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RADIO DIAGRAMS

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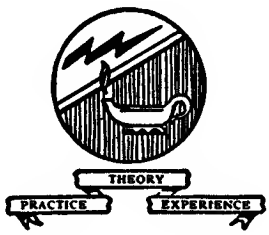

Compiled by

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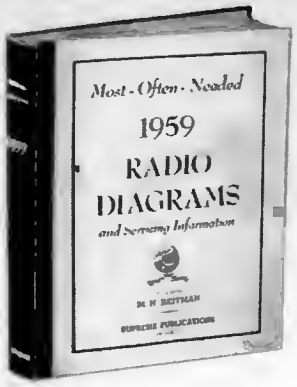

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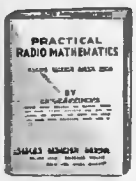

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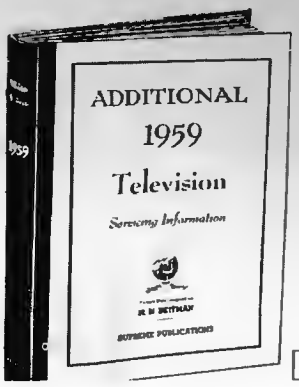

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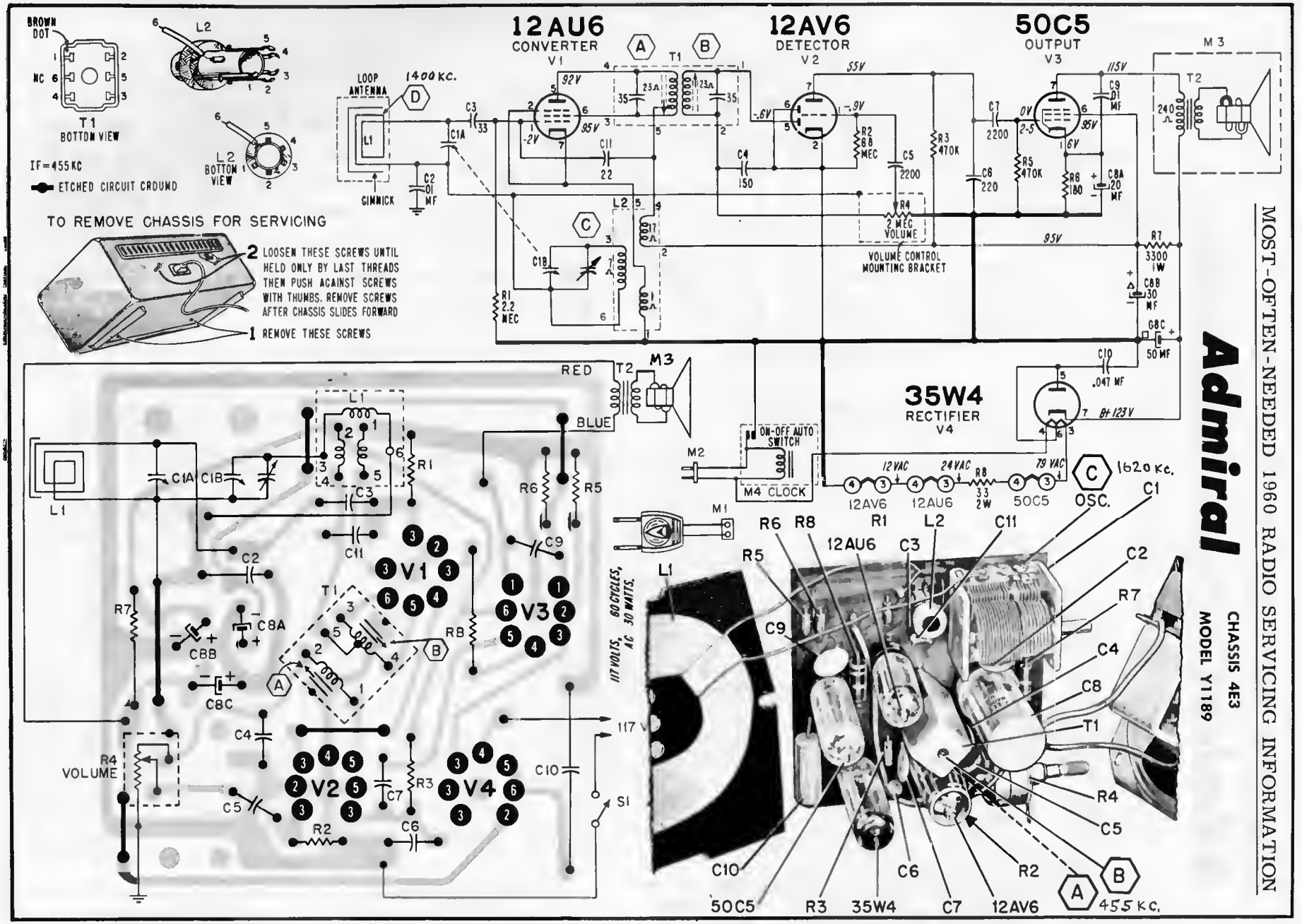


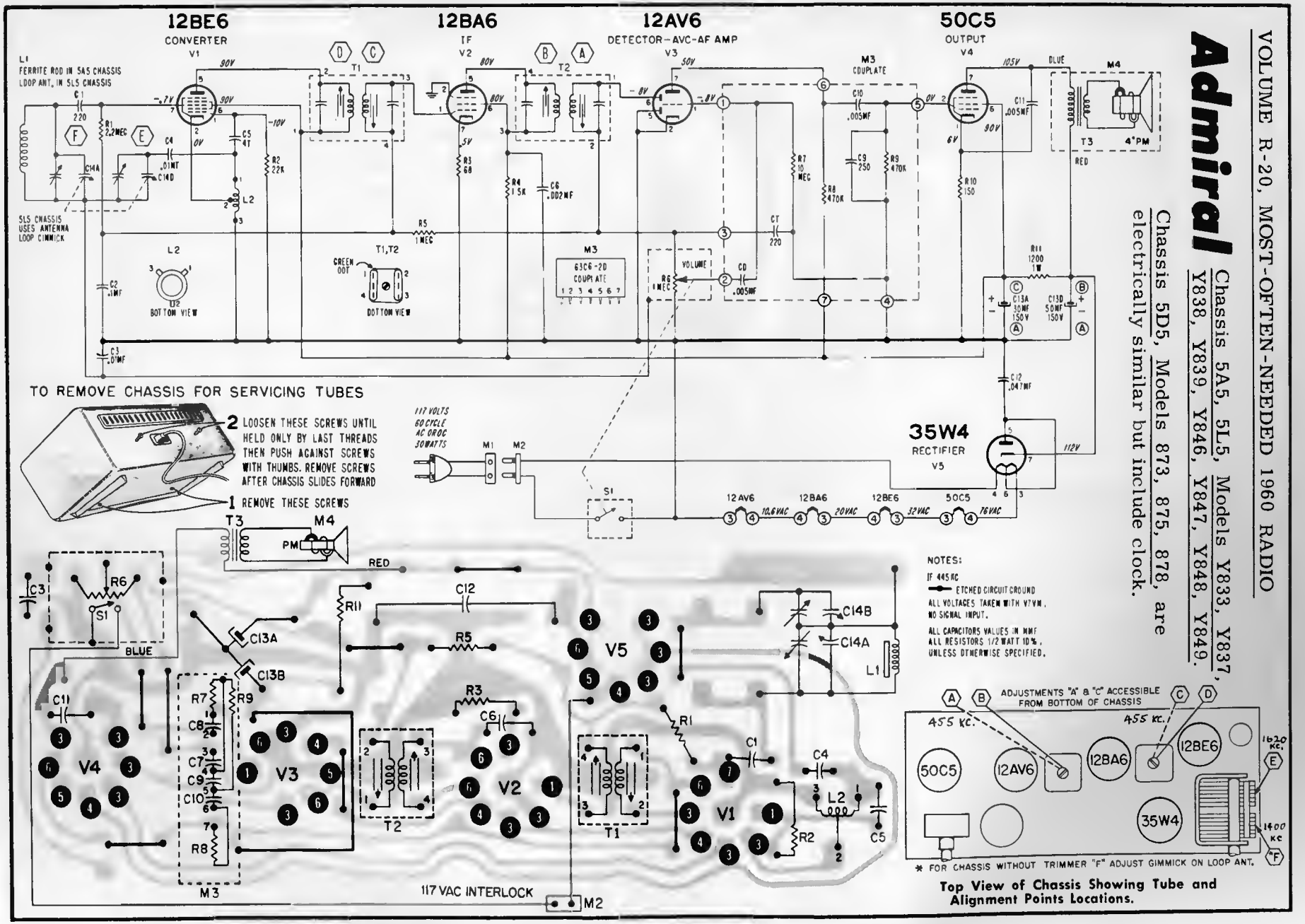
Rear View of Etched Circuit Board. Gray area represents etched wiring; black symbols and lines represent components and connections on opposite side.

Top View of Chassis Showing Location of Components and Alignment Points.

Note: Alignment Point "D" is a Gimmick on Antenna Loop.

Admiral Chassis 5A5, 5L5, Models Y833, Y837, Y838, Y839, Y846, Y847, Y848, Y849.

Chassis 5D5, Models 873, 875, 878, are electrically similar but include clock.



Top View of Chassis Showing Tube and Alignment Points Locations.

Bottom View of Etched Circuit Board. Gray area represents etched wiring; black symbols and lines represents components and connections on opposite side.

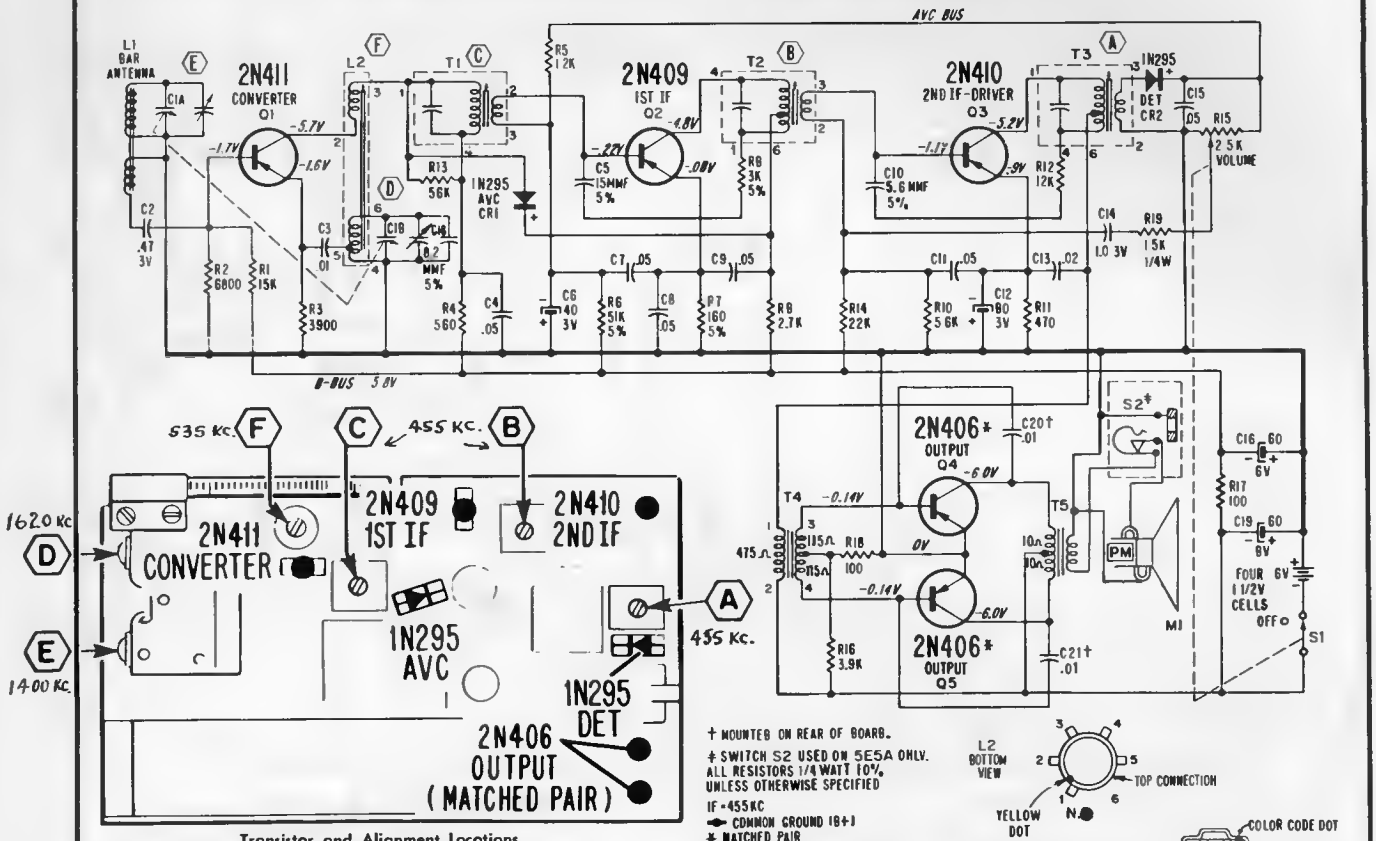
Admiral

CHASSIS 5B5
MODELS Y853 • Y858 • Y865 • Y866

Admiral

MODELS 691 • 692

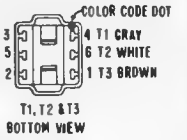
CHASSIS 5E5 • 5E5A

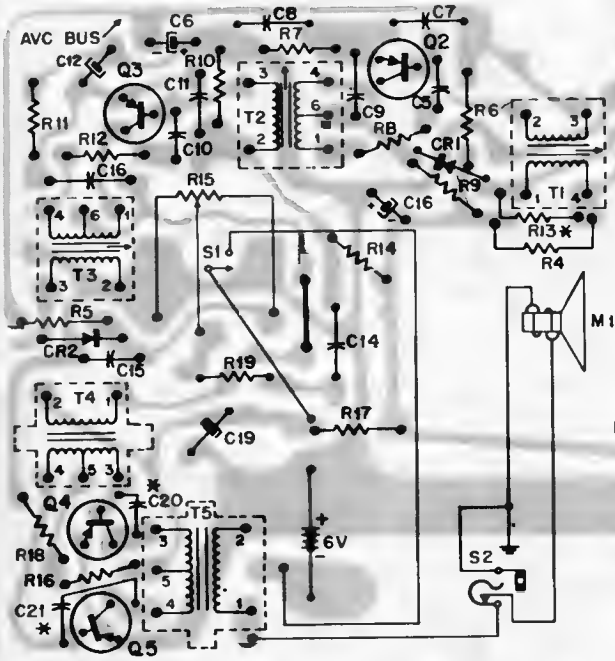


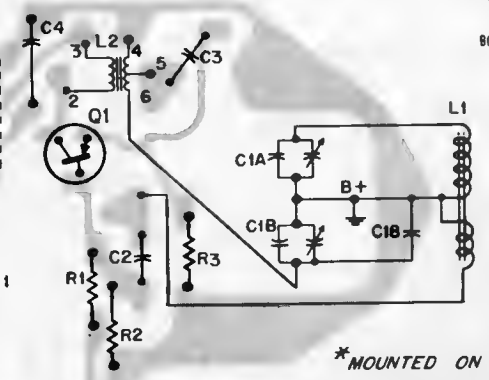
Transistor and Alignment Locations.

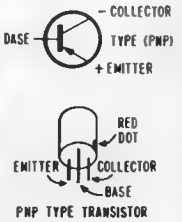
† MOUNTED ON REAR OF BOARD.
* SWITCH S2 USED ON 5E5A ONLY.
ALL RESISTORS 1/4 WATT 10% UNLESS OTHERWISE SPECIFIED
IF = 455 KC
⊖ COMMON GROUND (B+)
* MATCHED PAIR
CAPACITOR VALUES IN MICROFARADS UNLESS OTHERWISE SPECIFIED.

TOTAL CURRENT (NO SIGNAL) 5.4 MA
ALL VOLTAGES TAKEN WITH VTVM



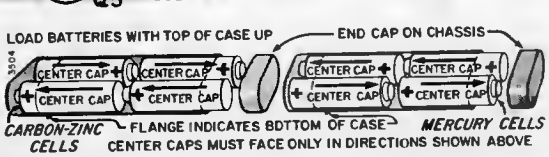






*MOUNTED ON REAR OF BOARD

View of Etched Wiring Board. Gray area represents etched wiring; black symbols and lines represent components on opposite side.



Later Production Battery Holder Showing Ordinary and Mercury Type Batteries in Correct Positions.

REMOVING CHASSIS FROM CABINET

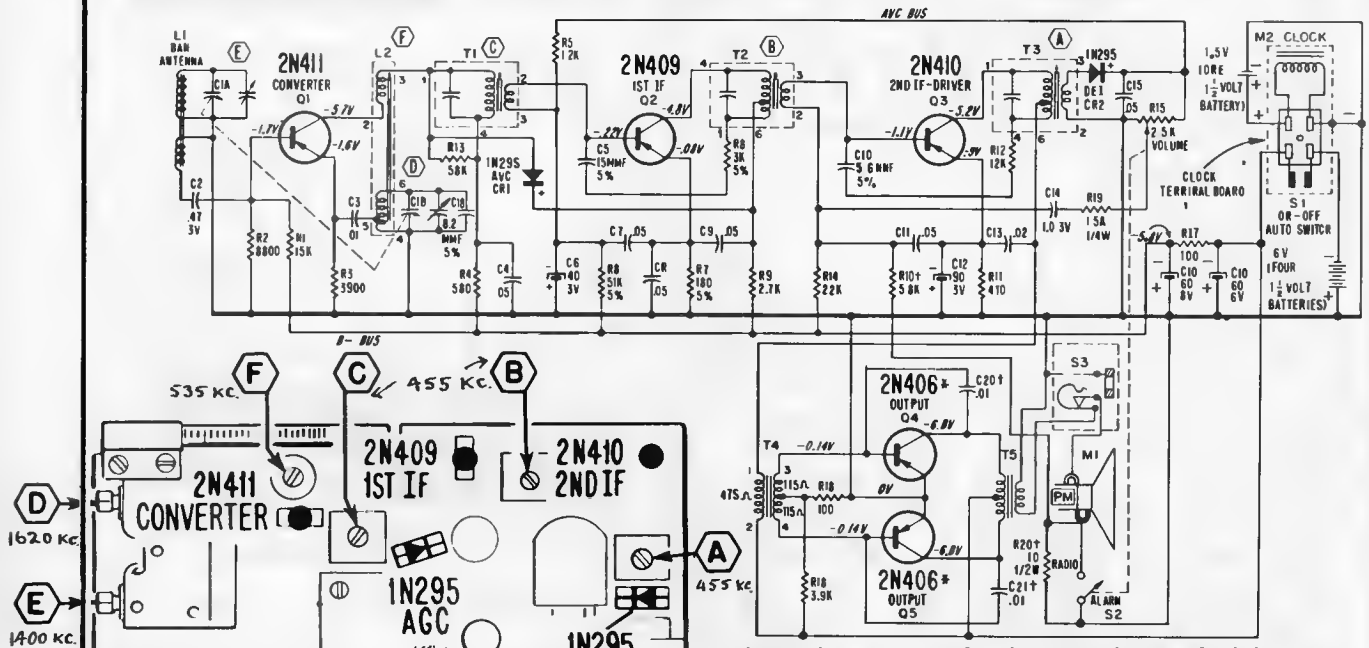
To remove cabinet back, simply insert a small coin into one of the slots on the bottom edge and twist.

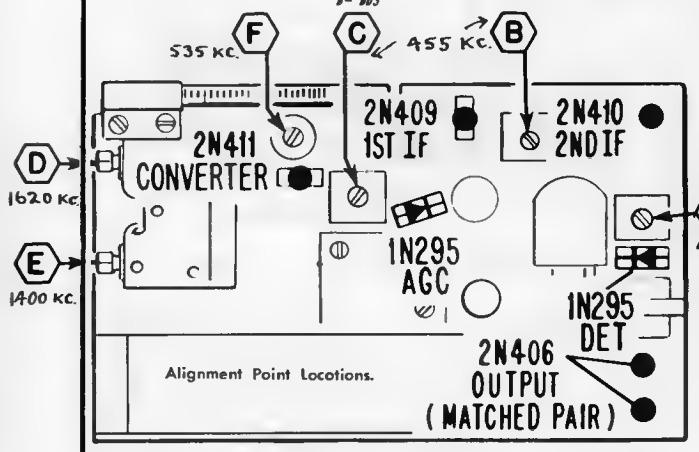
To remove chassis from cabinet, first remove the knobs by pulling them off. Remove the back cover as instructed above. Remove the four screws at the corners of the etched board. Lift entire chassis (etched board with all components) out of the cabinet front.

Admiral

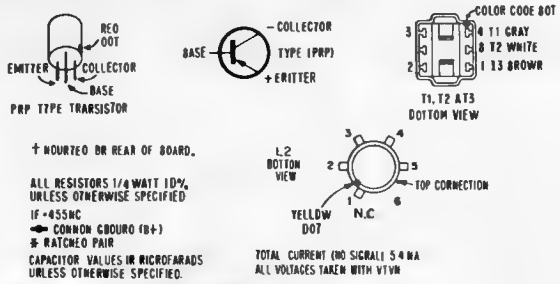
MODELS Y793 • Y797 • Y798

CHASSIS 5E5B



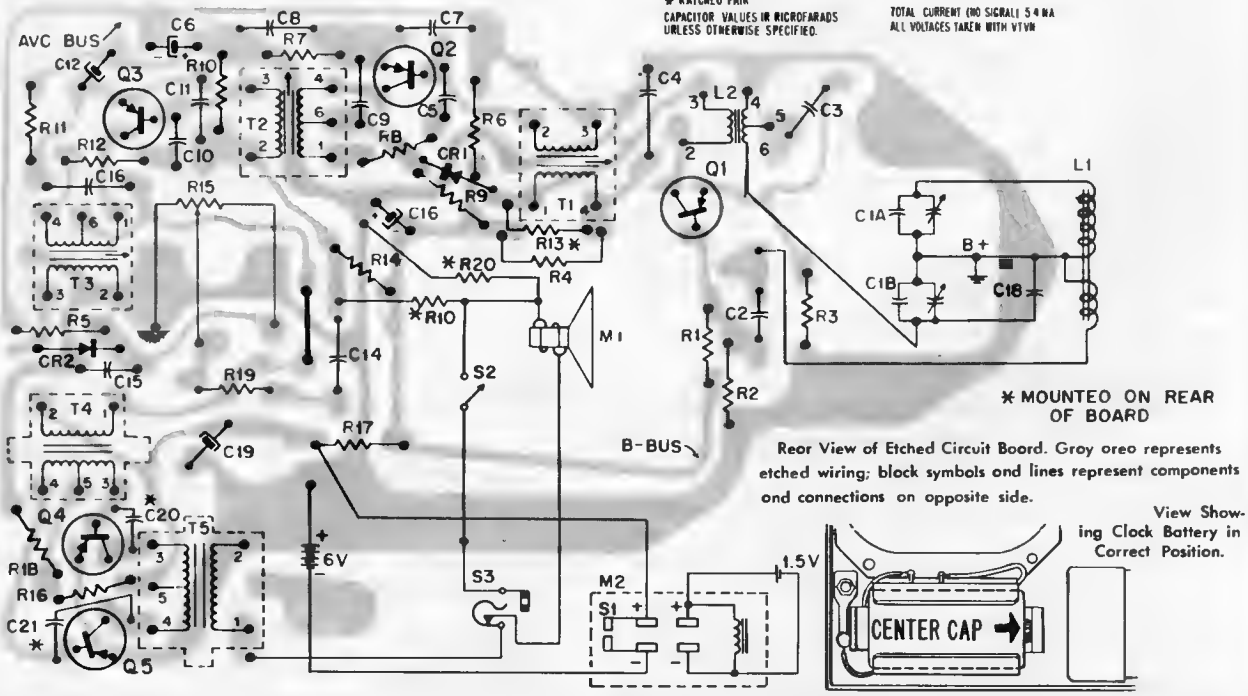


Voltages shown measured with no signal. using fresh batteries. All readings made with VTVM between transistor terminals and B plus (ground). • All voltages are negative.



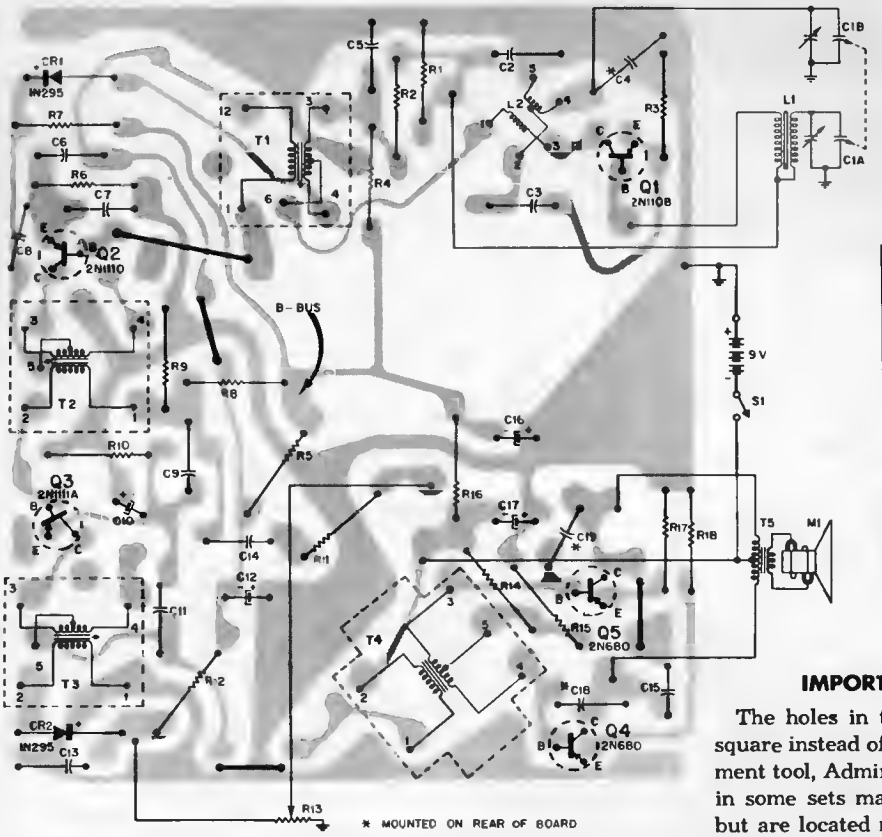
To remove cabinet back, simply insert a small coin into one of the slots on the bottom edge and twist.

To remove chassis from cabinet front, first remove the knobs by pulling them off. Remove the back cover as instructed above. Remove the four screws at the corners of the etched board. Lift entire chassis (etched board with all components) out of the cabinet front.



Rear View of Etched Circuit Board. Gray area represents etched wiring; block symbols and lines represent components and connections on opposite side.

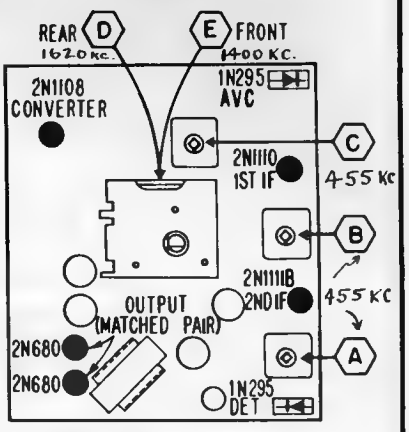
View Showing Clock Battery in Correct Position.



View of Etched Wiring Board. Gray area represents etched wiring, black symbols and lines represent components on opposite side.

Admiral

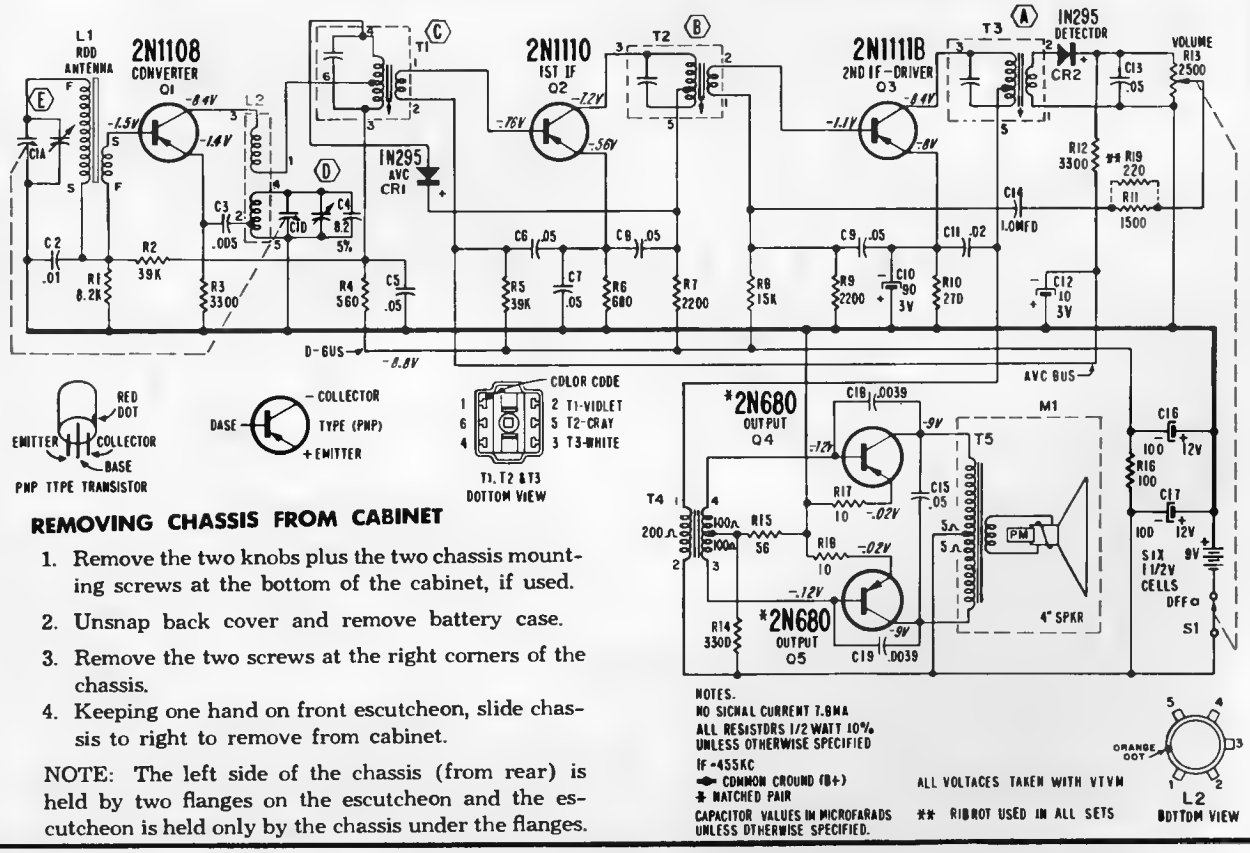
MODEL 739
CHASSIS 5F5



Transistor and Alignment Locations.

IMPORTANT ALIGNMENT NOTES

The holes in the tuning slugs in the IF cans are square instead of the usual hexagon shape. Use alignment tool, Admiral part number 98A30-21. The slugs in some sets may be accessible only from the rear, but are located near the top of the can. Use care, if more than one turn is required, to prevent damage to the slug against the top of the can.



REMOVING CHASSIS FROM CABINET

1. Remove the two knobs plus the two chassis mounting screws at the bottom of the cabinet, if used.
2. Unsnap back cover and remove battery case.
3. Remove the two screws at the right corners of the chassis.
4. Keeping one hand on front escutcheon, slide chassis to right to remove from cabinet.

NOTE: The left side of the chassis (from rear) is held by two flanges on the escutcheon and the escutcheon is held only by the chassis under the flanges.

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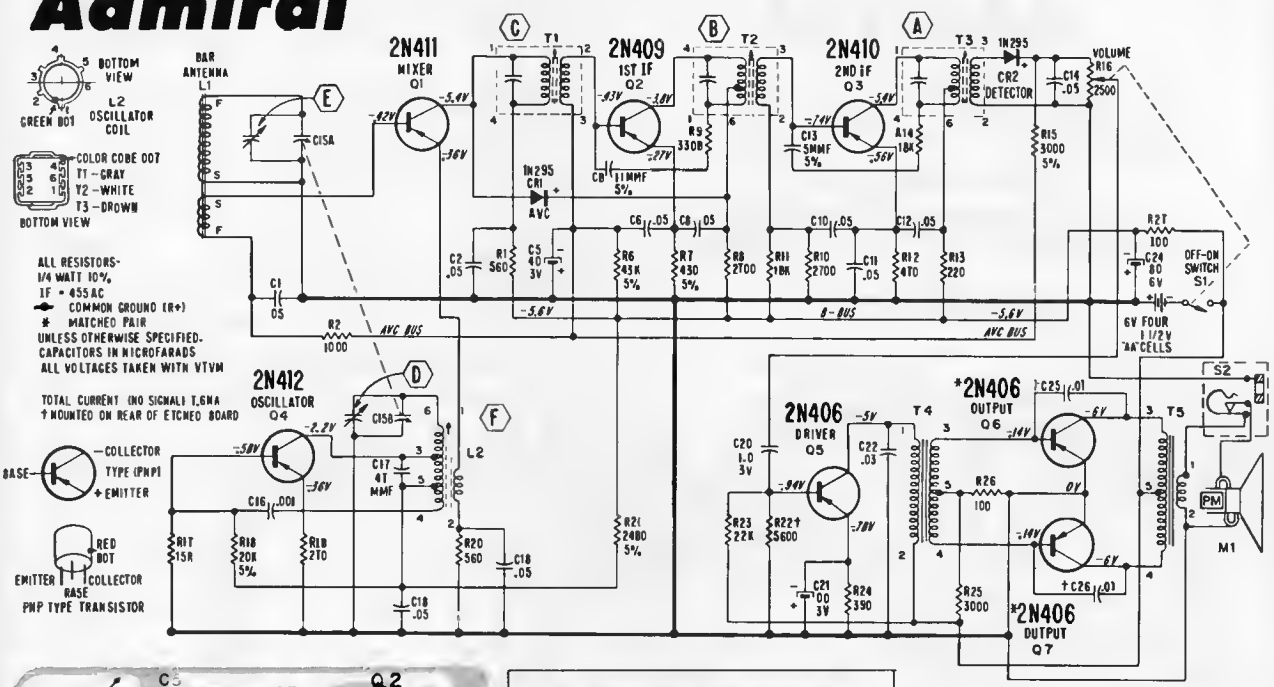
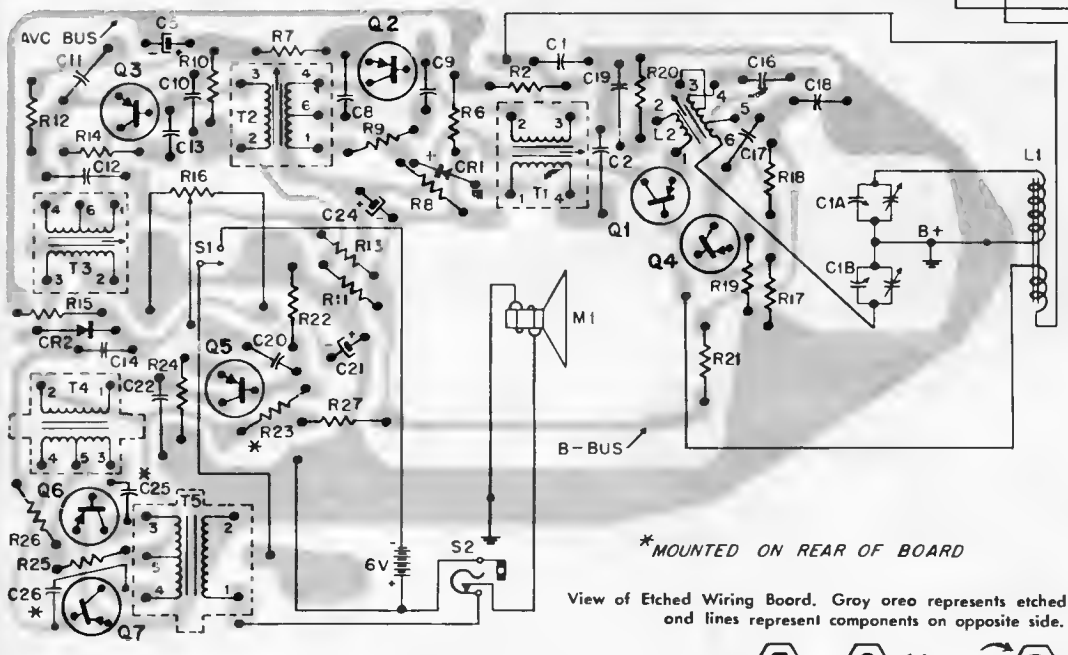
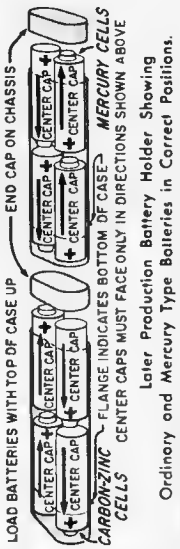
Chassis 7P1, Models 703 and 708





View of Etched Wiring Board. Gray area represents etched wiring; block symbols and lines represent components on opposite side.

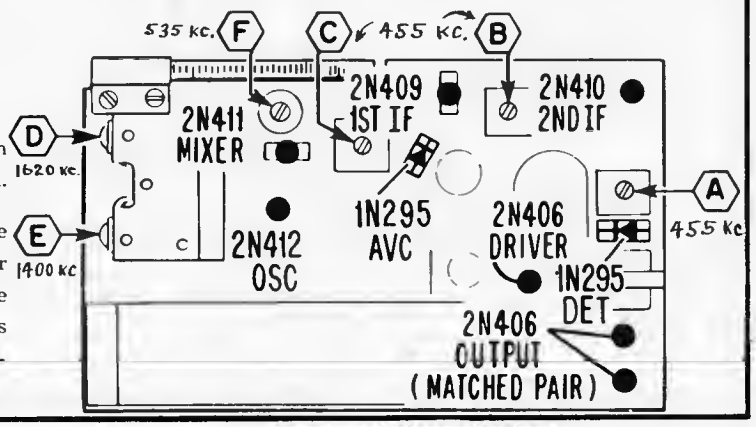


INTERMEDIATE FREQUENCY: 455 KC.

REMOVING CHASSIS FROM CABINET

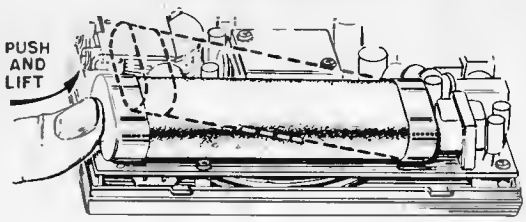
To remove cabinet back, simply insert a small coin into one of the slots on the bottom edge and twist.

To remove chassis from cabinet, first remove the knobs by pulling them off. Remove the back cover as instructed above. Remove the four screws at the corners of the etched board. Lift entire chassis (etched board with all components) out of the cabinet front.



Transistor and Alignment Locations.

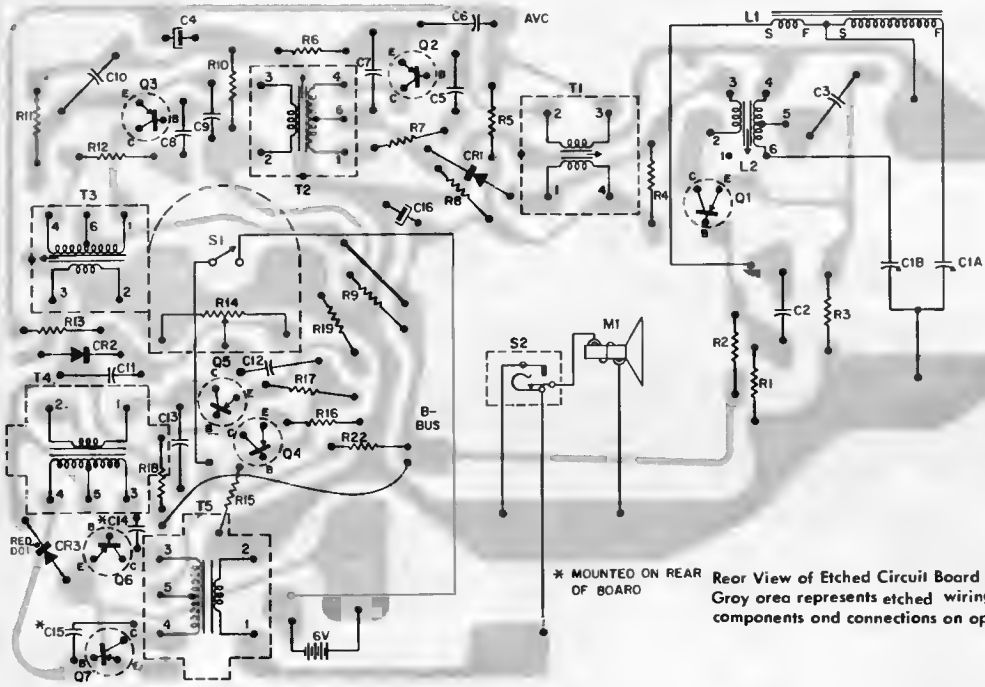
Admiral



View Showing Method of Removing Battery Holder From Chassis Board.

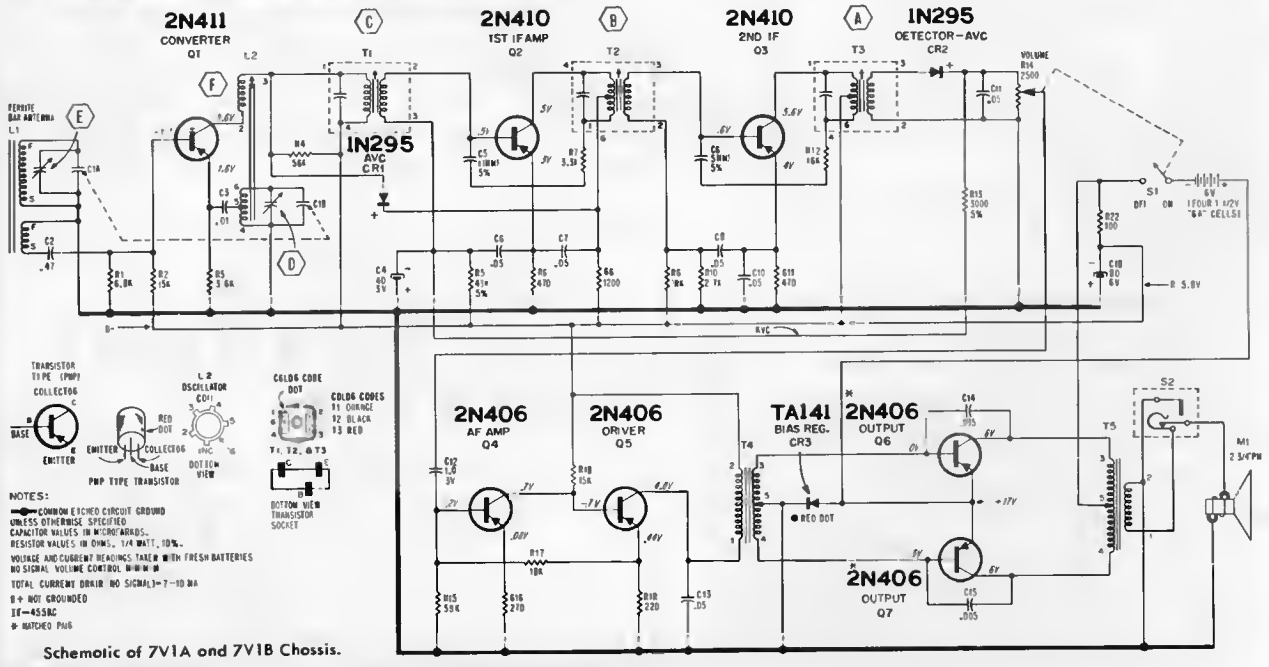
MODEL	COLOR	NAME	CHASSIS
Y2009	Black	The Comet	7V1
Y2011	Gray		7V1A
Y2012	Coral		
Y2013	White		
Y2023	White	The Starliner	7V1B
Y2027	Beige		
Y2028	Green		

(Continued on page 11)



* MOUNTED ON REAR OF BOARD

Rear View of Etched Circuit Board Used in 7V1A and 7V1B Chassis. Gray area represents etched wiring; black symbols and lines represent components and connections on opposite side.



Schematic of 7V1A and 7V1B Chassis.

Admiral Chassis 7V1, 7V1A, 7V1B, Continued from page 10

ALIGNMENT PROCEDURE

a. Fresh batteries should be used.

b. Set Volume control at maximum.

c. Connect output meter across output transformer secondary. For best results, have speaker disconnected, use 12 ohm load.

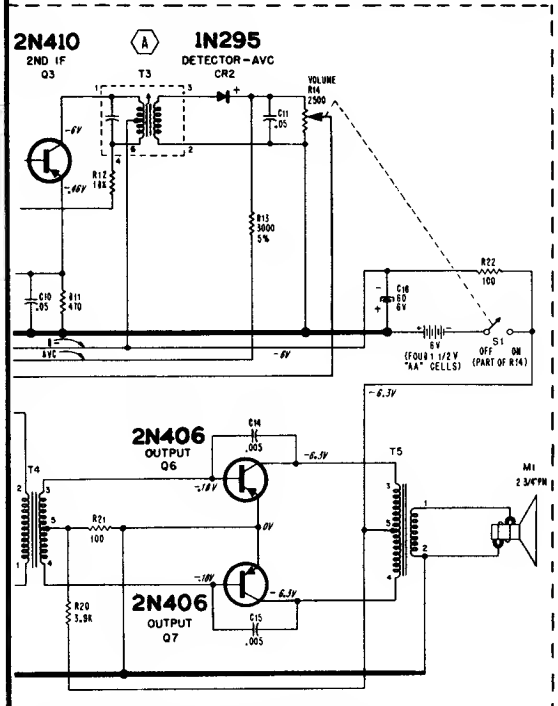
d. Use lowest output of signal generator that will produce adequate indication on lowest scale of output meter. IMPORTANT: Output level should be held at 25 mw. or less. The voltage reading at the 25 mw. level is approximately 1.8 volts across the 12 ohm load.

Step	Connection of Signal Generator	Signal Gen. Frequency	Receiver Gang Setting	Adjustment Description	Adjustment
1	Radiated Signal. †Loop of several turns of wire, or place generator lead close to receiver for adequate signal.	455 KC	Gang fully open	3rd IF 2nd IF 1st IF	* Ⓐ Ⓑ and Ⓒ for maximum output.
2	Same as "Step 1".	1620 KC	Gang fully open	Oscillator Trimmer	Ⓓ for maximum output.
3	Repeat "Step 1" several times until there is no further increase in the output.				
4	Same as "Step 1".	§ 1400 KC	Tune in generator signal	Antenna Trimmer	Ⓔ for maximum output.
	NOTE: After completing "Step 4" the tuning range should be 535 KC to 1620 KC; ±5 KC. If this range cannot be obtained, continue with Steps 5, 6 and 7.				
5	Same as "Step 1".	535 KC	Gang fully closed	Oscillator Coil Core	Ⓕ for maximum output.
6	Repeat "Step 2"; then repeat Steps 5 and 2 several times until oscillator covers required range.				
7	Repeat "Step 4".				

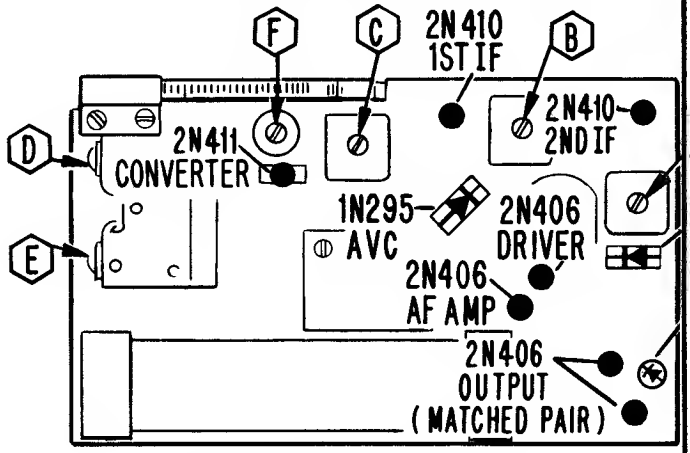
† If signal generator does not produce sufficient output for usable reading, clip hot lead of generator to RF stator plates terminal of gang; clip ground lead to frame of gang. Adjust Ⓐ Ⓑ and Ⓒ for usable output only. Then return to "Step 1".

* If difficulty is experienced in obtaining signal output, first rotate IF slugs out several turns, then slowly adjust slugs in until output is obtained. Caution: Rotating slugs too far inward will damage ceramic capacitor contained in IF can.

§ Antenna trimmer Ⓔ should first be adjusted for maximum output with generator tuned to 1400 KC. Then try to increase output by rocking gang or generator slightly while readjusting trimmer.



Circuit differences of 7V1 Chassis



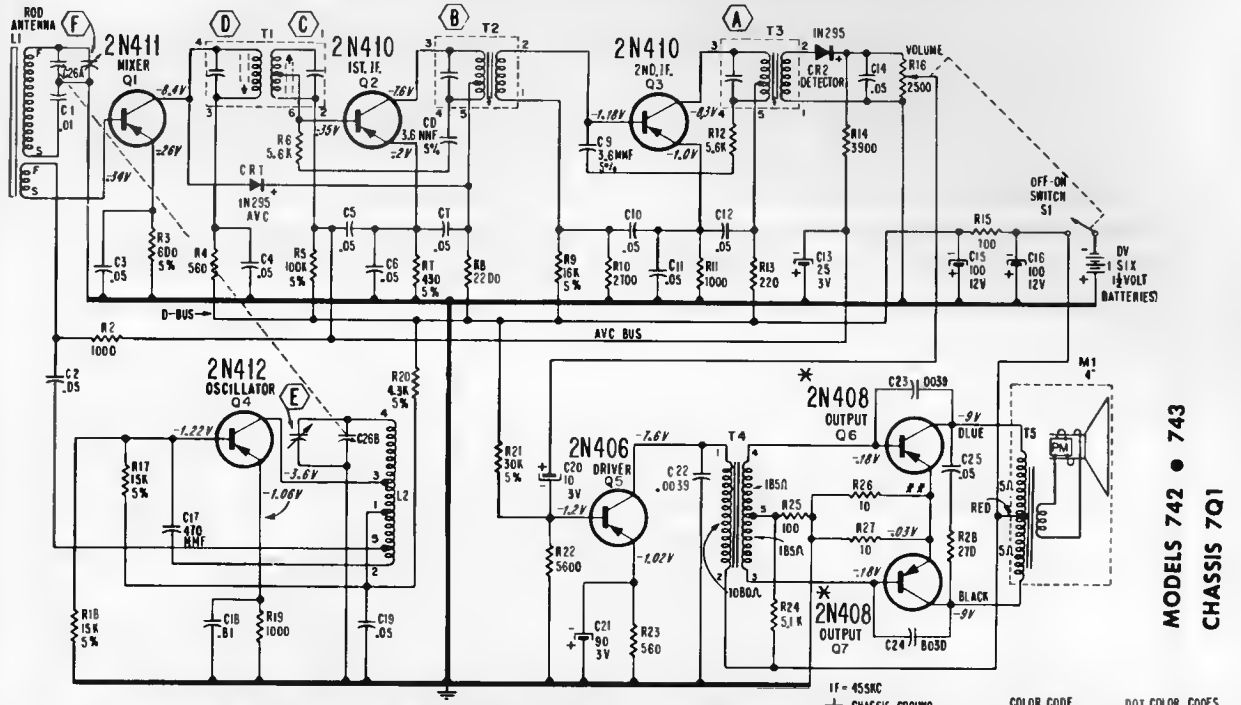
Top View of Chassis Showing Transistor and Alignment Point Locations.

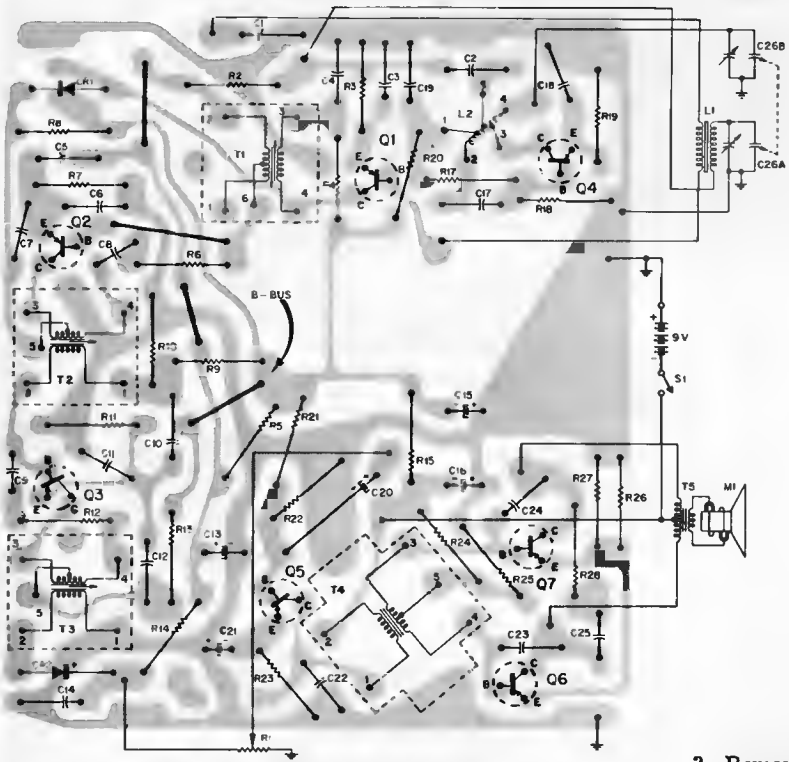
REMOVING CHASSIS FROM CABINET

To remove cabinet back, simply insert a small coin into one of the slots on the bottom edge and twist.

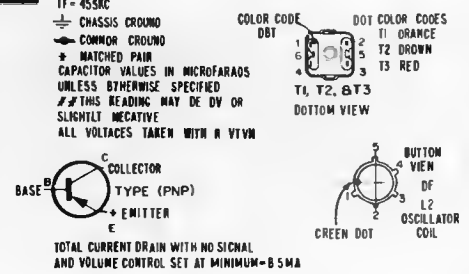
To remove chassis from cabinet, first remove the knobs by pulling them off. Remove the back cover as instructed above. Remove the four screws at the corners of the etched board. Lift entire chassis (etched board with all components) out of the cabinet front.

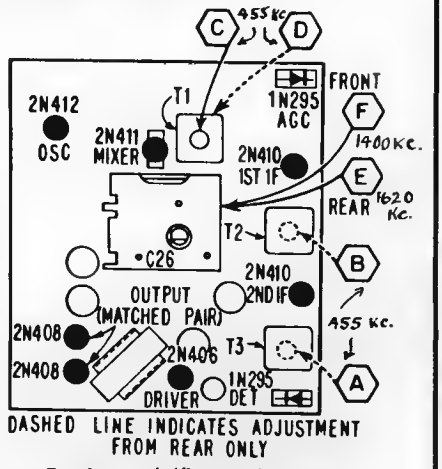
ADMIRAL Chassis 7Q1, Models 742 and 743





View of Etched Wiring Board. Gray area represents etched wiring, black symbols and lines represent components on opposite side.





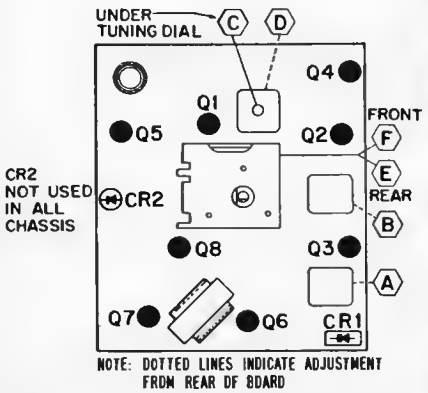
Transistor and Alignment Location:

REMOVING CHASSIS FROM CABINET

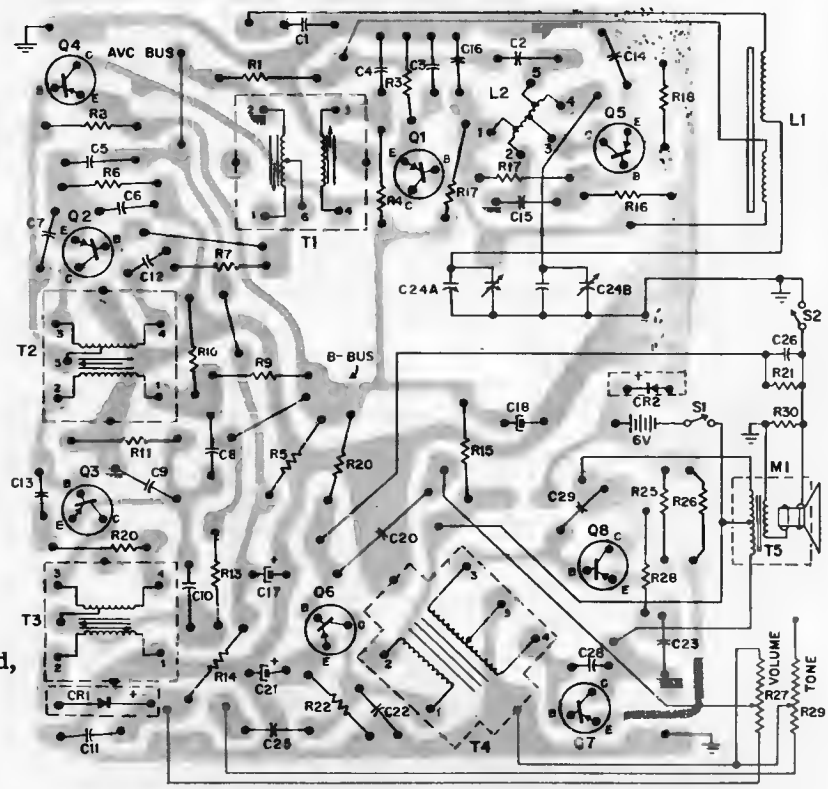
1. Remove the two knobs plus the two chassis mounting screws at the bottom of the cabinet, if used.
2. Unsnap back cover and remove battery case.
3. Remove the two nuts at the right corners of the chassis.
4. Keeping one hand on front escutcheon, slide chassis to right to remove from cabinet.

NOTE: The left side of the chassis (from rear) is held only by two flanges on the escutcheon and the escutcheon, in some sets, is held only by the chassis under the flanges.

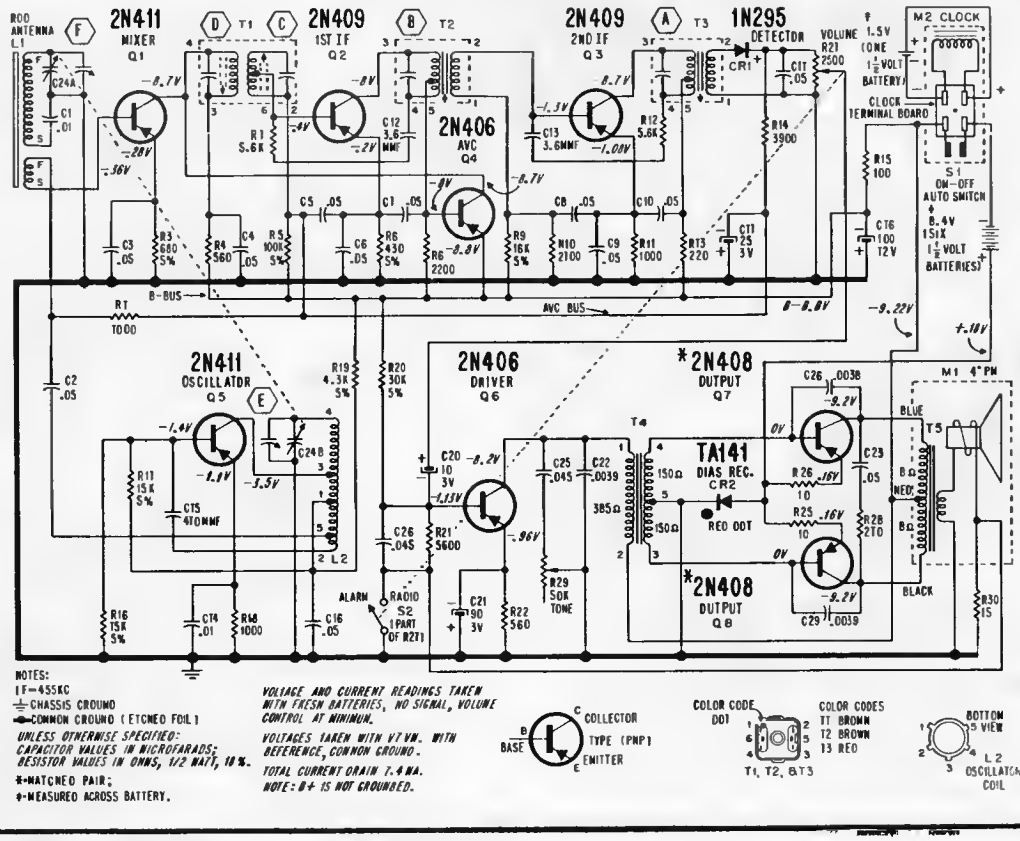
ADMIRAL Chassis 8S1C used in Models 811B and 816B



Transistor and Alignment Point Locations.



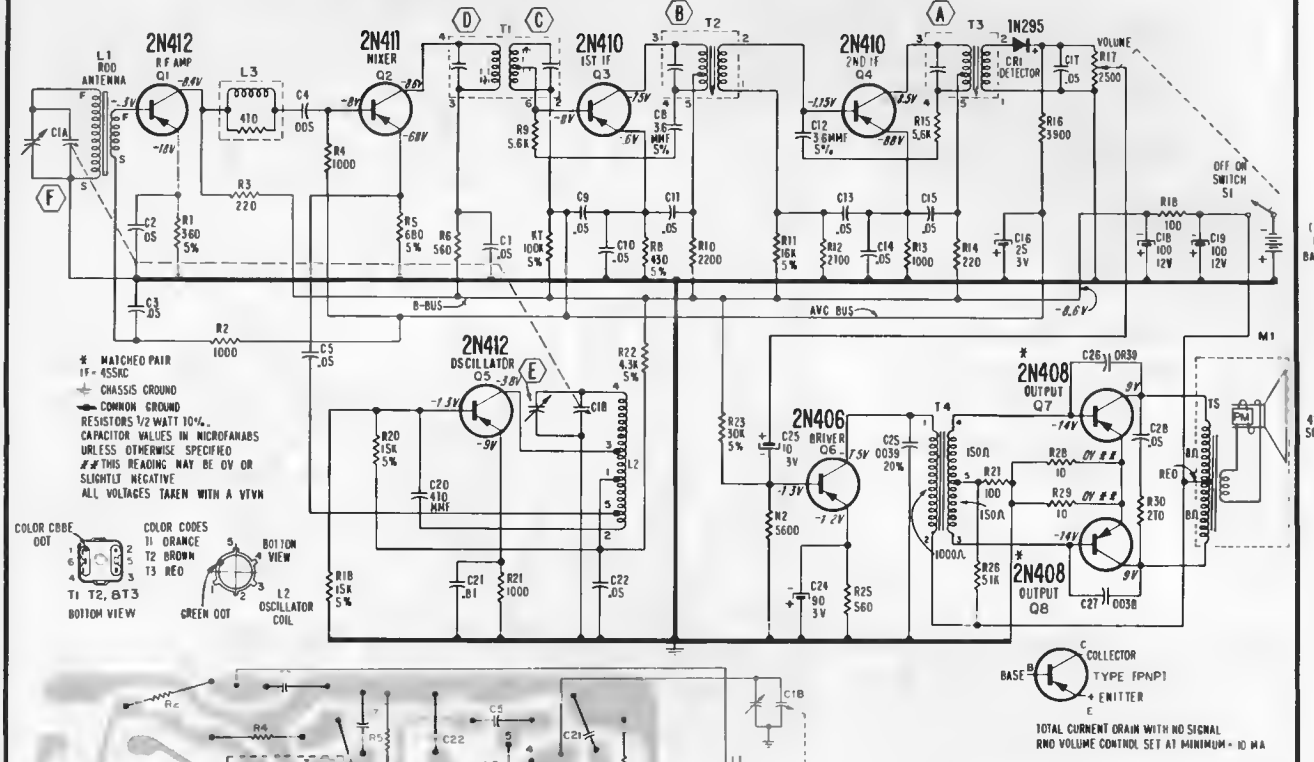
Rear View of Etched Circuit Board, Used in 8S1C Chassis.

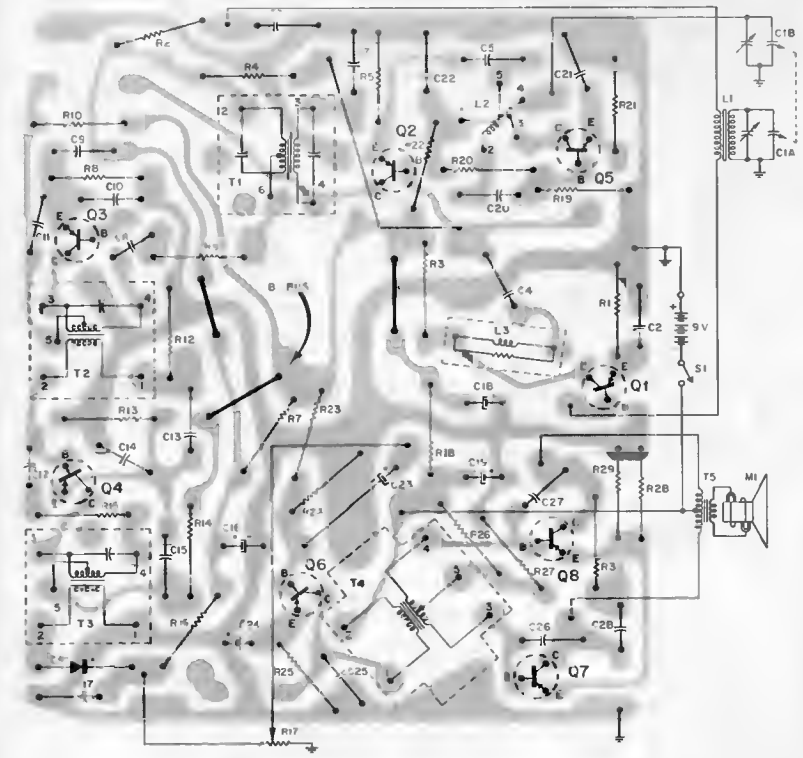


Admiral

MODELS 751 • 757

CHASSIS 8V1

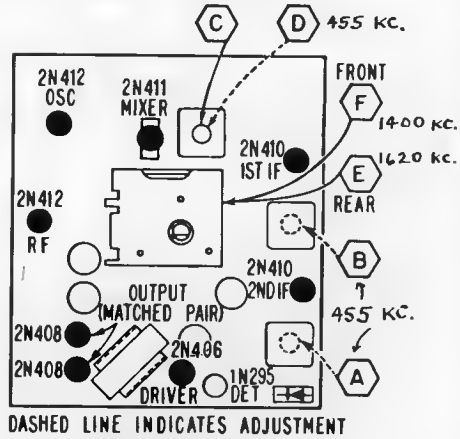




View of Etched Wiring Board. Gray area represents etched wiring, black symbols and lines represent components on opposite side.

VOLTAGE DATA

- Voltages shown measured with no signal, using fresh batteries.
- Volume control at minimum; dial set at low frequency end.
- All readings made with VTVM between transistor terminals and B plus (ground).



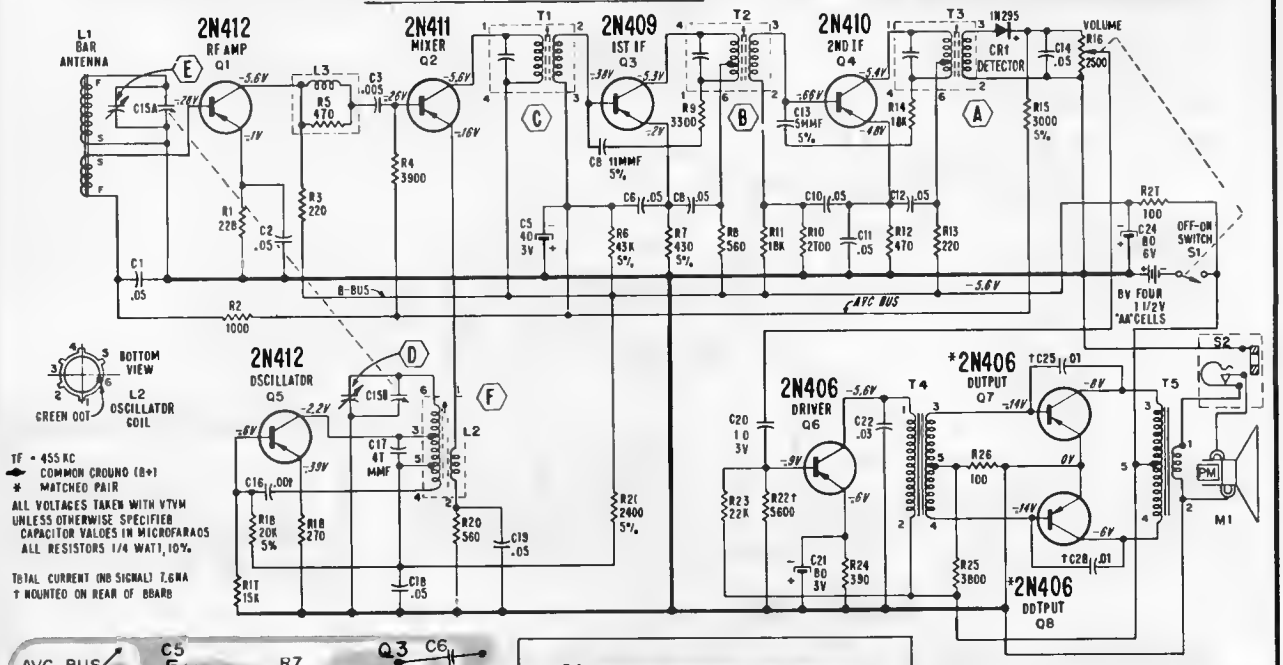
Transistor and Alignment Locations.

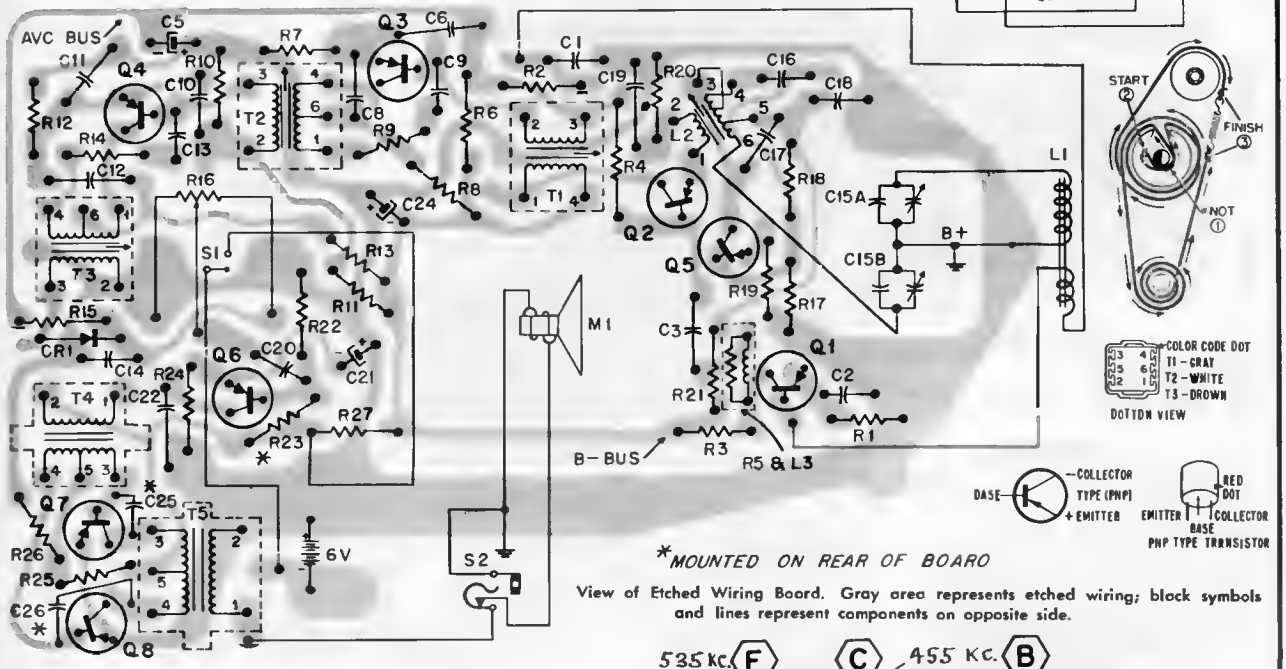
REMOVING CHASSIS FROM CABINET

1. Remove the two knobs plus the two chassis mounting screws at the bottom of the cabinet, if used.
2. Unsnap back cover and remove battery case.
3. Remove the two nuts at the right corners of the chassis.
4. Keeping one hand on front escutcheon, slide chassis to right to remove from cabinet.

NOTE: The left side of the chassis (from rear) is held only by two flanges on the escutcheon and the escutcheon, in some sets, is held only by the chassis under the flanges.

Admiral Chassis 8T1, Models 711 and 717. Chassis 8T1A used in Models Y821 and Y822 is electrically the same plus clock.





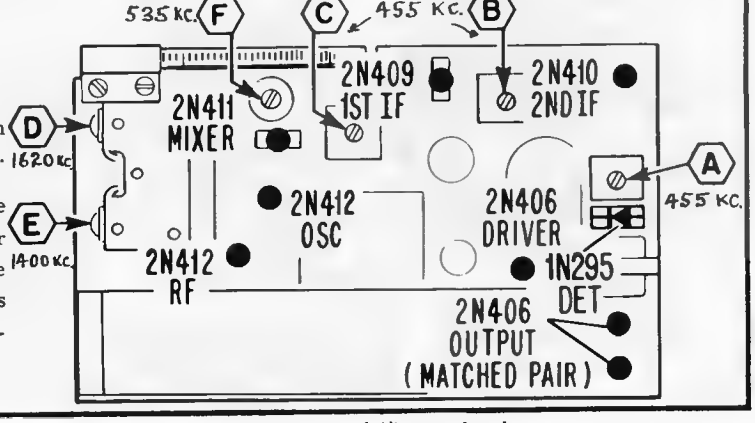
*MOUNTED ON REAR OF BOARD

View of Etched Wiring Board. Gray area represents etched wiring; black symbols and lines represent components on opposite side.

REMOVING CHASSIS FROM CABINET

To remove cabinet back, simply insert a small coin into one of the slots on the bottom edge and twist.

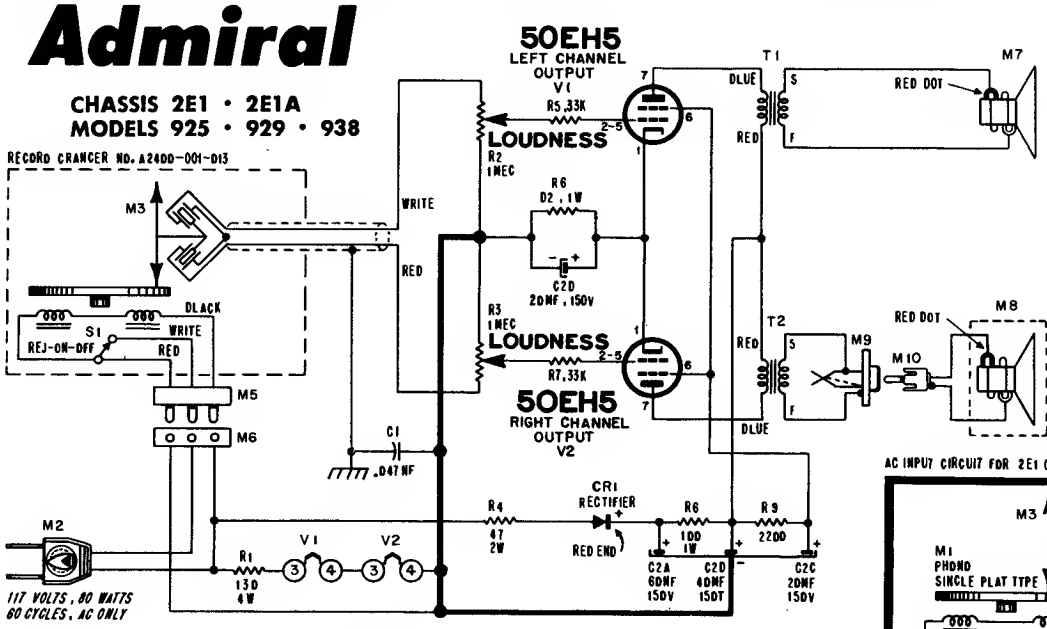
To remove chassis from cabinet, first remove the knobs by pulling them off. Remove the back cover as instructed above. Remove the four screws at the corners of the etched board. Lift entire chassis (etched board with all components) out of the cabinet front.



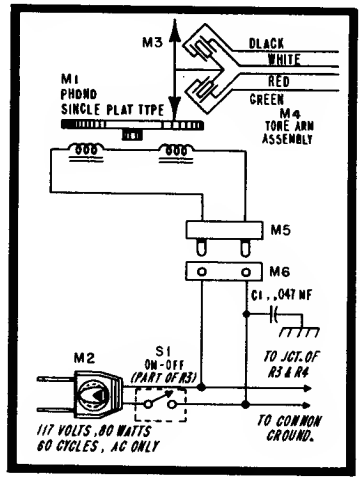
Transistors and Alignment Locations.

Admiral

CHASSIS 2E1 • 2E1A
MODELS 925 • 929 • 938



AC INPUT CIRCUIT FOR 2E1 CHASSIS



PARTS LIST

RESISTORS AND CONTROLS

Sym	Description	Part No.
R1	130 ohms, 4 watts	61B 20-34
R2	1 megohm, Loudness control left channel in 2E1 and 2E1A chassis	75D 1-127
R3	1 megohm, Loudness control right channel in 2E1 chassis (incl. S1)	75D 1-128
	right channel in 2E1A chassis	75D 1-127
R4	47 ohms, 2 watts	60B 21-470
R5	33,000 ohms, ½ watt	60B 8-333
R6	82 ohms, 1 watt	60B 14-820
R7	33,000 ohms, ½ watt	60B 8-333
R8	100 ohms, 1 watt	60B 14-101
R9	2,200 ohms, ½ watt	60B 8-222

CAPACITORS

Sym	Description	Part No.
C1	.047 mf, 400 volts	64B 8-28
C2A	60 mf, 150 volts	67B 42-1
C2B	40 mf, 150 volts	
C2C	20 mf, 150 volts	
C2D	20 mf, 150 volts	

TRANSFORMERS

Sym	Description	Part No.
T1	Transformer, Output	79D 88-1
T2	Transformer, Output	79D 88-1

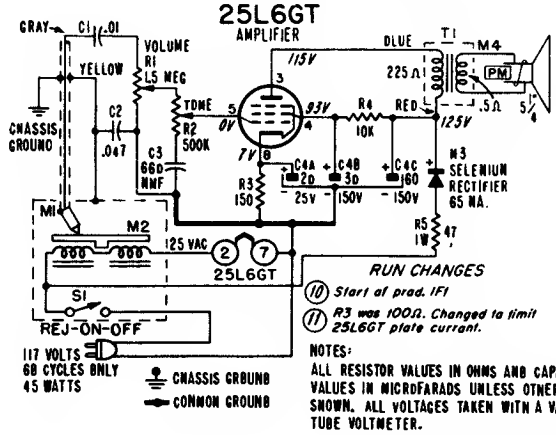
MISCELLANEOUS PARTS

Sym	Description	Part No.
CR1	Rectifier, Silicon Diode (200 ma)	93B 16-1
M1	Phono, 3 Speed, Motor and Turntable Assembly (less Tone Arm)	400D 710-1
M2	AC Line Cord and Plug	89B 1-1
M3	Cartridge, Dual Needle Type (includes needles)	409C 37-1
	Needle Assembly for above cartridge	
	sapphire, .7 mil needle	98C 95-4
	sapphire, 3 mil needle	98C 95-5
M4	Tone Arm Assembly, complete with cartridge and needles	
	models 925 and 929	400C 707-1
	Model 938	See Service Manual No. S800 Rev. 1
	Tone Arm Rest all models except model 938	401A 468
M5	Loc-plug, AC Line (does not include connector pins)	33B 287-2
	pin for above plug	9B 35-12
M6	Loc-socket, AC Line (does not include connector pins)	33B 287-1
	pin for above socket	9B 35-12
M7	Speaker 4" PM, all models except model 938	78C 160-1
	5" PM, model 938	78C 161-1
M8	Speaker 4" PM, all models except model 938	78C 160-1
	5" PM, model 938	78C 161-1
M9	Socket, right channel speaker connector	88B 11-3
M10	12 foot length, Twin Speaker Cable and Plug	89B 92-2

CABINET PARTS

Cabinet model 925 (Coral and Silver)	35E 550-1
model 929 (Blue and White)	35E 550-2
model 938 (Blue and Aqua)	35E 551-1

ADMIRAL Chassis 1F1 used in Models 329 and Y949



CHASSIS AND CHANGER REMOVAL

The amplifier tube may be reached for servicing by removing three screws that secure the metal grille to the top front edge of changer compartment and lifting the grille up, out of the way.

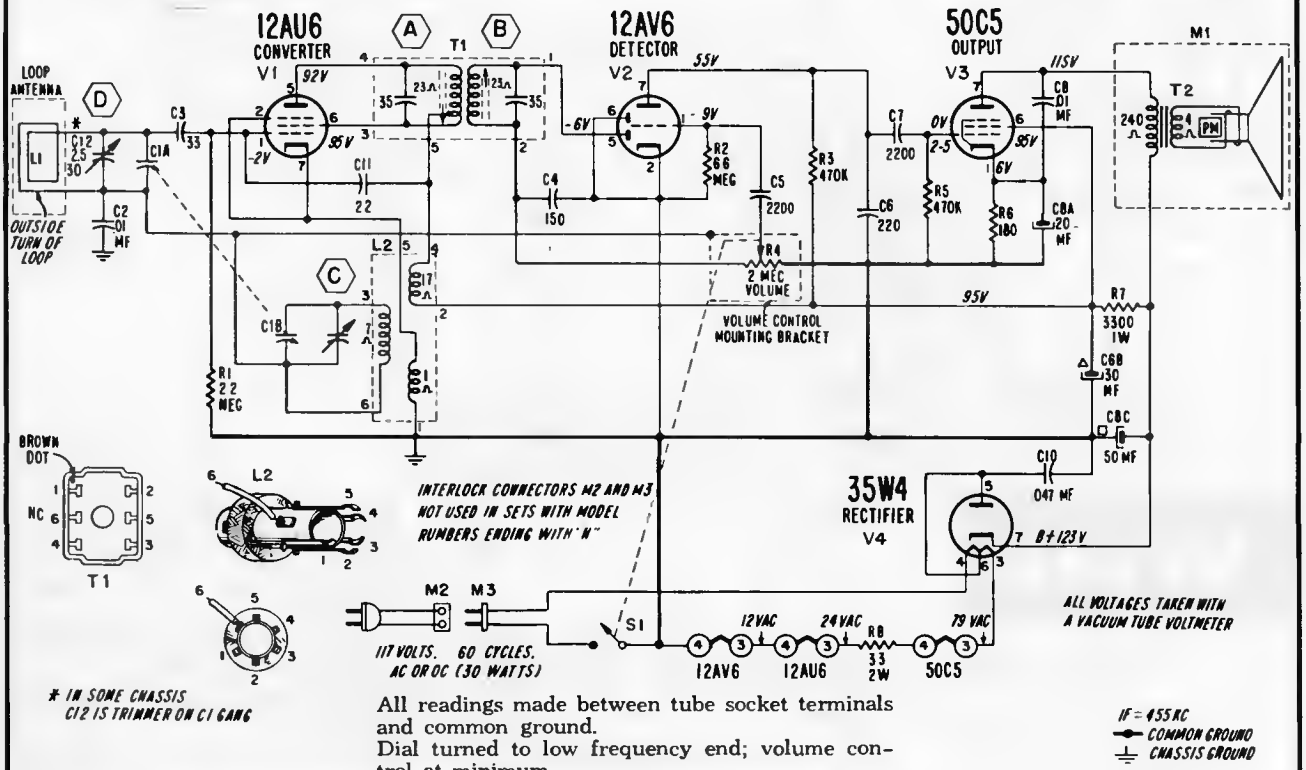
Tube socket voltages may be measured by using an octal "cheater" socket. If further servicing is necessary, remove the six Phillips screws that hold the motor board. Remove the control knobs and the 3/8" hex nuts that hold the controls to the cabinet.

Lift the changer up and turn the chassis over for servicing circuit components.

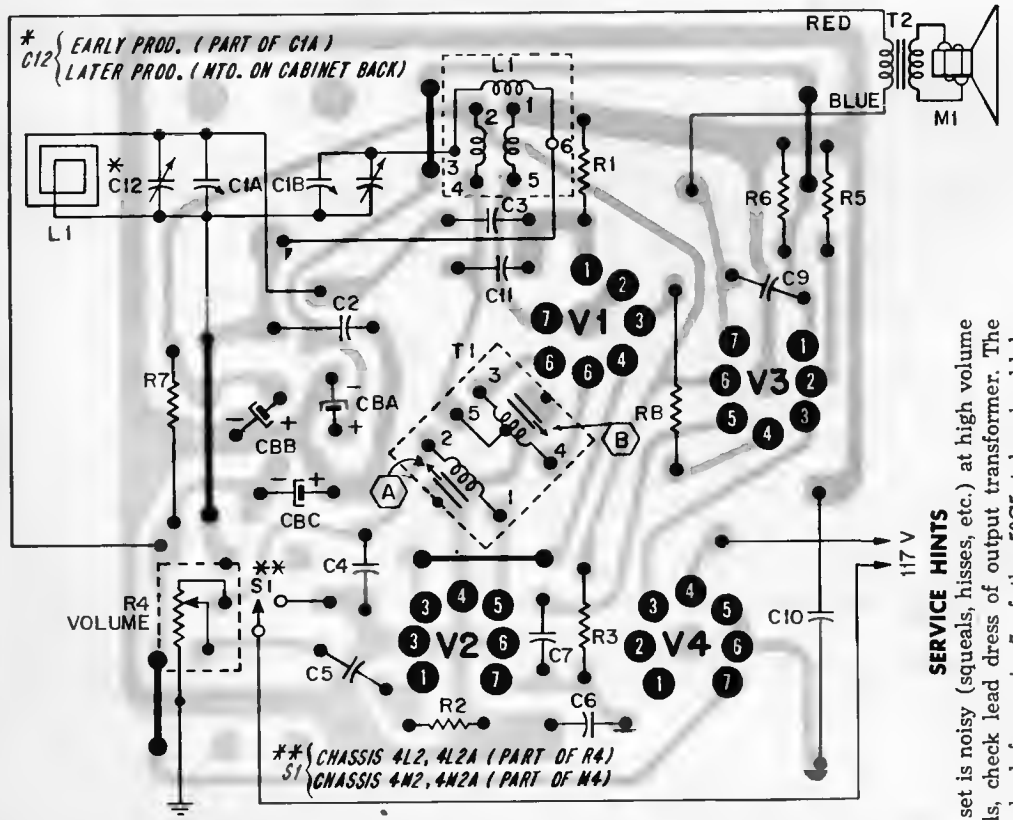
Admiral

CHASSIS 4L2 • 4L2A

MODELS 4L20A • 4L21 • 4L21A • 4L24 • 4L24A
4L25 • 4L25A • 4L26 • 4L26A • 4L28 • 4L28A



All readings made between tube socket terminals and common ground.
Dial turned to low frequency end; volume control at minimum.



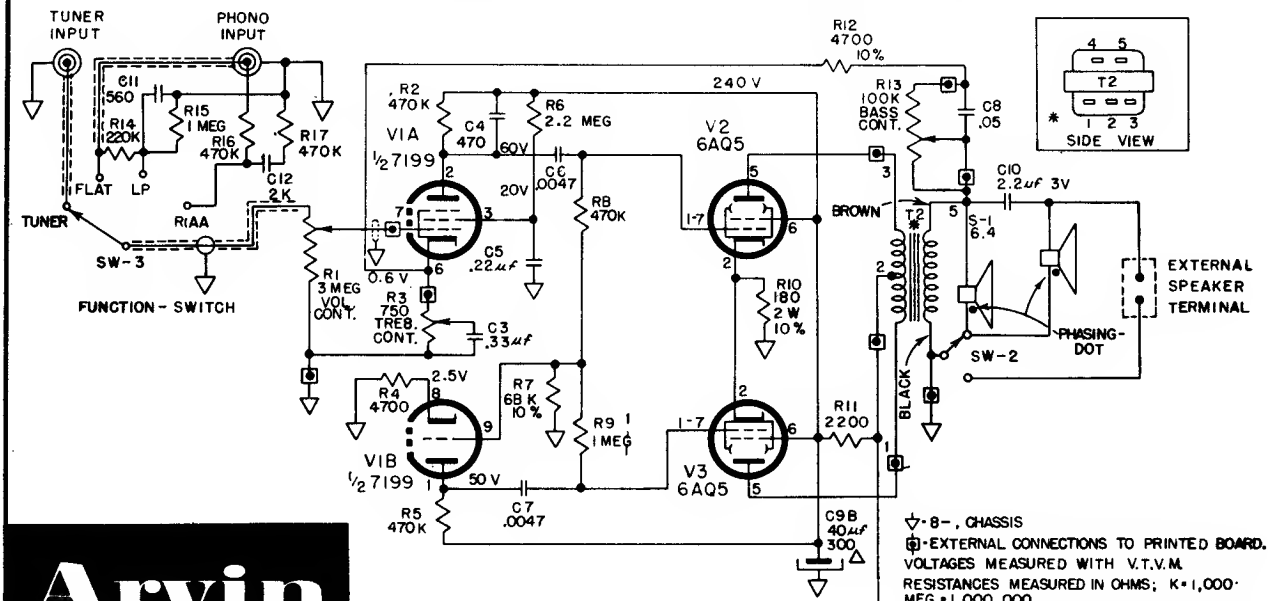
Rear View of Etched Wiring Board. Gray area represents etched wiring; black symbols and lines represent components on opposite side.

SERVICE HINTS

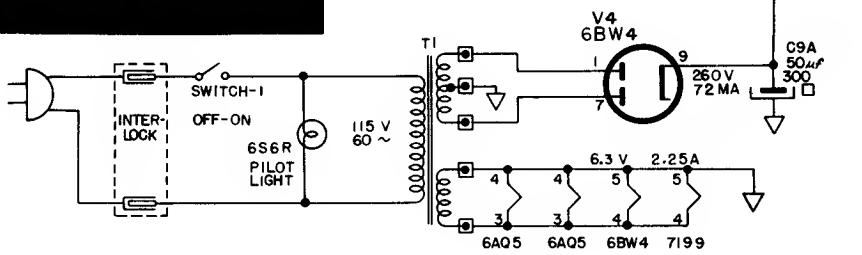
If set is noisy (squeals, hisses, etc.) at high volume levels, check lead dress of output transformer. The blue lead from pin 7 of the 50C5 tube should be routed along the rear of the board and the bottom of the cabinet to the transformer; **not across the board or between the tubes.**

If oscillator drift is encountered (resulting in the stations drifting slightly) check oscillator coil for number of terminals. The early production oscillator coil (L2) had only 5 terminals. Replace with later production coil with 6 terminals. Part No. 69A215-4. Ground terminal No. 6 to frame of gang capacitor.

ARVIN Industries Model 1586, Chassis 1.46500



Arvin



⏚-8-, CHASSIS

⊕-EXTERNAL CONNECTIONS TO PRINTED BOARD.

VOLTAGES MEASURED WITH V.T.V.M.

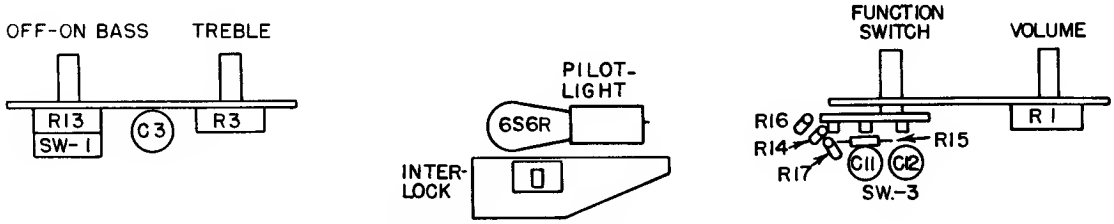
RESISTANCES MEASURED IN OHMS; K=1,000· MEG.=1,000,000.

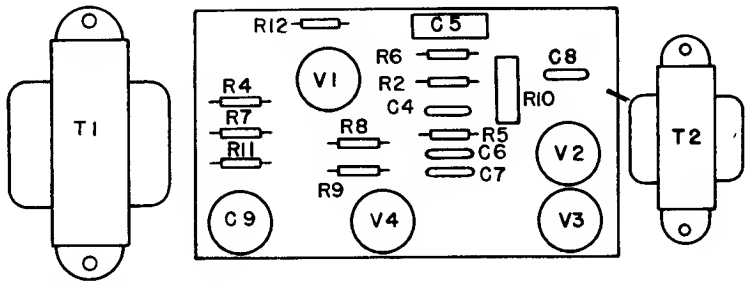
RESISTANCES TOLERANCES IS 20% UNLESS OTHERWISE INDICATED.

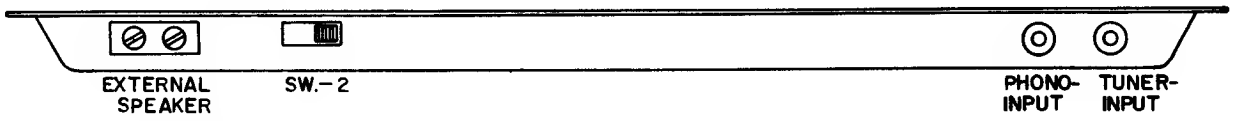
CAPACITANCE VALUES LESS THAN ONE (1) ARE IN MICROFARADS (μf), AND VALUES OF ONE (1) OR GREATER ARE IN MICROMICROFARADES (μμf) UNLESS OTHERWISE INDICATED.

* CAUTION: WHEN REPLACING T2 CONNECT AS INDICATED FOR CORRECT OPERATION OF FEEDBACK.

CAUTION: THIS AMPLIFIER IS SET UP SUCH, THAT WHEN A + VOLTAGE IS APPLIED TO THE PHONO INPUT THE SPEAKERS MOVE AWAY FROM THE SPEAKER BASKET SO THAT SPEAKERS ARE IN PHASE WITH COMPANION STERO UNIT. WHEN REPLACING SPEAKERS OR ANY OTHER PART OF THE CIRCUIT DO NOT ALTER THIS.







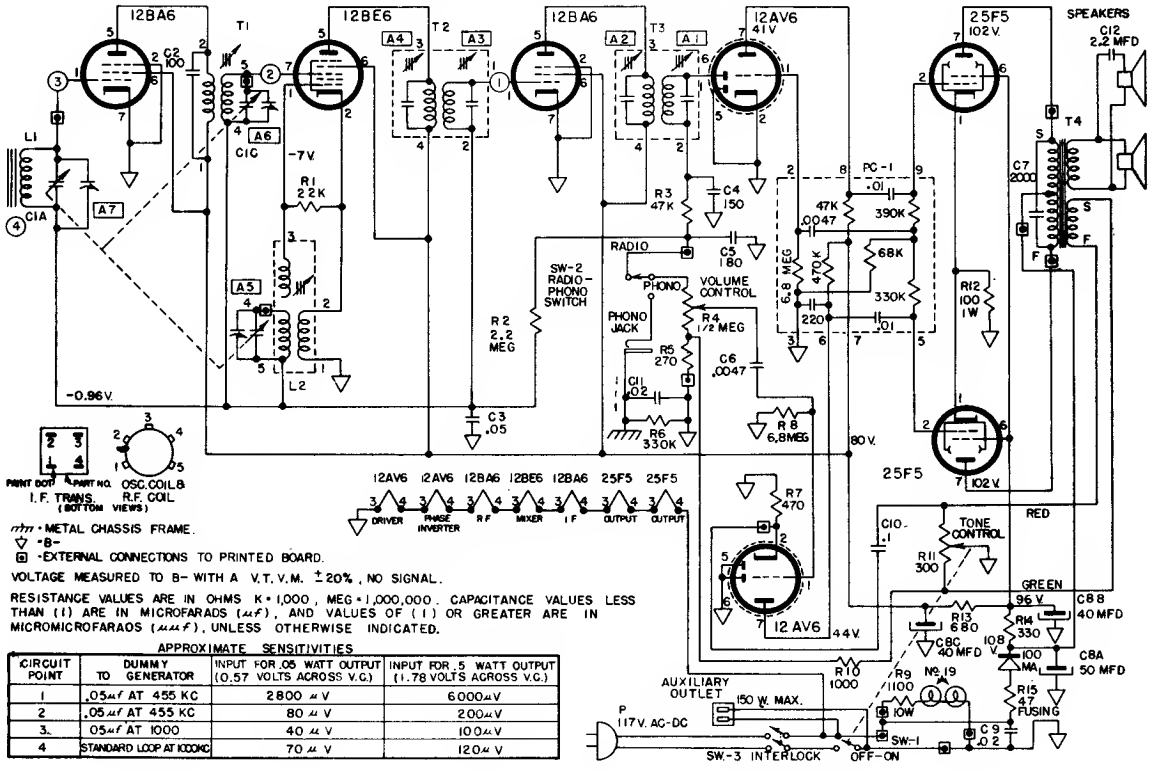
SPEAKERS

S-1 ---------- 5" x 7" P.M. Type ------- 6.4 ohms voice coil

S-2 ---------- 4" ------ P.M. Type ------- 6.4 ohms voice coil

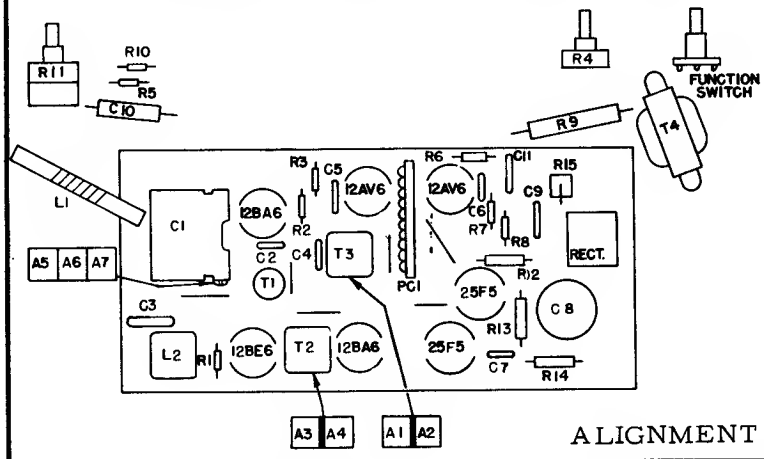
Impedance for external speaker 6.4 ohms.

ARVIN Industries Model 3582, Chassis 1.44700



APPROXIMATE SENSITIVITIES

CIRCUIT POINT	DUMMY TO GENERATOR	INPUT FOR .05 WATT OUTPUT (0.57 VOLTS ACROSS V.C.)	INPUT FOR .5 WATT OUTPUT (1.78 VOLTS ACROSS V.C.)
1	.05μf AT 455 KC	2800 μ V	6000μV
2	.05μf AT 455 KC	80 μ V	200μV
3.	.05μf AT 1000	40 μ V	100μV
4	STANDARD LOOP AT 1000KC	70 μ V	120μ V



SPEAKERS

Type: Permanent Magnet
Size: 5" x 7" and 4"
Voice Coil: 6.4 ohm

POWER SUPPLY

105-120 Volts, AC-DC, 45 watts

POWER OUTPUT

Undistorted	2.2 watts
Maximum	3.0 watts

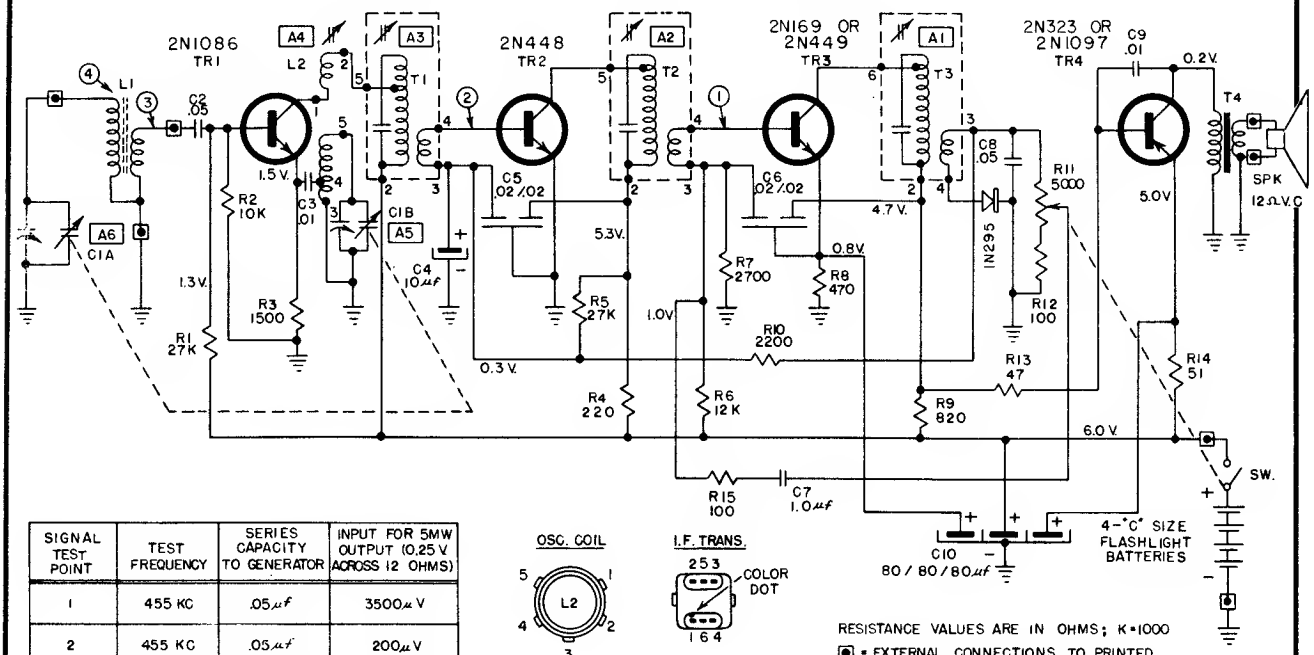
ALIGNMENT PROCEDURE

Position of Variable	Frequency of Generator	Dummy Antenna	Generator Output Connection	Trimmers Adjusted in order Shown for Maximum Output	Functions of Trimmer
Open	455	.05 μf	Pin 7 12BE6	A1, A2, A3, A4	I.F.
Open	1670		* Test Loop	A5	Oscillator
1400	1400		* Test Loop	A6, A7	R.F., Ant.
600	600		* Test Loop	Check Point	

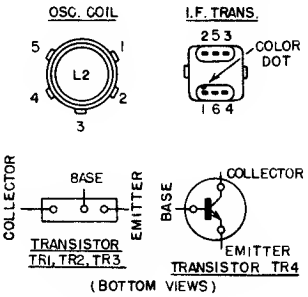
* Standard Hazeltine Test Loop Model 1150 or 3 turns of wire about 6" in diameter placed about one foot from the set loop.

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 AVC action of the receiver ineffective.

ARVIN Industries Model 7595, Chassis 1.47200



SIGNAL TEST POINT	TEST FREQUENCY	SERIES CAPACITY TO GENERATOR	INPUT FOR 5MW OUTPUT (0.25 V ACROSS 12 OHMS)
1	455 KC	.05µf	3500µV
2	455 KC	.05µf	200µV
3	455 KC	.05µf	8µV
4	1000 KC	STANDARD LOOP	500µV/M

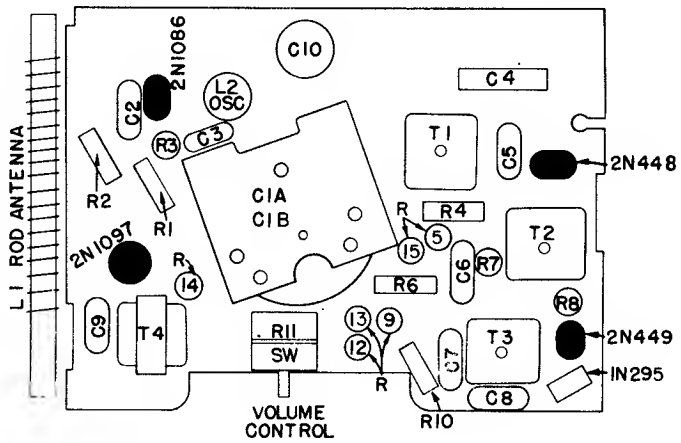


RESISTANCE VALUES ARE IN OHMS; K=1000

▣ = EXTERNAL CONNECTIONS TO PRINTED CIRCUIT.

CAPACITANCE VALUES LESS THAN 1.0 ARE IN MICROFARADS (µf), AND VALUES GREATER THAN 1.0 ARE IN MICRO-MICROFARADS (µµf) EXCEPT WHERE NOTED.

VOLTAGE READINGS TO COMMON GROUND ARE MEASURED WITH VACUUM TUBE VOLTMETER UNDER NO SIGNAL CONDITIONS WITH TUNING CAPACITOR CLOSED AND VOLUME CONTROL AT MAXIMUM CLOCKWISE ROTATION.



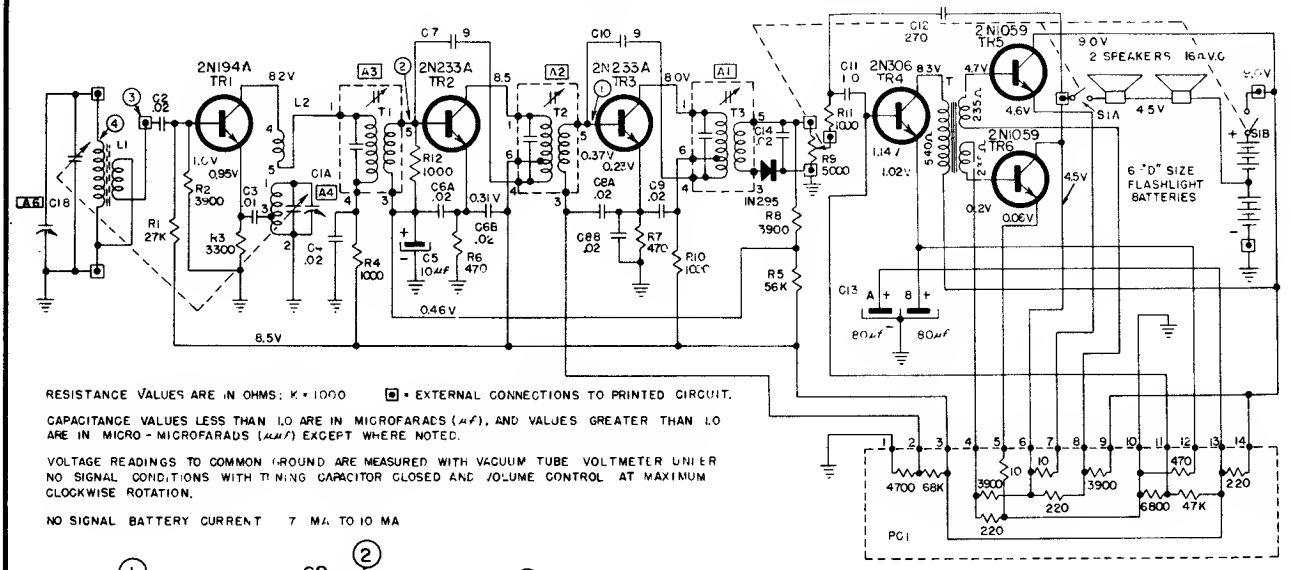
ALIGNMENT PROCEDURE

Output meter connected across voice coil. Generator ground to common ground. Generator modulation 30% at 400 cycles. Volume control in fully clockwise position.

Position of Variable	Generator Frequency	Dummy Antenna	Generator Connections	Trimmers Adj. in order shown for Max. Output	Function of Trimmer
Open	455 Kc	.05 µf	C1A	A1 (Top of T3)	I.F.
				A2 (Top of T2)	I.F.
				A3 (Top of T1)	I.F.
Open	1670 Kc		*Test Loop	A5	Oscillator
1400 Kc	1400 Kc		*Test Loop	A6	Antenna
600 Kc	600 Kc		*Test Loop	Check Point	

*Standard Hazeltine Test Loop Model 1150 or 3 turns of wire about 6" in diameter placed about one foot from the set loop.

ARVIN Industries Model 2598, Chassis 1.47900

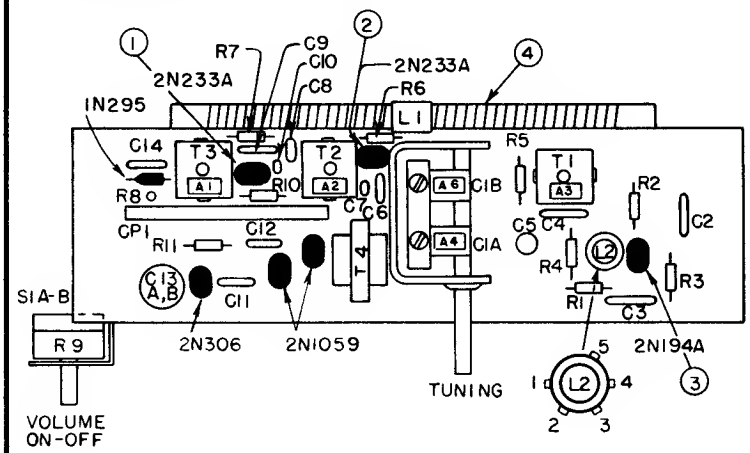


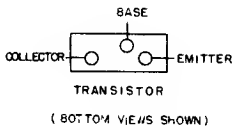
RESISTANCE VALUES ARE IN OHMS; K = 1000 ▣ = EXTERNAL CONNECTIONS TO PRINTED CIRCUIT.

CAPACITANCE VALUES LESS THAN 1.0 ARE IN MICROFARADS (μf), AND VALUES GREATER THAN 1.0 ARE IN MICRO-MICROFARADS (μμf) EXCEPT WHERE NOTED.

VOLTAGE READINGS TO COMMON GROUND ARE MEASURED WITH VACUUM TUBE VOLTMETER UNDER NO SIGNAL CONDITIONS WITH TUNING CAPACITOR CLOSED AND VOLUME CONTROL AT MAXIMUM CLOCKWISE ROTATION.

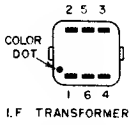
NO SIGNAL BATTERY CURRENT 7 MA. TO 10 MA.





TRANSISTOR

(BOTTOM VIEWS SHOWN)



I.F. TRANSFORMER

SIGNAL TEST POINT	TEST FREQUENCY	SERIES CAPACITOR TO GENERATOR	INPUT FOR 50MW OUTPUT (1.27 V. ACROSS 32Ω)
1	455 KC	.05 μf	3000 μV
2	455 KC	.05 μf	80 μV
3	455 KC	.05 μf	6 μV
4	1000 KC	STANDARD LOOP	250 μV/m

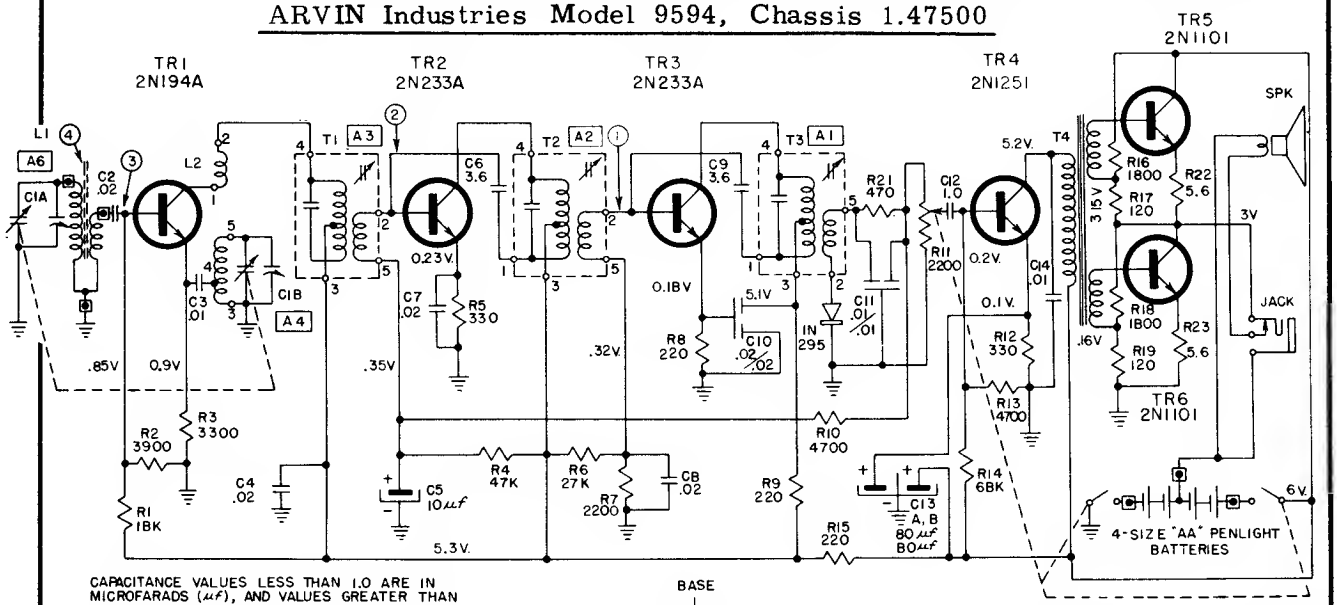
ALIGNMENT PROCEDURE

Output meter reading to indicate 50 milliwatts ..... **1.27 V**
Output meter connection..... Across speaker voice coils
Connection of generator ground lead ..... Common Ground
Generator Modulation..... 30% 400 cycles
Position of volume control..... Fully clockwise

Position of Variable	Generator Frequency	Dummy Antenna	Generator Connections	Trimmers Adj. in order shown for Max. Output	Function of Trimmer
Open	455 Kc	.05 μf	C1B.	A1 (Top of T3) A2 (Top of T2) A3 **(Top of T1)**)	I.F. I.F. I.F.
Open	1670 Kc		*Test Loop	A4	Oscillator
1400 Kc	1400 Kc		*Test Loop	A6	Antenna
600 Kc	600 Kc		*Test Loop	Check Point	

*Standard Hazeltine Test Loop Model 1150 or 3 turns of wire about 6" in diameter placed about one foot from the set loop.

ARVIN Industries Model 9594, Chassis 1.47500

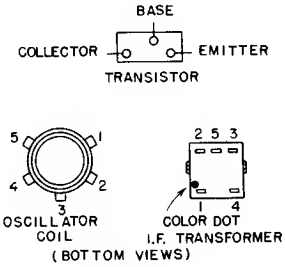


CAPACITANCE VALUES LESS THAN 1.0 ARE IN MICROFARADS (μf), AND VALUES GREATER THAN 1.0 ARE IN MICRO-MICROFARADS (μμf) EXCEPT WHERE NOTED.

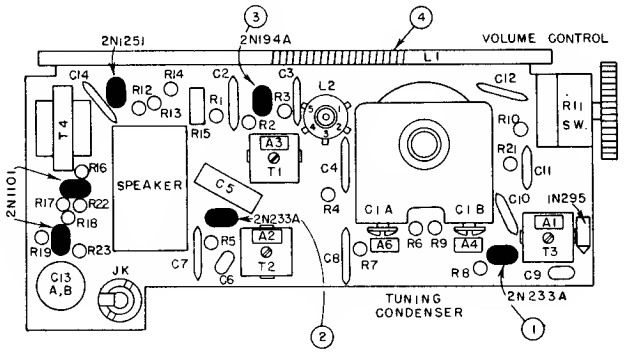
VOLTAGE READINGS TO COMMON GROUND ARE MEASURED WITH VACUUM TUBE VOLTMETER UNDER NO SIGNAL CONDITIONS WITH TUNING CAPACITOR CLOSED AND VOLUME CONTROL AT MAXIMUM CLOCKWISE ROTATION.

RESISTANCE VALUES ARE IN OHMS; K = 1000.

⏚ - COMMON GROUND SYMBOL.
⊡ - EXTERNAL CONNECTION TO PRINTED CIRCUIT.
TOTAL BATTERY CURRENT DRAIN UNDER ND SIGNAL CONDITIONS, 7 TO 11 MA.



SIGNAL TEST POINTS	TEST FREQUENCY	SERIES CAPACITOR TO GENERATOR	INPUT FOR 5MW OUTPUT (47V. ACROSS 45Ω)
①	455KC	.05μf	1500μV
②	455KC	.05μf	60μV
③	455KC	.05μf	10μV
④	1000KC	STANDARD LOOP	350μV/M



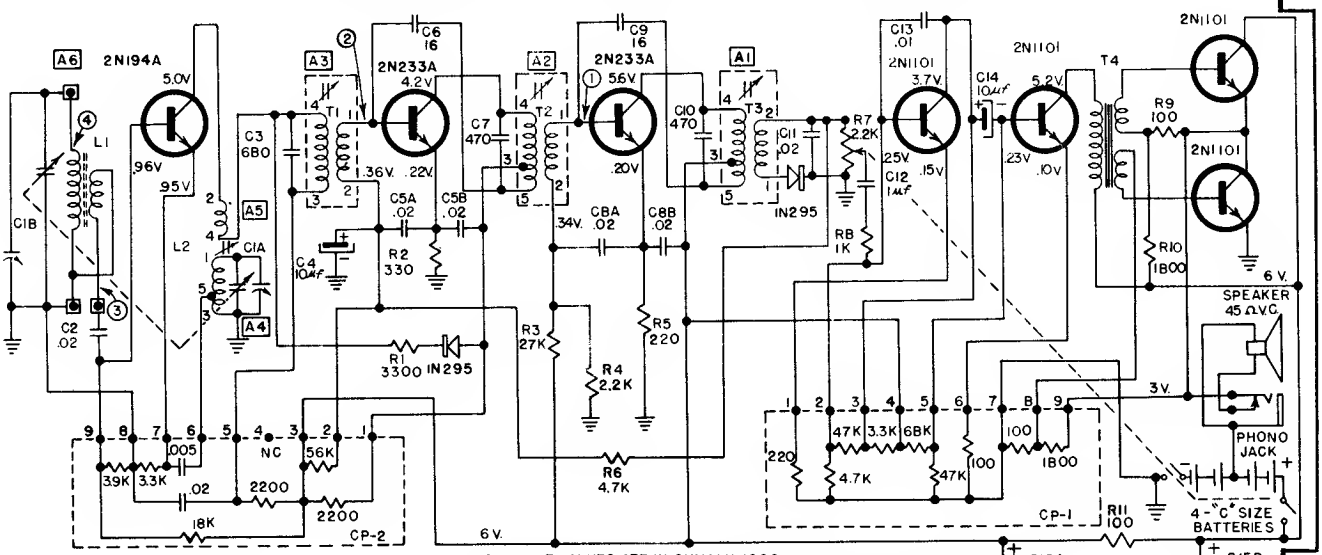
ALIGNMENT PROCEDURE

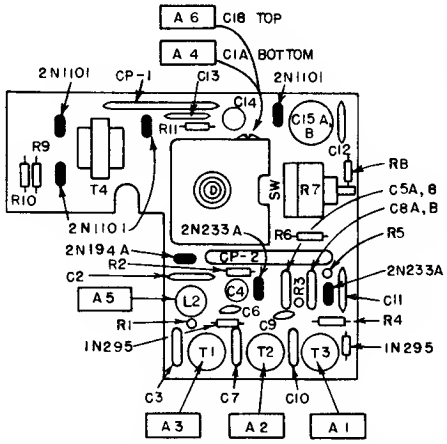
Output meter connected across voice coil. Generator ground lead connected to common ground. Generator modulation 30%, 400 cycles. Position of volume and tone controls maximum clockwise.

Position of Variable	Generator Frequency	Dummy Antenna	Generator Connections	Trimmers Adj. in order shown for Max. Output	Function of Trimmer
Open	455 Kc	.05 μf	C1A	A1 (Top of T3)	I.F.
				A2 (Top of T2)	I.F.
				A3 (Top of T1)	I.F.
Open	1670 Kc		*Test Loop	A4	Oscillator
1400 Kc	1400 Kc		*Test Loop	A6	Antenna
600 Kc	600 Kc		*Test Loop	Check Point	

*Standard Hazeltine Test Loop Model 1150 or 3 turns of wire about 6" in diameter placed about one foot from the set loop.

ARVIN Industries Model 9595, Chassis 1.47600





RESISTANCE VALUES ARE IN OHMS; K=1000.

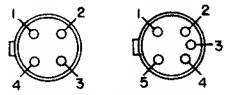
CAPACITANCE VALUES LESS THAN 1.0 ARE IN MICROFARADS (μf), & VALUES GREATER THAN 1.0 ARE IN MICRO-MICROFARADS (μμf) EXCEPT WHERE NOTED.

VOLTAGE READINGS TO COMMON GROUND ARE MEASURED WITH VACUUM TUBE VOLTMETER UNDER NO SIGNAL CONDITIONS WITH TUNING CAPACITOR CLOSED & VOLUME CONTROL AT MAXIMUM CLOCKWISE ROTATION.

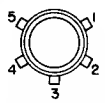
⏚ = COMMON GROUND SYMBOL.

■ = EXTERNAL CONNECTION TO PRINTED CIRCUIT.

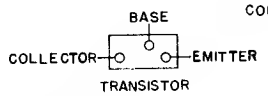
SIGNAL TEST POINT	TEST FREQUENCY	SERIES CAPACITOR TO GENERATOR	INPUT FOR 5 M W OUTPUT (.475 V. ACROSS 4.5Ω)
1	455 KC	.05μf	900 μV
2	455 KC	.05μf	30 μV
3	455 KC	.05μf	5 μV
4	1000 KC	STANDARD LOOP	200 μV/m



I.F. TRANSFORMER BASE (BOTTOM VIEWS)



OSCILLATOR COIL



TRANSISTOR

ALIGNMENT PROCEDURE

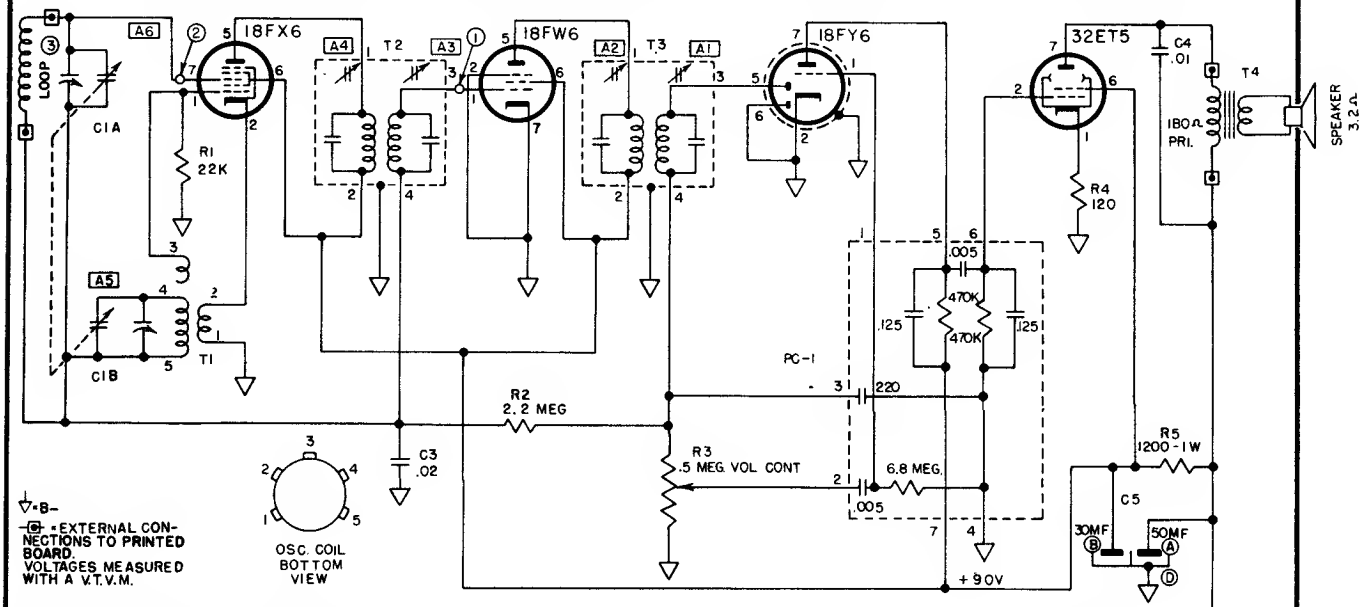
Output meter reading to indicate 5 milliwatts ..... .475V
Output meter connection ..... Across speaker voice coil
Connection of generator ground lead ..... Common Ground
Generator Modulation ..... 30% 400 Cycles
Position of volume control ..... Fully Clockwise

Position of Variable	Generator Frequency	Dummy Antenna	Generator Connections	Trimmers Adj. in order shown for Max. Output	Function of Trimmer
Open	455 Kc	.05 μf	C1B	A1 (Top of T3)	I.F.
				A2 (Top of T2)	I.F.
				A3 (Top of T1)	I.F.
Open	1670 Kc		*Test Loop	A4	Oscillator
1400 Kc	1400 Kc		*Test Loop	A6	Antenna
600 Kc	600 Kc		*Test Loop	Check Point	

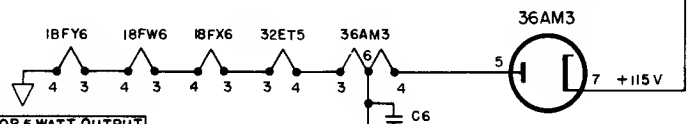
*Standard Hazeltine Test Loop Model 1150 or 3 turns of wire about 6" in diameter placed about one foot from the set loop.

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 AVC action of the receiver ineffective.

ARVIN Industries Model 5591, Chassis 1.46700. Model 5592, Chassis 1.46800, is electrically the same as data on this page except for clock connections.

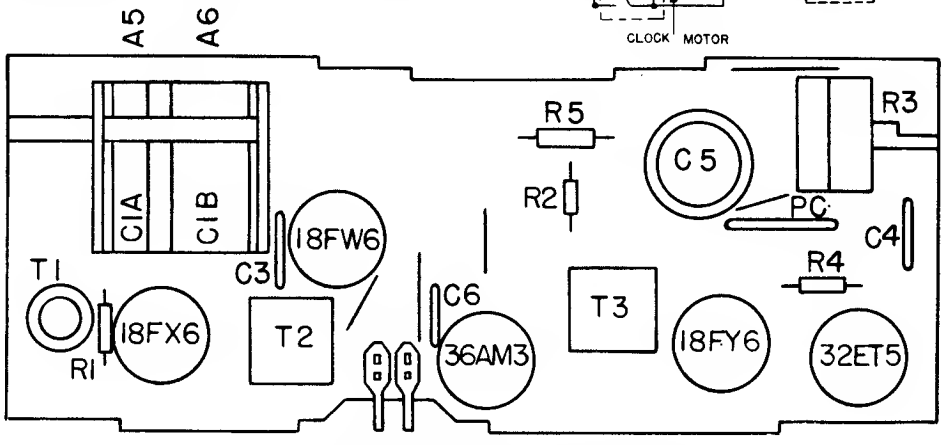


RESISTANCE VALUES ARE IN OHMS K=1,000, MEG=1,000,000. CAPACITANCE VALUES LESS THAN (1) ARE IN MICROFARADS (mf), AND VALUES OF (1) OR GREATER ARE IN MICROMICROFARADS (mmf), UNLESS OTHERWISE INDICATED.



APPROXIMATE SENSITIVITIES

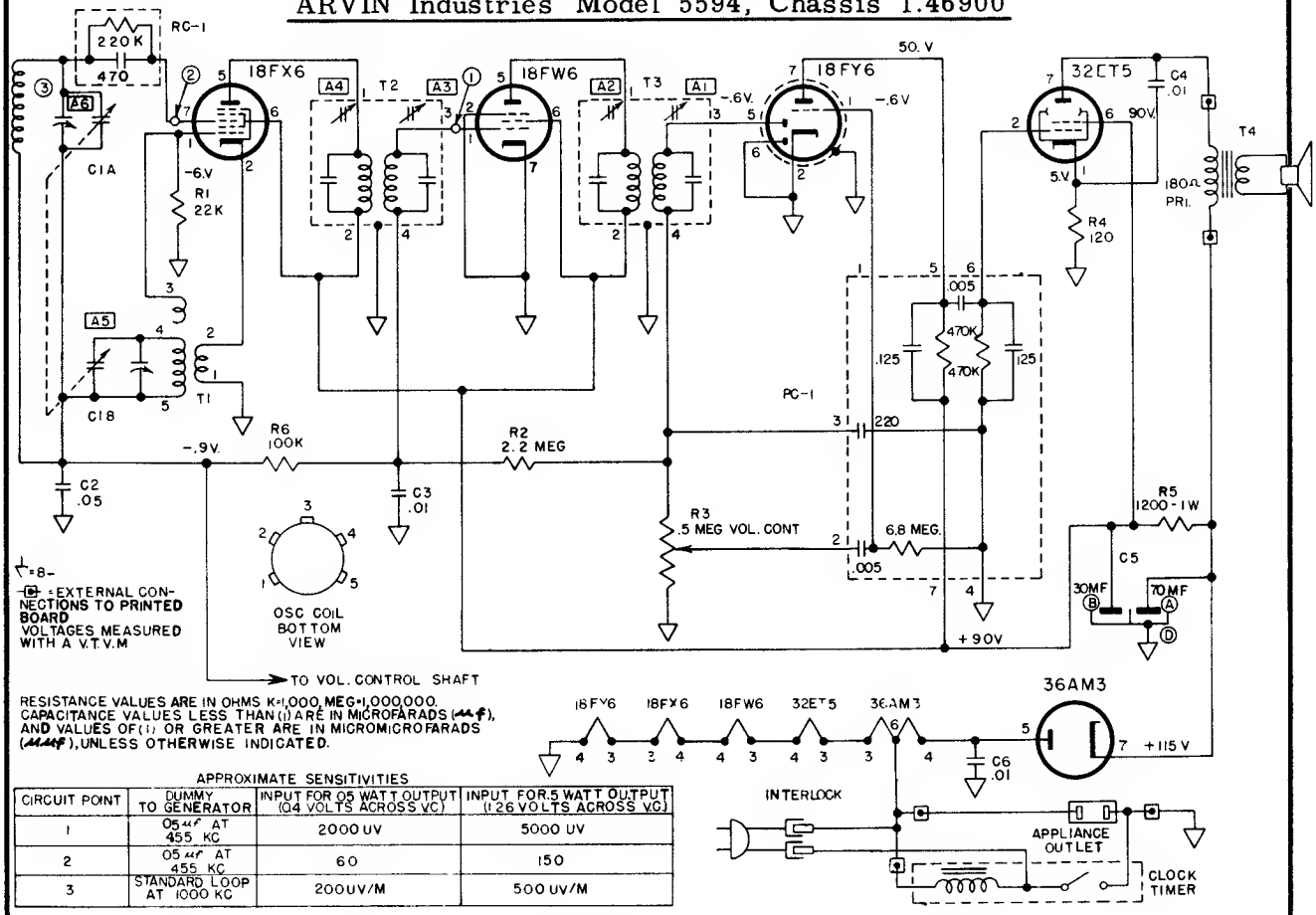
CIRCUIT POINT	DUMMY TO GENERATOR	INPUT FOR 05 WATT OUTPUT (04 VOLTS ACROSS VC)	INPUT FOR 5 WATT OUTPUT (1 26 VOLTS ACROSS VC)
1	05 mf AT 455 KC	2000 UV	5000 UV
2	05 mf AT 455 KC	60	150
3	STANDARD LOOP AT 1000 KC	200 UV/M	500 UV/M



ALIGNMENT PROCEDURE

Position of Variable	Frequency of Generator	Dummy Antenna	Generator Output Connection	Trimmers Adjusted in Order Shown for Maximum Output	Function of Trimmer
Open	455 Kc	.05 μ fd	Pin 7 18FX6	A1, A2, A3, A4	I.F.
Open	1670 Kc		Test Loop	A5	Oscillator
1400	1400 Kc		Test Loop	A6	Antenna
1000	1000 Kc		Test Loop	Fan C1A Plates	
600	600 Kc		Test Loop	Fan C1A Plates	

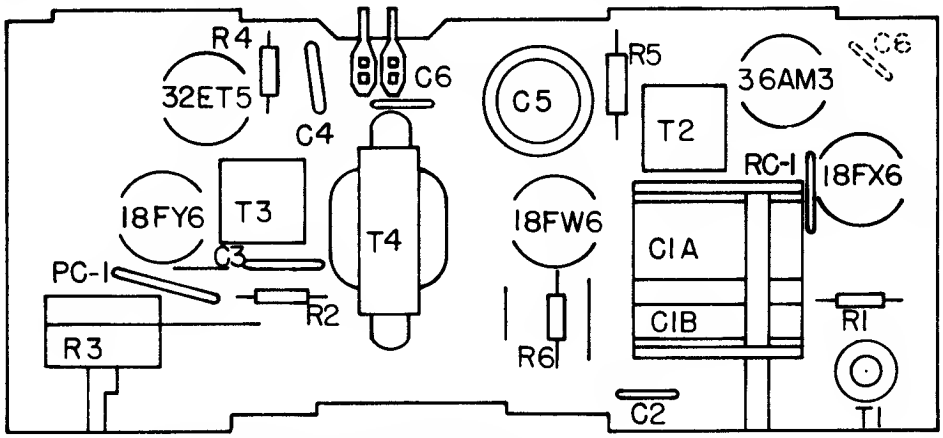
ARVIN Industries Model 5594, Chassis 1.46900



RESISTANCE VALUES ARE IN OHMS K=1,000, MEG=1,000,000. CAPACITANCE VALUES LESS THAN (1) ARE IN MICROFARADS (μf), AND VALUES OF (1) OR GREATER ARE IN MICROMICROFARADS (μμf), UNLESS OTHERWISE INDICATED.

APPROXIMATE SENSITIVITIES

CIRCUIT POINT	DUMMY TO GENERATOR	INPUT FOR 05 WATT OUTPUT (04 VOLTS ACROSS VC)	INPUT FOR 5 WATT OUTPUT (1.26 VOLTS ACROSS VC)
1	05 μf AT 455 KC	2000 UV	5000 UV
2	05 μf AT 455 KC	60	150
3	STANDARD LOOP AT 1000 KC	200 UV/M	500 UV/M



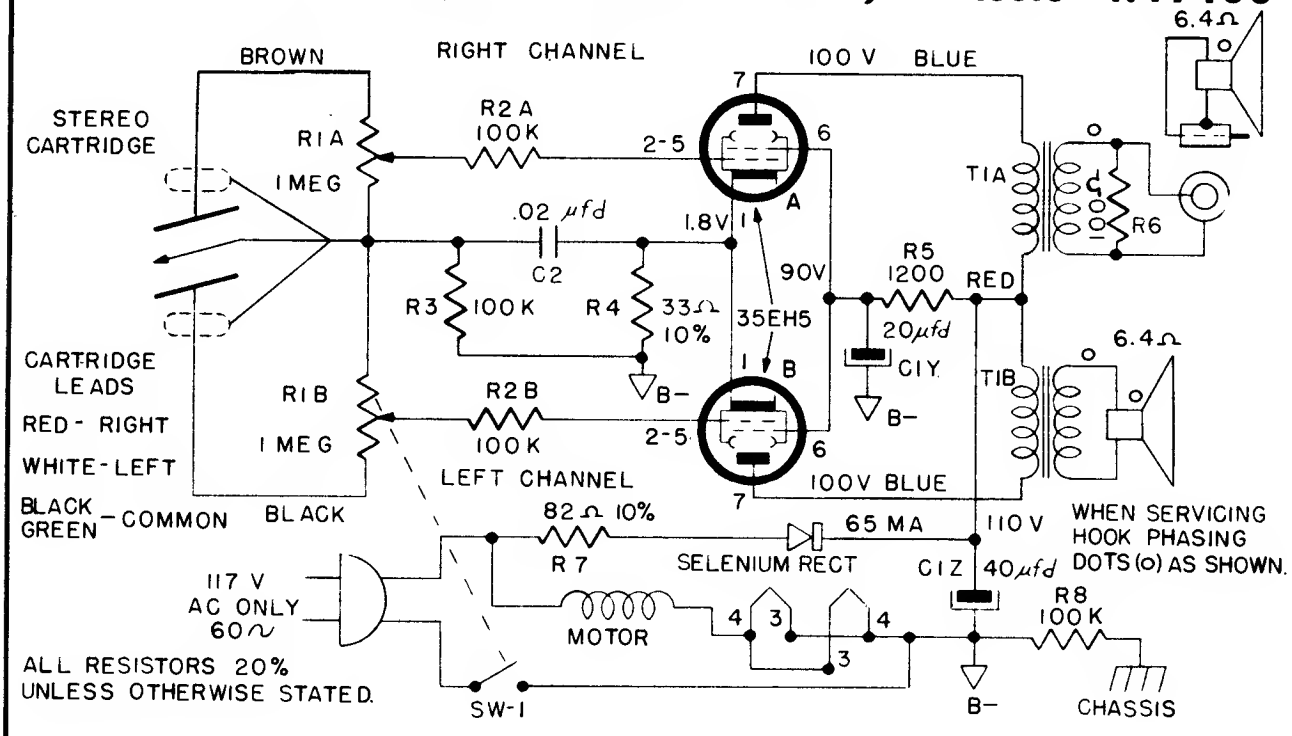
ALIGNMENT

Output meter connected across voice coil. Generator ground lead to floating ground. Modulation 30%, 400 cycles.

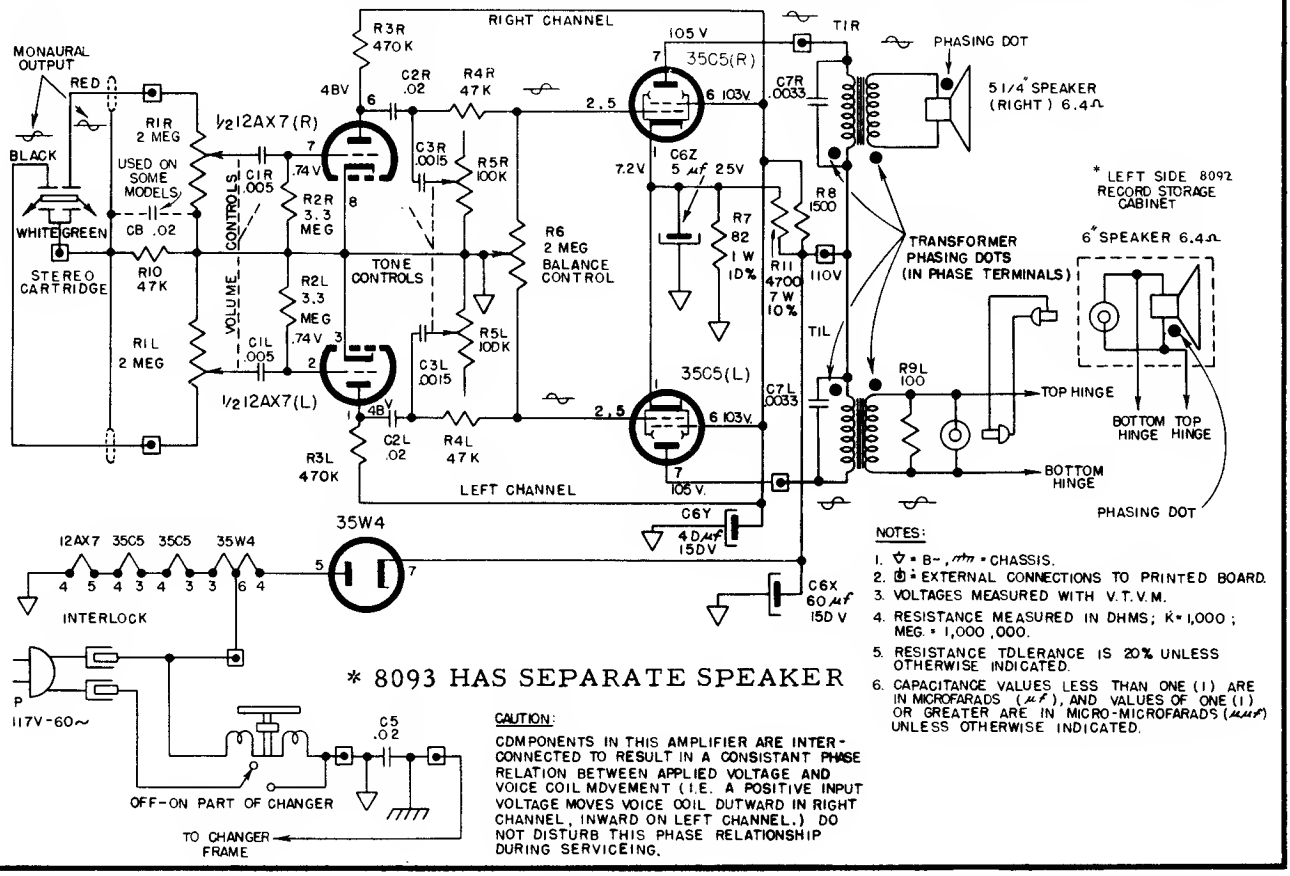
ALIGNMENT PROCEDURE

Position of Variable	Frequency of Generator	Dummy Antenna	Generator Output Connection	Trimmers Adjusted in Order Shown for Maximum Output	Function of Trimmer
Open	455 Kc	.05 μ fd	Pin 7 18FX6	A1, A2, A3, A4	I.F.
Open	1670 Kc		Test Loop	A5	Oscillator
1400	1400 Kc		Test Loop	A6	Antenna
1000	1000 Kc		Test Loop	Fan C1A Plates	
600	600 Kc		Test Loop	Fan C1A Plates	

Arvin INDUSTRIES, INC. MODEL 2094, CHASSIS 1.49400



ARVIN Industries Model 8092, Chassis 1.48300, and Model 8093, Chassis 1.48600

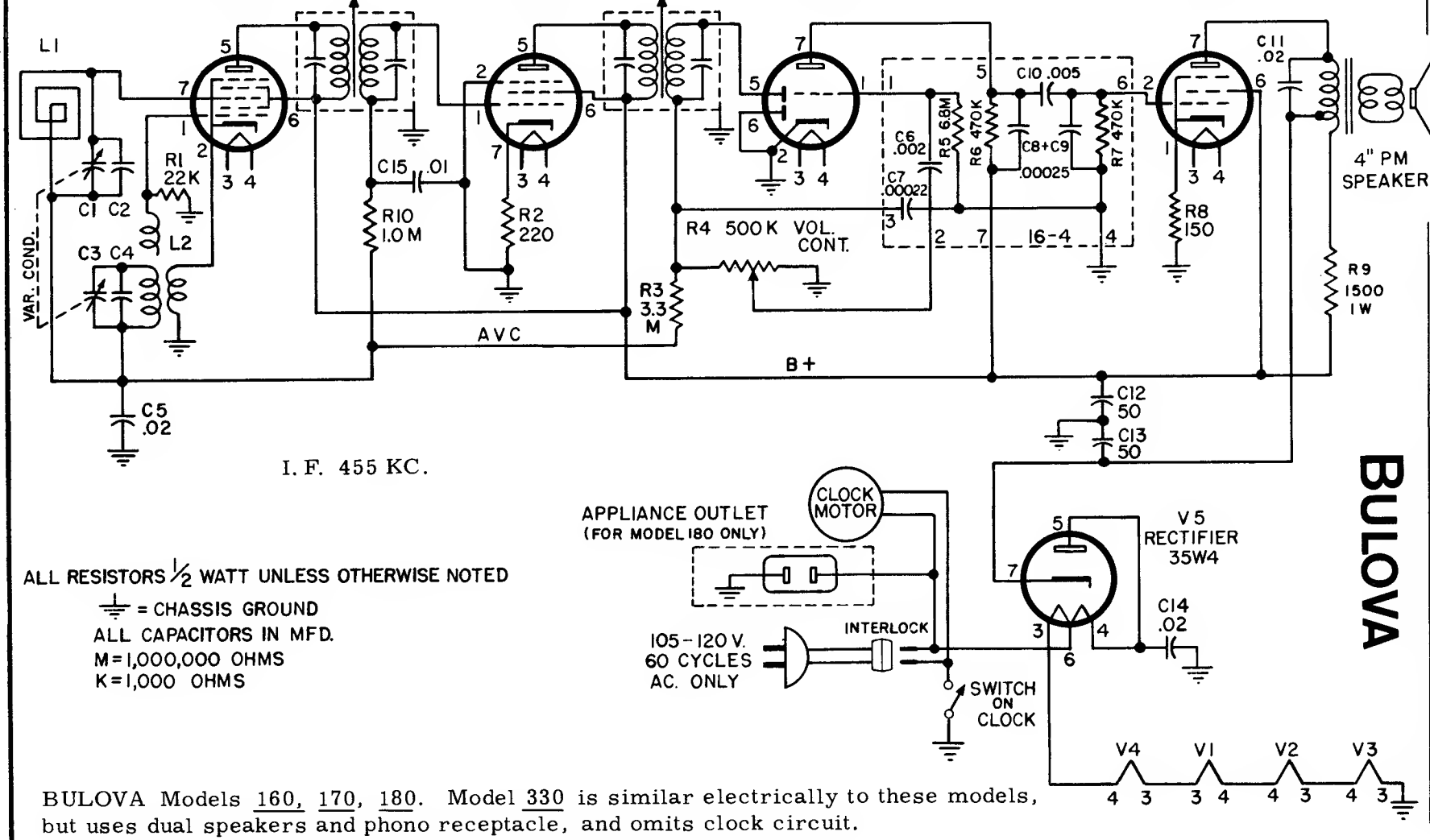


NOTES:

1. ▽ = B-, ⏚ = CHASSIS.
2. ⊕ = EXTERNAL CONNECTIONS TO PRINTED BOARD.
3. VOLTAGES MEASURED WITH V.T.V.M.
4. RESISTANCE MEASURED IN OHMS; K = 1,000; MEG. = 1,000,000.
5. RESISTANCE TOLERANCE IS 20% UNLESS OTHERWISE INDICATED.
6. CAPACITANCE VALUES LESS THAN ONE (1) ARE IN MICROFARADS (μf), AND VALUES OF ONE (1) OR GREATER ARE IN MICRO-MICROFARADS (μμf) UNLESS OTHERWISE INDICATED.

CAUTION:

COMPONENTS IN THIS AMPLIFIER ARE INTERCONNECTED TO RESULT IN A CONSISTANT PHASE RELATION BETWEEN APPLIED VOLTAGE AND VOICE COIL MOVEMENT (I.E. A POSITIVE INPUT VOLTAGE MOVES VOICE COIL OUTWARD IN RIGHT CHANNEL, INWARD ON LEFT CHANNEL.) DO NOT DISTURB THIS PHASE RELATIONSHIP DURING SERVICEING.



ALL RESISTORS 1/2 WATT UNLESS OTHERWISE NOTED

⏚ = CHASSIS GROUND

ALL CAPACITORS IN MFD.

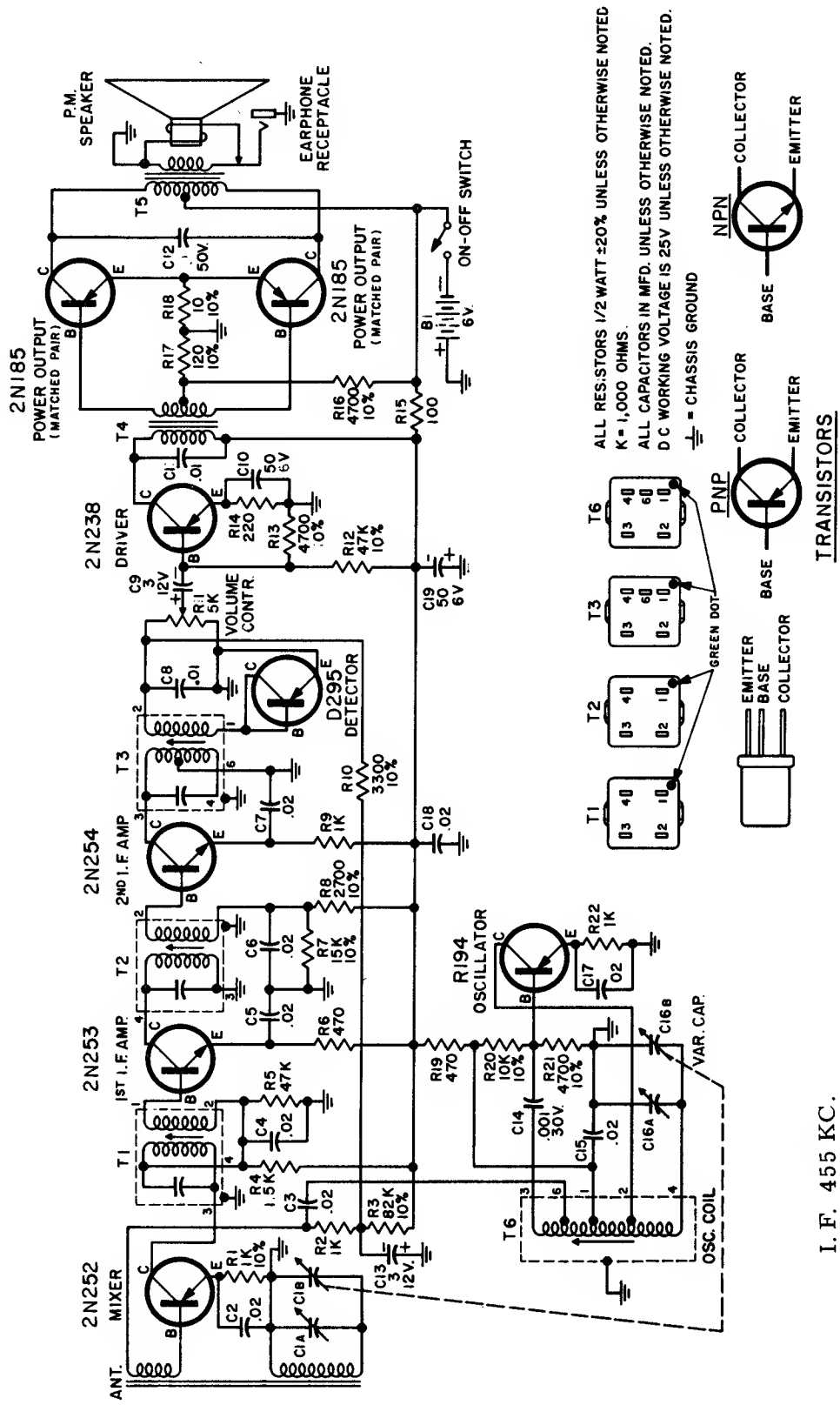
M = 1,000,000 OHMS

K = 1,000 OHMS

BULOVA

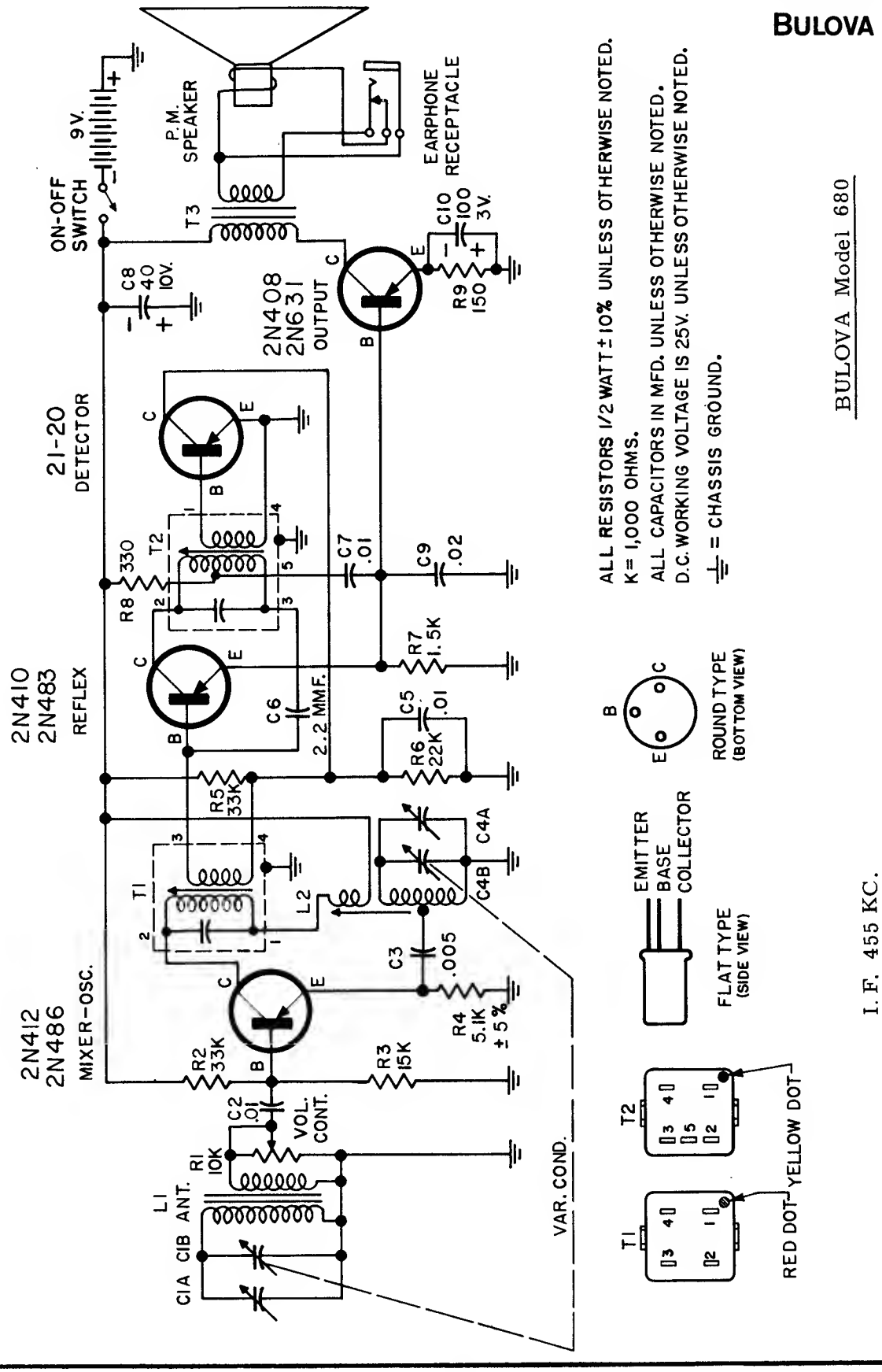
BULOVA Models 160, 170, 180. Model 330 is similar electrically to these models, but uses dual speakers and phono receptacle, and omits clock circuit.

BULOVA



I. F. 455 KC.

BULOVA Model 660 (Hercules)


BULOVA
BULOVA Model 680
I. F. 455 KC.
ALL RESISTORS 1/2 WATT ± 10% UNLESS OTHERWISE NOTED.
K= 1,000 OHMS.
ALL CAPACITORS IN MFD. UNLESS OTHERWISE NOTED.
D.C. WORKING VOLTAGE IS 25V. UNLESS OTHERWISE NOTED.
⏚ = CHASSIS GROUND.
2N412 2N486 MIXER-OSC.
2N410 2N483 REFLEX
21-20 DETECTOR
2N408 2N631 OUTPUT
ON-OFF SWITCH
9V.
P.M. SPEAKER
EARPHONE RECEPTACLE
T3
C10 100 3V.
R9 150
C8 40 10V.
R8 330
T2
C7 .01
C9 .02
R7 1.5K
C6 2.2 MMF.
C5 .01
R6 22K
R5 33K
C4A
C4B
T1
L2
C3 .005
R4 5.1K ± 5%
R2 33K
R3 15K
C2 .01
VOL. CONT.
R1 10K
L1 ANT.
C1A C1B
VAR. COND.
EMITTER
BASE
COLLECTOR
FLAT TYPE (SIDE VIEW)
ROUND TYPE (BOTTOM VIEW)
RED DOT
YELLOW DOT

COLUMBIA

MODEL 400

ALIGNMENT

Connect V.T.V.M. to speaker terminals; or through 10μf to 2S56 collector to ground. At 11 milliwatts output voice coil voltage is about 0.3 volts and collector to ground voltage is about 3.7 volts. 13 milliwatts output gives about 10% distortion. This level will give a voltage reading of 0.4 volts at the voice coil. Follow alignment procedure in the table below.

Alignment Procedure	1	2	3	4	5	6	7	8	9	10
Alignment Circuit	IF Transformers				Oscillator Circuit			Tuning Circuit		
Signal Connected to Generator	Between Outer Antenna Jack and Earth Potential				Test Loop					
Signal Generator Frequency	455 KC	455 KC	455 KC	455 ± 10	640 KC	1240 KC	640 & 1240	640 KC	1240 KC	640 & 1240
Dial Pointer Setting	Around 1600 KC				CD Mark (Lower)	CD Mark (Higher)	CD Mark (Both)	CD Mark (Lower)	CD Mark (Higher)	CD Mark (Both)
Adjust for Maximum Output	IFT_3	IFT_2	IFT_1	Repeat Nos. 1, 2, and 3	Osc. Coil L_2	Osc. Trimmer (Rear Section)	Repeat Nos. 5, 6	Antenna Coil	Trimmer (Front Section)	Repeat Nos. 8, 9

VOLTAGE MEASUREMENTS

Normal voltages measured by a 50 k/volt meter and a fully charged battery in the set

	V_c	V_e	V_b	I_c
2S52	8	1.3	1.3	0.2
2S53	8	0.5	0.3	0.5
2S45	5	1.2	1.4	2.5 to 3
2S56	9	1.3	1.5	6 to 8

SERVICING

To prevent damage to transistors when replacing battery, shut off the on-off switch. Also be certain of proper polarity connection.

In measuring resistances it is advisable not to use a high voltage type ohmmeter; also connect the positive side of the ohmmeter toward the circuit ground. Complete circuit resistance, with battery disconnected, is about 500 ohms measured across the battery clips.

COLUMBIA

MODEL 600

For alignment see instructions under Model 400, on page 30.

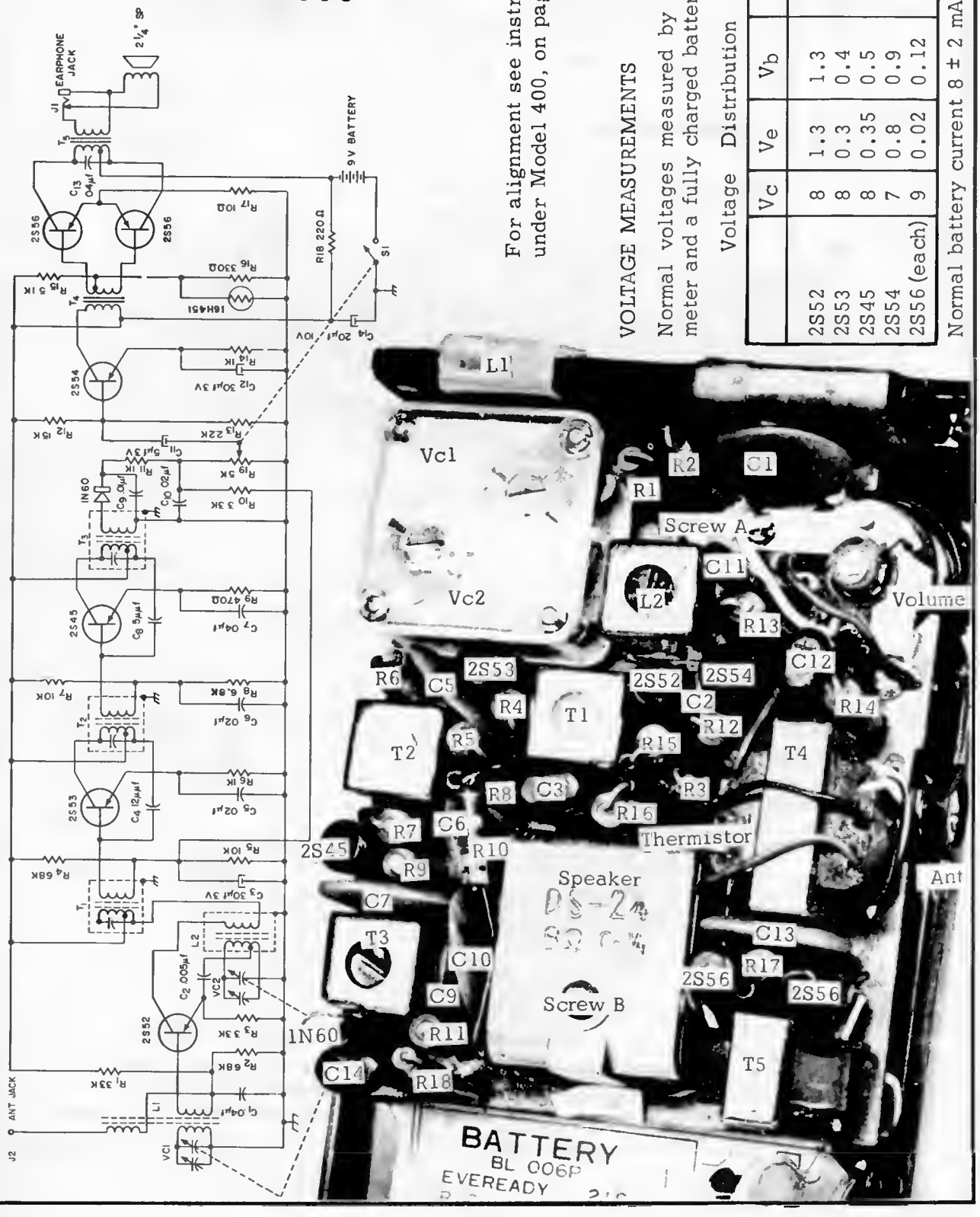
VOLTAGE MEASUREMENTS

Normal voltages measured by a 50 k/volt meter and a fully charged battery in the set

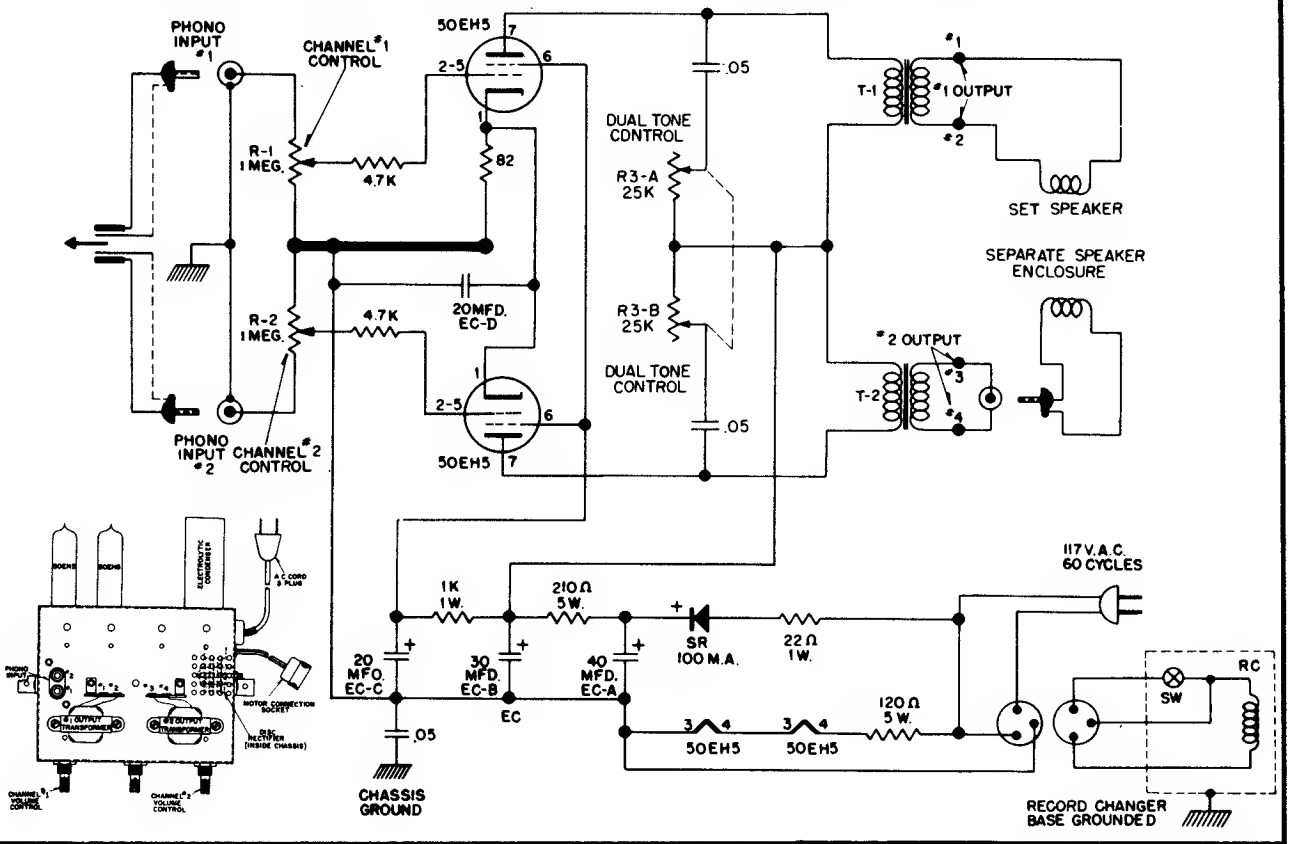
Voltage Distribution

	Vc	Ve	Vb	Ic
2S52	8	1.3	1.3	0.4
2S53	8	0.3	0.4	0.3
2S45	8	0.35	0.5	0.8
2S54	7	0.8	0.9	0.8
2S56 (each)	9	0.02	0.12	1.2

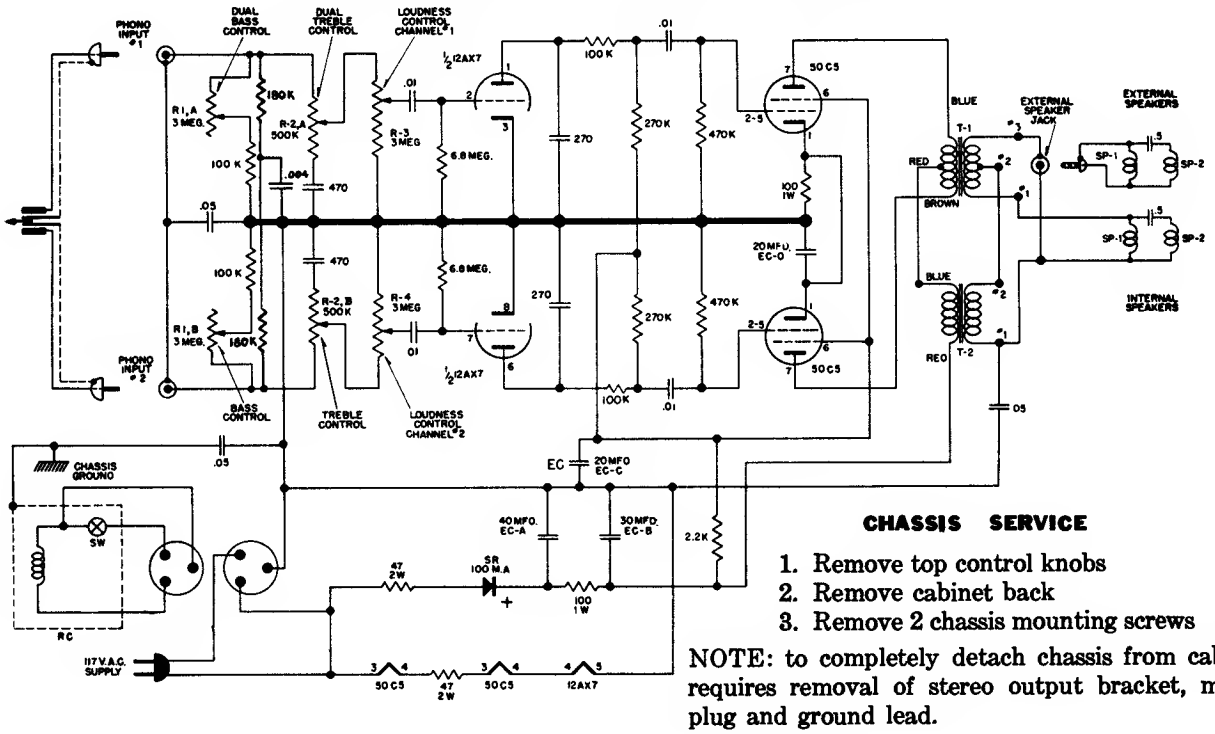
Normal battery current 8 ± 2 mA



COLUMBIA MODEL C1010



CBS-COLUMBIA Models C1012 and C1148



CHASSIS SERVICE

1. Remove top control knobs
2. Remove cabinet back
3. Remove 2 chassis mounting screws

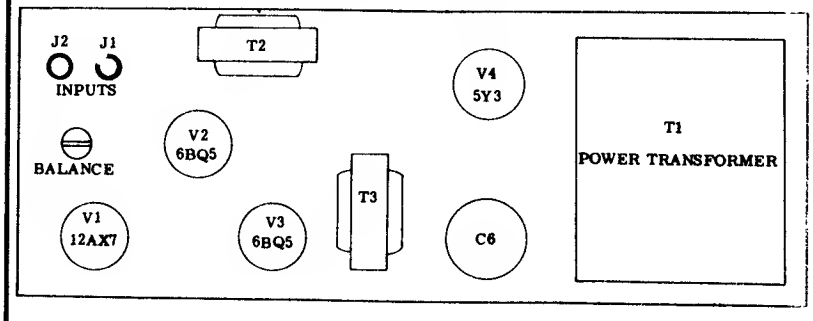
NOTE: to completely detach chassis from cabinet requires removal of stereo output bracket, motor plug and ground lead.

COLUMBIA

Models C1152, C1154, C1156, and C1160

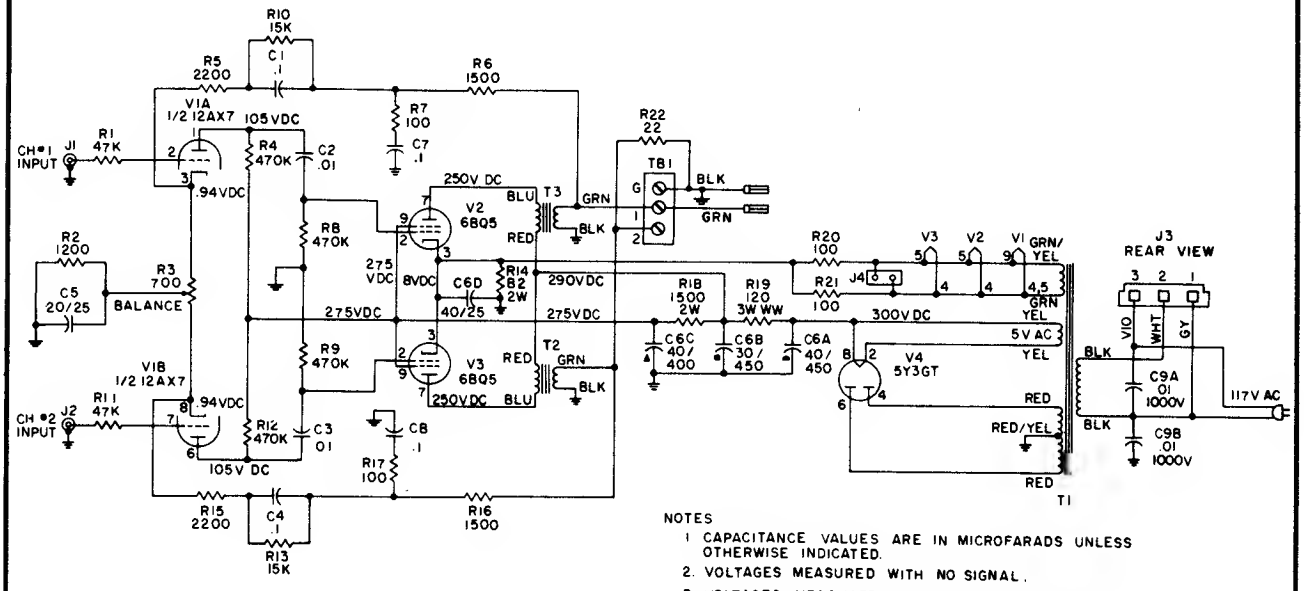
The Amplifier is a stereo self contained amplifier containing two complete amplification channels, using 6BQ5 tubes used as single-ended output in each channel. A control unit containing dual controls to provide adjustment of both channels simultaneously is used with this amplifier.

CHASSIS LAYOUT



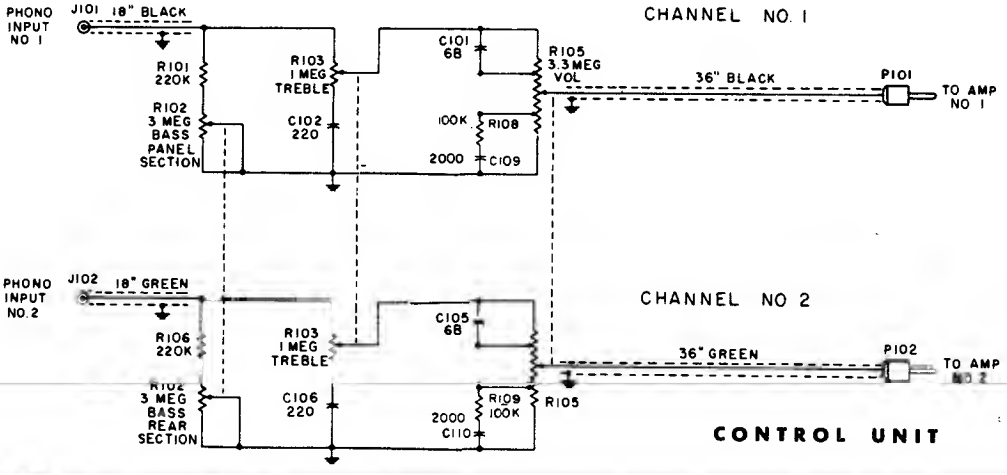
SPECIFICATIONS

Power Supply	
Voltage	117 volts
Frequency	60 cps.
Wattage	95 watts
Audio System	
Output Trans. Impedance	
CH-1 Pri. 5200	Sec. 3.2
CH-2 Pri. 5200	Sec. 3.2



NOTES

1. CAPACITANCE VALUES ARE IN MICROFARADS UNLESS OTHERWISE INDICATED.
2. VOLTAGES MEASURED WITH NO SIGNAL.
3. VOLTAGES MEASURED IN REFERENCE TO GROUND.
4. LINE VOLTAGE IS 117V AC, 60CPS.



Emerson Radio

MODEL 888
"TRANSTIMER II"
CHASSIS 120472

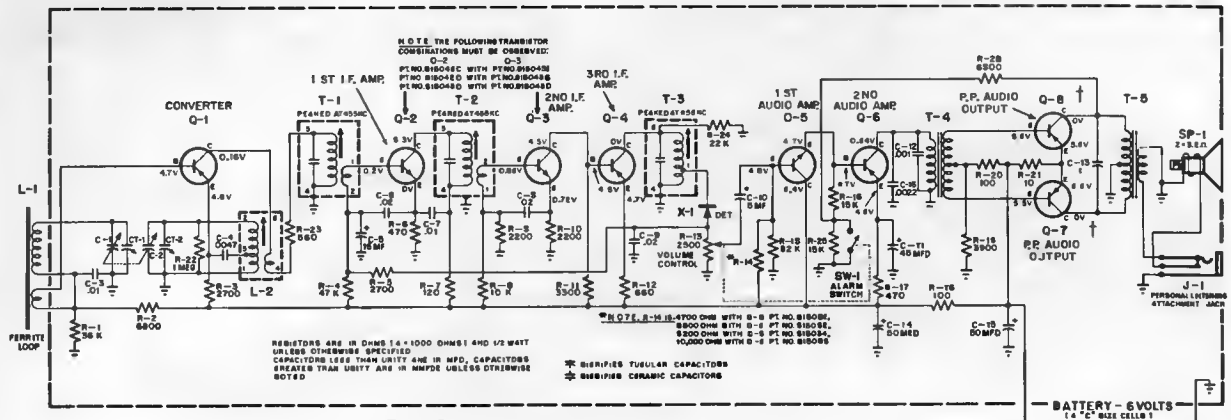


FIG. 2 – SCHEMATIC DIAGRAM, CHASSIS 120472

ADDITIONAL TRANSISTOR INFORMATION

TRANSISTOR PAIRS		ASSOCIATED R-12
Q-2	Q-3	
815045C	815045E	680
815045D	815045B	680
815045D	815045D	680

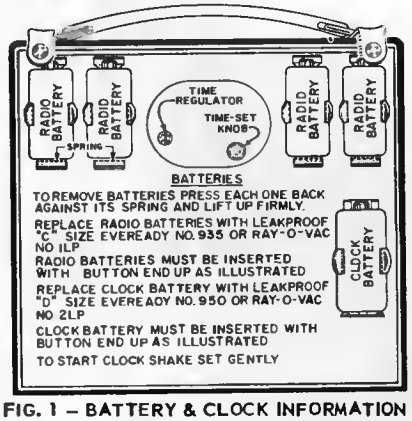


FIG. 1 – BATTERY & CLOCK INFORMATION

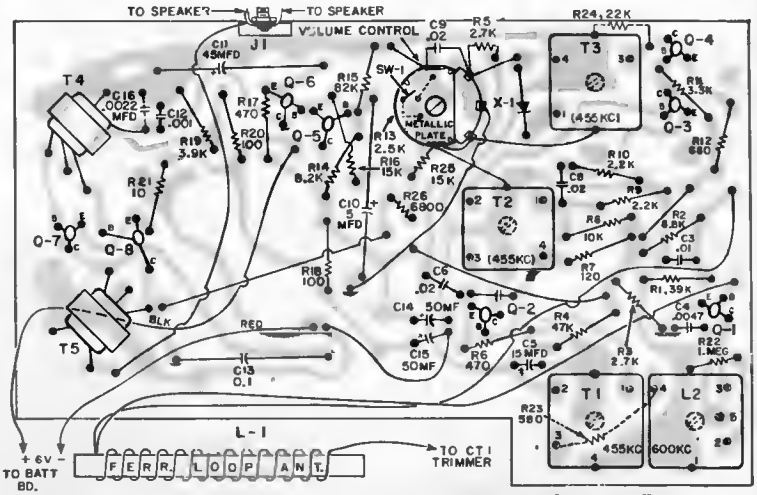


FIG. 3 – ETCHED PRINTED CIRCUIT CHASSIS 120472 (TOP VIEW)

GENERAL DESCRIPTION

Model 888 "TRANSTIMER II" is a completely self-powered 8-transistor superheterodyne portable clock-radio. The clock-timer, in conjunction with the associated circuitry will provide "automatic turn-on" of the radio or a "buzz-alarm". Either can be selected with the front panel control (switch on volume control). The buzz-alarm sound emitted by the speaker is created through regenerative feedback introduced by R-25 and R-26 in the last two audio stages (Re. figs. 2 & 3). Feedback voltage of the proper phase will only appear across R-25 when SW-1 is open, making the feedback from the output of Q-8 to the input of Q-6 effective. The manual on-off switch contained in the clock-timer will now turn the set ON or OFF since SW-1 is no longer used as the battery on-off switch.

CLOCK-TIMER

The clock operates continuously on a separate leakproof "D" size battery. It will not operate initially until fiber insulator (included for shipping purposes) between battery and its contact is pulled out.

TO START CLOCK AFTER FIBER INSULATOR IS REMOVED, SHAKE SET GENTLY.

TIME-SET KNOB (On back of clock)

1. To set time, pull time-set knob out and turn it counter-clockwise only.
2. To set time for alarm (as indicated by Alarm Time Pointer) hold knob in and turn it clockwise only.

CLOCK REGULATOR (On back of clock)

Insert a small coin into the slotted clock regulator knob, and turn it slightly in the direction of the arrow at the letter "F" if the clock is losing time. If the clock is gaining time, turn the knob slightly in the direction of the arrow at the letter "S".

FOR RADIO AUTOMATIC TURN-ON, OR FOR BUZZ-ALARM

1. Turn Master-Control Switch on clock-face to "ON".
2. Set Station Selector to station desired.
3. To be awakened by the radio, pre-set the Alarm-Volume Knob to the volume desired.
4. To be awakened by the electronic buzz-alarm, pre-set the Alarm-Volume Knob to its extreme counter-clockwise position until a click is heard.
5. Push Time-Set Knob in and set Alarm-Time Pointer to time selected for radio or buzz-alarm to go on.
6. Set Master-Control Switch to "AUTO" position.

TO TURN RADIO OFF AUTOMATICALLY (SLEEP SWITCH)

Turn Master-Control Switch to "OFF". Set Automatic "OFF" Switch (sleep) knob for any time up to 60 minutes. Radio will be turned off after playing the approximate amount of time indicated by the Automatic "OFF" knob. This feature is especially useful when using the radio after retiring at night.

Emerson

MODEL 888, "ATLAS," "EXPLORER," "VANGUARD,"
CHASSIS 120374 (See page 36 for Chassis 120485)

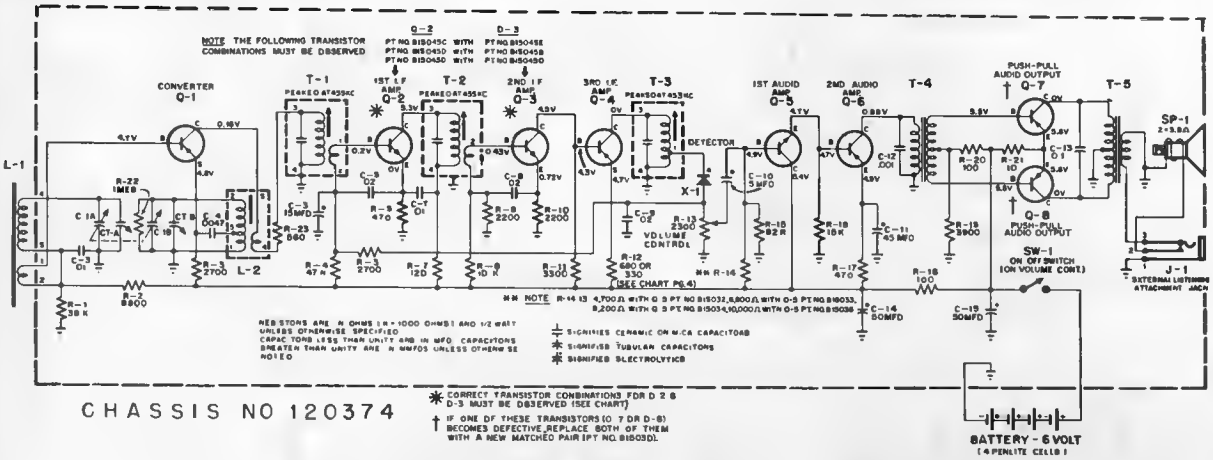


FIG. 1 – SCHEMATIC DIAGRAM, CHASSIS 120374

(VOLTAGE READING CONDITIONS ON PAGE 36)

TRANSISTOR PAIRS		ASSOCIATED
Q2	Q3	R12
815026C	815026A	680
815026B	815026B	680
815026B	815026D	680
815026C	815026E	680
815026D	815026D	680
815026C	815026F	330
815045C	815045E	680
815045D	815045B	680
815045D	815045D	680

TRANSISTOR SUBST.		TRANSISTOR NOS.
FOR	USE	
815026B	815026D	Q2/Q3
815026A	815026E	Q2/Q3
815026C	No subst.	Q2/Q3
815026F	No Subst.	Q2/Q3
815028	815032	Q5
815031	815032	Q5
815033	815032	Q5
815034	815032	Q5
815035	815032	Q5

TRANSISTOR Q5	ASSOCIATED R14
815031	3,300
815028	8,200
815032	4,700
815033	6,800
815034	8,200
815035	10,000

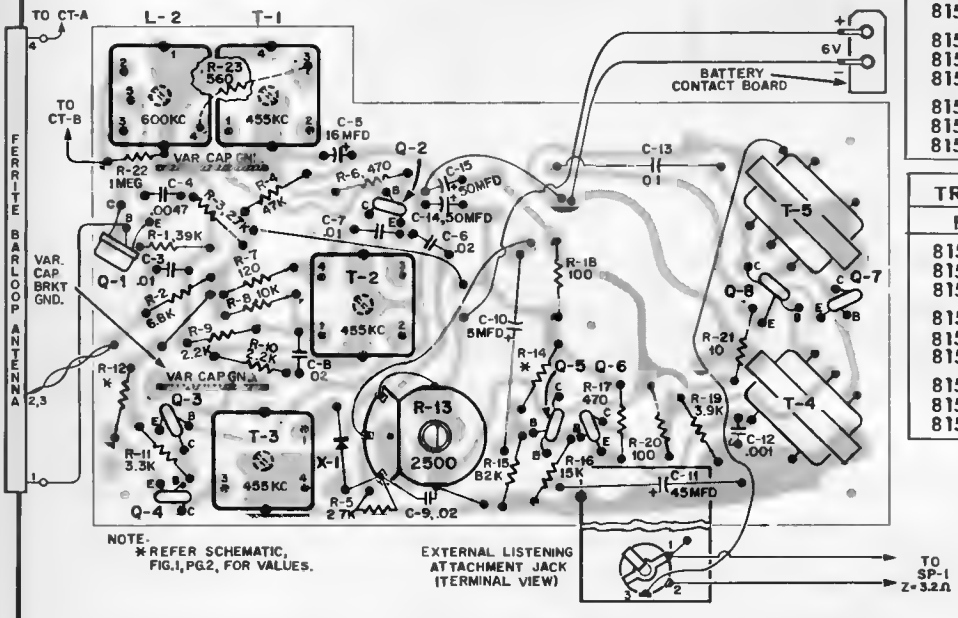


FIG. 2 – ETCHED PRINTED CIRCUIT, CHASSIS 120374 (TOP VIEW)

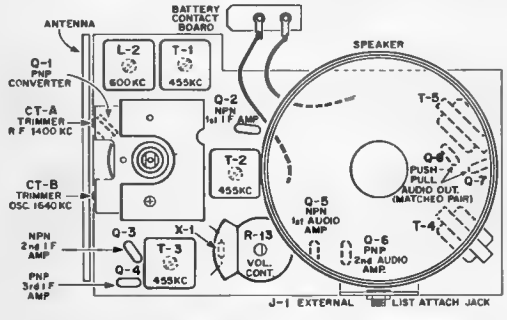


FIG. 4 – TRANSISTOR & ALIGNMENT POINT LOCATION, CH. 120374

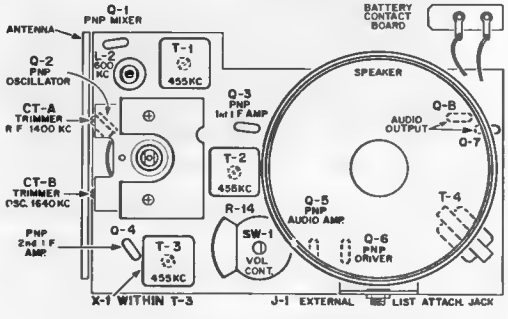


FIG. 5 – TRANSISTOR & ALIGNMENT POINT LOCATION, CH. 120485

EMERSON RADIO Model 880, "ATLAS," "EXPLORER," "VANGUARD,"

(For alignment points and transistor locations, see drawing on page 35)

Chassis 120485

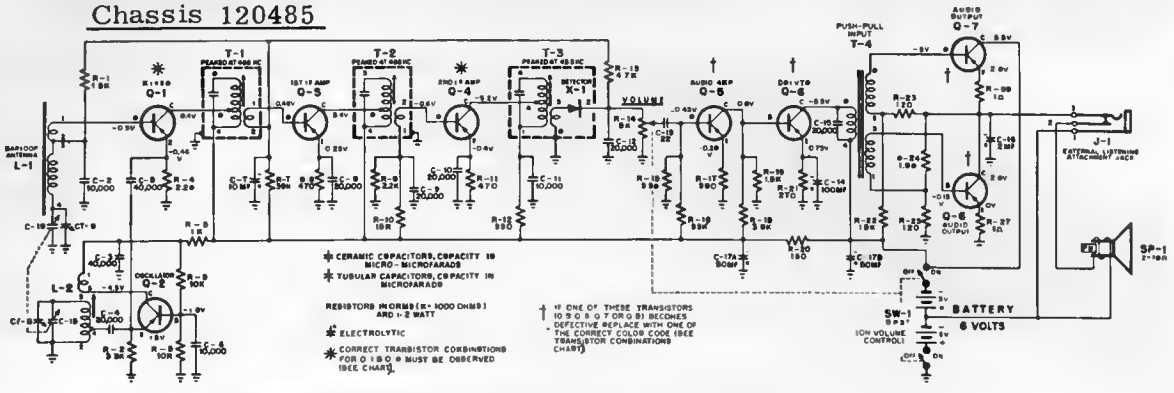


FIG. 6 – SCHEMATIC DIAGRAM, CHASSIS 120485 (VOLTAGE READING CONDITIONS

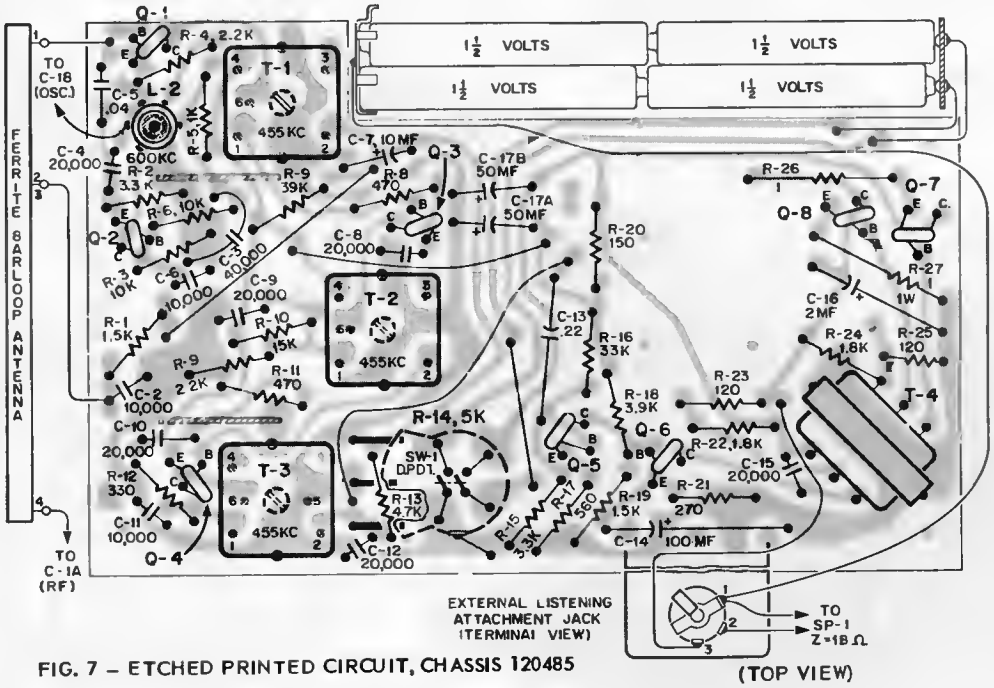


FIG. 7 – ETCHED PRINTED CIRCUIT, CHASSIS 120485

CONDITIONS FOR VOLTAGE READINGS

1. Voltages indicated are positive D.C.
2. All Measurements taken between points and chassis.
3. Voltage measurements taken with:
   (a) VTVM
   (b) Fresh 6 Volt battery supply. Four 1½ Volt conventional penlight cells.
   Note: Should Mercury or Nickel-Cadmium batteries be used, an approx. 15% lower voltage reading will be obtained from the battery supply which is considered to be perfectly normal. Bear in mind that the voltage supply will vary slightly with the type and condition of batteries used.
   (c) Volume control set for minimum volume.
   (d) Variable capacitor fully closed and no signal applied.
5. Nominal tolerances in component values make possible a variation of ± 15% in readings.

Caution – When taking voltage checks, avoid accidental shorting across transistor leads as it may cause transistor damage. Do not use a non-vacuum tube-type voltmeter as the relatively low shunt resistance of this type of voltmeter can easily disrupt the transistor bias and result in erroneous readings as well as damage to the transistor.

TRANSISTOR REPLACEMENT INFORMATION*

TRANSISTOR PAIRS	
Q1	Q4
815051H	815054A
815051A	815054B

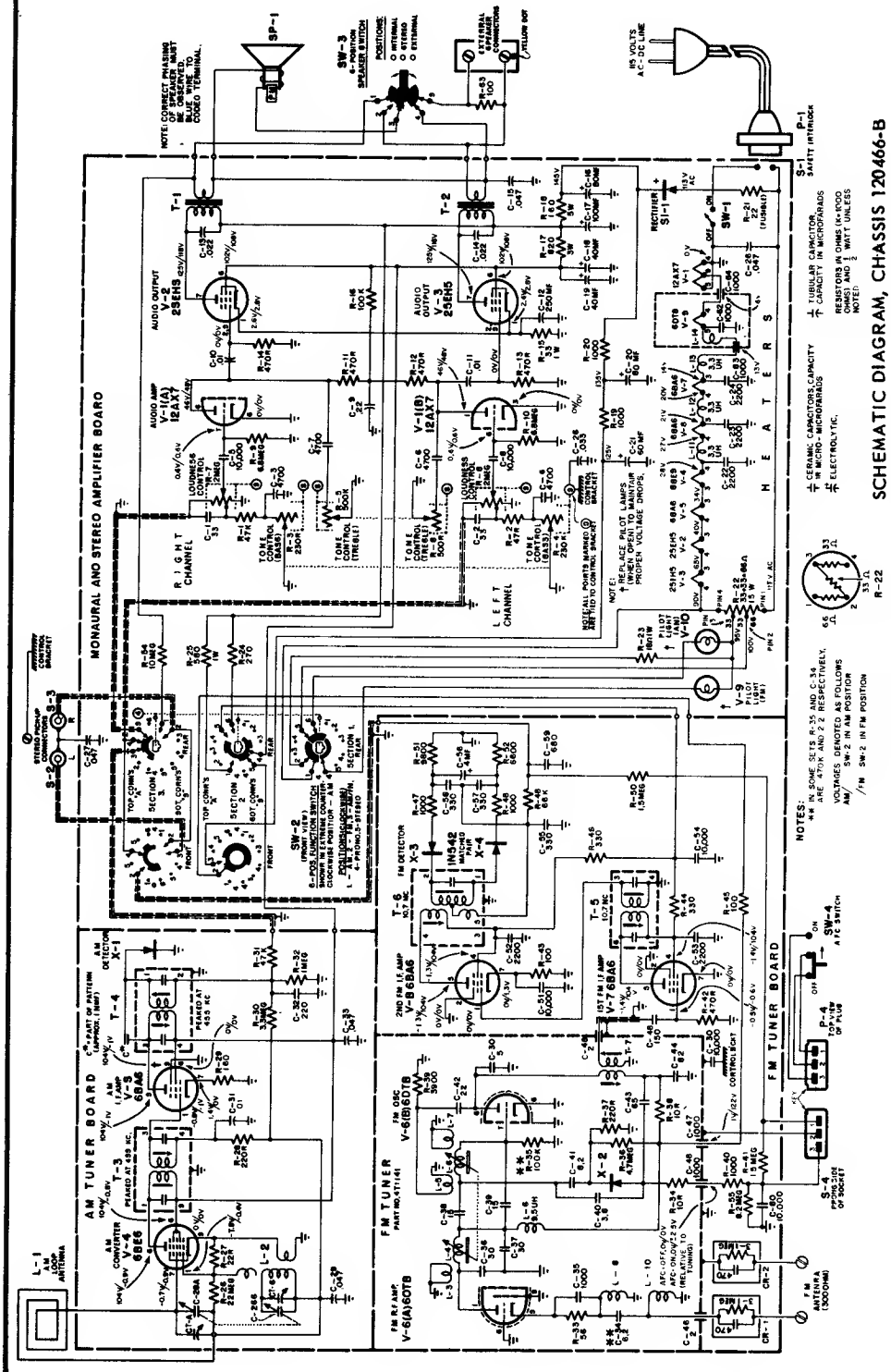
Q-5 - 1ST AUDIO 815055	Q-6 - DRIVER 815056	Q-7 & Q-8 - OUTPUT 815057
ANY COLOR	Yellow Dot	Yellow Dot
	Green Dot	Orange Dot
	Blue Dot	Red Dot
	Violet Dot	Brown Dot

NOTE: * Because of the small physical size of the transistors, the 1st three digits, "815", have been replaced by the letter, "E" for Emerson. The "E" also signifies that these transistors have been made to our design tolerances.

These sets utilize an etched circuit board chassis 120374 and 120485 identified by part number 630225 and 630243 respectively. The part number can be found on the etched circuit side of board. A paper label located on the external connection jack, containing the last three digits of the chassis number, is another means of identifying the chassis.

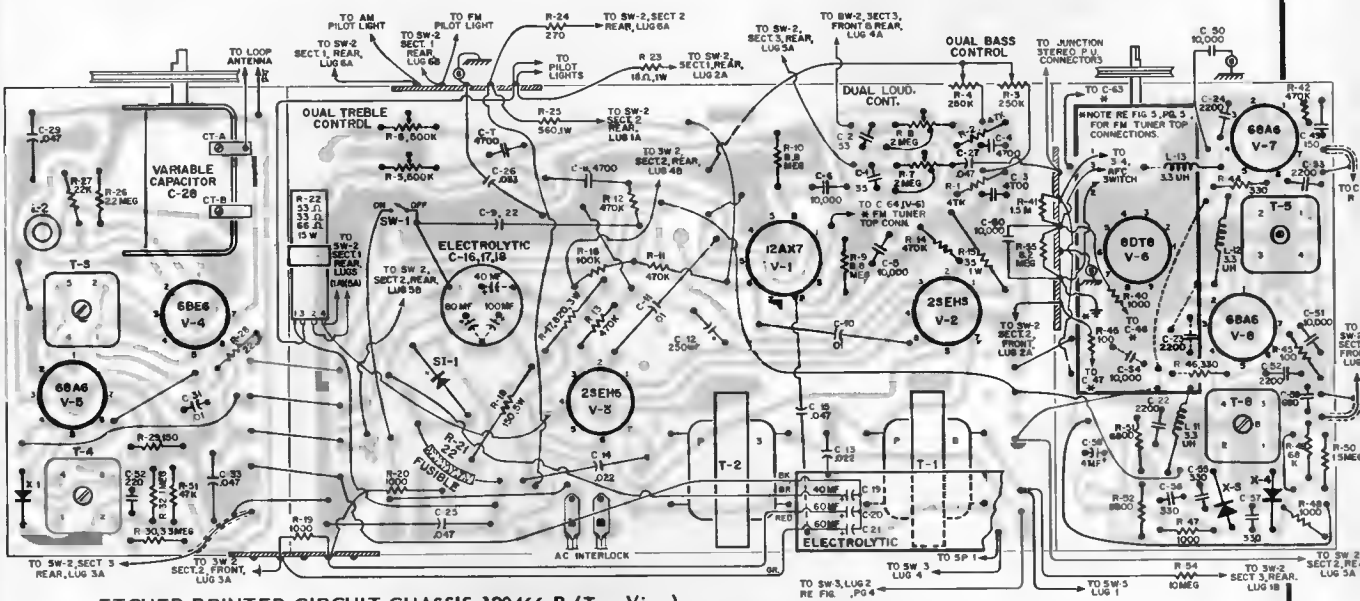
CAUTION: As with all transistorized equipment, do not place close to a hot radiator nor keep in an unventilated area such as the rear window shelf in an automobile. High heat might cause damage.

EMERSON RADIO Chassis 908-B, Chassis 120466B, material exact for this set. Model 909-B, Chassis 120468B; Model 912-B, Chassis 120480B; and Model 921-D, Chassis 120495B, are all electrically similar to 908-B and the important differences are explained on pages 38, 39, where material is continued.



EMERSON RADIO Model 908-B, Chassis 120466B, Continued on pages 38 and 39

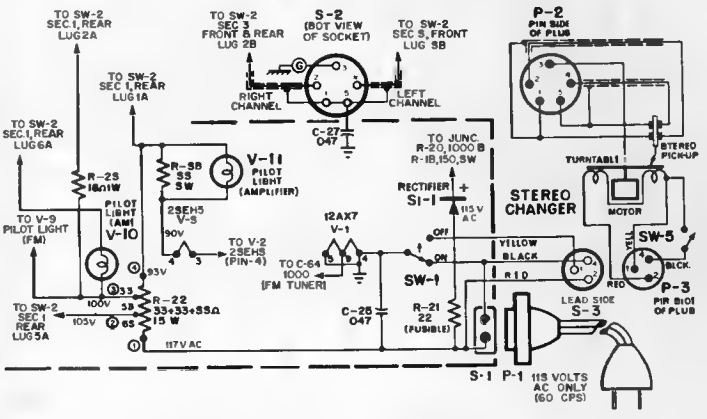
EMERSON RADIO Model 908-B, Chassis 120466B; Model 909-B, Chassis 120468B; Model 912-B, Chassis 120480B; and Model 921-D, Chassis 120495B; continued from page 37, more material on page 39.



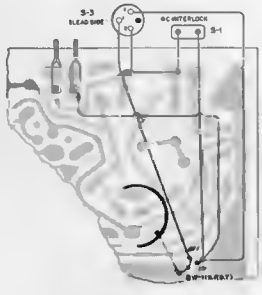
ETCHED PRINTED CIRCUIT CHASSIS 120466-B (Top View)

TUBE REPLACEMENT:

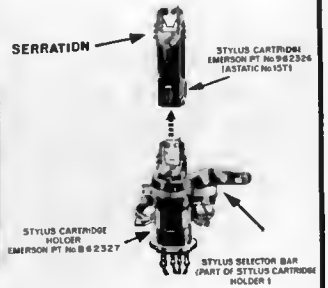
1. Remove line plug from wall outlet.
2. Remove retaining screws from back of cabinet.
3. Disconnect "built-in" FM antenna from antenna terminol strip.
4. Grosp bock by "interlock" and pull free of chossis.
5. Refer to tube layout diagram inside cabinet.



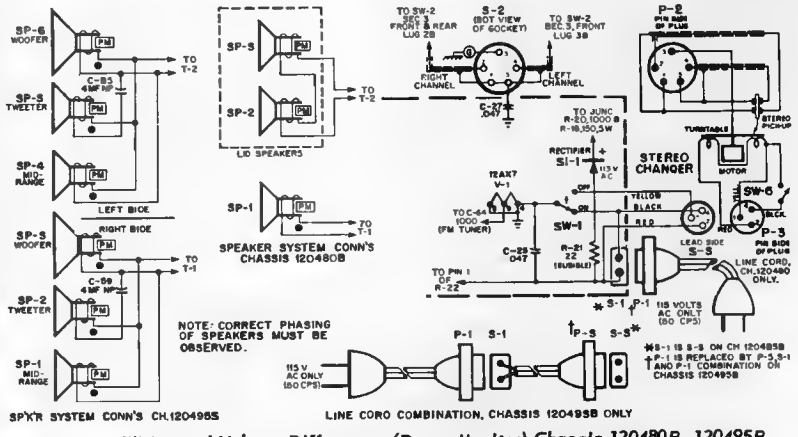
WIRING & VOLTAGE DIFFERENCES (POWER MONITOR) CH. 120466-B (BALANCE OF WIRING, USE SCHEMATIC FOR CHASSIS 120466-B)



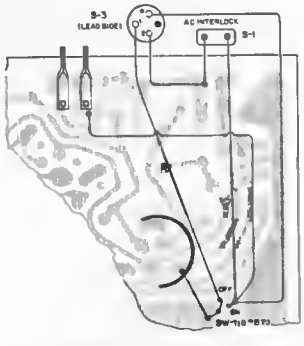
ETCHED PRINTED CIRCUIT SECTION (POWER MONITOR), CHASSIS 120466-B. BALANCE OF ETCHED CIRCUIT, RE. CHASSIS 120466-B)



REMOVAL OF STYLUS CARTRIDGE 962326



Wiring and Voltage Differences (Power Monitor) Chassis 120480B, 120495B (Balance of Wiring, use Schematic for Chassis 120466-B)



Etched Printed Circuit Section (Power Monitor), Chassis 120480, 120495 (Balance of Etched Circuit, Re. Chassis 120466-B).

EMERSON RADIO

Models 908-B, 909-B, 912-B, and 921-D, Chassis 120466B, 120468B, 120495, continued from previous two pages.

PRELIMINARY ALIGNMENT INSTRUCTIONS

NOTE: Be sure thot the dial pointer is physicolly oligned (Re. Fig. 4o & 4c). 1. Loudness control should be bocked off opproximotely 20% from moximum volume position. 2. Speoker selector switch (SW-3) should be in "INT" position. 3. Use on insulated screwdriver ond Hex olignment tool.

FM ALIGNMENT (Using RF Generator & VTVM) SW-2 in FM Pos.; AFC(SW-4) in "Off" Pos.

Step	SIGNAL GENERATOR Freq.	Coup.	Atten.	VTVM Connect.	Set.	FM RECEIVER Set.	Adjust	REMARKS
1	10.7MC (no sweep)	To FM Ant. Term.	Adjust for 1V indicotion on VTVM.	"Hot" leod to junction of R45, R50 & C59. "G'n'd" leod to metol con of electrolytic filter.	5 V DC Scole	Tune to o quiet spot on diol (no signol input).	Turn out top slug of rotio 1Fx'fmr(T-6) until greotest peok on VTVM is indicoted.	Indicotion is obtoinoble without slug touching top of IF con.
2	10.7MC (no sweep)	(os above)	Reodjust for 1V indicotion		(os above)		Peok in following order: 1. Top & Bot, 2nd IF(T-5) 2. Top & Bot; 1st IF(T-7) (reor of tuner). 3. Bot. slug of Rotio IF(T-6)	Adjust for moximum output on VTVM
	10.7MC (no sweep)	(os above)	(os above)		Adjust zero control for "0" center reoding.		Corefully turn in top slug of Rotio IF x x'fmr (T-6) until VTVM reoding posses thru zero reoding & turn bock for zero reoding on VTVM.	Vorying freq. obove & below center results in equol & opposite voltoge indications (Do not exceed 150 KC either side).

AM ALIGNMENT PROCEDURE (Using AM Generotor & Output Meter)
Function Selector SW-2 in "AM" Position

Step	SIGNAL GENERATOR Freq.	Coupling	TUNING CAPACITOR SETTING	OUTPUT METER or AC VTVM	ADJUST
1	455KC. 400 CPS AM Mod.	"High" side thru o .005 MFD copacitor to V-4(Pin 7 of 6BE6). "Low" side to "B minus" (metol con of electrolytic filter).	Minimum Copocity (fully open)	Connect ocross speoker voice coil.	IF X'formers T4, T3 top & Bot. for mox. output indicotion.
2	1638 KC. 400 CPS AM Mod.	Form "loop" of severol turns of wire, connect ocross generotor output ond rodiote into receiver.	(os above)	(as above)	Osc. Trimmer (CT-B) for mox. output indicotion.
3	1425KC 400 CPS AM Mod.	(os above)	Tune into strongest 1425KC Signol (Re. Fig. 4c).	(os above)	Ant. Trimmer (CT-A) for mox. output indic. (Repeat steps 2 and 3 for best results)

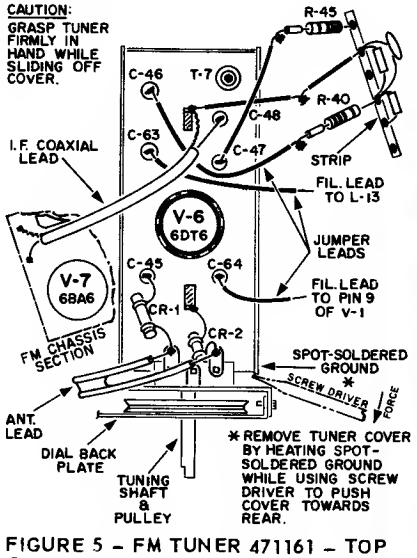


FIGURE 5 – FM TUNER 471161 – TOP CONNECTIONS FOR LIGHT SERVICING

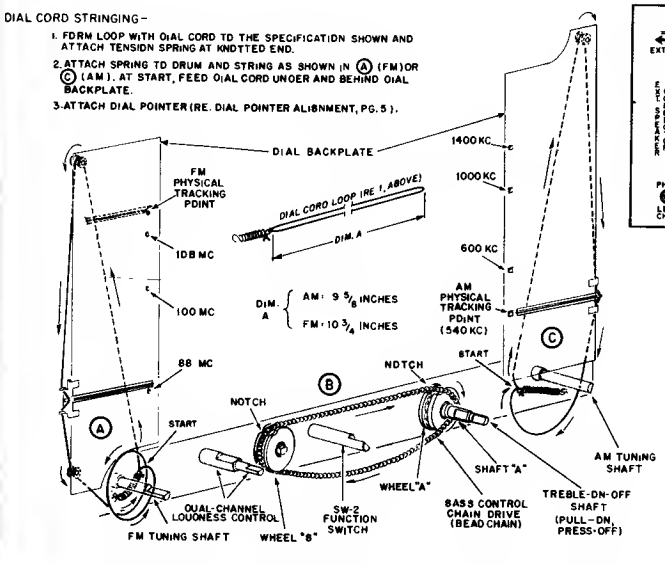
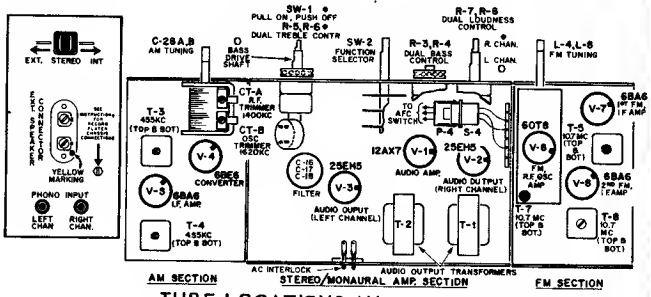


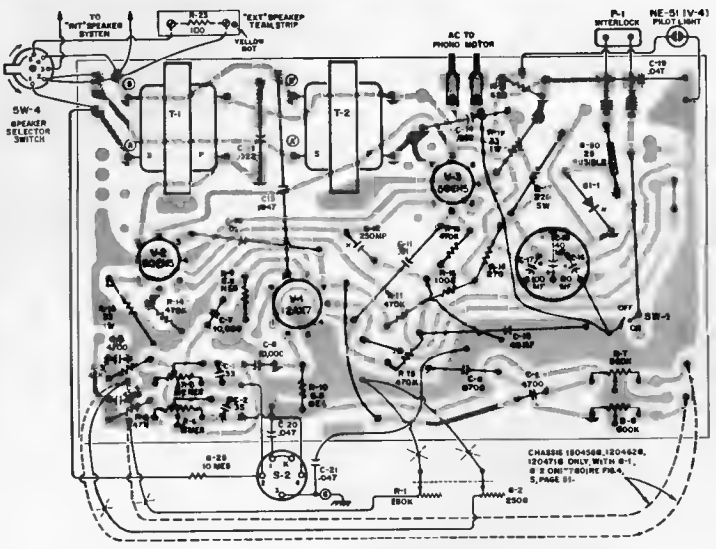
FIGURE 4 A, B, C – DIAL CORD, BEAD CHAIN STRINGING



TUBE LOCATIONS AND ALIGNMENT POINTS

PARTIAL REMOVAL OF FM TUNER FOR LIGHT FIELD SERVICING (Re. Fig. 5)

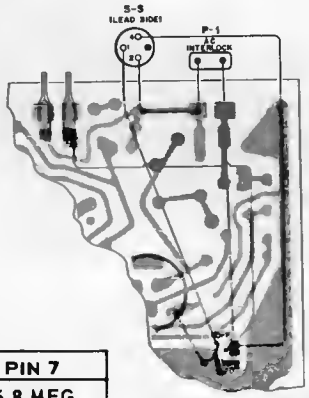
1. Remove the tube odjocent to the front of the tuner housing.
2. Unsolder the ground side of the disc capocitor ond the tuner ground strop (left front of tuner).
3. Unsolder wires ond components with the exception of the two "Copristors" ond the cooxiol leod.
4. Remove the twa hexogonol screws which mount the FM tuner to the front of the chossis. Finolly, unsolder the spot-soldered ground on the brocket to completely disengoge the tuner from the chossis.
5. Extend connections with jumper wire.
6. The tuner shield cover slides off the reor.



ETCHED PRINTED CIRCUIT

EMERSON RADIO

Model	Chassis
901-B	120467B
903-B	120462B
906-B	120473B
904-B	120458B
905-B	120471B



USED CH-120473-B ONLY (POWER MONITOR)

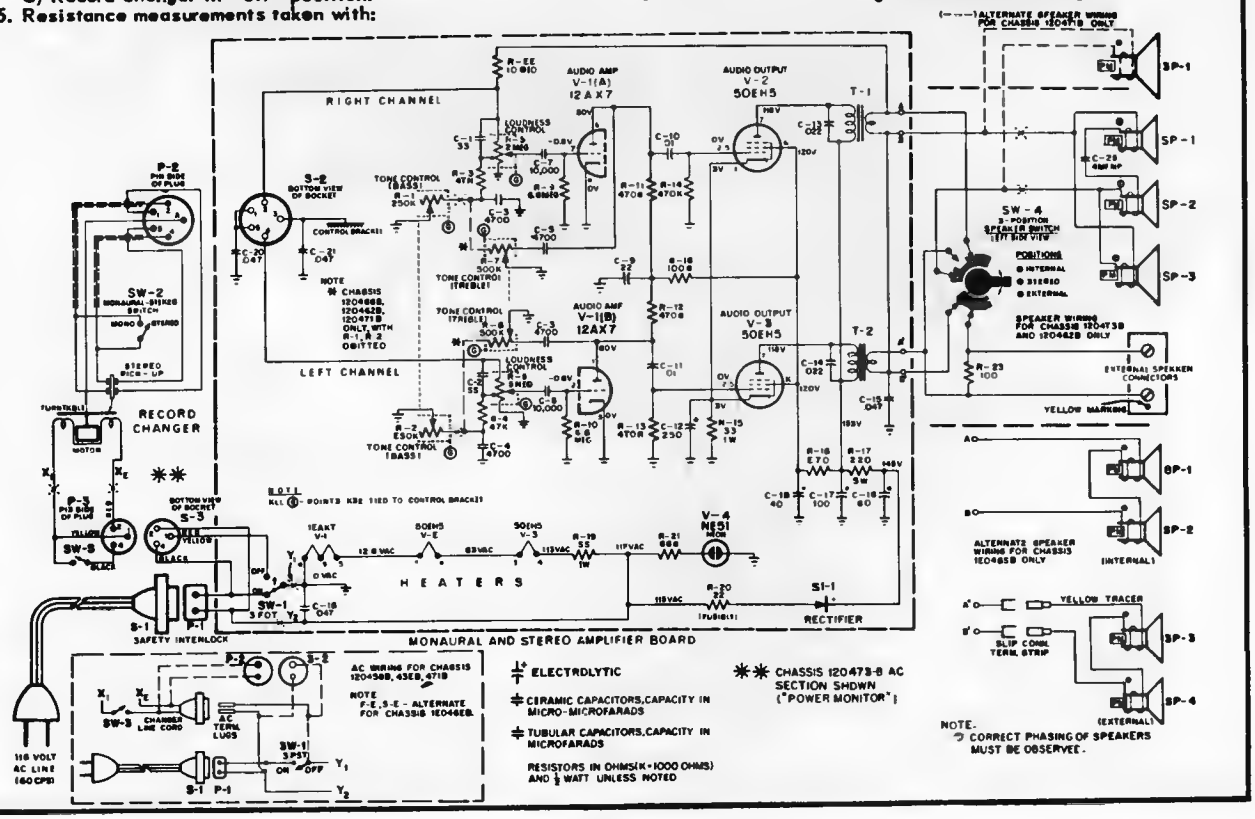
RESISTANCE READINGS

SYM.	TUBE	PIN 1	PIN 2	PIN 3	PIN 4	PIN 5	PIN 6	PIN 7
V-1	12AX7	*570K	6.8 MEG	0	0	8	* 570K	6.8 MEG
V-2	50EH5	33	470K	8	38	470K	* 490	* 400
V-3	50EH5	33	470K	38	68	470K	3 MEG	* 400

* Measured to junction of R-17, C-16.

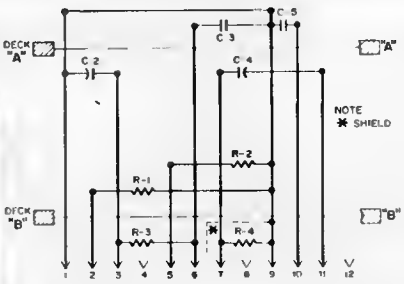
CONDITIONS FOR VOLTAGE AND RESISTANCE READINGS

1. Voltages indicated are positive d.c., resistances in ohms, unless otherwise indicated.
2. Measurements made with Voltohmyst or equivalent.
3. All measurements taken from pin to B minus unless otherwise indicated.
4. Voltage measurements taken with:
   A) Line voltage maintained at 117 volts a.c.
   B) Loudness control set for minimum volume.
   C) Record changer in "off" position.
5. Resistance measurements taken with:
   A) Power line cord disconnected from outlet.
   B) Loudness control set for minimum volume.
6. Nominal tolerance on component values makes possible a variation of ±15% in voltage and resistance readings.
7. N.C. denotes no connection, K is kilohms, Meg. is megohms.
   (Resistances marked * are measured to Junction of R-17, C-16).
8. Filament resistances given are cold readings.

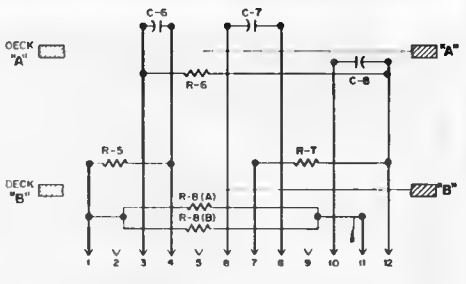


Emerson

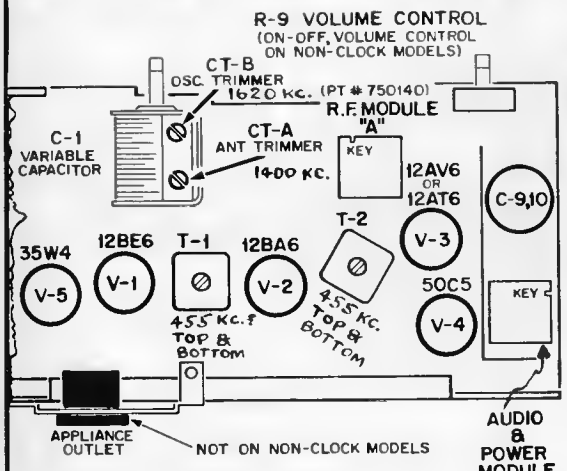
MODEL: 876B
CHASSIS: 120479B
MODELS: 881B, 883B
CHASSIS: 120474B, 120475B
MODELS: 915B, 924B
CHASSIS: 120487B
MODELS: 916B, 917B, 918B
CHASSIS: 120484B



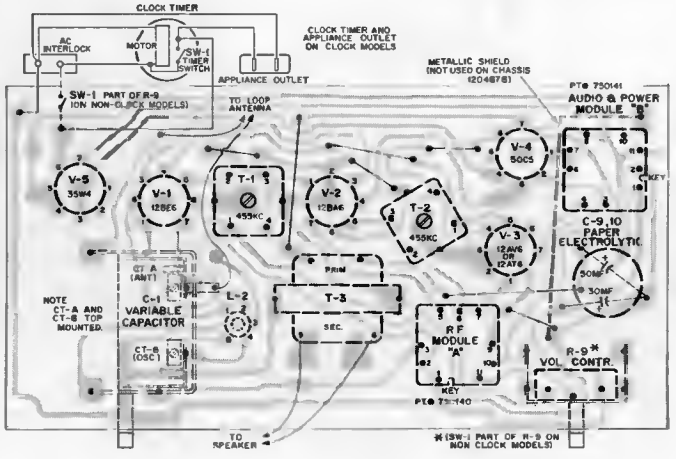
RF MODULE ("A") PART NO. 750140



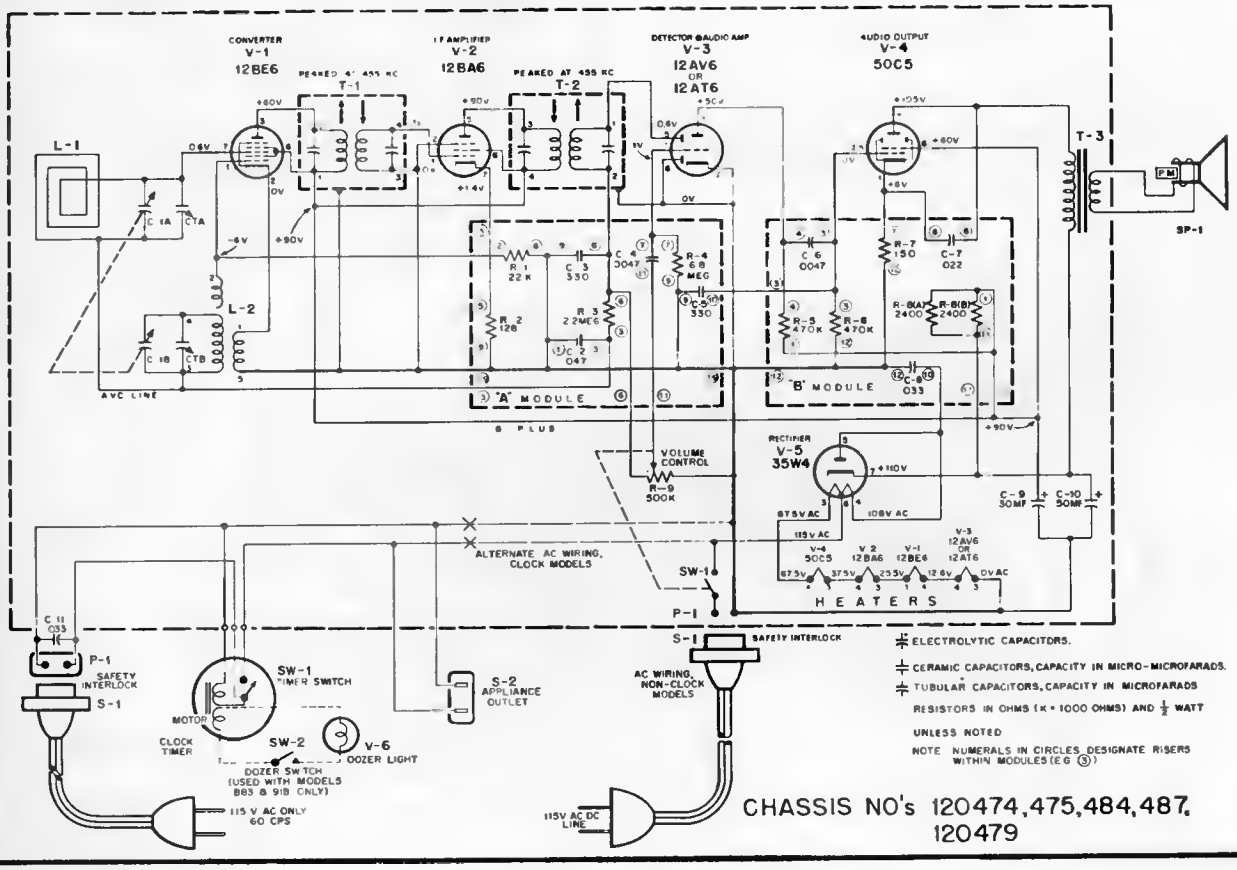
AUDIO MODULE ("B") PART NO. 750141



TUBE LOCATIONS AND ALIGNMENT

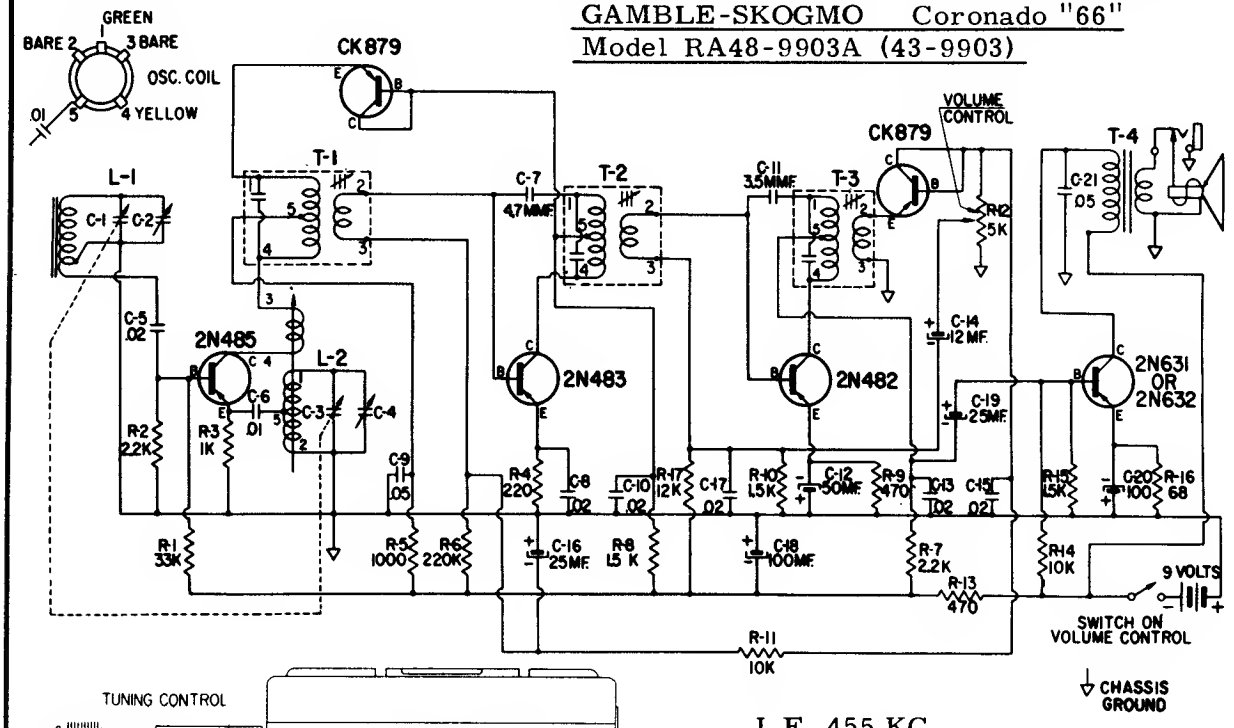


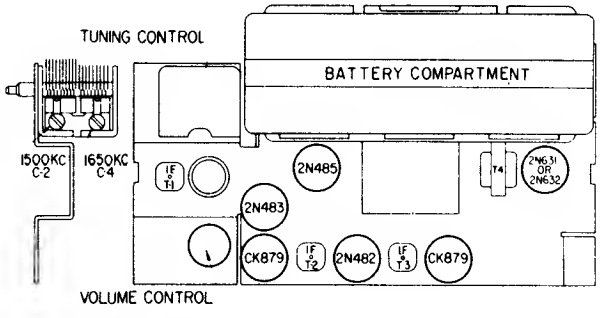
ETCHED PRINTED CIRCUIT CHASSIS



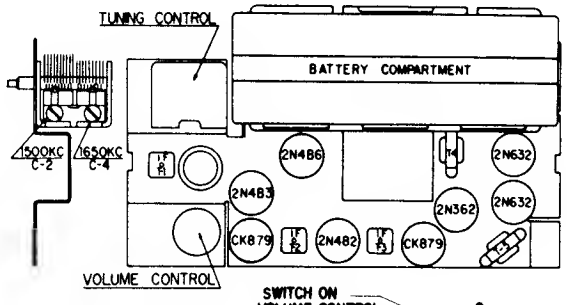
CHASSIS NO's 120474, 475, 484, 487, 120479

GAMBLE-SKOGMO Coronado "66"
Model RA48-9903A (43-9903)

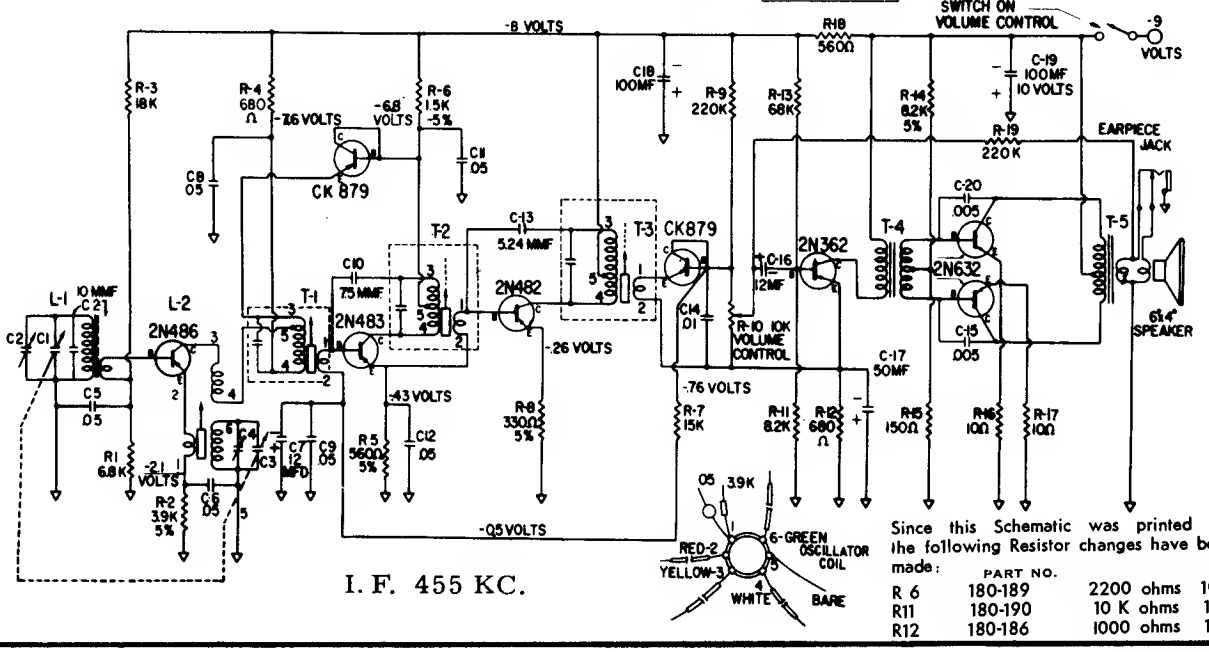




I. F. 455 KC.



GAMBLE-SKOGMO Coronado "88"
Model RA48-9905A (43-9905)



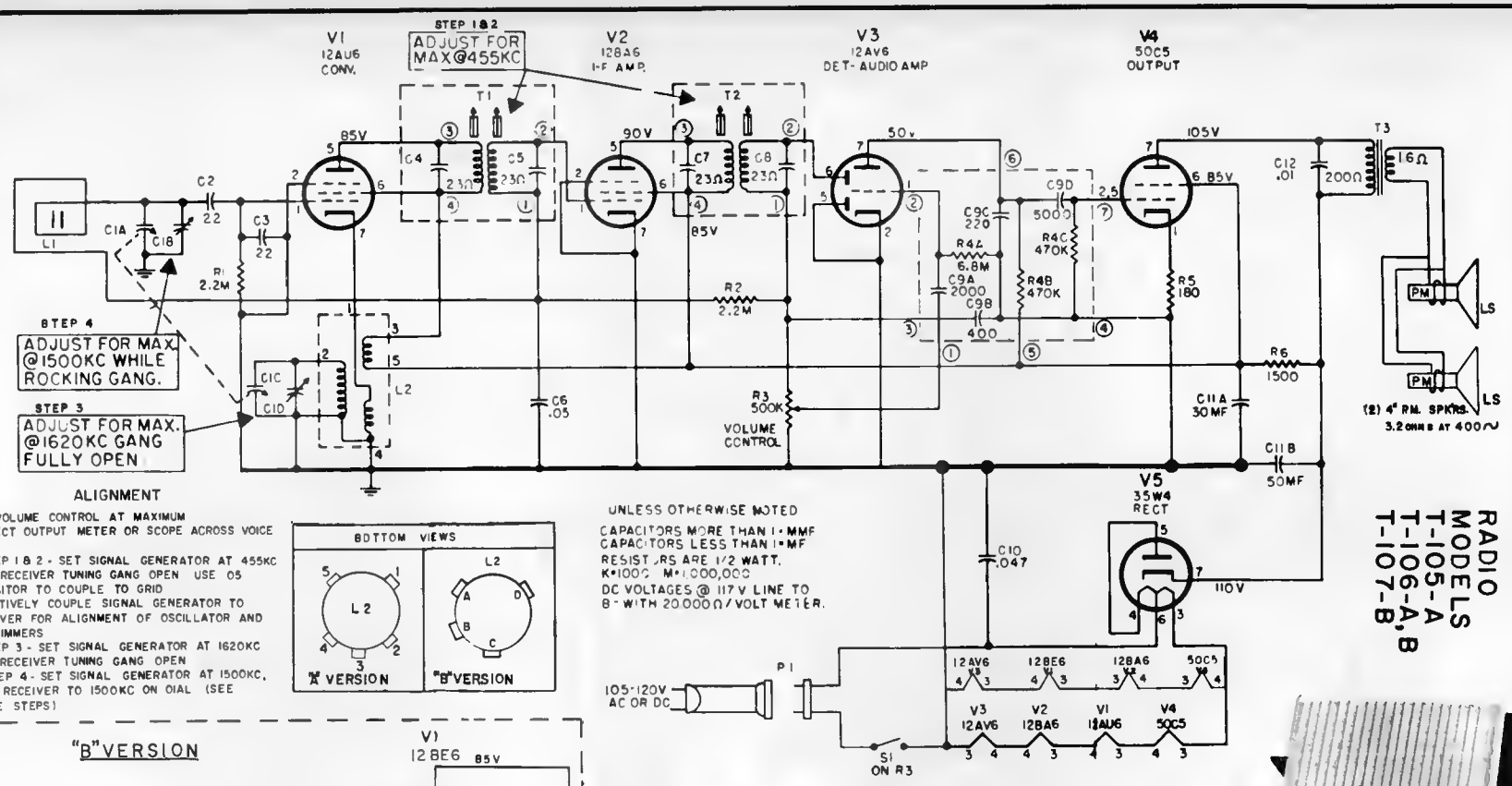
I. F. 455 KC.

Since this Schematic was printed the the following Resistor changes have been made:

	PART NO.	
R 6	180-189	2200 ohms 10%
R11	180-190	10 K ohms 10%
R12	180-186	1000 ohms 10%

GENERAL ELECTRIC

RADIO MODELS T-105-A T-106-A,B T-107-B



ALIGNMENT

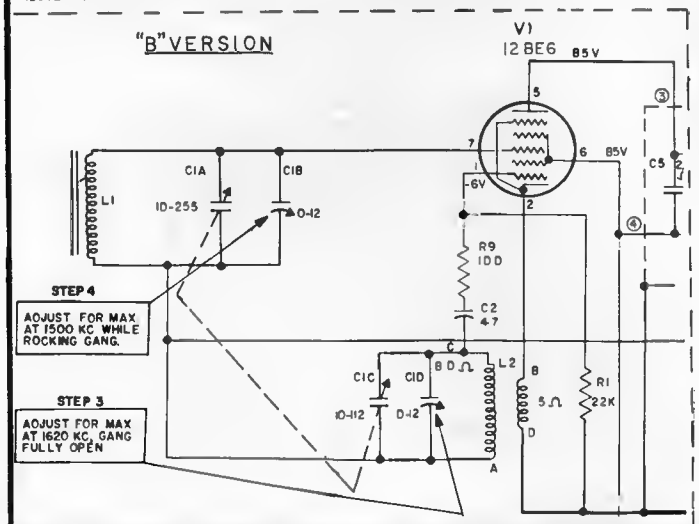
SET VOLUME CONTROL AT MAXIMUM
CONNECT OUTPUT METER OR SCOPE ACROSS VOICE COIL

STEP 1 & 2 - SET SIGNAL GENERATOR AT 455KC WITH RECEIVER TUNING GANG OPEN USE 05 CAPACITOR TO COUPLE TO GRID INDUCTIVELY COUPLE SIGNAL GENERATOR TO RECEIVER FOR ALIGNMENT OF OSCILLATOR AND IF TRIMMERS

STEP 3 - SET SIGNAL GENERATOR AT 1620KC WITH RECEIVER TUNING GANG OPEN

STEP 4 - SET SIGNAL GENERATOR AT 1500KC, TUNE RECEIVER TO 1500KC ON DIAL (SEE ABOVE STEPS)

UNLESS OTHERWISE NOTED
CAPACITORS MORE THAN 1 MMF
CAPACITORS LESS THAN 1 MF
RESISTORS ARE 1/2 WATT.
K=1000 M=1,000,000
DC VOLTAGES @ 117 V LINE TO B- WITH 20,000 Ω/VOLT METER.



The "A" and "B" versions of this set differ in the oscillator-converter circuitry.

TO REMOVE CHASSIS

To remove chassis from cabinet, remove cabinet back. Unsolder the output transformer leads from the speaker. Remove the four hex-head screws at each corner of the chassis, and the single hex-head screw below the tuning capacitor. The tuning knob is a captive knob and remains in the cabinet front. After removing volume control knob, close the tuning capacitor to prevent any possible damage to the plates. Remove chassis by holding tuning knob with one hand, while grasping tuning capacitor by the thumb and forefinger of the other hand and pull.

GENERAL ELECTRIC

MODELS T-140A, T-141A

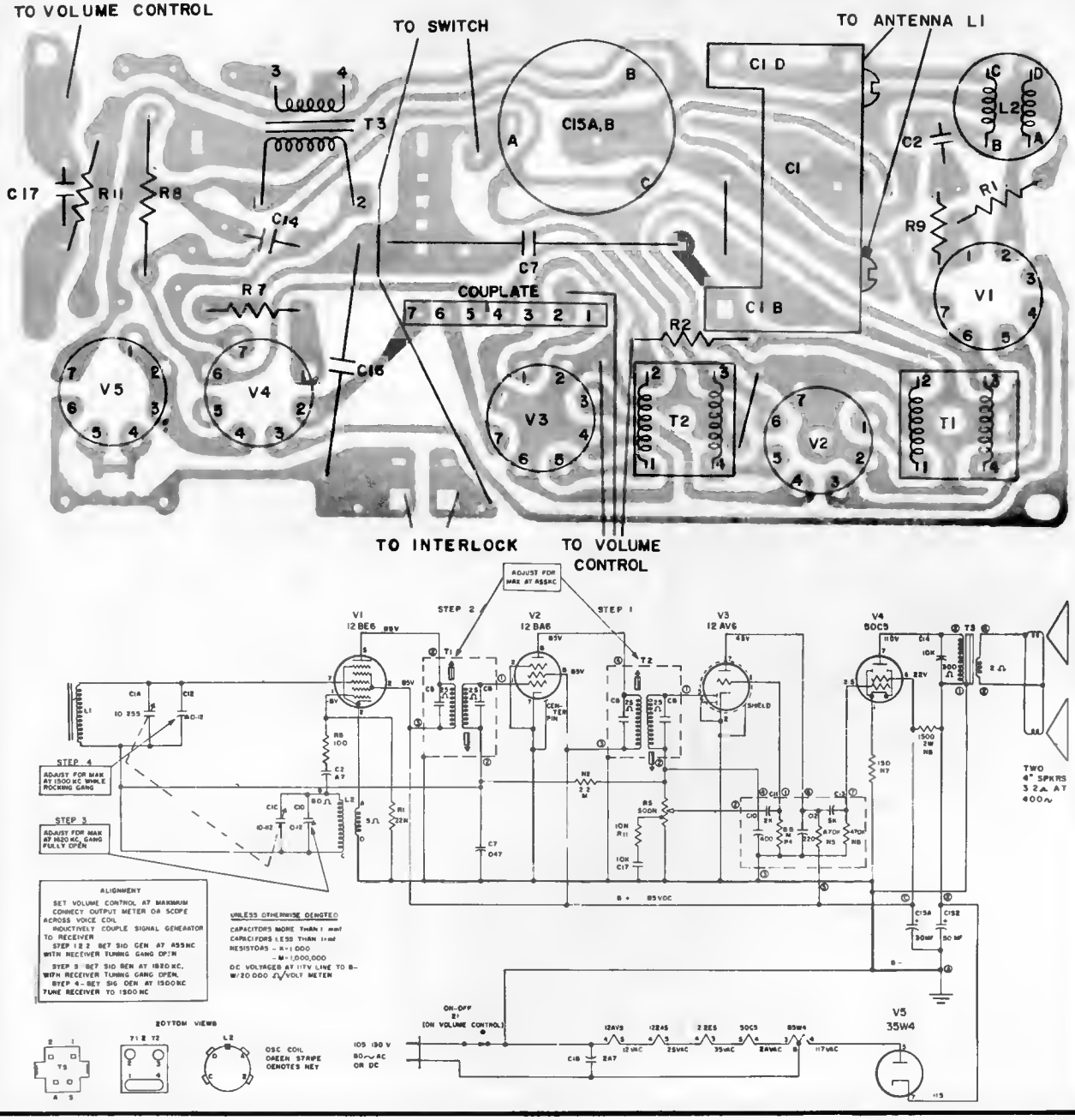
TO REMOVE CABINET BACK

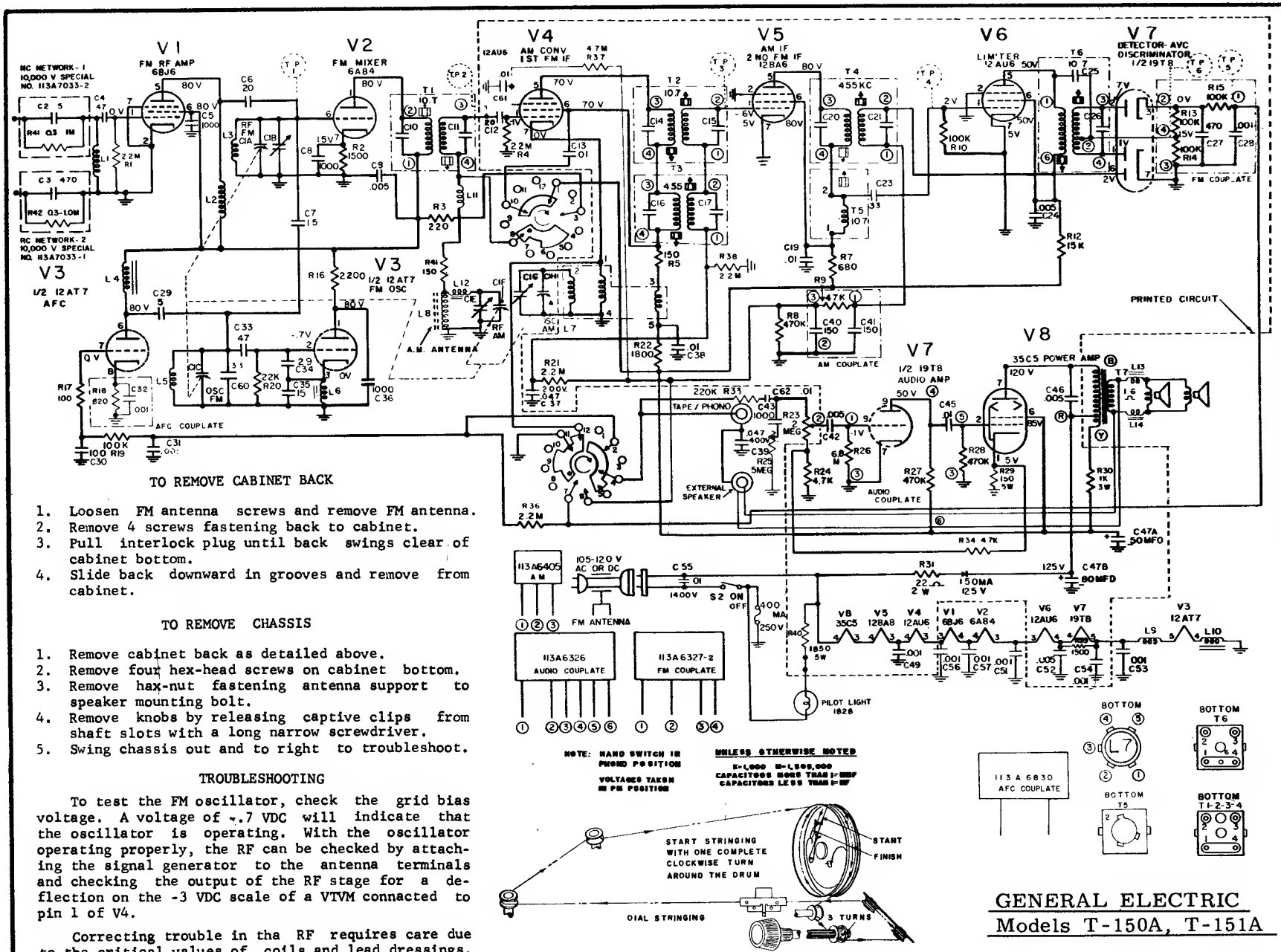
Place cabinet on end using a soft cloth to protect the finish. Insert a screw driver between cabinet bottom and cabinet back next to one of the slots in the cabinet bottom. Turn screw driver, forcing tab on bottom of cabinet back out of its slot. Repeat procedure with other tab on cabinet back. Slide out and down, releasing top tabs from top slots.

TO REMOVE CHASSIS

After removing cabinet back, remove fishpaper chassis support. Then remove the screw on cabinet bottom holding metal chassis support. Pull off loudness control knob and loosen hex nut on loudness control shaft. The tuning knob is a captive knob and remains in the cabinet front. Unsolder speaker leads. Close the tuning gang to prevent any possible damage to the plates. Slide one hand under the printed chassis board placing the fingers over the front edge. Slide the board back out of the grooves on both ends, simultaneously removing the tuning gang shaft from the tuning knob.

When replacing the chassis, close the tuning gang and line the flat side of the gang shaft up with the flat side of the tuning knob opening. Place the ends of the board in the grooves and push on the edge of the board, not on the components. The tuning shaft will enter the tuning knob and the front edge of the board will seat itself in the grooved bosses inside the cabinet front. Replace the board supports.





TO REMOVE CABINET BACK

1. Loosen FM antenna screws and remove FM antenna.
2. Remove 4 screws fastening back to cabinet.
3. Pull interlock plug until back swings clear of cabinet bottom.
4. Slide back downward in grooves and remove from cabinet.

TO REMOVE CHASSIS

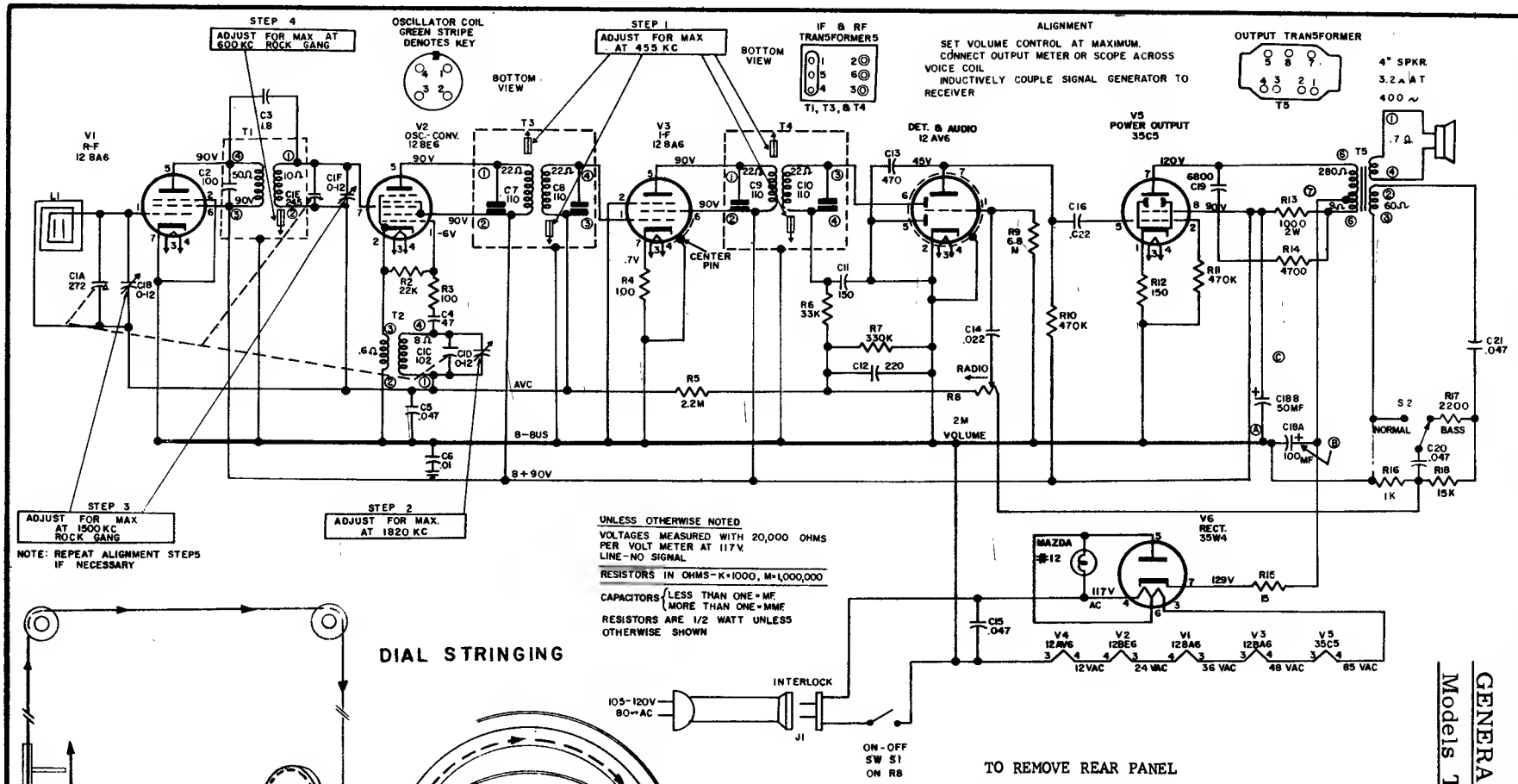
1. Remove cabinet back as detailed above.
2. Remove four hex-head screws on cabinet bottom.
3. Remove hex-nut fastening antenna support to speaker mounting bolt.
4. Remove knobs by releasing captive clips from shaft slots with a long narrow screwdriver.
5. Swing chassis out and to right to troubleshoot.

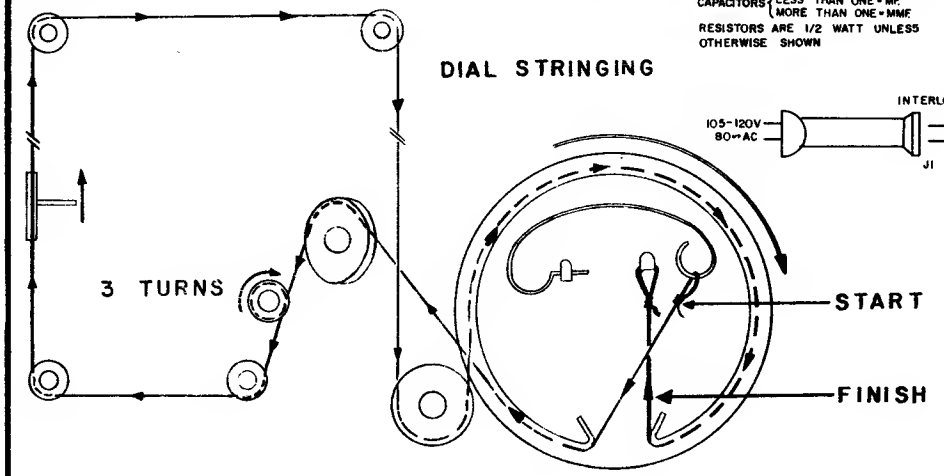
TROUBLESHOOTING

To test the FM oscillator, check the grid bias voltage. A voltage of -.7 VDC will indicate that the oscillator is operating. With the oscillator operating properly, the RF can be checked by attaching the signal generator to the antenna terminals and checking the output of the RF stage for a deflection on the -3 VDC scale of a VTVM connacted to pin 1 of V4.

Correcting trouble in tha RF requires care due to the critical values of coils and lead dressings.

GENERAL ELECTRIC
Models T-150A, T-151A





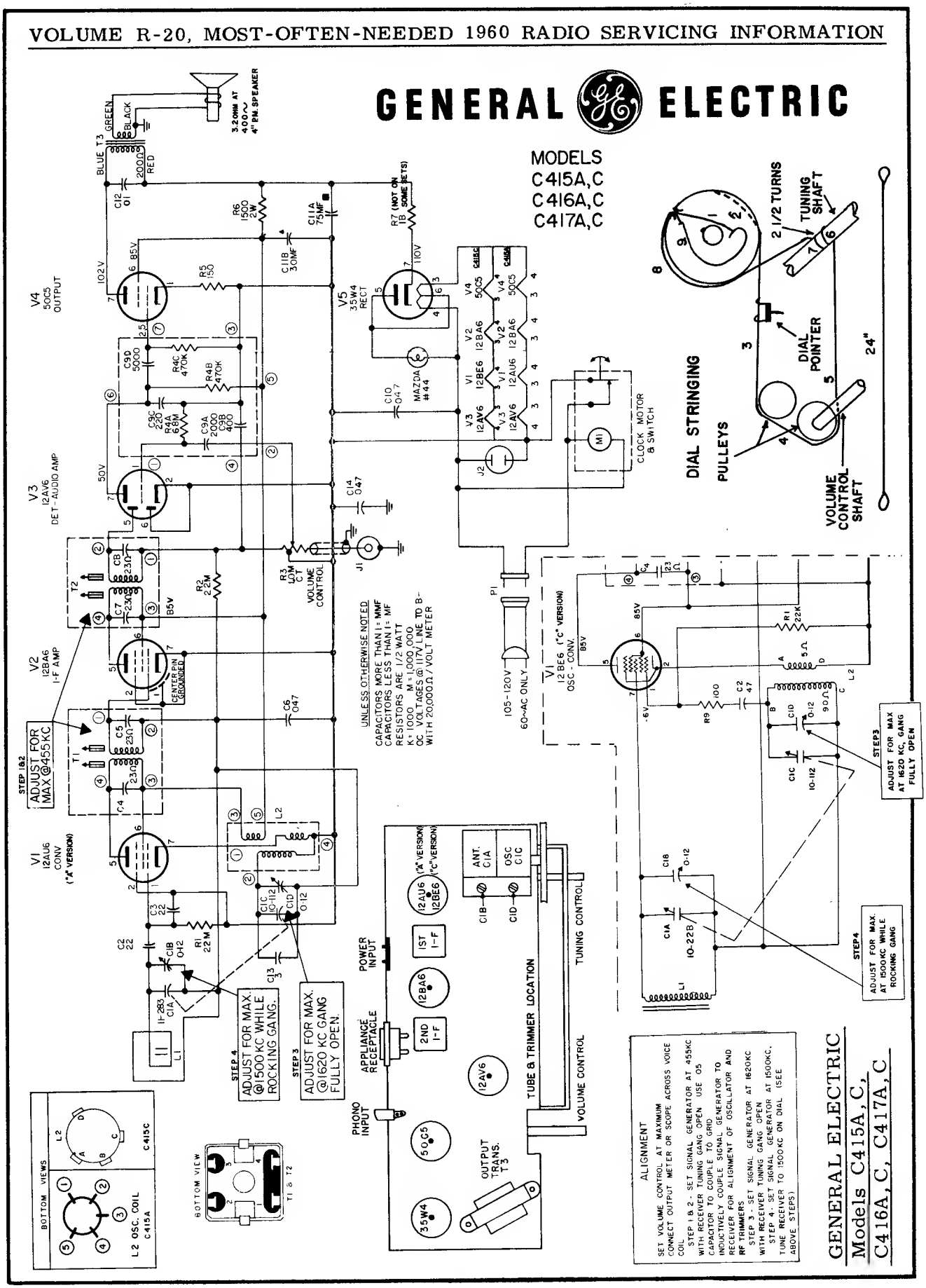
GENERAL ELECTRIC Models T-155A and T-156A

TO REMOVE REAR PANEL

Pull down slightly on cabinet bottom with one hand, while lifting bottom of rear panel up and out with other hand. This will release the bottom locking tabs on the panel from the slots on the cabinet bottom. Then pull panel out and down, releasing top locking tabs from top slots.

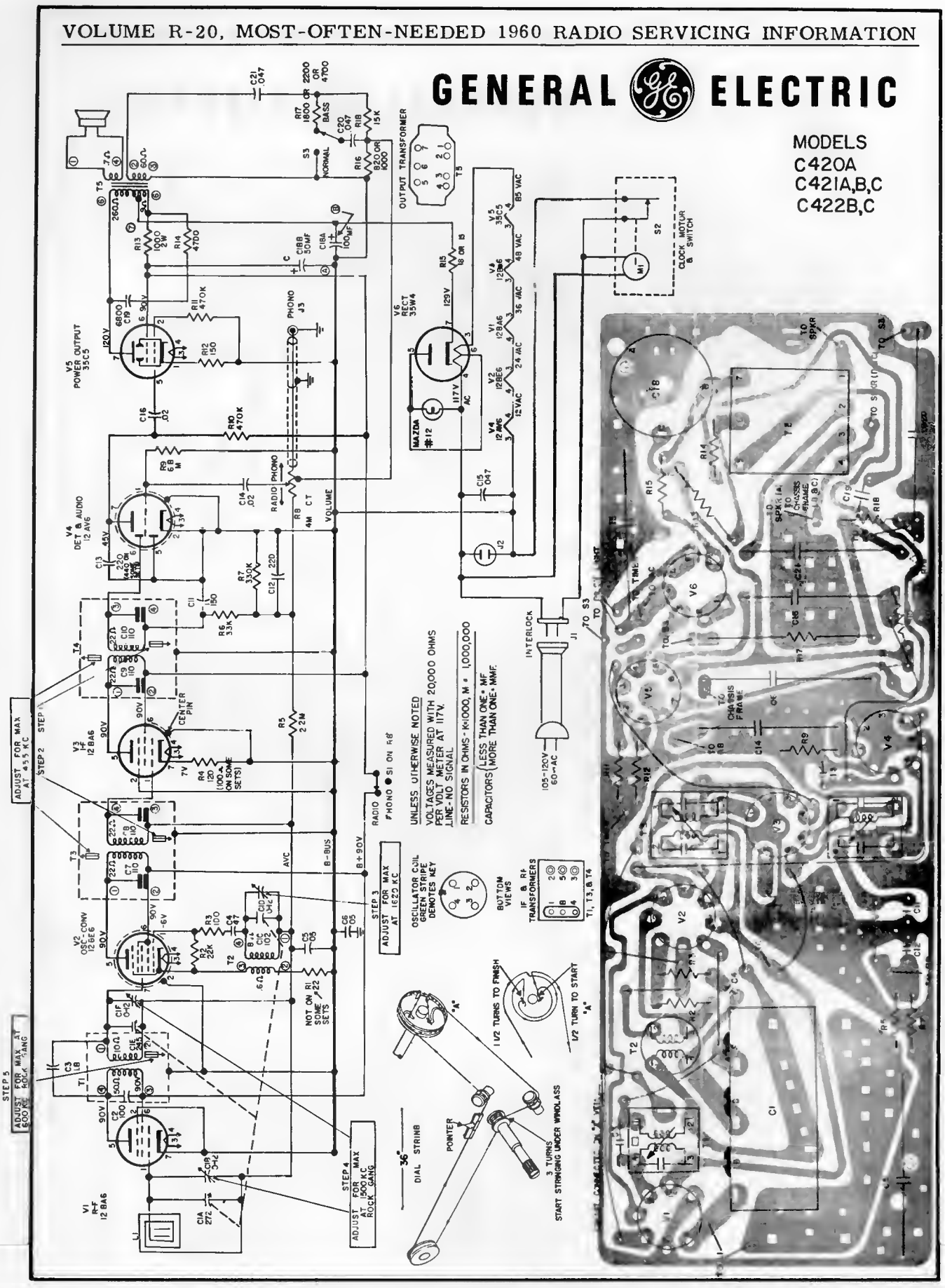
TO REMOVE CHASSIS FROM CABINET

1. Remove rear panel as detailed above.
2. Pull out volume and tuning control knobs.
3. Remove four screws on cabinet bottom which fasten the chassis down.
4. Remove two hex-head screws fastening control panel to front panel.
5. Unsolder speaker leads.
6. Slide chassis out to rear.


GENERAL ELECTRIC
MODELS
C415A,C
C416A,C
C417A,C
V1 12AU6 CONV ("A" VERSION)
V2 12BA6 I-F AMP
V3 12AV6 DET-AUDIO AMP
V4 50C5 OUTPUT
V5 35W4 RECT
V1 12BE6 ("C" VERSION) OSC-CONV.
STEP 1&2 ADJUST FOR MAX @455KC
STEP 4 ADJUST FOR MAX. @1500 KC WHILE ROCKING GANG.
STEP 3 ADJUST FOR MAX. @1620 KC GANG FULLY OPEN.
STEP3 ADJUST FOR MAX AT 1620 KC, GANG FULLY OPEN
STEP4 ADJUST FOR MAX. AT 1500KC WHILE ROCKING GANG
DIAL STRINGING
PULLEYS
2 1/2 TURNS
TUNING SHAFT
DIAL POINTER
24"
VOLUME CONTROL SHAFT
CLOCK MOTOR & SWITCH
105-120V 60~AC ONLY
UNLESS OTHERWISE NOTED
CAPACITORS MORE THAN 1= MMF
CAPACITORS LESS THAN 1= MF
RESISTORS ARE 1/2 WATT
K=1000 M=1,000,000
DC VOLTAGES @ 117V LINE TO B-
WITH 20,000Ω/VOLT METER
ALIGNMENT
SET VOLUME CONTROL AT MAXIMUM
CONNECT OUTPUT METER OR SCOPE ACROSS VOICE COIL
STEP 1 & 2 - SET SIGNAL GENERATOR AT 455KC WITH RECEIVER TUNING GANG OPEN USE .05 (CAPACITOR TO COUPLE TO GRID
INDUCTIVELY COUPLE SIGNAL GENERATOR TO RECEIVER FOR ALIGNMENT OF OSCILLATOR AND RF TRIMMERS
STEP 3 - SET SIGNAL GENERATOR AT 1620KC WITH RECEIVER TUNING GANG OPEN
STEP 4 - SET SIGNAL GENERATOR AT 1500KC, TUNE RECEIVER TO 1500KC ON DIAL (SEE ABOVE STEPS)
BOTTOM VIEWS
L2 OSC. COIL C415A
C415C
BOTTOM VIEW T1 & T2
TUBE & TRIMMER LOCATION
PHONO INPUT
APPLIANCE RECEPTACLE
POWER INPUT
VOLUME CONTROL
TUNING CONTROL
OUTPUT TRANS. T3
GENERAL ELECTRIC
Models C415A,C,
C416A,C, C417A,C

GENERAL ELECTRIC

MODELS
C420A
C421A,B,C
C422B,C



GENERAL ELECTRIC

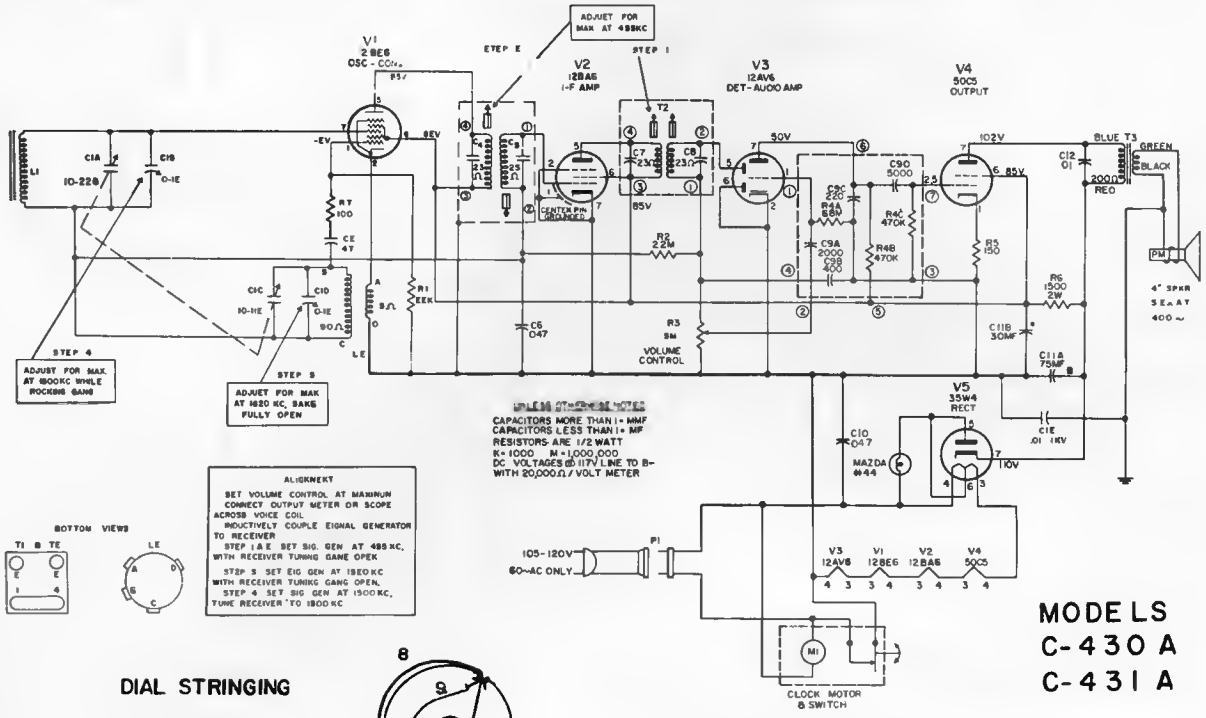
MODELS C-430A, C-431A

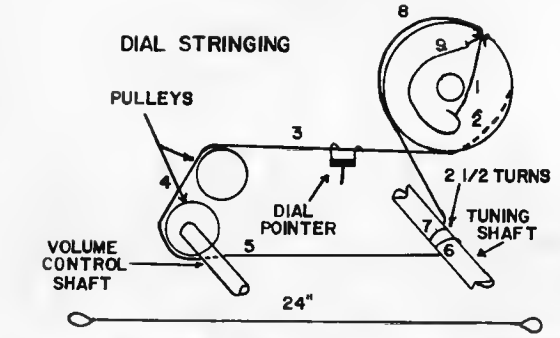
SPECIFICATIONS

CABINET:	C430A Antique White C431A Pink
ELECTRICAL RATING:	105 - 120 Volts A.C., 60 cycles 30 Watts
POWER OUTPUT:	Undistorted: 1 Watt Maximum: 1.5 Watts
SPEAKER:	4", 3.2 ohms @ 400 cps

TO REMOVE CHASSIS

Remove tuning, volume, timer, and time-set knobs. Then remove five hex-head screws on cabinet back, and four hex-head screws on cabinet bottom. Unscrew four Phillips head screws to remove timer. After unsoldering speaker leads, pull chassis out slowly. Leave leads from chassis to timer attached for A.C. power while troubleshooting.





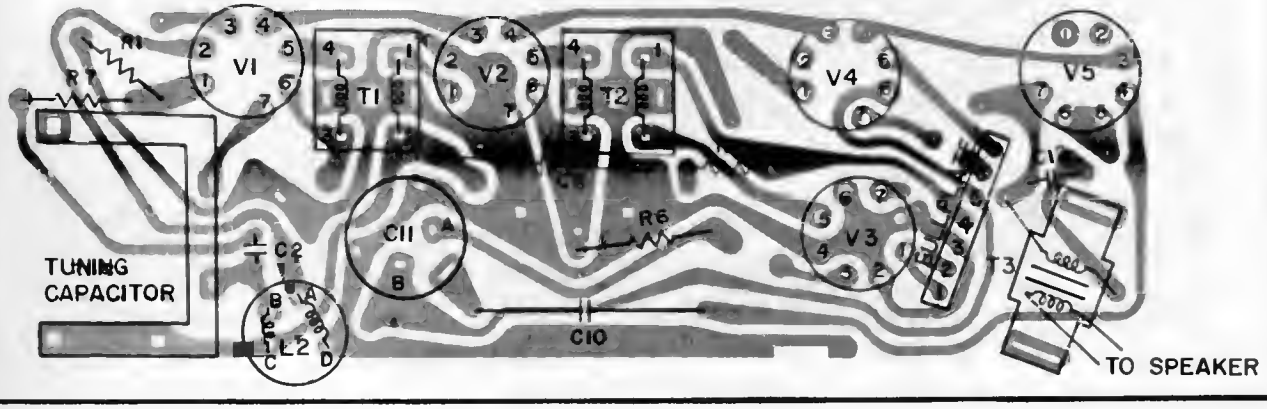
MODELS C-430A C-431A

Tube Pin Resistance Chart

	1	2	3	4	5	6	7
12BE6	22k	0	12	24	1500*	1500*	2.7M
12BA6	2.7M	0	24	36	1500*	1500*	0
12AV6	6.8M	0	12	0	500K	0	470K*
50C5	150	470K	36	75	470K	1500*	200*
35W4	TP	TP	75	103	100	100	20K (Min.)

* Measured from pin 7 of V5.
All readings unless marked are from socket pin to B-

TP Tie Point.



GENERAL ELECTRIC

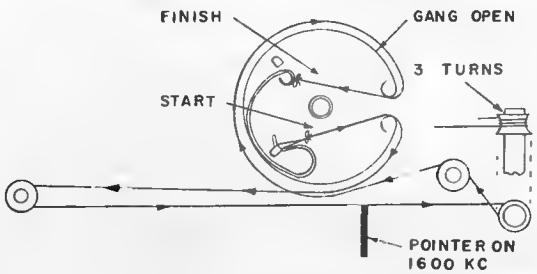
Models C-450A, -B, C-451A, -B, C-452A, -B

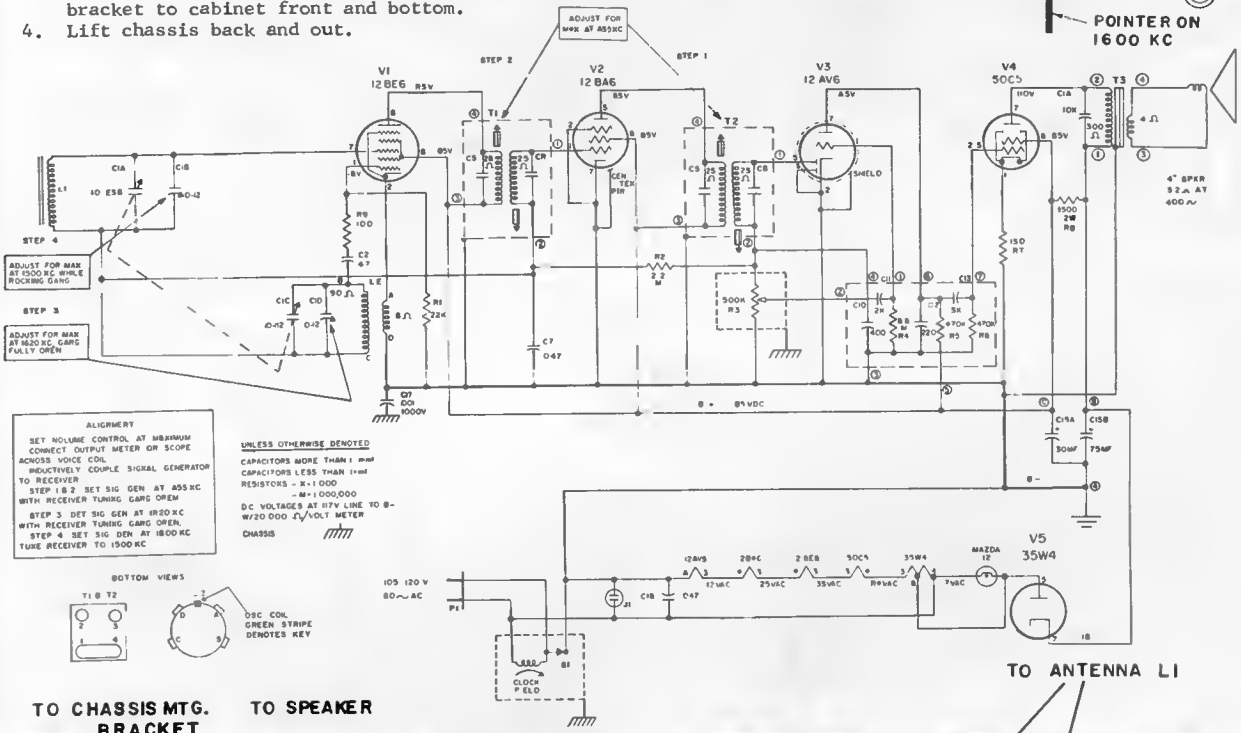
TO REMOVE CABINET BACK

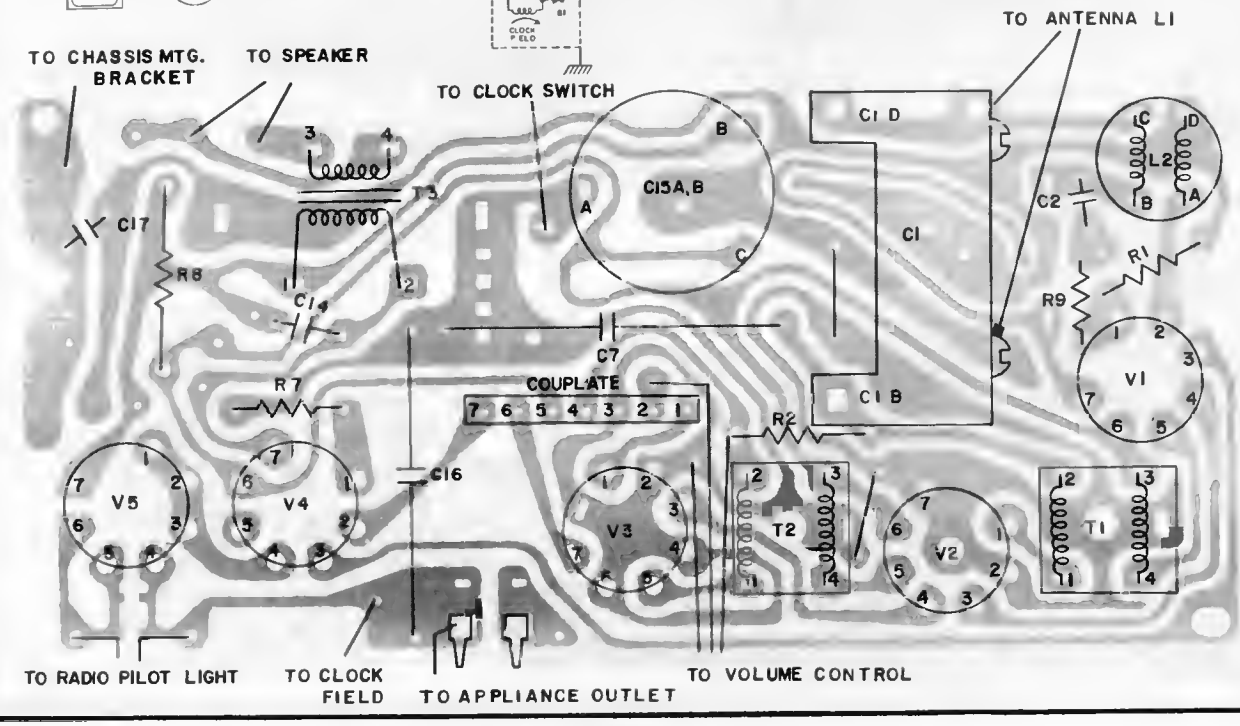
1. Remove time-set knob.
2. Remove two screws on bottom fastening cabinet back to cabinet front.
3. Remove screw above appliance outlet.
4. Disengage two snaps on top front of cabinet by exerting forward pressure on top rear of cabinet until bottom of cabinet back comes loose.
5. Pull cabinet back out.

TO REMOVE CHASSIS

1. Follow steps one thru five as above.
2. Pull off knobs.
3. Remove four screws fastening chassis mounting bracket to cabinet front and bottom.
4. Lift chassis back and out.







NOTES

1- UNLESS OTHERWISE NOTED - CAPACITORS MORE THAN 1 MMF CAPACITORS LESS THAN 1 MF RESISTORS ARE ½ WATT K=1000

2- VOLTAGE AND CURRENT READINGS ARE AVERAGE UNDER NO SIGNAL CONDITIONS VOLTAGES ARE POSITIVE WITH RESPECT TO GROUND

3- VOLTAGES SHOWN IN ▭ ARE FOR PNP TRANSISTORS IN TR5 AND TR6

4- REPLACE WITH TRANSISTOR TYPES SHOWN.

5- TRI	RI	R4
2N1058A	47K	3.9K
2N1059B	56K	3.9K
4JK2A85	39K	NONE

6- TR2	R7
2N94-132	68K
2N94-362	82K

7- FOR NPN TR5 & TR6
- A- SOLDER T5 YELLOW LEAD (B) TO POINT "A."
- B- SOLDER "D" SIDE OF R22 TO "C."
- C- RI5 MUST BE 100Ω THERMISTOR.
- D- RI8 MUST BE 2.2K.

8- FOR PNP TR5 & TR6
- A- SOLDER "D" SIDE OF R22 TO "A."
- B- SOLDER T5 YELLOW LEAD (B) TO POINT "C."
- C- RI5 MUST BE 2.2K. RI6 MUST BE 100Ω THERMISTOR.

TROUBLESHOOTING

The total radio battery current drain should always be ascertained before proceeding with the servicing of this receiver. To measure the total radio battery current, unsolder the red lead attached to the + terminal on the chassis side of the battery compartment and insert a milliammeter in series with the lead and + terminal. The total current drain should be between 12-18 mils. All current measurements must be made at quiescence with the receiver turned on, volume control at maximum, tuning gang closed, and with no signal conditions.

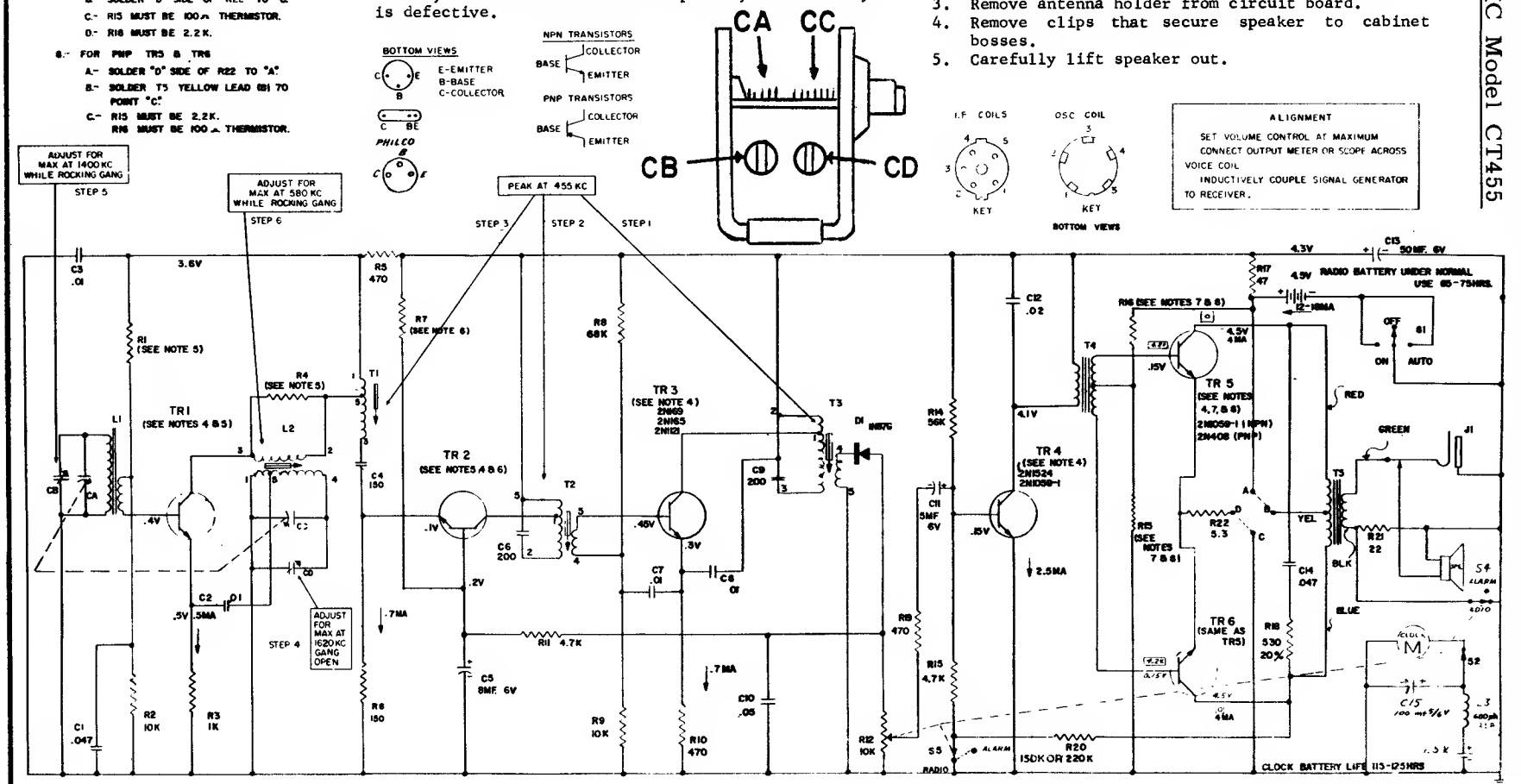
An excessive current reading may mean a shorted transistor; no current will indicate that a transistor, associated circuit component, or a battery is defective.

CHASSIS REMOVAL

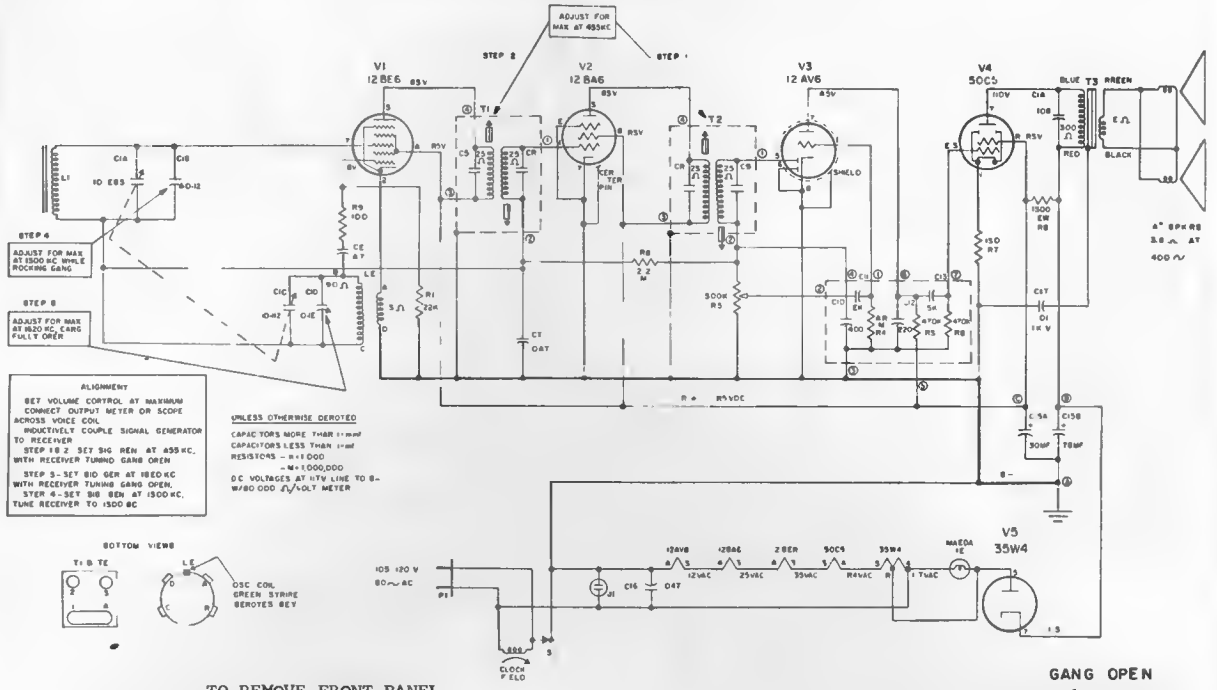
1. Remove two screws from cabinet back, lift cabinet back off.
2. Remove four screws holding circuit board to cabinet bosses (do not remove the two screws that secure antenna holder to circuit board.)
3. Remove volume control.
4. Remove output transformer from speaker.
5. Carefully lift chassis board out.

SPEAKER REMOVAL

1. Remove cabinet back.
2. Remove two screws holding output transformer mounting plate on speaker.
3. Remove antenna holder from circuit board.
4. Remove clips that secure speaker to cabinet bosses.
5. Carefully lift speaker out.

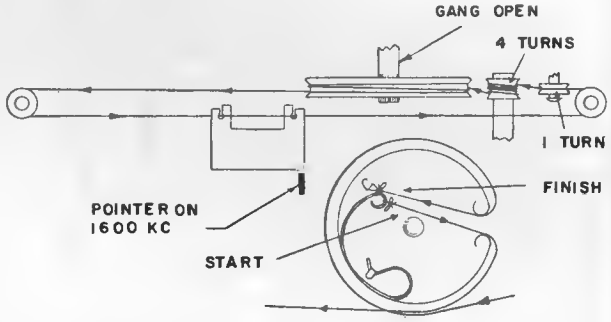


GENERAL ELECTRIC Model C-460A



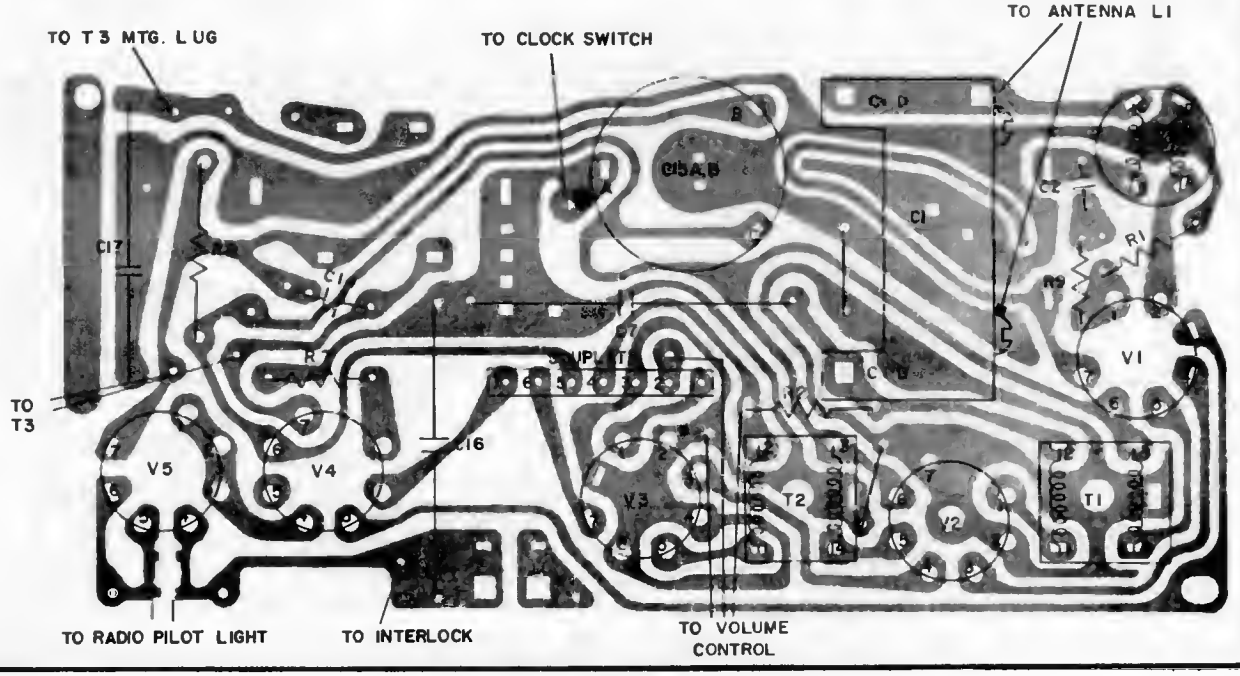
TO REMOVE FRONT PANEL

1. Pull off clock control levers.
2. Remove volume and tuning control knobs.
3. Remove screws fastening front panel to bottom of cabinet.
4. Lift panel out carefully to prevent scratching crystal on control shafts.



TO REMOVE CHASSIS

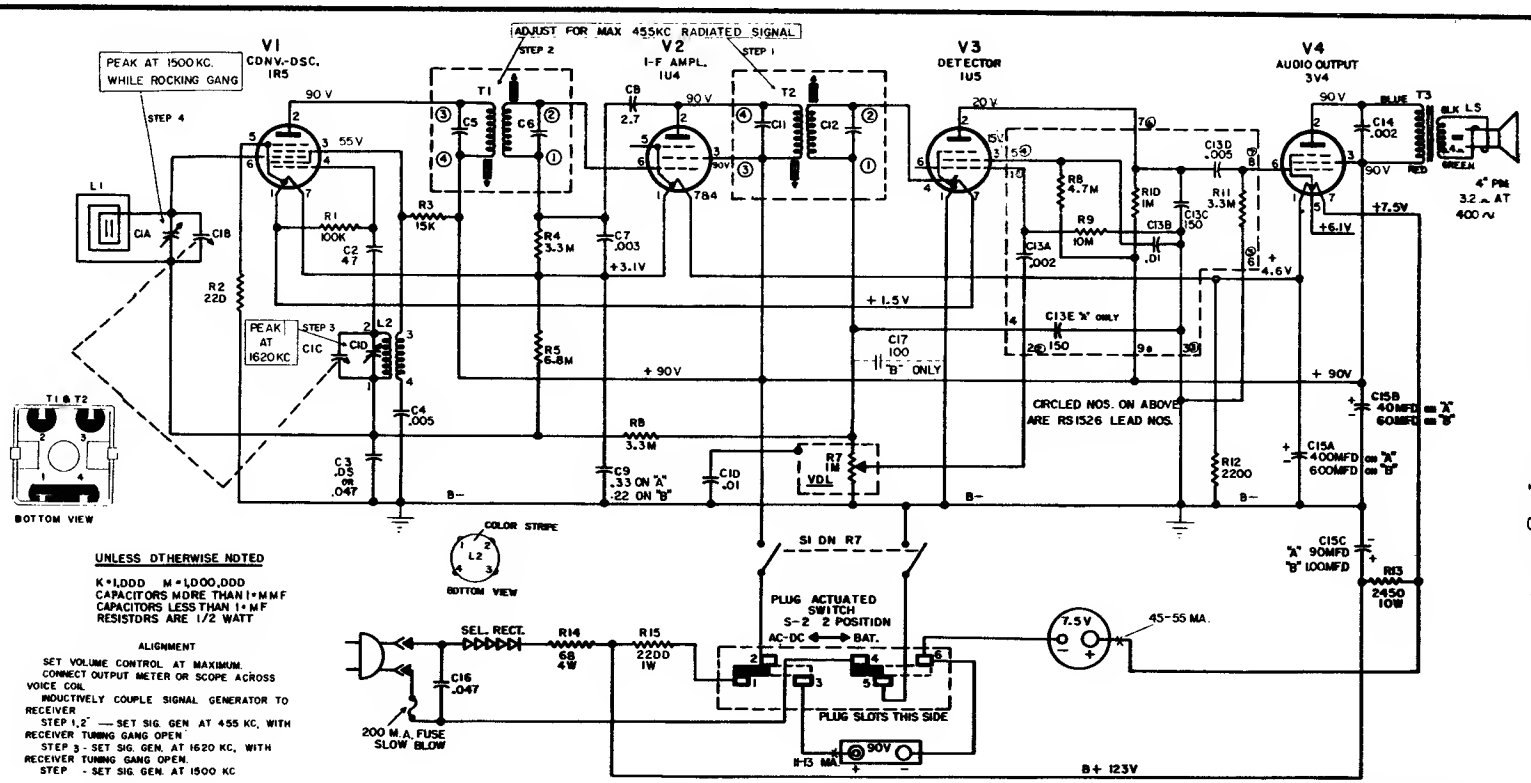
1. Follow steps one through four as above.
2. Remove two screws from top of masonite board and third screw beside line cord interlock.
3. Unscrew clock-set knob.
4. Unsolder speaker leads.

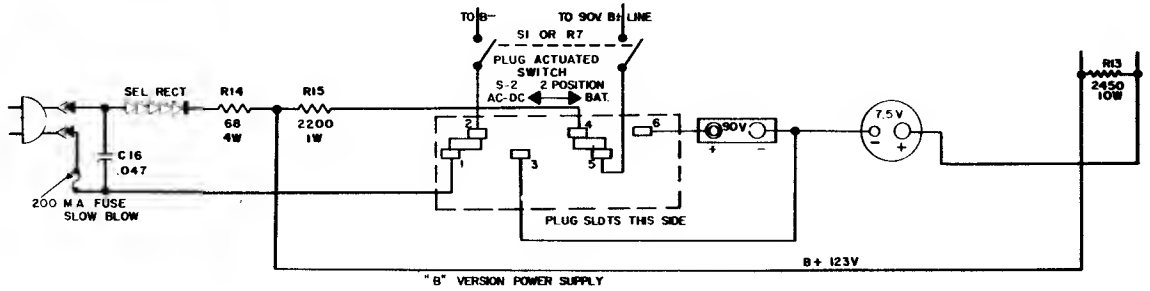


GENERAL ELECTRIC

Models P671A,B, P672A,B, P673A,B, P674B

(Continued on page 54)





CHASSIS REMOVAL

The chassis is easily removed by means of the following procedure:

1. Raise up handle and grasp edge of top cabinet front with one hand and cabinet with other hand. Pull firmly to open cabinet.
2. Pull tuning and volume control knobs straight off control shafts.
3. Remove the two small Phillips-head screws from the top rear edge of the metal chassis mounting bracket.
4. Slide chassis and bracket out of cabinet.
5. Remove bracket from chassis by unscrewing the 1/4" mounting screw from the bracket.

The power supply chassis is removable from cabinet by removing the four small hex-head mounting screws.

VOLUME CONTROL REPLACEMENT

The chassis must first be removed from the cabinet as described under CHASSIS REMOVAL, then replace volume control as follows:

Cut off the three control lugs and the four on-off lugs.

Heat the remaining part of the lugs on the circuit board end pull out with long-nose pliers.

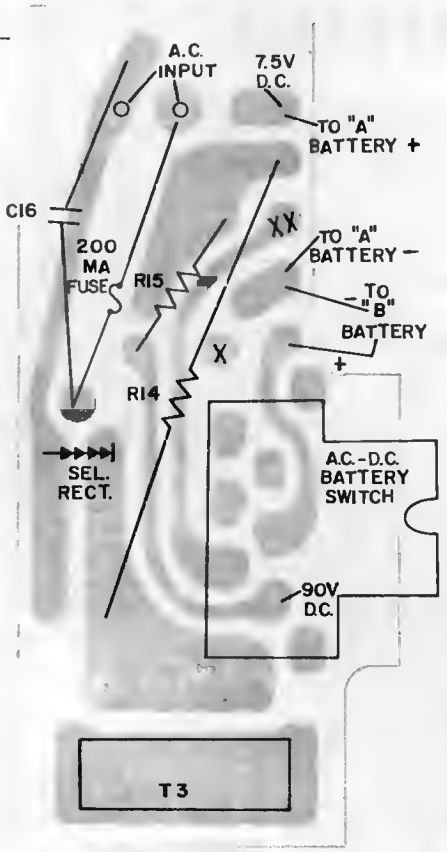
Clean all mounting holes of all excess solder.

Insert new control; then solder all lugs securely in place.

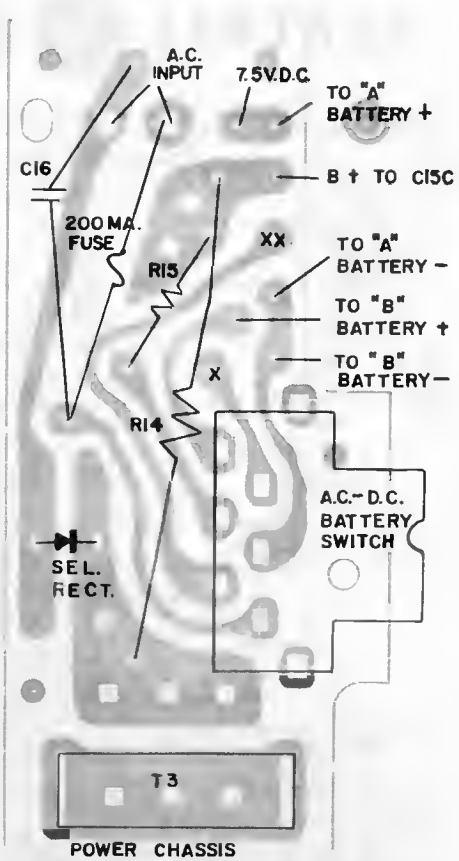
GENERAL ELECTRIC

MODELS
P671A,B
P672A,B
P673A,B
P674B

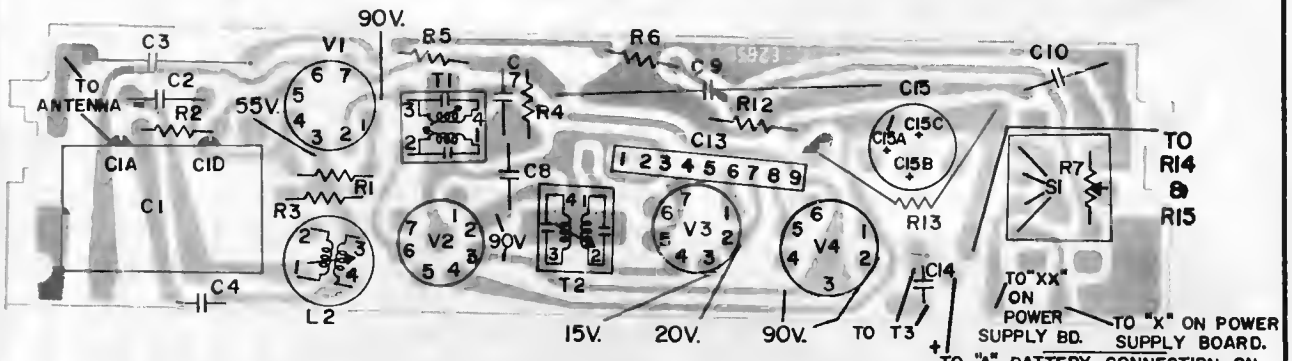
(Continued from page 53)



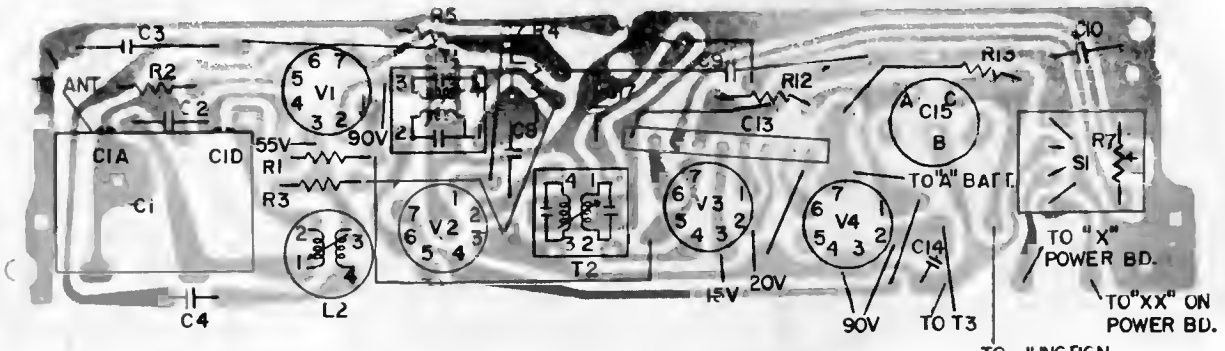
POWER CHASSIS COMPONENT LOCATION "A" VERSION



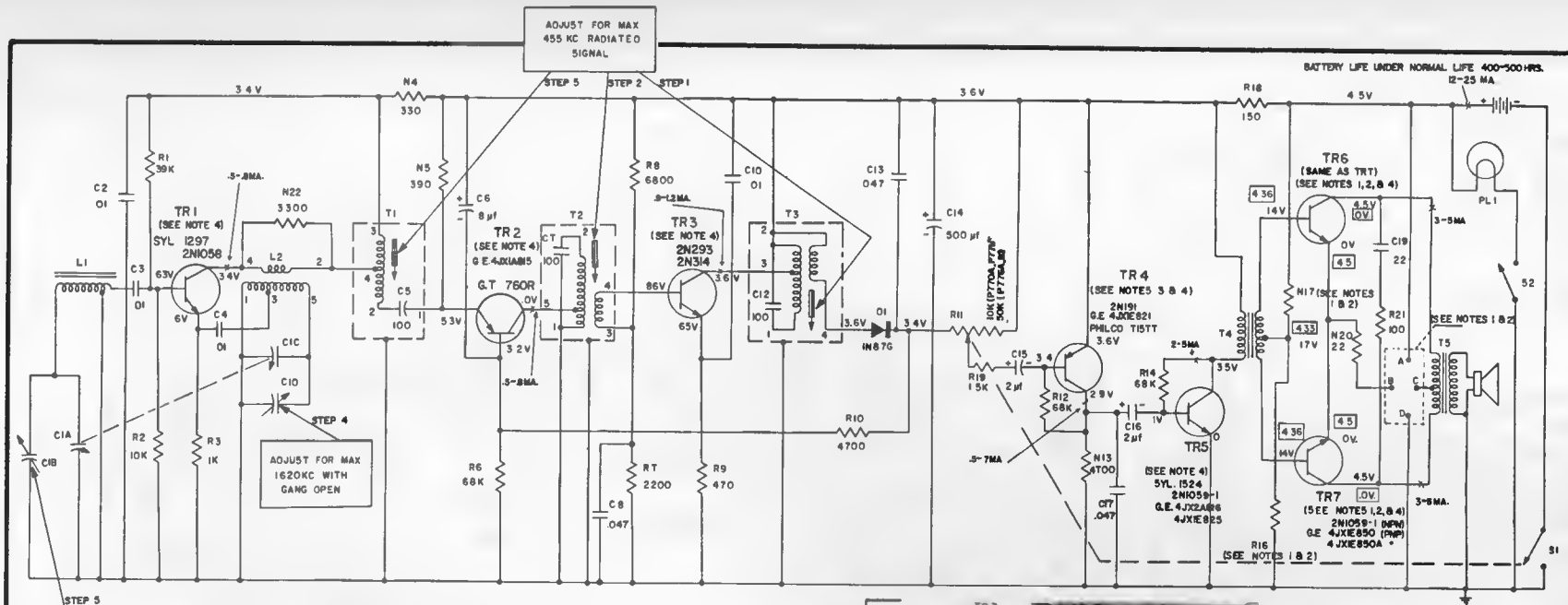
POWER CHASSIS COMPONENT LOCATION "B" VERSION



"A" VERSION MAIN CHASSIS - COMPONENT LOCATION



"B" VERSION MAIN CHASSIS – COMPONENT LOCATION



LF TRANSFORMER

T1, T2, T3

OSCILLATOR TRANSFORMER

TRANSISTOR MOUNTING PATTERN (EXCEPT T15T7)

PHILCO T15TT ONLY

BOTTOM VIEWS

NOTES—

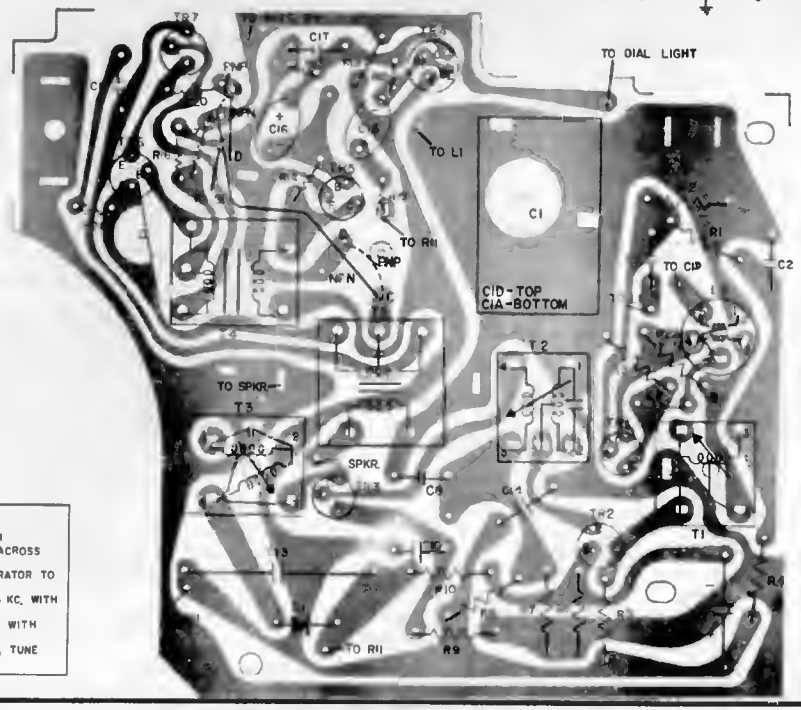
1. FOR NPN TR6 & TR7
   - A. CONNECT A JUMPER WIRE BETWEEN POINTS B & D. } SEE PHANTOM WIRING DIAGRAM
   - B. " " " " " " A & C. }
   - C. R16 MUST BE 50 OHMS (THERMISTER)
   - D. R17 MUST BE 1K
2. FOR PNP TR6 & TR7
   - A. CONNECT A JUMPER WIRE BETWEEN POINTS A & B. } SEE PHANTOM WIRING DIAGRAM
   - B. " " " " " " C & D. }
   - C. R16 MUST BE 1K
   - D. R17 MUST BE 50 OHMS (THERMISTER)
3. T1577 (PHILCO) TRANSISTOR BASE LEAD MUST BE SOLDERED INTO B2 AS SHOWN ON PHANTOM WIRING DIAGRAM. BASE LEAD OF ALL OTHER RECOMMENDED TRANSISTORS FOR TR4 MUST BE SOLDERED INTO B1
4. REPLACE WITH TRANSISTOR TYPES SHOWN.
5. UNLESS OTHERWISE NOTED— CAPACITORS MORE THAN 1 MMF CAPACITORS LESS THAN 1 MF RESISTORS ARE 1/2 WATT K = 1000
6. VOLTAGES ARE POSITIVE WITH RESPECT TO GROUND UNDER NO SIGNAL CONDITIONS
7. VOLTAGES SHOWN IN ☐ ARE WITH TR6 & TR7 PNP

ALIGNMENT

SET VOLUME CONTROL AT MAXIMUM
CONNECT OUTPUT METER OR SCOPE ACROSS VOICE COIL
INDUCTIVELY COUPLE SIGNAL GENERATOR TO RECEIVER
STEP 1, 2 & 3 - SET SIG GEN AT 455 KC, WITH RECEIVER TUNING GANG OPEN
STEP 4 - SET SIG GEN AT 1620 KC, WITH RECEIVER TUNING GANG OPEN
STEP 5 - SET SIG GEN AT 1400 KC, TUNE RECEIVER TO 1400 KC

CHASSIS REMOVAL - P770A, P771A

1. Remove tuning knob.
2. Open battery compartment door and remove batteries.
3. Remove screw located in center of battery compartment.
4. Separate front and back from bottom only.
5. Unsolder two leads from speaker.
6. Remove hex-head screws holding chassis board and volume control bracket to cabinet bosses.
7. Pull handle up and move chassis slightly out and unsolder lead to dial light button lug; then remove chassis.



PHANTOM WIRING DIAGRAM MODELS P770A, P771A, P776A

TROUBLESHOOTING

A check of the battery condition and total current drain of the receiver should be made first. All current measurements are made at quiescence with the receiver turned on, volume control at maximum, tuning gang closed, and with no signal conditions.

The total receiver current drain is 15 to 20 mils. This is measured by inserting a milliammeter in series with the batteries.

If an excessive total current drain is recorded, the individual collector current readings of each transistor should be checked.

NO RECEPTION:
1. Check battery voltage and battery contacts.
2. Check on-off switch.
3. Check all antenna lead connections.
4. Check coil L2.

WEAK AUDIO:
1. Check battery voltage for 4.5 volts.
2. Check battery current.
3. Check transistor collector currents.
4. Check alignment.

INTERMITTENT:
1. Check battery contacts for corrosion.
2. Check solder connections on dip-soldered side of circuit board.

Intermittent audio, motorboating, and poor reception is frequently caused by poor battery contact. The battery terminals should be cleaned to insure positive electrical contact.

ALIGNMENT

SET VOLUME CONTROL AT MAXIMUM.
CONNECT OUTPUT METER OR SCOPE ACROSS VOICE COIL.
INDUCTIVELY COUPLE SIGNAL GENERATOR TO RECEIVER
STEP 1, 2 & 3 - SET SIG. GEN AT 455 KC, WITH RECEIVER TUNING GANG OPEN.
STEP 4 - SET SIG. GEN. AT 1620 KC, WITH RECEIVER TUNING GANG OPEN
STEP 5 - SET SIG. GEN AT 1400 KC, TUNE RECEIVER TO 1400 KC.

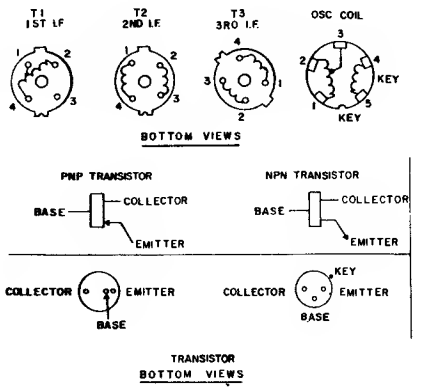
STEP 6 - SET SIG GEN AT 580 KC, TUNE RECEIVER TO 580 KC.

NOTES—

(1) TRANSISTOR 2N169A, 2N322/1297 → R1 68K; 2N654A, 2N658A, 2N869 → 22K, 33K, OR 39K

(2) AFTER REPLACING TR2, CHECK VOLTAGE ACROSS R6, IF NOT WITHIN RANGE, CHANGE VALUE OF R5 UNTIL VOLTAGE ACROSS R6 IS WITHIN VOLTAGE RANGE SHOWN.

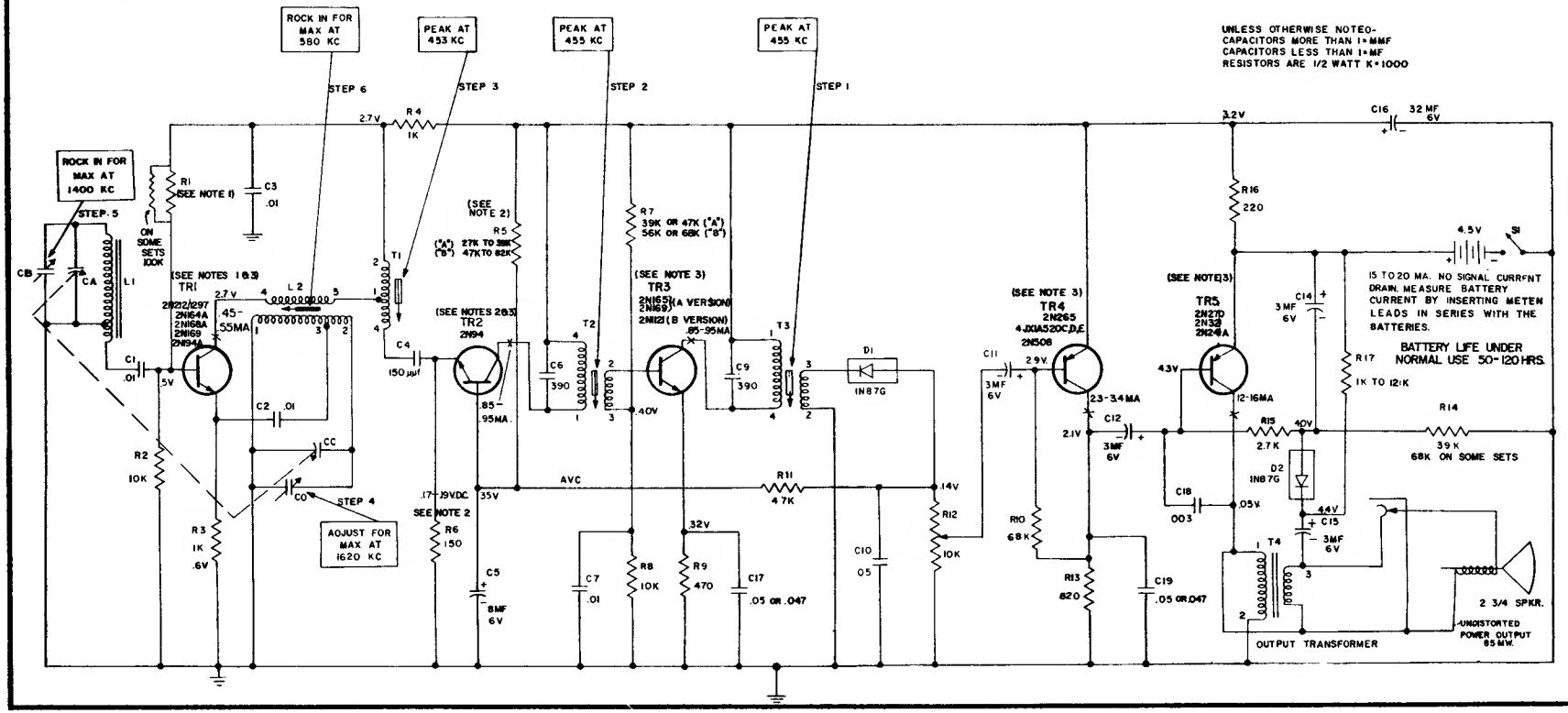
(3) REPLACE WITH TRANSISTOR TYPES SHOWN.



MEASURE COLLECTOR CURRENTS WITH A MILLIAMMETER INSERTED IN SERIES WITH THE CIRCUITS MARKED "X"

ALL VOLTAGES ARE POSITIVE WITH RESPECT TO GROUND.

UNLESS OTHERWISE NOTED-
CAPACITORS MORE THAN 1 = MMF
CAPACITORS LESS THAN 1 = MF
RESISTORS ARE 1/2 WATT K = 1000

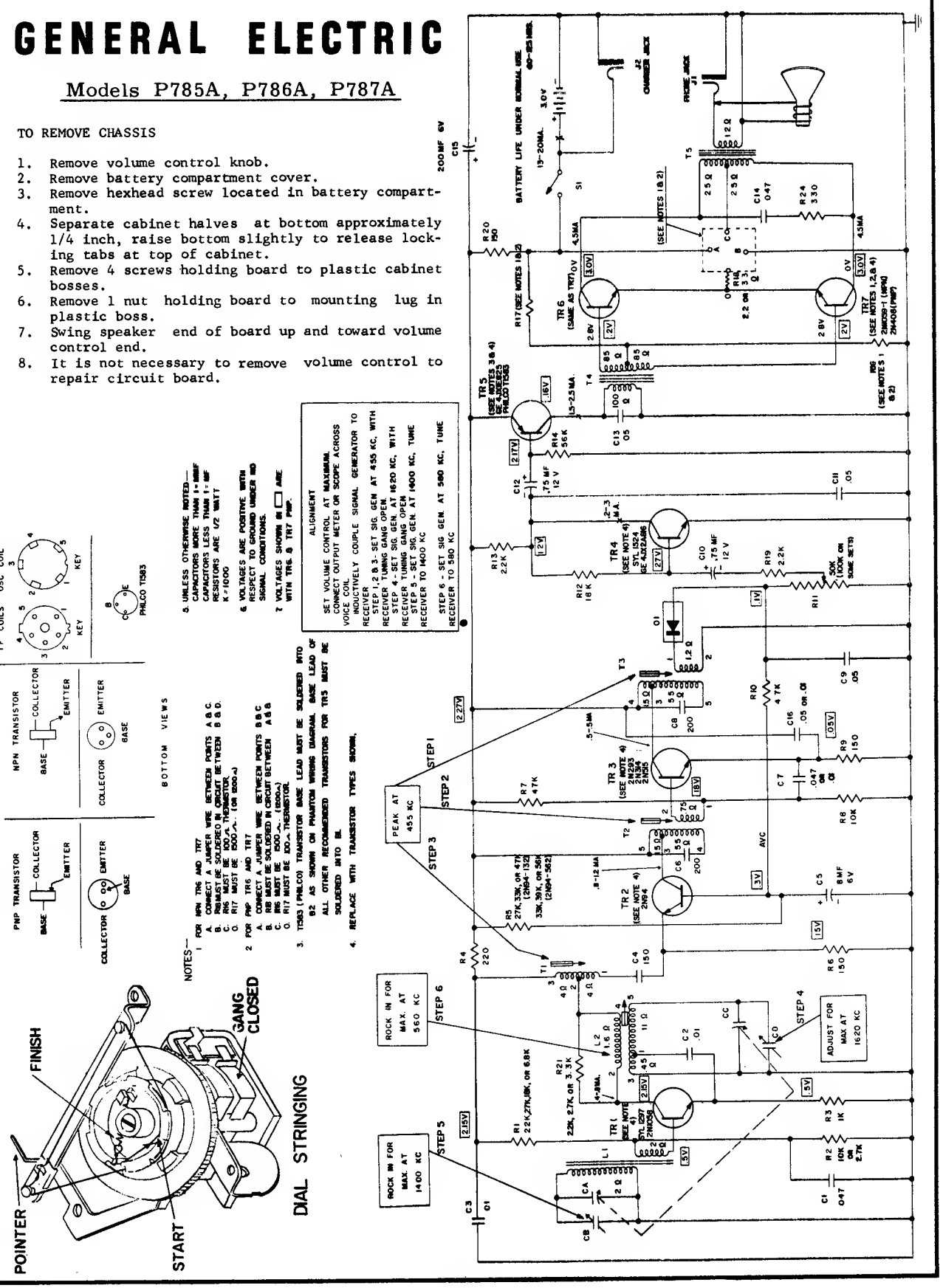


GENERAL ELECTRIC

Models P785A, P786A, P787A

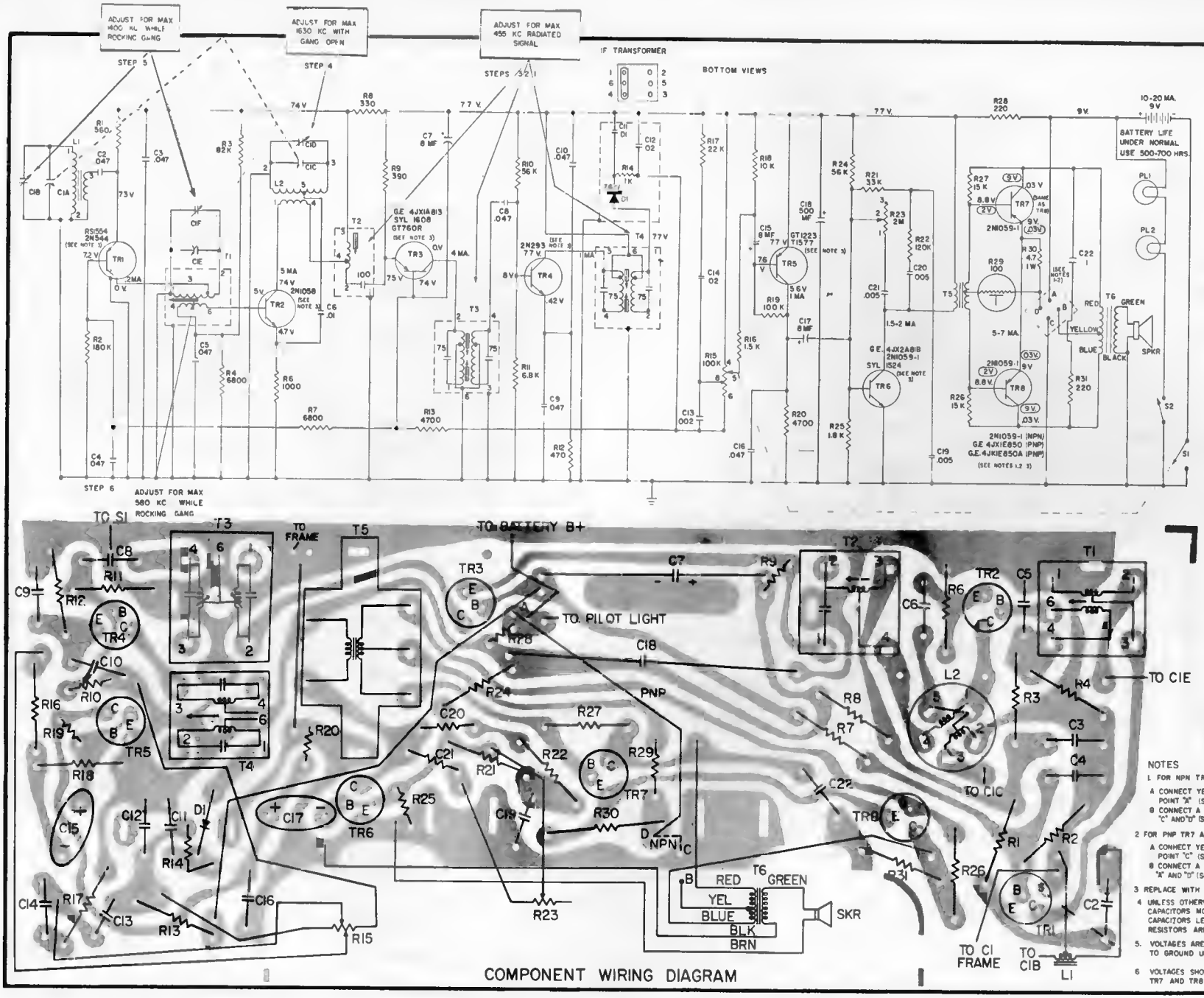
TO REMOVE CHASSIS

1. Remove volume control knob.
2. Remove battery compartment cover.
3. Remove hexhead screw located in battery compartment.
4. Separate cabinet halves at bottom approximately 1/4 inch, raise bottom slightly to release locking tabs at top of cabinet.
5. Remove 4 screws holding board to plastic cabinet bosses.
6. Remove 1 nut holding board to mounting lug in plastic boss.
7. Swing speaker end of board up and toward volume control end.
8. It is not necessary to remove volume control to repair circuit board.



GENERAL ELECTRIC

Model P780A



NOTES

1. FOR NPN TR7 AND TR8
   - A CONNECT YELLOW LEAD "B" FROM T6 TO POINT "A" (SEE COMPONENT WIRING DIAGRAM
   - B CONNECT A JUMPER WIRE BETWEEN POINTS "C" AND "D" (SEE COMPONENT WIRING DIAGRAM)
2. FOR PNP TR7 AND TR8
   - A CONNECT YELLOW LEAD "B" FROM T6 TO POINT "C" (SEE COMPONENT WIRING DIAGRAM
   - B CONNECT A JUMPER WIRE BETWEEN POINTS "A" AND "D" (SEE COMPONENT WIRING DIAGRAM)
3. REPLACE WITH TRANSISTOR TYPES SHOWN.
4. UNLESS OTHERWISE NOTED
   CAPACITORS MORE THAN 1 MMF
   CAPACITORS LESS THAN 1 MF
   RESISTORS ARE 1/2 WATT (K = 1000)
5. VOLTAGES ARE POSITIVE WITH RESPECT TO GROUND UNDER NO SIGNAL CONDITIONS
6. VOLTAGES SHOWN IN ▭ ARE WITH TR7 AND TR8 NPN

GENERAL ELECTRIC

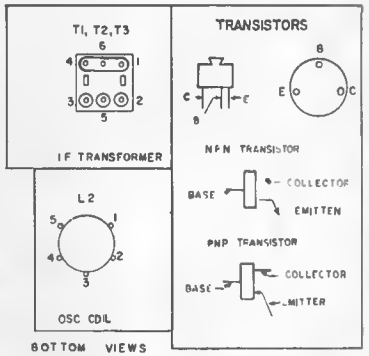
MODELS
P795
P796
P797

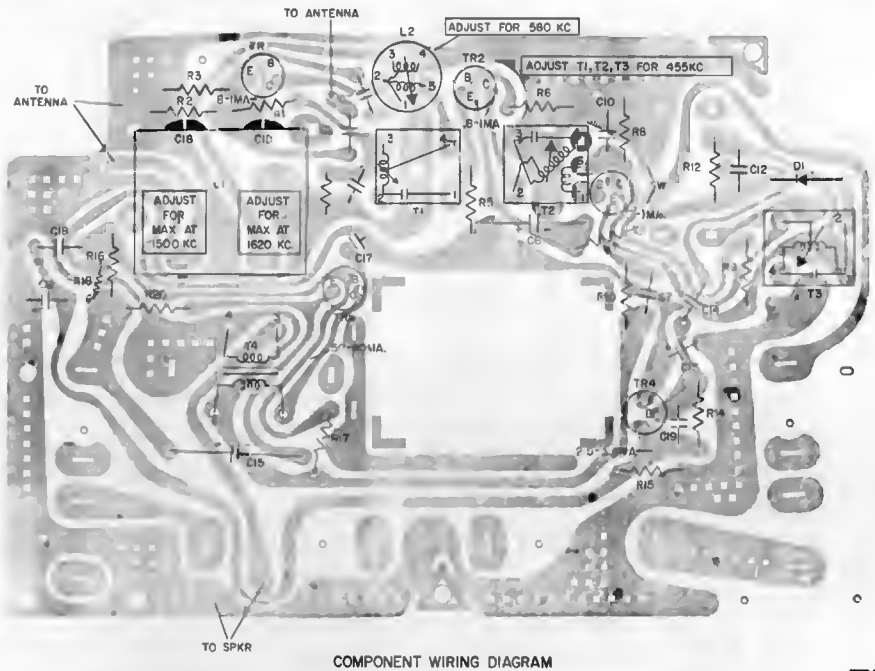
CHASSIS REMOVAL

1. Remove both knobs. 2. Remove the 4 batteries. 3. Remove cabinet retainer strap. 4. Unsolder the two leads on the speaker. 5. Unscrew the 5 screws holding chassis to cabinet. When replacing the circuit board slide the antenna edge of the board under the circuit board holder and replace the screws.

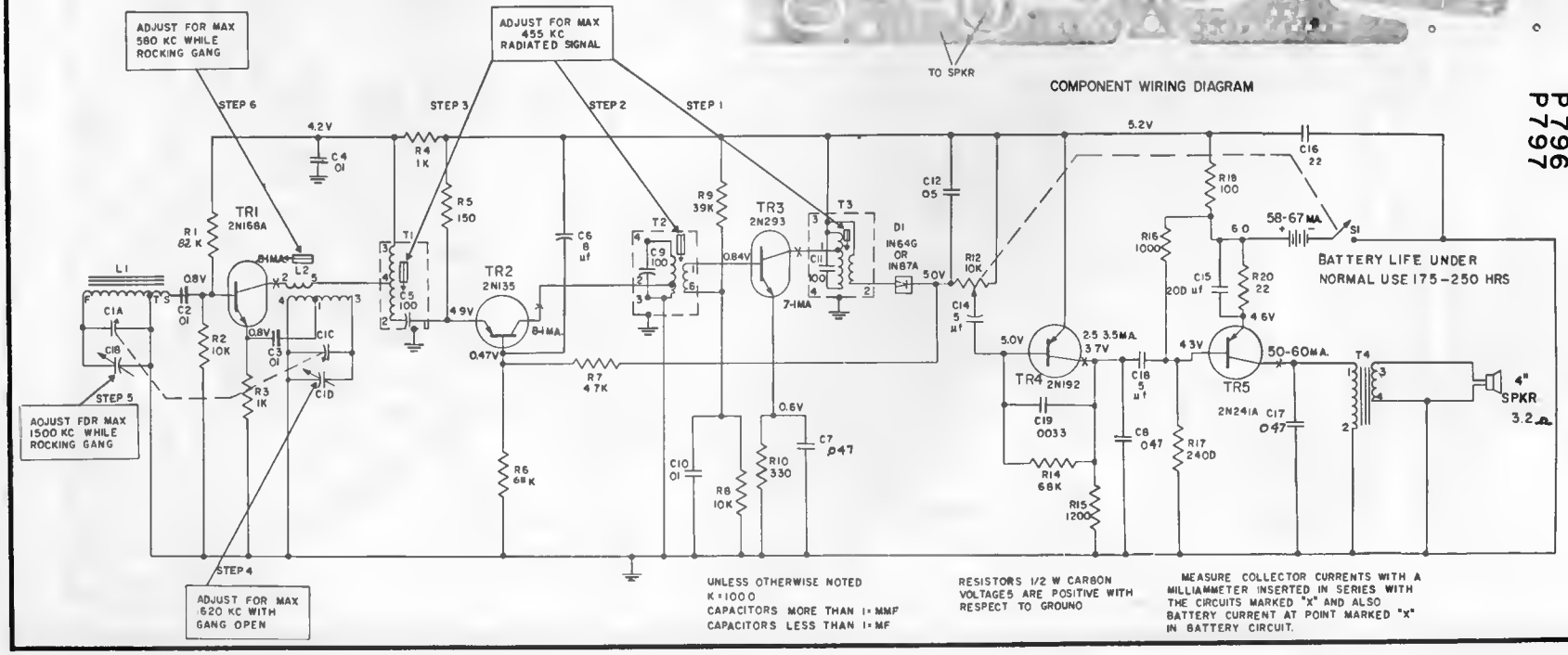
ALIGNMENT

SET VOLUME CONTROL AT MAXIMUM
CONNECT OUTPUT METER OR SCOPE ACROSS VOICE COIL
INDUCTIVELY COUPLE SIGNAL GENERATOR TO RECEIVER
STEP 1 2 & 3 SET SIG GEN AT 455 KC, WITH RECEIVER TUNING GANG OPEN
STEP 4 - SET SIG GEN AT 1620 KC, WITH RECEIVER TUNING GANG OPEN
STEP 5 SET SIG GEN AT 1500 KC, TUNE RECEIVER TO 1500 KC
STEP 6 - SET SIG GEN AT 580 KC, TUNE RECEIVER TO 580 KC





COMPONENT WIRING DIAGRAM



UNLESS OTHERWISE NOTED
K = 1000
CAPACITORS MORE THAN 1 = MMF
CAPACITORS LESS THAN 1 = MF

RESISTORS 1/2 W CARBON
VOLTAGES ARE POSITIVE WITH RESPECT TO GROUND

MEASURE COLLECTOR CURRENTS WITH A MILLIAMMETER INSERTED IN SERIES WITH THE CIRCUITS MARKED "X" AND ALSO BATTERY CURRENT AT POINT MARKED "X" IN BATTERY CIRCUIT.

GENERAL ELECTRIC Model P800A

TO REMOVE CIRCUIT BOARD

1. Remove cabinet back.
2. Remove hex-head screws holding chassis board to cabinet front.
   Caution: Do not remove brass hex-head screws holding speaker magnets to speaker.

TO REMOVE TUNING CAPACITOR OR VOLUME CONTROL

1. Remove knobs.
2. Remove cabinet back.
3. Remove chassis.
4. Remove flat head screw from cabinet front.
   a) To replace tuning capacitor, remove phillips head screws on cabinet front.
   b) To replace volume control, remove screw from bracket near volume control inside cabinet front.

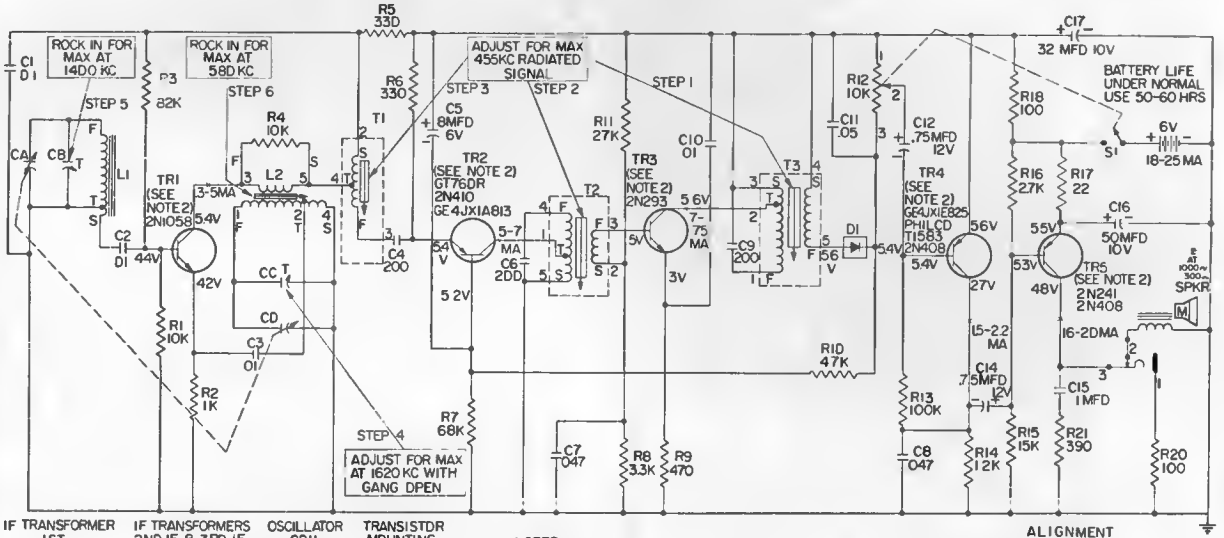
TROUBLESHOOTING

NO RECEPTION:
1. Check battery voltage and battery contacts.
2. Check on-off switch.
3. Check all antenna lead connections.
4. Check coil L2.

WEAK AUDIO:
1. Check battery voltage for 6 volts.
2. Check battery current.
3. Check transistor collector currents.
4. Check alignment.

INTERMITTENT:
1. Check battery contacts for corrosion.
2. Check solder connections on dip-soldered side of circuit board.

Intermittent audio, motorboating, and poor reception is frequently caused by poor battery contact or low battery voltage. The terminals on the batteries should be cleaned to insure positive electrical contact.



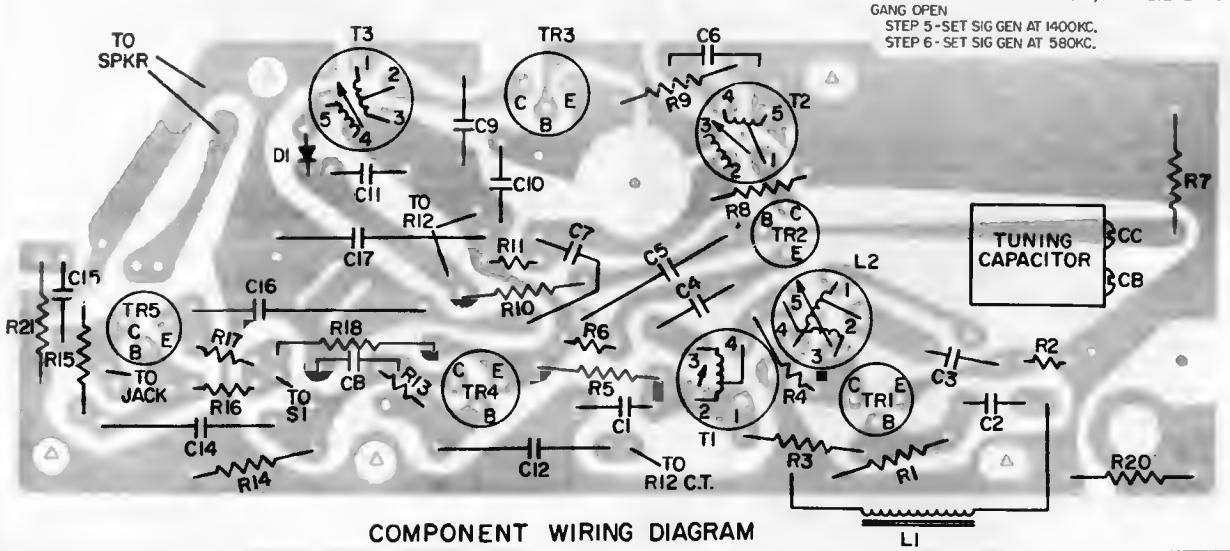
NOTES

1 UNLESS OTHERWISE NOTED-CAPACITORS MORE THAN 1=MMF CAPACITORS LESS THAN 1=MF RESISTORS ARE ½ WATT K=1000

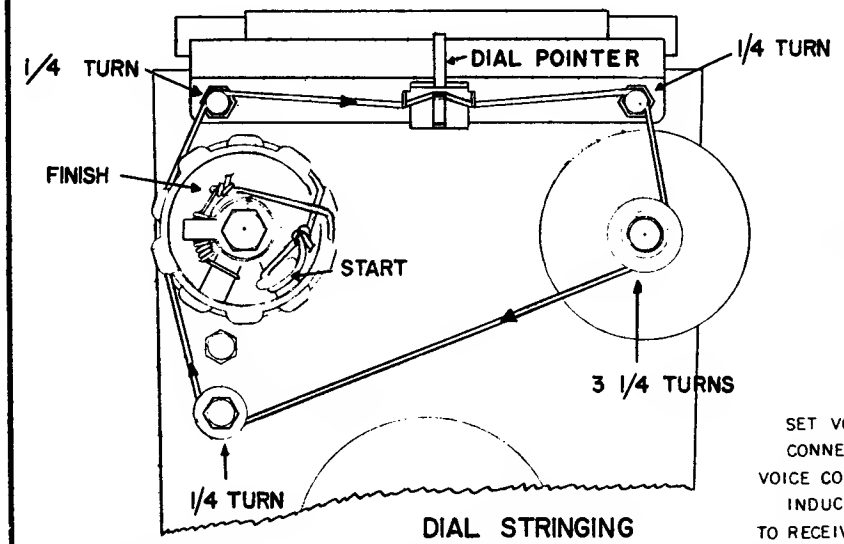
2 REPLACE WITH TRANSISTOR TYPES SHOWN.

ALIGNMENT

SET VOLUME CONTROL AT MAXIMUM
CONNECT OUTPUT METER OR SCOPE ACROSS VOICE COIL
INDUCTIVELY COUPLE SIGNAL GENERATOR TO RECEIVER
STEP 1,2, & 3-SET SIG GEN AT 455KC, WITH RECEIVER TUNING GANG OPEN
STEP 4-SET SIG GEN AT 1620KC, WITH RECEIVER TUNING GANG OPEN
STEP 5-SET SIG GEN AT 1400KC.
STEP 6-SET SIG GEN AT 580KC.



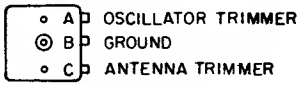
COMPONENT WIRING DIAGRAM



DIAL STRINGING

BOTTOM VIEWS

MOUNTING VIEW OF GANG



ALIGNMENT

SET VOLUME CONTROL AT MAXIMUM.

CONNECT OUTPUT METER OR SCOPE ACROSS VOICE COIL.

INDUCTIVELY COUPLE SIGNAL GENERATOR TO RECEIVER.

NOTES:

1 UNLESS OTHERWISE NOTED-CAPACITORS MORE THAN 1=MMF CAPACITORS LESS THAN 1=MF RESISTORS ARE ½ WATT K=1000

2 VOLTAGE AND CURRENT READINGS ARE AVERAGE UNDER NO SIGNAL CONDITIONS VOLTAGES ARE POSITIVE WITH RESPECT TO GROUND

3 VOLTAGES SHOWN IN ▭ ARE FOR PNP TRANSISTORS IN TR5 AND TR6

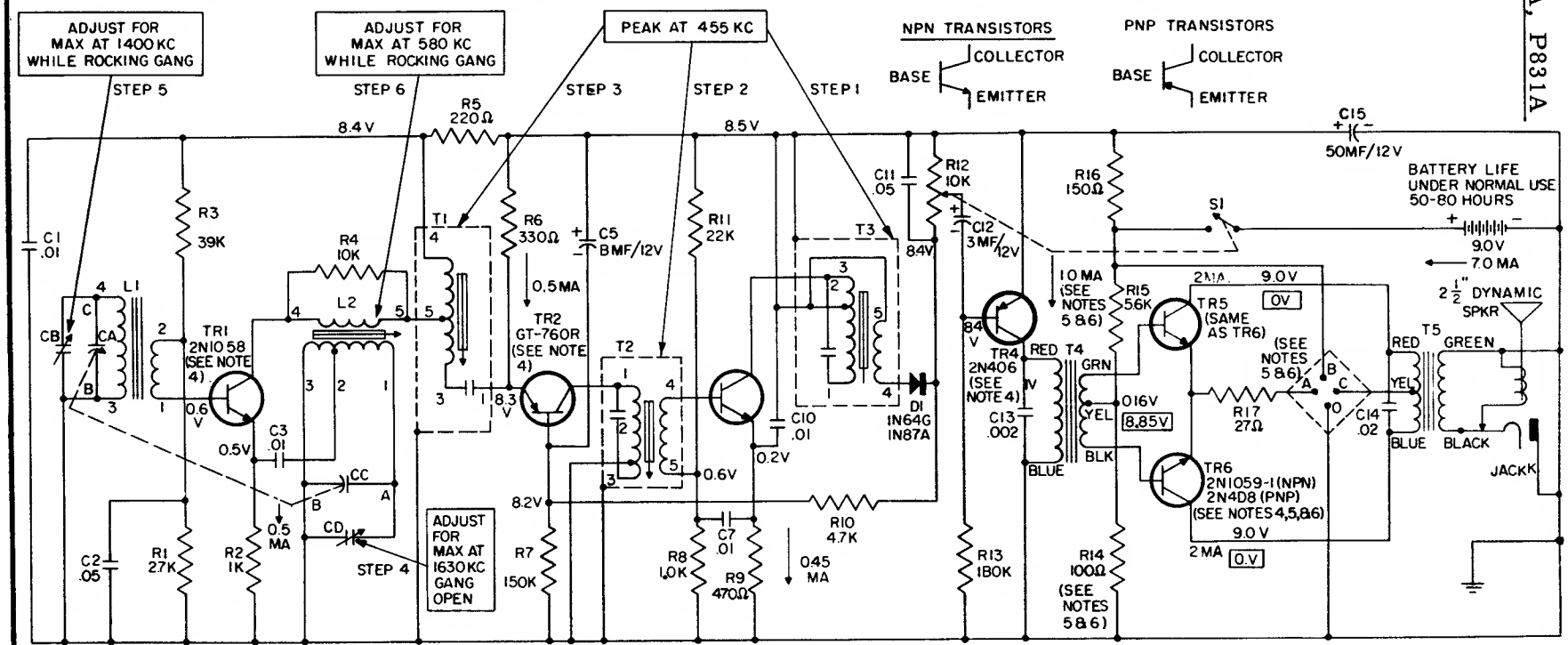
4 REPLACE WITH TRANSISTOR TYPES SHOWN,

5 FOR NPN TR5 AND TR6
A. CONNECT R17 ("A" SIDE) TO POINT "C"
B. CONNECT YELLOW LEAD FROM T5 TO POINT "B"
C R14 MUST BE 100 ohms
D. R15 MUST BE 5.6K

6 FOR PNP TR5 AND TR6
A. CONNECT R17 ("A" SIDE) TO POINT "B"
B. CONNECT YELLOW LEAD FROM T5 TO POINT "C"
C. R14 MUST BE 5.6K
D. R15 MUST BE 100 OHMS

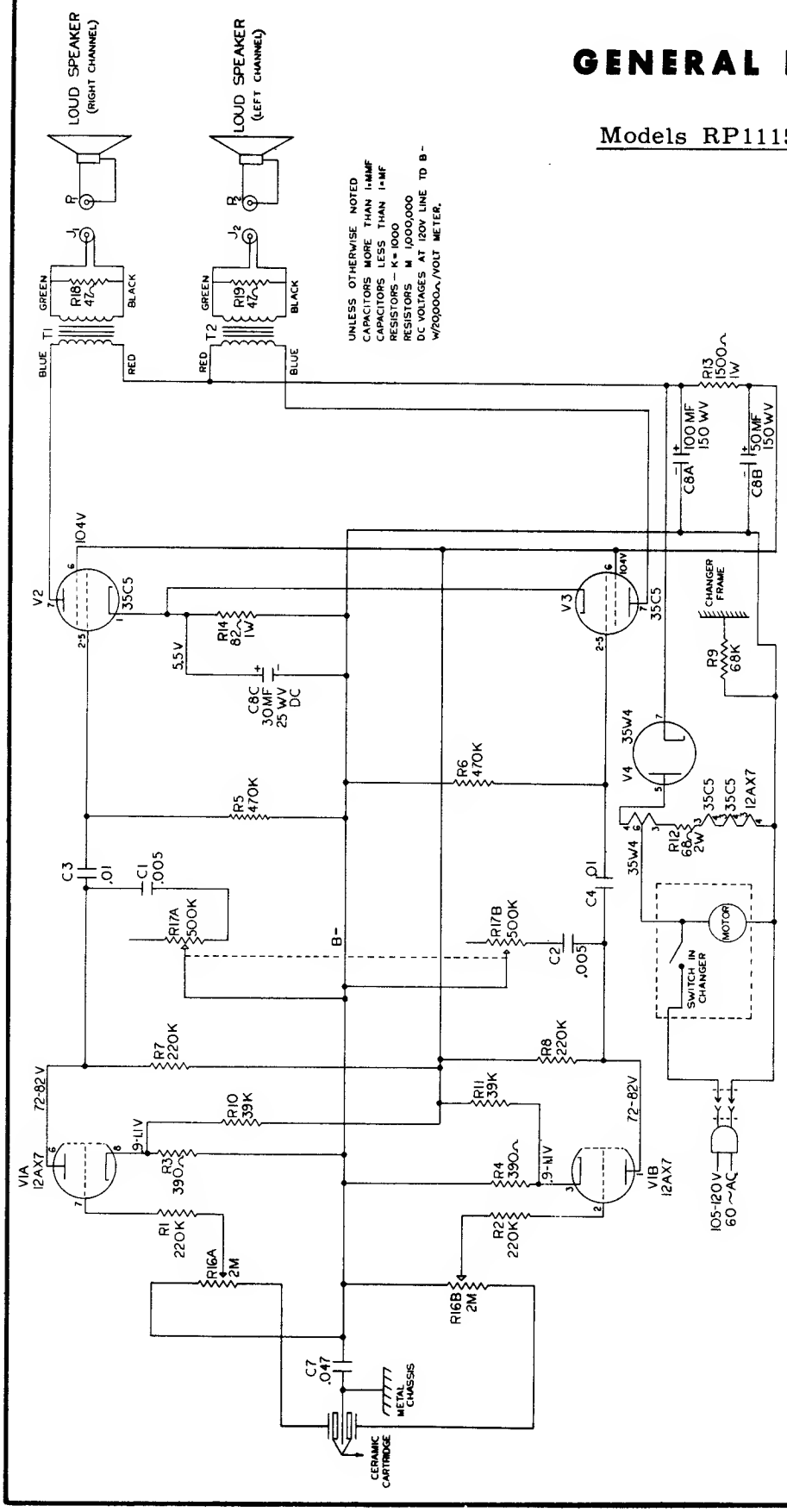
NPN TRANSISTORS

PNP TRANSISTORS



GENERAL ELECTRIC

Models RP1115A, RP1116A



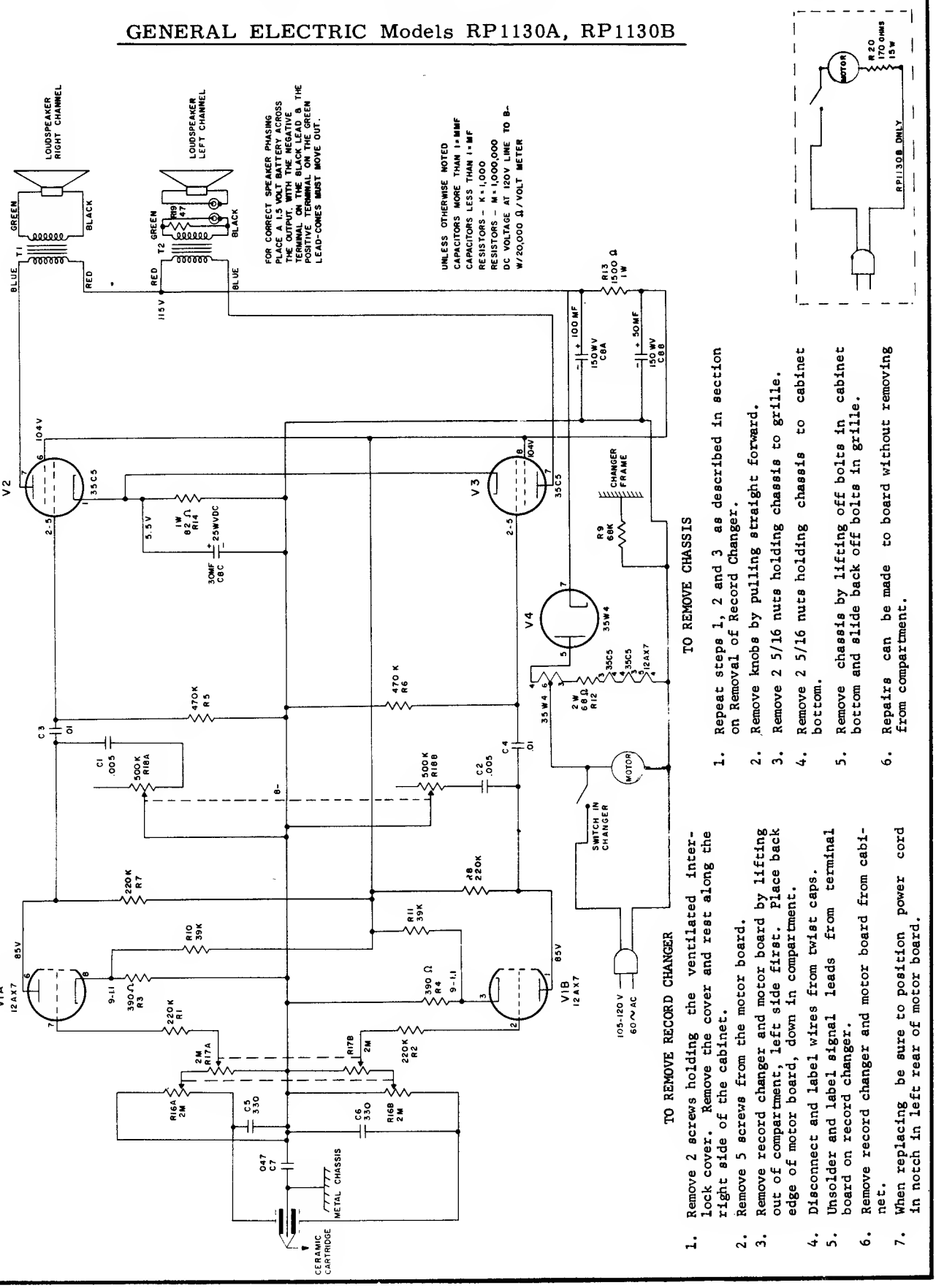
TO REMOVE CHASSIS

1. Remove two screws holding tube access panel; Remove panel.
2. Remove interlock panel.
3. Remove 4 screws holding record changer. Apply an outward pressure on the sides of the case to force the lid guides away from the changer, lift the right side of the changer out. (Replace in the same manner to avoid scratching changer on lid guides.)
4. Set changer upright in the cabinet.
5. Remove the knobs by pulling straight off.
6. Remove 2 nuts that hold the chassis to the cabinet front.
7. Remove 2 nuts that hold the chassis to the cabinet bottom.
8. Slide chassis up and back off the studs, it is not necessary to completely remove the chassis from the cabinet for component replacement.

TO REMOVE RECORD CHANGER

1. Follow steps 1, 2, 3, 4, in Chassis Removal.
2. Label and unsolder the signal leads from the terminal board to the chassis.
3. Remove wire nuts and label AC leads to changer.
4. Remove changer.

GENERAL ELECTRIC Models RP1130A, RP1130B



TO REMOVE RECORD CHANGER

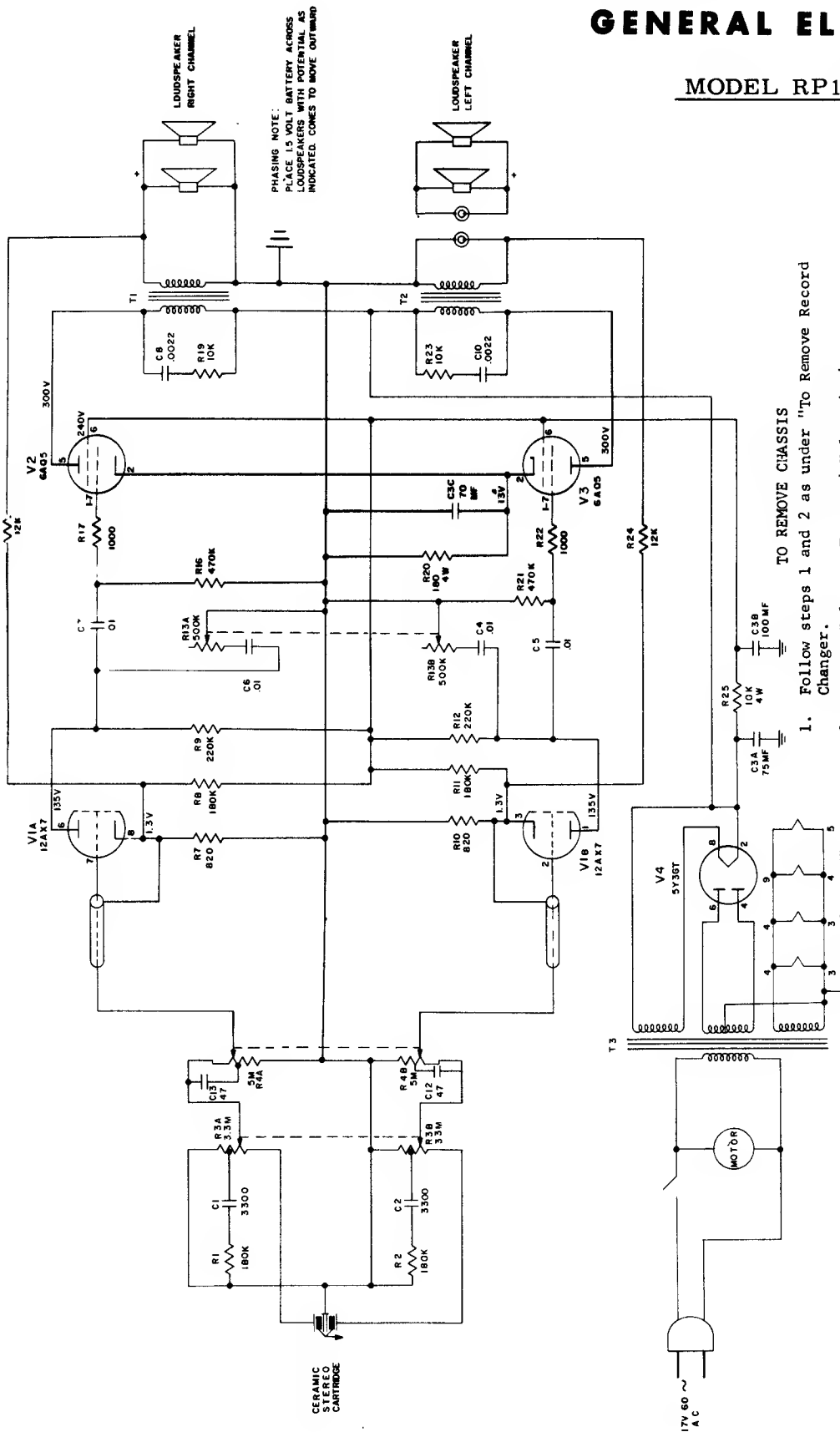
1. Remove 2 screws holding the ventilated interlock cover. Remove the cover and rest along the right side of the cabinet.
2. Remove 5 screws from the motor board.
3. Remove record changer and motor board by lifting out of compartment, left side first. Place back edge of motor board, down in compartment.
4. Disconnect and label wires from twist caps.
5. Unsolder and label signal leads from terminal board on record changer.
6. Remove record changer and motor board from cabinet.
7. When replacing be sure to position power cord in notch in left rear of motor board.

TO REMOVE CHASSIS

1. Repeat steps 1, 2 and 3 as described in section on Removal of Record Changer.
2. Remove knobs by pulling straight forward.
3. Remove 2 5/16 nuts holding chassis to grille.
4. Remove 2 5/16 nuts holding chassis to cabinet bottom.
5. Remove chassis by lifting off bolts in cabinet bottom and slide back off bolts in grille.
6. Repairs can be made to board without removing from compartment.

GENERAL ELECTRIC

MODEL RP1150A



TO REMOVE CHASSIS

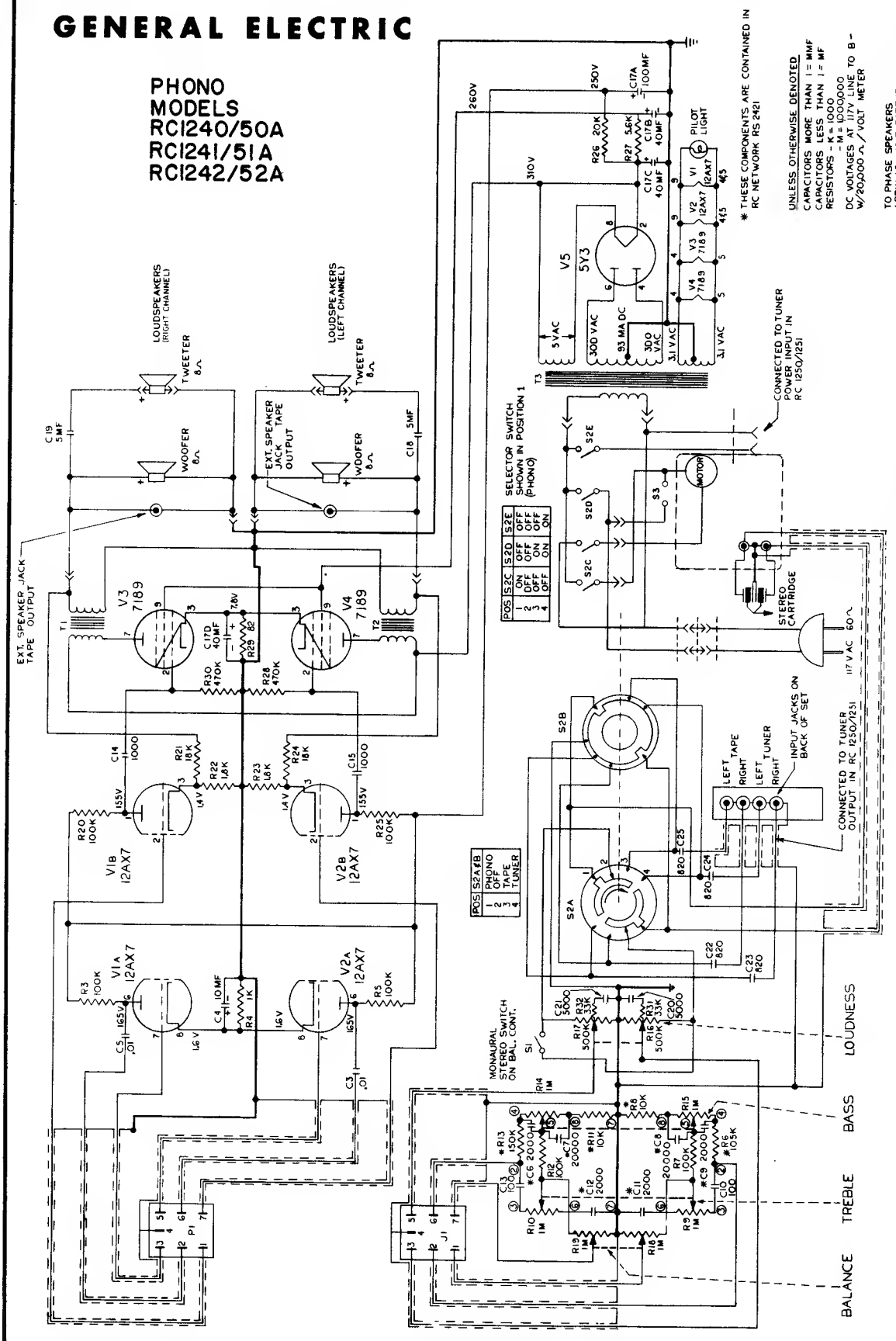
1. Follow steps 1 and 2 as under "To Remove Record Changer.
2. Remove Balance, Tone and Volume knobs.
3. Remove two (2) 5/16 inch nuts from control panel.
4. Remove two (2) screws holding interlock.
5. Remove three (3) 5/16 inch nuts from chassis.
6. Remove screw holding lead dress on signal leads.
7. Remove screw holding electrolytic.
8. Remove two (2) nuts holding auxiliary speaker jack.
9. Unsolder speaker leads.

TO REMOVE RECORD CHANGER

1. Remove 2 screws holding ventilated interlock panel, remove panel and rest on top of main unit speaker compartment.
2. Remove 6 screws holding motor board, remove motor board and changer and rest back edge of the motor board in compartment.
3. Remove "twist caps" and label wires.
4. Label and remove signal wires from terminal board.
5. Remove record changer and motor board.

GENERAL ELECTRIC

PHONO MODELS RC1240/50A RC1241/51A RC1242/52A



* THESE COMPONENTS ARE CONTAINED IN RC NETWORK RS 2421

UNLESS OTHERWISE DENOTED
CAPACITORS MORE THAN 1 = MMF
CAPACITORS LESS THAN 1 = MF
RESISTORS - K = 1000
- M = 1,000,000
DC VOLTAGES AT 117V LINE TO B- W/20,000 Ω/VOLT METER

TO PHASE SPEAKERS APPLY 1.5 VOLT BATTERY. POSITIVE TERMINAL TO SPEAKER TERMINAL MARKED WITH EITHER + OR COLOR DOT. THE SPEAKER CONES MUST MOVE OUTWARD. THIS MUST BE DONE FOR EACH SET OF SPEAKERS.

ALL VOLTAGES MEASURED TO CHASSIS.

TO REMOVE AMPLIFIER

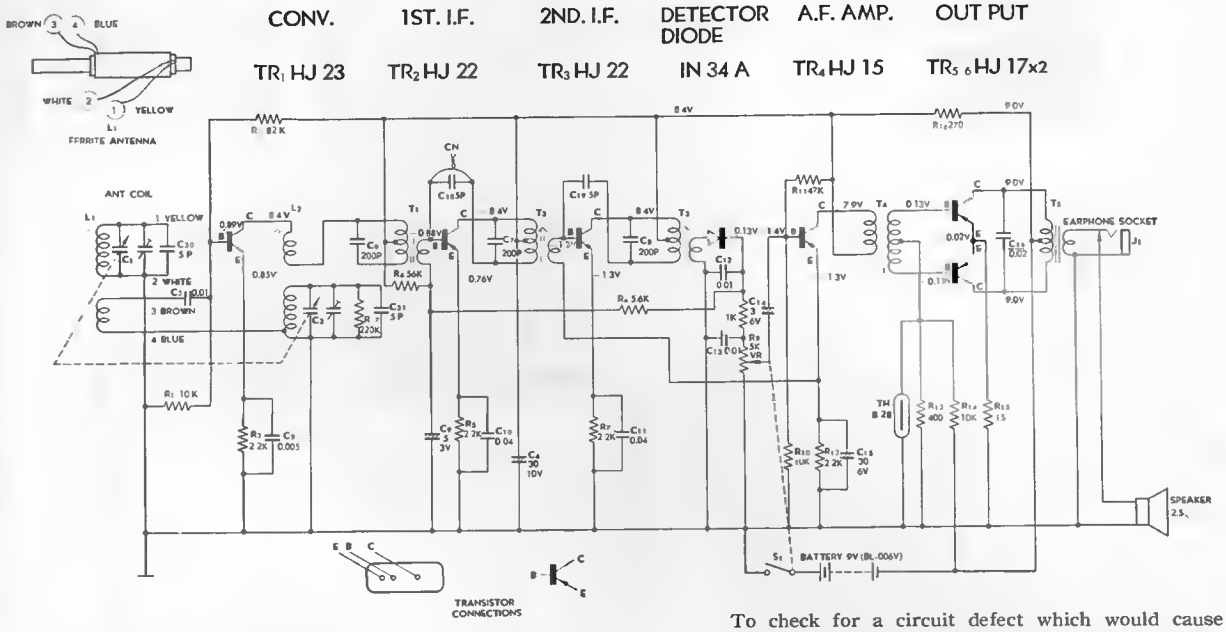
1. Remove cabinet back.
2. Disconnect AC1 to amplifier chassis (polarizing mark facing T3.)
3. Disconnect control socket S1.
4. Remove pilot light socket from clamp.
5. Disconnect 4 wire nuts from speaker leads and remove lead dress.
6. Remove 6 nuts that hold chassis to cabinet bottom.
7. Remove amplifier chassis.

Hitachi, Ltd.

Tokyo Japan

model TH-621

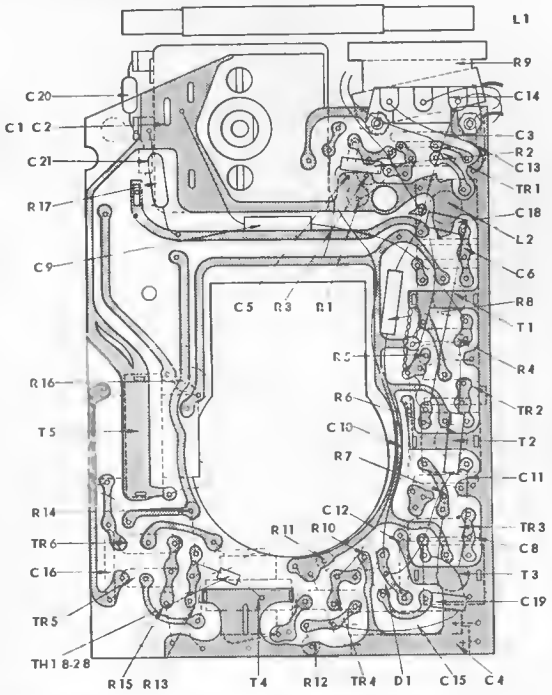
CONV.	1ST. I.F.	2ND. I.F.	DETECTOR DIODE	A.F. AMP.	OUT PUT
TR_1 HJ 23	TR_2 HJ 22	TR_3 HJ 22	IN 34 A	TR_4 HJ 15	$TR_{5\ 6}$ HJ 17x2



The output circuit used in this receiver is of the "Class B" type. It should be noted that in "Class B" output the battery current increases greatly with increased signal input.

With no signal input, the A.G.C. source as measured at the top of the volume control, will be 0.75 volts negative in respect to the ground. Rectified signal voltage will make this point less negative in respect to chassis ground.

Don't remove any transistor from its socket (or reinsert it) when the set is turned on.



To check for a circuit defect which would cause excessive battery drain, an overall current measurement and supplementary voltage measurement should be made.

Oscillator performance can not be judged by measurement of a D.C. voltage developed across a resistor.

Measurement of oscillator signal strength with an A.C. voltmeter at the emitter terminal of TR_1 will give an indication of oscillator performance.

A transistor should always be removed from its socket before using a soldering iron on the socket terminals.

ALIGNMENT PROCEDURE

Test oscillator—For all alignment operation, connect the low side of the test oscillator to the receiver chassis and keep the oscillator output as low as possihle to avoid A.G.C. action.

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

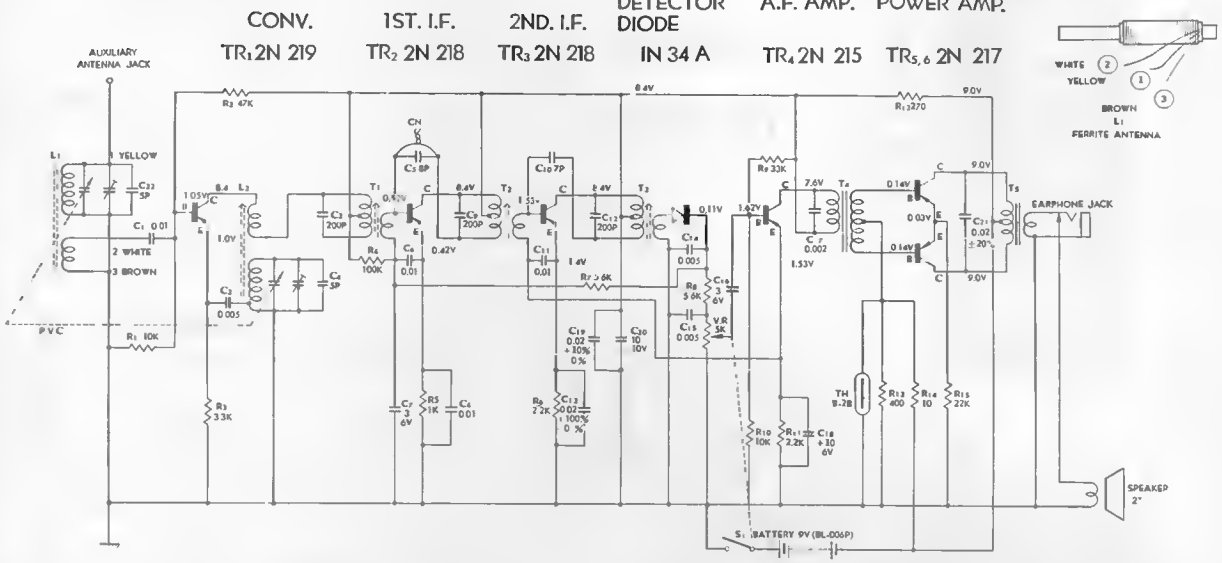
Step	Connect high side of S.G. to	S.G. Output	Dial pointer setting	Adjust for max. output
1	Variable condenser terminal of oscillator	555 KC	Quiet point near 1600 KC	IFT3 IFT2 IFT1
2		Repeat step 1		
3	Short wire placed near antenna for radiated signal	525 KC	Lowest freq. of dial scale	Dust core of oscillator coil L2
4		1630 KC	Highest freq. of dial scale	Trimmer of oscillator variable condenser
5		Repeat 3 and 4		
6		650 KC	650 KC	Move antenna coil

Hitachi, Ltd.

Tokyo Japan

model TH-666R

CONV.	1ST. I.F.	2ND. I.F.	DETECTOR DIODE	A.F. AMP.	POWER AMP.
TR_1 2N 219	TR_2 2N 218	TR_3 2N 218	IN 34 A	TR_4 2N 215	$TR_{5,6}$ 2N 217

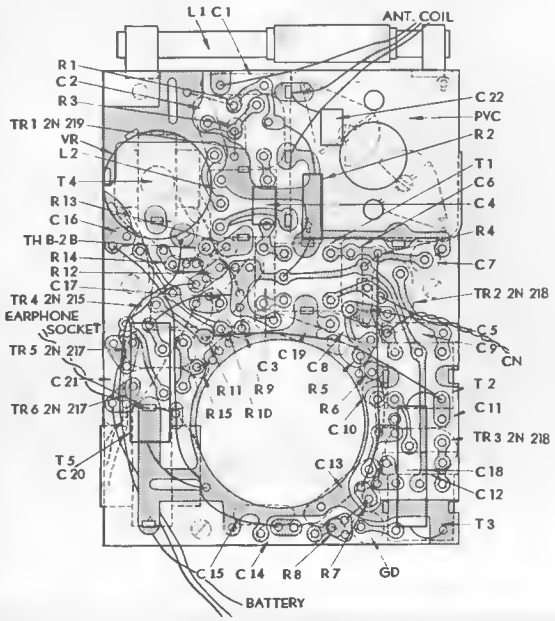


I. The first thing to check when the receiver is inoperative, is the battery with the receiver turned on. A new battery should test 9 volts although the receiver can be expected to operate with a battery which tests 5 volts or more.

2. To check for a circuit defect which would cause excessive battery drain, an overall current measurement and supplementary voltage measurements should be made.

3. The output circuit used in this receiver is of the "Class B" type. It should be noted that in "Class B" output the Battery Current increases greatly with increased signal input.

4. Extreme care should be used to avoid accidental shorting of transistor elements to the circuit ground. This is especially true of the output transistors; if the junction of R_{13}–R_{14} should be accidentally grounded for a few seconds, the output transistor would be permanently damaged.



5. With no signal input, the A.G.C. source as measured at the base of the TR_2 will be 0.5 volts negative in respect to ground. Rectifier signal voltage will make this point less negative in respect to chassis ground.

6. Do not remove any transistor from its socket (or reinsert it) when the set is turned on.

7. Oscillator performance can not be judged by measurement of a D.C. voltage developed across a resistor. Measurement of oscillator signal strength with an A.C. voltmeter at the emitter terminal of TR, will give an indication of oscillator performance.

8. Voltage measurements should be made only with a sensitive voltmeter.

9. Interchanging transistors in the IF stages may necessitate realignment.

ALIGNMENT PROCEDURE

Connect an output meter across the voice coil terminals of the speaker and turn the receiver volume control to maximum.

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.G.C. action.

Step	Connect high side of S.G. to	S.G. output	Dial pointer setting	Adjust for Max. output
1	Variable tuning capacitor terminal of oscillator	455 kc	Quiet point near 1,600 kc	IFT_3 IFT_2 IFT_1
2	Variable tuning capacitor terminal of oscillator	repeat	step 1	
3	Short wire placed near antenna for radiated signal	525 kc	Lowest frequency of dial scale	Dust core of oscillator coil L2
4	Short wire placed near antenna for radiated signal	1,630 kc	Highest frequency of dial scale	Trimmer of oscillator variable capacitor
5	Short wire placed near antenna for radiated signal		Repeat 3 and 4	
6	Short wire placed near antenna for radiated signal	650 kc	650 kc	Move antenna coil
7	Short wire placed near antenna for radiated signal	1,300 kc	1,300 kc	Trimmer of antenna variable capacitor

Hitachi, Ltd.
Tokyo Japan

model TH-862R

Tuning range 535-1605 kc
Intermediate frequency 455 kc

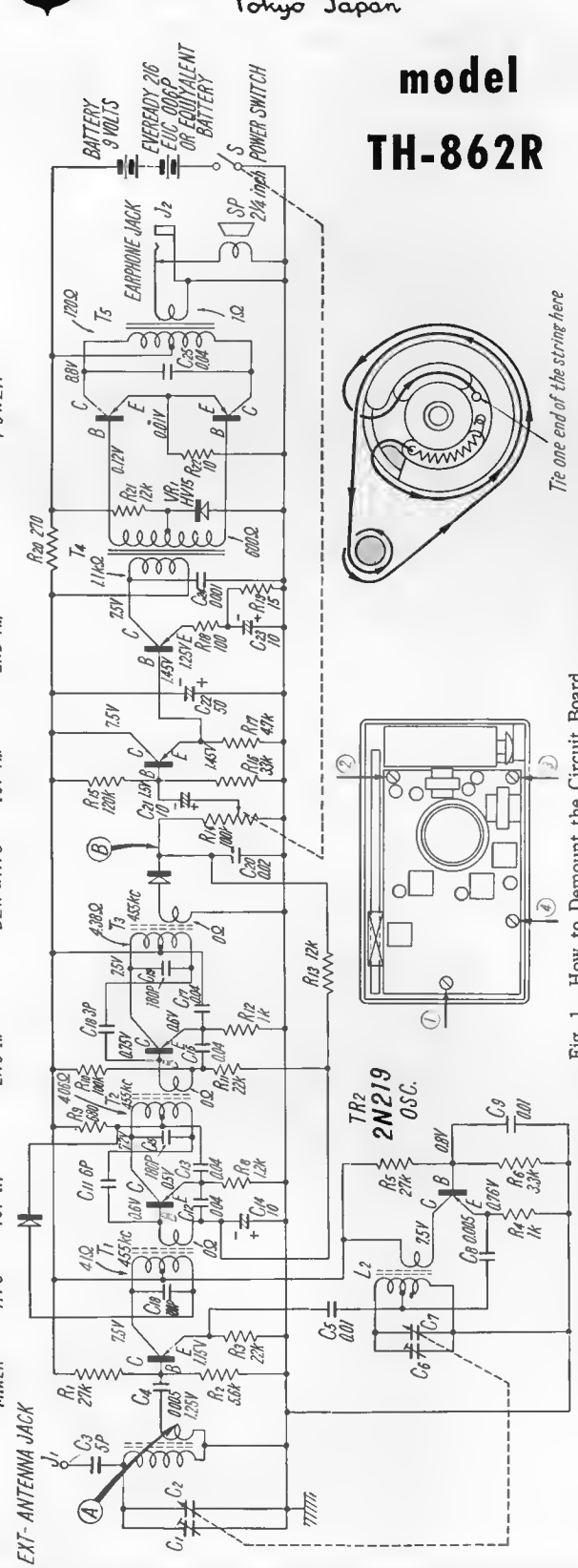


Fig. 2. How to Apply the Dial String

Fig. 1. How to Demount the Circuit Board

HINTS

Investigate trouble by the following procedure. When a faulty item is discovered inspect L, C, R and the transistor of the relative circuit by referring to the circuit diagram, base plate diagram and parts arrangement diagram.

Inspection 1 Check battery voltage

a. The battery voltage should be 6~7 volts or more when checked by a tester.

h. Replace with new battery when no tester is available.

Inspection 2 Check for faulty connection

a. Check the continuity of the battery snap lead wires by means of a tester.

b. Check the continuity of the switch on the volume control with a tester while turning it on and off.

Inspection 3 Operation test by click noise (poke with driver tip)

a. Check whether "click" is heard when a driver tip contacts point (B) of the circuit board diagram. The audio frequency circuit is okay if a "click" is heard.

b. Check whether click is heard when a driver tip contacts point (A) of the circuit board diagram. The frequency converter circuit and all following circuits after it are okay if a "click" is heard.

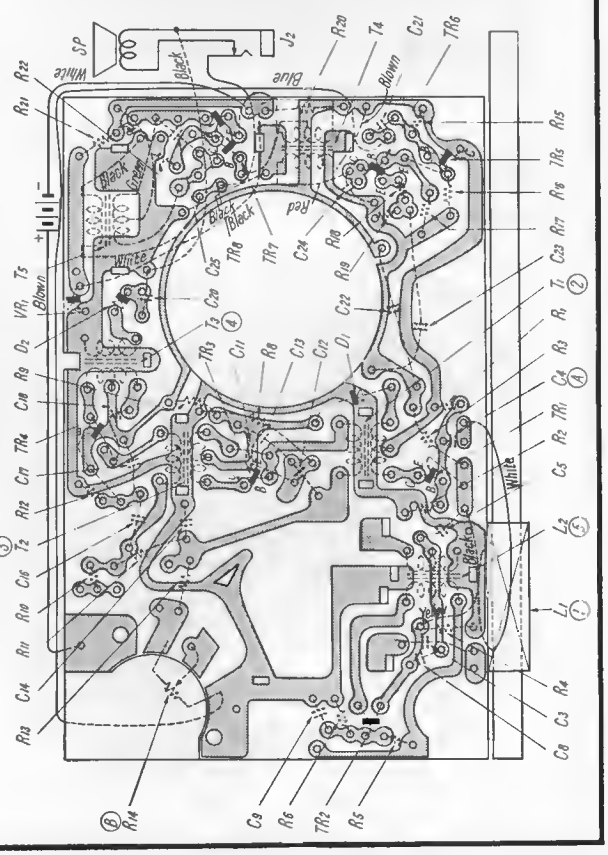
Inspection 4 If a click is heard in (b) of Inspection 3, check the antenna and input circuits.

Inspection 5 If a click cannot be heard in (a) of Inspection 3, detach the circuit board and repeat the test.

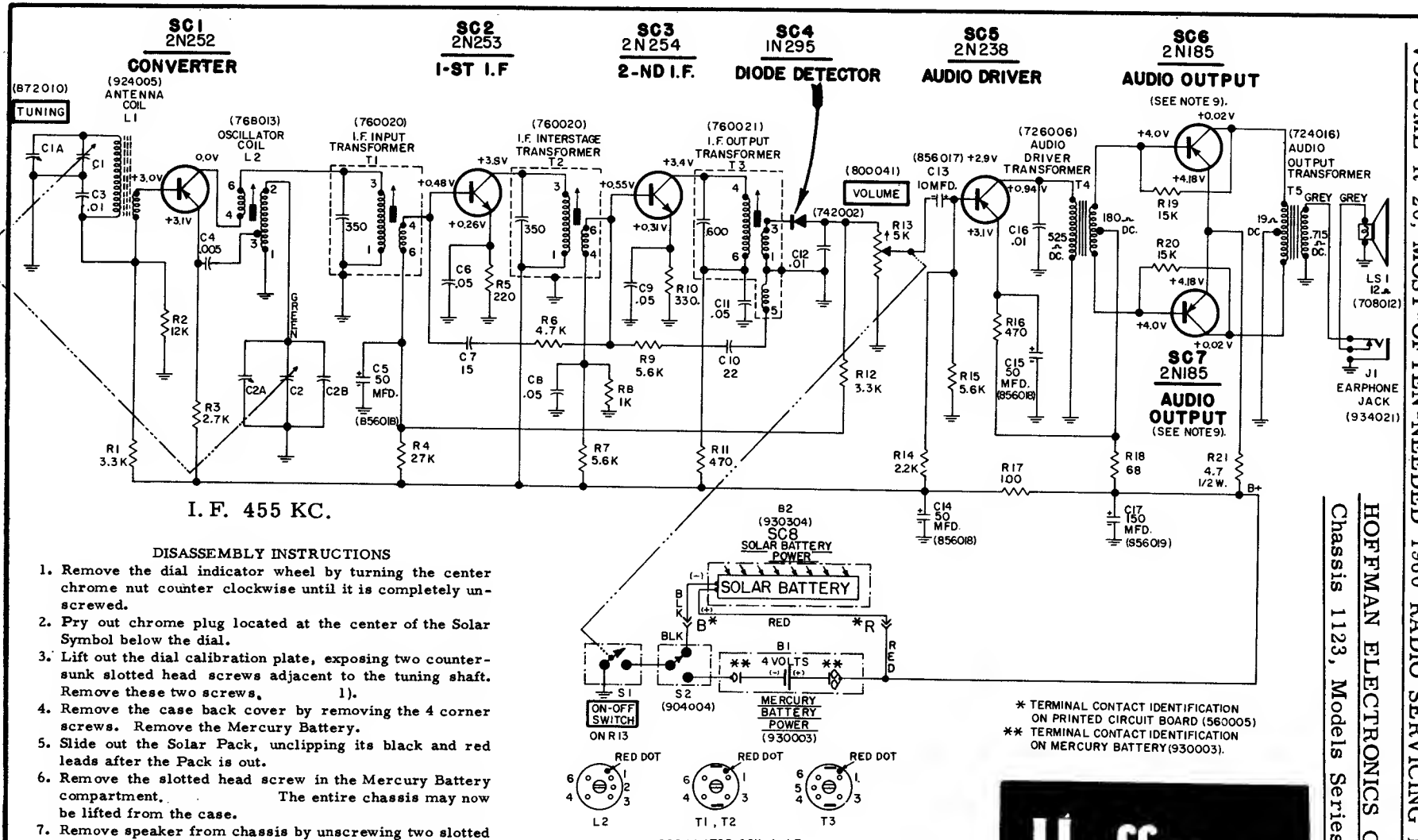
a. Check the emitter voltage of $TR_{7,8}$. If it is abnormal, check the resistors, capacitors and coils. Also, check the voltage of the collector and hase.

b. Check the emitter voltage of TR_6. If it is abnormal, check the resistors, capacitors and coils.

c. Check the emitter voltage of TR_5. If it is abnormal check the resistors, capacitors and coils.



Circuit Board Diagram



I. F. 455 KC.

OSCILLATOR COIL & I.F. TRANSFORMER BASE CONNECTIONS.

DISASSEMBLY INSTRUCTIONS

1. Remove the dial indicator wheel by turning the center chrome nut counter clockwise until it is completely unscrewed.
2. Pry out chrome plug located at the center of the Solar Symbol below the dial.
3. Lift out the dial calibration plate, exposing two countersunk slotted head screws adjacent to the tuning shaft. Remove these two screws, 1).
4. Remove the case back cover by removing the 4 corner screws. Remove the Mercury Battery.
5. Slide out the Solar Pack, unclipping its black and red leads after the Pack is out.
6. Remove the slotted head screw in the Mercury Battery compartment. The entire chassis may now be lifted from the case.
7. Remove speaker from chassis by unscrewing two slotted head screws in back of the speaker magnet.(See Fig. 1). This eliminates the speaker ground, so a clip lead should be connected from speaker frame to the metal battery compartment.

CAUTION DO NOT ATTEMPT TO PRY OFF THE TRIMMER COVER PLATE. THIS PLATE ROTATES TO EXPOSE TWO ACCESS HOLES IN THE END OF THE CASE. FRONT HOLE TO OSCILLATOR TRIMMER C2A, REAR HOLE TO RF TRIMMER C1A.

NOTES:

1. ALL CAPACITIES SHOWN AS DECIMAL FRACTIONS ARE MICROFARADS AND SHOWN AS WHOLE NUMBERS ARE MICROMICROFARADS, UNLESS OTHERWISE NOTED.
2. ALL RESISTANCES ARE GIVEN IN OHMS: K = 1,000; M = 1,000,000.
3. VOLTAGES MEASURED WITH A VTVM-RADIO TUNED OFF STATION - VOLUME FULL ON.
4. ARROWS ON POTENTIOMETERS INDICATE CLOCKWISE ROTATION.
5. "SC" NOTATION IDENTIFIES A "SEMICONDUCTOR" DEVICE.
6. ALL VOLTAGE MEASUREMENTS TO GROUND WITH NEW BATTERY - 4.2 V UNDER LOAD.
7. —·—·—·— INDICATES ASSEMBLY.
   ———— INDICATES SHIELD
   —··—··— INDICATES GANGED SECTIONS.
8. NUMERALS SHOWN IN PARENTHESIS (XXXXXX) INDICATE HOFFMAN PART NUMBER.
9. AUDIO OUTPUT TRANSISTORS SC6 AND SC7 ARE ELECTRICALLY MATCHED.

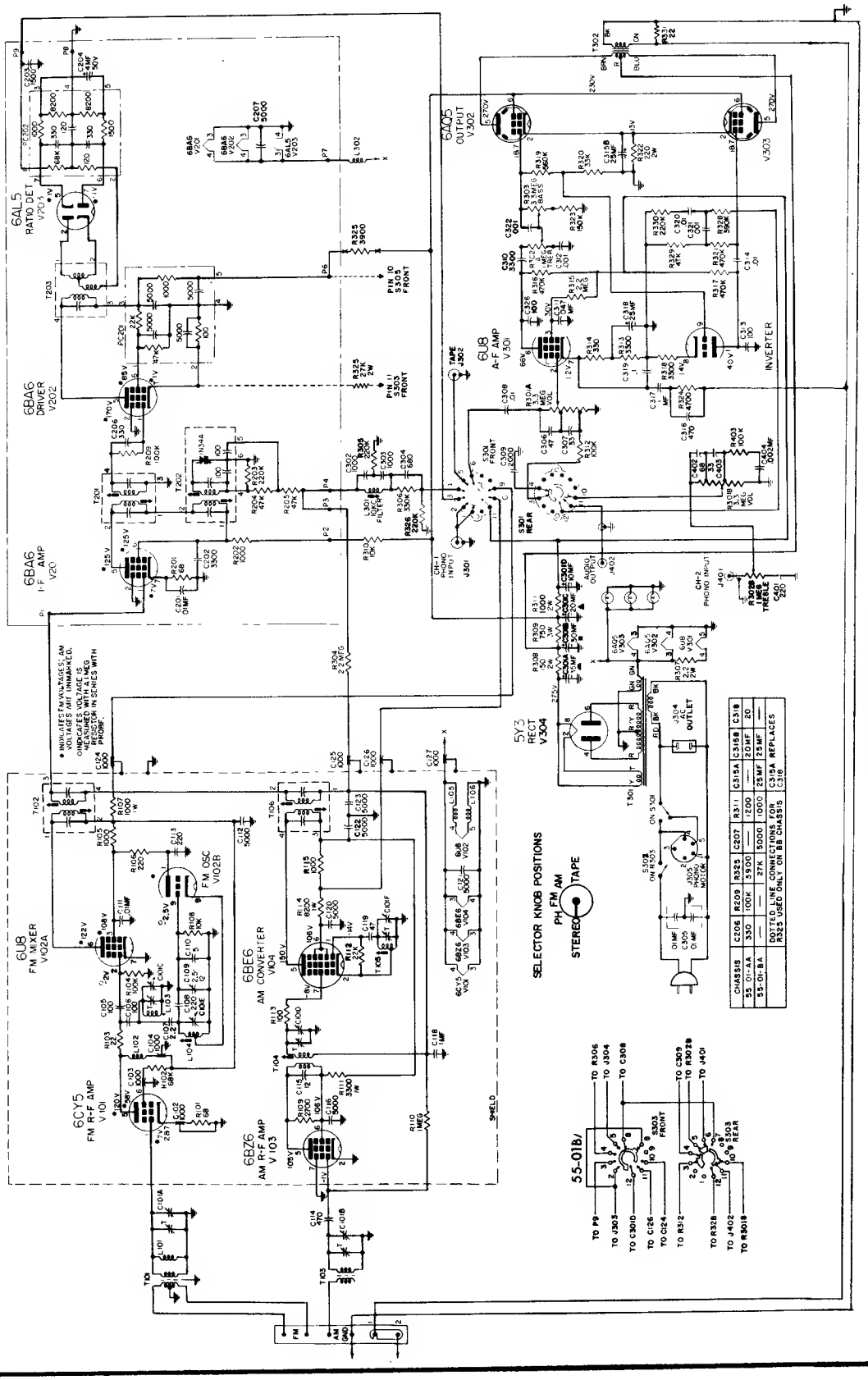
* TERMINAL CONTACT IDENTIFICATION ON PRINTED CIRCUIT BOARD (560005)
** TERMINAL CONTACT IDENTIFICATION ON MERCURY BATTERY (930003).

Hoffman

CHASSIS 1123
MODELS SERIES P706

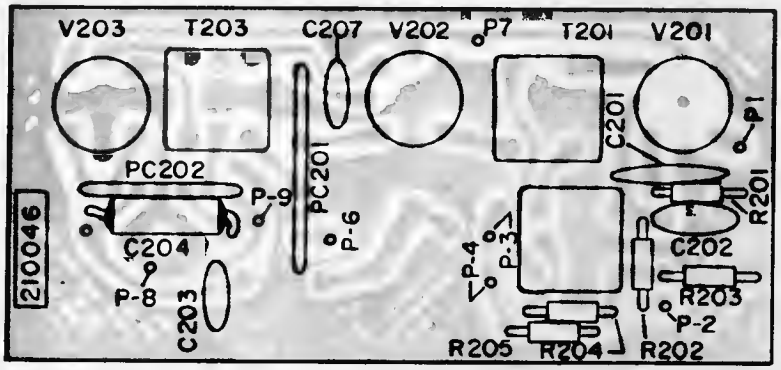
HOFFMAN ELECTRONICS CORP.
Chassis 1123, Models Series P706

MAGNAVOX Radio Chassis 55-01 (Continued on page 71)

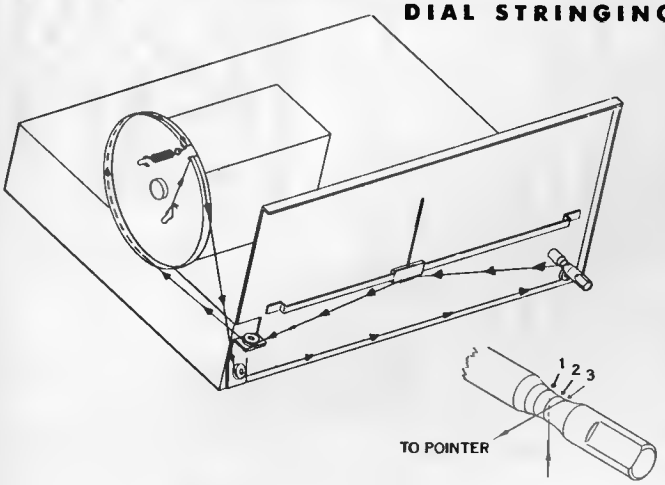


MAGNAVOX RADIO Chassis 55-01, Continued from page 70

PRINTED WIRING CIRCUIT



DIAL STRINGING INSTRUCTIONS

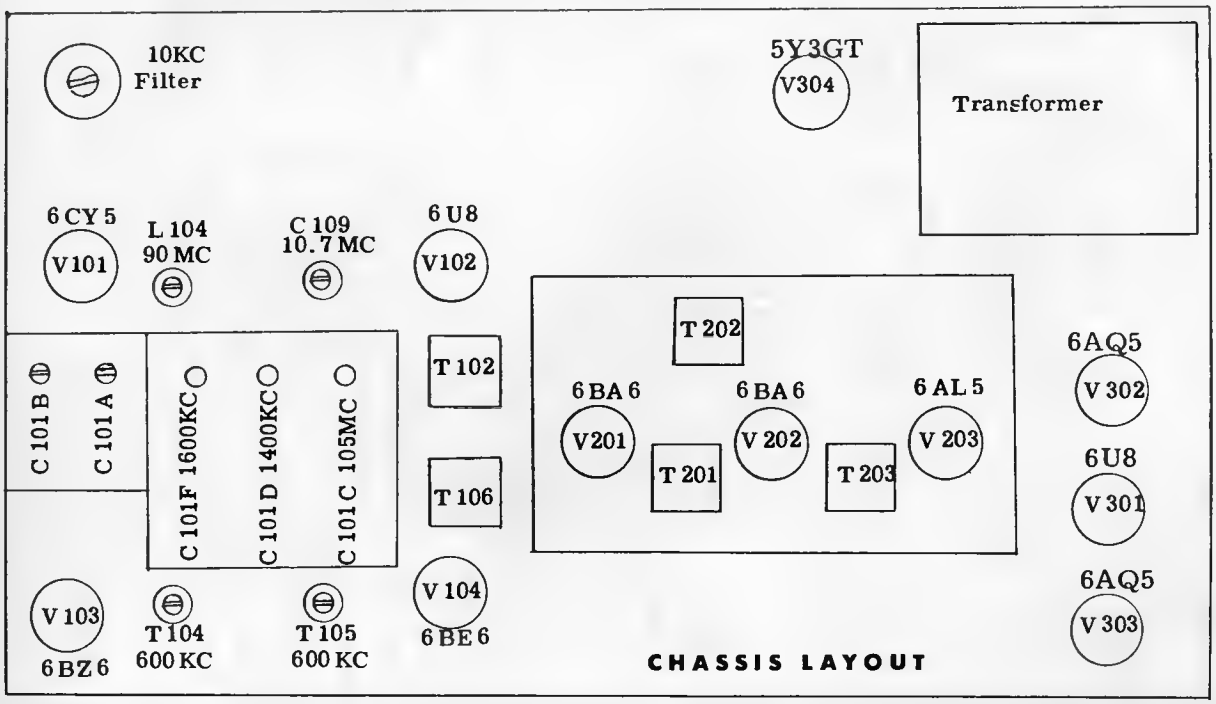


DIAL CORD PLACEMENT

Select a 46-inch length of dial cord and tie a small loop at each end. Turn the tuning gang fully out of mesh and hook one end of the cord over the metal hook on the condenser pulley nearest the front of the chassis and proceed with the stringing as shown in the drawing below.

DIAL POINTER PLACEMENT

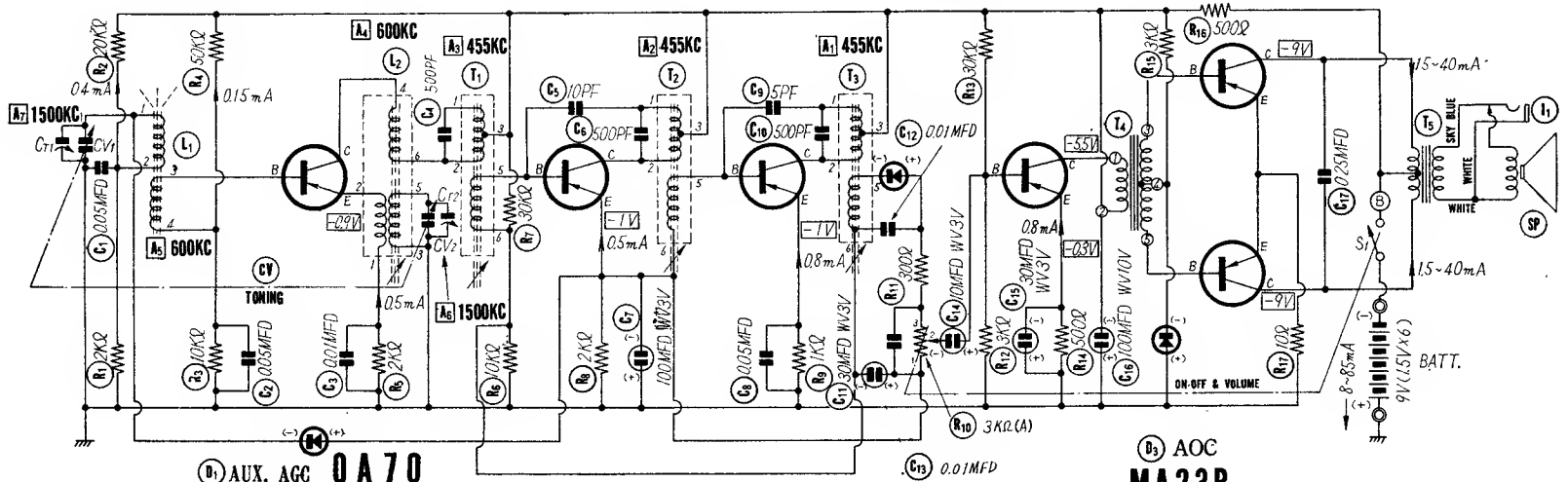
Place the dial pointer onto the pointer slide and turn the tuning gang completely in mesh. Lace the dial cord around the three hooks on the front of the pointer and with the tuning condenser still fully in mesh, slide the pointer over until it lines up with the last dial calibration mark at the low frequency end of the broadcast band. This completes the assembly.



CHASSIS LAYOUT

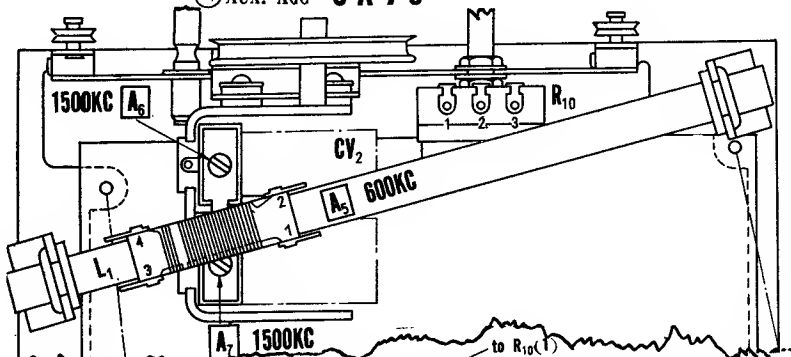
(TR1) CONV.	(TR2) 1st IF	(TR3) 2nd IF	(D2) 2nd DET. & AGC	(TR4) AF	(TR5)(TR6) OUTPUT
0C44	0C45	0C45	0A70	0C71	0C76 × 2

MAJESTIC
MODEL 900

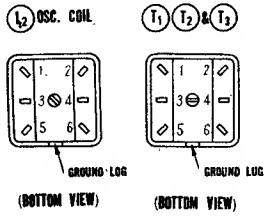


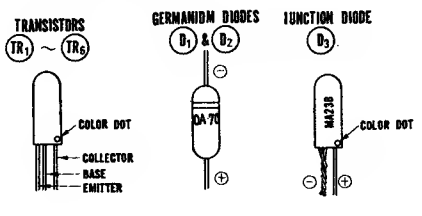
(D1) AUX. AGC **0A70**

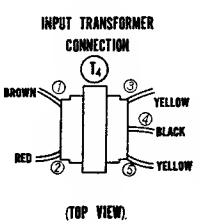
(D3) AOC **MA23B**



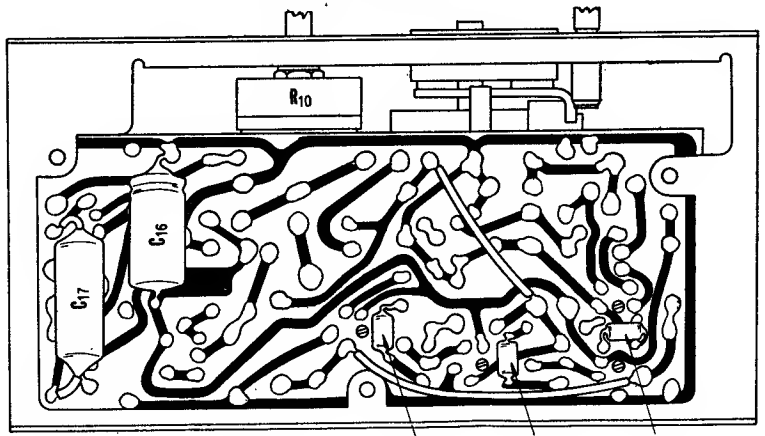
CHASSIS BOTTOM VIEW





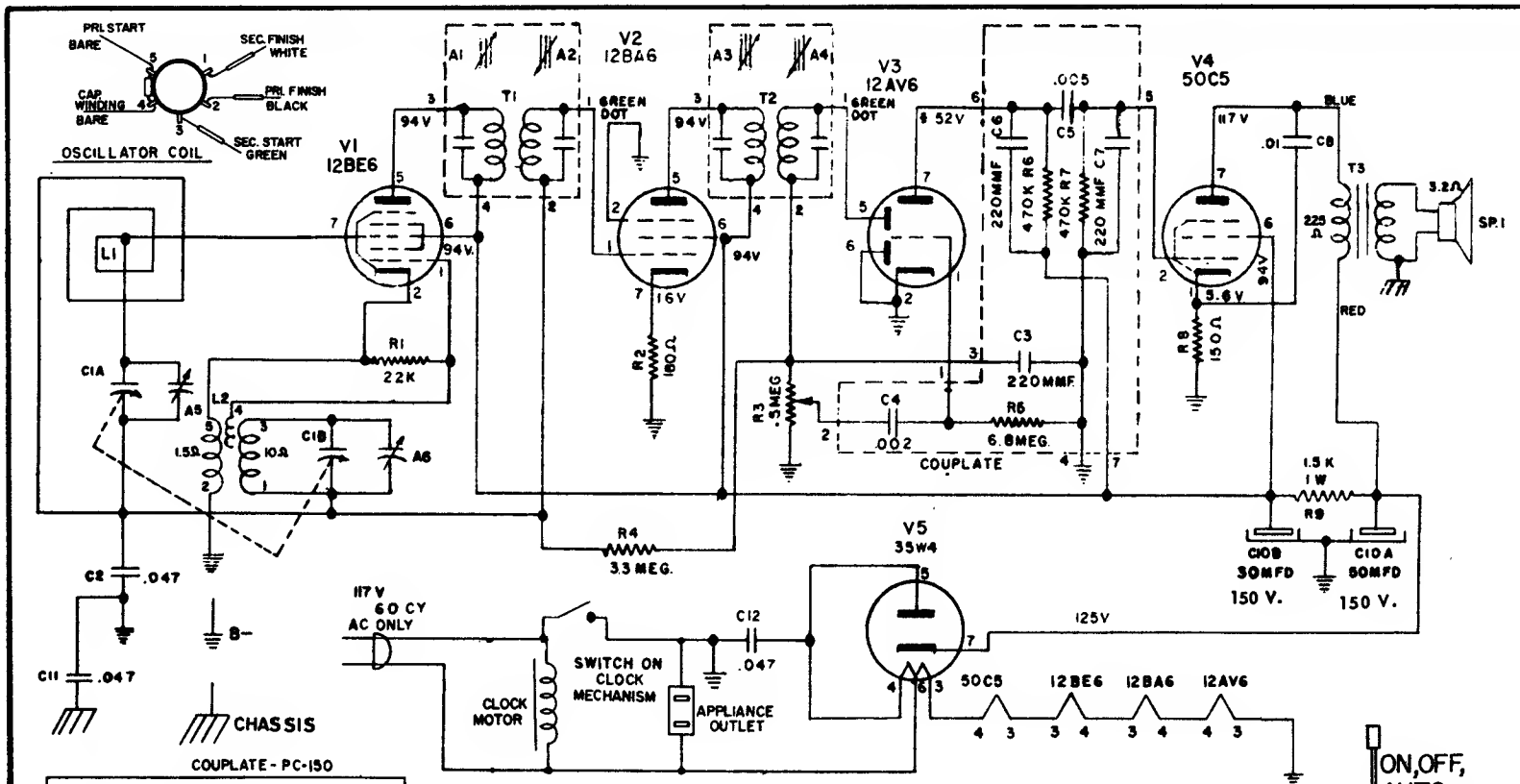


MAJESTIC
MODEL 900

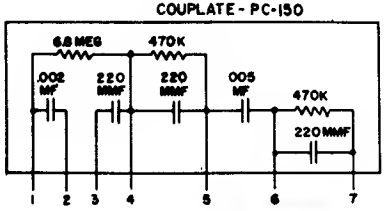


MONTGOMERY WARD & CO.

Models GEN-1850A, GEN-1851A



COUPLATE - PC-150

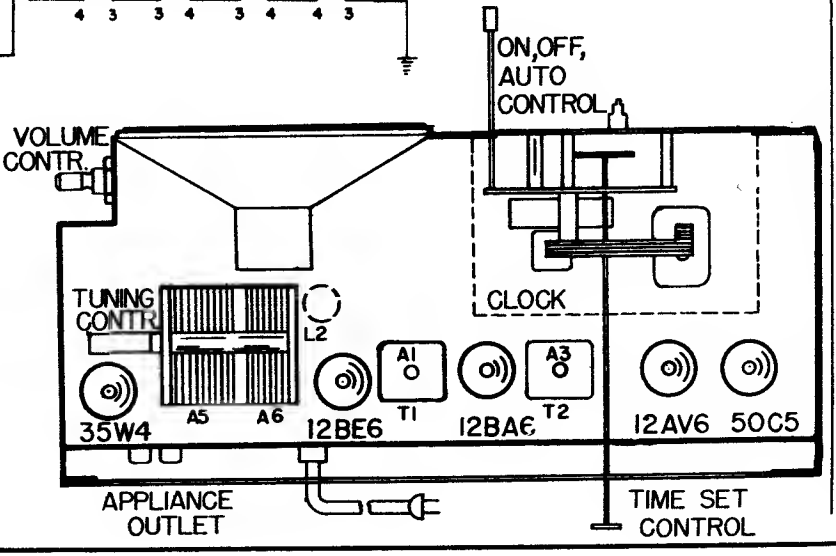


NOTE

1 # MEASURE WITH VTVM

2 ALL VOLTAGES ARE TAKEN FROM SOCKET PINS TO B-

3 ALL RESISTORS ARE ½WT. ± 20% AND ALL CAPACITORS ARE IN MFD. AND RATED AT 400 VOLTS UNLESS OTHERWISE NOTED.



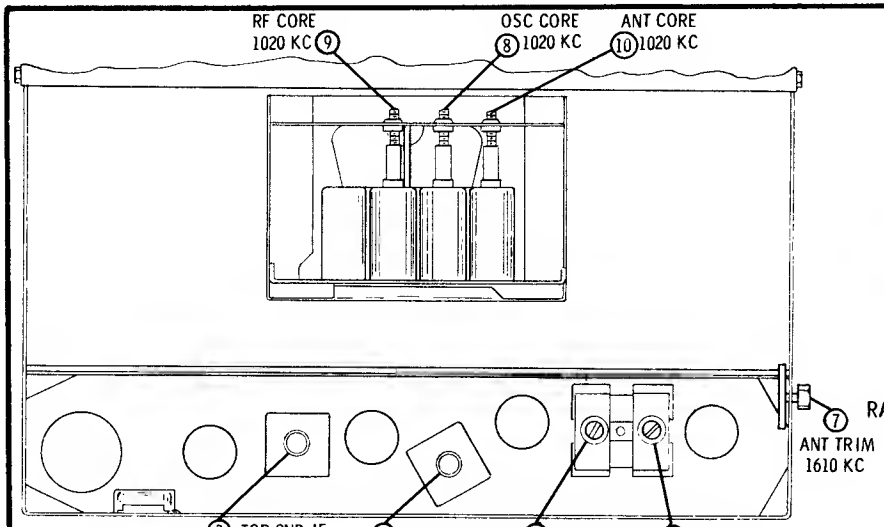
ALIGNMENT INSTRUCTIONS

DUMMY ANTENNA	SIGNAL GENERATOR COUPLING	SIGNAL GENERATOR FREQUENCY	RADIO DIAL SETTING	OUTPUT METER	ADJUST
.05MFD	High side to antenna stator lug on tuning gang. Low side to B-	455 KC (400cMod.)	Tuning gang fully open.	Across voice coil.	A2,A4 (Bottom) A1, A3 (Top) of I. F.
	Loop	1640KC	"	"	A6
	"	1400KC	Tune to 1400 KC signal	"	A5

MOTOROLA

MODEL
MOTOROLA 04MA
AMERICAN MOTORS 8990706

ALIGNMENT POINTS LOCATION DETAIL

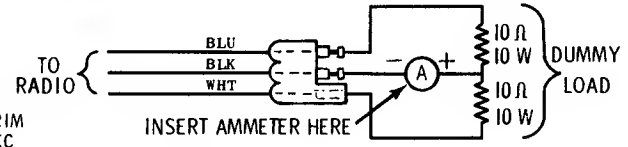


POWER TRANSISTOR CURRENT ADJUSTMENT - After replacing a power transistor, measure the collector current of BOTH power transistors and adjust for proper operation.

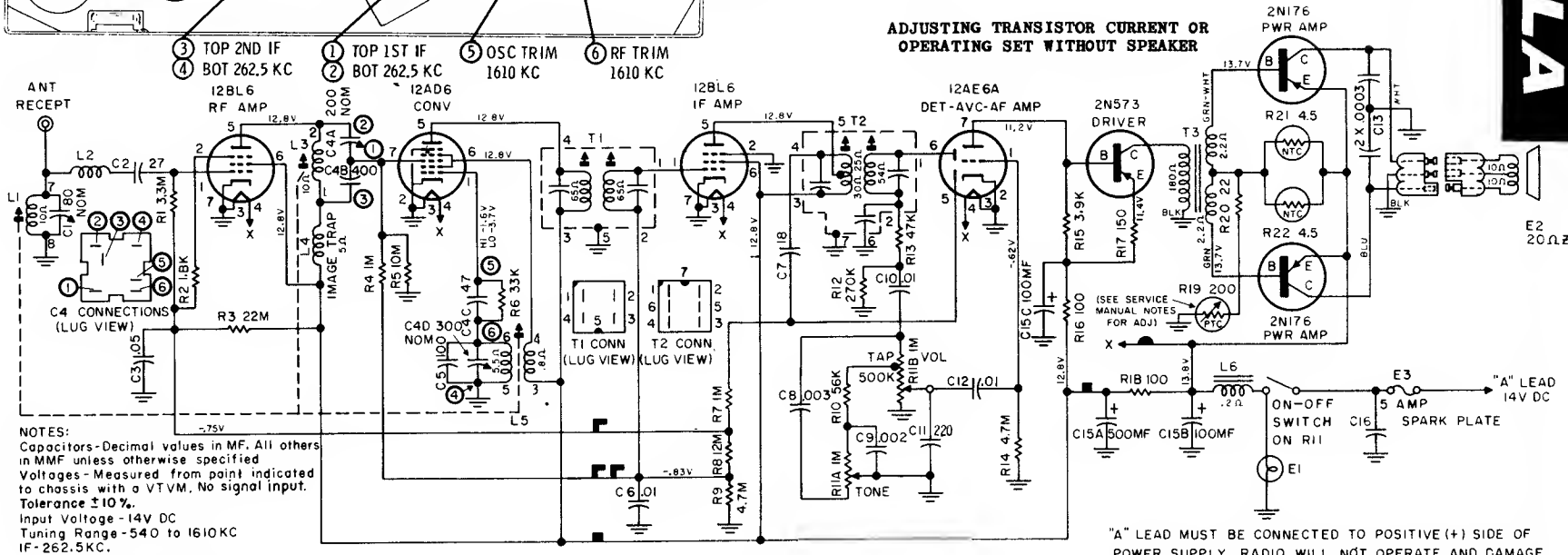
a. Allow radio to warm up for 15 minutes.

b. Connect a 0-1 amp DC AMMETER, whose internal resistance is .05 ohms or less in series with the center tap of a dummy load (see illustration). Connect positive side of meter to dummy load center tap; connect negative side of meter to radio chassis (ground).

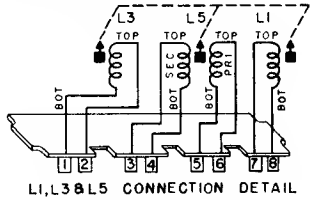
c. Adjust R-19 for a reading of 140 ma with 12.6 volts input to radio "A" lead.



ADJUSTING TRANSISTOR CURRENT OR OPERATING SET WITHOUT SPEAKER

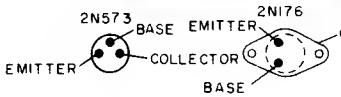


NOTES:
Capacitors - Decimal values in MF. All others in MMF unless otherwise specified
Voltages - Measured from point indicated to chassis with a VTVM. No signal input.
Tolerance ±10%.
Input Voltage - 14V DC
Tuning Range - 540 to 1610 KC
IF - 262.5 KC.



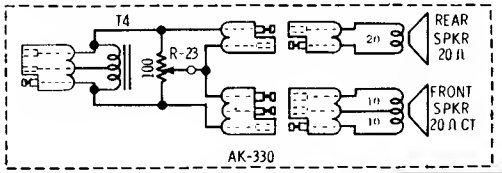
L1, L3 & L5 CONNECTION DETAIL

PLATED PANEL WIRING LEGEND
■ = B+ ◠ = FILAMENT
▛ = RF AVC ▛ ▛ = IF CONV AVC



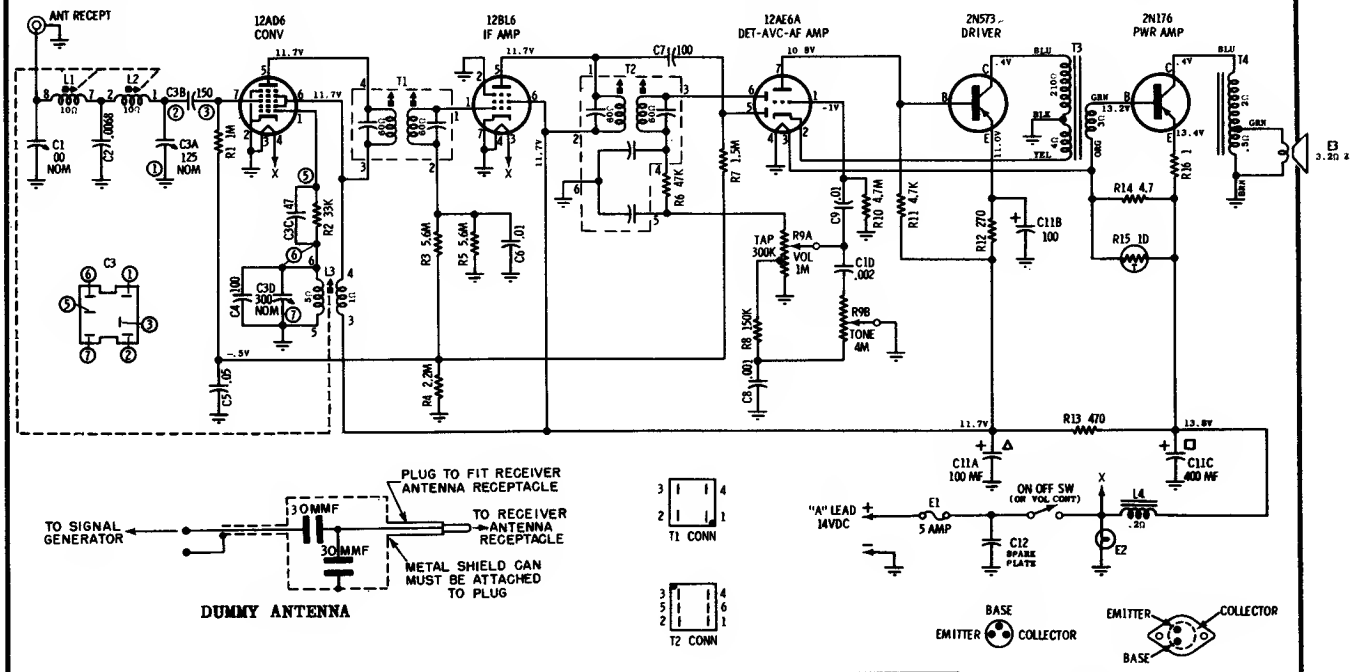
TRANSISTOR CONNECTIONS (LUG VIEW)

"A" LEAD MUST BE CONNECTED TO POSITIVE (+) SIDE OF POWER SUPPLY. RADIO WILL NOT OPERATE AND DAMAGE TO COMPONENTS WILL RESULT IF CONNECTED OTHERWISE



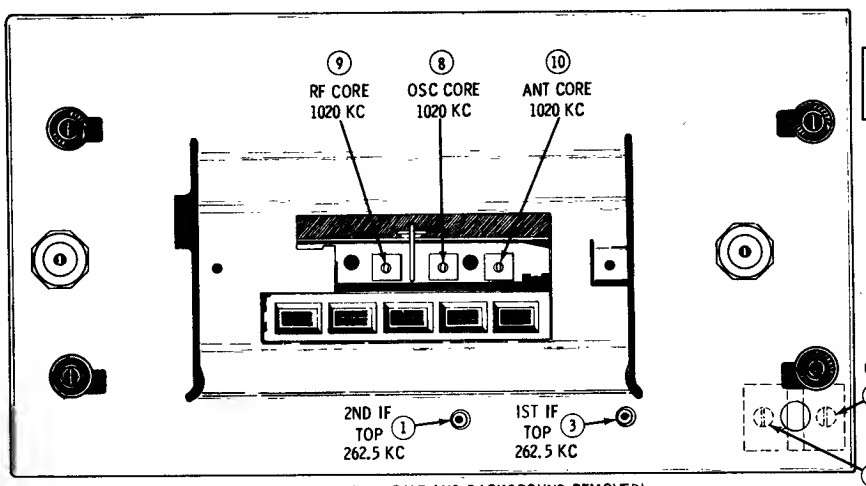
MOTOROLA 04MA
AMERICAN MOTORS 8990706

MOTOROLA Model 03AR, American Motors # 8990811, for use in 1960 Rambler



DUMMY ANTENNA

TRANSISTOR CONN

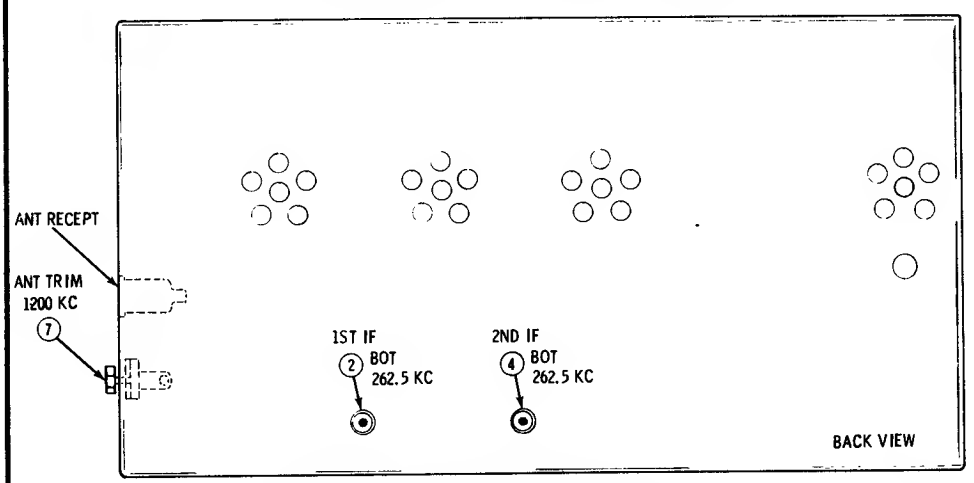


FRONT VIEW (WITH DIAL SCALE AND BACKGROUND REMOVED)

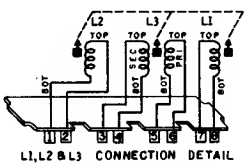
CAUTION

"A" LEAD MUST BE CONNECTED TO POSITIVE (+) SIDE OF POWER SUPPLY. RADIO WILL NOT OPERATE AND DAMAGE TO COMPONENTS WILL RESULT IF CONNECTED OTHERWISE.

NOTES:
CAPACITORS - Decimal values in MF. All others in MMF unless otherwise specified.
VOLTAGES - Measured from point indicated to chassis. ± 10%. No signal input.
INPUT VOLTAGE - 14V DC
TUNING RANGE - 540 KC to 1610 KC
IF - 262.5 KC

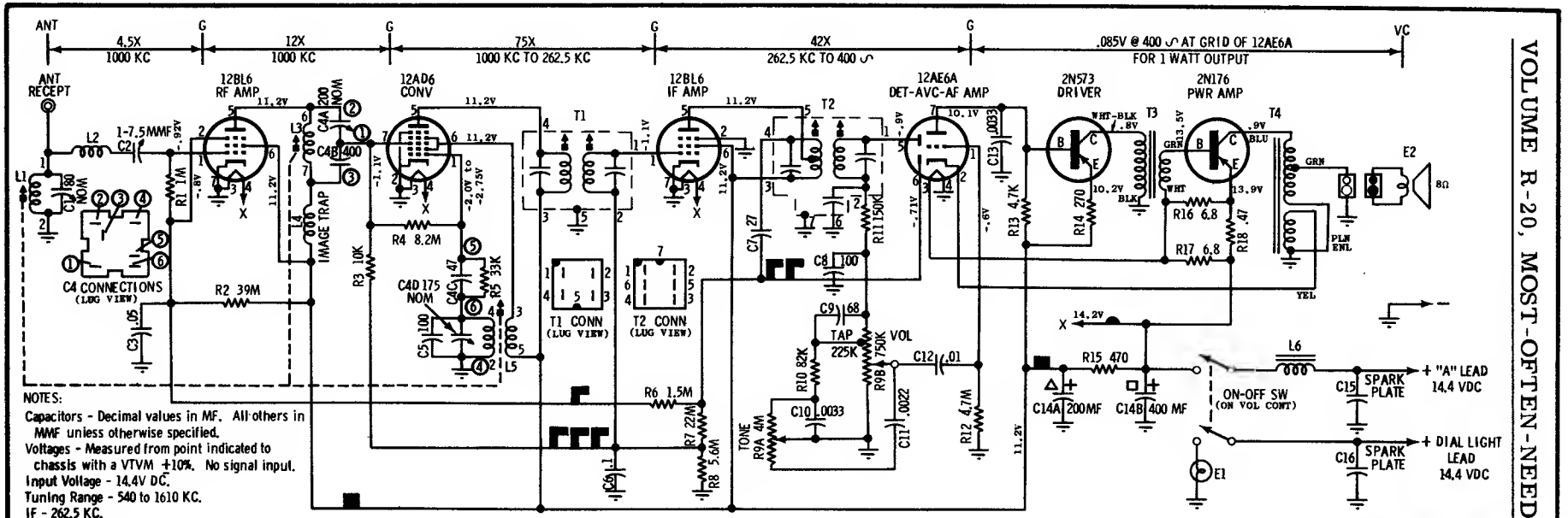


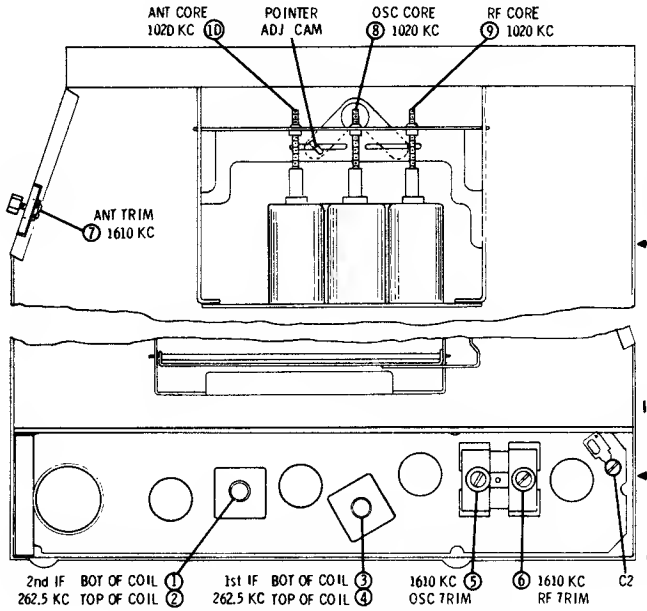
ALIGNMENT POINTS LOCATION DETAIL



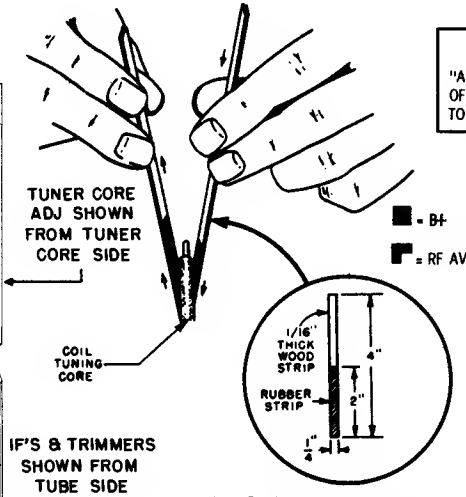
L1, L2 & L3 CONNECTION DETAIL

MOTOROLA
Model 03AR
American Motors
8990811

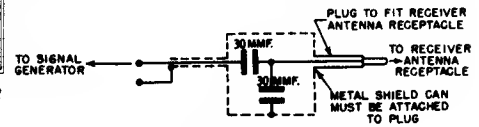




ALIGNMENT POINTS LOCATION DETAIL



CORE ALIGNMENT TOOL DETAIL



DUMMY ANTENNA DETAIL

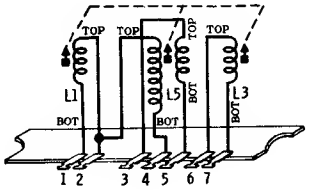
CAUTION

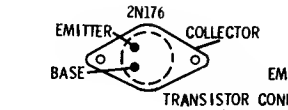
"A" LEAD MUST BE CONNECTED TO POSITIVE (+) SIDE OF POWER SUPPLY. RADIO WILL NOT OPERATE AND DAMAGE TO COMPONENTS WILL RESULT IF CONNECTED OTHERWISE.

PLATED PANEL WIRING LEGEND

■ - B+ ◠ = FILAMENT

▬ = RF AVC ▬▬ = AVC INPUT ▬▬▬ = IF, CONV AVC





TRANSISTOR CONNECTIONS (LUG VIEW)

MOTOROLA

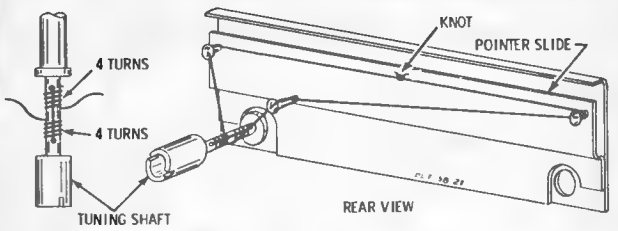
MODELS

MOTOROLA FORD

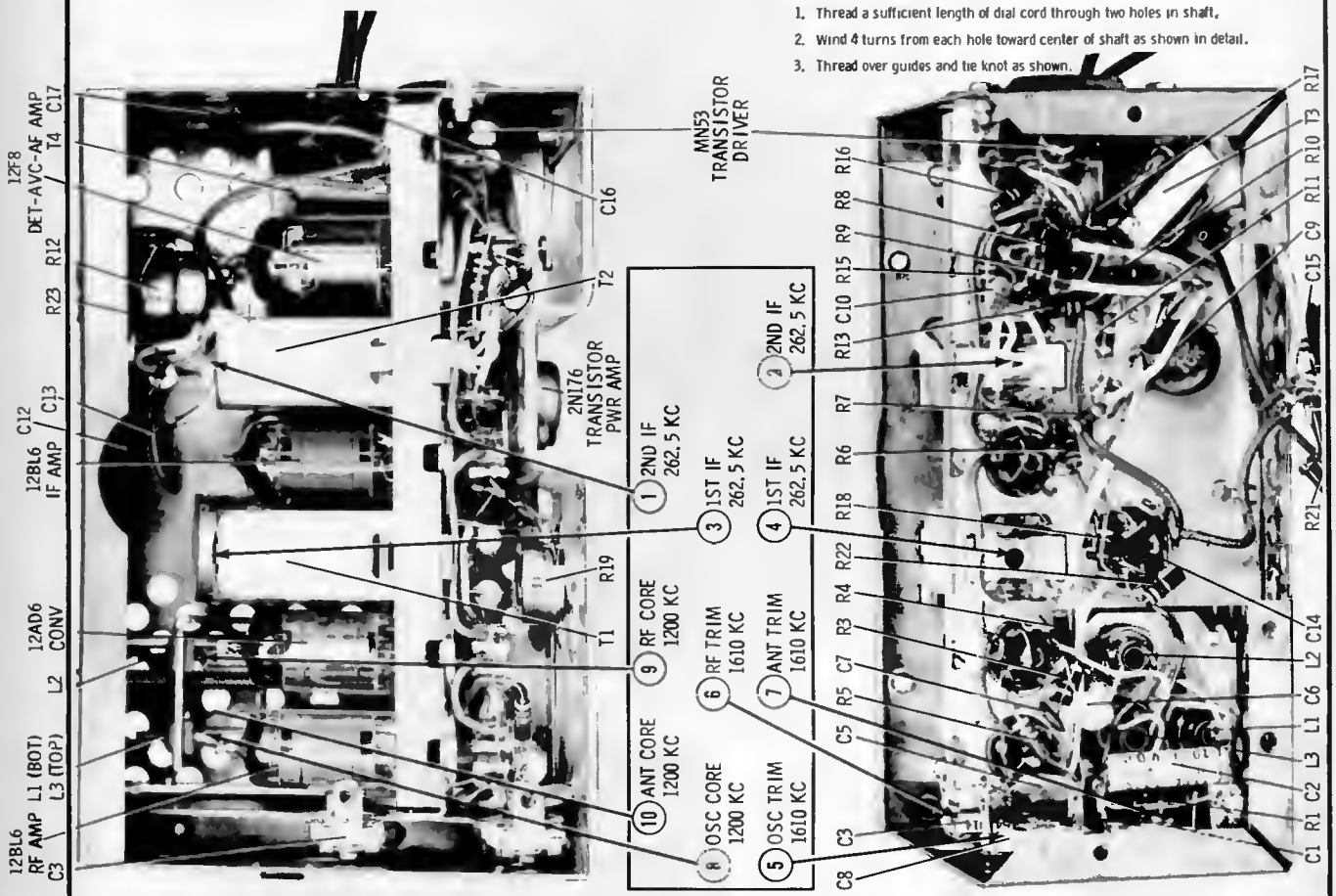
04MF COAF-18805-U
04MFM COAF-18805-T
04MD CODF-18805-D

MOTOROLA

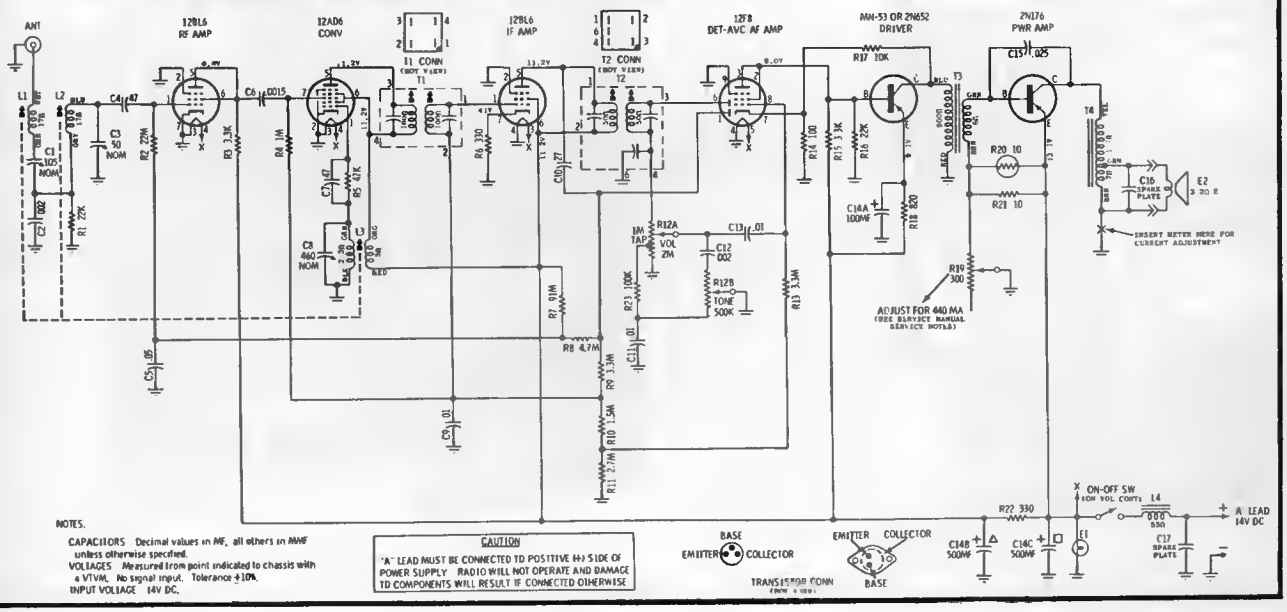
MODEL
10MX



1. Thread a sufficient length of dial cord through two holes in shaft.
2. Wind 4 turns from each hole toward center of shaft as shown in detail.
3. Thread over guides and tie knot as shown.



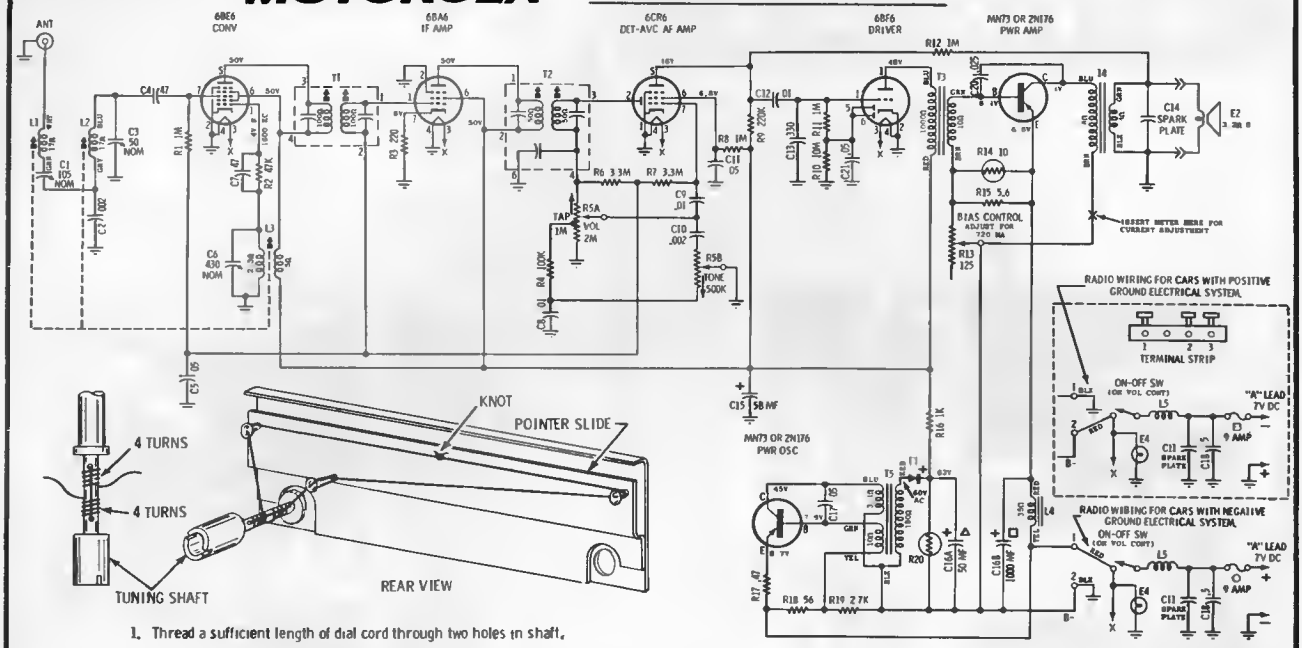
ALIGNMENT ADJUSTMENTS & PARTS LOCATION



NOTES.
CAPACITORS Decimal values in MF, all others in MMF unless otherwise specified.
VOLTAGES Measured from point indicated to chassis with a VTVM. No signal input. Tolerance ±10%. INPUT VOLTAGE 14V DC.

CAUTION
"A" LEAD MUST BE CONNECTED TO POSITIVE (+) SIDE OF POWER SUPPLY. RADIO WILL NOT OPERATE AND DAMAGE TO COMPONENTS WILL RESULT IF CONNECTED OTHERWISE

MOTOROLA Auto Radio Model 10M



1. Thread a sufficient length of dial cord through two holes in shaft.
2. Wind 4 turns from each hole toward center of shaft as shown in detail.
3. Thread over guides and tie knot as shown.

POINTER REPLACEMENT AND CALIBRATION

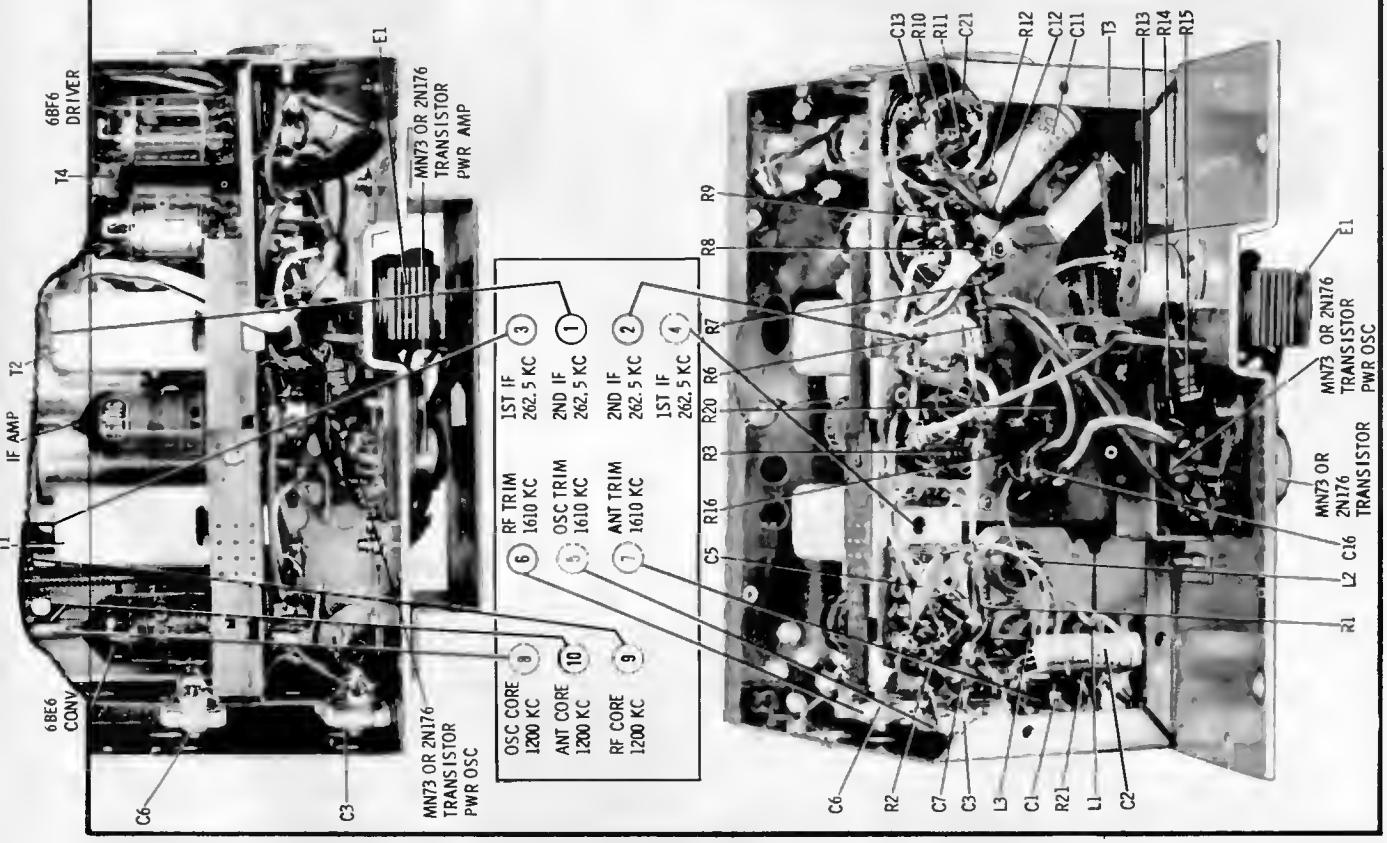
Set tuner to high end stop. Place pointer on pointer slide and set to coincide with calibration dot furthest right. Crimp and cement pointer in place.

CAUTION

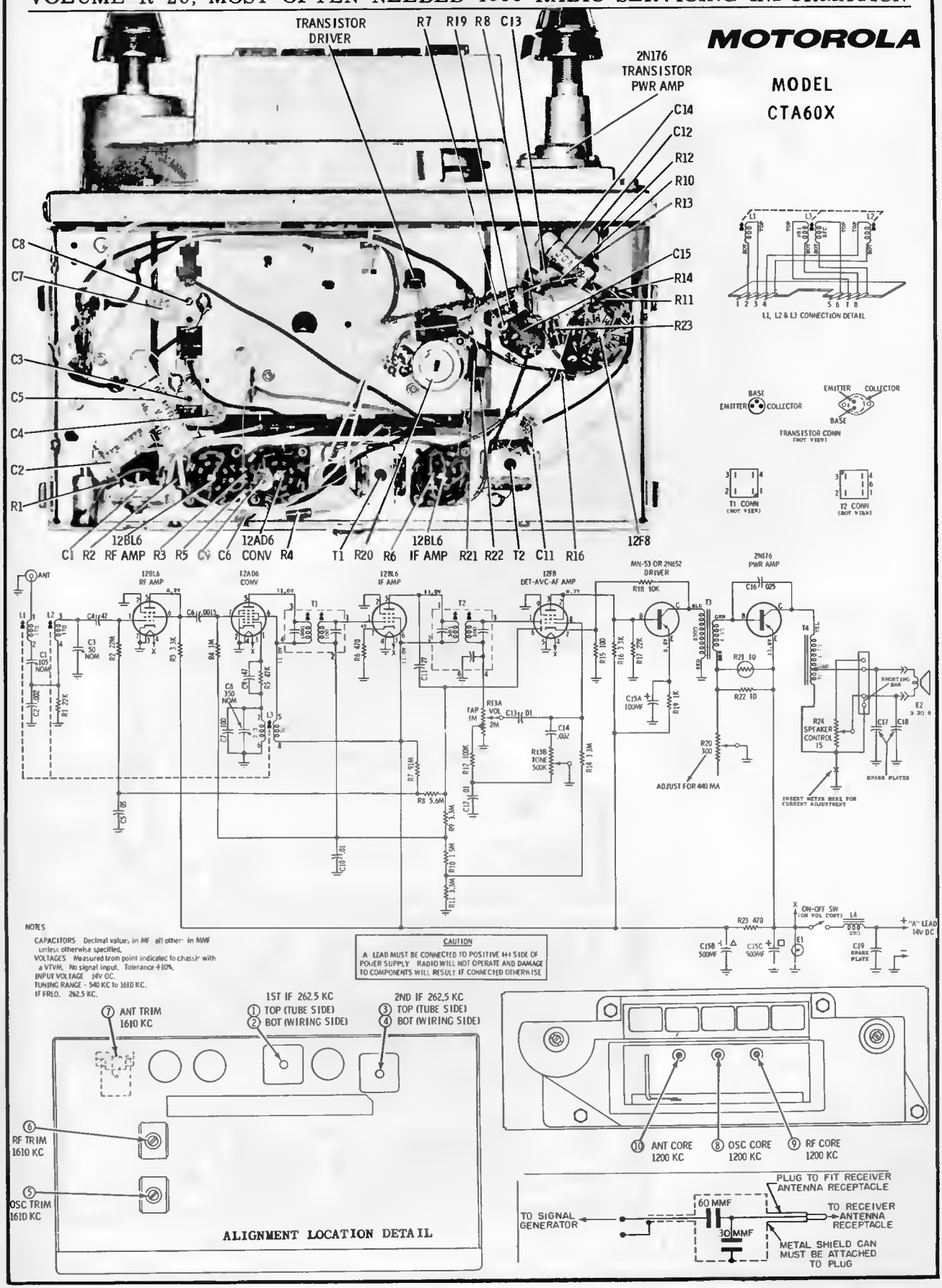
OBSERVE CORRECT TERMINAL STRIP WIRING FOR PROPER "A" LEAD POLARITY BEFORE CONNECTING RECEIVER TO SUPPLY SOURCE. RADIO WILL NOT OPERATE AND DAMAGE TO COMPONENTS WILL RESULT IF CONNECTED OTHERWISE

NOTES:

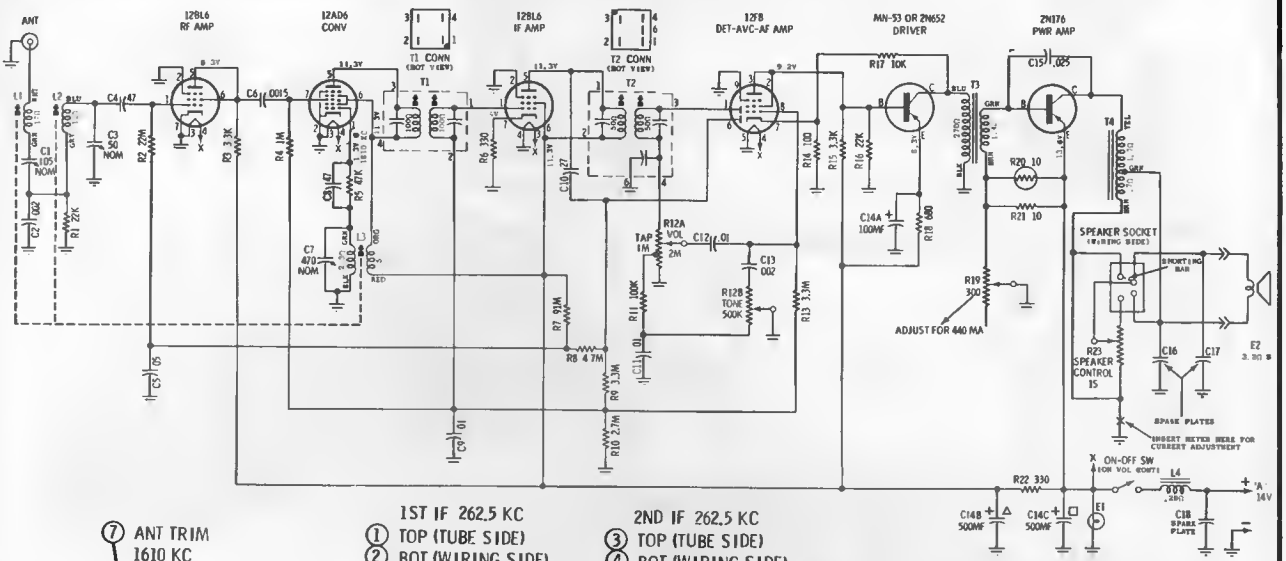
CAPACITORS - Decimal values in MF, all others in MMF unless otherwise specified.
VOLTAGES - Measured from point indicated to chassis with a VTVM. No signal input. Tolerance ±10%.
INPUT VOLTAGE - 7V DC.
TUNING RANGE - 540 KC to 1610 KC.
IF FREQUENCY - 262.5 KC.
→ - Indicates clockwise rotation of control.

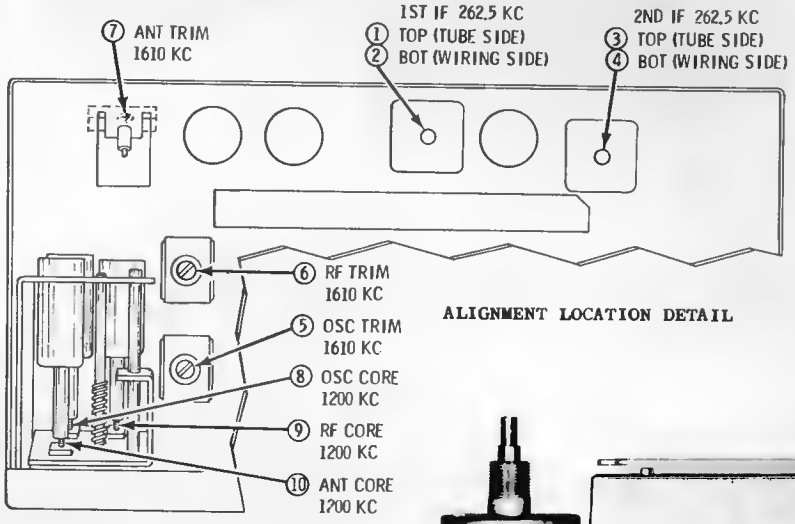


ALIGNMENT ADJUSTMENTS & PARTS LOCATIONS


MOTOROLA
MODEL
CTA60X
TRANSISTOR DRIVER
2N176 TRANSISTOR PWR AMP
R7 R19 R8 C13
C14 C12 R12 R10 R13
C15 R14 R11 R23
C8 C7 C3 C5 C4 C2 R1
C1 R2 12BL6 RF AMP R3 R5 C9 C6 12AD6 CONV R4 T1 R20 R6 12BL6 IF AMP R21 R22 T2 C11 R16 12F8
L1 L2 & L3 CONNECTION DETAIL
TRANSISTOR CONN
T1 CONN
T2 CONN
ANT
MN-53 OR 2N652 DRIVER
2N176 PWR AMP
ADJUST FOR 440 MA
INSERT METER HERE FOR CURRENT ADJUSTMENT
SPARK PLATES
ON-OFF SW
"A" LEAD 14V DC
NOTES
CAPACITORS Decimal values in MF all others in MMF unless otherwise specified.
VOLTAGES Measured from point indicated to chassis with a VTVM. No signal input. Tolerance ±10%.
INPUT VOLTAGE 14V DC.
TUNING RANGE - 540 KC to 1610 KC.
IF FREQ. 262.5 KC.
CAUTION
A LEAD MUST BE CONNECTED TO POSITIVE (+) SIDE OF POWER SUPPLY RADIO WILL NOT OPERATE AND DAMAGE TO COMPONENTS WILL RESULT IF CONNECTED OTHERWISE
1ST IF 262.5 KC
① TOP (TUBE SIDE)
② BOT (WIRING SIDE)
2ND IF 262.5 KC
③ TOP (TUBE SIDE)
④ BOT (WIRING SIDE)
⑦ ANT TRIM 1610 KC
⑥ RF TRIM 1610 KC
⑤ OSC TRIM 1610 KC
ALIGNMENT LOCATION DETAIL
⑩ ANT CORE 1200 KC
⑧ OSC CORE 1200 KC
⑨ RF CORE 1200 KC
PLUG TO FIT RECEIVER ANTENNA RECEPTACLE
TO RECEIVER ANTENNA RECEPTACLE
TO SIGNAL GENERATOR
60 MMF
30 MMF
METAL SHIELD CAN MUST BE ATTACHED TO PLUG

MOTOROLA Model CTM60X (used in 1960 Chevrolet cars)





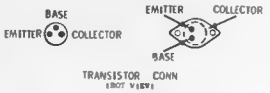
ALIGNMENT LOCATION DETAIL

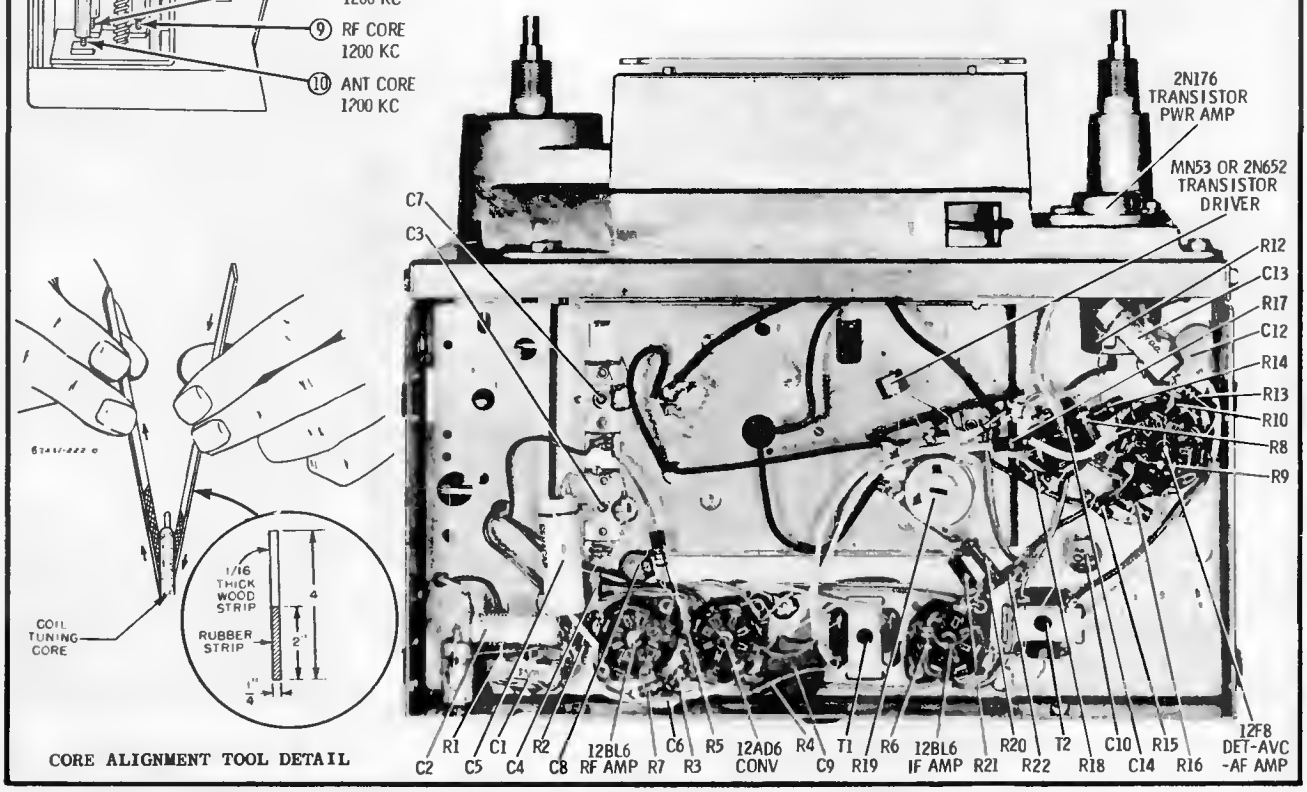
CAUTION

A LEAD MUST BE CONNECTED TO POSITIVE (+) SIDE OF POWER SUPPLY. RADIO WILL NOT OPERATE AND DAMAGE TO COMPONENTS WILL RESULT IF CONNECTED OTHERWISE

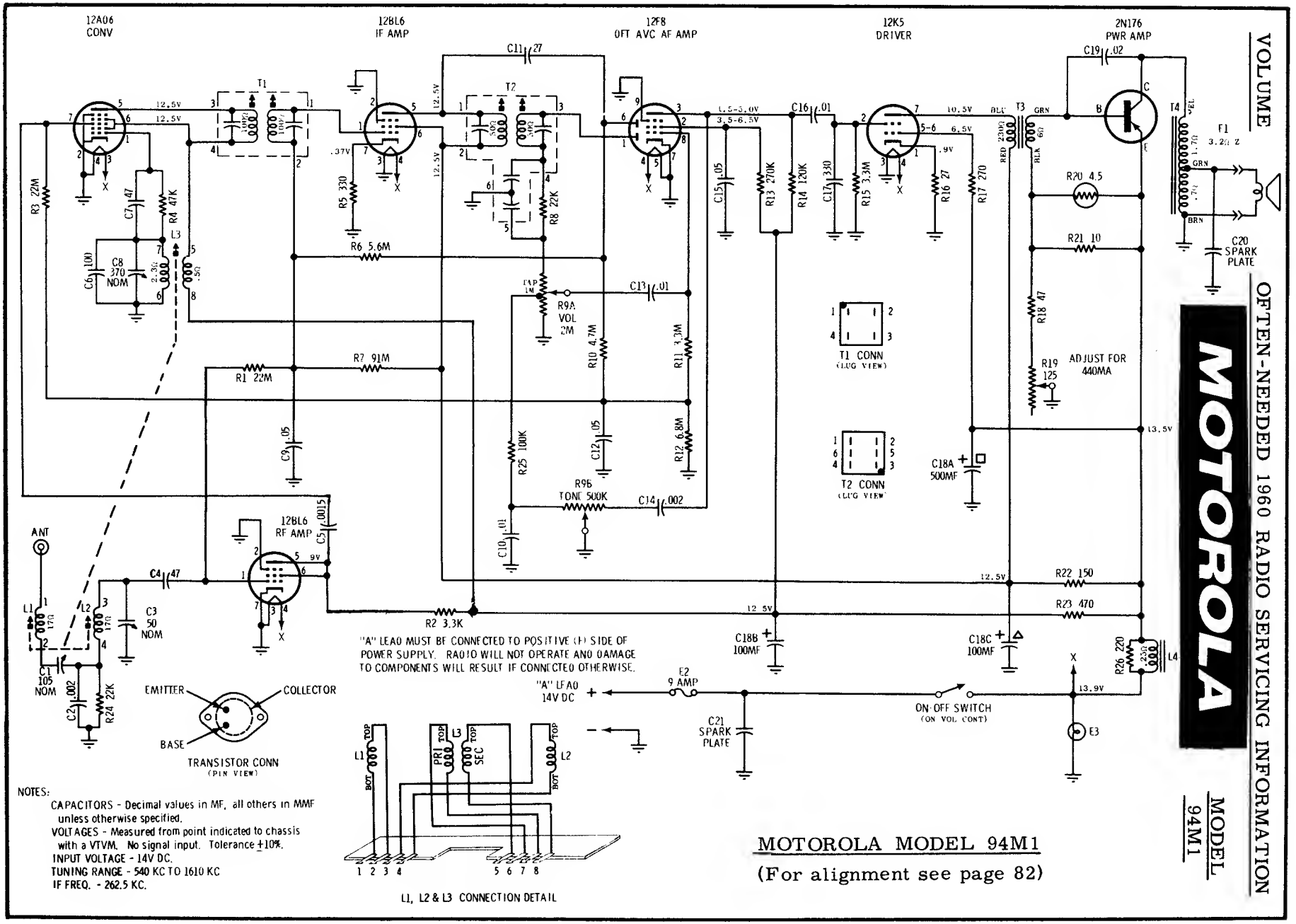
NOTES

CAPACITORS - Decimal values in MF, all others in MMF unless otherwise specified.
VOLTAGES - Measured from point indicated to chassis with a VTVM. No signal input. Tolerance ±10%.
INPUT VOLTAGE - 14V DC
TUNING RANGE - 540 KC To 1610 KC
IF FREQ. 262.5 KC





CORE ALIGNMENT TOOL DETAIL



NOTES:

CAPACITORS - Decimal values in MF, all others in MMF unless otherwise specified.
VOLTAGES - Measured from point indicated to chassis with a VTVM. No signal input. Tolerance ±10%.
INPUT VOLTAGE - 14V DC.
TUNING RANGE - 540 KC TO 1610 KC
IF FREQ. - 262.5 KC.

MOTOROLA MODEL 94M1

(For alignment see page 82)

MODEL 94M1

MOTOROLA MODEL 94M1 (Continued from page 81)

SERVICING PRECAUTION - When servicing this receiver, probing with a screwdriver (checking for spark to ground from various points) must be avoided, because the plate power is obtained directly from the storage battery and high currents can flow through the components causing permanent damage. The transistor stage is especially susceptible to damage from this type of check. If the transistor BASE electrode is shorted to ground (either directly or through any other path) the BASE bias will be removed allowing excessive current to flow through the transistor causing permanent damage by melting the indium junctions in the transistor.

TUBE CHECK - Substituting a known good tube for a suspected one is the best and only check recommended at this time.

CIRCUIT SIGNAL TRACING - Defective stages can be located by injecting a signal from stage to stage. A signal generator with a 400 cycle output can be used for this purpose as it has a source of RF and audio signals for checking the respective stages. In the transistor stages, the signal is injected between the base electrode and chassis; in tube stages, the signal is injected between the input grid and chassis. The signal is injected from stage to stage until the defective stage is located, and then the defective component is located by resistance and voltage measurements. This system of servicing will locate defects in stages caused by faults in the signal paths where the defect does not show up as a voltage reading difference.

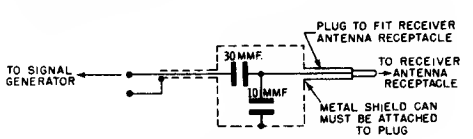
CAUTION: When using a signal generator as a signal source a .5 mf 100V capacitor must be used in series with the ground lead to prevent damage to transistors.

ALIGNMENT

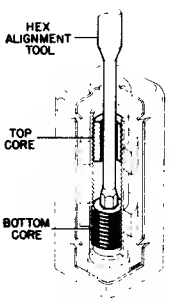
The following alignment procedure should be performed with receiver covers in place. Connect an output meter across the speaker voice coil, set volume to maximum. Attenuate signal generator output to maintain 1.79 volts on output meter at all times to prevent overloading the receiver. Refer to alignment detail for adjustment locations.

STEP	GENERATOR CONNECTION	GENERATOR FREQUENCY (400 cycle mod)	TUNER SET TO	ADJUST	REMARKS
IF ALIGNMENT					
1.	Ant recept thru .1 mf & chassis	262.5 Mc	Hi end stop	1, 2, 3 & 4	*Adjust for maximum.
RF ALIGNMENT					
2.	Ant recept thru dummy (see fig.)	1610 Kc	Hi end stop	5, 6 & 7	Adjust for maximum.
NOTE: Do not perform steps 3, 4, 5 & 6 unless the tuner has been tampered with or components have been replaced. Remove the escutcheon and dial background plate to expose the core screws. Before proceeding with step 3, back the tuning core screws 7/16" out of the coils to eliminate their effect on trimmer adjustments.					
3.	Ant recept thru dummy (see fig.)	1610 Kc	Hi end stop	5, 6 & 7	Adjust for maximum.
4.	"	1200 Kc	Tuner carriage 9/32" from hi end stop	8, 9 & 10	Adjust for maximum using alignment tool Motorola Part No. 66A76278.
5.	"	1610 Kc	Hi end stop	5, 6 & 7	Adjust for maximum.
6. Repeat steps 4 & 5 until no further increase, then cement tuning cores in place; step 5 should be last adjustment.					
ANTENNA TRIMMER					
7.	-	-	Weak station around 1400 Kc	7	With radio installed in car and antenna fully extended, adjust antenna trimmer for maximum.

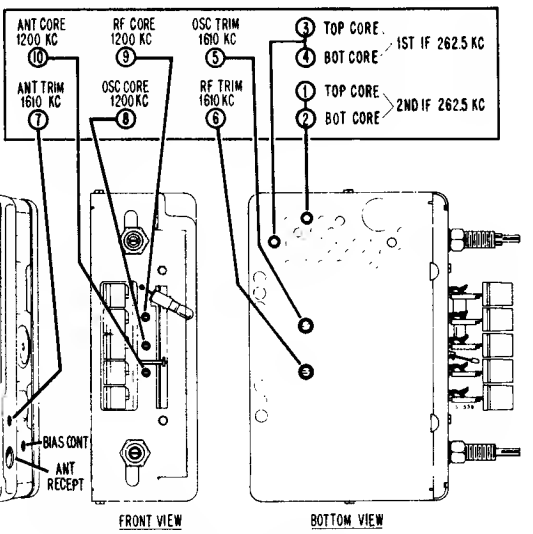
*NOTE: The cores of the IF transformers are adjusted from the top of the can by using a hex alignment tool such as shown in detail. This is accomplished by first adjusting the top core and then dropping the tool down until it makes contact with the bottom core.



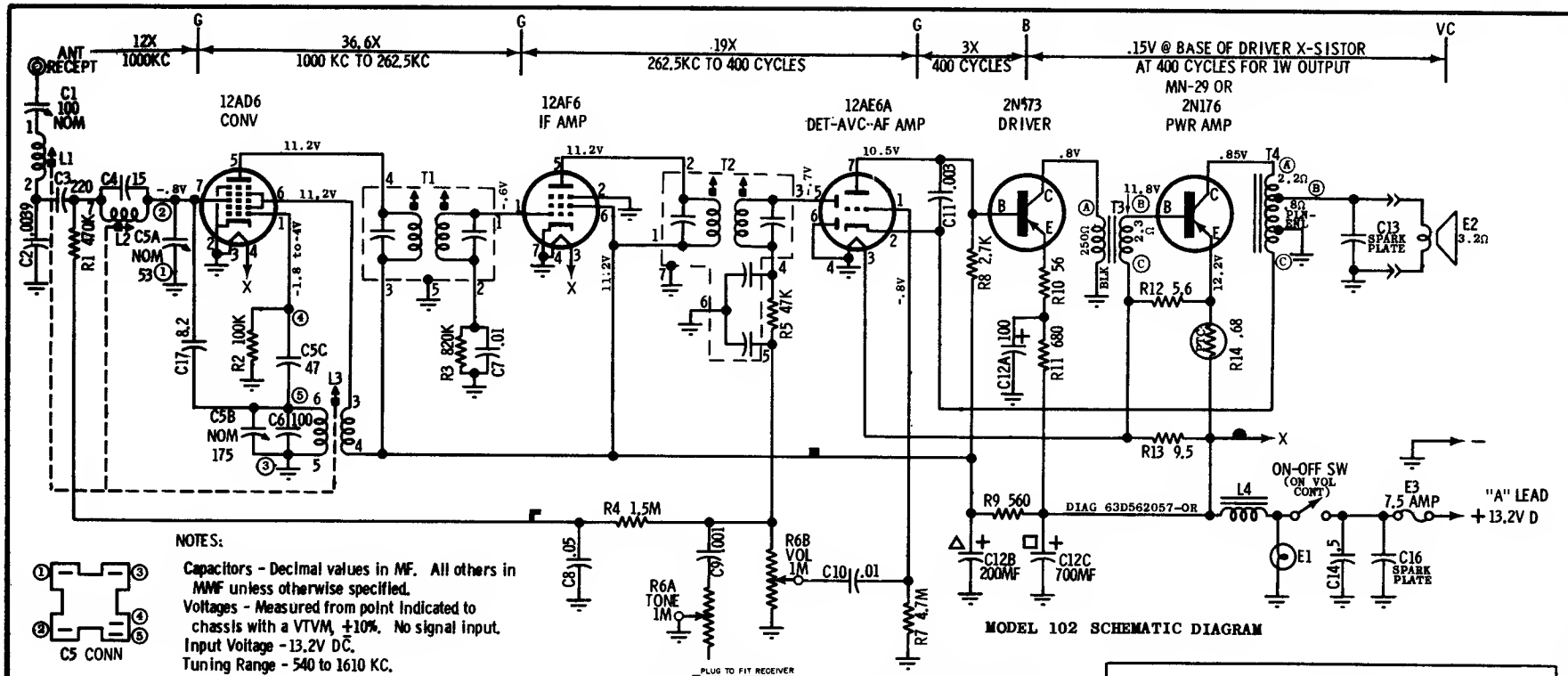
DUMMY ANTENNA DETAIL



IF ALIGNMENT DETAIL



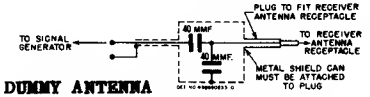
ALIGNMENT POINT LOCATION DETAIL



NOTES:

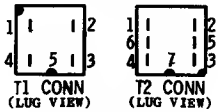
Capacitors - Decimal values in MF. All others in MMF unless otherwise specified.
Voltages - Measured from point indicated to chassis with a VTVM, ±10%. No signal input.
Input Voltage - 13.2V DC.
Tuning Range - 540 to 1610 KC.
IF - 262.5 KC.

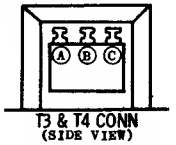
MODEL 102 SCHEMATIC DIAGRAM



DUMMY ANTENNA

PLATED PANEL WIRING LEGEND
■ = B+ ■ = FILAMENT ■ = AVC

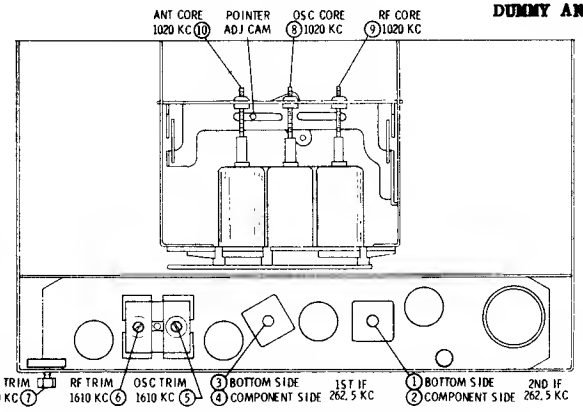




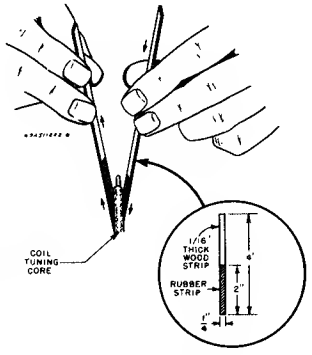
CAUTION

"A" LEAD MUST BE CONNECTED TO POSITIVE (+) SIDE OF POWER SUPPLY. RADIO WILL NOT OPERATE AND DAMAGE TO COMPONENTS WILL RESULT IF CONNECTED OTHERWISE.

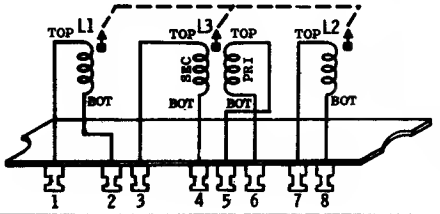
TRANSISTOR CONNECTIONS (LUG VIEW)



MODEL 102, 302 ALIGNMENT POINTS LOCATIONS



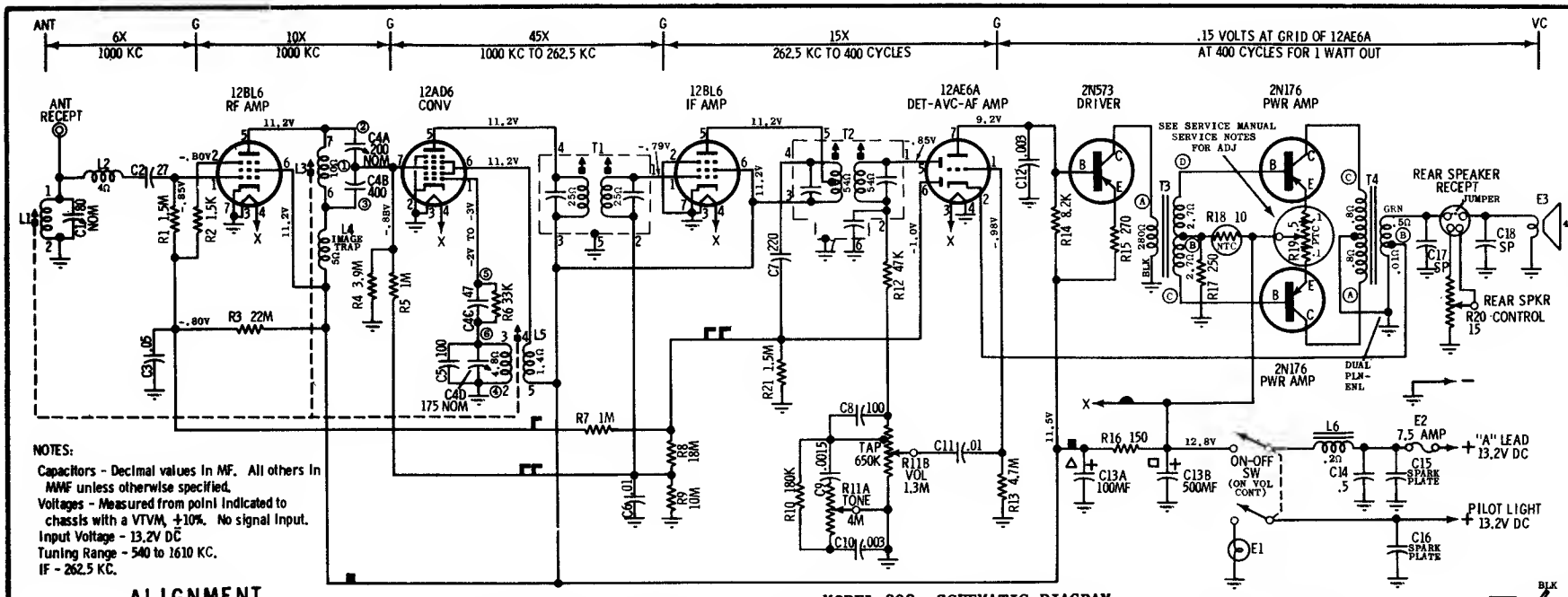
CORE TOOL ALIGNMENT DETAIL



MOTOROLA

MODEL 102

Used in 1960 Dodge cars, Models PD1 through PD4, for alignment see p. 84.



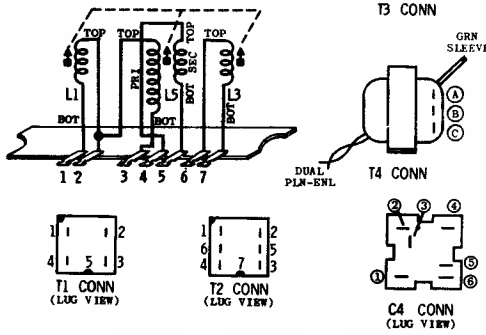
NOTES:

Capacitors - Decimal values in MF. All others in MMF unless otherwise specified.
Voltages - Measured from point indicated to chassis with a VTVM, ±10%. No signal input.
Input Voltage - 13.2V DC
Tuning Range - 540 to 1610 KC.
IF - 262.5 KC.

MODEL 302 SCHEMATIC DIAGRAM

PLATED PANEL WIRING LEGEND

■ = B+ ▬ = FILAMENT ■ = RF AVC
■ ■ = IF, CONV AVC



ALIGNMENT

Connect an output meter across the speaker voice coil. Set volume to maximum and tone to high. Attenuate signal generator output to maintain 1.79 volts on output meter at all times to prevent overloading the receiver.

STEP	GENERATOR CONNECTION	GENERATOR FREQUENCY (400 cycle mod)	TUNER SET TO	ADJUST	REMARKS
IF ALIGNMENT					
1.	Ant recept thru .1 mf capacitor & ground	262.5 Kc	Hi end stop	1, 2, 3 & 4	Adjust for maximum.
RF ALIGNMENT					
2.	Ant recept thru dummy antenna	1610 Kc	Hi end stop	5, 6 & 7	Adjust for maximum.
NOTE: Do not perform steps 3, 4, 5 & 6 unless the tuner has been tampered with or components have been replaced. Before proceeding with step 3, back tuning cores (of ant, RF & osc only) out of coils to eliminate their effect on the trimmer adjustments.					
3.	Ant recept thru dummy antenna	1610 Kc	Hi end stop	5, 6 & 7	Adjust for maximum.
4.	"	1020 Kc	Tuner carriage 49/64" in from hi end stop	8, 9 & 10	Adjnst for maximum.
5.	"	1610 Kc	Hi end stop	5, 6 & 7	Adjust for maximum.
6.	Repeat steps 4 and 5 until no further increase, then cement cores in place. Step 5 should be last step.				
ANTENNA TRIMMER					
7.	-	-	Weak station around 1000 Kc	7	With radio installed in car and antenna fully extended, peak antenna trimmer for maximum.

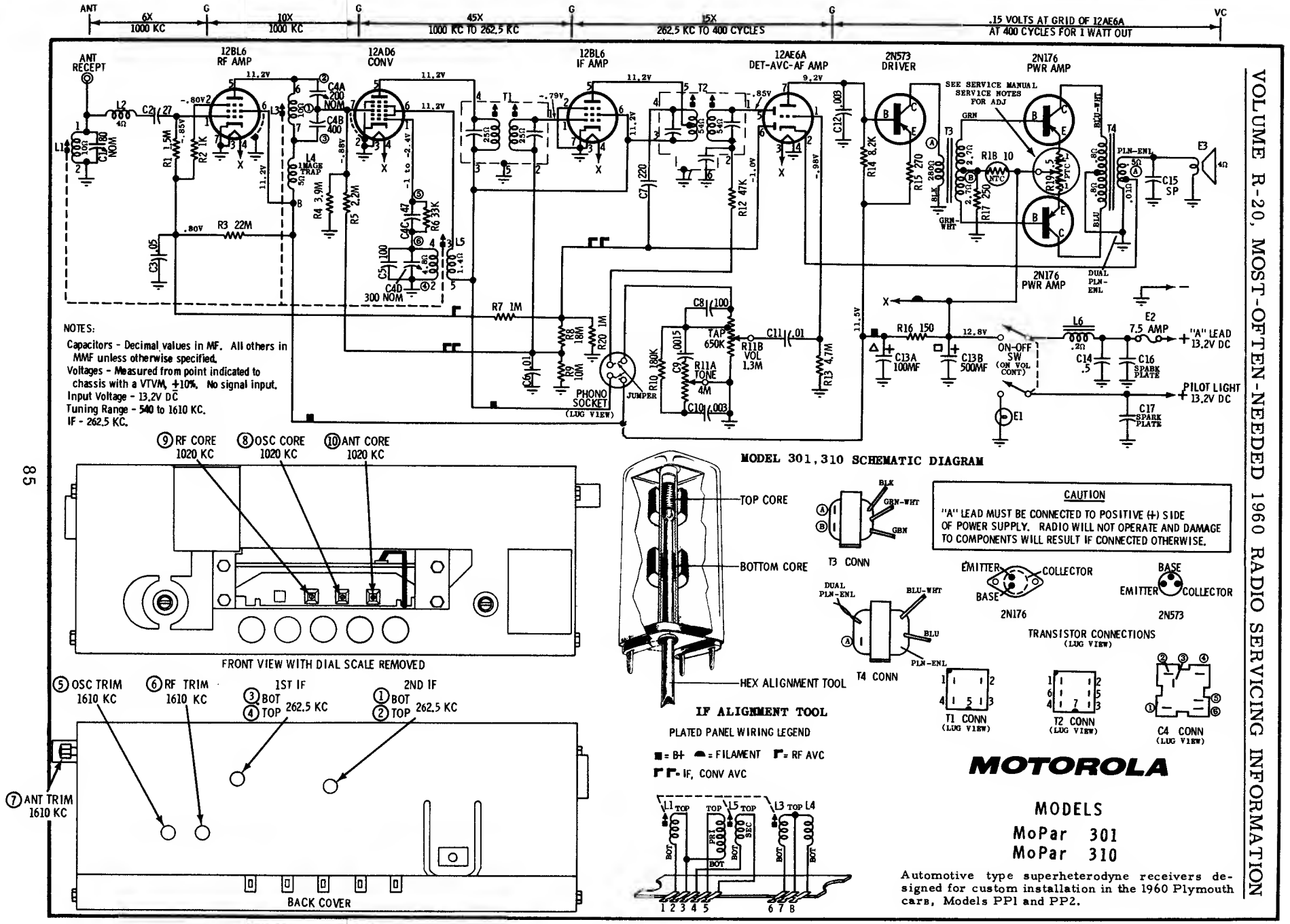
POINTER CALIBRATION - Tune radio to a 1000 Kc signal and adjust the pointer adjusting cam (see ALIGNMENT LOCATIONS) until pointer lines up with the 1000 Kc calibration mark on the dial scale.

MOTOROLA

MODEL 302

(Use this material with service data on page 83)

(See page 83 for Alignment Points Location Diagram)



MODEL 301,310 SCHEMATIC DIAGRAM

CAUTION

"A" LEAD MUST BE CONNECTED TO POSITIVE (+) SIDE OF POWER SUPPLY. RADIO WILL NOT OPERATE AND DAMAGE TO COMPONENTS WILL RESULT IF CONNECTED OTHERWISE.

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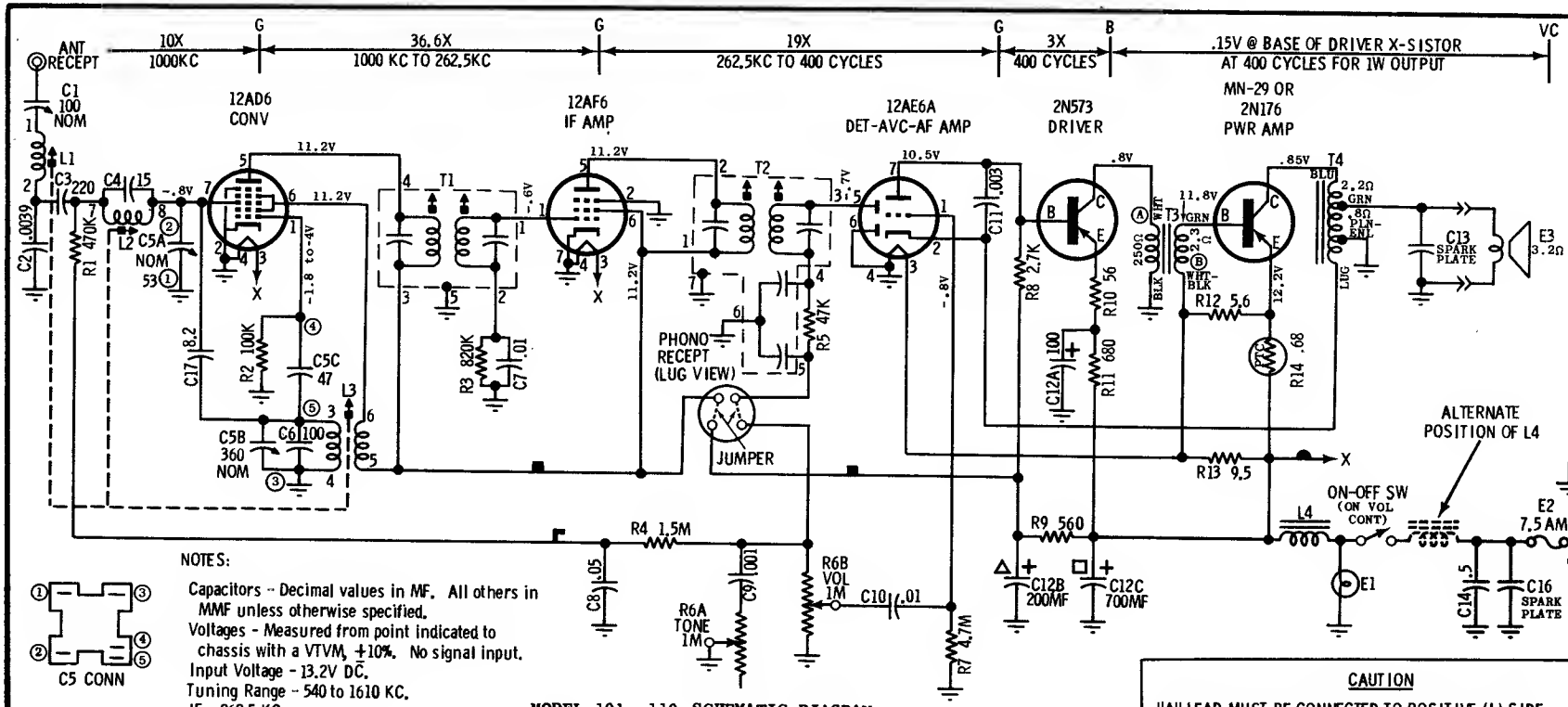
MODELS

MoPar 301
MoPar 310

Automotive type superheterodyne receivers designed for custom installation in the 1960 Plymouth cars, Models PP1 and PP2.



NOTES:

Capacitors - Decimal values in MF. All others in MMF unless otherwise specified.
Voltages - Measured from point indicated to chassis with a VTVM, ±10%. No signal input.
Input Voltage - 13.2V DC.
Tuning Range - 540 to 1610 KC.
IF - 262.5 KC.

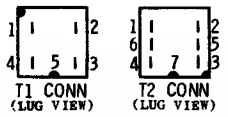
MODEL 101, 110 SCHEMATIC DIAGRAM

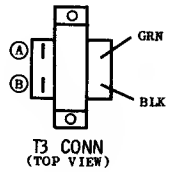
CAUTION

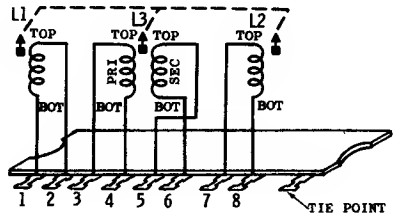
"A" LEAD MUST BE CONNECTED TO POSITIVE (+) SIDE OF POWER SUPPLY. RADIO WILL NOT OPERATE AND DAMAGE TO COMPONENTS WILL RESULT IF CONNECTED OTHERWISE.

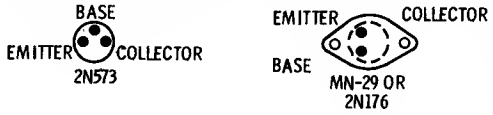
PLATED PANEL WIRING LEGEND

■ = B+ ▬ = FILAMENT ▛ = AVC









TRANSISTOR CONNECTIONS (LUG VIEW)

POWER TRANSISTOR REPLACEMENT - When replacing a transistor, be sure transistor insulator is in place and greased and that the mounting screws are securely and evenly tightened.

POWER TRANSISTOR INSULATOR - When replacing a power transistor or power transistor insulator, be sure to coat both sides of insulator with DC-4 grease (Motorola Part No. 11M490487) to insure proper heat dissipation.

DRIVER TRANSISTOR REPLACEMENT - When replacing a driver transistor, grasp the transistor leads (between transistor body and plated chassis board) with a pair of long nose pliers to prevent excessive heating of transistor body during soldering operation.

TO SET PUSHBUTTONS

1. Turn receiver on and allow to operate for fifteen minutes before setting pushbuttons.
2. Unlock pushbuttons by pulling them out.
3. Accurately tune in a station desired for pushbutton setup.
4. Lock one of the pushbuttons to this station by pushing it in firmly.
5. Repeat steps 3 and 4 for remaining pushbuttons.

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MODELS

MoPar 101
MoPar 110

(For alignment points refer to page 85)

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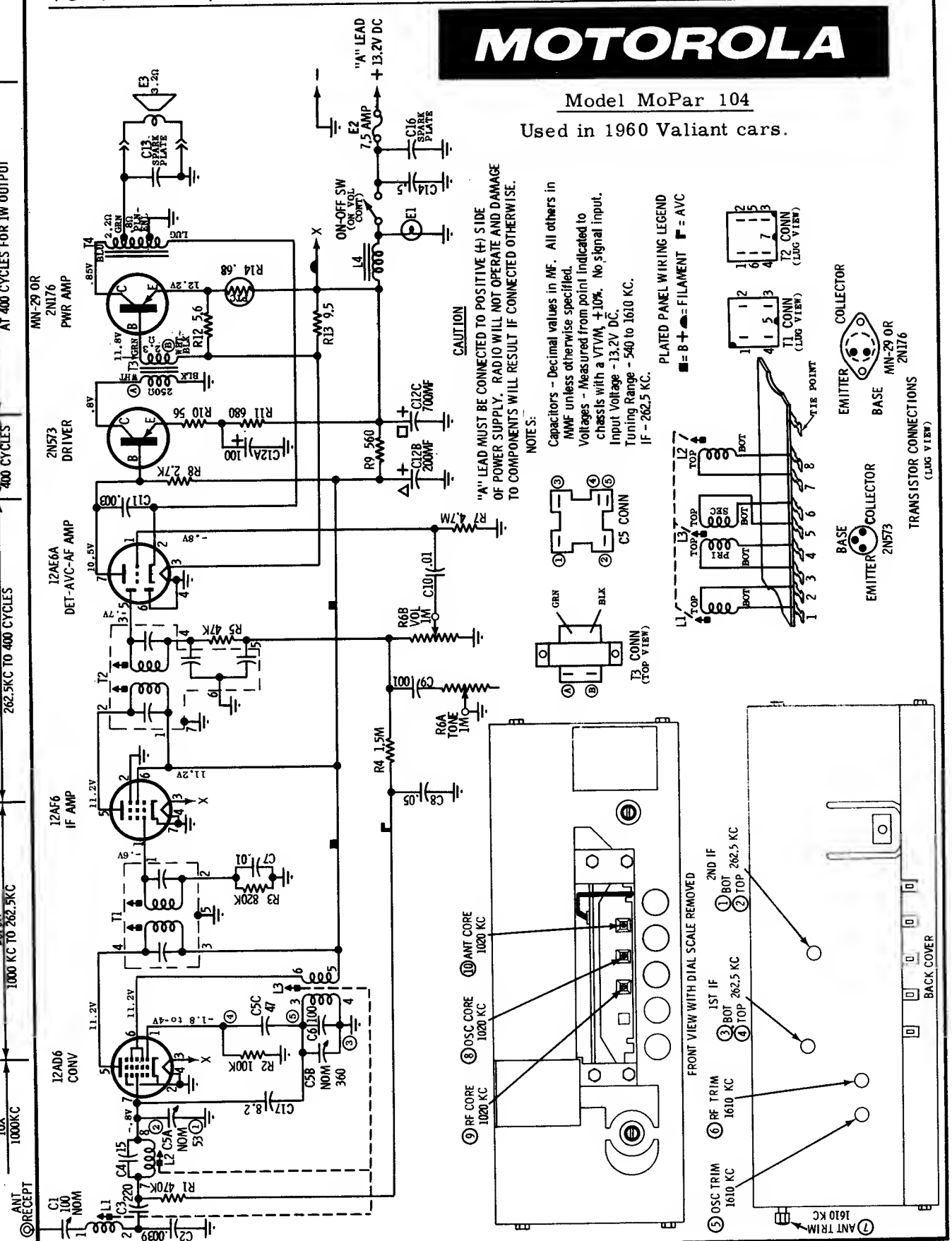
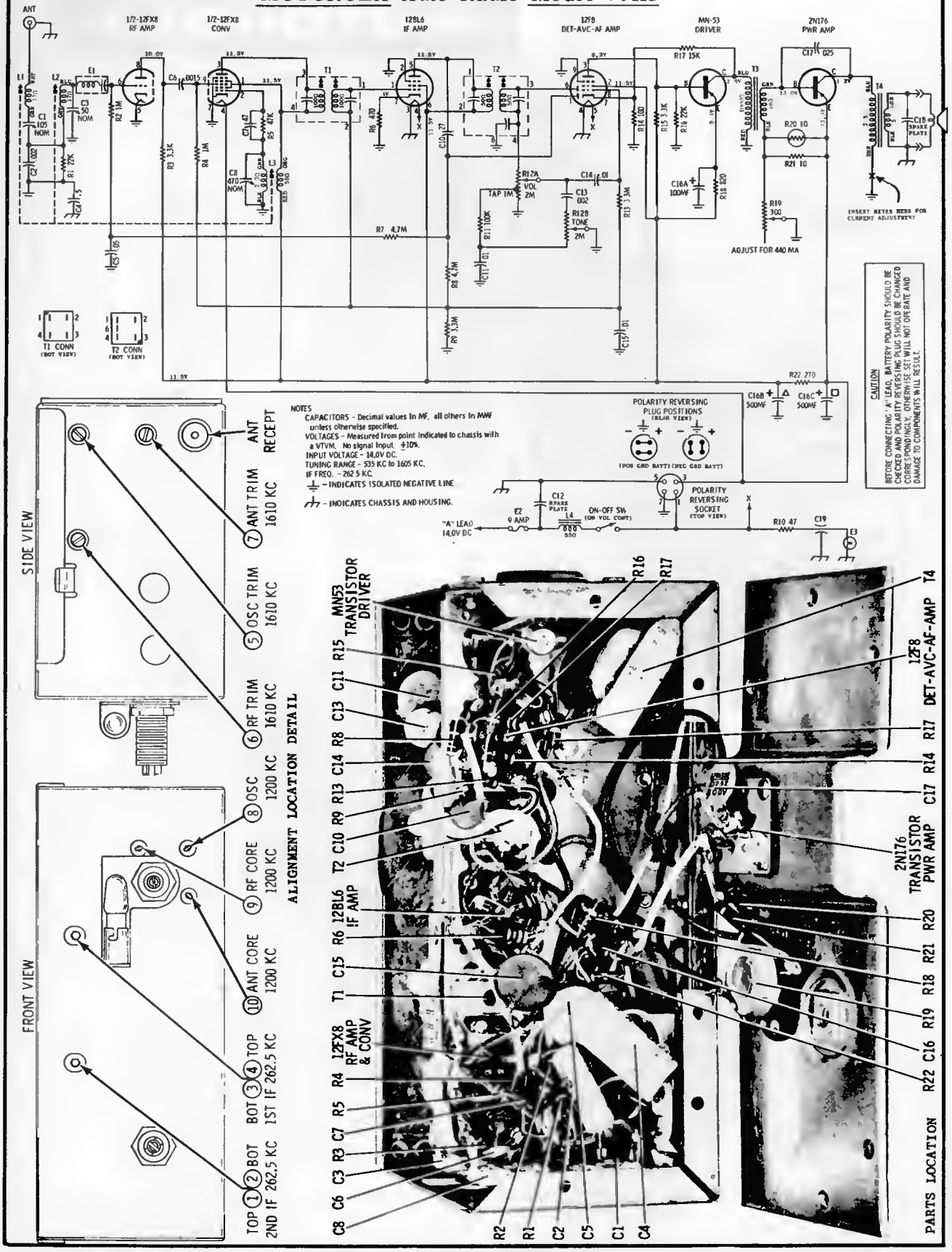
Model MoPar 104

Used in 1960 Valiant cars.

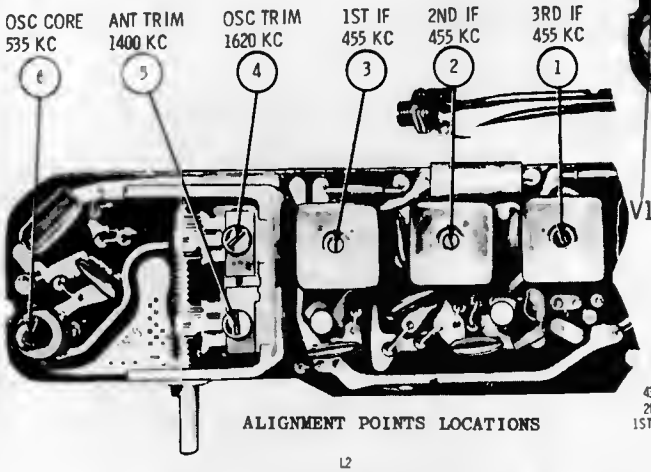


MOTOROLA Auto Radio Model 601X

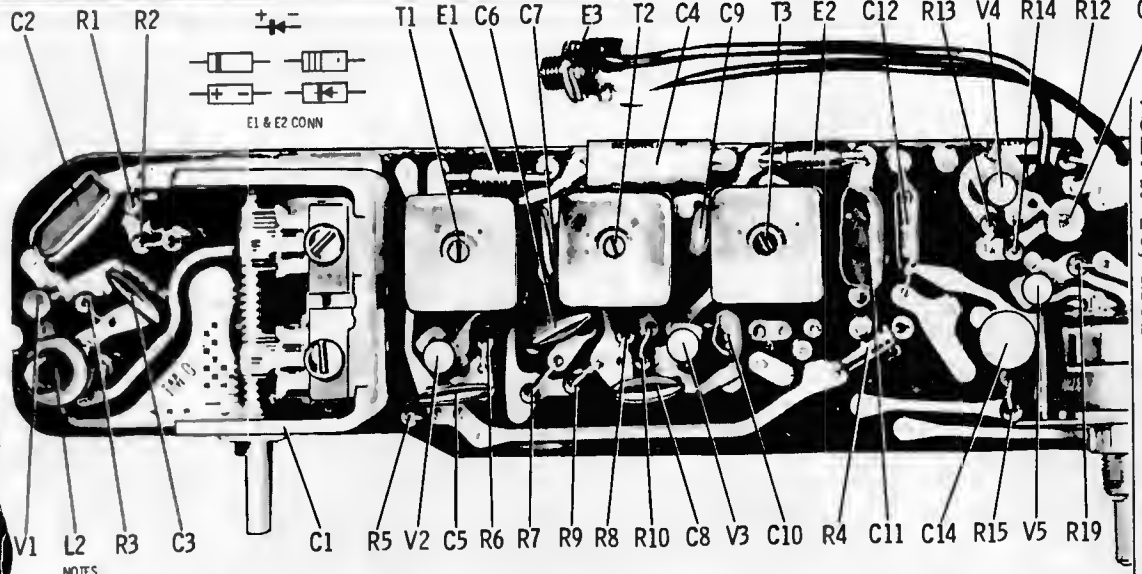


CHASSIS REMOVAL

1. Loosen two back panel mounting screws 5 or 6 turns (a coin can be used for a screwdriver) and remove panel (if necessary, press thumb against bottom center edge; the panel will swing free, allowing easy removal).
2. To remove cabinet back, remove 2 cabinet back mounting screws located under batteries; then remove back.
3. Remove volume and tuning knobs.
4. From front of cabinet, remove 2 chassis mounting screws and volume control mounting palnut.
5. Unscrew earphone jack mounting nut.
6. Unsolder chassis leads.
7. Remove chassis from cabinet.



ALIGNMENT POINTS LOCATIONS



NOTES

CAPACITORS - Decimal values in MF. All others in MMF. unless otherwise specified.
VOLTAGES - Measured from point indicated to ground or across points indicated with a VTVM. ±10%. No signal in.
TUNING RANGE - 535 KC to 1620 KC.
IF - 455 KC.
Resistances measured with transistors removed from associated circuitry.

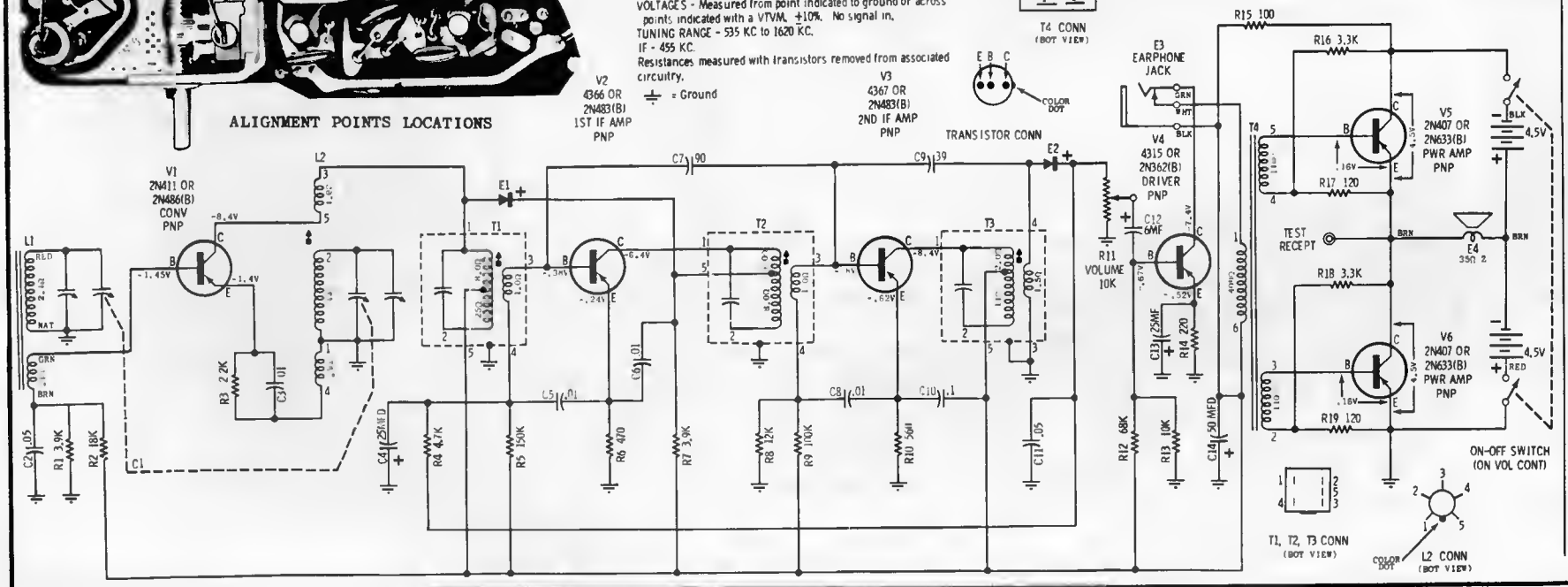
= Ground

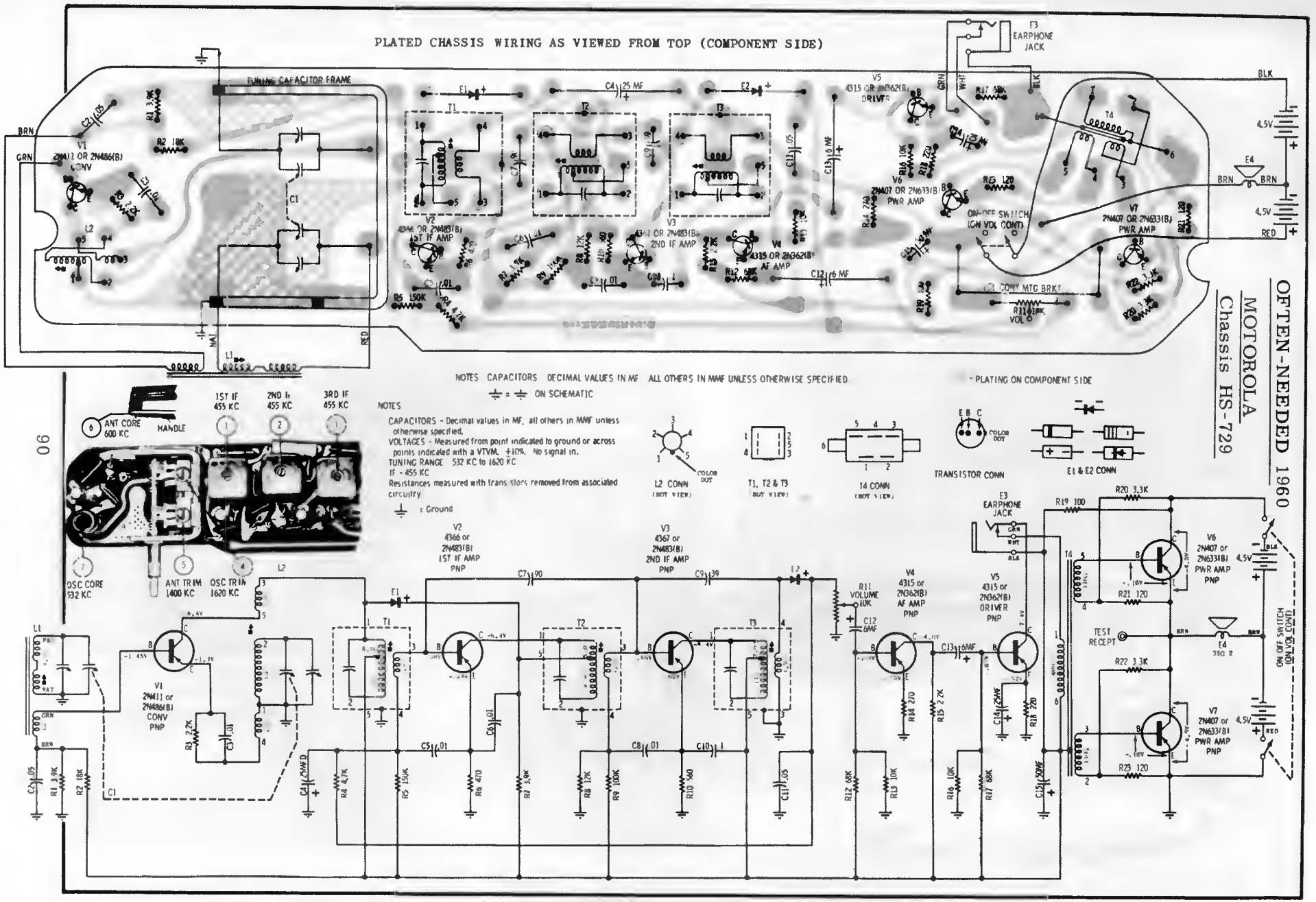
T4 CONN (BOT VIEW)

TRANSISTOR CONN

V2 4366 OR 2N483(B) 1ST IF AMP PNP

V3 4367 OR 2N483(B) 2ND IF AMP PNP





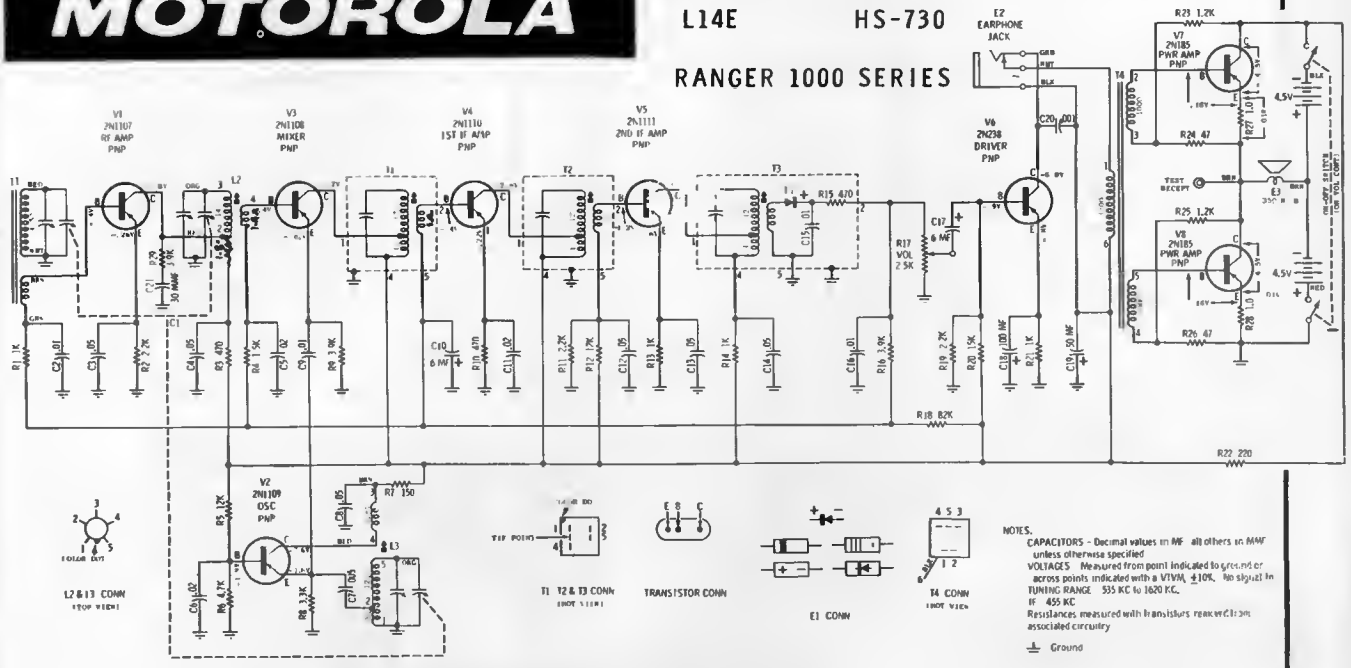
OFTEN-NEEDED 1960

MOTOROLA
Chassis HS-729

MOTOROLA

MODEL L14E CHASSIS HS-730

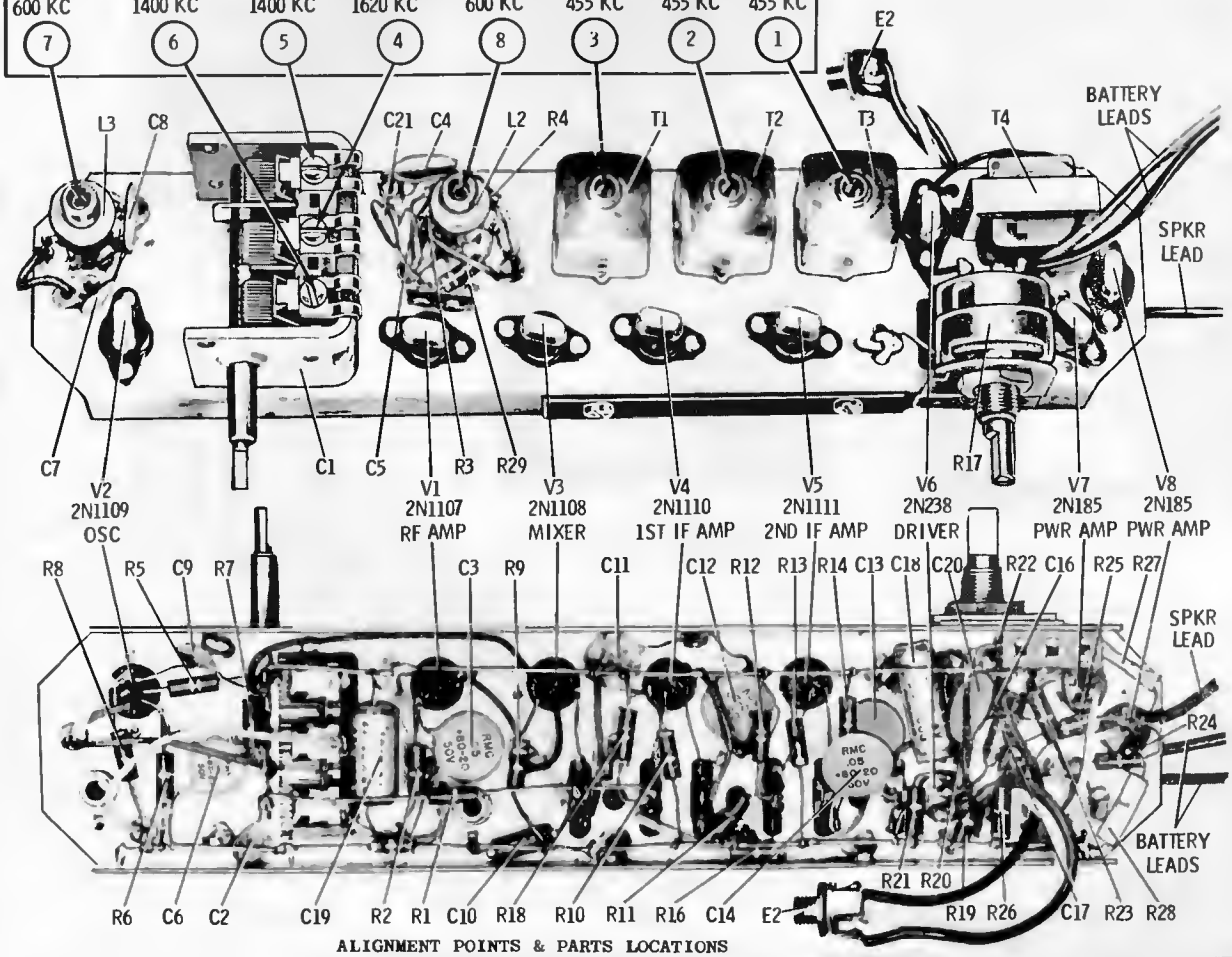
RANGER 1000 SERIES



NOTES.
CAPACITORS - Decimal values in MF all others in MMF unless otherwise specified
VOLTAGES Measured from point indicated to ground or across points indicated with a VTVM, ±10%. No signal in
TUNING RANGE 535 KC to 1620 KC.
IF 455 KC
Resistances measured with transistors removed from associated circuitry
⏚ Ground

ALIGNMENT POINTS

OSC CORE 600 KC	ANT TRIM 1400 KC	RF TRIM 1400 KC	OSC TRIM 1620 KC	RF CORE 600 KC	1ST IF 455 KC	2ND IF 455 KC	3RD IF 455 KC
7	6	5	4	8	3	2	1



ALIGNMENT POINTS & PARTS LOCATIONS

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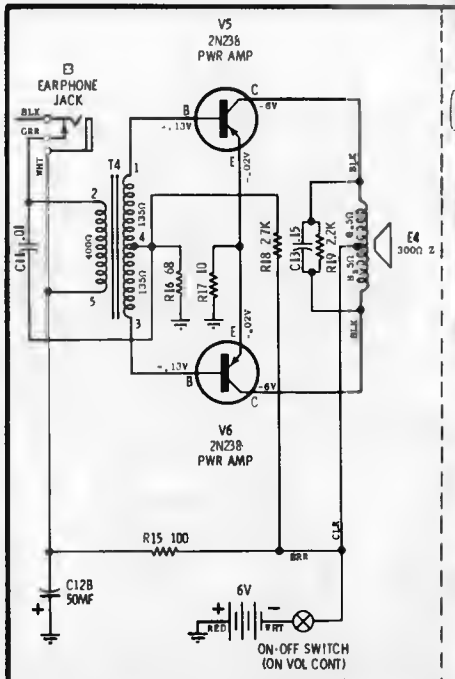
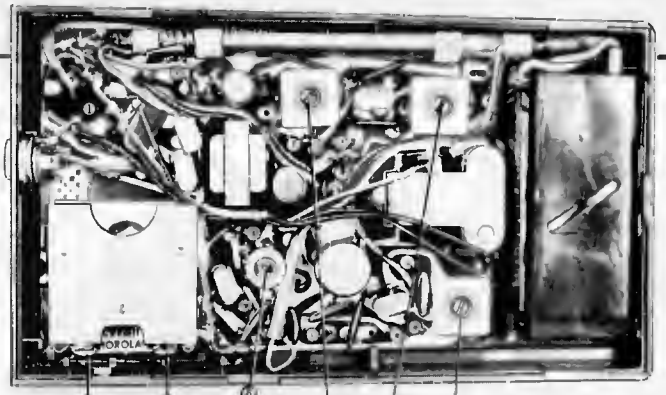
MODELS CHASSIS

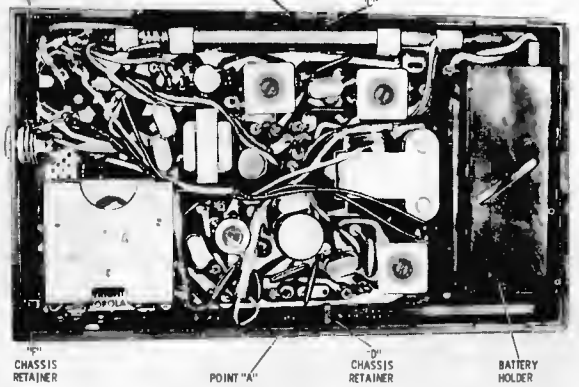
X12 Series HS-732
X12A-1 HS-789
X12E-1 HS-789

POWER EIGHT SERIES



Main differences of Chassis HS-732





REMOVAL OF CHASSIS

CHASSIS REMOVAL

1. Remove cabinet back by inserting a coin into the cover opening slot and twisting until cabinet back is free.
2. Remove earphone jack mounting nut and washer.
3. From inside cabinet, remove battery holder and batteries.
4. Spread cabinet slightly at top and bottom (points A & B) until chassis is free of chassis retainers (C & D) at top and bottom of cabinet; then lift up chassis at speaker end of cabinet until it clears the chassis retainers (C& D - see CHASSIS REMOVAL detail).
5. Lift chassis up until it is slightly above speaker, then slide chassis over speaker so that the chassis is free of chassis retainers (E & F) below earphone jack.
6. From under chassis, loosen speaker mounting screws until speaker mounting brackets are loose enough so that the speaker can be removed.
7. Lift chassis, speaker, and battery holder out of cabinet.
8. Before replacing chassis, mount speaker, then insert tuning gang end of chassis into cabinet, spread points A & B of cabinet, then lower other end of chassis into place under chassis retainers C & D (make certain battery leads are dressed under and away from antenna).
9. Place battery holder back into the cabinet slots as originally found.

NOTES
CAPACITORS - Decimal values in MF, all others in MMF unless otherwise specified.
VOLTAGES - Measured from point indicated to ground or across points indicated with a VTVM, ± 10%. No signal in.
TUNING RANGE - 535 KC to 1620 KC.
IF 455 KC.
Resistances measured with transistors removed from associated circuitry.

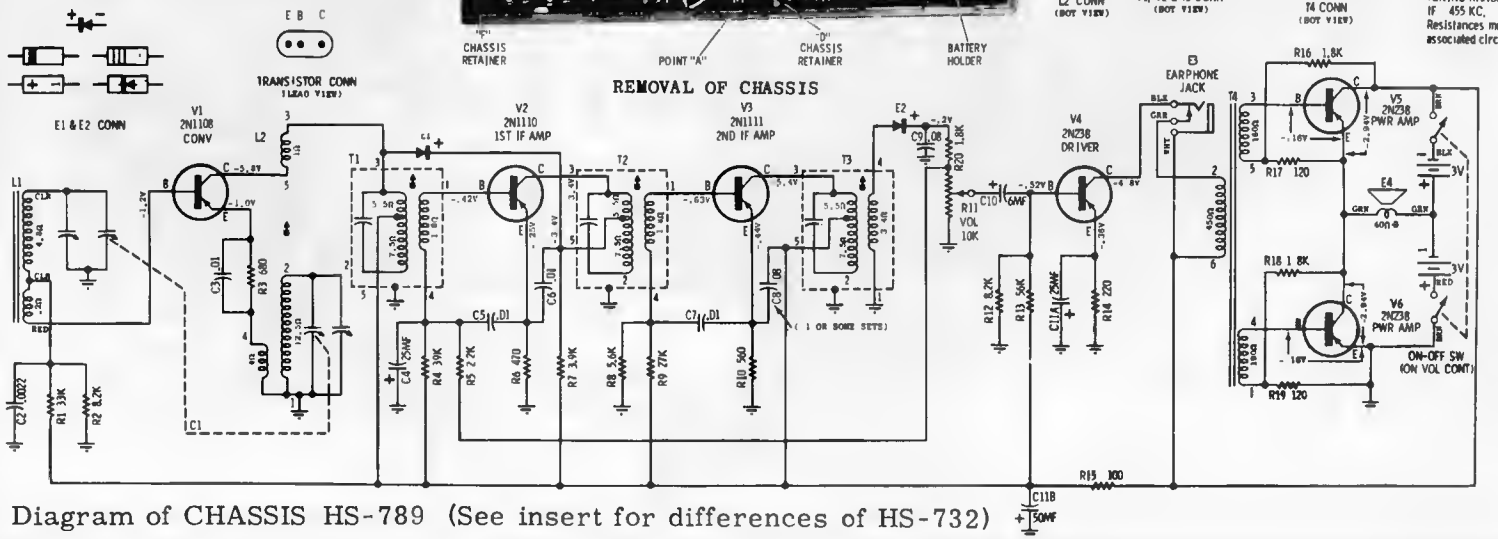


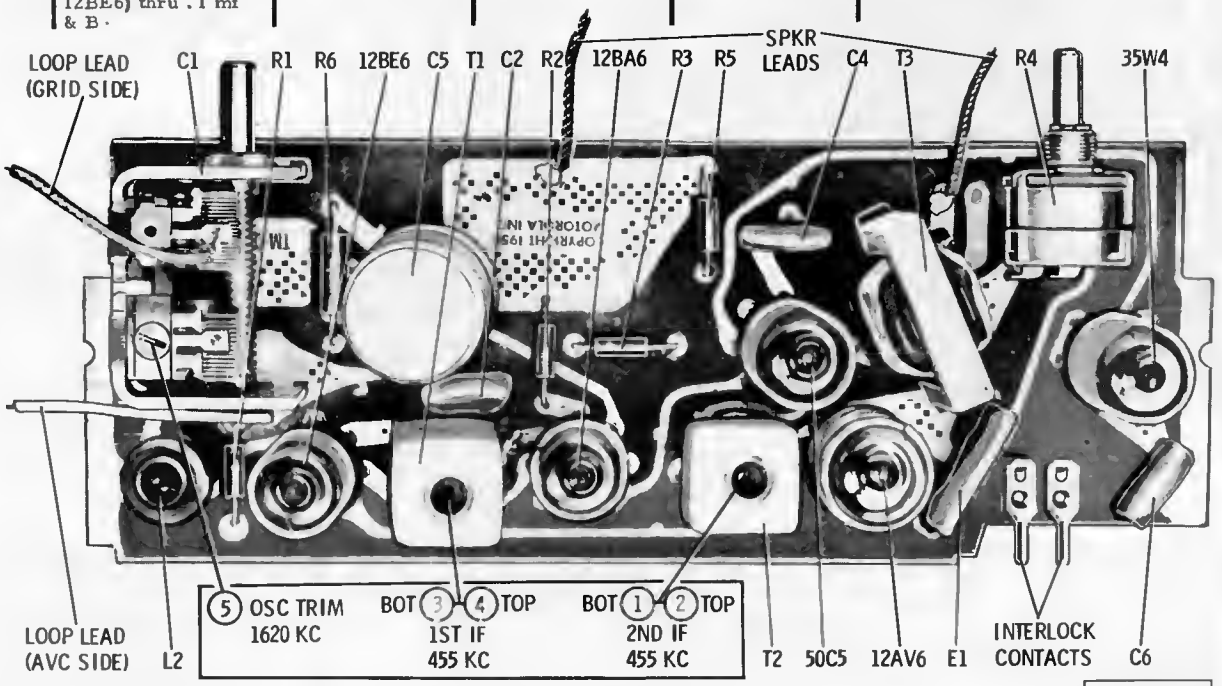
Diagram of CHASSIS HS-789 (See insert for differences of HS-732)

MOTOROLA

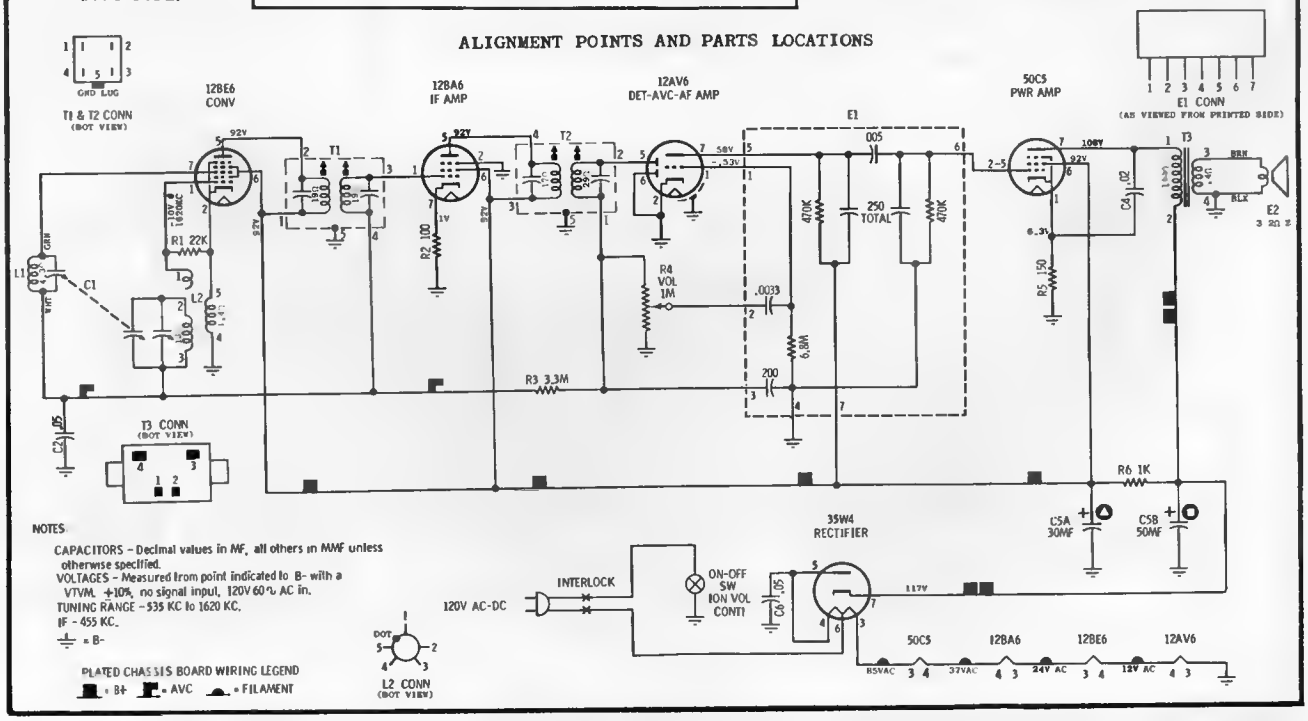
MODELS A1B,N,R,W — CHASSIS HS-744

ALIGNMENT

STEP	GENERATOR CONNECTION	GENERATOR FREQUENCY (400 cycle mod)	GANG SETTING	ADJUST	REMARKS
IF ALIGNMENT					
1.	Grid of conv (pin 7, 12BE6) thru .1 mf & B-	455 Kc	Fully open	1, 2, 3 & 4	Adjust for maximum.
RF ALIGNMENT					
2.	Grid of conv (pin 7, 12BE6) thru .1 mf & B-	1620 Kc	Fully open	5	Adjust for maximum.



ALIGNMENT POINTS AND PARTS LOCATIONS



NOTES:

CAPACITORS – Decimal values in MF, all others in MMF unless otherwise specified.
VOLTAGES – Measured from point indicated to B- with a VTVM, +10%, no signal input, 120V 60 ~ AC in.
TUNING RANGE – 535 KC to 1620 KC.
IF – 455 KC.
⏚ = B-

PLATED CHASSIS BOARD WIRING LEGEND
■ = B+ ■ = AVC ■ = FILAMENT

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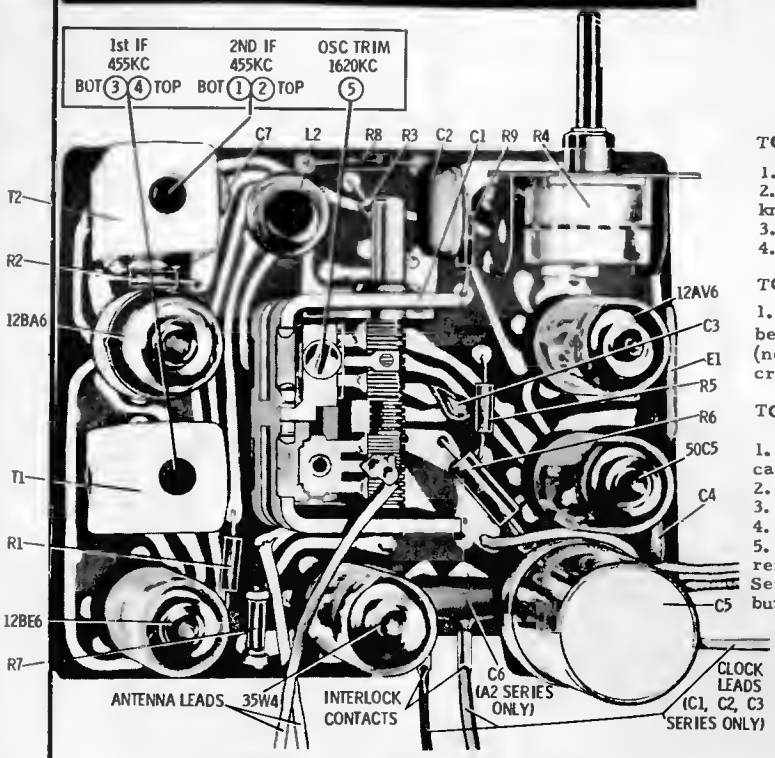
MODELS	CHASSIS
A2G, N, P, W	HS-745
C1N, W	HS-749
C2B, P, W	HS-749
C3G, S, W	HS-750
C3G-1, S-1, W-1	HS-750



ALIGNMENT POINTS AND PARTS LOCATIONS

TO REMOVE CHASSIS FROM CABINET

1. Remove back - 2 screws hold it in place.
2. Pull off volume and tuning knobs (place string under knob).
3. Remove screw from cabinet front and remove chassis.
4. To free chassis, unsolder appropriate leads.

TO REMOVE CLOCK CRYSTAL (Models C1, C2, C3 Series)

1. Pull off clock knob (or knobs). Insert a screwdriver between the cabinet and bottom edge of the clock crystal (near 6 o'clock on clock face) to release catch, then lift out crystal.

TO REMOVE CLOCK FROM CABINET (Models C1, C2, C3)

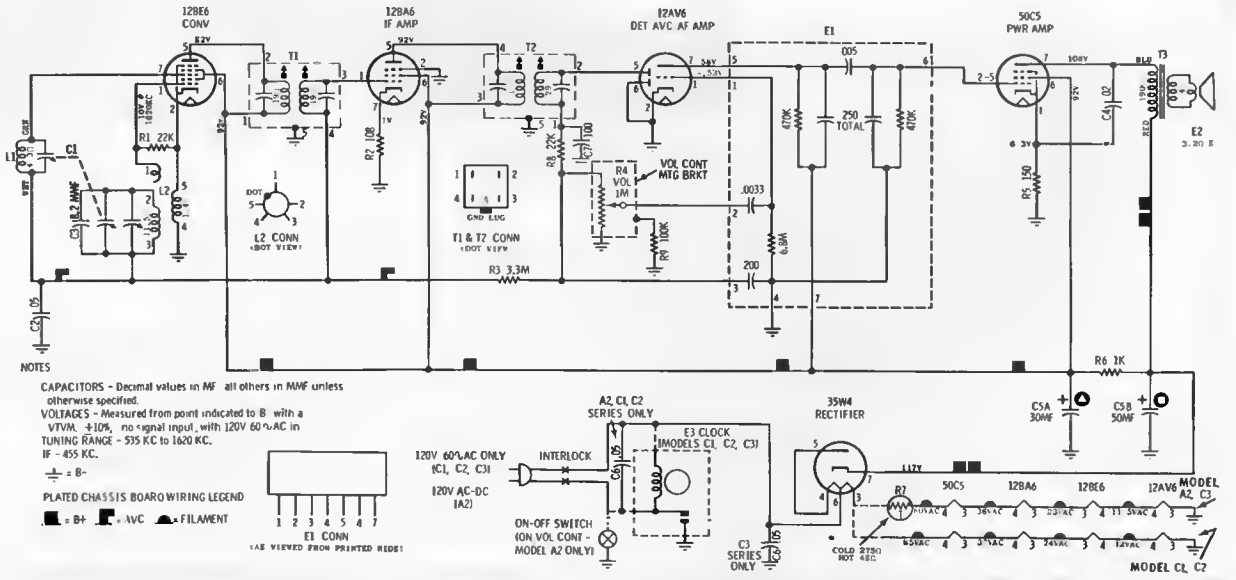
1. Remove 2 cabinet back mounting screws and remove cabinet back.
2. Unsolder 3 chassis leads connected to clock.
3. From rear, remove 4 clock mounting spring clips.
4. Pull off Lazalarm button from cabinet (Model C3 only).
5. Remove clock crystal (see "To Remove Clock Crystal"); remove clock from front of cabinet. NOTE: On Model C3 Series, install clock into cabinet before replacing Lazalarm button.

Models C4B, P, S, Chassis HS-752, is practically the same electrically, but includes dimmer and appliance outlet.

ALIGNMENT

Use an isolation transformer between the power line and the receiver. If not available, connect low side of generator to B- through a .1 mf capacitor. Connect a low range output meter across speaker voice coil and set volume control to maximum. Attenuate generator output to maintain .40 volts on output meter to prevent overloading.

STEP	GENERATOR CONNECTION	GENERATOR FREQUENCY (400 cycle mod)	GANG SETTING	ADJUST	REMARKS
IF ALIGNMENT					
1.	Grid of conv (pin 7, 12BE6) thru .1 mf & B-	455 Kc	Fully open	1, 2, 3 & 4	Adjust for maximum.
RF ALIGNMENT					
2.	Grid of conv (pin 7, 12BE6) thru .1 mf & B -	1620 Kc	Fully open	5	Adjust for maximum



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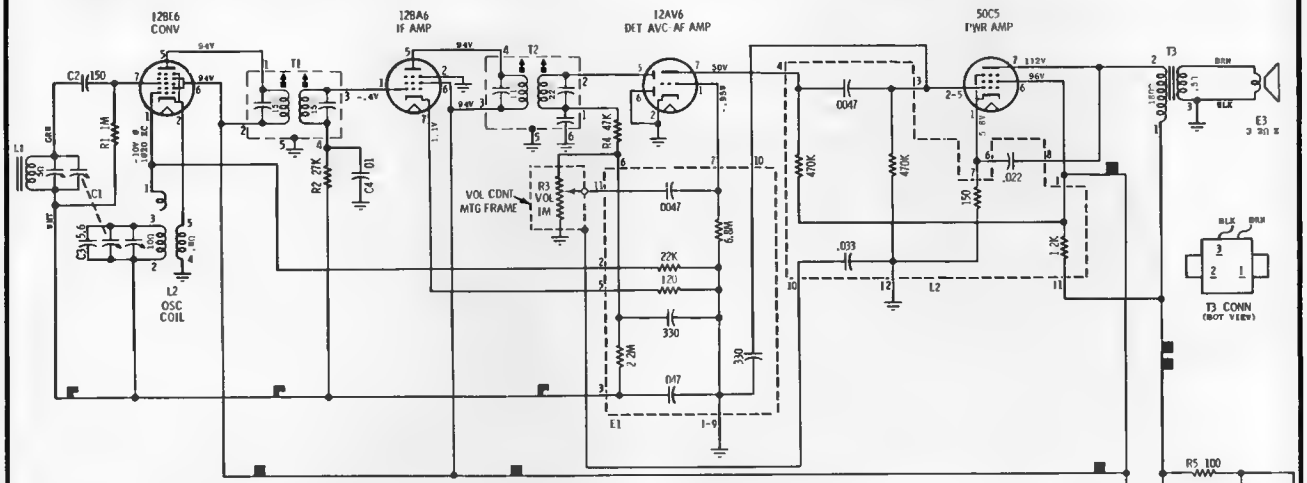
MODELS C5G,S,W CHASSIS HS-753

ALIGNMENT

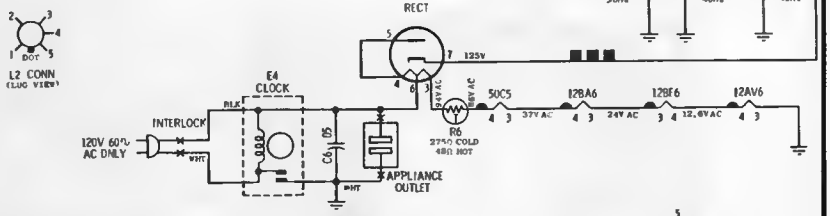
STEP	GENERATOR CONNECTION	GEN FREQ (400 cycle mod)	GANG SETTING	ADJUST	REMARKS
IF ALIGNMENT					
1.	12BE6 grid (pin 7) thru .1 mf & B-	455 Kc	Fully open	1, 2, 3 & 4	Adjust for maximum.
RF ALIGNMENT					
2.	Radiation loop*	1620 Kc	Fully open	5	Adjust for maximum.
3.	"	1400 Kc	Tune for max	6	"

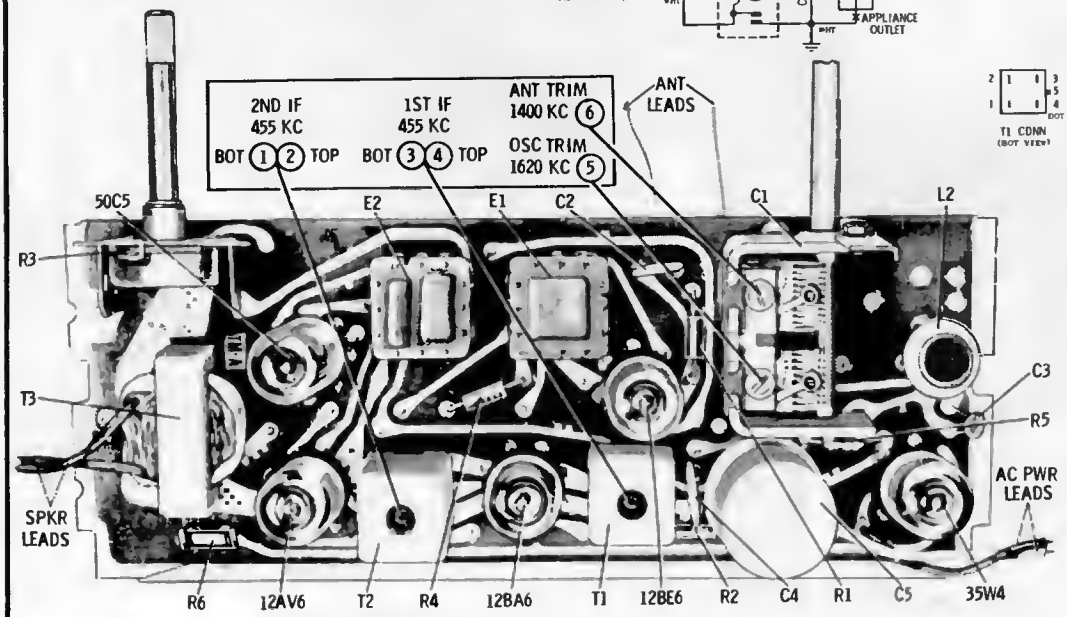
4. Repeat steps 2 & 3 until no further increase; step 3 should be last adjustment.

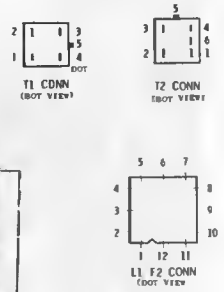
*Connect generator output across 5" diameter, 5 turn loop and couple inductively to receiver loop. Keep radiation loop at least 12" from receiver antenna.



NOTES
CAPACITORS - Decimal values in MF, all others in MMF unless otherwise specified
VOLTAGES - Measured from point indicated to B- with a VTVM ±10% No signal input.
INPUT VOLTAGE - 120V AC ONLY
TUNING RANGE - 532KC TO 1620KC
IF - 455KC
⏚ - B-
PLATED CHASSIS BOARD LEGEND
B+ AVC FILAMENT







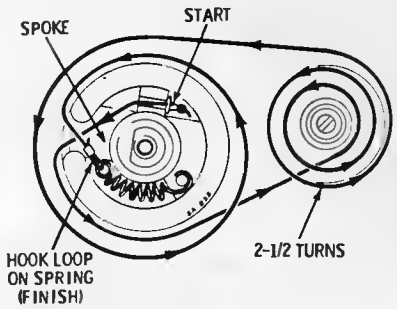
ALIGNMENT POINTS AND PARTS LOCATIONS

MOTOROLA Chassis HS-759, Models X11B, E, G, R

MODEL	CHASSIS
X11B	HS-759
X11E	HS-759
X11G	HS-759
X11R	HS-759

This material is exact for later production; some earlier sets used a different printed circuit board with different placement, and several different valued parts.

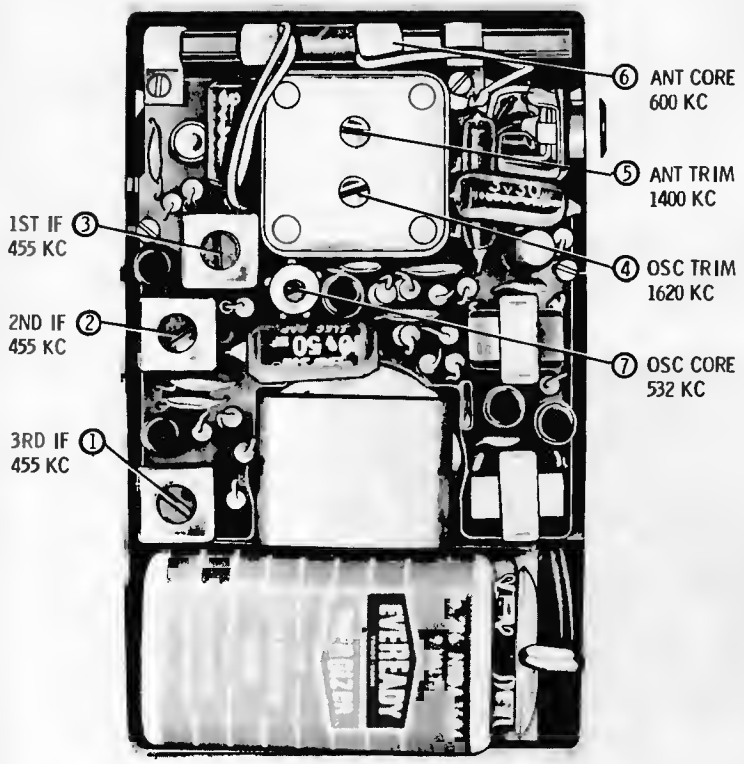
(Continued on page 97)



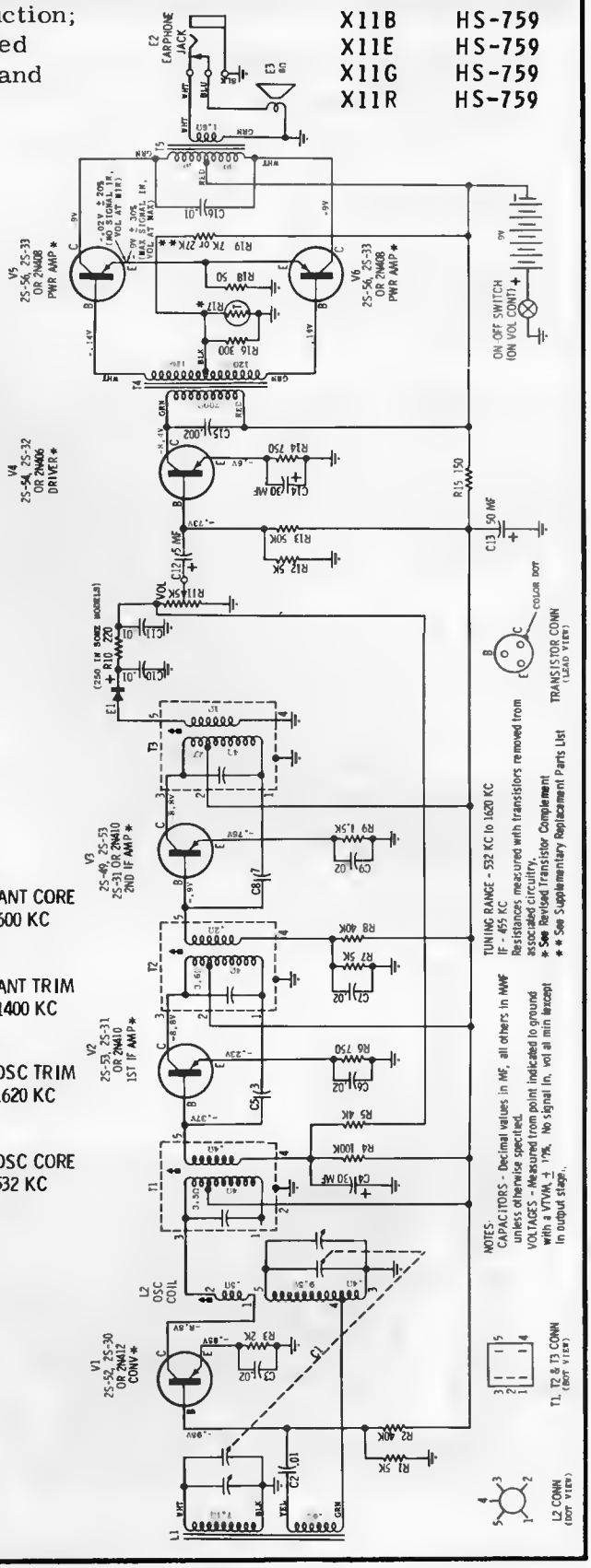
GANG SET TO LOW END (532 KC)

CHASSIS REMOVAL AND REINSTALLATION

The complete chassis is removed by opening the back and removing the two small screws securing the chassis to the cabinet. Loosening the phone jack will then complete removal from the cabinet. No unsoldering and resoldering is required. The chassis is free from the cabinet and is an operating unit that can be checked and completely repaired before reinstallation in the cabinet.



ALIGNMENT POINTS LOCATION



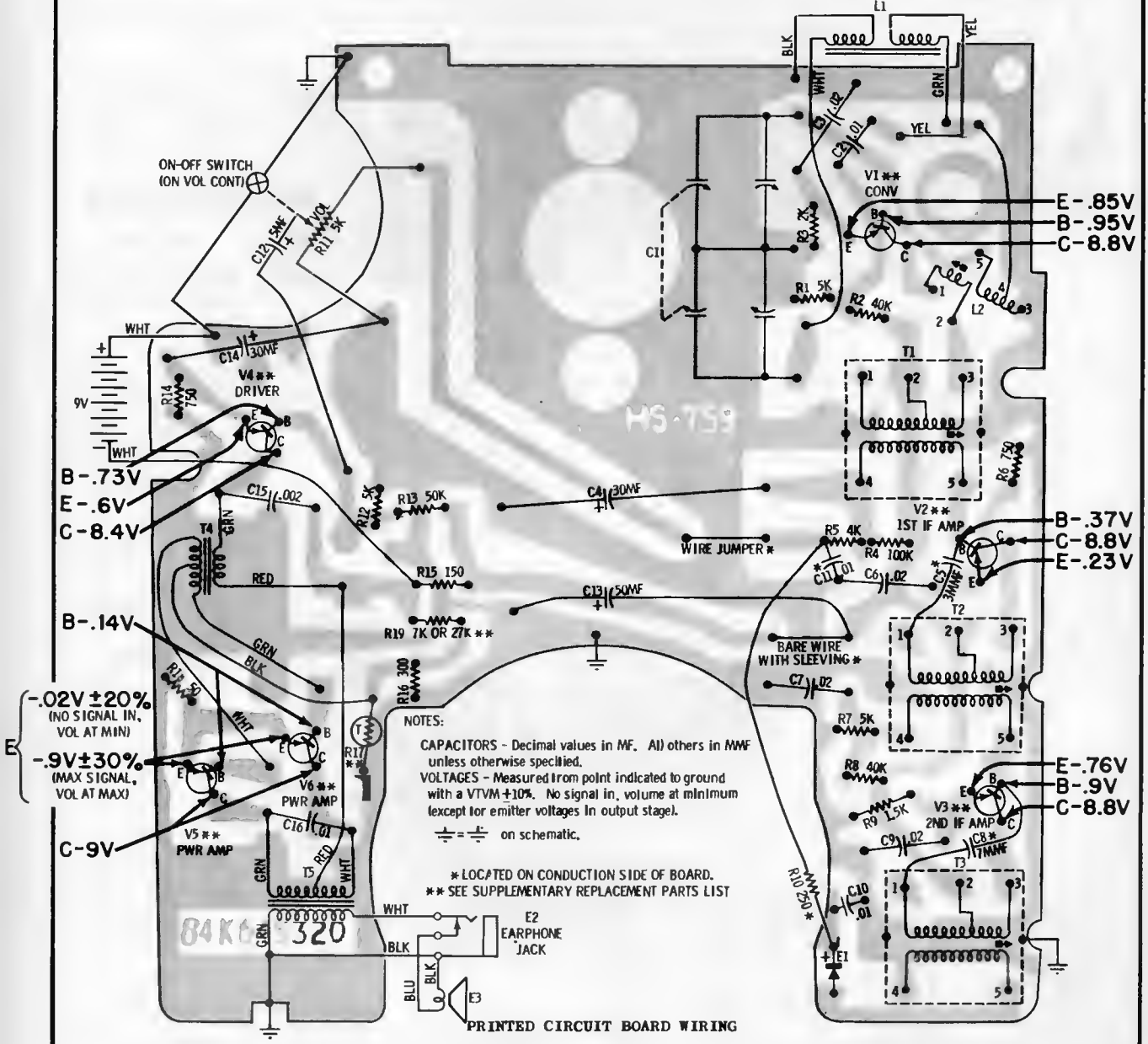
MOTOROLA Chassis HS-759, Models X11B, -E, -G, -R, Continued

SUPPLEMENTARY REPLACEMENT PARTS LIST

Ref. No.	Part Number	Description
ELECTRICAL PARTS		
C-5	*21K645601	Capacitor, cer disc: 3 mmf (some sets used 5 mmf; when replacing, use the 3 mmf listed)
R-10	6B127800	Resistor, carbon: 220 10% 1/4W (some sets used 250Ω; when replacing, use the 220Ω listed)
R-18	6K645513	Resistor, carbon: 50 10% 1/8W
R-19	8K644108	Resistor, carbon: 7000 10% 1/8W (in some sets)
	6K121300	Resistor, carbon: 27,000 10% 1/2W (in some sets)
V-1	48K844678	Transistor, type 2S-52: PNP (converter-also replaces type 2S-30 or 2N412 used in some sets)
V-2	48K644877	Transistor, type 2S-53: PNP (1st IF -also replaces type 2S-31, 2S-53 or 2N410 used in some sets)
V-3	*48K645867	Transistor, type 2S-49: PNP (2nd IF -also replaces type 2S-31, 2S-53 or 2N410 used in some sets)
V-4	48K644878	Transistor, type 2S-54: PNP (driver - also replaces type 2S-32 or 2N406 used in some sets)
V-5,8	48K644679	Transistor, type 2S-56: PNP (power amp -also replaces type 2S-33 used in some sets)
	48A124377	Transistor, type 2N408: PNP (power amp -used in some sets
MECHANICAL PARTS		
	*84K845320	Board, printed circuit: less all components

Note: When ordering, specify part number found on original board, and mention model number of this set. If part number is different from that found in this parts list, order by complete part number found on board and mention model number of this set.

Some early sets used a different printed circuit board and a few different valued parts, and other differences in location.



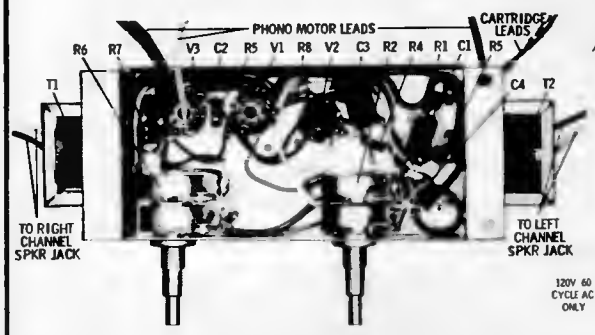
PRINTED CIRCUIT BOARD WIRING

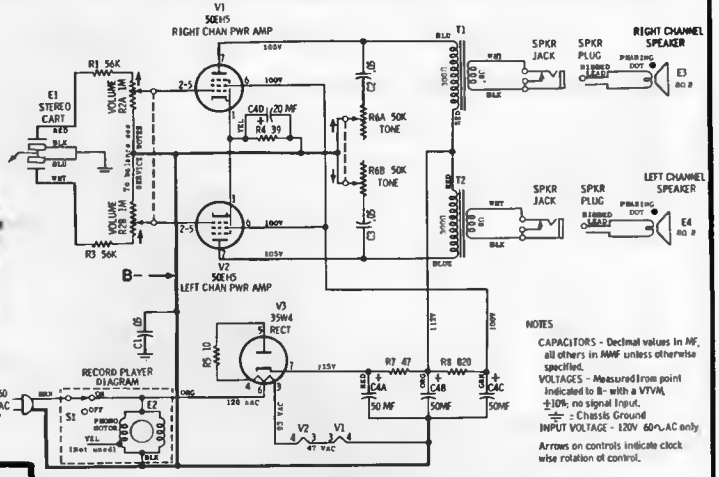
(Shown from conduction side of printed circuit board. Components shown appear on opposite side. To further aid servicing, the base, emitter, and collector voltages are included.)

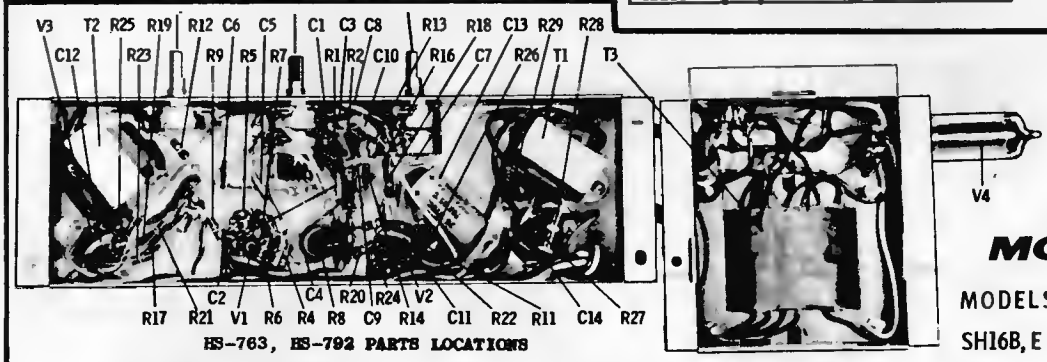
MOTOROLA

MODEL SF14SL

CHASSIS HS-761





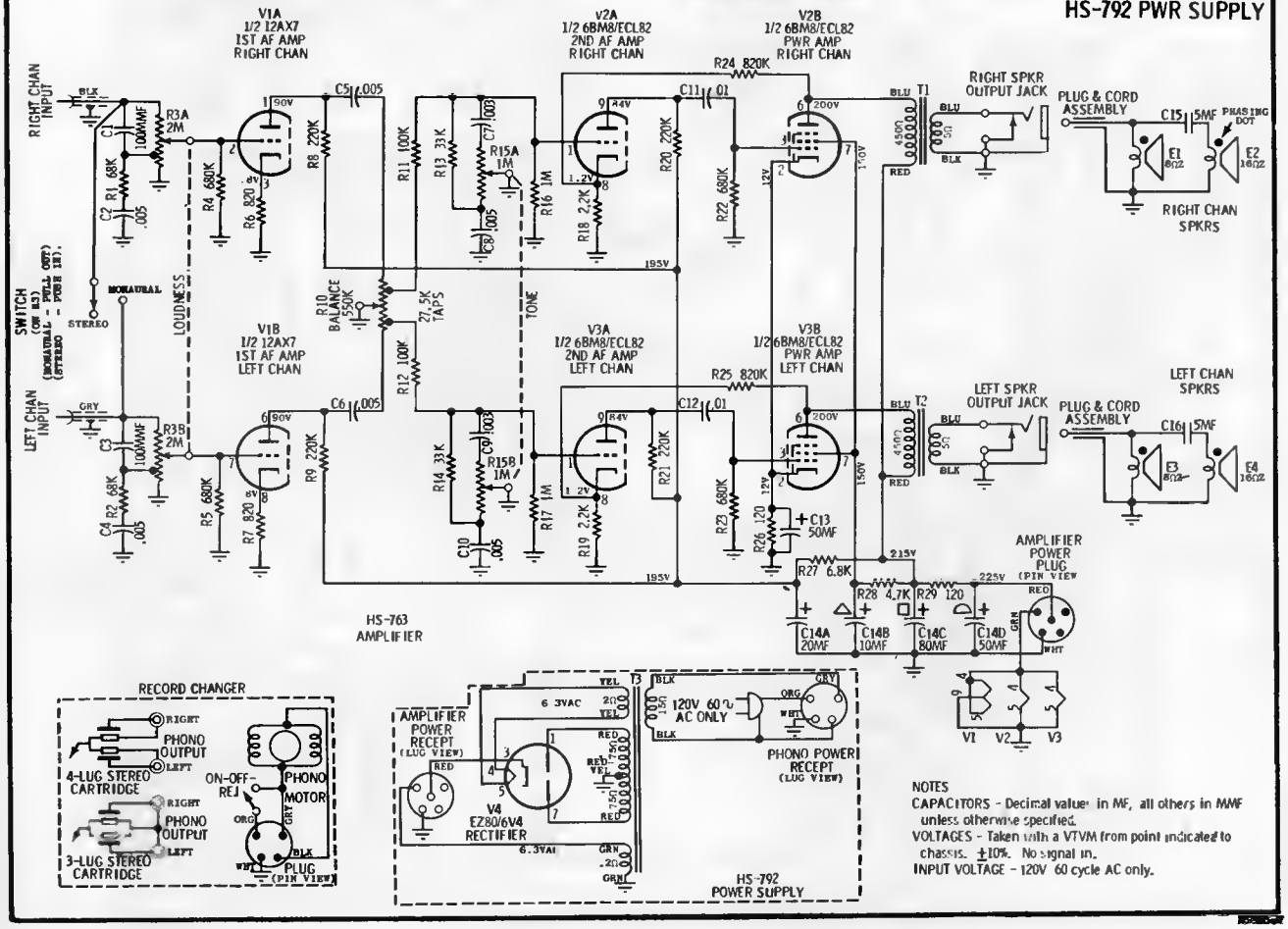


HS-763, HS-792 PARTS LOCATIONS

MOTOROLA

MODELS SH16B, E

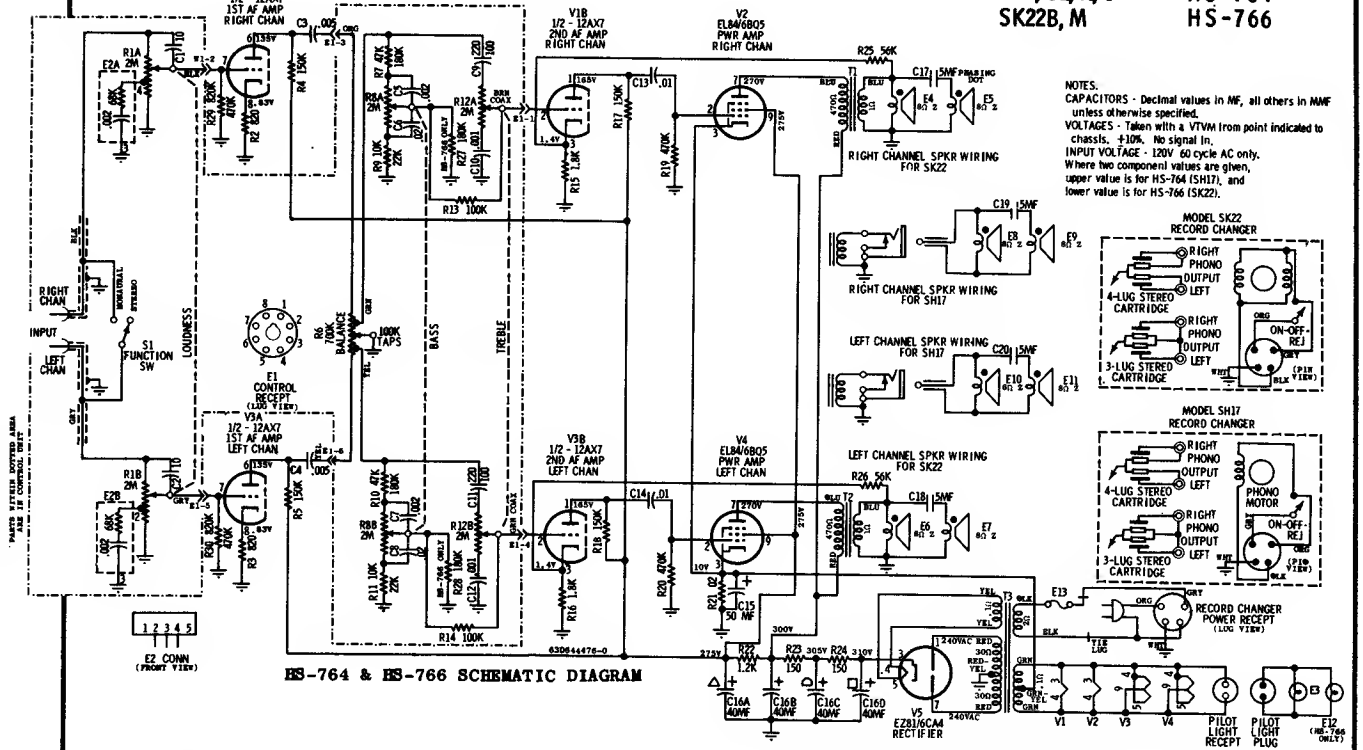
CHASSIS HS-763 AUDIO AMP, HS-792 PWR SUPPLY



NOTES
CAPACITORS - Decimal values in MF, all others in MMF unless otherwise specified.
VOLTAGES - Taken with a VTVM from point indicated to chassis. ±10%. No signal in.
INPUT VOLTAGE - 120V 60 cycle AC only.

MOTOROLA

MODELS	CHASSIS
SH17E, GL, N, S	HS-764
SK22B, M	HS-766



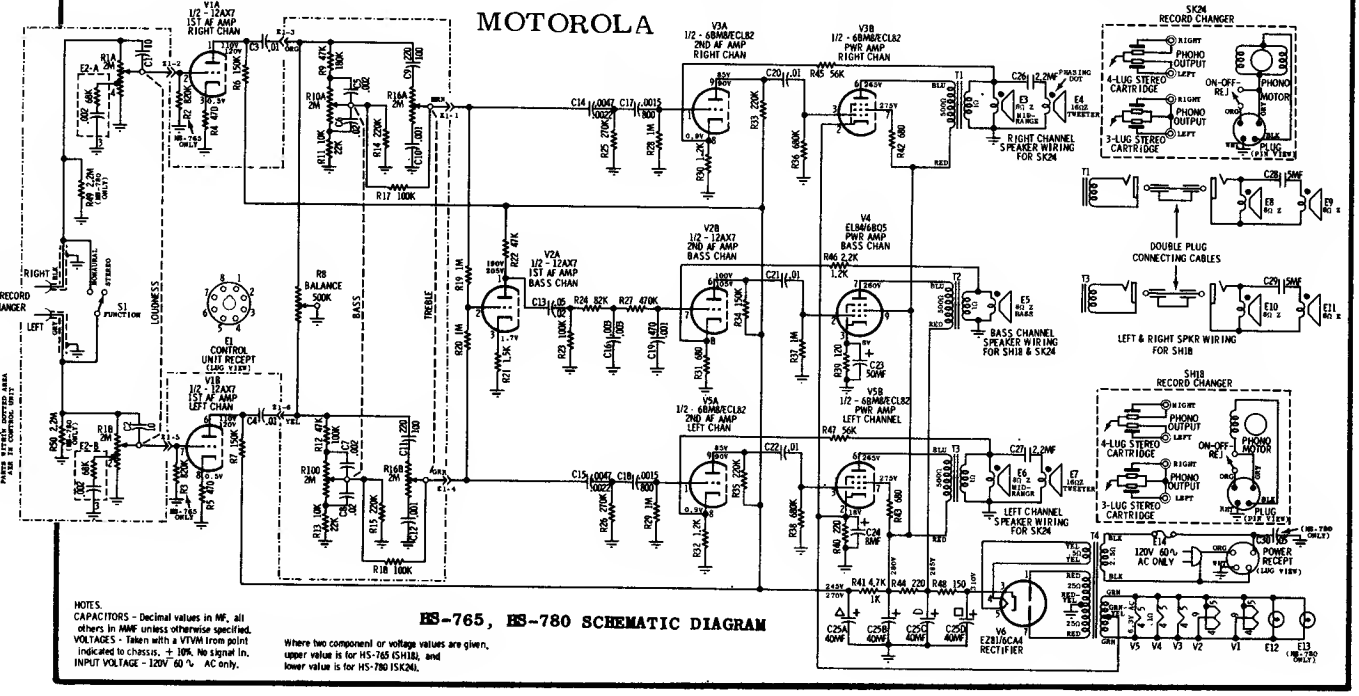
HS-764 & HS-766 SCHEMATIC DIAGRAM

CHASSIS REMOVAL (MODEL SH17)

1. Remove the screws that mount the control panel housing from side of cabinet and the record changer mounting board.
2. Lift up control panel housing so that control plug (plugged into chassis) is accessible; unplug control plug from receptacle and place control panel housing on record changer mounting board (so that it is out of the way).
3. Lift up record changer mounting board so that phono power receptacle is accessible; unplug phono power plug from receptacle.
4. Unplug pilot light plug connected to chassis.
5. Remove nuts that mount left and right channel speaker output jacks.
6. Remove 6 chassis mounting nuts and remove chassis from cabinet.

Chassis HS-765, Models SH18GL, N; Chassis HS-780, Models SK24B, M, W

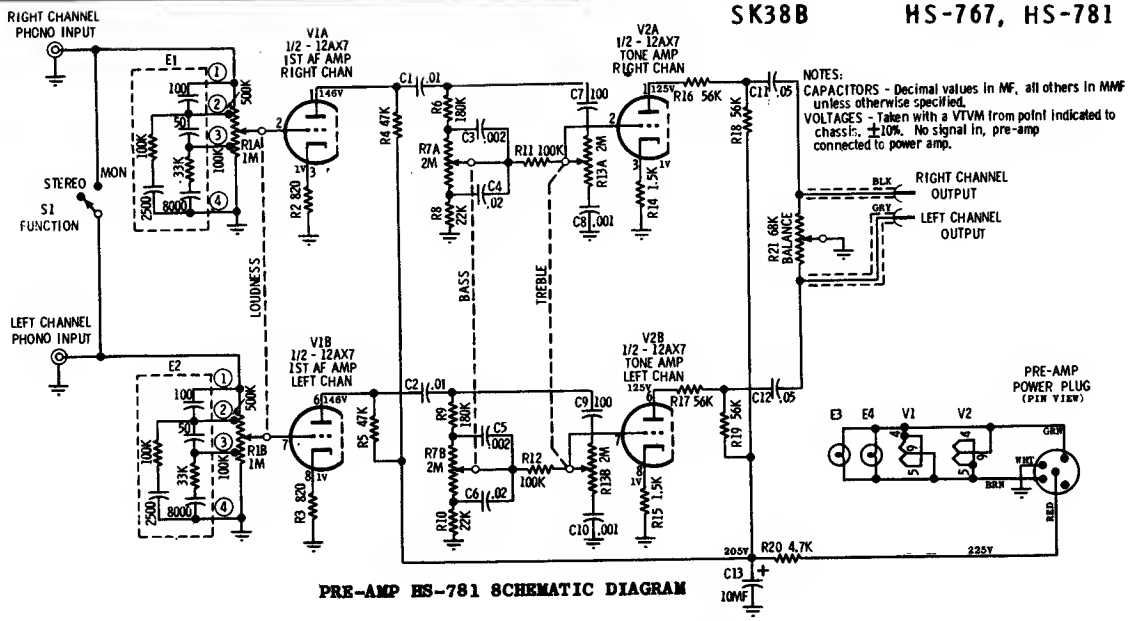
MOTOROLA



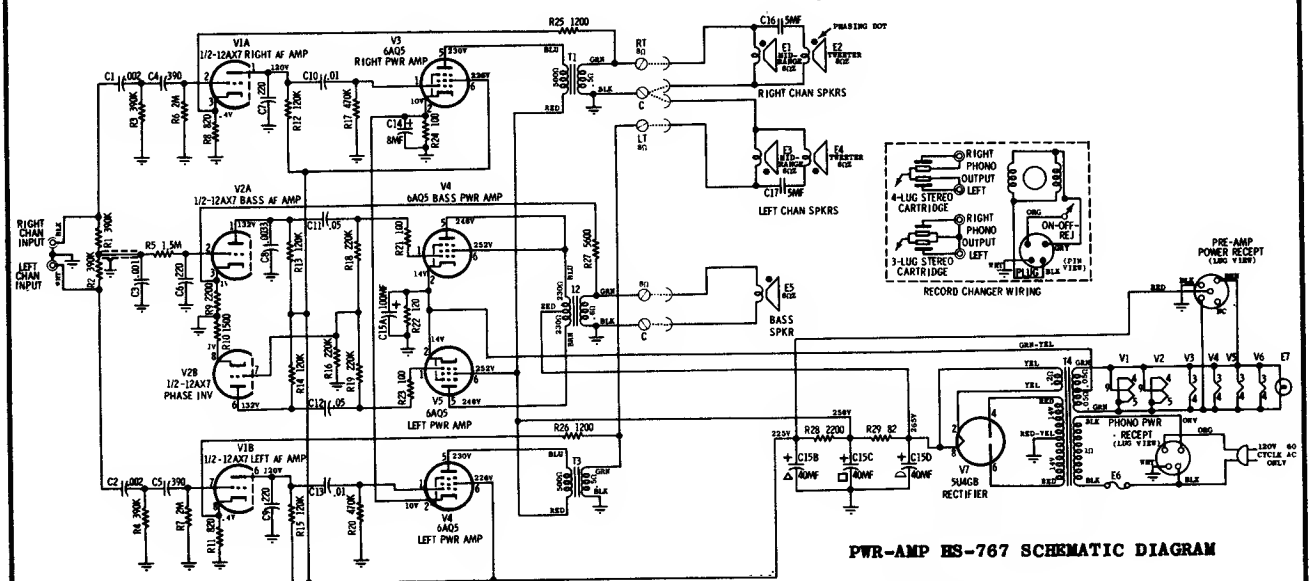
HS-765, HS-780 SCHEMATIC DIAGRAM

MOTOROLA

MODELS	CHASSIS
SK36M	HS-767, HS-781
SK37CW	HS-767, HS-781
SK38B	HS-767, HS-781



PRE-AMP HS-781 SCHEMATIC DIAGRAM



PWR-AMP HS-767 SCHEMATIC DIAGRAM

TYPE - Console, three channel stereophonic phonographs containing four-speed record changers and multiple speaker systems. The models differ from each other primarily in cabinet design.

PRE-AMP CHASSIS REMOVAL

1. Remove control knobs, cabinet back cover and sounding board located inside cabinet at base of record changer; board is held in place by 4 machine screws.

2. Disconnect all pre-amp connecting leads and remove pre-amp; pre-amp is held in place by 2 hex nuts.

POWER AMP CHASSIS REMOVAL

Remove cabinet back cover, disconnect all power amp chassis connecting leads, remove 6 power amp mounting machine screws and remove power amp chassis.

RECORD CHANGER REMOVAL

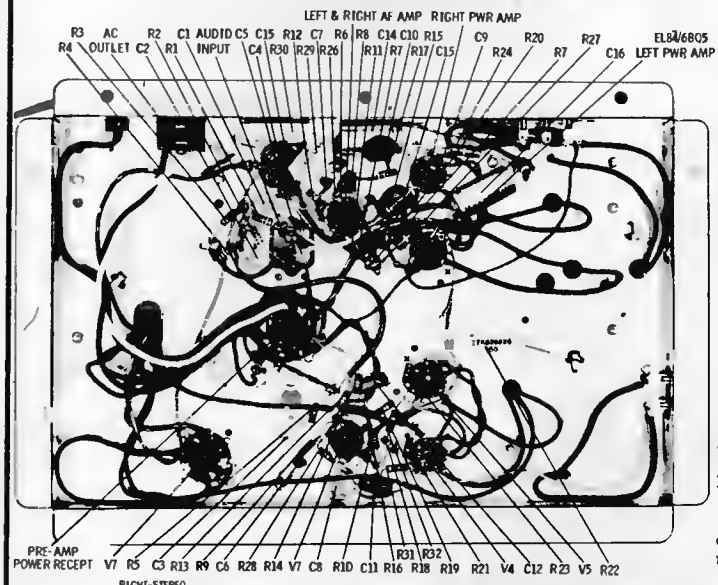
1. Turn the 2 changer mounting screws clockwise down flush with the changer base.
2. Remove cabinet back cover, then disconnect all cables to record changer.
3. Turn the mounting clips, located at the ends of the mounting screws so they are parallel with the mounting screws, then lift changer out of cabinet.

SPEAKER PHASING

THE SPEAKERS MUST BE IN PHASE OR A LOSS OF MID-RANGE FREQUENCIES WILL RESULT. Phasing can be checked by momentarily connecting a 1-1/2 volt flashlight battery in parallel with the speaker connecting leads (temporarily short across capacitors in cross-over networks) and noting if all speaker cones move in the same direction (with the same polarity reference voltage applied to all three speaker systems). If they do not, reverse the connections of the speaker whose cone is out of phase.

MOTOROLA

MODELS	CHASSIS
SK28B, M, W	HS-768, HS-774
SK29B, M, W	HS-793, HS-769
SK30B, M, MC, W	HS-768, HS-774
SK31B, CW, M	HS-768, HS-774



PRE-AMP CHASSIS REMOVAL (Models SK28, SK30, SK31)

1. Remove control knobs, cabinet back cover and sounding board (on SK31 it is not necessary to remove board) located inside cabinet at base of record changer; board is held in place by 4 machine screws.

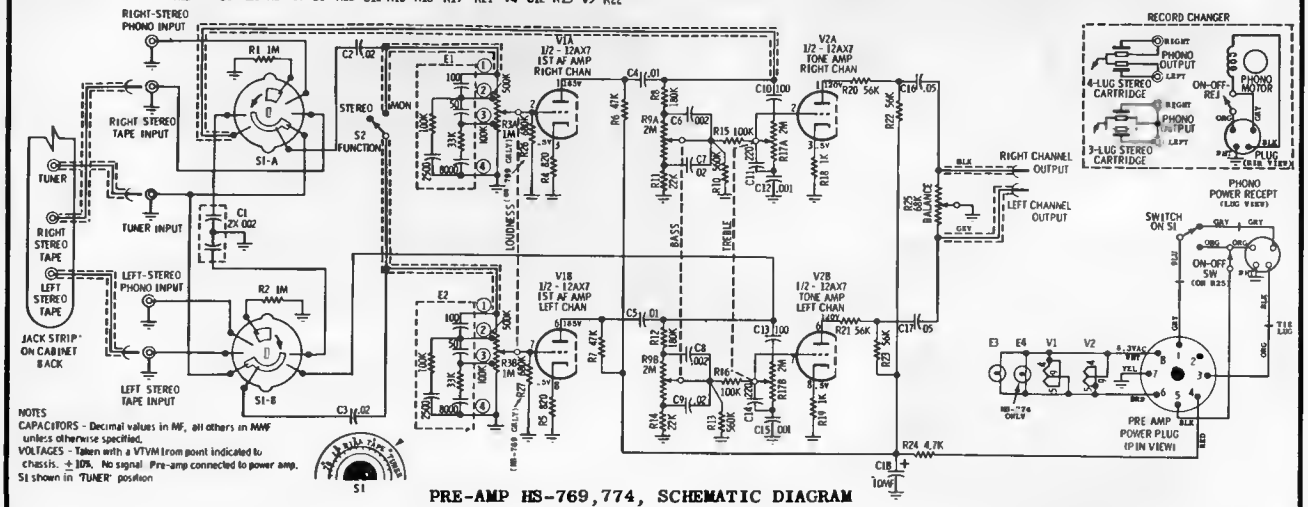
2. Disconnect all pre-amp connecting leads and remove pre-amp; pre-amp is held in place by 2 hex nuts.

PRE-AMP CHASSIS REMOVAL (Model SK29)

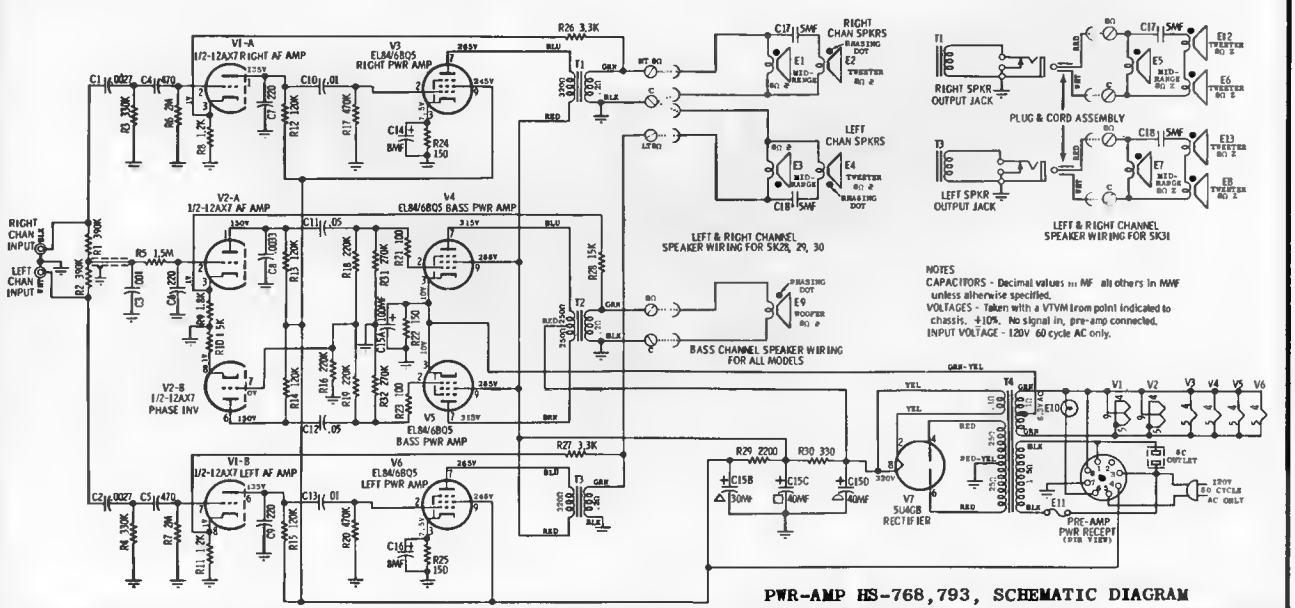
1. Remove control knobs and cabinet back cover.
2. Disconnect all pre-amp connecting leads to power amp, record changer and pilot lights; open front cabinet doors and remove pre-amp panel (located at upper left-hand corner of cabinet -panel is held in place by 6 screws); unplug remaining pre-amp connecting leads and remove pre-amp after removing the 2 hex mounting nuts.

POWER AMP CHASSIS REMOVAL (All Models)

Remove cabinet back cover, disconnect all power amp chassis connecting leads, remove 6 power amp mounting machine screws and remove power amp chassis



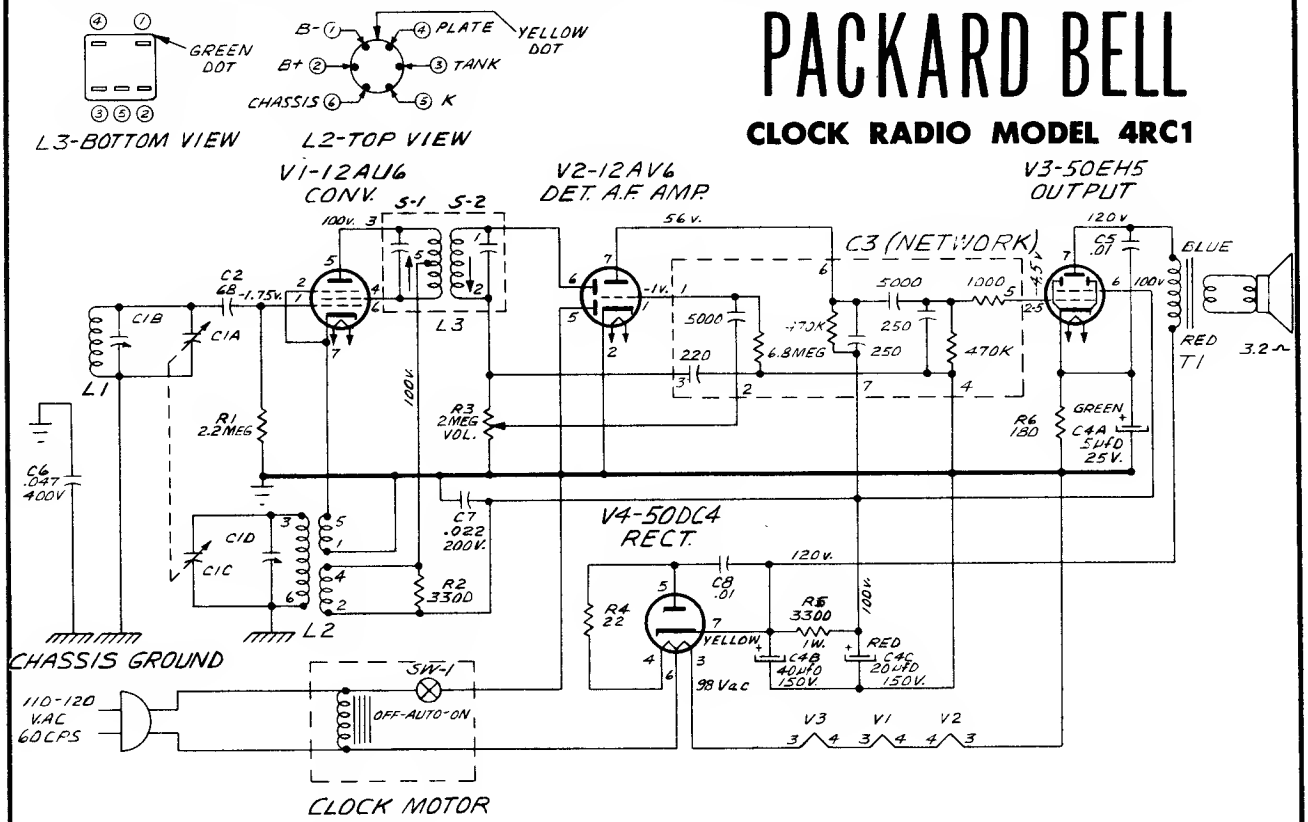
PRE-AMP HS-769,774, SCHEMATIC DIAGRAM



PWR-AMP HS-768,793, SCHEMATIC DIAGRAM

PACKARD BELL

CLOCK RADIO MODEL 4RC1



OSCILLATOR RF VOLTAGES:

Measured with an RF voltmeter between cathode (pin 7) of V-1 (12AU6) and B— bus. Line voltage 117 v AC.

1500 kc: 2.0 volts
1000 kc: 1.8 volts
750 kc: 1.6 volts
540 kc: 1.5 volts

ALIGNMENT PROCEDURE:

Follow the steps in the chart below. Connect output meter to speaker voice coil. Use isolation transformer between radio and power line to reduce shock hazard.

Each adjustment should be made using a minimum signal. Connect test oscillator through a .01 mfd capacitor to the point indicated below. Ground lead of oscillator is connected to B minus bus.

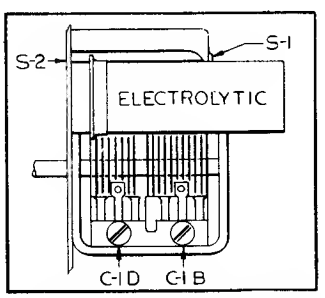
When chassis is removed from cabinet for alignment, leave back attached to chassis in its permanent position.

ELECTRICAL RATINGS:

Line voltage 110-120 volts, 60 cycles
Power consumption 31 watts

TUNING FREQUENCY RANGE:

540 kc to 1620 kc



Insert Showing Adjustments

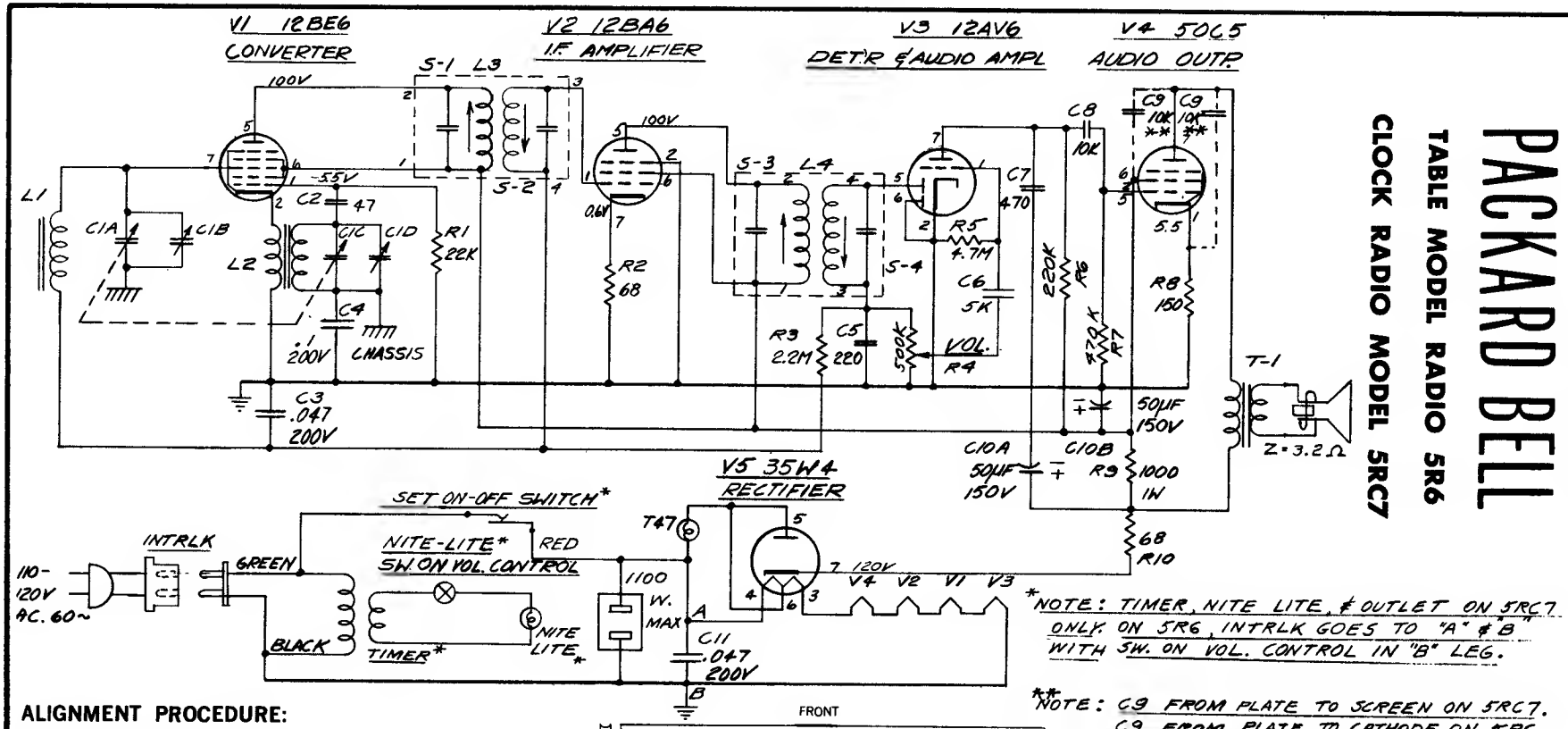
Step	Connect Test Oscillator to	Test Oscillator Frequency	Radio Dial Setting	Adjust
1.	Pin 1, V-1 12AU6	455 kc	540 kc	S-1 & S-2 for MAXIMUM
2.	Loose-couple to antenna	1620 kc	1620 kc	C1-D for MAXIMUM*
3.	ditto	1500 kc	Tune to oscillator	C1-B for MAXIMUM

*Before adjusting C-1D, screw C-1B tightly closed.

PACKARD BELL

TABLE MODEL RADIO 5R6

CLOCK RADIO MODEL 5RC7



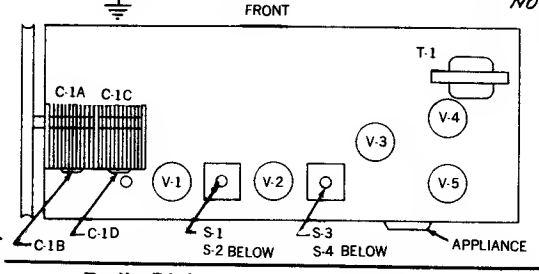
*NOTE: TIMER, NITE LITE, & OUTLET ON 5RC7 ONLY. ON 5R6, INTRLK GOES TO "A" & "B" WITH SW. ON VOL. CONTROL IN "B" LEG.

**NOTE: C9 FROM PLATE TO SCREEN ON 5RC7. C9 FROM PLATE TO CATHODE ON 5R6.

ALIGNMENT PROCEDURE:

The alignment of the set is accomplished by following the steps in the chart below. Connect output meter to speaker voice coil. Use isolation transformer between radio and power line to reduce shock hazard.

Each adjustment should be made using a minimum input signal. Connect test oscillator through a .01 mfd capacitor to the point indicated below. Ground lead of oscillator is connected to B minus bus.

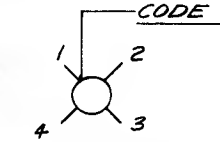


Step	Connect Test Oscillator to	Test Oscillator Frequency	Radio Dial Setting	Adjust
1.	Pin 7, V-1 (12BE6)	455 kc	1620 kc	S-1, S-2, S-3, & S-4 for MAXIMUM
2.	Loose-couple to antenna	1620 kc	1620 kc	C1-D for MAXIMUM
3.	ditto	1500 kc	Tune to oscillator	C1-B for MAXIMUM

DC RESISTANCE MEASUREMENTS:

1st I-F Coil (29077):
Primary, 12 ohms
Secondary, 13 ohms

2nd I-F Coil (29078)
Primary, 13 ohms
Secondary, 13 ohms



OSCILLATOR COIL BOTTOM VIEW

Oscillator Coil (29229B)
Primary, 1 ohm
Secondary, 5.5 ohms

PHILCO TRANSISTOR RADIO

MODEL T-45 — CODE 124

PANEL (CHASSIS) REMOVAL

1. Remove the following—Tuning and volume control knobs, cabinet back, batteries, two tri-mount fasteners at speaker end of panel, battery contact and retaining board, and the private listening jack from its cabinet mounting position.
2. Open the ground connection from the on-off switch to the speaker.
3. Remove the panel from the cabinet by first lifting up on the speaker end of the panel.

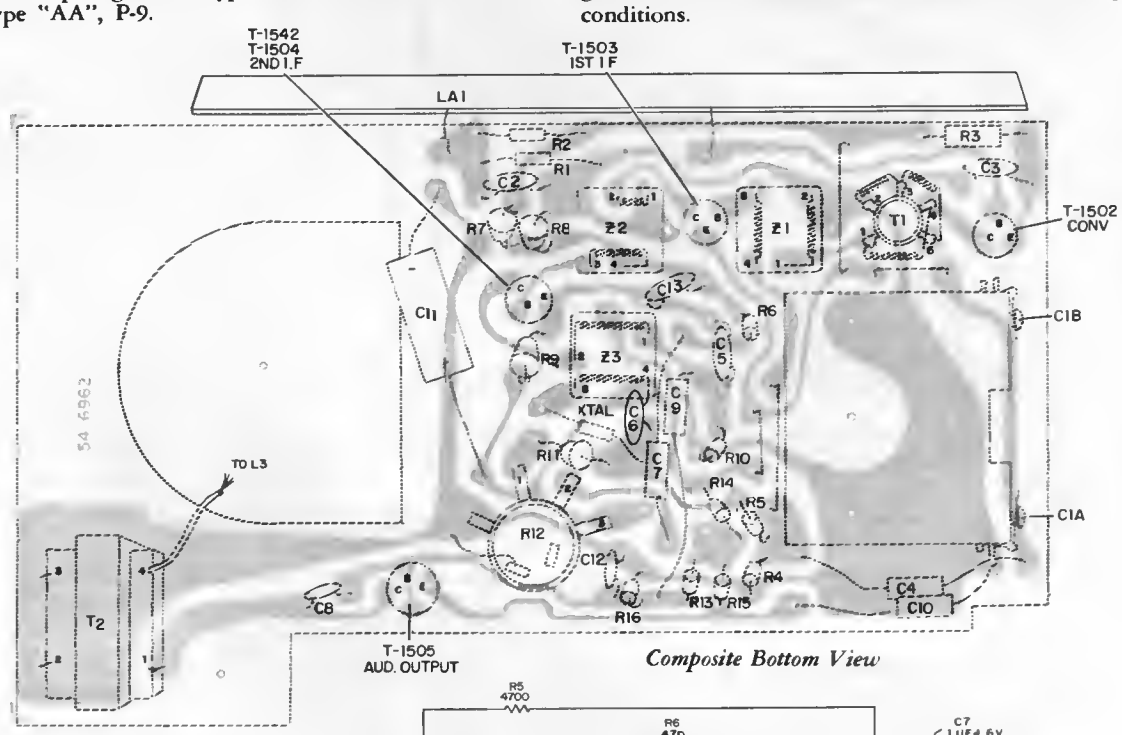
BATTERY VOLTAGE AND TYPE—6.0 volts from 4 penlight cells, type "AA", P-15, or mercury type "AA", P-9.

SCHEMATIC NOTES

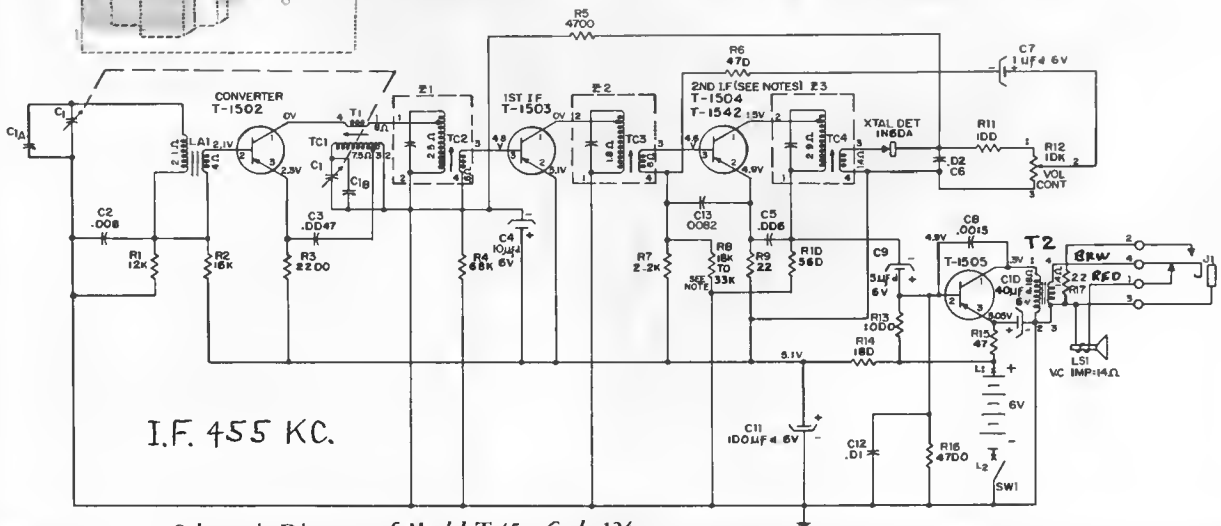
CAUTION—Due to 2nd I-F transistor variations, the value of resistor R8 must be selected, within limits for optimum performance. When transistor T-1504 (or T-1542) is defective and must be replaced, resistor R8 must also be changed unless the original provides the proper resistor operating characteristics. Failure to select the proper resistor can shorten the life of the transistor or seriously affect receiver operation.

The value of R8 is selected to allow the 2nd I-F transistor collector to draw 2 milliamps and will be between 18,000 to 33,000 ohms. This is checked by measuring the voltage across R10, the 560-ohm collector return resistor. This voltage should be 1.12 volts, with a 10% tolerance (±.12 volt).

All resistors are ½ watt, 10%, carbon, except R8 which is 5%. Coil resistances read with coil in circuit. Voice coil impedance = 14 ohms. Voltages measured to ground with a 20,000 ohms/volt meter under no signal conditions.

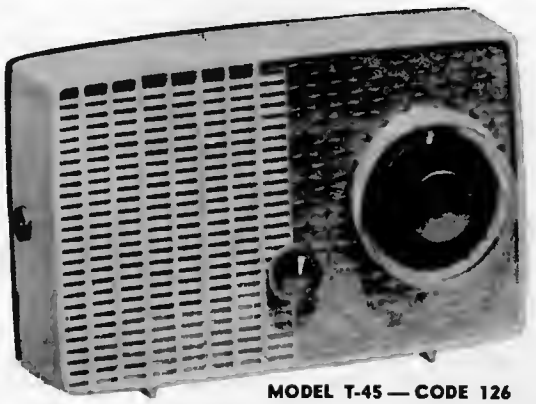


Composite Bottom View



Schematic Diagram of Model T-45—Code 124

PHILCO TRANSISTOR RADIO MODEL T-45 — CODE 126



MODEL T-45 — CODE 126

SERVICE NOTES

When signal tracing, inject signal at transistor collector and limit input to keep signal across speaker below 0.275 volts. Normally, the transistors should be the last item suspected.

SCHEMATIC NOTES

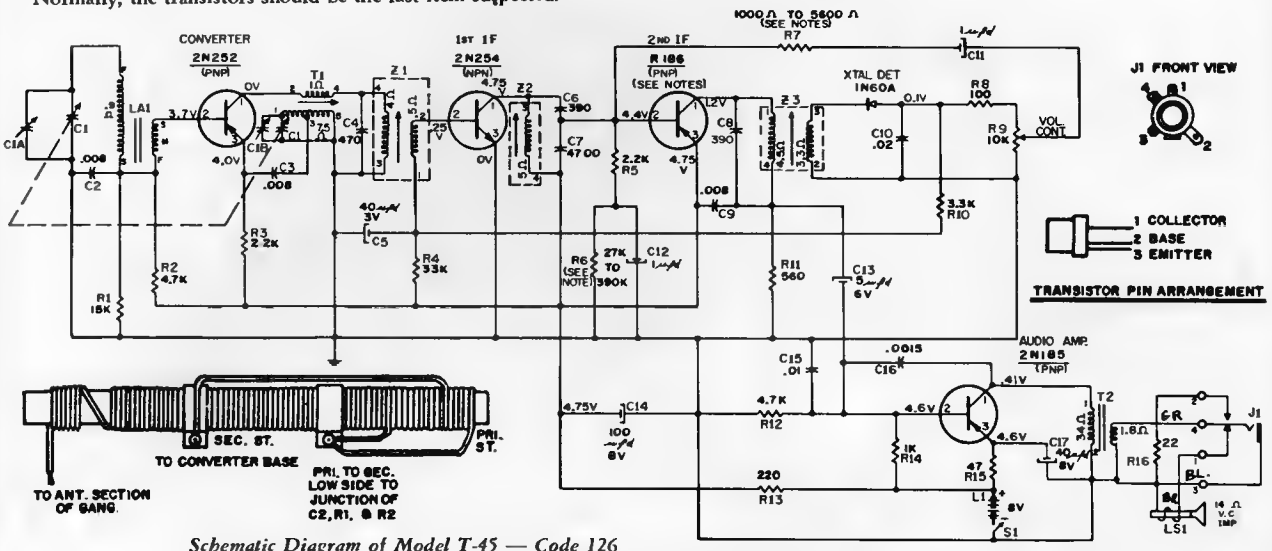
Due to 2nd IF transistor variations the values of resistors R6 and R7 must be selected, within limits, for optimum performance.

When transistor R186 is defective, kit number 324-8003 must be ordered. This kit contains a R186 transistor and two resistors (R6 and R7) properly matched. All three components must be replaced.

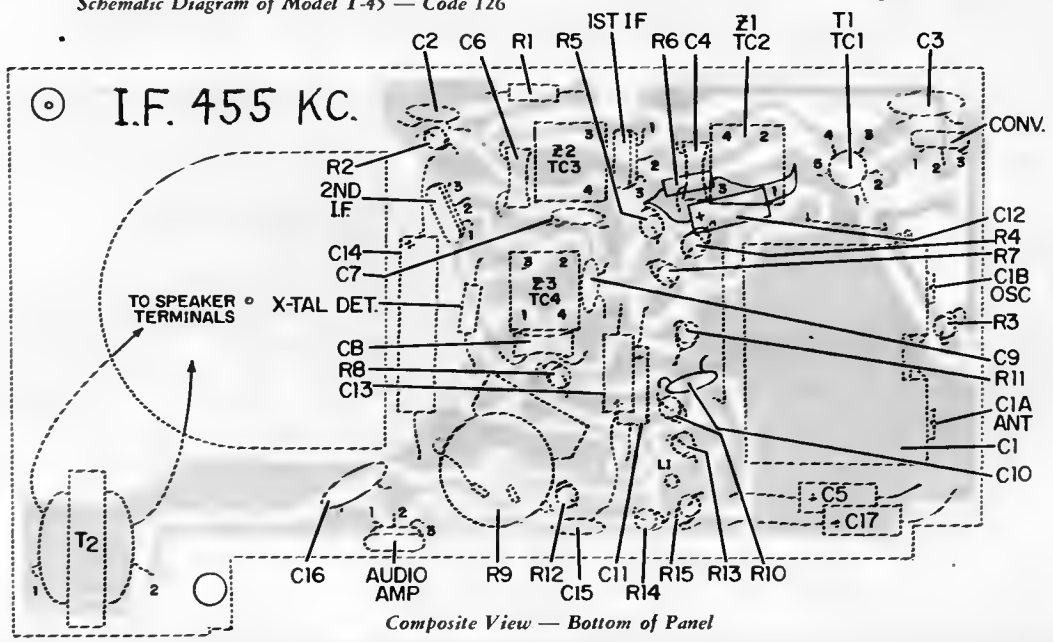
The stage may be checked as follows:

The value of R6 is selected to allow the 2nd IF transistor collector to draw 2 milliamps. This is checked by measuring the voltage across R11, the 560 ohm collector return resistor. This voltage should be 1.12 volts, with a tolerance of approximately ±.12 volts. The value of R6 falls within the limits of 27K to 390K.

All resistors are ½ watt, 10%, carbon.
Coil resistances read with coil in circuit.
Voice coil impendance = 14 ohms.
Voltages measured to ground with a 20,000 ohms/volt meter under no signal condition.



Schematic Diagram of Model T-45 — Code 126



Composite View — Bottom of Panel

PHILCO TRANSISTOR - CLOCK RADIO

MODEL TC-47

PANEL (CHASSIS) REMOVAL

1. Remove the following—Tuning and volume control knobs, batteries, two tri-mount fasteners at speaker end of panel, battery contact and retaining board.
2. Open the positive battery terminal lead from L1 tie lug on panel. Open the speaker connections.
3. Remove the panel from the cabinet by first lifting up on the speaker end of the panel.

SERVICE NOTES

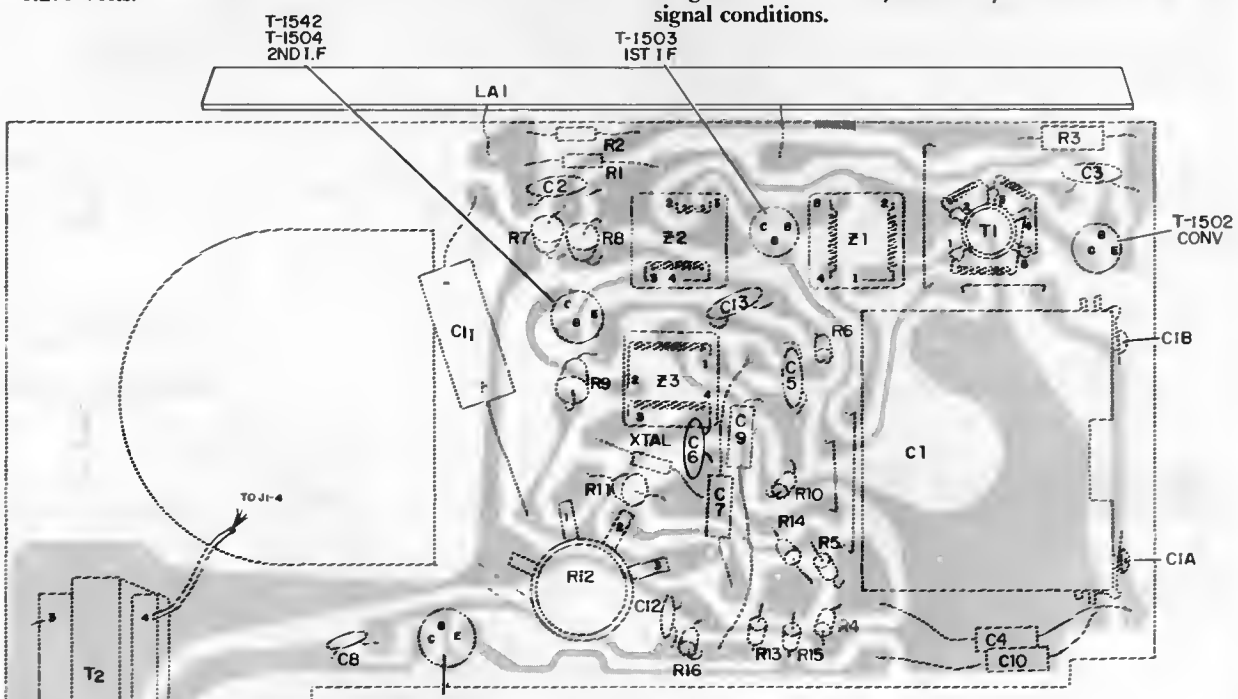
When signal tracing, inject signal at transistor collector and limit input to keep signal across speaker below 0.275 volts.

SCHEMATIC NOTES

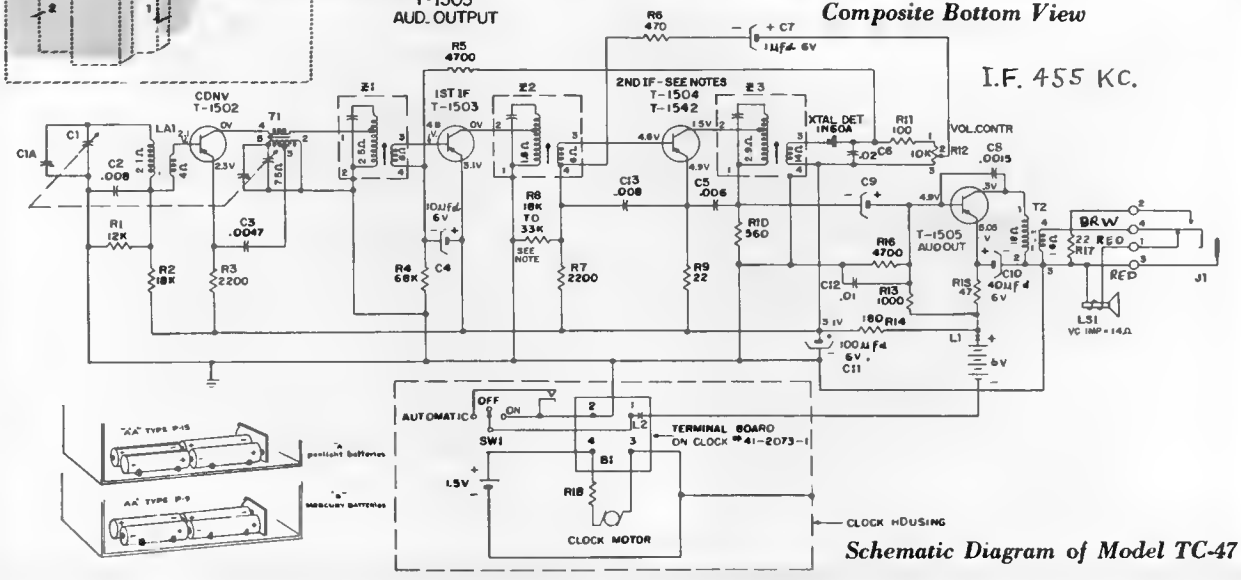
CAUTION—Due to 2nd I-F transistor variations, the value of resistor R8 must be selected, within limits for optimum performance. When transistor T-1504 (or T-1542) is defective and must be replaced, resistor R8 must also be changed unless the original provides the proper resistor operating characteristics.

The value of R8 is selected to allow the 2nd I-F transistor collector to draw 2 milliamps and will be between 18,000 to 33,000 ohms. This is checked by measuring the voltage across R10, the 560-ohm collector return resistor. This voltage should be 1.12 volts, with a 10% tolerance (± .12 volt).

All resistors are ½ watt, 10%, carbon, except R8 which is 5%. Coil resistances read with coil in circuit. Voice coil impedance = 14 ohms. Voltages measured to ground with a 20,000 ohms/volt meter under no signal conditions.

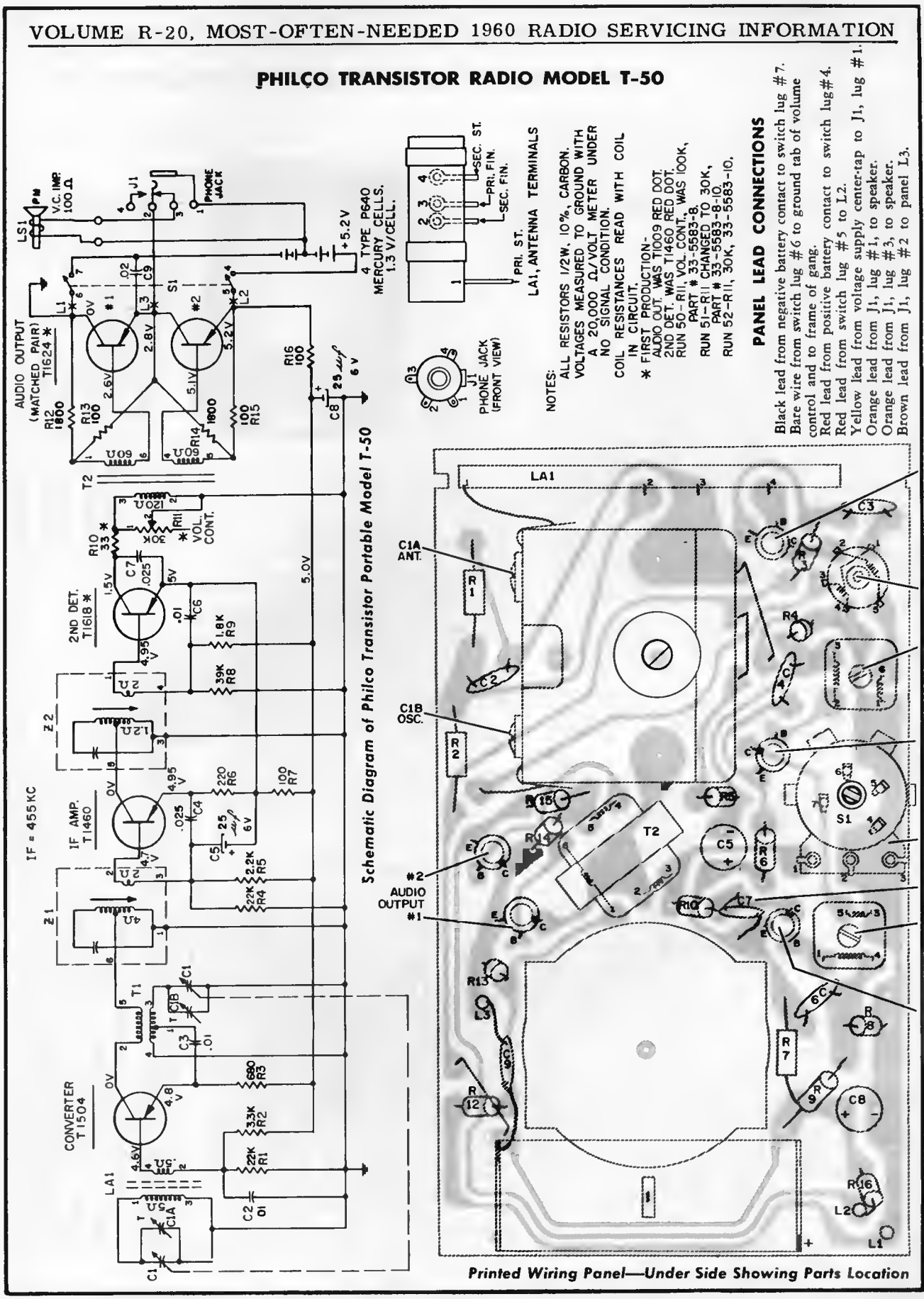


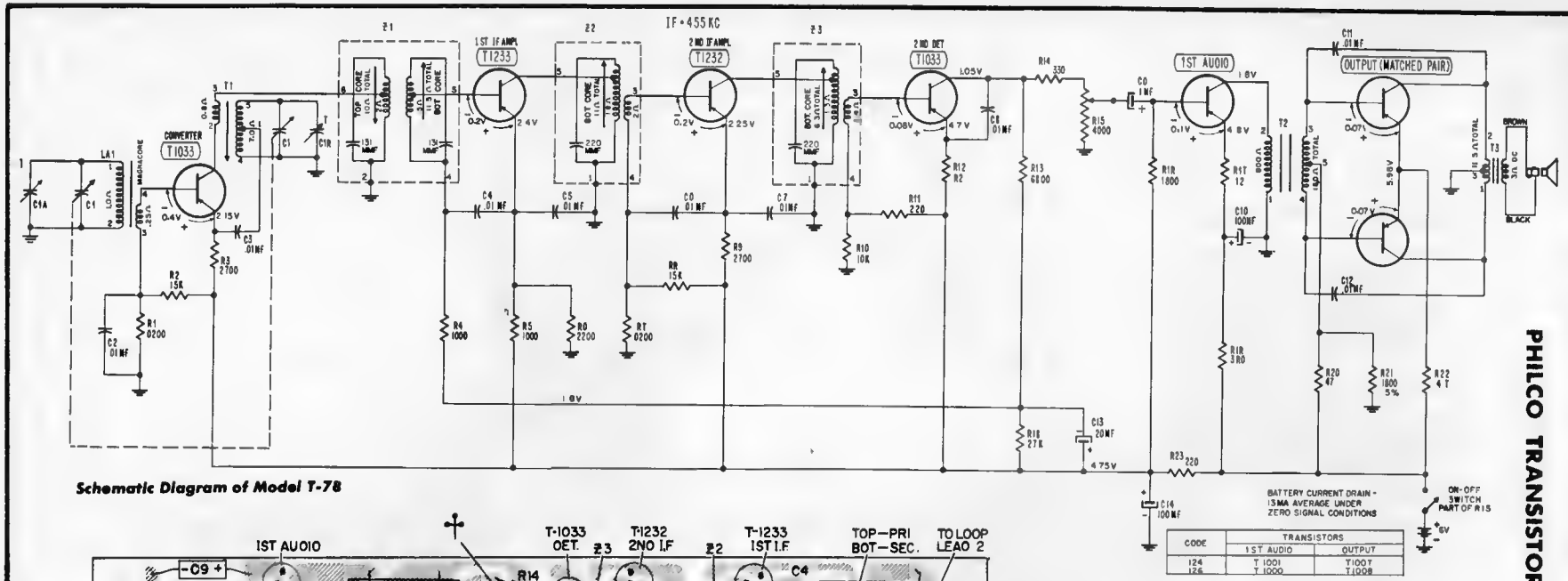
Composite Bottom View



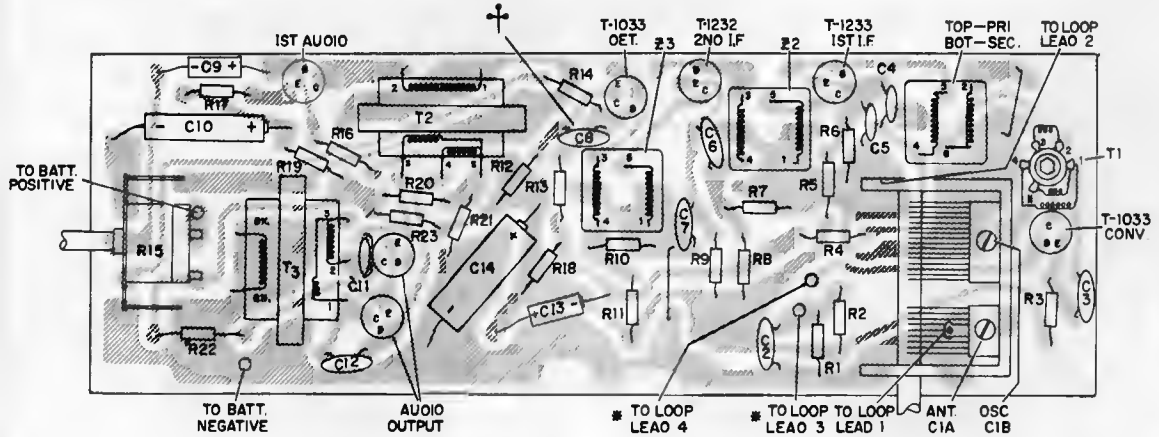
Schematic Diagram of Model TC-47

PHILCO TRANSISTOR RADIO MODEL T-50





Schematic Diagram of Model T-78



Top View, PW Panel

✳ LOOP LEADS 3 & 4—DRESS BETWEEN EDGE OF PRINTED PANEL AND MASONITE FRONT PLATE. CONNECT TO TIE LUGS INDICATED ON FOIL SIDE OF PANEL.

The dress (position) of condenser C8 may be helpful in reducing harmonic whistle when encountered. C8 may be bent over toward R14 and the detector transistor. In sets where C8 is in this bent position, do not disturb.

SERVICE NOTES

When signal tracing, inject signal at transistor collector and limit input to keep signal across speaker below 0.4 volts.

Normally, the transistors should be the last item suspected.

PHILCO AM/FM TUNER—MODEL RT-300

(Continued on page 110, over)

This tuner is equipped with a front panel and mounting board and is intended for quick installation in the space provided in the "H" line Philco Hi-Fidelity Phonographs.

AM ALIGNMENT PROCEDURE

The AM alignment should be completed before the FM alignment is performed. Before beginning the alignment, allow the receiver and test equipment to warm up for fifteen minutes.

Dial Pointer—With the gang fully closed, adjust the pointer to coincide with the first small index mark to the left of the "54' (540 kc) on the scale.

Tuner Controls—Set the function switch to the AM position and the AM tuning control as indicated.

Output Indicator—Connect a scope to output jack, J1.

Signal Generator—Use an AM r-f signal generator with 30% modulation.

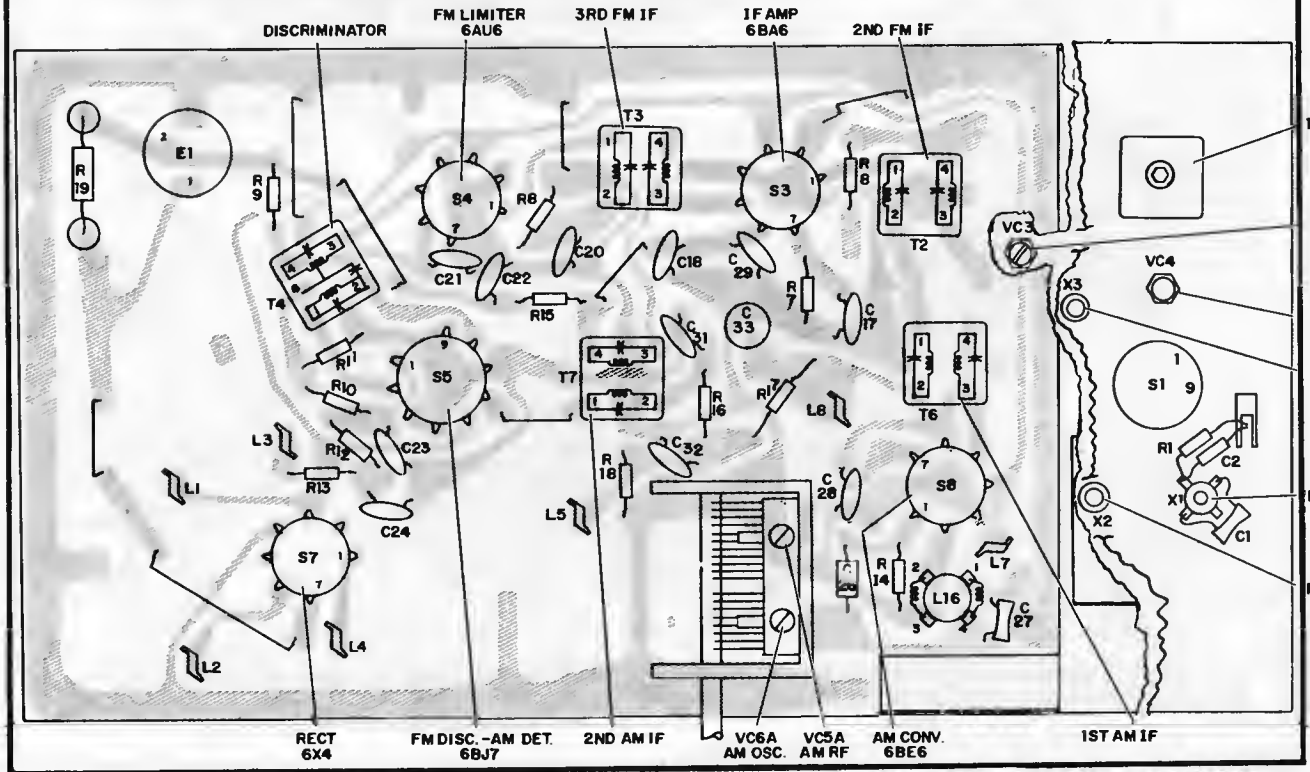
1. Connect generator, through a .05 μfd condenser, to the signal grid, pin 7 of the AM converter, S6 (6BE6). Connect the ground lead to chassis.
2. Set generator to 455 kc. Fully open tuning gang. Adjust, in order given, top of T7, bottom of T6, bottom of T7, and top of T6 for maximum output. Repeat until no furtber gain is indicated.
3. Connect generator to radiating loop. Set generator to 1600 kc. Set receiver to 1600 kc as indicated by pointer. Adjust VC6A (osc. trimmer) for maximum output.
4. Set generator to 1400 kc. Tune receiver to signal and adjust VC5A (antenna trimmer) for maximum output.

FM ALIGNMENT PROCEDURE

The AM alignment should be completed before the FM alignment is performed.

1. With the gang fully closed, adjust the pointer to coincide with the first small index mark to the left of the "88" (88 mc) on tbe scale.
2. Set the function switch to the FM position and tbe FM tuning control as indicated.
3. Connect an oscilloscope, through a 100,000 ohm isolating resistor, to junction of R8 and C20. Connect the oscilloscope ground lead to the chassis.
4. Connect the signal generator to the cathode of the FM, RF amplifier, pin 8 of S1. Connect the ground lead to the chassis.
5. Inject a 10.7 MC marker signal and a 10.7 MC sweep signal, approximately 150 KC total deviation (do not over sweep). Adjust cores in top and bottom of T3, T2 and T1 for maximum-amplitude, symmetrical curve with the 10.7 MC marker at the top of the curve. Adjust input signal to maintain output, as indicated on scope, below 2 volts peak during alignment. Repeat this step until no further gain is obtained.
6. Change scope connections to the output connector J1. Inject a 10.7 MC, 30% AM modulated signal to the grid of the 6AU6, pin 1 of S4. Adjust top of T4 for minimum indication between peaks. Inject 10.7 MC sweep signal, approximately 150 KC total deviation, to pin 1 of S4 and adjust bottom of T4 for maximum-amplitude, symmetrical output. Adjust input signal to maintain output, as indicated on scope, below 5 volts peak during alignment. (See NOTE below.)
7. Open tuning capacitor. Insert a 6-mil, non-metallic shim between stator and rotor of the FM gang and then close the capacitor against tbe shim. Inject 108.5 MC sweep signal (approx. 150 KC total deviation), through an antenna matching network, to the receiver antenna terminals. Adjust VC3 for maximum output.
8. Close (mesh) the tuning capacitor. Inject 87.75 MC sweep signal (approx. 150 KC total deviation) through an antenna matching network, to the receiver antenna terminals, and adjust X3 for maximum output (see NOTE below).
9. Set pointer to 91 MC and inject a 91 MC sweep signal. Adjust X2 for maximum output. (See NOTE below).
10. VC4 is the oscillator bridge capacitor used to minimize oscillator radiation. This is a factory adjustment and should not require further adjustment in the field.

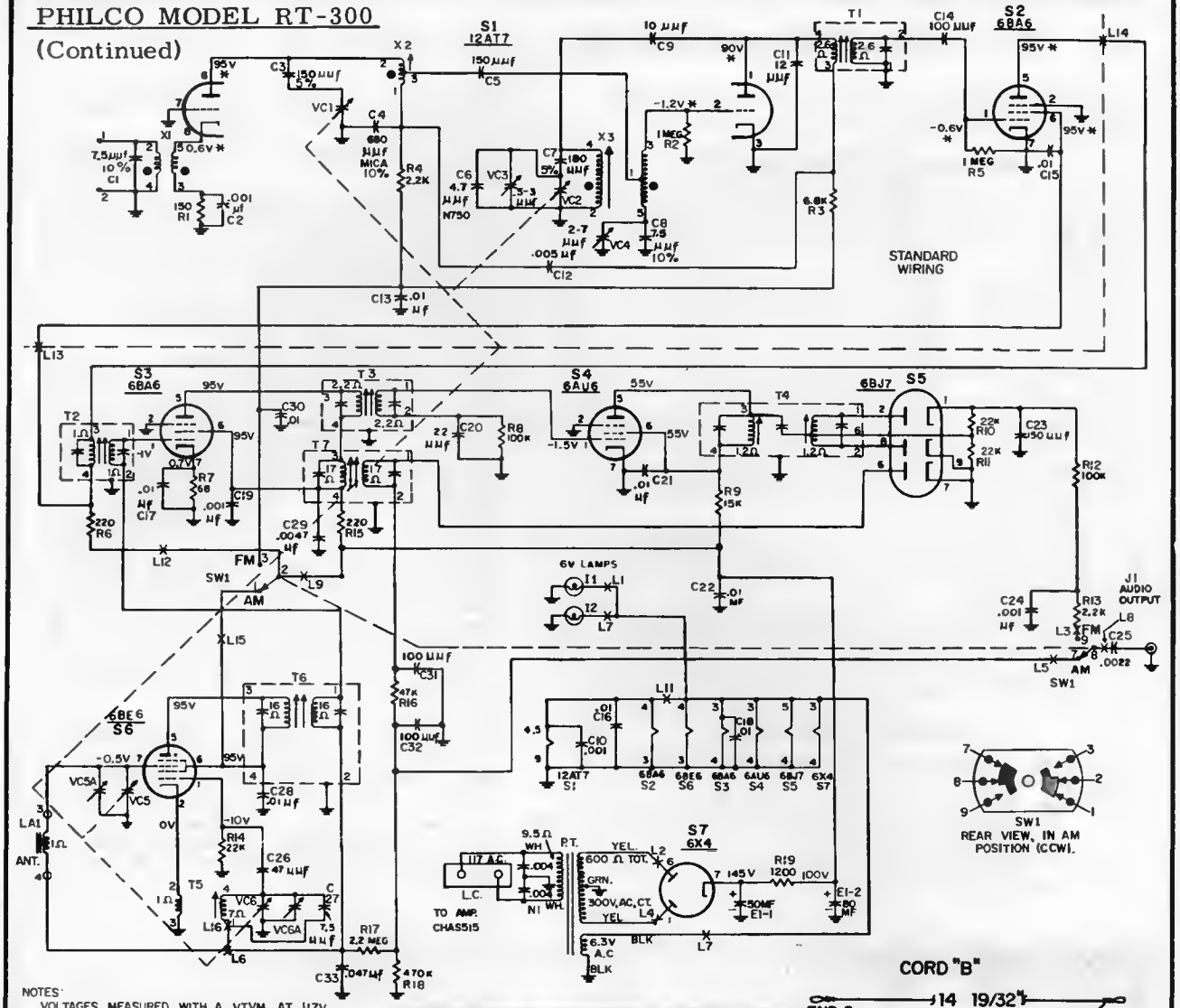
NOTE: The signal input must be as low as possible in order to obtain a sharp indication. In some cases it may be necessary to set the signal generator to the first sub-harmonic.



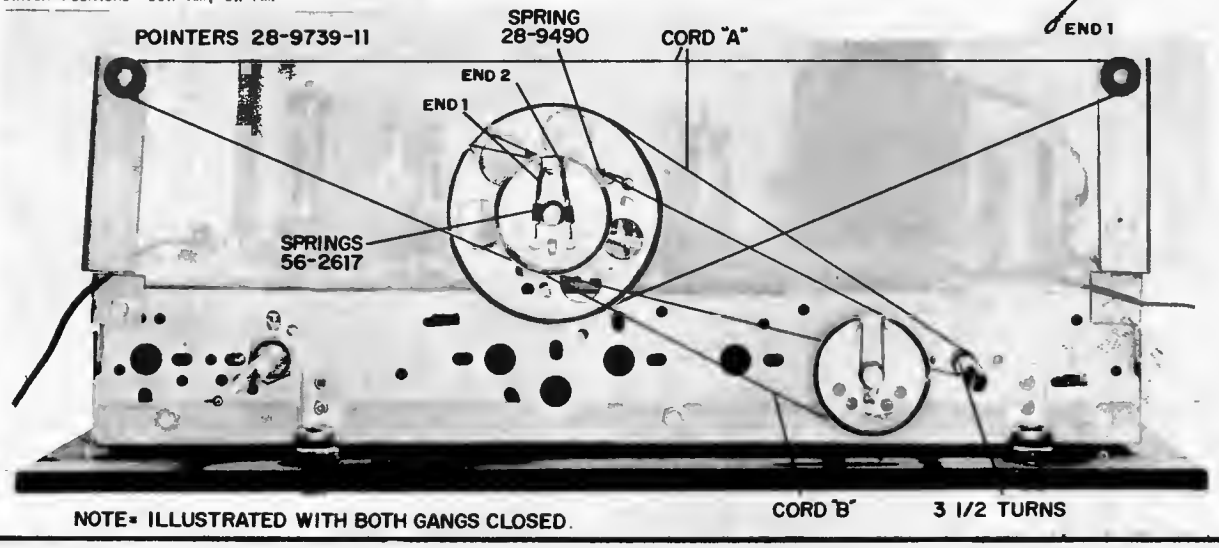
Top View—Showing Alignment Points, Tube Locations, Tie Lugs and Components

PHILCO MODEL RT-300

(Continued)



NOTES:
VOLTAGES MEASURED WITH A VTVM AT 117V, 60~ LINE UNDER NO SIGNAL CONDITION.
* INDICATES VOLTAGES READ IN "FM".
● INDICATES A RESISTANCE OF LESS THAN 1Ω.
COIL RESISTANCES READ WITH COIL IN CIRCUIT.
SWITCH POSITIONS: CCW-AM; CW-FM.



CORD "A"
55 1/4"

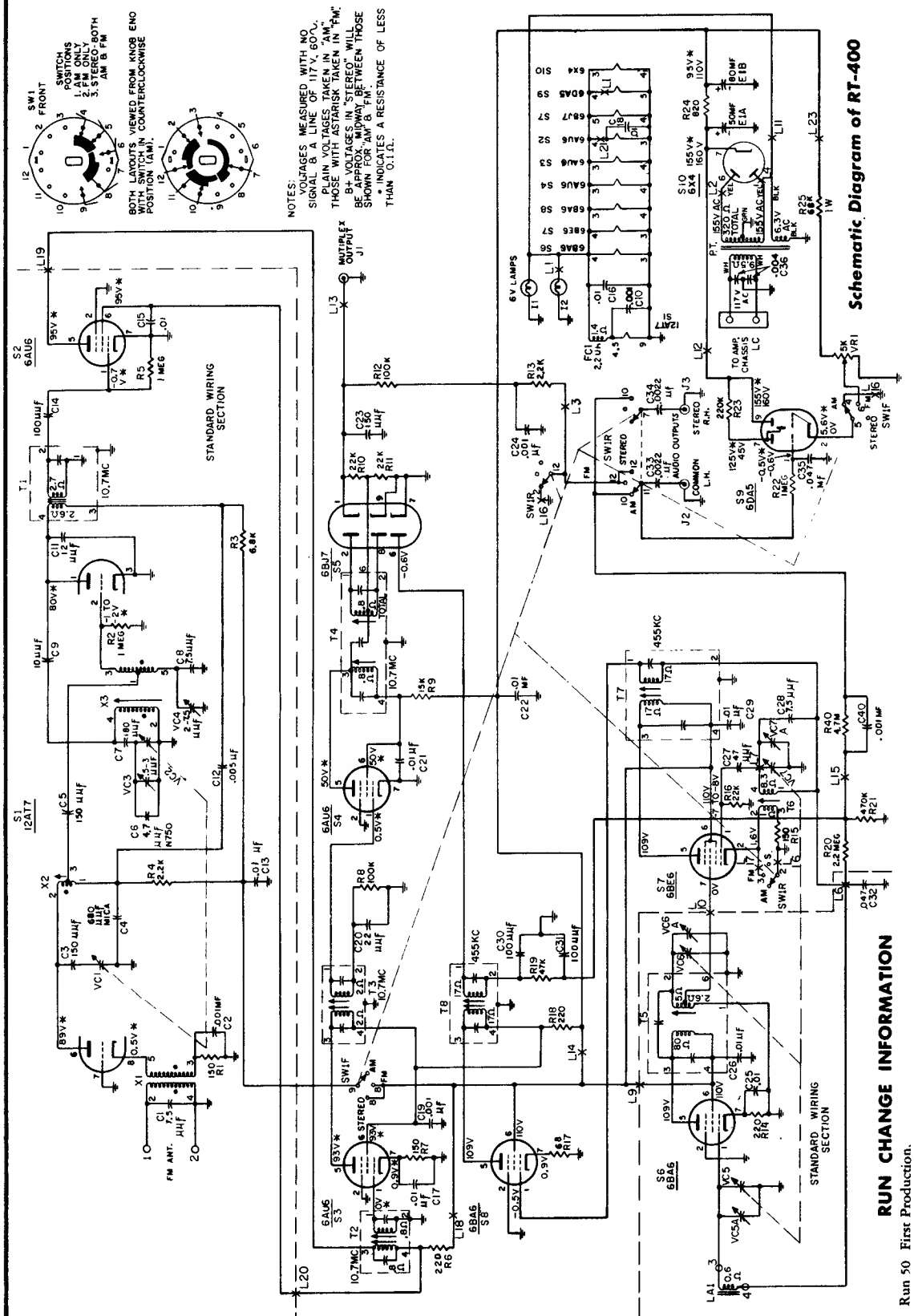
CORD "B"
END 2
14 19/32"
10 7/32"
END 1

NOTE: ILLUSTRATED WITH BOTH GANGS CLOSED.

Drive Cord Installation Details

PHILCO STEREO AM/FM TUNER—MODEL RT-400

(Continued on pages 112 and 113)



(More material on pages 112 and 113)

ADJUSTMENT OF TUNING INDICATOR

Remove S5, the 6BJ7 discriminator tube, or ground the cathode, pin 1 of the 6BJ7.

Adjust indicator balance pot, VR1, for parallel beams on the 6DA5.

Replace S5 (or remove ground).

RUN CHANGE INFORMATION

Run 50 First Production.

Run 51 To prevent AM oscillation. The AM i-f amplifier cathode resistor, R17, was changed in value from 68 ohms to 110 ohms, part number 66-1108340.

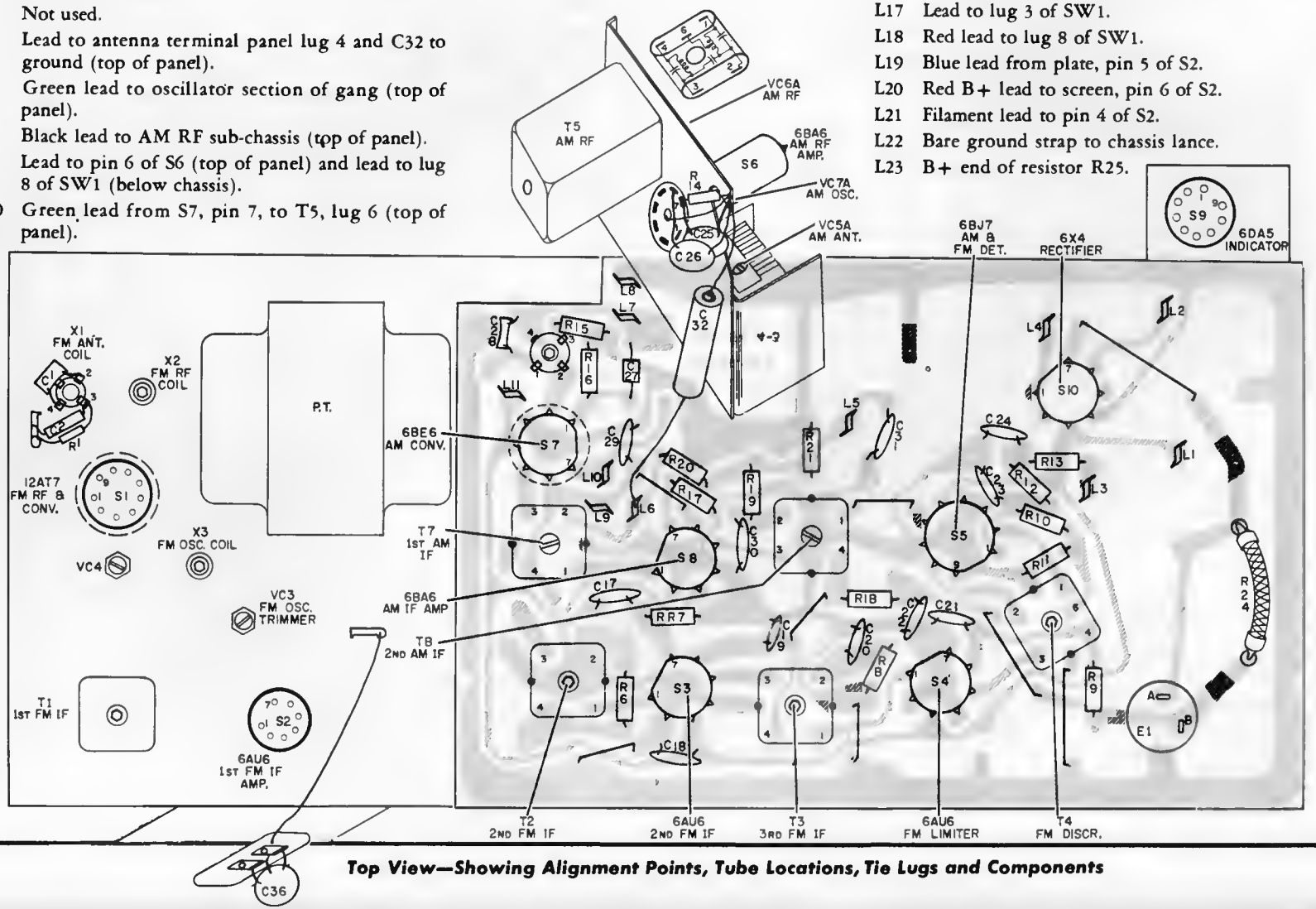
Run 52 To facilitate production. The FM tuning condenser was changed to 31-2789-1. This is a three section gang; the center section is grounded. For replacement purposes use the gang listed in the parts list, part number 31-2789-3.

IDENTIFICATION OF "PERMA-CIRCUIT" TIE LUGS

L1 Filament lead to pin 4 of 6DA5 (below panel) and pilot lamp lead (top of panel).
L2 Yellow lead from power transformer to pin 6 of 6X4 (top of panel).
L3 Lead from R13 to lug 12 of SW1 (below panel).
L4 Yellow lead from power transformer to pin 1 of 6X4 (top of panel).
L5 Not used.
L6 Lead to antenna terminal panel lug 4 and C32 to ground (top of panel).
L7 Green lead to oscillator section of gang (top of panel).
L8 Black lead to AM RF sub-chassis (top of panel).
L9 Lead to pin 6 of S6 (top of panel) and lead to lug 8 of SW1 (below chassis).
L10 Green lead from S7, pin 7, to T5, lug 6 (top of panel).
L11 Black filament lead from power transformer, brown pilot lamp lead and brown lead to pin 4 of S6 (top of panel).
L12 Red lead to pin 9 of S9.
L13 Lead to J1, the multiplex output jack.
L14 Red lead to lug 8 of SW1.
L15 R40 and C40 to SW1-10.
L16 Bare wire to lugs 2 and 4 of SW1.
L17 Lead to lug 3 of SW1.
L18 Red lead to lug 8 of SW1.
L19 Blue lead from plate, pin 5 of S2.
L20 Red B+ lead to screen, pin 6 of S2.
L21 Filament lead to pin 4 of S2.
L22 Bare ground strap to chassis lance.
L23 B+ end of resistor R25.

PHILCO

STEREO AM/FM TUNER
MODEL RT-400



Top View—Showing Alignment Points, Tube Locations, Tie Lugs and Components

PHILCO Stereo AM/FM Tuner, Model RT-400, Continued

SPECIFICATIONS

This tuner is equipped with a front panel and mounting board and is intended for quick installation in the space provided in the "H" line Philco Hi-Fidelity Phonographs.

CIRCUIT—Nine-tube superheterodyne plus rectifier. Function switch allows reception on AM only, FM only, or AM/FM stereo.

FREQUENCY RANGES—AM broadcast 540 KC to 1620 KC
FM broadcast 88 MC to 108 MC

TUNING DRIVE RATIO—10:1 on both AM and FM

OPERATING VOLTAGE—105 to 120 volts, 60 cycle AC only.

POWER CONSUMPTION—45 watts

INTERMEDIATE FREQUENCIES—AM—455 KC
FM—10.7 MC

AM ALIGNMENT PROCEDURE

The AM alignment should be completed before the FM alignment is performed. Before beginning the alignment, allow the receivet and test equipment to warm up for fifteen minutes.

Dial Pointer—With the gang fully closed, adjust the pointer to coincide with the first small index mark to the left of the "54" (540 kc) on the scale.

Tuner Controls—Set the function switch to the AM position and the AM tuning control as indicated.

Output Indicator—Connect a scope to output jack, J2.

Signal Generator—Use an AM r-f signal generator with 30% modulation.

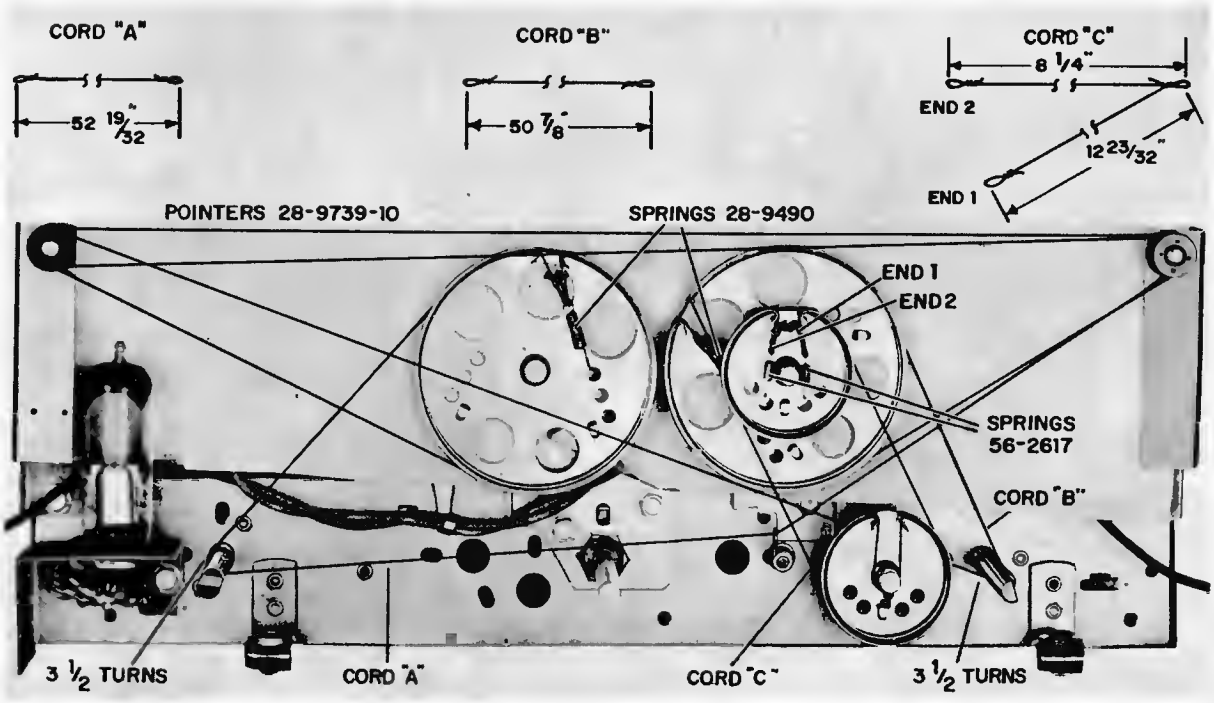
1. Connect generator, through a .05 μfd condenser, to the signal grid, pin 7 of the AM converter, S7 (6BE6). Connect the ground lead to chassis.
2. Set generator to 455 kc. Fully open tuning gang. Adjust, in order given, top of T8, bottom of T7, bottom of T8, and top of T7 for maximum output. Repeat until no further gain is indicated.
3. Connect generator to radiating loop. Set generator to 1600 kc. Set receiver to 1600 kc as indicated by pointer. Adjust VC7A (osc. trimmer) for maximum output.
4. Set generator to 1400 kc. Tune receiver to signal and adjust VC5A (antenna trimmer) and VC6A (r-f trimmer) for maximum output.
5. Set generator to 580 kc and tune receiver to signal; adjust core of r-f transformer (T5) for maximum output.
6. Repeat steps 4 and 5 until no further gain is indicated.

FM ALIGNMENT PROCEDURE

The AM alignment should be completed before the FM alignment is performed.

1. With the gang fully closed, adjust the pointer to coincide with the first small index mark to the left of the "88" (88mc) on the scale.
2. Set the function switch to the FM position and the FM tuning control as indicated.
3. Connect an oscilloscope, through a 100,000-ohm isolating resistor, to junction of R8 and C20. Connect the oscilloscope ground lead to the chassis.
4. Connect the signal generator to the cathode of the FM, RF amplifier, pin 8 of S1. Connect the ground lead to the chassis.
5. Inject a 10.7 MC marker signal and a 10.7 MC sweep signal, approximately 150 KC total deviation (do not over sweep). Adjust cores in top and bottom of T3, T2 and T1 for maximum-amplitude, symmetrical curve with the 10.7 MC marker at the top of the curve. Adjust input signal to maintain output, as indicated on scope, below 2 volts peak during alignment. Repeat this step until no further gain is obtained.
6. Change scope connections to the output connector J2. Inject a 10.7 MC, 30% AM modulated signal to the grid of the 6AU6, pin 1 of S4. Adjust top of T4 for minimum indication between peaks. Inject 10.7 MC sweep signal, approximately 150 KC total deviation, to pin 1 of S4 and adjust bottom of T4 for maximum-amplitude, symmetrical output. Adjust input signal to maintain output, as indicated on scope, below 5 volts peak during alignment. (See NOTE below.)
7. Open tuning capacitor. Insert a 6-mil, non-metallic shim between stator and rotor of the FM gang and then close the capacitor against the shim. Inject 108.5 MC sweep signal (approx. 150 KC total deviation), through an antenna matching network, to the receiver antenna terminals. Adjust VC3 for maximum output.
8. Close (mesh) the tuning capacitor. Inject 87.75 MC sweep signal (approx. 150 KC total deviation) through an antenna matching network, to the receiver antenna terminals, and adjust X3 for maximum output (see NOTE below).
9. Set pointer to 91 MC and inject a 91 MC sweep signal. Adjust X2 for maximum output. (See NOTE below.)
10. VC4 is the oscillator bridge capacitor used to minimize oscillator radiation. This is a factory adjustment and should not require further adjustment in the field.

NOTE: The signal input must be as low as possible in order to obtain a sharp indication. In some cases it may be necessary to set the signal generator to the first sub-harmonic.



Drive Cord Installation Details

PHILCO Auto Radio Model M-5944 (used in Mercury automobile)

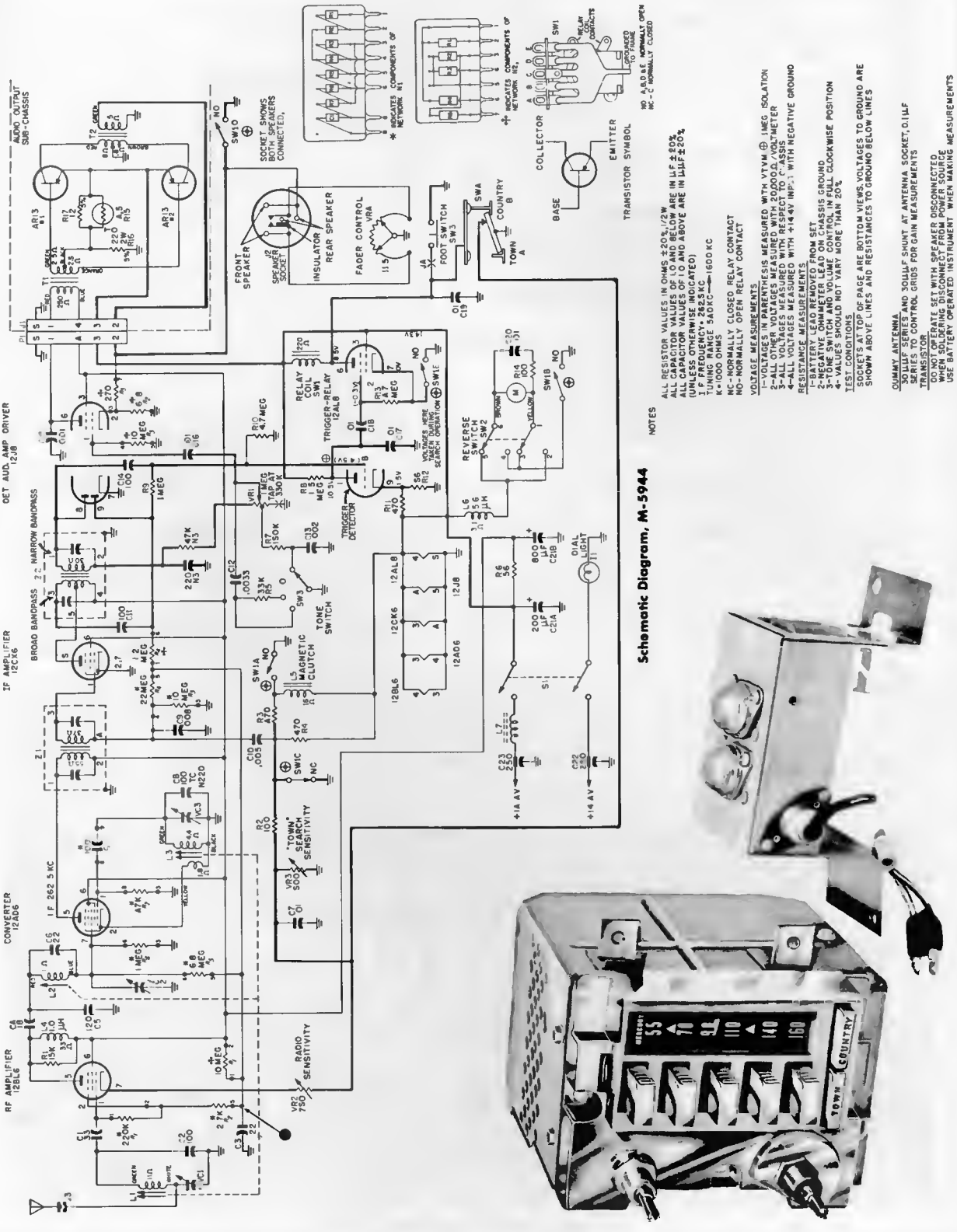
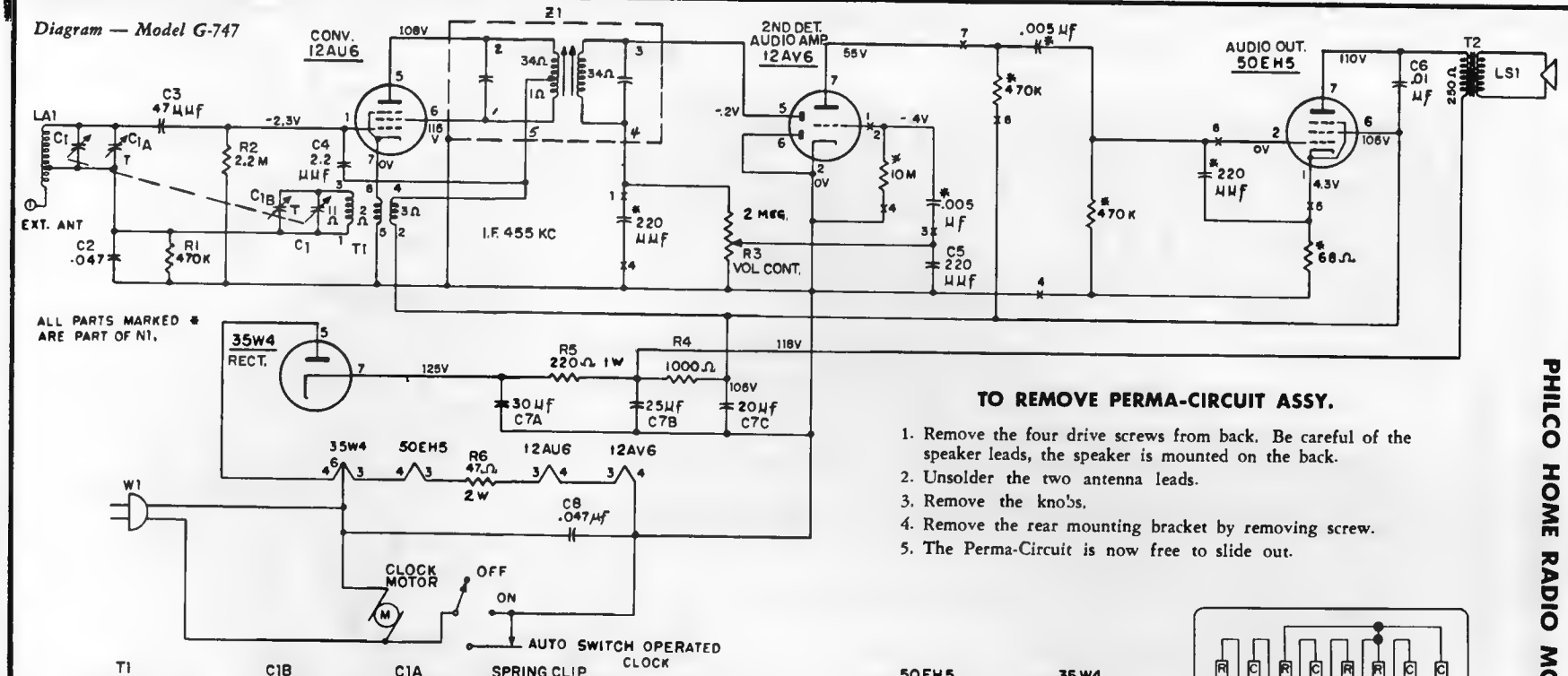
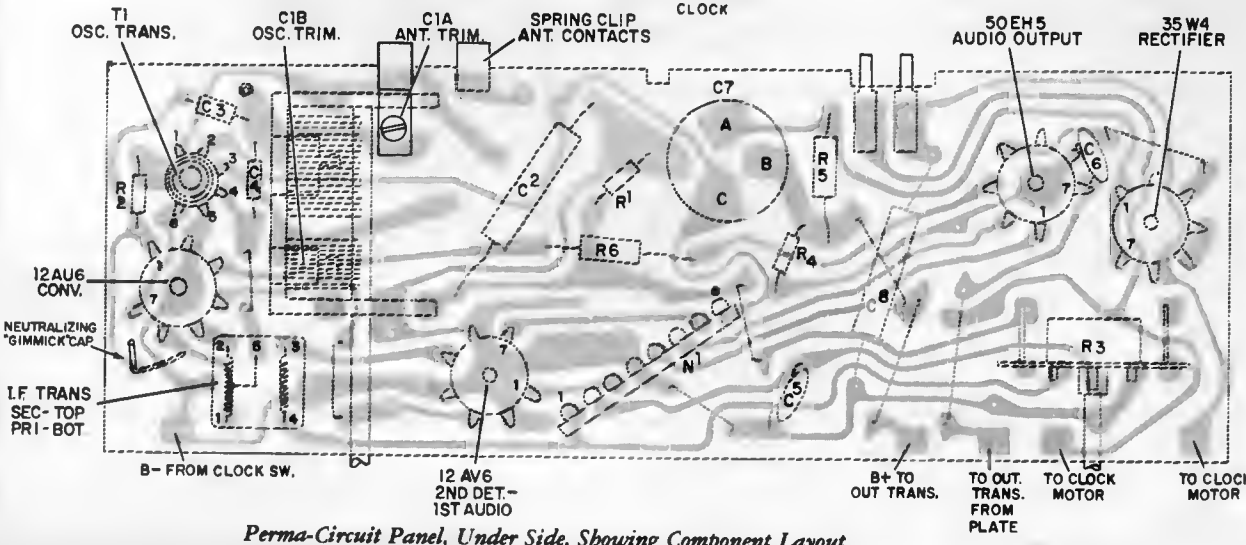


Diagram — Model G-747

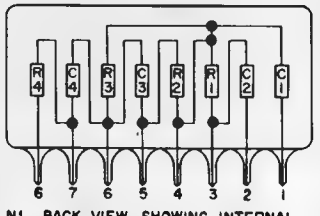


TO REMOVE PERMA-CIRCUIT ASSY.

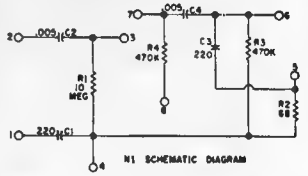
1. Remove the four drive screws from back. Be careful of the speaker leads, the speaker is mounted on the back.
2. Unsolder the two antenna leads.
3. Remove the knobs.
4. Remove the rear mounting bracket by removing screw.
5. The Perma-Circuit is now free to slide out.



Perma-Circuit Panel, Under Side, Showing Component Layout



N1 BACK VIEW, SHOWING INTERNAL CONNECTIONS.



N1 SCHEMATIC DIAGRAM

NOTES

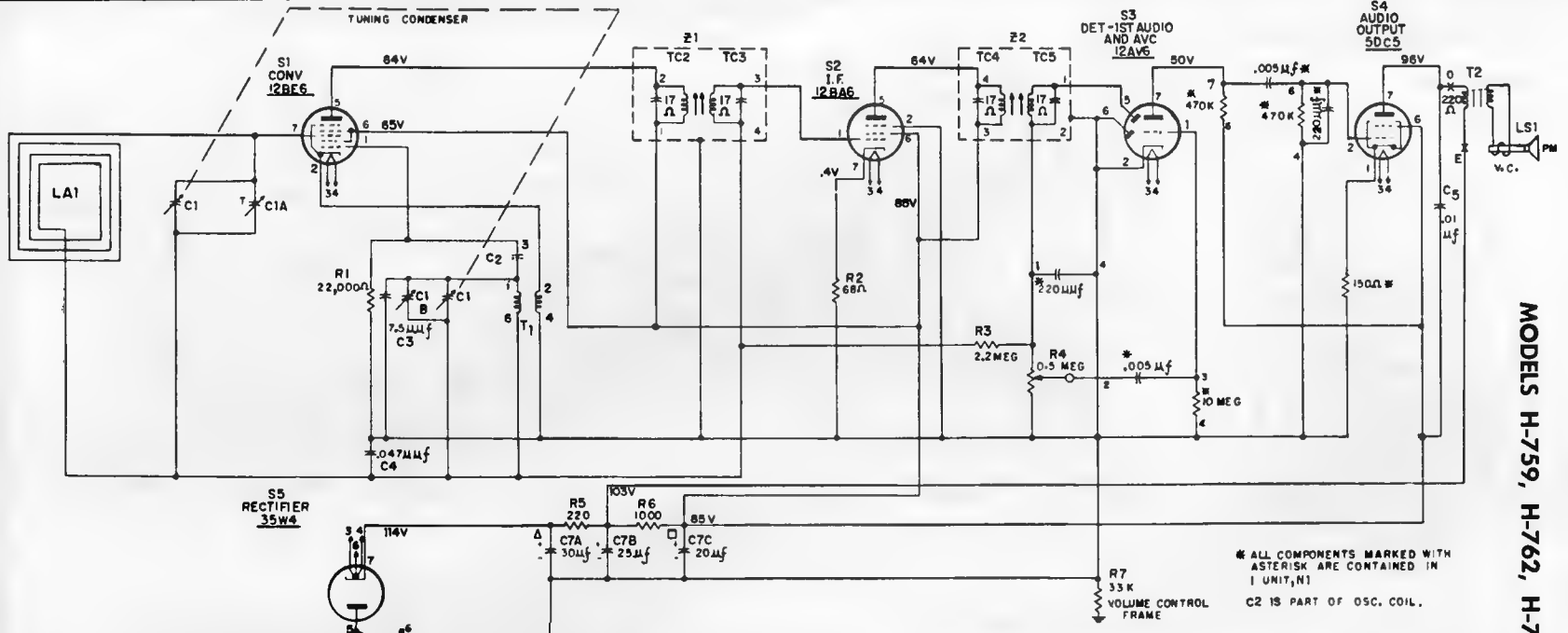
* All components marked with an asterisk are contained in one unit, N1.

All resistors are ½ watt, 10%, carbon type, unless otherwise noted.

Voltages read with a 20,000 ohms/volt meter, from point shown to B—, under no signal condition.

PHILCO RADIO

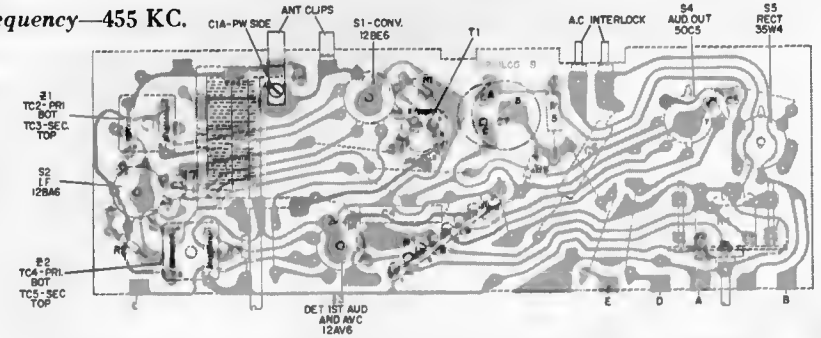
MODELS H-759, H-762, H-763 and H-764



Slow-off—All models except H-759 have the on-off switch in the filament return line. When the switch is opened, the set fades out rather than cuts off. Model H-759 has a conventional switching arrangement located in the B— line.

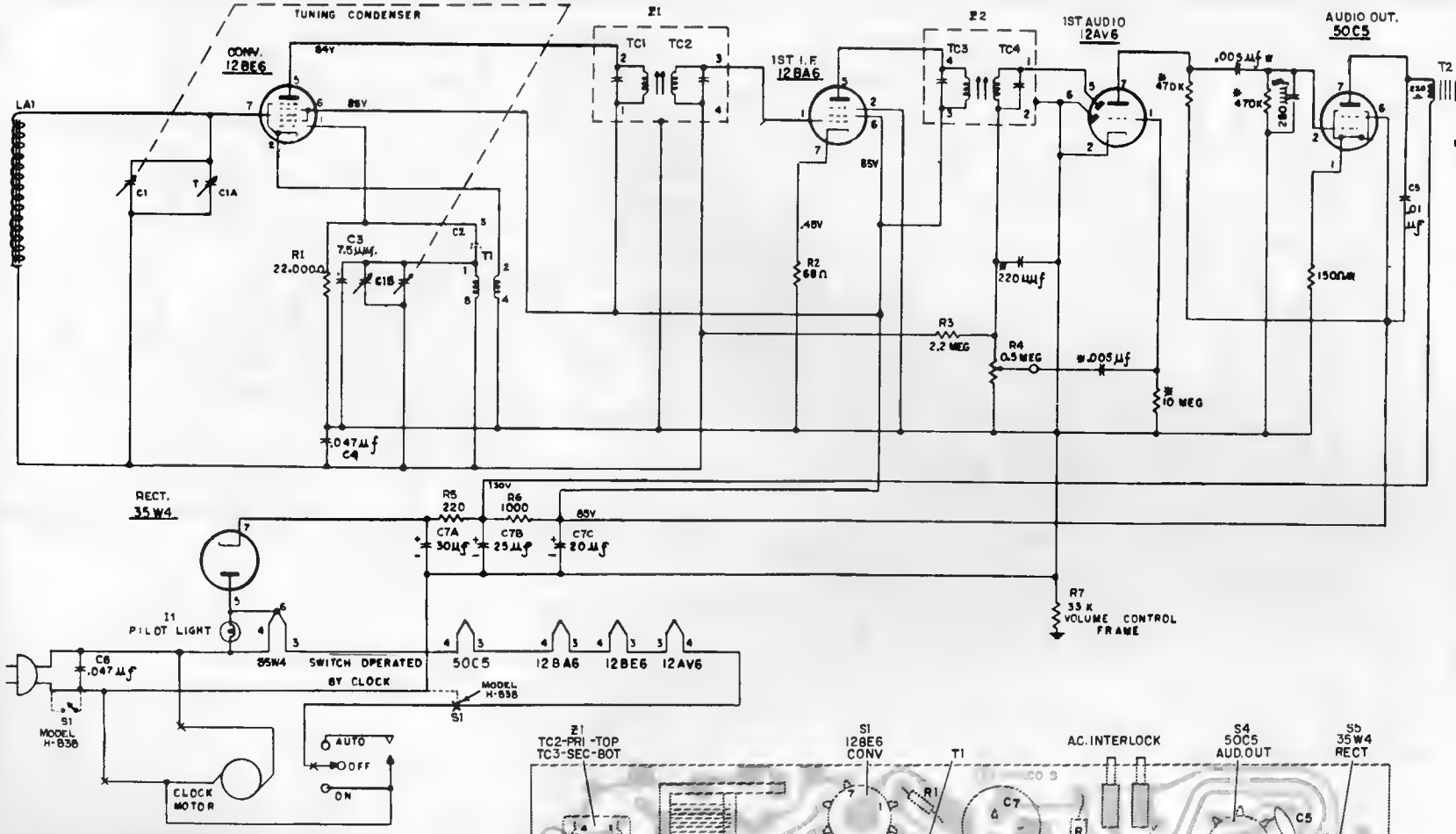
Frequency Range—540 KC to 1620 KC.

Intermediate Frequency—455 KC.



Bottom View, Printed Panel Component Layout – Models H-762, H-763 and H-764

PHILCO MODELS H-765 and H-838



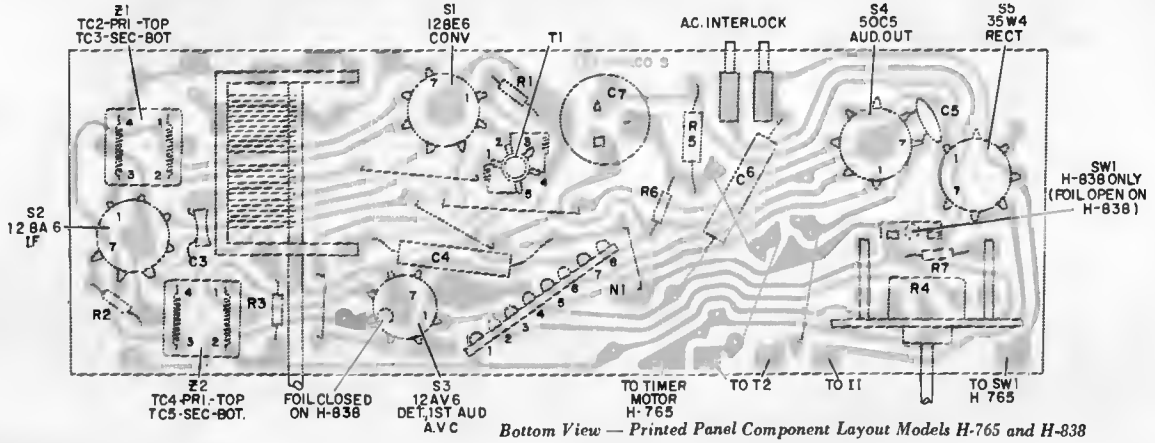
FREQUENCY RANGE—540 KC to 1620 KC
INTERMEDIATE FREQUENCY—455 KC
AUDIO OUTPUT—.9 watt
POWER CONSUMPTION—30 watts

NOTES

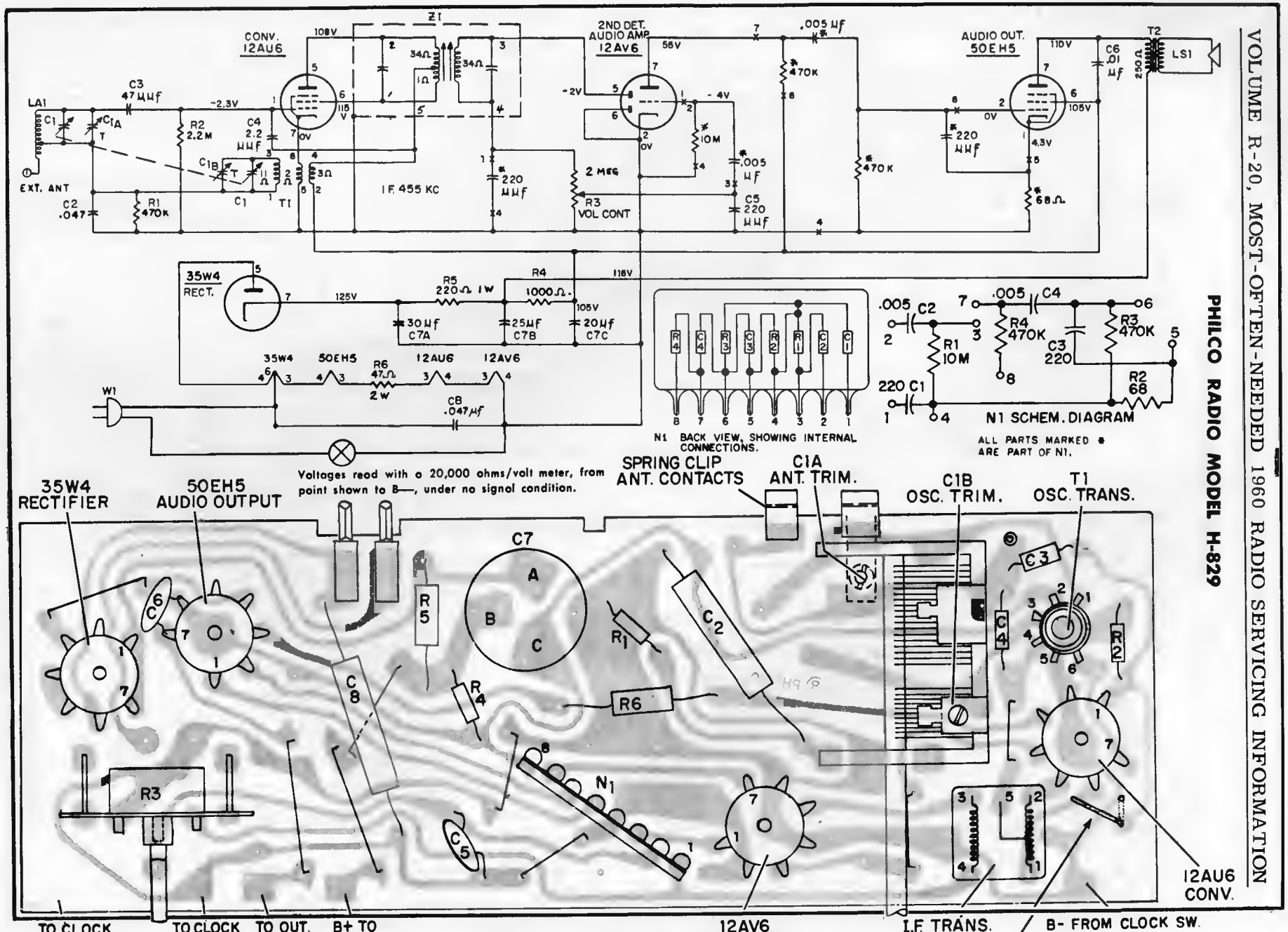
* All components marked with an asterisk are contained in a single (N1) unit.

X Timer circuit is included in Model H-765 only. Dashed lines indicate Model H-838 connections without timer.

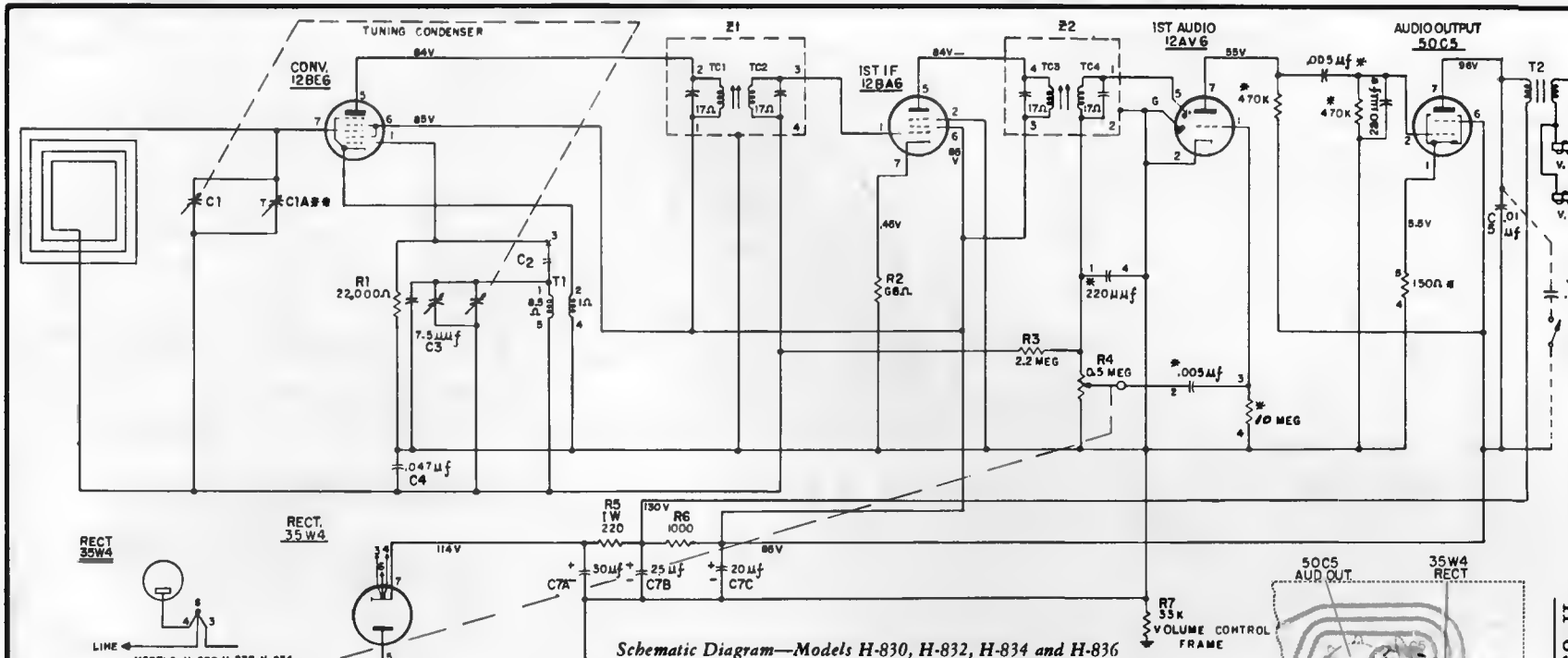
C2—Part of oscillator transformer T1.



Bottom View — Printed Panel Component Layout Models H-765 and H-838

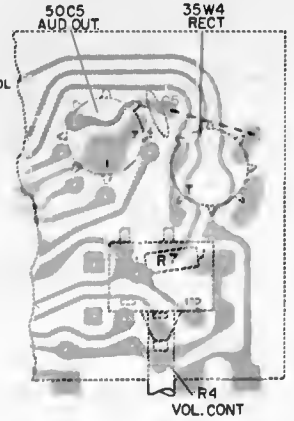


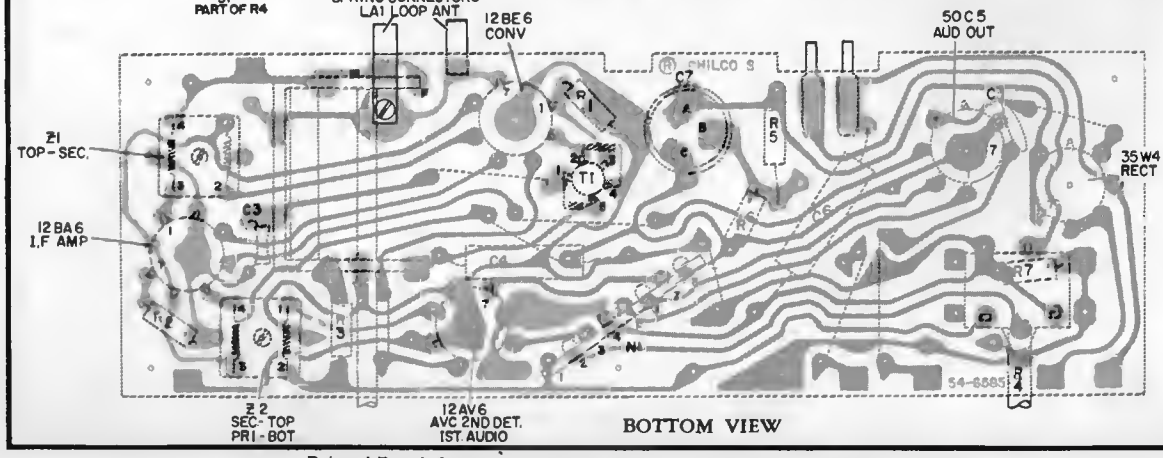
Base View PW Panel Component Layout



Schematic Diagram—Models H-830, H-832, H-834 and H-836

I. F. 455 KC.





Printed Panel Component Layout—Models H-830, H-832, H-834 and H-836

NOTES:

All capacitors over 1 are in mmf, unless otherwise noted.

All capacitors under 1 are in mfd.

All resistors are ½ watt, 10%, carbon type, unless otherwise noted.

Voltages are taken with a 20,000 ohm/volt meter, between the point indicated and B–, under no-signal condition.

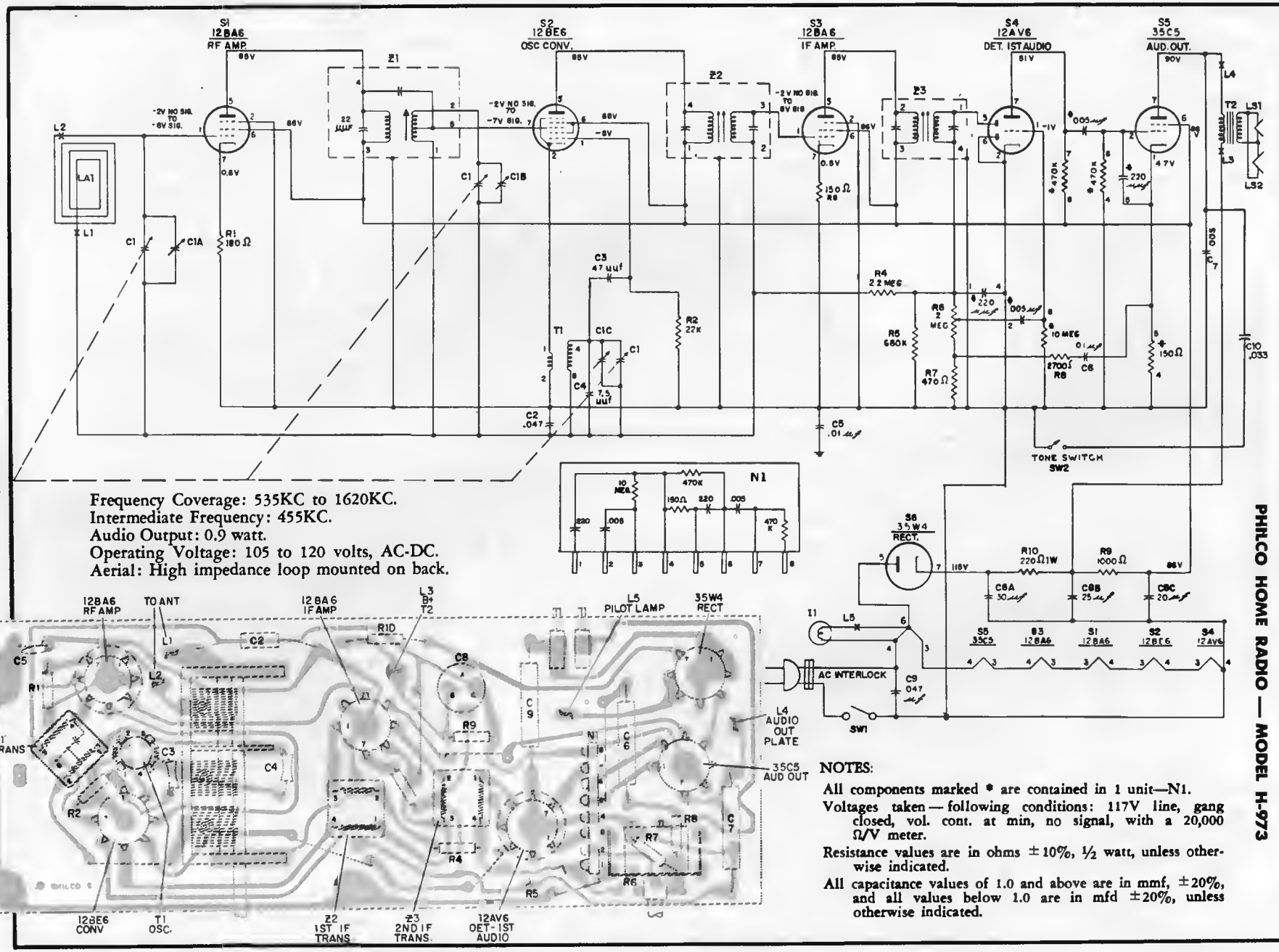
I1 pilot light, is used in Model H-836 only.

C1 is part of osc. coil.

Model H-838 uses only 1 speaker and a magnecore antenna.

*Indicates component is part of N1.

**C1A is on underside of panel.



Frequency Coverage: 535KC to 1620KC.
Intermediate Frequency: 455KC.
Audio Output: 0.9 watt.
Operating Voltage: 105 to 120 volts, AC-DC.
Aerial: High impedance loop mounted on back.

Composite Bottom View, Perma-Circuit Panel

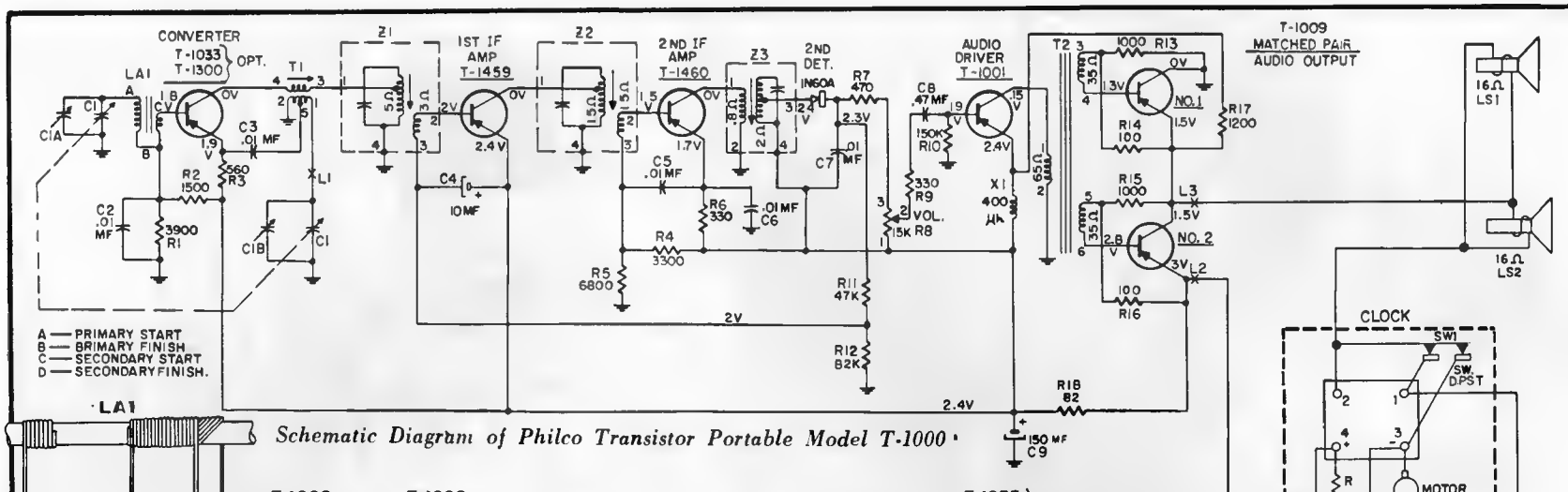
NOTES:

All components marked * are contained in 1 unit—N1.

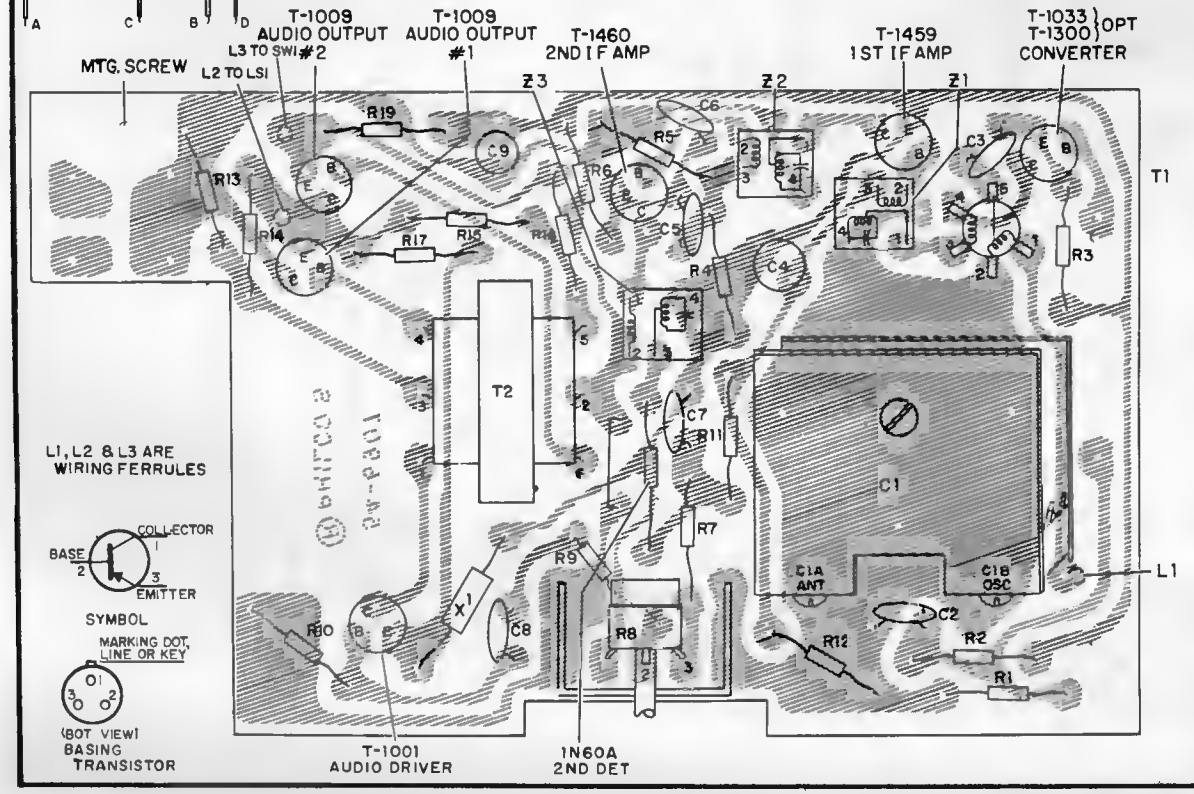
Voltages taken — following conditions: 117V line, gang closed, vol. cont. at min, no signal, with a 20,000 Ω/V meter.

Resistance values are in ohms ±10%, ½ watt, unless otherwise indicated.

All capacitance values of 1.0 and above are in mmf, ±20%, and all values below 1.0 are in mfd ±20%, unless otherwise indicated.



Schematic Diagram of Philco Transistor Portable Model T-1000



Component Panel Top View — Showing Parts Location and Tuning Adjustments

FREQUENCY COVERAGE—535 to 1620 KC.

INTERMEDIATE FREQUENCY—455 KC.

ANTENNA — Self-contained magnecor, high-impedance loop.

SPEAKERS — Two, 4 inch pm., 16 ohm voice coil impedance.

BATTERY SUPPLY — Radio; 2 standard D cells in 3 volt supply center tapped at 1½ volts. Timer; 1 D cell supply. Battery type, "A" P-920.

PRINTED WIRE PANEL REMOVAL

1. With set on its back, remove base panel.
2. Remove panel mounting screw indicated on figure.
3. Disengage panel from brackets and gently pull from set, (note that tuning knob is a push on type).

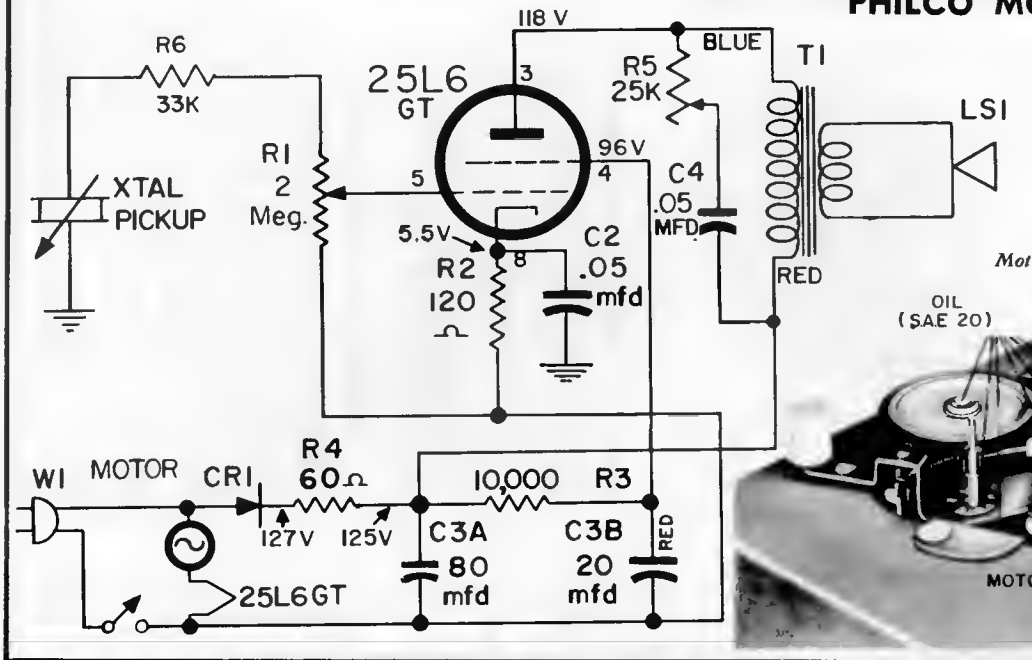
NOTE: When re-inserting panel, first position the tuning knob and hold from above.

SERVICE NOTES

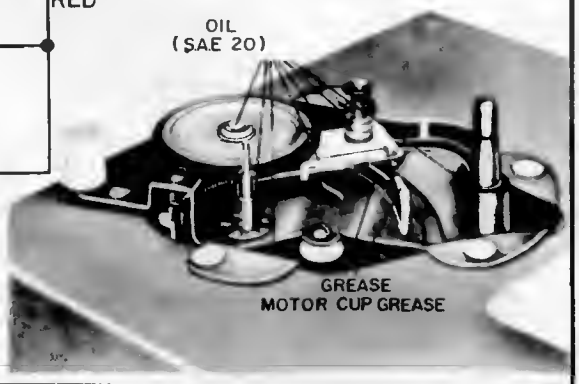
When signal tracing, inject signal at transistor collector and limit input to keep signal across speaker below .6 volt.

Normally, the transistors should be the last item suspected. If C9 opens serious audio oscillation will result.

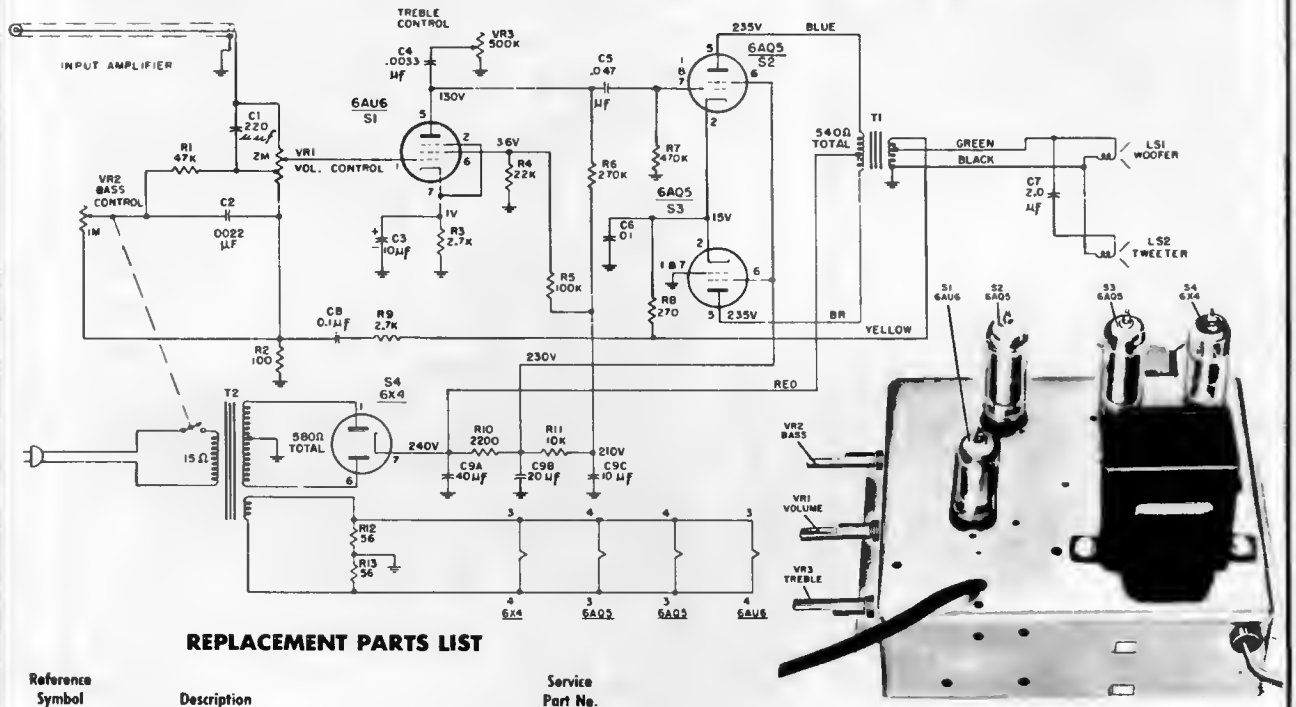
PHILCO MODEL H-1383



Motor Lubrication



PHILCO UNIVERSAL STEREO AMPLIFIER—MODEL SA-1005



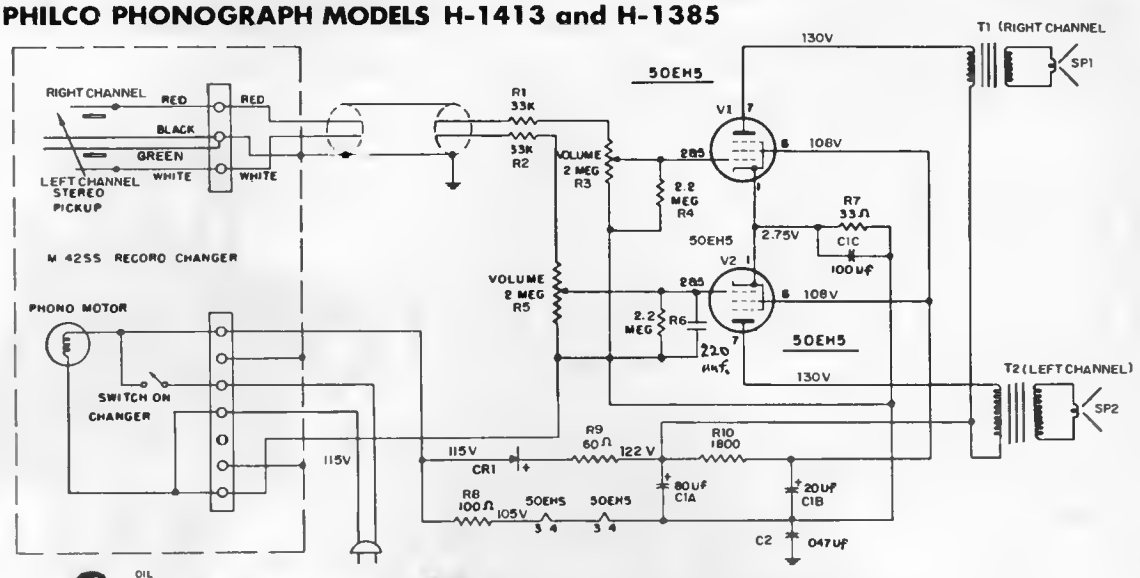
REPLACEMENT PARTS LIST

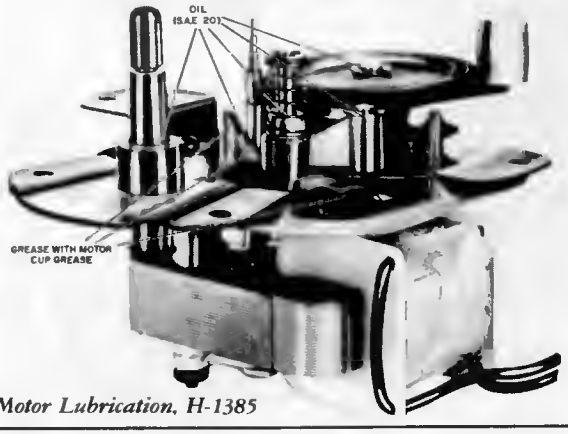
Reference Symbol	Description	Service Part No.
C1	Capacitor, 220 μμf, hi comp.	30-1225-11
C2	Capacitor, .0022 mfd, bass cut	30-4671-20
C3	Capacitor, elect., 10 mfd, 25V, cathode by-pass	30-2417-49
C4	Capacitor, .0033 mfd, treble control	30-4650-38
C5	Capacitor, .047 mfd, coupling	30-4650-62
C6	Capacitor, .1 mfd, cathode by-pass	30-4650-47
C7	Capacitor, 2 mfd, crossover	30-4681-7
C8	Capacitor, .1 mfd, feedback	30-4650-30
C9	Capacitor, elect., 40/20/10 at 350WV	30-2575-47
LS1	Speaker, 6" PM, 8 ohm V.C.	36-1680-8
LS2	Speaker, 4" PM, 16 ohm V.C.	36-1673-11

The SA-1005 is a single-channel amplifier primarily designed as a companion amplifier for the G-line Hi-Fidelity Stereo Phonographs. A 12-ft. audio cable and an a-c line cord are attached to the SA-1005.

T1	Transformer, audio output	32-8939-1
T2	Transformer, power	32-8890-1
VR1	Volume control, 2 meg, tapped	33-5535-46
VR2	Bass control, 1 meg	33-5588-12
VR3	Treble control, 500,000 ohms	33-5587-31

PHILCO PHONOGRAPH MODELS H-1413 and H-1385





Motor Lubrication, H-1385

CHANGER OR PLAYER—

H-1385—117-volt motor, 4-speed record player (16, 33⅓, 45 and 78 rpm).

H-1413—117-volt motor, 4-speed record changer (M4255) (16, 33⅓, 45 and 78 rpm).

SPEAKERS—

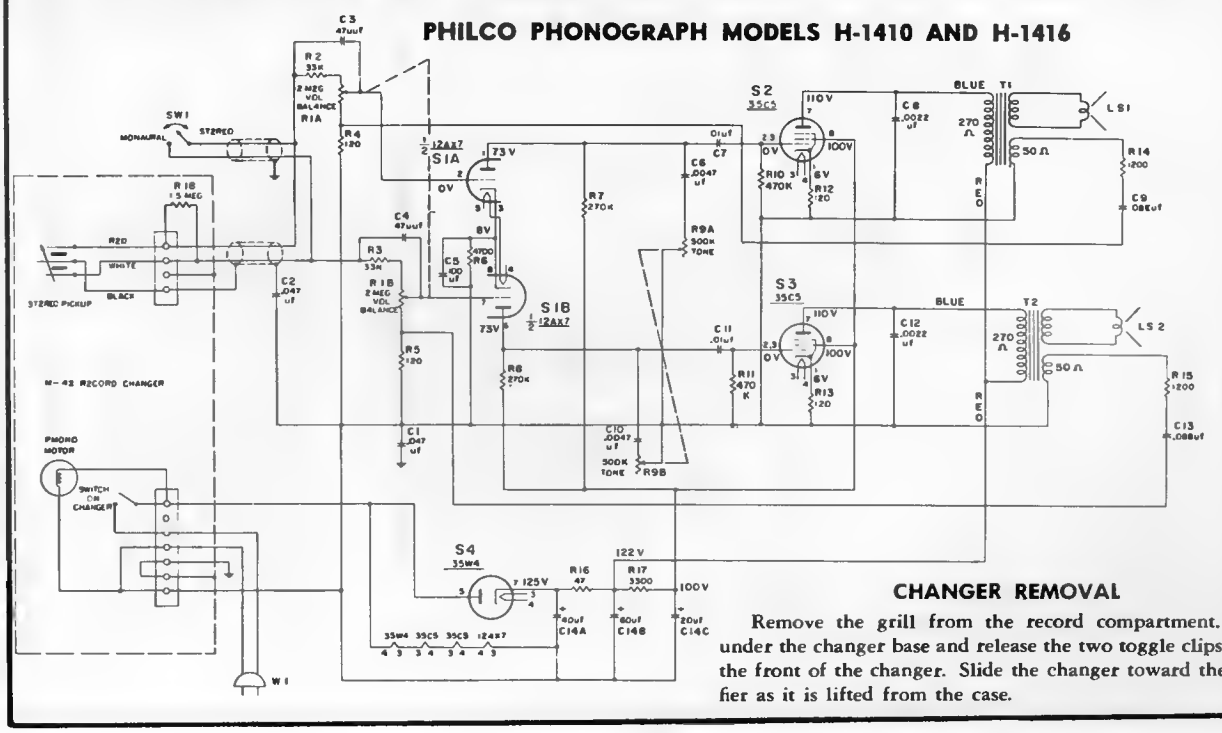
H-1413 and H-1385—4 in., 3.2 ohm voice coil.

H-1413—Two 4-in., 3.2 ohm voice coil.

H-1385—Two 4-in., 3.2 ohm voice coil.

The right stereophonic channel speaker is mounted inside the case on both models while the left channel speaker is mounted in the detachable lid (model H-1413) and in the detachable case (model H-1385).

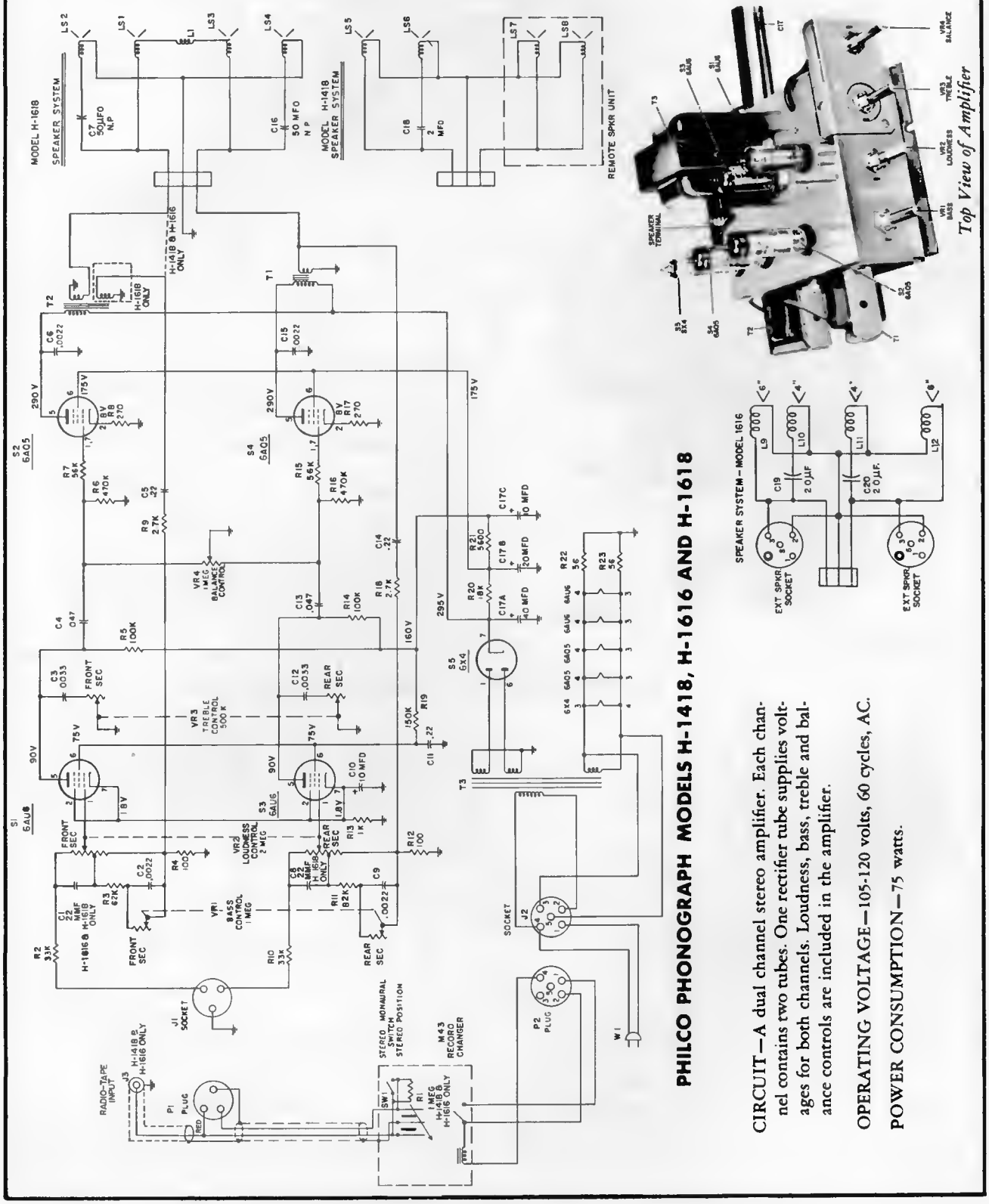
PHILCO PHONOGRAPH MODELS H-1410 AND H-1416



CHANGER REMOVAL

Remove the grill from the record compartment. Reach under the changer base and release the two toggle clips nearest the front of the changer. Slide the changer toward the amplifier as it is lifted from the case.

PHILCO Models H-1418, H-1616, and H-1618, exact material. Models G-1412 and G-1608 are practically identical to the models covered on this page, except for changer, cabinet, and minor differences in circuitry.



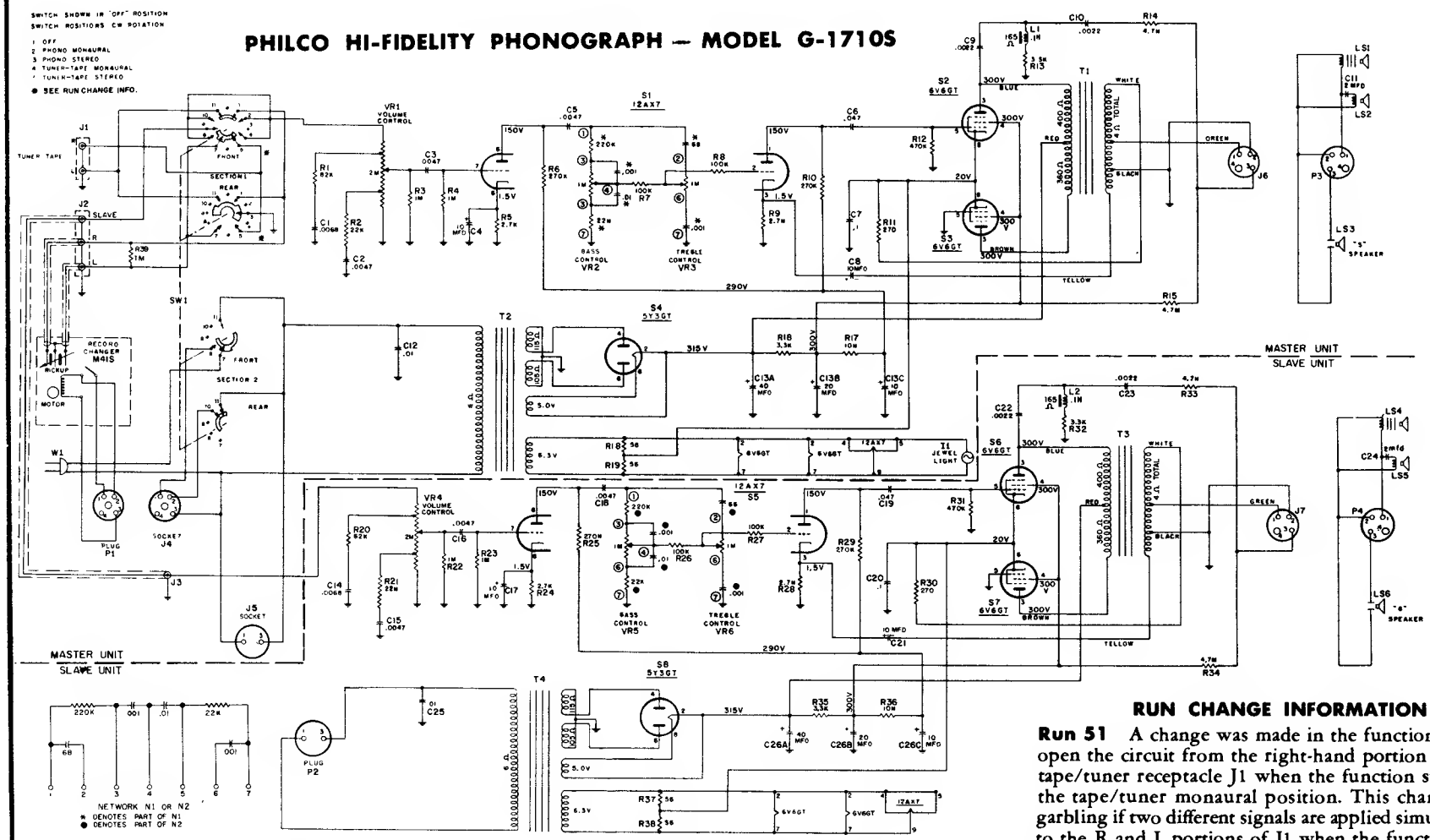
PHILCO PHONOGRAPH MODELS H-1418, H-1616 AND H-1618

CIRCUIT—A dual channel stereo amplifier. Each channel contains two tubes. One rectifier tube supplies voltages for both channels. Loudness, bass, treble and balance controls are included in the amplifier.

OPERATING VOLTAGE—105-120 volts, 60 cycles, AC.

POWER CONSUMPTION—75 watts.

Top View of Amplifier



SPECIFICATIONS

NOTE: The G-1710S contains two chassis, the master chassis and the slave chassis, mounted in one cabinet.

Cabinet—Wood console, mahogany, blond or walnut.

Circuit—Each chassis contains a three-tube amplifier and a rectifier. Controls include bass, treble and loudness controls. A function switch is included in the master chassis only.

Audio Output—Total, 40 watts peak output (20 watts each amplifier).

Operating Voltage—105-120 volts, 60 cycles, ac.

Power Consumption—155 watts.

Record Changer—A Philco 4-speed, automatic record changer, Model M-41. A stereo cartridge is included in the changer. For record changer service information refer to PR-3279.

Speakers—Two speaker systems are used in the Model G-1710S. Each speaker system consists of one 10" woofer, one 3½" mid-range and one "S" type electrostatic tweeter.

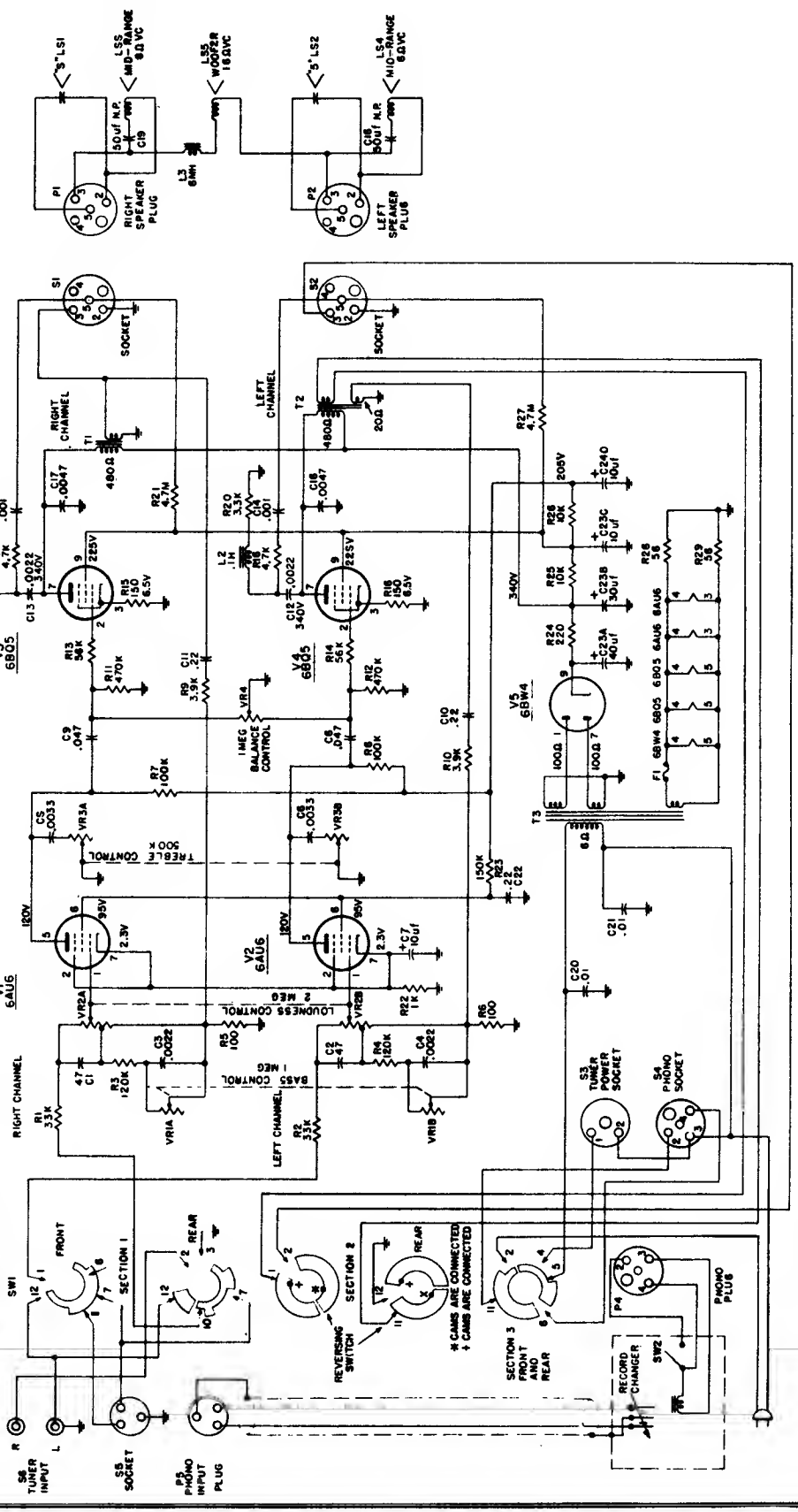
RUN CHANGE INFORMATION

Run 51 A change was made in the function switch to open the circuit from the right-hand portion (R) of the tape/tuner receptacle J1 when the function switch is in the tape/tuner monaural position. This change avoids garbling if two different signals are applied simultaneously to the R and L portions of J1 when the function switch is in the tape/tuner monaural position. This change is as follows:

1. Bend the short clip at #4 lug on rear side of the front section away from the rotor. There is a blue wire attached to this lug. The other end of this wire is connected to R of J1.
2. Interchange the blue wire mentioned above (connected to #4 lug) with the wire on #5 lug on the front side of the front section. The wire on #5 lug is a bare wire. This bare wire connects to lugs 2, 8 and 10 on the front side of the front section.

PHILCO HIGH FIDELITY STEREOPHONIC CONSOLE AMPLIFIER MODEL H-1714

Schematic Diagram, Model H-1714



LOUDNESS CONTROL

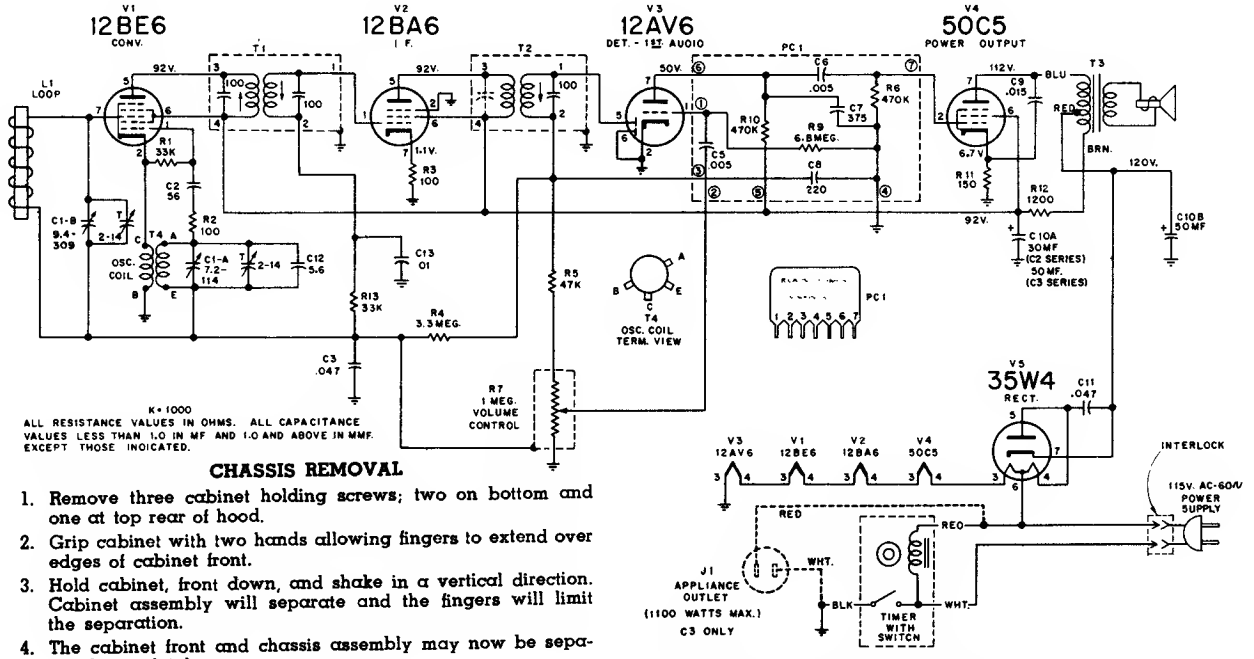
Output volume is controlled by the two ganged potentiometers, VR2A and VR2B connected in the 6AU6 grid circuit. Since this control adjusts both channels together, a balance control, VR4 connected between the 6BQ5 stages and ground is needed to equalize channel outputs.

WOOFER SPEAKER TUNER-TAPE STEREO REVERSE

As can be seen on the schematic, the circuit of the woofer speaker, LS5 starts at chassis ground, goes through the secondary winding of the output transformer T1, to the woofer. From the woofer connection is made to the reversing switch (section 2 contact 2 of SW1) and the upper secondary winding of transformer T2. The other end of this winding is then grounded by the rear section of the reversing switch to complete the circuit.

Since both right and left channels jointly drive the woofer, a phase difference between channel signals can cause cancellation and loss of woofer bass. Using the reversing switch to reverse the secondary winding of transformer T2 in its relation to the woofer and ground corrects this condition.

RCA Victor C-2 and C-3 Series, Chassis RC-1188B, RC-1188D, exact material on this page. Series PC-1, Chassis RC-1188A, are practically the same electrically but omit the appliance outlet. Series X-3, Chassis RC-1188C, are electrically similar, but omit entire clock circuit.



CHASSIS REMOVAL

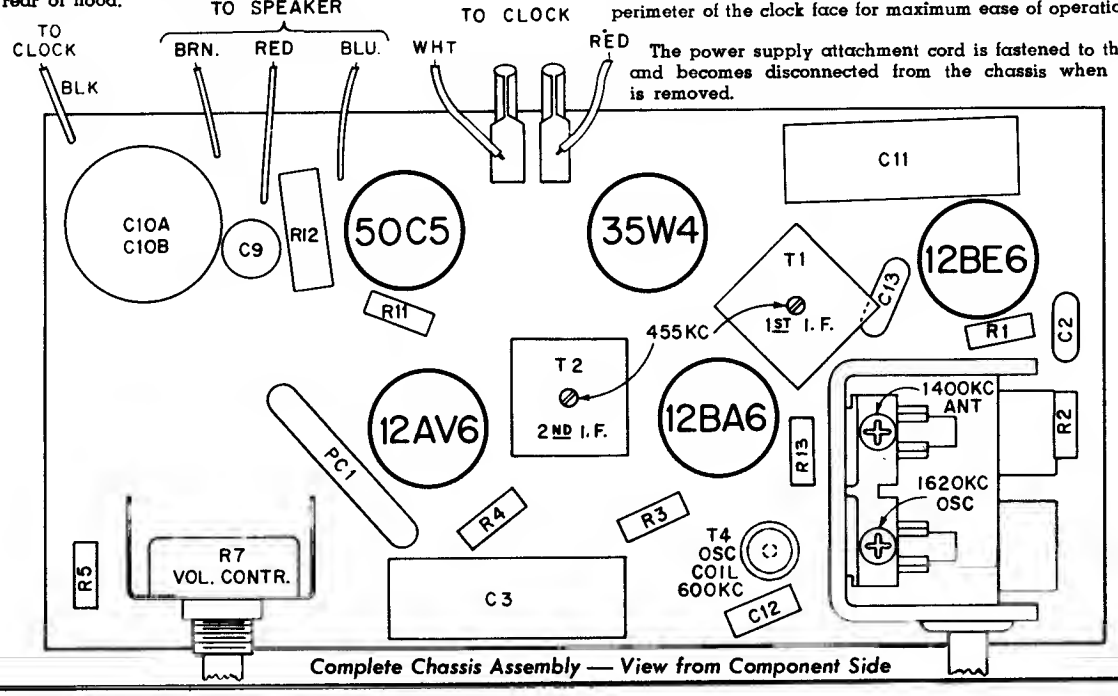
1. Remove three cabinet holding screws; two on bottom and one at top rear of hood.
2. Grip cabinet with two hands allowing fingers to extend over edges of cabinet front.
3. Hold cabinet, front down, and shake in a vertical direction. Cabinet assembly will separate and the fingers will limit the separation.
4. The cabinet front and chassis assembly may now be separated completely.

CABINET REASSEMBLY

1. Place chassis front and chassis assembly on the cabinet back so that the ribs of the cabinet front rest on the bottom — inside of the cabinet back.
2. Push cabinet sections together firmly.
3. Insert three holding screws; two on bottom and one at top rear of hood.

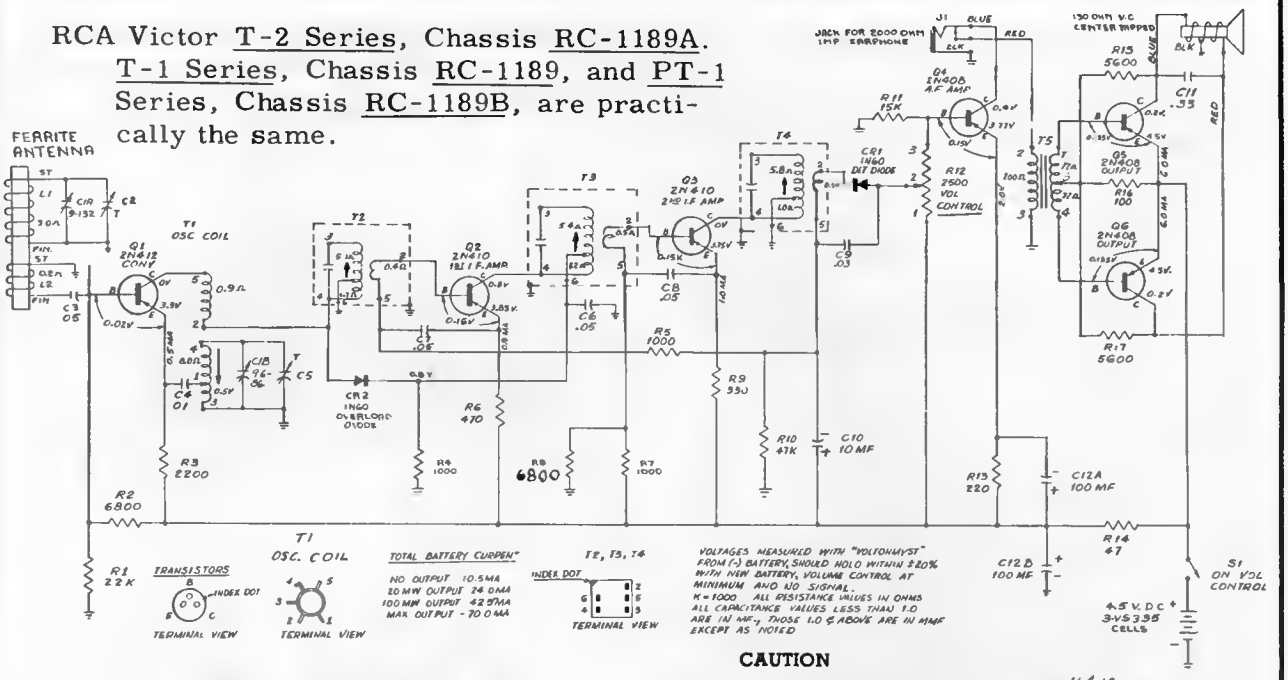
The clock-timer features not only the commonly accepted self-starting type of clock with sweep-second hand, but also a clock controlled switch which will: (1) turn the radio off after a period of operation of up to 60 minutes (sleep); (2) turns the radio on at a time predetermined up to 11 hours in advance (Auto), and, in the "C-3 Series," sound a buzzer alarm (if desired) a short time after the radio is energized. Lever type clock-timer function controls are located at the perimeter of the clock face for maximum ease of operation.

The power supply attachment cord is fastened to the cabinet and becomes disconnected from the chassis when the hood is removed.



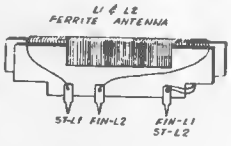
Complete Chassis Assembly — View from Component Side

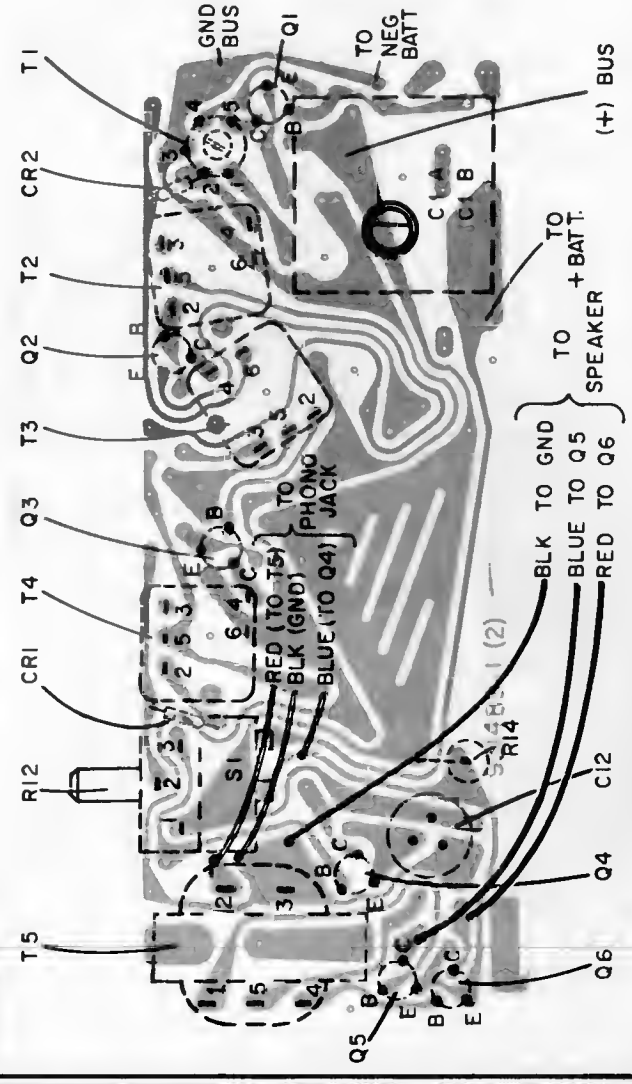
RCA Victor T-2 Series, Chassis RC-1189A. T-1 Series, Chassis RC-1189, and PT-1 Series, Chassis RC-1189B, are practically the same.



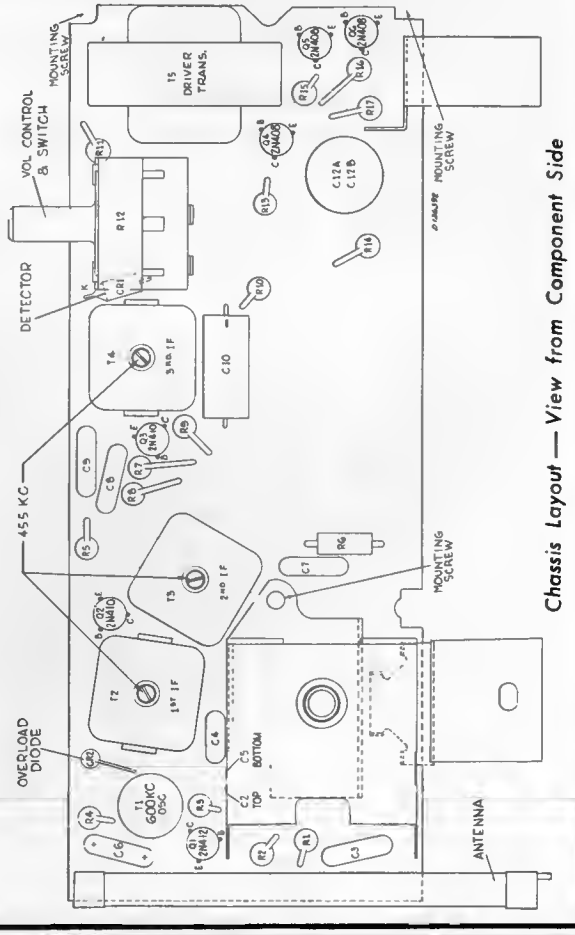
CAUTION

Damage can result from trying to pull or pry the tuning knob off from the front. To remove—remove the three chassis mounting screws, grasp the tuning capacitor and pull it out of the knob.



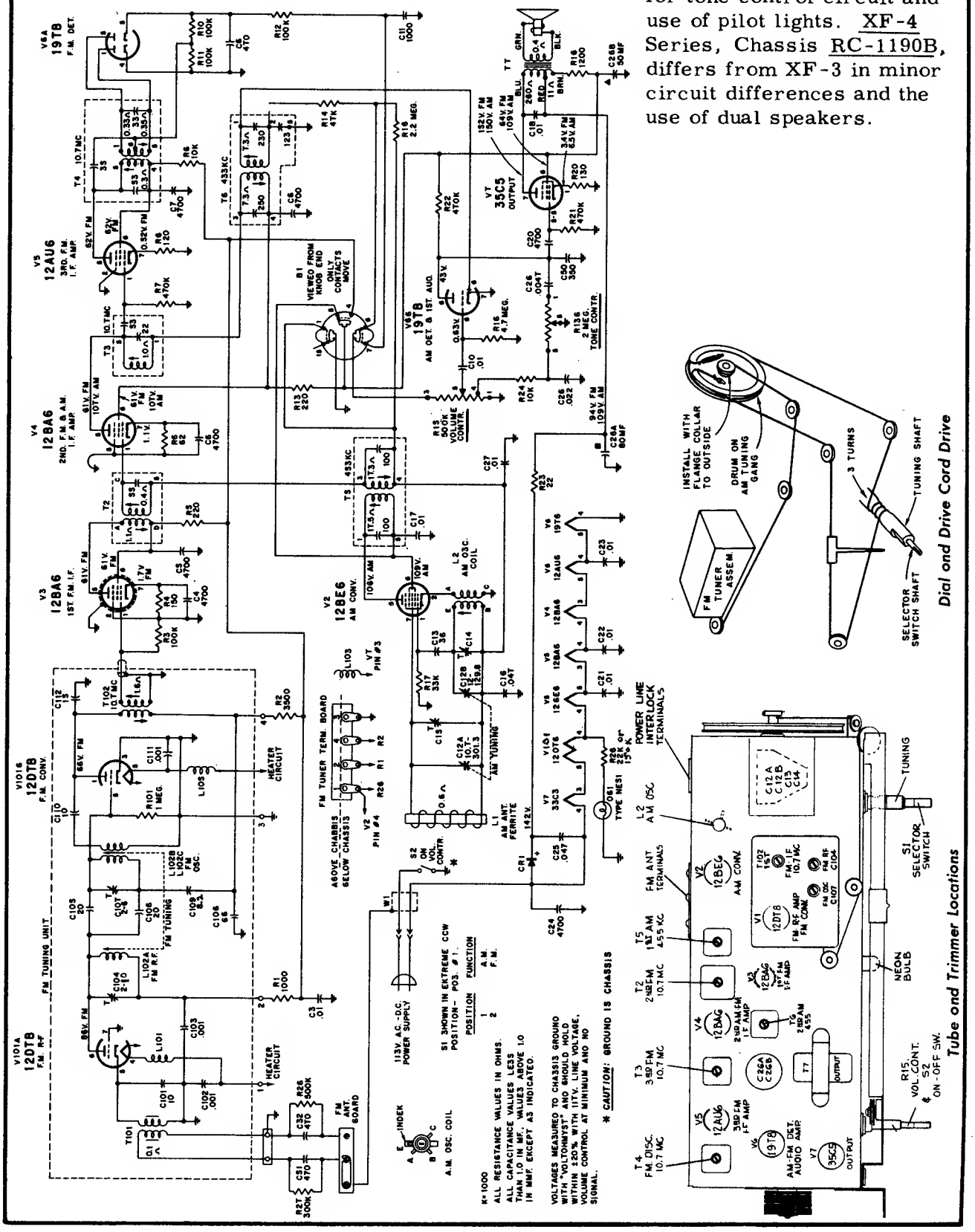


Chassis Wiring and Components — View from Wiring Side

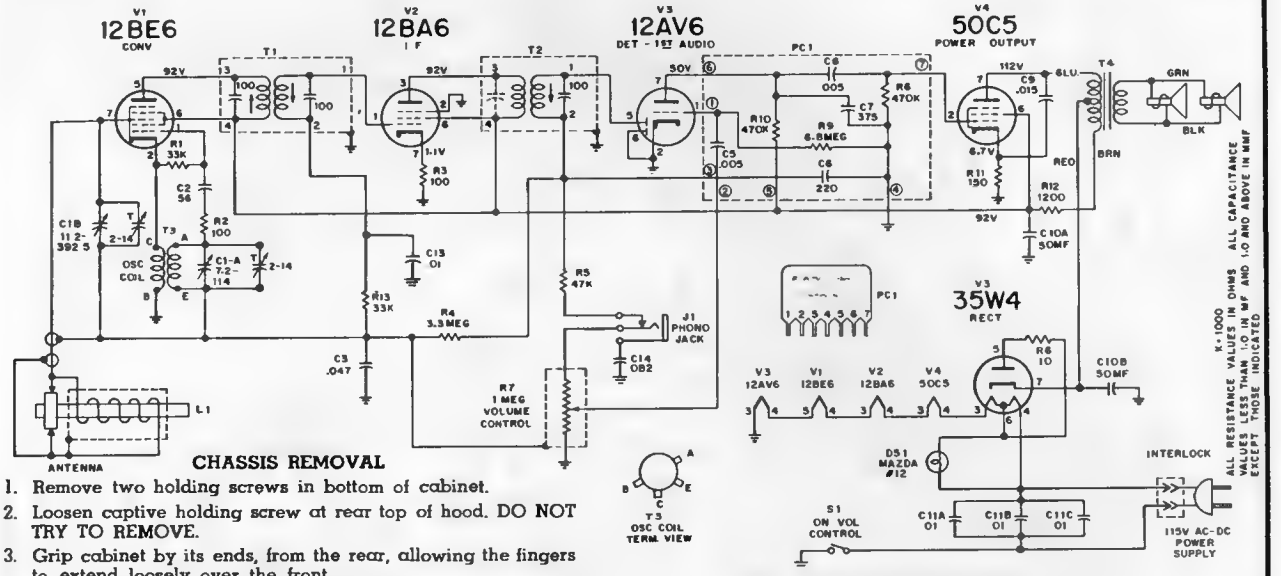


Chassis Layout — View from Component Side

RCA Victor XF-3 Series, Chassis RC-1190A, exact material on this page. XF-2 Series, Chassis RC-1190, practically the same electrically except for tone control circuit and use of pilot lights. XF-4 Series, Chassis RC-1190B, differs from XF-3 in minor circuit differences and the use of dual speakers.

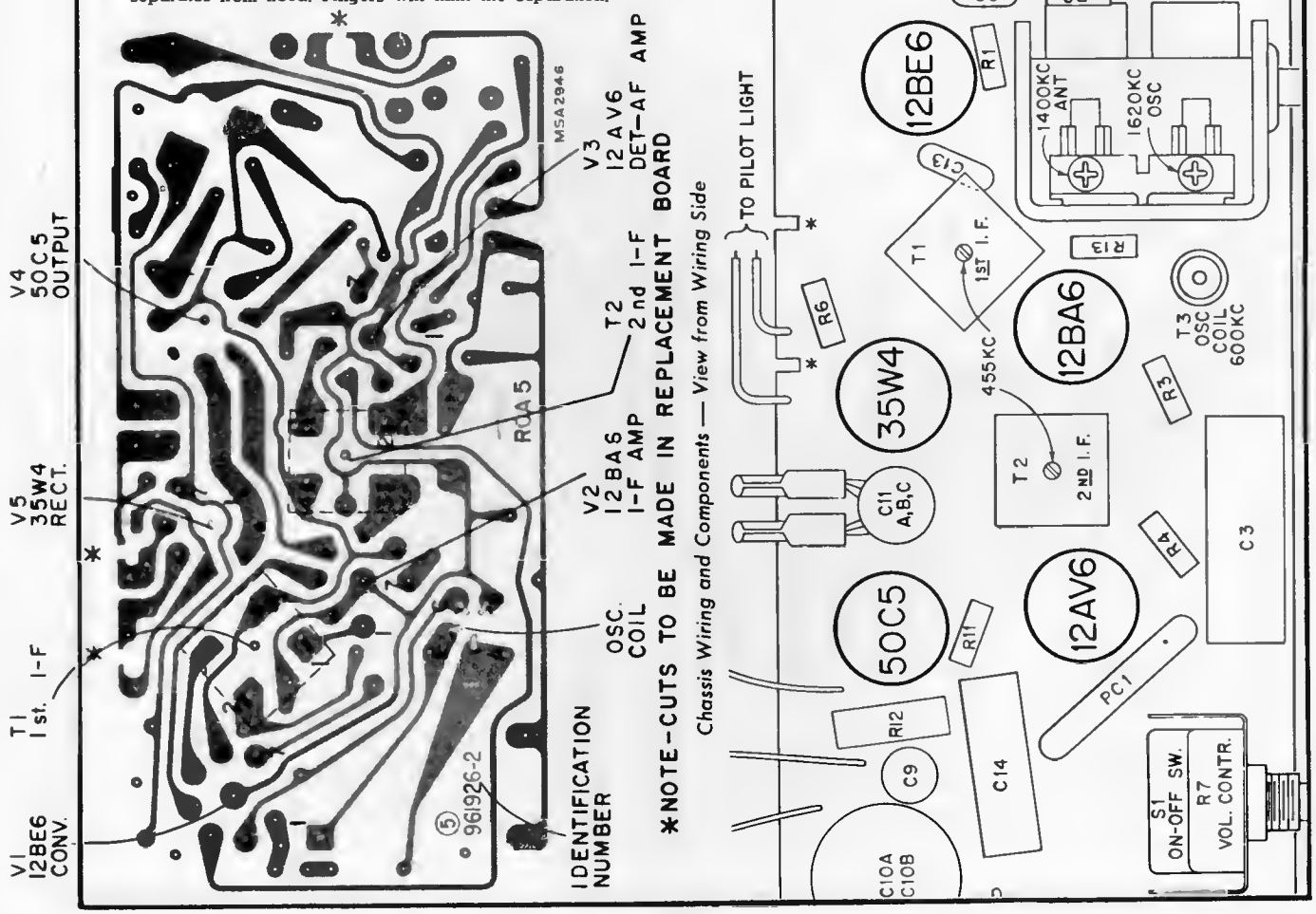


RCA Victor X-4 Series, Chassis RC-1191A, material on this page.
C-4 Series, Chassis RC-1191, is electrically the same except for addition of timer-clock with switch and appliance outlet.



CHASSIS REMOVAL

1. Remove two holding screws in bottom of cabinet.
2. Loosen captive holding screw at rear top of hood. DO NOT TRY TO REMOVE.
3. Grip cabinet by its ends, from the rear, allowing the fingers to extend loosely over the front.
4. Hold cabinet front down and shake vertically until front separates from hood. Fingers will limit the separation.



Tube and Trimmer Locations

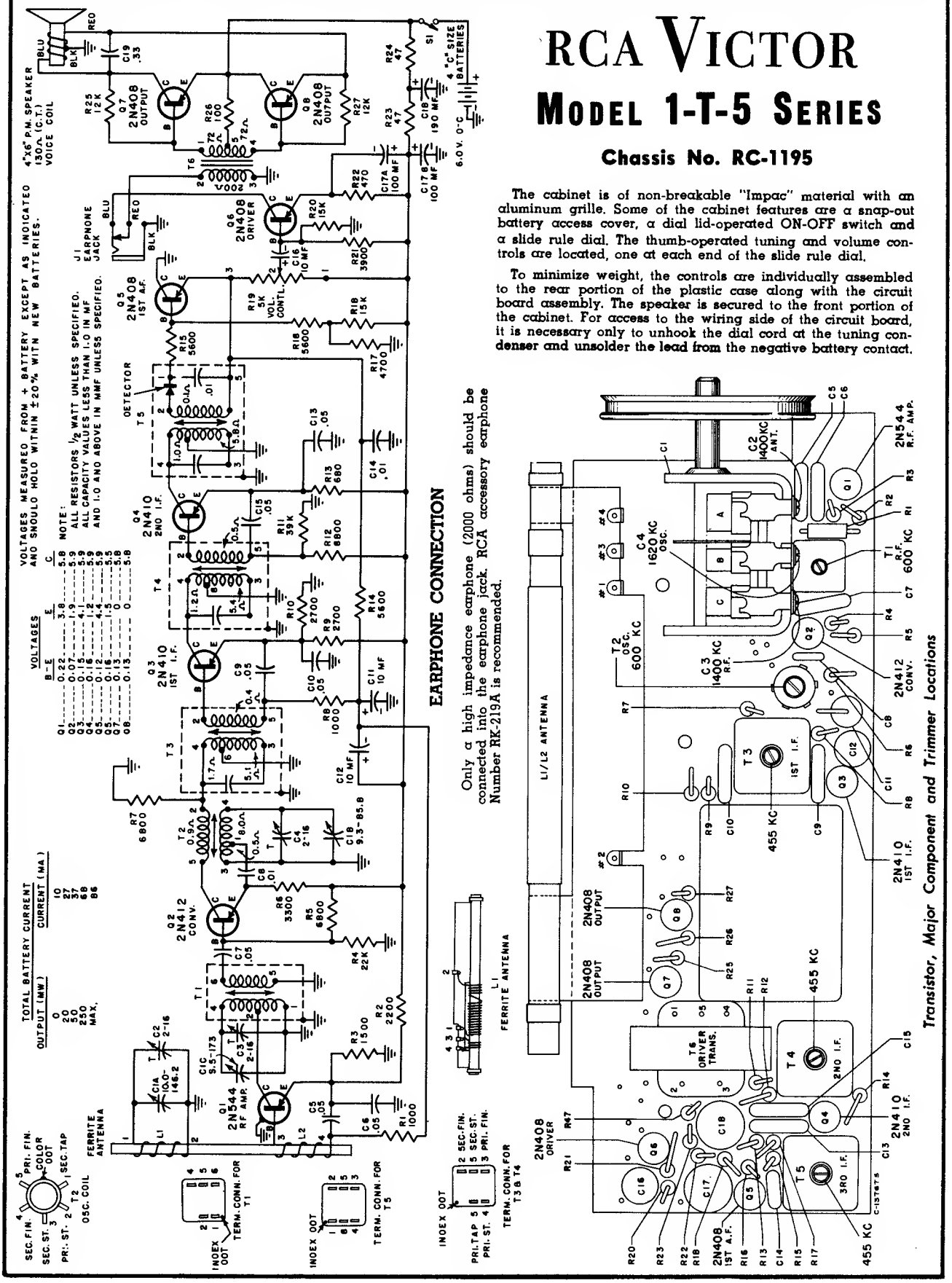
RCA VICTOR

MODEL 1-T-5 SERIES

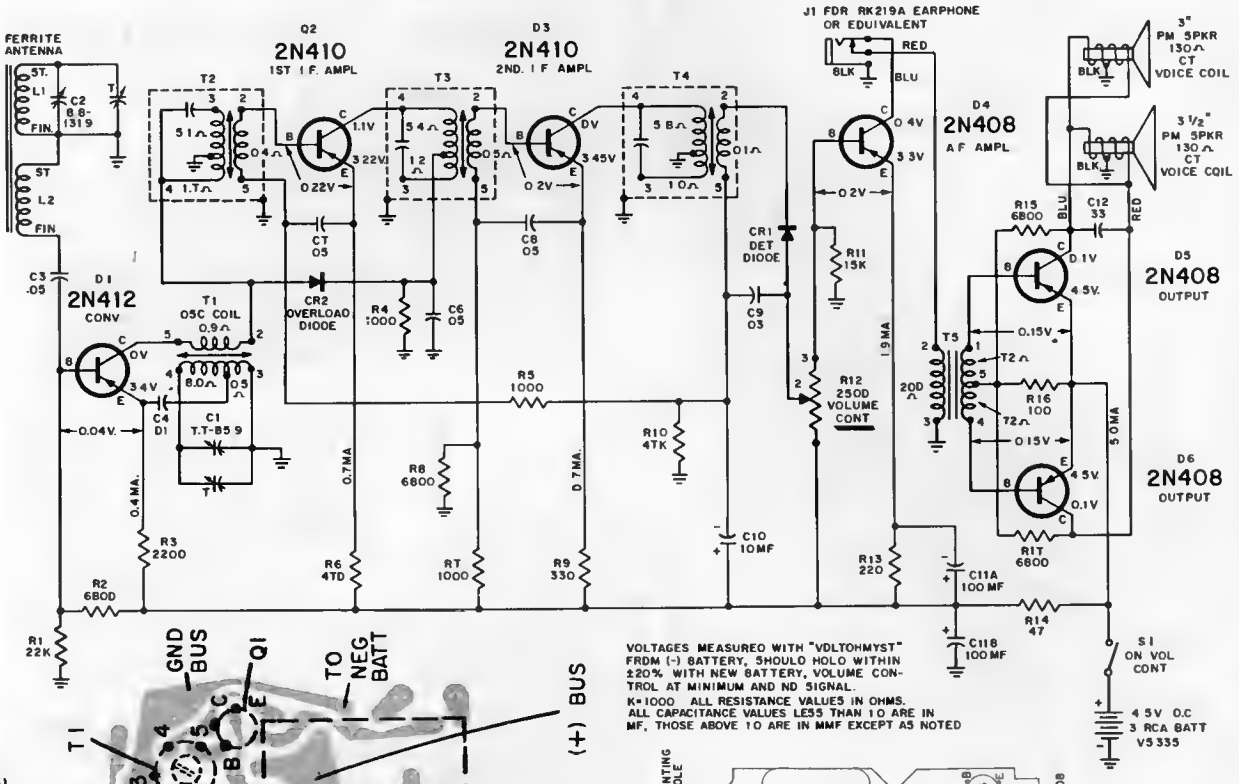
Chassis No. RC-1195

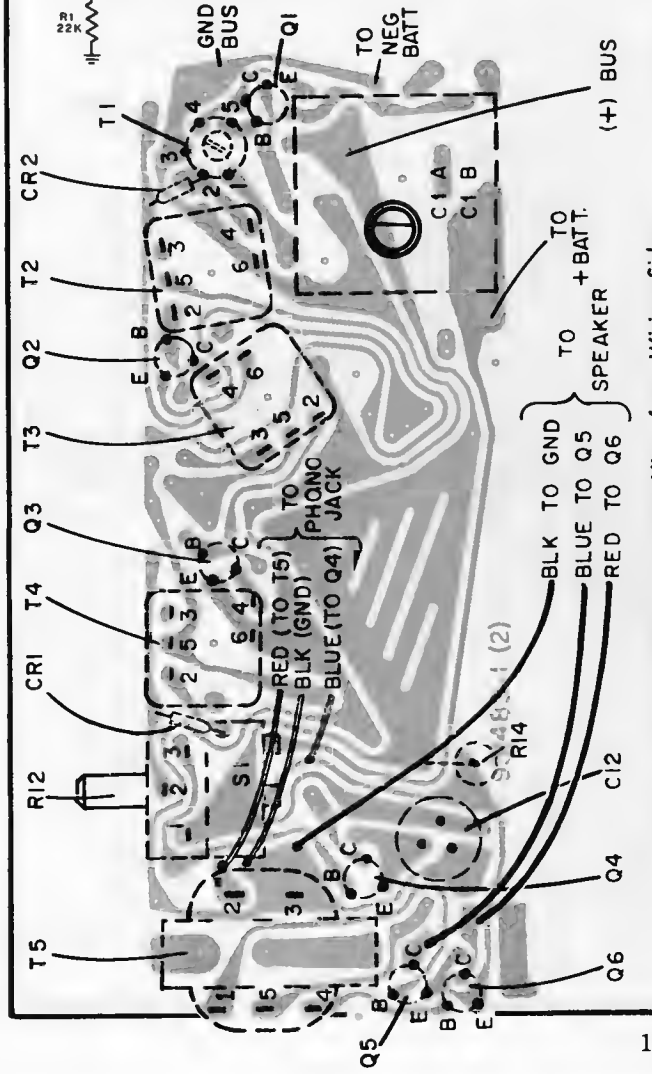
The cabinet is of non-breakable "Impac" material with an aluminum grille. Some of the cabinet features are a snap-out battery access cover, a dial lid-operated ON-OFF switch and a slide rule dial. The thumb-operated tuning and volume controls are located, one at each end of the slide rule dial.

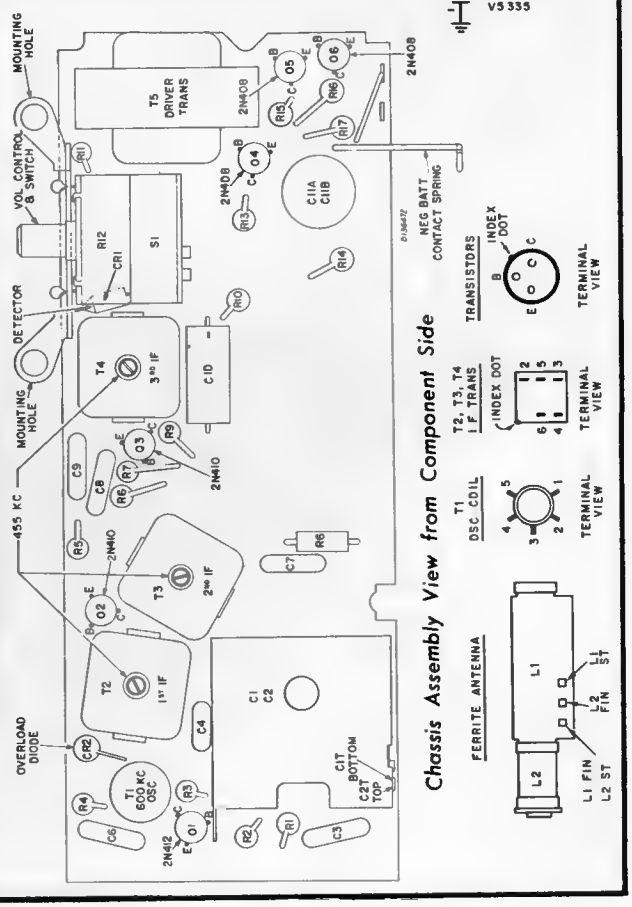
To minimize weight, the controls are individually assembled to the rear portion of the plastic case along with the circuit board assembly. The speaker is secured to the front portion of the cabinet. For access to the wiring side of the circuit board, it is necessary only to unhook the dial cord at the tuning condenser and unsolder the lead from the negative battery contact.



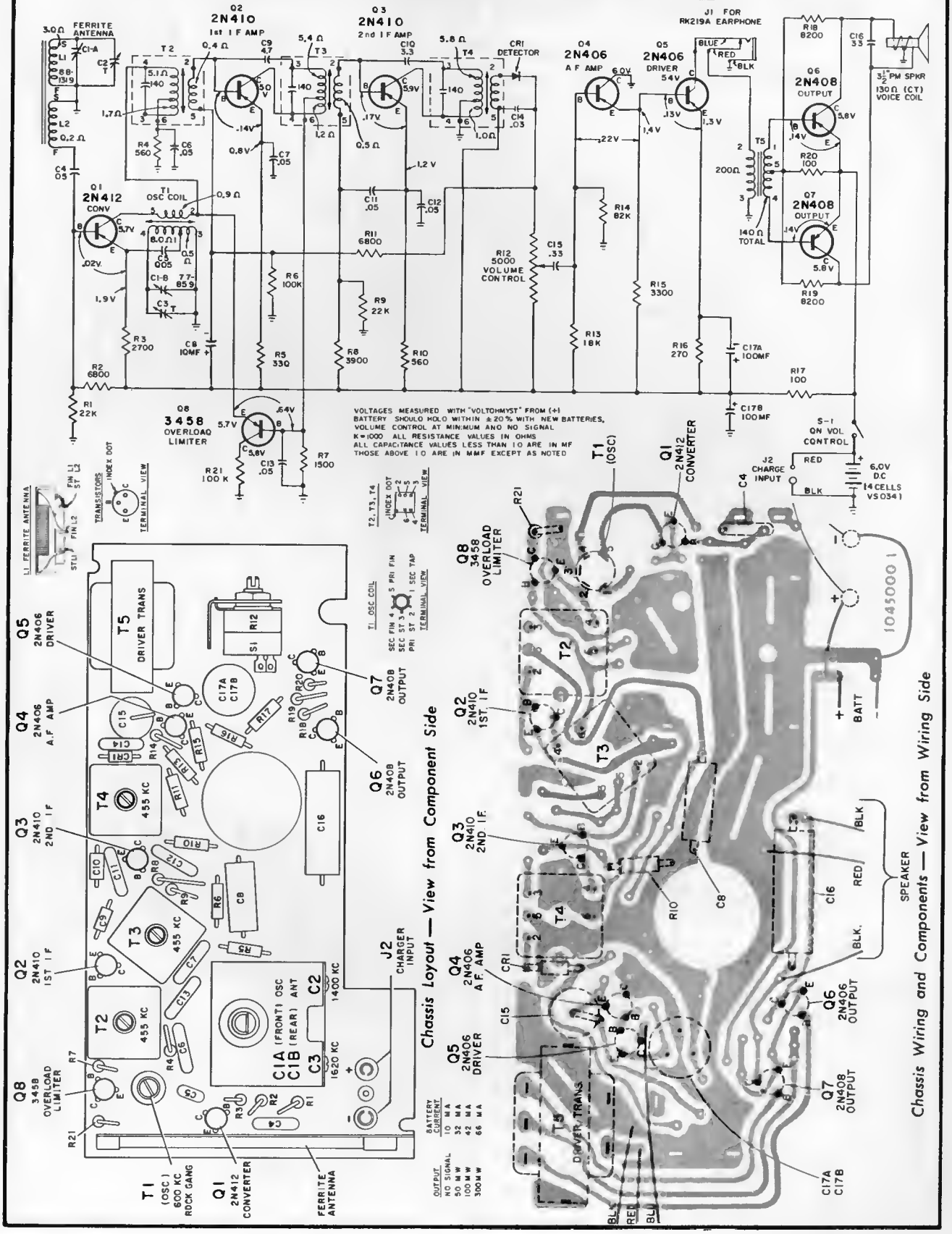
RCA Victor TX-1 Series, Chassis RC-1196A, material on this page.
TC-1 Series, Chassis RC-1196, uses practically identical circuit, but has a single speaker and includes a battery operated clock.







RCA Victor 1-T-4 Series, Chassis RC-1197.



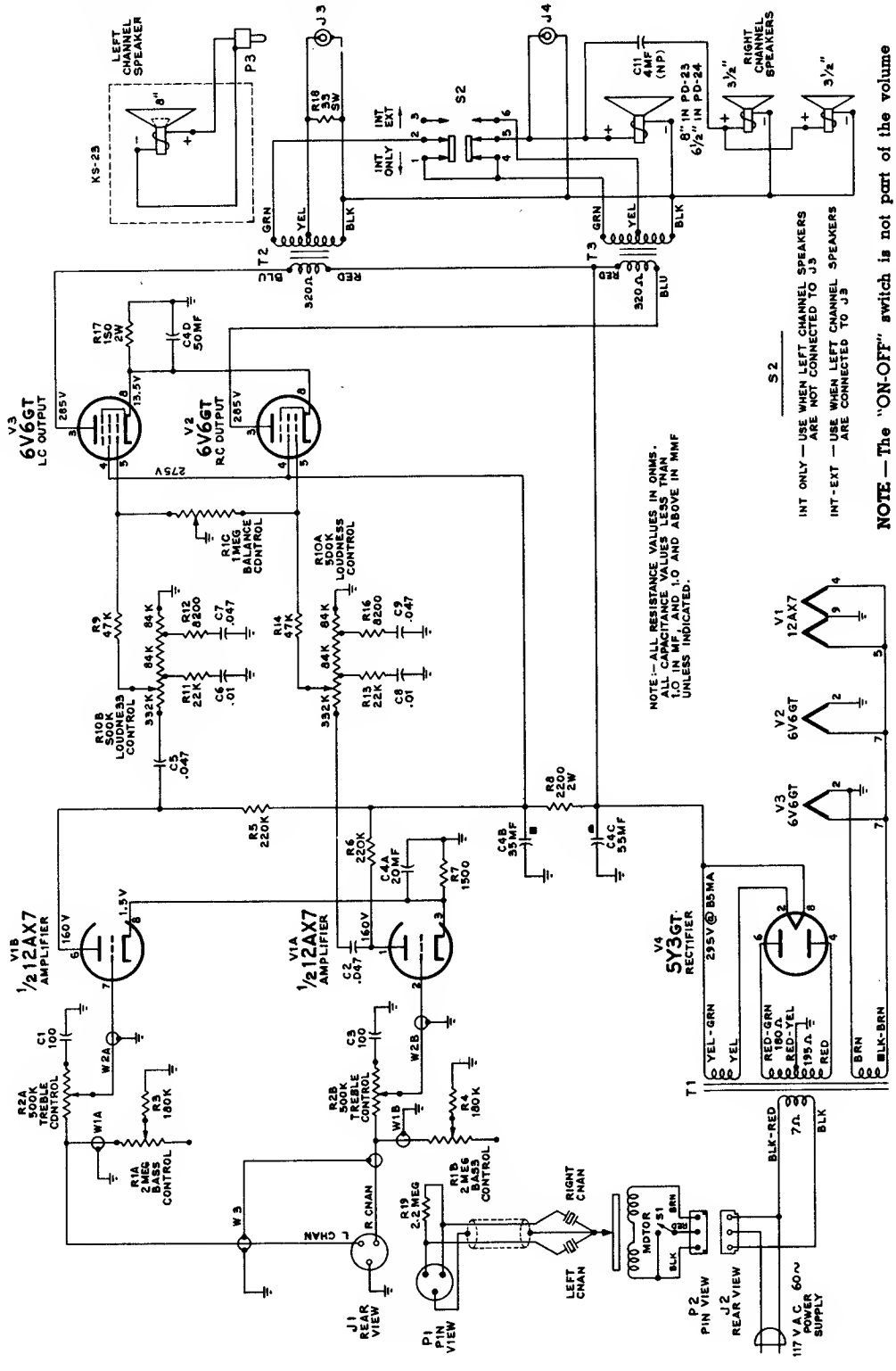
RCA MODELS PD-23, PD-24

Chassis No. RS-178

Companion Speaker Unit

MODEL KS-23

Model PM-23D, Chassis RS-178X, is similar, but has left and right internal speakers



NOTE — The "ON-OFF" switch is not part of the volume control. The record changer must be "ON" for power to be applied to the amplifier.

The SPEAKER FUNCTION SWITCH (S2) must be in "INT. ONLY" when internal speakers only are used (left-channel speakers not connected to J3).

For stereophonic record reproduction, an external speaker system must be connected to J3 and the speaker function switch must be in "INT.-EXT." position.

ACCESS TO TUBES AND CHASSIS

Model PD-23

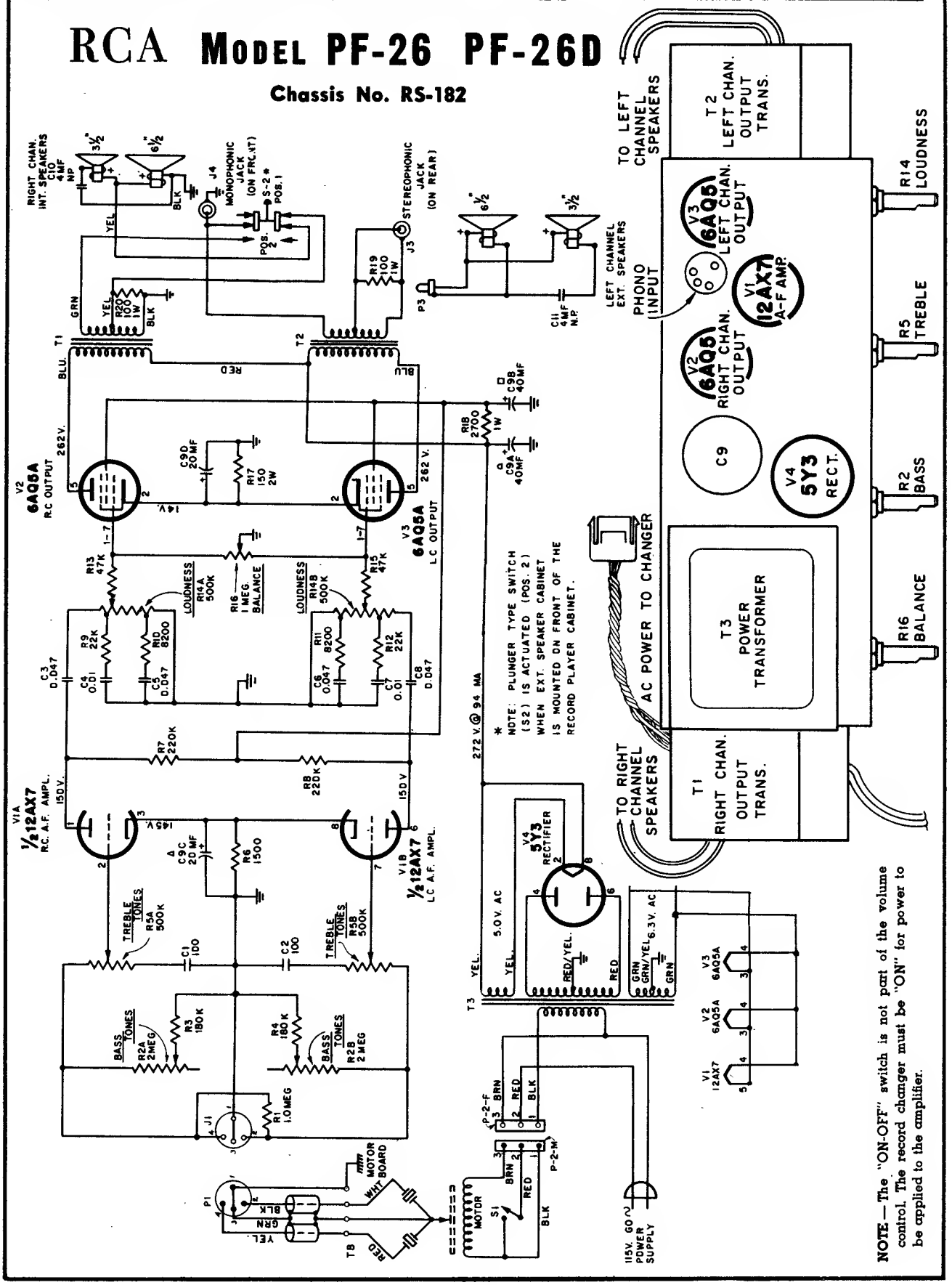
The rear of this cabinet is open allowing free access to the tubes and chassis.

Model PD-24

Access is possible either by removing the bottom of the cabinet or by removing the screws at the edges of the record changer motorboard and lifting the changer.

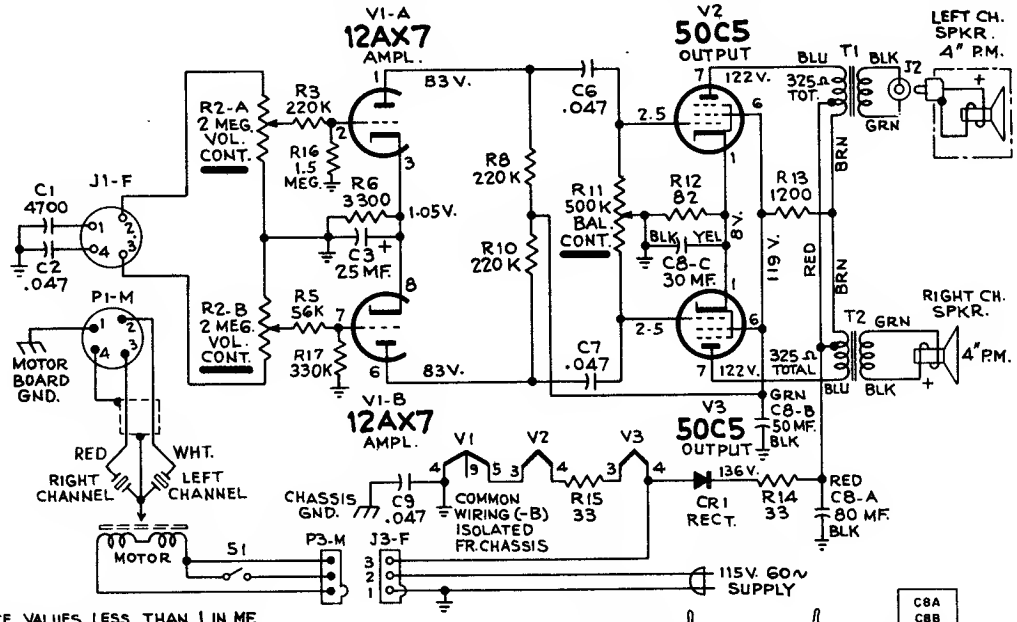
RCA MODEL PF-26 PF-26D

Chassis No. RS-182



NOTE—The "ON-OFF" switch is not part of the volume control. The record changer must be "ON" for power to be applied to the amplifier.

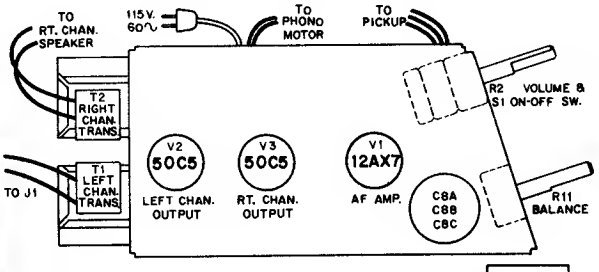
RCA Victor SES-3 Series, Chassis RS-184A. Model SES-4JE, RS-184 is similar.

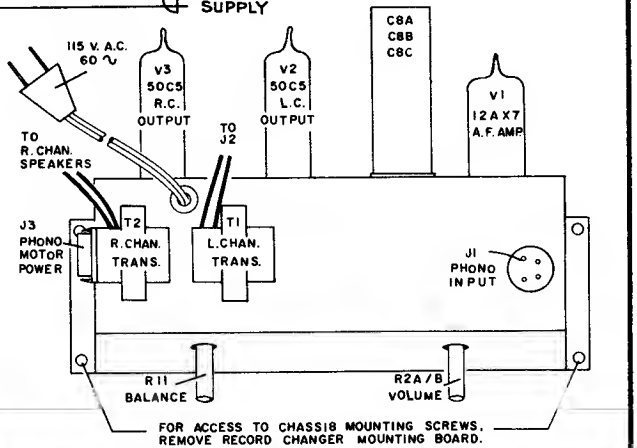


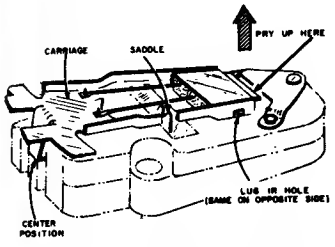
CAPACITANCE VALUES LESS THAN 1 IN MF. 1 AND ABOVE IN MMF. UNLESS OTHERWISE INDICATED.

RESISTANCE VALUES IN OHMS. K = 1000

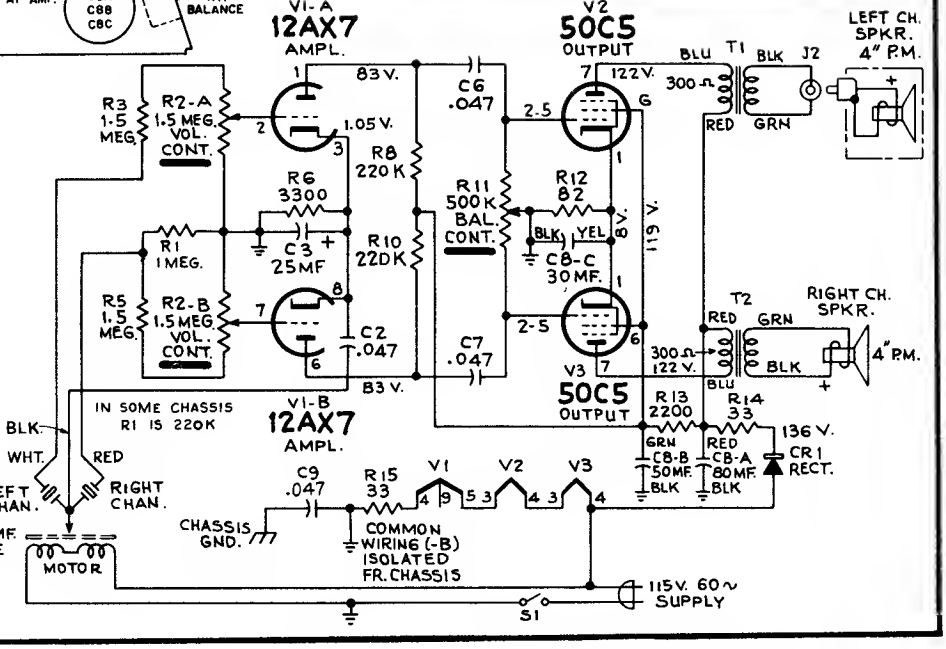
RCA Victor Model SES-2LE
Chassis RS-185







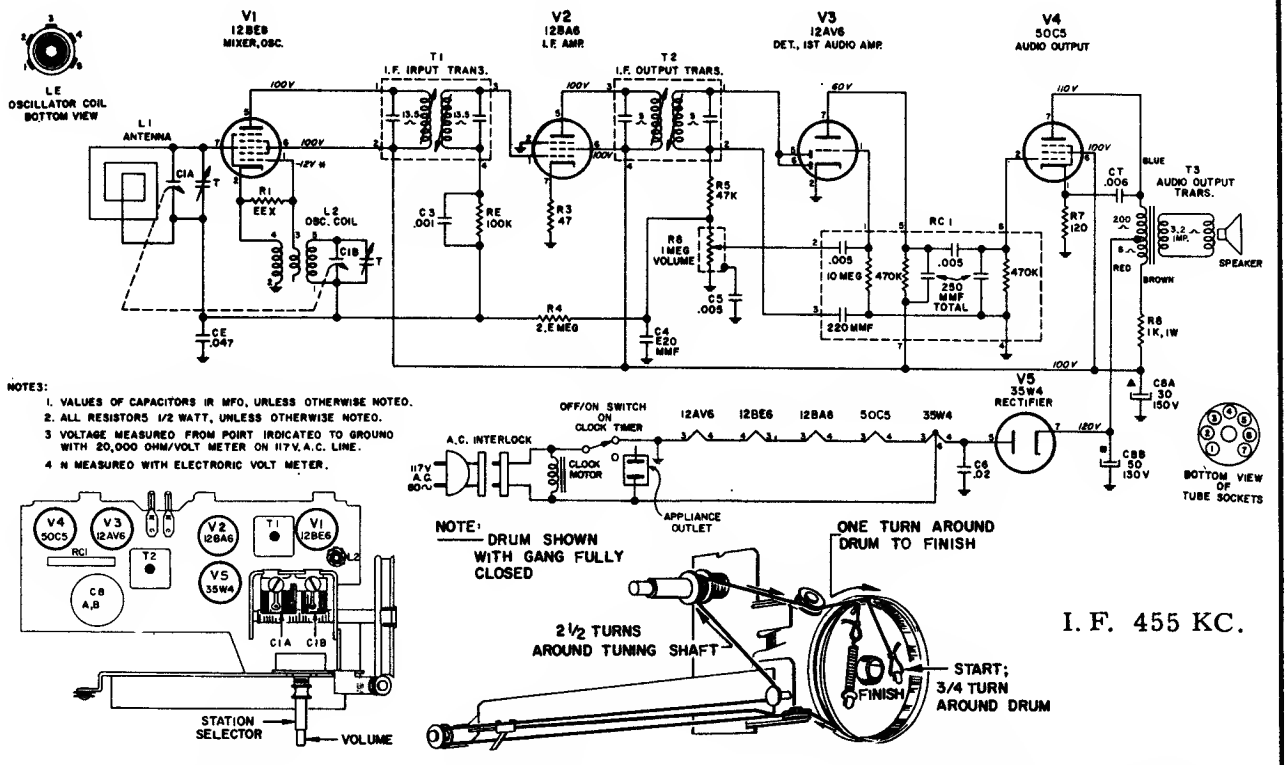
Removal of Stylus Assembly



CAPACITANCE VALUES LESS THAN 1 IN MF. 1 AND ABOVE IN MMF. UNLESS OTHERWISE INDICATED.

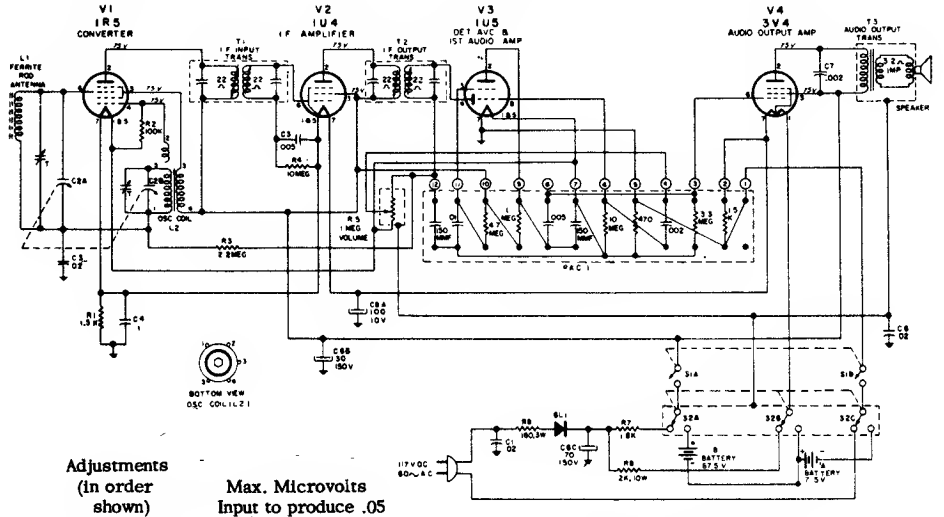
RESISTANCE VALUES IN OHMS. K = 1000

Sears, Roebuck & Co. Models 9021, 9022, 9023, 9023.5, Chassis 528.53300, Models 9019, 9020, Chassis 528.53310, are alike electrically less appl. outlet.



I. F. 455 KC.

Sears, Roebuck & Co. Models 9214, 9215, 9217A, 9218A, Chassis 528.53350



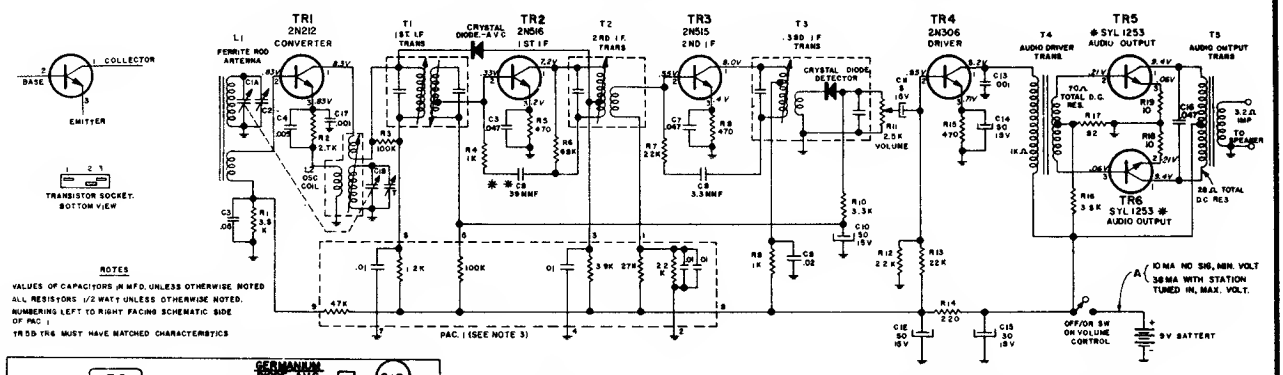
ALIGNMENT PROCEDURE

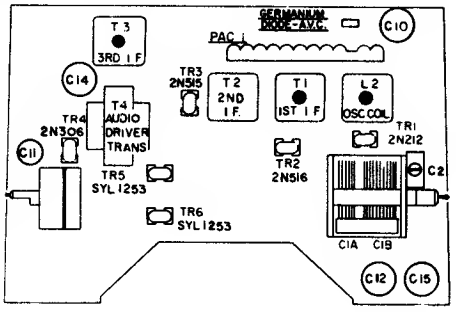
Output meter reading to indicate 0.05 watt across voice coil . . . . . 0.4 v.
Generator ground lead connected . . . . . to chassis
Generator modulation . . . . . 30%, 400 cycles
Position of volume control . . . . . fully on.
Position of dial with tuner fully closed . . . . . Dial should be fully counter-clockwise. Pointer should be at 550 Kc mark on dial.

Position of Tuner	Generator Freq.	Generator Connection	Adjustments (in order shown) For Max. Output	Max. Microvolts Input to produce .05 w. output
Min. Cap.	455 Kc	Pin #6 of 1U4 1. F. Amp.	T2 (top and bottom)	5000
Min. Cap.	455 Kc	Pin #6 of 1R5 Conv.	T1 (top and hottom)	250
Min. Cap.	1625 Kc	Stator ant. tuner	C2B (T)	
1400 Kc	1400 Kc	Hazeltine Test Loop	C2A (T)	900 uv/m
600 Kc	600 Kc	Hazeltine Test Loop	L2	900 uv/m

(Rock variable condenser back and forth through the signal while adjusting core in oscillator coil, L2).

Sears, Roebuck & Co. Model 9222, Chassis 528.53400

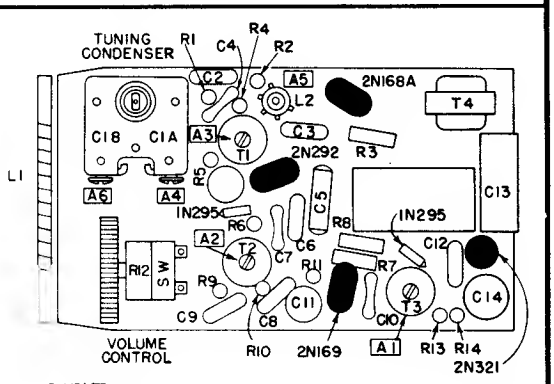




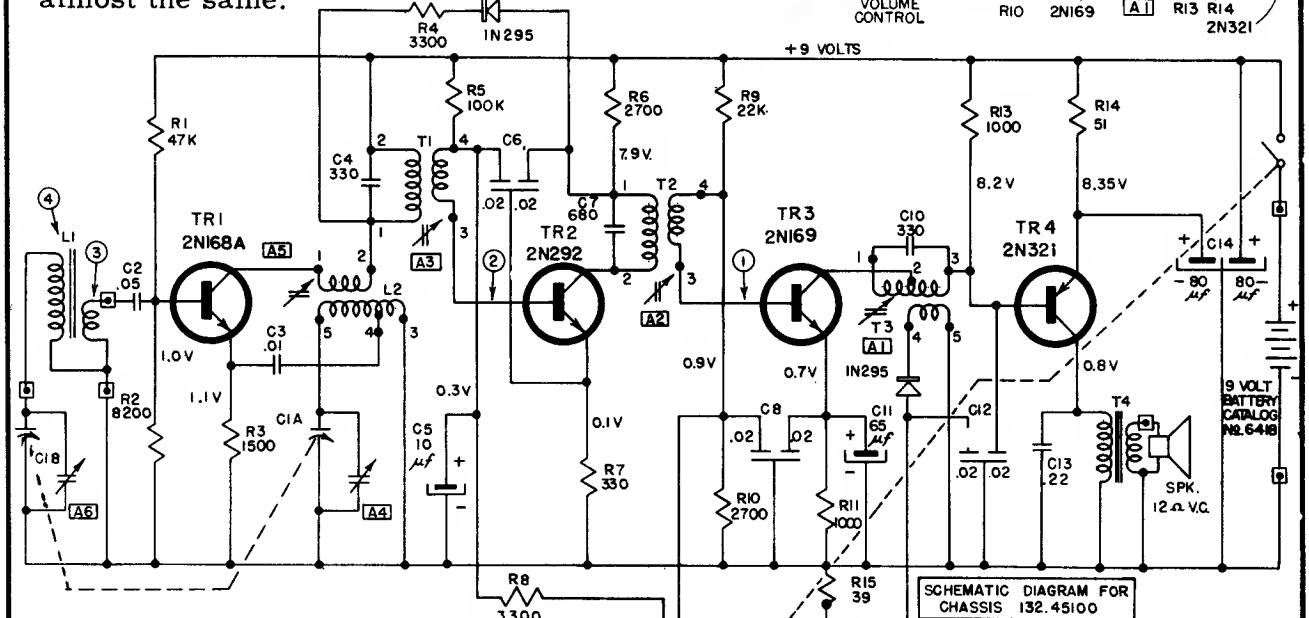
*Some models were produced using two type 2N214 output transistors in place of type 1253 transistors when replacing Output transistors, replace with two type 1253 transistors or two type 2N214 transistors. DO NOT USE ONE TRANSISTOR OF EACH TYPE.

* * On some models C6 is 33mmfd.

I. F. 455 KC.

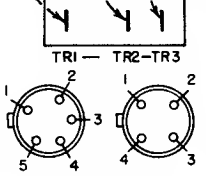


Sears, Roebuck & Co.
Models 9202 and 9203, Chassis 132.45100, Models 9202A, 9203A, Chassis 132.45102 are almost the same.

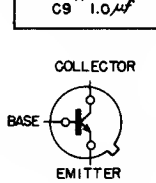


ALIGNMENT PROCEDURE

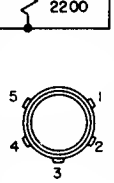
Position of Tuning Condenser	Frequency of Generator	Generator Output Connection	Trimmer Adj. in order shown for Max. Output
Open	455 KC	C1B	A1 (Top of T3) A2 (Top of T2) A3 (Top of T1)
Open	1670 Kc	Test Loop	A4
1400 Kc	1400 Kc	Test Loop	A6
600 Kc	600 Kc	Test Loop	Check Point



I.F. TRANSFORMER BASE



TRANSISTOR TR 4



L2

(BOTTOM VIEWS)

SCHEMATIC DIAGRAM FOR CHASSIS 132.45100

RESISTANCE VALUES ARE IN OHMS; K=1000

⊡ = EXTERNAL CONNECTIONS TO PRINTED CIRCUIT.

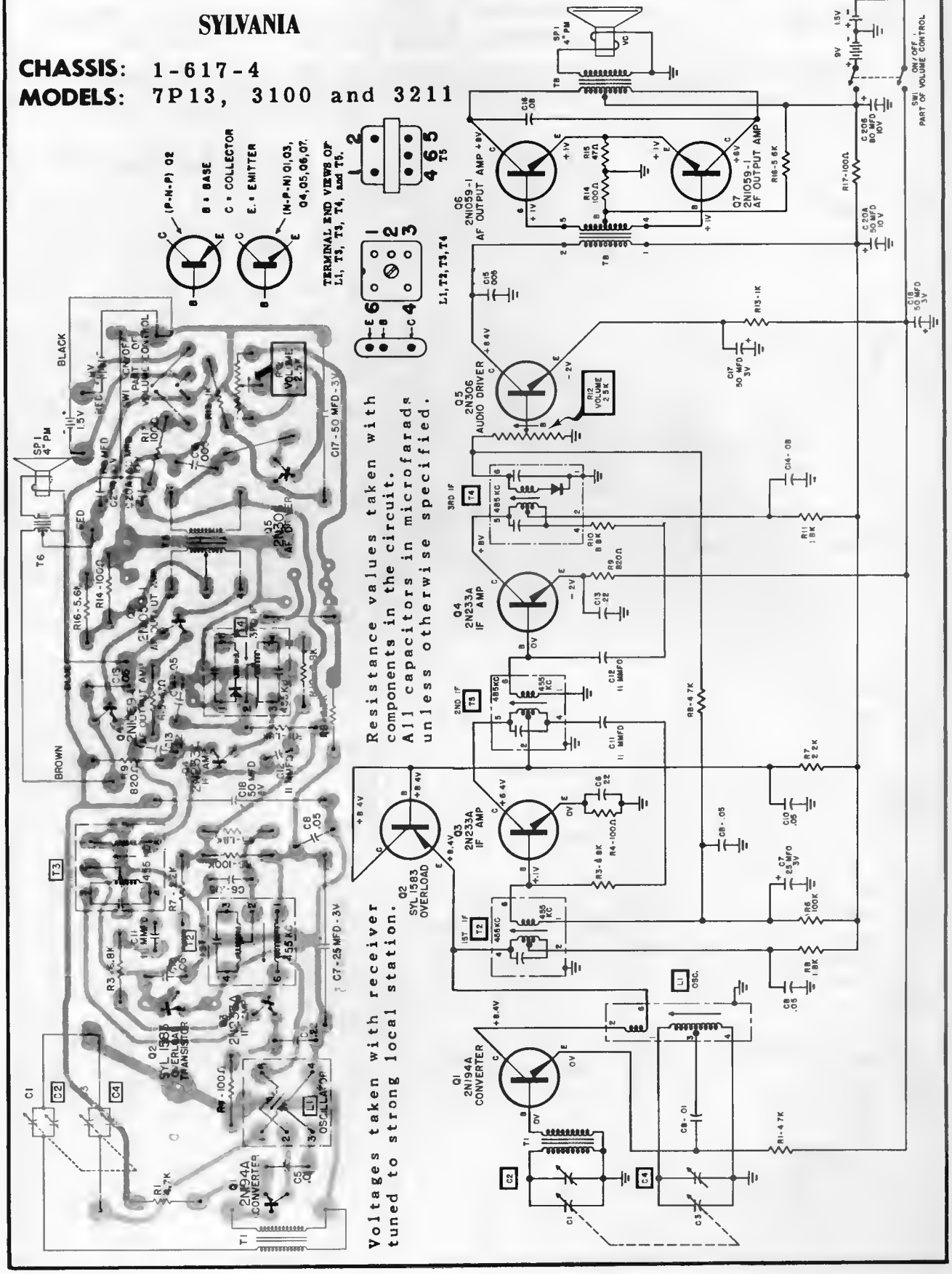
CAPACITANCE VALUES LESS THAN 1.0 ARE IN MICROFARADS (µf), AND VALUES GREATER THAN 1.0 ARE IN MICRO-MICROFARADS (µµf) EXCEPT WHERE NOTED.

VOLTAGE READINGS TO COMMON GROUND ARE MEASURED WITH VACUUM TUBE VOLTMETER UNDER NO SIGNAL CONDITIONS WITH TUNING CAPACITOR CLOSED AND VOLUME CONTROL AT MAXIMUM CLOCKWISE ROTATION.

SYLVANIA

CHASSIS: 1-617-4

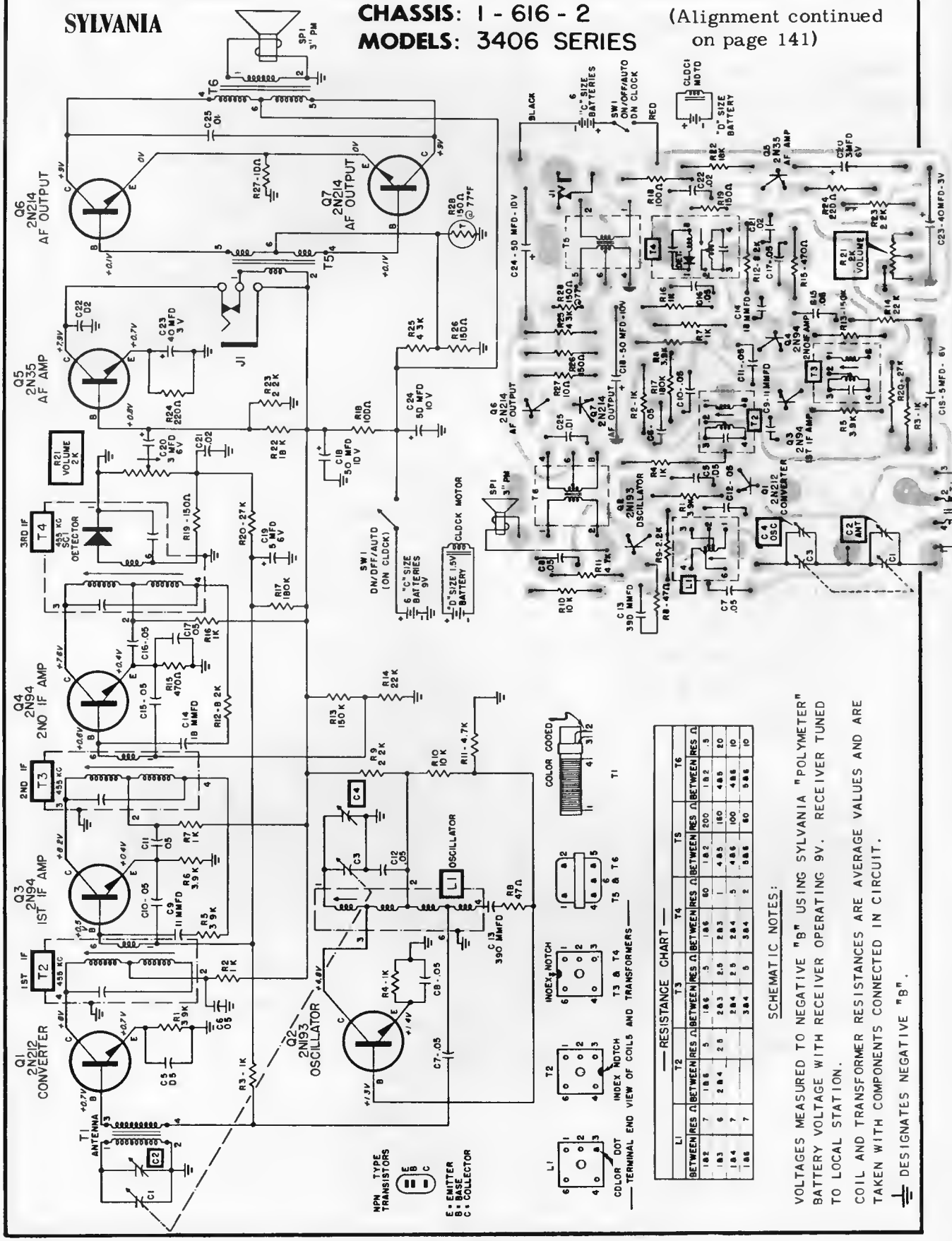
MODELS: 7P13, 3100 and 3211



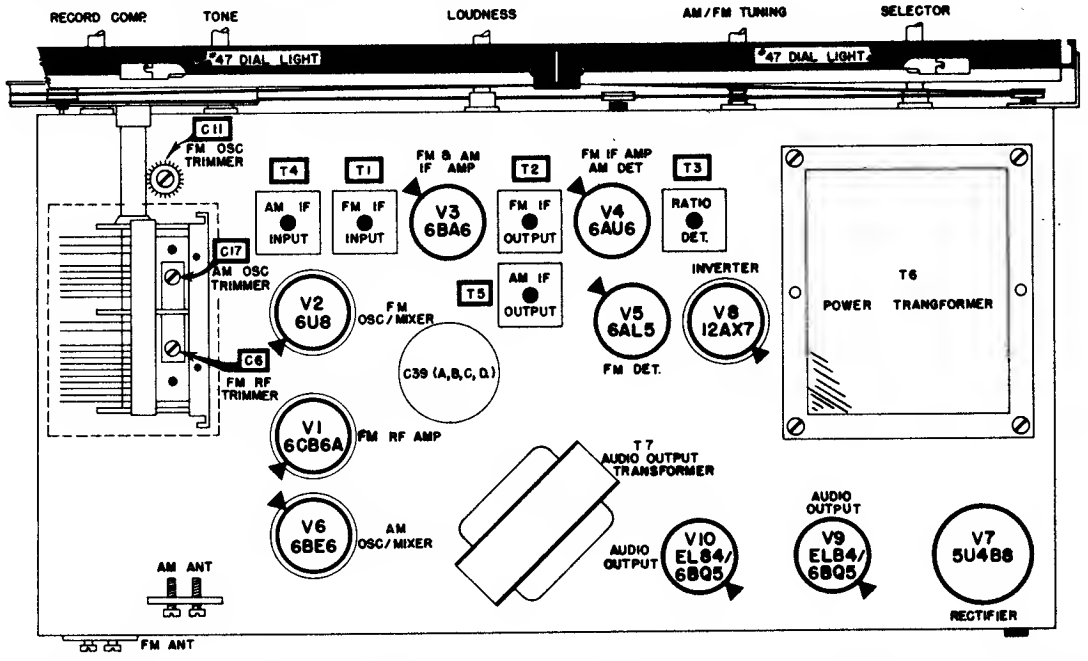
SYLVANIA

CHASSIS: 1 - 616 - 2
MODELS: 3406 SERIES

(Alignment continued on page 141)



SYLVANIA Chassis 1-635-1, Model 4703, Material continued on next two pages.



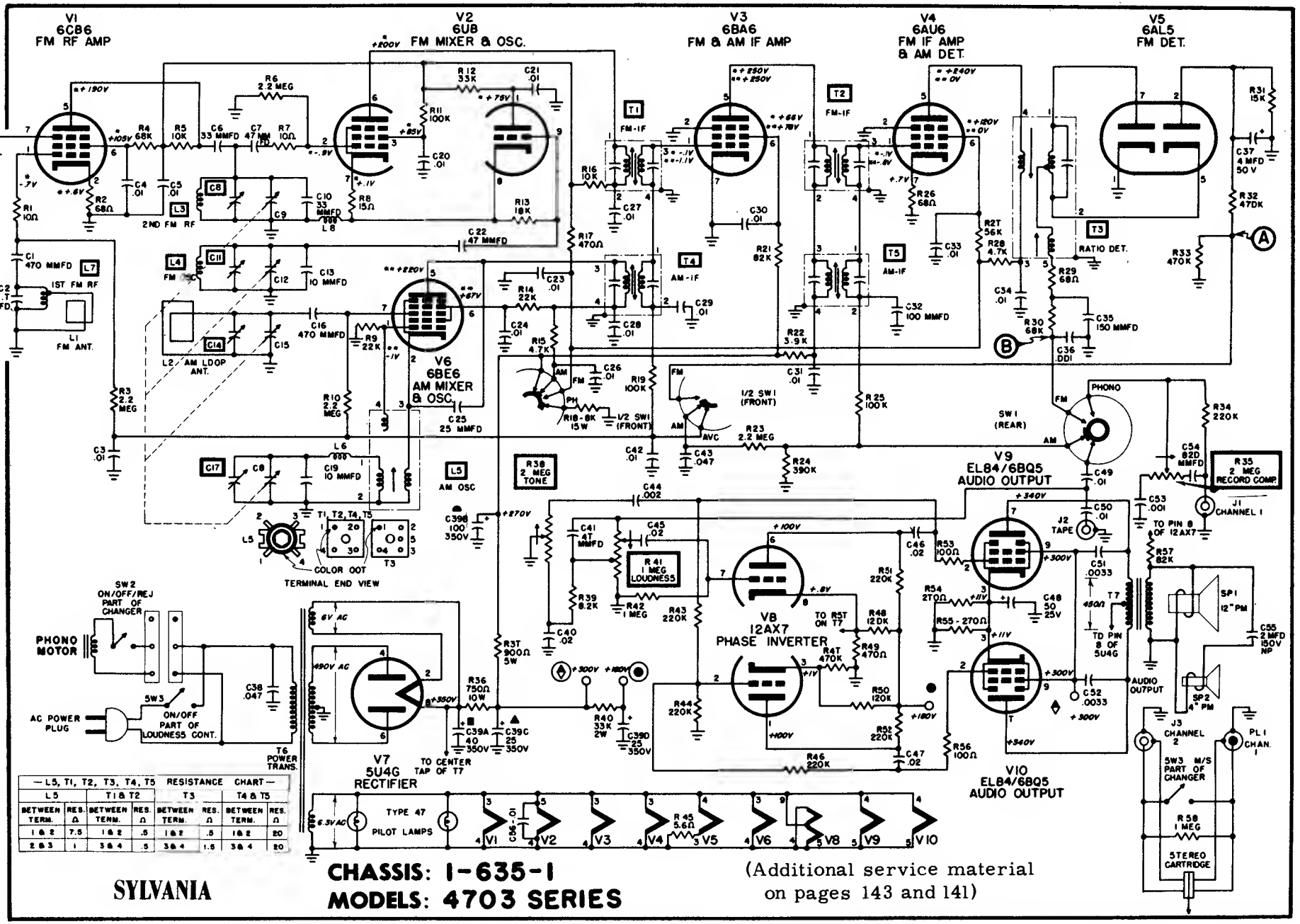
SYLVANIA Chassis 1-616-2, Model 3406, Alignment (Continued)

CHASSIS REMOVAL

1. Remove volume and tuning knobs by pulling straight out.
2. Unsnap buttons securing back flap, lift flap and remove large battery case as far as leads permit.
3. Remove four (4) nuts and insulating washers securing chassis to case, (2) located left edge of board, (1) located center of board and (1) located lower right corner of board. Remove chassis from case. (Speaker and clock lead lengths permit removal of chassis from case without unsoldering. If necessary to remove chassis from case completely, identify all leads, unsolder speaker leads at speaker, clock leads at terminals on chassis.

ALIGNMENT PROCEDURE

	ALIGNMENT SETUP NOTES	TEST EQUIPMENT HOOKUP	ADJUST FOR MAXIMUM VOLUME
1.	Set variable tuning capacitor plates fully open (minimum capacity).	SIGNAL GENERATOR - radiate signal to receiver through a loop consisting of several turns of wire in series with a 150 Ohm resistor. Set generator frequency at 455 KC.	In order shown T4, T3, T2. Repeat for optimum performance.
2.	Set dial to approximately 1650 KC.	SIGNAL GENERATOR - radiated to receiver as in step 1. Set generator frequency at 1650 KC.	C4 (oscillator trimmer)
3.	Set dial to a frequency between 1400 KC and 1500 KC.	SIGNAL GENERATOR - radiated to receiver as in step 1. Set generator to a frequency corresponding to receiver dial (until signal is heard) through receiver speaker.)	C2 (antenna trimmer)
4.	Set dial to 600 KC.	SIGNAL GENERATOR - radiated to receiver as in step 1. Set generator to 600 KC and tune for maximum volume.	L1 (oscillator coil) while simultaneously rocking tuning capacitor through the 600 KC position.



— L5, T1, T2, T3, T4, T5 RESISTANCE CHART —							
L5		T1 & T2		T3		T4 & T5	
BETWEEN TERM.	RES. Ω	BETWEEN TERM.	RES. Ω	BETWEEN TERM.	RES. Ω	BETWEEN TERM.	RES. Ω
1 & 2	7.5	1 & 2	.5	1 & 2	.5	1 & 2	20
2 & 3	1	3 & 4	.5	3 & 4	1.5	3 & 4	20

SYLVANIA

CHASSIS: 1-635-1
MODELS: 4703 SERIES

(Additional service material on pages 143 and 141)

SYLVANIA Chassis 1-635-1, Model 4703, Alignment, Continued

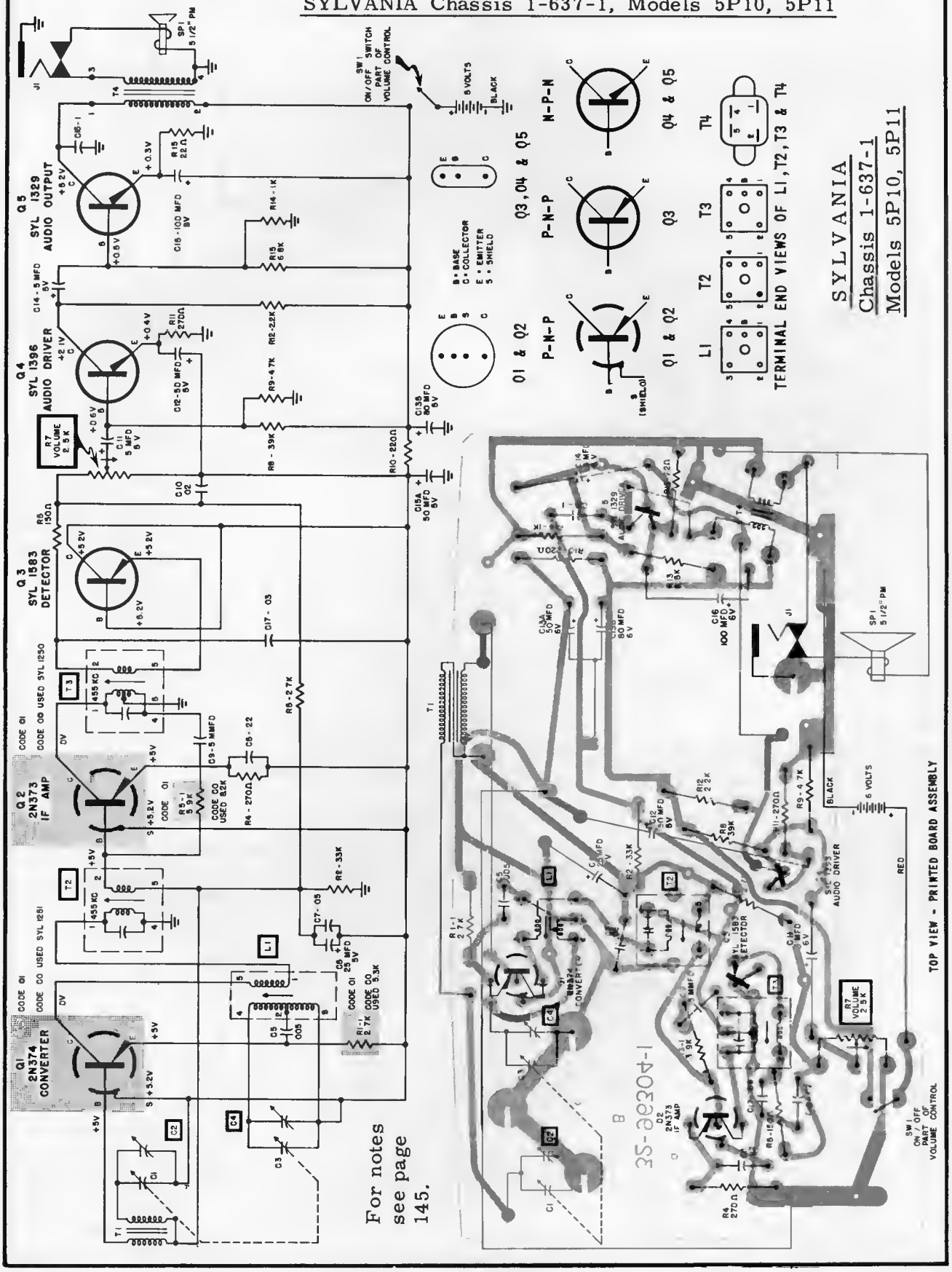
AM ALIGNMENT

STEP	SETUP NOTES	TEST EQUIPMENT HOOKUP	ADJUST FOR MAXIMUM
1.	SELECTOR SWITCH IN AM POSITION VARIABLE TUNING CAPACITOR FULLY OPEN	SIGNAL GENERATOR - "HOT" LEAD THROUGH A .1 MFD CAPACITOR TO PIN 7 OF V6. GROUND LEAD TO CHASSIS. SET GENERATOR TO 455 KC. AC VOLTMETER - ACROSS AUDIO OUTPUT TRANSFORMER.	T5 - BOTTOM CORE T5 - TOP CORE T4 - BOTTOM CORE T4 - TOP CORE
2.	SELECTOR SWITCH IN AM POSITION VARIABLE TUNING CAPACITOR AT 1620 KC	SIGNAL GENERATOR - "HOT" LEAD THROUGH A .1 MFD CAPACITOR TO PIN 7 OF V6. GROUND LEAD TO CHASSIS. SET GENERATOR TO 1620 KC. AC VOLTMETER - ACROSS AUDIO OUTPUT TRANSFORMER	C17 - AM OSC. TRIMMER
3.	SELECTOR SWITCH IN AM POSITION VARIABLE TUNING CAPACITOR AT 535KC	SIGNAL GENERATOR - "HOT" LEAD THROUGH A .1 MFD CAPACITOR TO PIN 7 OF V6. GROUND LEAD TO CHASSIS. SET GENERATOR TO 535 KC. AC VOLTMETER - ACROSS AUDIO OUTPUT TRANSFORMER.	L5 - AM OSC. COIL
4.	SELECTOR SWITCH IN AM POSITION VARIABLE TUNING CAPACITOR AT 1400 KC	SIGNAL GENERATOR - RADIATE SIGNAL TO RECEIVER THROUGH A LOOP OF SEVERAL TURNS OF WIRE. SET GENERATOR TO 1400 KC. AC VOLTMETER - ACROSS AUDIO OUTPUT TRANSFORMER.	C14 AM ANTENNA TRIMMER (LOCATED ON LOOP ANTENNA)

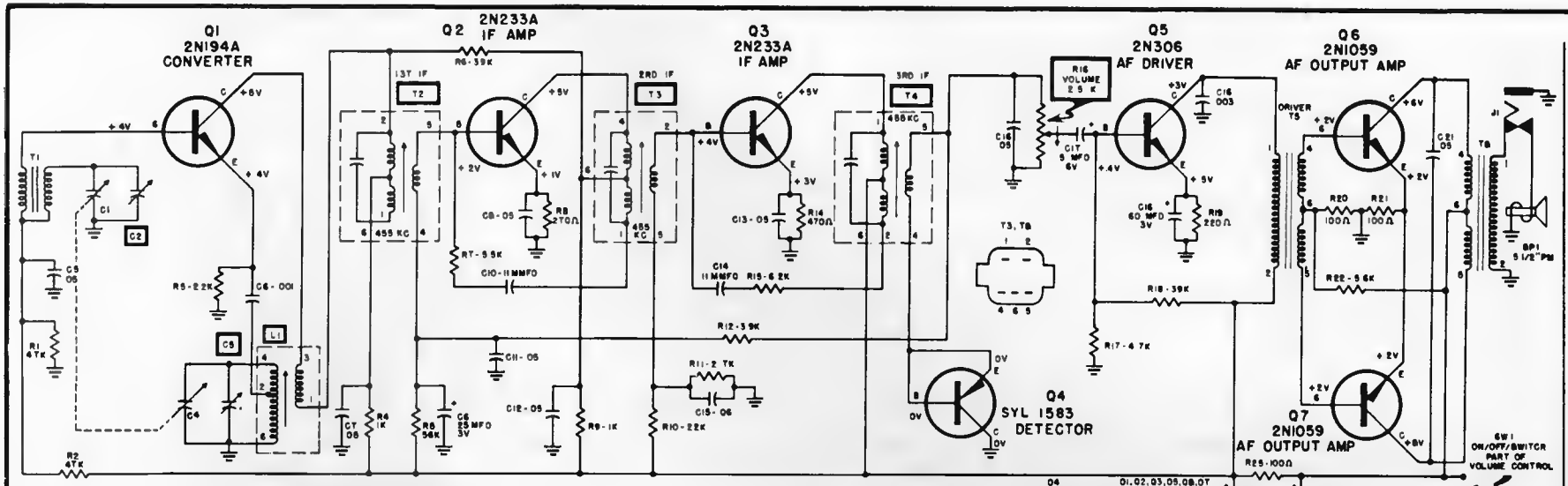
FM ALIGNMENT

STEP	SETUP NOTES	TEST EQUIPMENT HOOKUP	ADJUST FOR MAXIMUM
1.	SELECTOR SWITCH IN FM POSITION VARIABLE TUNING CAPACITOR FULLY OPEN	SIGNAL GENERATOR - "HOT" LEAD TO TUBE SHIELD V2 WHICH HAS BEEN DISCONNECTED FROM CHASSIS. GROUND LEAD TO CHASSIS. SET GENERATOR TO 10.7 MC AC VOLTMETER - DC PROBE TO POINT "A". GROUND LEAD TO CHASSIS.	T3 - BOTTOM CORE T2 - BOTTOM CORE T2 - TOP CORE T1 - BOTTOM CORE T1 - TOP CORE
2.	SAME AS STEP 1	SIGNAL GENERATOR - SAME AS STEP 1. AC VOLTMETER - ACROSS POINTS "A" AND "B"	T3 - TOP CORE ADJUST FOR ZERO METER READING.
3.	SELECTOR SWITCH IN FM POSITION VARIABLE TUNING CAPACITOR AT 108.4 MC	SIGNAL GENERATOR - "HOT" LEAD THROUGH A 300 OHM RESISTOR TO FM ANTENNA TERMINAL. GROUND LEAD TO CHASSIS. SET GENERATOR TO 108.4 MC. AC VOLTMETER - ACROSS AUDIO OUTPUT TRANSFORMER.	C11 - FM OSC. TRIMMER
4.	SELECTOR SWITCH IN FM POSITION VARIABLE TUNING CAPACITOR AT 87.6 MC	SIGNAL GENERATOR - "HOT" LEAD THROUGH A 300 OHM RESISTOR TO FM ANTENNA TERMINAL. GROUND LEAD TO CHASSIS SET GENERATOR TO 87.6 MC. AC VOLTMETER - SAME AS STEP 3.	L4 - FM OSC. COIL SPREAD OR COMPRESS LOOPS ON COIL.
5.	SELECTOR SWITCH IN FM POSITION VARIABLE TUNING CAPACITOR AT 104 MC	SIGNAL GENERATOR - "HOT" LEAD THROUGH 300 OHM RESISTOR TO FM ANTENNA TERMINAL. GROUND LEAD TO CHASSIS. SET GENERATOR TO 104 MC. AC VOLTMETER - SAME AS STEP 3.	C8 - FM RF TRIMMER
6.	SELECTOR SWITCH IN FM POSITION VARIABLE TUNING CAPACITOR AT 98 MC	SIGNAL GENERATOR - "HOT" LEAD THROUGH A 300 OHM RESISTOR TO FM ANTENNA TERMINAL. GROUND LEAD TO CHASSIS. SET GENERATOR TO 98 MC. AC VOLTMETER - SAME AS STEP 3.	L7 - 1ST FM RF COIL SPREAD OR COMPRESS LOOPS ON COIL.
7.	SELECTOR SWITCH IN FM POSITION VARIABLE TUNING AT 90 MC	SIGNAL GENERATOR - "HOT" LEAD THROUGH A 300 OHM RESISTOR TO FM ANTENNA TERMINAL. GROUND LEAD TO CHASSIS. SET GENERATOR TO 90 MC. AC VOLTMETER - SAME AS STEP 3.	L3 - 2ND FM RF COIL SPREAD OR COMPRESS LOOPS ON COIL.

SYLVANIA Chassis 1-637-1, Models 5P10, 5P11

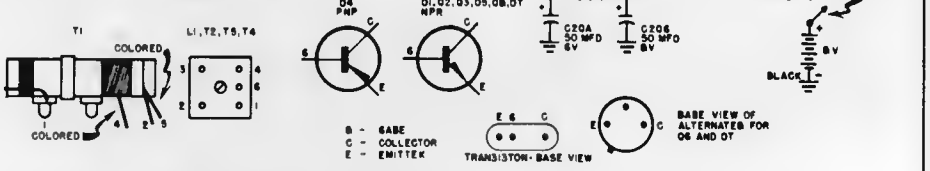


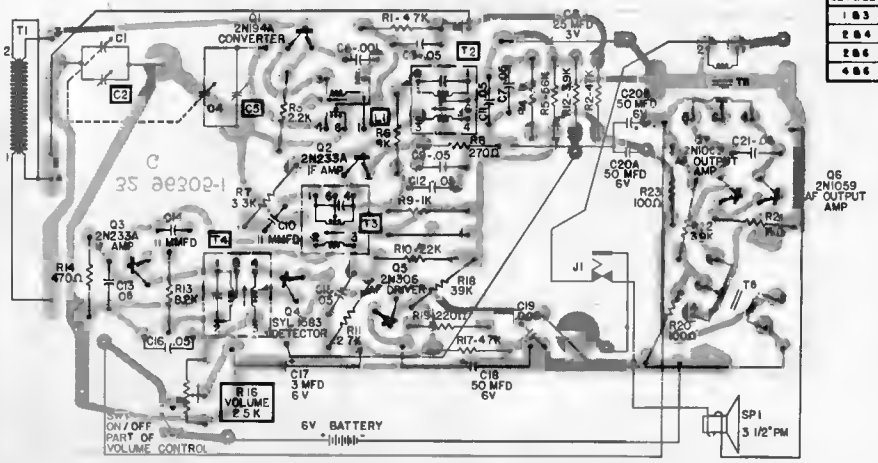
For notes see page 145.



SCHEMATIC NOTES

1. VOLTAGES TAKEN WITH RECEIVER TUNED TO STRONG LOCAL STATION.
2. BATTERY VOLTAGE WITH RECEIVER OPERATING 6V.
3. VOLTAGES SHOWN ARE AVERAGE READINGS. VARIATIONS MAY BE NOTED DUE TO NORMAL PRODUCTION TOLERANCES.
4. RESISTANCE VALUES TAKEN WITH COMPONENTS IN THE CIRCUIT.
5. ALL CAPACITORS IN MICROFARADS UNLESS OTHERWISE SPECIFIED.
6. ⏚ DESIGNATES CHASSIS GROUND.





TOP VIEW - PRINTED BOARD ASSEMBLY

RESISTANCE CHART

	L1		T2		T3		T4		T5		T6	
	BETWEEN	RES Ω	BETWEEN	RES Ω	BETWEEN	RES Ω	BETWEEN	RES Ω	BETWEEN	RES Ω	BETWEEN	RES Ω
	1 & 3	1	1 & 2	6	1 & 4	5	1 & 2	2.5	1 & 2	300	1 & 2	6
	2 & 4	4	1 & 6	2.6	1 & 6	2.6	1 & 6	1.6	4 & 6	280	4 & 6	7
	2 & 6		2 & 6	2.6	4 & 6	2.6	2 & 6	1.6	4 & 5	125	4 & 5	3.5
	4 & 6	4	5 & 4	6	2 & 3	6	3 & 4	1	5 & 6	120	3 & 5	5.5

CHASSIS REMOVAL

7P12 SERIES:

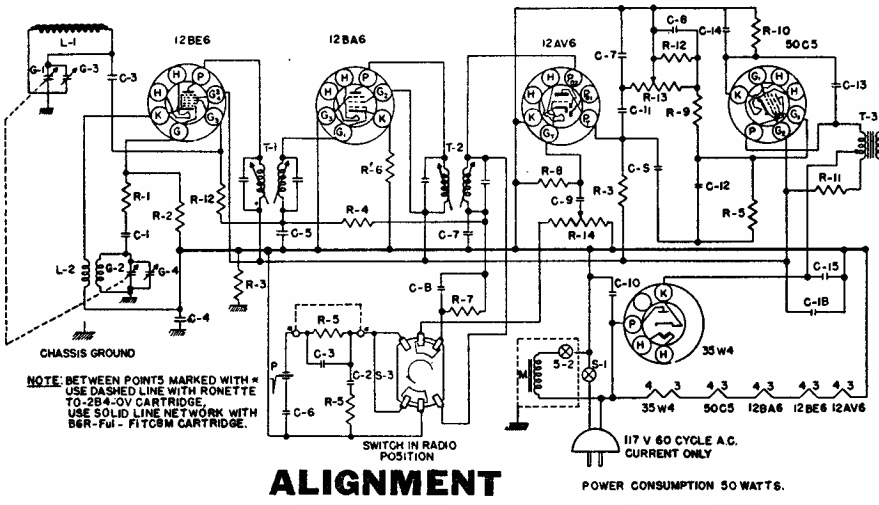
1. Using a coin or screwdriver, loosen the one (1) screw which secures the backcover to the front of the case. Remove cover as far as speaker leads permit.
2. Remove screw securing tuning knob and remove knob.
3. Remove the three (3) screws securing chassis to case, two at bottom of chassis and one near tuning capacitor.
4. To replace chassis, reverse the above procedure.

SYLVANIA

Chassis 1-638-1, -2, -3

Models 7P12, 2800, 2900 Series

TRAVLER Model 6521



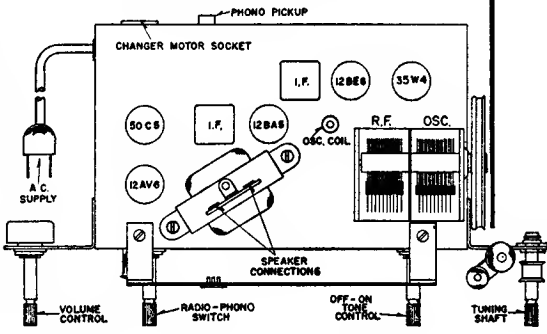
PART NO.		DESCRIPTION
IR- 4	R- 1	47Ω INSULATED RESISTOR 1/2W 20%
IR-45	R- 2	22K CARBON RESISTOR 1/2W 10%
IR-20	R- 3	220K INSULATED RESISTOR 1/2W 20%
IR-23	R- 4	3.3MEG. CARBON RESISTOR 1/2W 20%
IR-111	R- 5	470K CARBON RESISTOR 1/2W 10%
IR-155	R- 8	120Ω CARBON RESISTOR 1/2W 10%
IR-127	R- 7	680K CARBON RESISTOR 1/2W 10%
IR-13	R- 8	2.2MEG. CARBON RESISTOR 1/2W 20%
IR-100	R- 9	56K CARBON RESISTOR 1/2W 10%
IR- 5	R-10	220Ω CARBON RESISTOR 1/2W 10%
IR-42	R-11	1K CARBON RESISTOR 1W 10%
IR-12	R-12	1MEG. INSULATED RESISTOR 1/2W 20%
VC-67	R-13	1MEG. TONE CONTROL
VC-2	R-14	1MEG. VOLUME CONTROL
CC- 12	C- 1	47 MMFD 500V 10% CER COND.
CC- 76	C- 2	470 MMFD 500V 10% CER. COND.
CC- 44	C- 3	220 MMFD 500V 10% CER. CONO.
PC- B	C- 4	.1 MFD 400V PAPER TUB. COND.
PC- 2	C- 5	.05 MFD 200V PAPER CONO.
PC- 5	C- 6	.05 MFD 400V 20% PAPER TUB. CON.
CC- 5	C- 7	100 MMFD 10% CERAMIC COND.
CC-37	C- 8	1000 MMFD 10% CERAMIC CONO.
PC- 1	C- 9	.01 MFD 200V PAPER COND.
PC-21	C-10	.05 MFD 400V MOLDED COND.
CC-35	C-11	4700 MMFD 10% CERAMIC CONO.
CC-36	C-12	3300 MMFD 10% CERAMIC COND.
PC- 7	C-13	.01 MFD 400V 20% PAPER TUB. CON
EC-11	C-14	10 MFD 70V DC ELECTROLYTIC
PC-19	C-17	2 MFD 50V. PAPER CONDENSER
EC-68	C-15	70 MFD — 150V ELECTROLYTIC
	C-16	40 MFD —
L -16	T- 1	I.F. TRANSFORMER
	T- 2	
AT -27	T- 3	OUTPUT TRANSFORMER
LL -51	L- 1	ANTENNA ROD
LO -27	L- 2	OSCILLATOR COIL
	S- 1	SWITCH ON TONE CONTROL

ALIGNMENT

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. The IF adjustments are made in the top and in the bottom of the cans. Adjust the cores until a maximum reading is noted on the output meter.

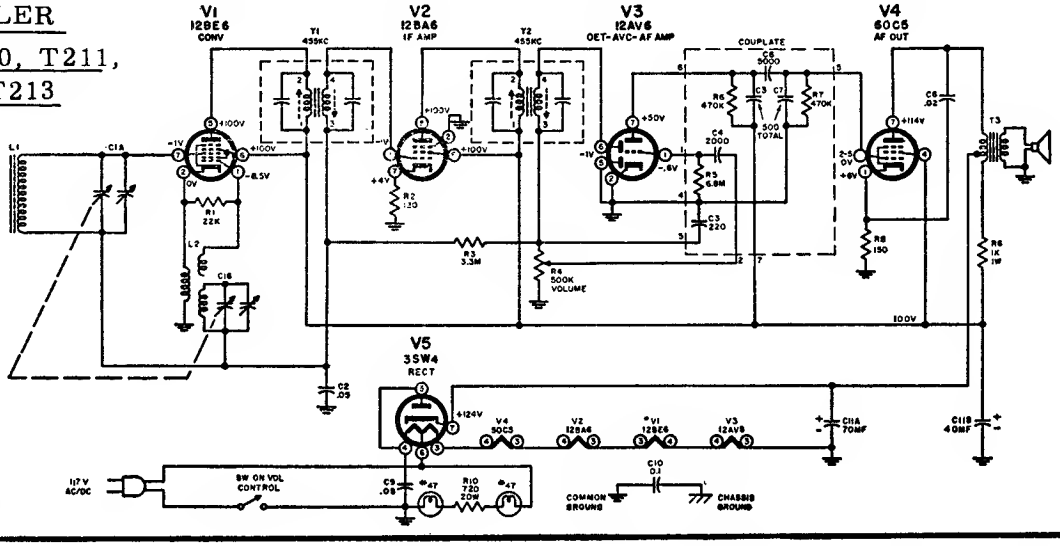
SECOND STEP: With the leads from the generator still connected as in IF alignment, adjust the generator to 1610 KC. Make sure that the gang condenser is turned to complete minimum capacity. Adjust the generator to 1610 KC. and adjust the oscillator trimmer of the receiver until the signal is tuned in. Next, turn the gang condenser to complete maximum capacity. Adjust the generator to 540 KC., then adjust the iron core in the end of the oscillator coil until the signal is tuned in. It may be well to recheck the 1610 KC. setting to make sure that the adjustment of the iron core has not shifted the frequency.

THIRD STEP: Remove the generator leads from the gang condenser and the chassis. Loosely couple the generator to the antenna by laying the hot generator lead near the antenna rod. Set the generator at 1400 KC. and tune in the 1400 KC. signal on the receiver. Adjust the ANT. trimmer until a maximum signal is noted on the output meter.



TRAV-LER Models T210, T211, T212, T213

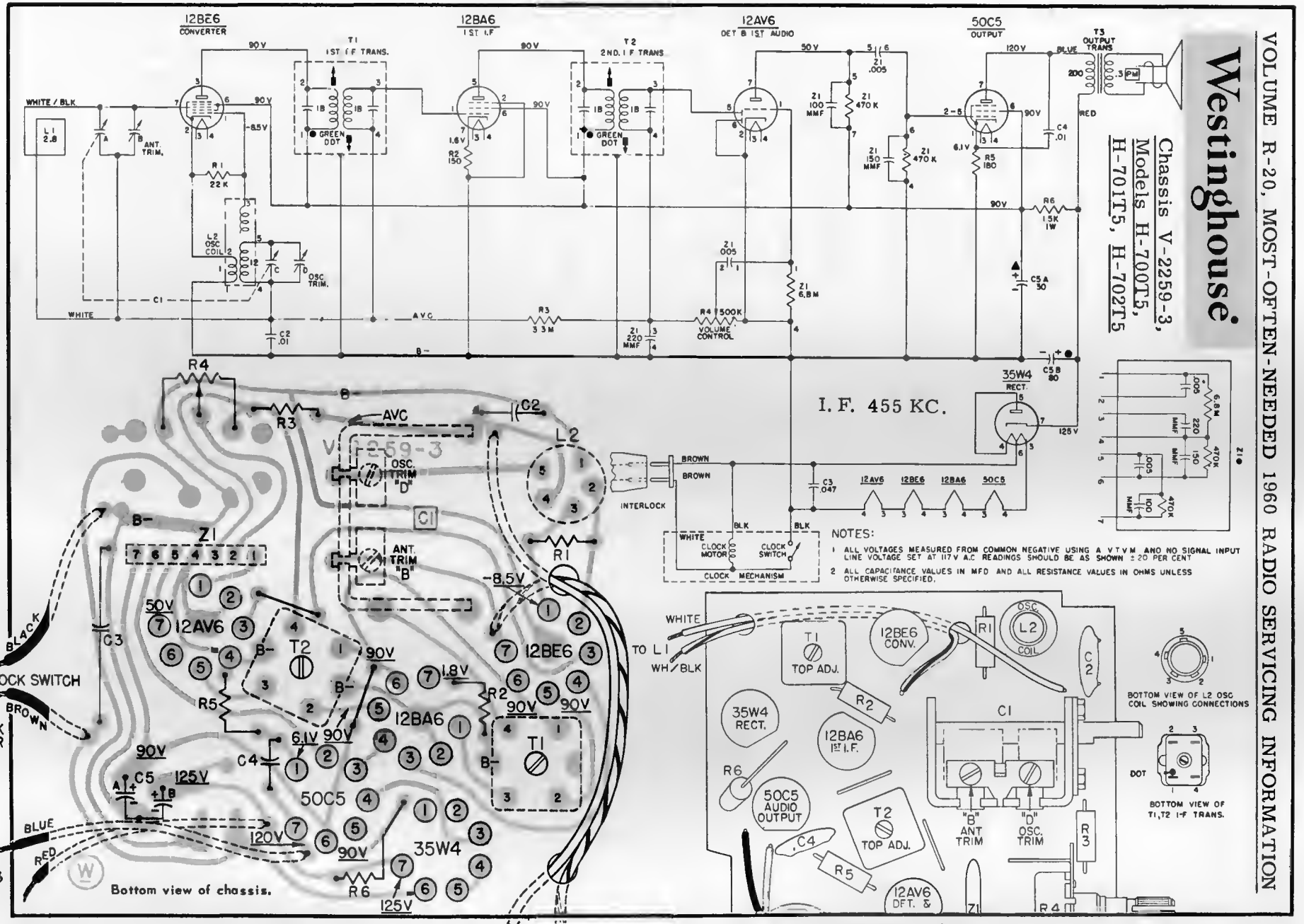
Table Model Radio Chassis 236



I. F. 455 KC.

Westinghouse

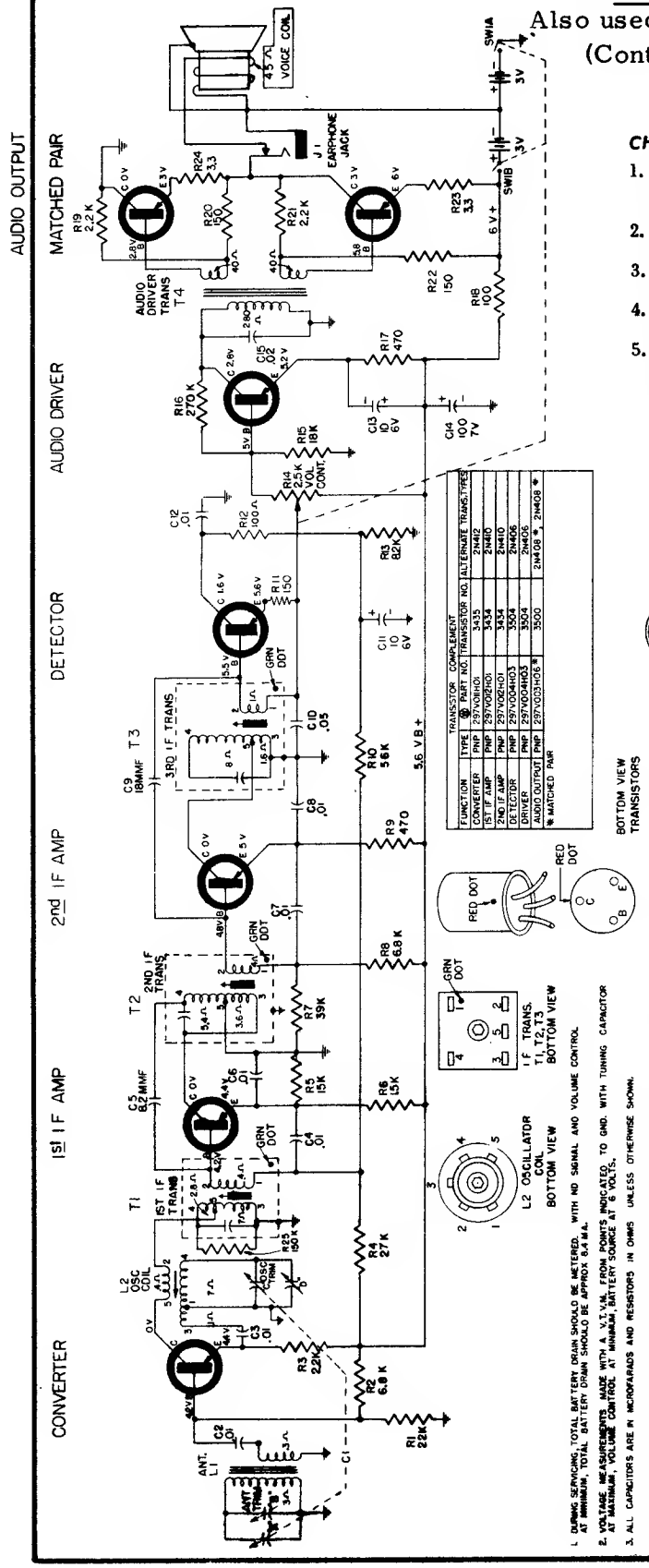
Chassis V-2259-3,
Models H-700T5,
H-701T5, H-702T5



WESTINGHOUSE Models H-697P7, H-698P7, H-699P7, Chassis V-2393-3

Also used in Montgomery Ward Model GTM-1201A

(Continued on page 149, at right)



CHASSIS REMOVAL

1. Remove the tuning knob as follows. Insert a loop of string (see figure 1) under the tuning knob and pull the knob up and out of the cabinet front.
2. Remove the back of the cabinet by loosening the two coin-slot screws on the back.
3. Remove the two 1" long hex head screws securing the chassis to the cabinet front.
4. Remove the printed circuit chassis, battery case, speaker spacers, rubber grommet and speaker.
5. To insert the printed circuit chassis back into the cabinet use the reverse procedure. *The tuning knob and cabinet back screws must be the same or identical to the original dimensions to prevent possible damage to the tuning gang.*

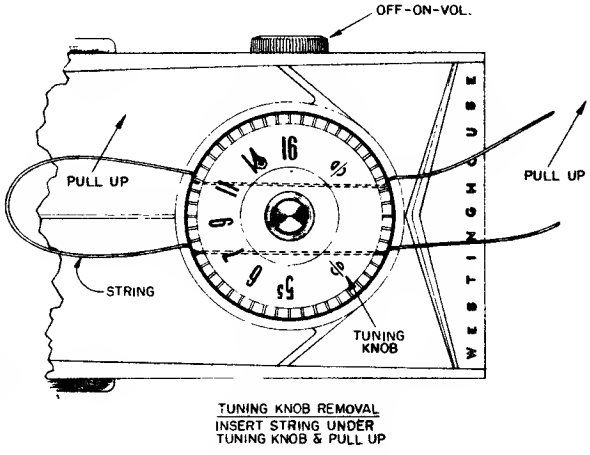


Figure 1 – Tuning knob removal

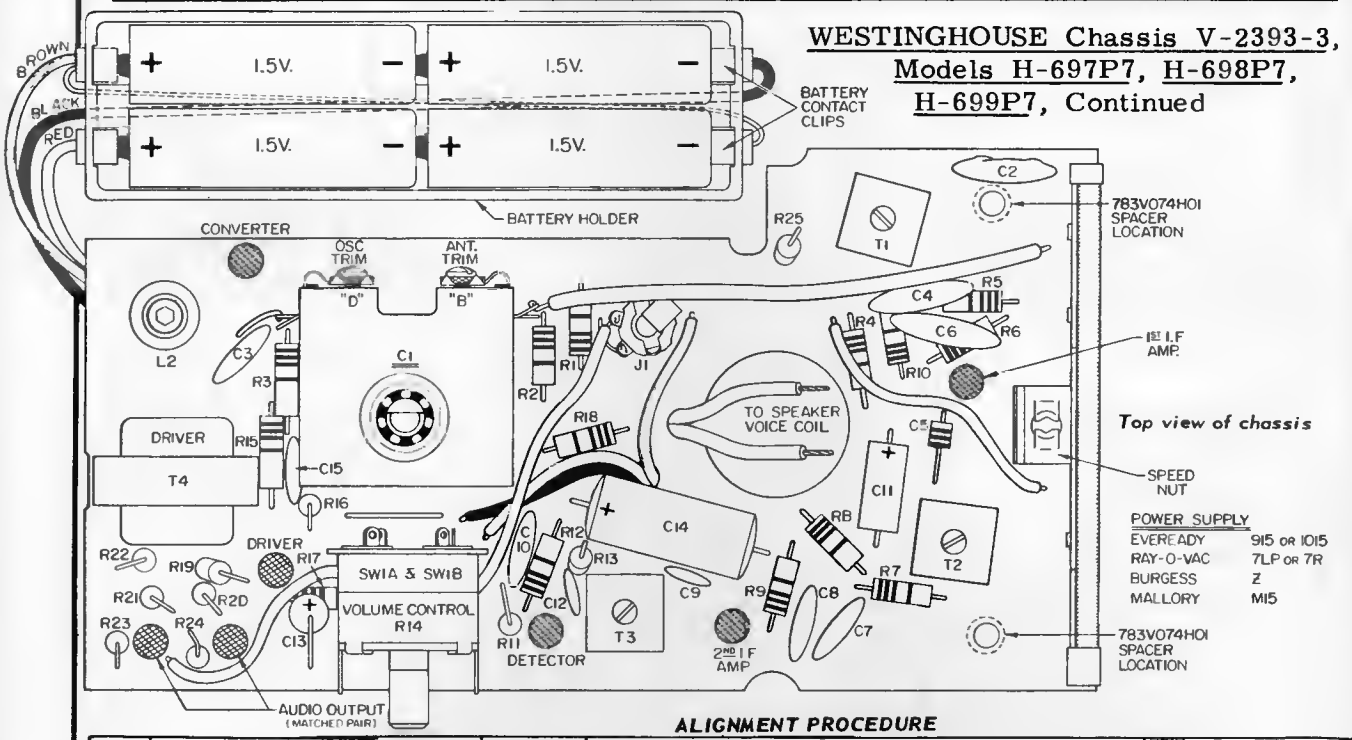
NEW CIRCUIT FEATURES

This receiver incorporates new circuitry not previously used in Westinghouse radios. This is the use of a transformerless audio output circuit and an improved transistor detector circuit having amplified AGC and DC coupling to the Audio Driver stage. These new circuits provide improved fidelity, less distortion and more uniform operation.

In the transformerless audio output circuit the trnasistors are operated in "push-pull" with each conducting for approximately 50% of each cycle. Both transistors are biased close to cutoff, so that with no AC signal, both are effectively not conducting. Out of phase audio signals are fed to the base of each transistor from the secondaries of the audio driver transformer (T4). Each transistor now conducts on alternate half cycles of the incoming signal. The collector-to-emitter AC currents of each transistor alternately flow through the speaker voice coil.

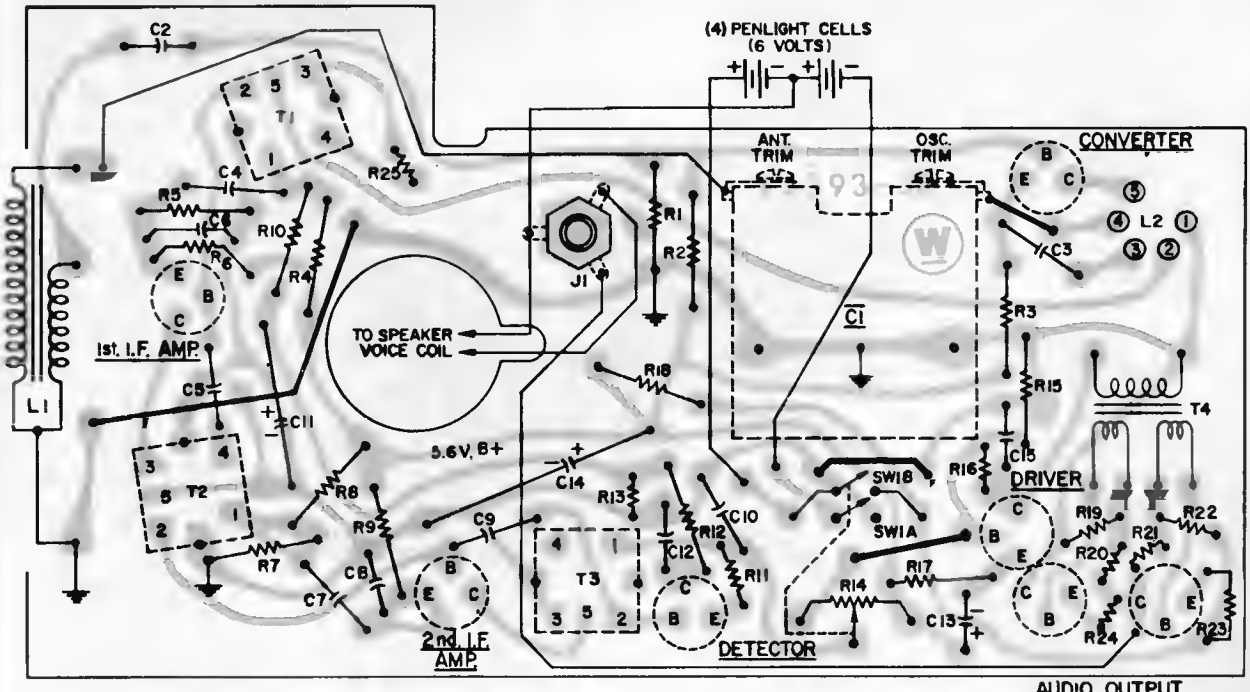
The need for a blocking capacitor between the detector and audio driver circuits is eliminated by locating the detector audio load (volume control) in the detector emitter circuit. The AGC voltage is taken from the collector load of the transistor and therefore provides a greater range of AGC control voltage. The detector transistor is biased at near cutoff. The base-to-emitter circuit of the transistor thus acts as a diode, rectifying the IF signal (detection). The amplified DC voltage, proportional to the IF signal level appears across R13 and is used for AGC. The AGC voltage is filtered by C11 and coupled to the base of the 1st IF amplifier through R10.

WESTINGHOUSE Chassis V-2393-3, Models H-697P7, H-698P7, H-699P7, Continued

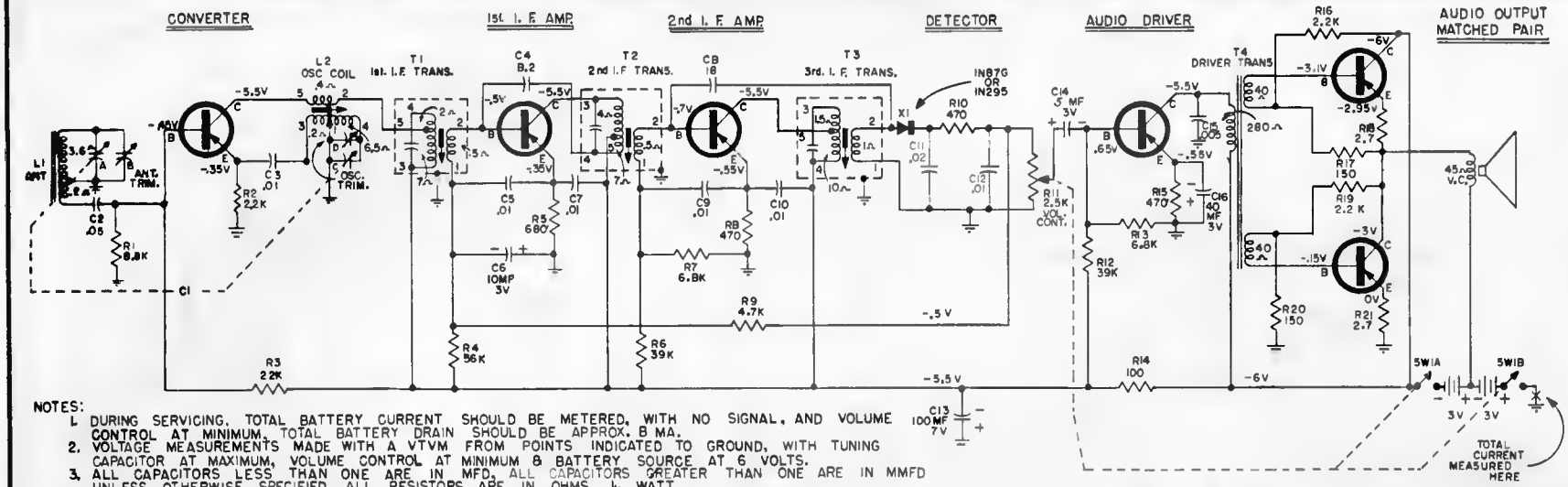


ALIGNMENT PROCEDURE

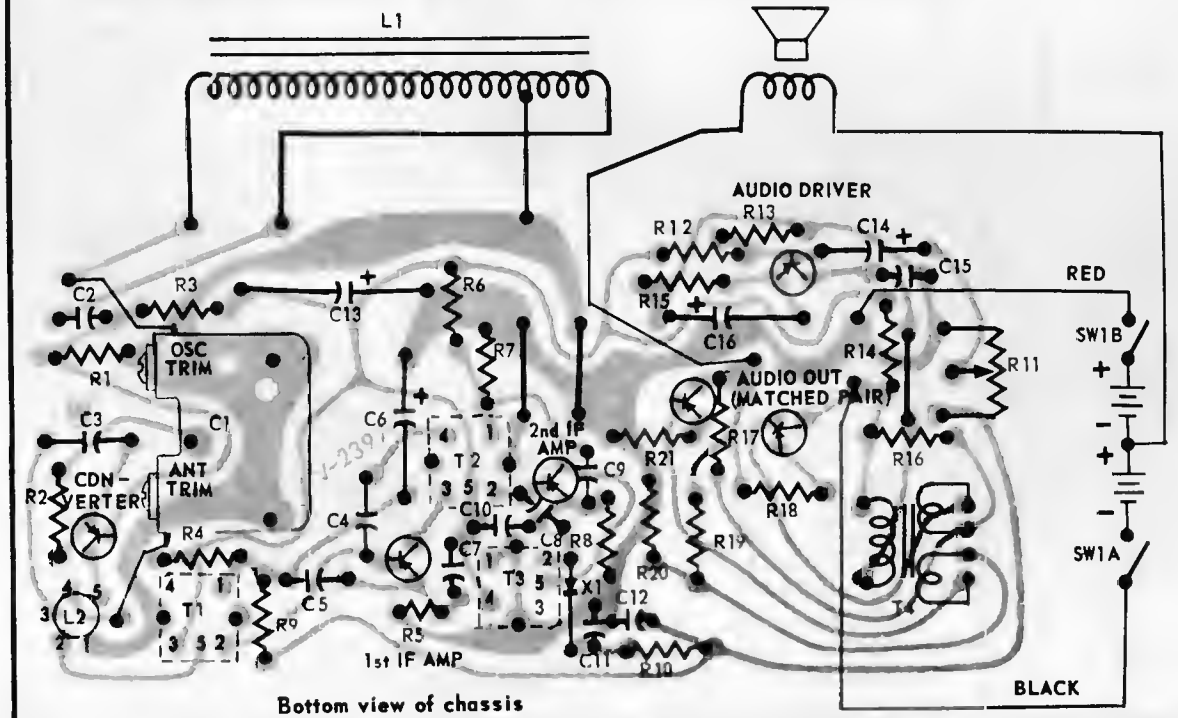
Step	*Loosely couple modulated signal to:*	*Generator frequency*	*C1 setting*	*Adjust for maximum:*
1	Loop L1	455KC	maximum	T3, T2 and T1 in order indicated for max. output: (Reduce generator output if necessary for T2 and T1 adjustments.)
2	"	1625KC	minimum	Oscillator trimmer "D"
3	"	1400KC	1400KC	RF trimmer "B"
4	"	600KC	600KC	Oscillator coil, L2, if necessary
5	Repeat steps 2, 3 & 4			



Bottom view of printed circuit chassis with components shown as electrical symbols



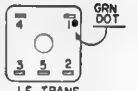
NOTES:
1. DURING SERVICING, TOTAL BATTERY CURRENT SHOULD BE METERED, WITH NO SIGNAL, AND VOLUME CONTROL AT MINIMUM. TOTAL BATTERY DRAIN SHOULD BE APPROX. 8 MA.
2. VOLTAGE MEASUREMENTS MADE WITH A VTVM FROM POINTS INDICATED TO GROUND, WITH TUNING CAPACITOR AT MAXIMUM, VOLUME CONTROL AT MINIMUM & BATTERY SOURCE AT 6 VOLTS.
3. ALL CAPACITORS LESS THAN ONE ARE IN MFD. ALL CAPACITORS GREATER THAN ONE ARE IN MMFD UNLESS OTHERWISE SPECIFIED. ALL RESISTORS ARE IN OHMS ½ WATT.
- ANY TWO AUDIO OUTPUT TRANSISTORS WITH IDENTICAL COLOR CODE ON TOP CAN BE USED AS A MATCHED PAIR.



Bottom view of chassis

BOTTOM VIEW OF TRANSISTOR

TRANSISTOR COMPLEMENT				
FUNCTION	TYPE	Ⓦ PART NO.	ALTERNATES	Ⓦ PART NO.
CONVERTER	PNP	297V011H01	2N412	
1st I.F. AMP	PNP	297V012H05	2N410	297V012H01,04, 05, 06
2nd I F AMP	PNP	297V012H06	2N410	297V012H01, 04, 05, 06
AUDIO DRIVER	PNP	297V004H03	2N406	
AUDIO OUTPUT	PNP	297V003H06*	2N408 * 2N406 *	
* MATCHED PAIR (SEE NOTE 5)				

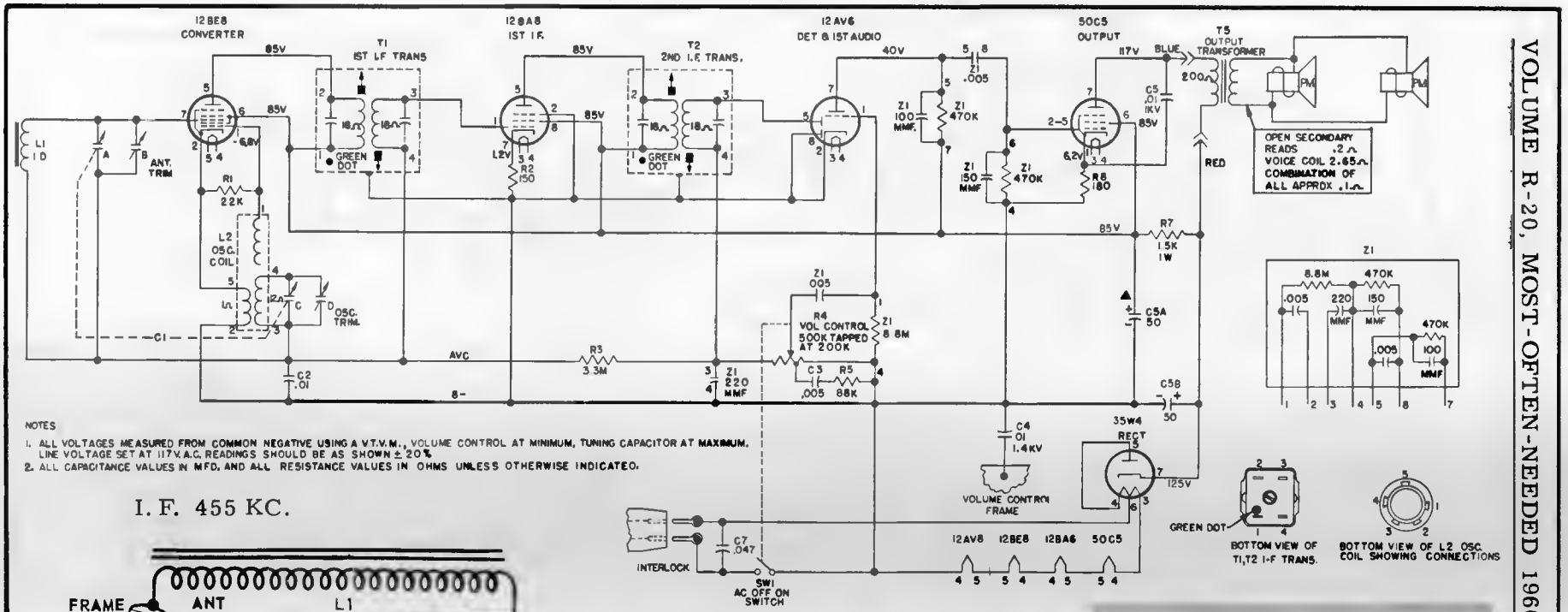


I. F. 455 KC.

(For alignment details follow data on page 149, preceding)

WESTINGHOUSE

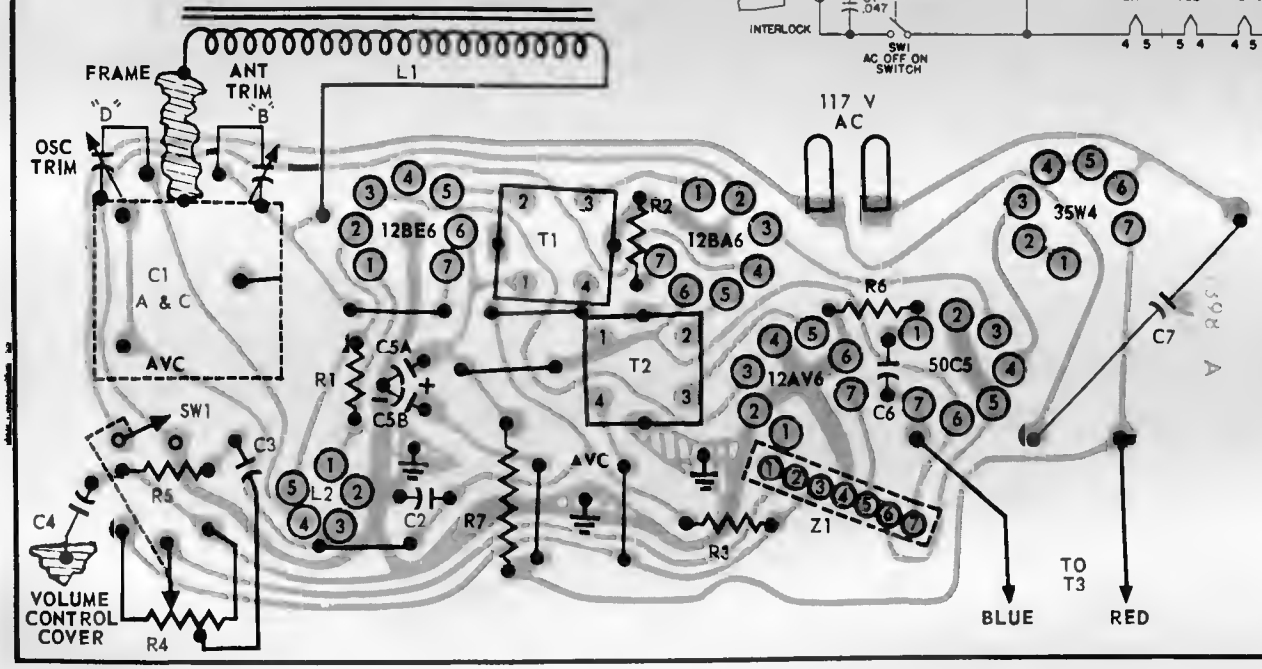
Chassis V-2397-3, used in Models H-725P6, H-726P6, H-727P6, and H-728P6



NOTES

1. ALL VOLTAGES MEASURED FROM COMMON NEGATIVE USING A V.T.V.M., VOLUME CONTROL AT MINIMUM, TUNING CAPACITOR AT MAXIMUM. LINE VOLTAGE SET AT 117 V.A.C. READINGS SHOULD BE AS SHOWN ± 20%
2. ALL CAPACITANCE VALUES IN MFD. AND ALL RESISTANCE VALUES IN OHMS UNLESS OTHERWISE INDICATED.

I. F. 455 KC.



Westinghouse

MODELS

H-704T5
(Chestnut Brown)

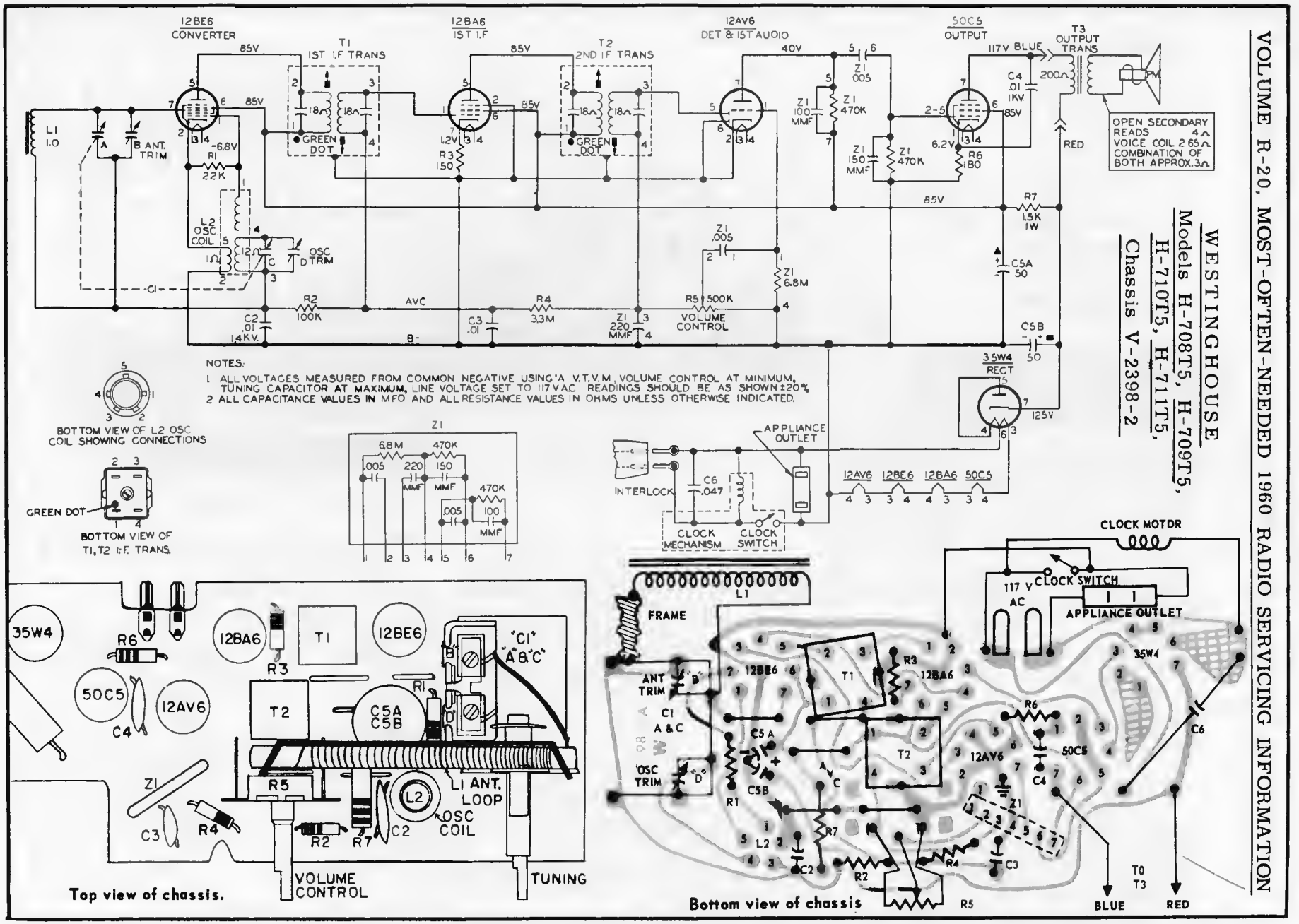
H-705T5
(Turquoise)

H-706T5
(Ivory)

CHASSIS V-2398-1

WESTINGHOUSE

Models H-708T5, H-709T5, H-710T5, H-711T5, Chassis V-2398-2



WESTINGHOUSE Chassis V-2400-1

Models H-715T5, H-716T5

(Additional service material and alignment continued on pages 154 and 155)

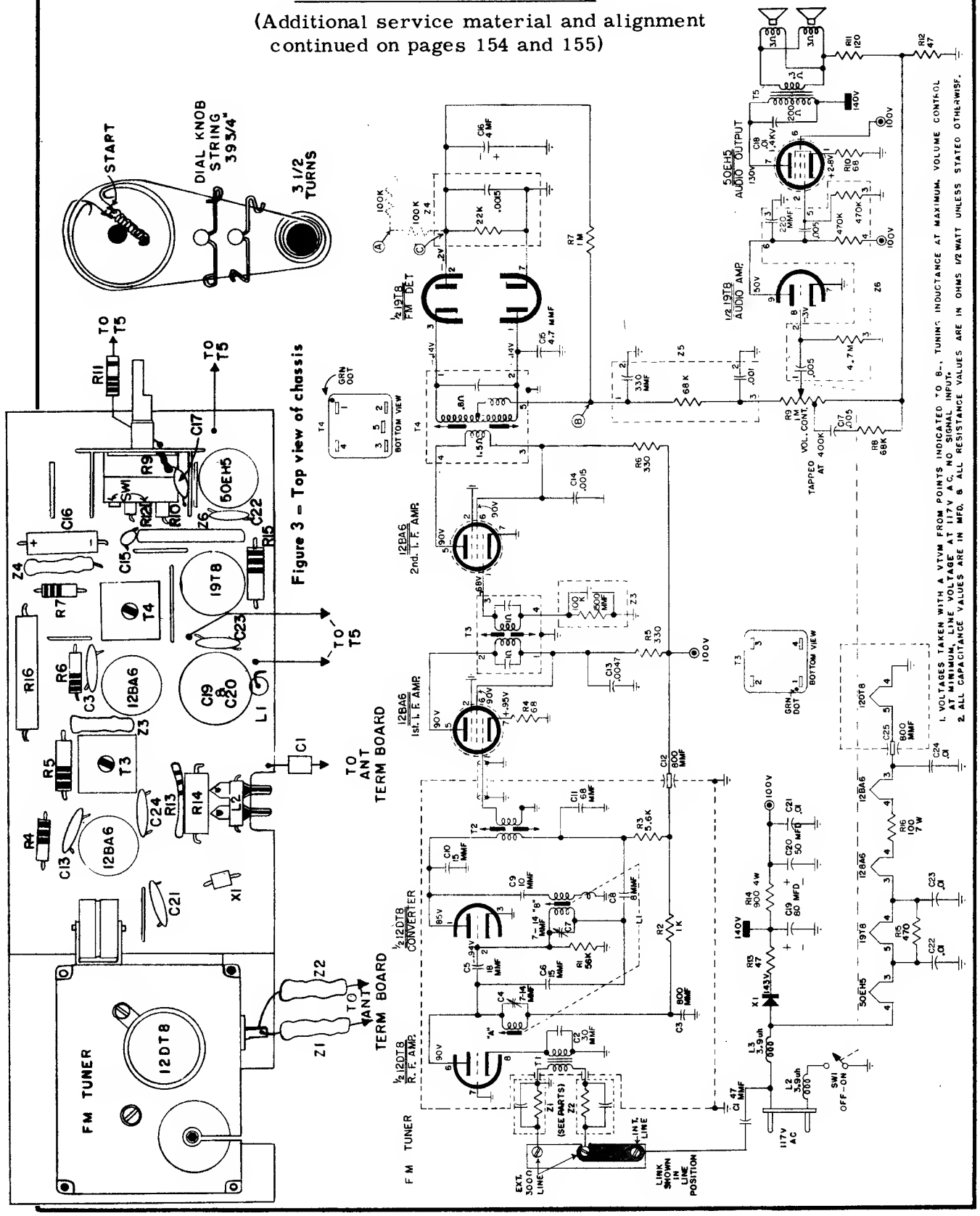


Figure 3 – Top view of chassis

1. VOLTAGES TAKEN WITH A VTVM FROM POINTS INDICATED TO B–. TUNING INDUCTANCE AT MAXIMUM. VOLUME CONTROL AT MINIMUM. LINE VOLTAGE AT 117 V AC, NO SIGNAL INPUT.
2. ALL CAPACITANCE VALUES ARE IN MFD. & ALL RESISTANCE VALUES ARE IN OHMS 1/2 WATT UNLESS STATED OTHERWISE.

WESTINGHOUSE Chassis V-2400-1, Continued

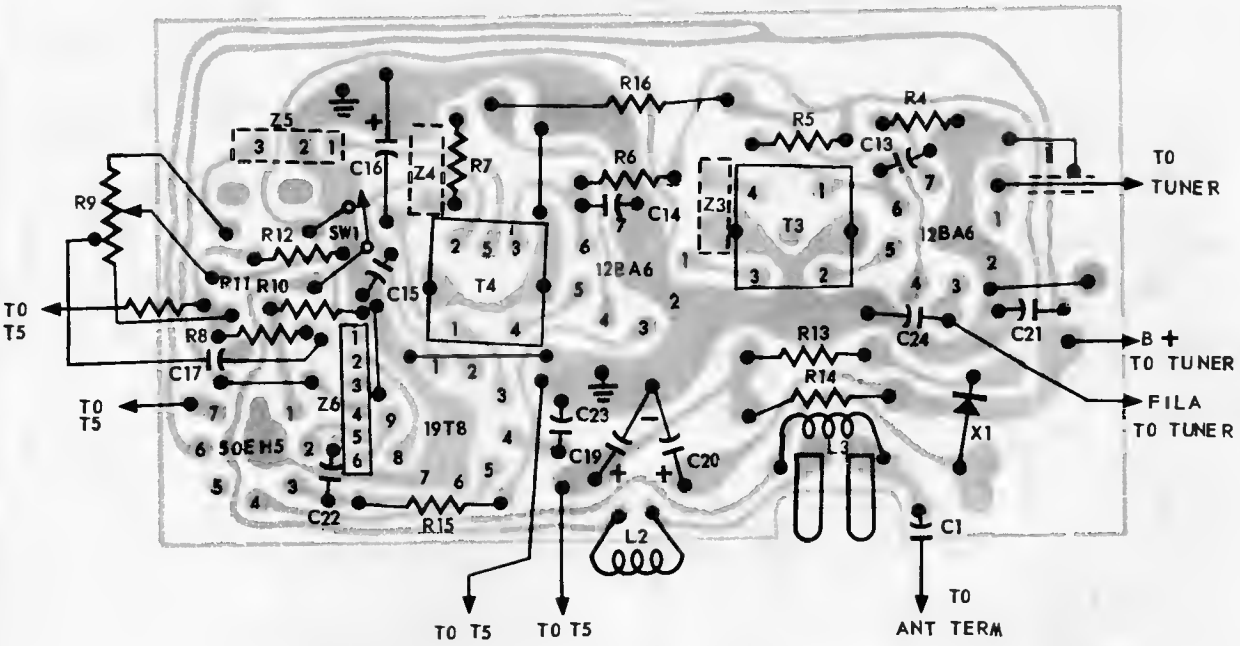
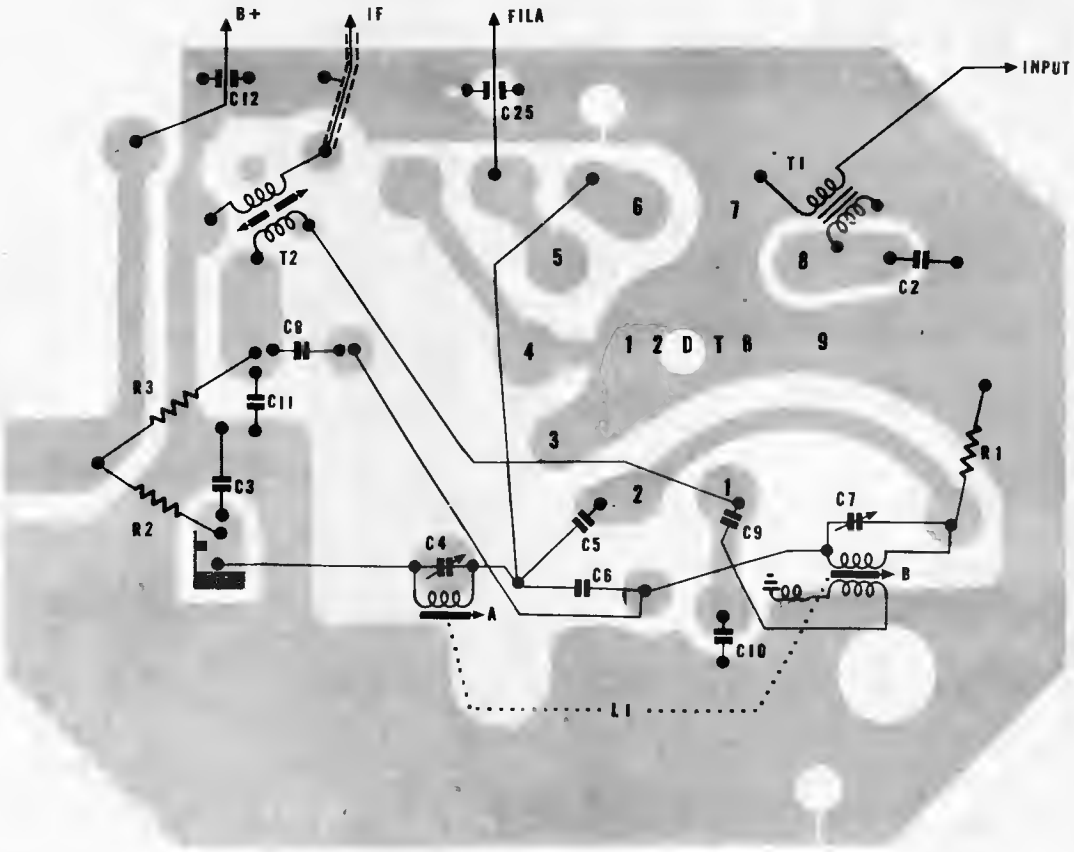


Figure 4 – Bottom view of printed circuit chassis with components shown symbolicolly



– Bottom view of tuner printed circuit with components shown symbolicolly

WESTINGHOUSE Chassis V-2400-1

(Continued)

ALIGNMENT

1. Connect two 100K ohm resistors from test point "C" to ground as shown in schematic.
2. Use VTVM connected as indicated in the FM alignment chart.
3. Use a signal generator with output frequencies of 10.7mc and 80 to 110mc. Generator should have an adjustable output attenuator.
4. Set the volume control at maximum.
5. Keep the signal generator output voltage level low to avoid overload.
6. Sweep generator providing 10.7mc signal, 500KC sweep width for discriminator alignment.

ANTENNA INFORMATION

When the metal link, on rear of the receiver, connects the center and right hand antenna terminals, the receiver is using the built-in antenna. For best results the AC line cord should be stretched out rather than coiled. In weak signal areas or under adverse conditions, it may be necessary to use an outside FM antenna. In this case, the metal link should be removed from the center antenna terminal and the 2-wire lead-in (300 ohm), from the external antenna should be connected to the center and left hand terminals.

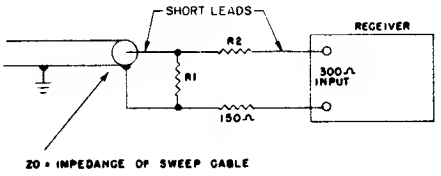
CHASSIS REMOVAL

1. Remove screw from cabinet bottom and two screws from cabinet rear.
2. Remove control knob from left side of cabinet.
3. Separate cabinet front from cabinet back. The chassis is now exposed and ready for servicing. To replace chassis follow reverse of above procedure, being careful to correctly slide chassis into side grooves on inside of cabinet rear cover.

Step	*Connect Signal Generator to:*	*Signal Generator Frequency*	*L1 Setting*	*VTVM Connection*	*Adjustment*
1	High side of generator to pin #1 of 2nd IF Amp.	10.7mc unmodulated	Min	Between points "A" and "B"	Secondary of T4 (top adj.) for zero voltage.
2	"	"	"	Between point "C" and ground	Primary of T4 (bottom adj.) for max. Adjust generator output for VTVM meter reading of 5 to 6 volts.
3	"	"	"	Between points "A" and "B"	Recheck T4 secondary and adjust for zero voltage if necessary.
4	Antenna terminals using network shown in figure 5.	"	"	Between point "C" and ground	Primary and secondary of T3 and T2 for maximum. Reduce generator output to maintain 5 to 6 volt reading.
5	REMOVE THE TWO 100K OHM RESISTORS				
6	Antenna terminals with proper termination see fig. 5	108.5mc unmodulated	Min.	Between point "C" and ground	C7 for maximum negative voltage.
7	"	106mc unmodulated	Tune for signal	"	C4 for max. negative voltage (rock in).
8	REPEAT STEPS 6 AND 7 UNTIL NO FURTHER CHANGE IS NOTED.				

ALTERNATE DISCRIMINATOR ALIGNMENT PROCEDURE (OSCILLOSCOPE METHOD)

Step	*Connect Marker and Sweep Generators to:*	*Marker Frequency*	*Connect Scope to:*	*Adjustment*
1	Pin #1 of 2nd IF Amp.	10.7mc	Between point "C" and ground	T4 primary (bottom) for symetrical response (see figure 6). Set generator output for 4-6 volt reading.
2	"	"	Between point "B" and ground	T4 secondary (top) for 10.7mc marker at center of curve (see figure 6).



ZO	R1	R2
52 Ω	56 Ω	120 Ω
72 Ω	85 Ω	110 Ω

Figure 5 – Impedance matching network

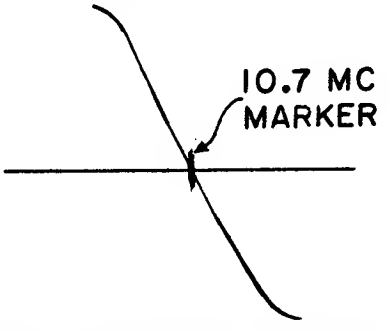


Figure 6 – Discriminator response curve

Westinghouse

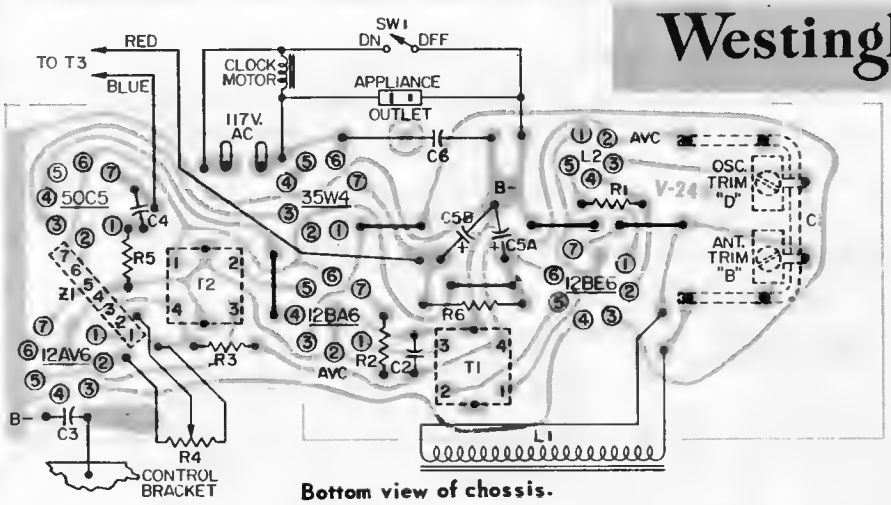
MODELS

H-718T5
(Turquoise/White)

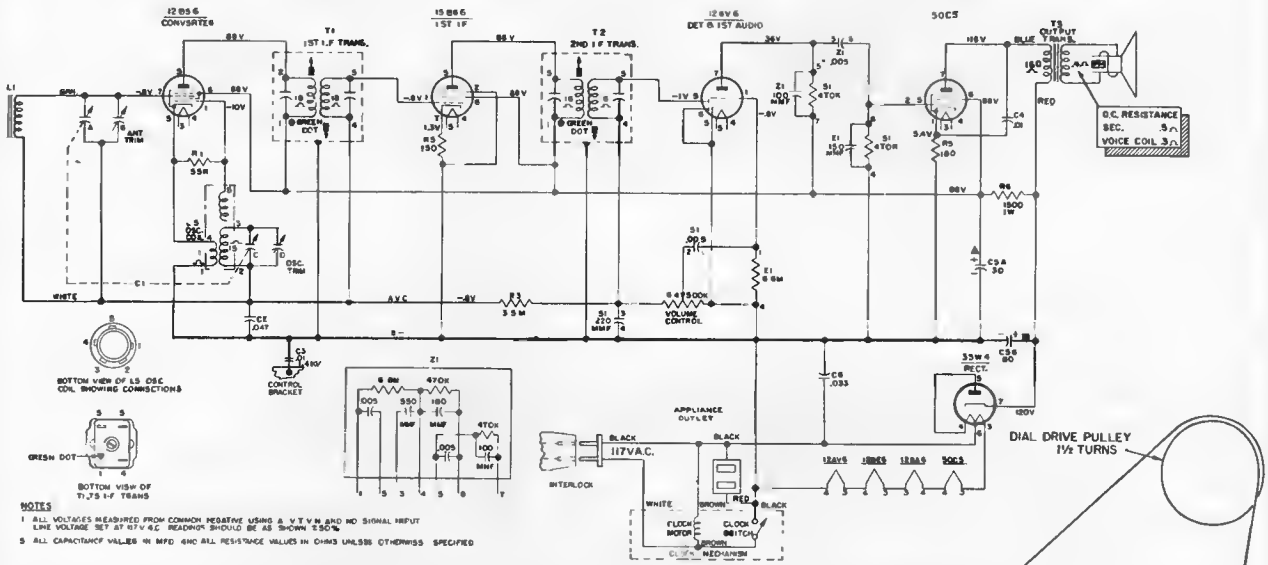
H-719T5
(Ivory/White)

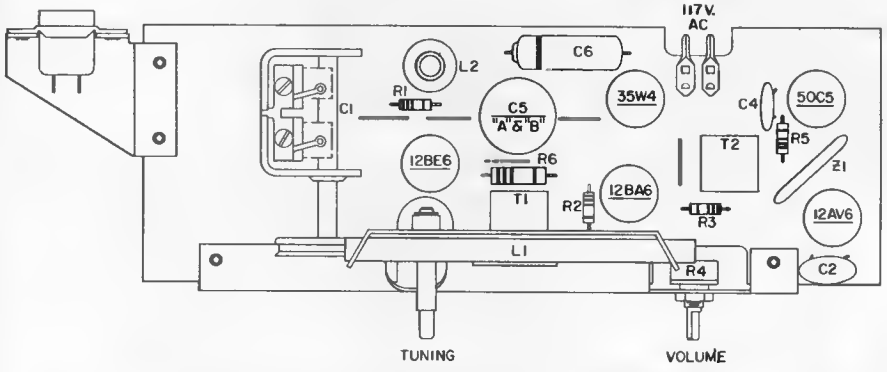
H-720T5
(Coral/White - Pink/White)

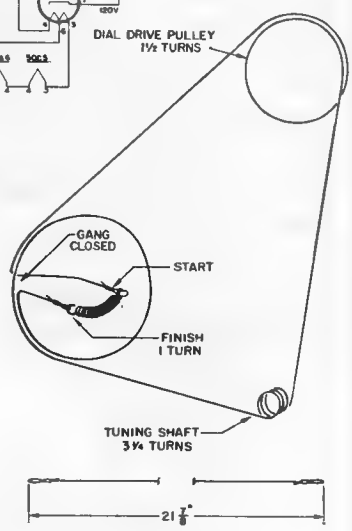
CHASSIS V-2401-1



Bottom view of chassis.







ALIGNMENT

While making the following adjustments, keep the volume control set for maximum output and the signal generator output attenuated to weakest usable signal level.

Step	*Connect Signal Generator to —*	*Signal Gen. Frequency*	*Radio Dial*	*Connect VTVM Across Voice Coil and Adjust for Maximum Output —*
1	Stator of ant. tuning capacitor (A) through a 200 mmf capacitor.	455KC 400 Cps. 30% Mod.	Minimum capacity	Top and bottom slugs of T2 and T1.
2	Radiated signal	1625 KC	Minimum capacity	Oscillator trimmer (D)
3	Radiated signal	1400 KC	1400 KC	Antenna trimmer (B)

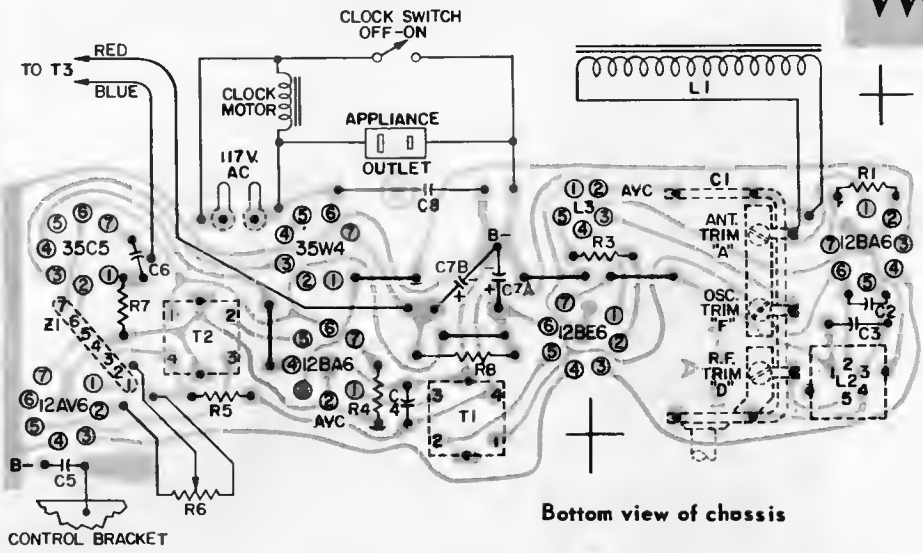
Westinghouse

MODELS

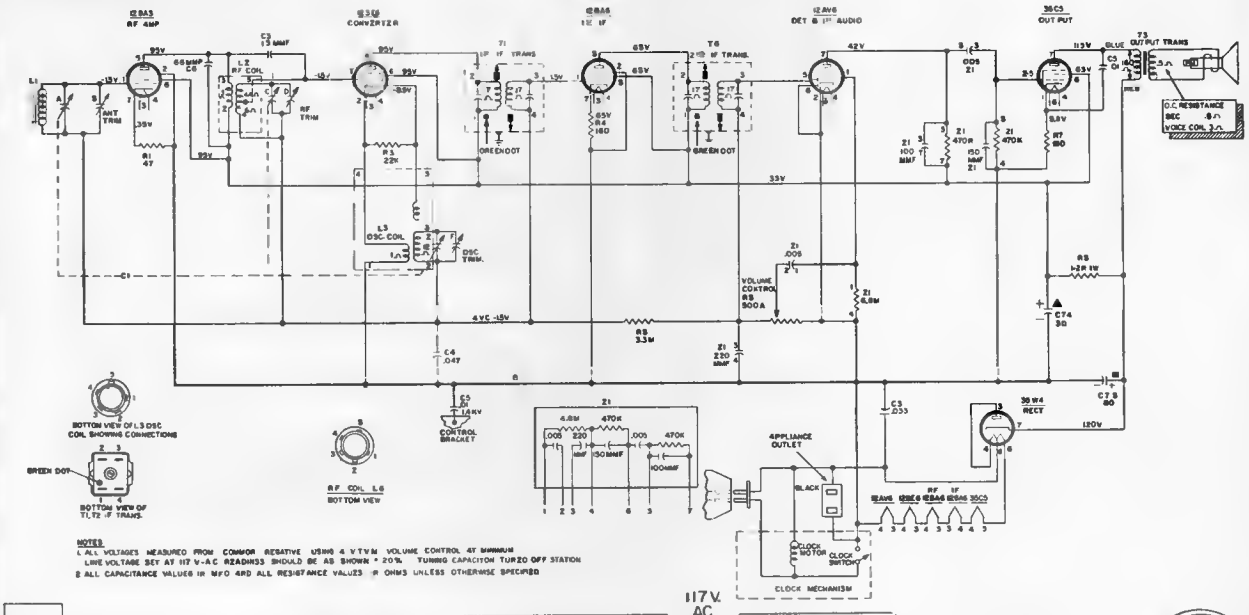
H-722T6
(Cameo beige/mocha)

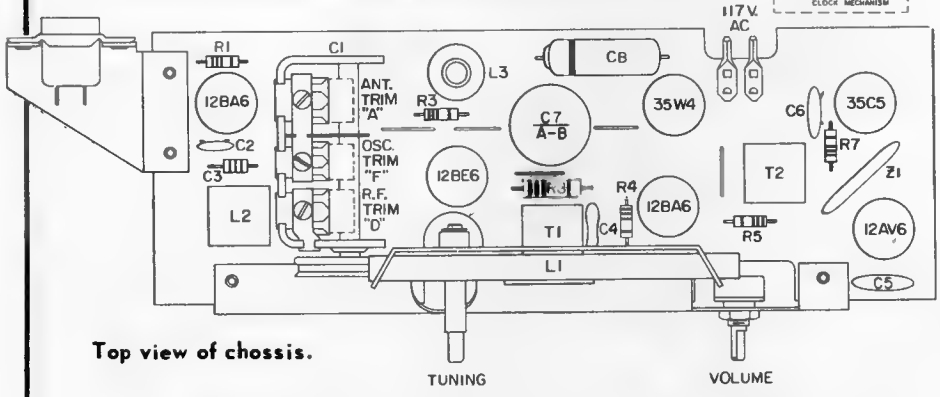
H-723T6
(Pink/Charcoal)

CHASSIS V-2401-2

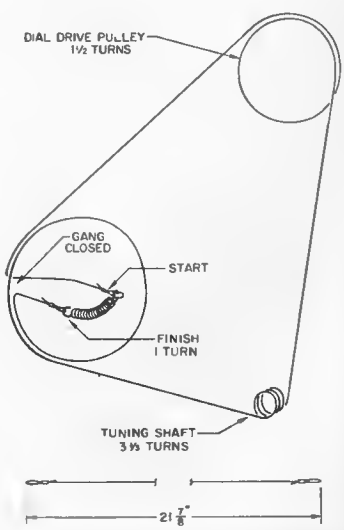


Bottom view of chassis





Top view of chassis.



Frequency Range	540 to 1600KC
Intermediate Frequency	455KC

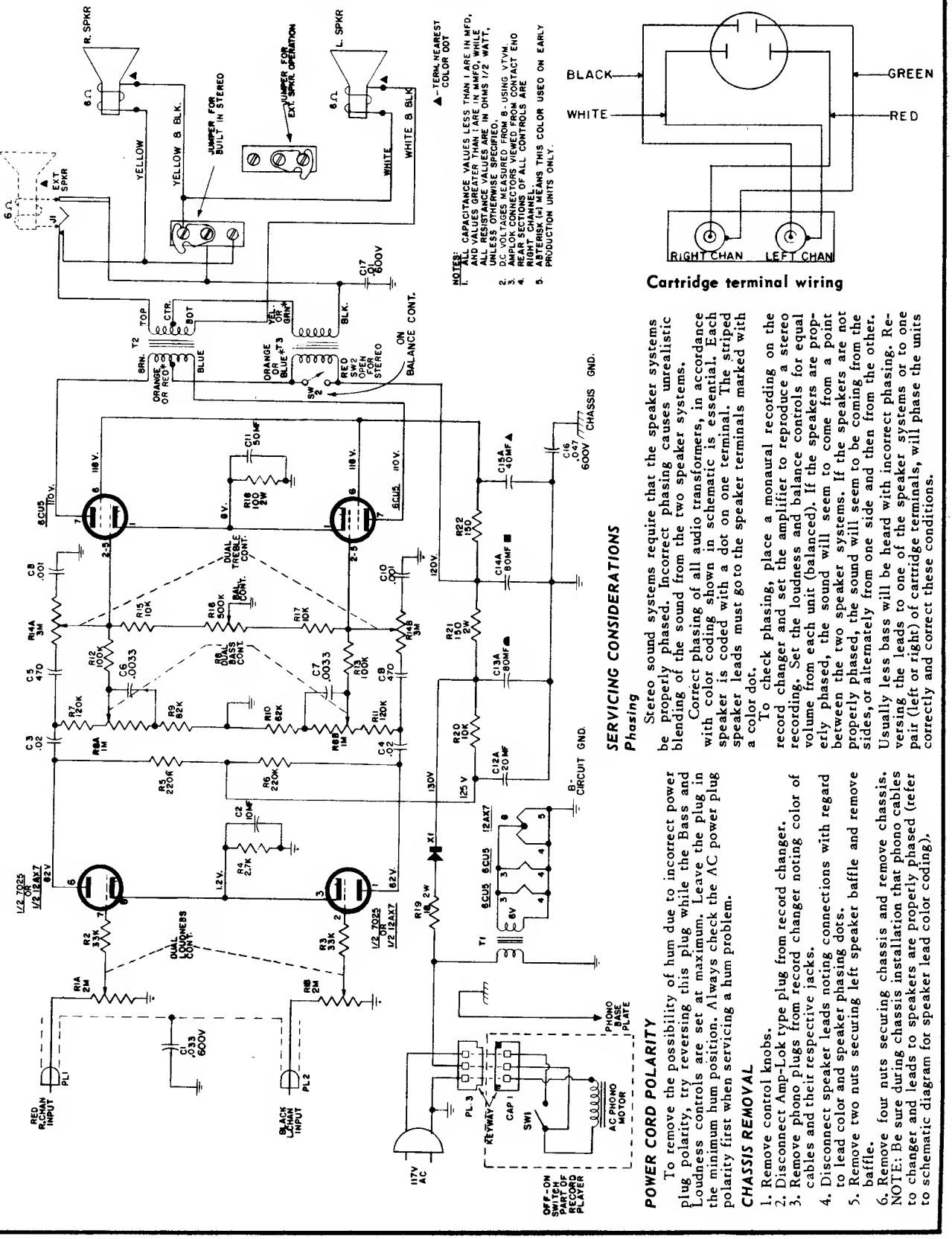
CHASSIS REMOVAL

1. Remove four screws, two from top corners on cabinet back and two from cabinet bottom.
2. Slide cabinet front and attached chassis out from cabinet.

WESTINGHOUSE Chassis V-2402-1
Models H-729P7, H-730P7

WESTINGHOUSE Chassis V-2507-1

Models H-60ACS1, H-60ACS2, H-60ACS3, H-F1000, H-F1001, H-F1002, H-F1003



Cartridge terminal wiring

SERVICING CONSIDERATIONS

Phasing

Stereo sound systems require that the speaker systems be properly phased. Incorrect phasing causes unrealistic blending of the sound from the two speaker systems.

Correct phasing of all audio transformers, in accordance with color coding shown in schematic is essential. Each speaker is coded with a dot on one terminal. The striped speaker leads must go to the speaker terminals marked with a color dot.

To check phasing, place a monaural recording on the record changer and set the amplifier to reproduce a stereo recording. Set the loudness and balance controls for equal volume from each unit (balanced). If the speakers are properly phased, the sound will seem to come from a point between the two speaker systems. If the speakers are not properly phased, the sound will seem to be coming from the sides, or alternately from one side and then from the other. Usually less bass will be heard with incorrect phasing. Reversing the leads to one of the speaker systems or to one pair (left or right) of cartridge terminals, will phase the units correctly and correct these conditions.

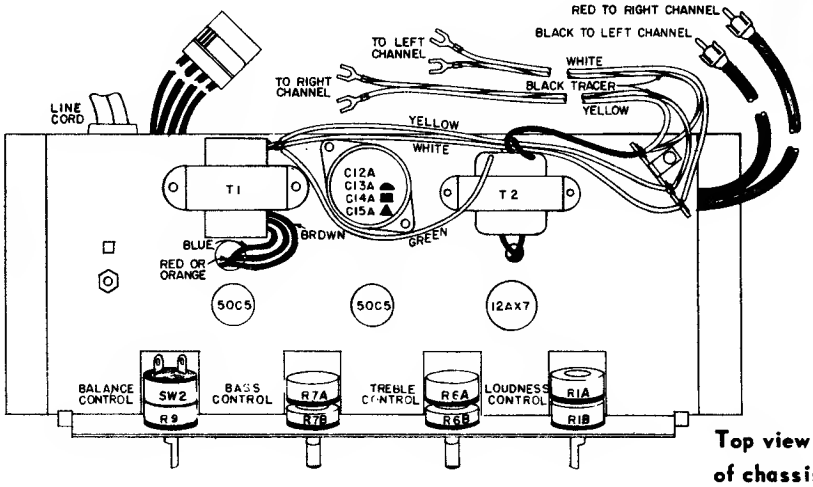
POWER CORD POLARITY

To remove the possibility of hum due to incorrect power plug polarity, try reversing this plug while the Bass and Loudness controls are set at maximum. Leave the plug in the minimum hum position. Always check the AC power plug polarity first when servicing a hum problem.

CHASSIS REMOVAL

1. Remove control knobs.
2. Disconnect Amp-Lok type plug from record changer.
3. Remove phono plugs from record changer noting color of cables and their respective jacks.
4. Disconnect speaker leads noting connections with regard to lead color and speaker phasing dots.
5. Remove two nuts securing left speaker baffle and remove baffle.
6. Remove four nuts securing chassis and remove chassis.

NOTE: Be sure during chassis installation that phono cables to changer and leads to speakers are properly phased (refer to schematic diagram for speaker lead color coding).



Top view of chassis,

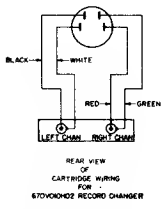
Westinghouse

MODELS

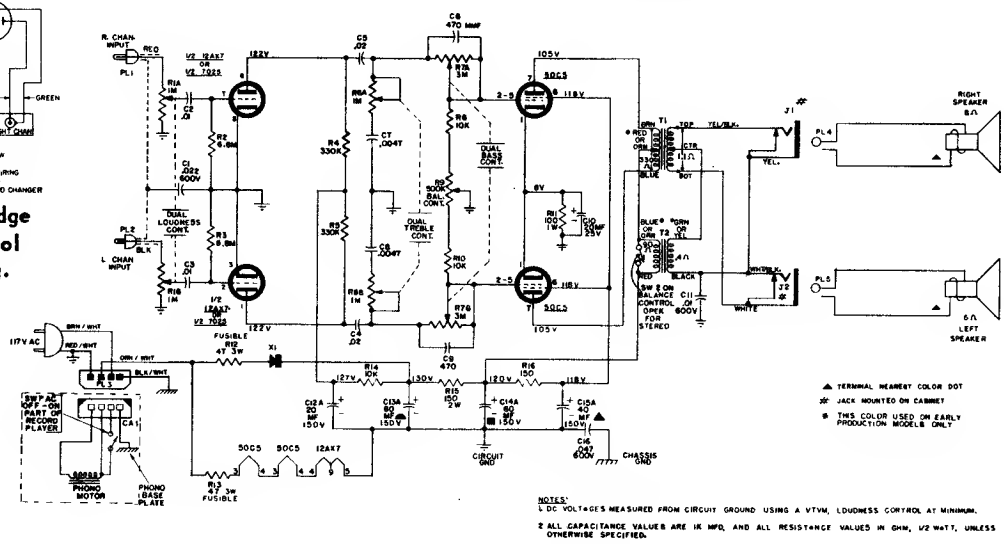
H-56ACS2 [*Charcoal Gray*]

H-56ACS1 [*Saddle Tan*]

CHASSIS V-2507-2



Cartridge terminol wiring.



NOTES:
1. DC VOLTAGES MEASURED FROM CIRCUIT GROUND USING A VTVM, LOUDNESS CONTROL AT MINIMUM.
2. ALL CAPACITANCE VALUES ARE IN MFD. AND ALL RESISTANCE VALUES IN OHM, 1/2 WATT, UNLESS OTHERWISE SPECIFIED.

CHASSIS REMOVAL

1. Remove control knobs. Remove the perforated tube-service cover which is attached to the cabinet by 2 phillips screws.
2. Remove the 4 phillips screws holding the motorboard. Lift the motorboard.
3. Note the color and location of the two coax cables connecting to the record changer. Disconnect the amp-lok plug and the two coax cable plugs from the record changer.
4. Remove the 4 speed nuts holding the chassis to the cabinet front. Remove screws holding the two External Speaker sockets.

PHASING

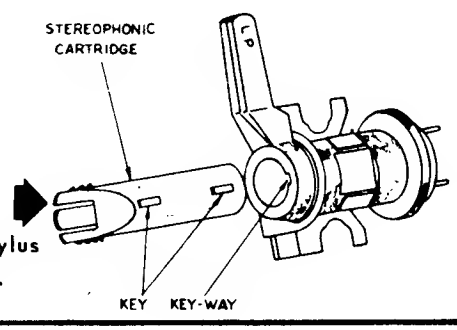
Each speaker is coded with a dot on one terminal. The striped speaker leads must go to the speaker terminals marked with a color dot.

CARTRIDGE AND STYLUS REPLACEMENT

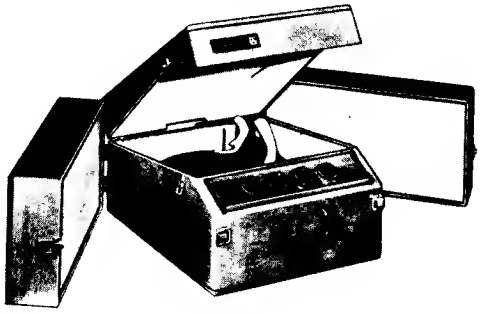
The cartridge and stylii are constructed as an integrated plug-in unit. To replace cartridge, lift tone arm and grasp cartridge on notched sides. Pull cartridge out of holder and insert new cartridge. The cartridge should be oriented so that the key, in the cartridge, fits into the key-way slot in the holder.

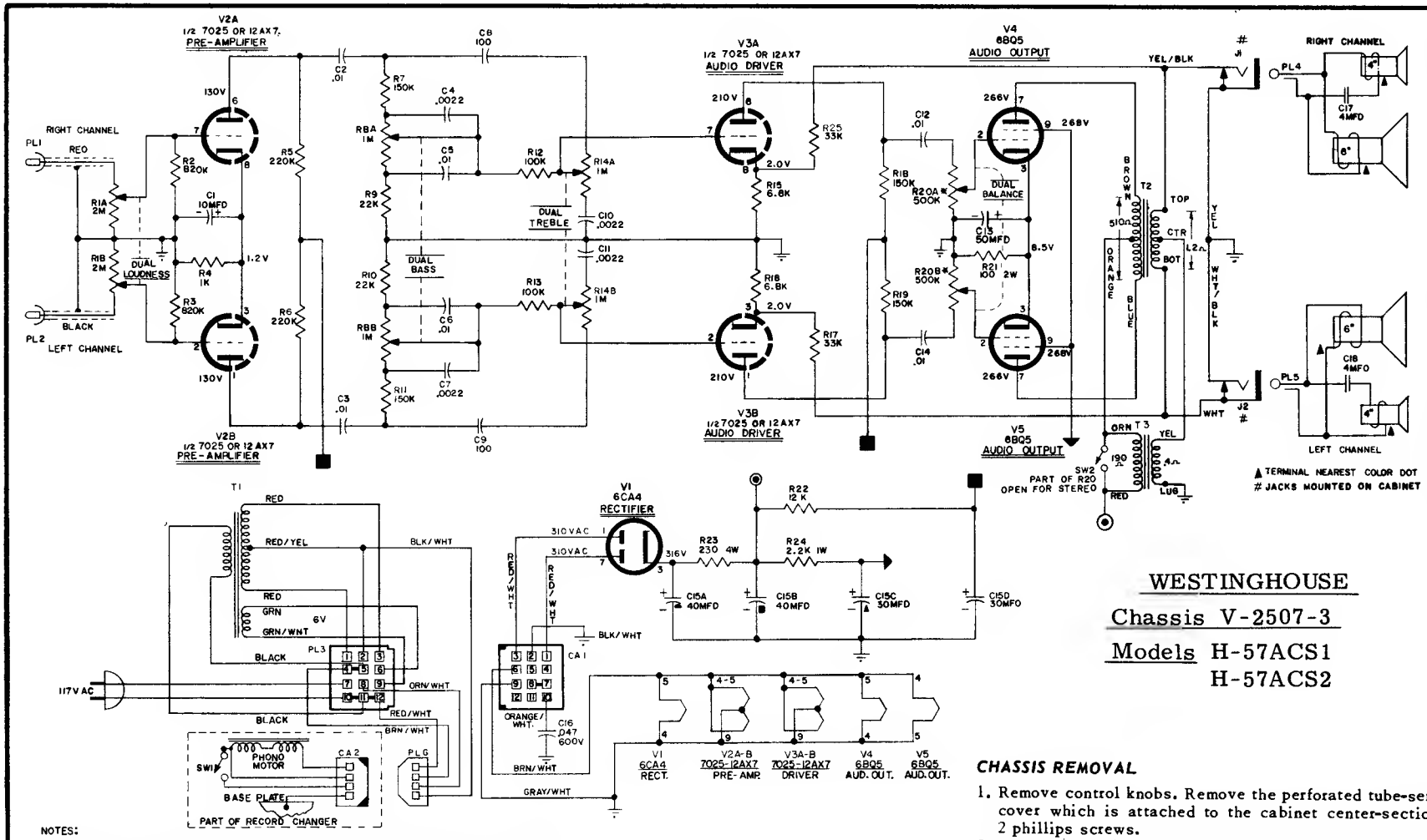
POWER CORD POLARITY

To remove the possibility of hum due to incorrect power plug polarity, try reversing this plug while the Bass and Loudness controls are set at maximum. Leave the plug in the minimum hum position. Always check the AC power plug polarity first when servicing a hum problem.



Cartridge-stylus replacement.





NOTES:

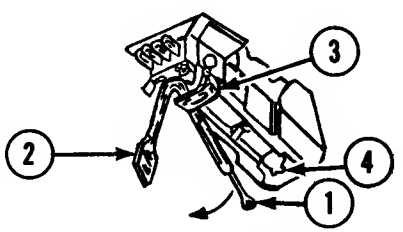
1. ALL CAPACITANCE VALUES LESS THAN ONE (1) ARE IN MFD, VALUES GREATER THAN ONE (1) ARE IN MMF, ALL RESISTANCE VALUES ARE IN OHMS 1/2 WATT UNLESS OTHERWISE SPECIFIED.
2. D.C. VOLTAGES MEASURED FROM POINTS INDICATED TO CHASSIS GROUND — NO SIGNAL APPLIED, USING A V. T. V. M., LINE VOLTAGE SET AT 117 VAC.
3. REAR SECTIONS OF ALL CONTROLS ARE THE RIGHT CHANNEL.
4. * INDICATES A SPECIAL CONTROL WITH OPPOSING TAPERS ON FRONT & REAR SECTIONS. A WESTINGHOUSE REPLACEMENT PART MUST BE USED.
5. ALL AMPLOK CONNECTORS VIEWED FROM CONTACT END.

WESTINGHOUSE

Chassis V-2507-3

Models H-57ACS1
H-57ACS2

To remove stylus (item #1), move lever handle (#2) until it is pointing down. Gently pull spring clip (#3) slightly open with finger. Grasp stylus by lever handle and slip it out from under clip. To replace stylus, slip heel of stylus under clip. Gently pull clip slightly open with finger. Slip stylus under clip making certain that stylus shaft rests in center of coupler (#4).



STYLUS REPLACEMENT

CHASSIS REMOVAL

1. Remove control knobs. Remove the perforated tube-service cover which is attached to the cabinet center-section by 2 phillips screws.
2. Remove the 4 phillips screws holding the motorboard. Lift the motorboard.
3. Note the color and location of the 2 coax cables connecting to the record changer. Disconnect these 2 coax cables.
4. Disconnect the amp-lok cap connection from the power transformer and the amp-lok plug connection from the record changer. Remove the record changer.
5. Remove the 4 nuts holding the chassis to the cabinet. Tag the wires connecting to the 2 External Speaker Sockets, then unsolder these wires.
6. Remove the 4 nuts holding the power transformer. Remove the chassis and the power transformer.

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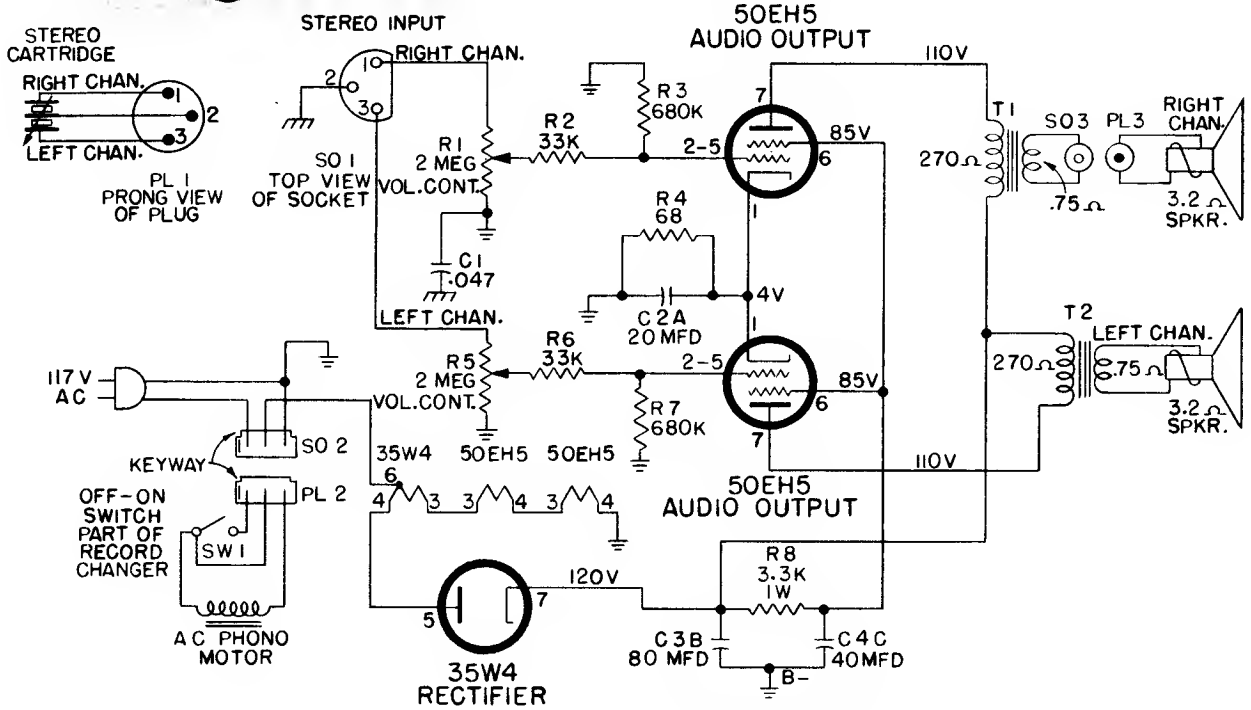
MODELS H-54ACS1, H-54ACS2, CHASSIS V-2508-3



NOTES:
1. ALL CAPACITANCE VALUES IN MFD AND ALL RESISTANCE VALUES IN OHMS UNLESS OTHERWISE STATED.
2. ALL VOLTAGES MEASURED FROM B- USING A V.T.V.M. LINE VOLTAGE SET AT 117 VAC READINGS SHOULD BE AS SHOWN ± 20%.
3. CHASSIS GROUND ⏚ COMMON B- ⏚

CHASSIS REMOVAL

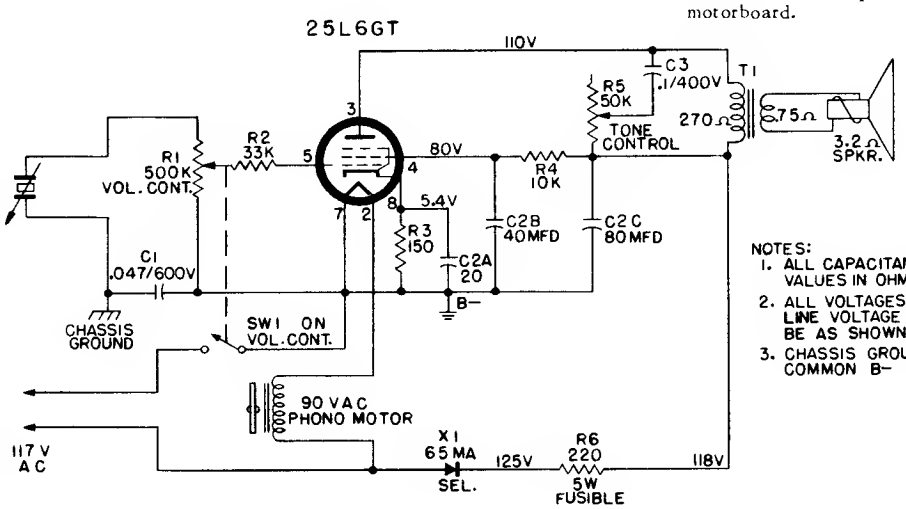
1. Remove the perforated tube-service cover which is attached to the rear of the speaker baffle by 2 phillips screws.
2. Remove the 4 phillips screws holding the motor board. Lift the motor board.
3. Remove the 2 cable plugs from the sockets on the chassis.
4. Remove the 2 speed nuts holding the chassis to the cabinet front.
5. Disconnect the speaker leads.

WESTINGHOUSE

Models H-51MP1, H-51MP2, H-51MP3, Chassis V-2508-1

CHASSIS REMOVAL

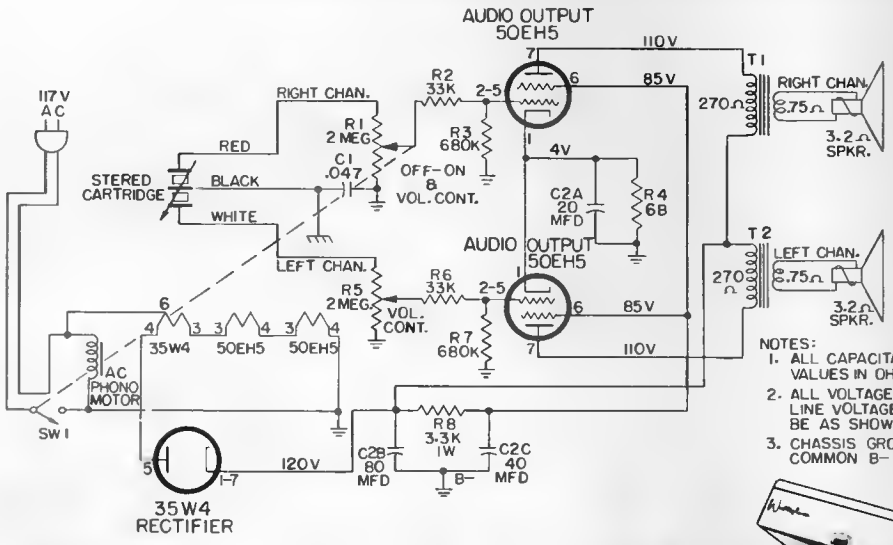
1. Remove 4 phillips screws holding the motorboard. Lift the motorboard.
2. Disconnect the speaker leads.
3. Remove the chassis cover (2 screws) and unsolder the 2 leads from the pickup cartridge and 2 leads from the phono motor.
4. Remove the 2 speed nuts holding the chassis to the motorboard.



NOTES:
1. ALL CAPACITANCE VALUES IN MFD AND ALL RESISTANCE VALUES IN OHMS UNLESS OTHERWISE STATED.
2. ALL VOLTAGES MEASURED FROM B- USING A V.T.V.M. LINE VOLTAGE SET AT 117 VAC READINGS SHOULD BE AS SHOWN ± 20%.
3. CHASSIS GROUND ⏚ COMMON B- ⏚

WESTINGHOUSE Models H-52MPS1, H-52MPS2, H-52MPS3

CHASSIS
V-2508-02

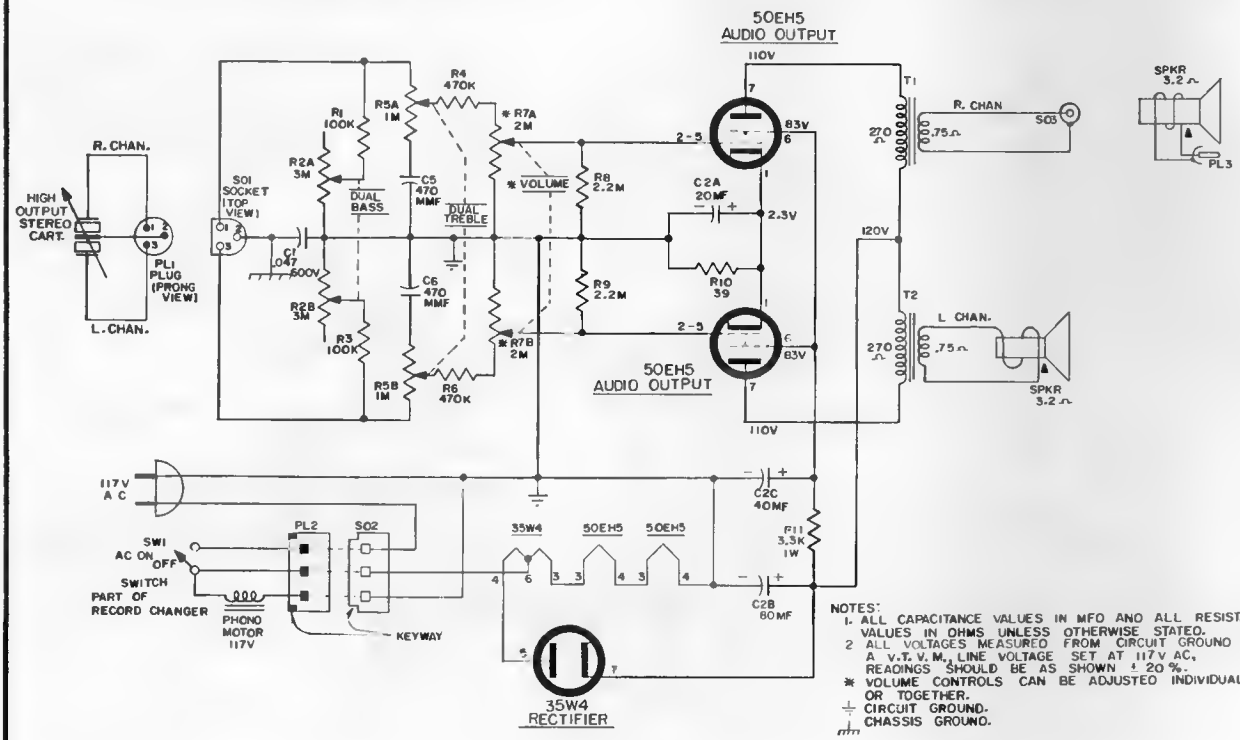


NOTES:
1. ALL CAPACITANCE VALUES IN MFD AND ALL RESISTANCE VALUES IN OHMS UNLESS OTHERWISE STATED.
2. ALL VOLTAGES MEASURED FROM B- USING A V.T.V.M. LINE VOLTAGE SET AT 117 V.A.C. READINGS SHOULD BE AS SHOWN ±20%
3. CHASSIS GROUND ⏚ COMMON B- ⏚

CHASSIS REMOVAL

1. Remove 4 phillips screws holding the motorboard. Lift the motorboard.
2. Disconnect the speaker leads.
3. Remove the chassis cover (2 screws) and unsolder the 2 leads from the pickup cartridge and 2 leads from the phono motor.
4. Remove the 2 speed nuts holding the chassis to the motorboard.

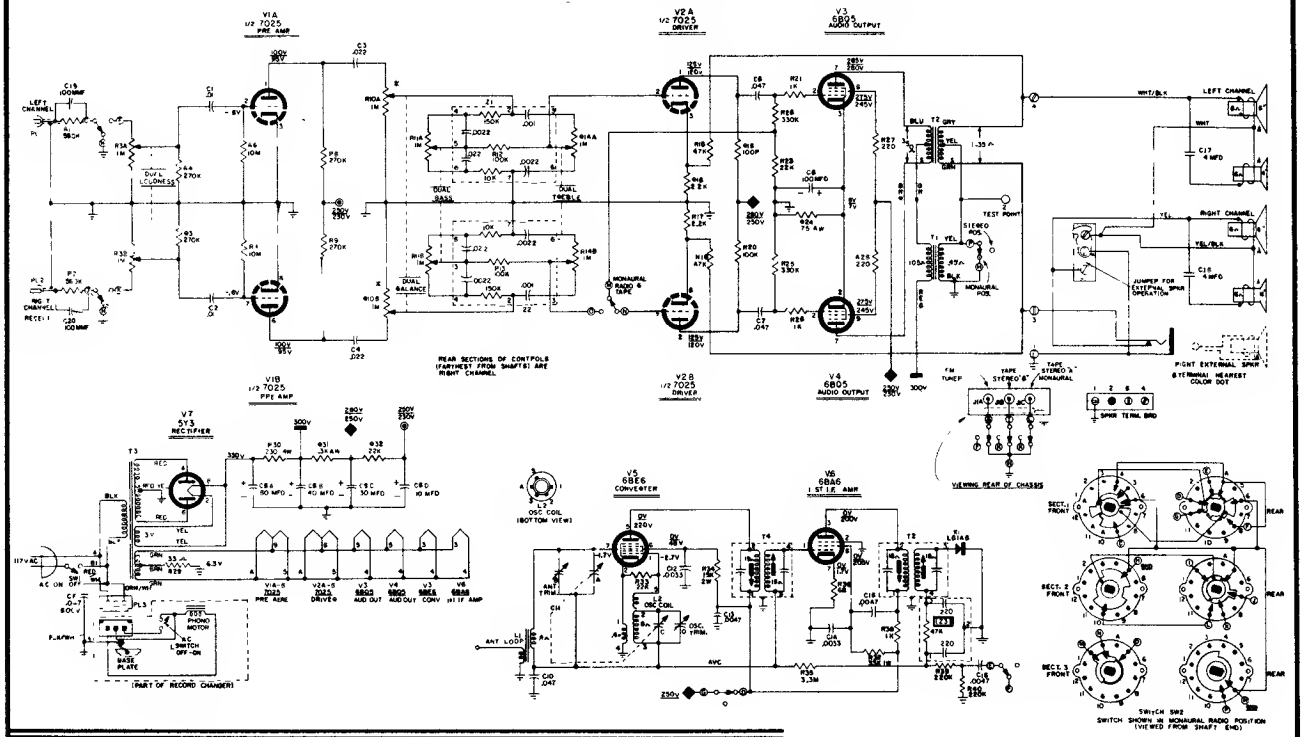
WESTINGHOUSE Chassis V-2508-04
Models H-55ACS1, H-55ACS2



NOTES:
1. ALL CAPACITANCE VALUES IN MFD AND ALL RESISTANCE VALUES IN OHMS UNLESS OTHERWISE STATED.
2. ALL VOLTAGES MEASURED FROM CIRCUIT GROUND USING A V.T.V.M., LINE VOLTAGE SET AT 117 V AC, READINGS SHOULD BE AS SHOWN ± 20%.
* VOLUME CONTROLS CAN BE ADJUSTED INDIVIDUALLY OR TOGETHER.
⏚ CIRCUIT GROUND.
⏚ CHASSIS GROUND.
3. REAR SECTIONS OF ALL CONTROLS ARE RIGHT CHANNEL.

WESTINGHOUSE Chassis V-2509-1

Models H-R1100, H-R1101, H-R1102, H-R1103

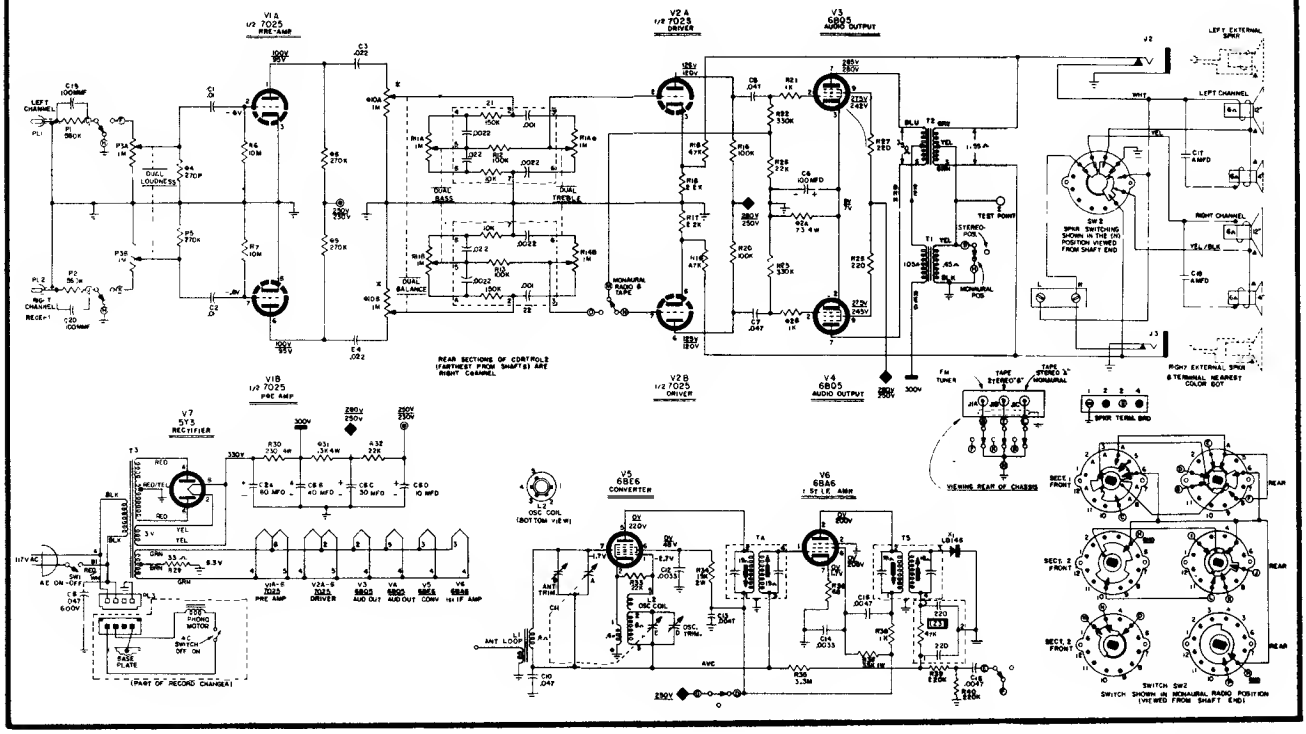


WESTINGHOUSE Chassis V-2509-2

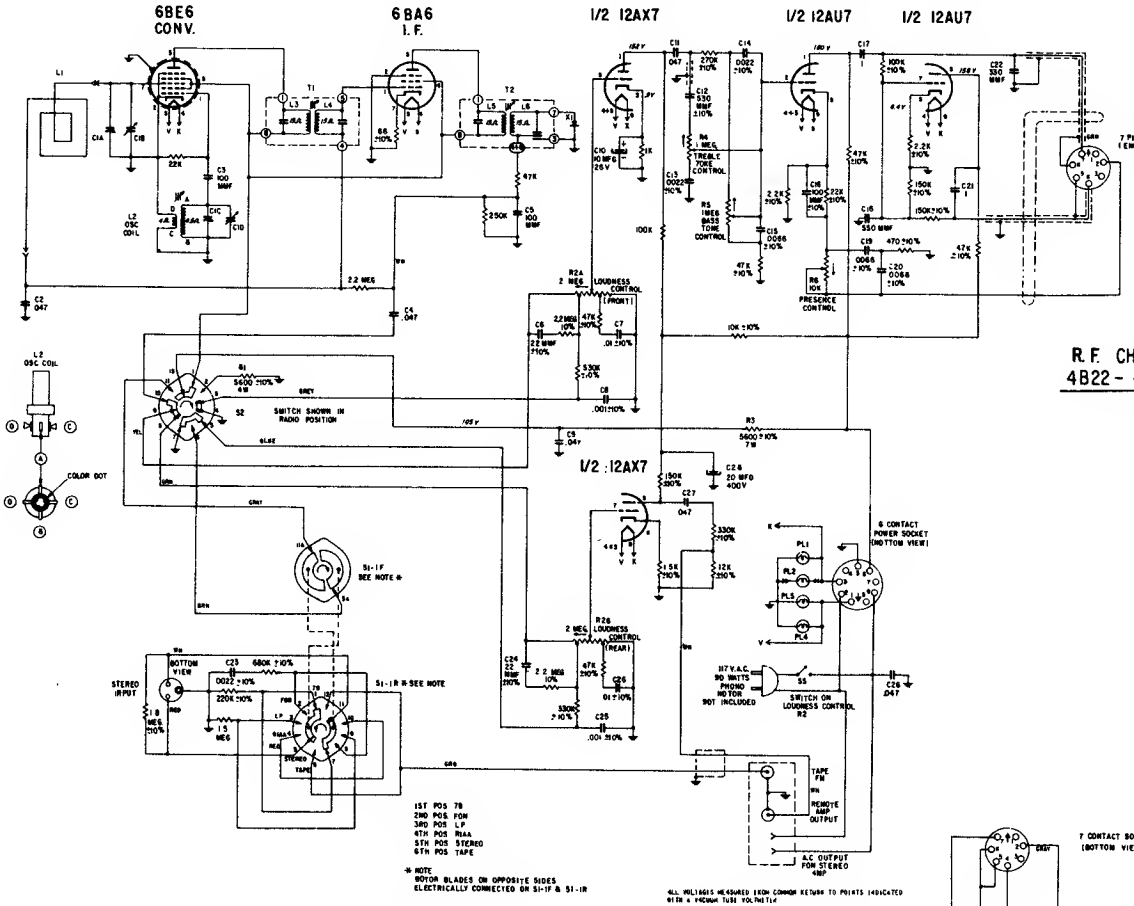
Models H-R1200, H-R1201, H-R1202, H-R1203, and H-R1204

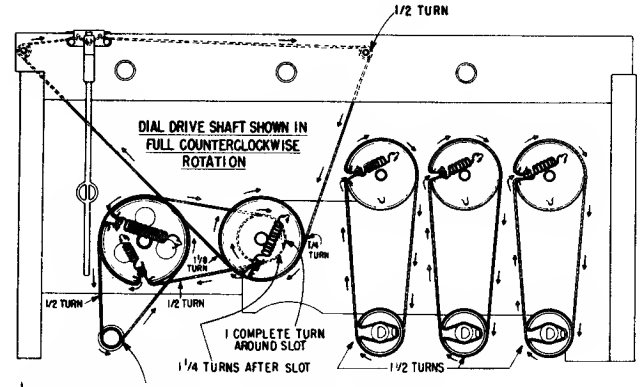
NOTES
1. ALL CAPACITANCE VALUES IN MFD & ALL RESISTANCE VALUES IN OHMS UNLESS OTHERWISE SPECIFIED.
2. ALL VOLTAGES ARE MEASURED FROM POINTS INDICATED TO CHASSIS GROUND USING A VTVM. LINE VOLTAGE SET AT 117V A.C., NO SIGNAL INPUT, LOUDNESS AT MINIMUM, TUNING CAPACITOR SET AT MAXIMUM.
3. VOLTAGES SHOWN UNDERLINED ARE WITH SWITCH SW2 IN ALL POSITIONS EXCEPT RADIO.
4. ALL REFERENCES TO LEFT AND RIGHT ARE AS VIEWED FACING FRONT OF SET.

* R10 IS A SPECIAL CONTROL WITH OPPOSITE TAPERS ON FRONT AND REAR SECTIONS. WESTINGHOUSE REPLACEMENT PART MUST BE USED.

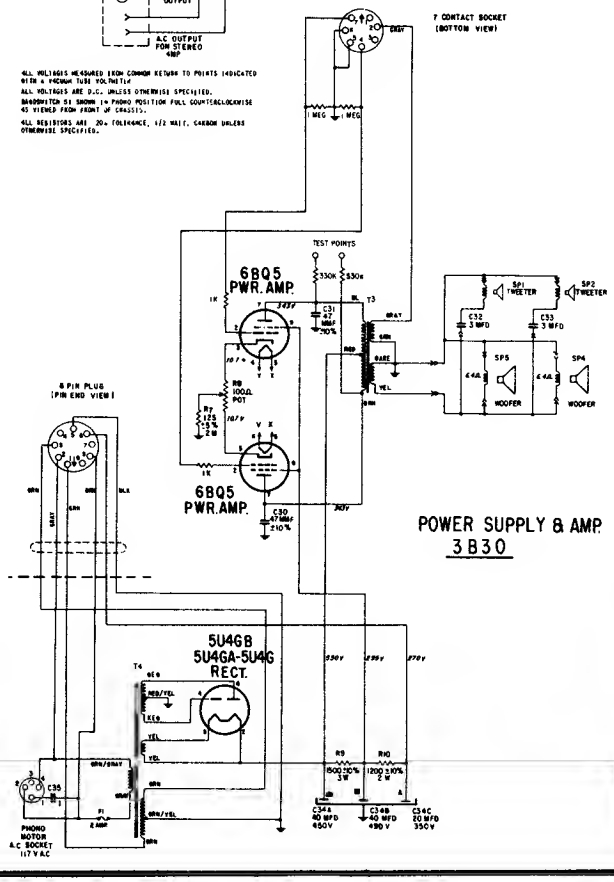


ZENITH Chassis 4B22Z and 3B30 used in Model SF174





DIAL CORD DRIVE

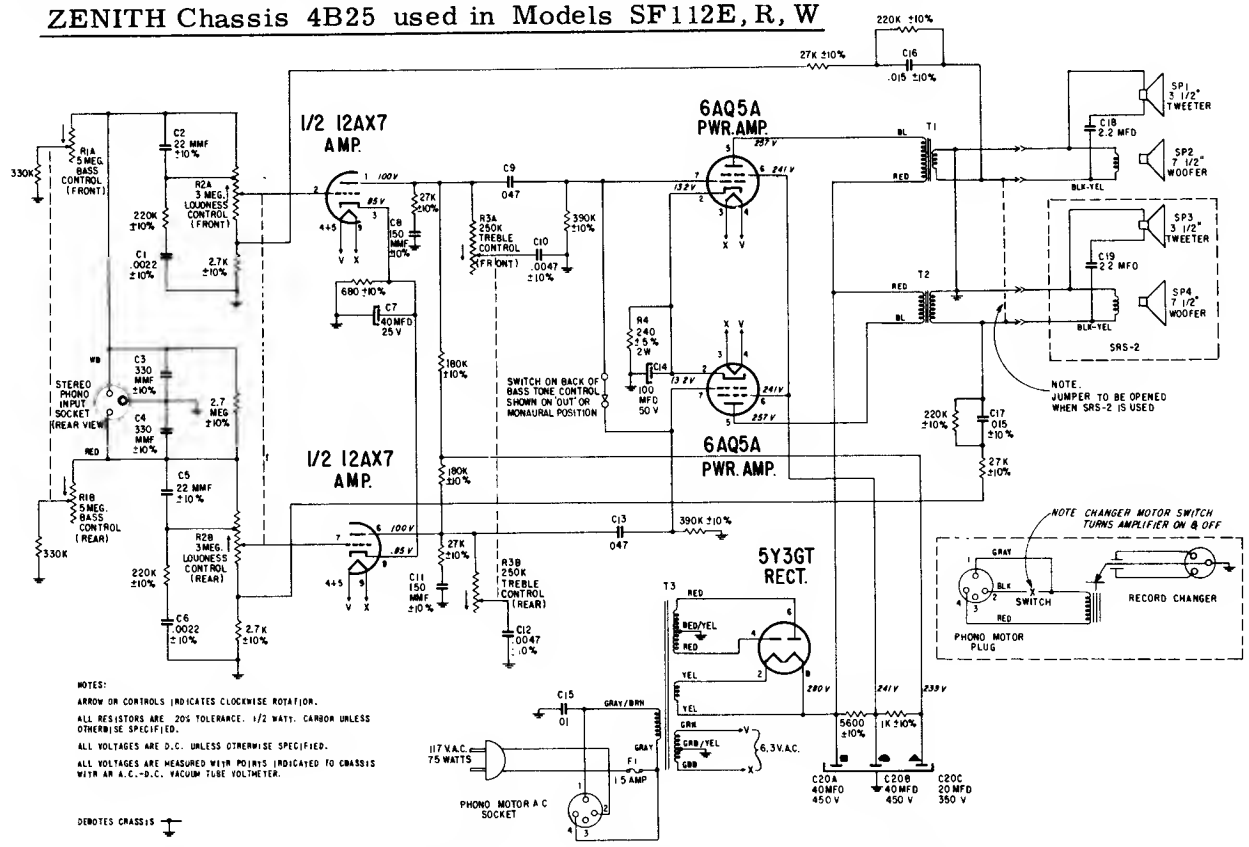


POWER SUPPLY & AMP. 3B30

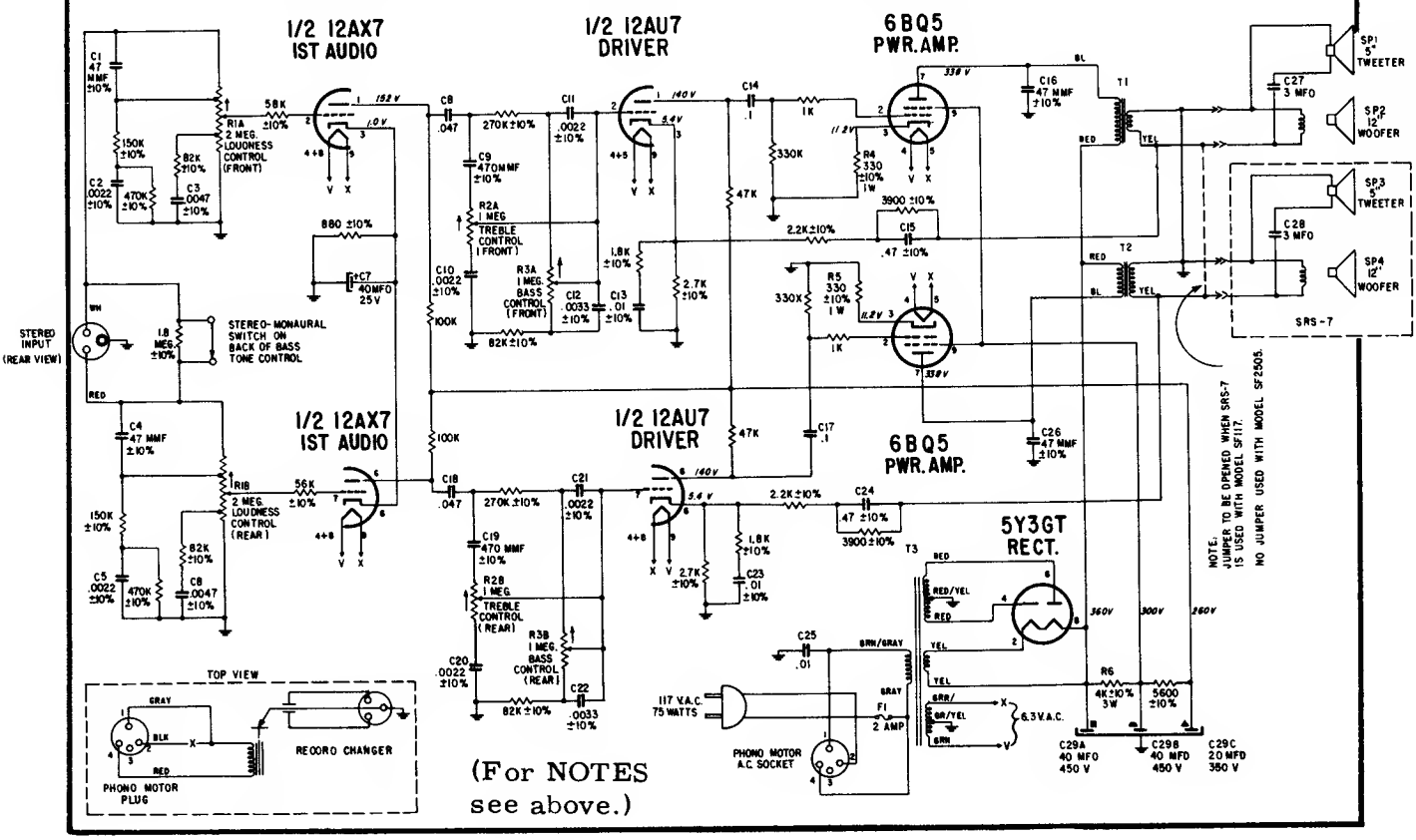
ALIGNMENT PROCEDURE

Operation	Connect Oscillator to	Dummy Antenna	Input Sig. Frequency	Set Dial at	Trimmers	Purpose
1	Converter Grid	.5 Mfd.	455 Kc.	600 Kc.	L3,L4, L5,L6	Align I.F. for maximum output.
2	One turn loop coupled loosely	--	1600 Kc.	1600 Kc.	C1D	Set osc. to dial scale
3	to wave magnet	--	1400 Kc.	1400 Kc.	C1B	Align antenna stage

ZENITH Chassis 4B25 used in Models SF112E, R, W

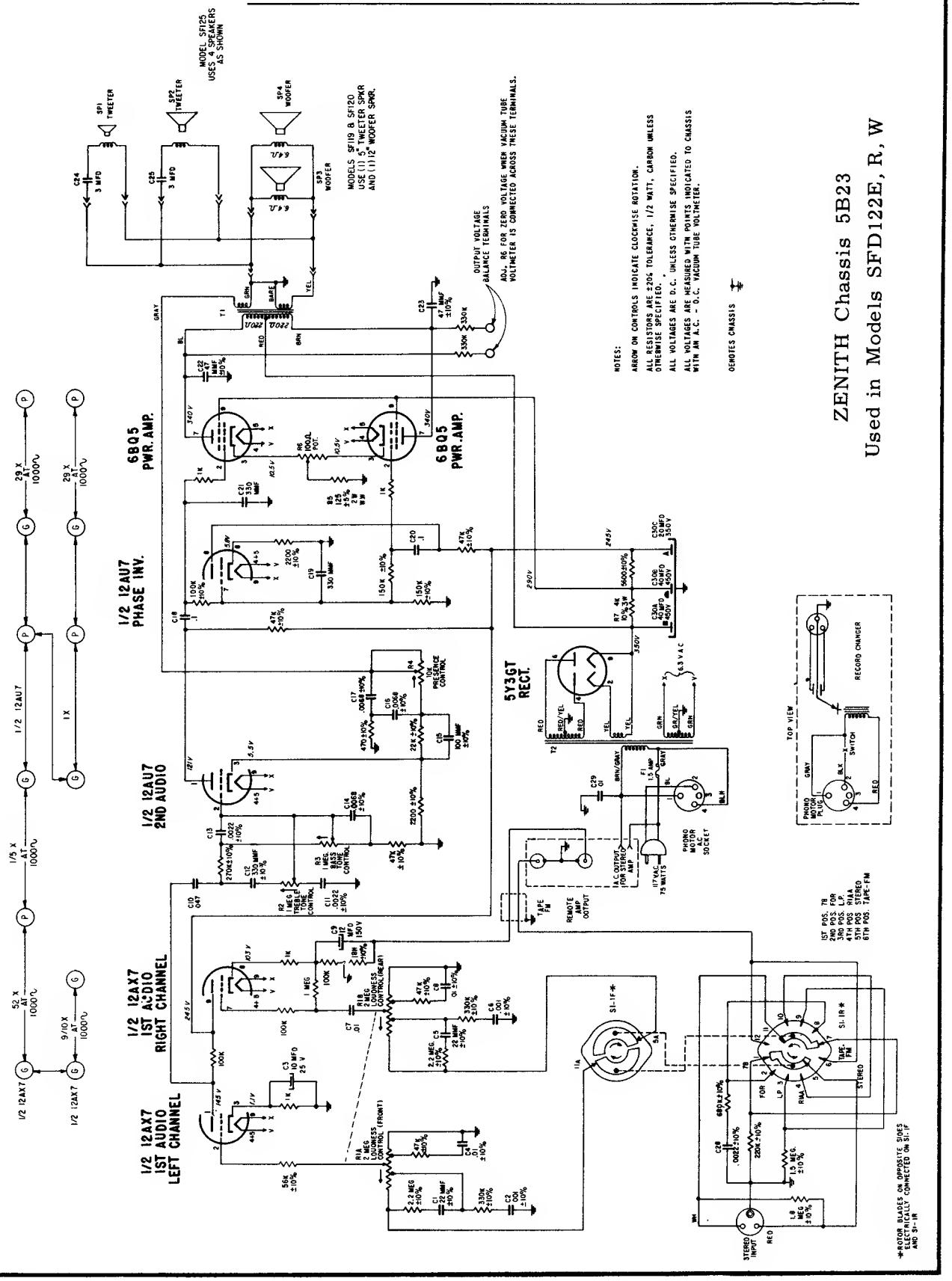


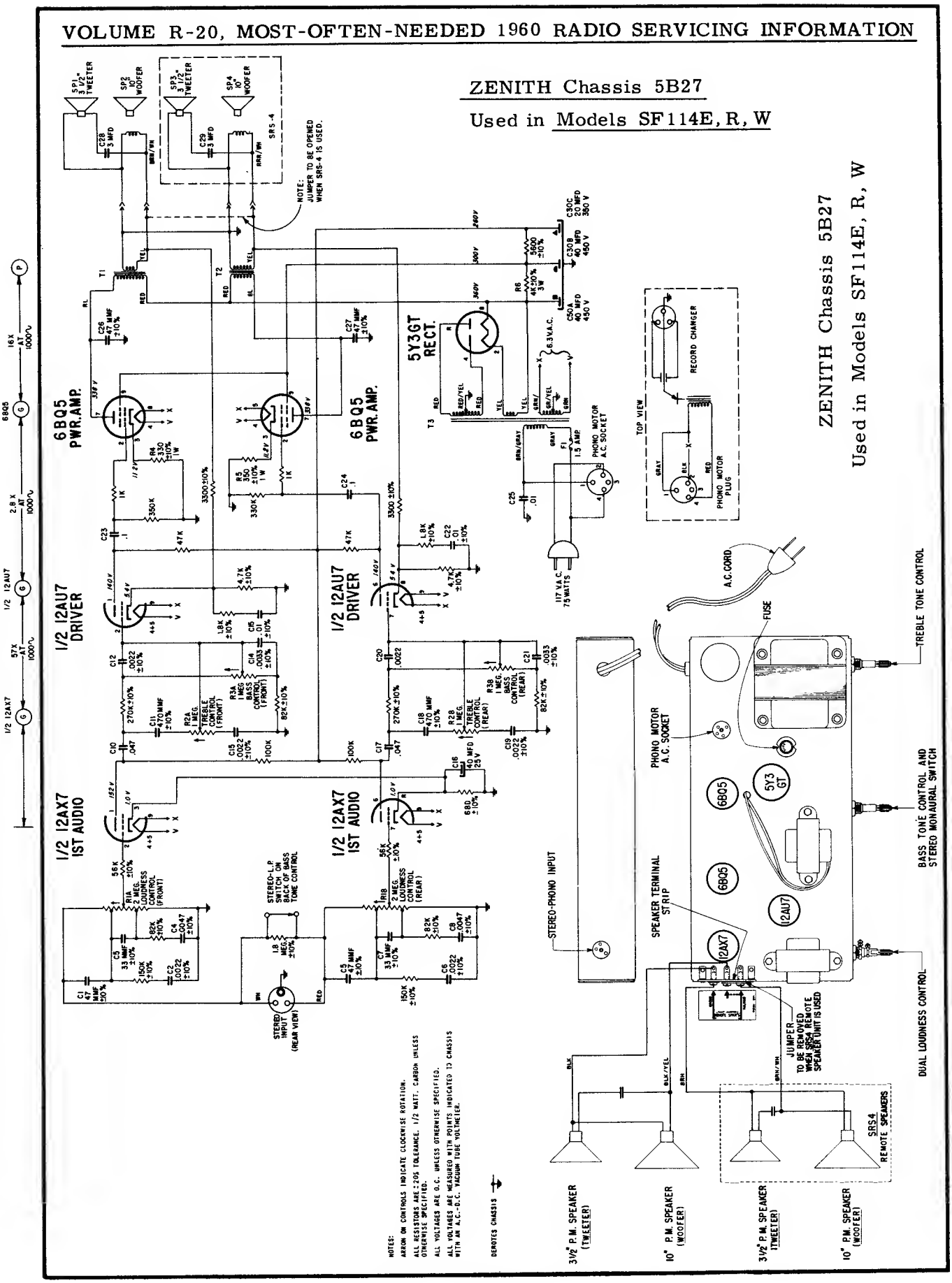
ZENITH Radio Chassis 5B29 used in Models SFD2505E, R, W



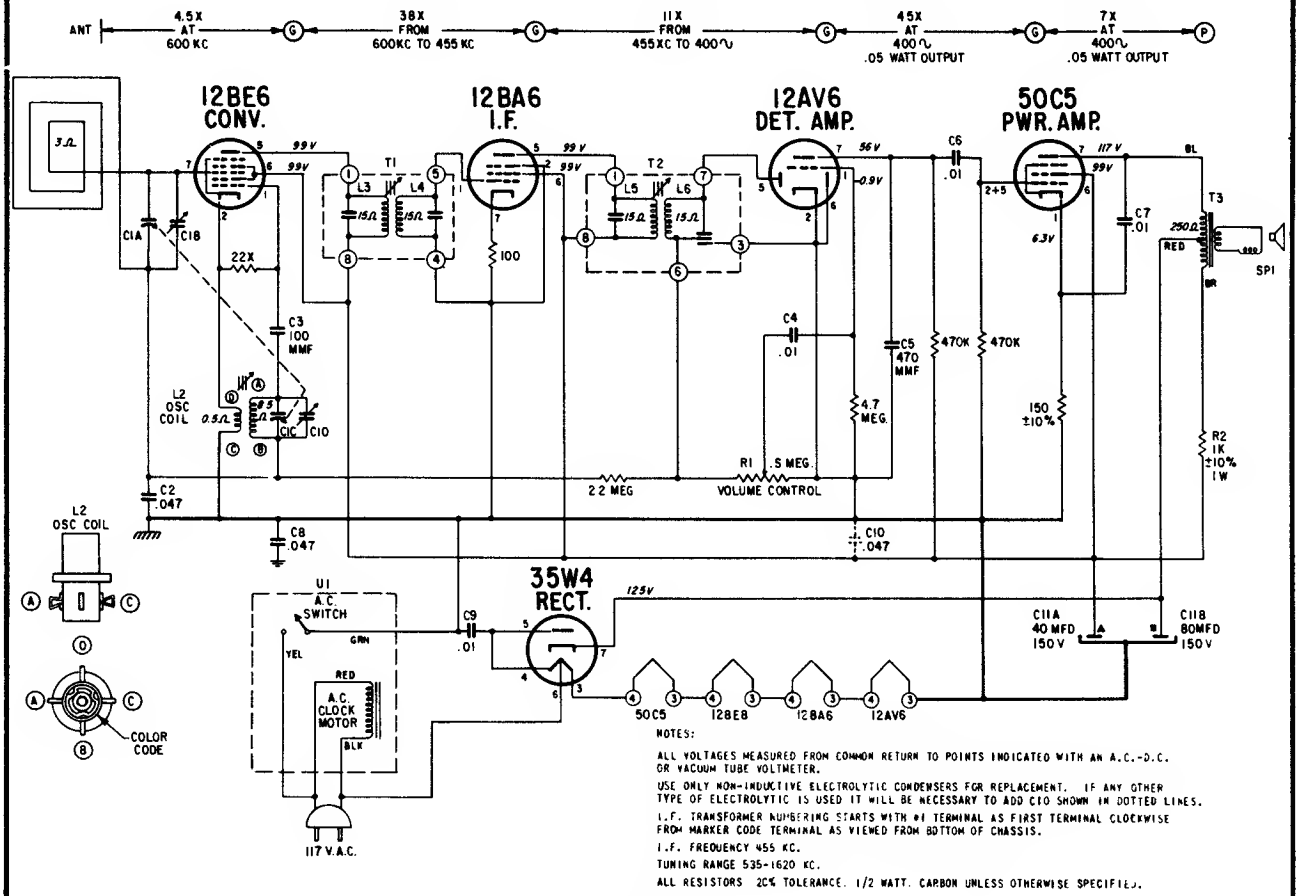
(For NOTES see above.)

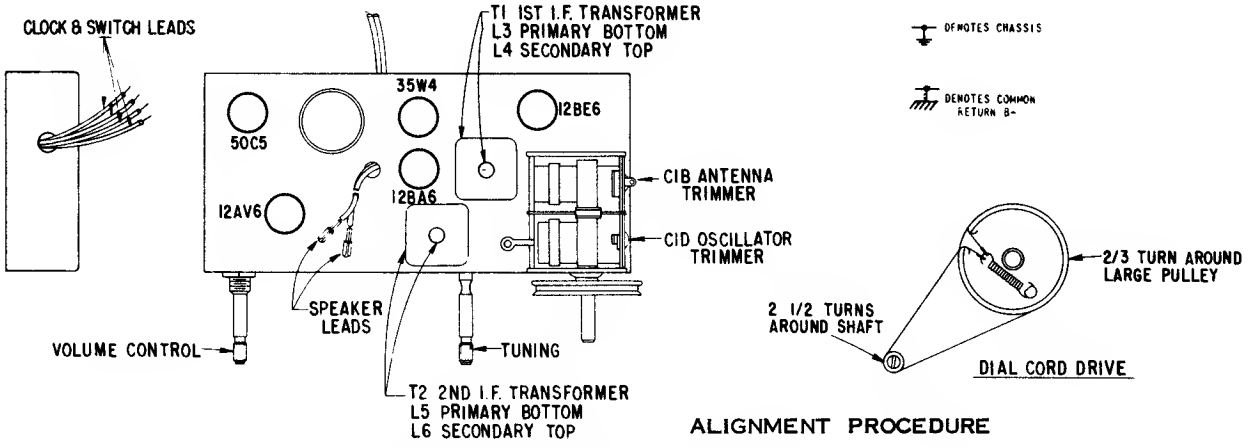
ZENITH Chassis 5B23 used in Models SFD122E, R, W




ZENITH Chassis 5B27
Used in Models SF114E, R, W
ZENITH Chassis 5B27
Used in Models SF114E, R, W
6BQ5 PWR.AMP.
6BQ5 PWR.AMP.
5Y3GT RECT.
1/2 12AU7 DRIVER
1/2 12AU7 DRIVER
1/2 12AX7 1ST AUDIO
1/2 12AX7 1ST AUDIO
SP1 3 1/2" TWEETER
SP2 10" WOOFER
SP3 3 1/2" TWEETER
SP4 10" WOOFER
SRS-4
NOTE: JUMPER TO BE OPENED WHEN SRS-4 IS USED.
A.C. CORD
FUSE
TREBLE TONE CONTROL
PHONO MOTOR A.C. SOCKET
RECORD CHANGER
TOP VIEW
PHONO MOTOR PLUG
117 V.A.C. 75 WATTS
STEREO-PHONO INPUT
SPEAKER TERMINAL STRIP
BASS TONE CONTROL AND STEREO MONAURAL SWITCH
DUAL LOUDNESS CONTROL
JUMPER TO BE REMOVED WHEN SRS-4 REMOTE SPEAKER UNIT IS USED
SRS4 REMOTE SPEAKERS
3½" P.M. SPEAKER (TWEETER)
10" P.M. SPEAKER (WOOFER)
3½" P.M. SPEAKER (TWEETER)
10" P.M. SPEAKER (WOOFER)
STEREO/ MONO INPUT (REAR VIEW)
STEREO-L.P. SWITCH ON BACK OF BASS TONE CONTROL
NOTES:
ARROW ON CONTROLS INDICATE CLOCKWISE ROTATION.
ALL RESISTORS ARE ±20% TOLERANCE. 1/2 WATT, CARBON UNLESS OTHERWISE SPECIFIED.
ALL VOLTAGES ARE D.C. UNLESS OTHERWISE SPECIFIED.
ALL VOLTAGES ARE MEASURED WITH POINTS INDICATED TO CHASSIS WITH AN A.C.-D.C. VACUUM TUBE VOLTMETER.
DENOTES CHASSIS

ZENITH RADIO CORPORATION MODELS C519W,C,P,L CHASSIS 5C07

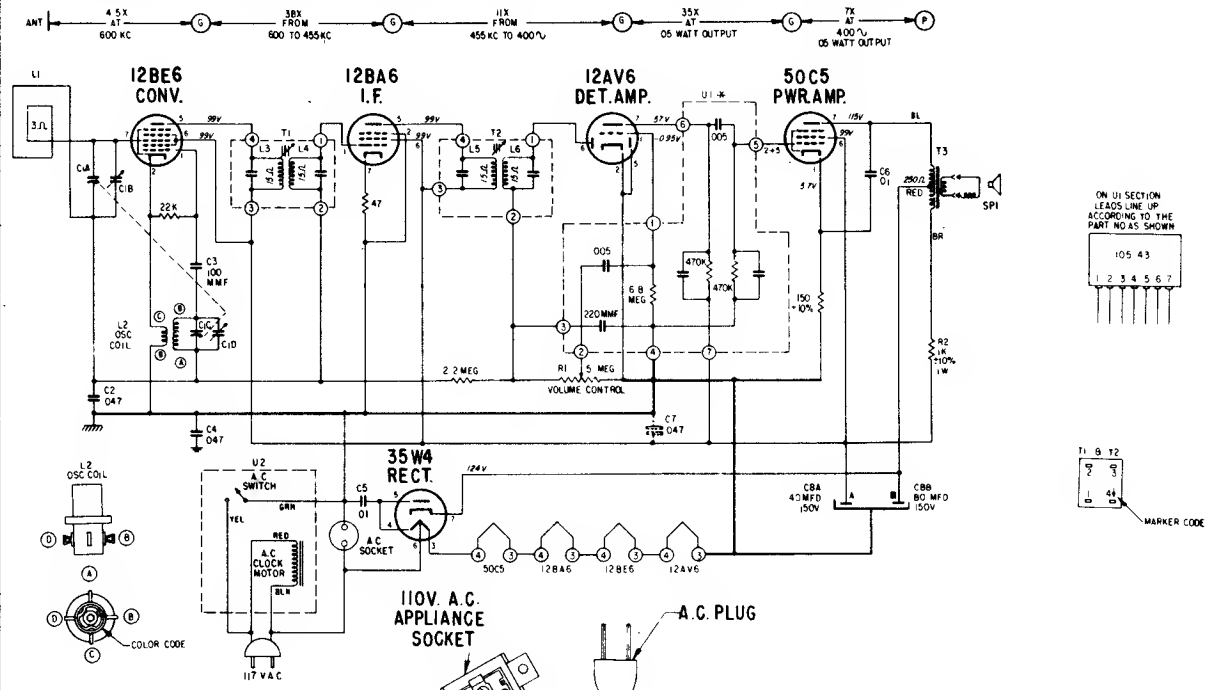




ALIGNMENT PROCEDURE

Operation	Connect Oscillator To	Dummy Antenna	Input Sig. Frequency	Set Dial At	Trimmers	Purpose
1	Converter Grid	.5 Mfd.	455 Kc.	600 Kc.	L3,L4,L5, L6	For I.F. Alignment.
2	One Turn Loop Coupled Loosely to Wave Magnet	—	1600 Kc.	1600 Kc.	C1D	Set Oscillator to Dial Scale
3		—	1400 Kc.	1400 Kc.	C1B	Align Antenna Stage

ZENITH RADIO CORPORATION — MODELS C520B,V,W — CHASSIS 5C09



NOTES:

ALL VOLTAGES MEASURED FROM COMMON RETURN TO POINTS INDICATED WITH AN A.C., D.C. OR VACUUM TUBE VOLTMETER.

USE ONLY ZENITH NON-INDUCTIVE ELECTROLYTIC CONDENSERS FOR REPLACEMENT.

IF ANY OTHER TYPE OF ELECTROLYTIC IS USED IT WILL BE NECESSARY TO ADD C7 SHOWN IN DOTTED LINES.

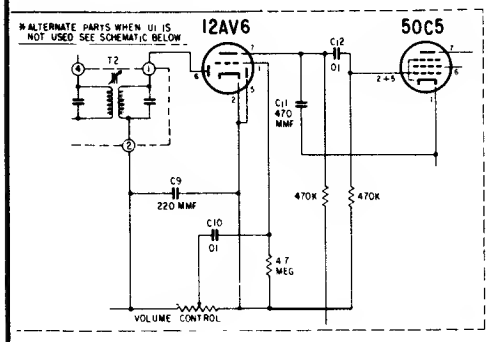
I.T. TRANSFORMER NUMBERING STARTS WITH #1 TERMINAL AS FIRST TERMINAL CLOCKWISE FROM MARKER CODE TERMINAL AS VIEWED FROM BOTTOM OF CHASSIS.

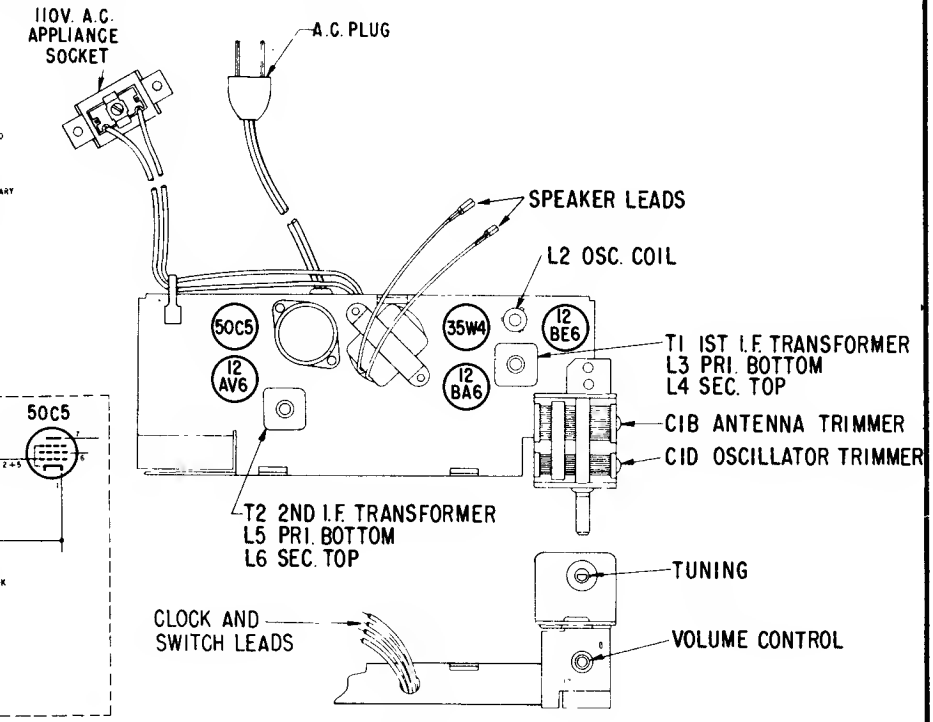
I.F. FREQUENCY 455 KC
TUNING RANGE 535-1620 KC

ALL RESISTORS ±20% TOLERANCE, 1/2 WATT CARBON UNLESS OTHERWISE SPECIFIED.

DENOTES COMMON RETURN B−

DENOTES CHASSIS



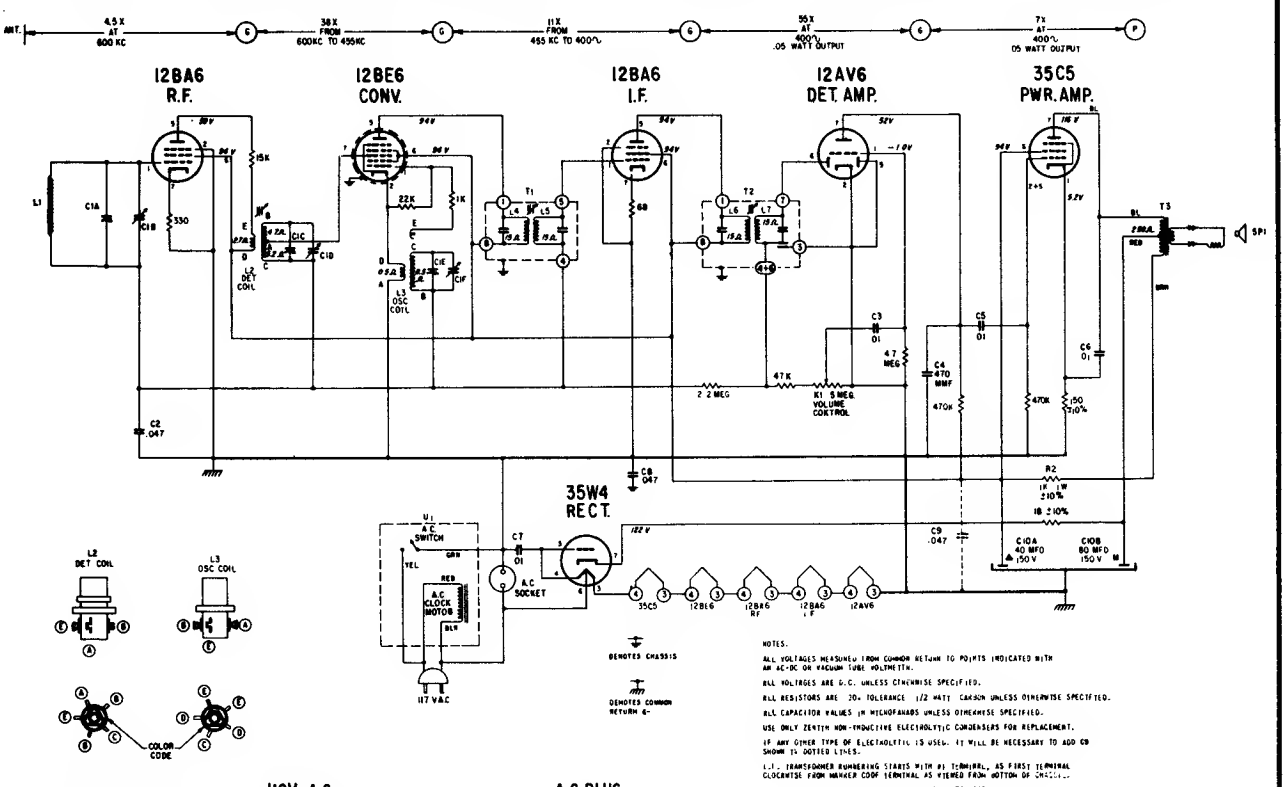


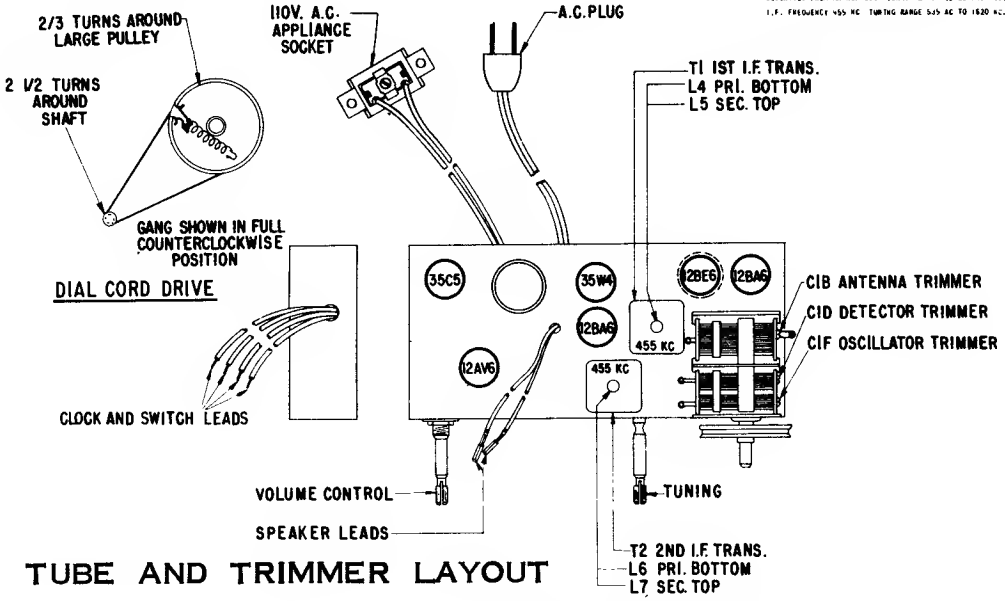
TUBE AND TRIMMER LAYOUT

ALIGNMENT PROCEDURE

Operation	Connect Oscillator To	Dummy Antenna	Input Sig. Frequency	Set Dial At	Trimmers	Purpose
1	Converter Grid	.5 Mfd.	455 Kc.	600 Kc.	L3,L4,L5, L6	For I.F. Alignment.
2	One Turn Loop Coupled Loosely to Wave Magnet	—	1600 Kc.	1600 Kc.	C1D	Set Oscillator to Dial Scale
3		—	1400 Kc.	1400 Kc.	C1B	Align Antenna Stage

ZENITH RADIO CORPORATION MODELS C624W,C,V, CHASSIS 6C03



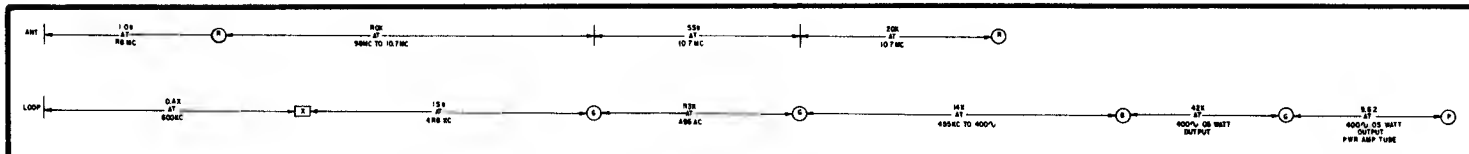


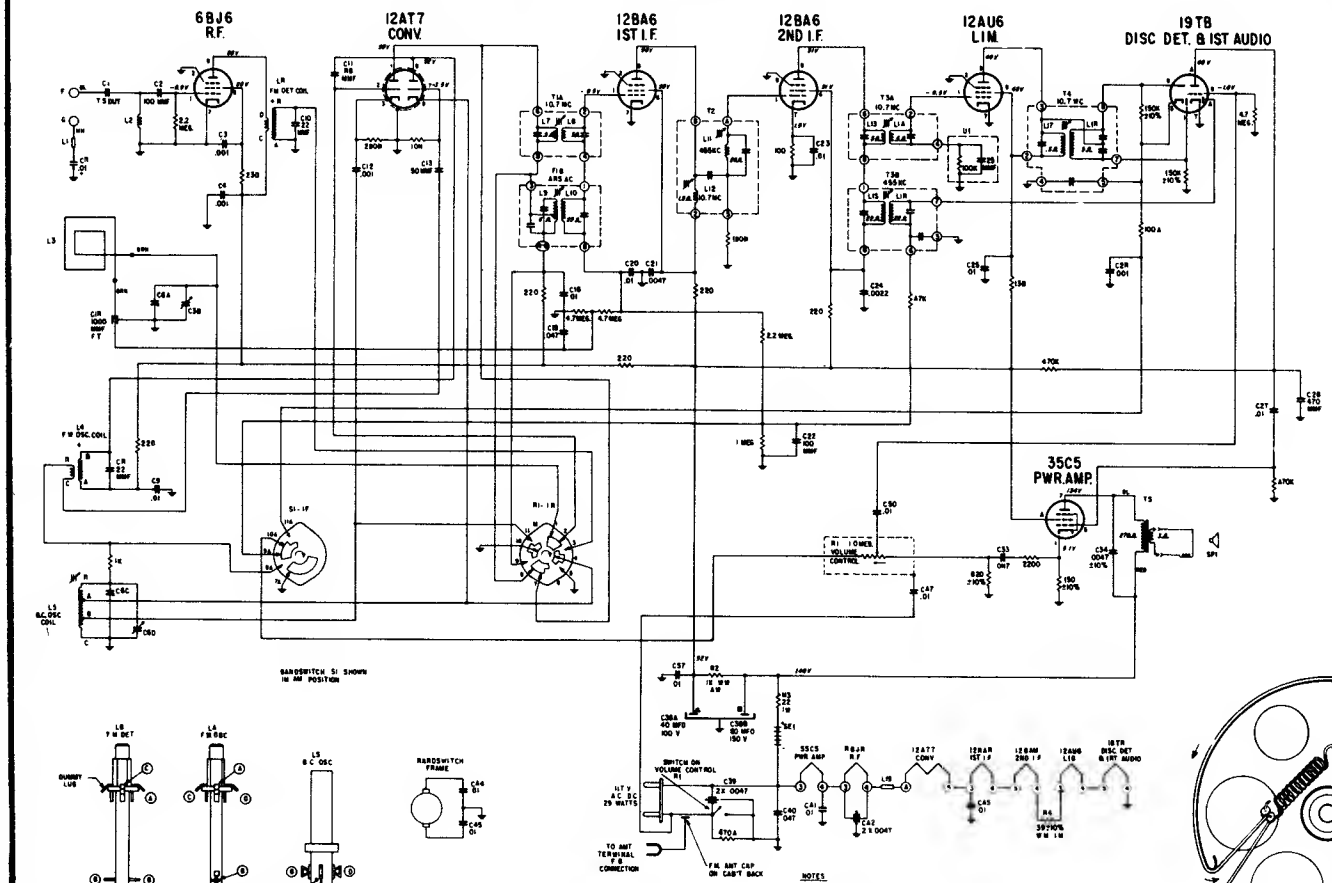
TUBE AND TRIMMER LAYOUT

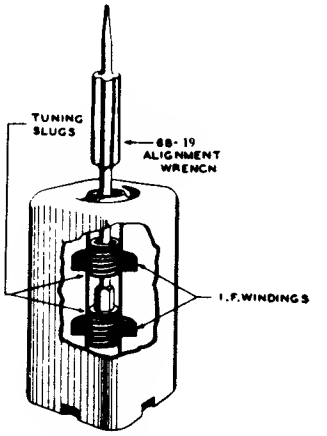
Clock and Timer Note:
The clock and timer assemblies used in this receiver are manufactured by Telechron. Face parts, such as hands, knobs, scales, bezel, etc., are not available through local Telechron service depots. We suggest that all clock and timer assemblies complete (less the rear cover and bushing) be returned to your local Zenith Distributor for repair or replacement. Be sure to pack all clock and timer assemblies individually and carefully to prevent damage in shipment.

ALIGNMENT PROCEDURE

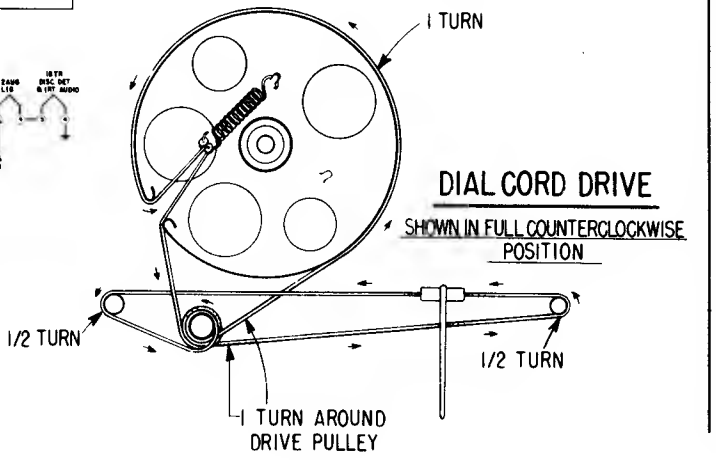
Operation	Connect Oscillator To	Dummy Antenna	Input Sig. Frequency	Set Dial At	Trimmers	Purpose
1	Converter Grid	.5 Mfd.	455 Kc.	600 Kc.	L4,L5,L6, L7	For I.F. Alignment.
2	One Turn Loop Coupled Loosely to Wavemagnet	——	1600 Kc.	1600 Kc.	C1F	Set Oscillator to Dial Scale.
3		——	1400 Kc.	1400 Kc.	C1D, C1B	Align Detector and Antenna Stage.







Detail of
IF Transformer



DIAL CORD DRIVE

SHOWN IN FULL COUNTERCLOCKWISE POSITION

ZENITH RADIO CORPORATION
MODEL C724L,P,G CHASSIS 7C02

ZENITH RADIO CORP.

Models C724L, P, G

Chassis 7C02

(Continued from page 172, adjacent at left)

ALIGNMENT PRDCEDURE

OPERATION	CDNNECT OSCILLATOR TO	DUMMY ANTENNA	INPUT SIGNAL FREQUENCY	BAND	SET DIAL TO	ADJUST	PURPOSE
1	Pin 2 12AT7 Converter	.05 Mfd.	455 Kc., 400 Cycle Modulated	BC	600 Kc.	L9,10,11,15,16	Align IF channel for maximum output.
2	2 turns loosely coupled to wavemagnet		1600 Kc., 400 Cycle Modulated	BC	1600 Kc.	C6D	Set oscillator to dial scale.
3	2 turns loosely coupled to wavemagnet		1400 Kc., 400 Cycle Modulated	BC	1400 Kc.	C6B	Align antenna stage
4 (a)	Pin 1 (grid) on 12AU6 limiter	.05 Mfd.	10.7 Mc. Unmodulated	FM		L17 coil slug pri. discr.	Align primary of discriminator for maximum reading.
5 (b)	Pin 1 (grid) on 12AU6 limiter	.05 Mfd.	10.7 Mc. Unmodulated	FM		L18 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		L13 & L14 pri. & 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		L12 2nd IF trans.	Align 2nd IF transformer for maximum reading.
8 (c)	Pin 2 (grid) on 12AT7 converter tube socket	.05 Mfd.	10.7 Mc. Unmodulated	FM		L7 & L8 pri. & sec. of 1st IF trans.	Align 1st IF transformer for maximum reading.
9 (c)	Antenna Post FM	270 Ohms	98 Mc. Unmodulated	FM	98 Mc.	L4 osc. coil slug	Set oscillator to dial scale.
10 (c) (d)	(Remove line ant.)	270 Ohms	98 Mc. Unmodulated	FM	98 Mc.	L6 det. coil slug	Align det. stage to maximum reading.

Correct alignment can only be made if the following procedure is followed:

A vacuum tube voltmeter with an isolation resistor of 2,000,000 ohms in series with the hot lead will serve for FM adjustments. This lead should be shielded.

The signal generator output should be kept just high enough to get an indication on the meter.

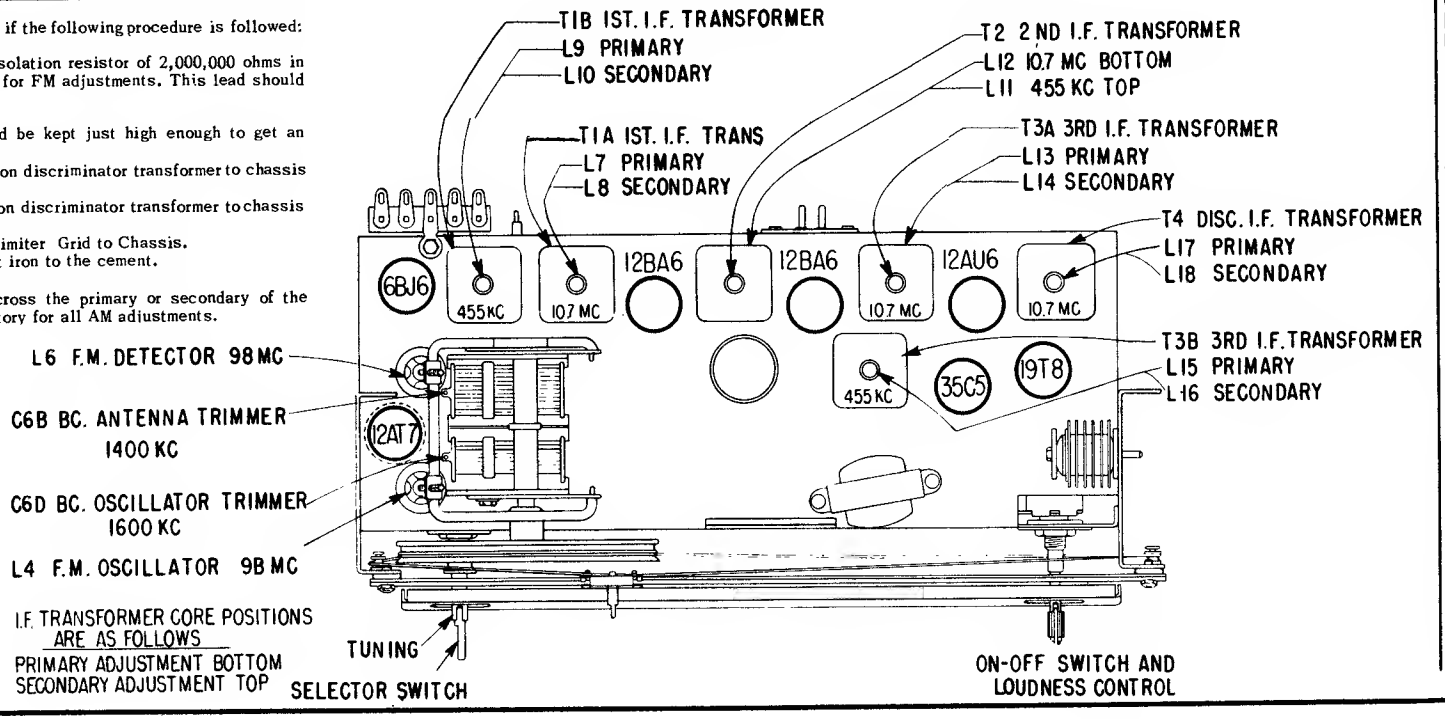
(a) Vacuum Tube Voltmeter Lug 7 on discriminator transformer to chassis (half discriminator load).

(b) Vacuum Tube Voltmeter Lug 5 on discriminator transformer to chassis (full discriminator load).

(c) Vacuum Tube Voltmeter from Limiter Grid to Chassis.

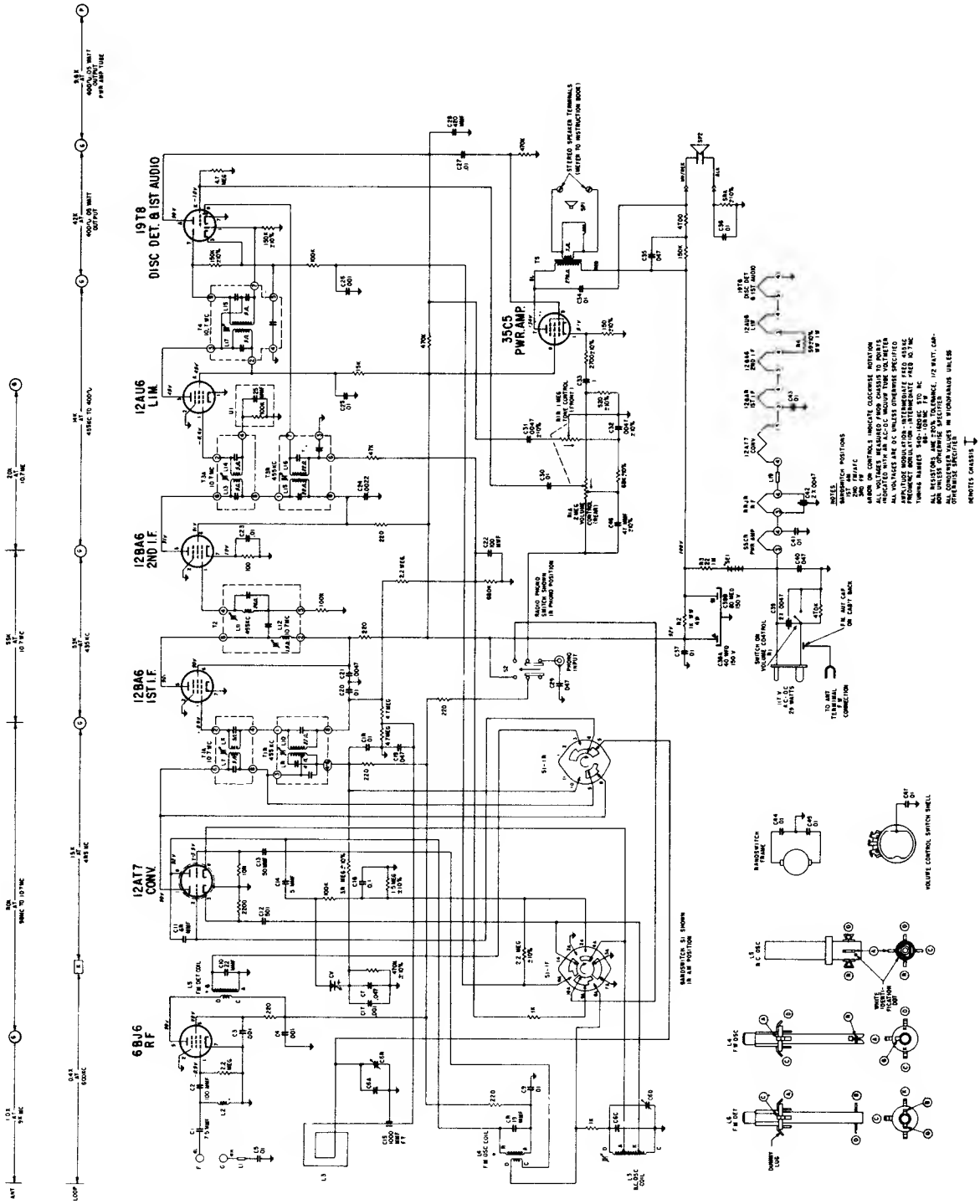
(d) Loosen Slugs by applying a hot iron to the cement.

An AC output meter connected across the primary or secondary of the output transformer will be satisfactory for all AM adjustments.



ZENITH RADIO MODEL C730, E, R, CHASSIS 7C05

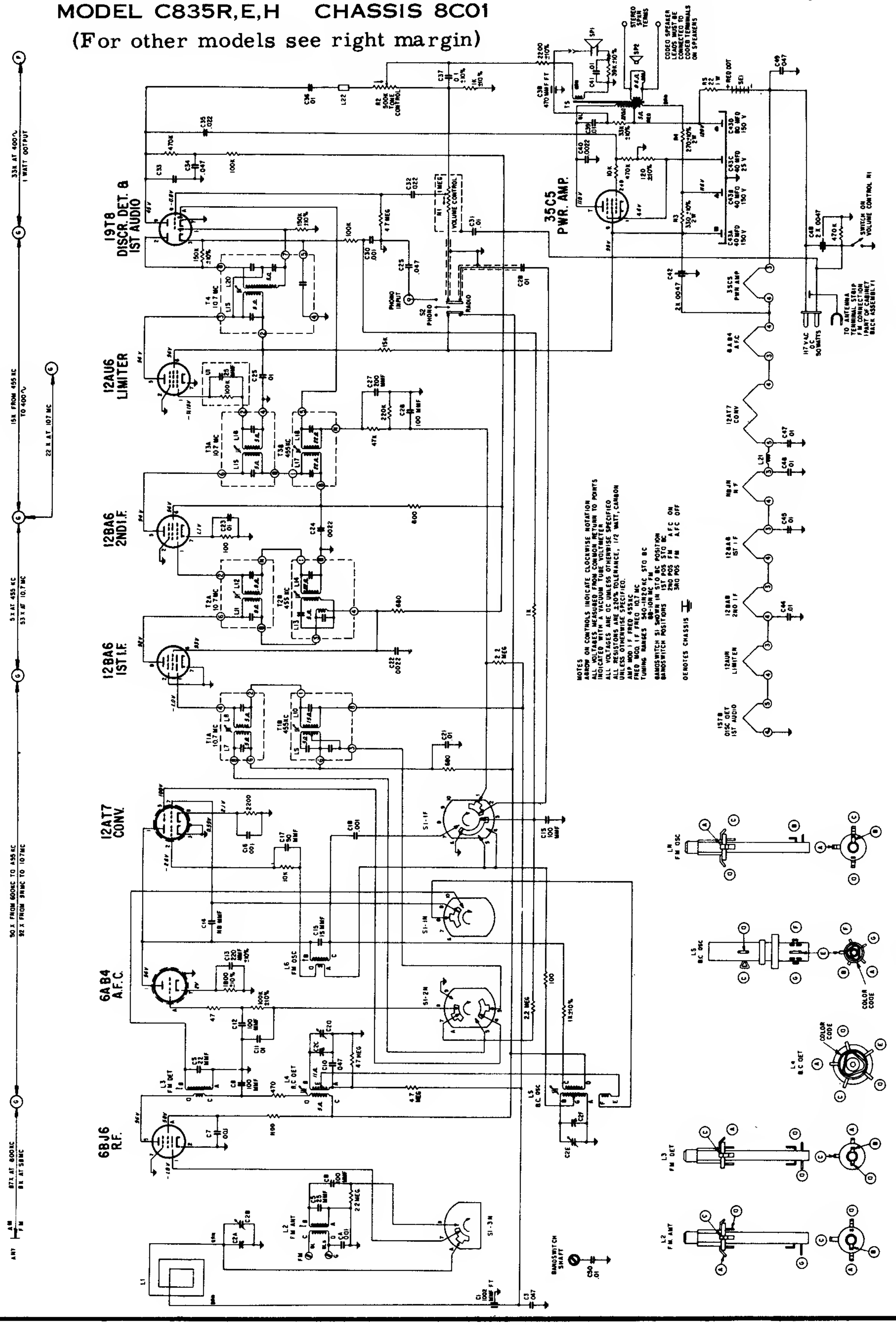
The schematic on this page is exact for models and chassis listed above. Zenith Radio Models C725C, F, L, Chassis 7C06, are practically the same electrically and this diagram will serve. For alignment and dial stringing information for both group of sets refer to material on 7C02, on page 173.



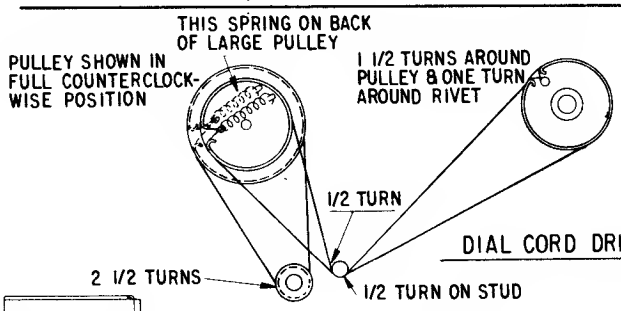
ZENITH RADIO CORPORATION
MODEL C835R,E,H CHASSIS 8C01

(For other models see right margin)

(Continued on page 176)



Schematic above is exact for Zenith Models C835E, H, R, Chassis 8C01. For alignment see page 176. Models C845L, M, W, Y, Chassis 8C02, are practically identical.



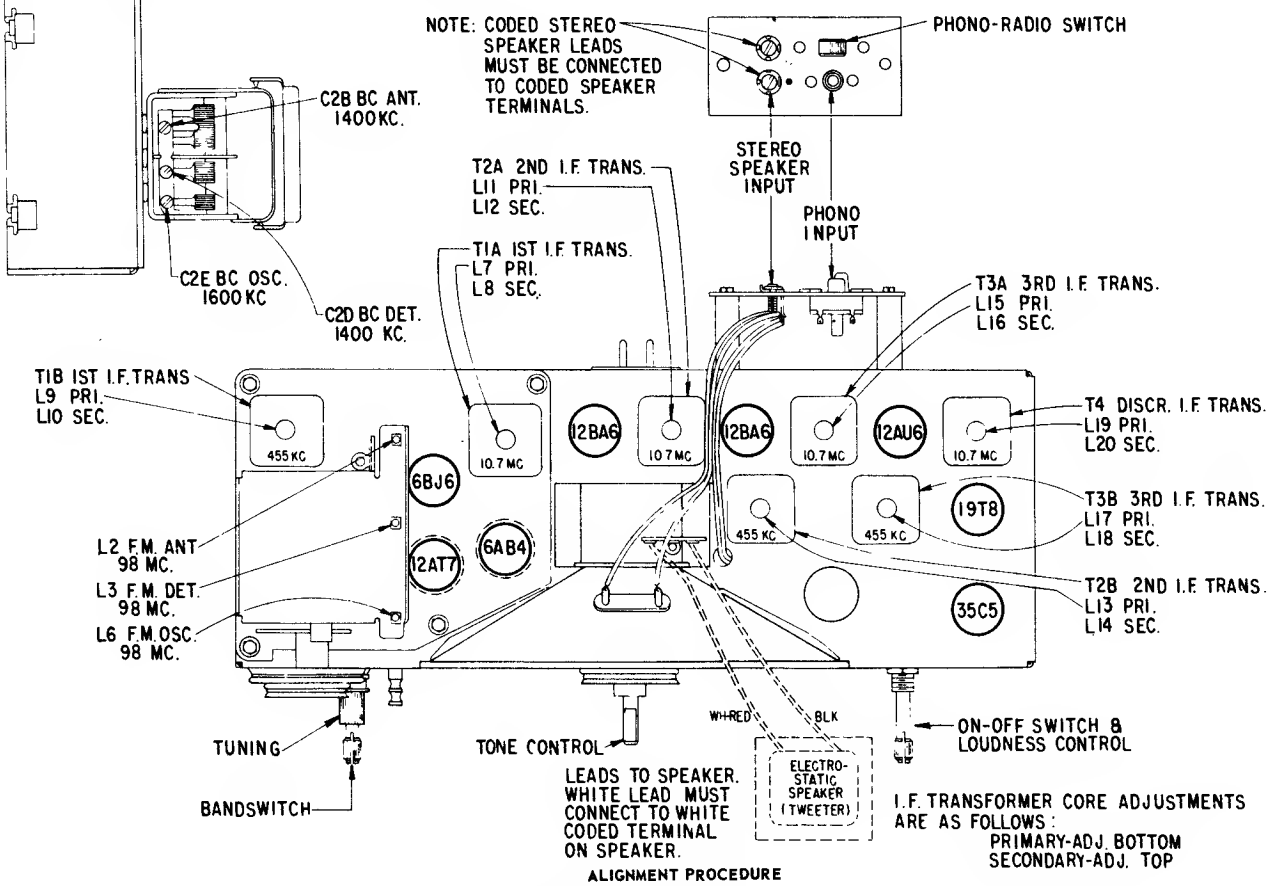
ZENITH RADIO CORP.

Models C835E, H, R, Chassis 8C01

Alignment Information

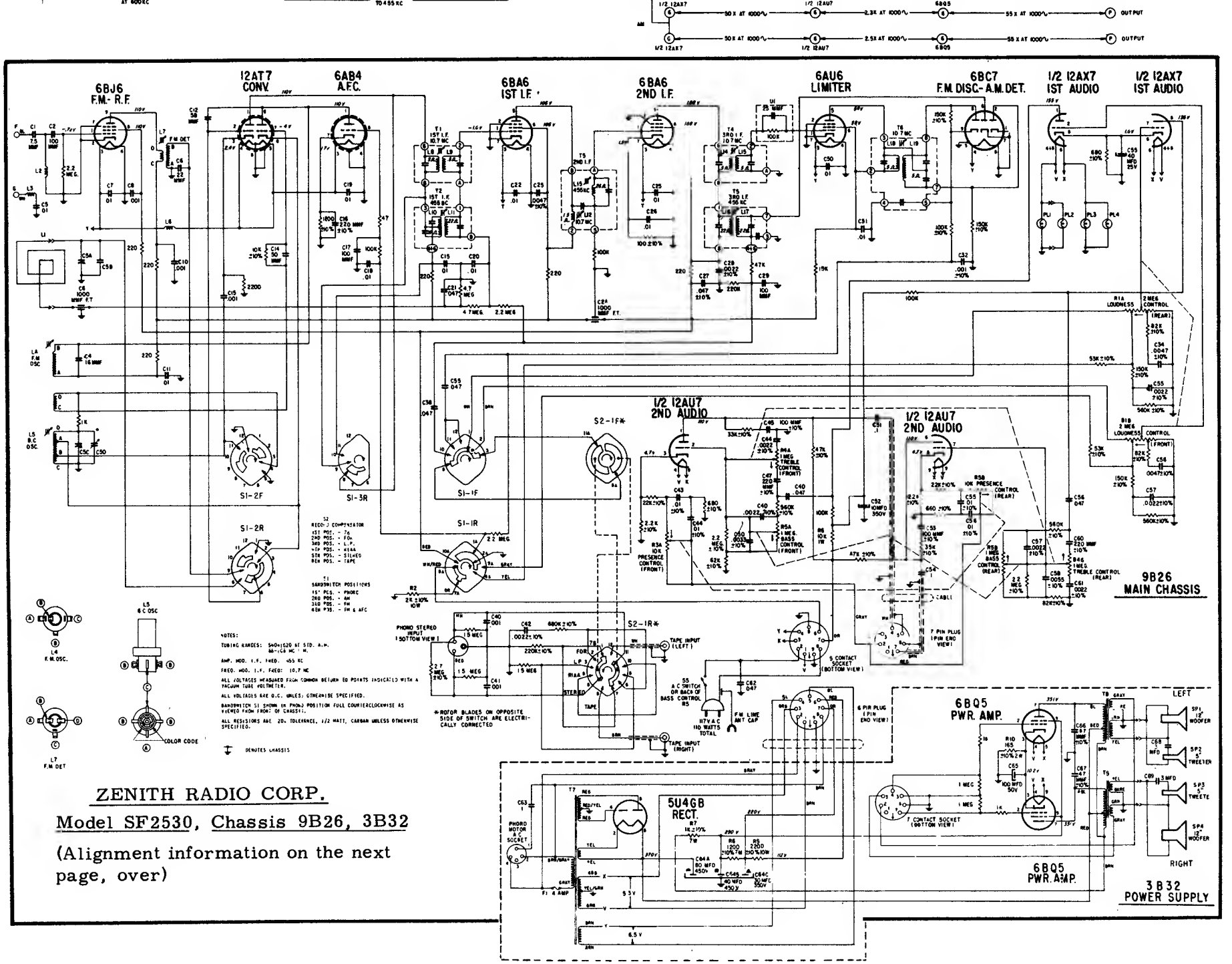
(Schematic diagram on page 175)

Models C845L, M, W, Y, Chassis 8C02, are practically the same.



ALIGNMENT PROCEDURE

OPERATION	CONNECT OSCILLATOR TO	DUMMY ANTENNA	INPUT SIGNAL FREQUENCY	BAND	SET DIAL TO	ADJUST TRIMMERS	PURPOSE
1	Pin 7 12AT7 converter	.05 Mfd.	455 Kc., 400 Cycle Modulated	BC	600 Kc.	L18,17,14,13, 10,9	Align IF channel for maximum output.
2	2 turns loosely coupled to wavemagnet		1600 Kc., 400 Cycle Modulated	BC	1600 Kc.	C2E	Set oscillator to dial scale.
3	2 turns loosely coupled to wavemagnet		1400 Kc., 400 Cycle Modulated	BC	1400 Kc.	C2D, C2B	Align detector and antenna stages.
4(a)	Pin 1 (grid) on 12AU6 limiter	.05 Mfd.	10.7 Mc. Unmodulated	FM		L19	Align primary of discriminator for maximum reading.
5(b)	Pin 1 (grid) on 12AU6 limiter	.05 Mfd.	10.7 Mc. Unmodulated	FM		L20	Adjust secondary of discriminator for zero reading.
6(c)	Pin 1 (grid) on 12BA6 2nd IF	.05 Mfd.	10.7 Mc. Unmodulated	FM		L16,15	Align 3rd IF transformer for maximum reading.
7(c)	Pin 1 (grid) on 12BA6 1st IF	.05 Mfd.	10.7 Mc. Unmodulated	FM		L12,11	Align 2nd IF transformer for maximum reading.
8(c)	Pin 7 (grid) on 12AT7 converter tube socket	.05 Mfd.	10.7 Mc. Unmodulated	FM		L8,7	Align 1st IF transformer for maximum reading.
9(c)	Antenna Post FM (Remove line ant.)	270 Ohms	98 Mc. Unmodulated	FM	98 Mc.	L6	Set oscillator to dial scale.
10(c) (d)		270 Ohms	98 Mc. Unmodulated	FM	98 Mc.	L3,2	Align detector and antenna stages for maximum reading.



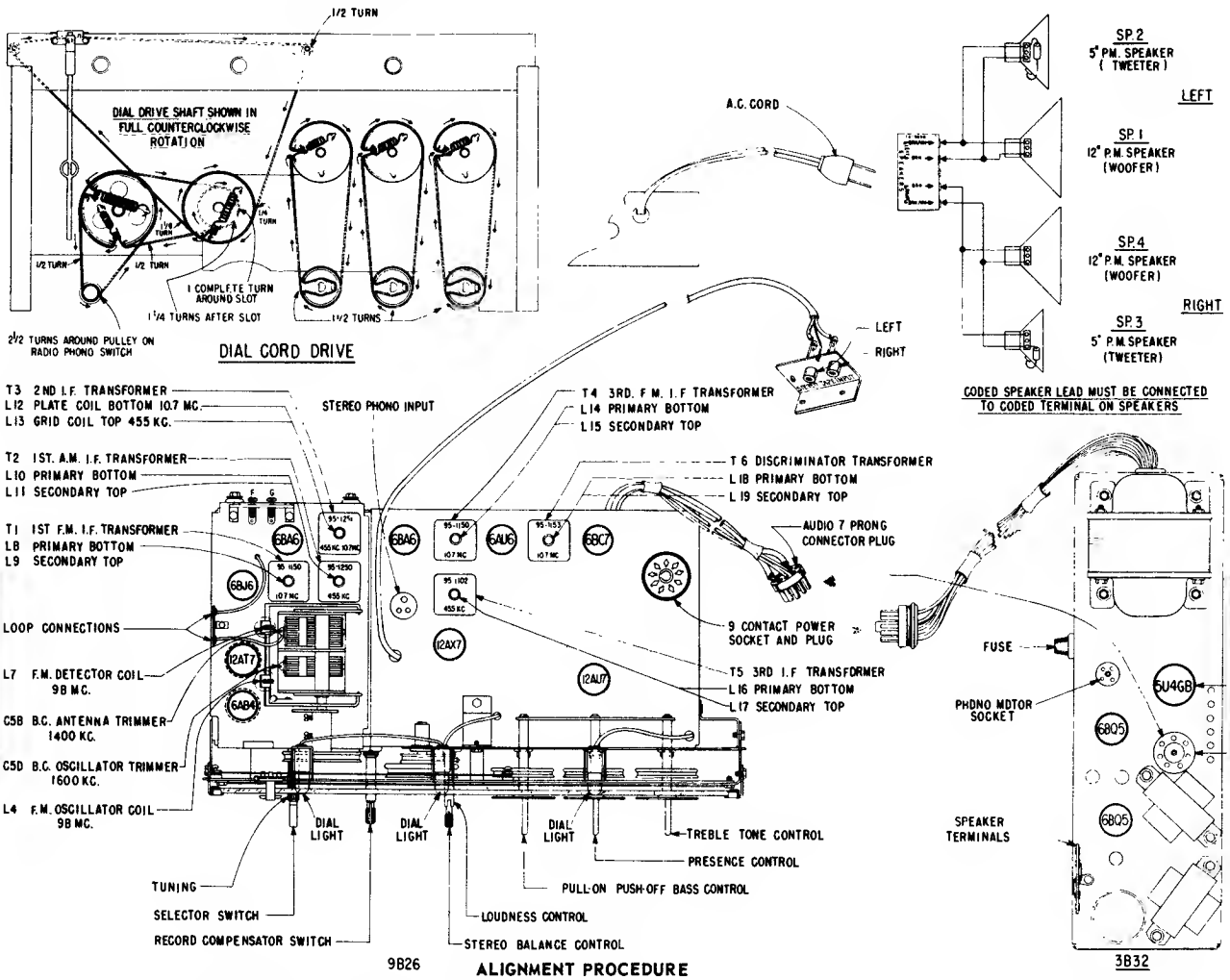
ZENITH RADIO CORP.

Model SF2530, Chassis 9B26, 3B32

(Alignment information on the next page, over)

ZENITH MODEL SF2530 CHASSIS 9B26—3B32

Alignment Information (Continued from page 177)



ALIGNMENT PROCEDURE

	CONNECT OSCILLATOR TO	DUMMY ANTENNA	INPUT SIGNAL FREQUENCY	BAND	SET DIAL TO	ADJUST	PURPOSE
1	Pin 2 on 12AT7 Mixer	.05 mfd.	455 Kc., 400 Cycle Modulated	AM	600 Kc.	L10,11,13,16 & 17	Align I.F. channel for maximum output.
2	TWO TURNS LOOSELY COUPLED TO WAVEMAGNET	.05 mfd.	1600 Kc., 400 Cycle Modulated	AM	1600 Kc.	C5D	Set oscillator to dial scale.
3		.05 mfd.	1400 Kc., 400 Cycle Modulated	AM	1400 Kc.	C5B	Align antenna stage.
4	**IMPORTANT**: Before attempting to align the FM portion of this receiver the Band switch should be turned to "FM".						
5 (a)	Pin 1 (grid) on 6AU6 limiter	.05 mfd.	10.7 Mc. Unmodulated	FM		L18	Align primary of discriminator for maximum reading.
6 (b)	Pin 1 (grid) on 6AU6 limiter	.05 mfd.	10.7 Mc. Unmodulated	FM		L19	Adjust secondary of discriminator for zero reading.
7 (c)	Pin 1 (grid) on 6BA6 2nd IF	.05 mfd.	10.7 Mc. Unmodulated	FM		L14,15	Align 3rd I.F. transformer for maximum reading.
8 (c)	Pin 1 (grid) on 6BA6 1st IF	.05 mfd.	10.7 Mc. Unmodulated	FM		L12	Align 2nd I.F. transformer for maximum reading.
9 (c)	Pin 2 on 12AT7 Mixer	.05 mfd.	10.7 Mc. Unmodulated	FM		L8,9	Align 1st I.F. transformer for maximum reading.
10 (c)	**REPEAT STEPS 7,8 & 9**						
11 (c)	Antenna Post FM (Remove line antenna)	270 ohms	98 Mc. Unmodulated	FM	98 Mc.	L4 Osc. Coil Slug.	Set oscillator to dial scale.
12 (c) (d)	Antenna Post FM (Remove line antenna)	270 ohms	98 Mc. Unmodulated	FM	98 Mc.	L7 Det. Coil Slug.	Align det. stage to maximum reading.

(Additional service material on page 180, over)

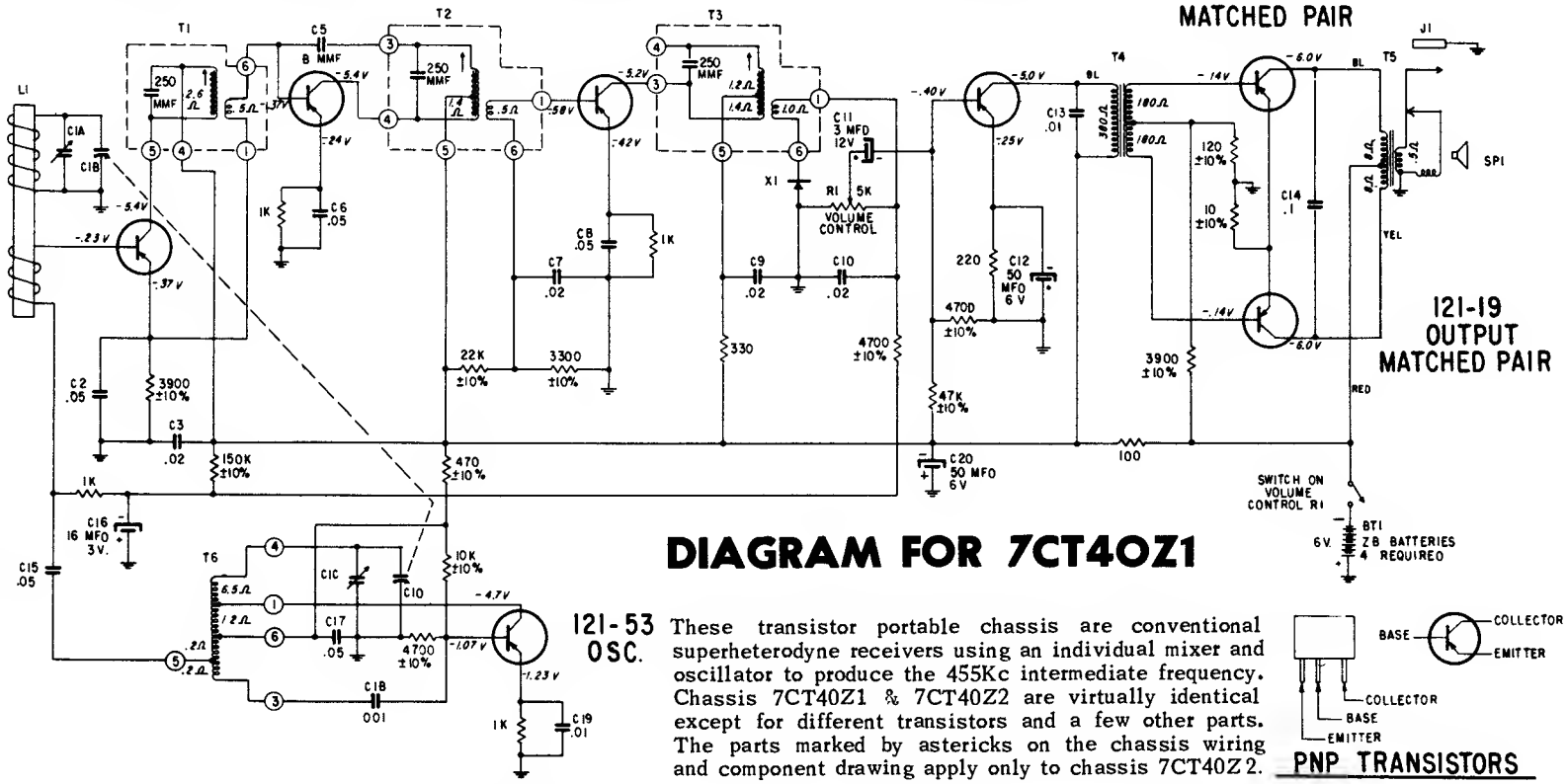


DIAGRAM FOR 7CT40Z1

These transistor portable chassis are conventional superheterodyne receivers using an individual mixer and oscillator to produce the 455Kc intermediate frequency. Chassis 7CT40Z1 & 7CT40Z2 are virtually identical except for different transistors and a few other parts. The parts marked by astericks on the chassis wiring and component drawing apply only to chassis 7CT40Z2.

ALIGNMENT PROCEDURE

Operation	Input Signal Frequency	Connect Inner Conductor From Oscillator To	Connect Outer Shield Conductor From Oscillator To	Set Dial At	Trimmers	Purpose
1	455 KC	ONE TURN LOOSELY COUPLED TO WAVEMAGNET	Chassis	600 KC	Adj. T1, T2, T3 for maximum output.	For I.F. Alignment
2	1620 KC		—	Gang wide open.	C1C	Set Oscillator to dial scale.
3	535 KC		—	Gang Closed	Adjust slug in T6	Set Oscillator to dial scale.
4	REPEAT STEPS 2 & 3		—	—	—	—
5	1260 KC		—	1260 KC	C1A	Align loop ant.

NOTES:

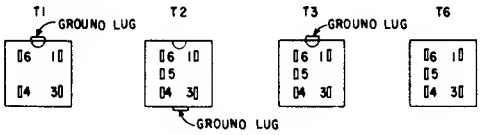
ALL RESISTORS ARE ±10%, TOLERANCE, CARBON, 1/2 WATT UNLESS OTHERWISE SPECIFIED.

ALL VOLTAGES ARE D.C. UNLESS OTHERWISE SPECIFIED.

ALL CONDENSERS ARE IN MICROFARADS UNLESS OTHERWISE SPECIFIED.

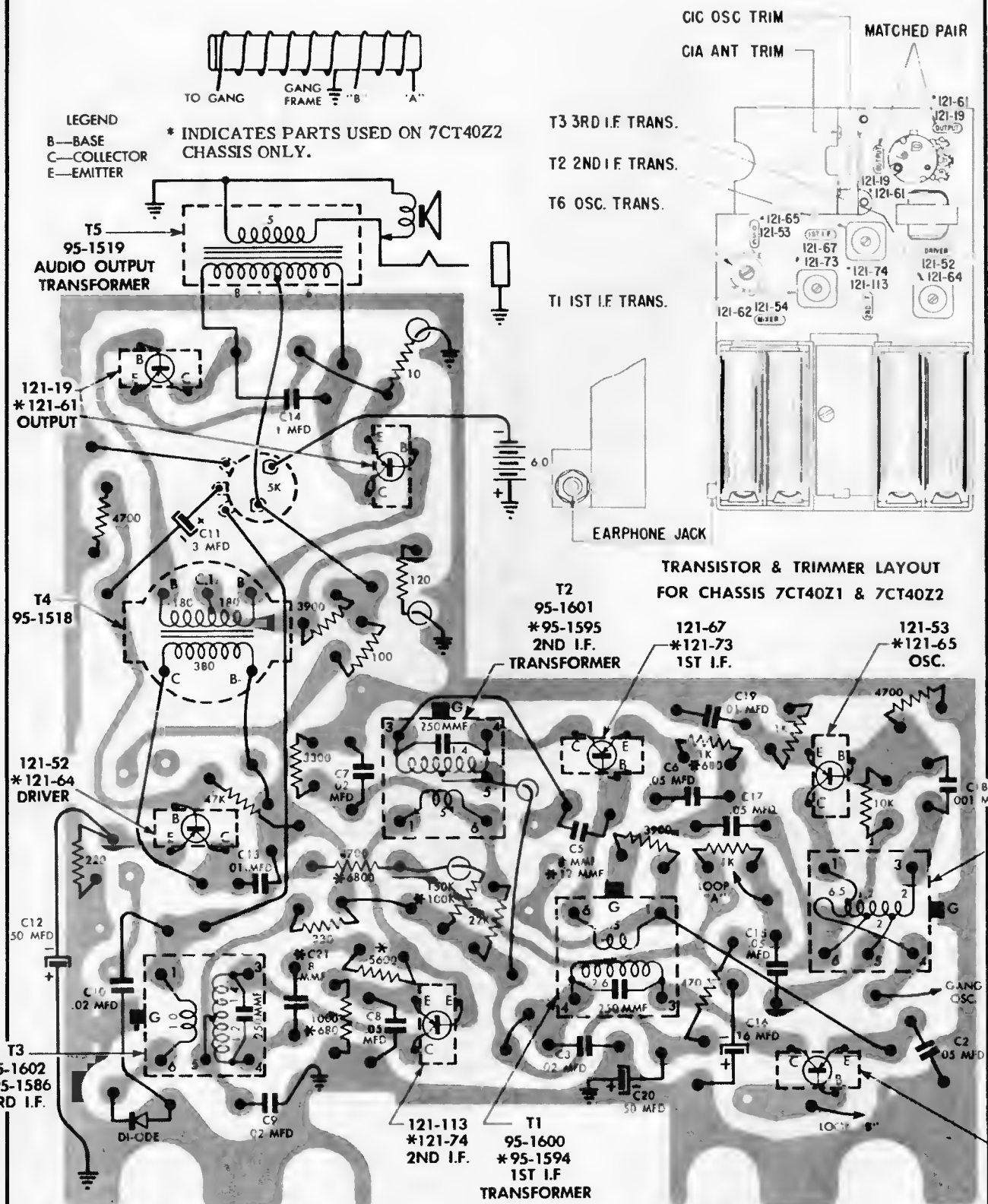
D.C. VOLTAGES SHOWN ARE MEASURED FROM CHASSIS WITH NO SIGNAL USING AN A.C., D.C. OR VACUUM TUBE VOLTMETER.

DENOTES CHASSIS



ZENITH RADIO Chassis 7CT40Z1 & 7CT40Z2, Model "Royal 275"

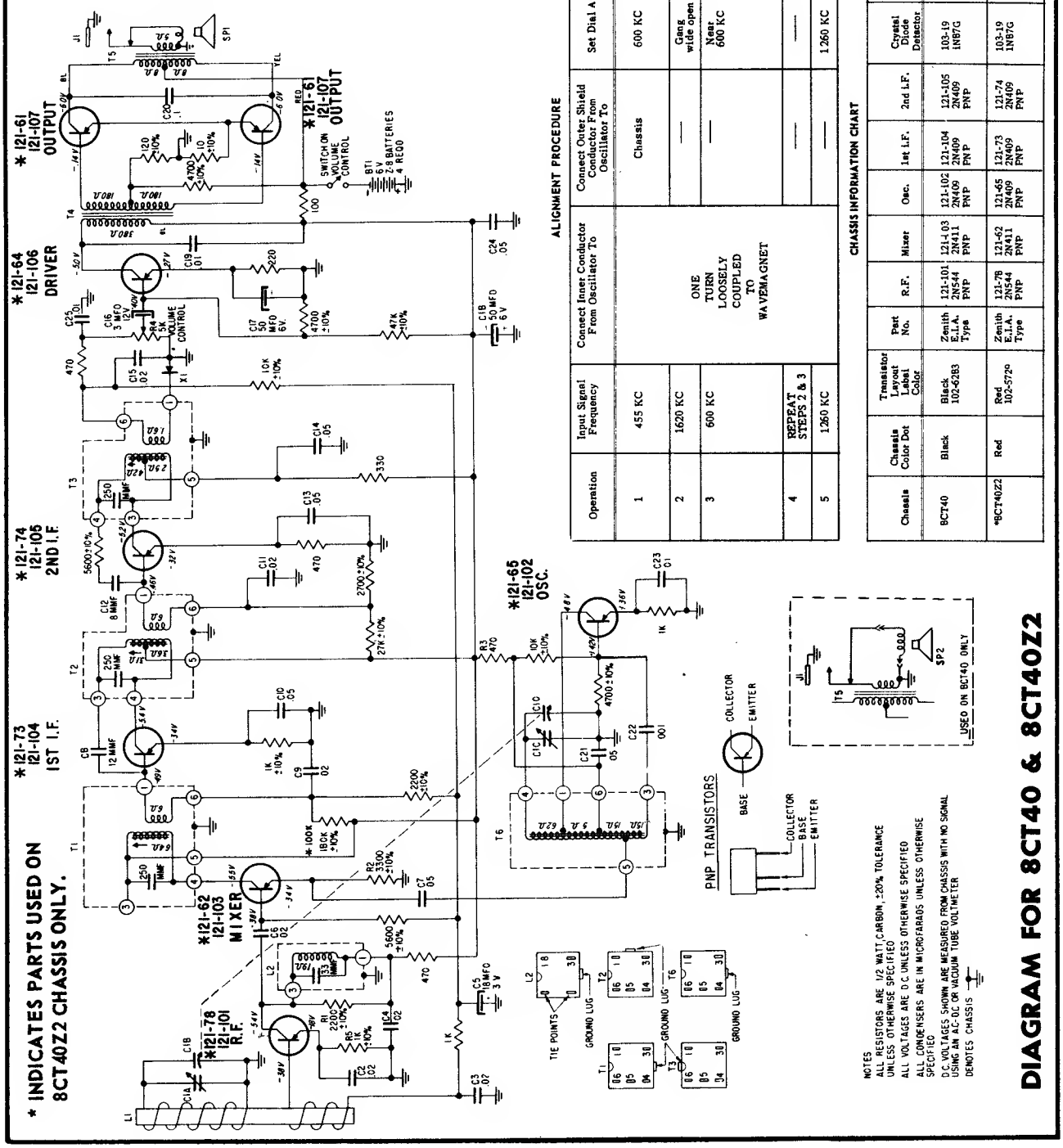
(Service material continued from page 179)



ZENITH RADIO CORP. Model "Royal 500E" — Chassis 8CT40, 8CT40Z2

(Continued on page 182)

These transistor portable chassis are conventional superheterodyne receivers. They use an untuned R.F. stage with an individual mixer and oscillator to produce the 455 Kc intermediate frequency. Chassis 8CT40 and 8CT40Z2 are virtually identical except for different transistors and a few other parts. The parts marked by astericks on the chassis wiring and component drawing apply only to chassis 8CT40Z2.



* INDICATES PARTS USED ON 8CT40Z2 CHASSIS ONLY.

ALIGNMENT PROCEDURE

Operation	Input Signal Frequency	Connect Inset Conductor From Oscillator To	Connect Outer Shield Conductor From Oscillator To	Set Dial At	Trimmers	Purpose
1	455 KC	ONE TURN LOOSELY COUPLED TO WAVEMAGNET	Chassis	600 KC	Adj. T1, T2 T3 for maximum output.	For I.F. Alignment
2	1620 KC		—	Gang wide open	C1C	Set oscillator to dial scale.
3	600 KC		—	Near 600 KC	Adjust slug in T6	Adjust T6 for maximum output while rocking the gang. Tune the antenna trimmer for maximum output regardless of dial accuracy.
4	REPEAT STEPS 2 & 3		—	—	—	—
5	1260 KC		—	1260 KC	C1A	Align loop ant.

CHASSIS INFORMATION CHART

Chassis	Chassis Color Dot	Transistor Layout Label Color	Part No.	R.F.	Mixer	Osc.	1st I.F.	2nd I.F.	Crystal Diode Detector	Driver	Output-Output	Supplier
8CT40	Black	Black 102-6283	Zenith E.L.A. Type	121-101 2N544 PNP	121-103 2N411 PNP	121-102 2N409 PNP	121-104 2N409 PNP	121-105 2N409 PNP	103-19 1N87G	121-106 2N407 PNP	121-107 2N407 Matched Pair PNP	Sylvania
*8CT4022	Red	Red 102-5720	Zenith E.L.A. Type	121-78 2N544 PNP	121-62 2N411 PNP	121-65 2N409 PNP	121-73 2N409 PNP	121-74 2N409 PNP	103-19 1N87G	121-64 2N407 PNP	121-61 2N407 Matched Pair PNP	R.C.A.

NOTES
ALL RESISTORS ARE 1/2 WATT, CARBON, ±20% TOLERANCE UNLESS OTHERWISE SPECIFIED
ALL VOLTAGES ARE D.C. UNLESS OTHERWISE SPECIFIED
ALL CONDENSERS ARE IN MICROFARADS UNLESS OTHERWISE SPECIFIED
D.C. VOLTAGES SHOWN ARE MEASURED FROM CHASSIS WITH NO SIGNAL USING AN A.C.-D.C. OR VACUUM TUBE VOLTMETER
⏚ DENOTES CHASSIS

DIAGRAM FOR 8CT40 & 8CT40Z2

ZENITH RADIO CORP.

Model "Royal 500E" -- Chassis 8CT40, 8CT40Z2

(Continued from page 181)

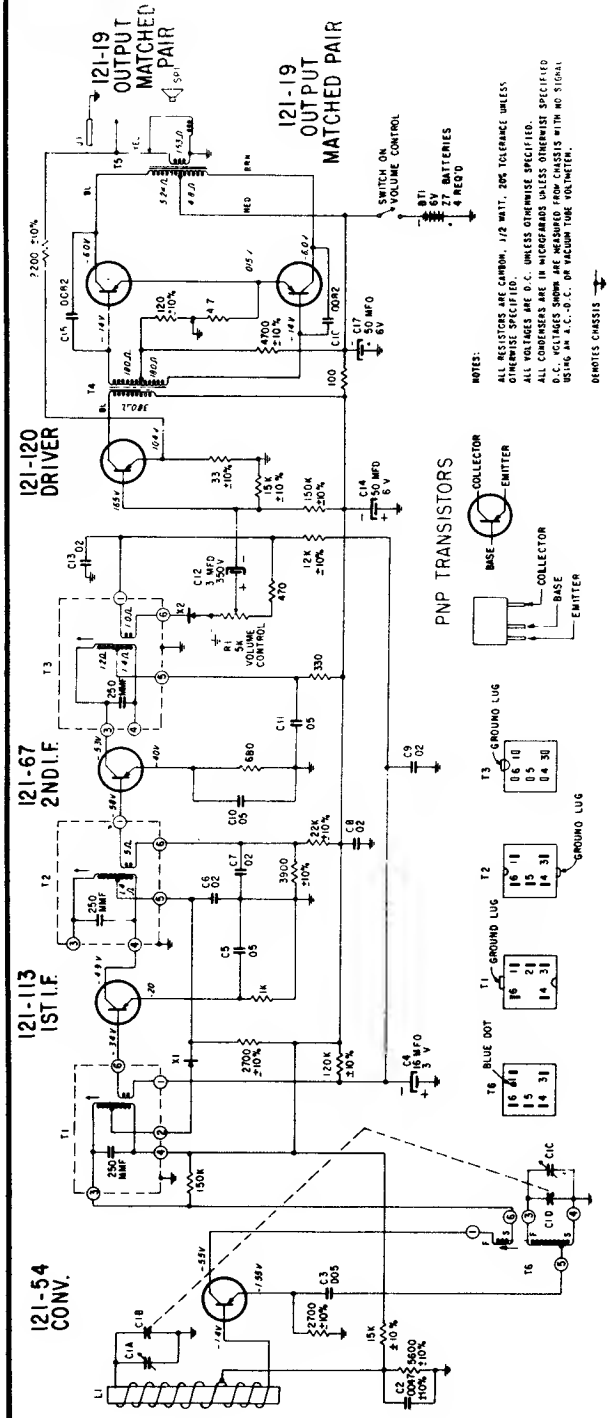
CHASSIS, WIRING AND COMPONENTS VIEWED FROM WIRING SIDE

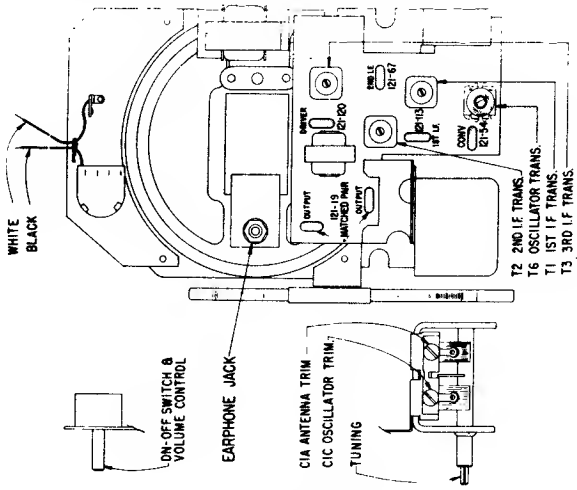
ZENITH

CHASSIS 6CT41Z1
MODEL "ROYAL 675"

(Continued on page 184,over)

This transistor portable chassis is a conventional superheterodyne receiver. This chassis has a converter to produce the 455 Kc intermediate frequency. The firat and second intermediate frequency amplifiers are conventional. A (103-19) X1 diode acts as a variable R.F. load across one half of the primary of the 1st I.F. transformer, thus preventing overload on strong signals. On strong signals the AVC voltage is increased and is fed to the base of the 1st I.F. amplifier, this tends to reduce I_c of the 1st I.F. As I_c decreases E_c in the 1st I.F. rises and approaches that of E_c inthe converter. When this occurs, X1 begins to conduct and loads down the 1st I.F. transformer.





TRANSISTOR & TRIMMER LAYOUT FOR CHASSIS 6CT41Z1

SCHEMATIC DIAGRAM FOR 6CT41Z1

ALIGNMENT PROCEDURE

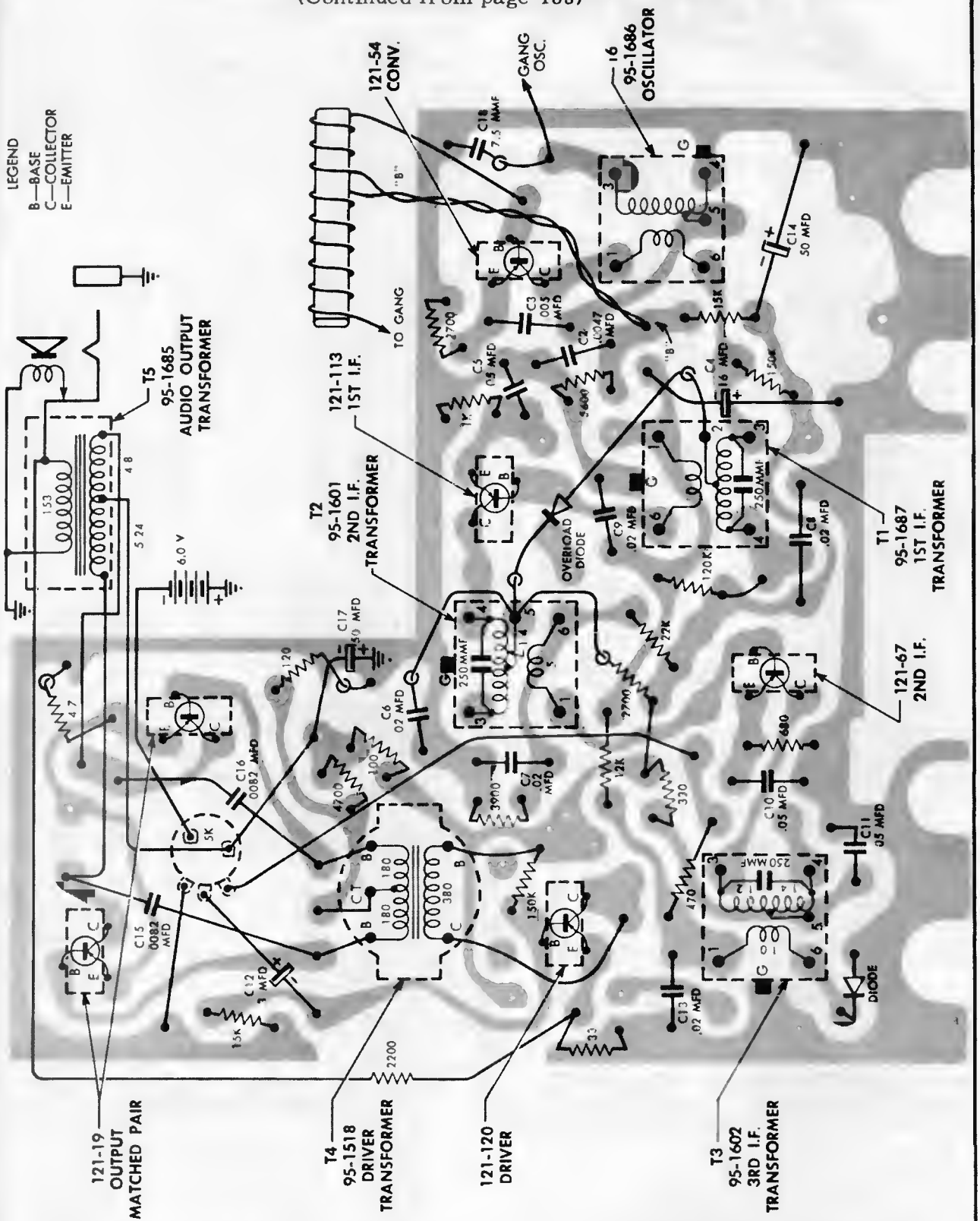
Operation	Input Signal Frequency	Connect Inner Conductor From Oscillator To	Connect Outer Shield Conductor From Oscillator To	Set Dial At	Trimmers	Purpose
1	455 KC	ONE TURN LOOSELY COUPLED TO WAVEMAGNET	Chassis	600 KC	Adj. T1, T2, T3 for maximum output.	For I.F. Alignment
2	1620 KC		—	Gang wide open.	C1C	Set Oscillator to dial scale.
3	535 KC		—	Gang Closed	Adjust slug in T6	Set Oscillator to dial scale.
4	REPEAT STEPS 2 & 3		—	—	—	—
5	1260 KC		—	1260 KC	C1A	Align loop ant.

CHASSIS INFORMATION CHART

Chassis	Chassis Color Dot	Transistor Layout Label Color	Part No.	Conv.	1st. I.F.	2nd. I.F.	Crystal Diode Detector	Driver	Output-Output	Supplier
6CT41Z1	Black	Black 102-5722	Zenith RETMA Type	121-54 2N252 PNP	121-113 2N309 PNP	121-67 2N308 PNP	103-19 1N87G	121-120 R119 PNP	121-19 R16 Matched Pair PNP PNP	Texas Instrument

ZENITH RADIO Chassis 6CT41Z1, Model "Royal 675"

(Continued from page 183)



CHASSIS, WIRING AND COMPONENTS — VIEWED FROM WIRING SIDE

ZENITH RADIO CORP.

Model "Royal 710" -- Chassis 7CT43Z1

(Continued on page 186, over)

PRINTED CIRCUIT SERVICING

Servicing printed circuit sets is, in general, mnch the same as servicing ordinary receivers. However, certain tools and techniques are well suited for this type of work. The following items are especially useful:

1. Good pair of long-nose pliers.
2. Sharp wire cutters.
3. Small stiff glue brush (for solder removal).
4. Pencil type soldering iron with a small tip (25 watts or less).

WARNING: Excessive heat may damage the printed circuit during component replacement if a soldering pencil, iron or gun of higher wattage rating is used.

5. Tin leads on component before soldering.
6. Use only solder with a 63% tin 37% lead mixture which has an extremely low melting point.
7. Metal pick (soldering aid).

COMPONENT REPLACEMENT

Resistors and capacitors should be replaced by clipping out the defective part and neatly soldering in the new part. If a unit, such as the oscillator coil or I.F. transformer, is to be removed heat the monnting lugs with a pencil type soldering iron and move them away from the soldered connection with a long-nose pliers or metal pick. Continue heating the lugs and brush away the molten solder with a small stiff glue brush. Remove the defective unit by lifting it off the chassis. Before inserting the new unit, be certain that the lug holes are open and free from solder. Forcing a lug against a solder filled lug hole may break the bond between the chassis base and the printed wiring. It is, therefore, necessary to exercise care when replacing units.

An open or damaged section of printed circuit wiring can be replaced by soldering a short jumper wire across the points to be connected.

ALIGNMENT PROCEDURE

Operation	Input Signal Frequency	Connect Inner Conductor From Oscillator To	Connect Outer Shield Conductor From Oscillator To	Set Dial At	Trimmers	Purpose
1	455 KC	ONE TURN LOOSELY COUPLED TO WAVEMAGNET	Chassis	600 KC	Adj. T1, T2, T3 for maximum output.	For I.F. Alignment
2	1620 KC		—	Gang wide open	C1C	Set oscillator to dial scale.
3	600 KC		—	Set dial near 600 KC	Adjust slug in T6	Adjust T6 for maximum output while rocking gang. Adjust for maximum output regardless of dial accuracy.
4	REPEAT STEPS 2 & 3		—	—	—	—
5	1260 KC			1260 KC	C1A	Align loop ant.

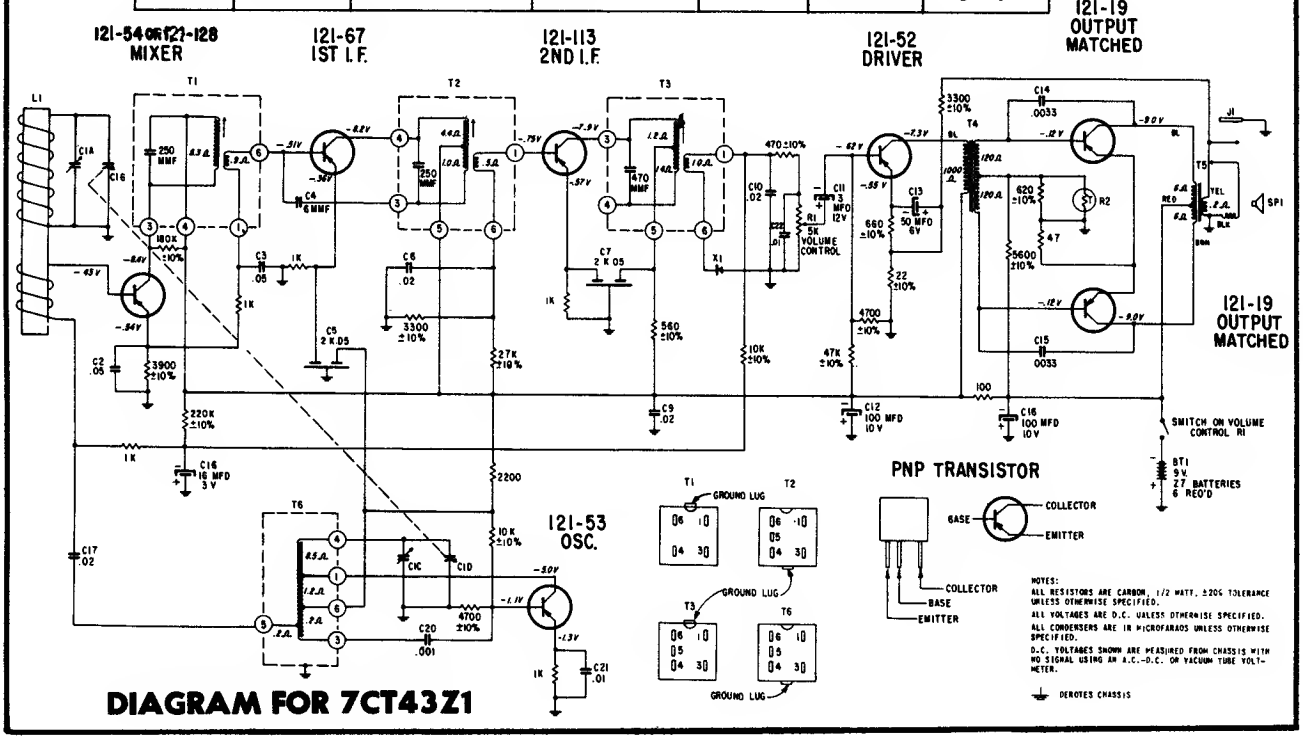


DIAGRAM FOR 7CT43Z1

ZENITH RADIO CORP.
Model "Royal 710"
Chassis 7CT43Z1
(Continued from page 185)
CHASSIS, WIRING AND COMPONENTS
VIEWED FROM WIRING SIDE
LEGEND
B—BASE
C—COLLECTOR
E—EMITTER
TRANSISTOR & TRIMMER LAYOUT
GANG FRAME
TO GANG R.F.
T2 2ND I.F. TRANS
T6 OSCILLATOR TRANS
T1 1ST I.F. TRANS
T3 3RD I.F. TRANS
WHITE
BLACK
ON-OFF SWITCH & VOLUME CONTROL
EARPHONE JACK
C1A ANTENNA TRIM
C1C OSCILLATOR TRIM
TUNING
121-53 OSC.
GANG OSC
LOOP "A"
LOOP "B"
T5 95-1588 AUDIO OUTPUT TRANSFORMER
T2 95-1601 2ND I.F. TRANSFORMER
121-67 1ST I.F.
T6 95-1513 OSCILLATOR TRANSFORMER
121-54 MIXER
T1 95-1600 1ST I.F. TRANSFORMER
121-113 2ND I.F.
121-19 OUTPUT MATCHED PAIR
T4 95-1587 DRIVER TRANSFORMER
121-52 DRIVER
T3 95-1602 3RD I.F. TRANSFORMER
DIODE

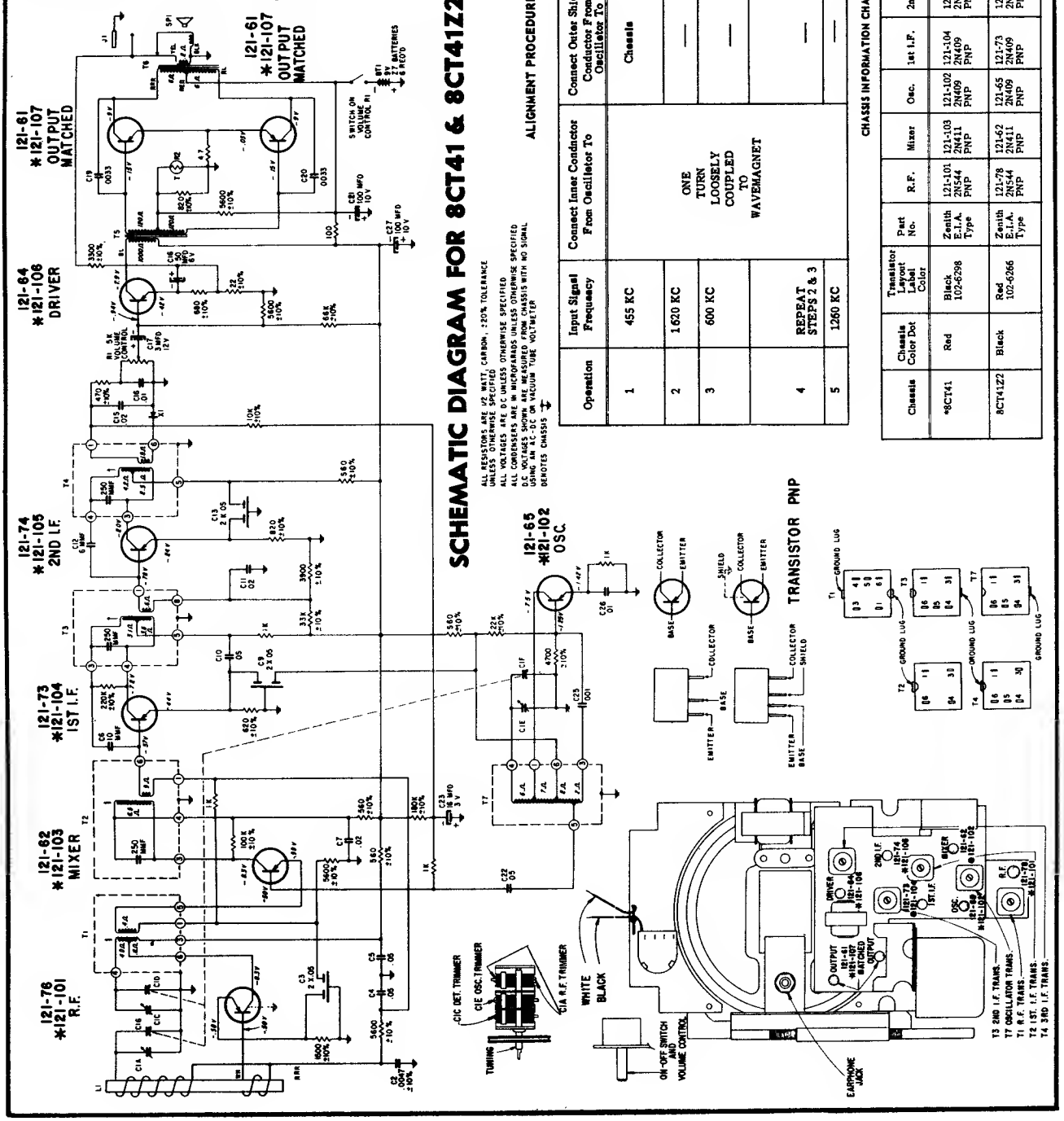
ZENITH RADIO CORP.

Model "Royal 755"

Chassis 8CT41, 8CT41Z2

(Continued on page 188,over)

These transistor portable chassis are conventional superheterodyne receivers with a tuned R.F. amplifier. They use an individual mixer and oscillator to produce the 455 Kc intermediate frequency. Chassis 8CT41 and 8CT41Z2 are virtually identical except for different transistors and a few other parts.



Operation	Input Signal Frequency	Connect Inner Conductor From Oscillator To	Connect Outer Shield Conductor From Oscillator To	Set Dial At	Trimmers	Purpose
1	455 KC	ONE TURN LOOSELY COUPLED TO WAVEMAGNET	Chassis	600 KC	Adj. T2, T3, T4 for maximum output.	For I.F. Alignment
2	1620 KC		—	Gang wide open	C1E	Set oscillator to dial scale.
3	600 KC		—	Set dial near 600 KC	Adjust slug in T7	Adjust T7 for maximum output while rocking gang. Tune T7 for maximum output regardless of dial accuracy.
4	REPEAT STEPS 2 & 3		—	—	—	
5	1260 KC		—	1260 KC	C1A, C1E	Align loop ant.

CHASSIS INFORMATION CHART

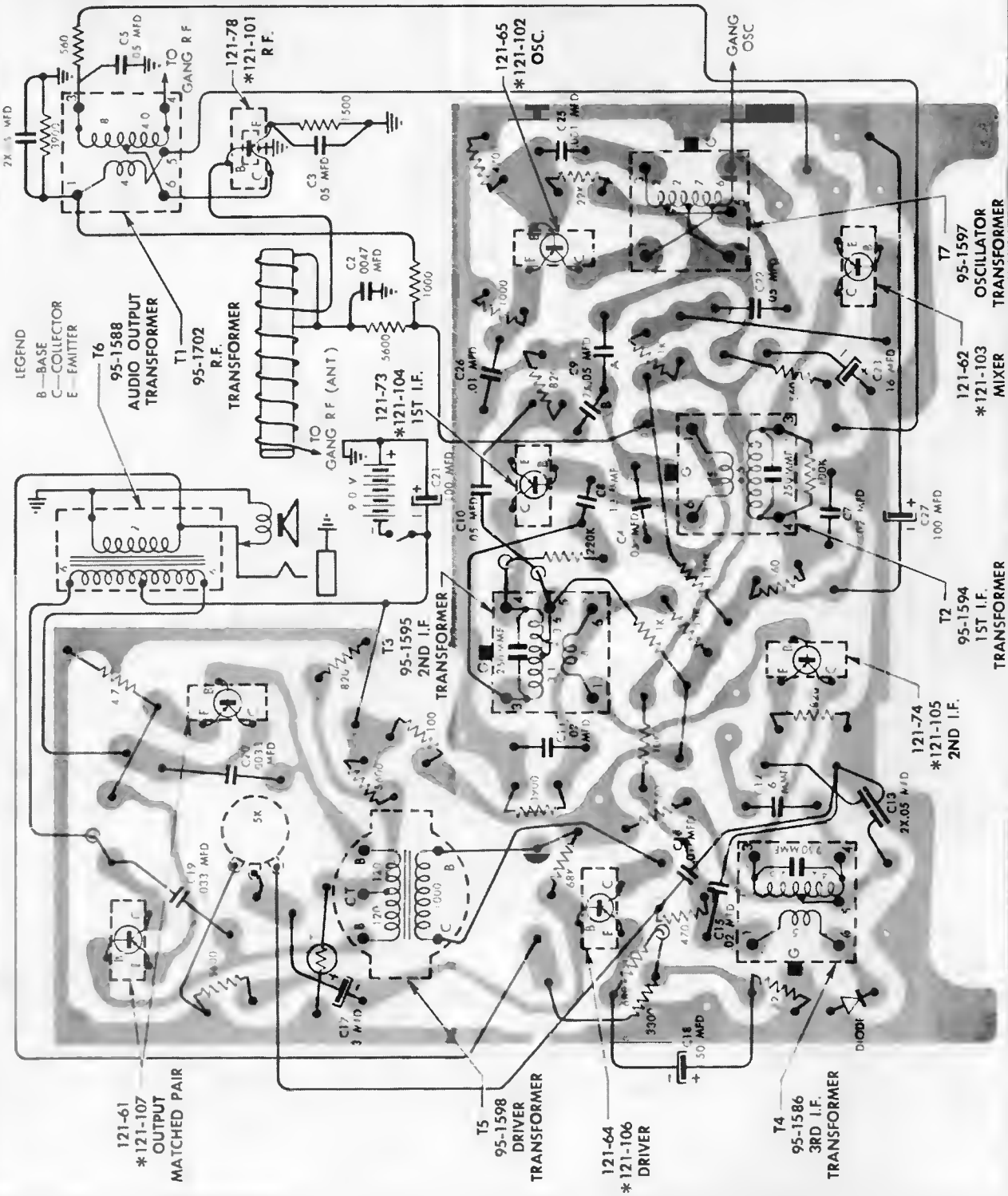
Chassis	Chassis Color Dot	Transistor Layout Label Color	Part No.	R.F.	Mixer	Osc.	1st I.F.	2nd I.F.	Crystal Diode Detector	Driver	Output-Output	Supplier
*8CT41	Red	Black 102-6298	Zenith E.I.A. Type	121-101 2N544 PNP	121-103 2N411 PNP	121-102 2N409 PNP	121-104 2N409 PNP	121-105 2N409 PNP	103-19 1N87G	121-106 2N407 PNP	121-107 2N407 Matched Pair PNP	Sylvania
8CT41Z2	Black	Red 102-6266	Zenith E.I.A. Type	121-78 2N544 PNP	121-62 2N411 PNP	121-65 2N409 PNP	121-73 2N409 PNP	121-74 2N409 PNP	103-19 1N87G	121-64 2N407 PNP	121-61 2N407 Matched Pair PNP	R.C.A.

ZENITH RADIO Model "Royal 755" -- Chassis 8CT41, 8CT41Z2 (Continued)

COMPONENT REPLACEMENT

Resistors and capacitors should be replaced by clipping out the defective part and neatly soldering in the new part. If a unit, such as the oscillator coil or I.F. transformer, is to be removed heat the mounting lugs with a pencil type soldering iron and move them away from the soldered connection with a long-nose pliers or metal pick. Continue heating the lugs and brush away the molten solder with a small stiff glue brush. Remove the defective unit by lifting it off the chassis. Before inserting the new unit, be certain that the lug holes are open and free from solder. Forcing a lug against a solder filled lug hole may break the bond between the chassis base and the printed wiring.

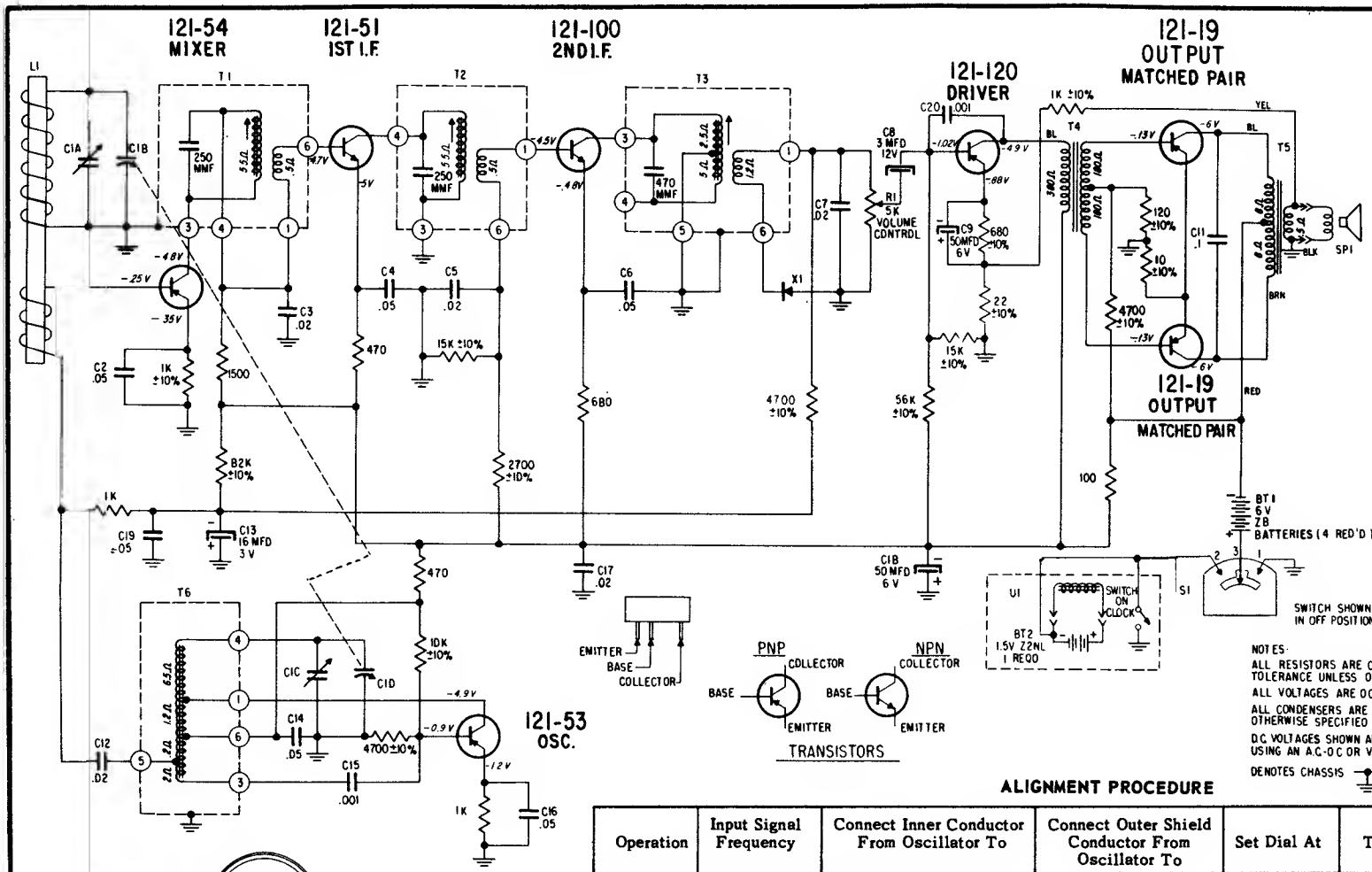
CHASSIS, WIRING AND COMPONENTS VIEWED FROM WIRING SIDE



ZENITH RADIO Chassis 7AT46Z1

Model "Royal 950"

(Continued on page 190, over)



NOTES:
ALL RESISTORS ARE CARBON, 1/2 WATT, ±20% TOLERANCE UNLESS OTHERWISE SPECIFIED
ALL VOLTAGES ARE D.C. UNLESS OTHERWISE SPECIFIED
ALL CONDENSERS ARE IN MICROFARADS UNLESS OTHERWISE SPECIFIED
D.C. VOLTAGES SHOWN ARE MEASURED WITH NO SIGNAL USING AN A.C.-D.C. OR VACUUM TUBE VOLTMETER
DENOTES CHASSIS

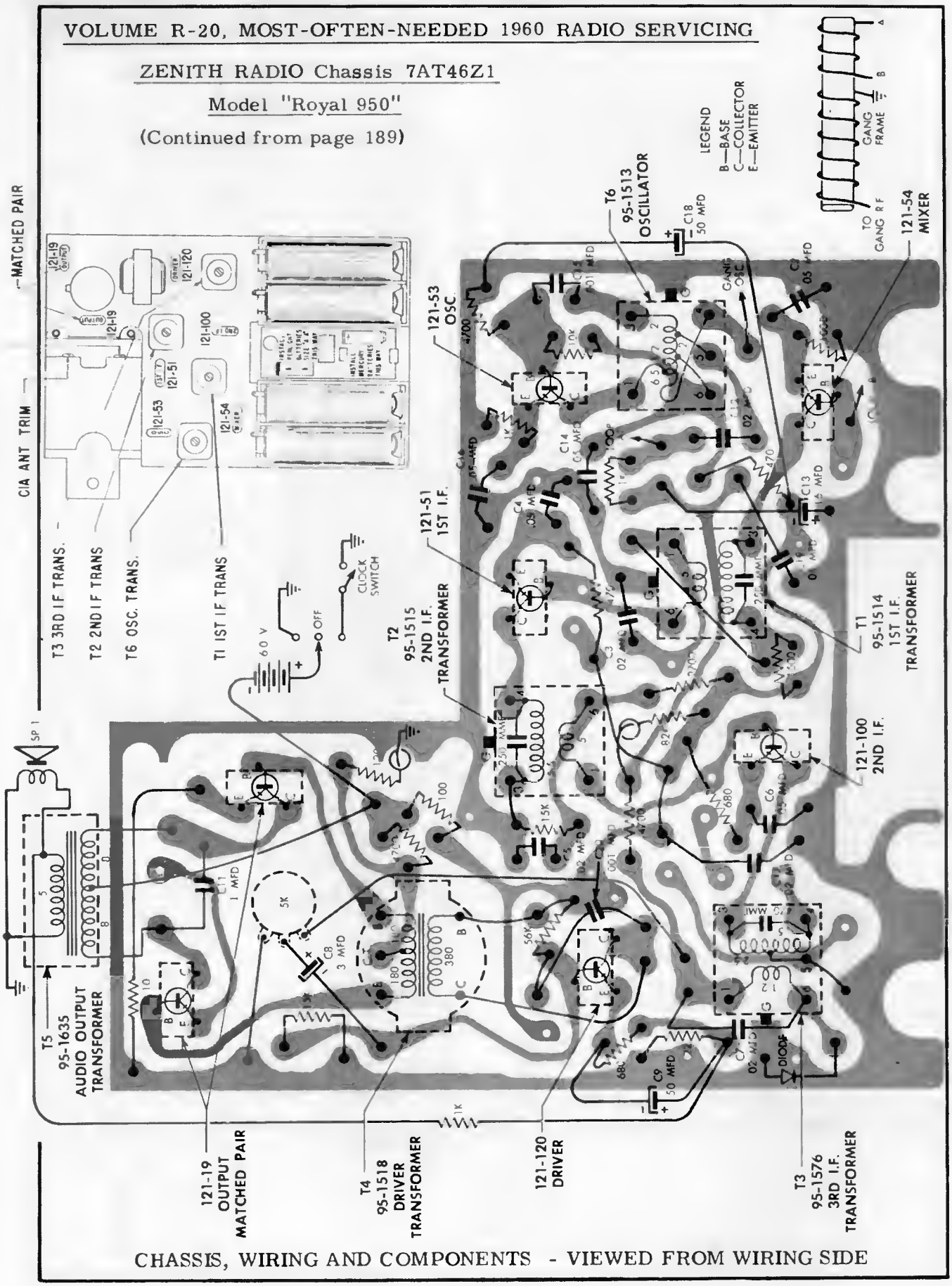
ALIGNMENT PROCEDURE

Operation	Input Signal Frequency	Connect Inner Conductor From Oscillator To	Connect Outer Shield Conductor From Oscillator To	Set Dial At	Trimmers	Purpose
1	455 KC	ONE TURN LOOSELY COUPLED TO WAVEMAGNET	Chassis	600 KC	Adj. T1, T2, T3 for maximum output.	For I.F. Alignment
2	1620 KC		—	Gang wide open.	C1C	Set Oscillator to dial scale.
3	535 KC		—	Gang Closed	Adjust slug in T6	Set Oscillator to dial scale.
4	REPEAT STEPS 2 & 3		—	—	—	—
5	1260 KC		—	1260 KC	C1A	Align loop ant.

ZENITH RADIO Chassis 7AT46Z1

Model "Royal 950"

(Continued from page 189)



CHASSIS, WIRING AND COMPONENTS - VIEWED FROM WIRING SIDE

Index