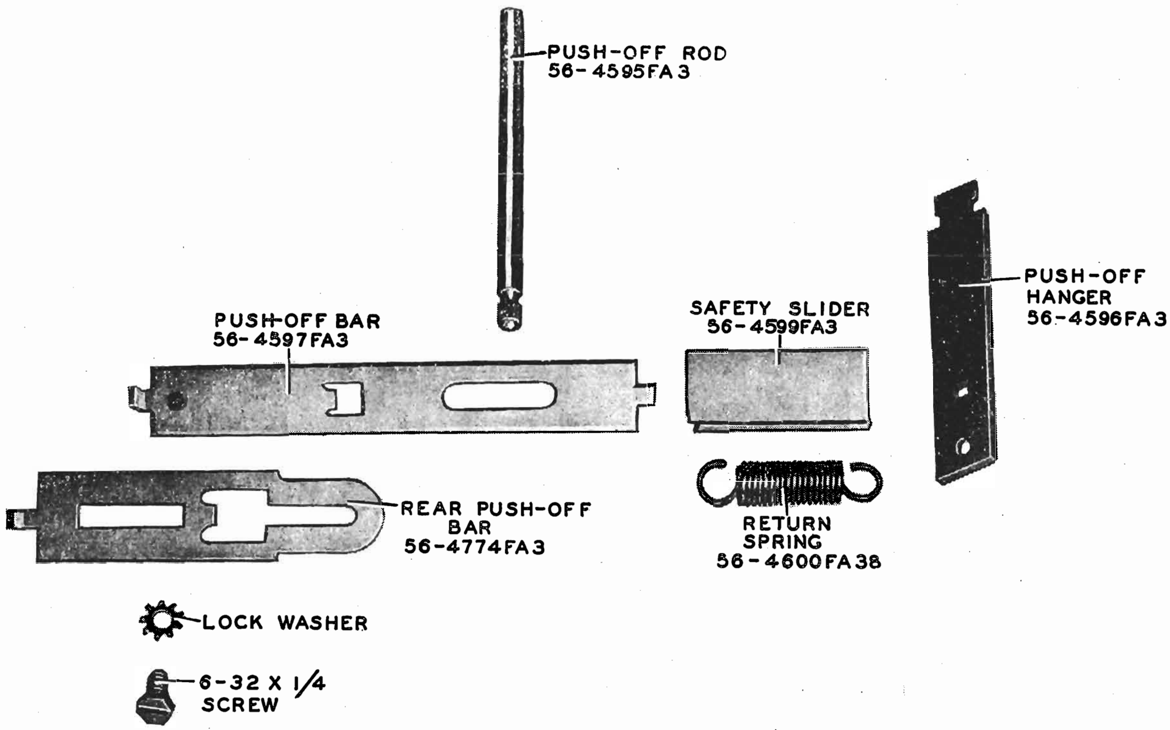


FIGURE 26 PUSH-OFF ASSEMBLY

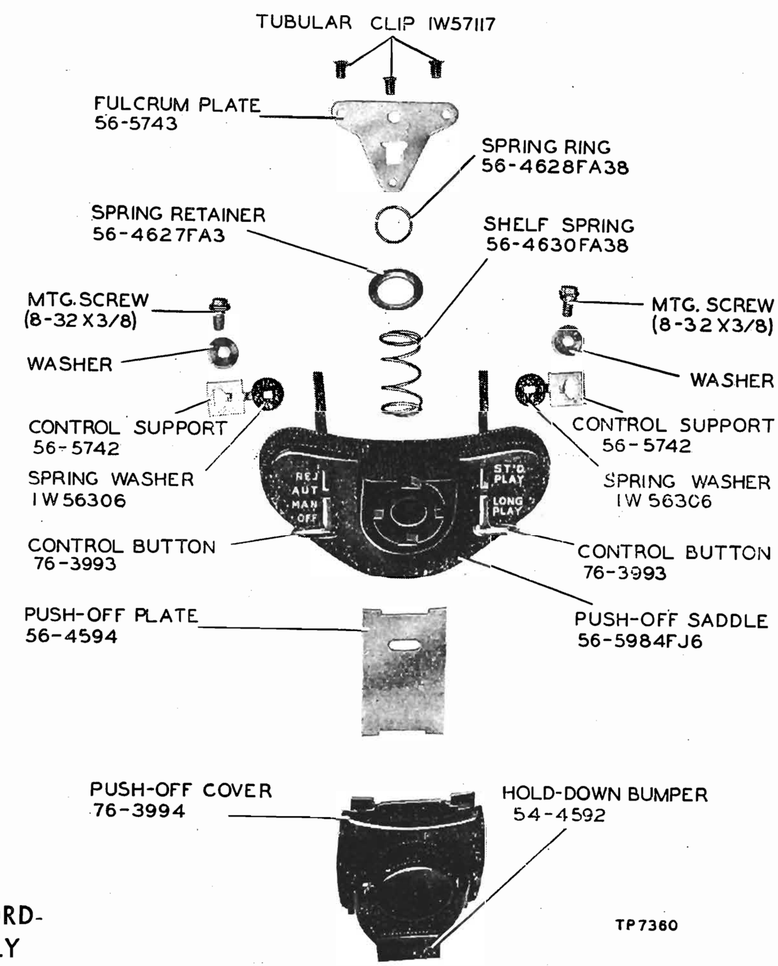


FIGURE 27 RECORD-SHELF ASSEMBLY

TRIP ADJUSTMENTS

Trip Finger

When the pickup needle is in the eccentric groove of a long-playing record, the trip finger should be riding over the ratchet latch, 76-4197, at an angle of 25° to 30°. To obtain the correct angle, adjust the screw shown in figure 20.

Trip Switch

When the pickup is set on the rest post, the mercury switch should be latched in the "on" position. To adjust the switch, loosen the clamp screw on the reset trip arm, 76-4198, hold the pickup on the rest post, and move the reset trip arm outward until its protruding leg contacts the short ear on the bracket-and-clip assembly, 76-4195; there should be a maximum of $1/32$" clearance between the long ear on the bracket-and-clip assembly and the cutout shelf on the ratchet latch, 76-4197. See figure 21.

When tightening the clamp screw, maintain $1/32$" vertical end play in the tone-arm shaft.

Selector-Lever Throw

The lock plate, 56-5986 (figure 3), is adjusted by loosening the hex-head screw under the base plate and moving the lock plate so that, when the play control is set to either position, the selector-lever throw does not cause the shift-speed lever on the motor to bind against the mechanical stop on the motor.

UNEVEN TURNTABLE SPEED (WOWS)

Uneven turntable speed can be caused by the following conditions:

a. Dirt under and around the idler-wheel assembly.
b. Idler-wheel spring loose or missing.
c. Flat spot on idler-wheel tire.

(For the $33\frac{1}{3}$ r.p.m. speed, a loose or worn pulley belt can result in a slow speed. To replace the pulley belt, push the idler-wheel assembly aside.)

REPLACEMENT OF PARTS AND ASSEMBLIES

The following procedures are recommended for the correct removal of parts and assemblies. The parts should be replaced by reversing the order of removal. Adjustments should be made according to the directions given in the Adjustment section of the manual.

1. Needles

To remove the needle from the standard crystal on the changer tone arm, loosen the knurled nut under the crystal and pull the needle out.

To remove the needle from the special cartridge of the long-play tone arm, grasp the sides of the cartridge with the fingernails and pull it out; then pry out the needle with the fingernail or knife point. When replacing this needle, align the keyway on the needle shaft with the slot in the chuck on the cartridge, then push the needle into the cartridge. Replace the cartridge by pushing it until it is firmly seated.

2. Crystal Cartridge, 35-2671-1

a. Bring changer tone arm toward center of turntable
b. Remove the two screws and lock washers that hold cartridge to tone arm.
c. Drop cartridge below tone arm sufficiently to allow the removal of the two clips from cartridge. Figure 22 shows the cartridge assembly.

3. Spindle, 76-3926

a. Unhook both ends of spindle spring, 56-5644, from the "U"-shaped bracket mounted under changer base. See figure 11.
b. Uncoil spring through spindle and remove spring.
c. Pull out spindle.

4. Changer-Tone-Arm Assembly, 35-2675

a. Unsolder tone-arm wires from terminal panel on under side of changer base plate.
b. Remove pull cord from link spring.
c. Loosen clamp screw that holds trip arm to tone-arm shaft (figure 12).
d. Lift out tone arm. Figure 22 shows the tone-arm assembly.

Note: When the tone arm is replaced on the changer, be sure to maintain $1/32$" vertical end play between the trip arm and the changer base plate.

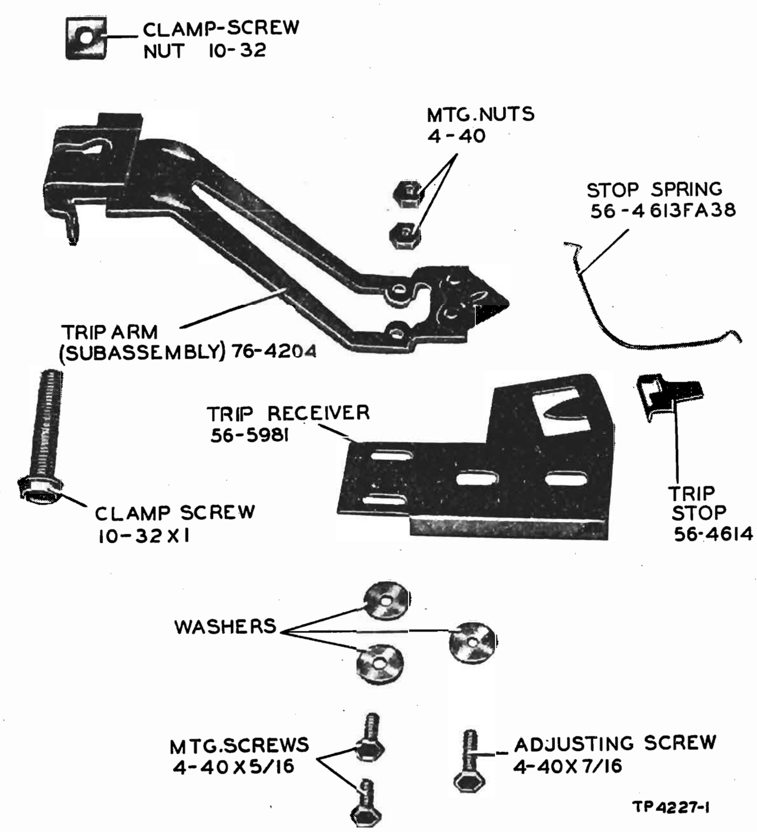


FIGURE 28 TRIP-ARM AND TRIP-RECEIVER ASSEMBLIES

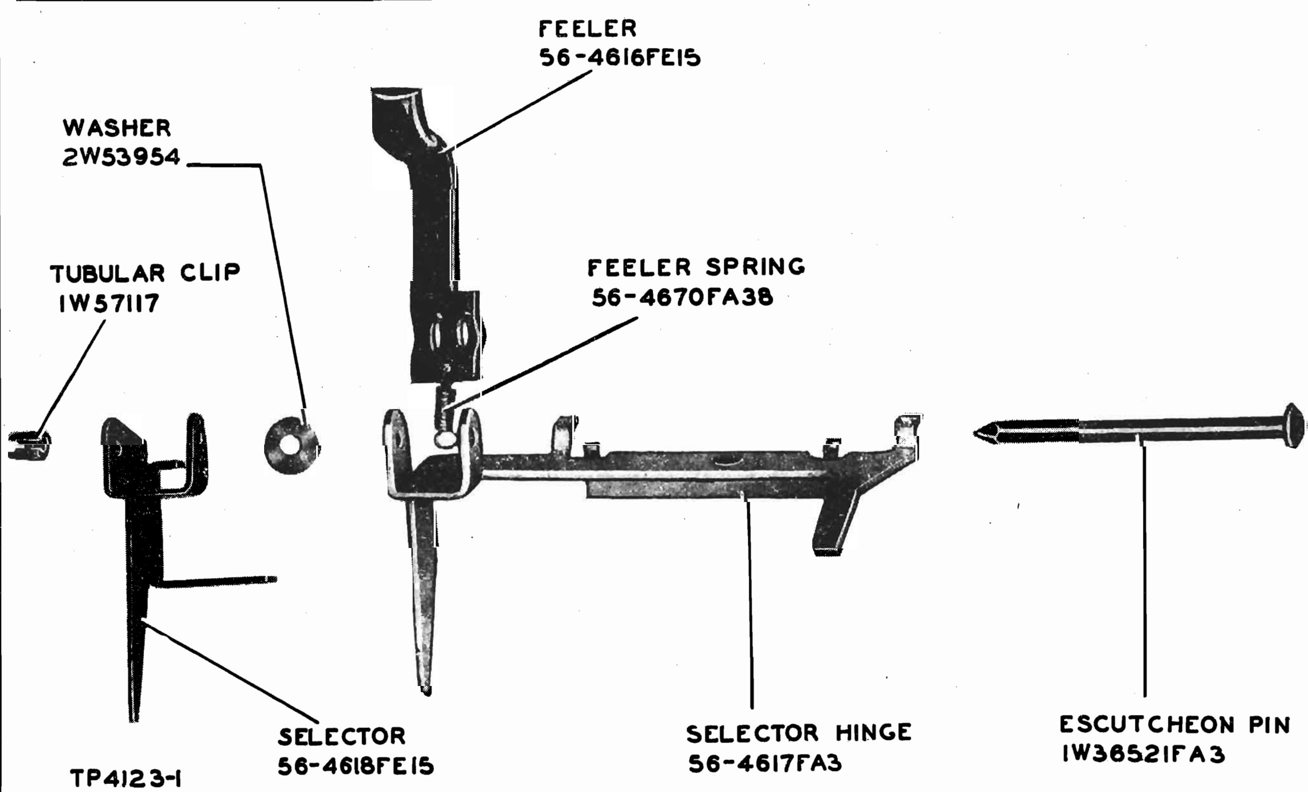


FIGURE 29 SELECTOR ASSEMBLY

REPLACEMENT OF PARTS AND ASSEMBLIES (Continued)

5. Long-Play-Tone-Arm Assembly, 35-2686

a. Unsolder tone-arm leads from terminal panel on underside of changer base plate.
b. Remove pull cord from lifter-link spring.
c. Loosen the clamp screw that holds the reset trip arm to the tone-arm pivot shaft.
d. Lift out tone arm. Figure 23 shows the tone-arm assembly.

6. Motor Assembly, 35-1371

a. Remove spindle as directed in paragraph 3
b. Unsolder motor lead from mercury switch.
c. Unsolder motor lead from switch mounted on bridge assembly.
d. Remove ground lead from one side of bridge assembly.
e. Remove the three screws, washers, and spacers from motor frame. Figure 24 shows the correct assembly.
f. Lift motor out.

7. Bridge Assembly, 76-3998

a. Remove the two hex-head screws from bridge plate.
b. Disengage the link control rod, 56-4589FA3, from the slider control bar.

8. Cam-Gear Assembly, 76-3995

a. Remove bridge assembly as directed in paragraph 7.
b. Slide trip plate off cam-gear spindle.
c. Remove turntable lower bearing, 76-2991, from "U"-shaped mounting bracket by pulling it off.
d. Remove large "E" washer, 1W60980, from cam-gear spindle.
e. Slide cam washer, 1W52627, off cam spindle.
f. Slide cam gear off spindle.

9. Tone-Arm Actuator Levers

a. Remove short link, 56-4607FA3, from link spring.
b. Remove "E" washer, 1W60980, from actuator stud.
c. Slide link actuator, 76-4193, from stud.
d. Disengage lifter link, 56-5990, from link actuator.
e. Remove long link, 56-4606FA3, from link spring.
f. Slide actuator lever, 76-2987, from stud. Figure 25 shows the actuator levers.

10. Push-Off Actuator, 56-4588FA3

a. Remove actuator levers as directed in paragraph 9.
b. Remove selector lever, 56-5985, as directed in paragraph 19.
c. Press push-off rod, 56-4595FA3, and push-off hanger bar, 56-4596FA3, together and pull downward to release the entire assembly.
d. Slide push-off actuator over to align upturned ears with cutout in base plate.
e. Slide actuator off stud.

Note: When removing the push-off assembly, the slide plate, 56-4594, on the record shelf may slide out of the assembly. When reassembling, this blade should be inserted in the record-shelf assembly with the elongated hole toward the 12-inch position of the record shelf. The push-off assembly is shown in figure 26.

11. Control Button (OFF-MAN-AUT-REJ), 76-3993

a. Remove bridge assembly, 76-3998, as directed in paragraph 7.
b. Disengage control link rod, 56-4589FA3, from control button.
c. Remove hex-head screw that holds record shelf to changer base plate.
d. Remove control-button support, 56-5742, from control button.
e. Lift control button out through record-shelf saddle.

12. Control Button (Play), 76-3993

a. Remove selector lever, 56-5985, as directed in paragraph 19.
b. Disengage selector link, 56-5991, from control button.
c. Remove the hex-head screw that holds the record-shelf assembly to the changer base plate.
d. Remove control-button support, 56-5742, from control button.
e. Lift control button out through record-shelf saddle.

13. Record-Shelf Assembly

a. Remove both control buttons as directed in paragraphs 11 and 12.
b. Lift out entire record-shelf assembly through top of changer base plate. Figure 27 shows the assembly of the record shelf

14. Trip-Arm Assembly, 76-4204

a. Loosen clamp screw on trip arm, 76,4204. See figure 12.
b. Raise tone arm and shaft sufficiently to clear trip arm.
c. Remove trip arm and disengage link spring. Figure 28 shows the trip-arm and trip-receiver assembly.

Note: When assembling the trip-arm assembly, maintain $1/32''$ vertical end play between the trip arm and the changer base plate.

15. Selector Assembly

a. Remove cam gear as directed in paragraph 8.
b. Remove feeler spring, 56-4670FA38, from bracket on changer base plate.
c. Tilt selector assembly and remove it from changer base plate. Figure 29 shows the assembly.

16. Long-Play-Tone-Arm Thrust Bearing, 56-5916

a. Remove long-play-tone-arm assembly, 35-2686, as directed in paragraph 5.
b. Remove "E" washer, 1W60977, from thrust-bearing shaft.
c. Lift thrust bearing out of the rubber grommet mounted on the long-play-tone-arm-shaft-support bracket. See figure 21.

17. Long-Play-Tone-Arm Stanchion, 56-5987

a. Remove long-play-tone-arm assembly, 35-2686, as directed in paragraph 5.
b. Remove the hex-head screws that hold stanchion to changer base plate.
c. Lift stanchion off base plate. See figure 19.

REPLACEMENT OF PARTS AND ASSEMBLIES (Concluded)

18. Long-Play-Tone-Arm Upper Bearing, 56-5903

a. Remove long-play-tone-arm stanchion, 56-5987, as directed in paragraph 17.

b. Remove "E" washer, 1W60981, from upper-bearing shaft mounted on long-play-tone-arm stanchion (figure 19).

c. Remove upper bearing from rubber grommet mounted on long-play-tone-arm stanchion.

19. Selector Lever, 56-5985

a. Remove "E" washer, 1W60977, from stud which mounts selector lever on changer base plate. See figure 14.

b. Remove spring washer, 1W56306, from stud.

c. Remove "U"-shaped detent spring, 56-5995, between selector lever and changer base plate.

d. Loosen lock-plate screw.

e. Align ears of selector lever with cutout slots on changer base plate.

f. Remove selector lever from stud.

g. Disengage selector link, 56-5991, from selector lever

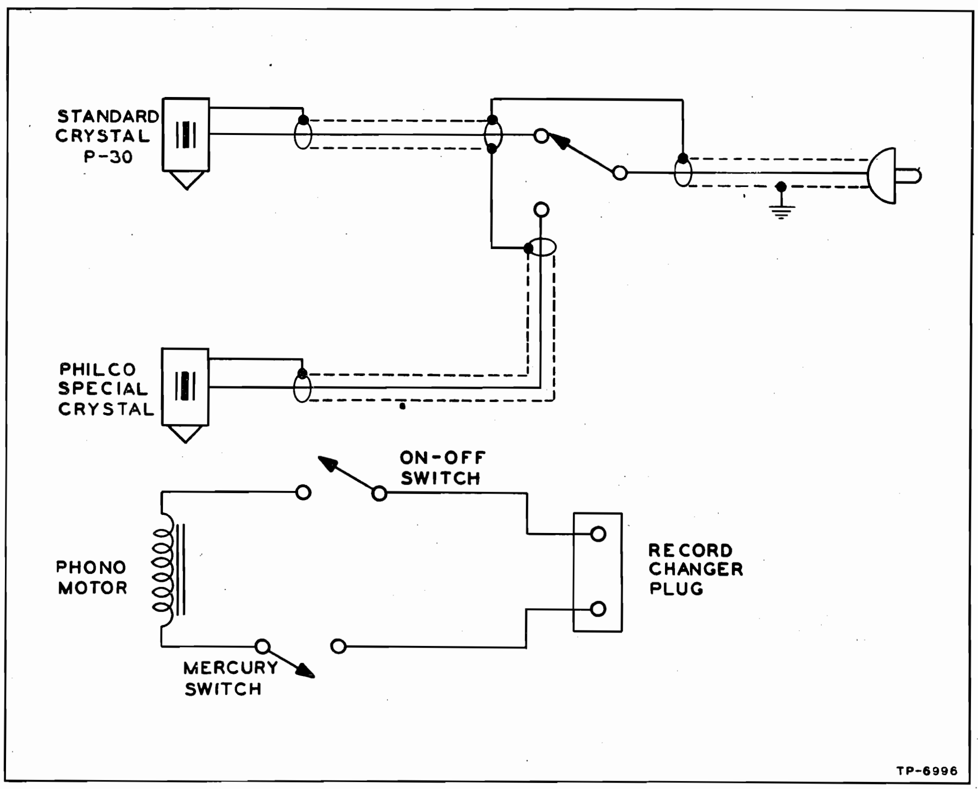


FIGURE 30 WIRING DIAGRAM OF MODEL M-12C

MODEL M-12C PHILCO CORP.

REPLACEMENT PARTS LIST

SERVICE PART NO.	DESCRIPTION
35-1371	Motor
35-2671-1	Crystal pickup (changer)
35-2675	Tone-arm assembly (changer)
35-2686	Tone-arm assembly (long play)
35-3066-1	Turntable
41-3869-2	Cable and plug
42-1873	Switch
45-1597	Needle (changer)
45-1609	Pickup-and-needle assembly (long play)
45-1610	Tone-arm shell (long play)
45-1612	Pickup cartridge
45-1613	Needle (long play)
45-3031	Knurled thumb nut
45-6479	Pulley belt
45-6480	Motor pulley
45-6481	Idler wheel
54-4501	Grommet, motor mtg.
54-4592	Bumper (record-shelf hold-down)
54-7613	Trip finger
56-2832FA3	Cable clamp
56-4585FA3	Lever, index
56-4588FA3	Actuator, push-off
56-4589FA3	Link, control
56-4594	Plate (push-off slide)
56-4595FA3	Rod, push-off
56-4596FA3	Hanger, push-off
56-4597FA3	Bar, push-off
56-4599FA3	Slider, safety
56-4600FA38	Spring, return
56-4603FA38	Spring, index
56-4606FA3	Link, long
56-4607FA3	Link, short
56-4608FA38	Spring
56-4613FA38	Spring, stop
56-4614	Trip-arm stop
56-4616FE15	Feeler (selector assembly)
56-4617FA3	Hinge, selector
56-4618FE15	Selector
56-4627FA3	Retainer, spring
56-4628FA38	Spring ring
56-4630FA38	Spring (record shelf)
56-4647	Retainer, spring
56-4670FA38	Spring (feeler)
56-4774FA3	Bar, push-off (rear)
56-4926	Spacer, motor mtg.
56-5644	Spring, spindle
56-5742	Support (control button)
56-5743	Plate, fulcrum
56-5744	Tone-arm rest (changer)
56-5753	Push-off saddle

SERVICE PART NO.	DESCRIPTION
56-5754	Pivot pin (changer tone arm)
56-5755	Counterweight (changer tone arm)
56-5758	Tone-arm shell (changer)
56-5882	Counterweight (long-play tone arm)
56-5903	Bearing (long-play tone arm)
56-5912	Stop (long-play tone arm)
56-5916	Bearing, thrust
56-5981	Trip receiver (trip arm)
56-5984FJ6	Saddle, push-off
56-5985	Lever, selector
56-5986	Plate, lock
56-5987	Stanchion (long-play tone arm)
56-5990	Link, lifter
56-5991	Link, selector
56-5995	Spring, detent ("U" shaped)
56-6404	Trip receiver (reset trip)
76-2140-2	Switch, mercury
76-2982	Pull-cord assembly (changer tone arm)
76-2982-1	Pull-cord assembly (long-play tone arm)
76-2987	Actuator assembly (changer tone arm)
76-2990	Trip plate
76-2991	Bearing assembly
76-3926	Spindle
76-3993	Control button
76-3994	Push-off cover (record shelf)
76-3995	Cam gear
76-3997	Shaft and swivel (changer tone arm)
76-3998	Bridge assembly
76-4008	Base-plate assembly
76-4010	Cover assembly (switch)
76-4086	Bracket (pickup and hinge)
76-4193	Link, actuator
76-4194	Trip switch
76-4195	Bracket-and-clip assembly
76-4196	Switch bracket
76-4197	Latch assembly
76-4198	Reset and trip
76-4201	Base-plate assembly
76-4204	Trip arm (subassembly)
76-4335	Pivot assembly
1W14460	Screw, 4-40 x ¼, crystal mtg.
1W36521FA3	Pin (escutcheon)
1W52627	Cam-gear washer
1W56306	Spring washer
1W57117	Tubular clip
1W60977	"E" washer, small
1W60980	"E" washer, medium
1W60981	"E" washer, large
2W53954	Washer, selector assembly

DESCRIPTION OF OPERATION

Power for the motor circuit is controlled by two mercury switches. These switches are inserted into clips; one of these clips is a part of a latch-plate-and-clip assembly, Part No. 76-4237, and the other is a part of a reset-plate-and-clip assembly, Part No. 76-4238. These two plate-and-clip assemblies are mounted on a switch-bracket assembly, Part No. 76-4235, which is located underneath the base plate, as shown in figure 1.

The tipping of the mercury switches to the OFF and ON position is accomplished by the trip arm, which is attached to the tone-arm shaft, and therefore is controlled by the tone arm.

When the tone arm is pulled back and set on its rest post, a protruding leg on the trip arm contacts the reset-plate-and-clip assembly, Part No. 76-4238, and raises it upward and tips the mercury switch mounted on it to the OFF position, as shown in figure 1. By the same action, the reset plate contacts an ear on the latch-plate-and-clip assembly, Part No. 76-4237, and holds it in an up, or horizontal, position. This tips the mercury switch mounted on it to the ON position, as shown in figure 1.

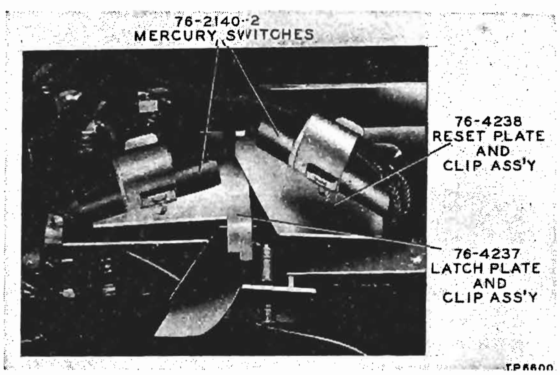


Figure 1

The two mercury switches are electrically connected in series. Since one of them is in the OFF position when the tone arm is on the rest post, the motor circuit is open and no power is supplied to the motor. When the tone arm is taken off the rest post and placed on a record, the reset-plate-and-clip assembly is permitted to drop down, tipping its mercury switch to the ON position. See figure 2. The motor circuit is now closed, and the record player is turned on.

During the playing of a record, a trip finger mounted on the trip arm rides over a ratchet on the latch-and-bushing assembly, Part No. 76-4197; see figure 3. When the pick-up needle enters the eccentric finish groove at the end of the record, the trip arm, which is connected to the tone arm through the tone-arm shaft, will oscillate in a forward and backward motion, causing the trip finger to trip the latch-and-bushing assembly, Part. No. 76-4197. This permits the latch-plate-and-clip assembly to drop down, and tip its mercury switch to the OFF position. The motor circuit is now open, and the record player is turned off.

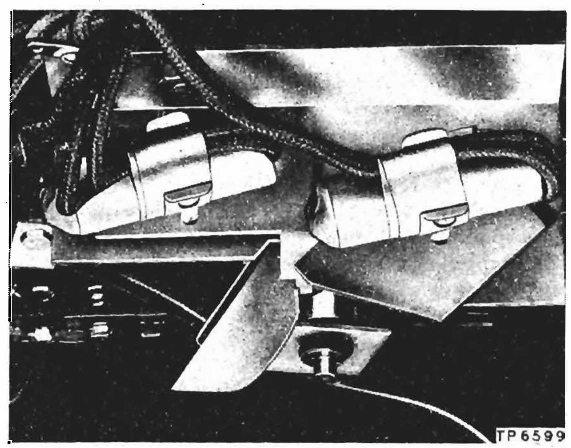


Figure 2

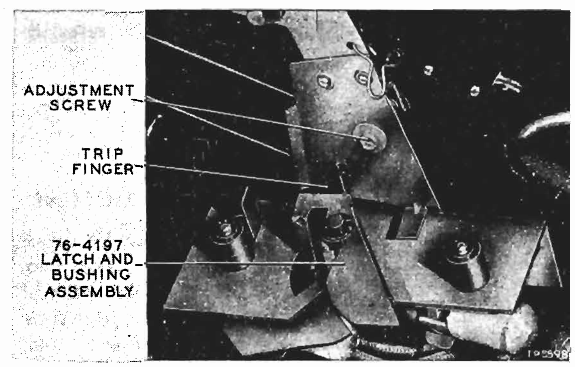


Figure 3

TESTS

STARTING

With the tone arm on the rest post, place a 12-inch Columbia Long Playing Record on the turntable, lift the tone arm from the rest post, and place it on the starting groove of the record. The turntable should start immediately after the tone arm is off the rest post. If not, refer to page for the adjustment of the switches.

PICKUP AND NEEDLE

After the tone arm has been placed on the record, listen to its tone. If distortion is noted, replace the crystal cartridge as directed on page . If the trouble continues, check for loose wiring leads, bad contacts, etc.

SHUTOFF

Place the tone arm in the finish groove of the record, and observe the shutoff action. The record player should shut off within three revolutions of the turntable, after the pickup needle has entered the finish groove of the record. Refer to page for trip-finger adjustments.

BASE-PLATE CLEARANCE

Remove the record from the turntable, and place the tone arm over the base plate. Note whether there is a minimum of ⅛-inch clearance between the needle point and the base plate. Refer to page for the base-plate-clearance adjustment.

TURNTABLE AND MOTOR

Allow the motor to run for at least 10 minutes, then place a stroboscope disc such as Philco Part No. 45-9531 on the turntable, and illuminate the disc with a lamp operating on 60-cycle a.c. The dots in the row calibrated for 33⅓ r.p.m. should appear to remain stationary or drift very slowly, but smoothly, forward or backward. If the dots are moving in either direction very fast or in a jerky motion, refer to "Uneven Turntable Speed and Rumble."

ADJUSTMENTS

NEEDLE PRESSURE AND VERTICAL FRICTION

Needle pressure and vertical friction can be measured by means of the Philco Gram Scale, Part No. 45-9532. The scale consists of a long, flat pointer spring set in a movable pivot. The end of the scale has a number of divisions, with each division equal to one gram. The center line is zero.

Hold the scale on its edge, with the setscrew up, and set the pointer spring to the midpoint, or zero, position. Lift the tone arm slightly off the rest post and place the needle point in the dimple in the pointer spring. Lift the tone arm approximately ½ inch with the scale, as shown in figure 4, and note the reading. Then lower the scale ½ inch again and note the reading; see figure 4A. The midpoint between the two readings is the needle pressure, and the difference between the two readings is the vertical friction. The needle pressure should be not less than 5 grams and not more than 7 grams, and the vertical friction should be not more than 2 grams.

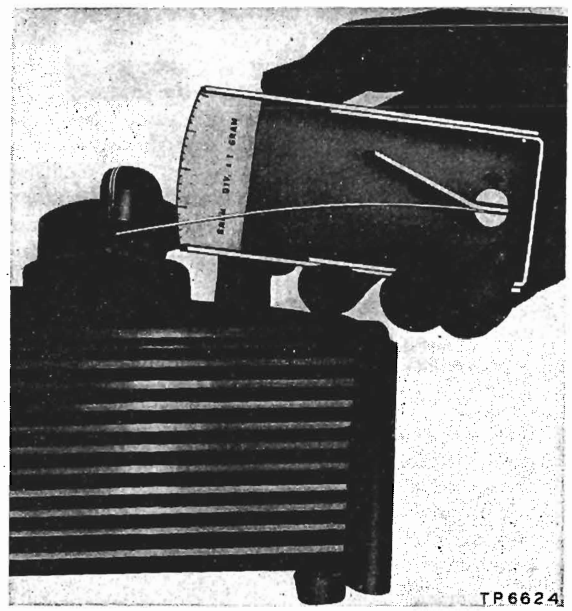


Figure 4

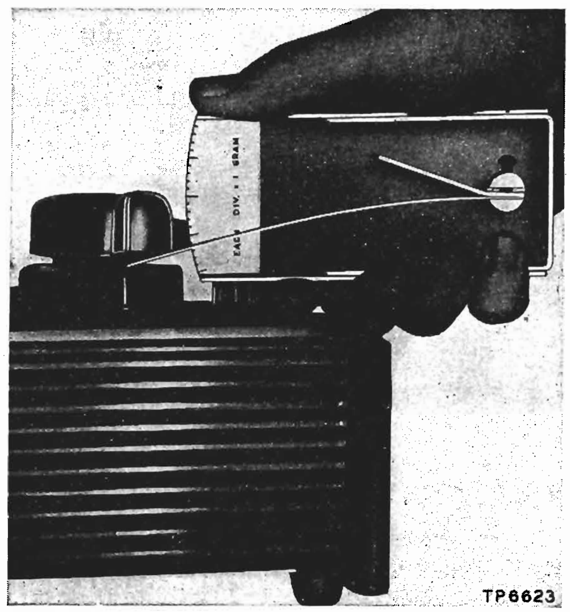


Figure 4A

Example:

With the scale attached and the tone arm raised ½ inch, the reading is 7 grams. With the tone arm lowered, the reading is 6¼ grams. The midpoint between the two readings, or the needle pressure, is approximately 6⅝ grams. The difference between the two readings, or the vertical friction, is ¾ gram.

To obtain the correct needle pressure, bring the tone arm to the center of the turntable and unhook the spring, shown in figure 6, from the notch of the pivot-and-shaft assembly, Part No. 76-4092. Place the spring in different notches until the correct needle pressure is obtained.

HORIZONTAL FRICTION

Lay the Philco Gram Scale, Part No. 45-9532, flat with the scale divisions up, and set the pointer spring to the midpoint, or zero, position.

Take the tone arm off the rest post and place a weight on top of the back section of the tone arm. Move the weight until the tone arm is balanced in a horizontal position.

Hold the scale so that the pointer spring bears against the side of the tone-arm head as shown in figure 5; move the tone arm with the spring toward the center of the turntable, and note the reading while the tone arm is being moved horizontally.

At no time should the reading be more than 3 grams.

PICKUP HOLDER

The pickup holder should be centrally spaced between the walls of the tone arm so that the pickup cartridge does not bind or rub against the inside of the tone-arm wall when the cartridge is move vertically.

To obtain the proper spacing, first remove the tone arm (see page); loosen the screw which holds the pickup-bracket mounting. Move the mounting until it is centrally spaced between the walls of the tone arm; maintain a 1/32-inch clearance between the tip of the ears on the holder and the inside surface at the front end of the tone arm, as shown in figure 7.

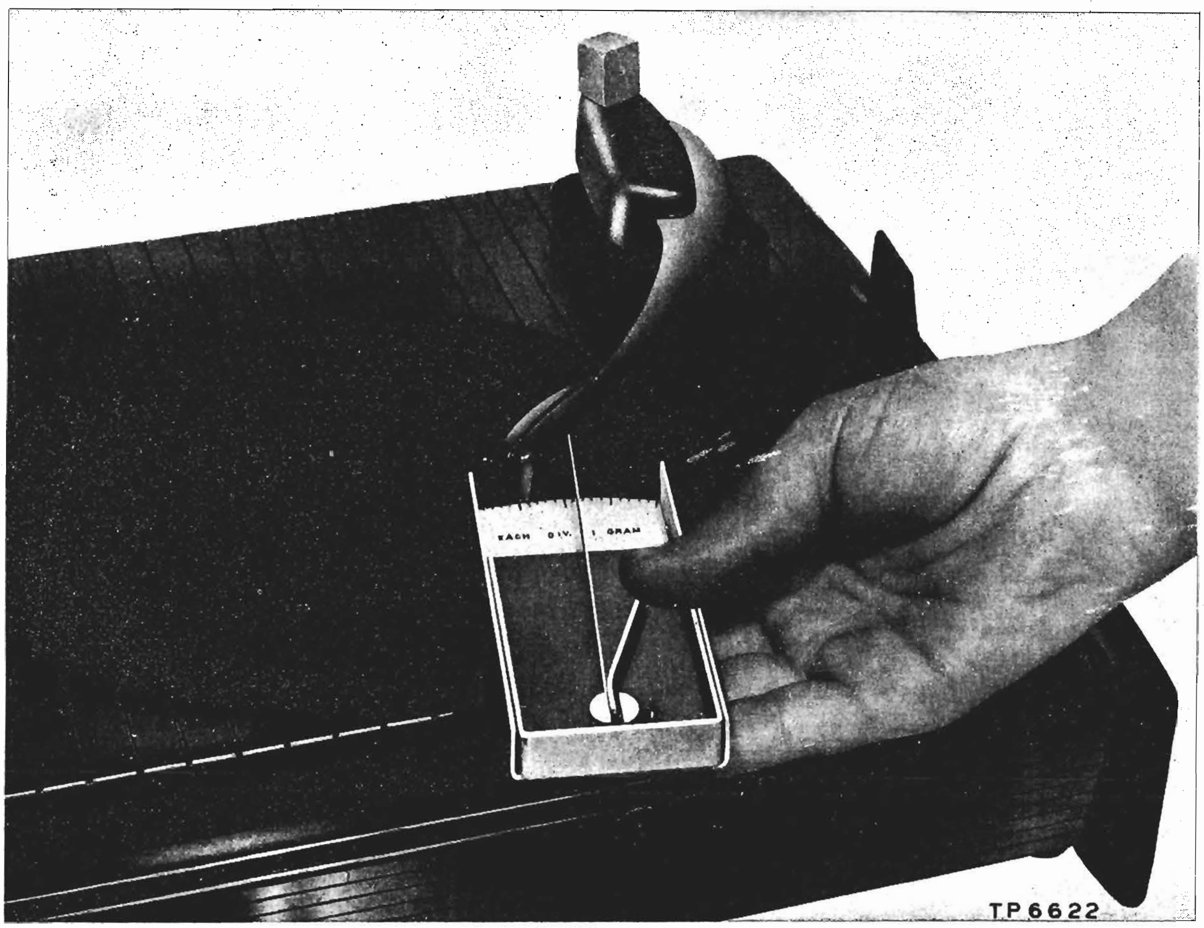


Figure 5

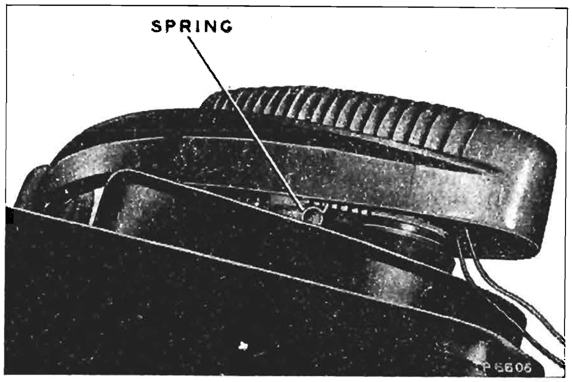


Figure 6

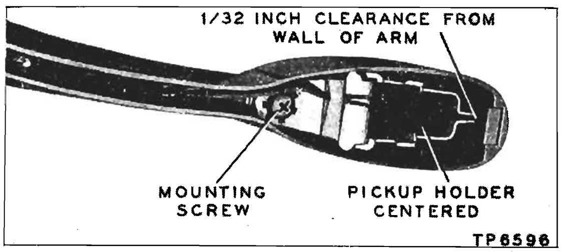


Figure 7

TONE-ARM BASE-PLATE CLEARANCE

With the tone arm off the rest post and lying over the base plate, as shown in figure 8, the needle should be at least 1/8-inch, and not more than 3/16-inch, above the base plate. If the clearance is incorrect, grasp the tone arm and raise or lower it, whichever is required) with a little pressure to obtain the correct clearance.

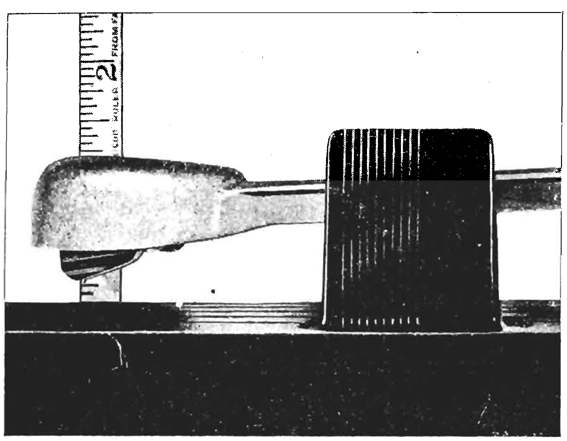


Figure 8

TRIP SWITCH

With the tone arm on the rest post, both the reset-plate switch, Part No. 76-4238, and the latch-plate switch, Part No. 76-4237, should be in a horizontal position, as shown in figure 1. To adjust, turn the record player around and, from the rear, loosen the trip-arm clamp screw. Hold the tone arm on the rest post, and move the trip arm until the trip-arm leg engages the reset-latch ear. At the same time, the latch-plate ear should be approximately 1/32 inch above the cut-out on the ratchet-plate-latch assembly, Part No. 76-4197. Refer to figure 9 for the correct position of the latch ears. After the adjustments are made, tighten the clamp screw on the trip arm.

Note: Before tightening the clamp screw, be sure to leave .010-inch vertical clearance between the spacer in the trip arm and the tone-arm-shaft support.

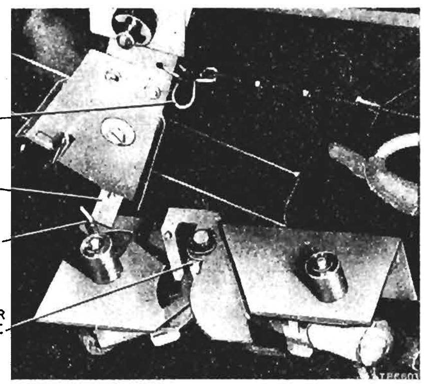


Figure 9

TRIP FINGER

Place the tone-arm needle in the finish groove of a record, and from underneath the rear of the record player observe the trip finger riding over the ratchet on the latch-bushing assembly. The trip finger should assume an angle of 25° to 30° while riding over the ratchet, as shown in figure 3. Adjust the screw on the trip arm to obtain the proper angle.

TRIP-FINGER CENTERING

The trip-finger center line should be directly over the ratchet on the latch-and-bushing assembly when the tone-arm needle is in the finish groove of the record. To adjust, remove the mercury switches from their clips by pulling them out. Loosen the two nuts which hold the switch-assembly bracket, Part No. 76-4235, to the base plate. Move the switch bracket until the trip-finger center is directly over the ratchet. Tighten the switch-bracket nuts and insert the mercury switches, in the clips, in the correct positions.

Note: Be sure that sufficient clearance between the mercury switches is maintained, or they may bind against each other when tripped.

IDLER PULL CORD

The idler wheel should be disengaged from the motor shaft when the tone arm is on the rest post. It should re-engage when the needle is approximately $\frac{1}{16}$-inch from the edge of a 12-inch record. To adjust, tighten or spread the loop of the pull cord attached to the trip arm. See figure 7.

UNEVEN TURNTABLE SPEED AND RUMBLE

Remove the turntable by removing the E washer from the spindle and pulling the turntable up. Clean all dirt from the idler-wheel assembly and the inside rim of the turntable. Examine the idler wheel and the rim of the turntable for bumps. Replace the idler wheel or turntable if any bumps are found. Some rumble can be caused by looseness of one or more of the motor mounting screws, or by hardening of the rubber grommets on the motor frame.

REPLACEMENT OF PARTS AND ASSEMBLIES

The following procedures are recommended for the correct replacement of parts and assemblies. The part should be replaced by reversing the order of removal, and should be adjusted as directed in the "Adjustments" section of this manual.

CRYSTAL-CARTRIDGE ASSEMBLY, PART No. 45-1609

To remove the crystal cartridge, grasp the crystal by its sides and pull it down and out. When replacing the cartridge, push it up into the head of the tone arm until it is completely seated.

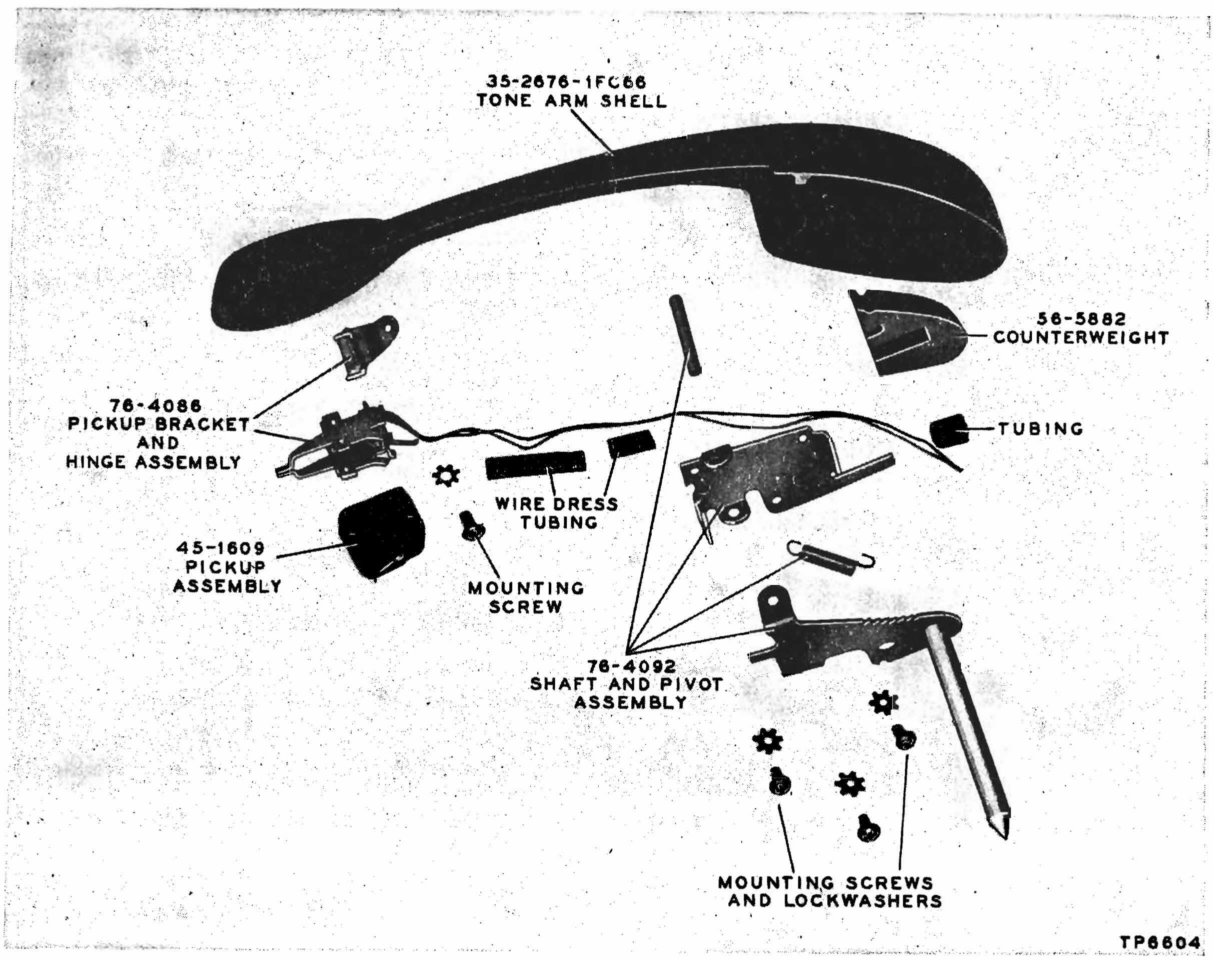


Figure 10

MOTOR, PART No. 35-1359 OR 35-1361

1. Remove E washer from spindle.
2. Lift out turntable.
3. Remove idler pull cord from idler bracket.
4. Unsolder motor leads.
5. Remove the three mounting screws.
6. Lift out motor.

TONE-ARM ASSEMBLY, PART No. 35-2681

1. Unsolder tone-arm lead wires from terminal panel on underside of record-player base plate.
2. Loosen clamp screw which holds trip arm to tone-arm shaft.
3. Lift out tone arm. Be careful not to lose fiber spacer on tone-arm shaft. Refer to figure 10 for correct assembly of tone arm.

TONE-ARM THRUST BEARING, PART No. 56-5916

1. Remove tone-arm assembly as directed under "Tone-Arm Assembly, Part No. 35-2681."
2. Remove E washer, Part No. 1W60977FE7, from bearing shaft; see figure 11.
3. Lift bearing out of grommet, Part No. 27-4099-3, mounted on tone-arm-shaft support, Part No. 56-5827.

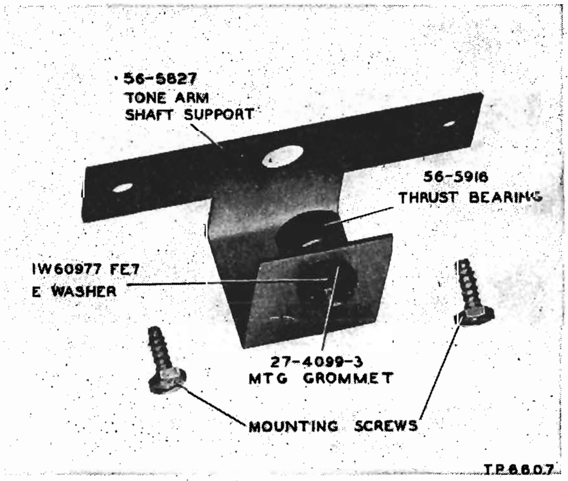


Figure 11

TONE-ARM UPPER BEARING, PART No. 56-5903

1. Remove tone-arm assembly as directed under "Tone-Arm Assembly, Part No. 35-2681."
2. Remove E washer, Part No. 1W60981FE7, from upper bearing at top of tone-arm housing.
3. Lift out bearing from underneath base plate.

TONE-ARM-SHAFT SUPPORT, PART No. 56-5827

1. Remove tone-arm assembly as directed under "Tone-Arm Assembly, Part No. 35-2681."
2. Remove the two mounting screws from underneath base plate.

RESET-PLATE-AND-CLIP ASSEMBLY, PART No. 76-4238

1. Remove mercury switch from clip.
2. Remove E washer, Part No. 1W60971FE7, from shaft of reset plate mounted on switch assembly; see figure 12.
3. Slide reset plate out of brass bushing from switch assembly.

LATCH-PLATE-AND-CLIP ASSEMBLY, PART No. 76-4237

1. Remove reset plate, Part No. 76-4238, as directed in paragraph above.
2. Remove E washer, Part No. 1W60971FE7, from latch-plate shaft.
3. Slide latch plate out of brass bushing from switch assembly.

RATCHET-LATCH ASSEMBLY, PART No. 76-4197

1. Remove E washer, Part No. 1W60977FE7; see figure 12.
2. Slide ratchet-latch assembly off switch assembly.

SWITCH ASSEMBLY, PART No. 76-4235

1. Remove mercury switch from latch-plate clip.
2. Remove the two hex-head nuts which hold switch assembly to base plate.

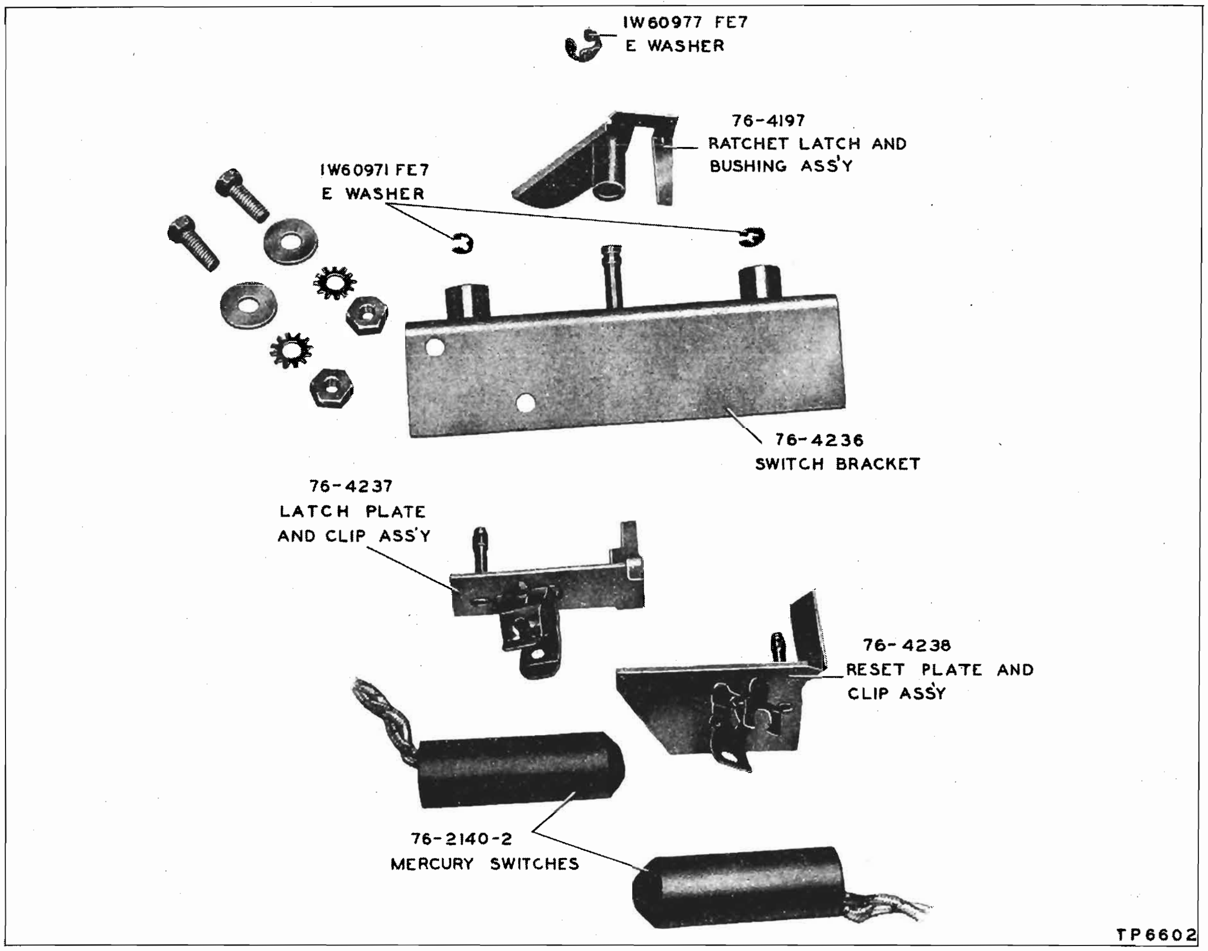
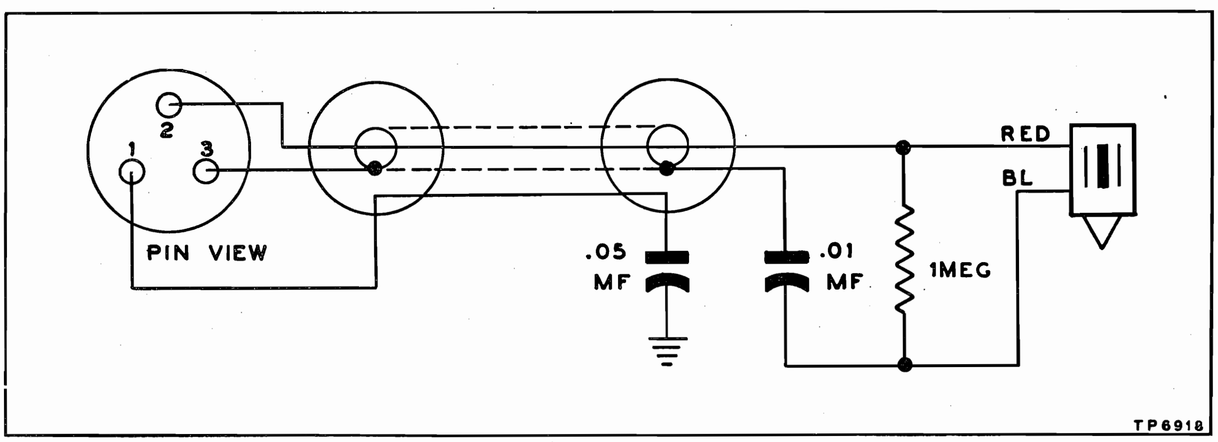


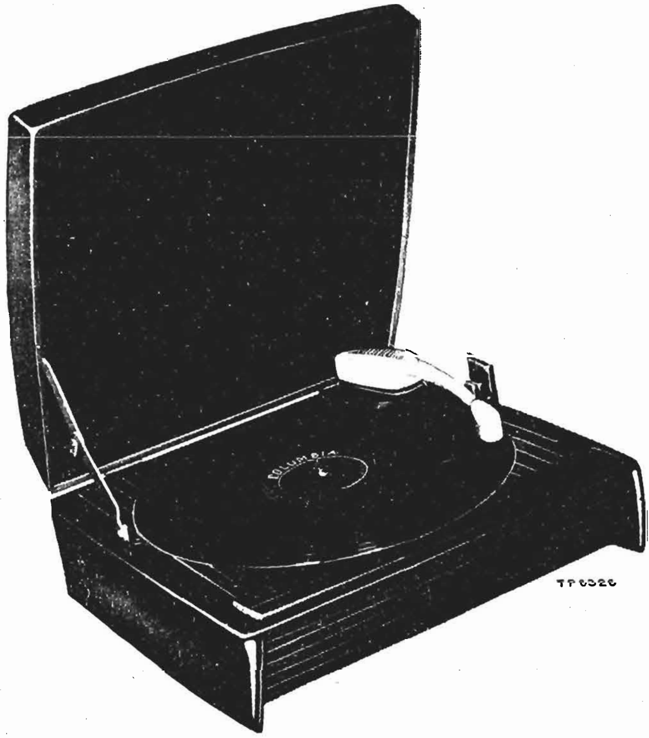
Figure 12



Model M-15, Schematic Diagram

MODEL M-15 PHILCO CORP.

REPLACEMENT PARTS LIST



Part No.	*Description*
10720	Cabinet, less scale
10720A	Cabinet, less scale
27-4099-3	Grommet
28-2345	Cable clamp
28-2669FA43	Plug (for FM Adaption)
35-1359	Motor (Alliance)
35-1361	Motor (G.I.)
35-2676-1FC66	Tone-arm shell
35-2681	Tone arm
35-2683	Turntable (Alliance)
35-2685	Turntable (G.I.)
41-3821-6	Line cord
41-3869	Cable
45-1609	Pickup-and-needle assembly
54-4604	Cabinet base
54-4605	Cabinet top
54-4624	Grommet
54-4638	Tone-arm rest
54-4645	Rubber foot
54-7665	Bottom cover
55-0890	Bumper
56-2832FA3	Cable clamp, pickup
56-4584FA3	Loop, cord
56-5827FA3	Support, shaft
56-5882	Counterweight
56-5903	Bearing, upper
56-2912FA3	Stop
56-5916	Thrust bearing
56-6295	Lid support
56-6296	Binder post
56-6305	Hinge

Part No.	*Description*
76-2140-2	Mercury switch
76-4086	Bracket assembly, pickup and hinge
76-4092	Pivot, tone arm
76-4189	Reset and trip
76-4197	Latch assembly
76-4235	Switch assembly
76-4236	Switch bracket
76-4237	Latch plate
76-4238	Reset plate
W2537-3	Screw, hinge
1W10796FA9	Screw, binder post
1W56920FE7	Speed clip, tone-arm rest
1W60971FE7	E washer, switch assembly
1W60977FE7	E washer, thrust bearing
1W60981FE7	E washer, upper bearing
11W52604	Fiber washer

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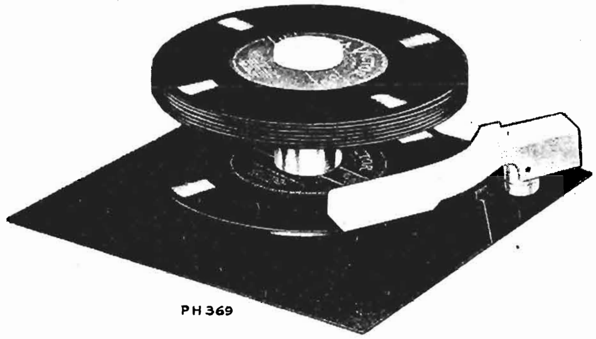
MODEL RP-168, Series



PH 369

The basic RP168 mechanism includes the metal sub-panel and all necessary operating parts except the tone arm and trip lever assemblies. Instruments using the cabinet as the motor board will have additional items (other than the tone arm and trip lever assemblies) listed in the Service Data issued for the individual models.

RP-168-1: Record changer mechanism plus tone arm assembly RMP-129-1; instrument cabinet is used as record changer motor board. Used in Models 9JY and 9EY3.

RP-168A-1: Record changer mechanism plus tone arm assembly RMP-129-1 and metal motor board. Used in Models 9W101, 9W103, 9W105, 9TW333, 9TW390 and 9Y7.

Complete record changer parts listing (except output cable), included in this Service Data. Different types and lengths of output cables are used—listed in Service Data of Individual Instruments.

RP-168A-2: Record changer mechanism plus tone arm assembly RMP-130-1 and metal motor board. Used in Berkshire Models.

AUTOMATIC OPERATION

1. Place a stack of records over the center post, with the desired selections upward the last record to be played on top.
2. Apply power to drive motor.
3. Push the "start-reject" knob to "start" and let go. The mechanism will automatically play in sequence one side of each record stacked on the separator shelves.
4. To reject a record being played push the "start-reject" knob to "reject."
5. At conclusion of playing and as the last record is being repeated, lift tone arm and place on rest. Push "on-off" knob to the "off" position.

SPECIFICATIONS

This mechanism is designed to play automatically a series of eight new RCA seven-inch fine groove records.

RPM	45
Pickup	Crystal
Sapphire dia.	.0009 inches
Pickup voltage output	Medium
Pickup force	5 grams

CAUTION

1. Avoid handling the tone arm when the mechanism is in cycle.
2. Do not use force to release a jam.
3. Do not try to remove the records on the turntable if the turntable is stopped in cycle.
4. Do not try to operate the mechanism if the separator knives protrude from the center post when the mechanism is out of cycle.

   Turn Power control on. The turntable revolves. Press finger gently against protruding discs until they disappear inside the holder. Do not do this during a change cycle.

LUBRICATION

A light machine oil (SAE No. 10) should be used to oil the bearings of the drive motor.

On all bearing surfaces, excepting the motor bearings, Houghton STA-PUT No. 320, or equivalent, should be used. On all other sliding surfaces, STA-PUT No. 512, or equivalent, is recommended. STA-PUT can be purchased from E. F. Houghton & Co., 303 W. Lehigh Ave., Philadelphia, Pa.

(Do not oil or grease record separator shelves.)

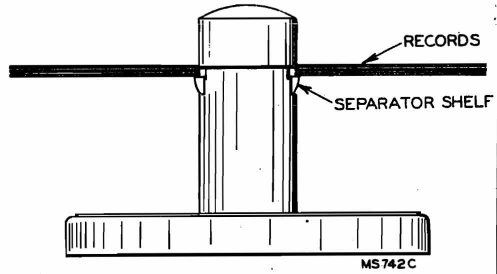
It is important that the drive motor spindle and the rubber tire on the idler wheel be kept clean and free from oil or grease, dirt, or any foreign material at all times. Carbon tetrachloride or naphtha is satisfactory for cleaning these parts.

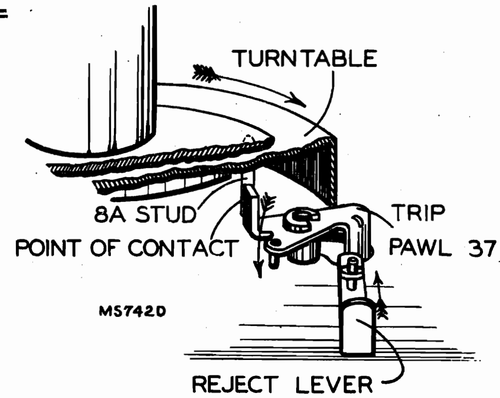
MODEL RP-168,
Series

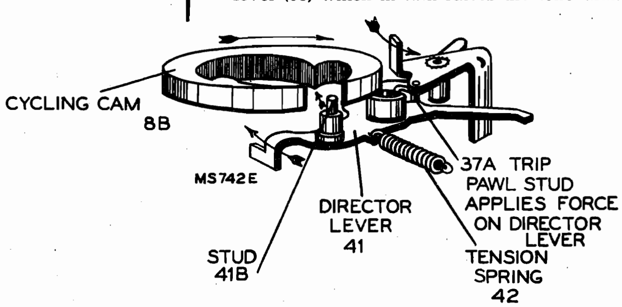
RADIO CORP. OF AMERICA

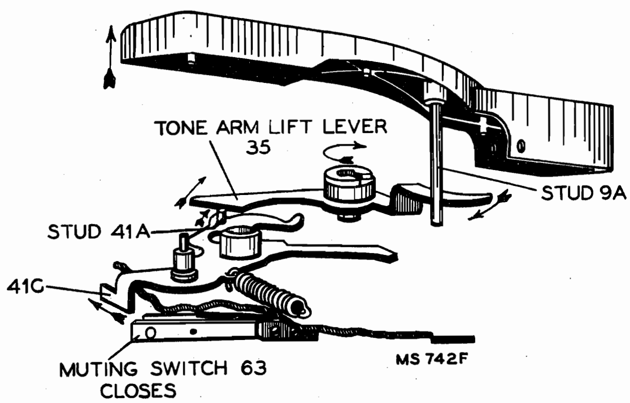
CYCLE OF OPERATION RP-168

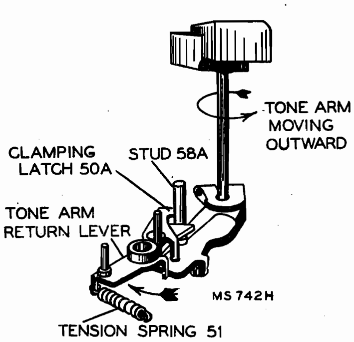
	Function	Explanation
	Place records over the center post and turn the power on	1. Records rest on separator shelves protruding from either side of the center post.
Operator	Push start-reject knob	1. Start-reject knob which is linked to start-reject slide (45A) moves trip pawl (37) into tripping position. 2. As the turntable rotates the small projection (8A) extending from the underside of the turntable contacts end of trip pawl.
Automatic Cycle	Tone arm rises	1. As the turntable continues to rotate it carries the trip pawl (37) along for a short distance. 2. The stud (37A) on trip pawl applies force against director lever (41) in opposition to tension spring (42). This force continues to be applied until the stud (41B) on the director lever has been forced through the slot and into the cycling cam (8B). 3. The end (41C) of the director lever extending below the motor board moves away allowing the muting switch (63) to close. 4. At the same time the stud (41A) pushes the tone arm lift lever (35) which in turn raises the tone arm.

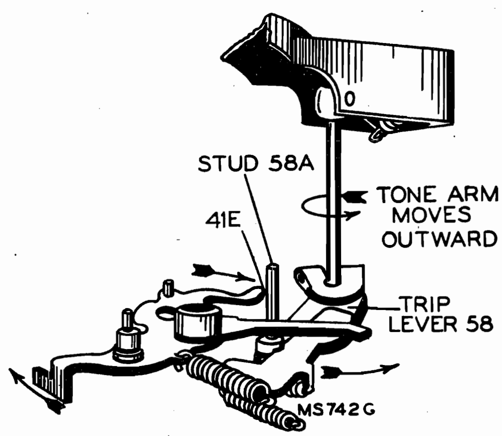












Function	Explanation
Tone arm moves out	1. The end (41E) of the director lever (41) contacts stud (58A) on trip lever (58), starting the tone arm on its outward movement. 2 The stud (58A) on trip lever contacts tone arm return lever (50), pushing it outward against the tension spring (51). 3. As the tone arm reaches its outermost position, it is locked in position by the latch (50A) clamping the stud (58A) on the end of the tone arm return lever.

RADIO CORP. OF AMERICA

MODEL RP-168, Series

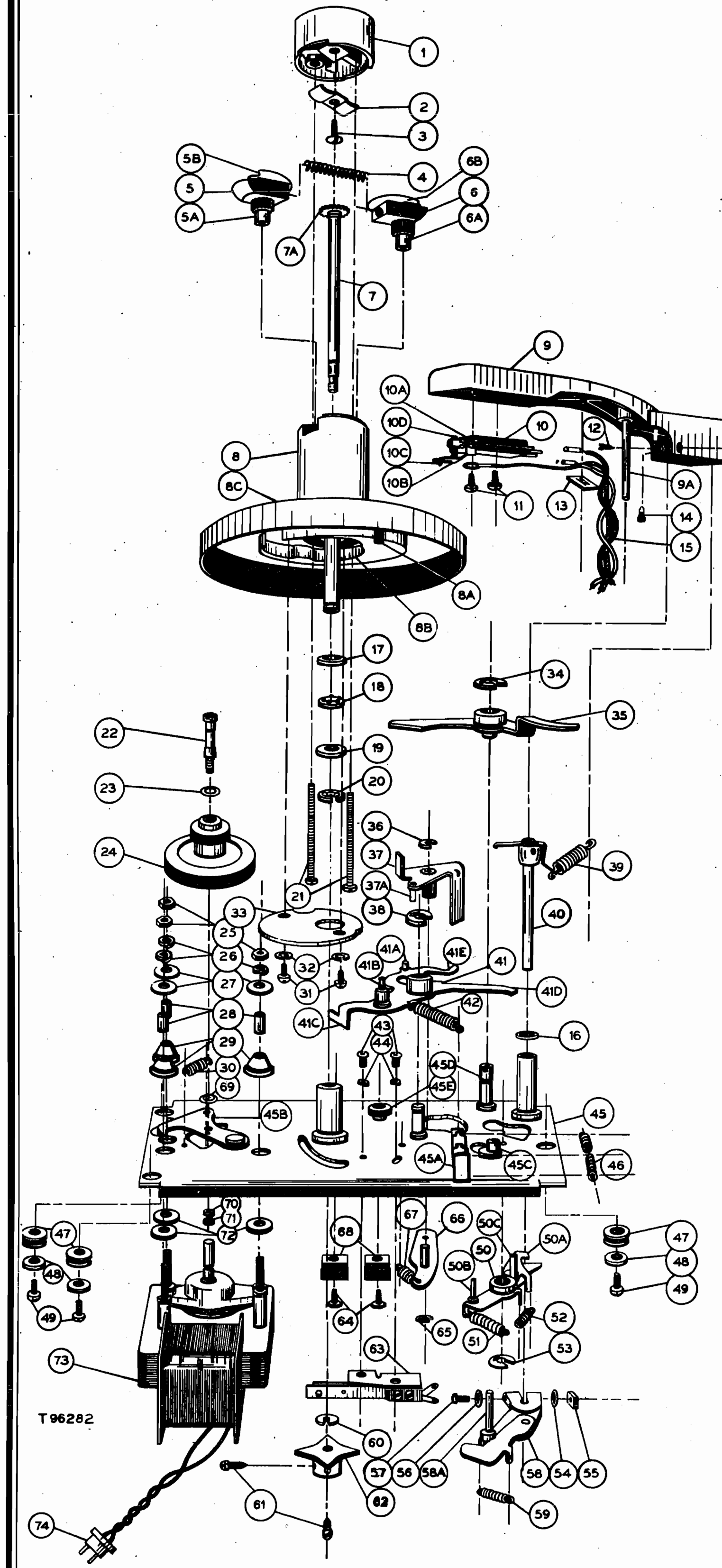
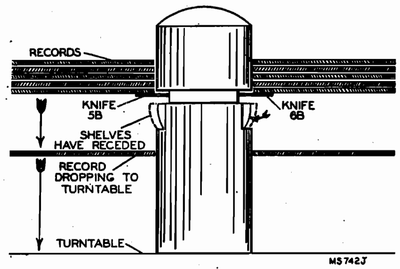
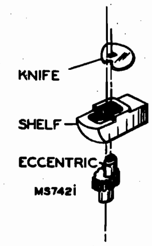
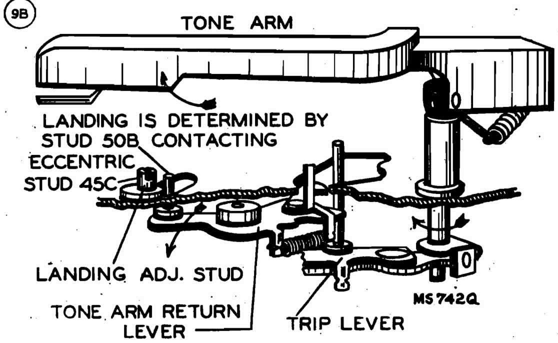
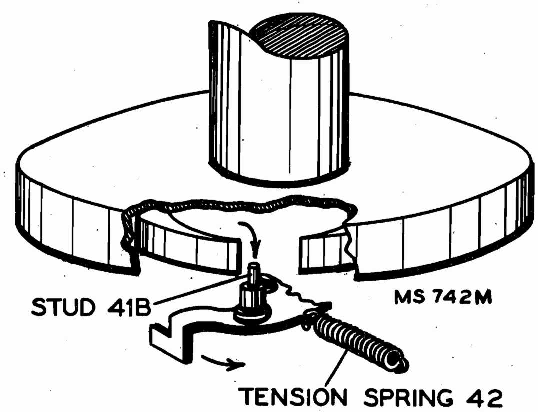


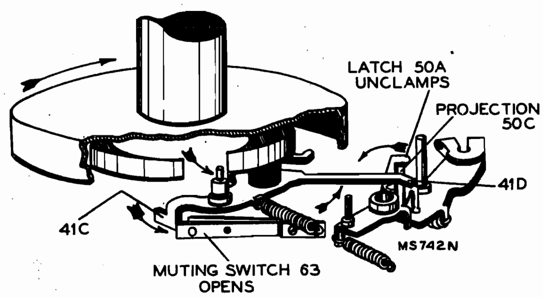
Fig. 1











MODEL RP-168, Series

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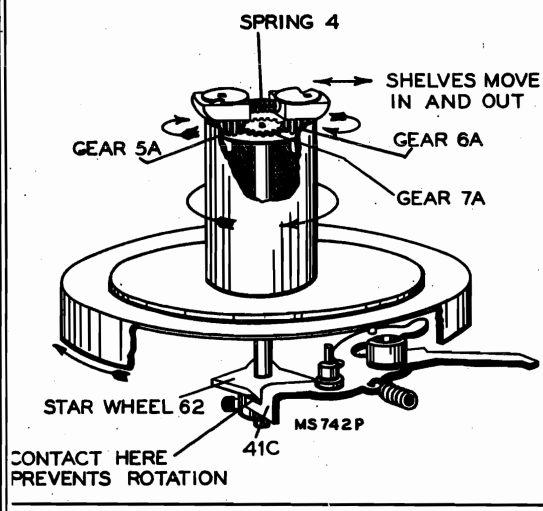
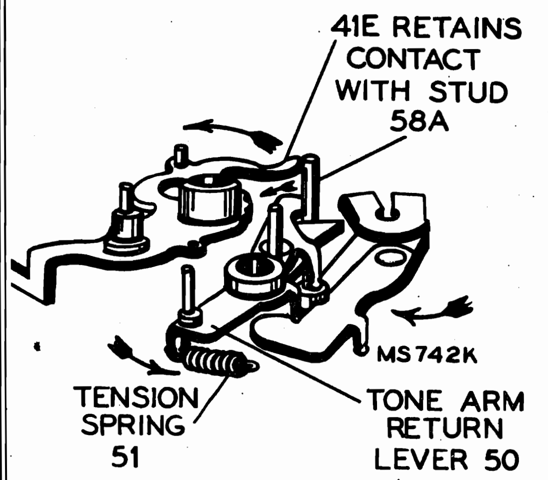


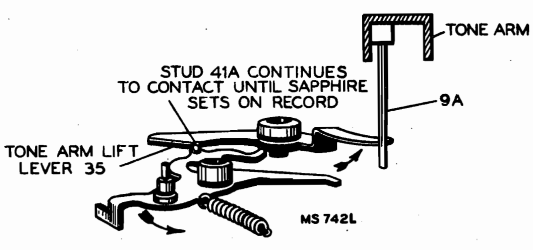
Separator knives separate the lower record from the stack and allows the record to drop to the turntable

1. While the tone arm is moving outward the end (41C) of the director lever (41) extending below the motor board, contacts and prevents the star wheel (62) from rotating.
2. Since the turntable continues to rotate and the star wheel and shaft remain stationary. The two small gears (5A and 6A) embedded in the upper section of the center post rotate around the gear (7A) on the upper end of the star wheel shaft (7).
3. The eccentric extending from the upper end of the twc embedded gears runs in a slot in the separator shelves (5 and 6). This produces the necessary action which causes the shelves to move in against the tension of spring (4).
4. As the shelves recede the separator knives (5B and 6B mounted above each separator shelf, separate the lowe record of the stack and support the remaining stack while the lower record drops to the turntable.



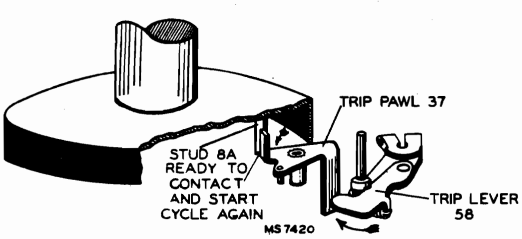
Tone arm moves in for landing

1. As the locator lever (41) continues to move toward the ou of cycle position the end of the locator lever (41E) retains contact with the stud (58A) on the trip lever (58). This contact stabilizes the inward movement of the tone arm which is being pushed in by the tone arm return lever (50).
2. The inward movement of the tone arm is stopped directly above the landing position due to the stud (50B) on tone arm return lever coming in contact with the eccentric stud (45C).



Tone arm lowers sapphire to the record

1. The stud (41A) on director lever (41) continues to contact tone arm elevating lever (35) and lowers the sapphire on the start of the record.
2. As the turntable completes on revolution the stud (41B) on director lever is pulled through the slot in the cycling cam by the force produced by tension spring (42).
3. While the stud (41B) on director lever slides through the slot in the cam and assumes the out of cycle position, the end of the director lever (41D) contacts projection (50C) and unlatches the tone arm return lever (50).
4. The end (41C) of the director lever below the motor board moves away from the star wheel and opens muting switch.



Record plays

1 After the selection has been completed the sapphire moves into the tripping groove. At this time the trip lever (58) pushes the trip pawl (37) into position for engagement with the stud (8A) on the under side of the turntable.
2. This contact between stud (8A) and the trip pawl (37) starts another change cycle and the next record is moved into position for playing.

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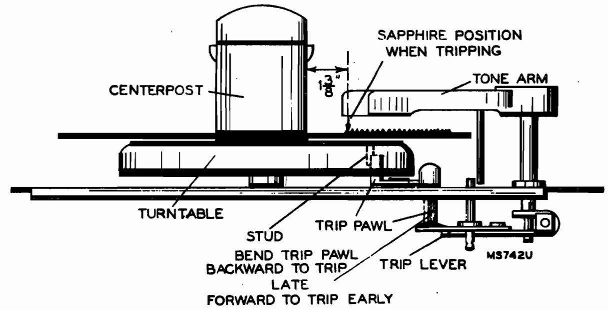
MODEL RP-168, Series

REPLACEMENT PARTS

STOCK No.	ILL. No.	DESCRIPTION
		MODEL RP-168
*74090	1	Nose—Spindle nose
*74091	2	Spring—Spindle nose spring (formed)
	3	Screw—No. 6-32 round head machine screw for spindle nose spring
*74095	4	Spring—Separator shelf return spring (.180" O.D. x 1-1 16"—10 turns)
*74096	5	Separator—Separator knife, shelf and gear assembly
*74096	6	Separator—Separator knife, shelf and gear assembly
*74092	7	Gear—Star wheel shaft and gear assembly
*74042	8	Turntable—Turntable and shaft complete with mat
*74094	8A	Mat—Turntable mat
*74080	17	Washer—Washer for turntable assembly
72349	18	Bearing—Turntable thrust bearing
72688	20	Washer—"C" washer for turntable assembly
	21	Screw—No. 6-32 x 1¾" fillister head machine screw for turntable assembly (2 required)
*74079	22	Stud—Idler wheel mounting stud
*74078	23	Washer—Dampening washer for idler wheel (top)
*74077	24	Wheel—Idler wheel
*74132		Hardware—Motor mounting hardware consisting of
	25	Three (3) hex nuts
	26	Three (3) lockwashers
	27-72	Six (6) flat washers
	28	Three (3) spacers
*74087	29	Grommet—Rubber grommet to mount motor (3 required)
*74089	30	Spring—Idler wheel spring (.195" O.D. x .593"—14 turns)
*74231	33	Cam—Follower cam
35969	34	Washer—"C" washer for tone arm lift lever
*74073	35	Lever—Tone arm lift lever
33726	36	Washer—"C" washer for trip pawl
*74072	37	Pawl—Trip pawl
35969	38	Washer—"C" washer for director lever
*74076	41	Lever—Director lever
*74084	42	Spring—Director lever spring (.195" O.D. x .732"—23¼ turns)
	43	Screw—No. 6-32 screw to mount muting switch
	44	Lockwasher—No. 6 lockwasher (external) to mount muting switch
*74070	45	Base—Sub-base assembly complete with all staked and riveted parts including idler lever and reject lever
*74082	45E	Washer—Felt washer (½" O.D. x ¼" I.D. x 3/16" thick)
*74086	46	Spring—Reject lever spring (.203" O.D. x 13/16"—34¾ turns)
*74074	50	Lever—Return lever (includes spring No. 61)
*74085	51	Spring—Return lever actuating spring (.195" O.D. x 29/32"—37½ turns)
*74075	52	Spring—Return lever latch spring (.180" O.D. x .535"—21½ turns)
35969	53	Washer—"C" washer for tone arm return lever
33726	60	Washer—"C" washer for star wheel shaft
*74083	61	Screw—No. 6-32 x .281" cone point set screw for star wheel (2 required)
*74081	62	Wheel—Star wheel
*74088	63	Switch—Muting switch
33726	65	Washer—"C" washer for trip pawl lever
*74245	66	Lever—Trip pawl lever
*74100	67	Spring—Trip pawl take-up spring (.195" O.D. x ⅝"—20½ turns)
*74102	69	Washer—Dampening washer for idler wheel (bottom)
	70	Lockwasher—No. 4 lockwasher for idler wheel mounting stud
	71	Nut—No. 4-40 hex nut for idler wheel mounting stud
*74071	73	Motor—105/125 volts, 60 cycles
		MODEL RP-168A-1
		NOTE: Parts listed for mechanism RP-168 plus the following are those parts for the above Record Changer. (For Pickup and Arm Assembly RMP-129-1, see separate listing.)
*74256	16	Washer—Vellutex washer
*74099	58	Lever—Trip lever (includes spring No. 59)
74060	59	Spring—Trip lever spring (.171" O.D. x .695"—43 turns)
73549		Emblem—"RCA-Victor" emblem
*74210		Knob—Reject control knob
*74211		Lever—Reject lever actuating lever
*74184		Motorboard—Motorboard complete with welded brackets and stud—less rest and operating parts
*74212		Nut—Speed nut for reject control knob
*74185		Rest—Pickup arm rest
33726		Washer—"C" washer for mounting reject lever actuating lever
		MODEL RMP-129-1 Pickup and Arm Assembly (Used with 9EY3, 9JY and RP-168A)
*74041	9	Arm—Pickup arm shell and stud less cystal, cable and rear pivot arm
*74061	9B	Pivot—Tone arm pivot
*74067	10	Crystal—Crystal cartridge complete including sapphire and guard
*74065	10A	Screw—No. 2-56 x 3/16" fillister head screw to mount crystal (2 required) or needle guard (2 required)
*74069	10B	Guard—Needle guard
*74068	10C	Sapphire—Sapphire and holder
*74230	10D	Washer—Washer and nut to mount sapphire and holder
74065	11	Screw—No. 2-56 x 3/16" fillister head screw to mount crystal (2 required) or needle guard (2 required)
*74062	12	Screw—No. 8-32 x 13/32" cone point pivot adjusting screw
38458	13	Nut—Speed nut to hold pickup cable
74410	14	Screw—No. 4-40 x 3/16" fillister head set screw to lock pivot screw 74062
*74066	15	Cable—Twisted pickup cable (12") complete with connectors
*74060	39	Spring—Pivot arm spring (.171" O.D. x 695"—43 turns)
*74059	40	Arm—Pivot arm and shaft

TRIPPING ADJUSTMENT

The tripping should occur after the sapphire leaves the last playing groove. This point of tripping should be when the sapphire is 1⅜ inches from the side of the centerpost. Bend end of trip pawl as required.



TIMING OF SEPARATOR KNIVES

1. Make certain the two embedded gears (5 and 6) are meshed with gear (7A) on the upper end of the star wheel shaft so the action of the separator knives are synchronized.
2. Loosen the two set screws (61) sufficiently to permit the star wheel to rotate without disturbing the shaft (7).
3. Position the separator knives as indicated in figure (3).
4. Push reject lever and rotate the turntable slowly by hand until the end (41C) of the director lever moves in far enough, so when the star wheel is rotated it contacts by the amount as indicated in figure (2).
5. Tighten the two set screws (61) and rotate the mechanism through a complete cycle.
   The separator knives must rotate 360° and return to the starting position as indicated in figure (3).

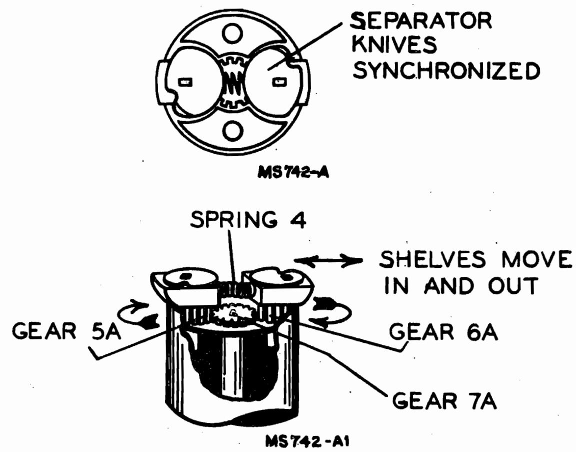


Fig. 3

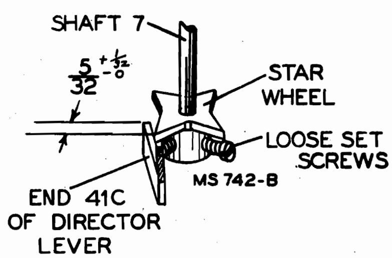


Fig. 2

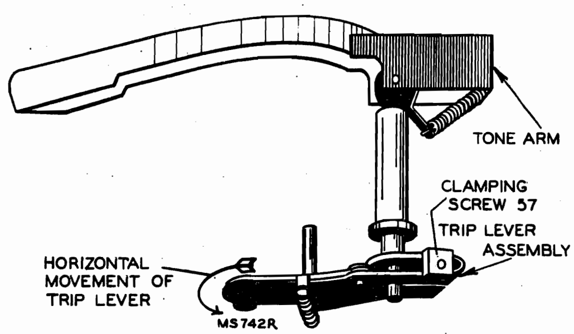


Fig. 4

PICKUP LANDING ADJUSTMENT

1. Assemble the tone arm and trip lever assemblies as shown in figure (4). Leave the clamping screw (57) loose enough to permit horizontal movement of the trip lever on the shaft. (Allow approx. .010 inch vertical end play.)
2. Turn the eccentric landing adjustment stud (45C) to determine the inward and outward limit of adjustment, then turn it to a setting half way between the limits. Fig. 6. (Screwdriver slot approx. 30° from parallel with front edge of subpanel, in a counter-clockwise direction.)
3. Place a record on the turntable, push the reject lever and slowly rotate the turntable until the sapphire is just ready to set on the start of the record.
4. Hold the trip lever and move the tone arm by hand until sapphire is in position halfway between the music grooves and the edge of the record.
5. Tighten clamp screw (57), apply power and run the mechanism through cycle. (Note the sapphire landing position.)
6. The exact landing position of the sapphire can be adjusted by turning the eccentric landing adjustment screw (45C). (Do not attempt to correct a landing error of more than ± 1/32", with the eccentric screw driver adjustment stud.)

   Sapphire landing position should be (2⅝") ± 1/64" from the side of the center post as shown in figure (5).

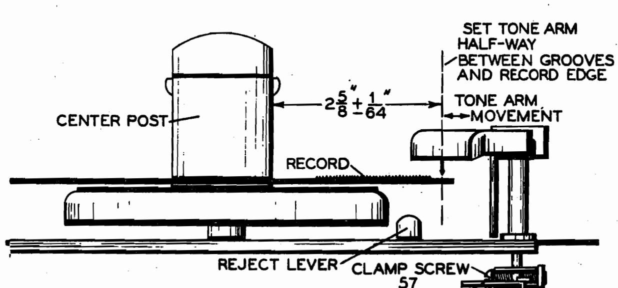


Fig. 5

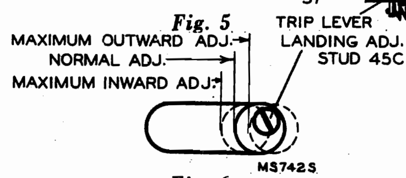


Fig. 6

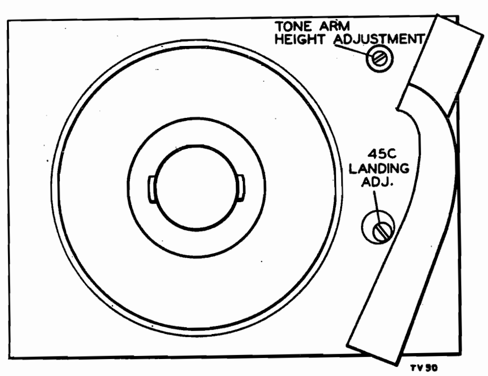


Fig. 7

RADIO CORP. OF AMERICA

MODEL RP-168, Series

OUT OF CYCLE HEIGHT OF TONE ARM

Bend tone arm lug so the sapphire point is approximately 1/16" above the motor board as shown in the sketch.

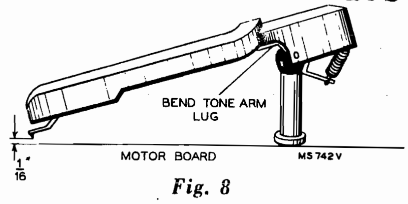
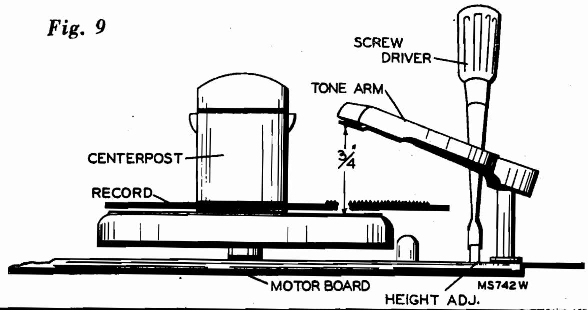


Fig. 8

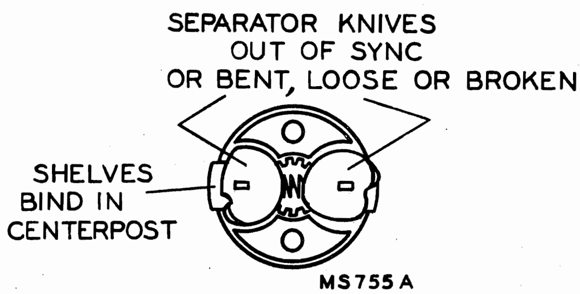
TONE ARM IN CYCLE HEIGHT ADJUSTMENT

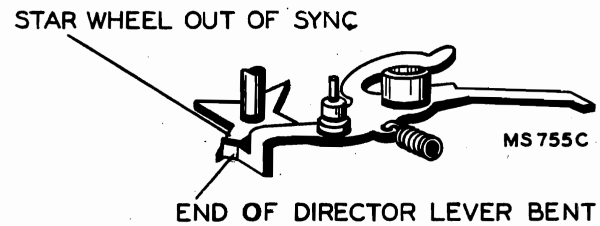
Set the mechanism in cycle. Turn the turntable by hand, until the tone arm has reached its maximum height. By means of a screwdriver turn the height adjustment stud until the distance between the top of the turntable and the sapphire point is 3/4". Turning the stud clockwise will raise the arm and counter-clockwise will lower the arm.

Fig. 9



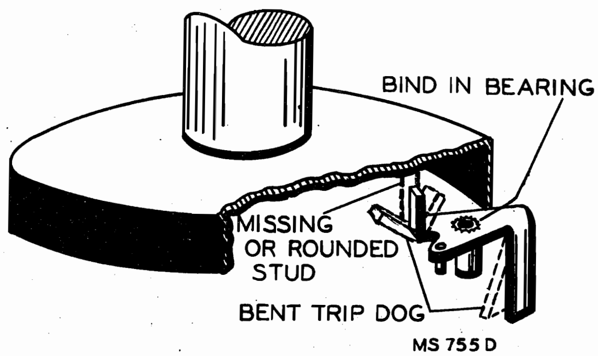
IMPROPER RECORD SEPARATION

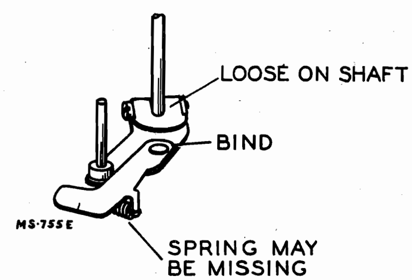




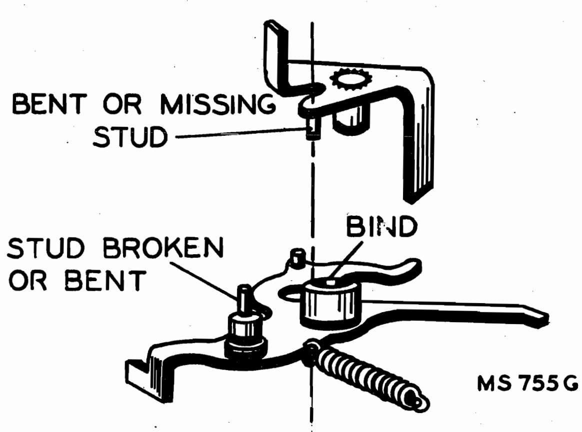
To insure proper dropping of records and avoid tilting of stack. It is important that the separator shelves move in and out freely. It is therefore essential that the shelves be free from burrs, grease, grit or dirt in general.

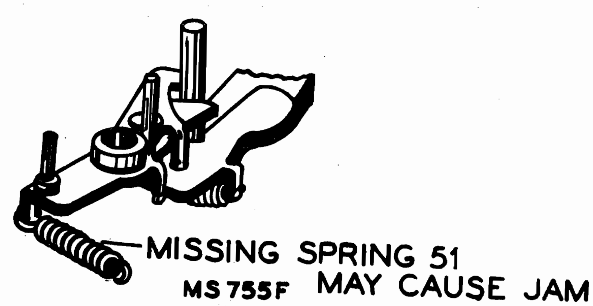
FAILS TO TRIP





FAILS TO GO INTO CYCLE

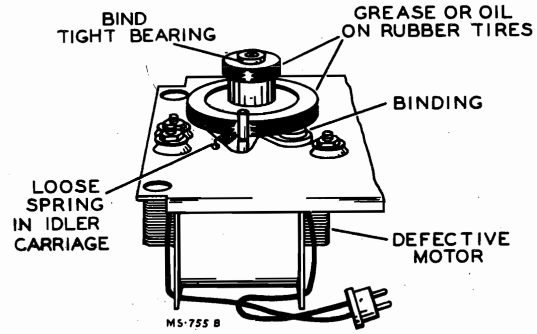


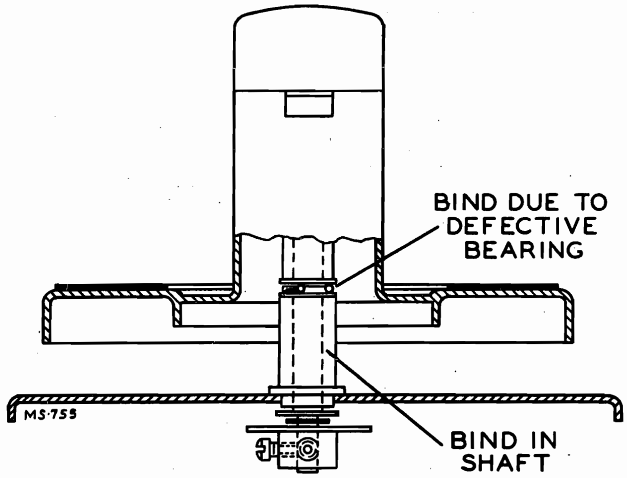


MODEL RP-168,
Series

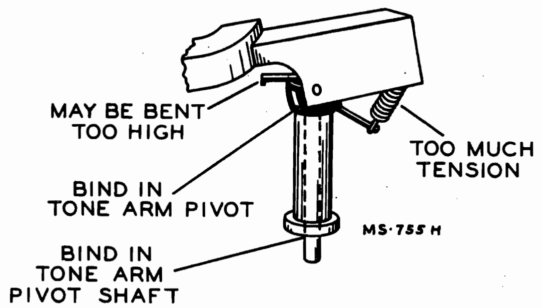
RADIO CORP. OF AMERICA

WOW (Speed Variation)

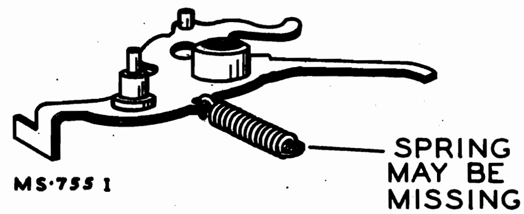




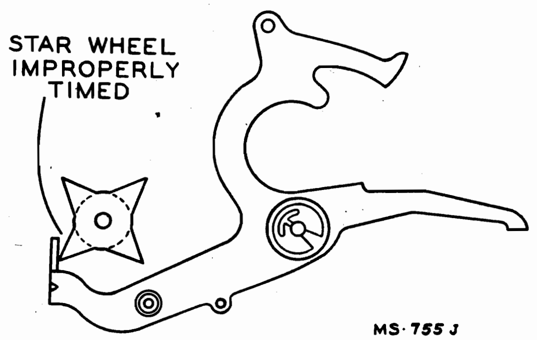
REPEATS GROOVES



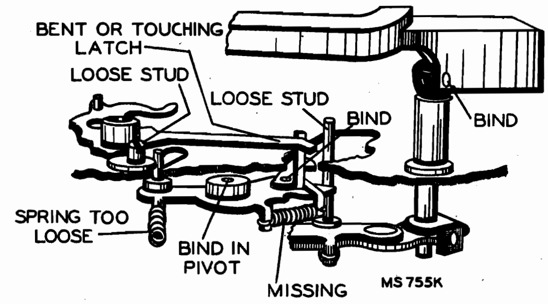
CONTINUOUS TRIPPING



RECORD DROP ON OR HIT TONE ARM



ERRATIC PICKUP LANDING



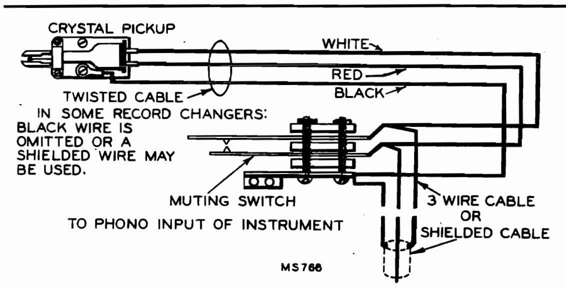
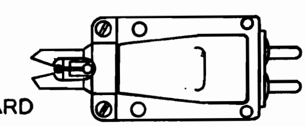


Fig. 10

A BENT SAPPHIRE SUPPORT
CHIPPED SAPPHIRE
SAPPHIRE TOUCHING
TONE GUARD
LINT OR FOREIGN
MATERIAL IN GUARD

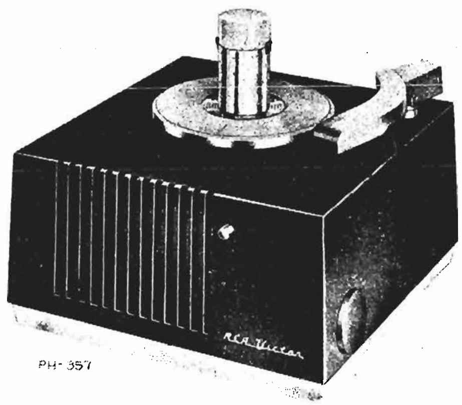


A CHIPPED SAPPHIRE MAY CAUSE
SKIPPING OF GROOVES

A CHIPPED SAPPHIRE MAY CAUSE FAILURE TO TRIP

RADIO CORP. OF AMERICA

MODEL 9EY3,
CHASSIS RS-132



Specifications

Tube Complement

1. RCA 12AV6 .... Amplifier
2. RCA 50C5 .... Output
3. RCA 35W4 .... Rectifier

Loudspeaker (92577-6W)

Size and type .... 4 in. P.M.
Voice coil impedance .... 3.2 ohms at 400 cycles

Dimensions (overall)

Height, 7⅝"   Width, 9¹¹⁄₁₆"   Depth, 9⅝"

Power Supply Rating

115 volts, 60 cycles A.C. .... 45 watts

Power Output

Undistorted ...... 1.0 watt   Maximum ...... 1.25 watts

Record Changer (RP-168-1)

Turntable speed .... 45 r.p.m.
Records used .... Long playing—7 in.
Record capacity .... 8 records
Pickup .... Crystal (medium output)

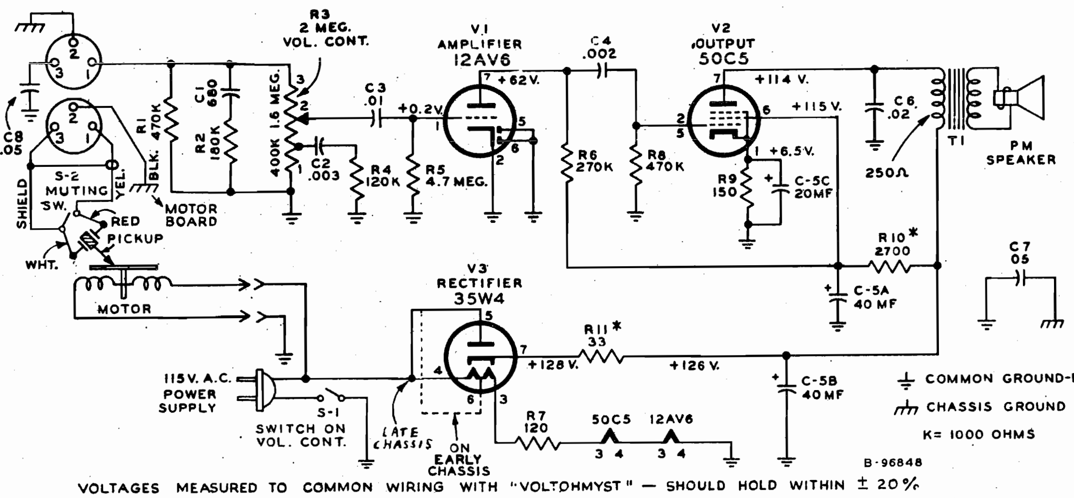
REPLACEMENT PARTS

STOCK No.	DESCRIPTION
	AMPLIFIER ASSEMBLIES RS-132
39648	Capacitor—Mica, 680 mmf. (C1)
72839	Capacitor—Moulded paper, .002 mfd., 400 volts (C4)
73961	Capacitor—Tubular, .003 mfd., 200 volts (C2)
71923	Capacitor—Tubular, .01 mfd., 200 volts (C3)
56871	Capacitor—Moulded paper, .02 mfd., 400 volts (C6)
71702	Capacitor—Moulded paper, .05 mfd., 400 volts (C7, C8)
72281	Capacitor—Electrolytic, comprising 1 section of 80 mfd., 150 volts; 1 section of 40 mfd., 150 volts; and 1 section of 20 mfd., 25 volts (C5A, C5B, C5C)
*74133	Control—Volume control and power switch (R3, S1)
28451	Cover—Insulating cover for electrolytic capacitor
*73693	Grommet—Strain relief grommet (1 set) for power cord
70391	Insulator—Phono input socket insulator
30868	Plug—2 contact female plug for motor cable
73237	Resistor—Wire wound, 33 ohms, 150 ma. (R11)
72314	Resistor—Wire wound, 120 ohms, 5 watts (R7)
	Resistor—Fixed, composition, 150 ohms ±10%, ½ watt (R9)
	Resistor—Fixed, composition, 2700 ohms ±10%, ½ watt (R10)
	Resistor—Fixed, composition, 120,000 ohms ±10%, ½ watt (R4)
	Resistor—Fixed, composition, 180,000 ohms ±10%, ½ watt (R2)
	Resistor—Fixed, composition, 270,000 ohms ±10%, ½ watt (R6)
	Resistor—Fixed, composition, 470,000 ohms ±20%, ½ watt (R8)
	Resistor—Fixed, composition, 470,000 ohms ±10%, ½ watt (R1)
	Resistor—Fixed, composition, 4.7 megohms ±20%, ½ watt (R5)
73117	Socket—Tube socket
36422	Socket—3 contact socket for phono input cable
72535	Transformer—Output transformer (T1)
	SPEAKER ASSEMBLIES 92577-6W—RL 108B4
*74165	Speaker—4" P.M. speaker complete with cone and voice coil
	MISCELLANEOUS
*74135	Baffle—Speaker baffle
*74134	Bottom—Cabinet bottom cover
*74137	Bracket—Mounting bracket for reject button and shaft
*74136	Bracket—Speaker mounting bracket
*74138	Button—Reject button and shaft
Y2071	Cabinet—Plastic cabinet—maroon—less bottom cover
*74190	Cable—Shielded pickup cable complete with 3 prong male plug
*74193	Clamp—Spring clamp for reject button and shaft
73549	Emblem—"RCA-Victor" emblem
74087	Grommet—Rubber grommet to mount record changer (3 required)
73490	Knob—Volume control and power switch knob—maroon
*74192	Plug—3 prong male plug for pickup cable
*74191	Spacer—Metal spacer (eyelet) to mount record changer (3 required)
14270	Spring—Retaining spring for knob
*74139	Spring—Reject button and shaft return spring (.203" dia. x 1½"—21" turns)
2917	Washer—"C" washer for reject button and shaft

* This is the first time that this Stock No. has appeared in Service Data.

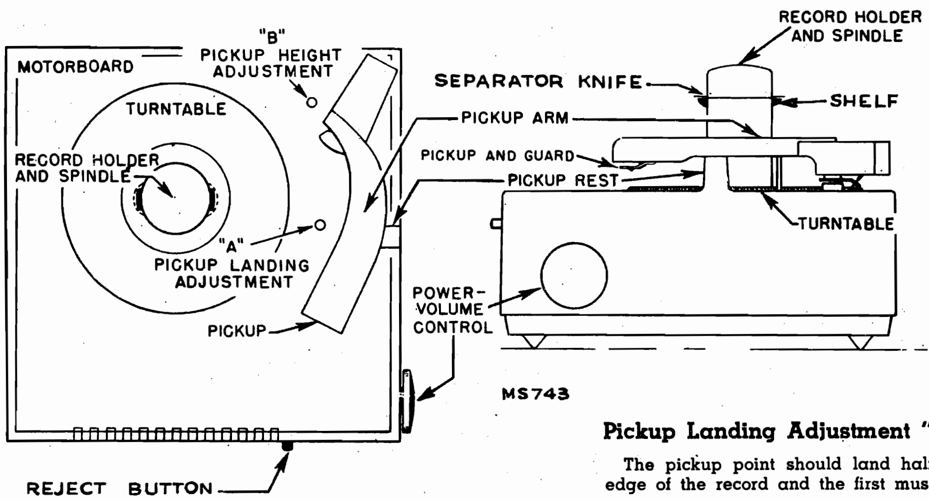
MODEL 9EY3,
CHASSIS RS-132

RADIO CORP. OF AMERICA



VOLTAGES MEASURED TO COMMON WIRING WITH "VOLTOHMYST" — SHOULD HOLD WITHIN ± 20%.
* IN SOME CHASSIS R10 IS 5600 OHMS, R11 IS NOT USED, RECTIFIER CIRCUIT AS SHOWN BY DOTTED LINE.

Schematic Diagram



Top and Side Views

Record Separators

In the out of cycle position the record separator knives or discs are normally concealed inside the center post. During service the position of the star wheel on the underside of the record changer may be accidently shifted; this may cause the separator knives to be extended when they should be concealed.

If the separator knives are thus extended—turn the power on so that the turntable is revolving, gently press fingers against the extended knives until they disappear inside the center post—DO THIS ONLY WHILE MECHANISM IS OUT OF CYCLE.

Record Changer Mounting

The cabinet is used as the motor board of the record changer. The record changer is attached to the cabinet with three screws, grommets and spacers. THE PICKUP ARM MUST BE REMOVED BEFORE THE RECORD CHANGER CAN BE REMOVED—REFER TO RP-168 SERIES SERVICE DATA.

To Remove Chassis

Remove the four screws at the corners of the bottom cover, separate the motor power plug and socket and remove the pickup cable from its socket on the amplifier chassis.

Elongated holes permit the speaker position to be adjusted. If the speaker should be replaced or its mounting bracket loosened, the speaker mounting bracket screws should not be tightened until after the bottom cover is assembled to the cabinet.

Pickup Landing Adjustment "A"

The pickup point should land half-way between the outer edge of the record and the first music groove.

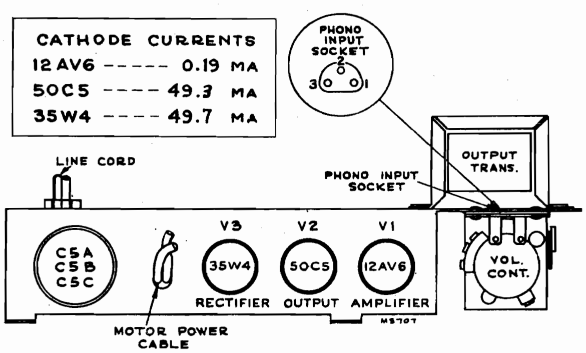
If the pickup lands inside the starting grooves—turn screw "A" slightly clockwise. If pickup lands outside the starting grooves—turn screw "A" slightly counterclockwise.

Pickup Height Adjustment "B"

During cycle the pickup arm must rise high enough to clear a stack of eight records on the turntable, but not high enough to cause the top of the arm to touch records resting on the record supports.

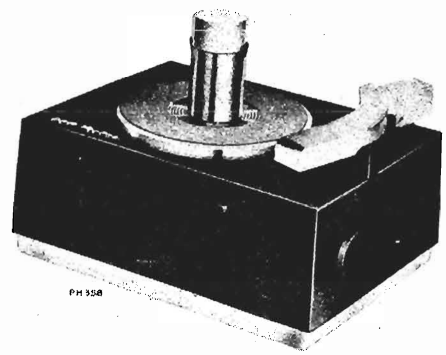
If pickup does not clear a stack of eight records—turn screw "B" slightly clockwise. If pickup arm touches records on record supports—turn screw "B" slightly counterclockwise.

CATHODE CURRENTS	
12AV6	0.19 MA
50C5	49.3 MA
35W4	49.7 MA



Amplifier Top View

RADIO CORP. OF AMERICA MODEL 9JY



Specifications

Record Changer (RP-168-1)

Turntable speed .... 45 r.p.m.
Records used .... Long playing—7 in.
Record capacity .... 8 records
Pickup .... Crystal (medium output)

Power Supply Rating

115 volts, 60 cycles A.C. .... 15 watts

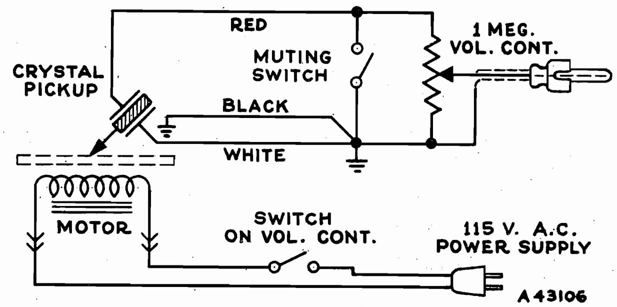
Dimensions (overall)

Height 6⅝" Width 9⅛" Depth 6⅞"

Record Separator

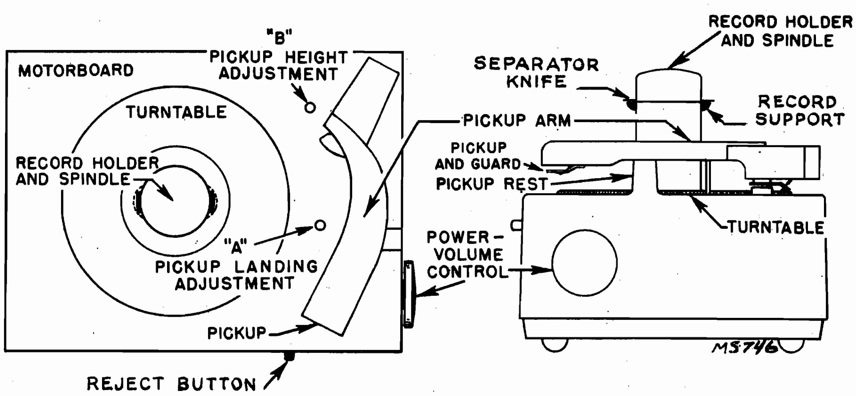
In the out of cycle position the record separator knives or discs are normally concealed inside the center post. During service, the position of the star wheel on the underside of the record changer may be accidently shifted; this may cause the separator knives to be extended when they should be concealed.

If the separator knives are thus extended—turn the power on so that the turntable is revolving, gently press fingers against the extended knives until they disappear inside the center post—DO THIS ONLY WHILE MECHANISM IS OUT OF CYCLE.



In some instruments: Black wire is omitted or a shielded wire is used in place of the red-black-white cable.

Schematic Diagram



Top and Side Views

Record Changer Mounting

The cabinet is used as the motorboard of the record changer. The record changer is attached with three screws and bushings. THE PICKUP ARM MUST BE REMOVED BEFORE THE RECORD CHANGER CAN BE REMOVED—REFER TO RP-168 SERIES SERVICE DATA.

FOR RECORD CHANGER SERVICE INFORMATION—REFER TO RP-168 SERIES SERVICE DATA.

Pickup Landing Adjustment "A"

The pickup point should land half-way between the outer edge of the record and the first music groove.

If the pickup lands inside the starting grooves—turn screw "A" slightly clockwise. If pickup lands outside the starting grooves—turn screw "A" slightly counterclockwise.

Pickup Height Adjustment "B"

During cycle the pickup arm must rise high enough to clear a stack of eight records on the turntable, but not high enough to cause the top of the arm to touch records resting on the record supports.

If pickup does not clear a stack of eight records—turn screw "B" slightly clockwise. If pickup arm touches records on record supports—turn screw "B" slightly counterclockwise.

REPLACEMENT PARTS

STOCK No.	DESCRIPTION
*74097	Bottom—Cabinet bottom cover
*74189	Bushing—Shoulder bushing to mount record changer in cabinet (3 required)
*74098	Button—Reject button
Y2062	Cabinet—Moulded cabinet less bottom cover
39386	Cable—Shielded pickup cable complete with pin plug
*74101	Control—Volume control and power switch
73549	Emblem—"RCA-Victor" emblem
31051	Foot—Rubber foot (4 required)
73490	Knob—Volume control and power switch knob—maroon
14270	Spring—Retaining spring for knob

* This is the first time that this Stock No. has appeared in Service Data.

Connecting Record Changer Attachment to Radio Receivers

RCA Radios with Phono Jack

Plug male connector on the end of the "Phono" lead into the female connector on the receiver chassis. If set is provided with a phono switch, push or turn the "Phono" switch to "Phono" position, and operate the Record Changer Attachment according to instructions. If no switch is provided, use maximum setting of volume control on attachment, and minimum setting of radio volume control which will give acceptable volume, and tune receiver off frequency from any very strong station. In some instances the radio volume control will have the effect of a tone control.

RCA Type No. 202W1 Record Player Selector

This selector switch may be used for combined operation of two record players through one phono input jack. A choice of two types of input jacks and output cable plugs are provided.

Radio-Phonograph Combinations

Most radio-phonograph combinations use resistors and/or capacitors for tone compensation in the phono input circuit.

Where unsatisfactory reproduction is obtained with Model 9JY connected into the phono jack of such instruments, we suggest that Model 9JY be connected as indicated for radios which do not have a phono jack.

Radios Without Phono Jack

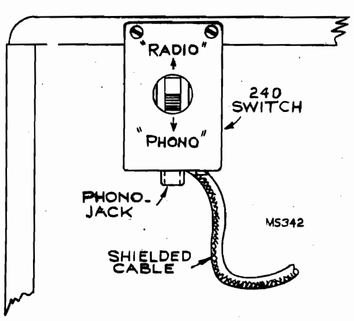
Methods of connecting the Record Changer Attachment to various types of audio systems are given in the accompanying text and illustrations. The data given requires that an RCA Type No. 240X1 (Formerly Stock No. 240) Radio-Phono switch be used for switching from radio to phonograph, as desired. For ease in connecting the "phono" lead to the switch, the male plug on the end of the lead matches the phono jack on the switch.

In general, the Record Changer Attachment must be used with radio receivers having at least two stages of high-gain audio amplification. The output of the Record Changer Attachment should be connected to the input of the first audio tube, and at the same time the output of the radio receiver portion of the chassis should be shorted or opened, to prevent radio signals being heard while the Record Changer Attachment is in operation.

Installation of Switch

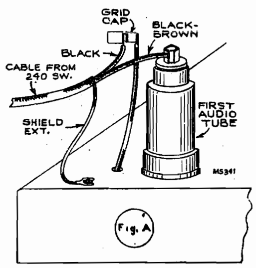
Fasten the bracket to the cabinet in such a position that the switch may be easily reached. For wooden cabinets, a suggested place is the upper rear edge of the cabinet. If the radio has a plastic cabinet, the bracket may be fastened to the chassis by self-tapping screws or soldering. **In the case of a.c.-d.c sets, the bracket should not be fastened to the chassis.** In such cases, a wooden block may be fastened to the chassis and the bracket screwed to the wooden block, care being exercised that there is no metallic path from the bracket to the chassis.

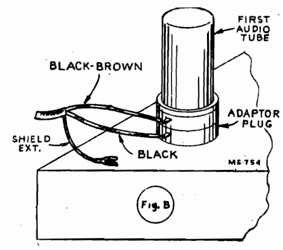
Connect the braided shield extension to the radio chassis by either soldering or placing the spade lug under a mounting screw.



On a.c.-d.c. sets it is necessary to isolate the cable shield from the chassis. This is best done by connecting the shield to the chassis through a .25 mfd 300-volt condenser. Care should be taken that the shield braiding and switch bracket do not come in contact with the chassis.

If the common-negative wiring in the a.c.-d.c. set is isolated from the set chassis, connect the cable shield, through a .25 mfd. capacitor, to the common-negative wiring, and not to the chassis.



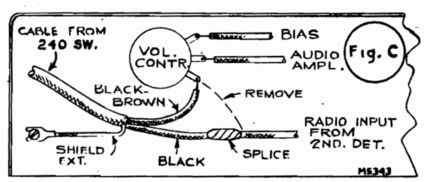


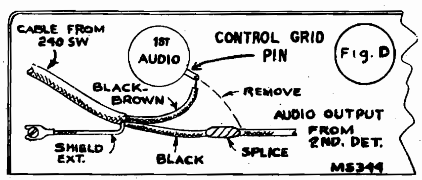
For radio receivers in which the 1st-audio tube has a top grid cap—see Fig. A:

1. Disconnect the grid lead from the first audio tube.
2. Connect the cap on the black lead to the clip on the grid lead, as shown above.
3. Connect the clip on the black-brown lead to the grid cap at the top of the first audio tube, bending the terminal if necessary to proper size for a metal tube cap.
4. Insert the plug on the end of the record player lead into the jack on the bracket.
5. Secure or position the connection cable assembly so that the cap and clip terminals are well separated from each other and other metal parts.

For radio receivers in which the 1st-audio tube is type 6SQ7, 6SR7, 12SQ7 or 12SR7—see Fig. B:

1. Use adaptor plug RCA Stock No. 37798.
2. Remove the 1st audio tube.
3. Solder the switch leads to the adaptor plug terminals—black to bottom lug—black-brown to top lug.
4. Tape terminals to prevent short circuits when installed in set.
5. Insert the adaptor into the 1st audio tube socket.
6. Insert the 1st audio tube into the adaptor.
7. Insert the plug on the end of the record player lead into the jack on the bracket.

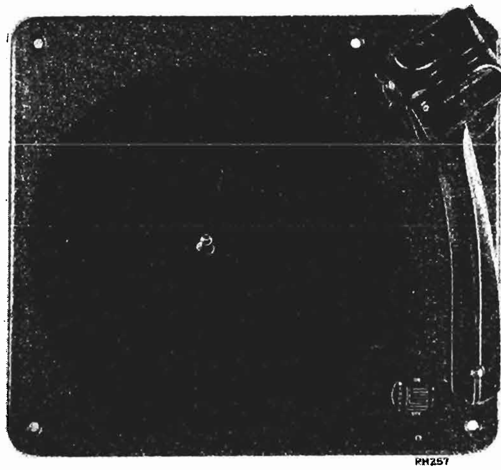




For other radio receivers in which the 1st-audio tube does not have a grid cap; connection to volume control input—see Fig. C, connection to 1st-audio tube control grid—see Fig. D:

1. Unsolder the lead from the volume control lug indicated in Fig. C or from the control grid pin indicated in Fig. D. It is usually necessary to remove the chassis from the cabinet to do this.
2. Solder the black-brown lead (remove clip) to the lug or pin disconnected in Step 1.
3. Solder the black lead (remove plug) to the lead disconnected in Step 1. Tape the joint to prevent short circuits.
4. Insert the plug on the end of the record player lead into the jack on the bracket.

RADIO CORP. OF AMERICA MODEL 960276



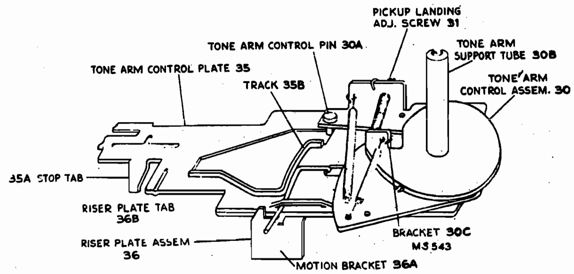


FIG. 2

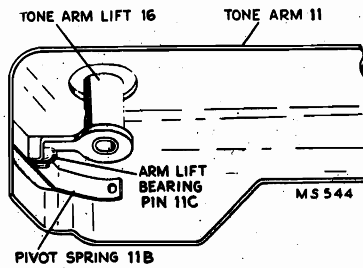


FIG. 3

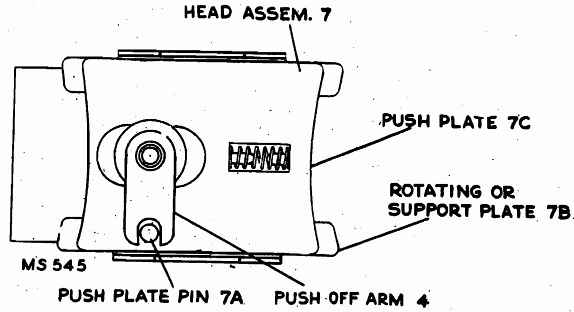


FIG. 4

Manual Operation

1. Rotate the record separator shelf clockwise for 10-inch or counterclockwise for 12-inch position (numerals 10 or 12 pointing towards center post).
2. Place the record to be played on the turntable and turn the power switch on.
3. Move the control knob to manual and to the on position.
4. Press down firmly but momentarily on the end of the tone arm and let go. The pickup will land automatically on the start of the record. When the selection is completed the pickup will ride the eccentric groove until the pickup is placed on the rest manually.
5. Turn power switch off manually.
6. Remove the record by raising straight up without tilting.

Automatic Operation

1. With the power switch in the off position rotate the record support shelf as required for 10- or 12-inch records until the record size indicated on the support cover is pointing toward the center post. (Rotate clockwise for 10-inch and counterclockwise for 12-inch records).
2. Place the records to be played in a stack with desired selections upward and in proper sequence with the last record on top. Load them on the changer by placing them over the center post and resting on the record support shelf. Place record stabilizing clip on top of the record stack.
3. Push the control knob to automatic and to the on position.
4. Press down firmly but momentarily on the end of the tone arm and let go. The changer will continue to play one side of each record of the entire stack automatically.
   The tone arm can be moved to the rest position any time the mechanism is not in cycle.
5. Turn the power switch off and remove the stack from the turntable by placing fingers of both hands directly opposite and under the stack. Then lift straight up—"don't tilt" or squeeze stack. Turning the support shelf one-fourth turn facilitates removal of records.

Cautions

1. Avoid handling the tone arm or rotating record support assembly while mechanism is in cycle.
2. Never turn the power switch off, leaving the mechanism in cycle for an extended period of time.
3. Do not allow the records to remain on supports when not in use.
4. Do not allow oil or grease to come in contact with any rubber parts.
5. Do not install instrument near source of heat. Excessive heat may damage the pickup cartridge.

FUNCTIONS OF PRINCIPAL PARTS

Head Assembly—7, 7A, 7B, 7C
Supports outer edge of record stack and pushes the record off notch in center post and allows it to drop to the turntable while the mechanism is going through cycle.

Center Post—53
Supports the entire stack of records, and together with the offset notch and latch in the center post, provides a means for separating records.

Tone Arm Lift Assembly—16
Couples tone arm to riser plate 36 through arm lift shaft 47, thereby transferring the action for the vertical motion of the tone arm during change cycle.

Arm Control Assembly—30
Provides a tie between tube 30B, bracket 30C and tone arm support bracket 18, thereby directing the horizontal movement of the tone arm during change cycle. Arm control pin 30A slides along track in arm control plate 35, and in so doing, determines the point of landing of the pickup and the point of trip of the mechanism. It also incorporates landing adjusting screw 31.

Arm Control Plate Assembly 35, 35A, 35B, 35C
Incorporates a track 35B which controls the pickup landing and the tripping of the mechanism.
Stop tab 35A functions as portion of the tripping device, stud 35C, contacting push-off cam 47A controls, the point of landing for both 10- and 12-inch records.

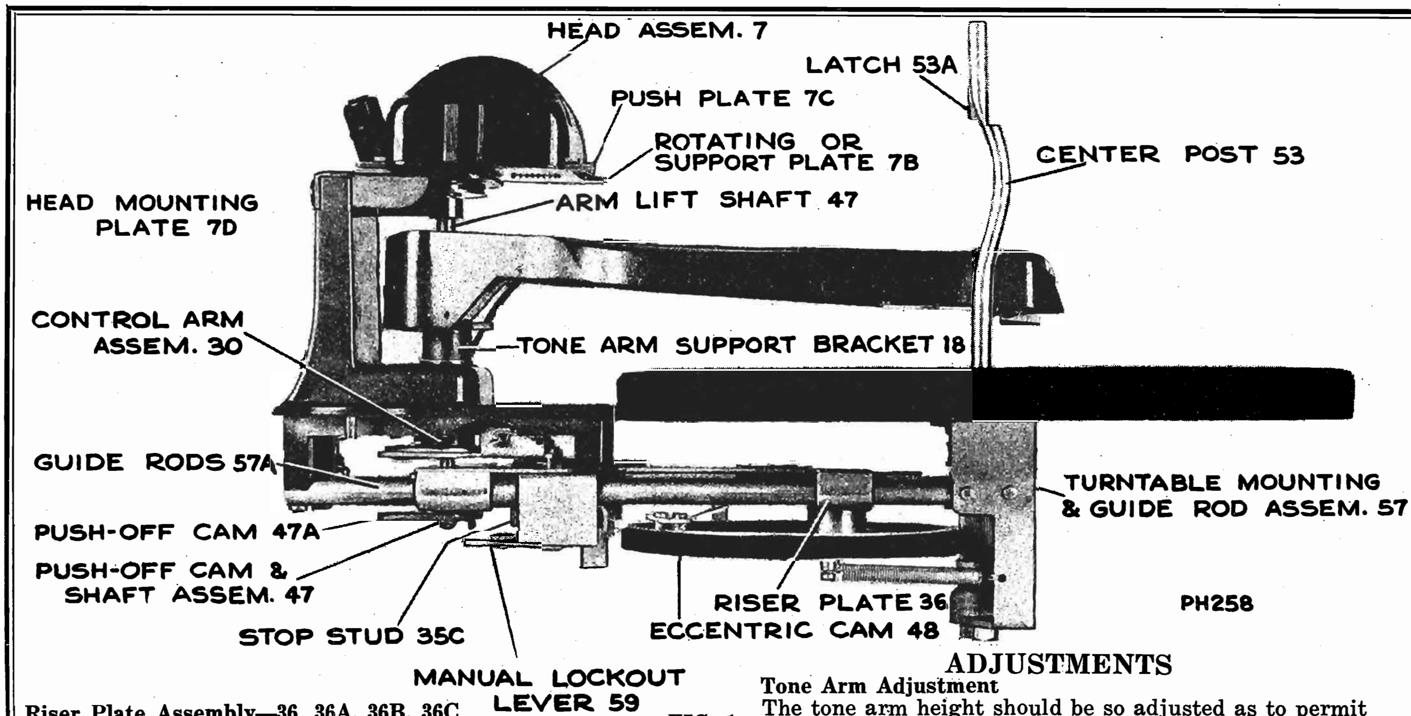


FIG. 1

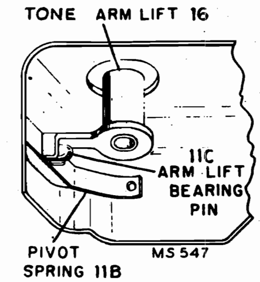


FIG. 6

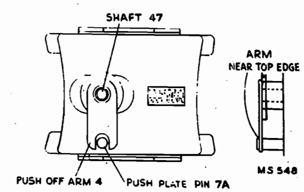


FIG. 7

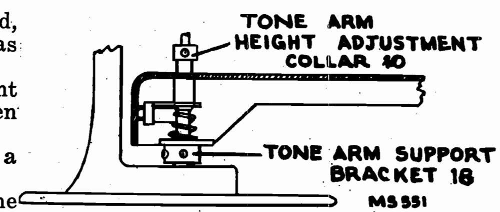


FIG. 9

Riser Plate Assembly—36, 36A, 36B, 36C
Provides mounting for eccentric cam 48, and incorporates an inclined track 36C, which controls the vertical movement of the tone arm.
Riser plate tab 36B pushes against curved portion of cam on arm control assembly 30, providing a control for the horizontal movement of tone arm during change cycle. Riser plate bracket 36A contacting push-off cam 47A provides the necessary motion for push plate 7C.

Eccentric Cam—48
Transfers motion from turntable to riser plate 36 while cycling.

Push-Off Cam and Shaft Assembly—47, 47A
Provides a means of mechanically coupling tone arm lift 16 and push plate 7 assemblies to main cycling mechanism. Cam 47A contacting stud 35C controls the position of arm control plate while in cycle, which determines the landing point of the pickup on 10- or 12-inch records.

Turntable Mounting and Guide Rod Assembly—57, 57A
Incorporates the main bearings for the turntable and provides a mounting for guide rods 57A.

Manual Lockout Lever—59
Consists of a small lever which forms a stop for stud 35C. This prevents arm control plate 35 from moving forward and disengaging stop catch 45 when the mechanism is operated in the manual position.

ADJUSTMENTS

Tone Arm Adjustment
The tone arm height should be so adjusted as to permit the sapphire to engage and ride in the grooves of one record placed on the turntable, but at the same time prevent the tone arm from touching the records on the supports while the mechanism is going through cycle, fig. 5.

1. With the mechanism out of cycle, lift tone arm and check, and make certain tone arm lift 16 engages pin 11C as shown in fig. 6.
2. With the pickup near the edge of the record, loosen the set screw, holding collar 10, fig. 9, and moving it up or down on shaft 47, so as to have the conditions indicated in sketch, fig. 5.

Preliminary Landing Adjustments
An accessible landing adjustment screw 31 is provided, but if for any reason the tone arm support bracket has become loose or removed, proceed as follows:

1. With the mechanism out of cycle turn adjustment screw 31, fig. 8, clockwise as far as it will go, then turn counterclockwise two or three full turns.
2. Set head assembly for 12-inch position; place a 12-inch record on turntable.
3. Press down on the reject button and rotate the turntable by hand, causing the mechanism to cycle until the pickup is about to land on the record. In this position, the arm control pin 30A is in a position on track 35B as indicated by "s" and adjustment screw 31 remains against bracket 30C as indicated in fig. 8.

4. Loosen the two set screws holding the tone arm support bracket.
5. While holding this position, indicated in step 2, place the sapphire in the starting groove of the record and tighten the two set screws in the tone arm support bracket.

Final Landing Adjustment

The exact landing adjustment can be made by pressing the reject button and rotating the turntable by hand until the pickup is about to land. Then turn adjustment screw 31, fig. 8, until the sapphire is directly above the starting groove of the record. If the mechanism continues to land incorrectly after this adjustment has been made, compensate the difference by turning the screw 31 slightly. Turning screw counter-clockwise will move the landing towards the center post.

Positioning Push-Off Arm

1. With the mechanism out of cycle, turn the push-off cam 47A so that its arm makes a 90° angle with the slide bars as shown in fig. 10. Make certain the large radius side of cam is toward the stud 35C when the support post is in the 12-inch position.
2. Place push-off arm 4 over push-off cam shaft 47, and engage push-off plate pin 7A near the top edge, fig. 7. Tighten set screws.
3. Press down on reject button and rotate the turntable slowly by hand, making certain push plate does not reach its limit before riser plate motion bracket has reached the end of its outward travel. If the push plate should reach its limit, deviate slightly from the 90° angle but make certain that the mechanism operates satisfactorily on both 10" and 12" records.
4. Check this for 10- and 12-inch setting.

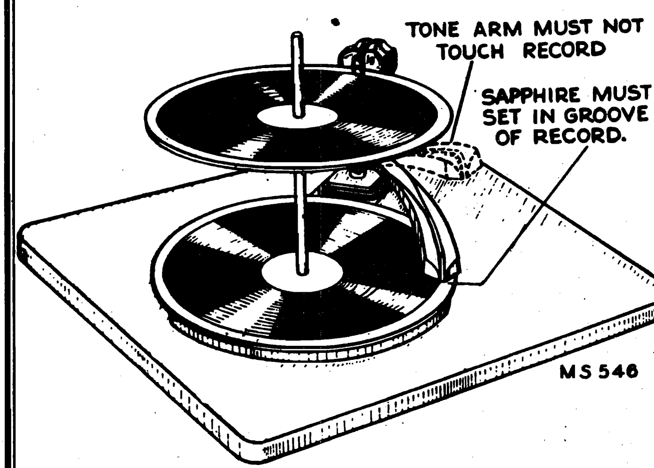


FIG. 5

Replacement Parts

STOCK No.	ILL. No.	DESCRIPTION
*73338	1	Cover—
*73337	2	Pad—Hold down pad and arm
71232	3	Spring—Hold down spring
72458	4	Arm—Push off arm
37458	5	Screw—#6-32 x ⅛" set screw
*73339	6	Plate—Hold down plate
71177	6A	Spring—Hairpin spring
*73340	7	Head—Head assembly including
———	7A	Push pin } Part of 7
———	7B	Rotating plate } Part of 7
———	7C	Push plate } Part of 7
71209	8	Spring—Push plate spring
71201	9	Screw—#6-32 x 3/16" Bristo head set screw
72461	10	Collar—Lift adjusting collar
*73342	11	Arm—Pickup arm shell complete with
———	11A	—Arm mounting rivets } Part of 11
———	11B	—Pivot mounting spring } Part of 11
———	11C	—Lift stud } Part of 11
———	11D	—Plastic button } Part of 11
73190	11D	Button—Plastic button for pickup arm
71169	12	Clip-Pickup arm spring clip
70338	13	Crystal—Crystal cartridge complete with guard and sapphire
72345	13A	Sapphire—Sapphire and holder assembly
38452	13B	Guard—Sapphire guard
70341	13C	Nut—Mounting nut and washer for sapphire
37763	13D	Screw—#2-56 x ⅛" screw for sapphire guard
70912	14	Screw—#4-40 screw to mount crystal (2 required)
71240	15	Cable—Shielded pickup cable complete with pin plug
31048	15A	Plug—Pin plug for shielded cable
72462	16	Lift—Pickup arm lift
72463	17	Spring—Brake spring
72465	18	Support—Pickup arm support
———	†19	Screw—To mount pickup arm support (two required) one Allen or Bristo #6-32 x ⅛" cone point set screw one Allen or Bristo #6-32 x 3/16" blunt set screw
*73341	21	Screw—#6 x 5/16" Phillips flat head type Z screw
*73343	22	Base—Operating mechanism mounting base less all removable parts
*73362	22A	Washer—Faston washer to mount mechanism base to motorboard
*73356	23	Knob—Control knob
72466	24	Washer—Spring washer
72469	25	Spring—Safety spring
72470	26	Spring—Set down spring
32119	27	Switch—"On-Off" switch
	†27A	Cover—Switch cover
*73358	28	Trigger—Manual control trigger (wire)
71225	29	Washer—Spring washer
*73344	30	Control—Arm control assembly including
———	30A	—Arm control pin } Part of 30
———	30B	—Arm control tube } Part of 30
———	30C	—Bracket } Part of 30
72472	31	Screw—Landing adjustment screw
*73345	32	Spring—Set down adjustment lock spring
72474	33	Spring—Cushion spring
72475	34	Spring—Trip spring
*73346	35	Control—Arm control plate including
———	35A	—Stop tab } Part of 35
———	35B	—Track } Part of 35
———	35C	—Size change stop } Part of 35

STOCK No.	ILL. No.	DESCRIPTION
*73347	36	Riser—Riser plate including
———	36A	—Motion bracket } Part of 36
———	36B	—Riser plate tab } Part of 36
———	36C	—Inclined track } Part of 36
71191	37	Spring—Recoil spring
*73353	38	Rest—Pickup arm rest and start-reject button
*73354	39	Lever—Reject lever
71228	40	Spring—Reject lever spring
———	†41	Screw—self tapping screws for mounting item 39
*73355	42	Trigger—Reject trigger (wire)
———	43	Terminal—Terminal strip
71177	44	Spring—Hair pin spring
*73352	45	Catch—Reject catch
72486	46	Spring—Reject catch support spring
72478	47	Cam—Push off cam including
	47A	—Shaft (part of 47)
72479	48	Cam—Eccentric cam and tire
71198	48A	Tire—Rubber tire for eccentric cam
72480	49	Spring—Eccentric cam spring
———	†50	Washer—Washer used to mount eccentric cam (#8 washer approx. 9/16" O.D.)
———	†51	Washer—Lock washer (#8)
———	†52	Screw—Eccentric cam mounting screw (#8 x 32 x ¼" binder head)
71235	53	Centerpost—
*73348	54	Turntable—
71239	55	Washer—One set of cork washers for turntable
71238	56	Bearing—Turntable thrust bearing (including 2 steel washers)
*73349	57	Support—Turntable mounting support including guide rods
*73350	58	Screw—#6 x ⅝" fillister head set screw to mount turntable support (4 required)
*73351	59	Control—Reject manual control including
———	59A	—Arm (Part of 59)
71228	60	Spring—Reject arm spring
72926	61	Roller—Turntable shaft knurled roller
71200	62	Screw—#8-32 x ⅛" bristo head set screw to fastern knurled roller (2 required)
———	†63	Washer—lockwasher for mounting centerpost
71236	64	Nut—Hex nut for centerpost
———	†65	Screw—#8 R.H. ¼" screw to mount turntable support
71183	66	Motor—Motor (117 volt, 60 cycle) complete with drive idler, tension spring, mounting grommets, shaft bushing and mounting bracket—less power cord
71413	66A	Wheel—Drive idler wheel for motor stamped 407B9
71177	66B	Pin—Cotter pin (hairpin spring) for drive idler wheel
71414	66C	Spring—Drive idler wheel tension spring for motor stamped 407B9
*71244	66D	Grommets—Motor mounting grommets
*73359	67	Fastener—Snap fastener to mount motor (3 required)
*73360	68	Grommet—Rubber grommet to mount record changer (4 required)
*73361	69	Stud—Record changer mounting stud (4 required)
———	†70	Washer—#10 Flat washer (OD ½")
———	71	Screw—Phillips #10 x 32 x ½" flat head counter sunk screw used to connect shock mounts to motor board
30870	72	Plug—2 prong male AC plug

* This is the first time this Stock Number has appeared in Service Data.
† These parts are not stocked.

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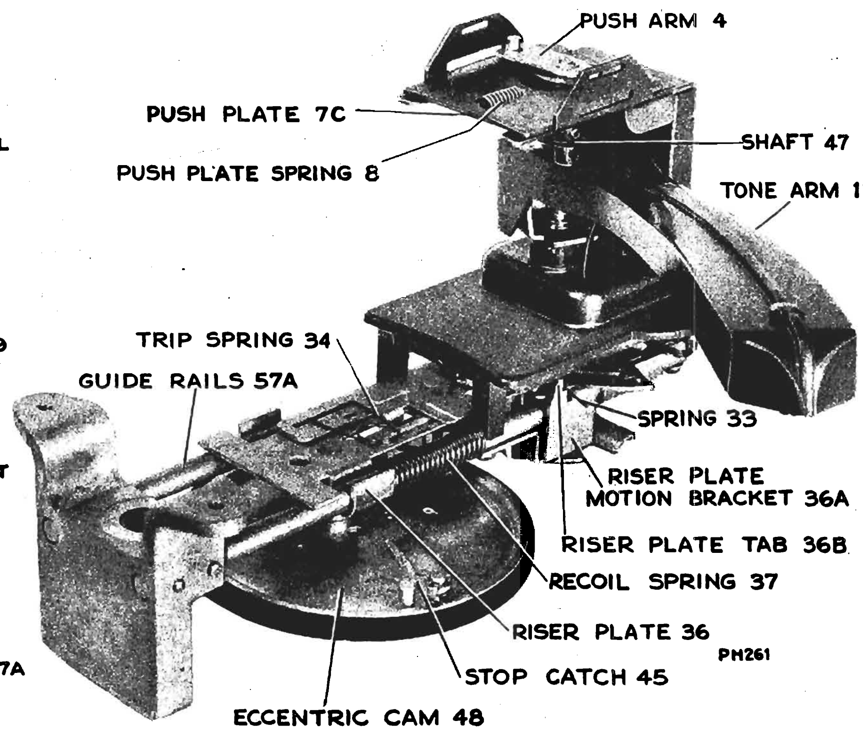

FIG. 12

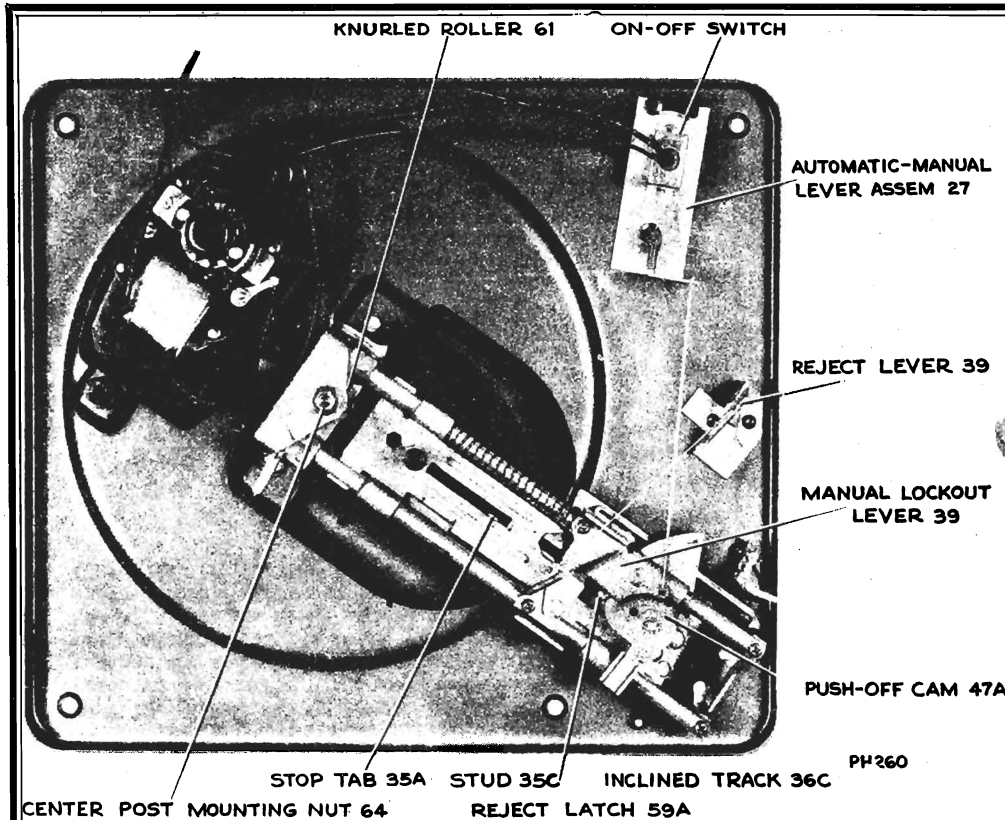

FIG. 11

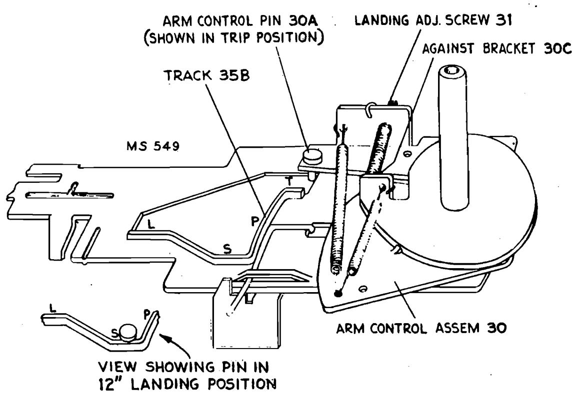

FIG. 8

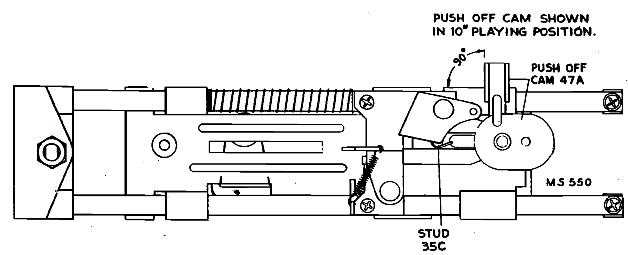

FIG. 10

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CYCLE OF OPERATION

Turn record support to 10- or 12-inch position as desired and place a stack of records on supports.	1. Turning the record support positions the push-off cam 47A through the linkage of push-off arm 4 and push-off shaft 47. In so doing it determines the amount of movement of control plate 35 which in turn governs pickup landing.
Start-reject button.	1. Press down on tone arm; this actuates button on which it is resting. 2. Start-reject button actuates reject lever. 3. Reject lever transfers action to reject latch 59A through coupling wire 42. 4. The unlatching of reject latch allows eccentric cam 48 to be pulled against rotating knurled roller 61 which starts cycle.
Record plays:	1. While the record is being played and the tone arm moves towards the center of the record, the arm control pin 30A on arm control assembly 30 moves along track 35B as designated by "P," fig. 13. 2. As pickup moves into trip groove on record, tone arm control pin 30A moves into recess in control plate 35 at point indicated by "T," fig. 13. 3. Trip spring 34 pulls arm control plate 35 towards center post 53, and in so doing allows stop tab 35A on arm control plate 35 to disengage stop catch 45 on eccentric arm 48. **(In manual operation the manual lockout lever holds stud 35C thereby preventing arm control plate from moving forward and starting cycle.)**
Cycling starts.	1. Spring 49 pulls eccentric cam 48, causing rubber tire 48A to engage rotating knurled roller 61. 2. Eccentric cam 48 mounted on riser plate forces the riser plate assembly back along the guide rails 57A away from center post 53. 3. As riser plate moves, the push-off cam and shaft assembly 47 rides along the inclined track 36C of the riser plate 36. 4. This action results in the push-off cam and shaft assembly 47 being pulled down.
Tone arm raises and moves out.	1. The tone arm lift 16 sliding on shaft 47 is pulled downward, contacting lift bearing pin 11C, and causing tone arm to raise and clear record. 2. The riser plate tab 36B contacting curved portion of arm control assembly 30, which is coupled to tone arm support bracket assembly, causes the tone arm to be moved outward away from, and clear of the edge of the records. Arm control plate is also being carried along by tab 36B contacting spring 33.
Record is separated and drops to turntable.	1. As riser plate 36 continues to travel further along guide rods 57A, the riser plate motion bracket 36A contacts and rotates the push-off cam and shaft assembly 47. 2. Push-off arm 3, being coupled to push-off cam and shaft assembly 47, is rotated, causing push plate 7C to push record off of projection on center-post and dropping it to the turntable. **Note:** The small separator latch in the end of the center post functions as a thickness gauge, allowing only one record to be pushed off the projection at one time.
Tone arm is returned and is positioned for landing.	1. As eccentric cam 48 is returning to minimum diameter (out of cycle position), riser plate is being pushed back to normal position by recoil spring 37. At the same time, the push plate spring 8 is pushing the push plate 7C and push-off arm 4 back to normal position. 2. The portion of arm control assembly mounting the control pin, and the control bracket 30C, are hinged on the plate forming part of assembly 30. Since the pin 30A has followed the track 35B and the curved portion of bracket 30C was forced out by motion of tab 36B, the tension of spring 26 is tending to pull them together as the riser plate is returning to normal position. The governing factor in determining how far the bracket will be pulled in, is the setting of the landing adjustment screw 31.
Pickup lands.	1. During part of the change cycle when riser plate is in the outermost position, and carrying arm control plate along by tab 36B contacting spring 33, the stud 35C is stopped by cam 47A. This acts as a gauge to determine the point of contact of pin 30A on arm control track 35B. This cam having two different radii will govern the distance arm control plate can travel since this is set when the record size change is made. If the smaller radius side of cam 47A is toward stud 35C, the arm control pin 30A will ride portion of track 35B designated by "L," causing the pickup to land on 10-inch records. On the other hand, if the larger radius portion of cam is toward the stud, the pin will ride along track designated by "S," which determines landing point on 12-inch records.

FIG. 13

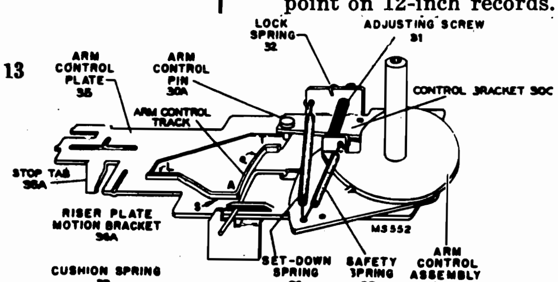
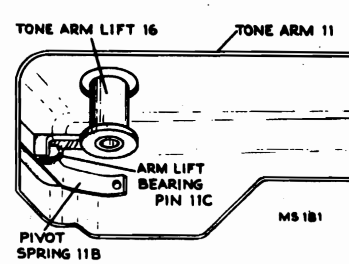


FIG. 14



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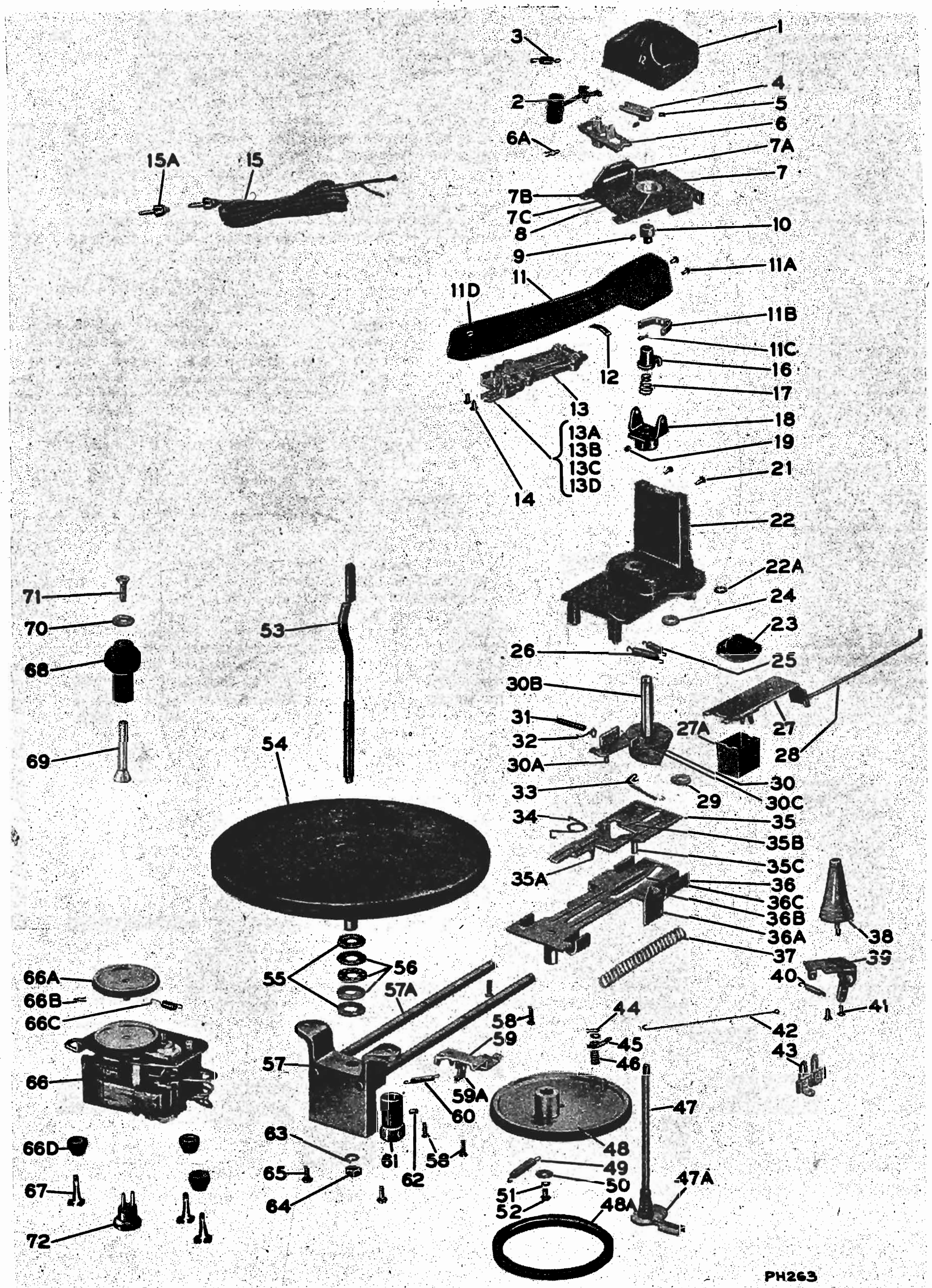


PHOTOGRAPH OF PARTS

FIG. 15

CHANGER WILL NOT COMPLETE CYCLE

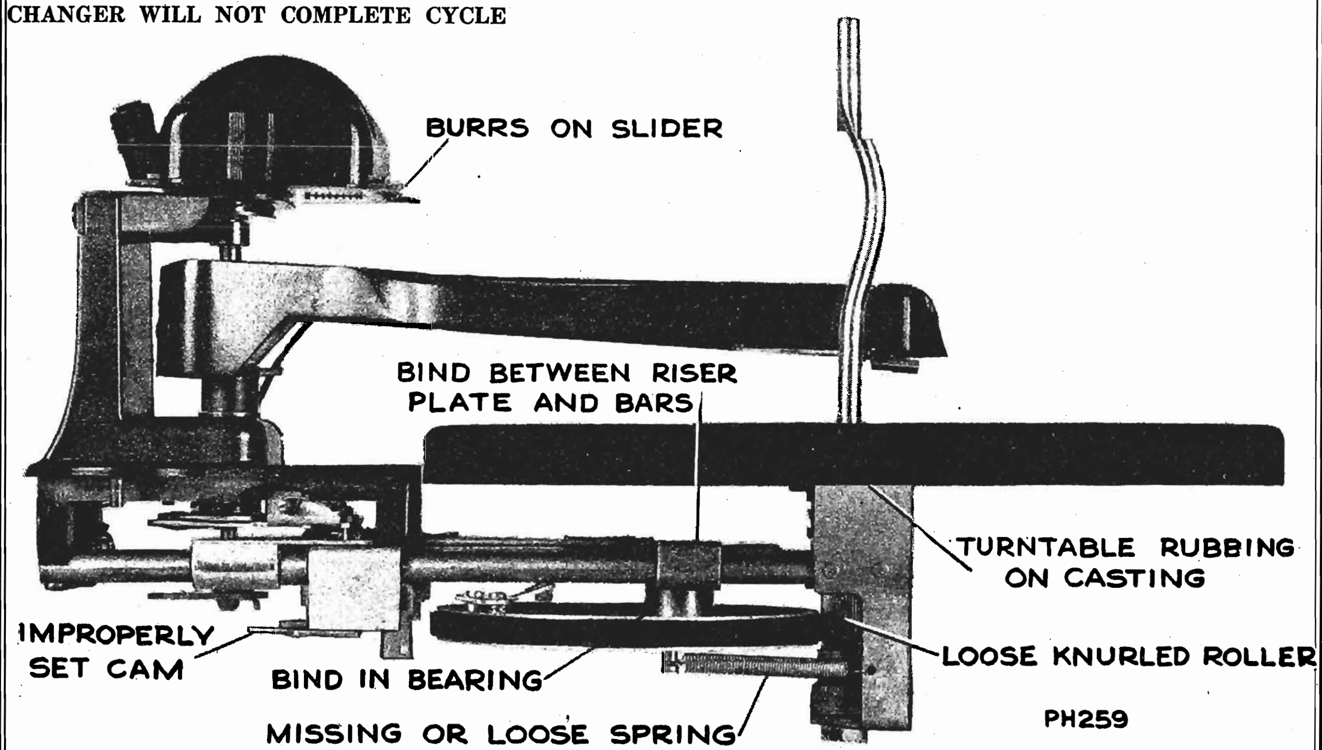


FIG. 16

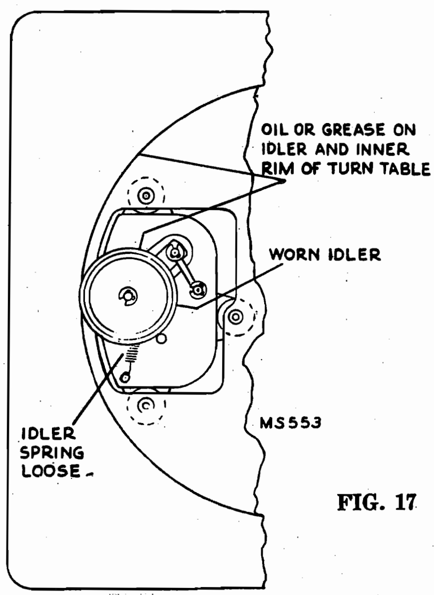


FIG. 17

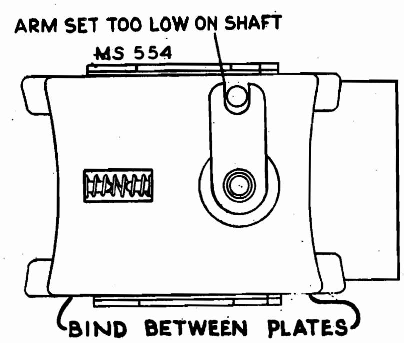


FIG. 18

RECORDS DO NOT SEPARATE OR DROP PROPERLY

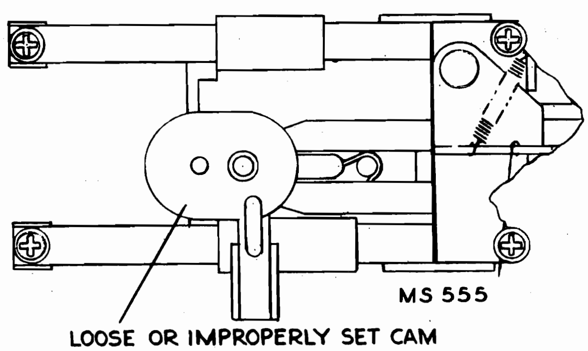


FIG. 19

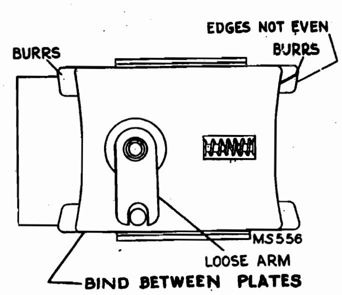


FIG. 20

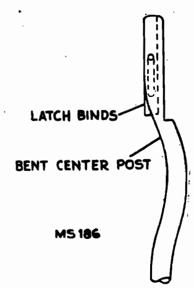


FIG. 21

PICKUP REPEATS GROOVES

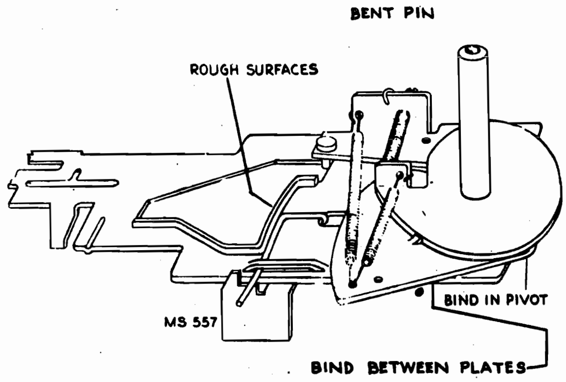


FIG. 22

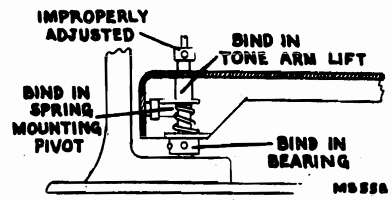


FIG. 23

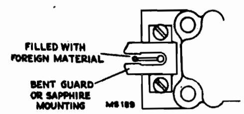


FIG. 24

"WOW" OR SLOW TURNTABLE SPEED

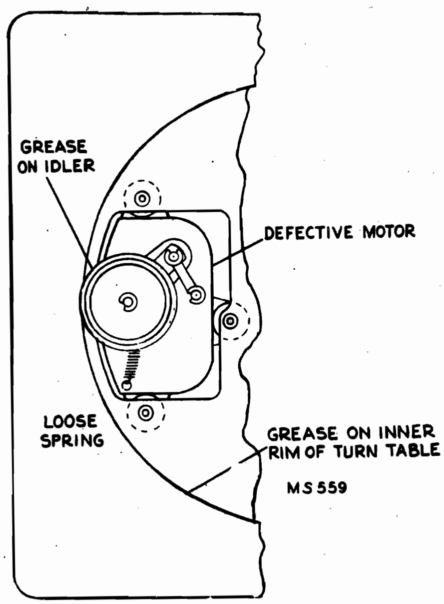


FIG. 25

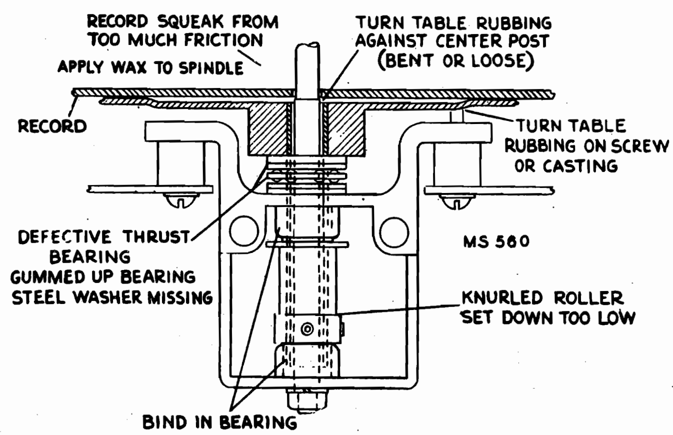


FIG. 26

CONTINUOUS TRIPPING

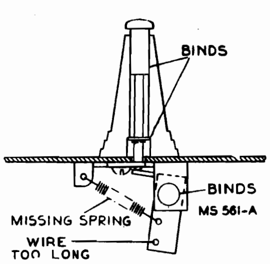


FIG. 27

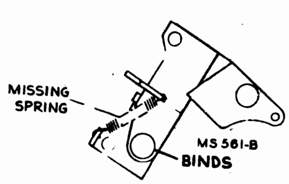


FIG. 28

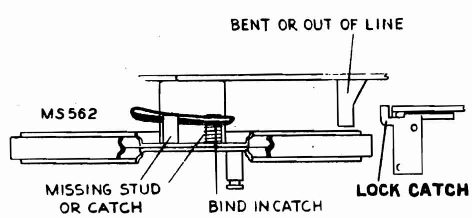


FIG. 29

RADIO CORP. OF AMERICA MODEL 960276

IMPROPER PICKUP LANDING

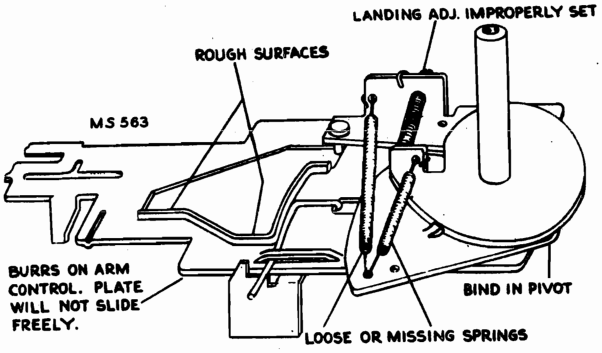


FIG. 30

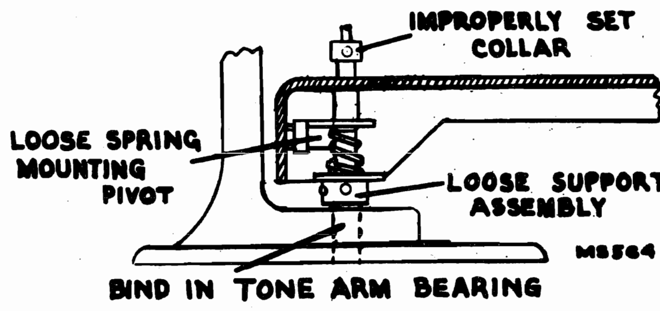


FIG. 31

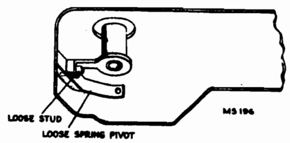


FIG. 32

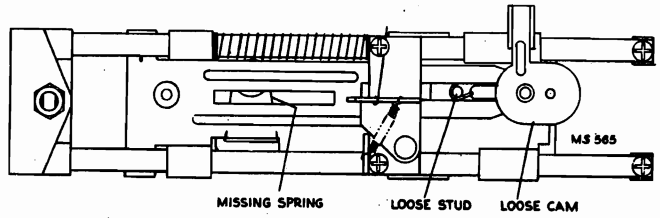


FIG. 33

FAILURE TO TRIP OR GO INTO CYCLE

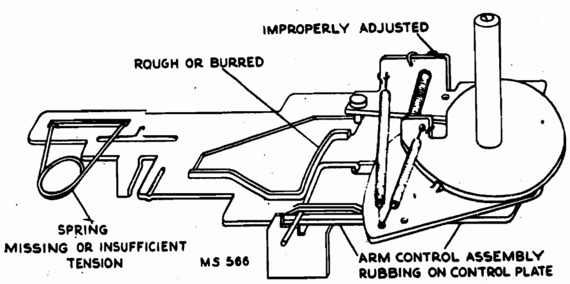


FIG. 34

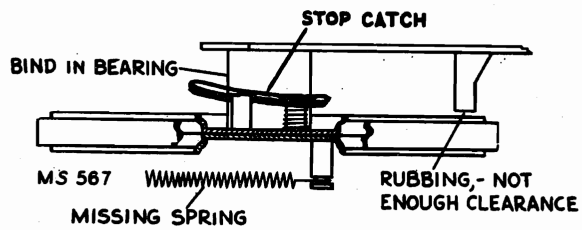


FIG. 35

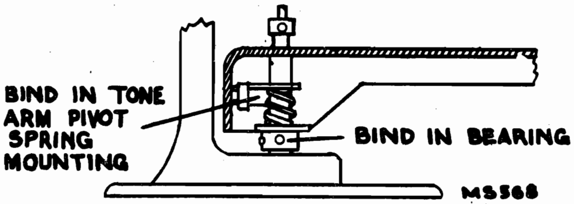


FIG. 36

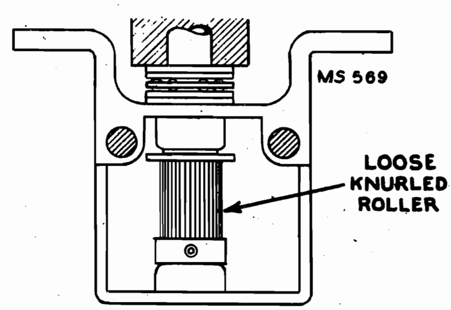


FIG. 37

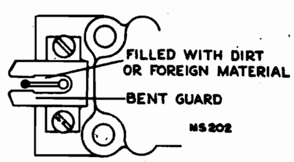
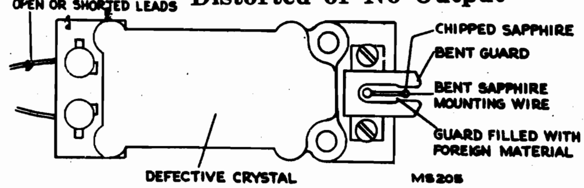


FIG. 38

PREMATURE TRIPPING

Distorted or No Output



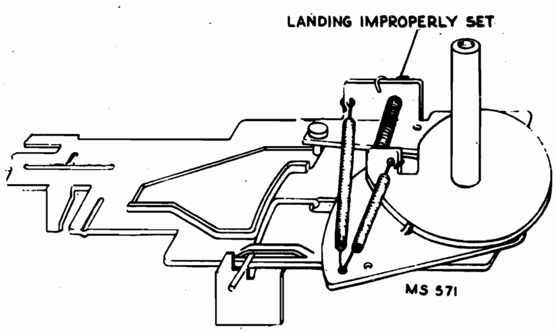


FIG. 40

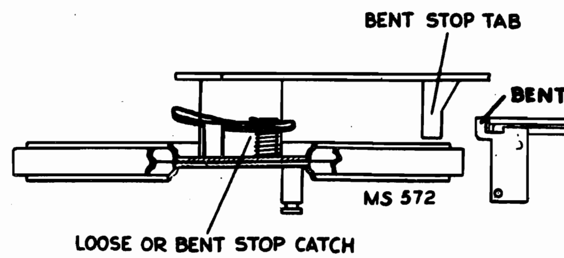


FIG. 41

MODEL 960276 RADIO CORP. OF AMERICA

RUMBLE OR HOWL

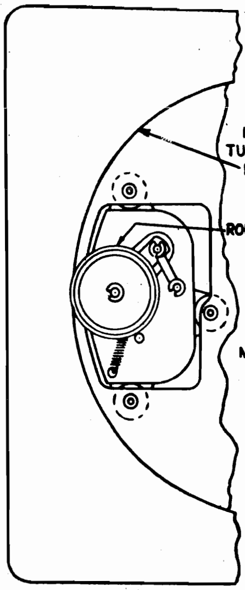


FIG. 42

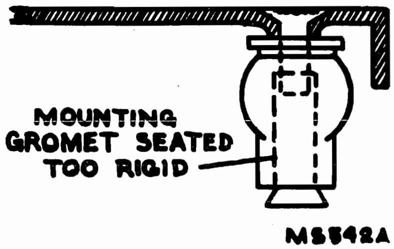


FIG. 43

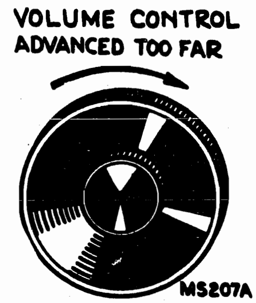


FIG. 44

TONE ARM FAILS TO LEAVE REST AUTOMATICALLY

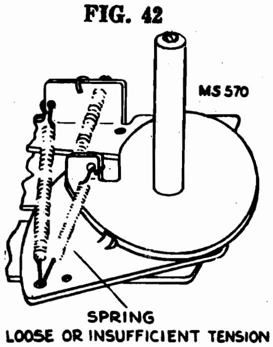


FIG. 45

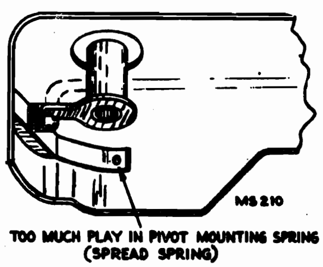


FIG. 46

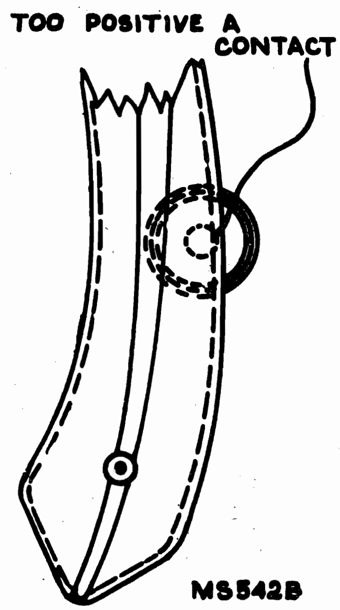


FIG. 47

REPLACEMENT OF SAPPHIRE

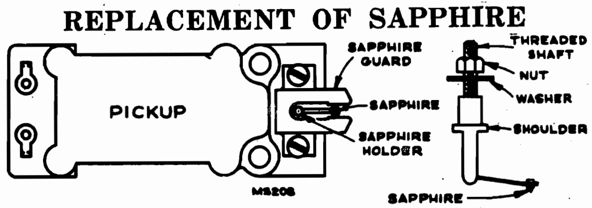


FIG. 48

RECORD DAMAGE

The spindle shelf and the top of spindle shaft should be free from burrs or rough edges to avoid scratching records or damaging record center holes. The record shelf edge should be smooth and be rounded only to a minute radius. Never round the bottom edge of the record separator latch.

A slight application of wax on the spindle shaft will prevent "squeal" of a stack of records.

LUBRICATION

Motor

Motor is lubricated at factory to provide normal operation for a long period of time.

If it becomes necessary to lubricate, use SAE #10 motor oil to saturate the felt wicks on the motor bearings.

Main Bearing

Use STA-PUT #512 or SAE #30 motor oil.

Slides and Levers

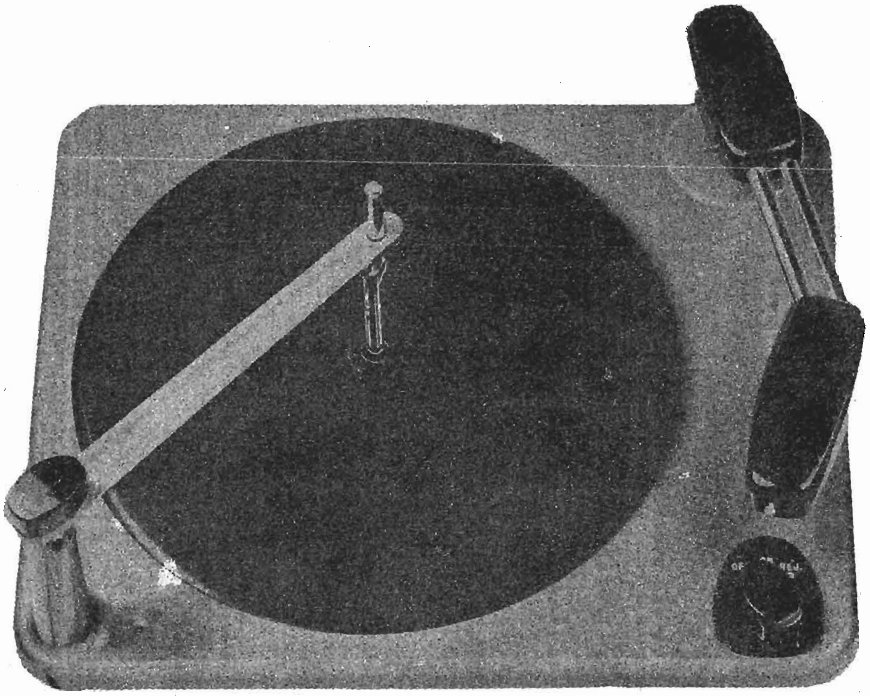
Use STA-PUT #512.

STA-PUT can be purchased from E. F. Houghton & Co., 303 W. Lehigh Ave., Phila., Pa.

Caution: Never bend the sapphire support wire. Extreme care should be used when loosening the nut so that the twisting motion does not break the crystal. Remove the two screws holding the sapphire guard in place and remove guard. Remove the small nut and washer on the threaded shaft of the sapphire holder and gently push the shaft through the hole in the armature shaft until the sapphire holder assembly comes free. Do not use force or the crystal may be broken.

Insert threaded shaft of replacement sapphire holder through armature shaft and replace the washer and nut. Make sure that the sapphire is in the correct position. Take hold at the lower end of the shaft with a pair of pliers while tightening the nut, being very careful so as not to strip the threads or break the crystal. Replace the sapphire guard, positioning it by means of the oversize screw slots. Make certain that the sapphire and its supporting wire are centered in the guard. Tighten the guard screws. Before using, check to see that the sapphire projects far enough (approx. .020) beyond the guard so that the guard will not strike the record. If necessary, bend the guard a little.

SEARS, ROEBUCK & CO. MODELS 101.211, 101.211-1, 101.211-2, 101.211-3, 101.211-4



The Models 101.211-1 and 101.211-1 are designed to automatically change as many as ten 12-inch, twelve 10-inch or ten intermixed records of standard commercial dimension with a minimum of record wear and to manually play any standard record up to twelve inches in diameter and to automatically shut off after last record has been played.

Model Differences:

Both Record Changers are similar, however, plastic parts on the 101.211-1 are finished in dark brown.

Chassis 101.211-2 same as 101.211-1 except uses ungrounded Syntronic pickup cartridge in pick-up arm with adapter plate.

101.211-3 - Chassis same as 101.211-1 except uses new style pickup arm with ungrounded Syntronic pickup cartridge.

101.211-4 - Chassis same as 101.211-3 except uses grounded Syntronic pickup cartridge.

Power Requirments

These changers have been designed to operate on 110 Volt 60 Cycle A. C. current unless otherwise indicated.

LOCATION NUMBER	PART NUMBER	DESCRIPTION
1	R57700	Knob - (101.211)
1	R57786	Knob - (101.211-1)
2	R49655	Russell Drive Wheel Assembly
3	R57701	Record Support Assembly
4	R57702	Speed Nut
5	R57703	Turntable Assembly
	R57704	Turntable Washer
	R57705	Turntable Bearing
	R57706	Retainer Spring - Turntable
6	R57707	Shipping Bolt
7	Part of Item 14	Trip Lever
8	R57708	Adjusting Ring Spring
9	R57709	Set Screw
10	R57710	Adjusting Screw
11	R57711	Adjusting Ring
12	R57712	Hinge Pin
13	R57713	Lift Bed Screw
14	R57714	Hinge Body Assembly
15	Part of Item 11	Adjusting Screw
16	Part of Item 14	Catch
17	R57715	Catch Spring
18	Part of Item 14	Hinge Cam
19	R57716	Cable & Clip Assembly

MODELS 101.211,
101.211-1, 101.211-2,
101.211-3, 101.211-4

SEARS, ROEBUCK & CO.

LOCATION NUMBER	PART NUMBER	DESCRIPTION
20	R52826	Crystal Cartridge
21	R57718	Pickup Arm - (101.211)
21	R57788	Pickup Arm - (101.211-1)
22	R57719	Screw - #4 Type "2"
23	R57720	Escutcheon - (101.211)
23	R57787	Escutcheon - (101.211-1)
24	R57721	"C" Washer
25	R57700	Knob - (101.211)
25	R57786	Knob - (101.211-1)
26	R57722	Ratchet Arm Assembly
27	R57723	Pawl Spring
28	Part of Item 26	Drive Pin
29	Part of Item 26	Ratchet Pawl
30	R57724	Trip Rod Bearing
31	R57725	Screw - #6 x 1/4 Type "2"
32	R57726	"C" Washer
33	R57727	Fiber Washer
34	R57728	Ratchet Assembly
35	Do Not Stock	Control Shaft
36	R57729	Fiber Washer
36	R57730	"C" Washer
37	R57731	Switch Cover
38	R57725	Screw - #6 x 1/4 Type "2"
39	R57732	Reject Spring
40	R57733	Switch Assembly
41	R57734	Control Link
42	R57735	Cutoff Lever
43	R57736	Set Down Locater
44	R57737	Control Lever
44	R57744	Tubular Rivet
45	R57719	Screw - #4 x 1/4" Type "Z"
46	R57738	Lever - Spring
47	Do Not Stock	Screw - #8-32 x 3/8"
48	R57739	Lift Arm Assembly
49	Part of Item 51	Pawl Spring
50	Do Not Stock	Cam Bearing
51	R57740	Cam Assembly
52	R57741	"C" Washer
52	R57742	Fiber Washer
53	Do Not Stock	Roller
54	R57743	Cam Stud Sleeve
55	R419	Cam Locater Spring
56	R57744	Tubular Rivet
57	R57745	Control Crank
58	R57746	Speed Nut
59	R57747	Lift Arm Washer
59	R57748	Fiber Washer - 1/64" Thick
59	R57749	Fiber Washer - 3/64" Thick
60	R57728	Ratchet Assembly
61	R57750	Trip Rod Bearing

LOCATION NUMBER	PART NUMBER	DESCRIPTION
62	R133	Trip Spring
63	Part of Item 51	Clutch Pawl
64	R57751	"C" Washer
65	R57752	Screw - #6 x 5/8 Type "Z"
66	R57753	Grommet Spacer (Russell)
67	R57754	Grommet (Russell)
68	R57755	Motor Assembly - 110 Volt - 60 Cycle (Russell)
68	R62360	Motor Assembly - 110 Volt - 50 Cycle (Russell)
69	R57756	"C" Washer
70	R57757	Spindle Assembly
70	R57758	Spindle Shaft & Base Assembly
71	R57759	Record Pusher
72	R57760	Pusher Pin
73	R57761	Pusher Spring
74	Part of Item 78	Pusher Shaft
75	Part of Item 5	Turntable Hub
76	R57705	Turntable Bearing
77	R57763	Spindle Set Screw
78	R57764	Pusher and Roller Assembly
79	Part of Item 78	Spindle Roller
80	Do Not Stock	Roller Plunger
81	Part of Item 78	Roller Spring
82	R57765	Turntable Bearing Washer
83	R57766	Fiber Washer
84	R57767	Pinion Gear
85	R57768	Pusher Shaft Spring
86	R57769	Guide
87	R57770	Spindle Guide Spring
88	R57771	Spindle Pin
89	R57772	Bearing Cone
90	R57773	Bearing Ball
91	R57774	Fiber Washer
92	R57775	"C" Washer
93	R57776	Safety Spring
94	R57777	Left Rod
95	R57778	Left Rod Spring
96	R57779	Lock Spring
97	R57780	Hinge Bearing Assembly
98	R57781	Pickup Arm Locater Assembly
99	R57782	Bearing Spacer
100	R57783	Return Spring
101	R57736	Set Down Locater
102	R57722	Ratchet Arm Assembly
103	R57784	Pinion Spring
104	R57706	Retainer Spring
Chassis 101.211-2		
20	R65100	Cartridge - Syntronic Pickup (grounded)
	R57881	Plate - Adaptor - Syntronic Pickup Attaching
	R57888	Screw - Syntronic Pickup Attaching

SEARS, ROEBUCK & CO. MODELS 101.211, 101.211-1, 101.211-2, 101.211-3, 101.211-4

RECORDS

The mechanism will operate automatically on all standard records. In case of records not having the standard "trip groove" (a spiral groove near the center of record) when tone arm reaches end of record, turn control knob to "REJ" to bring next record to playing position.

Warped, worn, dished or dirty records will cause poor reproduction. Records should be stored away from heat in a record album or laid flat. Clean records periodically with a soft, lint-free cloth.

AUTOMATIC OPERATION

Loading:

(1) Pull straight up on record support knob (1) until record support (3) clears spindle.
(2) Swing record support in either direction until pin in shaft drops into locating groove. As many as ten 12-inch, twelve 10-inch or ten intermixed records may be loaded at one time.
(3) Carefully place records on spindle and lower to offset shoulder.
(4) Steady records with one hand and replace record support over spindle. Gently press down on record support knob until records are held parallel with turntable.

Starting:

To start operation of record changer, turn control knob (25) clockwise to "REJ" and release. Changer will operate automatically until last record has been played. Control knob then turns to "OFF" position, pickup arm (21) returns to rest and machine automatically stops.

Reject:

To reject a record at any time while it is playing, turn control knob to "REJ" and release.

Manual Stopping:

To turn off changer before last record has been played, turn control knob to "OFF", lift pickup arm from record and replace on rest.

Unloading:

To remove records from turntable, lift up on record support knob and swing record support in either direction until pin in shaft drops in locating groove. Carefully lift entire stack of records straight up.

CAUTION: When loading or unloading changer, use care to prevent bending spindle. Records should never be left on the offset portion of the spindle as they may warp. If changer is turned off before all records have been played, remove unplayed records from spindle or operate "Reject" until all records have dropped to turntable.

MANUAL OPERATION

Starting:

(1) To play single records or home recordings, pull straight up on record support knob until record support clears spindle. Swing record support in either direction until pin in shaft drops into locating groove.
(2) Lower record to offset shoulder of spindle and tilt toward back of tone arm. Carefully work record past offset shoulder.
(3) Turn control knob to "ON" and push down on trip lever (51) located near back of tone arm. Machine will then operate independently of cycling mechanism - PROVIDED - tone arm is moved all the way in to the spindle before it is returned to the rest after the record is played. When playing "inside out" records, move tone arm all the way in to spindle before setting it down on first playing grooves of the record.

Repeating:

(1) To repeat a 10-inch record, remove any records remaining above offset shoulder of spindle.
(2) Pull straight up on record support knob until record support clears spindle.
(3) Swing record support in either direction until pin in shaft drops into locating groove.
(4) Carefully lift records from spindle. Do not replace record support over spindle. Changer will repeat the record on the turntable until control knob is turned to "OFF".

MODELS 101.211, 101.211-1, 101.211-2, 101.211-3, 101.211-4

SEARS, ROEBUCK & CO.

LUBRICATION

No lubrication should be necessary for the life of the changer, but in cases of unusual use or high operating temperature, the changer should be lubricated as follows:
(1) Hinge bearing (97).
(2) Ratchet arm (102) and set down locater plate (101).
(3) Cam faces on lift arm (48), lift arm bearing, and lift arm cutoff rod bearings.
(4) Between lever spring (46) and cutoff rod (42).
(5) Heart shaped cam track on cam (51) and cam bearing (50).
(6) Spindle, between roller plunger (80) and roller spring housing (78) and between the roller spring housing and the spindle body.
(7) Turntable ball bearing (76).
Apply a small quantity of light machine oil to:
(1) Pickup arm locater assembly bearing (98) and ball bearing in pickup arm post (90).
(2) Ratchet pawl bearing (28).
(3) Trip rod bearings (30) and (61).
(4) Control lever bearing (35).

ADJUSTMENTS

NEEDLE SET DOWN: The set down position of the needle is adjusted by means of the two adjusting screws (10) & (15). If the needle is setting down too far out on the record, loosen the back screw (10) about 1/4 turn and tighten the front screw (15) to lock the adjustment in place. If the needle is setting down too far in on the record, loosen the front screw and tighten the back screw.

PICKUP ARM HEIGHT: The pickup arm height is adjusted by the screw (13) located on top of the tone arm lift rod. Turn the screw out or in until the underneath side of the tone arm clears the rest by 1/8" to 3/16".

SERVICE INFORMATION

CONTROL KNOB CANNOT BE TURNED TO "ON" POSITION

Machine stalled in cycle. Turn turntable carefully by hand until the control knob is free.

TURNTABLE DOES NOT REVOLVE WHEN CONTROL KNOB IS TURNED TO "ON" POSITION:

1. Machine stalled in cycle. Turn turntable carefully by hand until it starts rotating under its own power.
2. No current at motor:
   (a) Check to determine if current is reaching A. C. leads of changer.
   (b) Check switch to determine if it is closing.
   (c) Check wiring and soldered terminals in changer.
3. Motor defective:
   Remove turntable to allow motor to operate without load. If current is reaching the motor and pulley does not rotate, the motor is defective. Repair or replace.
4. Motor idler wheel not engaging turntable rim.
   If motor pulley is turning but turntable is not:
   (a) Check motor idler assembly to determine if it is free to contact the motor pulley and the turntable.
   (b) Wipe off the inside rim of the turntable to remove flock or if oily, clean turntable rim and rubber tire of idler wheel with carbon tetrachloride.
5. Turntable bearing tight:
   Hold idler away from turntable or remove idler wheel and rotate turntable by hand to see if it is free. If binding occurs, remove turntable, clean out foreign matter and lubricate with light oil.

CHANGER DOES NOT CYCLE WHEN CONTROL KNOB IS TURNED TO "REJ" POSITION:

1. Changer stalled or motor not driving turntable. See "TURNTABLE DOES NOT REVOLVE WHEN CONTROL KNOB IS TURNED TO "ON" POSITION".
2. Manual reject not actuating trip:
   Turn control knob to "REJ" position, hold and see if leg on control lever (44) is contacting the stud on the bottom of the ratchet casting (34) and turning the trip rod (60) sufficiently to allow the trip rod to disengage the trip.

3. Trip not actuating clutch:
When the trip rod (60) is turned, if the clutch pawl (63) does not move forward, engaging the pinion teeth, check for a loose pawl spring (49) or binding between the clutch pawl and the cam. If binding occurs, clean out foreign matter and check for freedom but do not oil.

RECORD DOES NOT DROP WHEN CHANGER CYCLES:

1. Spindle pusher shaft broken:
If the pusher shaft (74) is broken, the roller assembly (78) will drop out of the spindle (70). To replace the roller assembly, loosen the spindle screw (77) and remove the spindle. Slip the pusher shaft return spring (85) over the pusher shaft and insert the roller assembly in the spindle. Turn the milled flat section at the top of the pusher shaft until it faces out of the milled opening in the spindle. Press up on the roller until it raises about 1/8". Hook the pusher (71) around the pusher pin (72) and press the pusher back until it touches the spindle body. Push down and back on the pusher and slightly up on the bottom of the roller assembly until the pusher snaps into place.
2. Pusher in spindle not moving far enough forward to eject a record:
The pusher (71) should move up inside the spindle body, then move forward until it has reached a point flush with, or a maximum of .010" beyond the spindle body. To assure tha the pusher is all the way forward, the spindle roller should be raised high enough by the lift arm (48) at the top of the cam face to slightly compress the roller spring (81). See "TURNTABLE STALLS DURING CYCLE" - 7. If the roller spring is compressed and the pusher does not move far enough forward to eject a record, the spindle should be replaced. If a record is not pushed completely off the ledge, it may hang up on the spindle momentarily, then drop on the pickup arm when it moves in over the turntable.
3. Lift arm screw loose:
Check screw (47) to determine if it is turned all the way in.
4. Pusher raises outside spindle body:
When the changer cycles, the pusher (71) should first rise up inside the spindle body, then move forward inside the center hole in the record. If the pusher rises outside the spindle body, it will raise the record instead of pushing it off the spindle ledge. Check the pusher shaft (74) to see if it is straight. If the shaft is bent, it will force the pusher forward prematurely.
5. Lift arm roller broken off:
If the lift arm roller (53) is broken off, the lift arm (48) will not turn when the cam (51) revolves.

TWO RECORDS DROP AT ONCE:

1. Hole in record too large:
Check the diameter of the hole in the record. An oversize hole will cause two records to drop at once.
2. Spindle slide not fully down:
If the spindle slide is not all the way down, more than one record may be dropped at a time.
   (a) Check the slide to be sure it is free and does not bind at any point. Clean out foreign matter or straighten if necessary. Do not oil.
   (b) When records are placed on the spindle, be sure the slide is all the way down. The slide will normally raise slightly as a record is being dropped but it should return to place immediately.
3. Record support binding on spindle or bent out of square with the shaft.
The record support must be able to slide freely by gravity down the spindle. If the support does not follow the records down as they are being ejected, two or more records may be ejected at once.
If binding occurs:
   (a) Check the spindle to determine if it is straight. Bend carefully with the fingers if necessary.
   (b) Straighten the record support (3) if it is not square with the record support shaft.
   (c) If the hole in the record support is not centered over the spindle after checking (a) and (b), bend the support shaft post on the base plate until the hole in the record support is centered over the spindle.
   (d) When the pin in the record support shaft has just entered the slot in the record support shaft post on the base plate, the play in the record support as it is swung from one side to the other should be equal on both sides of the spindle. To correct bent position, hold the support shaft and carefully force the record support into the proper position. If the support is loose on the shaft, remove the knob and re-stake with hammer and punch.
4. Record pusher defective:
The record pusher (71) may be deformed, etc. This may cause two records to drop at once. Replace the pusher.

MODELS 101.211, 101.211-1, 101.211-2, 101.211-3, 101.211-4

SEARS, ROEBUCK & CO.

RECORD HITS PICKUP ARM:

1. Pusher in spindle not moving far enough forward to eject record. See "RECORD DOES NOT DROP WHEN CHANGER CYCLES". - 2.
2. Lift arm screw loose:
   Tighten lift arm screw (47).
3. Pusher extending beyond outside diameter of spindle:
   Cycle changer by hand until roller assembly (78) is at the top of its travel. Using new record as a gauge pass it over spindle to see if it binds at any point. File off high points on pusher (71) with a fine file until record will pass freely over spindle.
4. Pickup arm not adjusted properly:
   The adjustment procedure for the needle set down point is given under "ADJUSTMENTS" If the hinge bearing (97) has been removed or the hinge bearing set screw (9) has been loosened, the relationship between the hinge bearing and the pickup arm locater assembly (98) must be reset. The procedure is as follows:
   Loosen the set screw (9) sufficiently to allow the hinge bearing to slide on the pickup arm locater assembly shaft. The set screw may be adjusted with an Allen wrench through the hole in the adjusting ring (11) located between the two adjusting screws (10) and (15). Place a 1/32" shim between the set down locater (101)and the ratchet arm (102). Turn the control knob to the "OFF" position. Place the pickup arm on the rest. In this position the arm extending from the set down locater should be engaged by the turned up leg on the control lever (44). Take up all the play between the parts by pressing up on the bottom of the ratchet arm and down on the top of the hinge bearing. Tighten the hinge body set screw (9) and remove the shim.

NEEDLE DOES NOT SET DOWN ON 10" RECORD IN PROPER POSITION:

1. Pickup arm not adjusted properly. See "RECORD HITS PICKUP ARM" - 4.
2. Hinge catch does not return to 10" record position when changer cycles.
   (a) Stop the machine in mid cycle when the lift arm (48) has moved as far out as it will go and is about to move back to its starting position. Lift the pickup arm and see if there is a gap of at least 1/64" between the end of the leg on the catch (16) and outside step on the adjusting ring (11). The catch should be free to allow it to be pulled forward against the stop at the end of the leg on the adjusting ring. If there is not enough gap, check the setting of the hinge body and the pickup arm locater, see "RECORD HITS PICKUP ARM" - 4. If the setting is correct, the cam face on the lift arm (48) which contacts the round stud on the bottom of the ratchet arm (26) may be bent. The ratchet arm should be forced around far enough to bring the pickup arm out until the stop on the bottom of the hinge casting meets the stop in the base plate; then, to assure that the pickup arm is out as far as it will go, the lift arm should move the ratchet arm a few degrees further around, which will slightly compress the safety spring (93) and hold the pickup arm out firmly against the stop.
   (b) Lubricate the hinge bearing with lubriplate. Do not use heavy grease. If the bearing between the hinge bearing and hinge body binds, the safety spring will compress instead of bringing the hinge body around firmly against the stop.
3. Binding between safety spring and ratchet arm:
   If the safety spring (93) binds against the ratchet arm and does not hold the casting on the bottom of the pickup arm locater assembly (98) against the stop inside the ratchet arm, irregular needle set down will result. Disassemble the pickup arm locater assembly (98) by removing the lift arm (48), loosening the hinge bearing set screw (9) and pulling the ratchet arm and pickup arm locater assemblies down from the bottom of the changer. Hold the pickup arm locater shaft in one hand, turn the ratchet arm assembly to slightly compress the safety spring, release, and see if the safety spring returns the pickup locater casting firmly against the stop surface in the ratchet arm assembly. If binding occurs, remove the safety spring, see if the pickup arm locater casting turns freely in the ratchet arm casting. Remove burrs or sharp edge on end of safety spring, stretch safety spring a little to increase tension and replace.
4. Hinge catch does not disengage from the hinge cam:
   When the trip lever (7) has been depressed, it is held in the position until the catch (16) is disengaged, see "NEEDLE DOES NOT SET DOWN ON 12" RECORD IN PROPER POSITION" - 6. When the cycle is completed, if the catch does not disengage from the hinge cam (18):
   (a) Check to determine if the leg on the catch (16) is sliding down the incline on the leg on the adjusting ring (11), see "NEEDLE DOES NOT SET DOWN ON 12" RECORD IN PROPER POSITION" - 7.
   (b) The catch (16) and the hinge cam (18) are not disengaging when the catch leg is resting on the inside step on the adjusting ring. If this occurs, file the edge of the catch which contacts the hinge cam until the two parts have a clearance between them of about 1/64" when the leg on the catch is on the inside step on the adjusting ring.

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MODELS 101.211,
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101.211-3, 101.211-4

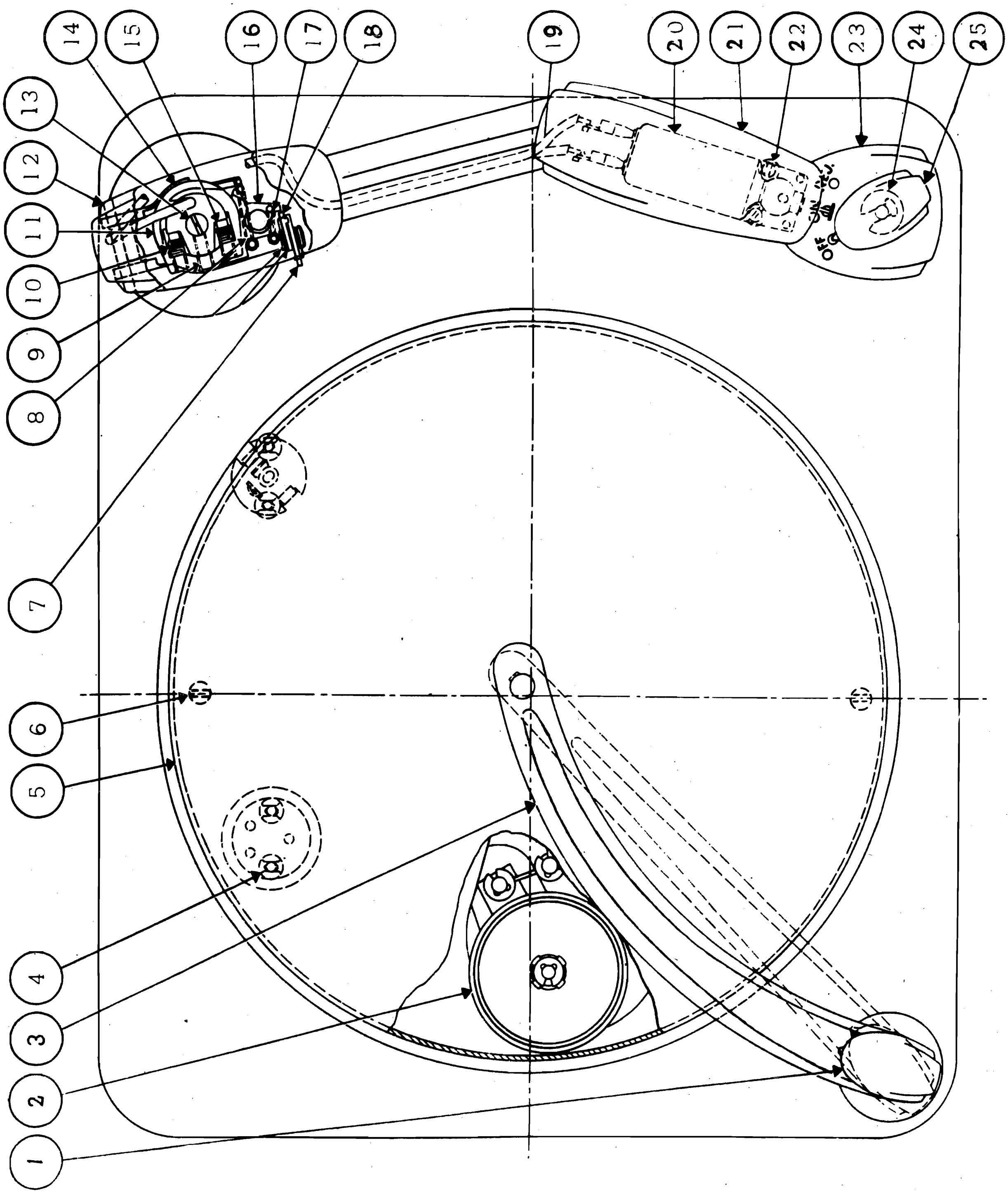

Figure 1

MODELS 101.211,
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101.211-3, 101.211-4

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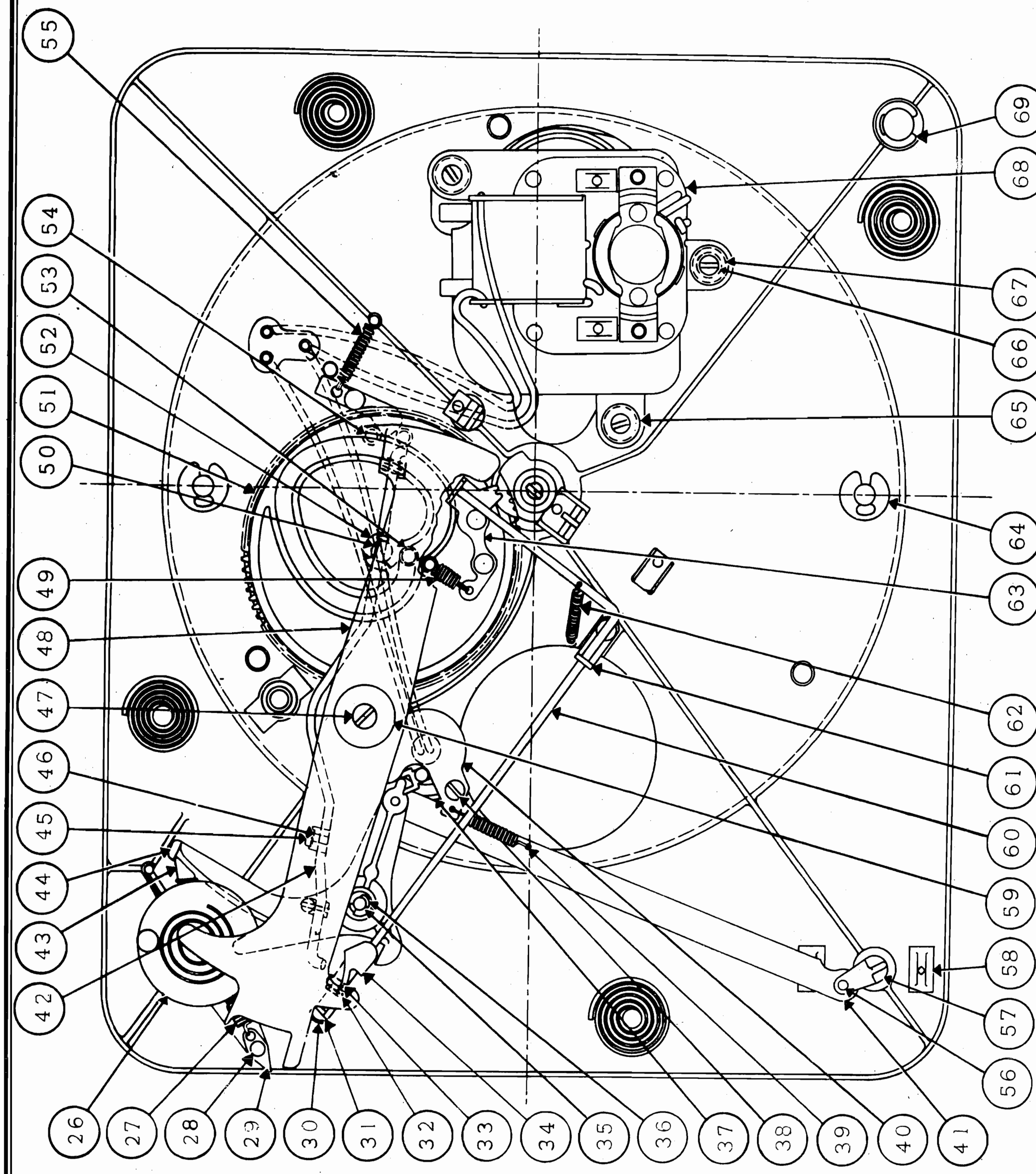

Figure 2

SEARS, ROEBUCK & CO. MODELS 101.211, 101.211-1, 101.211-2, 101.211-3, 101.211-4

NEEDLE DOES NOT SET DOWN ON 12" RECORD IN PROPER POSITION:

1. **Diameter of 12" record undersize:** The set down position of the needle for 12" records is determined by the edge of the record striking the trip lever (7). If a 12" record has a diameter of less than the standard size of 11 7/8" plus or minus 1/32", it may fail to depress the trip lever far enough.
2. **Enlarged center hole in record:** An enlarged center hole might fail to set the trip lever because it could produce the same effect as a small record.
3. **Pickup arm not adjusted properly:** See "RECORD HITS PICKUP ARM" - 4.
4. **Binding between safety spring and ratchet arm:** See "NEEDLE DOES NOT SET DOWN ON 10" RECORD IN PROPER POSITION" - 3.
5. **Trip lever does not cock when 12" record drops:** Allow a 12" record to drop to the turntable and shut off the changer just after it falls, before the pickup arm has a chance to move in over the record. The trip lever (7) should be forced down until the step on the hinge cam (18) passes the edge of the catch (16), preventing the hinge cam and the trip lever from returning to their original position. If the trip lever does not stay down in a depressed position:
   (a) Check the catch (16) to see if it is free to move forward and engage the hinge cam.
   (b) If the stop on the hinge body (14) is defective, it might allow the pickup arm to move too far out, thus moving the trip lever away from the spindle. This will produce the same effect as an undersized record.
6. **Hinge catch does not go into inside step on adjusting ring when trip lever is depressed:** When the trip lever (7) is tripped by a falling 12" record, the leg on the catch (16) should be moved out over the incline between the inside and outside steps on the adjusting ring leg and held in that position by the shoulder on the hinge cam (18) until the pickup arm starts to move in over the record. When this occurs, the leg on the catch should contact the incline and be moved out as it slides down the incline until the catch is disengaged and the trip lever can snap back up to a horizontal position. If the leg on the catch is not moved out far enough to enable it to slide down the incline, file about the 1/64" chamfer on the edge of the catch leg which contacts the incline.
   Check for binding between hinge body (14) and hinge bearing (97). Burrs on the bearing surfaces or lack of lubrication may prevent the hinge bearing from turning freely.

NEEDLE DOES NOT TRACK ACROSS RECORD PROPERLY:

1. Ratchet arm does not disengage from the set down locater when a cycle is completed.
   (a) There should be a 1/32" gap between the ratchet arm and the set down locater when the machine is not in cycle. If the gap is small enough to allow the parts to touch and bind as the needle moves across the record, the hinge bearing must be reset. See "RECORD HITS PICKUP ARM" - 4.
2. Hinge bearing binds.
   Place a block under the back end of the tone arm to prevent the needle from touching the turntable. With sensitive gram scale, check the amount of force required to move the pickup arm across the turntable. The force required should not exceed 2 grams. If the pressure required is excessive:
   (a) Check the ratchet arm and set down locater for binding. See 1, above.
   (b) Check the bearing in the pickup arm post for binding. The bearing is located below the hinge bearing (97). To inspect it, loosen the set screw (9) in the hinge bearing. Un-solder the pickup leads and pull them out through the hole in the hinge bearing. Pull up on the hinge and pickup assemblies. Clean foreign matter or corrosion from the bearings; Lubricate with light oil. To reset position, see "RECORD HITS PICKUP ARM" - 4.

CHANGER TRIPS BEFORE NEEDLE REACHES END OF RECORD:

1. Hole in record too large:
   If hole in record is too large, the grooves may turn eccentric with the spindle and cause premature tripping.
2. Binding in trip rod bearings:
   With the trip released, check the trip rod for play in the bearings. It should be free to turn without binding.

CHANGER DOES NOT CYCLE WHEN RECORD HAS BEEN PLAYED:

1. Binding in trip rod bearings. See "CHANGER TRIPS BEFORE NEEDLE REACHES END OF RECORD" - 4.
2. No eccentric trip groove on record:
   All standard records made today have an eccentric trip groove, but some records made in the past did not have this groove. When records of this type are being played the control knob must be turned to "REJ" at the end of the record.

MODELS 101.211,
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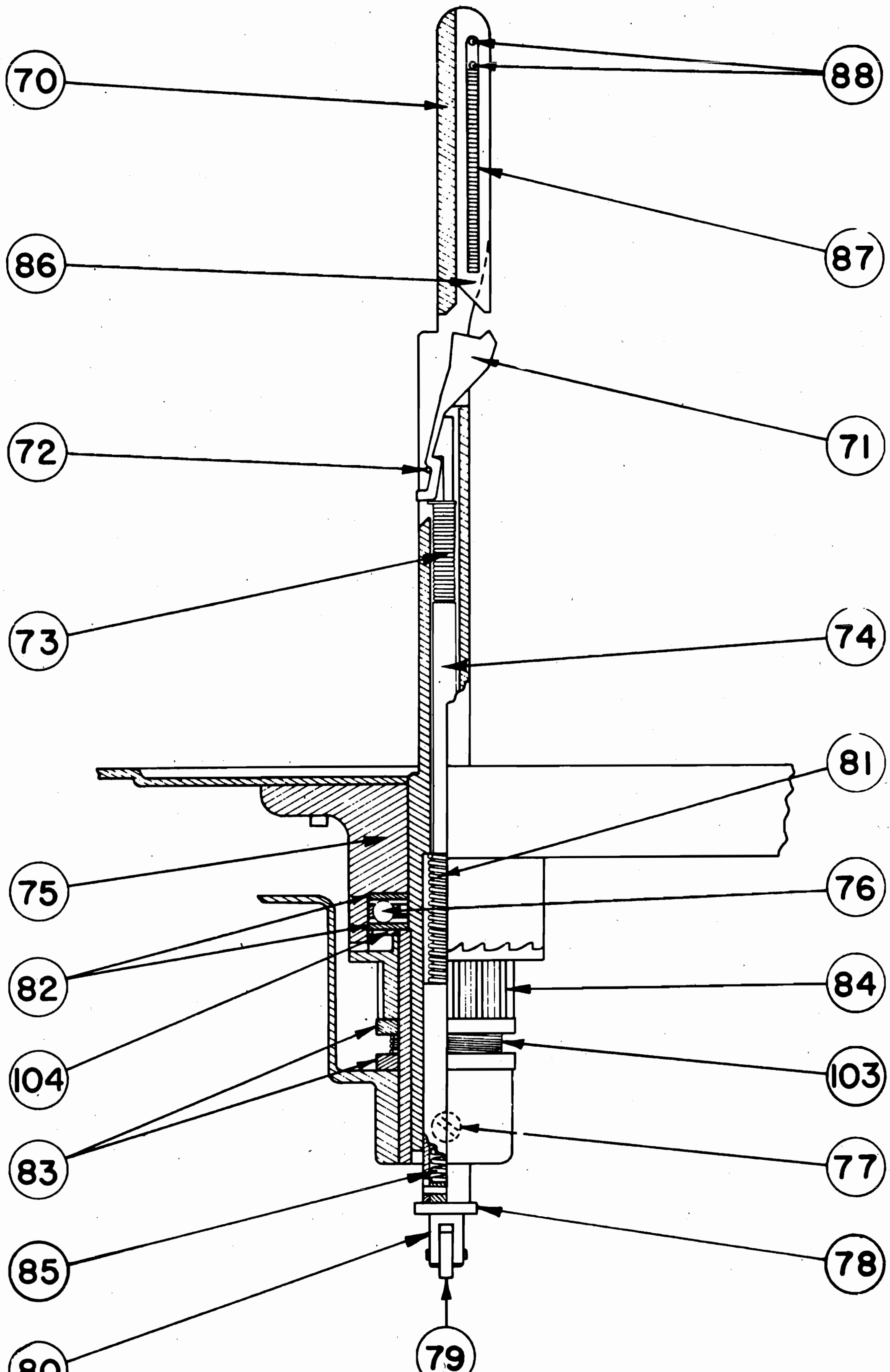

Figure 3

3. Ratchet pawl not engaging the ratchet sector:
   The ratchet pawl (29) must press against the ratchet sector forcing it back when the motion of the pickup arm is reversed. If the pawl does not contact the ratchet sector or slides over it:
   (a) Check the pawl (29) for burrs around the hole.
   (b) Be sure the pawl is free to turn on the bearing. If the drive pin (28) is driven down too far causing binding, the pin may be relieved by tapping up on the shank.
   (c) Check the pawl spring (27) for insufficient tension.
   (d) Check the point on the pawl. It should be sharp to enable it to dig into the ratchet teeth. Sharpen with stone if necessary.
4. Ratchet sector too far away from ratchet pawl:
   If the ratchet sector (34) is too far away from the pawl (29), the eccentric motion required to operate the trip will be excessive. If necessary, bend the trip bracket slightly to reduce this distance. If the sector is too close to the pawl, excessive trip pressure will result.
5. Needle jumps out of eccentric groove in record:
   (a) Check trip pressure, it should not exceed 8 grams for the trip shown in Fig. 2. If the pressure is excessive, see "CHANGER TRIPS BEFORE NEEDLE REACHES END OF RECORD" - 4 above.
   (b) The record may be defective. The trip groove is often too shallow. Check with a record which is known to be good.
   (c) The point on the needle may be bad. Check for a worn point.
   (d) There may be binding in the pickup bearing or ratchet arm. See 1 and 2, "NEEDLE DOES NOT TRACK ACROSS RECORD PROPERLY".
6. Clutch pawl binding on cam face:
   On the trip mechanism shown in Fig. 2 the clutch pawl (63) must be free to move forward and engage the pinion gear teeth when the trip rod releases it. Check for burrs or foreign matter lodged between the pawl and the cam. Do not oil as this might collect dirt and gum up the pawl.

PICKUP ARM STRIKES RECORDS ON SPINDLE WHEN IT RAISES OR PICKUP ARM REST WHEN IT MOVES OUT:

Pickup arm height not adjusted properly. See instructions for adjusting the pickup arm height under "ADJUSTMENTS".

TURNTABLE SPEED TOO SLOW:

1. Binding in turntable bearing: Check the turntable bearing for freedom. Hold the motor idler wheel (2) out of engagement with the turntable and spin the turntable by hand to see if it turns readily and coasts for a long time. Clean out the bearings to remove foreign matter and lubricate with light oil.
2. Motor pulley too small in diameter: Replace the motor pulley with one having a greater diameter.
3. Line voltage too low: The line voltage should not be less than 100 volts or the turntable may be too slow.
4. Operating temperature too low. If the machine has been stored in a cold place or operated in surroundings at a temperature of less than 60° F., the turntable speed may be too slow.

TURNTABLE SPEED TOO FAST:

Motor pulley too large in diameter. Replace the pulley with one having a smaller diameter or grind one or two thousandths off the pulley.

TURNTABLE STALLS DURING CYCLE:

1. Motor idler not engaging turntable. See "TURNTABLE DOES NOT REVOLVE WHEN CONTROL KNOB IS TURNED TO "ON" POSITION" - 4.
2. Turntable bearing tight. See "TURNTABLE DOES NOT REVOLVE WHEN CONTROL KNOB IS TURNED TO "ON" POSITION" - 5.
3. Operating temperature too low. See "TURNTABLE SPEED TOO SLOW" - 4.
4. Line voltage too low: The line voltage should not be less than 100 volts.
5. Binding in drive mechanism:
   (a) Remove lift arm (48) and hold idler (2) away from turntable or remove idler wheel. Cycle machine, turning turntable slowly by hand. The cam should turn freely for the complete revolution without binding at any point. If binding occurs check for foreign matter in the gear teeth, a bent cam bearing or bent spindle bushing.
   (b) Replace lift arm, loosen spindle screw (77) and raise spindle high enough to clear the lift arm cam when the machine cycles. Hold the pickup arm lift rod (94) up so the end of the lift rod does not contact the lift arm cam. Cycle the machine by hand. The entire cycle should be free, without binding at any point. If binding occurs, check the lift arm bearing for freedom and the lift arm roller to be sure it is not bent causing binding in the cam track.

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6. **Binding between pickup arm lift rod and lift arm cam face:** Cycle machine stopping it halfway through the cycle just as the lift arm is about to return. Lift pickup arm and raise lift rod (94) by pulling up on the adjusting screw (13) as high as it will go. Feel the lift arm (48) for play. The lift rod may still touch the lift arm cam face, but it should not bind. If binding occurs, the lift arm bearing may be bent or the fiber washer (59) under the lift arm should be removed to lower the lift arm.
7. **Spindle roller spring compressed too far.** Cycle the changer and watch the relationship between the bottom of the roller spring housing (78) and the roller (79). Just before the top of the lift arm cam raise is reached, the roller spring housing should stop its upward motion and the roller should continue up .005" to .047" more, slightly compressing the roller spring (81). If the spring compresses too much, the changer may stall on the shut off cycle. Check the lift arm bearing to determine if it is square with the base plate. It should be 90° to the base plate within 1/4°. If it is bent, carefully pound into place with a soft mallet. If it is straight and the roller spring is being compressed too much, remove the fiber washer (59) between the lift arm and the steel washer under it. The dimension on the spindle between the shoulder on which it rests and the bottom of the roller should be 1 7/8" plus or minus .010". An oversize spindle could also cause a binding condition.
8. **Motor weak.** In cases where everything checks all right but the changer still stalls in cycle, the motor may be weak.

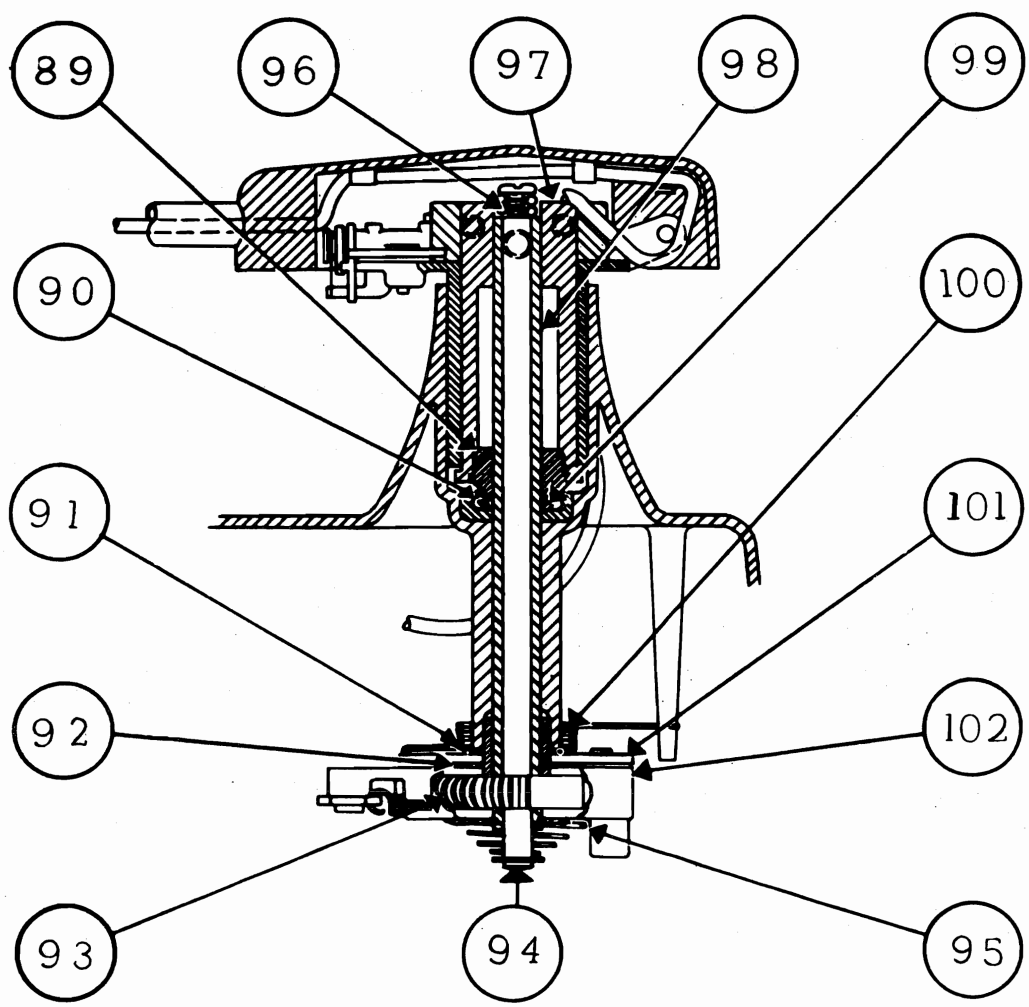

Figure 4

SEARS, ROEBUCK & CO. MODELS 101.211, 101.211-1, 101.211-2, 101.211-3, 101.211-4

CHANGER CONTINUES TO CYCLE:

1. Trip catch not engaging properly. See 2, "CHANGER TRIPS BEFORE NEEDLE REACHES END OF RECORD".
2. Insufficient tension on trip spring. See 3, same as above.
3. Binding in trip rod bearings. See 4, same as above.
4. Defective trip catch. See 5, "CHANGER DOES NOT CYCLE WHEN RECORD HAS BEEN PLAYED".
5. Reject control holding trip open. Check the control knob (25), control link (41), and control lever (44) for binding to determine if the control assembly is holding the trip in a disengaged position.
6. Trip rod not holding clutch pawl out of engagement with pinion teeth. On changers having the trip shown in Fig. 2, the end of the trip rod (60) should contact the bent up section of the clutch pawl (63) and push the pawl out of engagement with the pinion teeth. If the trip rod is not free to meet the clutch pawl, continuous cycling will result.
   (a) See if the trip spring (62) is in place.
   (b) Check the trip rod (60) for freedom in its bearings.

NOISE DURING PLAYING OF RECORD:

1. Rumble:
   (a) From motor: If a low pitched rumbling sound comes from the loud speaker while a record is being played, check the motor grommets (67) to be sure the motor is freely suspended on them. The motor lead wires should have slack to allow the motor to float. Motor rumble may also come from an out of balance motor rotor. In this case, the motor should be replaced.
   (b) From bearings: Defective turntable bearings can cause rumble. Check for foreign matter in the bearings, defective balls, binding between balls and ball retainer. Rough surface on washers. Clean ball bearing, sleeve bearing and washers, lubricate with lubriplate or light oil.
2. Defective motor idler wheel:
   A rapid thumping sound while the motor is running may indicate a flat spot on the motor idler wheel (2). Remove the turntable and check the rubber tire on the idler. If the surface of the rubber tire is not smooth and even, replace the idler.
3. Defective needle:
   A bad needle will cause loud needle scratch or hiss through both the speaker and the air directly from the needle. For reduced needle scratch and "needle talk" use a needle with high vertical compliance such as an offset "dog leg" type needle.
4. Defective record:
   Worn or defective records cause needle scratch and distortion of the recorded sound. If the record is warped, it may slip on the other records causing "wow", a waver in the recorded sound. An enlarged hole in the record can also cause "wow".
5. Turntable scrapes:
   If a scraping sound occurs as the turntable revolves, check:
   (a) Turntable warped, causing outer rim to rise and fall.
   (b) Motor idler (2) bent.
   (c) Wires beneath turntable rubbing.
6. Squeaks:
   Squeaking sound as changer operates indicates lack of oil. Lubricate points indicated under "LUBRICATION".

NOISE DURING CYCLING:

1. Squeaks: See "LUBRICATION".
2. Grinding sound indicates lack of lubrication or worn parts:
   Lubricate spindle roller assembly in bearing between it and spindle body.

DISTORTION OF RECORDED SOUND:

1. Defective needle. See 3, "NOISE DURING PLAYING OF RECORD".
2. Defective record. See 4, "NOISE DURING PLAYING OF RECORD".
3. Defective pickup cartridge:
   When the cartridge is defective, the recorded sound may be distorted, weak or stop entirely.
4. Defective amplifier:
   Check phonograph, amplifier and speaker.

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NO SOUND DURING PLAYING:

1. Defective cartridge. See 3, "DISTORTION OF RECORDED SOUND" - 4.
2. Defective wiring:
   Check pickup leads for a shorted or open lead.
3. Defective amplifier. See "DISTORTION OF RECORDED SOUND" - 4.

EXCESSIVE RECORD WEAR:

1. Binding in pickup arm. See 1 and 2, "NEEDLE DOES NOT TRACK ACROSS RECORD PROPERLY".
2. Defective needle. See 3, "NOISE DURING PLAYING OF RECORD".
3. Excessive needle pressure:
   The pickup arm is designed to give the proper needle pressure when an aluminum cased cartridge is used. If a cartridge with a die-cast housing is used, a compensating spring must be used to bring the needle pressure down to the usual standard of 1 oz. to $1\frac{1}{2}$ oz. If the needle pressure is too great on a compensating spring, bend the long end of the spring.

CHANGER DOES NOT SHUT OFF AFTER LAST RECORD HAS BEEN PLAYED:

1. Record support binding on spindle:
   The record support (3) must rest on the offset shoulder of the spindle or the changer will not shut off.
   See 3, "TWO RECORDS DROP AT ONCE".
2. Changer stalls during shut off cycle.
   See "TURNTABLE SECTIONS; under "SERVICE INFORMATION.
3. Cutoff rod not engaging shoulder on spindle roller spring housing.
   On the shut off cycle, the end of the cutoff rod (42) should contact the shoulder on the bottom of the spindle roller spring housing (78) and turn the cutoff rod over 90°. If the end of the cutoff rod passes under the roller spring housing as the machine cycles, on the shut off cycle, check:
   (a) The record support to be sure it is resting on the spindle shoulder, see 1, above.
   (b) The spindle to see if it is being held down in place by the spindle screw (77).
   (c) The lift arm screw (47) to be sure it is tight.
   (d) The bent up end of the cutoff rod (42) may be short. Replace if necessary.

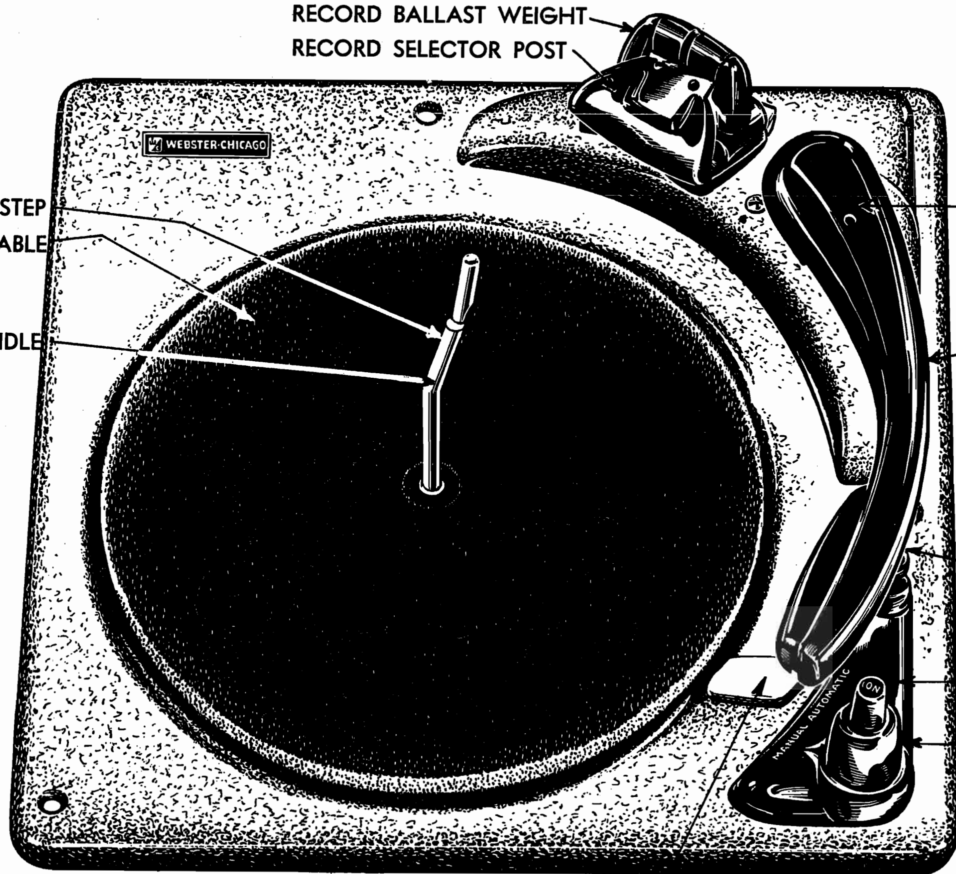
PICKUP ARM DOES NOT SET DOWN ON REST AFTER LAST RECORD HAS BEEN PLAYED:

Control lever does not engage set down locater.
On the shut off cycle, one leg of the control lever (44) should catch the set down locater (43) holding it to prevent the return spring (100) from pulling the pickup arm in. The pickup arm should be held against the stop in the base plate. In this position, the nest in the pickup arm should be directly above the pickup rest.

CHANGER SHUTS OFF PREMATURELY:

1. Spindle roller spring compressed too far. See 7, "TURNTABLE STALLS DURING CYCLE".
2. Roller spring in spindle too weak:
   When the bottom record of a stack of ten 12" records is being ejected from the spindle ledge, the roller spring (81) should not compress until just before the roller reaches the top of the cam incline on the lift arm. If the roller spring is compressed under the load of a full stack of records it may cause premature shut off. Replace the roller assembly (78) if necessary.
3. Record too thick:
   The changer is designed to play standard records. If an old style 1/8" thick record is used, the changer will shut off instead of dropping the record.
4. Cutoff rod not being reset:
   After the shut off cycle, when the cutoff rod (42) has been turned to throw the switch to the "OFF" position, it should be returned to its original position the next time the machine cycles by the bent up end of the cutoff rod, contacting the round stud on one leg of the control lever (44). The flat spring (46) acting against the cutoff rod should throw the rod against its stop on the lift arm (48) and hold it there. If the cutoff rod is not fully turned, the bent up end next to the spindle may stick up high enough to prematurely contact the shoulder on the roller spring housing (78).
   (a) Check the lever spring (46) for tension. Remove and bend slightly to increase tension if necessary.
   (b) Lubricate the cutoff rod bearings and around the lever spring with lubriplate or oil.
   (c) Check the clearance between the end of the cutoff rod (42) which passes under the control lever (44) and the bottom of the round stud on the control lever. When the cutoff rod is in its normal operating position, it should not clear the bottom of the round stud by more than enough to completely turn the end of the cutoff rod from a vertical position back to a horizontal position.

WEBSTER CHICAGO CORP. MODEL 156



OPERATION

MOTOR

Connect the motor cord to a source of 105-115 volt 60 cycle current only. If it is desired to operate the changer on 50 cycle current, a special motor pulley (Part No. 17X412-11) must be used in place of the one supplied with the changer in order to drive the turntable at the required speed of 78 R.P.M.

Do not under any circumstances connect the motor to a source of direct current or alternating current of any other frequencies.

PICKUP

The high impedance crystal cartridge supplied may be of the fixed permanent point or removable needle type. If it is the latter, use a needle which is not more than 1$\frac{1}{16}$ inches long for most satisfactory results.

Some desirable qualities of a good needle are faithful reproduction, low surface scratch or hiss, long wearing qualities, minimum record wear and rugged construction.

The Webster-Chicago Nylon Needles are particularly adaptable for use with your Webster "156". The "Knee-action" of the nylon knee permits the needle to ride the record groove in a gentle, floating motion, protects valuable records from unnecessary wear . . . virtually eliminates breakage of the sapphire tip if accidentally dropped . . . greatly lengthens needle life . . . produces a pleasing harmonious tonal balance and delivers remarkably authentic reproduction. DO NOT USE SINGLE PLAY OR CACTUS NEEDLES FOR AUTOMATIC OPERATION.

OPERATION — AUTOMATIC

1. Turn the Record Selector Post to "10" or "12" for ten or twelve inch records.
2. Turn the Selector Control (sleeve of ON button) to AUTOMATIC.
3. With the Record Ballast Weight turned back, place up to ten 12" records, or twelve 10" records on the spindle so that the bottom record rests on the step of the spindle and the shelf of the Record Selector Post.
4. Turn the Record Ballast Weight forward to rest on the top record.
5. Press the ON button.

To "reject" any record while playing in the AUTOMATIC position, press the ON button.

NOTE: The OFF button may be pressed during any portion of the change cycle. The Pickup Arm may be moved manually at any time without damage to the mechanism. However, after the last record has been played, the Pickup Arm is automatically locked in position and should not be handled until it has come to rest on the OFF button.

6. After the last record has been played, the entire stack may be removed from the turntable at one time. The simplest procedure is as follows:
   a. Turn the Record Ballast Weight out of position.
   b. Place the fingers of both hands under opposite edges of the bottom record.
   c. Do not apply pressure to the top record. (Keep your thumbs free.)
   d. Lift the stack of records straight up, following the contours of the spindle. This permits the stack of records to follow the curve of the spindle without binding and greatly facilitates the removal of the stack.

OPERATION — MANUAL

1. Turn the Record Selector Post to the 12" position. (This is not essential but permits more clearance in loading and unloading records.)
2. Turn the Selector Switch (sleeve of ON button) to MANUAL.
3. Place a record on the Turntable. It may facilitate this operation if the record is placed over the spindle at an angle, with the edge of the record held below the level of the Record Selector Post Shelf. Records may be removed in this same manner.
4. Press the ON button.
5. Place the needle gently on the edge of the record. Do not lift the Pickup Arm too high as this will cause it to catch in the Automatic Stop Lock position. Particular care should be exercised if your pickup has a sapphire point needle. Although the sapphire is very hard and long wearing, it is extremely brittle and may be fractured or chipped if dropped on the record.
6. To stop the mechanism at any time, press the OFF button.

SERVICE INFORMATION AND ADJUSTMENTS

All units are accurately adjusted, lubricated and tested at the factory. However service repairs and adjustments sometimes become necessary. This bulletin should be studied carefully before making any adjustments or replacing parts.

Service parts are available from your Webster-Chicago distributor. All parts must be ordered by piece part number and also record changer model and production number, stamped on the under side of the main plate.

The functions and most probably misadjustments of the main assemblies are as follows (reference numbers refer to the exploded view)

THE AUTOMATIC TRIP FAILS TO FUNCTION

The Main Cam Assembly (38) and Actuating Gear (36) are the heart of the record changer. The Main Cam Assembly drives the mechanisms associated with the action of the Pickup Arm (5) and the Record Selector assemblies. It, in turn, is driven by the gear train (29, 30, 31) and the Turntable which is rim driven by the phonograph motor.

The Main Cam Assembly and Actuating Gear is put in motion or "tripped" by means of the "automatic" trip or by the manually operated "reject" trip. When the movement of the Pickup Arm toward the spindle is greater than 1/8" in 1/2 revolution of the Turntable, the Automatic Trip Arm (33) trips the Velocity Trip and Roller Assembly (37). This releases the Actuating Pawl on the Main Cam Assembly (38), allowing it to engage the Main Cam Actuating Gear (36) and driving it through the change cycle. The pressure from the Automatic Trip Arm required to actuate the trip mechanism is negligible.

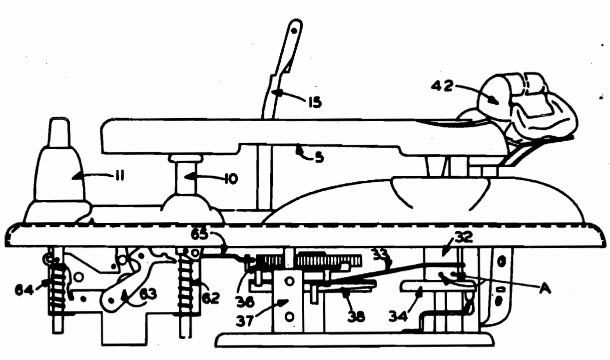


Fig. 1

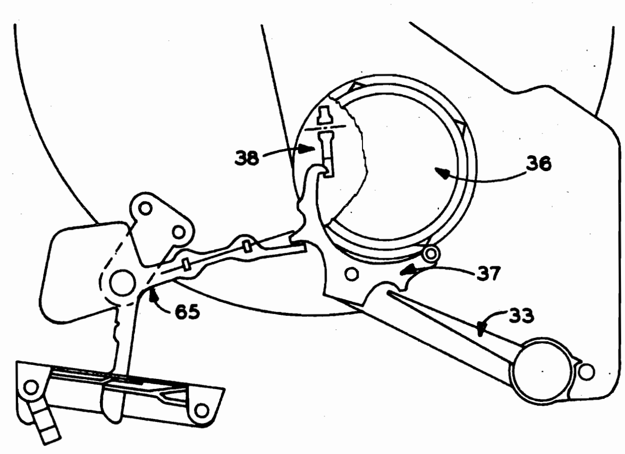


Fig. 2

The Automatic Trip Arm (33) follows the movement of the Pickup Arm through a weighted friction clutch (32). This clutch must be kept free of oil and grease. Should it become necessary, clean the clutch parts with carbon tetrachloride. This clutch should operate the trip mechanism without placing undue drag on the movement of the pickup arm.

Also check for:

1. Velocity Trip and Roller Assembly binding.
2. Slight burr on end of the actuating pawl or on the underside of the Velocity Trip hook.
3. Actuating Pawl stuck (part of Main Cam Assembly (38) engaged by the hook end of the Velocity Trip and Roller Assembly (37).
4. Automatic Trip Arm (33) bent and not hitting the Velocity Trip and Roller Assembly (37).
5. Automatic Trip Arm (33) fails to touch the Velocity Trip and Roller Assembly.
6. Velocity Trip and Roller Assembly (37) rubbing on the underside of the Main Cam Actuating Gear (36).
7. No velocity lead-in groove or eccentric groove in the center of record.
8. Foreign matter in record groove.
9. Badly worn record.
10. Badly bent or worn needle.

IF THE "REJECT" TRIP FAILS TO FUNCTION

When the "On" button is pressed, the hair spring of the "reject" trip lever arm (65), actuates the Velocity Trip and Arm Assembly, putting the change mechanism in cycle.

Check for:

1. "Reject" trip hair spring of Lever (65) bent or broken.
2. Velocity Trip and Roller Assembly (37) binding.
3. Actuating Pawl (part of Main Cam Assembly 38) stuck.

IF THE MECHANISM CONTINUES TO CYCLE

At the completion of the change cycle, the Actuating Pawl is disengaged from the Main Cam Assembly Actuating Gear (36) by the hook end of the Velocity Trip and Roller Assembly (37) which has been returned to its normal position by the reset points on the Main Cam Drive Gear (Fig. 3). This hook should be adjusted for about $\frac{1}{64}$" clearance from the bottom of the Main Cam Drive Gear (36), Fig. 1. Greater clearance may permit the pawl to bounce past the hook and re-engage, causing the mechanism to continue to cycle.

If the clearance between the lip on the Velocity Trip Lever and the edge of the Main Cam is too small, it will prevent the hook end of the Velocity Trip Lever from engaging the trigger. Adjust the clearance between the lip (D, Figs. 3 and 5) on the Velocity Trip Lever of the Main Cam to be within $\frac{1}{64}$" when the roller is contacting the point of one of the protrusions on the Actuating Gear.

Also check for:

1. Velocity Trip and Roller Assembly (37) rubbing on Main Cam Actuating Gear (36).
2. Manual Trip Lever (65) binding.
3. "Disengage Roller" broken on Velocity Trip and Roller Assembly (37).

PICKUP ARM LIFT TOO HIGH OR TOO LOW

The vertical movement of the pickup arm is controlled by the angle of the Pickup Arm Raising Lever (40), Fig. 4. The needle should approach the top record of a full stack of 10" records on the turntable with approximately $\frac{1}{8}$" clearance.

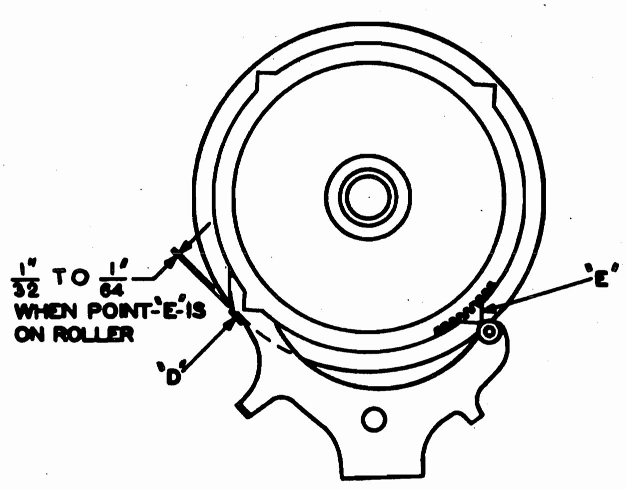


Fig. 3

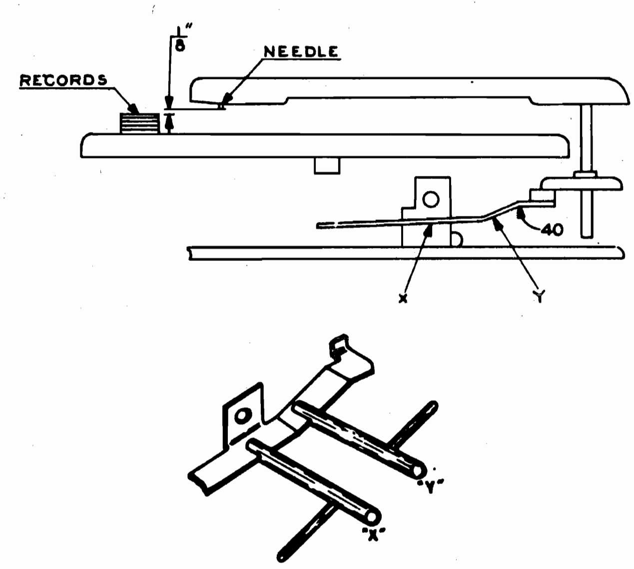


Fig. 4

To adjust:

1. Put a full stack of 10" records ON THE TURNTABLE.
2. Press the "On" button and rotate the Turntable clockwise until the needle clears the top record of the stack by about 1/8".
3. Be sure the notch in the Pickup Arm raising disc (34) engages the pickup arm raising lever (40).
4. If the needle does not clear the top record or if it raises too high, adjust by bending the pickup arm raising lever at the point indicated in Fig. 4.

CAUTION: All adjusting bends should be made slowly, using slight but firm, easy pressure.

Be sure the set screws of (A of Fig. 1) of the pickup arm raising disc are not loose and are properly positioned in the alignment holes as explained in the paragraph on Needle Setdown Indexing.

NEEDLE SET DOWN INDEXING INCORRECT

The horizontal movement of the pickup arm (5) is controlled by the eccentric excursion of the Pickup Arm Raising Lever (40) moving the Pickup Arm Raising Disc (34) when actuated by the Main Cam Assembly (38). The eccentric screw (part of 6), accessible through the top of the pickup arm (5), should take care of any normal position adjustment. Turn this screw clockwise to index the needle in toward the spindle and counter-clockwise to index the needle out away from the spindle.

Should further adjustment be necessary, proceed as follows:

1. Set the eccentric screw, just mentioned, to a middle position.
2. Set the Record Selector Post (42) to the 10" position.
3. Operate the mechanism by revolving the Turntable manually until the needle drops to within 1/8" of a 10" record on the turntable.
4. Be sure the notch in the Pickup Arm Raising Disc (34) engages the Pickup Arm Raising Lever (40).
5. With a No. 8 Bristol wrench in each of the set screws of the Pickup Arm Raising Disc (35) as indicated in A, Fig. 1, alternately loosen one screw and tighten the other until the needle rests above the record lead-in groove at the desired point.
6. Complete the change cycle of the mechanism and position the Pickup Arm on the "off" button (10). If necessary, bend the tongue of the Pickup Arm Raising Disc closer to or away from the Base Plate Post until the Pickup Arm is correctly seated on the "off" button when the tongue is touching the Base Plate Post.

NOTE: All adjusting bends should be slight but firm, easy bends.

7. Be sure that both set screws are tight when this adjustment is completed.
8. Turn the Record Selector Post to 12" and check the needle drop on a 12" record. Make any additional adjustments with the eccentric screw mentioned previously.

PICKUP ARM DROPS OFF THE "OFF" BUTTON

The upturned end of the pickup arm pivot shaft bracket (35) prevents the pickup arm from falling off the "off" button. There should be approximately 1/64" clearance between the tongue of the Pickup Arm Raising Disc (34) and the bottom of the groove formed by the bracket and the Base Plate Post. Bend the Bracket end up or down to secure proper positioning of the disc tongue and the Pivot bracket. Be careful to bend the end only or the Bracket will bind on the Pickup Arm Pivot Shaft (7).

The Bracket should not be too high or the disc tongue will rub on it when the needle approaches the edge of a 12" record, causing "glide in" on the first few grooves of the record.

CHANGE CYCLE STARTS BEFORE END OF RECORD

If the trip assembly chatters while the changer is running, or if the changer cycles before the entire record is played, there is probably insufficient clearance between the hook end of the Velocity Trip and Roller Assembly (37) and the Actuating Gear (36). This clearance should be adjusted to be within 1/32" to 1/64" by bending the lever at point "C" shown in Fig. 5.

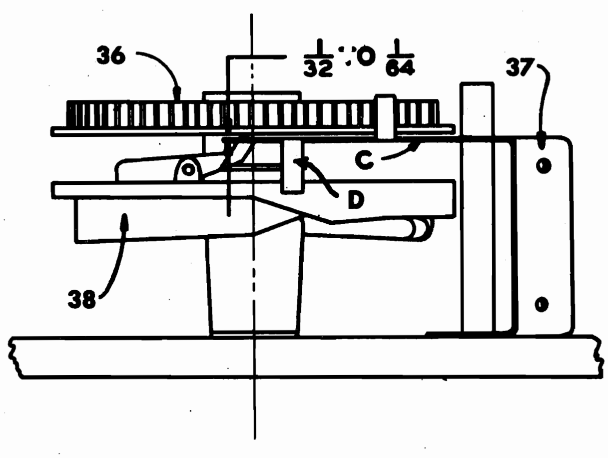


Fig. 5

MORE THAN ONE RECORD IS DROPPED DURING A CHANGE CYCLE

The floating latch at the top of the Record Spindle is so spaced that only one record at a time can slide between the heel of the latch and the step of the spindle. The hole in the latch is elongated so that the latch can slip into the spindle recess when records are being removed.

If more than one record is dropped at a time, it will be found to be due to:

1. Foreign matter in spindle recess causing the latch to stick.
2. Exceptionally thin records. Standard records are .075" - .090" thick.

RECORD DROPS ON PICKUP ARM

As the change cycle is started, the first motion of the inclined outer bottom surface of the Main Cam (38) causes the Record Selector Post (42) to move toward the Spindle about $\frac{3}{32}$ inch. This position is maintained until the Pickup Arm has made its full outward lateral excursion at which time the Record Selector Post again moves toward the spindle, causing the bottom record to drop into playing position.

If the Record Selector Post (42) has been bent back, away from the Record Spindle, it is possible for a standard record to rest on the spindle step with its edge just over the edge of the Record Selector Post shelf. Then as the change cycle is started, the record is pushed off the spindle by the initial movement of the Record Selector Post, so that it drops on the Pickup Arm.

To correct this condition, the Rocker Arm Assembly must be adjusted so that the Record Selector Post is brought nearer to the spindle. This adjustment is made in the following manner:

1. With the mechanism at rest, remove the Turntable and replace the Record Spindle. Set the Record Selector Post to the position for playing 12-inch records and place a 12-inch record on the Record Spindle.
2. Insert a short screwdriver through the motorboard opening into the screw slot as shown at "A" in Fig. 6. Clockwise rotation of the screw will increase the distance between the Record Spindle and the Record Selector Post; counterclockwise rotation will decrease it.

It is recommended that the distance between the edge of the record and the step of the Rcord Slector Post be held to just over $\frac{1}{32}$ of an inch so that records with rough or sharply beveled edges will not catch on the outer edge of the Record Selector Post.

CAUTION: Be certain that a standard size record is used in making this adjustment. A standard 10" record measures $9\frac{7}{8}" \pm \frac{1}{32}"$ diameter. A standard 12" record measures $11\frac{7}{8}" \pm \frac{1}{32}"$ diameter.

PUSH OFF POST ANGLE INCORRECT

The Record Selector Post should be adjusted so that the curve of the shelf matches the curve of the record. See Fig. 7.

To adjust this angle:

1. Turn the Record Selector Post to the "10" position.
2. Place a ten-inch record on the Spindle in the normal position for automatic playing.
3. With a No. 8 Bristol wrench in each of the set screws (point A, Fig. 7), alternately loosen one and tighten the other until the Record Selector post angle is correct. Be sure that both set screws are tight at the completion of this adjustment.

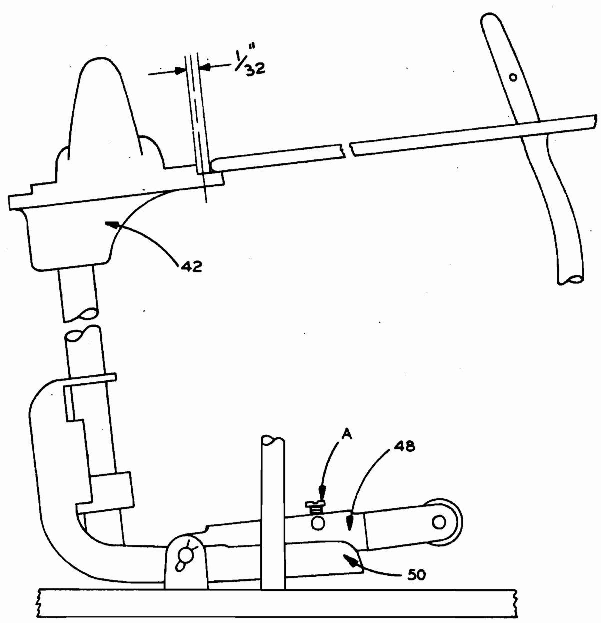


Fig. 6

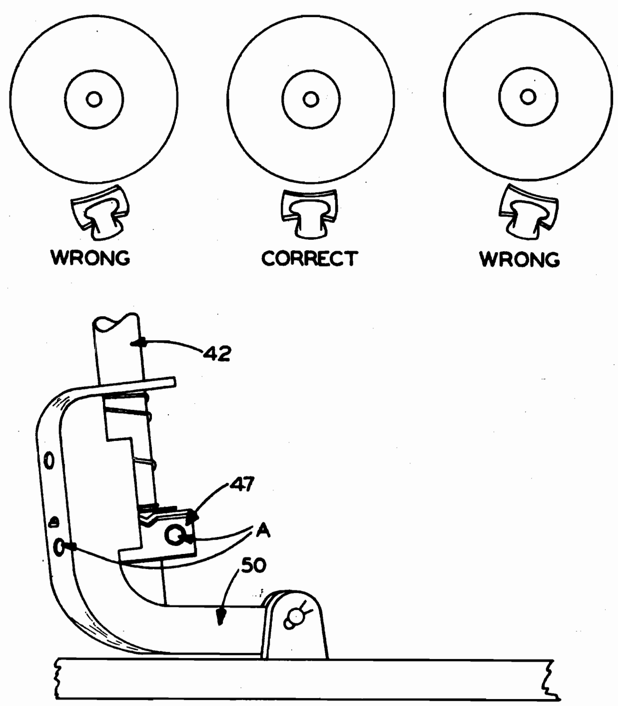


Fig. 7

ERRATIC INDEXING

Indexing in the 10" or the 12" position is controlled through the presence or absence of pressure from the Compression Spring (47A) on the Pickup Arm Raising Lever (40). The compression on this spring is changed as the Record Selector Post (42) is changed to the 10" or 12" position. Improper adjustment of the spring tension will result in erratic indexing. In the 12" position, the spring should be just free. In the 10" position, the compression of the spring holds the stud of the Pickup Arm Raising Lever (40) against the outside edge of the groove, forcing the stud to travel the inside edge or the outside edge of the groove in the bottom of the Main Cam (38).

To adjust:

Bend the slotted arm (part of 40) for proper tension and smooth clearance of the spring guide arm (47).

GLIDE IN ON 12" RECORDS

1. Check tension of compression spring (47A) as explained above. Spring should be free in 12" position.
2. Remove any cause of friction in Index Lever (47).
3. Tongue of Pickup Arm Raising Disc (34) should not touch beveled edge of pickup arm pivot shaft bracket (35) when the needle is on the edge of a 12" record. Bend the end of the bracket if necessary.

"WOW"

If the speed of the Turntable varies during each revolution, check:

1. Defective Idler wheel (24).
2. Dirt or foreign matter inside the rim of the Turntable.

LAST RECORD CONTINUES TO PLAY

1. Check the record spindle to be sure that it moves up and down freely.
2. With no records on the spindle, check the Automatic Shut Off Lock Lever (44). The lower hook end of this arm ("C") shoud catch the Pickup Arm Raising Disc (34) at the beginning of the cycle to prevent travel of the Pickup Arm, causing it to drop on the OFF button. With no records on the Spindle and with the mechanism at rest, this hook should clear the top of the Pickup Arm Raising Disc by 1/32". Adjust, if necessary, by inserting a screw driver in the hole in the bottom base plate and bending lip "D". Never attempt to move the Pickup Arm Raising Disc up or down.
3. The elevated hook "A" on the Automatic Shut Off Lock Lever will sometimes lock with the bracket "B" on the Record Selector Post (50) if the drop of the record is delayed. More clearance can be obtained by bending the elevated hook "A" away from the bracket.

LAST RECORD DOES NOT PLAY

The weight of the records on the Spindle keeps the Automatic Shut Off Lock Lever (44) from dropping and engaging the Pickup Arm Raising Disc (38), thus permitting the mechanism to continue to cycle.

The Push Off Post (50) moves forward slightly at the beginning of each change cycle. The bracket "B" on this post is then underneath the elevated hook "A" on the Automatic Shut Off Lock Lever (44). This forward movement takes place before the last record drops so the change cycle should continue. However the dropping of the last record releases the Automatic Shut Off Lock Lever, permitting it to drop and shut off the mechanism when the change cycle starts after the last record.

If the last record does not play:

1. Bend the elevated hook "A", Fig. 8 forward so that it will overlap the Push Off Post bracket "H" about 1/32" with a record on the spindle.

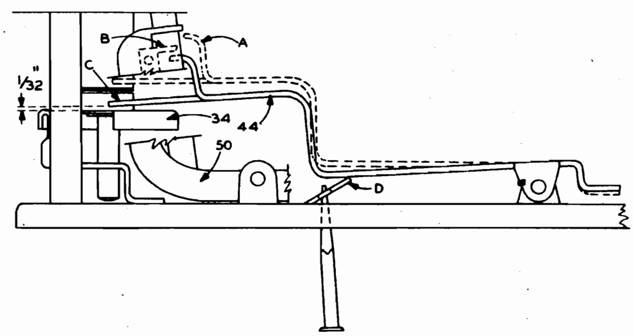


Fig. 8

MOTOR DOES NOT SHUT OFF

1. OFF button stuck.
2. Defective switch.
3. OFF button Shaft Spring (62) has too much tension.
4. Roller on Switch Lever binding.
5. Switch Lever binding on switch frame.
6. Excessive counterbalancing on Pickup Arm.

REPLACEMENT OF PARTS

REPLACE PICKUP CARTRIDGE

1. Press upward on the clip fastener at the forward end of the Pickup Mounting Bracket and raise the Pickup Arm to a vertical position.
2. Remove the screws holding the cartridge in place and replace the cartridge.

REPLACE PICKUP ARM

1. Press upward on the clip fastener at the forward end of the Pickup Arm Mounting Bracket.
2. Raise arm to vertical position.
3. Remove screws holding arm and bracket.
4. After the new Pickup Arm has been installed, press the arm and the Mounting Bracket together until the clip latches.

REMOVE THE SUB-PLATE ASSEMBLY

In the event that it becomes necessary to replace any of the major parts in the sub-plate assembly, the entire assembly should first be removed from the motorboard.

1. Remove the Record Spindle which is held in by a clip under the sub-plate.
2. Remove the Turntable.
3. Remove the Pickup Arm in the manner outlined previously.
4. Unhook the Rocker Arm Return spring.
5. Remove the Rocker Arm Pivot Pin.
6. Remove the five No. 8-32 x 3/4 R.H. screws holding the sub-plate studs and the No. 8-32 x 3/8 R.H. screw holding the center post to the motorboard. Note that one of the 8-32 x 1/4 R.H. screws is accessible through the Pickup Arm hole in the Crescent Assembly.

It should not be necessary to remove the Crescent Assembly except for replacement or to remove the complete Rocker Arm Assembly.

REPLACING THE SUB-PLATE ASSEMBLY

1. Reverse the above procedure making certain that all parts fall into their proper positions.
2. Particularly note the Selector Lever and Selector Lever Compression Spring to see that they are in position with the lever through the slot in the Pickup Arm Raising Lever Bracket.

REPLACE PICKUP ARM BRACKET AND SHAFT ASSEMBLY

1. Loosen Bristol screws in Pickup Arm Raising Disc.
2. Remove Disc and Clutch parts by sliding them off the bottom of the Pickup Arm Shaft and pull shaft out of changer from above.

To replace, reverse the procedure and adjust the Pickup Arm Raising Disc for proper operation.

REPLACE RECORD POST AND ROCKER ARM ASSEMBLY

1. Remove the Pickup Arm Assembly.
2. Remove the four nuts under the main plate which hold the Crescent Assembly.
3. Unhook the Rocker Arm Return Spring.
4. Remove the Rocker Arm Pivot Pin.
5. Lift out the Record Selector Post, Rocker Arm and Crescent Assembly as a unit.
6. In replacing the Rocker Arm Assembly, note paragraph "Replacing the Sub-Plate Assembly."

LUBRICATION

Model 156 Record Changers leave the factory completely oiled and lubricated. Under normal conditions this should be sufficient for approximately one year or 1,000 hours of operation. When operated under extreme conditions of dust or heat, this operation should be performed more frequently as required.

NOTE: AVOID EXCESSIVE LUBRICATION.

Do not permit any oil or grease to get on the rubber idler drive wheel or the Motor Sleeve (Illus. 11 and 21, Fig. 4), on turntable drive rim or on the automatic trip arm clutch. Any oil or grease on these points should be removed using carbon tetrachloride.

The recommonded lubricants and points of lubrication are as follows:

A — No. 10 OIL (Apply With Small Oil Can Or Medicine Dropper)

1. Motor Bearings. Saturate top and bottom felts.
2. Pickup Arm Shaft (Illus. 22, Fig. 6). Apply one drop each to bottom bearing point, bracket hole and hole through Main Base Plate.
3. Ball Bearing Assembly (Illus. 7, Fig. 4).
4. Idler Wheel Felt (Illus. 13, Fig. 4).

B — LUBRIPLATE (Apply With Small Brush)

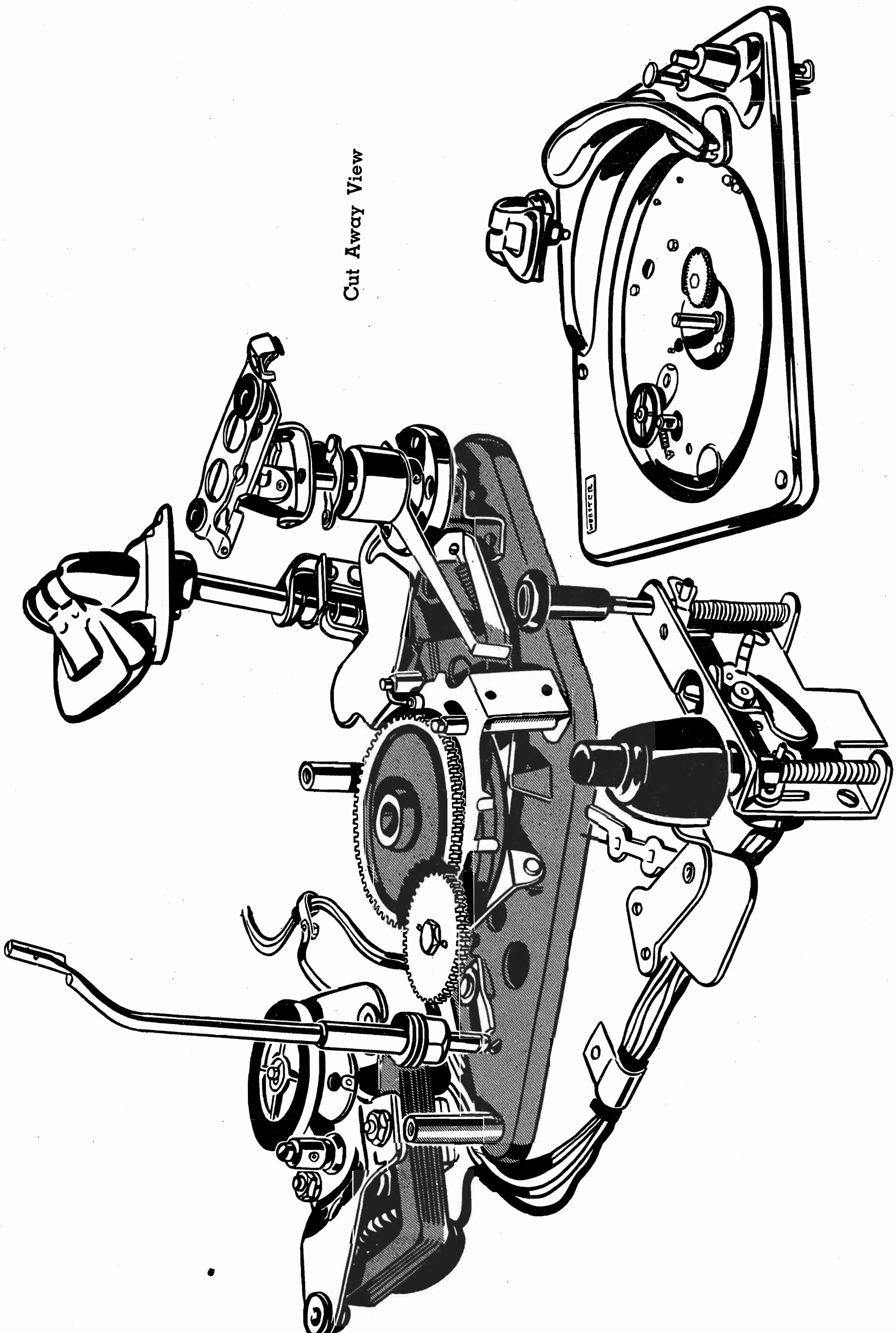
1. Idler Wheel Link (Illus. 16, Fig. 4).
2. Turntable Shaft Stud.
3. Pickup Arm Hinge Pins.
4. Knife edge of Raising Lever (Illus. 33, Fig. 7).
5. Main Cam Bearing. (It is necessary to remove the sub-plate Assembly to lubriplate this bearing. See paragraph Mechanical Repairs "C" To Remove the Sub-Plate Assembly.)

C — STA-PUT (Apply With Small Brush)

1. Teeth of Main Cam Actuating Gear (Illus. 43, Fig. 7).
2. Track of Main Cam Gear (Illus. 42, Fig. 7).
3. Teeth of Large and Small idler gears (Illus. 9, Fig. 4).
4. Raising lever Bracket bearing surfaces (Illus. 33, Fig. 7).

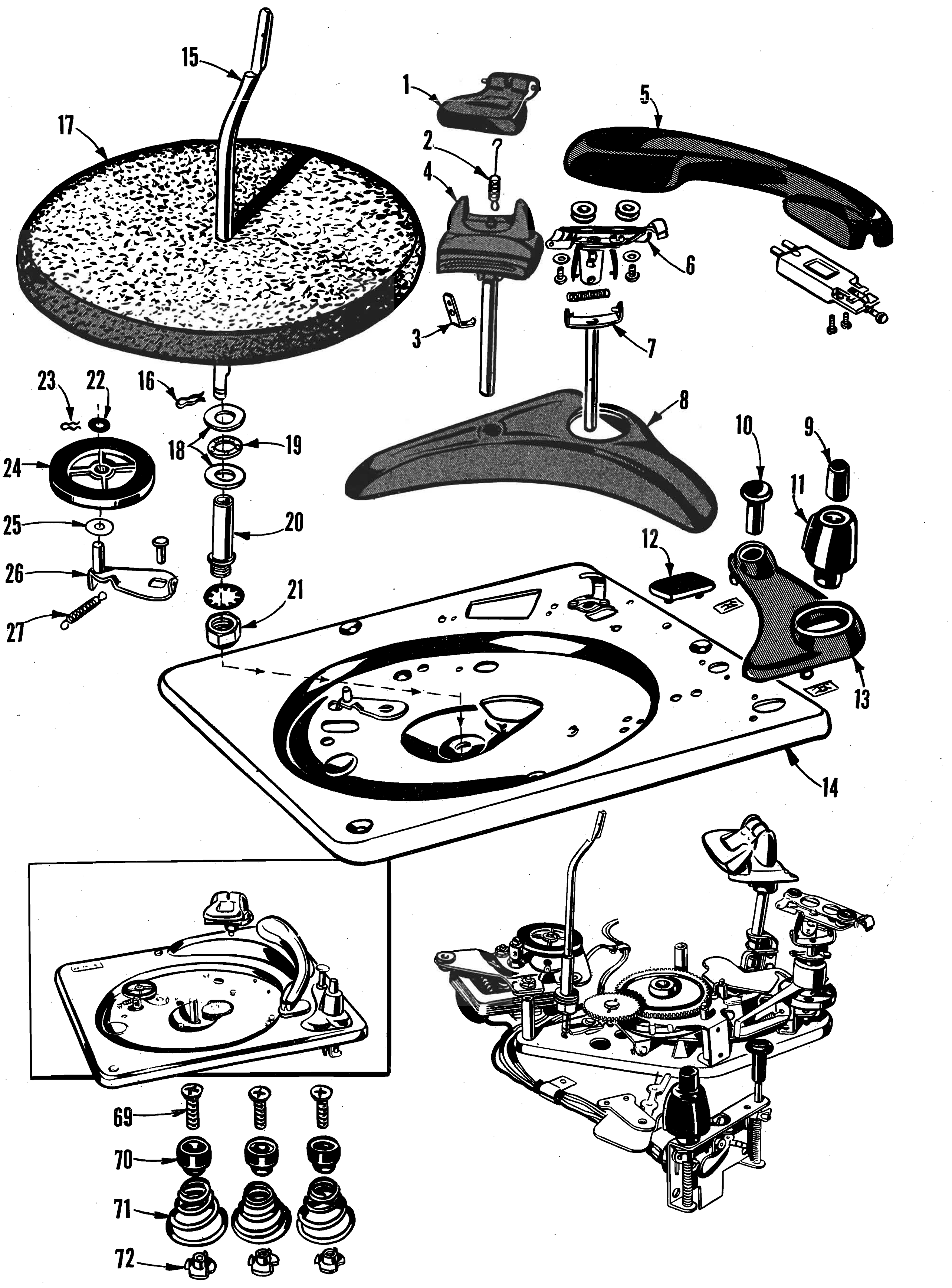
MODEL 156

WEBSTER CHICAGO CORP.



Cut Away View

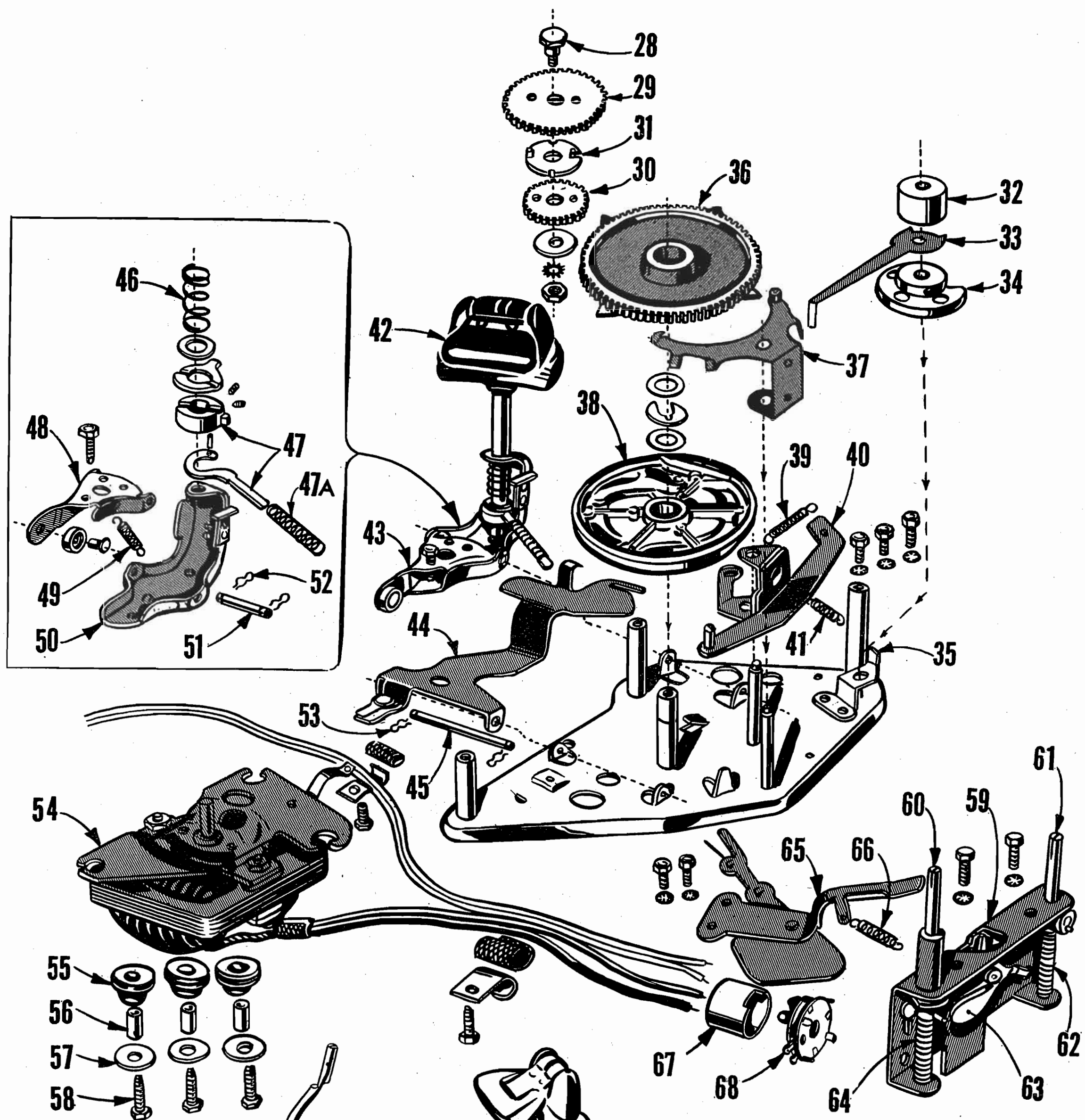
WEBSTER CHICAGO CORP. MODEL 156

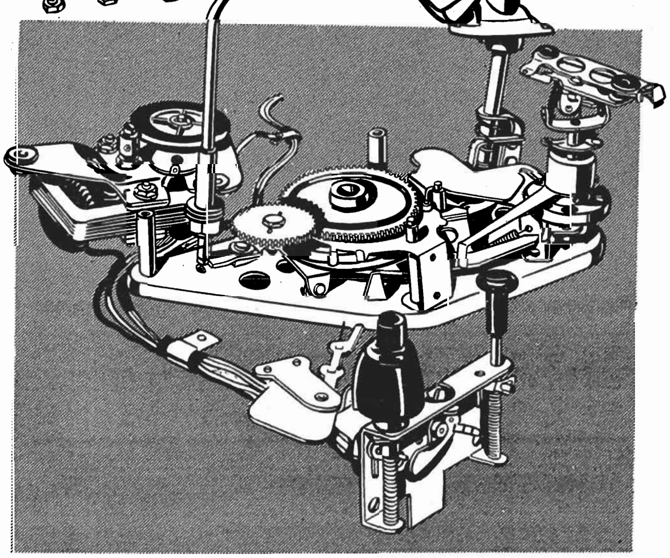


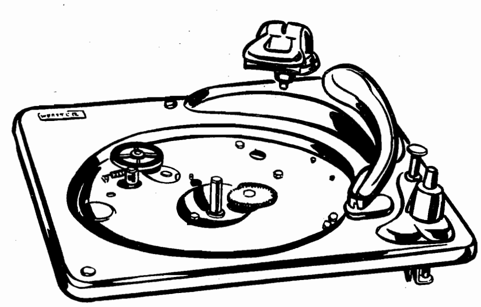
Exploded View

MODEL 156

WEBSTER CHICAGO CORP.







Exploded View

WEBSTER CHICAGO CORP.

MODEL 156

REPLACEMENT PARTS LIST

Illustration No.	Part No.	Part Name and Description
1	49P074	Record Stabilizer Weight
2	46P126	Stabilizer Weight Tension Spring
3	45P464	Stabilizer Spring Retaining Bracket
4	49X029	Record Selector (Pushoff) Post
5	49X068	Pickup Arm Less Hardware and Cartridge
6	21X280	Pickup Arm Mounting Hinge
7	11X136	Pickup Arm Base Shaft Assembly
8	*	Pickup Arm — Record Post Base Crescent Assembly
9	49P026	"ON" Button
10	49P050	"OFF" Button
11	11X139	"Automatic - Manual" Knob
12	24P014	Rubber Needle Set Down Pad
13	49P027	Control Escutcheon
14	*	Main Base Plate
15	11X133	Spindle Assembly Including Pawl
16	50P160	Spindle Retaining Clip
17	11X138	Turntable Including Gear
18	25P269	Bearing Race Washer
19	11X058	Bearing Race Assembly
20	41P414	Steel Turntable Bearing
21	26P687	Turntable Bearing Nut
22	25P030	Idler Wheel Felt Washer
23	50P125	Idler Retaining Clip
24	11X003	Idler Drive Wheel
25	25P046	Fibre Idler Washer
26	11X068	Idler Link Assembly
27	46P112	Idler Tension Spring

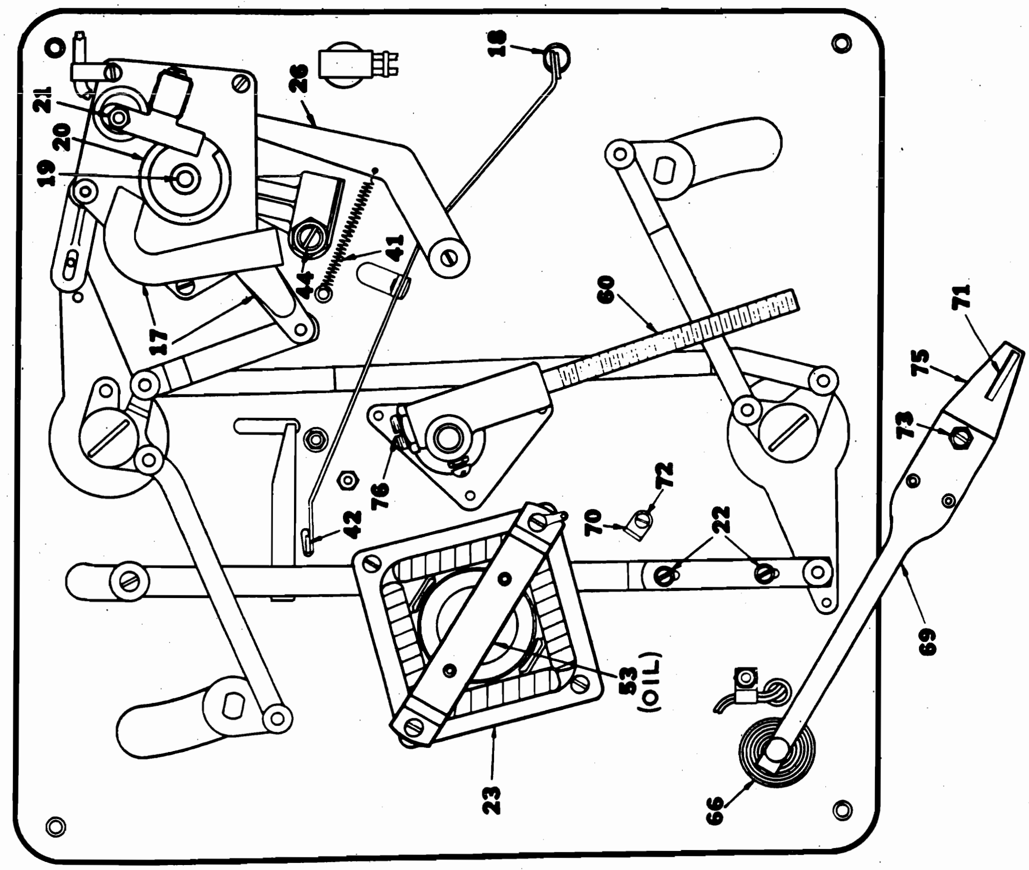
*Not stocked for service.

REPLACEMENT PARTS LIST

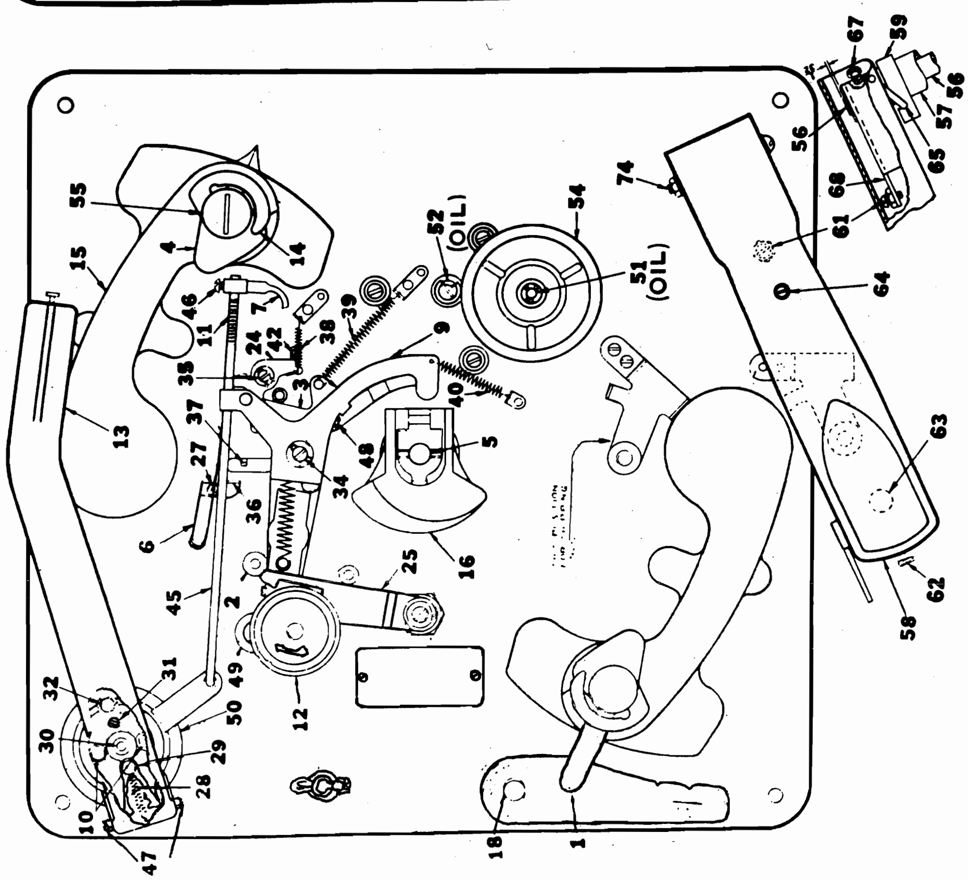
Illustration No.	Part No.	Part Name and Description
28	41P333	Shoulder Screw
29	47P024	Large Fibre Gear
30	47P023	Small Fibre Gear
31	45P342	Idler Gear Coupler
32	41P576	Clutch Tension Weight
33	46P568	Automatic Trip Arm
34	11X227	Pickup Arm Raising Disc and Hub Assembly
35	45P347	Tone Arm Lift Stop Bracket
36	11X032	Main Cam Actuating Gear
37	11X047	Velocity Trip and Roller Assembly
38	11X033	Main Cam Assembly
39	46P044	Raising Lever Tension Spring
40	11X046	Pickup Arm Raising Lever
41	46P139	Pickup Arm Raising Lever Tension Spring
43	45P583	Rocker Arm Lever Assembly
44	11X079	Automatic Shut-Off Lock Lever
45	41P443	Automatic Shut-Off Lock Lever Pin
46	46P012	Automatic Shut-Off Lock Compression Spring
47	11X049	Selector Lever and Collar Assembly
48	11X141	Rocker Arm Lever Assembly
49	46P017	Rocker Arm Lever Assembly Compression Spring
50	11X142	Rocker Arm Lever Assembly
51	41P421	Rocker Arm Lever Assembly Pin
52	50P125	Rocker Arm Lever Assembly Clip
53	50P125	Rocker Arm Lever Assembly Clip
54	50X090	Motor Assembly 60 Cycle, 105 - 120 Volt
54A	17X412-11	Motor Shaft Sleeve — 50 Cycle
55	25P363	Rubber Shock Motor Mounts
56	41P592	Motor Mounting Sleeve
57	25P367	Motor Mounting Washer
58	26P312	Motor Mounting Bolt
59	11X145	Switch Assembly Complete Less Buttons
60	41P444	Switch Assembly "ON" Post
61	41P588	Switch Assembly "OFF" Post
62	46P138	Switch Assembly "OFF" Spring
63	45P570	Switch Assembly Release Lever
64	46P123	Switch Assembly "ON" Spring
65	11X158	Trip Lever and Wire Assembly
66	46P117	Trip Lever Tension Spring
67	32X039	A. C. Switch Cover
68	32X044	A. C. Switch

WILCOX-GAY CORP.

MODELS 7E40, 7E44



Bottom View



Top View — Table Removed

MODELS 7E40, 7E44

WILCOX-GAY CORP.

DRAWING NO.	PART NO.	NAME
1	11419	10" and 12" link pin handle assembly
2	11562	Sleeve for pulley control lever stop post
3	11475	Cam lift lever assembly
4	11402	Record shelf
5	11144	Turntable shaft
6	12969	Trip rod tension spring
7	11523	Spiral trip dog
8	Not used	
9	11677	Pulley control lever assembly
10	11616	Adjusting screw for tone arm and mounting bracket
11	11430	Trip rod
12	12870	Change mechanism drive pulley
13	13612	Tone arm complete (Less cartridge)
14	11406	Record divide support
*15	12811	Rear record support bracket complete
16	11529	Trip cam assembly complete
17	11632	Record shelf turning lever assembly
18	13396	Reject button
19	11499	Gear shaft
20	11685	Tone arm lift cam assembly
21	21184	Lift pin platform lock nut
22	11611	Connecting link adjustment screw
	5017	Screw for assembly #12812 and #12814
	1194	Lock washer for mtg. screw
23	22105	Motor 115 volt A C 60 cycles
24	12974	Latch and trip lever assembly
25	11533	Latch lever
26	11413	Cam follower lever
27	12143	Screw for attaching #12144 clip, also for #11523
28	13603	Tone arm lift spring
29	13236	Tone arm spring pin
30	11098	Tone arm lift pin
31	Not separate part	
32	11616	Adjusting screw for tone arm and mounting bracket and
	11573	Nut for #11616 screw
	Not used	
33	11657	Pulley control lever stud
34	21914	Clip for shift cam stud and for holding drive disc and
	11663	Washer for #11657
35	11588	Washer for #11559 screw
	11559	Screw for cam lift lever and latch lever
	and	
	21841	Clip for cam lift lever and latch lever
36	Part of #12969	
	Not separate part	
38	12963	Latch lever spring

DRAWING NO.	PART NO.	NAME
39	12964	Cam lift lever spring
40	11581	Pulley Control spring
41	11581	Latch lever spring
42	Not separate part	
44	31049	End thrust screw
45	11430	Trip rod
46	12143	Screw for attaching #12144 clip and also for #11523
47	11509	Tone arm pivot screw
48	16207	Nut for #11509 screw
	21841	Clip for cam lift lever and latch lever
	11588	Washer for #11559 screw
	11559	Screw for cam lift lever and latch lever
49	Not separate part	
50	11093	Tone arm base assembly
51	12817	Drive disc mtg. bracket
	21844	Drive disc stud washer
	21914	Clip for holding drive wheel
52	22899	Rotor shaft pulley
	22903	Pulley set screw
53	Part of motor	
54	22076	Turntable drive wheel
55	11094	Record shelf spindle spacer
	11565	Record divide spacer washer
	11414	Record divide clamping screw
56	13109	Follower arm complete
57	12157	Washer for follower arm shaft
58	13924	Cutter arm complete (less cutting crystal)
59	12140	Straddle plate assembly
60	12902	Lead screw and gear assembly
61	9228	Nut for #12129 screw
	12129	Saddle plate adjusting screw
	49009	Needle set screw for cutting crystal
62	Not separate part	
63	Not separate part	
64	12121	Lift lever
65	22375	Follower arm spring
66	1208	Hex nut for pivot post bushing
	12153	Lock washer for pivot post bushing
	12157	Washer for follower arm shaft
67	12128	Set screw for saddle bushing
68	12133	Saddle plate assembly
69	13109	Follower arm complete
70	12852	Follower arm stop
71	Part of #13109	
72	11569	Mounting screw for follower arm stop
73	9934	Nut for #5871 screw
	5871	Follower arm adjusting screw
74	12173	Cutter arm mounting screw
	12172	Cutter arm mounting screw nut
	7217	Lock washer for cutter arm mounting screw
75	Part of #13109	
76	21934	End thrust screw
	13823	Nut for #21934 screw
	13178	Crystal cutting head
	12836	10" weighted turntable
	23-2135-2	Crystal play back
	49-2032	Replaceable osmium tipped needle

* The other record support bracket is part #12809 and is described as the front bracket. It is not numbered on the drawing but part #1 on the drawing is part of it,

ZENITH RADIO CORP. MODELS S-13675, S-14002, S-14006, S-14008

GENERAL

Service notes for models S-13675, S-14002, S-14006, and S-14008 have been combined in this manual. Except for slight mechanical, electrical and color variations, these models are alike. The adjustments that the serviceman will be called to make will be the same for all models.

Models S-13675 (maroon) and S-14006 (black) have the automatic shut-off feature and are identical mechanically. Models S-14002 (maroon) and S-14008 (black) have slight electrical differences.

For convenience, the Operating Instructions supplied with each Record Changer are summarized as follows: The Record Changer will automatically play up to fourteen 10 inch or twelve 12 inch records at one loading, or up to twelve 10 and 12 inch records intermixed. The Record Stack rests on the Spindle and the Record Shelf. The Selector Sprocket drives the Ejector Cam which pushes the records off the Shelf and Spindle allowing them to drop on the Turntable. To load for automatic operation, swing the Pressure Bar to the right, place the stack of records on the Spindle, swing the Pressure Bar to the left until it rests on the record stack, set the OFF-MAN-AUTO switch to AUTO and press the Record Change button. Models S-14002 and S-14008 will play the entire selection of records and repeat the last record until turned off. Models S-13675 and S-14006 will automatically shut off after the last record is played.

For manual operation set the OFF-MAN-AUTO switch to MAN and play the records singly as on a non-automatic record player.

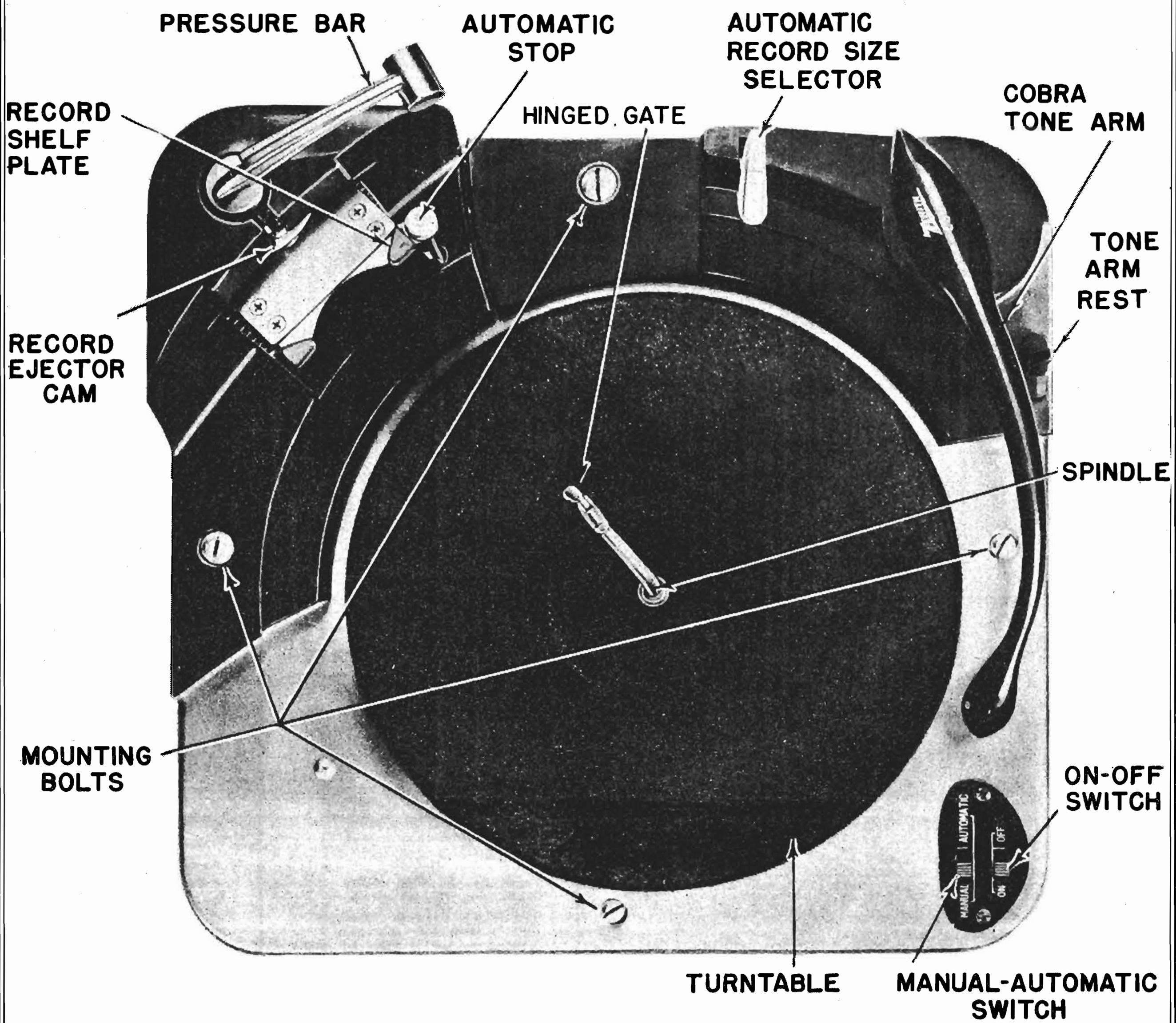


Fig. 1. Top View S-13675 and S-14006 Record Changers.

MODELS S-13675, S-14002, S-14006, S-14008

ZENITH RADIO CORP.

DESCRIPTION OF CYCLING

The phono motor friction drives the idler wheel. The idler wheel rim drives the turntable, and the turntable shaft. To the turntable shaft is attached the segmented clutch drive plate. The pawl on the clutch drive sprocket assembly engages the drive plate, causing the sprocket to rotate. The pawl pusher lever on the clutch release arm assembly causes the clutch to engage or disengage.

Closing either the trip switch or the record change switch energizes the solenoid. The magnetic flux of the solenoid attracts the clutch release lever causing the mechanism to trip and move the pawl pusher lever away from the clutch pawl. This action allows the clutch pawl spring to pull the pawl into position for the drive plate segment to engage and start the clutch sprocket rotating. The clutch sprocket is meshed with the chain drive sprocket and the chain drives the selector and timing sprockets.

The timing sprocket completes 7 functions through 360° rotation. These functions are as follows: 1. Applies the tone arm brake. The brake lever is actuated by the brake stud on the timing sprocket. The brake prevents coasting and erratic landing of the needle. 2. The inclined groove pushes the lift pin upward. The lift pin raises and lowers the tone arm. 3. The locating pin laterally swings the tone arm off the record stack. 4. The locating pin or bushing swings the tone arm over the starting groove of the record. With 12″ records, the locating pin swings the tone arm in while the locating bushing swings the tone arm with 10″ records. The locating bushing is pushed upward by the discriminator trip plate. 5. The reset stud resets the clutch trip mechanism and moves the pawl pusher lever in the path of the clutch pawl. 6. The lift pin lowers the tone arm over the starting groove of the record. 7. The brake stud releases the brake. When the clutch pawl hits the pawl pusher lever, the clutch is disengaged.

The selector sprocket actuates the record ejector cam, and must be timed with the timing sprocket to drop the records on the turntable when the tone arm is at its greatest outward swing. This occurs immediately after the No. 3 function of the timing sprocket.

As the record is played, the tone arm gradually moves toward the center. The ratchet on the tone arm control lever moves toward the pawl on the trip switch lever. As the ratchet comes in contact with the pawl, the oscillating action produced by the eccentric groove on the record causes the trip switch to close, complete the solenoid circuit and repeat the cycle. If the record does not have an eccentric groove, the position trip will close the trip switch and start the next cycle.

Noise and microphonics are eliminated by muting the phono pre-amplifier during the record change cycle. The tone arm brake lever actuates the muting switch. When the contacts are closed, a low reactance capacitor is connected across the audio output making the amplifier inoperative during the change cycle.

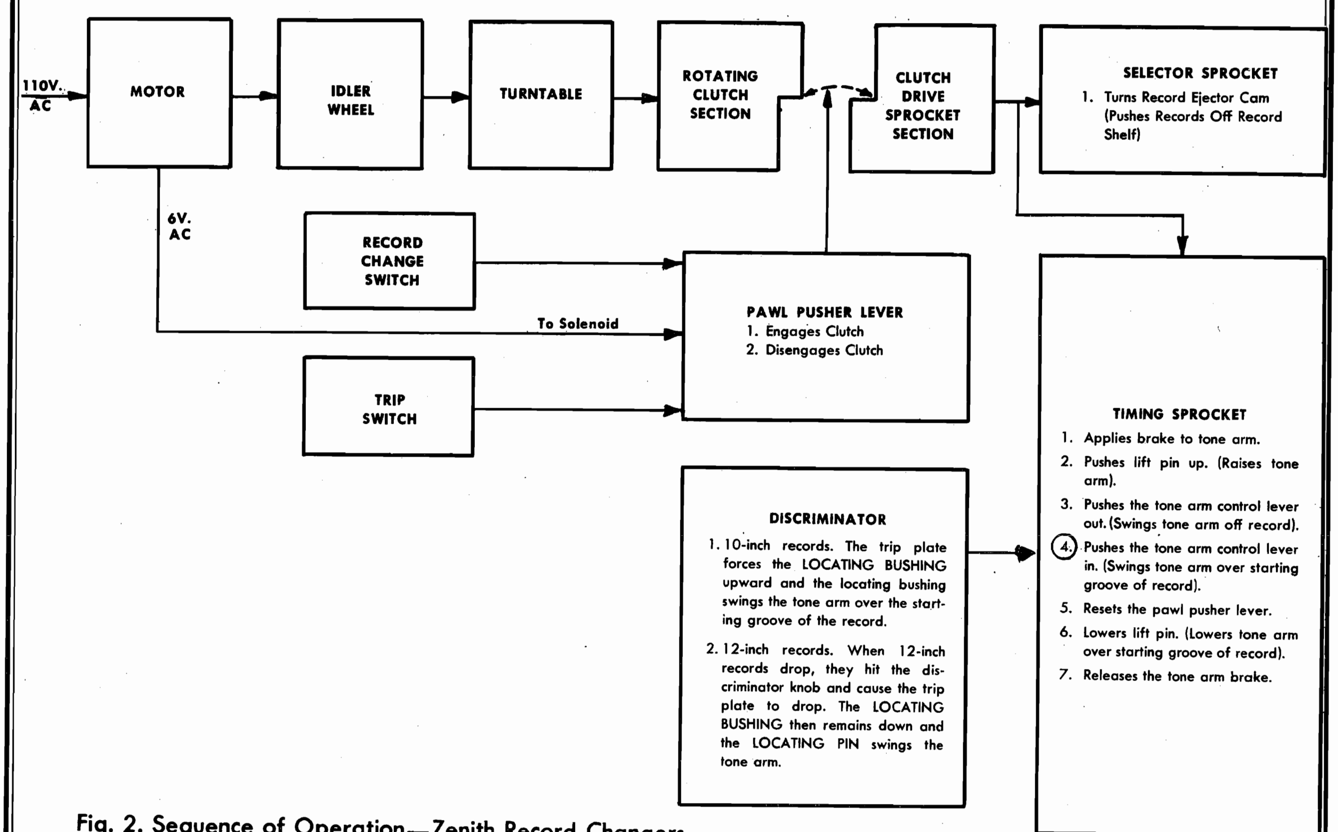


Fig. 2. Sequence of Operation—Zenith Record Changers.

ZENITH RADIO CORP.

MODELS S-13675, S-14002, S-14006, S-14008

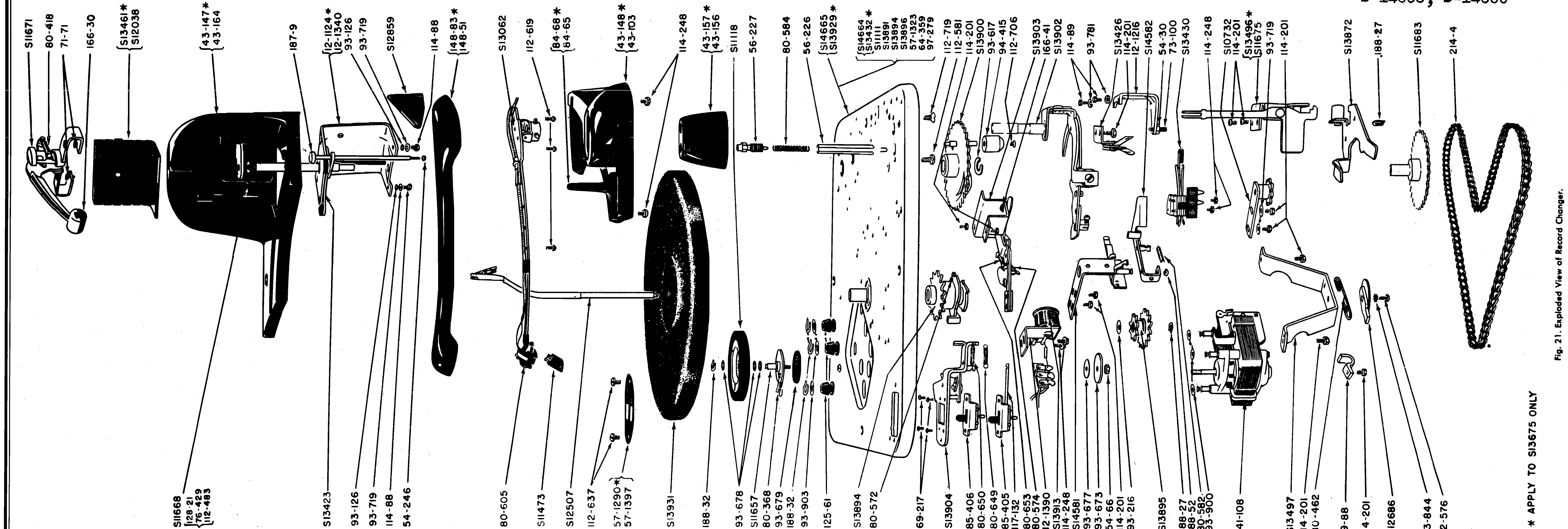


Fig. 21. Exploded View of Record Changer.

* APPLY TO S13675 ONLY

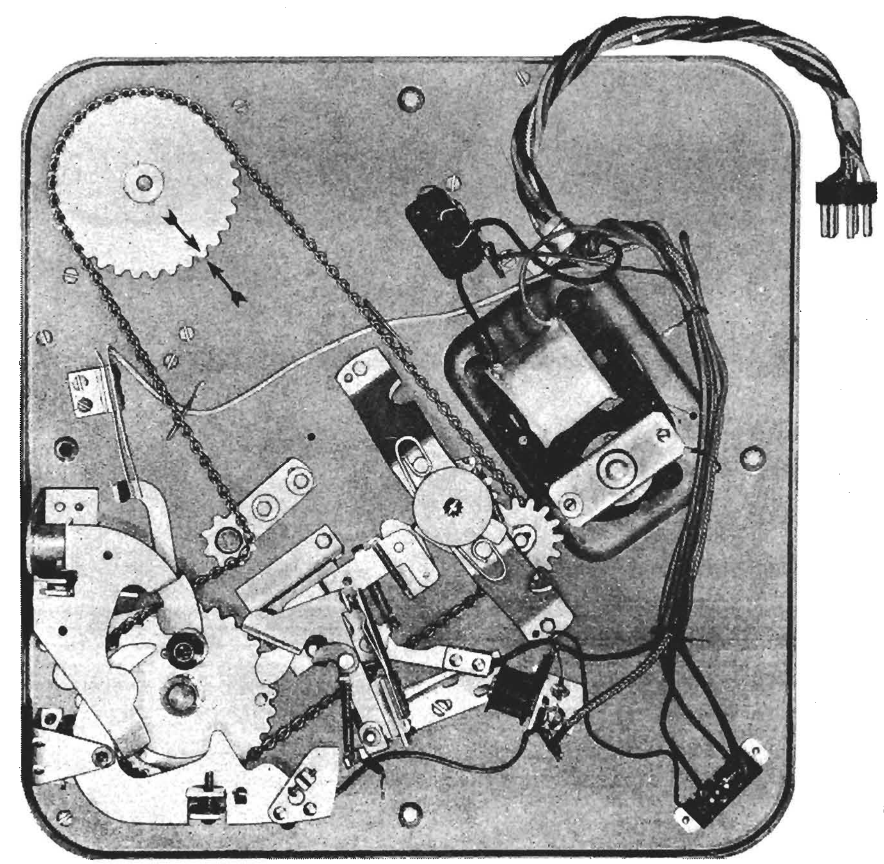


Fig. 4. Bottom View S-14002 and S-14008 Record Changers.

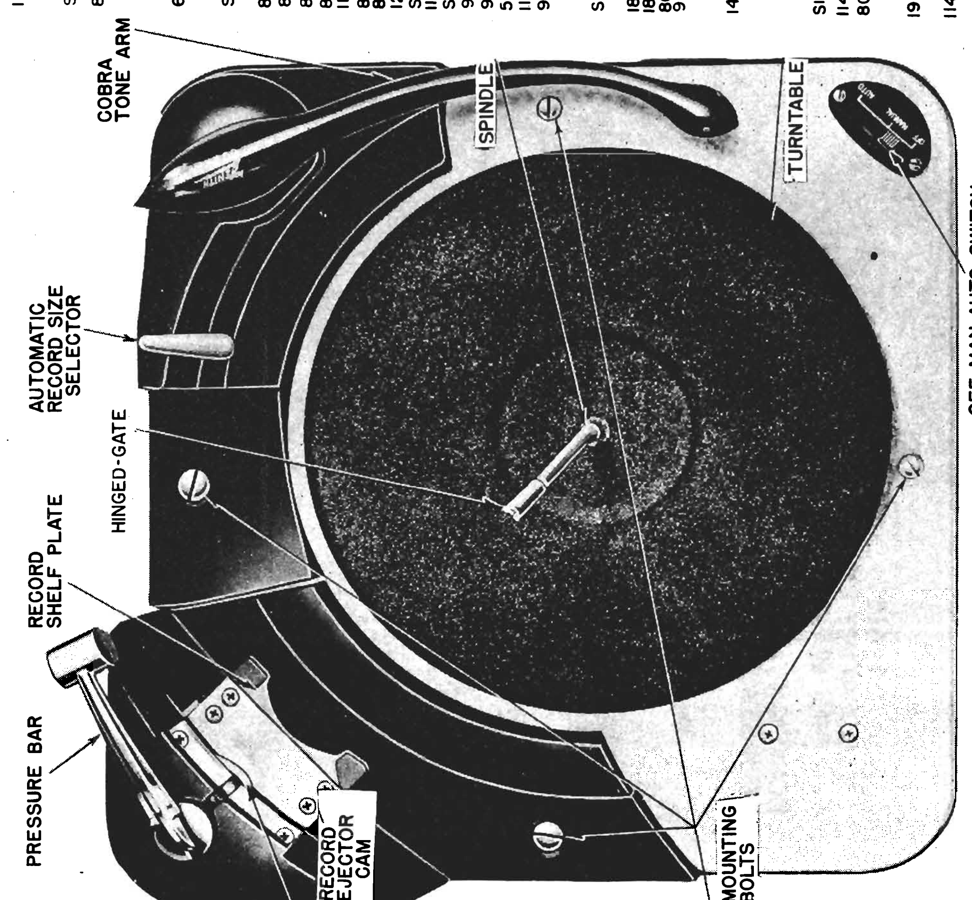


Fig. 3. Top View S-14002 and S-14008 Record Changers.

ZENITH RADIO CORP.

MODELS S-13675, S-14002, S-14006, S-14008

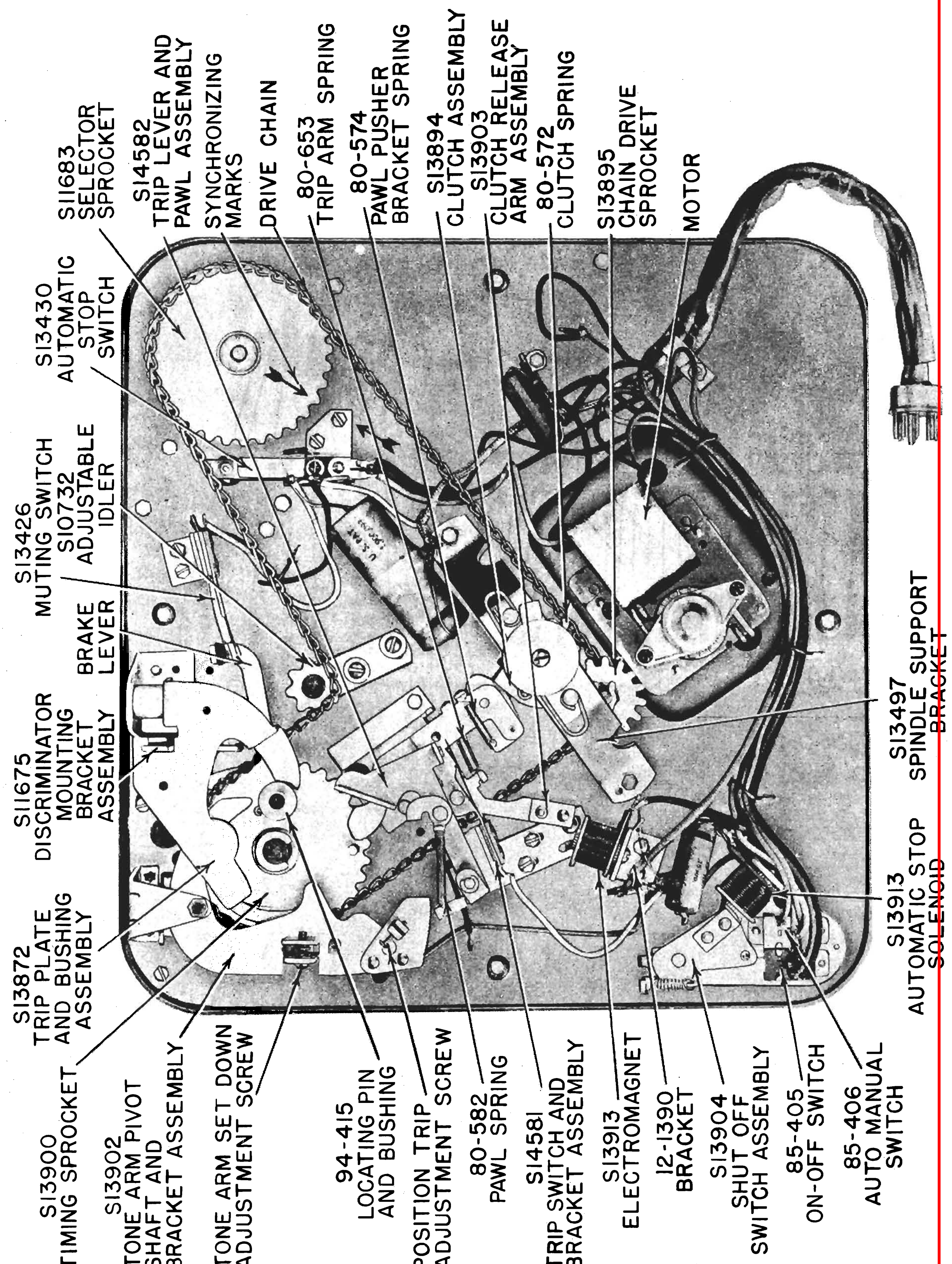


Fig. 5. Bottom View of S-13675 and S-14006 Record Changers.

MODELS S-13675, S-14002, S-14006, S-14008

ZENITH RADIO CORP.

LUBRICATION

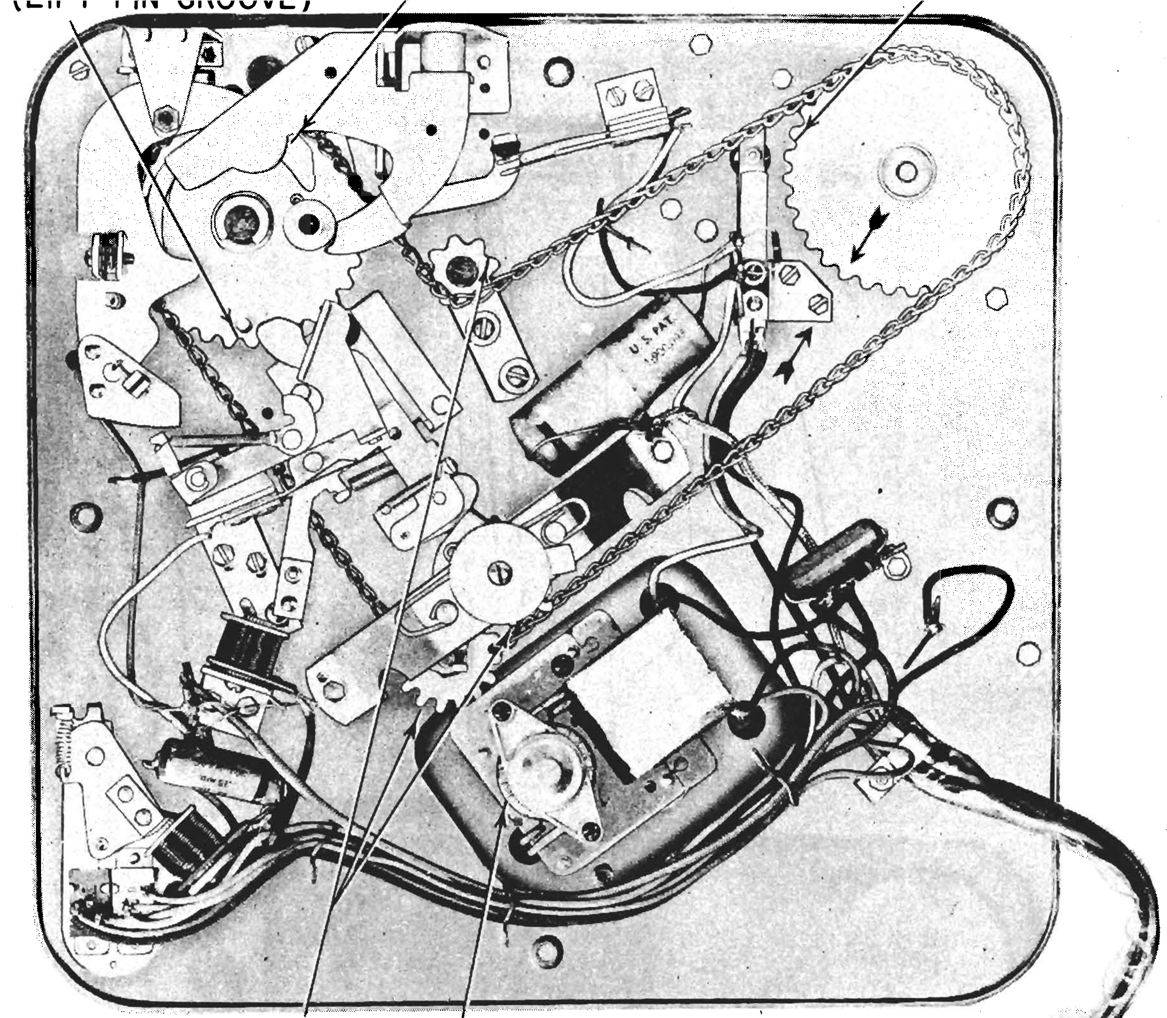


Fig. 6. Lubrication Bottom of Record Changer.

Sta-Put grease No. 512 (light grease of the vaseline type) and light machine oil of No. 10 consistency are used for lubrication throughout.

Figures 6 and 7 indicate the points to be lubricated and the type of lubricant to use. The Motor has two oil wicks, which should be saturated with oil. The Record Spindle Guide Bearing, Idler Wheel Bearing, Lower Drive Shaft Bearing, Drive Shaft Thrust Bearing and the Motor Bearings are of the OILITE type and require very little attention. If squeaks develop, be certain that they are not caused by friction between the Spindle and records on the Turntable. A thin coat of wax on the Spindle will remedy this condition.

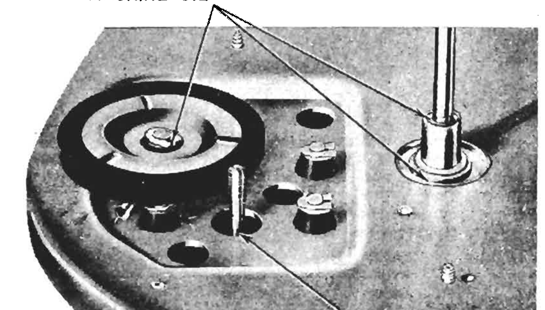


Fig. 7. Lubrication Top of Record Changer.

THEORY OF THE COBRA RADIONIC PICKUP

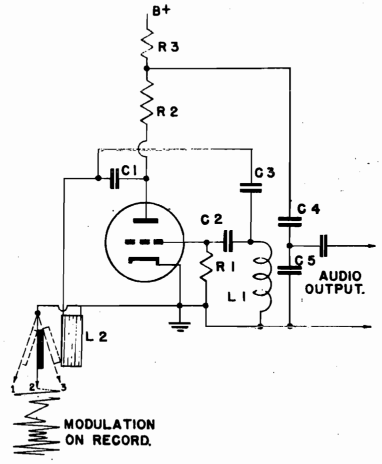


Fig. 8. Simplified Circuit of Oscillator.

The operation of the Cobra pickup is considerably different from Crystal and Dynamic pickups. These pickups generate audio power, while the Cobra controls power generated by a radio frequency oscillator. The triode tube is a modulated oscillator, detector and audio amplifier. The oscillator operates at a frequency of 2.5 Mc. Modulation is accomplished by changing the energy losses in a tuned circuit. These losses may be represented by an equivalent resistance in series with the reactance of the coil. The ratio of the resistance to the reactance determines the efficiency or Q of the coil. The amplitude of the RF voltage developed across this coil by the oscillator will vary with changes in Q.

The grid coil L_1 and other components of the oscillator are mounted in the receiver chassis, while the plate coil L_2 is in the Needle Cartridge with the vane and needle assembly. The coil is fixed and has 40 turns of No. 40 wire (approximate DC resistance 2½ ohms). The stainless steel vane, which is in the field of the coil, is spot welded to the osmium-iridium tipped stylus. Any movement of the stylus will cause a corresponding movement of the vane. As the stylus and vane follow the modulations in the record, changes in the mutual inductance between the vane and coil occur (see Fig. 8). In position 2 the vane is at rest, and a constant RF voltage appears across the plate coil. As the vane is set in motion and reaches position 1, it is at its greatest outward swing from the coil, resulting in low mutual inductance, low reflected resistance, higher Q, and a higher RF voltage across the coil. In position 3 it is at its greatest inward swing; resulting in a high mutual inductance, high reflected resistance, lower Q and a lower RF voltage. It can be seen that the amplitude of the RF voltage which appears across the coil will vary with changes in Q, satisfying the condition for amplitude modulation. The position of the vane changes both the Q and L of the coil. Changes in L shift the frequency slightly, and a certain amount of frequency modulation is present, but since there is no frequency discrimination it remains undetected.

Since the grid and plate coils are part of a single tuned circuit any variations of amplitude of the RF voltage brought about by the changes in Q across the plate coil will also appear across the grid Coil L_1 causing a shift in the average plate current through the plate load resistor across which the audio output voltage is developed. Plate bend detection takes place since only the positive half of the grid swing causes an increase in the average plate current. These changes in the average plate current appear as audio voltage across the plate load resistor.

The 2.5 Mc. RF voltage and the audio voltage both appear at the plate of the oscillator triode. R_2, C_4 and C_5 filter out the RF voltage allowing only the audio component to the grid of the pre-amplifier where it is amplified and reproduced by the loud-speaker.

ADJUSTMENTS

1. Tone Arm Set Down Adjustment.

The Tone Arm Set Down Adjustment determines the landing position of the needle on the starting groove of the record. The adjustment screw can be reached with a screwdriver (Fig. 10). The tone arm must be held in the rest position while the adjustment is made. Clockwise rotation of the screw moves the tone arm in, while counter-clockwise rotation moves it out.

2. Tone Arm Height Adjustment.

The Tone Arm vertical rise is governed by the Lift Pin. The Lift Pin is adjustable (see Fig. 9). Too long a Lift Pin will cause the Tone Arm to hit the underside of the records on the Spindle. If the Lift Pin is short, the needle will not clear fourteen records on the Turntable. To make the proper adjustment, trip the Clutch by hand and rotate the Turntable clockwise until the Tone Arm starts to swing toward the Spindle. Gently push the Tone Arm as close to the Spindle as it will go, place a record on the Spindle and observe the spacing between it and the Tone Arm. The spacing "A" (Fig. 11), should be approximately the thickness of a record.

Fig. 9. Lift Pin.

If the spacing is incorrect, lift the Tone Arm, remove the Lift Pin, and adjust the Lift Pin to the proper length.

3. Trip Switch Adjustment.

As the record is played, the ratchet on the tone arm pivot shaft engages the trip pawl. The oscillating action developed by the eccentric groove on the record closes the trip switch contacts and allows the solenoid to become energized. The magnetic flux attracts the trip lever which moves the pawl pusher lever from the path of the clutch pawl. This allows the clutch to engage and start the next cycle.

The gap between the trip switch contacts should be approximately 1/16". If the spacing is incorrect, bend the contact spring. If the contact spring tension is too great, the needle may not follow the oscillating groove on the record. To adjust the spring tension, insert a screwdriver between the contact and guide springs and bend the contact spring (Fig. 10) until an approximate pressure of one ounce is necessary to move the contact spring from the guide spring. Be certain that the contact spring exerts some pressure on the guide spring after adjustment.

The spacing between the trip magnet and trip lever should be approximately 3/32".

MODELS S-13675, S-14002, S-14006, S-14008

ZENITH RADIO CORP.

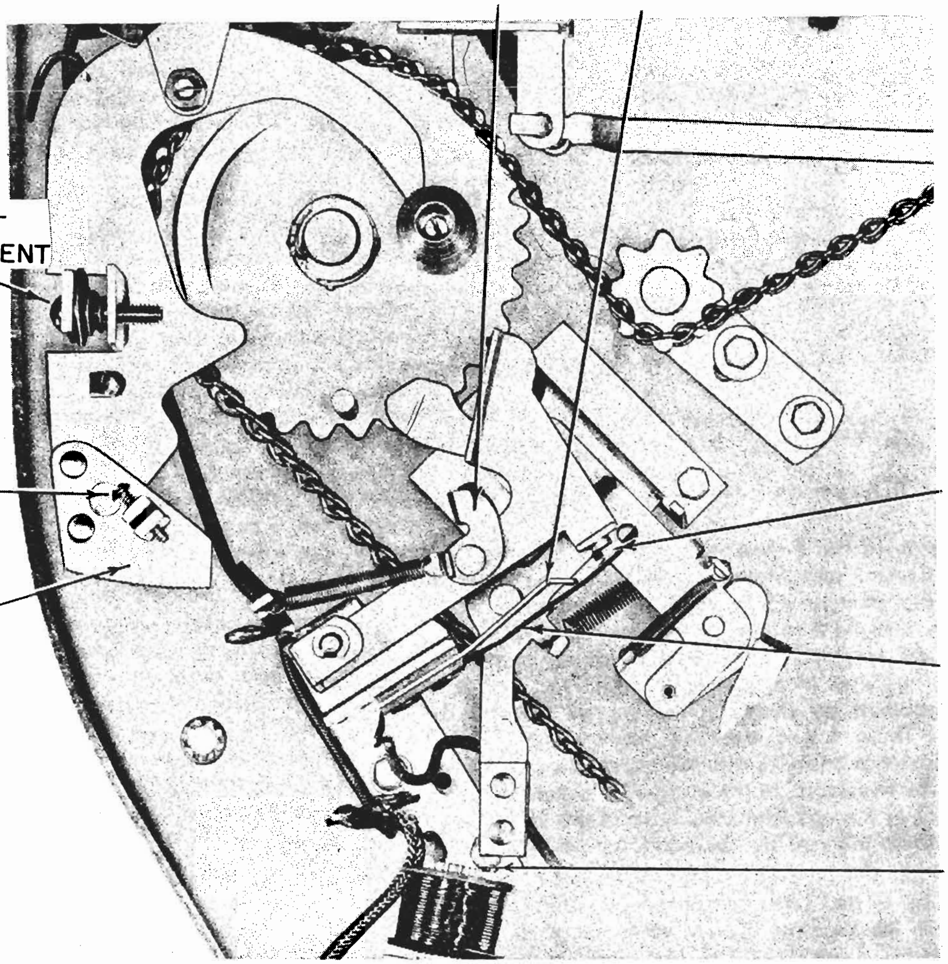


Fig. 10: Tone Arm Set Down, Position Trip and Trip Switch Adjustments.

4. Position Trip Adjustment.

The Position Trip does not depend on an eccentric groove in the record to start the record change cycle, but will trip the mechanism whenever the needle comes within a pre-determined distance from the Spindle. Older type records that do not have an eccentric groove can in most cases be played automatically by the proper adjustment of the Position Trip. Under normal conditions with the needle approximately 1⅞" from the center of the Spindle, adjust the Position Trip Adjustment Screw (Fig. 10) until the Trip Switch contacts close. This distance is generally satisfactory since no modern record will be cut off before it has completed its play, and none will fail to trip the mechanism at the end. In special cases, screw the Position Trip Adjustment Screw clockwise for earlier tripping and counter-clockwise for later tripping as the individual case may be.

It may be impossible to find an adjustment that will always trip the mechanism and never cut off on all type records, and in these special cases the record must be played manually.

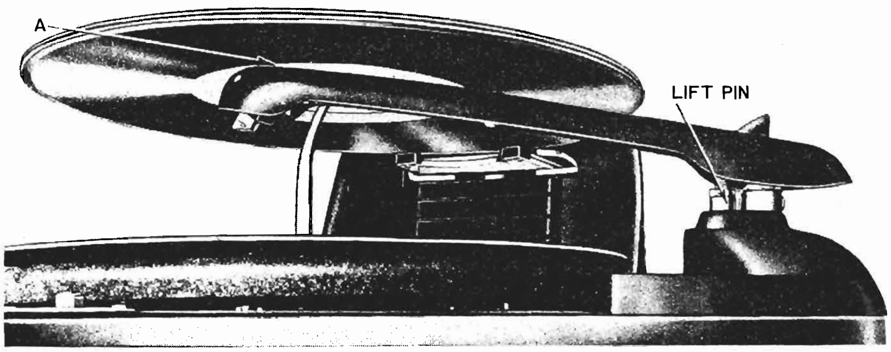


Fig. 11. Tone Arm Height Adjustment.

ZENITH RADIO CORP. MODELS S-13675, S-14002, S-14006, S-14008

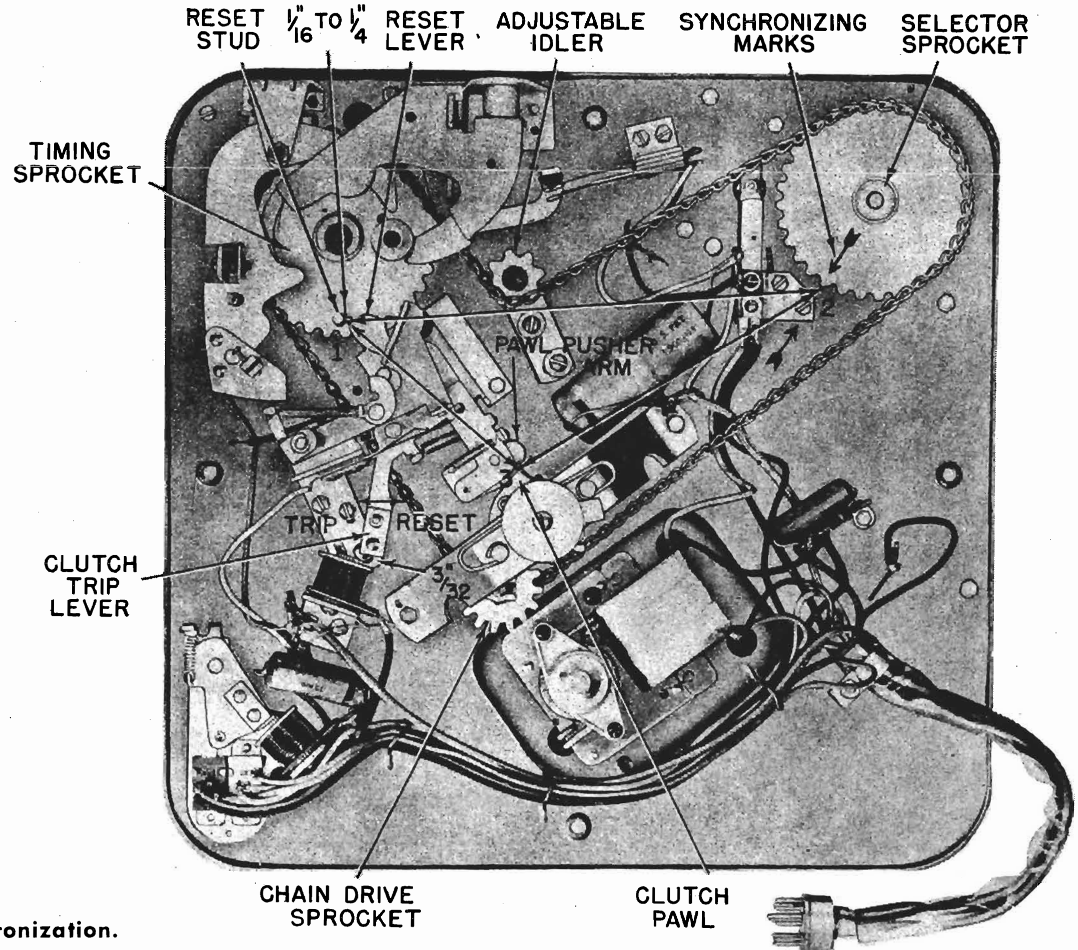


Fig. 12. Synchronization.

5. Synchronization.

A properly timed changer drops records on the turntable when the tone arm is at its greatest outward swing. Improper timing results in the records hitting the tone arm. The record changer is kept in time by the drive chain. If the chain is removed, the changer must be synchronized.

Fig. 12 indicates the correct position of the timing sprocket, selector sprocket and the clutch. To synchronize, study Fig. 12 and proceed as follows:

1. Reset the clutch trip lever.
2. Turn the timing sprocket until the reset stud is approximately 1/16" from the reset lever (1). Turn the selector sprocket until the synchronizing mark lines up with the mark on the base plate (2). THESE POSITIONS MUST BE MAINTAINED DURING THE NEXT OPERATION.
3. Thread the chain over the timing sprocket, chain drive sprocket, adjustable idler, selector sprocket and set the adjustable idler for medium tension of the chain. Check the position of the synchronizing marks and the reset stud.
4. Remove the retaining washer and lift the chain drive sprocket until the gears disengage.
5. Turn the clutch until the clutch pawl touches the pawl pusher lever (3).
6. Lower the chain drive sprocket until it engages the clutch gears and reinsert the retaining washer.

REMOVING THE TURNTABLE

Hold the clutch by inserting a wide blade screwdriver against the spindle bracket and a segment of the drive plate. Apply a twisting, pulling force to the turntable.

Before seating the turntable, be certain that the idler wheel is pushed inside the turntable rim.

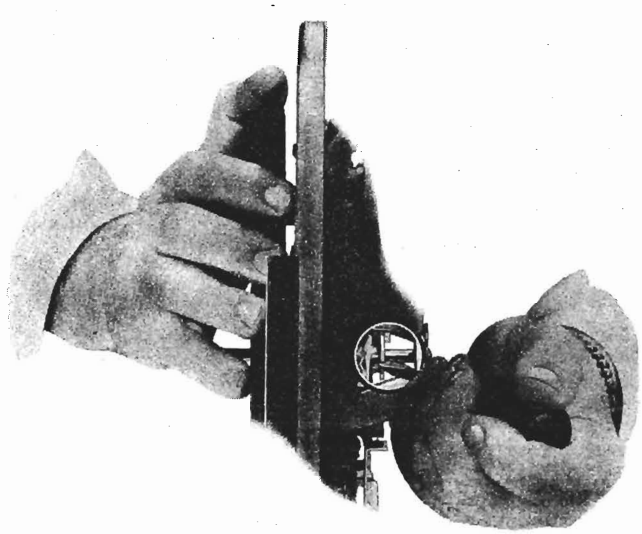


Fig. 13. Removing the Turntable.

REPLACING THE MOTOR

When a replacement Motor is ordered, include the line voltage and frequency of the receiver.

To replace the Motor, unsolder the connecting leads, remove the Turntable, the three retaining washers and allow the Motor to drop out. When the Motor is installed do not draw the connecting leads tight as this will prevent the Motor from "floating" on its mounts. Be certain that the retaining washers are crimped and the leads securely soldered and taped.

REPLACING THE CHAIN

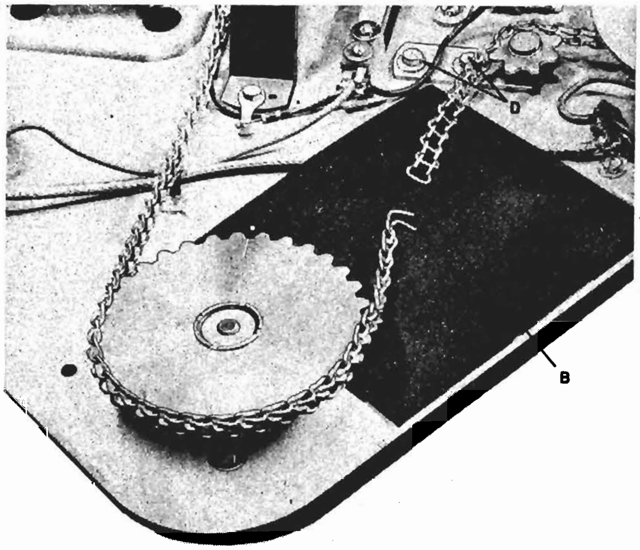


Fig. 14. Replacing the Chain.

The chain may be removed by loosening the adjustable idler (Screws "D," Fig. 14), and opening one of the links (B). It will be noted that on some models the open ends of the links face inward while on others outward as in Fig. 14. The reason for this is to get the quietest operation. Normally the open ends of the links will face outward with all replacement chains.

After the chain is threaded in place, carefully close the open link and be certain that there is no stiffness in its action. Read the paragraph on Synchronization before the chain is permanently installed.

TROUBLE SHOOTING

SQUEAKS OR NOISES DURING PLAYING OF RECORDS.

a. Friction between the records on the turntable and the spindle will occasionally cause squeaks. A thin coat of wax applied to the spindle will remedy this condition.
b. Check lubrication.

MECHANISM STARTS SLOWLY AND MOTOR GETS HOT.

a. Check line voltage and frequency.
b. Check lubrication.
c. Motor windings damaged.
d. Room temperature abnormally low.

PRESSING RECORD CHANGE BUTTON ON RECEIVER PANEL DOES NOT START THE RECORD CHANGE CYCLE.

a. See that the OFF-MAN-AUTO switch is set to AUTO.
b. Check Record Change Switch.
c. Check electrical continuity of solenoid circuit.
d. Check the solenoid energizing voltage.

MOTOR FAILS TO RUN EVEN WHEN IT IS DISCONNECTED FROM CHANGER AND PROPER VOLTAGE AND FREQUENCY APPLIED DIRECTLY TO THE TWO INPUT LEADS OF THE WINDING.

a. Open windings.
b. Damaged or frozen bearings.
c. Lower Bearing Support Bracket bent. Remove and straighten bracket—Re-center armature.

RUMBLE AND MICROPHONICS DURING REPRODUCTION.

a. Changer not "floated" properly. Loosen mounting bolts.
b. Motor retaining rings rubbing on the idler wheel.
c. Motor leads pulled too tight preventing motor from "floating" freely.
d. Noisy Phono Oscillator tube.
e. Impression on Idler Wheel.

NEEDLE SETS DOWN PROPERLY ON RECORD BUT SLIDES OVER THE RECORD GROOVES.

a. Cabinet tilted.
b. Badly worn or broken needle cartridge.

NEEDLE FAILS TO CLEAR MAXIMUM LOAD OF RECORDS ON THE TURNTABLE.

a. Check Tone Arm height adjustment. (Adjustment 2.)

CHANGER CYCLES WITH OFF-MAN-AUTO SWITCH ON MAN.

a. Check OFF-MAN-AUTO switch.
b. Reset stud does not engage clutch reset lever.

TONE ARM FALLS OFF RECORD.

a. Check Tone Arm set down adjustment. (Adjustment 1.)
b. Check Tone Arm Pivot Bracket.
c. Changer not level.

TONE ARM SET-DOWN POSITION VARIES.

a. Check Tone Arm Brake and Spring.
b. Tight Tone Arm Connecting Leads.

RECORD IS NOT HEARD ALTHOUGH CHANGER OPERATES.

a. See that the Phono Radio switch is on Phono.
b. Check receiver audio by listening to radio.
c. Check the phono oscillator tube.
d. Check Needle Cartridge.
e. Check Tone Arm Housing for broken leads.

TONE ARM SETS DOWN TOO FAR IN OR OUT ON RECORD.

a. Check Tone Arm set down adjustment. (Adjustment 1.)

CHANGER CONTINUES TO CYCLE.

a. Check Trip switch adjustment. (Adjustment 3.)
b. Check Record Change switch.
c. Clutch release mechanism sticks.
d. Pawl pusher lever not reset by reset stud.

CHANGER WILL NOT CYCLE UPON COMPLETION OF RECORD.

a. See that the OFF-MAN-AUTO switch is set to AUTO.
b. Be certain the record has an eccentric center groove.
c. Check Trip switch.

ZENITH RADIO CORP. MODELS S-13675, S-14002, S-14006, S-14008

Fig. 15. Checking Spindle Centering.

RECORD CENTER HOLE WEAR.

a. Record centers oversize.

b. A bent spindle will cause center hole wear due to impeded record injection. To check the spindle position, place a 10" record as shown in Fig. 15. If the spindle is properly centered, a triangle will be formed with the metal ends of the record shelf plate.

SQUEAKS WHEN CHANGER IS IN CYCLE.

a. Friction between Lift Pin and Timing Sprocket. Apply a thin coat of Sta-Put.

MOTOR RUNS BUT TURNTABLE SLIPS OR STOPS.

a. Turntable not fully seated. Tap gently.

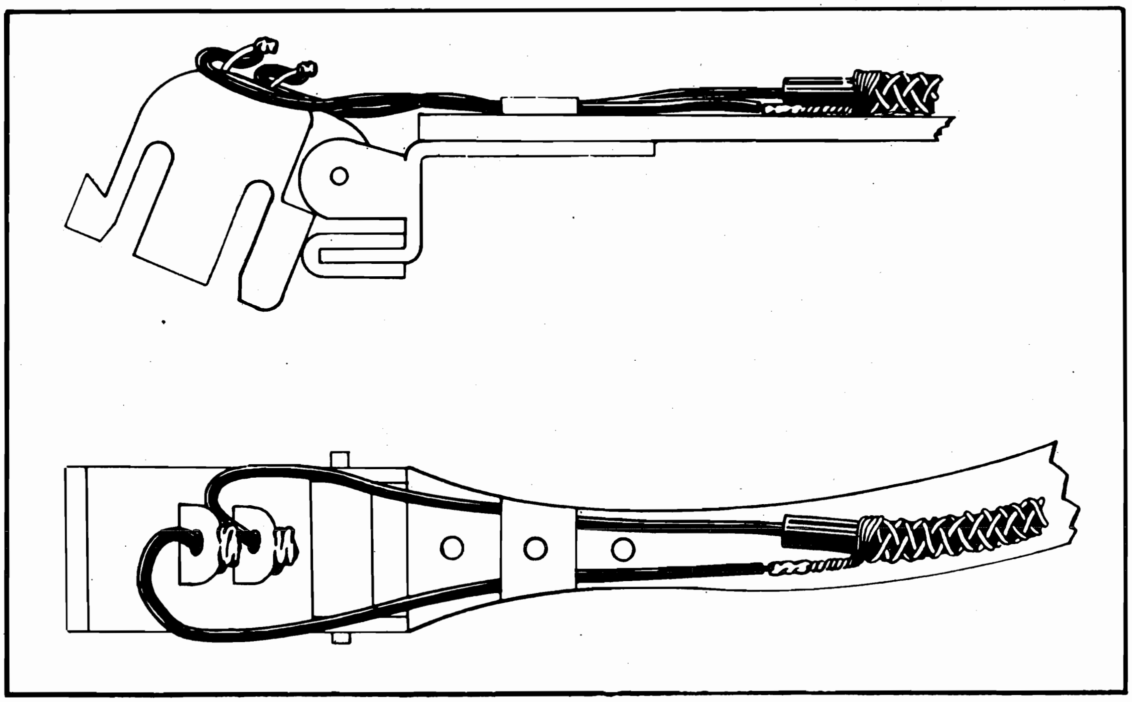


Fig. 16. Needle Cartridge Socket Connection.

Fig. 16 shows how the leads are connected to the Needle Cartridge Socket. The lead and insulation are run through the hole in the contact and the lead is soldered with a light soldering iron. Great care must be exercised, and very little heat applied as the socket is made of lucite and will burn easily. The complete lead and socket are supplied as S-12633.

MODEL S-14002

ZENITH RADIO CORP.

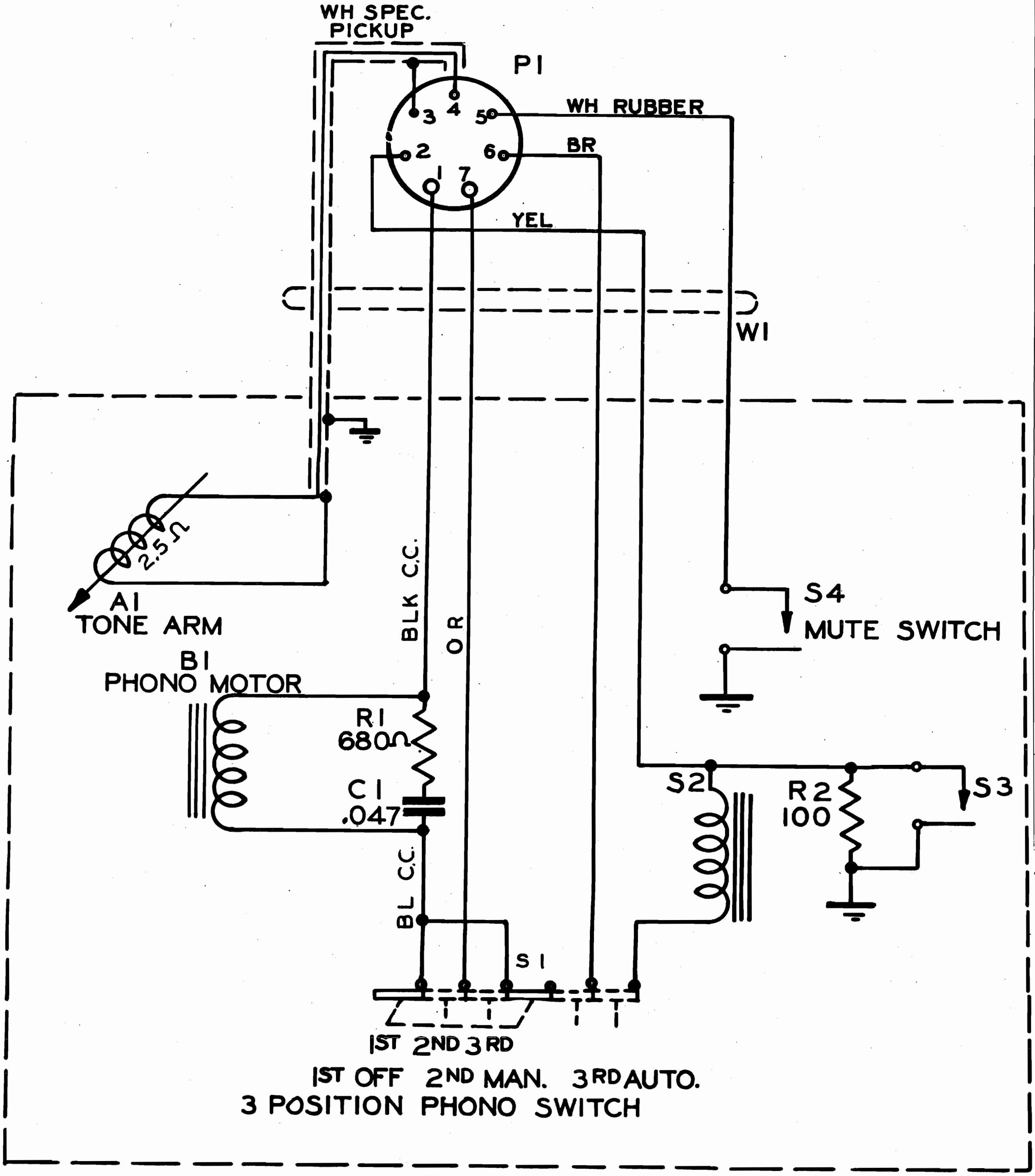


Fig. 17. S-14002 Schematic Diagram.

ZENITH RADIO CORP. MODEL S-14008

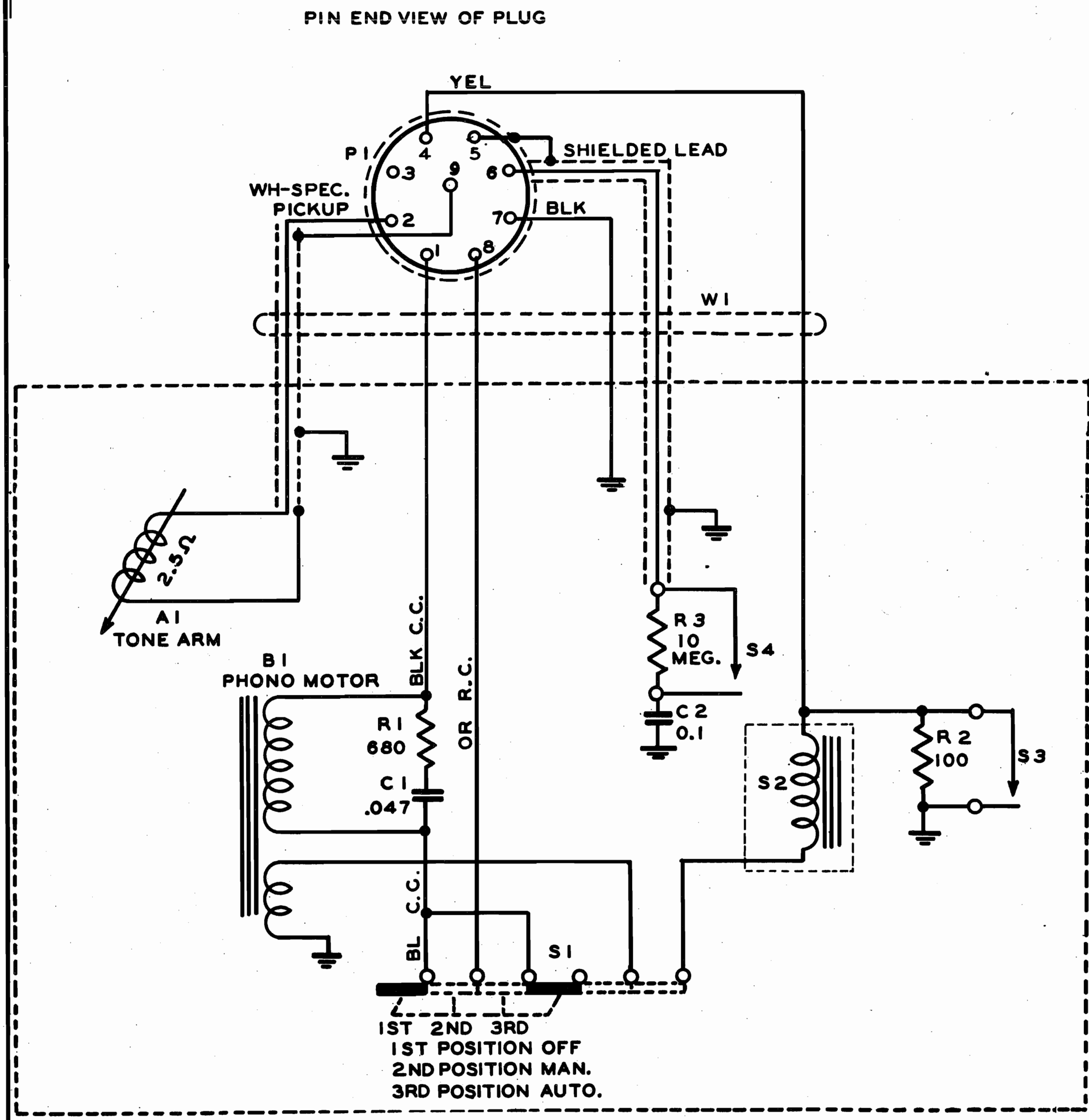


Fig. 18. S-14008 Schematic Diagram.

MODELS S-13675, S-14006

ZENITH RADIO CORP.

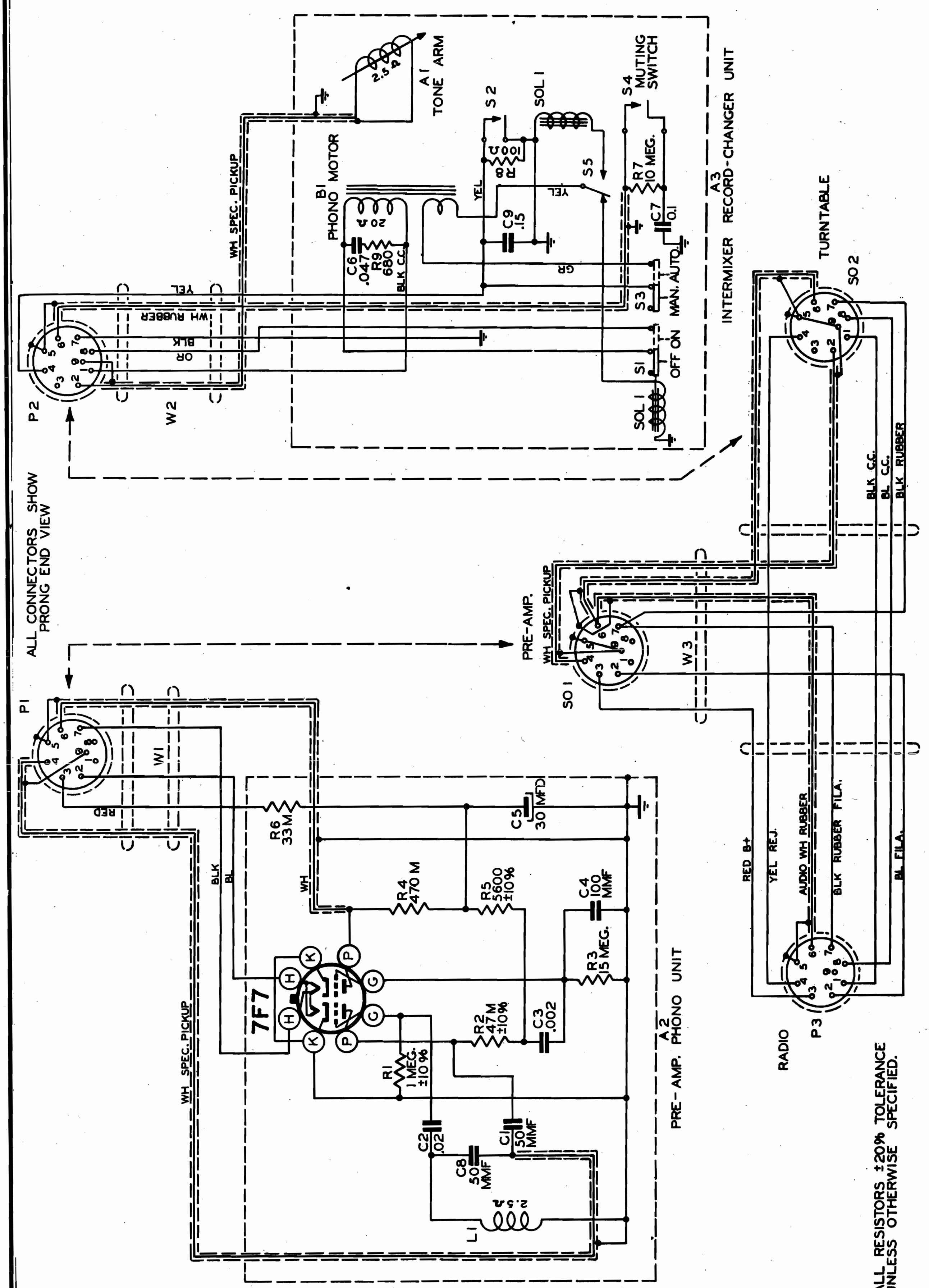


Fig. 19. S-13675 and S-14006 Schematic Diagram.

ZENITH RADIO CORP. MODELS S-13675, S-14002, S-14006, S-14008

NUMERICAL PARTS LIST

12-1124	Record Ejector Plate Mounting Bracket (S-13675, S-14006)
12-1216	Tone Arm Pivot Bracket
12-1340	Record Ejector Plate Mounting Bracket (S-11674)
12-1390	Solenoid Mounting Bracket
15-64	Plug Cap and Insulator
19-88	Cable Clip
19-150	Housing Cover Clip
22-417	.1 Mfd. Paper Dielectric Capacitor 600 V.
22-1570	.05 Mfd. Paper Dielectric Capacitor 400 V.
24-354	Record Ejector Housing Cover (S-14006, S-14008)
24-432	Record Ejector Housing Cover (S-13675, S-14002)
43-103	Tone Arm Housing (S-14006, S-14008)
43-147	Record Ejector Housing (S-13675, S-14002)
43-148	Tone Arm Housing (S-13675, S-14002)
43-156	Tone Arm Support Housing (S-14006, S-14008)
43-157	Tone Arm Support Housing (S-13675, S-14002)
43-164	Record Ejector Housing (S-14006, S-14008)
54-30	No. 8-32 x 5/16″ x 7/64″ Hex Nut—Steel N.P.
54-66	No. 10-32 x 5/16″ Hex Nut—Steel N.P.
54-246	No. 4-40 x 3/16″ x 3/32″ Hex Nut (S-13675, S-14006)
56-146	Spring Retaining Pin (Pressure Arm)
56-226	Tone Arm Lift Pin—Lower
56-227	Tone Arm Lift Pin—Upper
57-1290	Switch Escutcheon (S-13675)
57-1323	Turntable Shaft Plate
57-1324	Clutch Drive Plate
57-1355	Switch Plate (S-14002, S-14008)
57-1397	Switch Escutcheon (S-14006)
58-133	Phono Plug (S-13675, S-14006, S-14008)
58-169	Phono Plug (S-14002)
63-1744	100 Ohm Carbon Resistor ½ W. ±20%—Insulated
63-1779	680 Ohm Carbon Resistor ½ W. ±20%—Insulated
63-1954	10 Megohm Carbon Resistor ½ W. ±20%—Insulated (S-13675, S-14006, S-14008)
69-38	No. 8-32 x ¾″ R.H.M.S.—Steel N.P.
69-43	No. 8-32 x ⅜″ R.H.M.S.—Steel N.P.
69-217	No. 4-40 x 3/16″ R.H.M.S. (S-13675, S-14006)
69-238	No. 4-40 x ⅝″ R.H.M.S.—Steel Cad.
71-70	No. 6-32 x 3/16″ Phillips Flat Hd. M.S.—Steel—Bright N.P.
71-71	No. 6-32 x ¼″ Phillips Flat Hd. M.S.—Steel N.P.
71-81	No. 8-32 x 2¾″ Flat Hd. M.S.—Steel N.P.
73-99	No. 8-32 x ¼″ Slab Hd. Set Screw—Steel—Conepoint
73-100	No. 8-32 x ½″ Slab Hd. Set Screw—Steel—Conepoint
80-368	Idler Wheel Tension Spring
80-418	Tension Spring (Pressure Arm)
80-462	Cam Spring
80-479	Spring (Spindle Dog)
80-531	Brake Spring
80-538	Landing Adjustment Spring (S-13902)
80-544	Contact Spring
80-545	Contact Spring
80-572	Clutch Spring (S-13894)
80-574	Pawl Pusher Bracket Spring (S-13903)
80-582	Pawl Spring (S-13901)
80-584	Tone Arm Lift Pin Spring
80-605	Cobra Cartridge Socket Tension Spring (S-13675, S-14006)
80-649	Shut-Off Lever Spring (S-13675, S-14006)
80-650	Shut-Off Pawl Spring
80-653	Trip Arm Spring (S-13903)
83-343	Three Lug Terminal Strip
83-1106	Two Lug Terminal Strip
83-1301	Two Lug Terminal Strip
83-1349	Tone Arm Shipping Strip
83-1423	Cobra Needle Guard Strip
84-65	Tone Arm Rest (S-14006, S-14008)
84-68	Tone Arm Rest (S-13675, S-14002)
85-372	Three Position Slide Switch (S-14002, S-14008)
85-405	On-Off Switch (S-13675, S-14006)
85-406	Auto-Man Switch (S-13675, S-14006)
86-81	Shakeproof Terminal No. 2101-8
86-190	Terminal—Cinch No. 1483
93-125	No. 6 Int. Shakeproof Lockwasher No. 1206
93-126	No. 8 Int. Shakeproof Lockwasher No. 1208
93-216	.015 x .255 x 7/16″ Steel Washer—Cad.
93-415	No. 6 Ext. Shakeproof Lockwasher No. 1106
93-536	⅝″ x 5/16″ x .031 Steel Washer—Cad. Pl.
93-617	Sprocket Shaft Retaining Washer
93-655	.012 x .098 x 9/32″ Steel Washer—N.P.
93-672	Idler Wheel Stud Washer—Large
93-673	Idler Wheel Stud Washer—Small
93-677	Idler Wheel Stud Fishpaper Washer—Large
93-678	Idler Wheel Stud Fishpaper Washer—Small
93-679	Idler Wheel Stud Felt Washer
93-719	7/16″ x 3/16″ x .031 Flat Washer—Cad.
93-764	Spring Washer—Shakeproof No. 3759-14
93-767	Cam Spacer Washer (.020 x .385 x ⅝″ Stee—Cad. Pl.)
93-769	Steel Washer—Cad. Pl.
93-844	No. 5 External Shakeproof Lockwasher
93-876	Fibre Washer
93-900	Fibre Washer
93-903	Steel Washer
94-415	Tone Arm Locating Bushing
94-416	Timing Sprocket Bushing
112-56	No. 6 x ¼″ Hex. Hd. Self Tapping Screw—Type Z—Cadmium
112-483	No. 6-32 x ⅜″ B.H.M.S.—Steel N.P.
112-576	No. 5-40 x ¼″ Oval B.H.M.S.—Steel N.P.

MODELS S-13675, S-14002; S-14006, S-14008

ZENITH RADIO CORP.

NUMERICAL PARTS LIST—Continued

112-581	No. 6 x 3/8" R.H. Self Tapping Screw—Shakeproof Type 25—Cadmium
112-585	No. 6 x 3/8" R.H. Self Tapping Screw—Type FZ—Cadmium
112-619	Cobra Tone Arm Housing Mounting Screws
112-637	No. 4-40 x 1/4" B.H.M.S.—Steel N.P.
112-706	No. 4-40 x 3/16" R.H.M.S.—Steel N.P. (SEMS)
112-719	No. 6 x 3/8" Flat Hd. Self Tapping Screw—Shakeproof Type 25—Steel Cad. Pl.
114-88	No. 8-32 x 1/2" Hex. Acorn Hd. M.S.—Steel N.P.
114-89	No. 8-32 x 5/16" Hex. Acorn Hd. M.S.—Steel N.P.
114-201	No. 8 x 5/16" Hex. Hd. Slotted Self Tapping Screw—STAN-TAP—Cad. Pl.
114-248	No. 6-20 x 5/16" Hex. Hd. Slotted Self Tapping Screw—Shakeproof Type 25—Steel Cad. Pl.
114-262	No. 8 x 7/16" Hex. Hd. Slotted Self Tapping Screw—STAN-TAP—Cadmium
117-132	Shut-Off Switch Lever (S-13675, S-14006)
125-61	Rubber Grommet—Motor Mtg.
128-21	Record Ejector Cam (S-11668)
141-108	A.C. Phono Motor—60 Cycles
141-109	A.C. Phono Motor—60 Cycles (S-14002)
148-83	Cobra Tone Arm Housing (S-13675, S-14006)
148-51	Bakelite Housing
166-30	Rubber Bumper
166-41	Rubber Bumper
187-9	Push Rod (Automatic Stop S-13675, S-14006)
188-27	Retaining Ring
188-32	Retaining Ring
188-52	Retaining Ring
214-4	Sprocket Drive Chain
S-10732	Idler Assembly
S-11111	Turntable Shaft and Bearing Assembly
S-11118	Idler Wheel Assembly
S-11473	Cobra Needle Cartridge
S-11657	Idler Wheel Stud and Washer Assembly
S-11668	Record Ejector Cam and Shaft Assembly
S-11671	Pressure Arm and Bracket Assembly
S-11672	Record Support Plate Assembly
S-11674	Record Support Plate Mounting Bracket Assembly
S-11675	Discriminator Mtg. Bkt. Assembly (S-14002, S-14006 and S-14008)
S-11683	Selector Sprocket and Bushing Assembly
S-11983	Idler Wheel and Rubber Drive Ring Assembly
S-12038	Record Ejector Housing Cover Assembly (S-14006, S-14008)
S-12507	Record Spindle Assembly
S-12633	Needle Cartridge Socket and Cable Assembly
S-12686	Cam and Washer Assembly
S-12859	Discriminator Knob and Plate Assembly
S-13060	Cobra Tone Arm Hinge Plate and Swivel Bracket Assembly
S-13062	Cobra Tone Arm Hinge Plate, Swivel Bracket, Needle Cartridge Socket and Cable Assembly
S-13063	Cobra Tone Arm Assembly (S-14006, S-14008)
S-13423	Record Support Plate and Bracket Assembly (S-13675)
S-13426	Muting Switch Assembly (S-13675, S-14006, S-14008)
S-13430	Automatic Stop Switch Assembly (S-13675, S-14006).
S-13461	Record Ejector Housing Cover Assembly (S-13675, S-14002)
S-13466	Cobra Tone Arm Assembly (S-13675, S-14002)
S-13494	Record Support Plate Mounting Bracket Assembly (S-13675)
S-13496	Discriminator Mounting Bracket Assembly (S-13675)
S-13497	Bracket and Spring Assembly
S-13872	Trip Plate and Bushing Assembly
S-13894	Clutch Pawl Assembly
S-13895	Drive Sprocket and Bushing Assembly
S-13896	Turntable Drive Shaft Bearing Assembly
S-13900	Timing Sprocket Assembly
S-13901	Trip Switch Assembly
S-13902	Tone Arm Pivot Shaft and Bracket Assembly
S-13903	Clutch Release Arm Assembly
S-13904	Shut-Off Switch Assembly (S-13675, S-14006)
S-13913	Magnet Assembly
S-13915	Cable Assembly (S-13675, S-14006, S-14008)
S-13929	Main Base Plate Assembly (S-13675)
S-13931	Turntable Assembly
S-14229	Cable Assembly (S-14002)
S-14312	Main Base Plate Assembly
S-14313	Muting Switch Assembly (S-14002)
S-14314	Main Base Plate Assembly (S-14008)
S-14581	Trip Lever Mounting Bracket Assembly
S-14582	Trip Lever and Pawl Assembly
S-14665	Main Base Plate Assembly (S-14006)
S-14666	Record Support Plate Mounting Bracket Assembly (S-14006)

Unless Specified, Parts Apply to All Models.

ZENITH RADIO CORP.

MODELS S-13675, S-14006

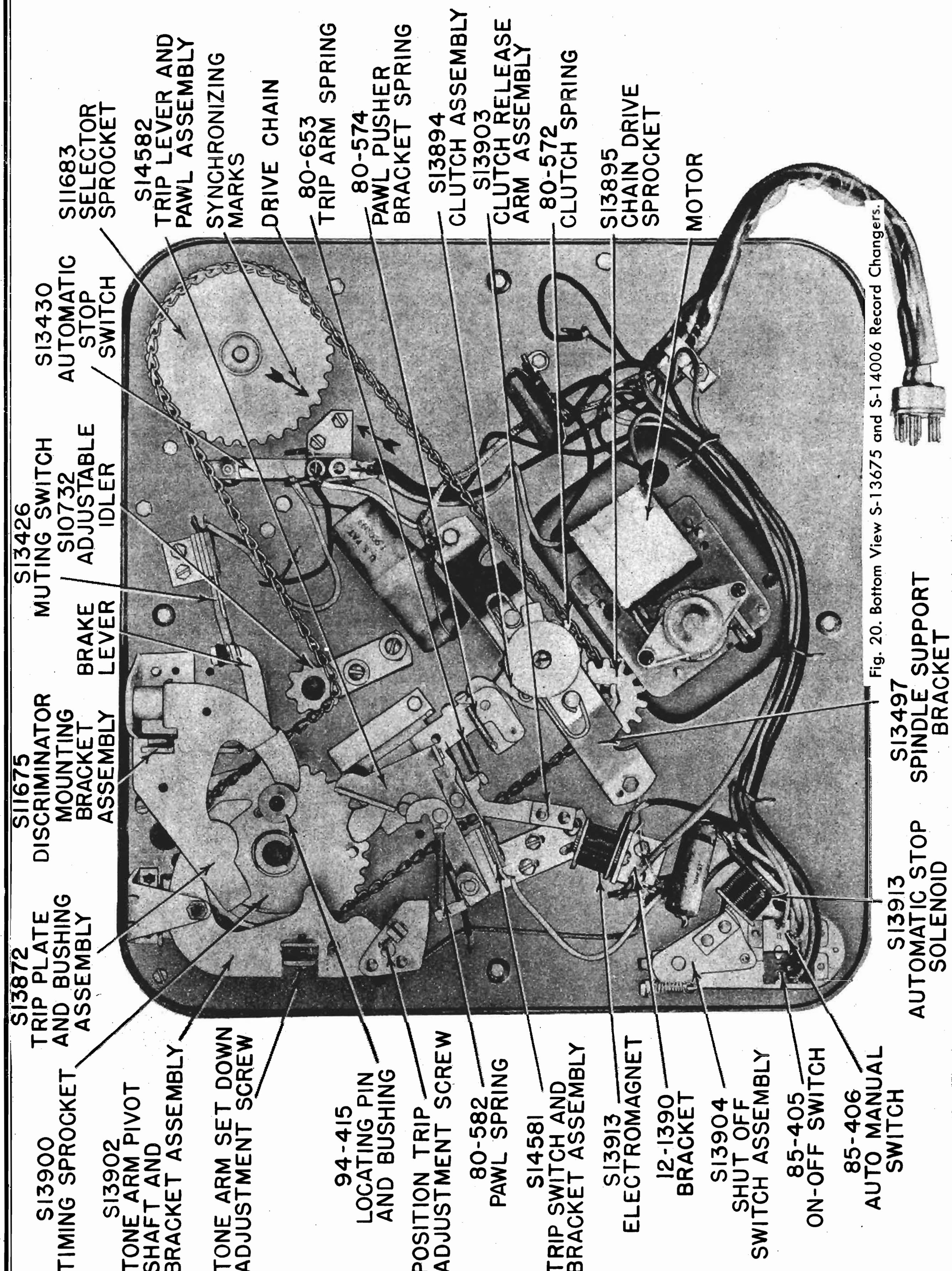


Fig. 20. Bottom View S-13675 and S-14006 Record Changers.