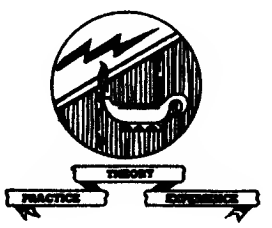
Most - Often - Needed

1949 RADIO DIAGRAMS

and Servicing Information

Compiled by

M. N. BEITMAN



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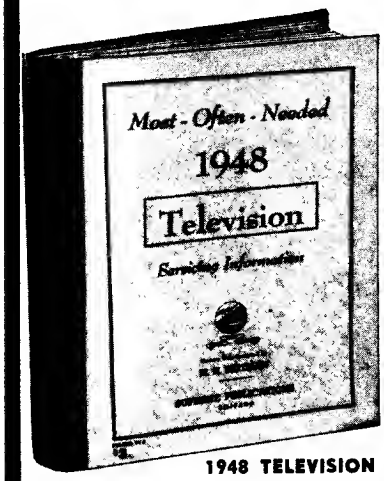
New 1948 TELEVISION *Manual*

INCLUDES EVERY POPULAR TELEVISION RECEIVER



1948 TELEVISION

Contains material on all popular television sets, of Admiral, Belmont Radio, DuMont, Farnsworth, General-Electric, Hallicrafters, Motorola, Philco, R.C.A., Sonora, Stromberg-Carlson, and others. Gives description of circuits, many pages of test patterns, response curves, oscilloscope waveforms, alignment tablas, service hints, many diagrams in the form of giant double-spread blueprints, test points, voltage charts, etc. Large size: 8½x11 in., manual style binding, flexible covers, priced at only **$3.00**

In this giant volume of television factory data, you have everything you need to repair every modern television set. For only $3, total price, you get complete service and alignment material on all popular T-V sets. You receive easy-to-understand explanations of circuits, 144 pages of alignment procedure, test patterns, T-V antenna data, response curves, oscilloscope waveforms, voltage charts, adjustment hints, many diagrams on mammoth 11x17-inch blueprints, everything to bring you up to date and make you an expert in television repairs.

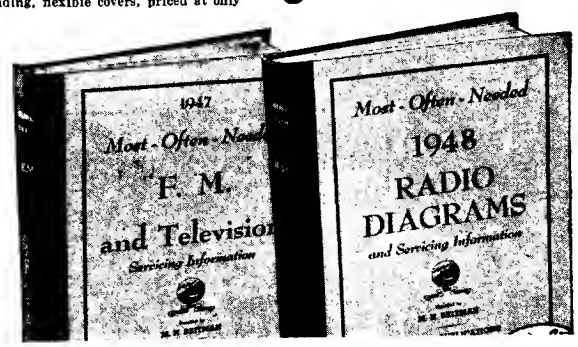
Compiled by M. N. Beitman, radio engineer, teacher, author & serviceman.

FIND-FIX ALL TELEVISION FAULTS

Use this new practical "cyclopedia" of television servicing as your guide to quick fault finding and repair of any modern television set. Eliminates guesswork—tells you just where to look and what to do. Cuts hour-wasting jobs to pleasant moments. Use test patterns for quick adjustment, or look up probable cause of trouble in the pages of hints after simply observing fault of picture on screen. No equipment needed with these tests. Or use your volt-meter and compare values with many voltage charts included. Observe waveforms similar to hundreds illustrated using test points suggested and in a flash locate what used-to-be a hard-to-find fault. This manual will give you the know-how of a television expert and will repay for itself with time saved on the first T-V job.

BIGGEST BARGAIN T-V TRAINING

For 15 years, radio servicemen expected and received remarkable values in **Supreme Publications** service manuals. The new 1948 **Television Manual** is a virtual treatise on practical television repairs. By normal standards, such a large manual packed as it is with practical data, illustrations, diagrams, charts, photographs, and expensive extra-large blueprints, should sell for $10—but as another Snpreme special value, it is priced to servicemen at only $3, postpaid. Only a publisher who sold over one million of various radio manuals can offer such bargain prices based on tremendous volume-sales. Read about this new T-V manual at left. Find out about other radio manuals listed below.



F.M. and Televisien

Use this extra-large manual of factory instructions for trouble-shooting, repairing, and alignment of all popular 1947 **F.M.** and **Televisien** sets. Covers every popular make, including F.M. tuners, AM-FM combinations, and all types of television receivers. Detail circuit diagrams, theory of operation, test hinta, alignment data, including both **metar** and **oscilloscope** methods. Use this recent **Supreme** manual to save time and money on your very next F.M. job. Data presented on 192 large pages. 8½x11 inches. Sturdy, manual-style binding. Tremendous value. Price postpaid, only..... **$2.**

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Be prepared to repair quickly all new 1948 radio receivers. In this hig single volume you have clearly-printed, large schematics, needed alignment data, replacement parts lists, voltage values, and information on stage gain, location of trimmers, and dial stringing, for almost all recently released sets. Makes toughest jobs amazingiy easy. Find all faults in a jiffy. A worthy companion to the 7 previous volumes used by over 120,000 shrewd radio servicemen. Will pay for itself on first job. Manual covers models of 42 different manufacturers. Giant size 8½x11 inches. 192 pages+index. Manual-style binding. Price only.... **$2.**

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1947 1946 1942 1941 1940 1939 1926-1938

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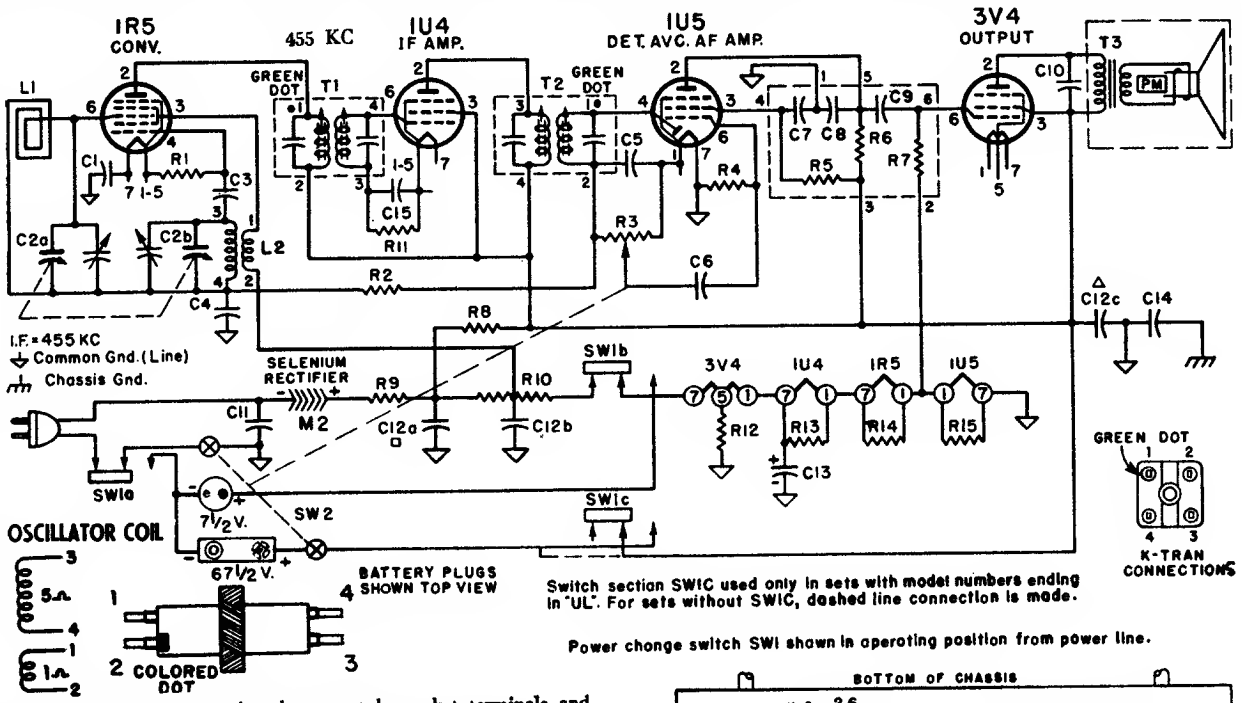
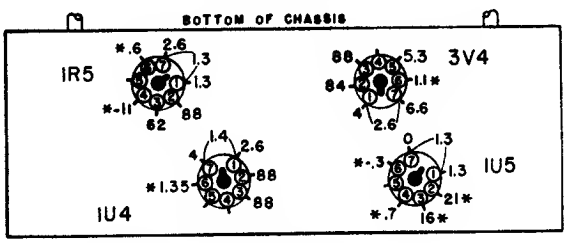


Switch section SW1C used only in sets with model numbers ending in "UL". For sets without SW1C, dashed line connection is made.

Power change switch SW1 shown in operating position from power line.

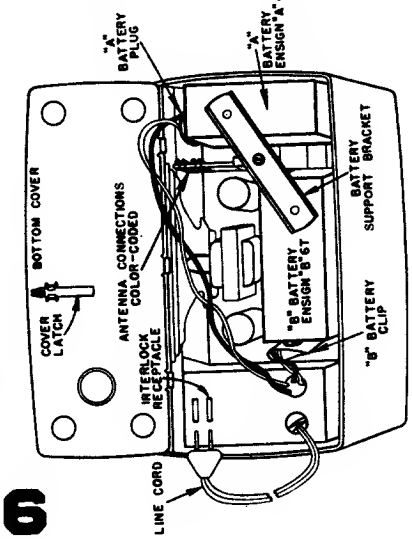


* If taken with a 1000 ohm-per-volt meter, readings will be lower or zero.

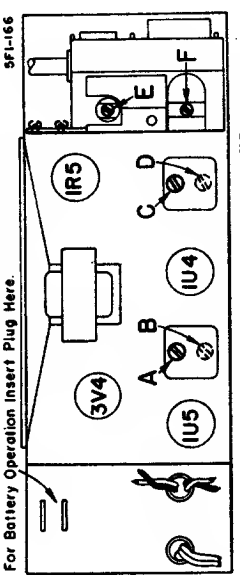
- Voltage readings taken between tube socket terminals and B minus (metal shell of electrolytic condenser).
- Dial set to low frequency, no signal, and volume control minimum.
- Measurements made from 117 volts AC line. If measured from DC line, voltages may be slightly lower.
- Voltage readings taken with a vacuum tube voltmeter. Socket terminals marked with an asterisk * indicate much lower voltage or zero voltage if measured with a 1000 ohm-per-volt meter.
- If measurements are made on battery operation, tube filament and B plus voltages will vary with the condition of the batteries. These voltages will equal the terminal voltage of the A or B battery less the voltage drop through components.

Admiral

CHASSIS 5F1
MODELS 5F11, 5F12



TUBE AND TRIMMER LOCATION



REPLACEMENT OF BATTERIES

Use replacement A and B batteries of the following types:
A Battery: Ensign A47 or equivalent.
B Battery: Ensign B67, Burgess XX45, Eveready 467 or equivalent.

RESISTORS

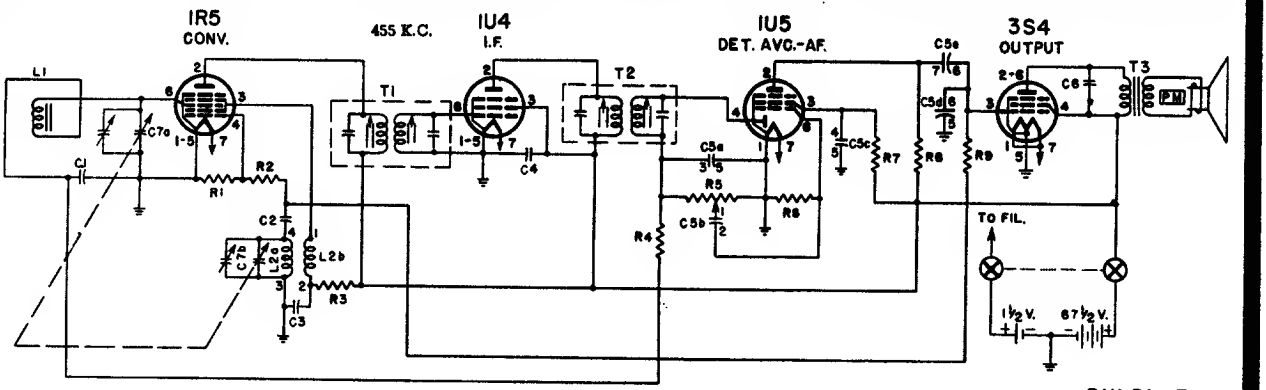
Symbol	Description	Part No.
R1	100,000 Ohms, ¼ Watt	60B 27-104
R2	3.3 Megohms, ¼ Watt	60B 27-335
R3	1 Megohm, Volume Control and On-Off Switch	75B 1-21
R4	10 Megohms, ¼ Watt	60B 27-106
†R5	4.7 Megohms	
†R6	1 Megohm	
†R7	2.2 Megohms	
R8	2,700 Ohms, 1 Watt	60B 14-272
R9	47 Ohms, 1 Watt	60B 14-470
R10	2,400 Ohms, 2.5 Watt (Tapped Candohm)	61A 5-3
R11	10 Megohms, ¼ Watt (R11 not used in early production)	60B 27-106
R12	2,200 Ohms, ¼ Watt	60B 26-222
R13	390 Ohms, ¼ Watt	60B 26-391
R14	160 Ohms, ¼ Watt	60B 26-181
R15	120 Ohms, ¼ Watt	60B 26-121

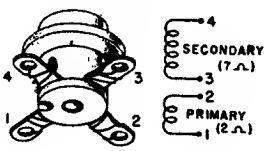
CONDENSERS

C1	.25 mfd., 200 Volts, Paper	64B 1-28
C2a, C2b	Gang, 420 mmfd. (max) / Gang, 126 mmfd., (max)	68B 14
C3	100 mmfd., Ceramic	65B 6-3
C4	.01 mfd., 400 Volts, Paper	64B 1-25
C5	100 mmfd., Ceramic	65B 6-3
C6	.001 mfd., Ceramic (tolerance — 0%, + 20%)	65B 6-41
†C7	.005 mfd., Ceramic	
†C8	100 mmfd., Ceramic	
†C9	.005 mfd., Ceramic	
C10	.001 mfd., Ceramic (tolerance — 0%, + 20%)	65B 6-41
C11	.05 mfd., 400 Volts, Paper	64B 1-22
C12a, C12b, C12c	30 mfd., 150 Volts / 20 mfd., 150 Volts / 20 mfd., 150 Volts — Elect.	67C 7-1
C13	100 mfd., 25 Volts, Elect.	67A 4-6
C14	.1 mfd., 200 Volts, Paper	64B 1-30
C15	.001 mfd., Ceramic (tolerance — 0%, + 20%) (C15 not used in early production)	65B 6-41

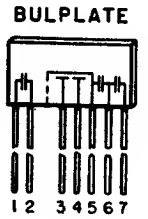
† C7, C8, R5, R8, R7 are contained in a multiple-unit component called a couplate (part number 63A4-3). Although a defective section of the couplate can sometimes be replaced by individual components, we recommend replacing the entire couplate.

Note that numerals 1, 2, 3, 4, 5, and 6 shown at schematic connections, correspond to couplate lead numbers printed on body of couplate directly above the leads.





NOTE: C5a, C5h, C5c, C5d and C5e are contained in a single unit (Bulplate). The numbers next to the C5 condenser plates on the schematic correspond to the lead numbers as shown on the drawing of the "BULPLATE" (see inset). If sections of this unit should open or short it will not be necessary to replace the entire Bulplate. Replace the bad section with a condenser of proper value.
Note that leads 5 and 6 are common to more than one section.



NOTE: Some microphonic howling may occur on strong signals if the volume control is turned beyond the overload point.
The following changes have been made in late production because some "B" batteries, with high internal resistance, may cause squealing at normal volume levels.

(a) Condenser C3 (.005 mfd. 600 volt, oscillator plate bypass) has been replaced with a .1 mfd. 200 volt condenser.
(b) Condenser C6 (.002 mfd. 600 volt, 3S4 late bypass) has been returned to the screen grid (pin 4) rather than to ground.
(c) The speaker leads have been reversed, the red lead has been connected to the plate and the blue lead to the screen of the **3S4.**
(d) For early production chassis which do not have the above changes, the same results can usually be secured by adding 4 mfd. 200 volt electrolytic condenser from B+ to chassis. Be sure the condenser is connected in the circuit on the set side of the on-off switch. Do not connect it to the battery side of the switch or the inherent leakage of the condenser will appreciably shorten the "B" battery life.

RESISTORS

Symbol		Part No.
R1	47,000 Ohms, ¼ Watt	60B 3-473
R2	560 Ohms, ¼ Watt	60B 2-561
R3	10,000 Ohms, ¼ Watt	60B 3-103
R4	3.3 Megohms, ¼ Watt	60B 3-335
R5	1 Megohm Volume Control and Switch SWI	75B 1-22
R6	10 Megohms, ¼ Watt	60B 3-106
R7	4.7 Meghoms ¼ Watt	60B 3-475
R8	1 Meghom, ¼ Watt	60B 3-105
R9	2.2 Meghoms, ¼ Watt	60B 3-225

CONDENSERS

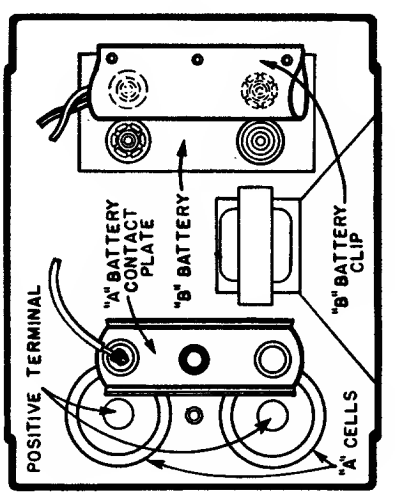
Symbol		Part No.
C1	.01 mfd., 600 Volts, Paper	64B 1-10
C2	.0001 mfd., Ceramic	65B 6-3
C3	.1 mfd. 200 Volts, Paper	64B 1-30
C4	.25 mfd., 200 Volts, Paper	64B -128
C5a	150 mmfd., Ceramic	Bulpate 63A 2 * See Schematic
C5b	.002 mfd., Ceramic	
C5c	.006 mfd., Ceramic	
C5d	100 mmfd., Ceramic	
C5e	.005 mfd., Ceramic	
C6	.002 mfd., 600 Volts, Paper	64B 1-14
C7a	0 to 354 mmfd., Gang	68B 13
C7b	0 to 107.2 mmfd., Gang	

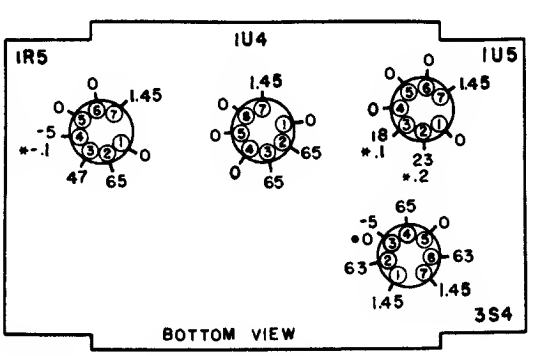
COILS, TRANSFORMERS, Etc.

Symbol		Part No.
L1	Antenna, Loop	69B 38
L2a, L2b	Coil, Oscillator	69A 39-1
T1	Transformer, 1st I.F.	72B 28-1
T2	Transformer, 2nd I.F.	72B 28-1
T3	Transformer, Output	98A 13
	Speaker (3½" PM) & Output Transformer	78C 33
SWI	Switch, On-Off	Part of R5

Admiral

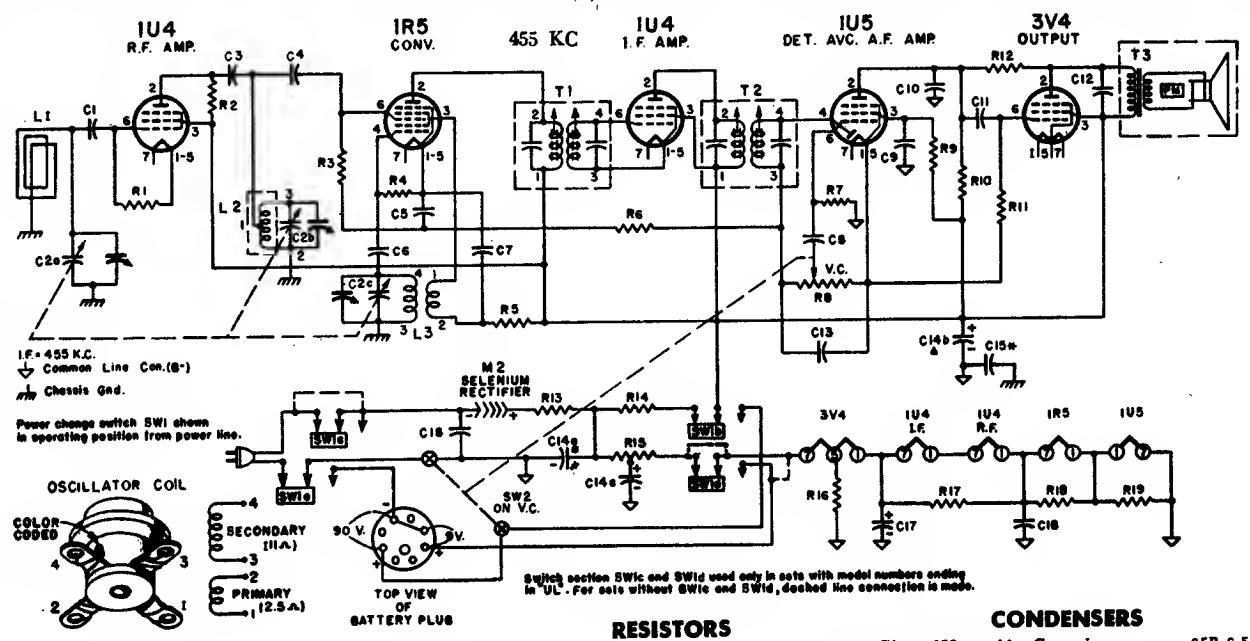
CHASSIS 4D1
MODELS 4D11, 4D12, 4D13

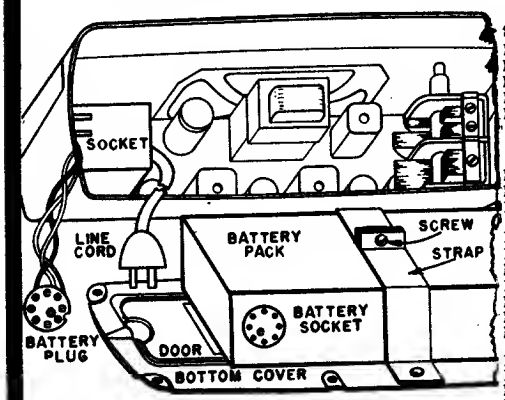




VOLTAGE DATA

- Readings made between point indicated and chassis.
- Measured using a fresh set of batteries.
- Turned to low frequency end, no signal.
- Voltages measured with Vacuum-Tube Voltmeter.
- A second voltage reading (marked with an asterisk *) indicates readings made with a 1000 ohm-per-volt meter when use of this instrument would result in appreciably lower readings.



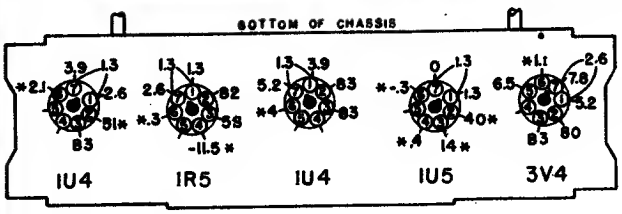


RESISTORS

Symbol	Description	Part No.
R1	2.2 Megohms, ¼ Watt	60B 27-225
R2	27,000 Ohms, ¼ Watt	60B 28-273
R3	1 Megohm, ¼ Watt	60B 27-105
R4	100,000 Ohms, ¼ Watt	60B 27-104
R5	8,200 Ohms, ¼ Watt	60B 26-822
	Note: In some sets, R5 was 10,000 Ohms; other sets used pair of 18,000 Ohm resistors in parallel.	
R6	3.3 Megohms, ¼ Watt	60B 27-335
R7	10 Megohms, ¼ Watt	60B 27-106
R8	1 Megohm, Volume Control and On-Off Switch	75B 1-26
R8	4.7 Megohms, ¼ Watt	60B 27-475
R10	470,000 Ohms, ¼ Watt	60B 27-474
R11	2.2 Megohms, ¼ Watt	60B 27-225
R12	5.6 Megohms, ¼ Watt	80B 26-565
R13	47 Ohms, 1 Watt	60B 14-470
R14	2,700 Ohms, 1 Watt	60B 14-272
R15	2,400 Ohms, 2.5 Watt Tapped Candohm	61A 5-3
R16	1,500 Ohms, ¼ Watt	80B 26-152
R17	820 Ohms, ¼ Watt	80B 26-821
R18	220 Ohms, ¼ Watt	60B 26-221
R19	150 Ohms, ¼ Watt	60B 26-151

CONDENSERS

C1	250 mmfd., Ceramic	65B 6-5
C2a	Gang, 420.0 mmfd. (max.) Ant. Section	
C2b	Gang 193.8 mmfd. (max.) RF Section	68B 10
C2c	Gang, 90.0 mmfd. (max.)	
C3	100 mmfd., Ceramic	65B 6-3
C4	250 mmfd., Ceramic	65B 6-5
C5	100 mmfd., Ceramic	65B 6-3
C6	.05 mfd., 200 Volts, Paper	64B 1-32
C7	.001 mfd., Ceramic (tolerance — 0%, + 20%)	65B 6-41
C8	.005 mfd., 800 Volts, Paper	64B 1-12
C9	.05 mfd., 200 Volts, Paper	84B 1-32
C10	100 mmfd., Ceramic	65B 6-3
C11	.005 mfd., 600 Volts, Paper	84B 1-12
C12	.001 mfd., Ceramic (tolerance — 0%, + 20%)	85B 6-41
C13	250 mmfd., Ceramic	65B 6-5
C14a	30 mfd. 150 Volts	
C14b	40 mfd. 150 Volts	Elect. 67C 7-52
C14c	20 mfd., 150 Volts	
C15	.18 mfd., 200 Volts, Paper	64A 2-2
	Note: In sets with model numbers ending in "UL", C15 is .1 mfd., 400 V.	
C16	.05 mfd., 400 Volts, Paper	64B 1-22
C17	100 mfd., 25 Volts, Elect.	67A 4-6
C18	.25 mfd., 200 Volts, Paper	64B 1-28



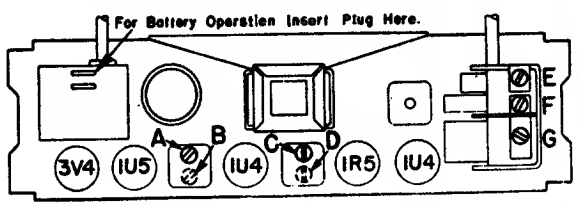
* If taken with a 1000 ohm-per-volt meter, readings will be lower or zero.

- Voltage readings taken between tube socket terminals and B minus (metal shell of electrolytic condenser).
- Dial set to low frequency, no signal, and volume control minimum.
- Measurements made from 117 volts AC line. If measured from DC line, voltages may be slightly lower.
- Voltage readings taken with a vacuum tube voltmeter. Socket terminals marked with an asterisk * indicate much lower voltage or zero voltage if measured with a 1000 ohm-per-volt meter.
- If measurements are made on battery operation, tube filament and B plus voltages will vary with the condition of the batteries. These voltages will equal the terminal voltage of the A or B battery minus the voltage drop through components.

Admiral

CHASSIS 6C1
MODEL 6C11

TUBE AND TRIMMER LOCATION

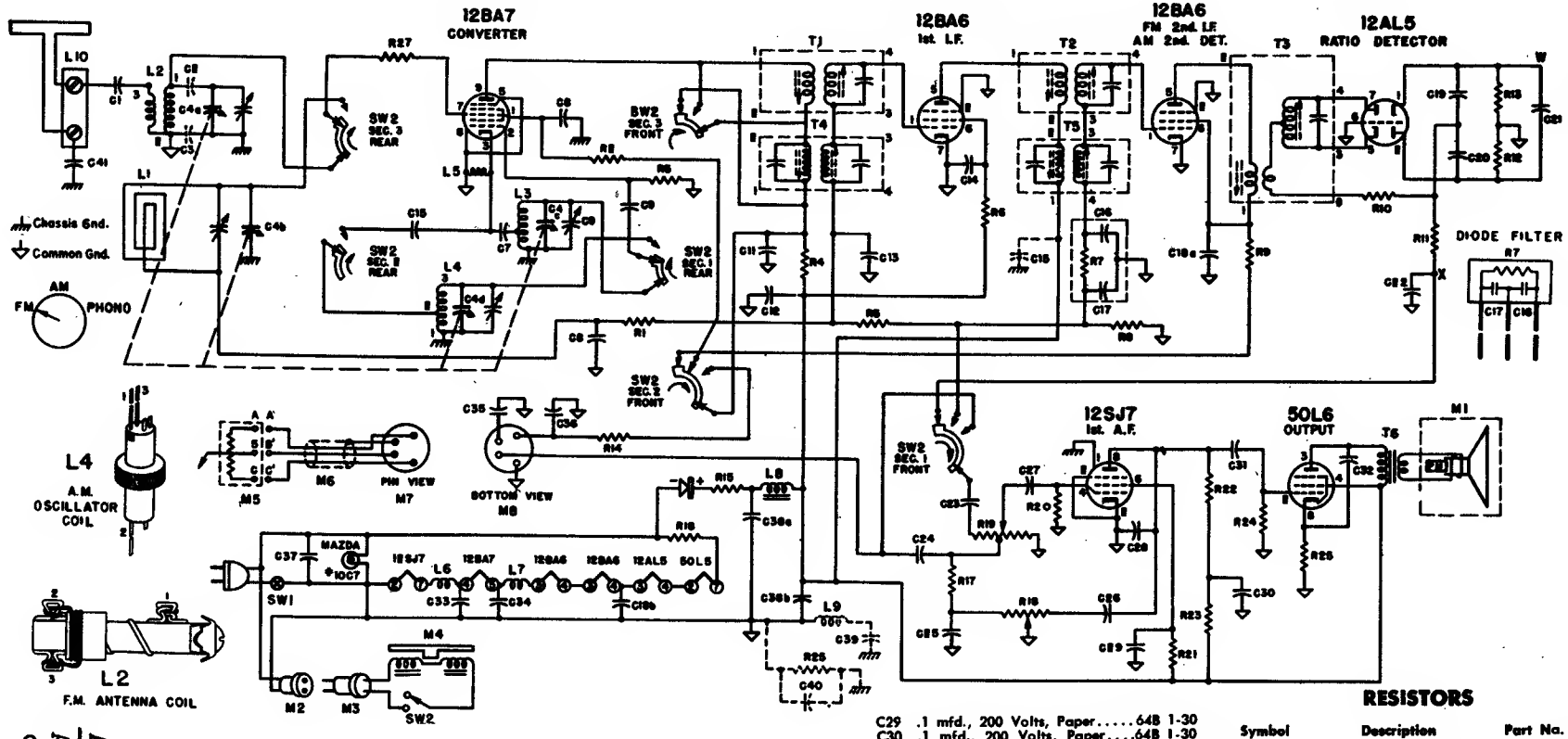


REPLACEMENT OF BATTERY PACK

Replace A-B battery pack with Ensign type AB50 pack, Ray-O-Vac AB994, General 60A-6F6-5, Burgess F6A60 or other equivalent.

To install a replacement battery pack, first remove the six screws that hold the metal bottom cover to the cabinet. (See illustration.) The battery pack is strapped to the bottom cover and will come ont when the cover is removed. Pull out the battery plug, loosen tbe screw which bolds the battery strap tight, and slide out the old battery pack.

Slip a new battery pack into place, tighten the screw which tightens the strap around the battery, plug in the battery plug and re-install the bottom cover.



CONDENSERS

			Symbol	Description	Part No.
C1	200 mmfd., Ceramic	65B 9-15	§C15	.005 mfd. min., Ceramic	65A 10-1
§C2	.0015 mfd., Ceramic	65B 9-63	†C16	100 mmfd., Mica	
§C3	.005 mfd. min., Ceramic	65A 10-1	†C17	100 mmfd., Mica	
C4a	15 mmfd. (max.), FM RF	A1B14 Gang	C18a	.004 mfd. min.	Dual Ceramic 65A 17-1
C4b	485.8 mmfd. (max.) AM RF		C18b	.004 mfd. min.	
C4c	15 mmfd. (max.) FM osc.		C19	100 mmfd. 5%,—.00075 Temp. Coeff., Ceramic	65B 6-7
C4d	142.6 mmfd. (max.) AM Osc.		C20	100 mmfd. 5%,—.00075 Temp. Coeff., Ceramic	65B 6-7
C5	.01 mfd., 400 Volts, Paper	64B 1-25	C21	4 mfd., 50 Volts, Elect	67A 4-8
C6	3-12 mmfd. Trimmer (Silver mica)	66A 19-2	C22	.002 mfd., 600 Volts, Paper	64B 1-14
C7	50 mmfd., Ceramic	65B 6-4	C23	.001 mfd., Ceramic	65B 9-31
C8	.005 mfd. min., Ceramic	65A 10-1	C24	500 mmfd., Ceramic (Used in early production only; removed to prevent detuning on FM.)	65B 9-24
C9	35 mmfd., 10% Zero Temp. Coeff., Ceramic	65B 6-57	C25	.005 mfd., 600 Volts, Paper	64B 1-12
C10	.005 mfd. min., Ceramic	65A 10-1	C26	.002 mfd.,600 Volts, Paper	64B 1-14
C11	.005 mfd. min., Ceramic	65A 10-1	C27	.01 mfd., 400 Volts, Paper	64B 1-25
C12	.005 mfd. min., Ceramic	65A 10-1	C28	50 mmfd., Ceramic	65B 6-4
C13	.005 mfd. min., Ceramic	65A 10-1			
C14	.01 mfd. min., Ceramic	65A 10-3			

			Symbol	Description	Part No.
C29	.1 mfd., 200 Volts, Paper	64B 1-30	C38a	70 mfd., 150 Volts	Elect. 67C 6-40
C30	.1 mfd., 200 Volts, Paper	64B 1-30	C38b	30 mfd., 150 Volts	
C31	.01 mfd., 400 Volts, Paper	64B 1-25	§C39	.1 mfd., 200 Volts, Paper	64B 1-30
C32	.01 mfd., 400 Volts, Paper	64B 1-25	§C40	.01 mfd. min., Ceramic	65A 10-3
C33	.0015 mfd. min., Ceramic	65A 14-2	C41	.0015 mfd. min., Ceramic (Used only in sets with model numbers ending in "N".)	65A 14-2
C34	.0015 mfd. min., Ceramic	65A 14-2			
C35	.01 mfd., 400 Volts, Paper	64B 1-25			
C36	.1B mfd., 200 Volts, Paper	64A 2-2			
C37	.05 mfd., 200 Volts, Paper	64B 1-32			

COILS, TRANSFORMERS, ETC.

L1	Antenna, Loop (AM)	69B 73
L2	Coil, RF (FM)	69A 68
L3	Coil, Oscillator (FM)	69A 69
L4	Coil, Oscillator (AM)	69A 20-3
L5	Choke, Cathode RF	AA139-5
L6	Choke, Heater RF	73A 2-3
L7	Choke, Heater RF	73A 2-3
L8	Choke, Filter	74A 15-2
§L9	Coil, IF Trap Approx. 5 turns (1B") of solid No. 22 hook-up wire wound on C39. Solder one end to inside foil lead of C39.	

RESISTORS

Symbol	Description	Part No.
R1	470,000 Ohms, ¼ Watt	60B 2-474
R2	1,000 Ohms, ¼ Watt	60B 2-102
R3	22,000 Ohms, ¼ Watt	60B 2-223
R4	470 Ohms, ¼ Watt	60B 2-471
R5	470,000 Ohms, ¼ Watt	60B 2-474
R6	1,000 Ohms, ¼ Watt	60B 2-102
†R7	47,000 Ohms, ¼ Watt	
R8	220,000 Ohms, ¼ Watt	60B 2-224
R9	1,000 Ohms, ¼ Watt	60B 2-102
R10	390 Ohms, ¼ Watt	60B 2-391
R11	27,000 Ohms, ¼ Watt	60B 2-273
R12	6,800 Ohms, ¼ Watt, 5%	60B 1-682
R13	6,800 Ohms, ¼ Watt, 5%	60B 1-682
R14	100,000 Ohms, ¼ Watt	60B 2-104
R15	33 Ohms, 1 Watt	60B 14-330
R16	47 Ohms, 1 Watt	60B 14-470
R17	27,000 Ohms, ¼ Watt	60B 2-273
R18	2 Megohms Tone Control and ON-OFF Switch SW2	75B 1-12
R19	1 Megohm Volume Control (Tapped at 500,000 Ohms)	75B 2-12
R20	4.7 Megohms, ¼ Watt	60B 3-475
R21	1.8 Megohms, ¼ Watt	60B 3-185
R22	470,000 Ohms, ¼ Watt	60B 2-474
R23	47,000 Ohms, ¼ Watt	60B 2-473
R24	470,000 Ohms, ¼ Watt	60B 2-474
R25	150 Ohms, ½ Watt	60B 8-151
§R26	150,000 Ohms, ½ Watt	60B 2-154
R27	10 Ohms, ¼ Watt	60B 2-100

† Part of encased Diode Filter Unit 63A3-1. This unit consists of R7, C16, C17 (see schematic). If a section of the unit becomes defective, it may be replaced with a component of proper value.

§ Used only in sets with model numbers ending in "UL".

Admiral Model 6R11

Alignment information on the next two pages.

IMPORTANT PRELIMINARY ALIGNMENT STEPS

In FM alignment, it is essential that every step be followed. Especially important is picking the center of the IF curve (step 4 in the FM-IF alignment instructions). During this portion of the alignment it is necessary to tune the signal generator very carefully; it may necessitate having to estimate the dial readings to a tenth of a division.

Under normal operating conditions or use, misalignment of RF or IF circuits with age will be slight. Lack of sensitivity and poor tone quality may be due to causes other than alignment. Do not attempt to realign the receiver until all other possible causes have first been thoroughly investigated.

If complete alignment is necessary, it is essential that proper sequence be followed as tabulated in the alignment chart. However, if only the AM band or a portion of the FM circuit are to be aligned, proceed from that point on the chart being sure to follow all remaining steps.

Adjustments made to FM-IF's at 10.7 MC, will require realignment of AM-IF slug adjustments.

Check pointer position. With tuning gang closed, the tip of the pointer clip should be over the 1/16" circular punch at the extreme left end of the dial background (see stringing diagram).

Use an isolation transformer if available, otherwise connect a .1 mfd. condenser in series with low side of signal generator and attach to B minus of chassis.

Be sure both the set and the signal generator are thoroughly warmed up before starting alignment.

FM I.F. AND RATIO DETECTOR ALIGNMENT

- Keep output indicator leads well separated from signal generator leads and chassis wiring.
- Band switch in FM position (fully to the left).
- While peaking IF's, keep reducing signal generator output so VTVM reading is approximately +1.5 volts DC with exception of Step #5.
- To avoid splitting the slotted head of iron core tuning slugs in the IF transformers, use an insulated alignment tool with a ⅛" wide screwdriver blade. Do not exert undue pressure as threads of slugs may strip.
- Speaker must be connected during alignment.
- FM antenna disconnected during alignment.

Before proceeding, be sure to follow all steps listed above, under "Important Preliminary Alignment Steps."

	Connect Signal Generator	Generator Frequency	Receiver Dial Setting	Output Indicator and Special Connections	Adjust as Follows (very carefully)
1	Thru .001 cond. to 2nd IF grid (pin #1 of 12BA6 2nd IF)	10.7 MC unmodulated.	Tuning gang wide open	Connect VTVM (DC probe) from point "W" to B minus ("Y"). (See Fig. 7.)	"A" (ratio detector primary) for maximum reading on VTVM.
2	**Thru .001 cond. to 1st IF grid (pin #1 of 12BA6 1st IF)	"	"	" "	Iron cores "B" and "C" (2nd IF trans.) for maximum reading on VTVM.
3	High side FM antenna terminal	"	"	" "	Iron cores "D" and "E" for maximum on VTVM. Readjust A, B, C, D, E, for maximum. (Keep reducing generator output to keep VTVM at 1.5 volts)
4	"	a. Reduce output of signal generator until VTVM reads exactly +1.5 volts DC. b. Tune generator frequency above 10.7 MC until VTVM reads exactly +1.0 volt. Note exact generator frequency. Extreme care in reading this is essential. c. Tune generator frequency below 10.7 MC until VTVM reads exactly +1.0 volt. Note exact generator frequency. Extreme care in reading this is essential. d. Add generator frequency in step c to generator frequency in step d and divide by 2. The result is the center frequency of the IF curve to be used in step 5. See example on next page. e. Tune generator frequency above and below 10.7 MC and note voltage reading on VTVM at different frequency points until you have a good impression of the shape of the selectivity curve. If you have two peaks as in Figures 5 or 6, note readings (voltage) of both peaks. If one peak is over 20% higher than the other one, it will be necessary to realign IF's. A selectivity curve that would require realignment is illustrated by Figure 6.			
5	"	Center of IF selectivity curve per step 4d above. See "EXAMPLE" on next page.	Tuning gang wide open	Connect VTVM (DC probe) from point "X" to B minus ("Y"). (See Fig. 7.)	Iron core "F" (ratio detector secondary) for zero voltage reading on VTVM. (The correct zero point is located between a positive and a negative maximum.)

If any adjustments were very far off, it is desirable to repeat steps 3. 4 and 5.

**Do not feed I.F. signal into converter grid as this will cause mis-alignment.

SETTING SIGNAL GENERATOR TO CENTER OF I.F. SELECTIVITY CURVE

CAUTION: Due to the difficulty of setting a signal generator to the accuracy required by this operation, extreme care must be exercised in making each setting. Otherwise, improper alignment of the ratio detector and consequent audio distortion will result.

EXAMPLE: (See Figures 1 and 2)

Voltage reading in Step 4a is + 1.5 volts.

Generator frequency on low side of 10.7 MC for a reading of + 1 volt DC = 10.640 MC.

Generator frequency on high side of 10.7 MC for a reading of + 1 volt DC = 10.800 MC.

Center frequency is obtained by adding 10.640 and 10.800, then dividing by 2. For these readings it will be 10.72 MC.

Set generator frequency to 10.72 MC as this is center of selectivity curve as shown in Figure 2.

Note: Numerical vernier dial readiugs may be used instead ef MC.

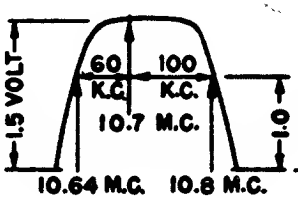


Fig. 1

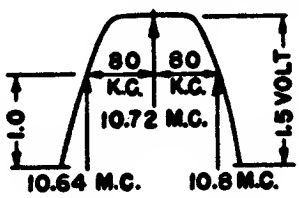


Fig. 2

TYPICAL SELECTIVITY CURVES

Fig. 3

Fig. 4

Fig. 5

Fig. 6

FM RF ALIGNMENT PROCEDURE

	Connect Signal Generator	Generator Frequency	Receiver Dial Setting	Output Indicator and Connectiens	Adjust as Follows
6	Thru 270 ohm carbon resistor to high side FM antenna terminal	109 MC† (unmodulated).	Tuning gang wide open	Connect VTVM (DC probe) from point "W" to ground.	*G for maximum VTVM reading.
7		102 MC† (unmodulated).	102 MC	"	*Tune in generator signal on receiver. Adjust H for max. VTVM reading.

* It is advisable to adjust generator output so VTVM readings do not exceed approximately + 1.5 V. DC after peaking.
† If your signal generator does not reach this frequency, use harmonics as described in "FM Alignment Equipment."

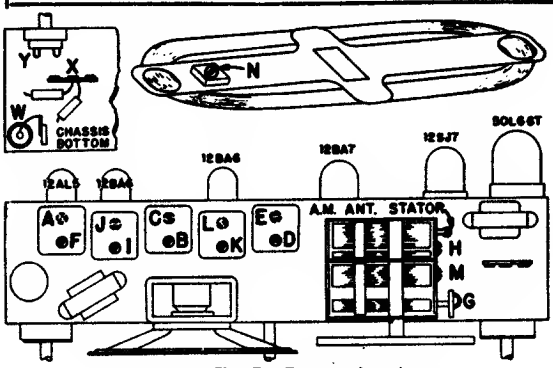


Fig. 7. Trimmer Location

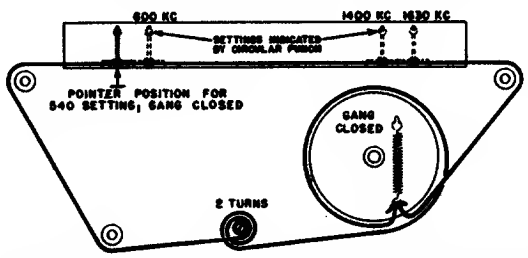


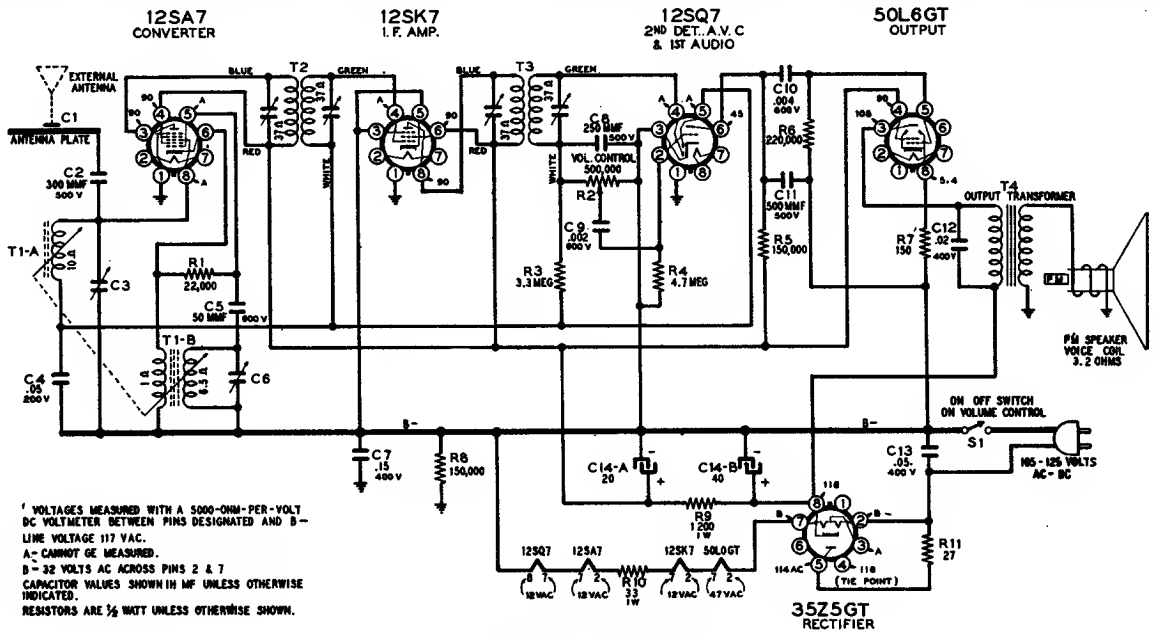
Fig. 8. Dial Stringing and Pointer Setting

With the gang fully closed, the tip of the pointer clip should be in line with the 1/16" circular punch at the extreme left end of the dial background.

AM ALIGNMENT PROCEDURE

- Use regular output meter connected across speaker voice coil.
- Turn receiver Volume Control full on; Tone Control full treble.
- AM loop antenna must be connected and placed in the same relative position to the chassis as when in cabinet.
- Use lowest output setting of signal generator that gives a satisfactory reading on meter.

	Connect Signal Geuerator	Dummy Autenna Between Radio and Signal Generator	Signal Generator Frequency	Receiver Dial Setting	Adj. Trimmers iu Following Order to Max.
	Set Band Switch to Broadcast Position (center) and be sure to follow instructions under heading "Important Preliminary Alignment Steps." Loop antenna must be connected.				
1	Gang condenser antenna stator	.1 MFD	455 KC	Tuning gang wide open	I, J, K, L
2	AM Antenna Stator	Direct connection	1620 KC	Tuning gang wide open	M
	Install chassis and AM loop in cabinet.				
3	Place generator lead close to loop of set to obtain adequate signal. No actual connection (signal by radiation).		1400 KC	Tune in signal	N



ALIGNMENT PROCEDURE

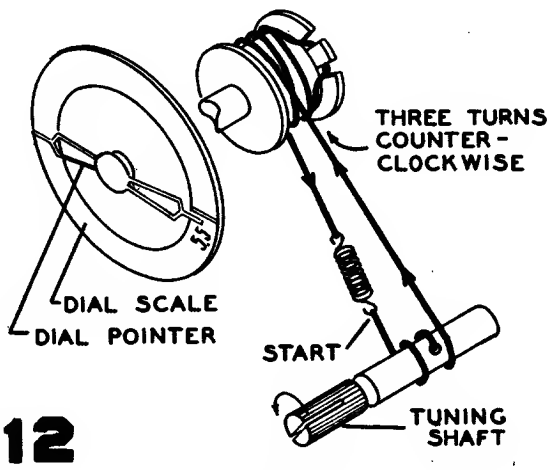
Volume control—Maximum all adjustments.

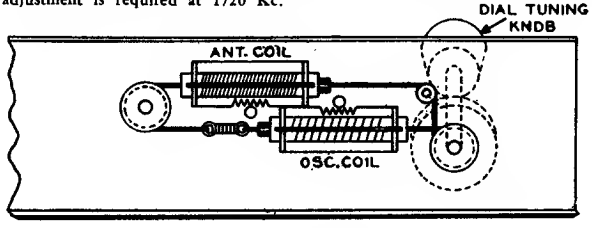
Connect B—of radio chassis (12SQ7-Pin 3) to ground post of signal generator through ,1 Mfd. condenser.

SIGNAL GENERATOR			*POSITION OF IRON CORES (Dial Setting)*	*ADJUST TRIMMERS TO MAXIMUM (in order shown)*
Frequency Setting	*Dummy Antenna*	*Connection to Radio*		
455 Kc.	.1 MFD.	Connect to Metal Antenna Backplate	Iron Cores All the way out	Trimmers on output and input I. F. cans
1720 Kc.	.1 MFD.	Connect to Metal Antenna Backplate	Iron Cores All the way out	Osc. Trimmer (C6) (See voltage chart)
1720 Kc.	200 MMF.	Connect to Outside Antenna Clip	Iron Cores All the way out	Ant. Trimmer (C3) (See voltage chart)
1400 Kc.	200 MMF.	Connect to Outside Antenna Clip	Turn Dial to 1400 Kc.	Adjust position of antenna coil (See coil assembly view)
1720 Kc.	200 MMF.	Connect to Outside Antenna Clip	Turn Dial to 1720 Kc.	Adjust trimmer (C3) (See voltage chart)

NOTE "A"—The antenna coil assembly is made so that it is movable. When making the adjustment as given in the alignment procedure move the coil assembly very slowly. It can be moved by hand or by pivoting one edge of the blade of a screwdriver in the hole and engaging the blade in the gear teeth of the coil form.

NOTE "B"—After the antenna coil has been tracked at 1400 Kc. it is necessary to check the antenna trimmer (C3) adjustment again at 1720 Kc. If no appreciable change in trimmer adjustment is made the coil is in track. If the trimmer requires considerable change it will be necessary to again adjust the position of the antenna coil at 1400 Kc. These two adjustments should be tried several times until no change of trimmer adjustment is required at 1720 Kc.





Coil Assembly View

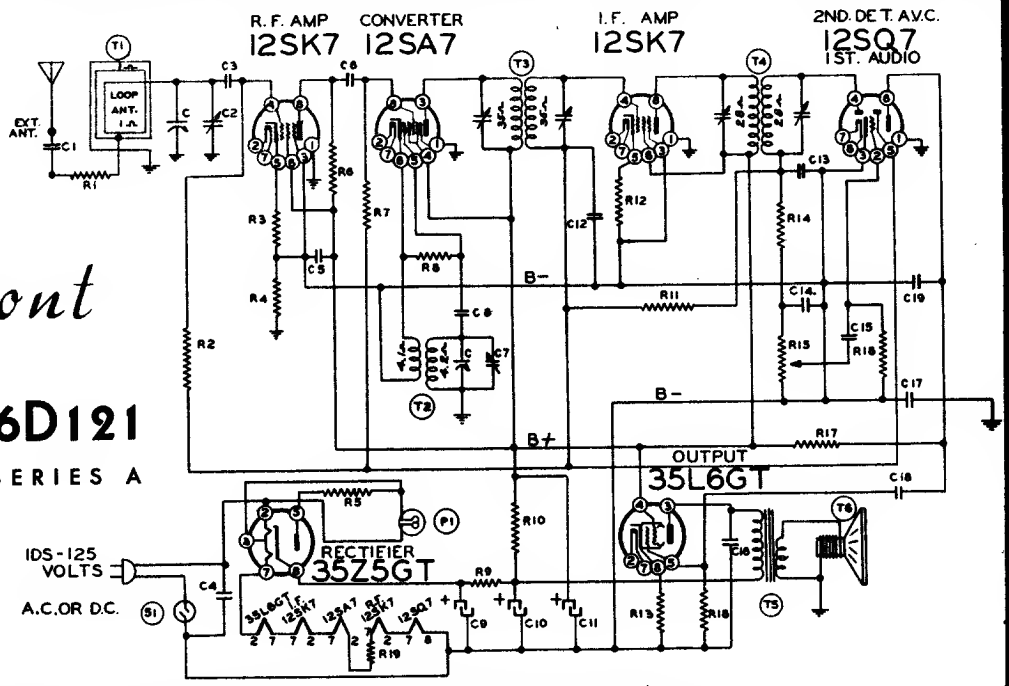
Belmont Radio

MODEL A-5D118

Belmont

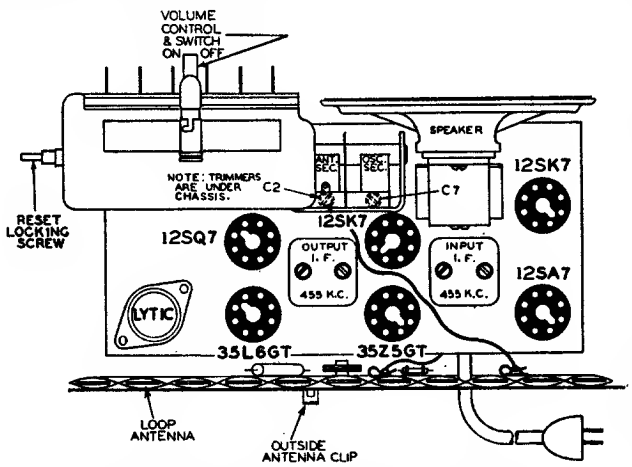
MODEL 6D121

SERIES A



NOTE: On some sets slug tuned I.-F.s are used instead of trimmer tuned I.-F.s. 108-140H and 108-145 are trimmer tuned. B-13A-12023 and B-13B-12022 are slug tuned. The slug tuned 1-F.s are tuned from the top and bottom (secondary on top, primary on bottom).

Slug tuned I.-F.s cannot be used to substitute trimmer tuned I.-F.s but trimmer tuned I.-F.s can be used to substitute slug tuned I.-F.s.



CHASSIS VIEW, SHOWING TUBE LOCATIONS
(See note above ou I.-F.s)

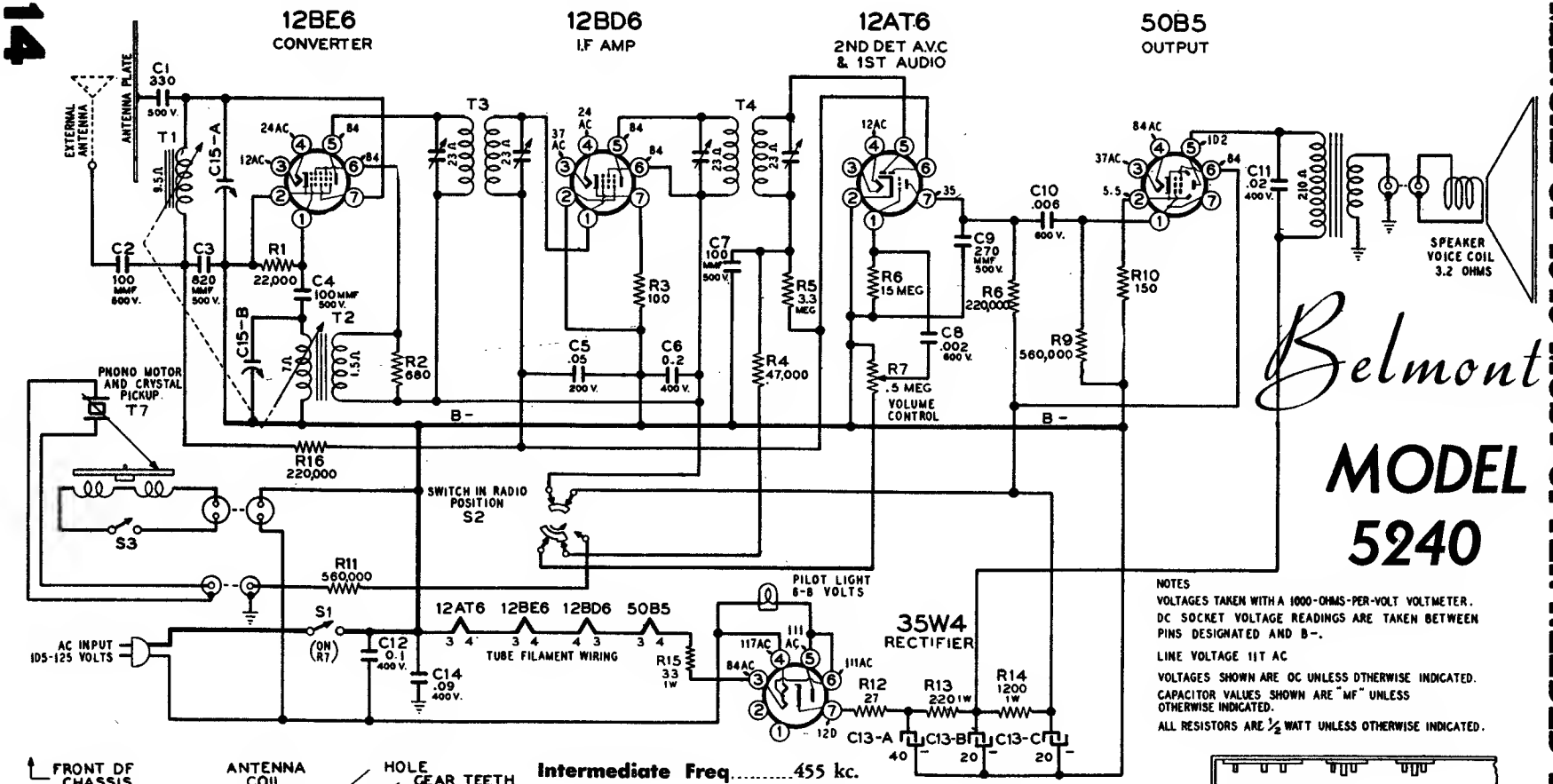
Part No.	Schematic Symbol	Description
		CONDENSERS
C-8D-10953	C17	.15 MFD x 400 volts.
C-8D-10778	C1, C15	.002 x 600 volts, +40%, −15%
C-8F3-12	C3	.470 mmfd., mica, ±20%
C-8D-10760	C4	.1 x 400 volts, +20%
C-8D-10775	C5	.25 x 200 volts, ±20%
C-8F3-8	C6, C8, C19	.001, mica, ±20%
11994 or A-8C-10077	C9, C10, C11	Electrolytic (for 50-60-cycle sets), 40 mfd. x 150 volts, 20 mfd. x 150 volts, 20 mfd. x 150 volts.
C-8D-10770	C12	.05 x 200 volts, ±20%
129161	C13, C14	Dual .0001, mica, ±10%
C-8D-10774	C16	.02 x 400 volts, ±20%
C-8D-10778	C18	.004 x 600 volts, ±20%
		RESISTORS
C-9B1-13	R1	1000 ohms, ½ watt, ±20%
C-9B1-31	R2	1 megohm, ½ watt, ±20%
C-9B1-50	R3	100 ohms, ½ watt, ±10%
C-9B1-26	R4	150,000 ohms, ½ watt, ±20%
C-9B1-42	R5	22 ohms, ½ watt, ±10%
C-9B1-70	R6	4700 ohms, ½ watt, ±10%
C-9B1-25	R7	100,000 ohms, ½ watt, ±20%
C-9B1-28	R8, R14	47,000 ohms, ½ watt, ±20%
C-9B2-53	R9	180 ohms, 1 watt, ±10%
C-9B2-63	R10	1200 ohms, 1 watt, ±10%
C-9B1-34	R11	3.3 merohms, ½ watt, ±20%
C-9B1-52	R12, R13	150 ohms, ½ watt, ±10%
C-9B1-29	R16	470,000 ohms, ½ watt, ±20%
C-9B1-27	R17	220,000 ohms, ½ watt, ±20%
C-9B1-35	R18	4.7 megohms, ½ watt, ±20%
C-9B2-44	R19	33 ohms, 1 watt, ±10%

ALIGNMENT PROCEDURE

- No aligning adjustments should be attempted until all other possible causes of trouble have been checked.
- Chassis must be removed from cabinet for proper alignment. Slight adjustments of the oscillator and antenna circuits can be made, without removing the chassis, through two holes provided on the bottom of the cabinet. The two adjustment screws can be reached with a long insulated screwdriver.
- It is important that during alignment the loop antenna be maintained at the same distance from the chassis as when the chassis is installed in the cabinet.
- Turn volume control to maximum for all adjustments.
- Connect ground post of signal generator to B— of radio through a 0.1 mfd. condenser.
- Connect dummy antenna value in series with generator output lead.
- Connect output meter across primary of output transformer.

Band	Signal Generator Frequency Setting	Dummy Antenna	Connection to Radio	Tuning Condenser Setting	Adjust for Maximum Output (see chassis view)
I.F.	455 Kc.	0.1 mfd.	Grid of 12SA7	Rotor full open (plates out of mesh)	4 trimmers on input and output I.F. transformers (See note)
Broadcast	1650 Kc.	0.1 mfd.	Grid of 12SA7	Rotor full open (plates out of mesh)	Oscillator trimmer C7 on bottom of radio
	1400 Kc.	None	See note A	Set dial at 1400 Kc.	Antenna trimmer C2 on bottom of radio

Note A: Lay output lead of generator in back of loop antenna. Turn up generator output. Loop antenna will pick up



Belmont

MODEL 5240

NOTES

VOLTAGES TAKEN WITH A 1000-OHMS-PER-VOLT VOLTMETER.

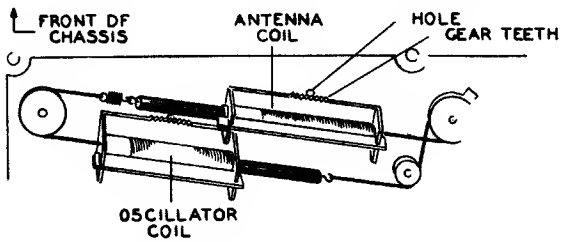
DC SOCKET VOLTAGE READINGS ARE TAKEN BETWEEN PINS DESIGNATED AND B-.

LINE VOLTAGE 117 AC

VOLTAGES SHOWN ARE DC UNLESS OTHERWISE INDICATED.

CAPACITOR VALUES SHOWN ARE "MF" UNLESS OTHERWISE INDICATED.

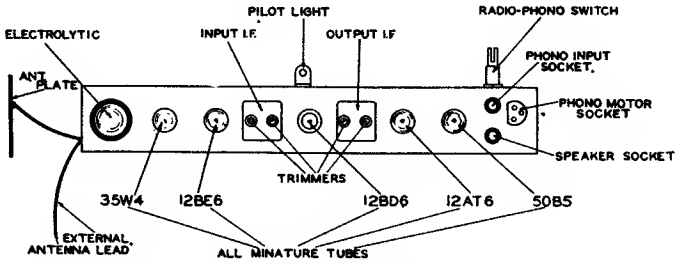
ALL RESISTORS ARE ½ WATT UNLESS OTHERWISE INDICATED.



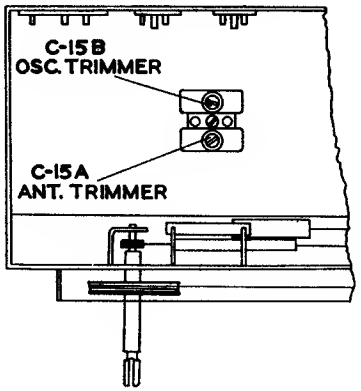
View of Coil Assembly

The antenna coil assembly is movable left to right. When making the adjustment as required in the alignment procedure, move the coil assembly very slowly, either by hand or by pivoting one edge of a screwdriver blade in the hole and engaging the blade in the gear teeth of the coil form.

Intermediate Freq.....455 kc.



CHASSIS VIEW



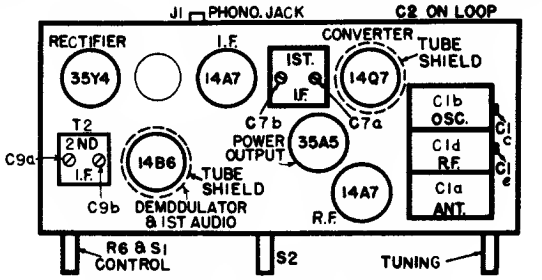
BENDIX MODEL 65P4

Circuit Aligned	Input Freq.	Pointer Position	Adjustments
IF	*455 KC	Max. to right	C9b, C9a, C7b, C7a
OSC.	**1475 KC	1475 Ref. Mark	C1c
RF	**1475 KC **965 KC **580 KC	1475 965 580	C1e, C2 +Check Calibration

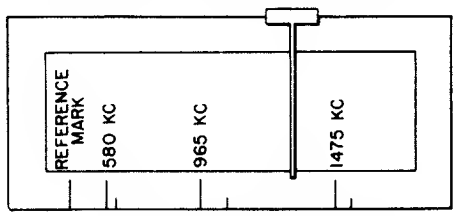
* Applied to Antenna input through .1 mfd or less.

** Applied to Antenna input through 50 mmf. or less.

\+ If dial pointer calibration is not within plus or minus 10 KC the gang rotor plates must be bent to cause correct tracking.



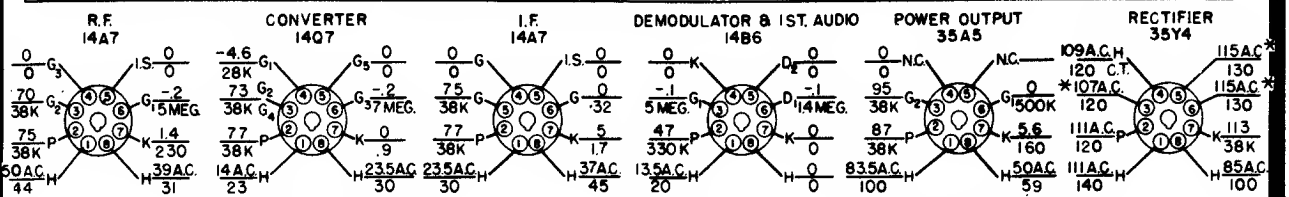
TRIMMER LOCATION DIAGRAM

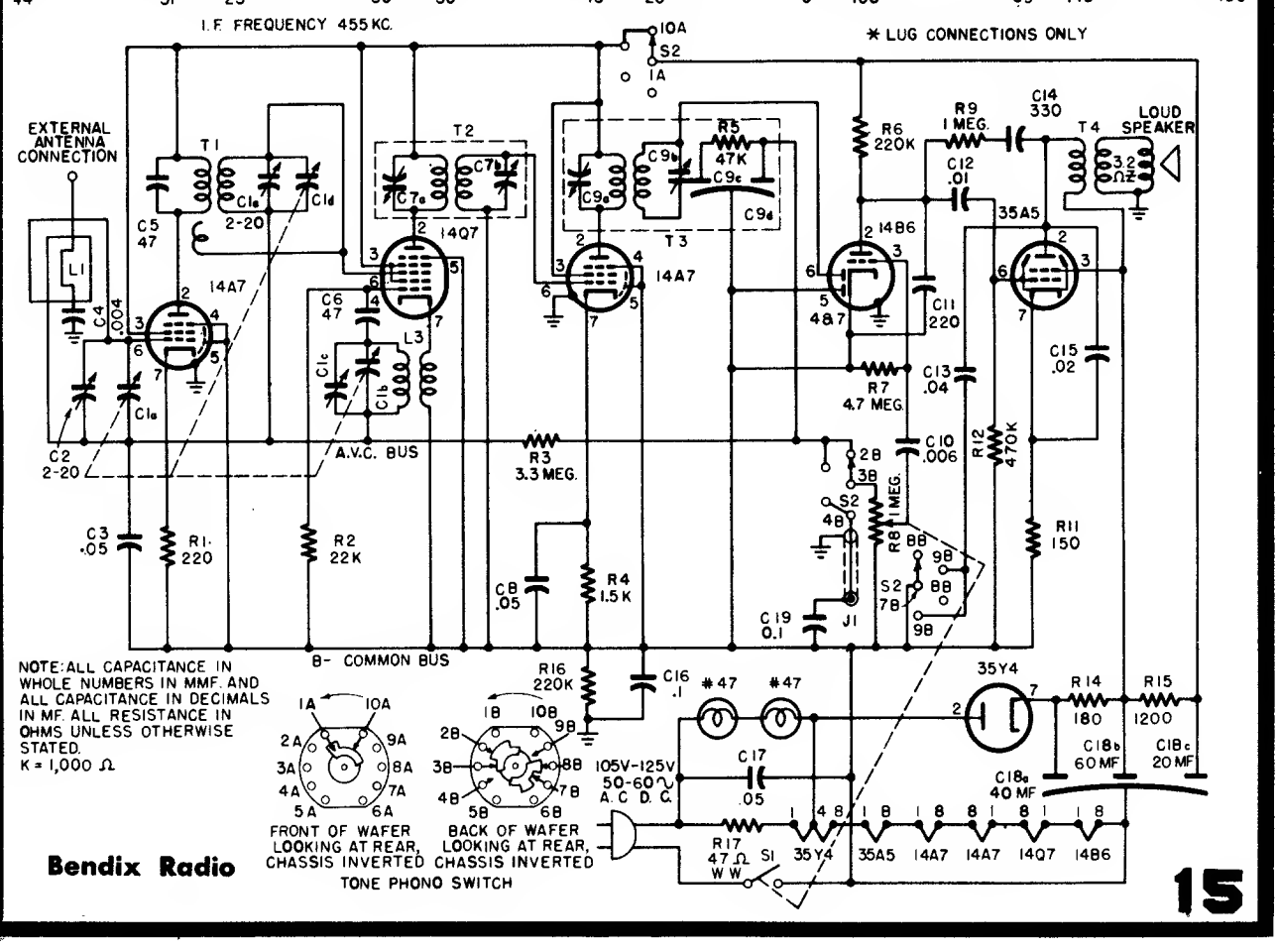


DIAL REFERENCE POINTS

CONDITIONS OF MEASUREMENTS

LINE VOLTAGE 117 A.C. ZERO SIGNAL VOL. CONT. MIN. SOCKET VOLTAGE / RESISTANCE TO COMMON B MINUS D. C. AT 20,000Ω A. C. AT 1,000Ω/V.



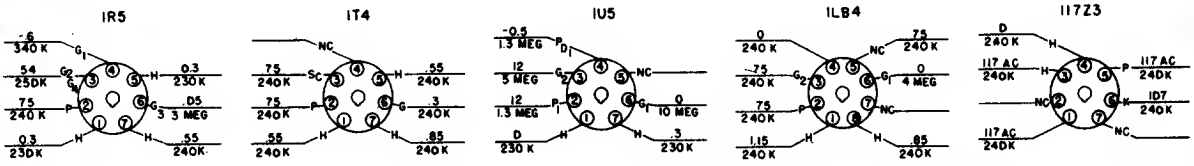


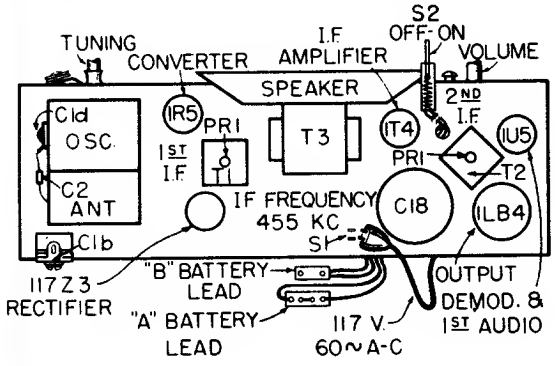
NOTE: ALL CAPACITANCE IN WHOLE NUMBERS IN MMF. AND ALL CAPACITANCE IN DECIMALS IN MF. ALL RESISTANCE IN OHMS UNLESS OTHERWISE STATED.
K = 1,000 Ω

TONE PHONO SWITCH

CONDITIONS OF MEASUREMENTS

VOLTAGE 117 A.C ZERO SIGNAL INPUT. VOL. CONT. MIN. SOCKET VOLTAGE / RESISTANCE TO CHASSIS GROUND. D.C AT 20,000Ω/V. A.C. AT 1,000Ω/V. SWITCH S1 CLOSED.





Bendix Radio 55X4

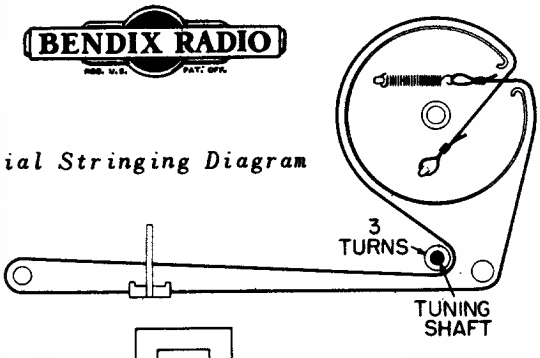
CIRCUIT ALIGNED	DIAL POINTER	INPUT FREQ.	APPLY THROUGH	ADJUST
IF	Max. To Right	†455KC	.01 mfd	SLUGS-Top & Bottom of T2 SLUGS-Top & Bottom of T1 (Fig. 3)
OSC. & ANT.	1475 Ref. Mark (Fig. 4)	1475KC	50 mmf	C1d;C1b (Fig. 3)
	965 Ref. Mark (Fig. 4)	965KC	50 mmf	* Check Calibration
	580 Ref. Mark (Fig. 4)	580KC	50 mmf	* Check Calibration

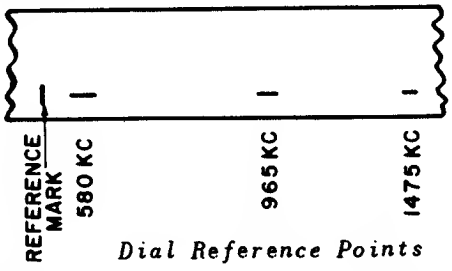
† If calibration does not check within the frequency mark, both oscillator and antenna sections of the gang condenser must be bent to correct tracking.

* Signal Generator connected to external antenna connection for complete alignment.

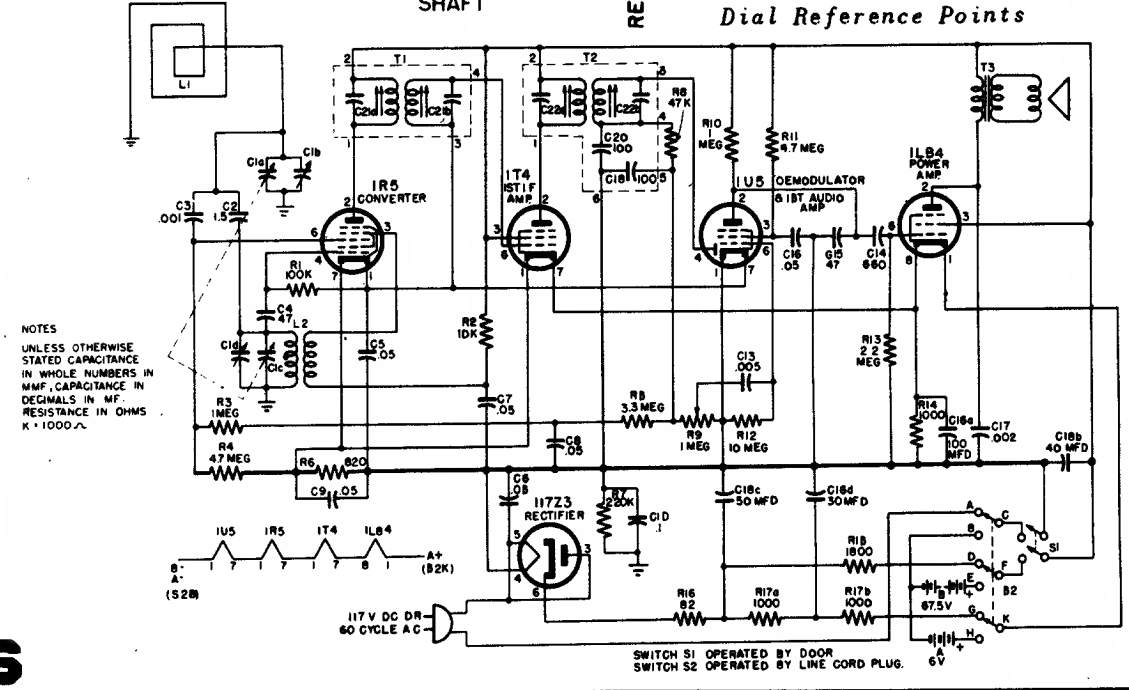
BENDIX RADIO

Dial Stringing Diagram





Dial Reference Points



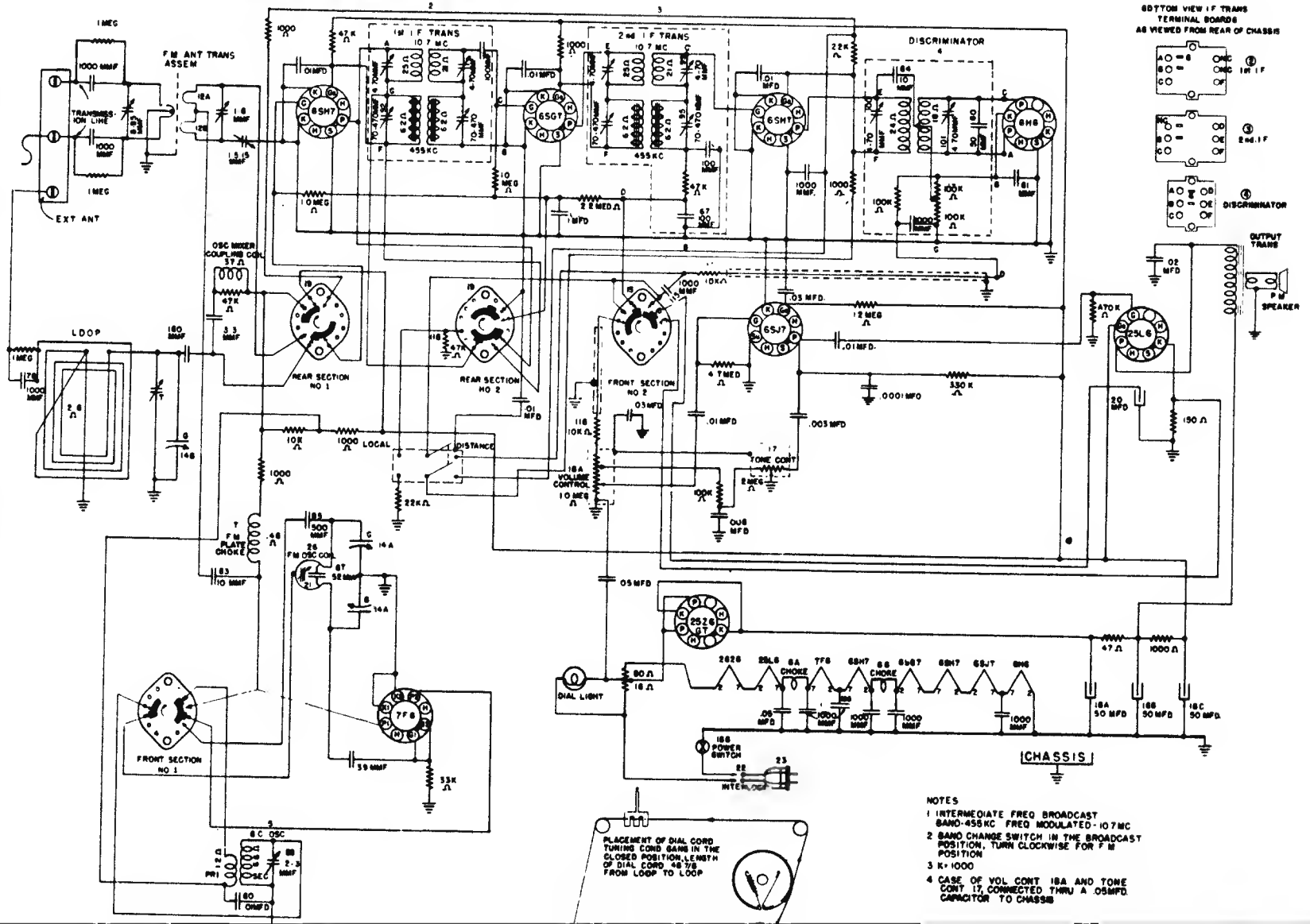
NOTES

UNLESS OTHERWISE STATED CAPACITANCE IN WHOLE NUMBERS IN MMF, CAPACITANCE IN DECIMALS IN MF. RESISTANCE IN OHMS K = 1000Ω

MANUAL OF 1949 MOST-OFTEN-NEEDED RADIO DIAGRAMS

CROSLEY

MODELS: 88TA, 88TC



NOTES

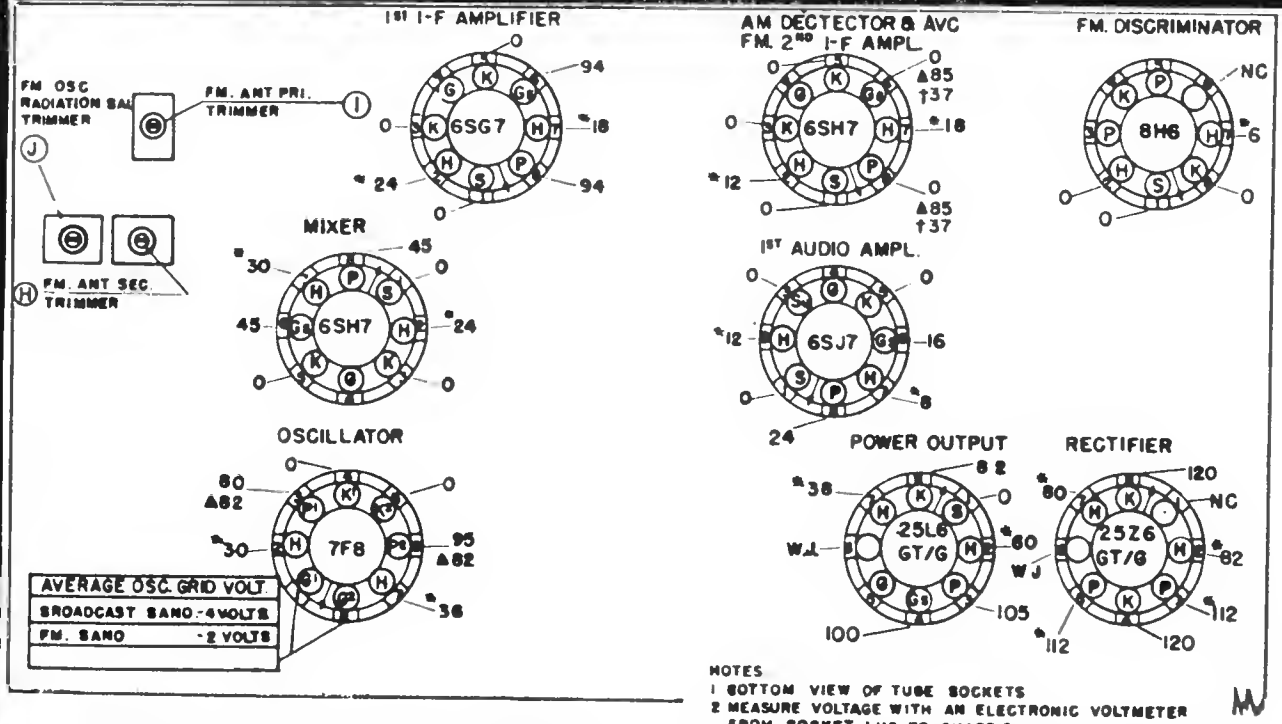
1 INTERMEDIATE FREQ BROADCAST BAND-455KC FREQ MODULATED-10.7MC

2 BAND CHANGE SWITCH IN THE BROADCAST POSITION, TURN CLOCKWISE FOR F M POSITION

3 K=1000

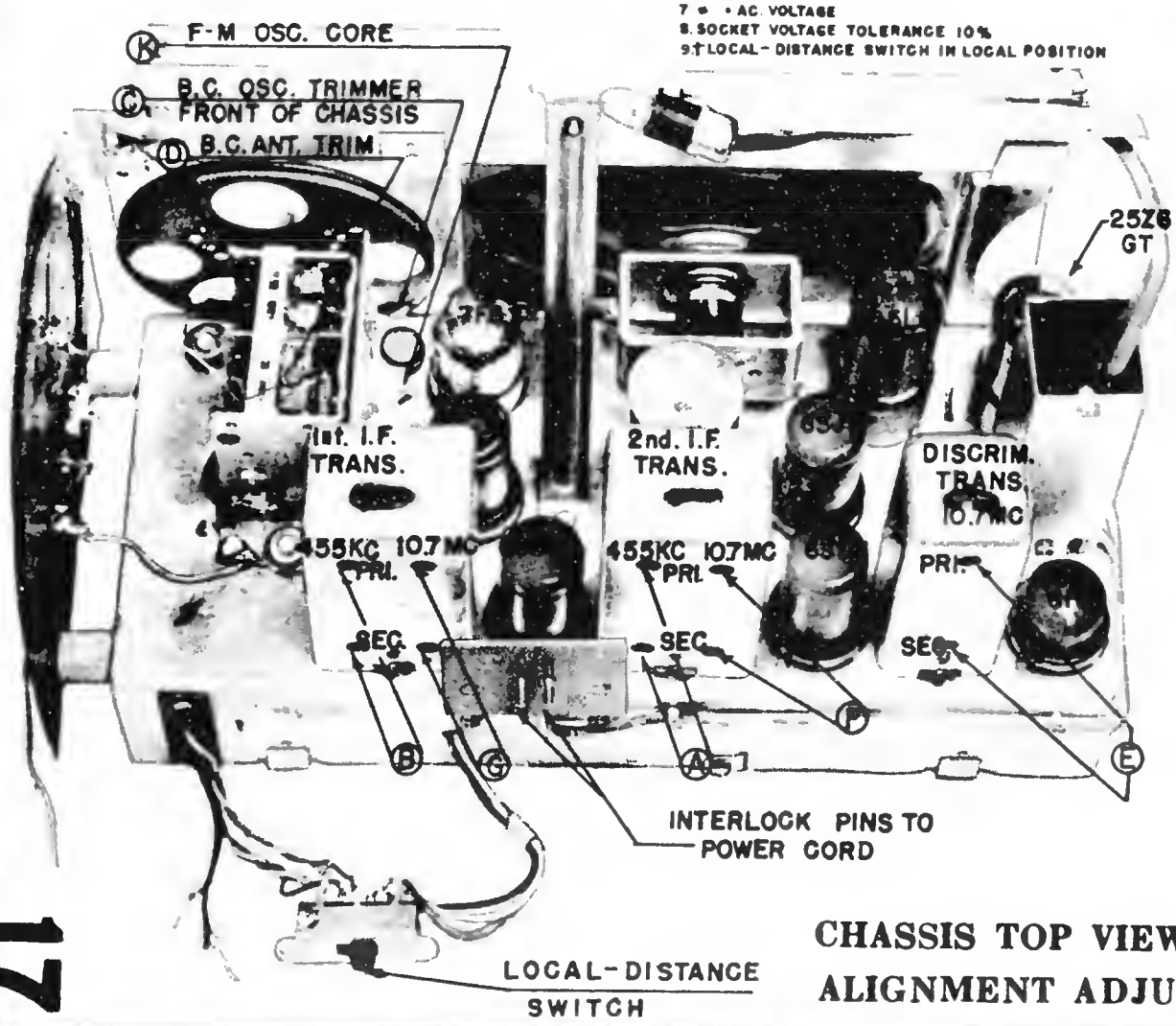
4 CASE OF VOL CONT 18A AND TONE CONT 17, CONNECTED THRU A .05MFD. CAPACITOR TO CHASSIS

FOLLOWING ADJUSTMENTS



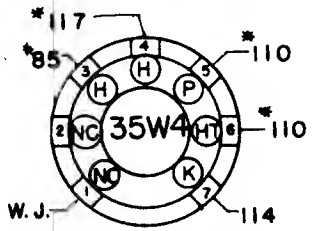
NOTES
1 BOTTOM VIEW OF TUBE SOCKETS
2 MEASURE VOLTAGE WITH AN ELECTRONIC VOLTMETER FROM SOCKET LUG TO CHASSIS.
3 ALL VOLTAGES ARE THE SAME FOR BC & FM EXCEPT WHERE MARKED WITH DELTA (Δ), THIS IS THE VOLTAGE WITH BAND SWITCH IN THE FM. POSITION
4 LINE VOLTAGE 117 V 60 ~
5 NC = NO CONNECTION
6 WJ = WIRING JUNCTION
7 ~ = AC. VOLTAGE
8. SOCKET VOLTAGE TOLERANCE 10%
9. † LOCAL - DISTANCE SWITCH IN LOCAL POSITION

SOCKET VOLTAGE CHART

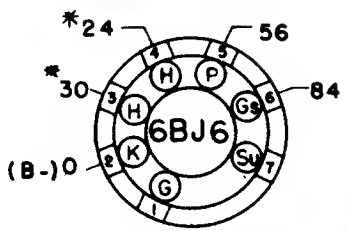


CHASSIS TOP VIEW SH
ALIGNMENT ADJUSTM

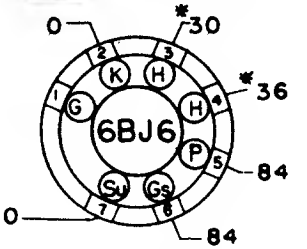
RECTIFIER



R.F. AMPLIFIER



I.F. AMPLIFIER



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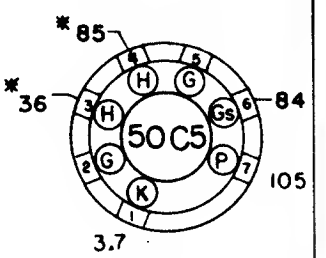
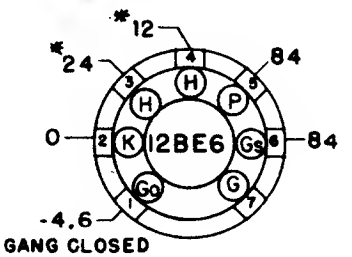
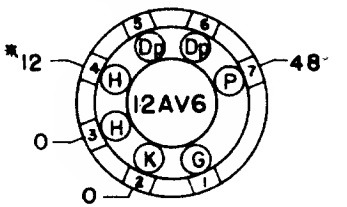


CONVERTER



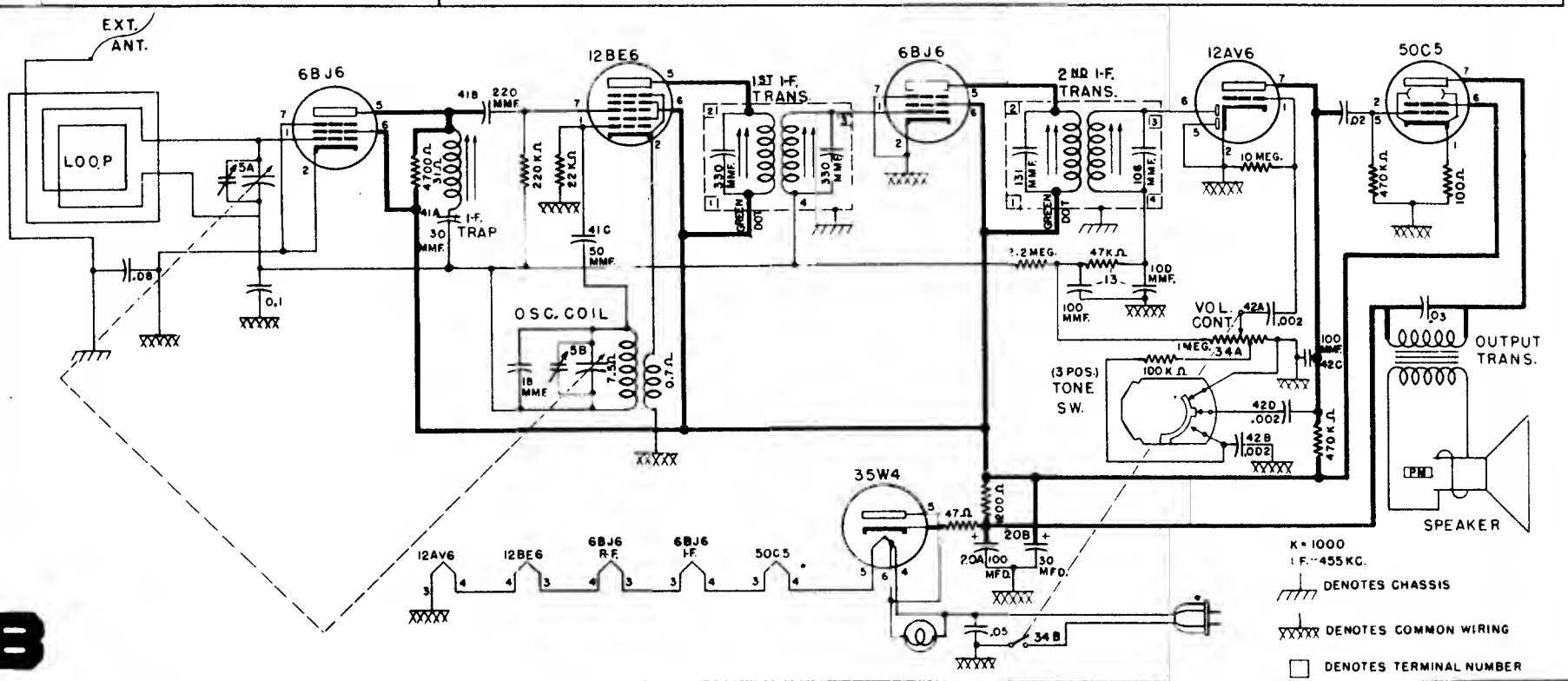
DET. AVC. & 1st AUDIO AMPLIFIER



NOTES:

1. BOTTOM VIEW OF TUBE SOCKETS.
2. VOLTAGE MEASURED WITH AN ELECTRONIC VOLTMETER FROM SOCKET LUG TO B-.
3. LINE VOLTAGE 117 V. 60 CYCLE.
4. NC = NO CONNECTION.
5. W. J. = WIRING JUNCTION.
6. * = AC. VOLTAGE.
7. SOCKET VOLTAGE TOLERANCE ± 10%.

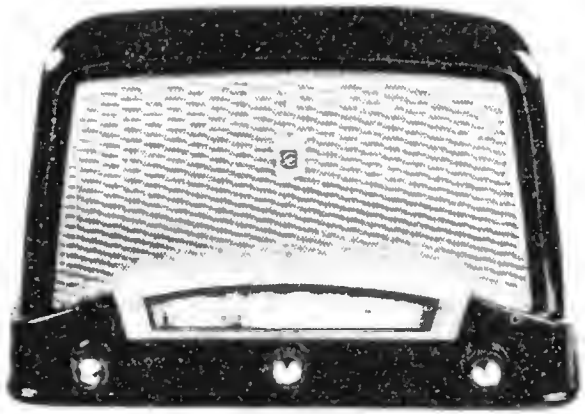
SOCKET VOLTAGE CHART



CROSLEY

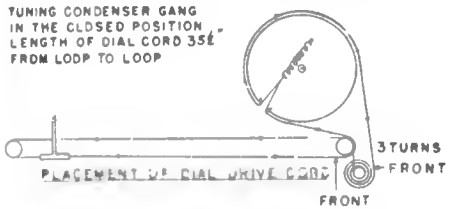
MODELS: 9-103, 9-104W

9-103



FREQUENCY RANGE: 540 to 1600 kc.

INTERMEDIATE FREQUENCY: 455 kc.

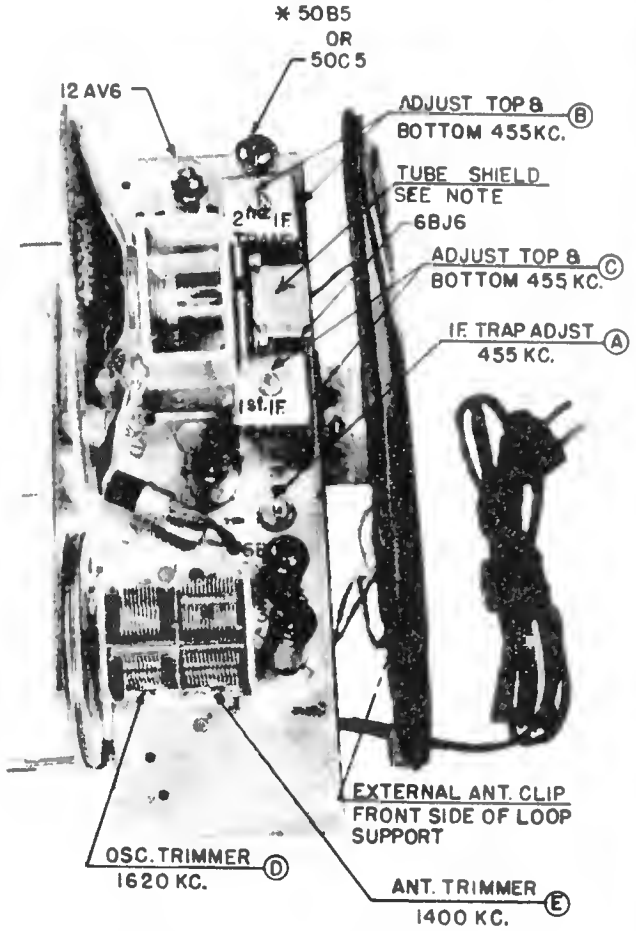


PLACEMENT OF DIAL DRIVE CORD

*NOTE:

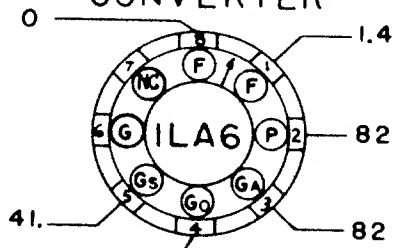
RECEIVERS WITH TUBE SHIELD USE 50B5 TUBE.

RECEIVERS WITHOUT TUBE SHIELD USE 50C5 TUBE.



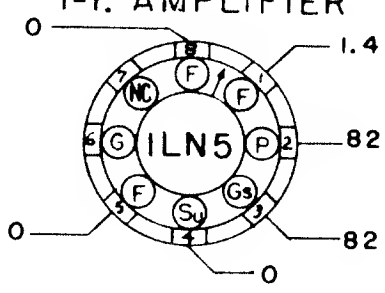
CHASSIS, VIEW

CONVERTER

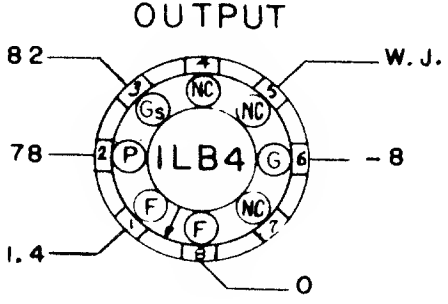


OSC. GRID VOLTAGE
GANG OPEN -11 VOLTS
GANG CLOSED -8 VOLTS

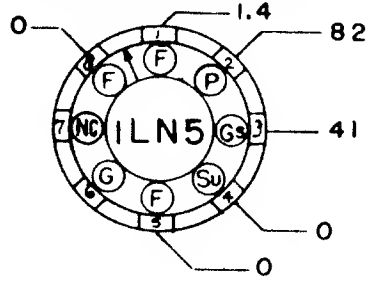
I-F. AMPLIFIER



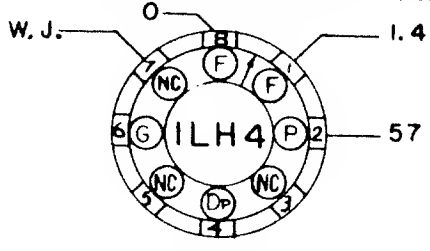
OUTPUT



R-F. AMPLIFIER



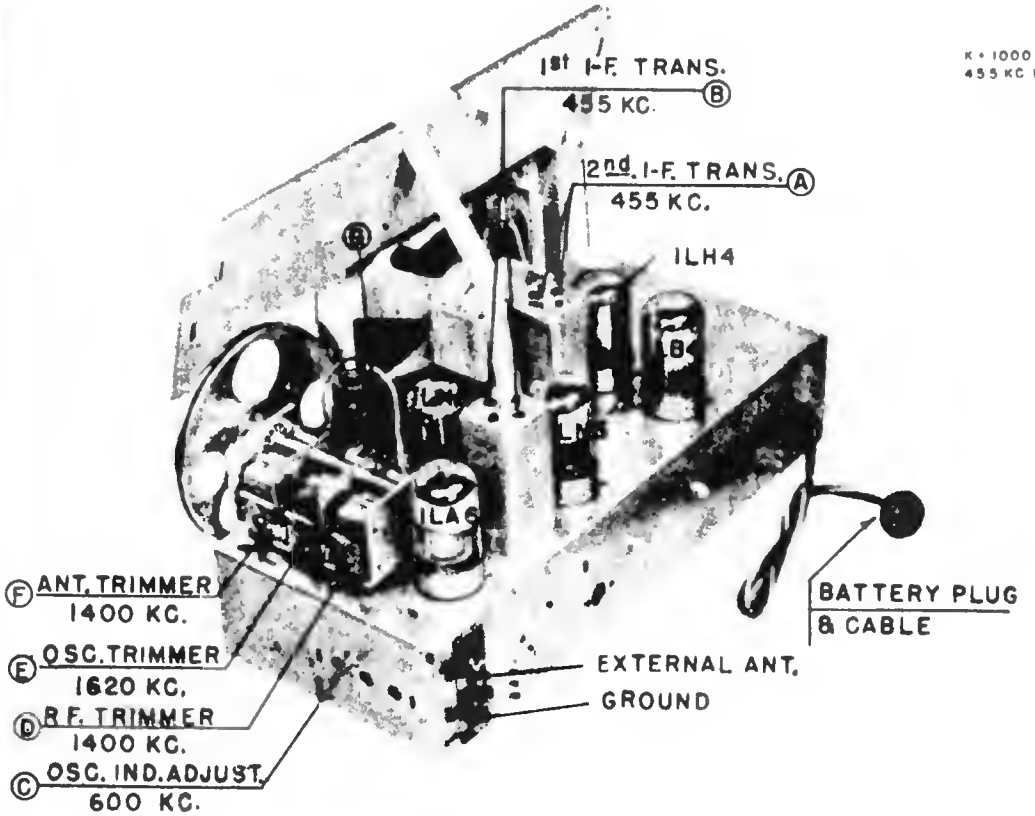
DET.- AVC.- 1ST A-F. AMPL.



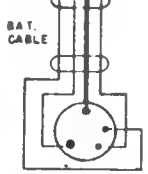
CHASSIS REAR VIEW

NOTES:

1. BOTTOM VIEW OF TUBE SOCKETS
2. VOLTAGES MEASURED FROM SOCKET LUG TO CHASSIS WITH AN ELECTRONIC VOLTMETER
3. W.J.= WIRING JUNCTION
4. N.C.= NO CONNECTION
5. BATTERY PACK VOLTAGE "A" =1.4VOLTS,"B"=90 VOLTS
6. SOCKET VOLTAGE TOLERANCE 10 %

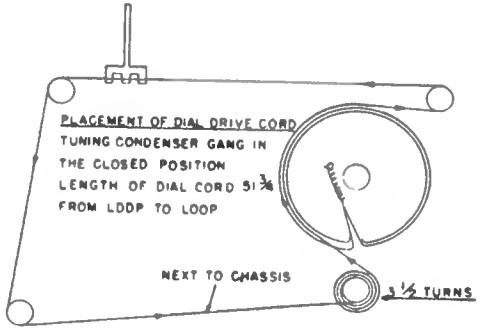


K = 1000
455 KC I.F. FREQUENCY

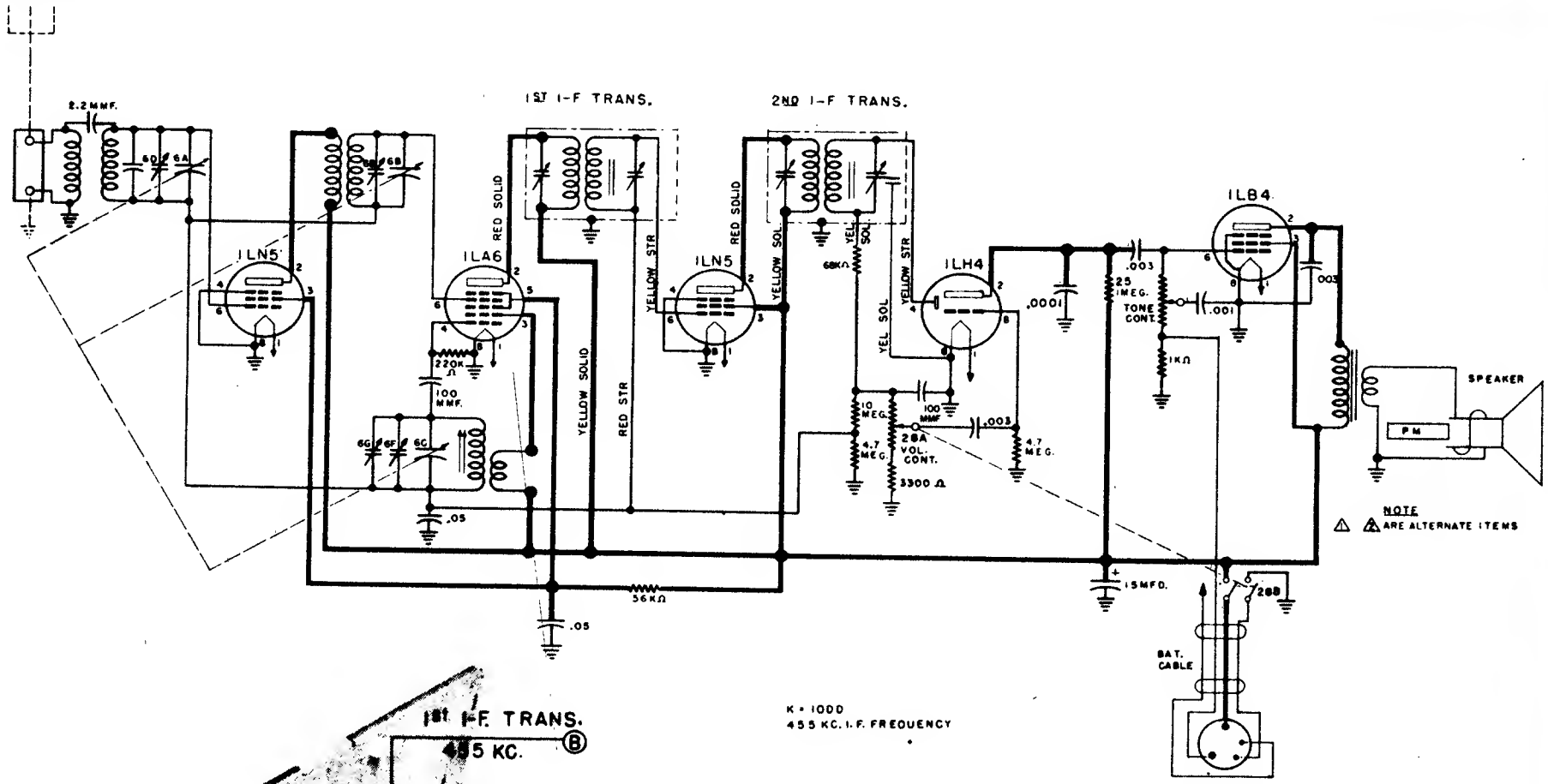


CROSLEY

MODEL: 9-101



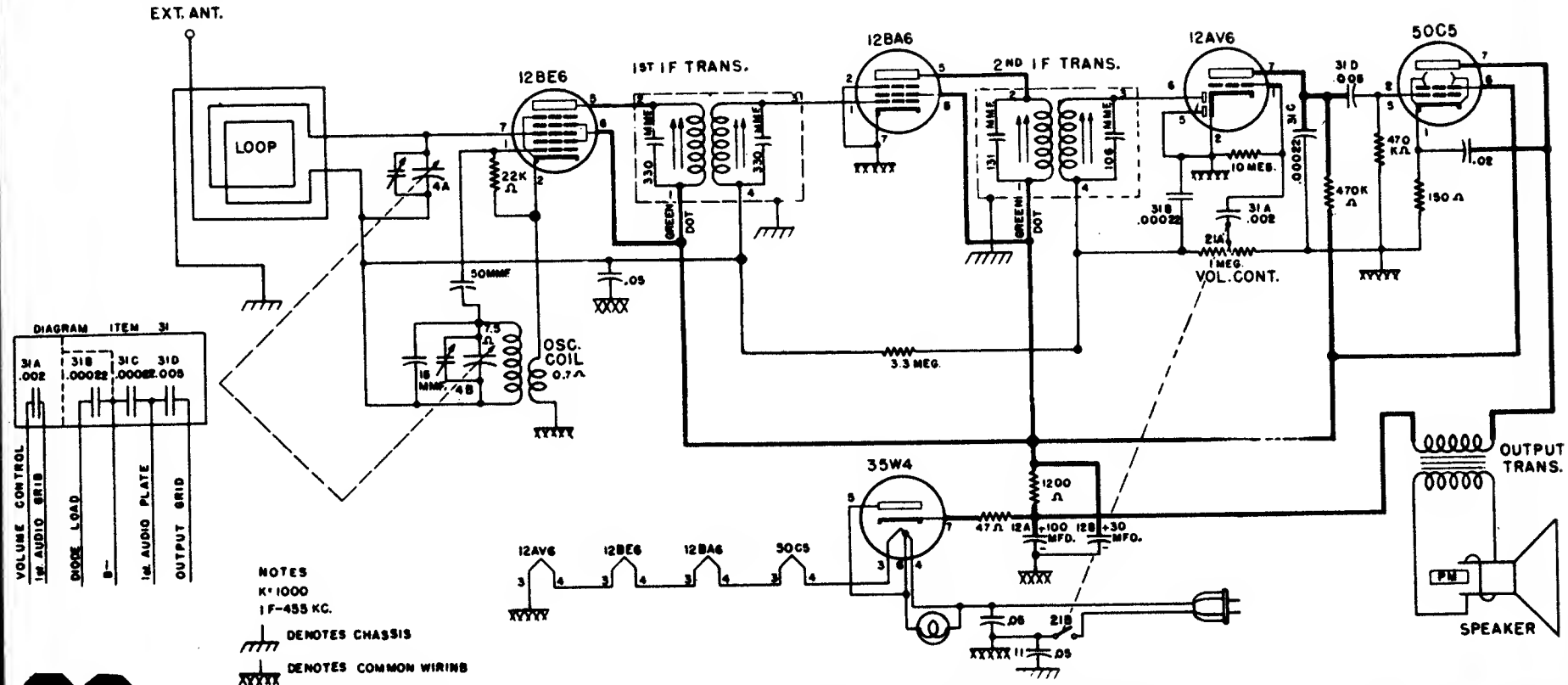
MANUAL OF 1949 MOST-OFTEN-NEEDED RADIO DIAGRAMS



ALIGNMENT PROCEDURE

Alignment Sequence	Signal Generator Output			Position of Tuning Cond.	Adjust for Maximum Output
	Frequency in kc.	In Series with	To		
1	455	200 mmf.	High Side of Loop	Open	A & B
2	1620	*Radiated to Loop		Open	C
3	1400	*Radiated to Loop		Tune to Signal	D

* Place signal generator output lead near the loop antenna.

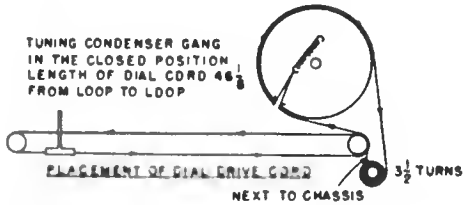


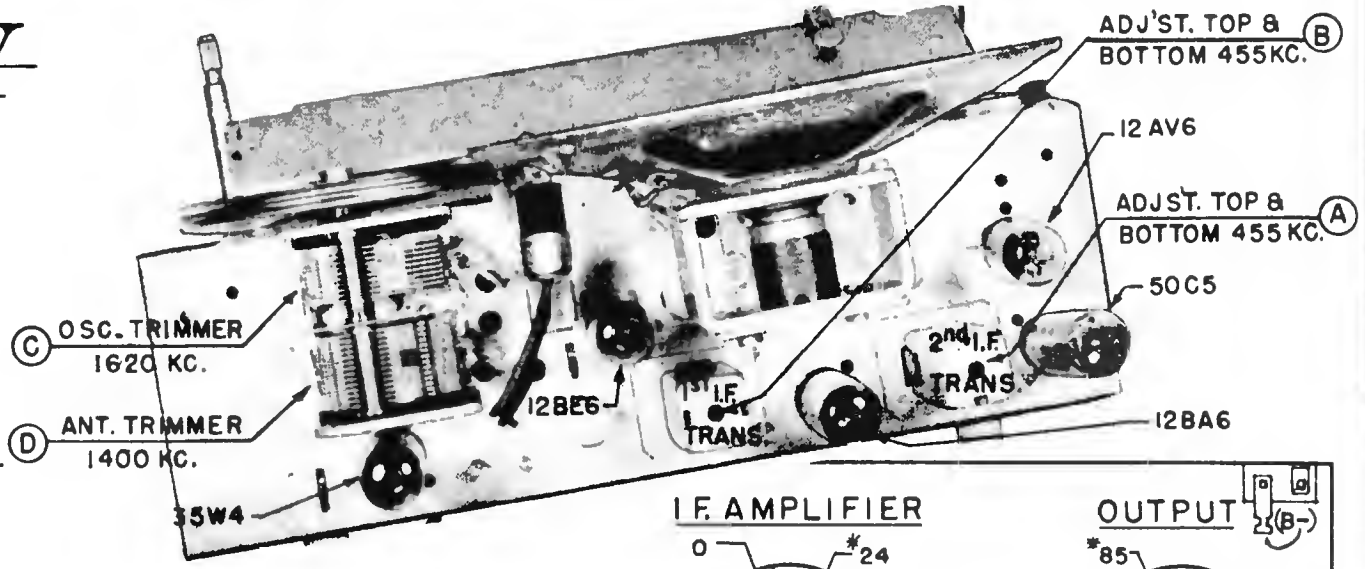
SCHEMATIC DIAGRAM (Second Production)

MANUAL OF 1949 MOST-OFTEN-NEEDED RADIO DIAGRAMS

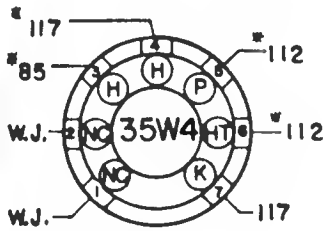
CROSLEY

MODELS 9-113, 9-114W

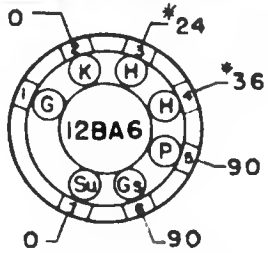




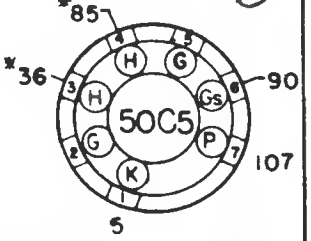
RECTIFIER



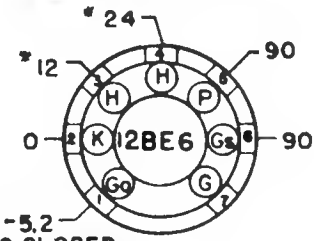
I.F. AMPLIFIER



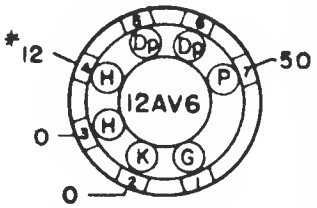
OUTPUT



CONVERTER

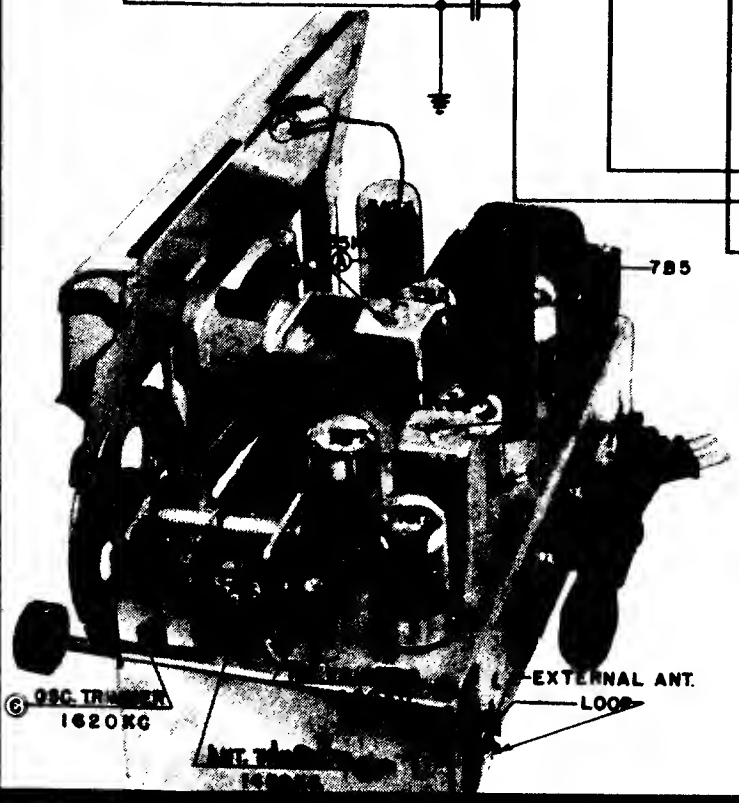


DET. AVC. & 1st AUDIO AMPLIFIER



NOTES:

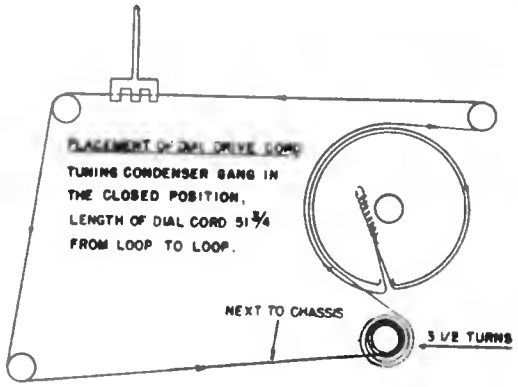
1. BOTTOM VIEW OF TUBE SOCKETS.
2. VOLTAGE MEASURED WITH AN ELECTRONIC VOLTMETER FROM SOCKET LUG TO B-.
3. LINE VOLTAGE 117 V. 60 CYCLE.
4. NC = NO CONNECTION.
5. W.J. = WIRING JUNCTION.
6. * = AC. VOLTAGE.
7. SOCKET VOLTAGE TOLERANCE 10%.



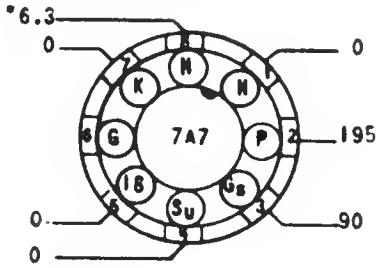
MANUAL OF **1949** MOST-OFTEN-NEEDED RADIO DIAGRAMS

CROSLEY

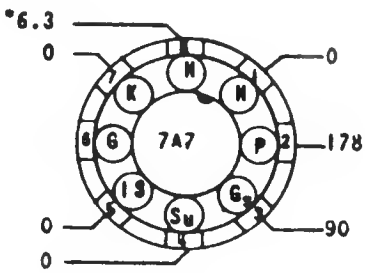
MODELS 9-102, 9-118W



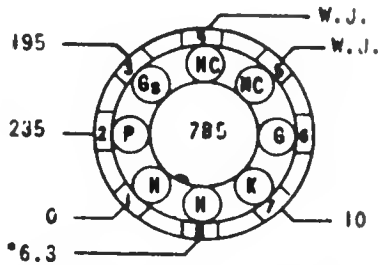
R. F. AMPLIFIER



I. F. AMPLIFIER

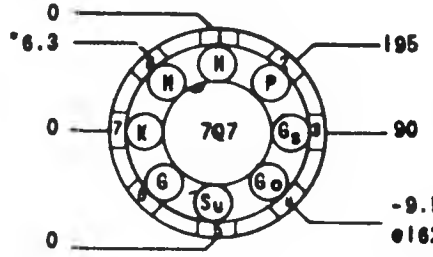


POWER OUTPUT

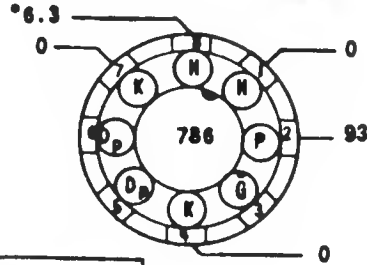


POWER TRANSFORMER

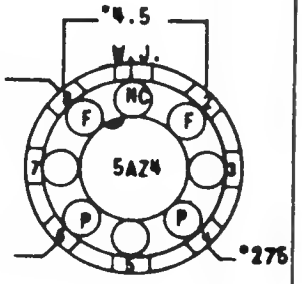
CONVERTER



DET.-AVC.-1st. A.F.AMPL.

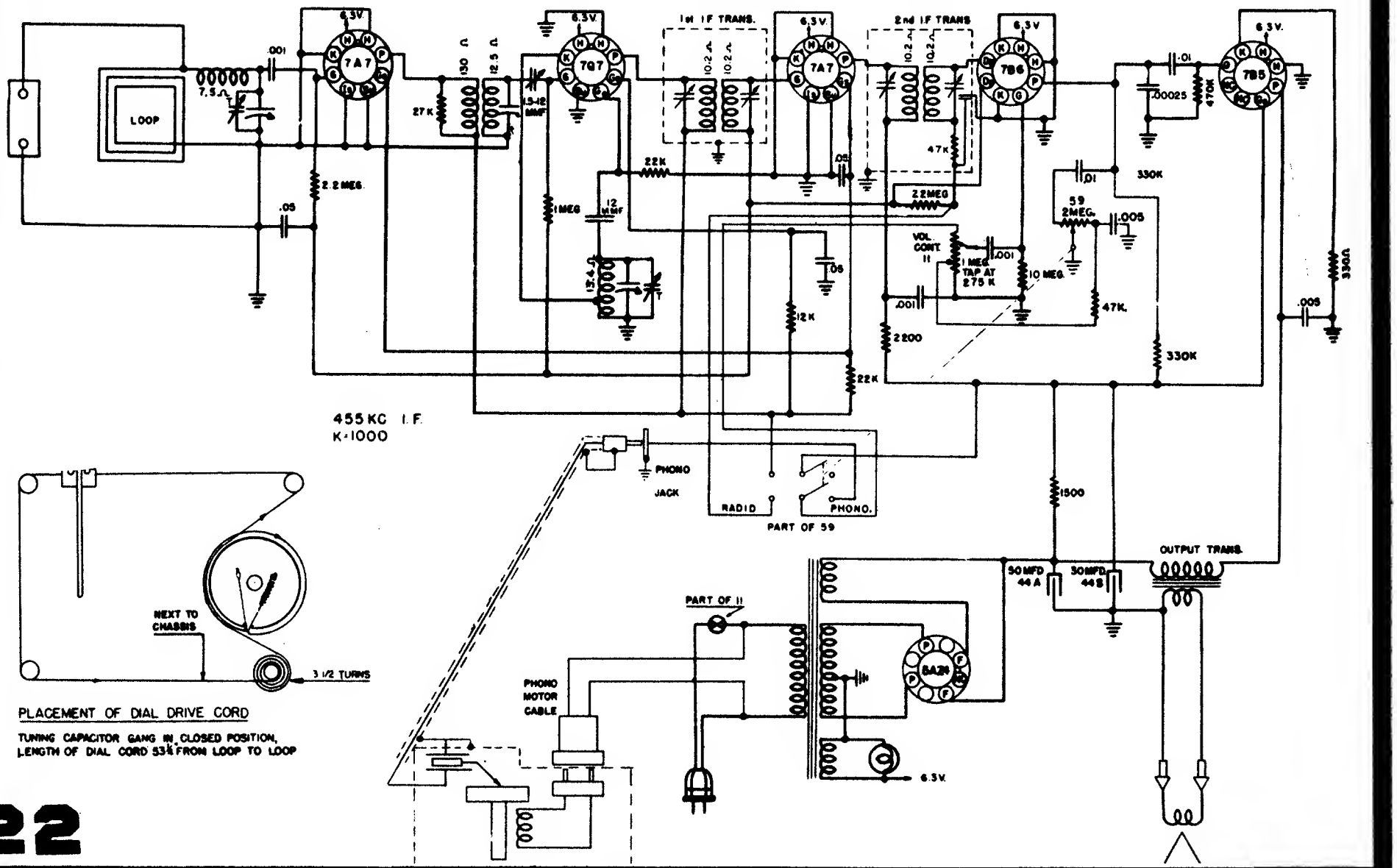


RECTIFIER



NOTES:
1. Bottom View Of Sockets
2. Measure Voltage From Socket Lug To -B(Chassis)
3. Voltages Measured With An Electronic Voltmeter
4. W.J. = Wiring Junction.
5. N.C. = No Connection.
6. * = A.C. Voltage.
7. Voltage Tolerance, 10%
8. Line Voltage 117 V_L 60 ~ A.C.

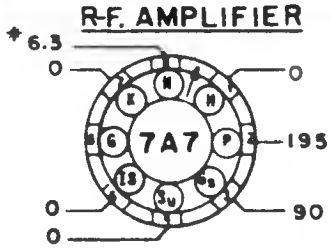
SOCKET VOLTAGE CHART



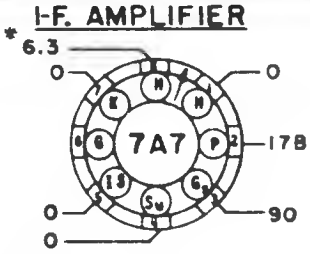
PLACEMENT OF DIAL DRIVE CORD

TUNING CAPACITOR GANG IN CLOSED POSITION, LENGTH OF DIAL CORD 53¼ FROM LOOP TO LOOP

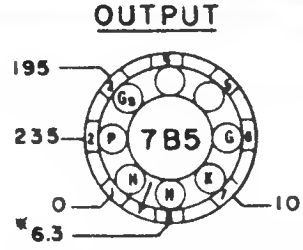
R-F. AMPLIFIER



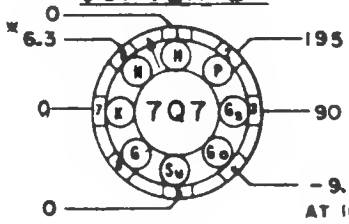
I-F. AMPLIFIER



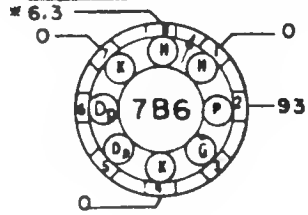
OUTPUT



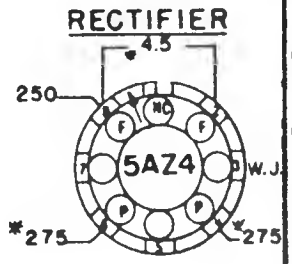
CONVERTER



DET.-AVC.-1ST. A-F. AMPL.

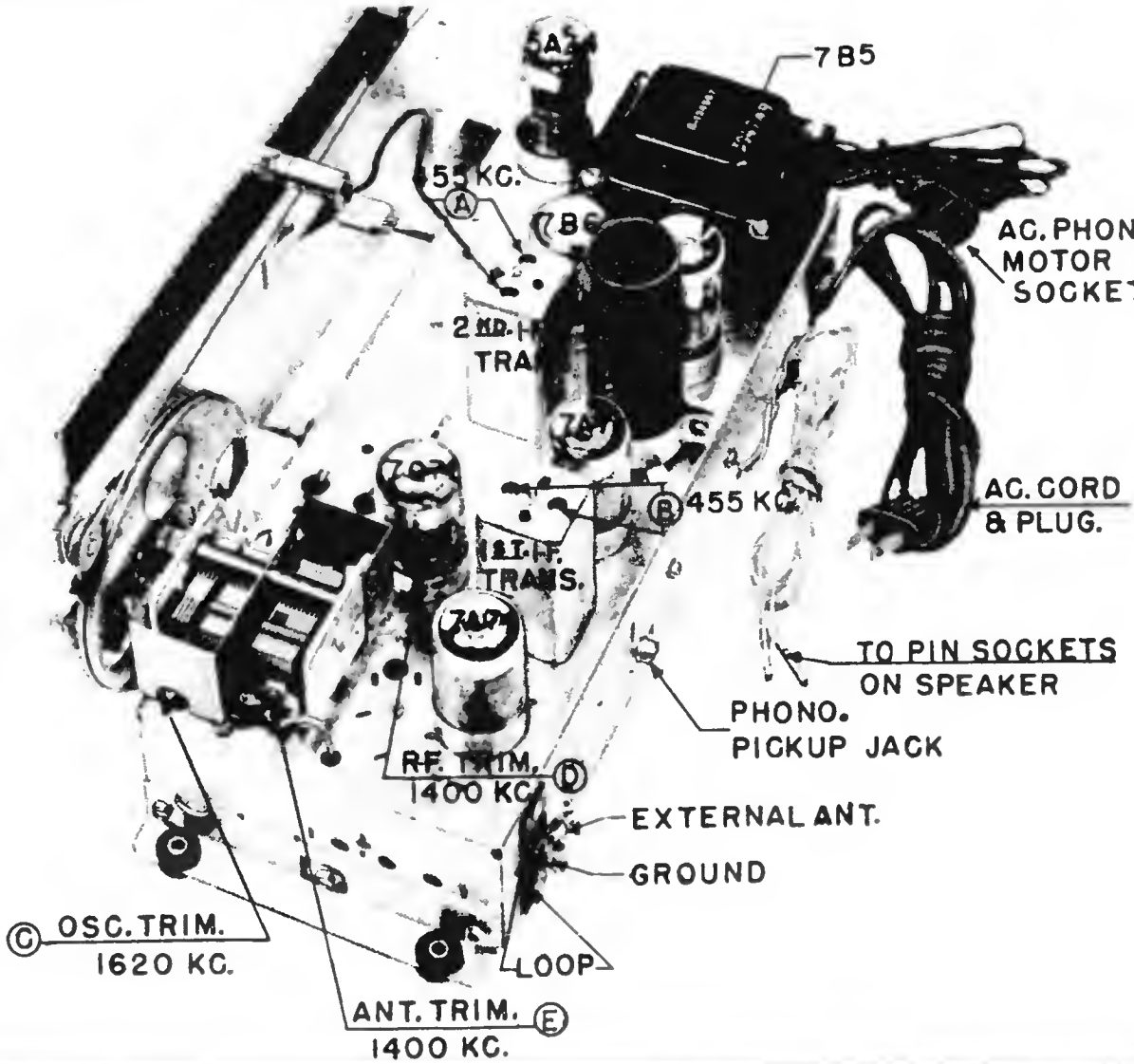


RECTIFIER



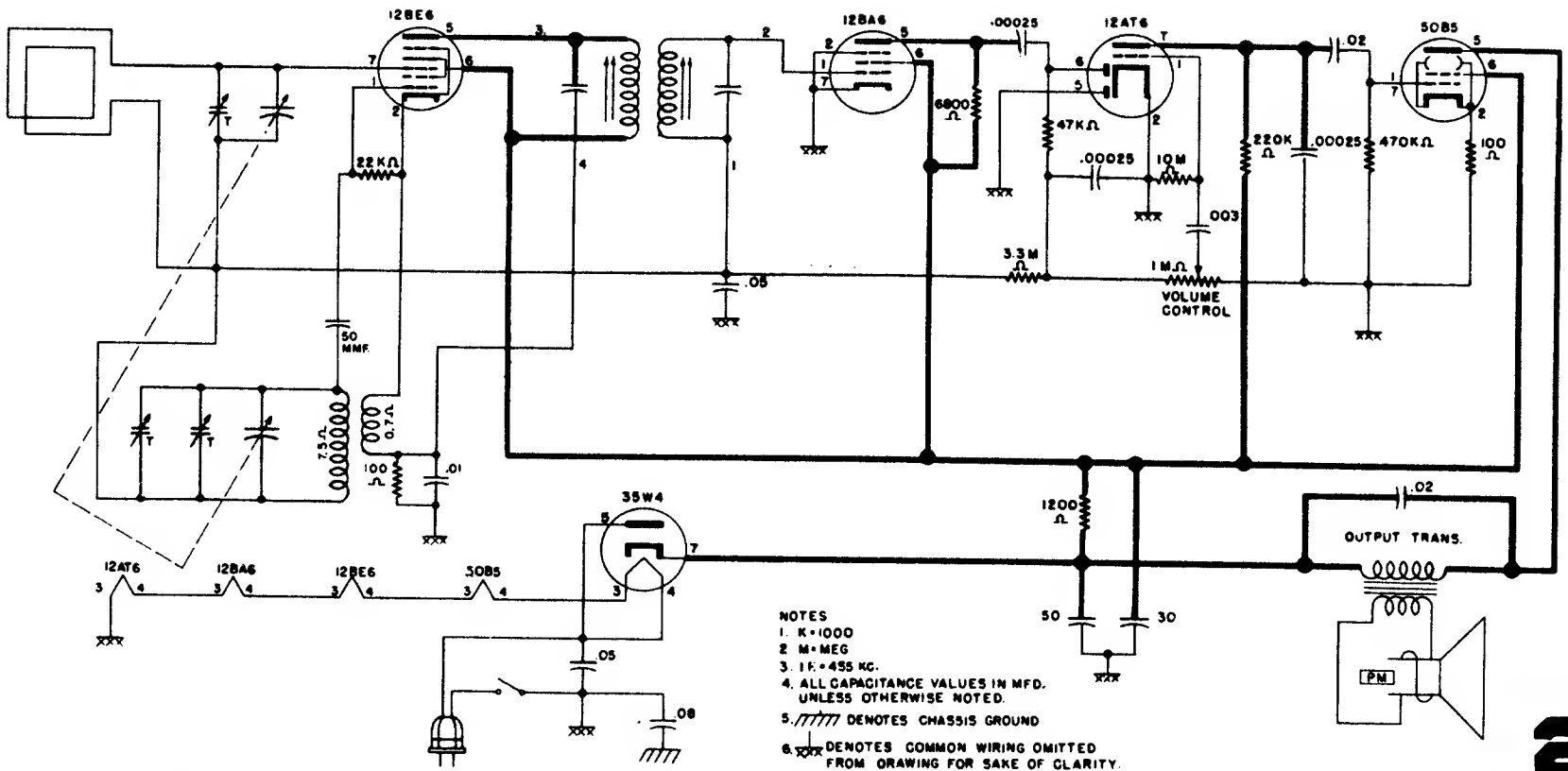
NOTES:

1. BOTTOM VIEW OF SOCKETS.
2. MEASURE VOLTAGES FROM SOCKET LUG TO -B (CHASSIS).
3. VOLTAGE MEASURED WITH AN ELECTRONIC VOLTMETER.
4. W. J. = WIRING JUNCTION.
5. N.C. = NO CONNECTION.
6. * = A.C. VOLTAGE
7. LINE VOLTAGE 117 V., 60 ~ AC
8. SOCKET VOLTAGE TOLERANCE 10%.



CROSLEY

MODELS 9-209, 9-212M


12BE6
12BA6
12AT6
50B5
35W4
22KΩ
6800Ω
47KΩ
.00025
10M
.003
3.3M
1MΩ
VOLUME CONTROL
220K
.02
470KΩ
100Ω
50 MMF.
7.5Ω
0.7Ω
100Ω
.01
.05
1200Ω
50
30
OUTPUT TRANS.
PM
.08
NOTES
1. K=1000
2. M=MEG
3. I.F.=455 KC.
4. ALL CAPACITANCE VALUES IN MFD. UNLESS OTHERWISE NOTED.
5. DENOTES CHASSIS GROUND
6. DENOTES COMMON WIRING OMITTED FROM DRAWING FOR SAKE OF CLARITY.

ALIGNMENT PROCEDURE

1. Connect an output meter across the speaker voice coil.

2. The r.f. signal input from the signal generator should be connected to the high side of loop antenna. Connect the signal generator ground through a 0.1 mfd. condenser to B— (pin 2 on 12BA6 tube socket).

3. Turn the volume control on full and adjust the signal generator output to produce approximately midscale deflection of the output meter, but maintain signal generator output as low as possible to prevent AVC action in the receiver.

Alignment Sequence	Signal Generator Output			Position of Dial Pointer	Adjust for Maximum Output
	Frequency in kc.	In Series with	To		
1	455	200 mmf.	High Side of Loop	1620	A
2	1620	*Radiated to Loop		1620	B
3	1400	*Radiated to Loop		1400	C

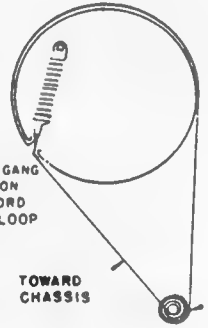
* Place signal generator output lead near the loop antenna.

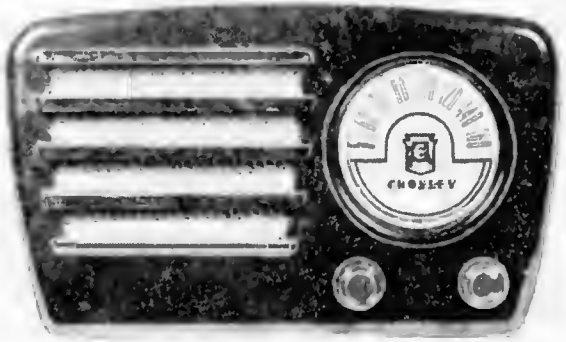
MANUAL OF 1949 MOST-OFTEN-NEEDED RADIO DIAGRAMS

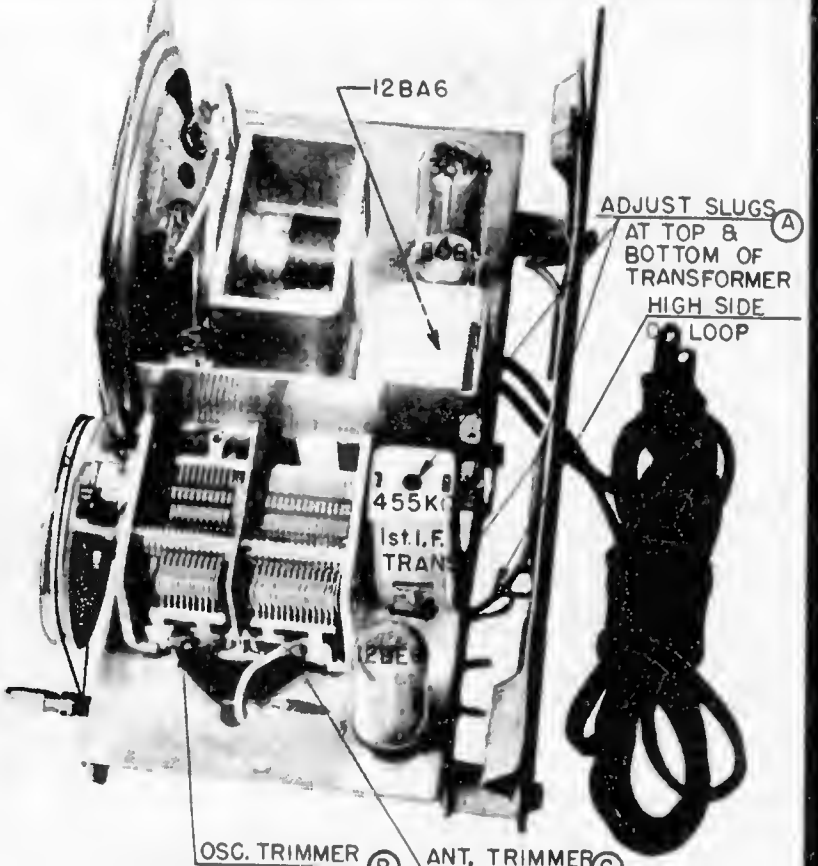
CROSLEY

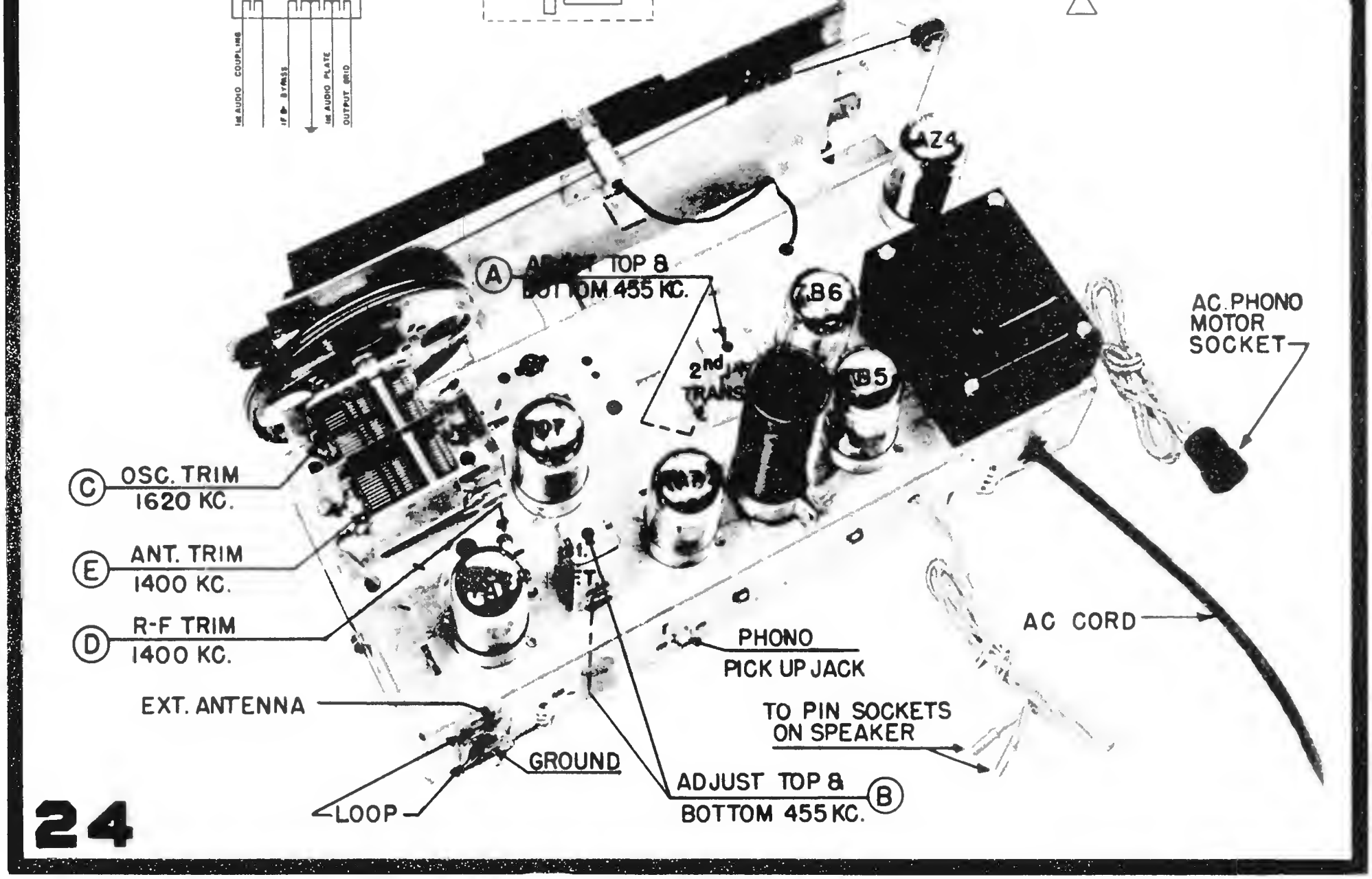
MODELS 9-119, 9-120W

9-119








1st AUDIO COUPLING
IF BYPASS
1st AUDIO PLATE
OUTPUT GRID
AZ4
6B6
6B5
2nd TRANS
A ADJUST TOP & BOTTOM 455 KC.
C OSC. TRIM 1620 KC.
E ANT. TRIM 1400 KC.
D R-F TRIM 1400 KC.
EXT. ANTENNA
GROUND
LOOP
ADJUST TOP & BOTTOM 455 KC. B
PHONO PICK UP JACK
TO PIN SOCKETS ON SPEAKER
AC PHONO MOTOR SOCKET
AC CORD

CROSLEY

MODELS 9-209L, 9-212ML, 9-213B

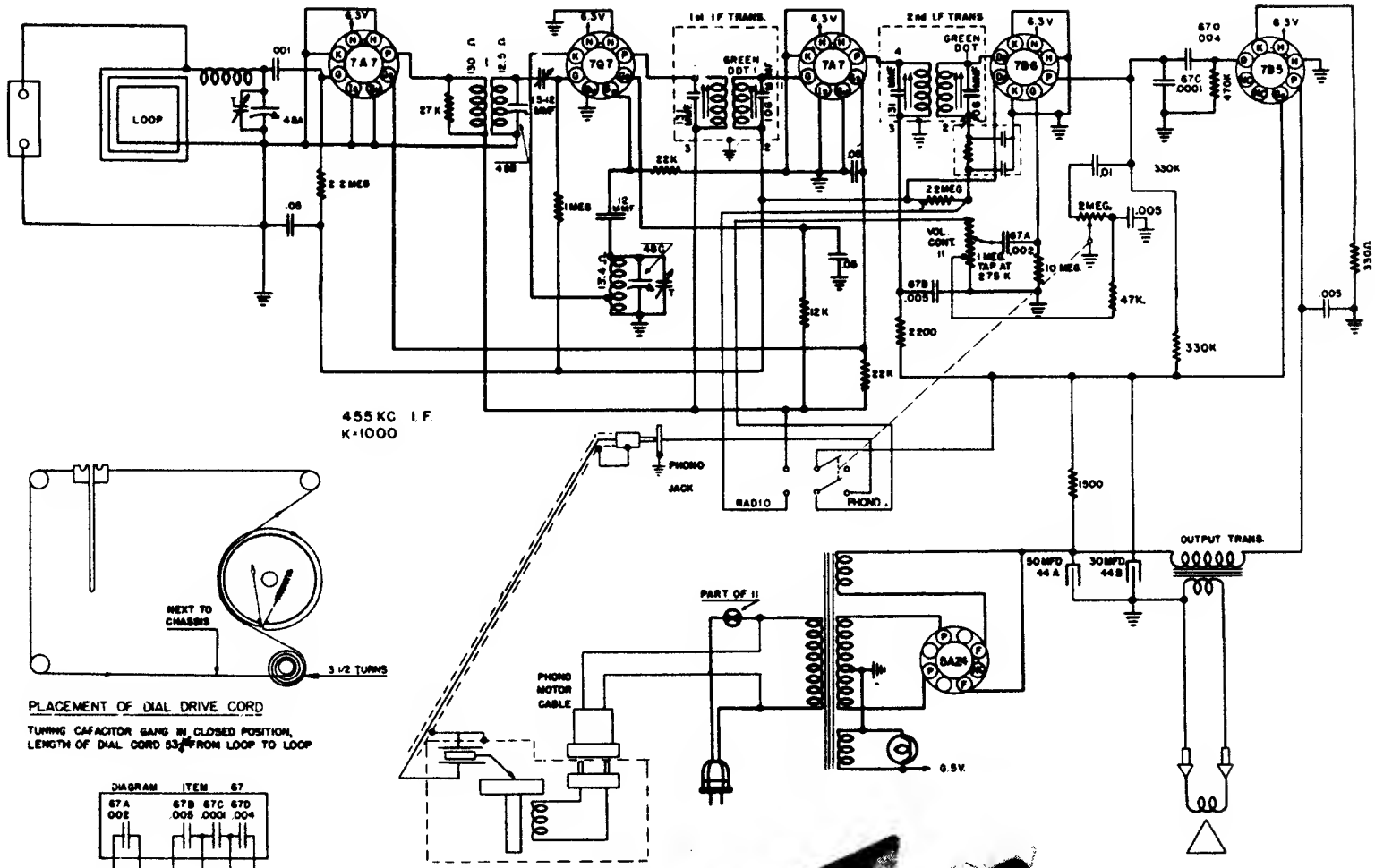
TYPE: Six-tube, single band, superheterodyne.

FREQUENCY RANGE: 540 to 1600 kc.

INTERMEDIATE FREQUENCY: 455 kc.

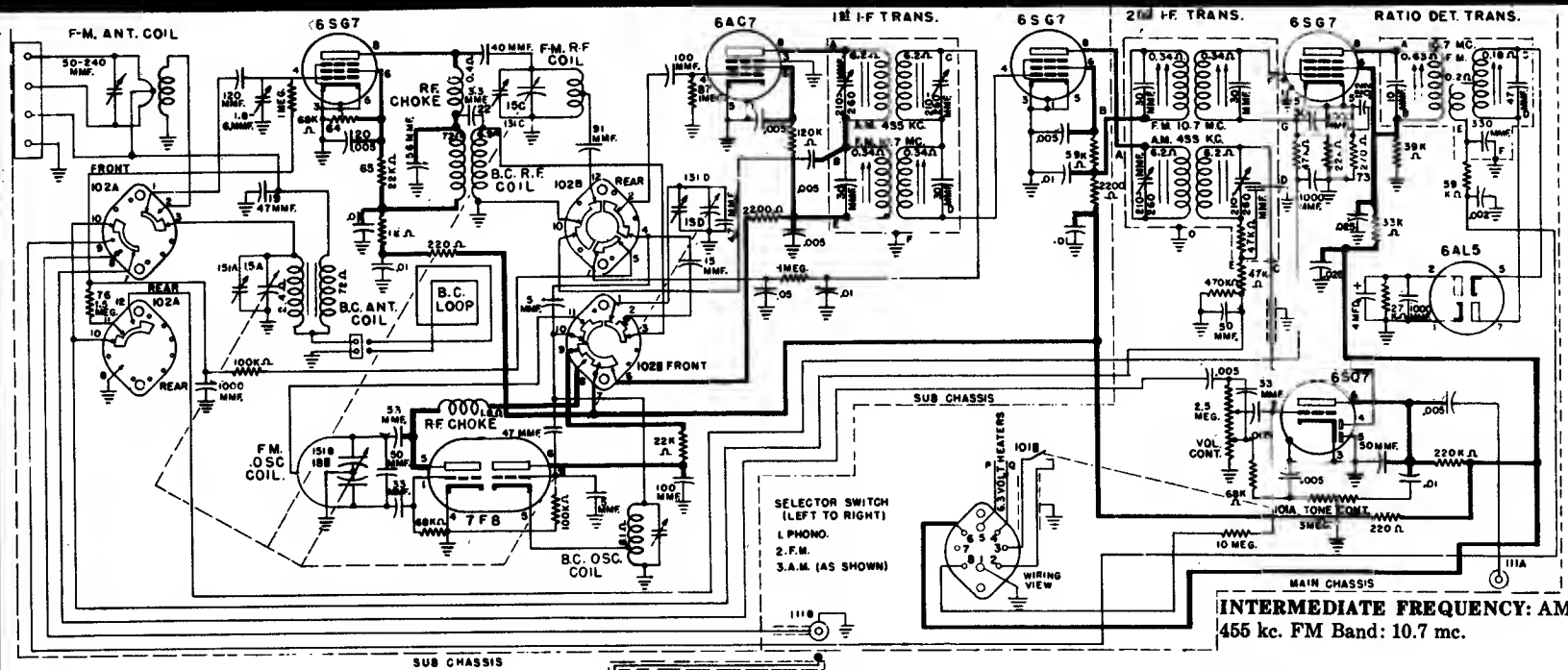
POWER SUPPLY: 60 cycle a. c. only

VOLTAGE RATING: 105-125 volts.

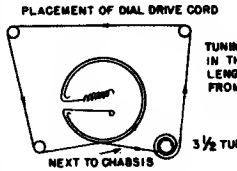


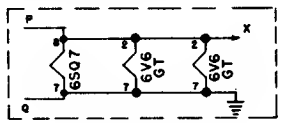
CROSLEY

MODELS 9-214M, 9-214ML



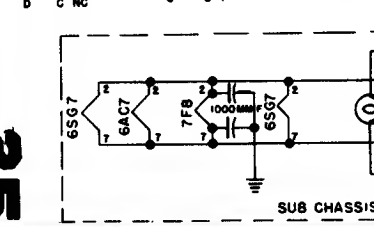
INTERMEDIATE FREQUENCY: AM Band: 455 kc. FM Band: 10.7 mc.

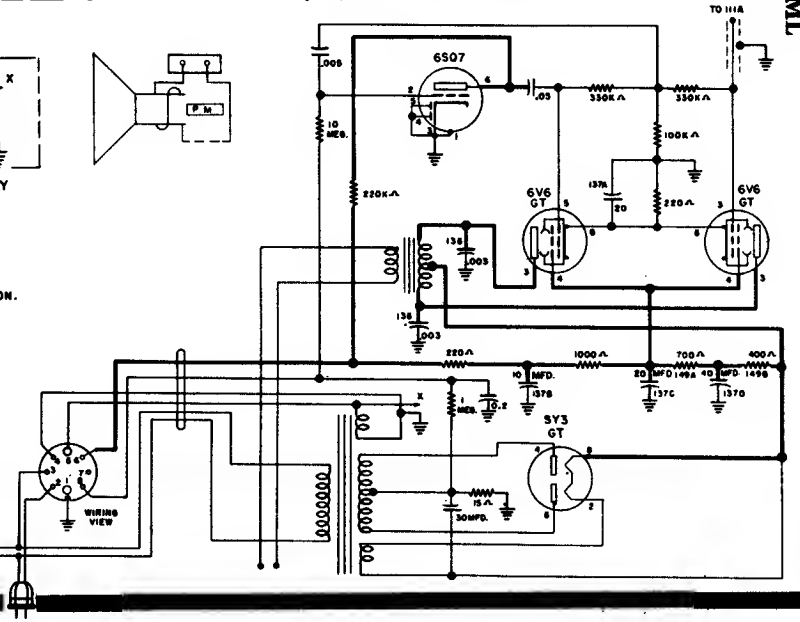




AUDIO & POWER SUPPLY CHASSIS 9-214M

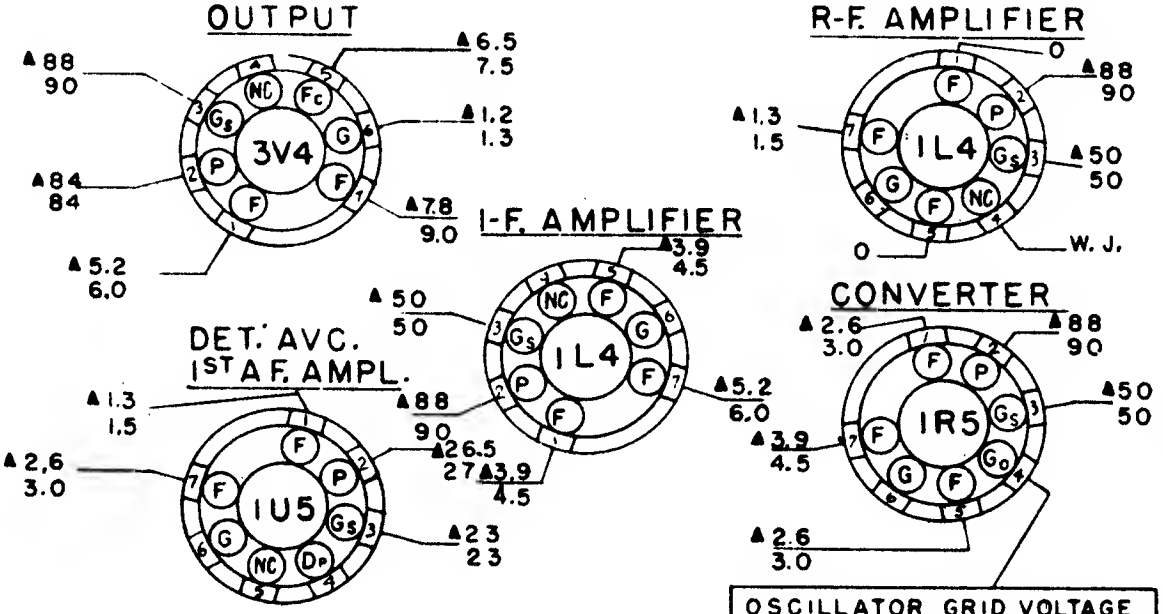
NOTES:
1. K=1000
2. ALL CAPACITORS IN MFD. UNLESS OTHERWISE NOTED.
3. W. J. DENOTES WIRING JUNCTION.





PLACEMENT OF DIAL DRIVE CORD
TUNING CONDENSER GANG IN THE CLOSED POSITION.
LENGTH OF DIAL CORD 29 1/4" FROM LOOP TO LOOP.

CHASSIS, TOP VIEW

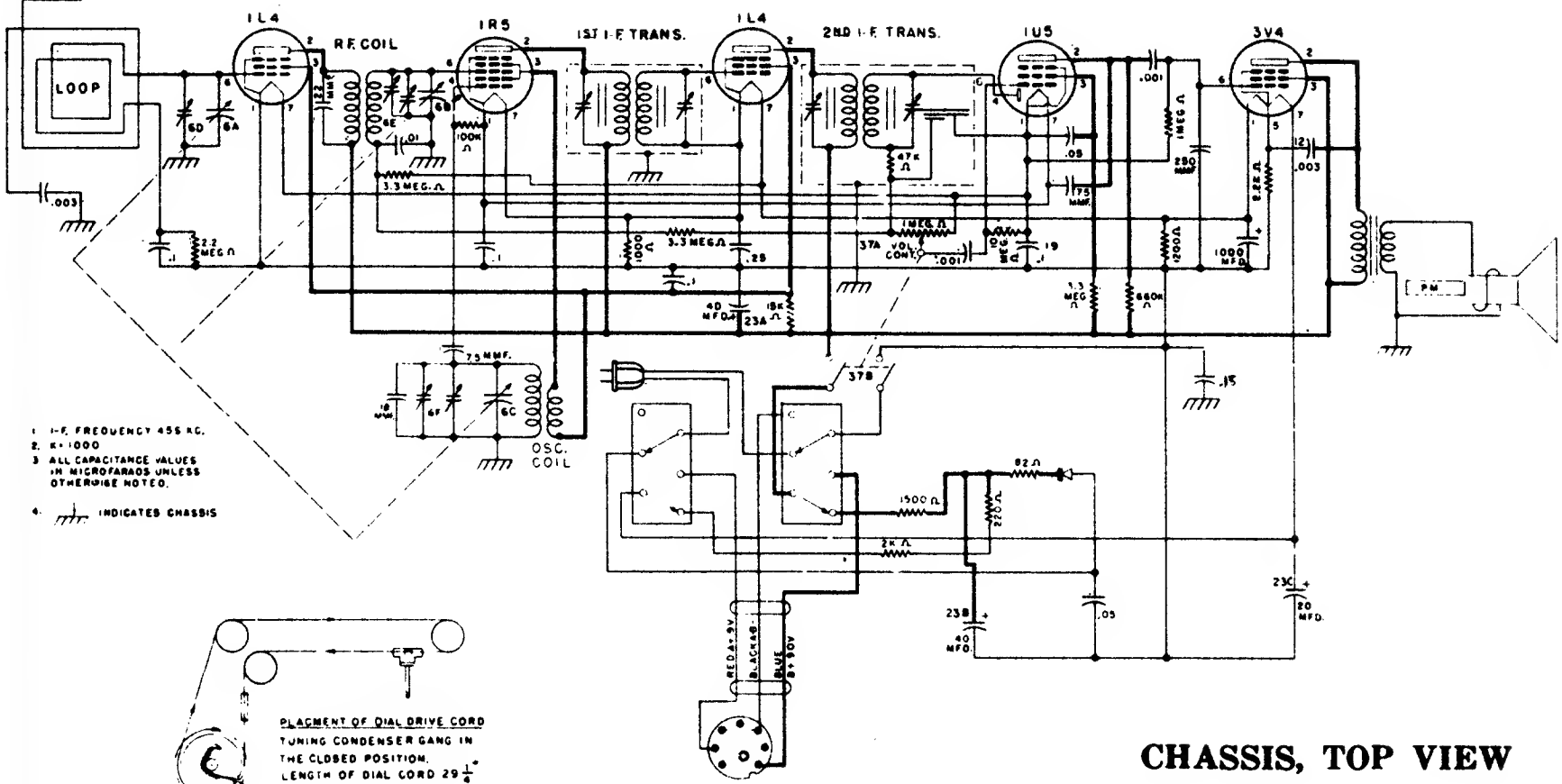


SOCKET VOLTAGE CHART

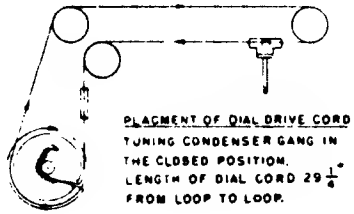
OSCILLATOR GRID VOLTAGE		
POSITION OF GANG	117 VOLT OPERATION	BATTERY OPERATION
CLOSED	▲ − 4	−3.8
OPEN	▲ − 8.6	− 8.2

NOTES:

1. BOTTOM VIEW OF TUBE SOCKETS
2. VOLTAGES MEASURED WITH AN ELECTRONIC VOLTMETER FROM SOCKET LUG TO B−.
3. W. J.= WIRING JUNCTION.
4. N.C.= NO CONNECTION.
5. ▲ = VOLTAGES MEASURED WITH RADIO PLUGED INTO 117 VOLT, 60 CYCLE LINE.
6. * = 60 CYCLE VOLTAGE.
7. ALL OTHER VOLTAGES MEASURED IN BATTERY OPERATION POSITION WITH "A"= 9 VOLTS, "B"= 90 VOLTS.
8. SOCKET VOLTAGE TOLERANCE 10%.



1. I-F. FREQUENCY 455 KC.
2. K = 1000
3. ALL CAPACITANCE VALUES IN MICROFARADS UNLESS OTHERWISE NOTED.
4. ⏚ INDICATES CHASSIS



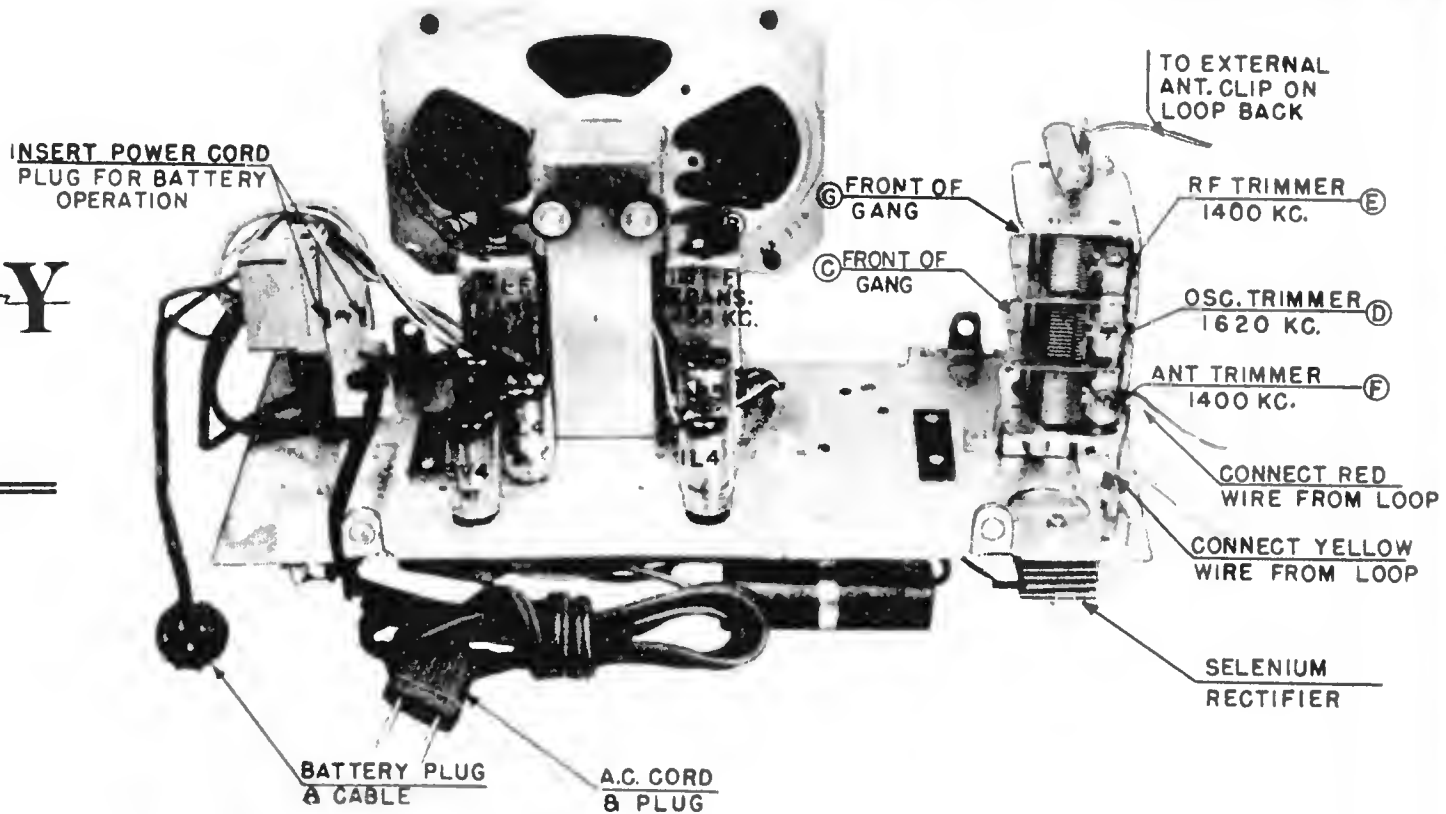
PLACEMENT OF DIAL DRIVE CORD
TUNING CONDENSER GANG IN THE CLOSED POSITION.
LENGTH OF DIAL CORD 29 1/4" FROM LOOP TO LOOP.

CHASSIS, TOP VIEW

MANUAL OF **1949** MOST-OFTEN-NEEDED RADIO DIAGRAMS

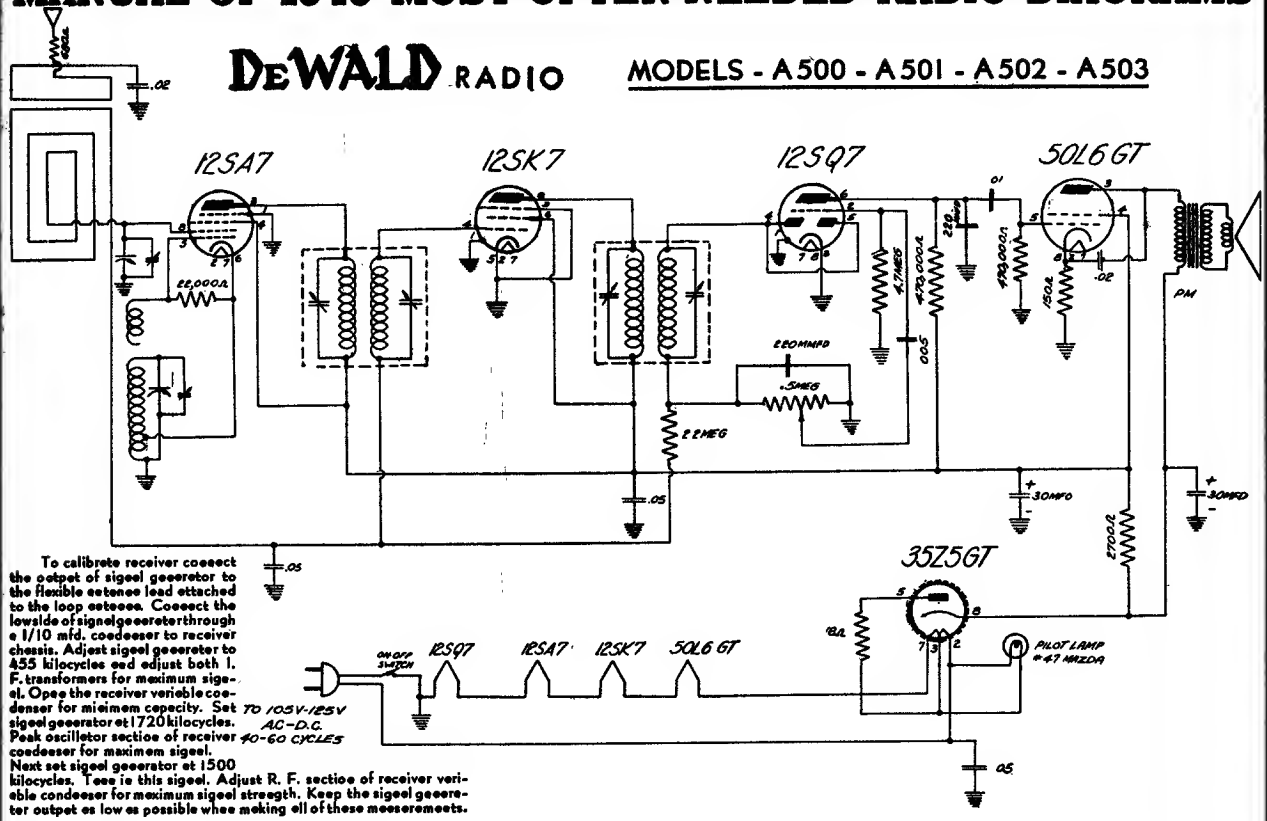
CROSLEY

MODEL: 9-302



DeWALD RADIO

MODELS - A500 - A501 - A502 - A503



To calibrate receiver connect the output of signal generator to the flexible antenna lead attached to the loop antenna. Connect the low side of signal generator through a 1/10 mfd. condenser to receiver chassis. Adjust signal generator to 455 kilocycles and adjust both I. F. transformers for maximum signal. Open the receiver variable condenser for minimum capacity. Set signal generator at 1720 kilocycles. Peak oscillator section of receiver condenser for maximum signal. Next set signal generator at 1500 kilocycles. Tune in this signal. Adjust R. F. section of receiver variable condenser for maximum signal strength. Keep the signal generator output as low as possible when making all of these measurements.

ANTENNA:

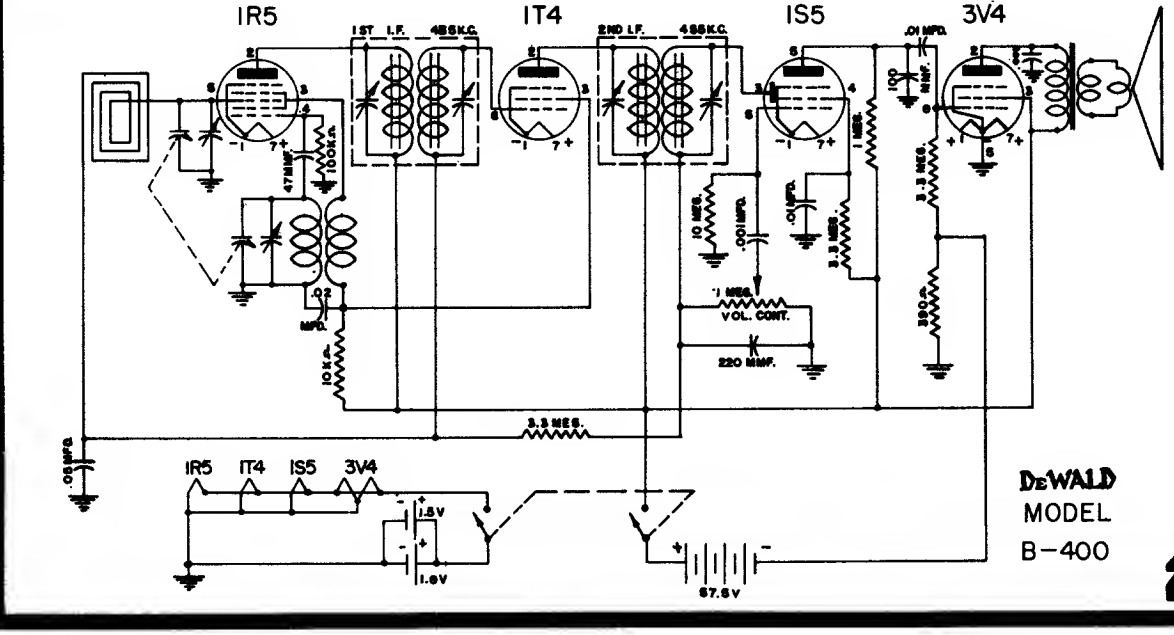
The receiver operates satisfactorily without an antenna. If additional pick-up is desired, an antenna may be connected to the lead, extending from the rear of the chassis.

VOLUME CONTROL:

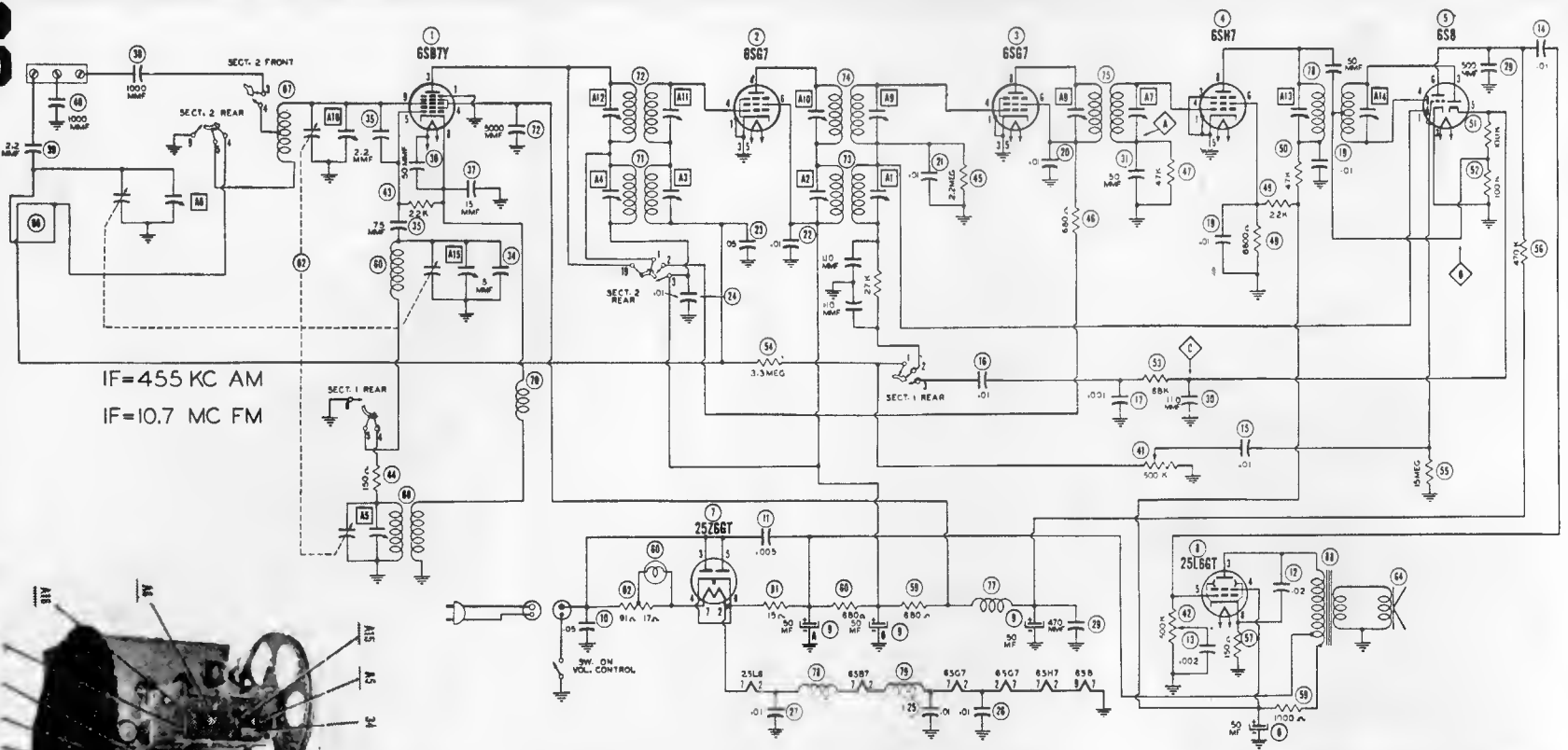
The left knob of the receiver is used as the power switch and volume control. Rotation of this knob in a clockwise direction turns the receiver "on". Further rotation in this direction increases the volume.

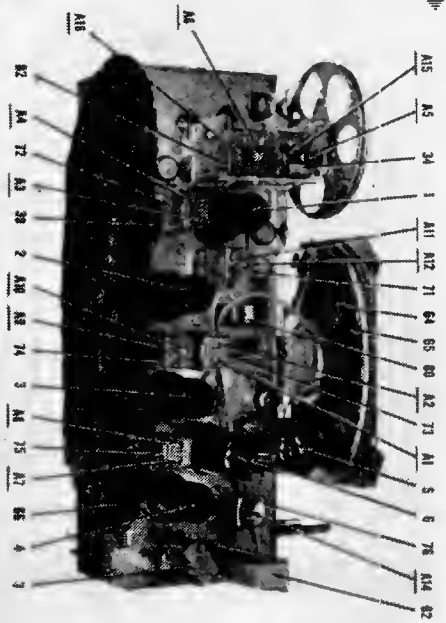
STATION SELECTOR:

The right hand knob operates the tuning in of stations and pointer. Ease and accuracy in tuning is provided because of a reduction drive.



DeWALD
MODEL
B-400





Emerson Radio

MODEL: 557 - 565

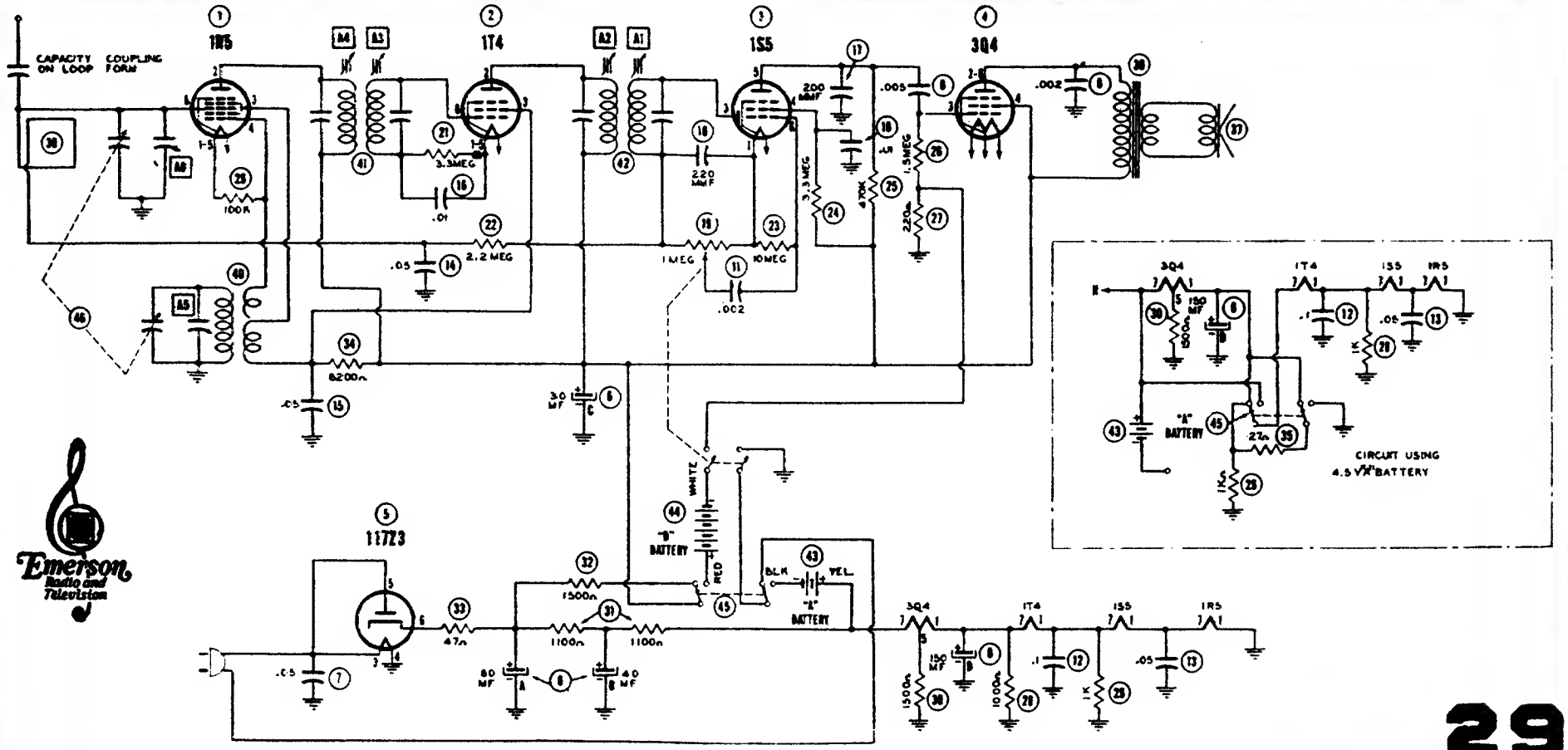
CHASSIS MODEL: 120048B

RESISTANCE READINGS

SYMBOL	TUBE	PIN 1	PIN 2	PIN 3	PIN 4	PIN 5	PIN 6	PIN 7	PIN 8
1	6SB7Y	0 ohm	22 ohm	30K ohm	31K ohm	22K ohm	.6 ohm	34 ohm	3.8 meg.
2	6SG7	0 ohm	17 ohm	0 ohm	3.8 meg.	0 ohm	30K ohm	21 ohm	30K ohm
†3	6SG7	0 ohm	17 ohm	0 ohm	2.2 meg.	0 ohm	30K ohm	9 ohm	30K ohm
†4	6SH7	0 ohm	3 ohm	0 ohm	47K ohm	0 ohm	7K ohm	9 ohm	77K ohm
5A	6S8GT	520K ohm	0 ohm	100K ohm	100K ohm	200K ohm	500K ohm	0 ohm	3 ohm
†5B	6S8GT	Inf.	0 ohm	100K ohm	100K ohm	200K ohm	500K ohm	0 ohm	3 ohm
6	25L6GT	31K ohm	35 ohm	30K ohm	31K ohm	420K ohm	30K ohm	46 ohm	150 ohm
7	25Z6GT	30K ohm	46 ohm	175 ohm	30K ohm	175 ohm	30K ohm	65 ohm	30K ohm

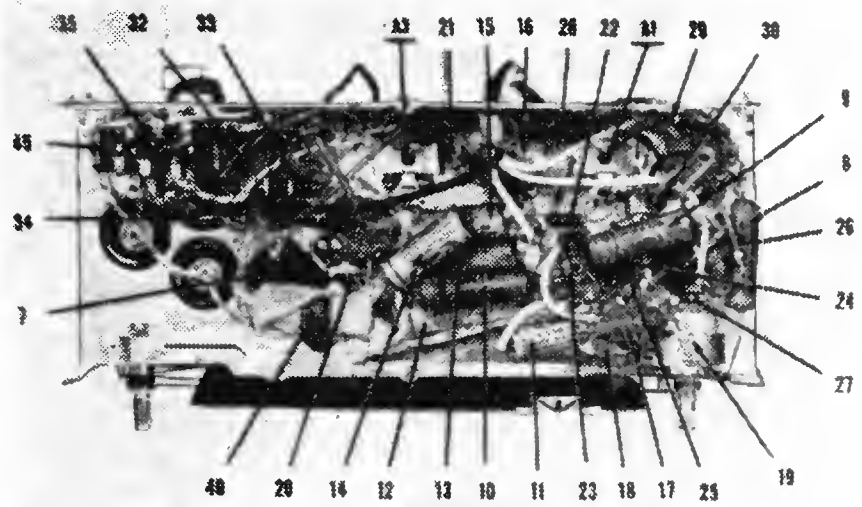
† Taken in FM Position.

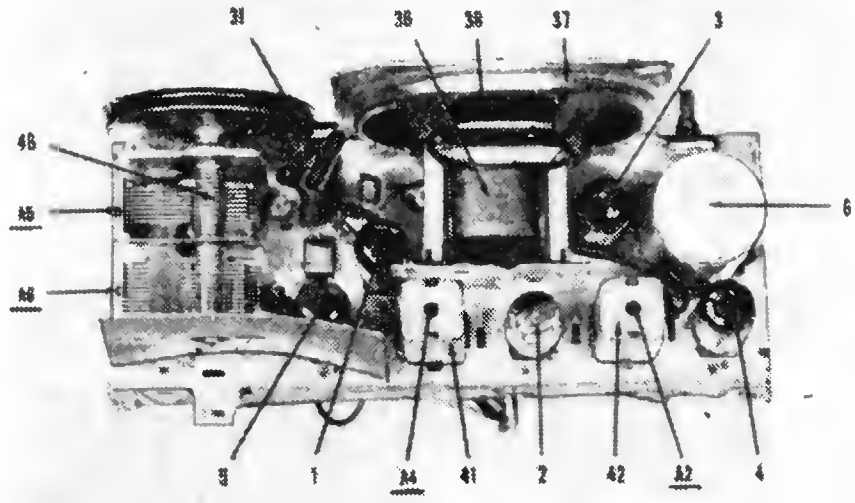
Socket connections are shown as bottom views.
Measured values are from socket pin to common negative.



Emerson Radio and Television

Oscillator Grid Voltages Are Measured By Vacuum-Tube Voltmeter.





MANUAL OF 1949 MOST-OFTEN-NEEDED RADIO DIAGRAMS

EMERSON RADIO & PHONOGRAPH CORP.

MODEL: 559

CHASSIS MODEL: 120059

	DUMMY ANTENNA	SIGNAL GENERATOR COUPLING	SIGNAL GENERATOR FREQUENCY	RADIO DIAL SETTING	OUTPUT METER	ADJUST	REMARKS
1	0.1 mfd.	High side to rear stator of variable condenser. Low side to chassis.	455 kc	Variable condenser fully open.	Across voice coil.	A1, A2 A3, A4	Adjust for maximum output. If a-c power is used without an isolation transformer, reduce dummy antenna to 200 mmfd. to reduce hum modulation.
2		Loop	1620 kc	Variable condenser fully open.	Across voice coil.	A5	Fashion loop of several turns of wire and radiate signal into loop of receiver. Adjust for maximum output.
3		Loop	1400 kc	Tune for maximum	Across voice coil.	A6	Adjust for maximum output.

1—Voltage and resistance readings taken in a.c.-d.c. position.

2—Voltage readings are in volts and resistance readings in ohms unless otherwise specified.

3—D-C voltage measurements are at 20,000 ohms per volt; a-c voltages measured at 1000 ohms per volt.

4—Socket connections are shown as bottom views.

5—Measured values are from socket pin to common negative.

SYMBOL	TUBE TYPE	PIN 1	PIN 2	PIN 3	PIN 4	PIN 5	PIN 6	PIN 7
1	1R5	0	90DC	62DC	†—14.8DC	0	0	1.4DC
2	1T4	2.7D.C.	90DC	62DC	0	2.7DC	0.1DC	4.2DC
3	1S5	1.4DC	0	0.1DC	16DC	28.5DC	0	2.7DC
4	3Q4	4.2DC	85DC	0	90DC	5.6DC	85DC	7DC
5	117Z3	0	106DC	117AC	0	117AC	117DC	106DC

† Oscillator Grid Voltages Are Measured By Vacuum-Tube Voltmeter.

EMERSON RADIO

MODELS: 570 - 574 - 580

CHASSIS MODEL: 120064

Schematic Symbol	†Part No.	DESCRIPTION
C1, C2	900022	Two-gang variable condenser
*C3	Part of C1	Trimmer
*C4	Part of C2	Trimmer
*C5, C6	Part of T1	Trimmer
*C7, C8	Part of T2	Trimmer
C9	928013	0.0001 mfd. ceramic condenser
C10	920497	0.001 mfd., 200 volt condenser
C11	920496	0.005 mfd., 200 volt condenser
C12	928104	212 mmfd., ceramic condenser
C13	920497	0.001 mfd., 200 volt condenser
C14	928010	0.0001 mfd., ceramic condenser (Alternate part 928013)
C15	920494	0.05 mfd., 200 volt condenser
C16	920120	0.02 mfd., 100 volt condenser
C17	925063	16 mfd., 100 volt electrolytic condenser
C18	920485	0.01 mfd., 100 volt condenser
L1	700019	Loop antenna
L2	708007	Loading coil
R1	340970	100,00 ohms, ½ watt resistor
R2	340470	820 ohms, ½ watt resistor·
R3	390025	1 meg., volume control
R4	351450	10 meg., ½ watt resistor
R5	351330	3.3 meg., ½ watt resistor
R6	351130	470,000 ohms, ½ watt resistor
R7	351250	1.5 meg., ½ watt resistor
R8	340730	10,000 ohms, ½ watt resistor
R9	351330	3.3 meg., ½ watt resistor

I-f Alignment

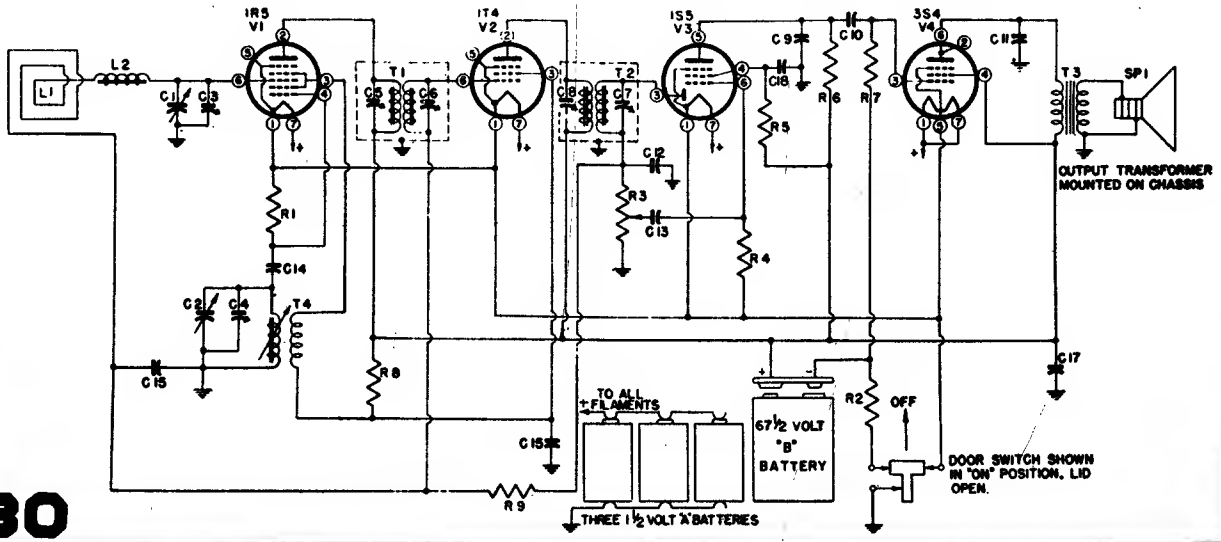
1. Rotate the variable condenser to the minimum capacity position.
2. Feed 455 kc to the grid (pin 6) of the 1R5 tube through a 0.01 mfd. condenser.
3. Adjust the four i-f trimmer screws for maximum response. (Clip the test signal lead to the stator of the larger capacity section of the variable condenser.)

R-f Alignment

1. Connect the test oscillator to a coil composed of three or four turns of wire wound in a circle approximately 12 inches in diameter. This coil should be placed parallel to and in line with the receiver loop at a distance of approximately 15 to 20 inches.
2. Radiate a signal at 1620 kc, rotete the variable condenser to minimum capacity, and adjust the oscillator trimmer, on the smaller section of the variable condenser, for maximum response.
3. Radiate a signal at 1420 kc, tune in the 1420 kc signal, end adjust the antenna trimmer, on the larger section of the variable condenser, for maximum response.
4. Radiate a signal at 600 kc, set the dial indicator to 60, and adjust the oscillator coil core trimmer while rocking the variable condenser for maximum response.
5. Return to 1620 kc and check alignment. If readjustment is necessary, repeet Steps 2 to 4 nntil no fnrther improvement is noted.

The following voltage raadings ara d-c measurements taken from B— (chassis) to the indicated tube-socket pin. A 1000 ohms-per-volt meter should be used for all readings except those indicated by en asterisk (*), which should be taken with a d-c vacuum-tube voltmeter. Take readings with the volnme control set at minimum and the variable condenser closed. Use fresh batteries.

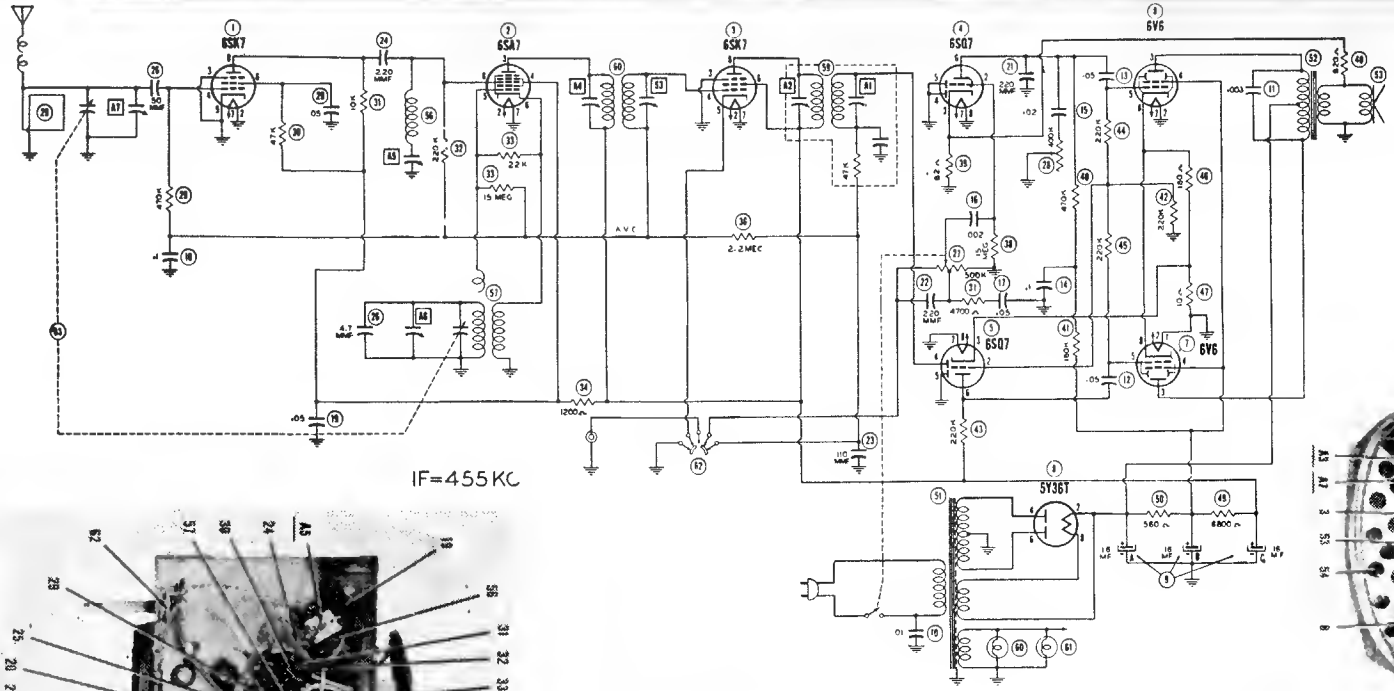
	PIN NUMBER						
TUBE	1	2	3	4	5	6	7
1R5		60	35	*-8		*-0.2	1.5
1T4		60	35			*-0.2	1.5
1S5			*-0.2	*17	*25	*-0.1	1.5
3S4	1.5	59	*-6.5	60		59	1.5

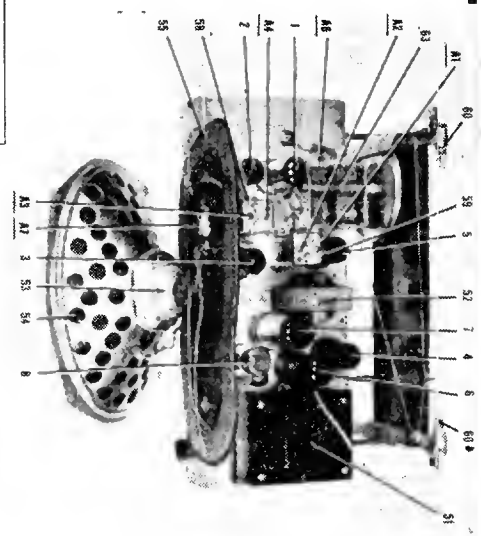


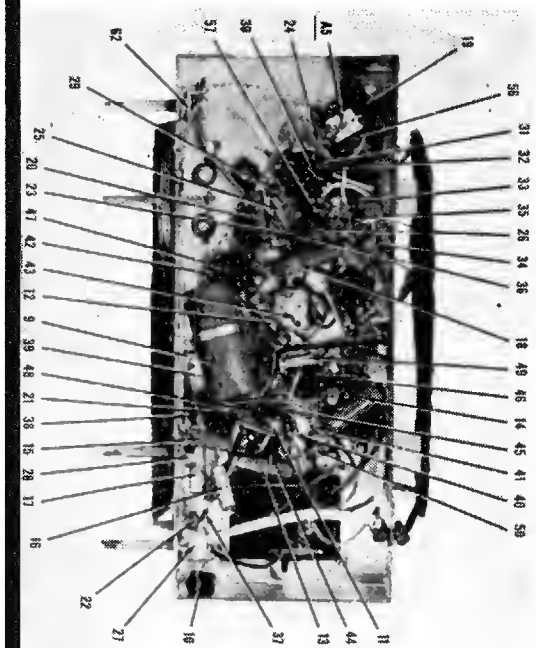
EMERSON RADIO

MODEL: 577

CHASSIS MODEL: 120012B



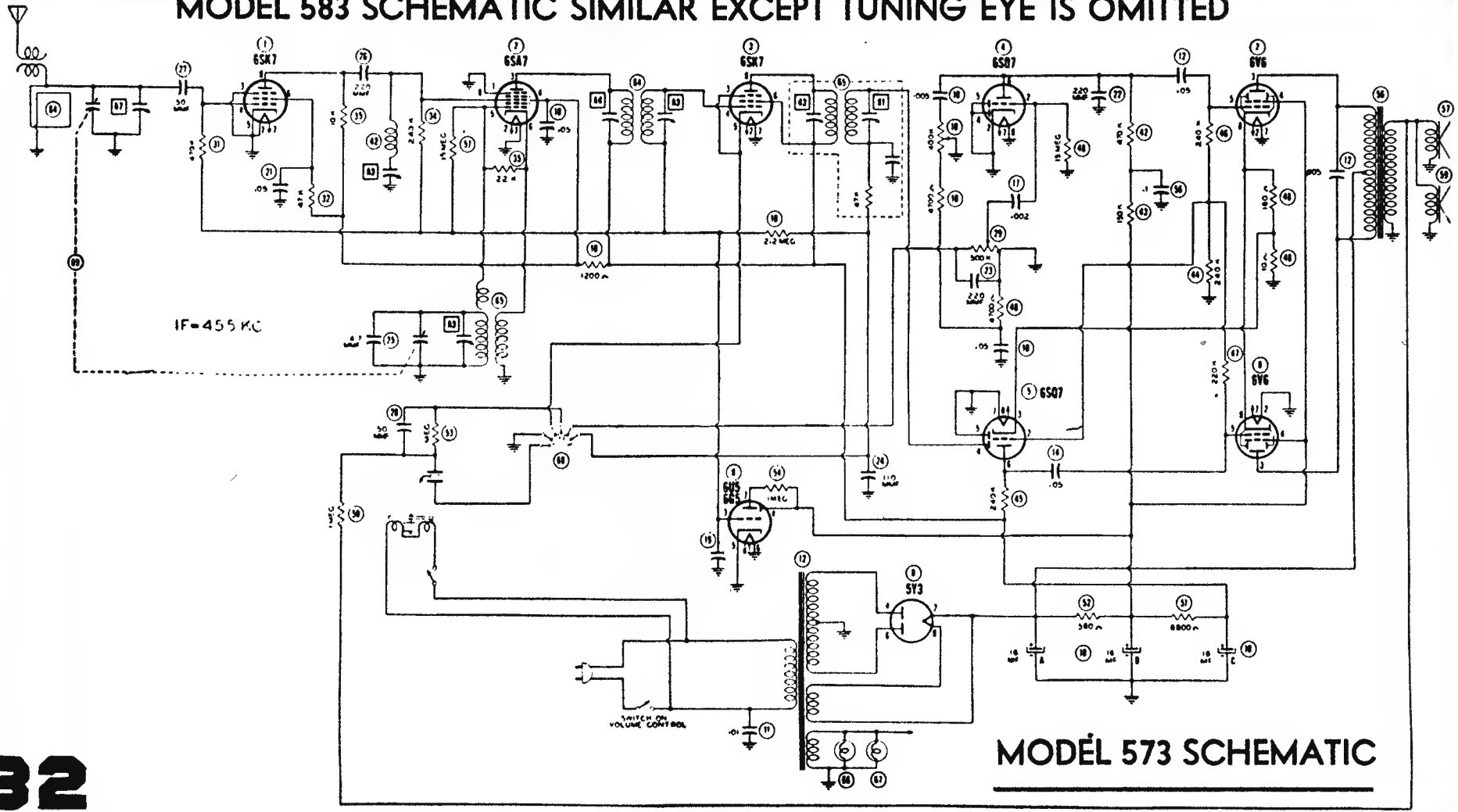




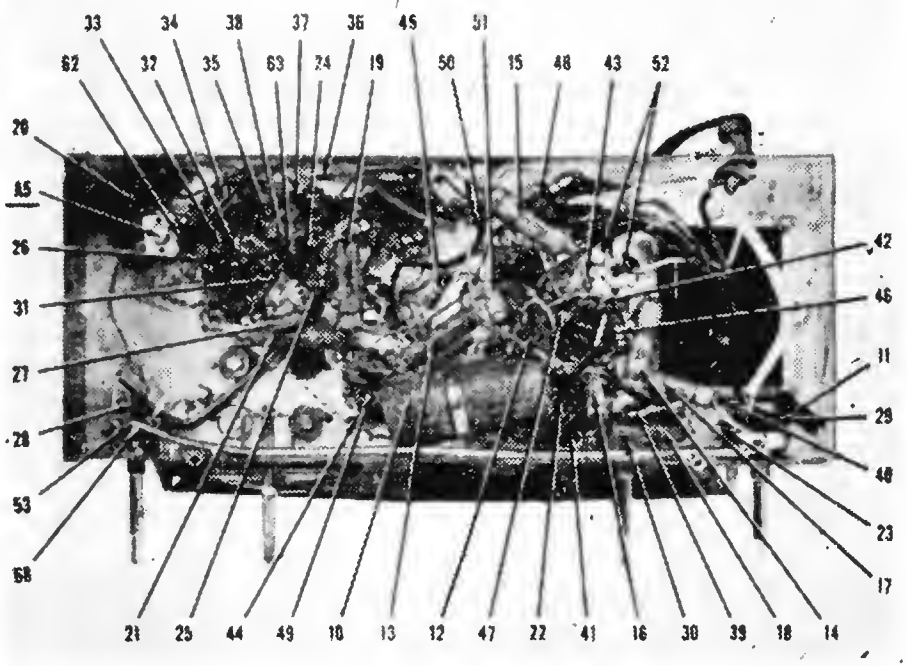
For Alignment set volume control in maximum position; signal generator output just high enough to obtain reading.

	DUMMY ANTENNA	SIGNAL GENERATOR COUPLING	SIGNAL GENERATOR FREQUENCY	RADIO DIAL SETTING	OUTPUT METER	ADJUST	REMARKS
1	.1 mfd.	High side to Pin 8 (grid) of 6SA7. Low side to chassis.	455KC	Tuning cap. fully open.	Across voice coil.	A1, A2, A3, A4	Adjust for maximum output.
2	200 mmf.	High side to ext. ant. lead. Low side to chassis.	"	Tuning cap. fully closed.	"	A5	Adjust for minimum output.
3	200 mmf.	"	1620KC	Tuning cap. fully open.	"	A6	Adjust for maximum output
4	200 mmf.	"	1400KC	Tune for maximum output.	"	A7	" " "
5	200 mmf.	"	600KC	"	"		Adjust outside turn of loop for maximum output.

MODEL 583 SCHEMATIC SIMILAR EXCEPT TUNING EYE IS OMITTED



MODEL 573 SCHEMATIC


33
34
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45
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48
43
52
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A5
26
31
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28
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58
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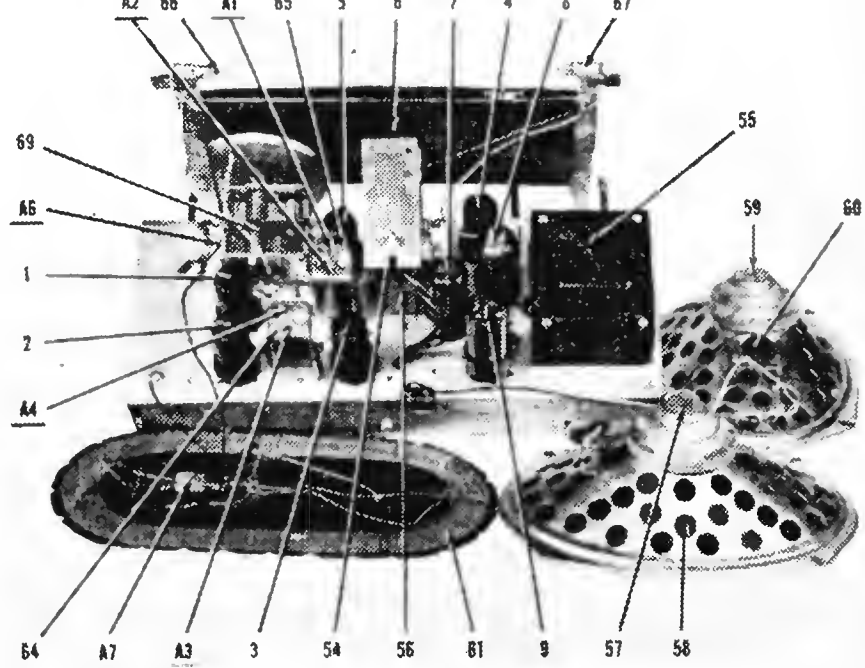

A2
66
A1
65
5
6
7
4
8
67
69
55
A6
59
60
1
2
A4
64
A7
A3
3
54
56
61
9
57
58

MANUAL OF 1949 MOST-OFTEN-NEEDED RADIO DIAGRAMS

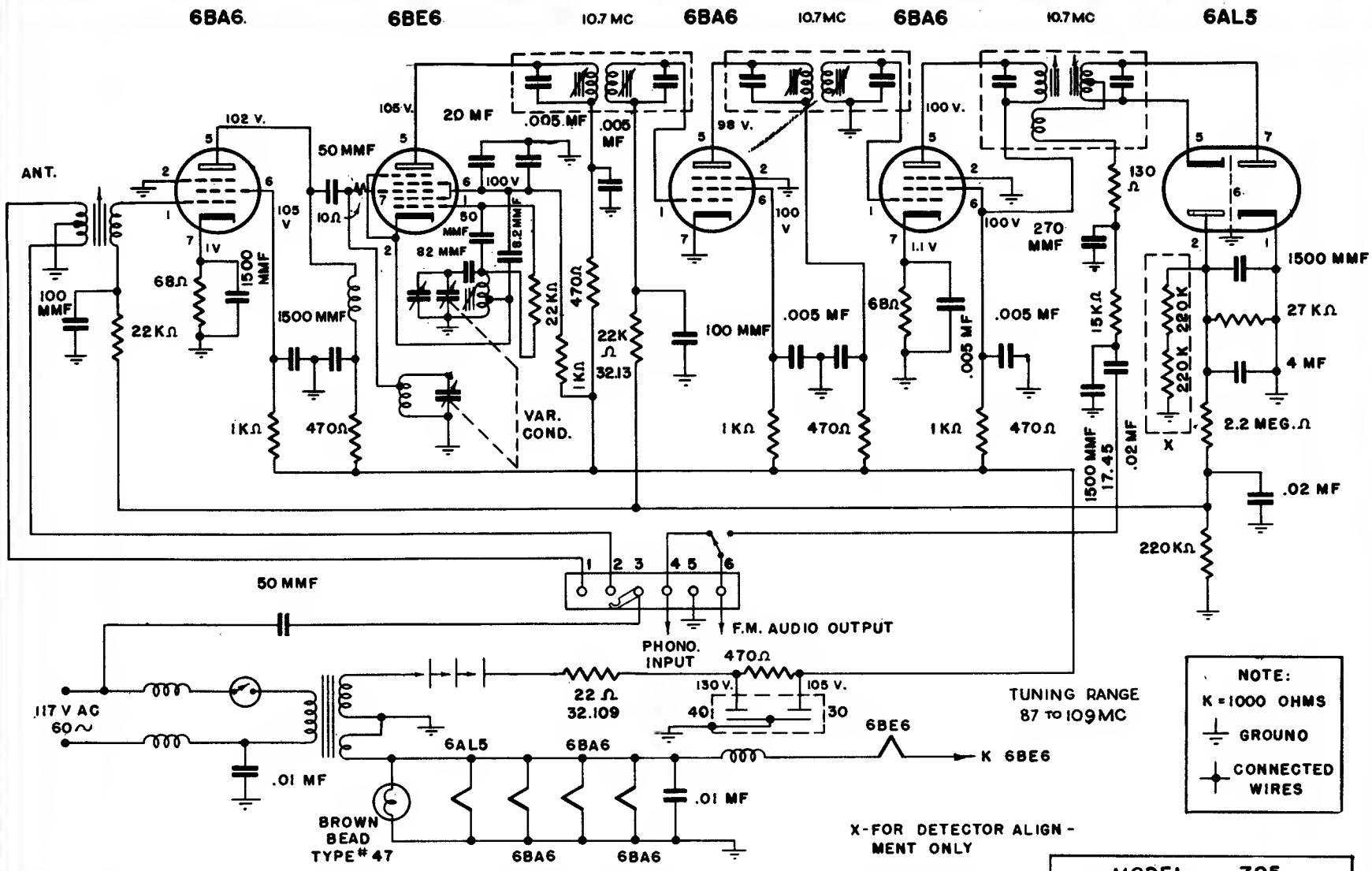
Emerson Radio Models 573, 583, Chassis 120039B, Alignment

To set pointer, turn tuning cap. fully closed and set pointer 2-3/8" from left edge of dial backplate. This is the calibration mark referred to below.

Loop should be maintained in same relative position to chassis as when receiver is in cabinet.

Volume control should be at maximum position; output signal generator should be no higher than necessary to obtain an output reading. Use an insulated alignment schewdriver for adjusting.

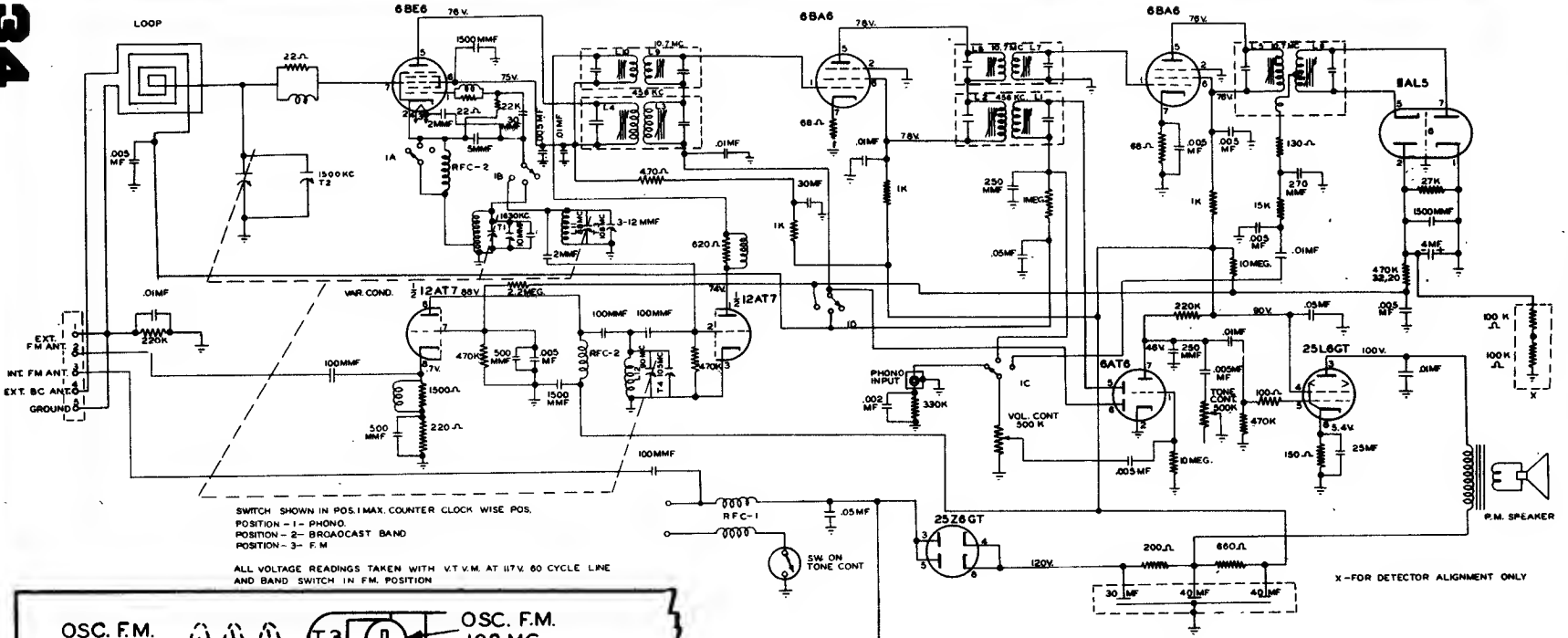
	DUMMY ANTENNA	SIGNAL GENERATOR COUPLING	SIGNAL GENERATOR FREQUENCY	RADIO DIAL SETTING	OUTPUT METER	ADJUST	REMARKS
1	.1 mfd.	High side to pin 8 (grid) of 6SA7. Low side to chassis.	455KC	Tuning cap. fully open.	Across voice coil.	A1, A2, A3, A4	Adjust for maximum output.
2	.1 mfd.	High side to ext. antenna leod. Low side to chassis.	"	Tuning cap. fully closed.	"	A5	Adjust for minimum output.
3	200 mmf.	"	1400KC	5" from calibration mark.	"	A6	Adjust for maximum output.
4	200 mmf.	"	"	Tune for maximum output.	"	A7	Adjust for maximum output.
5	200 mmf.	"	600KC	"	"		Use adjusting turn in rear of loop. Adjust for max. output.

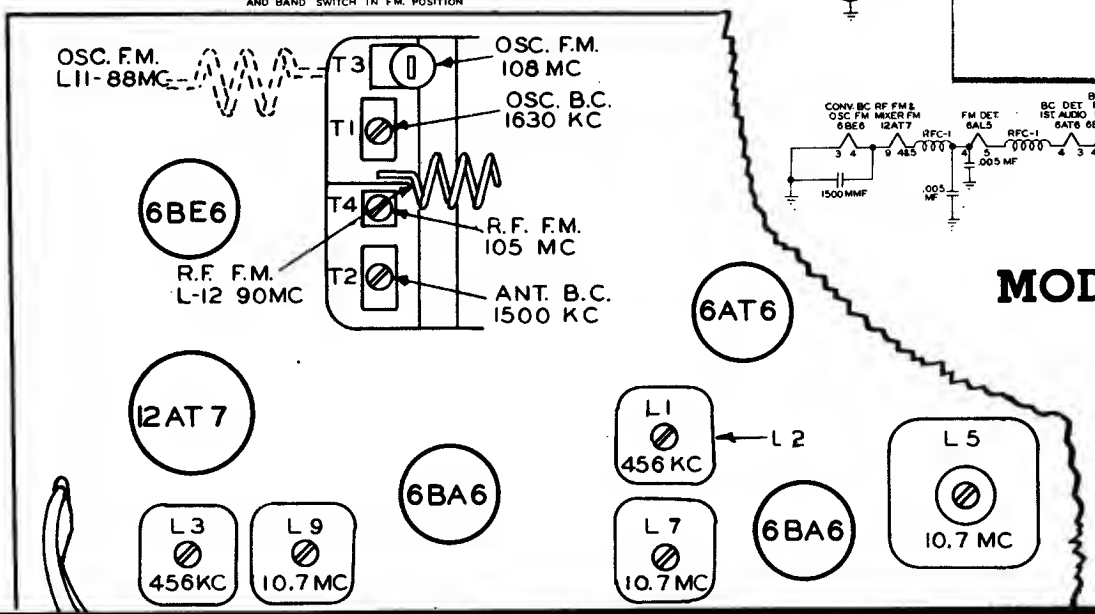


795 SERIES

5 Tube AC Superheterodyne FM Tuner

MODEL 795
SCHEMATIC
FADA RADIO & ELECTRIC CO, INC.
BELLEVILLE, NEW JERSEY U.S.A.





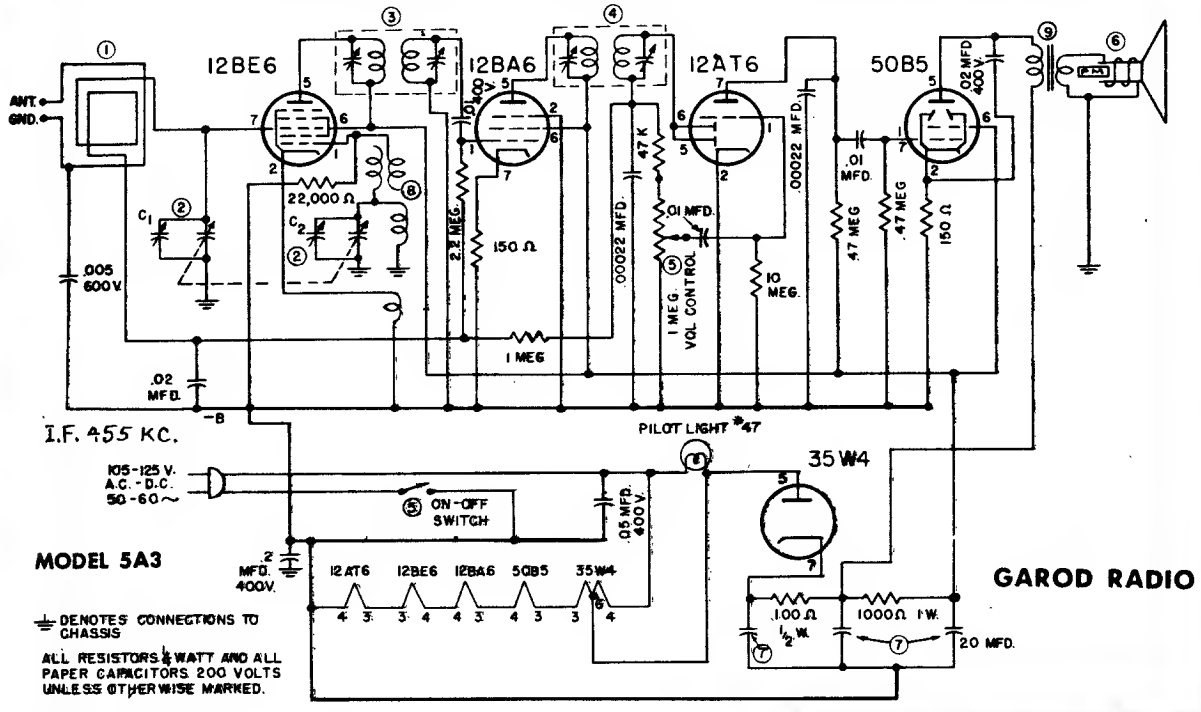
MODEL 790 ... *Series B and following*

FADA RADIO

TUNING RANGE

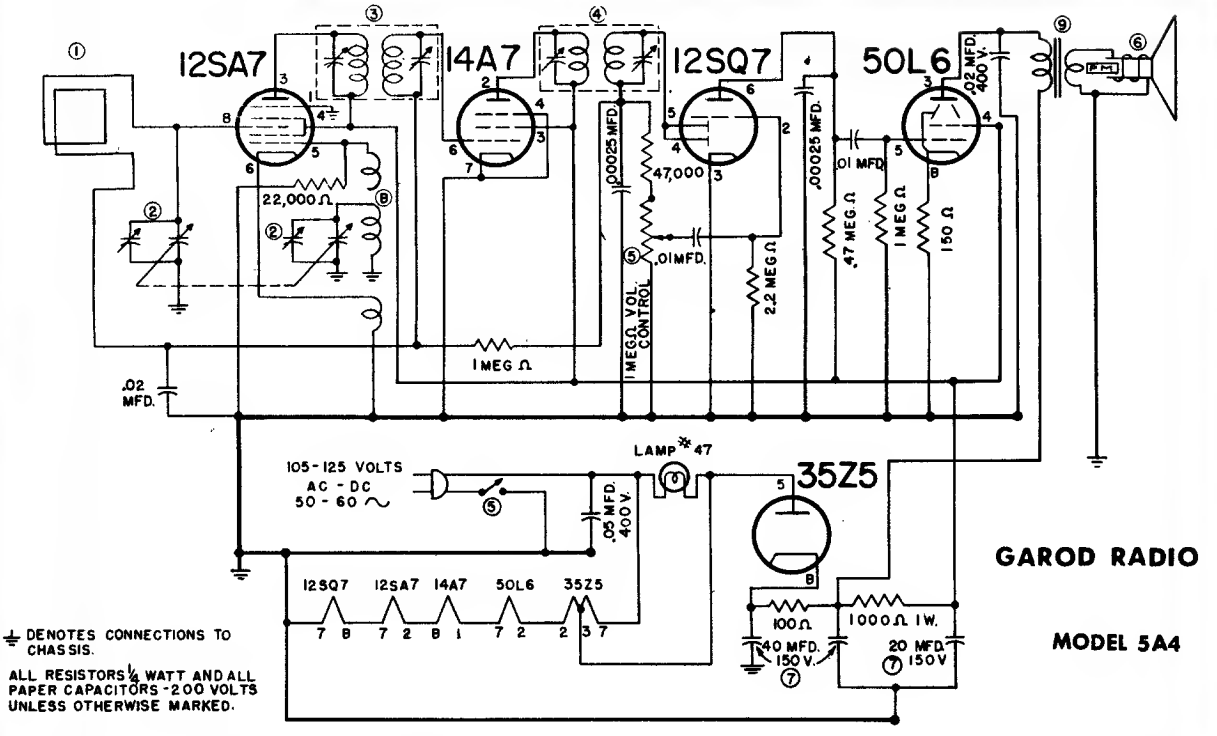
B.C. - 534 KC. - 1630 KC.

F.M. - 87.6 MC. - 108.4 MC.



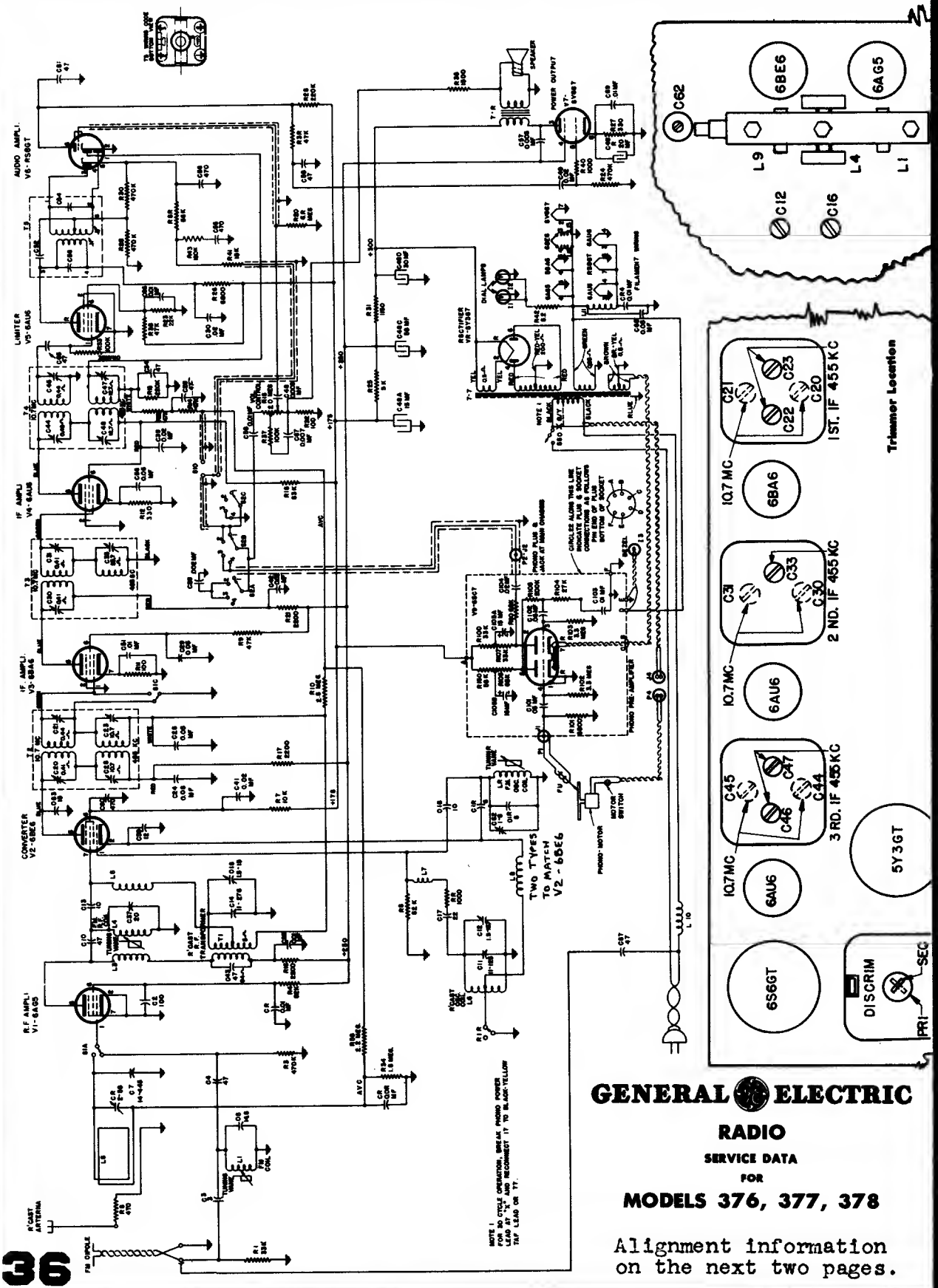
① 1.464 LOOP ANTENNA
② 2.213 2 GANG VARIABLE COND.
③ 1.259 1ST I.F. TRANSFORMER
④ 1.409 2ND I.F. TRANSFORMER
⑨ 9.208 OUTPUT TRANSFORMER
⑤ 8.200-1 VOLUME CONTROL & SWITCH
⑥ 30.300 P.M. SPEAKER
⑦ 5.415-1 ELECTROLYTIC CAP. 40-40-20 MFD.
⑧ 1.402-1 OSCILLATOR COIL

MODEL 5A3



① 1.469 LOOP ASSEMBLY
② 2.163 2GANG VARIABLE COND.
③ 1.259 1ST. I.F. TRANSFORMER
④ 1.409 2ND. I.F. TRANSFORMER
⑤ 8.201-3 VOLUME CONTROL & SWITCH
⑥ 30.318 P.M. 5" SPEAKER
⑦ 5.400-8 ELECTROLYTIC CAP. 40-40-20 MFD.
⑧ 1.402-1 OSCILLATOR COIL
⑨ 9.219 OUTPUT TRANSFORMER

I.F. = 455 K.C.



GENERAL ELECTRIC

RADIO

SERVICE DATA

FOR

MODELS 376, 377, 378

Alignment information on the next two pages.

General-Electric Models 376, 377, 378, Alignment Information

NOTES IN CONNECTION WITH METER ALIGNMENT:

(1) Use unmodulated signal.

(2) Connect 20,000 ohm-per-volt meter from junction of R29 and R41.

(3) Connect 20,000 ohm-per-volt meter from grid pin 1 of (V5) 6AU6 limiter to chassis with a 200,000-ohm resistor in series. The resistor must be connected directly to the grid to minimize capacity loading and to isolate the meter from the i-f voltage. Keep signal generator output down so that meter indicates not more than one volt at the grid (5 microamperes through 200,000 ohms) (Alignment Steps 7 through 13).

(4) Use 400-cycle modulation (Steps 1, 2, 3, 15, 16, 17, and 18).

(5) Connect a standard output-meter across speaker voice coil. Turn volume control full on. Keep signal generator output down so that meter indicates not more than ½ watt output (1.26 volts) during alignment. (Steps 1, 2, 3, 15, 16, 17 and 18.)

(6) Two oscillator settings will give response. The higher frequency response is the correct one; the other is the image response. If in doubt, start with the trimmer screw loosened completely and adjust for the first response.

(7) For alignment of the standard band oscillator and r-f trimmers, the input signal should be inductively coupled to the radio loop antenna by connecting a 4-turn, 6-inch diameter loop of bell wire across the signal generator terminals, and then locate the loop about one foot from the radio loop antenna to prevent possible errors in peak readings. The position of the loop in respect to the radio loop antenna should not be changed during any one set of adjustments. Steps 15, 16, 17 and 18.

(8) The lead from the signal generator must be kept as short as possible and it must be kept away from later stages to prevent regeneration. The signal may also be fed in to the tube pin connection from the top of the chassis to prevent regeneration.

(9) A dummy antenna is a resistor in series with the hot lead of the signal generator. The resistance of the resistor plus the termination impedance of the signal generator should equal 300 ohms.

(10) If a dial scale is not available, index the dial pointer as follows: Turn the pointer to the left-hand limit of travel and mark the dial plate at a reference edge of the pointer slide. Then set the pointer by turning the dial knob until the indicated dimension exists between the reference edge and the mark.

ALIGNMENT CHART

STEP	SIGNAL GENERATOR FREQUENCY	SIGNAL INPUT POINT	BAND SWITCH	DIAL SETTING	ADJUST	SEE NOTE	REMARKS
			AM I-F METER ALIGNMENT				
1	455 kc	Conv. grid directly thru .01 mfd	STD	....	Peak C47 and C46	4, 5	Adjust for max.
2	455 kc	Conv. grid directly thru .01 mfd	STD	....	Peak C33	4, 5	Adjust for max.
3	455 kc	Conv. grid directly thru .01 mfd	STD	....	Peak C23 and C22	4, 5	Adjust for max.
			FM DISCRIMINATOR AND I-F METER ALIGNMENT				
4	10.7 mc	Pin 1 of V5 (6AU6) thru .01 mf	FM	....	Discrim. Secondary for zero meter	1, 2	Apply 1 volt signal input.
5	Detune signal generator	Pin 1 of V5 (6AU6) thru .01 mf	FM	....	*Signal Generator	1, 2	*Detune signal generator to point of maximum meter reading.
6	As in Step 5	Pin 1 of V5 (6AU6) thru .01 mf	FM	....	Peak discr. primary	1, 2	Adjust for max.
7	10.7 mc	Pin 1 of V4 (6AU6) thru .01 mf	FM	....	Peak C45 and C44	1, 3	Adjust for max.
8	10.7 mc	Pin 1 of V3 (6BA6) thru .01 mf	FM	....	C31 and C30	1, 3	Adjust for max.
9	10.7 mc	Pin 7 of V2 (6BE6) thru .01 mf	FM	....	C21 and C20	1, 3, 8	Adjust for max.
			FM R-F METER ALIGNMENT				
10	98 mc	Dipole terminals thru dummy antenna	FM	98 mc or 3 1/8 inches	Peak C62	1, 3, 6, 9, 10	
11	98 mc	Dipole terminals thru dummy antenna	FM	For max. output	Peak L4 vane	1, 3, 9	
12	Repeat steps 10 and 11 until no further improvement in sensitivity.						
13	98 mc	Dipole terminals thru dummy antenna	FM	98 mc	Peak L1 vane	1, 3, 9	
14	Repeat steps 10, 11, and 12.						
			AM R-F METER ALIGNMENT				
15	1500 kc	Inductively coupled	STD	1500 kc or 5 inches	Peak C12	4, 5, 7, 10	
16	1500 kc	Inductively coupled	STD	For max. output	Peak C16	4, 5, 7	
17	Repeat steps 15 and 16 until no further improvement in sensitivity.						
18	1500 kc	Inductively coupled	STD	Do not change from Step 16	Peak C6	4, 5, 7	

General-Electric Models 376, 377, 378, Alignment continued

AM I-F VISUAL ALIGNMENT

1	455 kc ±20 kc at 60-cycle sweep	Conv. grid directly pin 7 V2 (6BE6) thru .01 mf	AM	....	C47 and C46*	4, 5	*Adjust for max. amplitude and min. distortion of curve on scope screen.
2	Same as Step 1	Same as Step 1	AM	....	C33	4, 5	Same as Step 1.
3	Same as Step 1 and 2	Same as Step 1 and 2	AM	....	C23 and C22	4, 5	Same as Steps 1 and 2.

FM I-F VISUAL ALIGNMENT

4	10.7 mc ±.3 mc at 60-cycle sweep	Conv. grid directly pin 7 V2 (6BE6) thru .01 mf	FM	....	C45 and C44	1, 2, 11	Adjust for max. amplitude and min. distortion.
5	Same as Step 4	Same as Step 4	FM	....	C31 and C30	1, 2, 11	Same as Step 4.
6	Same as Steps 4 and 5	Same as Steps 4 and 5	FM	....	C21 and C20	1, 2, 11	Same as Steps 4 and 5.

DISCRIMINATOR VISUAL ALIGNMENT

7	10.7 mc ±.3 mc at 60-cycle rate	Conv. grid directly pin 7 V2 (6BE6) thru .01 mf	FM	....	Primary of T5 discrim. transformer	1, 3, 11	Adjust primary for max. amplitude.
8	Same as Step 7	Same as Step 7	FM	....	Secondary of T5	1, 3, 11	Adjust secondary for vertical symmetry with respect to mid-point horizontal traces.
9	Same as Step 7	Same as Step 7	FM	....	Primary of T5	1, 3, 11	Adjust for straightest possible slope of straight line trace.

FM R-F VISUAL ALIGNMENT

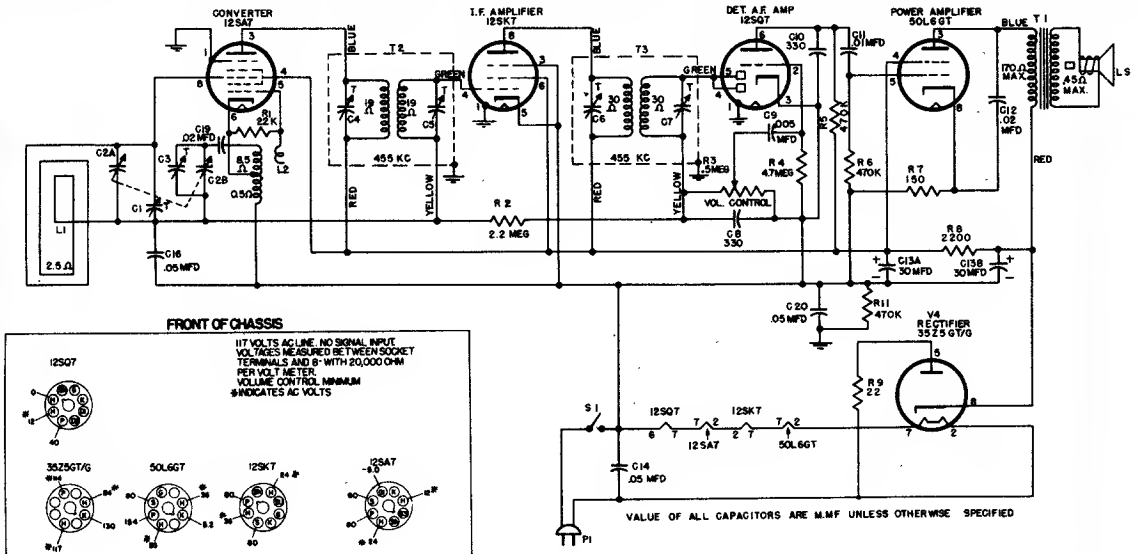
10	98 mc Note 6	Dipole terminals thru dummy antenna	FM	98 mc or $3\frac{1}{16}$ in.	Adjust C62*	2, 6, 7, 8, 10	*Set dial pointer accurately, then adjust for steepest slope of straight line trace on scope.
11	98 mc Note 1	Dipole terminals thru dummy antenna	FM	98 mc	Peak L4 vane	1, 2, 9, 10	Center response curve on scope, then peak for max. amplitude.
12	98 mc Note 1	Dipole terminals thru dummy antenna	FM	98 mc	Peak L1 tuning vane	1, 2, 10	Peak for max. amplitude.

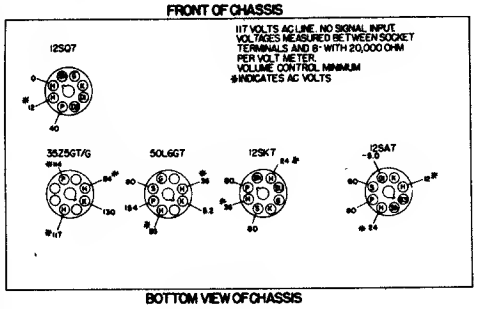
AM R-F VISUAL ALIGNMENT

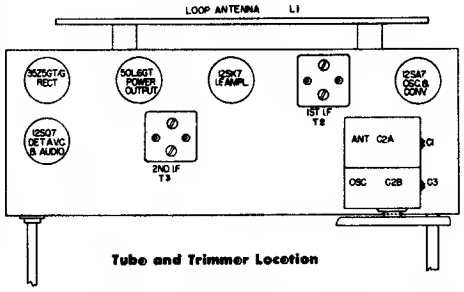
13	1500 kc Note 6	Antenna thru 200 mmf	STD	1500 kc or 5 in.	Adjust C12	4, 6, 7	Adjust C12 for steepest slope of straight line trace on scope.
14	1500 kc Note 5	Antenna thru 200 mmf	STD	1500 kc	Adjust C16	4, 5, 7, 9	Adjust C16 for max. amplitude.
15	1500 kc Note 5	Antenna thru 200 mmf	STD	1500 kc	Adjust C6	4, 5, 7	Adjust C6 for max. amplitude.

NOTES IN CONNECTION WITH VISUAL ALIGNMENT TABLE:

(1) Use FM signal modulated at 60 cps ±300 kc.
(2) Connect vertical plates of scope to the limiter grid (pin 1 of V5) (6AU6) through 200,000 ohm resistor.
(3) Connect vertical plates of scope to the junction of R29 and R41 (FM audio) through 200,000 ohms.
(4) Connect vertical plates of scope at junction of R13 and C28 (AM audio output) through 200,000 ohms.
(5) Use FM signal modulated at 60 cps ±20 kc.
(6) Use a 60 cycle amplitude modulated signal.
(7) If a dial scale is not available, index the dial pointer as follows: Turn the pointer to the left-hand limit of travel and mark the dial plate at a reference edge of the pointer slide. Then set the pointer by turning dial knob until the indicated dimension exists between the reference edge and the mark.
(8) Two oscillator settings will give a response. The higher frequency response is the correct one, the other response is the image. If in doubt, start with the trimmer screw loosened completely and adjust for the *first* response.
(9) In some cases tuning of the converter grid will cause "pulling" of oscillator which will change the oscillator frequency. After centering the response curve on the scope, if peaking of L4 causes the response curve to move off of the screen it is necessary to realign the oscillator for calibration.
(10) A dummy antenna is a resistor in series with the hot lead of the signal generator. The resistance of the resistor plus the termination impedance of the signal generator should equal 300 ohms.
(11) Leads from the signal generator must be kept as short as possible and away from later stages to prevent regeneration. The signal may also be fed to the tube pin connection from the top of the chassis to prevent regeneration.







Tube and Trimmer Location

I-F ALIGNMENT

Connect an output meter across the voice coil. Turn the volume control to maximum. Set test oscillator to 455 KC and keep the oscillator output as low as a readable meter reading will permit. Apply signal to the converter grid through a .05 mfd. capacitor and align progressively the trimmers in the 2nd and 1st I-F transformer cans.

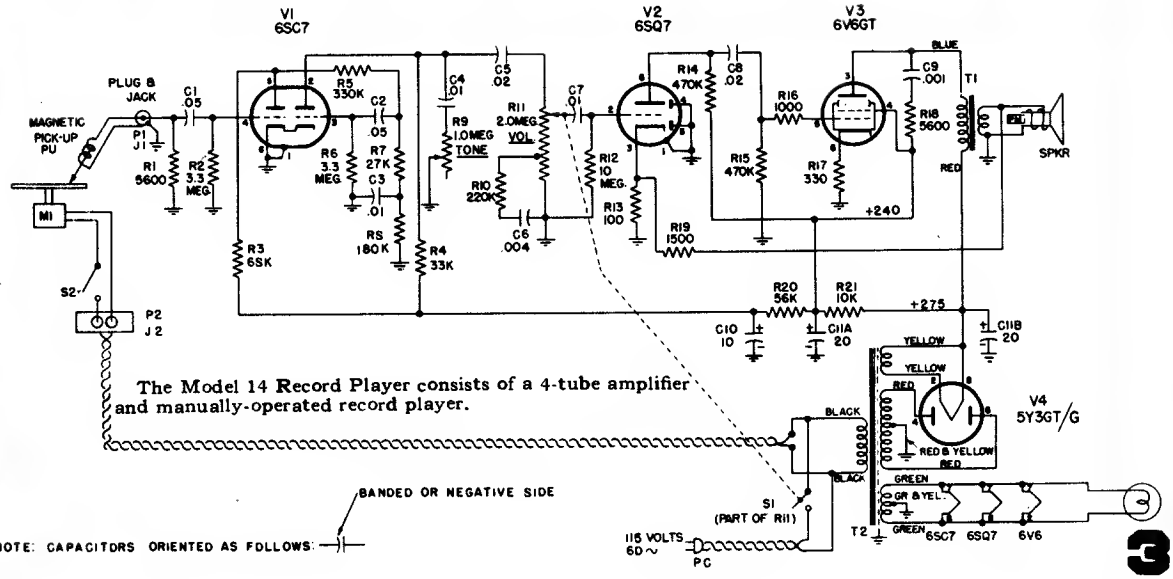
R-F ALIGNMENT

Apply the R-F alignment signals through a standard IRE dummy antenna to the primary on the loop. With the gang condenser wide open, align the oscillator trimmer (C3) to 1720 KC. Change the generator signal to 1500 KC, tune the receiver to the signal and peak the antenna trimmer (C1) for maximum output.

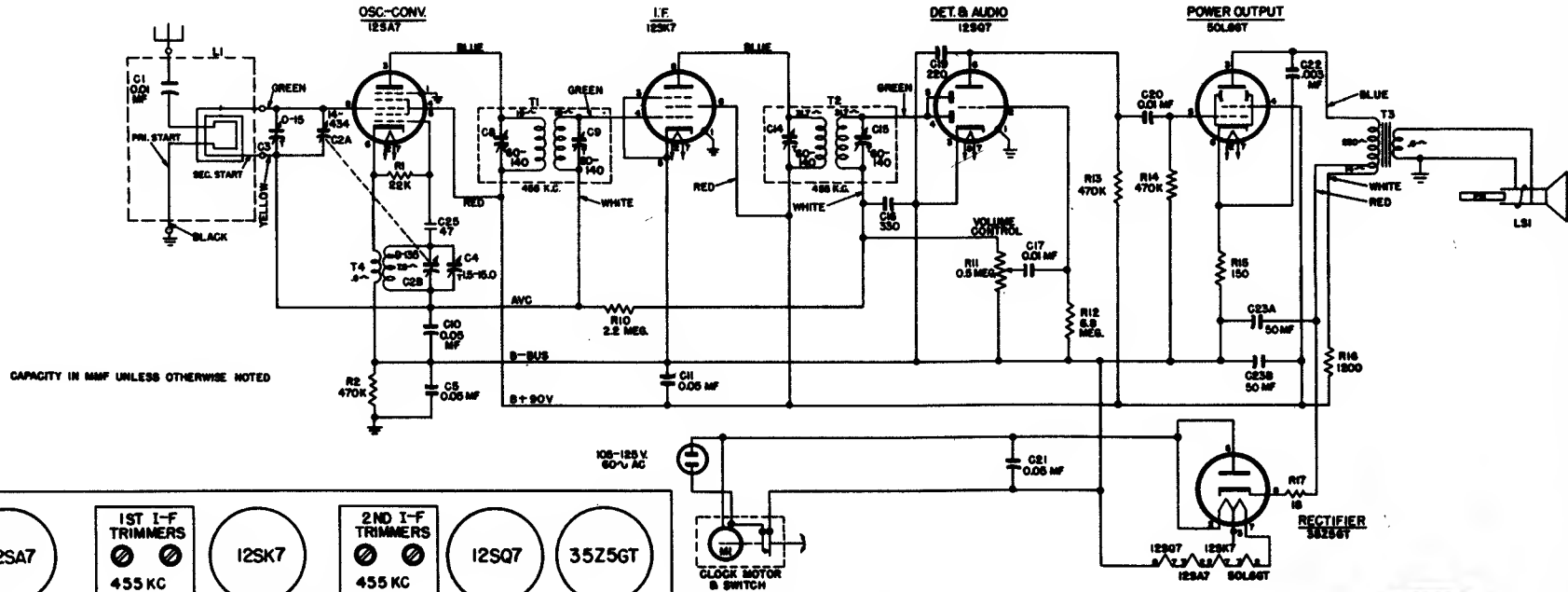
GENERAL ELECTRIC

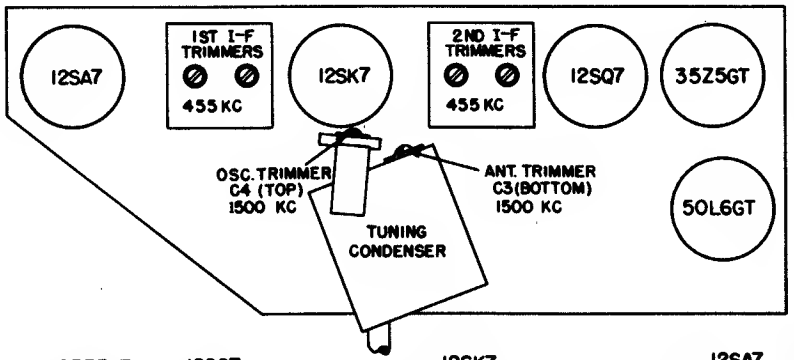
MODELS 102, 102W, 107, 107W, 114, 114W, 115, 115W

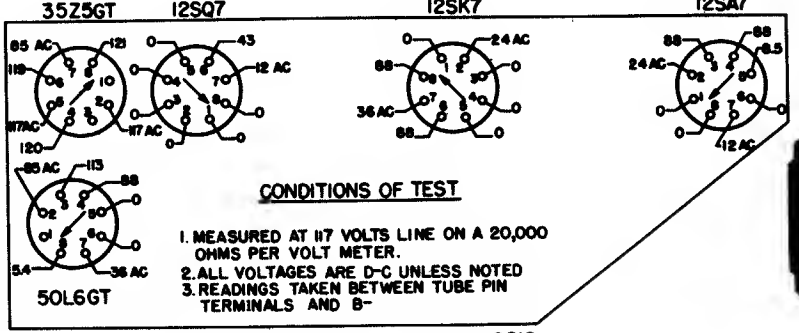
GENERAL ELECTRIC RECORD PLAYER MODEL 14



The Model 14 Record Player consists of a 4-tube amplifier and manually-operated record player.







GENERAL ELECTRIC

SERVICE DATA

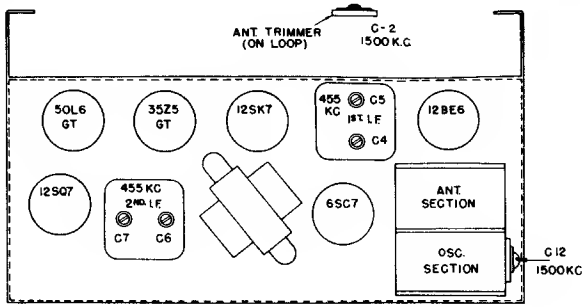
FOR

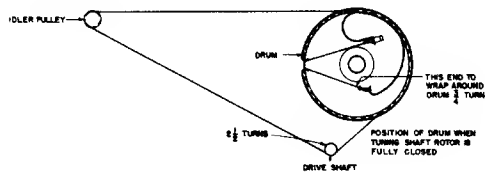
CLOCK-RADIO

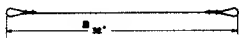
MODELS 60 AND 62

ALIGNMENT CHART

Step	Connect Test Oscillator to—	Test Osc. Setting	Dial Drum Setting	Adjust Trimmers for Maximum Output
1	12SK7 grid (4) in series with 0.05 mf. cap.	455 kc	1600 kc	2nd i-f trans. trimmers, C14 and C15
2	12SA7 grid (8) in series with 0.05 mf. cap.	455 kc	1600 kc	1st i-f trans. trimmers, C8 and C9
3	Antenna Post in series with 200 mmf. cap.	1500 kc	1500 kc	C4 (oscillator)
4	Antenna Post in series with 200 mmf. cap.	1500 kc	1500 kc	C3 (antenna)







ALIGNMENT CHART

Step	Connect Test-Oscillator To:	Test Oscillator Setting	Dial Setting	Adjust Trimmers For Max. Output
1	12SK7 grid (Pin 4) In series with .05 mf.	455 kc	—	C6 and C7
2	12BE6 grid (Pin 7) In series with .05 mf.	455 kc	—	C4 and C5 Readjust C6 and C7
3	Blue wire on loop in series with 200 mmf. and 470 ohms.	1500 kc	1500 kc	C12 (Osc.); C2 (Ant.)*

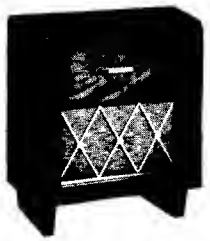
* Rock gang condenser when making alignment.

The oscillator trimmer is accessible by tilting the chassis slightly in the cabinet. The antenna trimmer is on the loop and is accessible from the rear of the cabinet. The locations of these trimmers are shown in Figure 3.

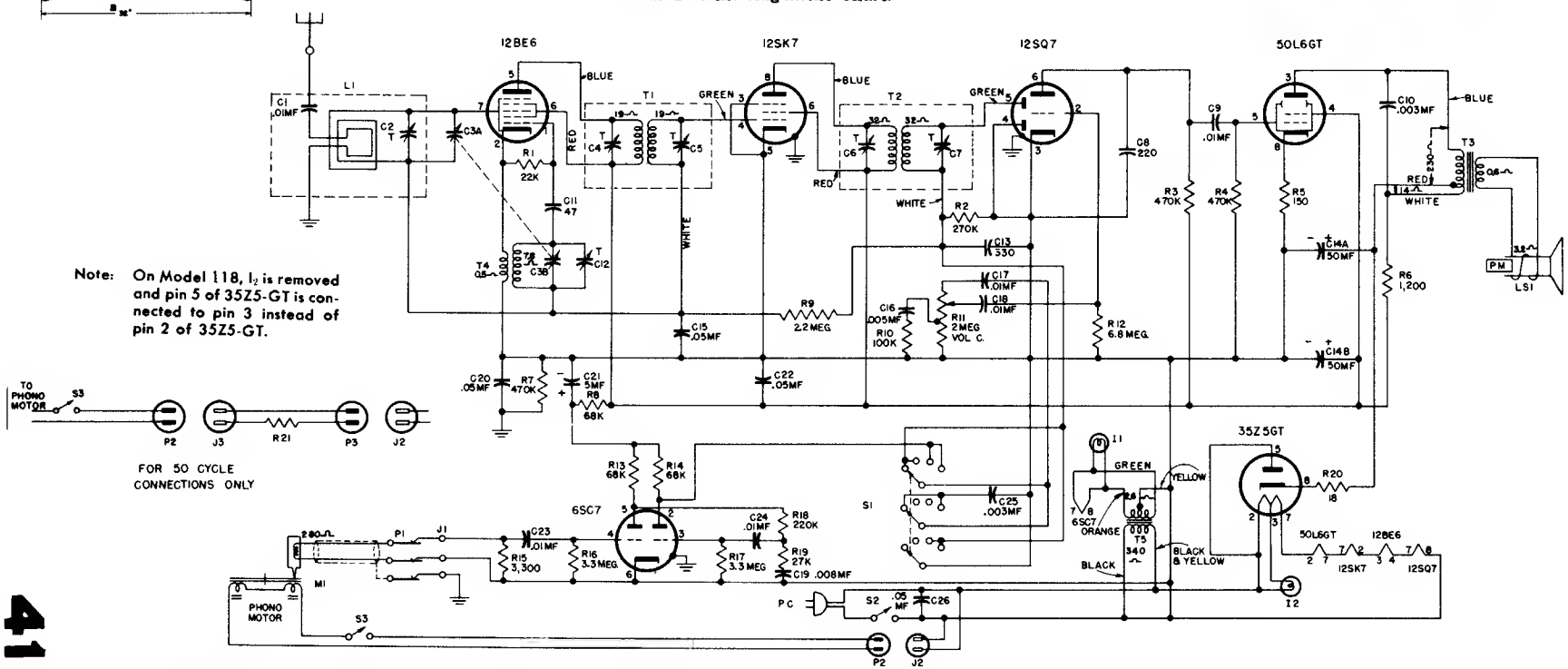
The output meter should be connected across the loudspeaker voice coil terminals. The low side of the test oscillator should be connected to B minus; the high side should be connected as indicated in the Alignment Chart.

GENERAL ELECTRIC

RADIO SERVICE DATA FOR MODELS 118, 119W and 119M



119M and 119W



Note: On Model 118, I_2 is removed and pin 5 of 35Z5-GT is connected to pin 3 instead of pin 2 of 35Z5-GT.

FOR 50 CYCLE CONNECTIONS ONLY

GENERAL ELECTRIC

RADIO

SERVICE DATA

FOR

MODEL 113

ALIGNMENT PROCEDURE

ALIGNMENT FREQUENCIES:

I-F ..... 455 kc
R-F ..... 1725 kc and 1500 kc
The location of all trimmers is shown in Figure 1.

I-F ALIGNMENT:

Connect an output meter across the voice coil. Turn the volume control to maximum. Set test oscillator to 455 kc and keep the oscillator output as low as a readable meter reading will permit. Apply signal to the converter grid through a .05 mfd. capacitor and align progressively the trimmers in the 2nd and 1st i-f transformer cans.

R-F ALIGNMENT:

Apply the r-f alignment signals through a standard IRE dummy antenna to C9. With the gang condenser wide open, align the oscillator trimmer (C11) to 1725 kc. Change the generator signal to 1500 kc, tune the receiver to the signal, and peak antenna trimmer (C9) for maximum output.

PRECAUTION:

If the signal generator is a-c operated, use an isolating transformer between the power supply and the radio receiver power input. The use of an isolating capacitor is not recommended, as a-c through the capacitor will introduce hum modulation and/or create the possibility of a burned-out signal generator attenuator.

CABINET:

OVER-ALL DIMENSIONS:

Height ..... 6 in.
Width ..... 9¼ in.
Depth ..... 4¾ in.

ELECTRICAL RATING:

Voltage ..... 105-125 v. AC or DC
Frequency on AC ..... 40-60 cps
Wattage (at 117 volts) ..... 28 watts

OPERATING FREQUENCIES:

Broadcast Band ..... 540-1725 kc

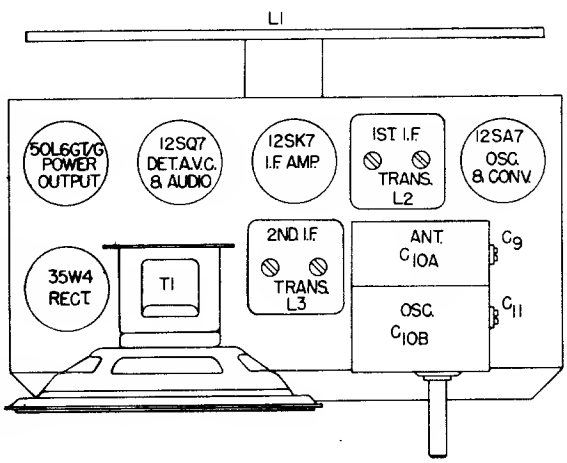
Intermediate Frequency ..... 455 kc

LOUDSPEAKER ..... ***"ALNICO V" MAGNET DYNAMIC***

Outside Cone Diameter ..... 4 in.
Voice Coil Impedance (400 cycles) ..... 3.5 ohms

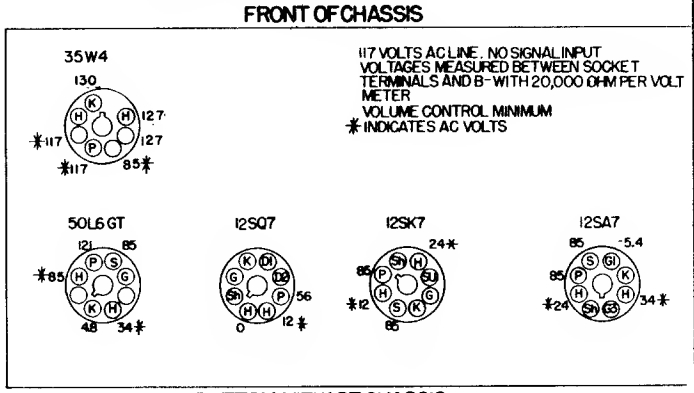
TUBES COMPLEMENT:

Converter-Oscillator 12SA7
I-F Amplifier 12SK7
Detector, AVC Audio 12SQ7
Power Output 50L6GT
Rectifier 35W4

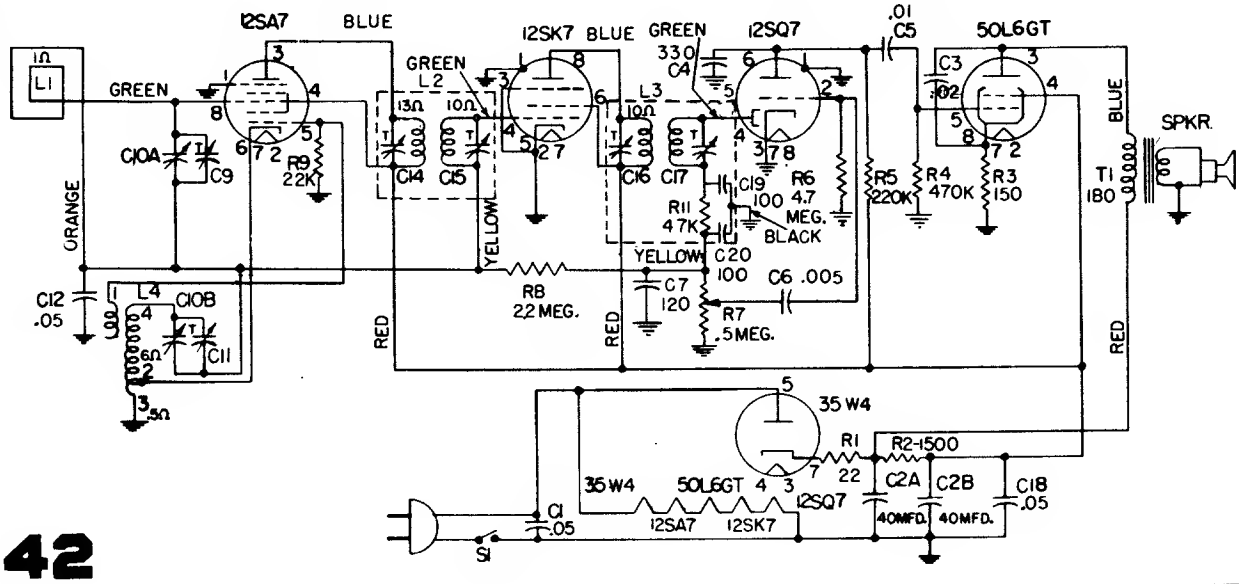


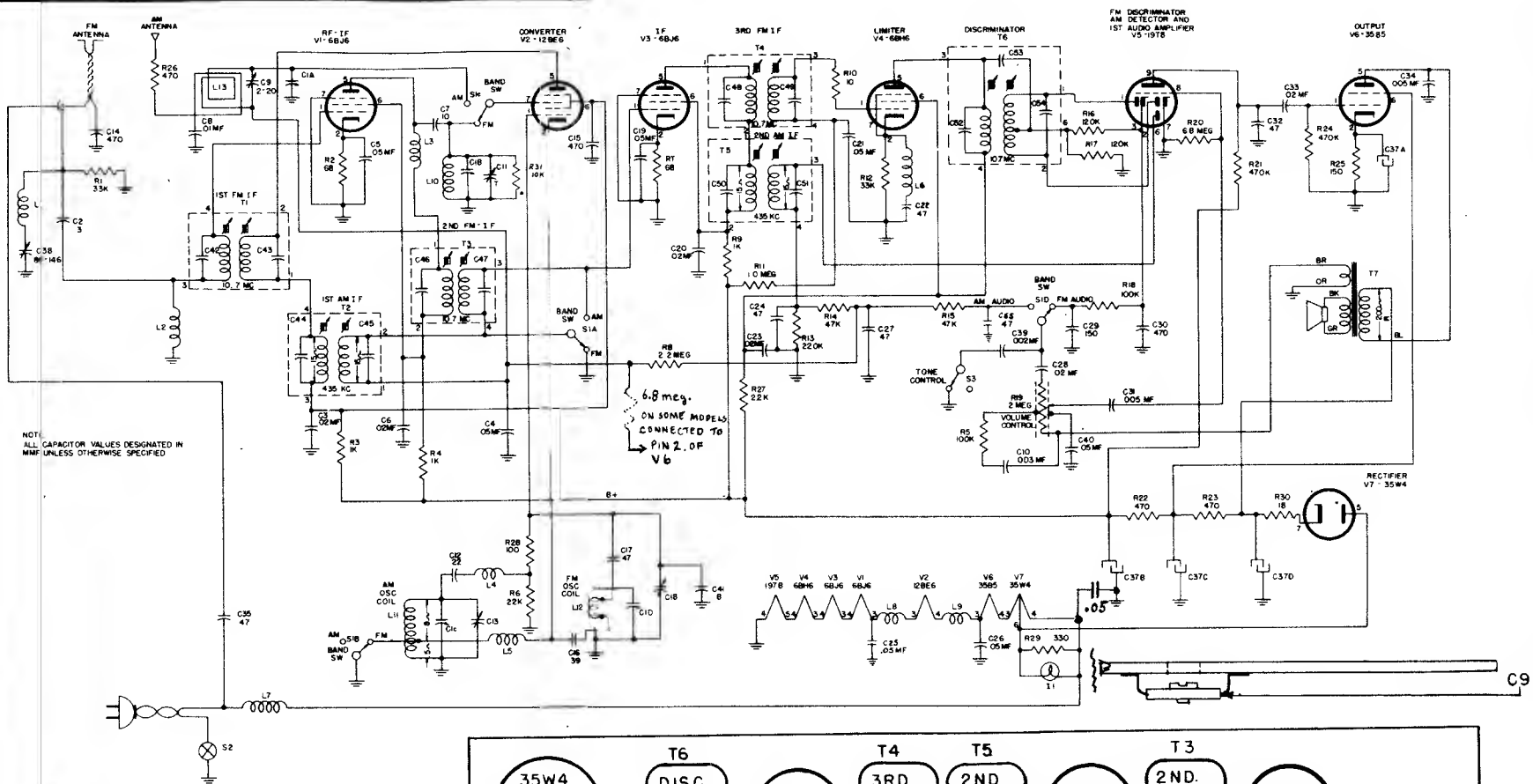
Tube and Trimmer Location

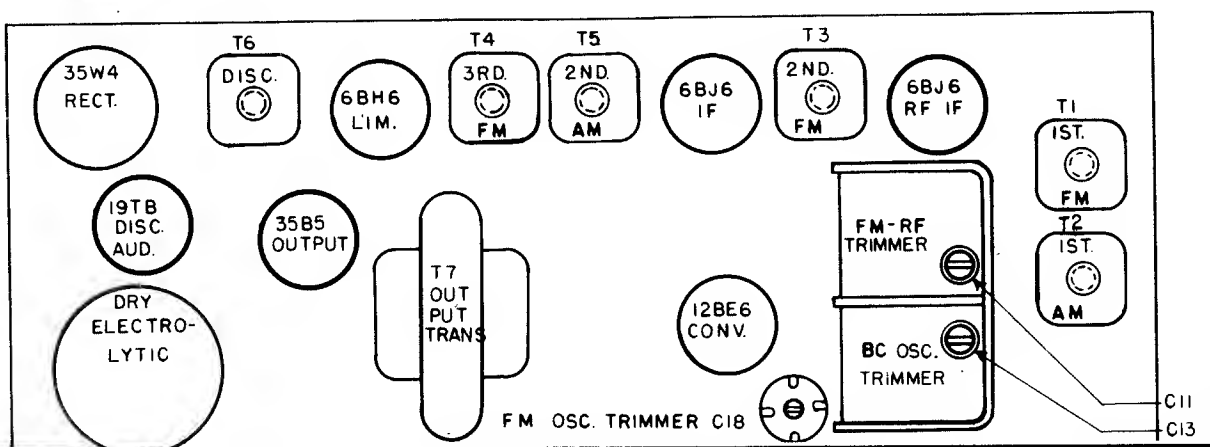
FRONT OF CHASSIS



BOTTOM VIEW OF CHASSIS







TUNING BAND:

AM.....540–1600 kc
FM.....88–108 mc

INTERMEDIATE FREQUENCIES:

AM.....455 kc
FM.....10.7 mc

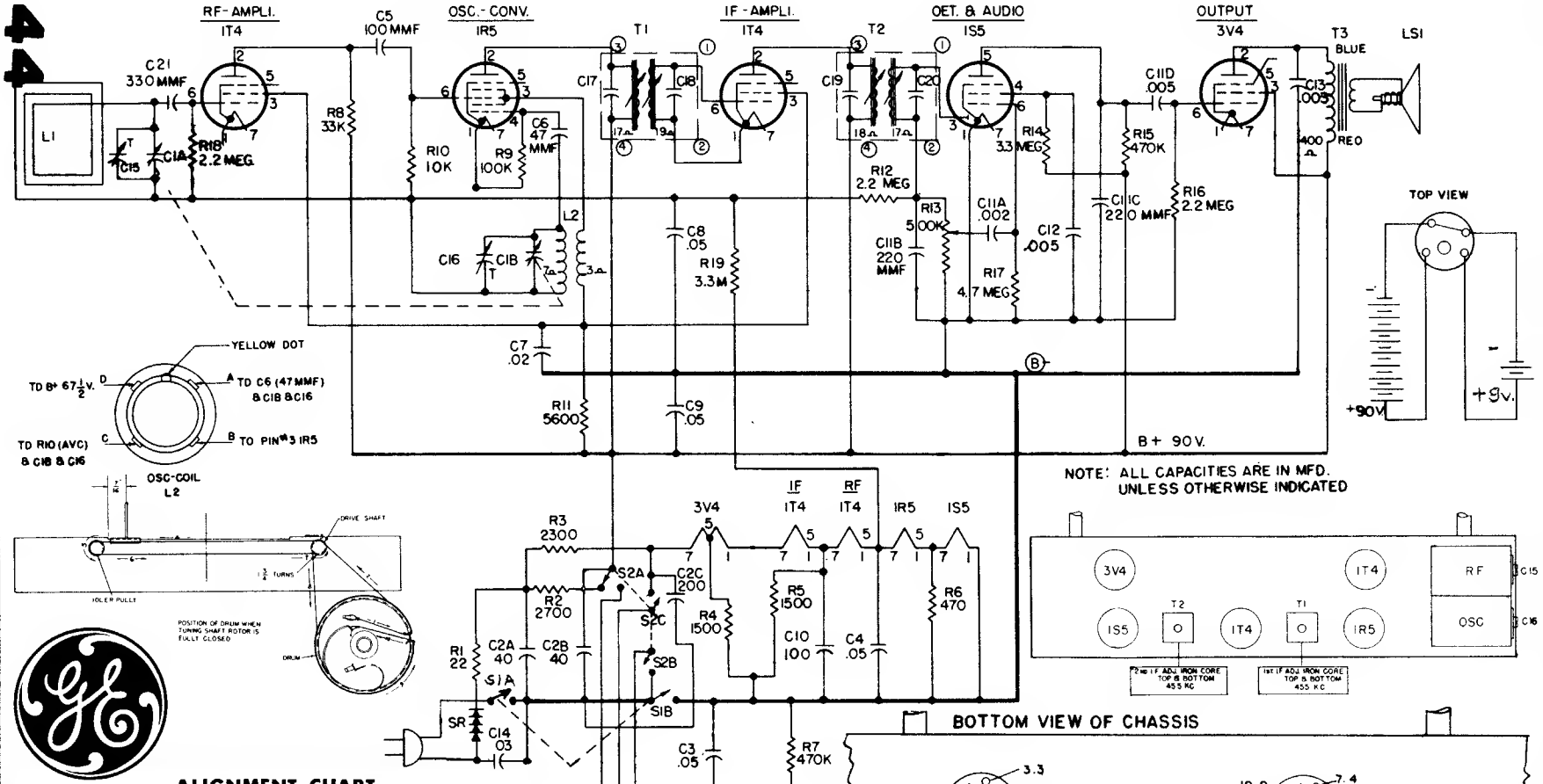
GENERAL ELECTRIC

RADIO

SERVICE DATA

FOR

MODELS 210, 211, 212



ALIGNMENT CHART

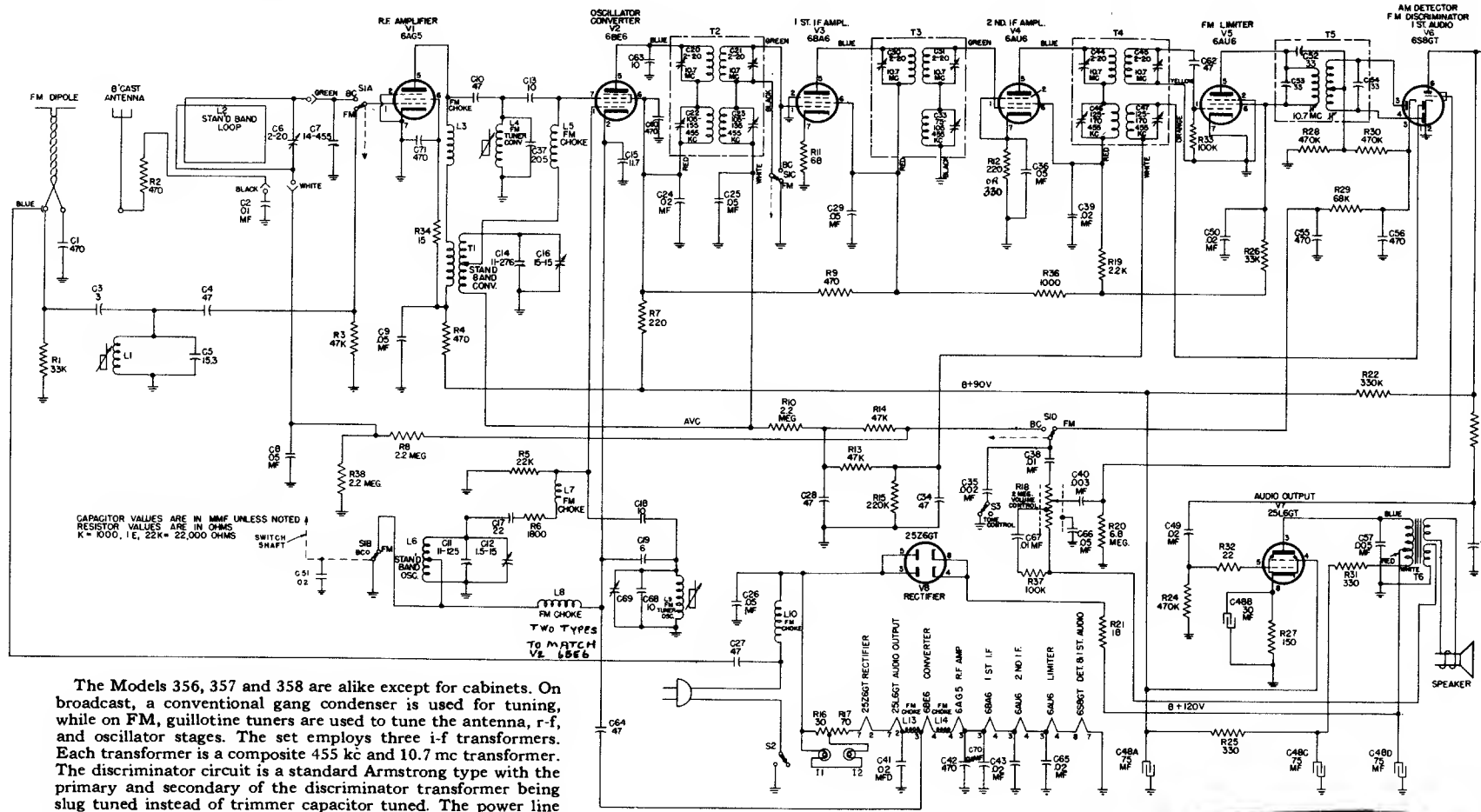
Step	Test-Osc. Connected to:	Test-Osc. Setting	Pointer Setting	Adjust for Max. Output
1	1T4 I-F grid in series with .05 mfd.	455 KC	550 KC	Iron cores of I-F Transformer T2.
2	1R5 converter grid in series with .05 mfd.	455 KC	550 KC	Iron cores of I-F Transformer T1.
3	Repeat Steps 1 and 2.			
4	Inductively coupled	1500 KC	1500 KC	C15* C16

* Chassis in cabinet and cabinet back (with loop) closed; remove plug button to adjust C15.

MODEL 150

GENERAL ELECTRIC

D.C VOLTAGES TO GROUND UNLESS OTHERWISE SPECIFIED
ALL RATINGS ARE A.C OPERATION MEASURED WITH REFERENCE TO B-
VOLTAGE IS MEASURED WITH 20,000 OHMS PER VOLT METER



The Models 356, 357 and 358 are alike except for cabinets. On broadcast, a conventional gang condenser is used for tuning, while on FM, guillotine tuners are used to tune the antenna, r-f, and oscillator stages. The set employs three i-f transformers. Each transformer is a composite 455 kc and 10.7 mc transformer. The discriminator circuit is a standard Armstrong type with the primary and secondary of the discriminator transformer being slug tuned instead of trimmer capacitor tuned. The power line antenna is used when there is no external dipole and is utilized by attaching the blue wire on the cabinet back to the top dipole terminal. This should be disconnected when a dipole is used. For best reception with a power line antenna, the power cord should not be coiled up.

TUNING BAND:

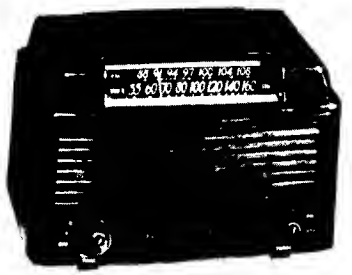
Standard Broadcast	540–1600 kc
FM	88–108 mc

INTERMEDIATE FREQUENCY:

Standard Broadcast	455 kc
FM	10.7 mc

GENERAL ELECTRIC RADIO

SERVICE DATA FOR MODELS 356, 357 AND 358



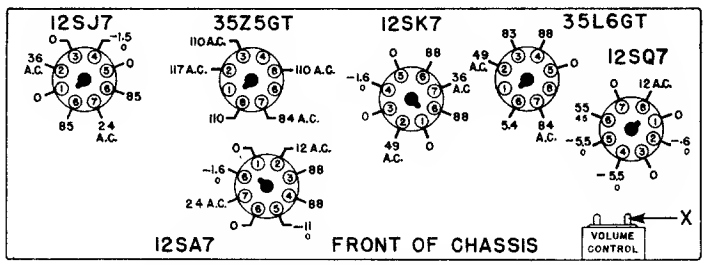
Model 356—Mahogany Plastic
Model 357—Ivory Plastic

THE B. F. GOODRICH CO.

Mantola

Models 92505
92506

VOLTAGE DATA



Bottom View of Chassis, Showing Voltages

- Readings made between point indicated and Volume Control Lug (Point "X" on drawing).
- Measured on a 117 Volt A.C. line.
- Dial turned to low frequency end, no signal.
- Measured with Vacuum Tube voltmeter.
- A second voltage reading is shown made with a 1000 ohm-per-volt meter when use of this instrument would result in appreciably lower readings.

REPLACEMENT PARTS

RESISTORS

Symbol		Part No.
R1..	10,000 Ohms, ½ Watt	60B 8-103
R2..	10 Megohms, ½ Watt	60B 8-106
R3..	22,000 Ohms, ½ Watt	60B 8-223
R4..	100 Ohms, ½ Watt	60B 8-101
R5..	1 Megohm, ½ Watt	60B 8-105
R6..	½ Megohm, Volume Control & Switch	75B 1-6
R7..	4.7 Megohms, ½ Watt	60B 8-475
R8..	270,000 Ohms, ½ Watt	60B 8-274
R9..	470,000 Ohms, ½ Watt	60B 8-474
R10.	150 Ohms, ½ Watt	60B 8-151
R11.	33 Ohms, 1 Watt	60B 28-3
R12.	1,000 Ohms, 1 Watt	60B 28-2
R13.	150,000 Ohms, ½ Watt	60B 8-154

CONDENSERS

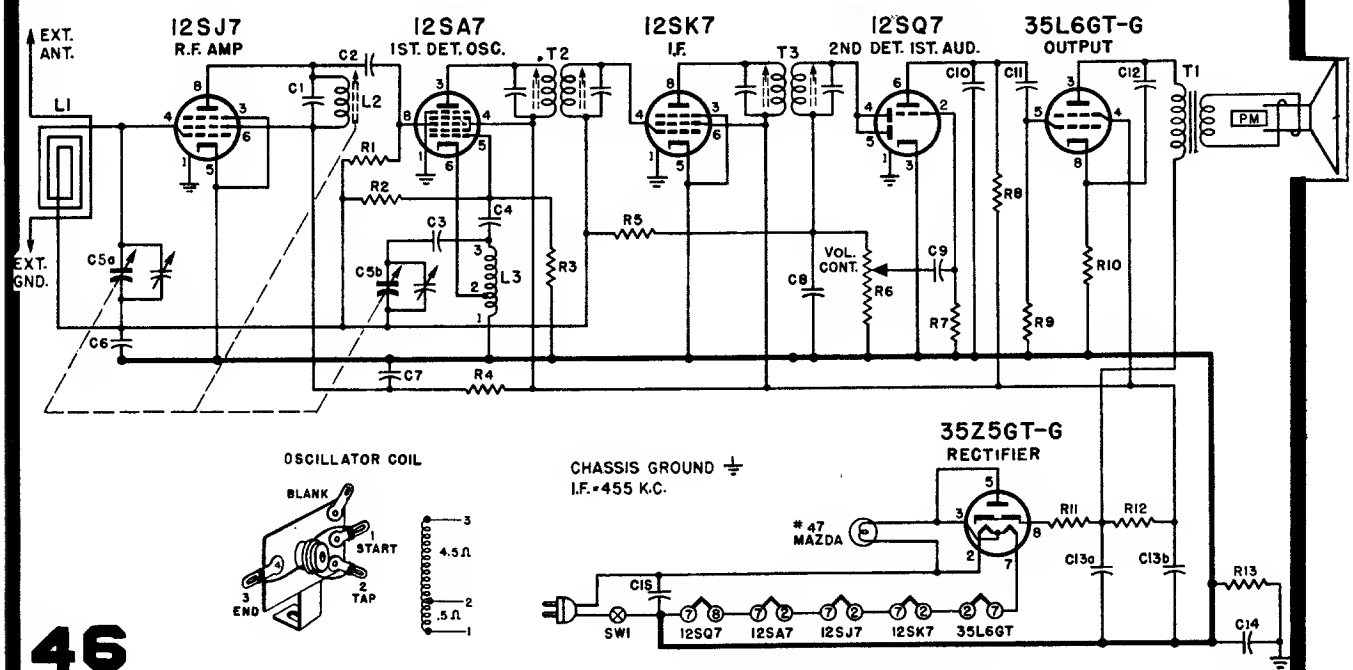
Symbol		Part No.
C1..	785 mmfd., ±5%, Silver Mica	65B 1-8
C2..	250 mmfd., Mica	65B 7-22
C3..	.02 mfd., 400 Volts, Paper	64B 1-24
C4..	50 mmfd., Mica	65B 7-11
C5a.	0 to 420 mmfd. } Gang	68A 18
C5b.	0 to 108 mmfd. }	
C6..	.1 mfd., 200 Volts, Paper	64B 1-30
C7..	.05 mfd., 400 Volts, Paper	64B 1-22
C8..	250 mmfd., Mica	65B 7-22
C9..	.01 mfd.,400 Volts, Paper	64B 1-25
C10.	500 mmfd., Mica	65B 7-27
C11.	.01 mfd., 400 Volts, Paper	64B 1-25
C12.	.02 mfd., 400 Volts, Paper	64B 1-24
C13a	50 mfd., 150 Volts } Elect.	67A 10
C13b	30 mfd., 150 Volts }	
C14.	.18 mfd., 200 Volts, Paper	64A 2-2
C15.	.05 mfd., 400 Volts, Paper	64B 1-22

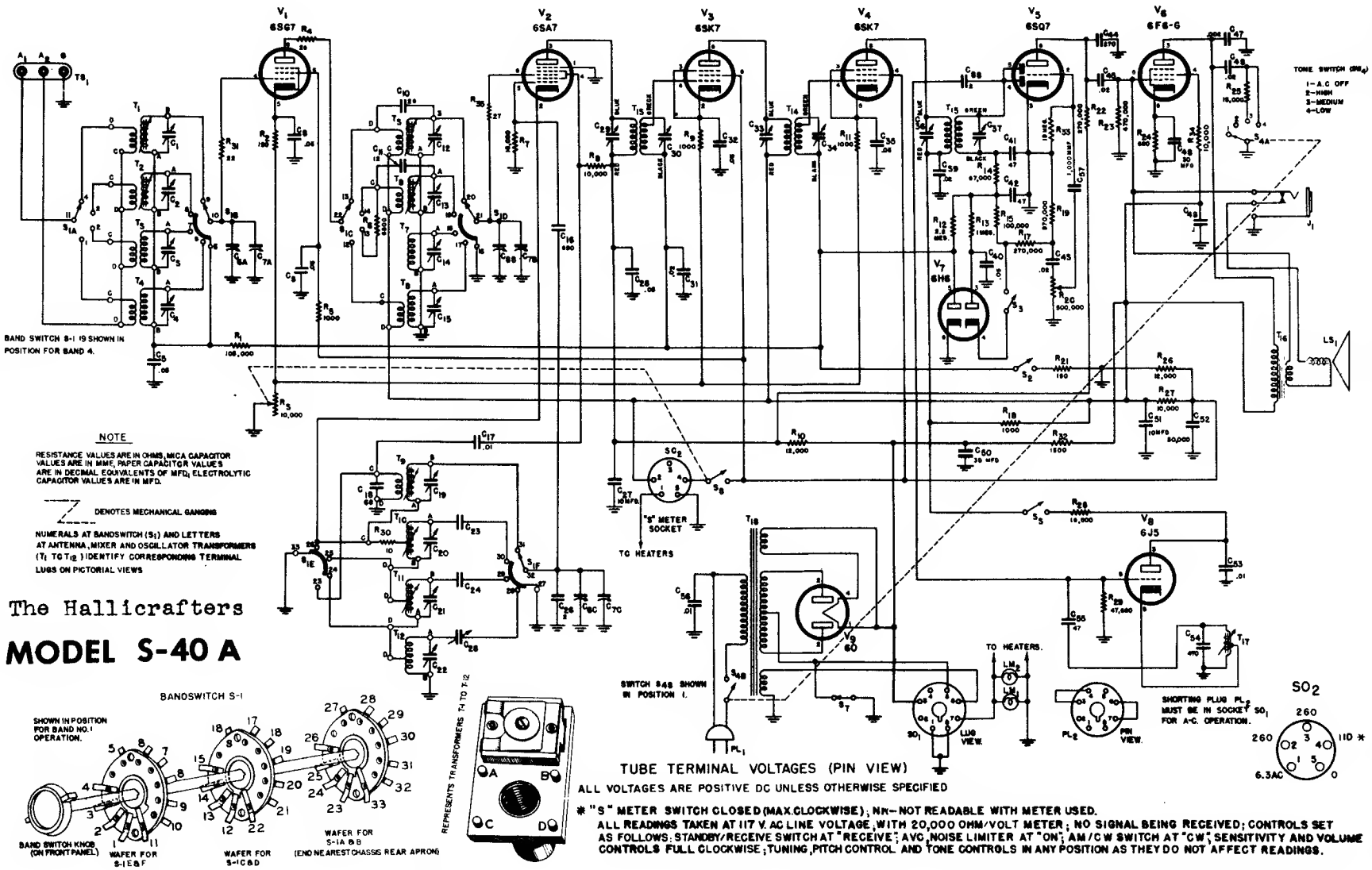
COILS & TRANSFORMERS

		Part No.
L1..	Loop Antenna	69C 44
L2..	R.F. Coil and Mounting	A1052
L3..	Oscillator Coil	69A 43
T1..	Transformer, Output	98A 4
T2..	Transformer, 1st I.F.	72B 50
T3..	Transformer, 2nd I.F.	72B 51

MISCELLANEOUS

Description	Part No.
Background, Dial	X22C3-1
Bracket Plate, Loop Retainer	15A 14
Buttons, Snap (for R.F. Coil)	13A 1-2-2
Cabinet, Ivory (Model 92505)	34D 8-1
Cabinet, Mahogany (Model 92506)	34D 8-2
Clip, Dial Glass	18A 2
Cord, Dial	50A 1-3
Cover, Back (Incl. Loop Antenna)	69C 44
Dial Scale, Glass	21B 10-2
Drum and Cam Assembly	A1049
Knob, Mahogany (Model 92506)	33A 7-2
Knob, Ivory (Model 92505)	33A 7-1
Lever Arm Assembly (R.F.)	A1050
Pilot Light, No. 47	81A 1-8
Pilot Light Socket and Leads	82A 2-3
Pointer	25A 13-1
Pulley, Fibre; ⅛x½" OD	17A 1-3
Screw, Set; 8/32x⅛" (Dial Drum)	1A 5-58
Shaft, Tuning	28A 1-1
Slug, R.F. Iron Core (with wire)	71B 1-2
Socket, Octal Tube	87A 10-2
Speaker (5" PM) and Transformer	78B 4-4
Spring, Tension (Dial)	19B 1-3
Spring, Lever Arm (R.F.)	19A 4
Spacer, T (R.F.)	29A 2-3-21
Stud, Slug Adj. (R.F.)	27A 4
Washer, C (Tuning Shaft)	4A 4-6
Washer, Spring (Tuning Shaft)	4A 6-3-0





The Hallicrafters

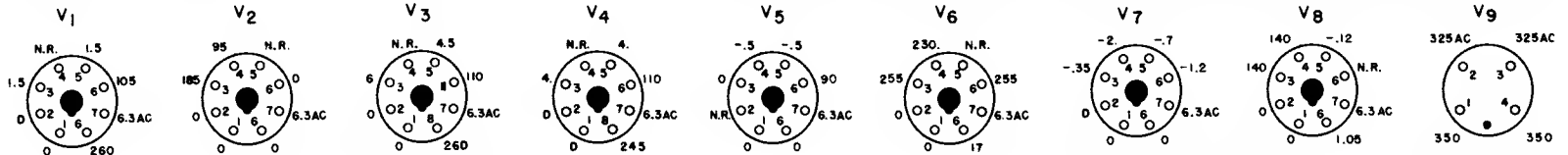
MODEL S-40 A

BANDSWITCH S-1

TUBE TERMINAL VOLTAGES (PIN VIEW)

ALL VOLTAGES ARE POSITIVE DC UNLESS OTHERWISE SPECIFIED

* "S" METER SWITCH CLOSED (MAX. CLOCKWISE); NN—NOT READABLE WITH METER USED.
ALL READINGS TAKEN AT 117 V. AC LINE VOLTAGE, WITH 20,000 OHM/VOLT METER; NO SIGNAL BEING RECEIVED; CONTROLS SET AS FOLLOWS: STANDBY/RECEIVE SWITCH AT "RECEIVE"; AVC NOISE LIMITER AT "ON"; AM/CW SWITCH AT "CW"; SENSITIVITY AND VOLUME CONTROLS FULL CLOCKWISE; TUNING, PITCH CONTROL AND TONE CONTROLS IN ANY POSITION AS THEY DO NOT AFFECT READINGS.



The Hallicrafters Co.

MODEL S-40 A
ALIGNMENT

EQUIPMENT:

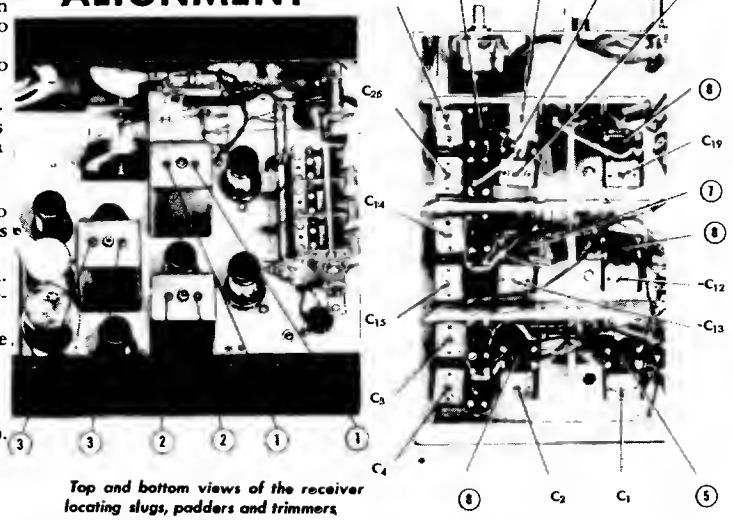
1. Signal Generator capable of the ranges indicated in the Alignment Chart, including a 400 cycle audio modulator.
2. Output meter capable of handling 1.5 watts of audio power.
3. Standard RMA dummy consisting of a 200 mmf condenser in series with a 20uh r-f choke which is shunted by a 400 mmf condenser in series with a 400 ohm carbon resistor.
4. Non-metallic screw driver.

CONNECTIONS: Connect the Sig. Gen. "cold" lead to the receiver's chassis; the "hot" lead is connected as indicated in the Chart.

Connect the output meter across the speaker voice coil. Caution: Set the meter at a sufficiently high range to prevent possible damage from overload.

CONTROL SETTINGS: After allowing about a ten minute warm up period, set the receiver's control as follows:

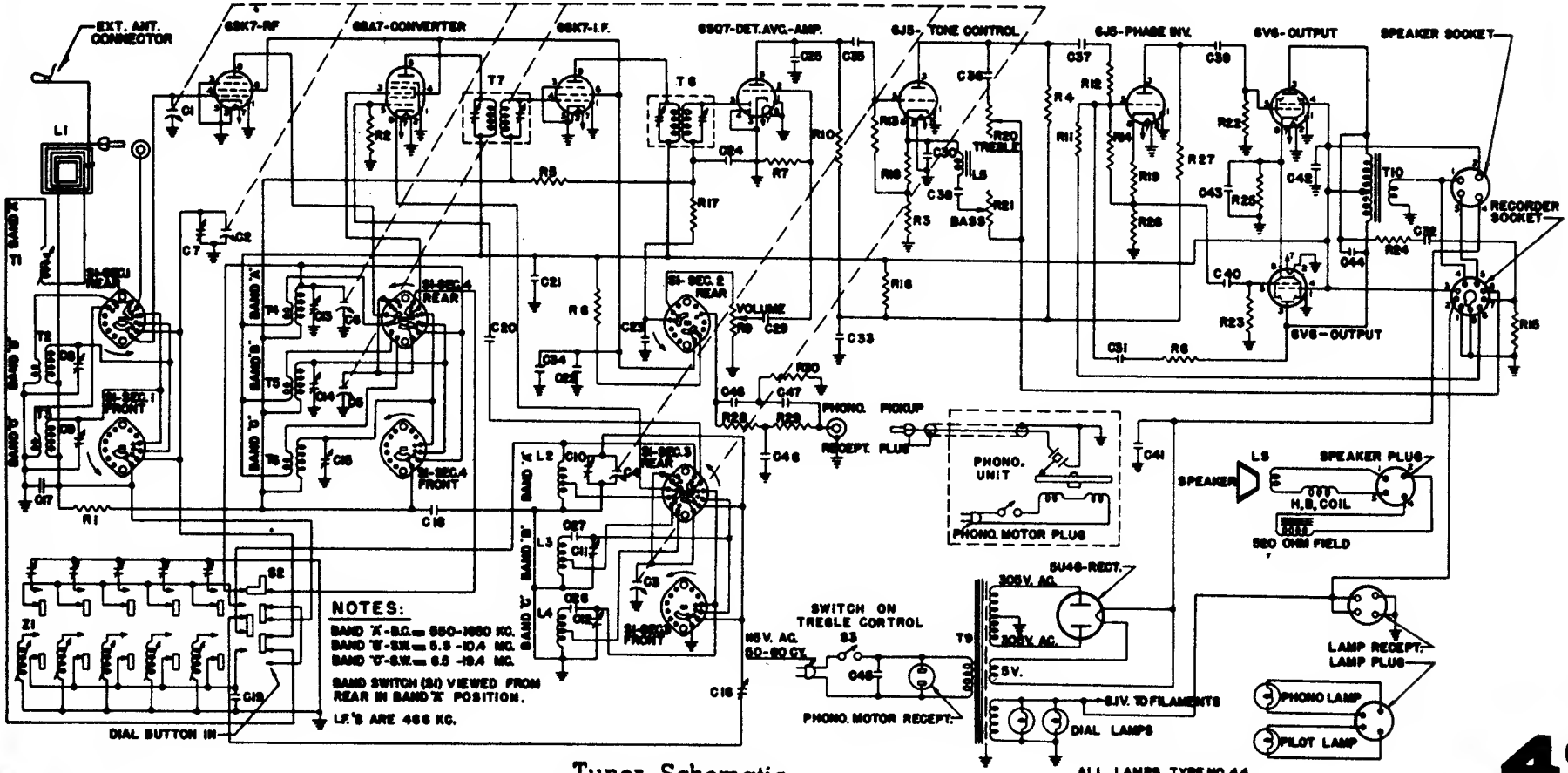
SENSITIVITY control at full clockwise (maximum).
VOLUME control at full clockwise (maximum).
CW/AM switch at "AM" (except for BFO adjustment).
A.V.C. switch at "OFF."
NOISE LIMITER switch at "OFF."
TONE control at "HIGH".



Top and bottom views of the receiver locating slugs, padders and trimmers

DUMMY ANT. IN SERIES WITH SIG. GENERATOR	CONNECTION OF SIG. GENERATOR OUTPUT TO RECEIVER	SIGNAL GEN. FREQUENCY SETTING	BAND SWITCH SETTING	RECEIVER DIAL SETTING	ADJUST SLUG, PADDER, OR TRIMMER NO.	DESCRIPTION	TYPE OF ADJUSTMENT —MAKE ADJUSTMENT FOR:	STEP NO.
				IF ADJUSTMENT				
None	Stator plates of center sect. of tuning gang	455 kc	"1"	1000 kc	3 (both)	3rd IF	Maximum output	1
					2 (both)	2nd IF	Maximum output	2
					1 (both)	1st IF	Maximum output	3
							Repeat steps 1, 2 and 3	
BFO ADJUSTMENT—NOTE: Turn off Sig. Gen. 400 cycle modulation; set CW/AM switch at "CW"; remove Pitch Control knob adjust slotted screw shaft.								
None	Stator plates of center sect. of tuning gang	455 kc	"1"	1000 kc	T-17 slug (See Fig. 3 for location)	BFO slug	Zero heat	4
BAND #4 ADJUSTMENT—NOTE: Make sure 400 cycle audio modulator is turned on; AM/CW switch should be at "AM.								
STANDARD RMA Dummy	"A1" on antenna strip	36 mc	"4"	36 mc	C-19	Osc. Trimmer	Maximum output	5
		18 mc		18 mc	8	Osc. Slug	Maximum output and repeat step 5	6
		36 mc		36 mc	†C-1	RF Trimmer	Maximum output	7
		36 mc		36 mc	†C-12	Mix.Trimmer	Maximum output	8
		18 mc		18 mc	*†5	RF Slug	Maximum output and repeat step 7	9
		18 mc		18 mc	*†6	Mix Slug	Maximum output and repeat step 8	10
				BAND #3 ADJUSTMENT				
STANDARD RMA Dummy	"A1" on antenna strip	14 mc	"3"	14 mc	C-20	Osc. Trimmer	Maximum output	.11
		10 mc		10 mc	* 9	Osc. Slug	Maximum output and repeat step 11	12
		14 mc		14 mc	†C-2	RF Trimmer	Maximum output	13
		14 mc		14 mc	†C-13	Mix. Trimmer	Maximum output	
		7 mc		7 mc	*† 4	RF Slug	Maximum output and repeat step 13	14 15
		7 mc		7 mc	*† 7	Mix. Slug	Maximum output and repeat step 14	16
				BAND #2 ADJUSTMENT				
STANDARD RMA Dummy	"A1" on antenna strip	5 mc	"2"	5 mc	C-21	Osc. Trimmer	Maximum output	17
		3 mc		3 mc	* 11	Osc. Slug	Maximum output and repeat step 17	18
		5 mc		5 mc	C-3	RF Trimmer	Maximum output	19
		5 mc		5 mc	C-14	Mix. Trimmer	Maximum output	20
				BAND #1 ADJUSTMENT				
STANDARD RMA Dummy	"A1" on antenna strip	1500 kc	"1"	1500 kc	C-22	Osc. Trimmer	Maximum output	21
		600 kc		600 kc	C-25	Osc. Padder	Maximum output and repeat step 21	22
		1500 kc		1500 kc	C-4	RF Trimmer	Maximum output	23
		1500 kc		1500 kc	C-15	Mix. Trimmer	Maximum output	24

*It may be necessary to repeat the indicated adjustments several times.
†Rock the main tuning capacitor slightly (turn back and forth) when making these adjustments.



Tuner Schematic

MANUAL OF 1949 MOST-OFTEN-NEEDED RADIO DIAGRAMS

Hoffman
RADIO CORP.

Models B503, B513, Chassis 115

TUNING RANGES:

Band "A"	540 Kc to 1600 Kc.
Band "B"	5.6 MC to 10.4 Mc.
Band "C"	9.4 Mc to 19.4 Mc
Intermediate Frequency	455 Kc
Power Supply	115V. A.C., 50-60 C.P.S.

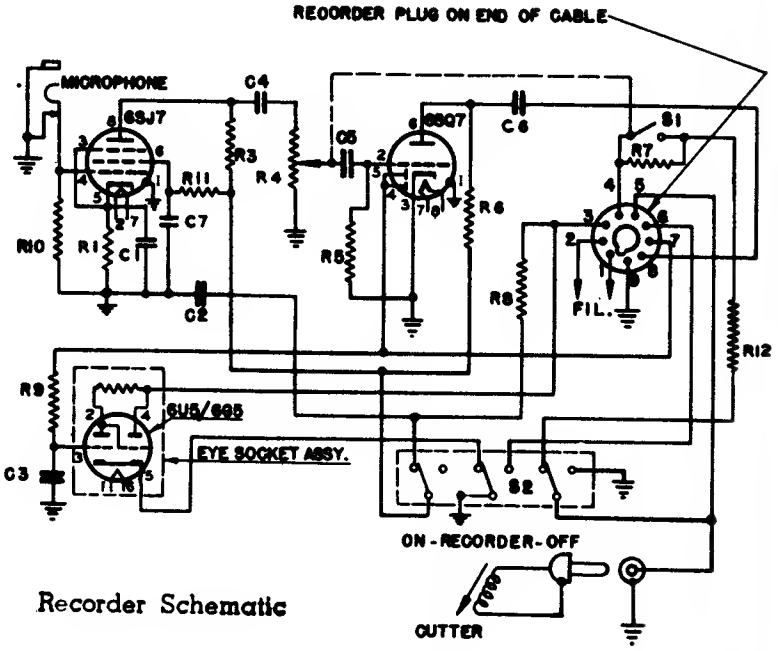
TUNER CHASSIS

SYMBOL	DESCRIPTION	HOFFMAN No.	*LIST PRICE
C1-C2, C3-C4, C5-C6	Three-Section Variable with Split Stator (160-260, 160-260, 160-260 Mmf.)	4403	6.88
C7, C8, C9	Three-Section Trimmer Assembly	4300	.76
C10, C11, C12	Three-Section Trimmer Assembly	4300	.76
C13, C14, C15	Three-Section Trimmer Assembly	4300	.76
C16	110-560 Mmf., Padder, Band "A"	4301	.45
C17, C18,	.05 Mfd., 200 Volt, Tubular Paper	4100	.21
C19	500 Mmf., ±5% Silver Mica	4004	.45
C20	47 Mmf., ±10% Mica	4007	.22
C21 C22	.05 Mfd., 400 Volt, Tubular Paper	4101	.23
C23, C24, C25	100 Mmf., ±20% Mica	4000	.18
C27	1050 Mmf., ±5% Mica	4005	.42
C28	2300 Mmf., ±5% Mica	4006	.63
C29, C30, C31, C32	.005 Mfd. 600 Volt, Tubular Paper	4102	.21
C33, C34	10 Mfd. 450 Volt, Tubular Electrolytic	4203	1.24
C35, C36, C37	.01 Mfd., 400 Volt Tubular Paper	4112	.19
C38	.5 Mfd. 200 Volt Tubular Paper	4110	.41
C39, C40	.02 Mfd., 400 Volt, Tubular Paper	4106	.19
C41, C42, C43	20-20-20 Mfd. 450-450 25V. Electrolytic	4200	2.28
C44	.001 Mfd., 600 Volt, Tubular Paper	4104	.20
C45	.01 Mfd, 600 V. Tubular Paper, Metal Can.	4105	.37
C46, C47	330 Mmf. ±5% Mica	4010	.34
C48	650 Mmf. ±5% Mica	4011	.38
L1	Loop Antenna	55210	1.85
L2	Oscillator Coil (Band "A")	5215	1.08
L3, L4	Oscillator Coil (Bands "B" and "C")	5218	1.68
L5	Choke-Bass Boost	5103	3.80
LS	12" Loudspeaker (Electrodynamic)	9044	19.68
R1	.1 Megohm ±20% ½Watt	4511	.05
R2, R3, R4	22,000 Ohm ±20% ½Watt	4501	.05
R5	2.2 Megohm ±20% ½Watt	4502	.05
R6	10,000 Ohm ±10% 2 Watt	4503	.19
R7	10 Megohm ±20% ½Watt	4505	.05
R8	5 Megohm ±20% ½Watt	4544	.07
R9	.5 Megohm Potentiometer—Volume Control	4804	.80
R10, R11, R12	.22 Megohm ±20% ½Watt	4500	.05
R13, R14, R15	1 Megohm ±20% ½Watt	4513	.05
R16	47,000 Ohm ±20% 1 Watt	4516	.09
R17	47,000 Ohm ±20% ½Watt	4504	.05
R18, R19	2,200 Ohm ±20% ½Watt	4512	.05
R20	.25 Meg. Pot. with Switch—Treble Control	4805	1.38
R21	50,000 Ohm Potentiometer—Bass Control	4806	.75
R22, R23, R24	.47 Megohm ±20% ½Watt	4506	.05
R25	220 Ohm ±20% 3 Watt	4519	.29
R26, R27, R28, R29	47,000 Ohm ±5% ½Watt	4537	.11
R30	22,000 Ohm ±5% ½Watt	4538	.11
S1	Band Change Switch	6005	2.81
S2	Pushbutton Switch Assembly	6004	2.92
S3	On-Off Switch (on treble Control)		
T1	Antenna Coil (Band "A")	5220	1.18
T2, T3	Antenna Coil (Bands "B" and "C")	5217	1.68
T4	R.F. Coil. Shielded (Band "A")	5216	1.45
T5, T6	R.F. Coil (Bands "B" and "C")	5219	1.68
T7	Input I.F. Transformer	5213	2.15
T8	Output I. F. Transformer	5214	1.93
T9	Power Transformer	5001	10.08
T10	Audio Output Transformer	5108	2.68
Z1	Pushbutton Tuning Assembly	55200	4.40

*Prices subject to change without notice.

Hoffman Models C503 and C513 are electrically identical with Models B503 and B513 respectively, except for the following:

1. Push-pull parallel 6K6's are used in the output stage instead of push-pull 6V6's.
2. An "Entertainment Panel" has been wired into the tuner chassis to provide microphone input, a speaker off-on switch, a pillow speaker plug, and an auxiliary phono input.
3. A resistance-capacity filter has been inserted in the B-plus line feeding the phase inverter stage (see R111 and C110, power supply schematic)
4. On the recorder amplifier the screen dropping resistor (R111) has been changed from .1 meg to 2.2 meg and the cathode resistor (R2) for this stage changed from 2200 ohms to 4700 ohms.



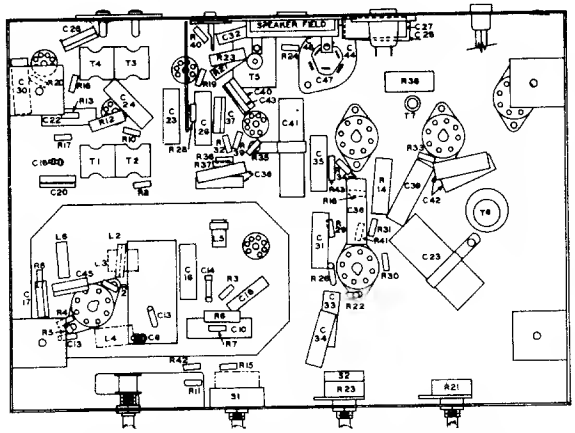
Recorder Schematic

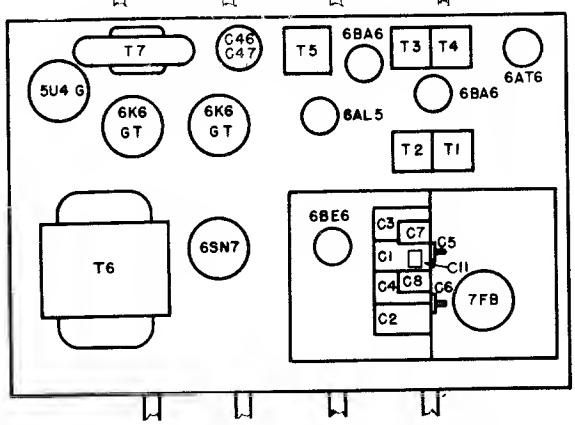
RECORDER CHASSIS

SYMBOL	DESCRIPTION	HOFFMAN NO.	*List Price
C1	25 Mfd—25 Volt, Electrolytic	4205	.73
C2	10 Mfd. 450 Volt, Electrolytic	4203	1.24
C3, C4	.01 Mfd. 400 Volt, Tubular paper	4112	.19
C5	.005 Mfd, 600 Volt, Tubular Paper	4102	.21
C6	.02 Mfd. 400 Volt, Tubular Paper	4106	.19
R1	2200 Ohm ±20% ½Watt	4512	.05
R2	10,000 Ohm. ±20% ½Watt	4515	.05
R3	.47 Megohm ±20% 1 Watt	4506	.05
R4	.5 Megohm Potentiometer	4802	1.09
R5	10 Megohm ±20% ½Watt	4505	.05
R6	.22 Megohm ±20% ½Watt	4500	.05
R7	1.0 Ohm ±20% ½Watt Wire Wound	4707	.13
R8	47,000 Ohm ±20% 1 Watt	4516	.09
R9, R10	1.0 Megohm ±20% ½Watt	4513	.05
R11	.1 Megohm ±20% ½Watt	4511	.05
S1	Monitor on-off Switch (Part of R4)		
S2	Recorder On-off- Switch	6003	1.45
R12	.5 Ohm ±20% ½Watt Wire Wound	4708	.06

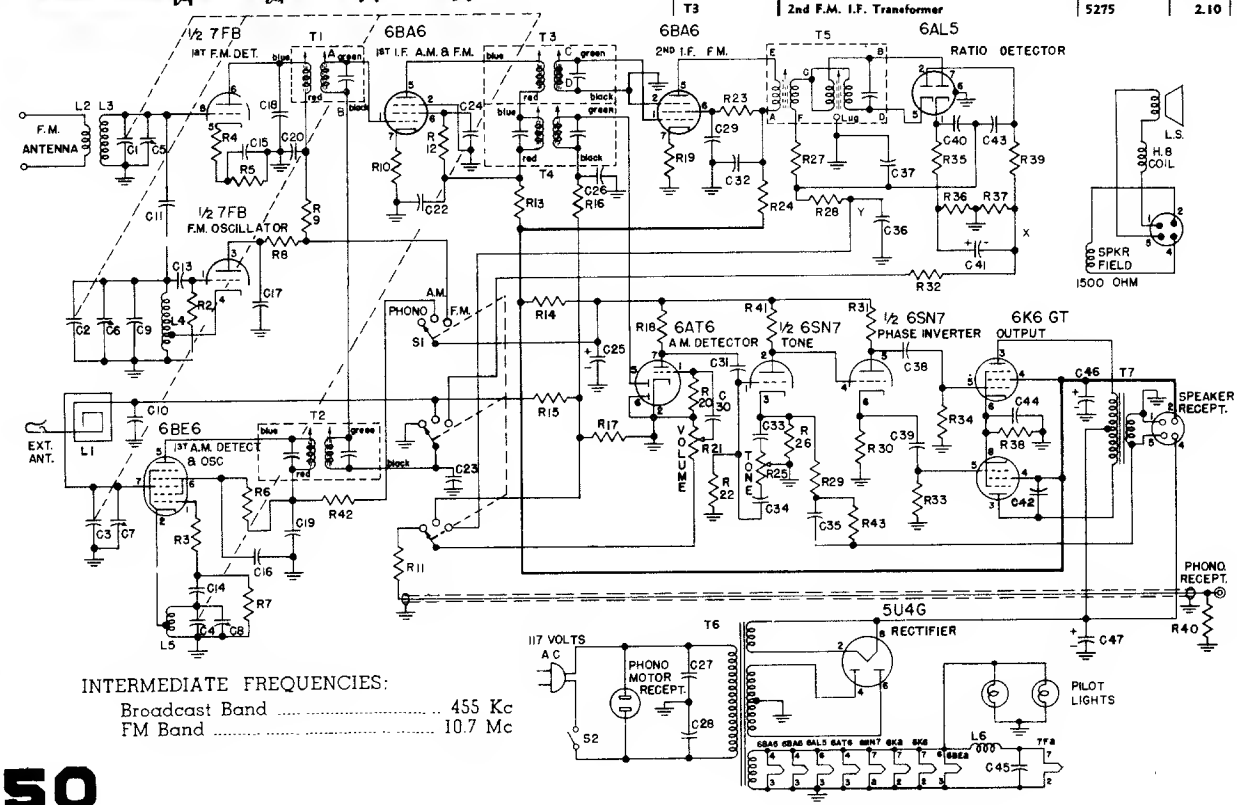
HOFFMAN RADIO CORPORATION

MODELS B508, B509 and B510
CHASSIS 129





SYMBOL	DESCRIPTION			HOFFMAN NO.	LIST* PRICE
C1, C2, C3, C4	4 Section Variable			4409	$3.96
C5, C6	Trimmer (F.M. Section)			4308	.80
C7, C8	Trimmer (A.M. Section)			4313	.20
C9, C18	8 Mmf.	±10%	Ceramic NPO	4019	.24
C10, C23	.05 Mfd.	200 V.	Paper	4100	.21
C11	1.5 Mmf.	±20 %	Ceramic	4008	.10
C12	220 Mmf.	±20 %	Ceramic N750	4026	.30
C13	22 Mmf.	±10%	Ceramic N150	4021	1.00
C14, C26	100 Mmf.	±10%	Ceramic	4012	.18
C15, C17, C45	650 Mmf.	±20 %	Ceramic	4011	.38
C16, C19, C21, C22, C24, C29, C30, C31	.01 Mfd.	400 V.	Paper	4112	.19
C20, C32	2300 Mmf.	±5%	Mica	4006	.63
C25	10 Mfd.	450 V.	Electrolytic	4203	1.24
C27, C28	.01 Mfd.	600 V.	Paper	4103	.18
C33	.02 Mfd.	400 V.	Paper	4106	.19
C34	.005 Mfd.	600 V.	Paper	4102	.21
C35	.1 Mfd.	200 V.	Paper	4111	.22
C36, C42	.002 Mfd.	600 V.	Paper	4118	.20
C37, C40, C43	270 Mmf.	±20 %	Mica	4001	.22
C38, C39	.05 Mfd.	400 V.	Paper	4101	.23
C41	5 Mfd.	50 V.	Electrolytic	4209	.84
C44	20 Mfd.	25 V.	Electrolytic	4200	2.28
C46, C47	20 Mfd.	450 V.	Electrolytic		
R1, R33, R34	.47 Meg.	±20 %	½ Watt	4506	.05
R2, R7, R28	22000 Ohm	±20 %	½ Watt	4501	.05
R3	22 Ohm	±20 %	½ Watt	4560	.13
R4	68 Ohm	±20 %	½ Watt	4524	.05
R5	1200 Ohm	±10%	½ Watt	4553	.05
R6	15000 Ohm	±20 %	1 Watt	4539	.08
R8, R9, R13, R24	1500 Ohm	±20 %	½ Watt	4534	.05
R10, R19	56 Ohm	±10%	½ Watt	4561	.05
R11, R15, R20	2.2 Meg.	±20 %	½ Watt	4502	.05
R12, R23	33000 Ohm	±20 %	1 Watt	4556	.60
R14	2200 Ohm	±20 %	1 Watt	4540	.08
R16, R17	.1 Meg.	±20 %	½ Watt	4511	.05
R18, R40, R41	.22 Meg.	±20 %	½ Watt	4500	.08
R21	.5 Meg. Pot. (Volume Control)			4804	.80
R22	1.0 Meg.	±20 %	½ Watt	4513	.05
R25	.25 Meg. Pot. (Tone Control)			4805	1.05
R26	2200 Ohm	±20 %	½ Watt	4512	.05
R27	120 Ohm	±10%	½ Watt	4546	.05
R29	4700 Ohm	±20 %	½ Watt	4543	.04
R30, R31	47000 Ohm	±10%	½ Watt	4559	.40
R32	47000 Ohm	±20 %	½ Watt	4504	.05
R35, R39	390 Ohm	±10%	½ Watt	4549	.05
R36, R37	6800 Ohm	±10%	½ Watt	4557	.10
R38	400 Ohm	±20 %	3 Watt	4517	.05
L1	A.M. Loop Antenna			5279	1.80
L2	F.M. Antonna Primary Coil			5281	
L3	F.M. Antenna Secondary Coil			5283	
L4	F.M. Oscillator Coil			5280	
L5	A.M. Oscillator Coil			5282	
L6	Filament Choke			5266	.60
T1	1st. F.M. I.F. Transformer			5274	2.10
T2	1st A.M. I.F. Transformer			5276	2.00
T3	2nd F.M. I.F. Transformer			5275	2.10



INTERMEDIATE FREQUENCIES:

Broadcast Band ..... 455 Kc
FM Band ..... 10.7 Mc

TRIMMER LOCATION CHARTS

HOWARD RADIO

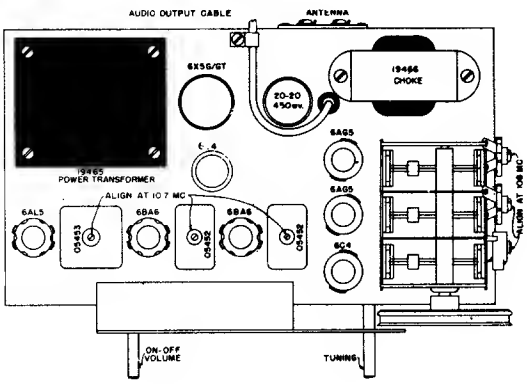
MODEL 481-A (Chassis)

The HOWARD 481-A Chassis, is essentially the same as the 481-M, 481-B and 481-C, the only difference is that the Short Wave is not included in this model.

Meissner F.M. Receptor, Model 8C

Intermediate Frequency - 10.7 megacycles

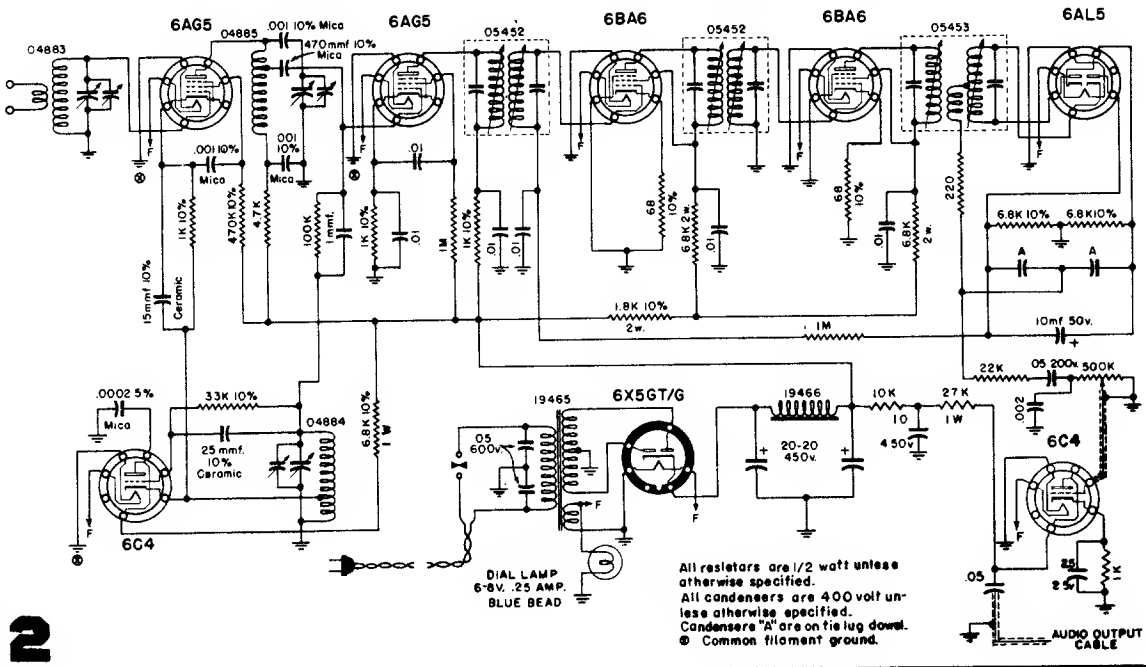
Tuning range - 88 to 108 megacycles



Voltage Chart - The voltages tabulated in the table below are the correct voltages which should be measured between the socket terminal and chassis with nominal line voltage and no signal. All voltages measured with a high impedance voltmeter.

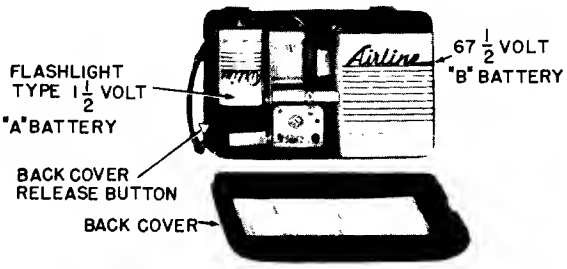
VOLTAGE CHART

Terminal Number	1	2	3	4	5	6	7	8
6AG5 1st Converter	0	2.1	6.3V RMS	0	260	63	2.1	
6AG5 2nd Converter	0	1.2	6.3V RMS	0	270	37	1.2	
6C4 Oscillator	184	0	6.3V RMS	0	184	—	0	
6BA6 1st I.F. Amp	-0.4	0	6.3V RMS	0	95	95	0.95	
6BA6 2nd I.F. Amp	0	0	6.3V RMS	0	84	84	0.95	
6AL5 Detector	0	0	6.3V RMS	0	0	0	0	
6C4 Audio	105	0	6.3V RMS	0	150	0	3.4	
6X5GT/G Rectifier	NC	0	240V RMS	Tie Point	240V RMS	Tie Point	6.3V RMS	287



WARDS Airline RADIO

84GCB-1062A



ALIGNMENT PROCEDURE AND RECEIVER STAGE SENSITIVITIES

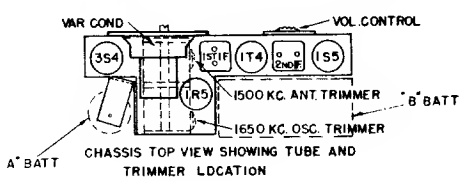
The signal source must be an accurately calibrated signal generator capable of supplying R.F. signals modulated 30% with a 400-cycle audio signal. A 400-cycle source is necessary for the audio measurements.

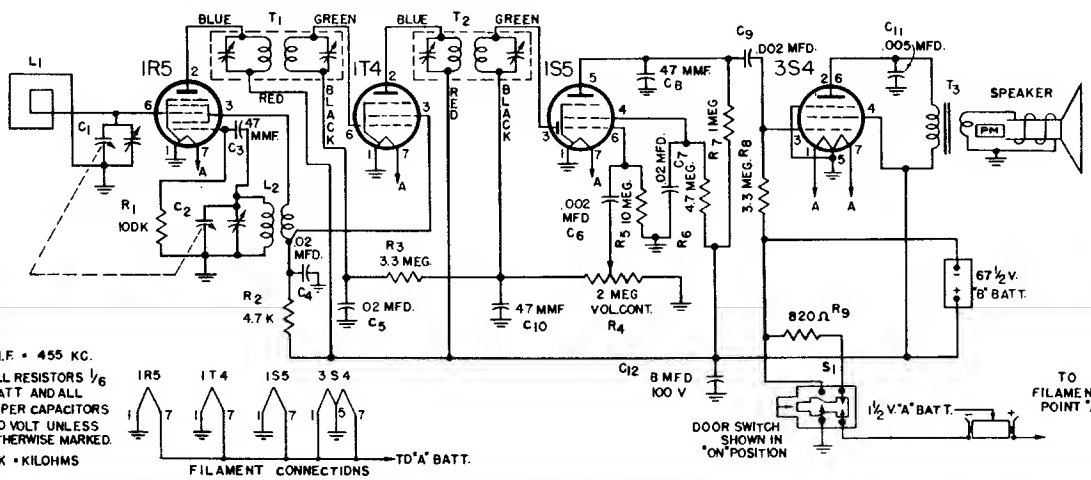
In order to make the adjustments listed in the table below, it is necessary to first remove the front panel in order to remove the chassis from the cabinet. The loop leads must also be disconnected (unsolder) and extended by means of short leads. The table below lists the sensitivity at various points. All measurements are based on an output of 50 milliwatts. This may be measured by disconnecting the speaker voice coil and substituting a 3.2 ohm, 5 watt resistor across the secondary winding of the output transformer. A reading of .4 volts AC across this resistor will be equivalent to a 50-milliwatt output with the speaker connected. Variations of plus or minus 25% are usually permissible. Volume control at maximum for all adjustments.

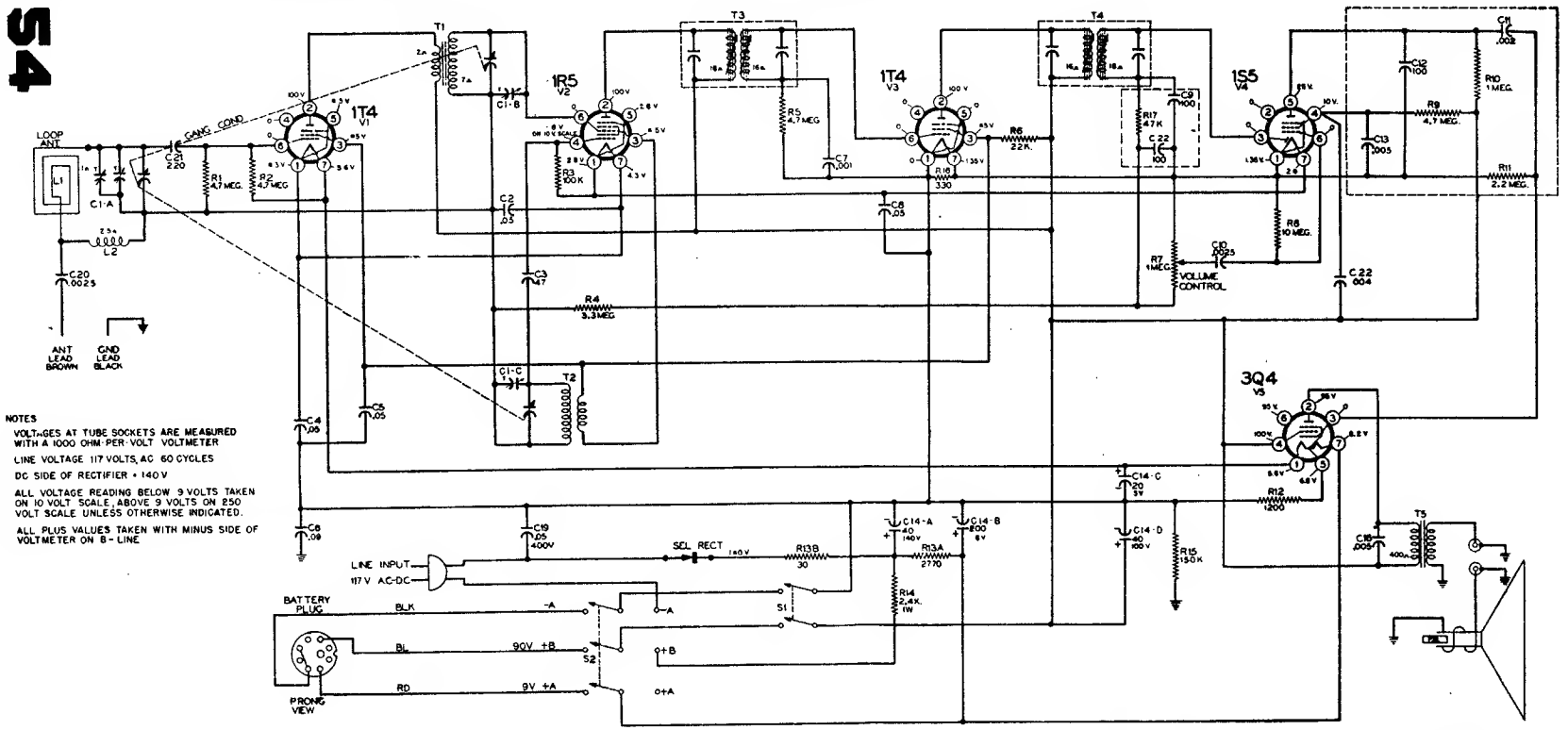
SIGNAL GENERATOR				DIAL SETTING	ADJUST FOR MAXIMUM OUTPUT	INPUT FOR 50-MILLIWATT OUTPUT
Frequency	Coupling	Connection to Radio	Ground Connection			
455 KC	.1 mfd condenser	Stator lug Var. Capacitor (front section)	Chassis	Variable Condenser fully open	Trimmers 1st and 2nd I.F. transformer	100 microvolts
1650 KC	Coupling loop see note 1	None	None	Variable Condenser fully open	Oscillator Trimmer (Rear section)	———
1500 KC	Coupling loop see note 2	None	None	1500 KC	Ant. trimmer (front section)	———
400 cycles	.1 mfd condenser	High side of volume control	Chassis	———	———	.045 volts

Note 1 — Connect signal generator leads to a three turn radiating loop approximately 4" in diameter placed about 8" from the loop of the receiver.

Note 2 — After chassis is installed in cabinet and reconnected to its loop re-adjust the antenna trimmer by ear, with low signal input.







NOTES

VOLTAGES AT TUBE SOCKETS ARE MEASURED WITH A 1000 OHM-PER-VOLT VOLTMETER

LINE VOLTAGE 117 VOLTS, AC 60 CYCLES

DC SIDE OF RECTIFIER = 140 V

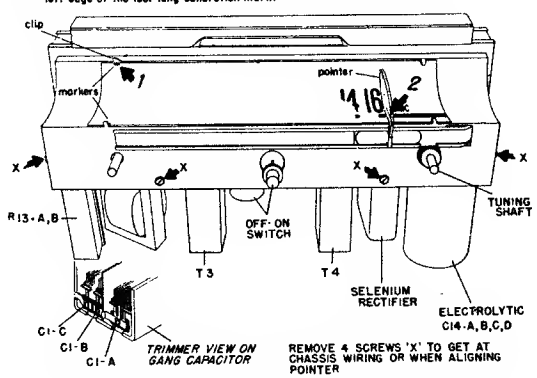
ALL VOLTAGE READING BELOW 9 VOLTS TAKEN ON 10 VOLT SCALE, ABOVE 9 VOLTS ON 250 VOLT SCALE UNLESS OTHERWISE INDICATED.

ALL PLUS VALUES TAKEN WITH MINUS SIDE OF VOLTMETER ON B- LINE

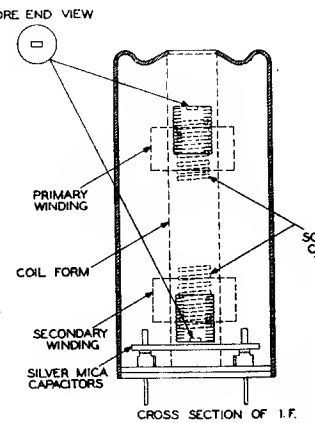
To Align Pointer!

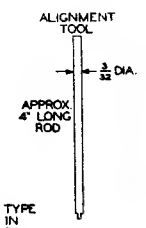
1 - Line up markers with clips

2 - Turn tuning shaft completley clockwise, line up right side of pointer with the left edge of the last long calibration mark.



REMOVE 4 SCREWS 'X' TO GET AT CHASSIS WIRING OR WHEN ALIGNING POINTER





Frequency Range.....535 to 1600 kc.
Intermediate Freq.....455 kc.

WARDS

84BR-1065A

CAUTION—The I.F. transformer construction is such that two resonance peaks occur for each winding, one peak when the slug is above its coil and another peak when the slug is below its coil. Be sure the upper cores are above the top coils and the lower cores are below the bottom coils (see coil drawing).

74BR-1501B, 1502B

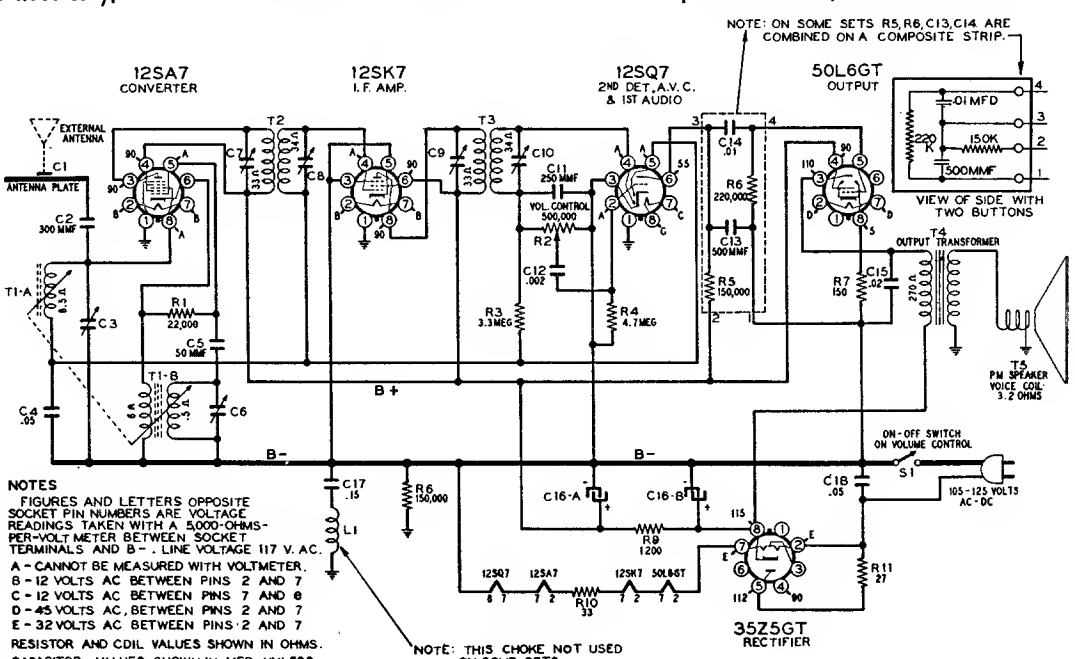
ALIGNMENT PROCEDURE AND RECEIVER STAGE SENSITIVITIES

The signal source must be an accurately calibrated signal generator capable of supplying R. F. signals modulated 30% with a 400-cyle audio signal. A 400-cycle source is necessary for the audio measurement.

The table below lists the sensitivity at various points. All measurements are based on an output of 50- milliwatts. This may be measured by disconnecting the speaker voice coil and substituting a 3.2-ohm, 5-watt resistor across the secondary winding of the output transformer. A reading of .4 volts AC across this resistor will be equivalent to a 50-milliwatt output with the speaker connected. Variations of plus or minus 25% are usually permissable. Volume control at maximum for all adjustments.

SIGNAL GENERATOR				TUNER SETTING	ADJUST FOR MAXIMUM OUTPUT	INPUT FOR 50-MILLIWATT OUTPUT
Frequency	Coupling Capacitor	Connection to Radio	Ground Connection			
455 kc	.1 mf	Metal antenna plate	12SQ7 Pin 3	Iron cores all the way out	Trimmers on output and input I.F. cans	———
1720 kc	.1 mf	Metal antenna plate	12SQ7 Pin 3	Iron cores all the way out	Oscillator trimmer C6	———
1720 kc	200 mmf	External antenna clip	12SQ7 Pin 3	Iron cores all the way out	Antenna trimmer C3	———
1400 kc	200 mmf	External antenna clip	12SQ7 Pin 3	1400 kc	Adjust position of ant. coil (see coil illustration view)	31 microvolts
1720 kc	200 mmf	External antenna clip	12SQ7 Pin 3	1720 kc	Antenna trimmer C3*	31 microvolts
1000 kc	200 mmf	External antenna clip	12SQ7 Pin 3	1000 kc	———	28 microvolts
455 kc	.1 mf	12SA7, Pin 8	12SQ7 Pin 3	Iron cores all the way out	———	82 microvolts
400 cycles	.1 mf	12SQ7, Pin 2	12SQ7 Pin 3	———	———	.05 volts

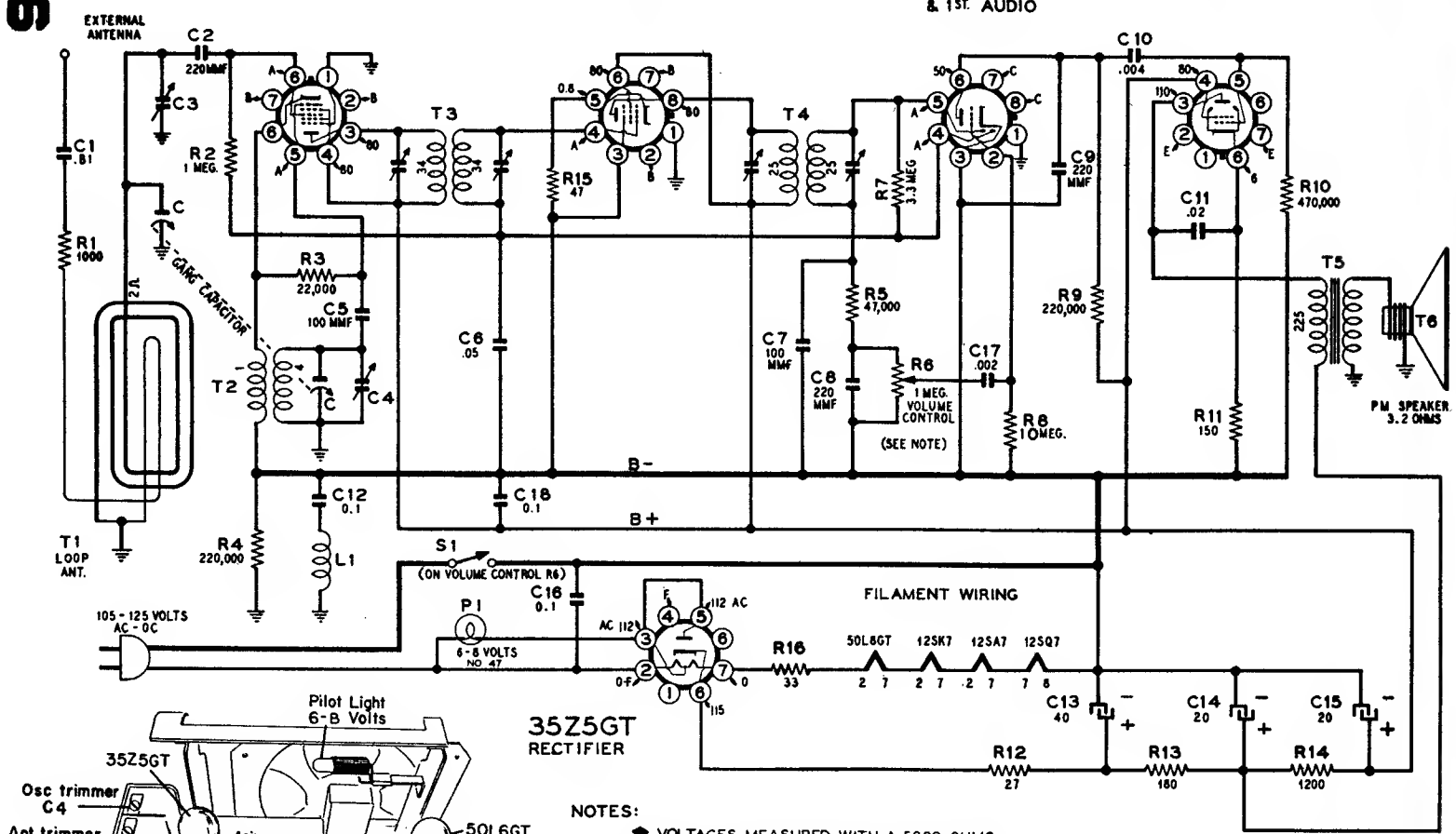
*After the antenna coil has been tracked at 1400 kc, it is necessary to check the antenna trimmer C3 again at 1720 kc. If no appreciable change in trimmer adjustment is necessary, the coil is in track. If the trimmer requires considerable change, the position of the antenna coil at 1400 kc must be readjusted. These two adjustments should be made several times, until no trimmer adjustment is required at 1720 kc.



NOTES: On some sets dual trimmer C3, C6 is grounded to chassis instead of to B— as shown above. On some sets R6 is 470K ohms and R5 is 220K ohms. On some sets R10 is not used.

WARDS Airline RADIO

MODELS 84BR-1503D, 1504D



Frequency Range .....530 to 1630 kc.
Intermediate Freq....455 kc.

NOTES:

◆ VOLTAGES MEASURED WITH A 5000-OHMS-PER-VOLT METER BETWEEN B- AND SOCKET TERMINALS. LINE VOLTAGE 117 VOLTS AC.

A – CANNOT BE MEASURED WITH VOLTMETER.
B – 11 VOLTS AC ACROSS PINS 2 AND 7.
C – 11 VOLTS AC ACROSS PINS 7 AND 8.
D – 35 VOLTS AC ACROSS PINS 2 AND 7
E – 49 VOLTS AC ACROSS PINS 2 AND 7.
F – 117 VOLTS AC ACROSS PINS 2 AND 4.

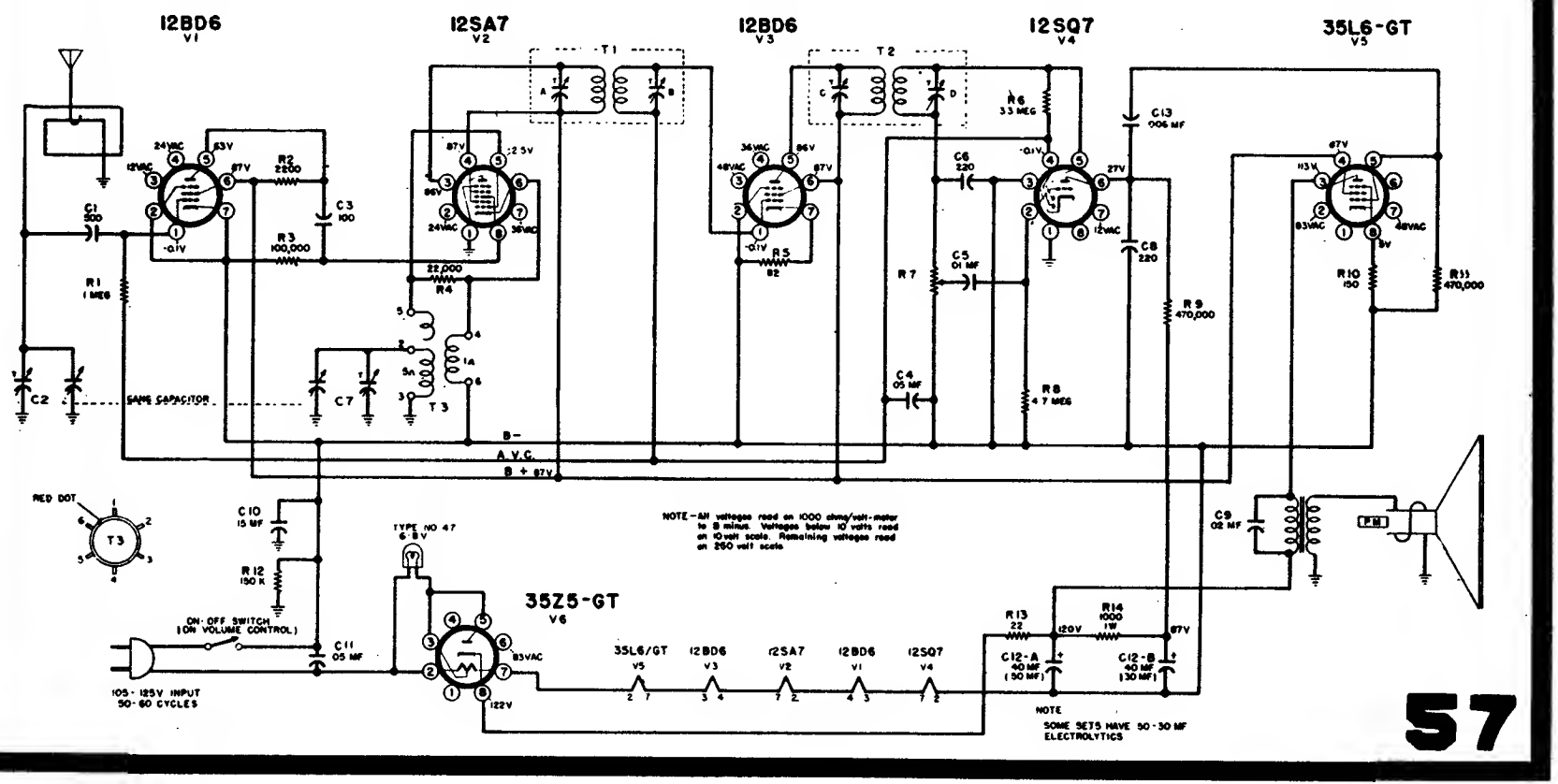
WHERE NO READING IS INDICATED VOLTAGE IS *ZERO*.

CAPACITOR VALUES IN MFD UNLESS OTHERWISE INDICATED.
RESISTOR AND COIL VALUES IN OHMS.
WHERE VALUE OF COIL IS NOT SHOWN, RESISTANCE IS LESS THAN ONE OHM.

NOTE

SOME SETS HAVE 500,000 OHM VOLUME CONTROL.

NOTE: On some sets the B+ lead of the second I F is connected to C14 instead of C15.


12BD6
V1
12SA7
V2
12BD6
V3
12SQ7
V4
35L6-GT
V5
T1
T2
T3
C1 500
C2
C3 100
C4 05 MF
C5 01 MF
C6 220
C7
C8 220
C9 02 MF
C10 15 MF
C11 05 MF
C12-A 40 MF (150 MF)
C12-B 40 MF 130 MF
C13 006 MF
R1 1 MEG
R2 2200
R3 100,000
R4 22,000
R5 82
R6 33 MEG
R7
R8 47 MEG
R9 470,000
R10 150
R11 470,000
R12 150 K
R13 22
R14 1000 1W
SAME CAPACITOR
B-
A.V.C.
B + 87V
RED DOT
TYPE NO 47
6.8 V
35Z5-GT
V6
ON-OFF SWITCH (ON VOLUME CONTROL)
105-125 V INPUT 50-60 CYCLES
83VAC
122V
35L6/GT V5
12BD6 V3
12SA7 V2
12BD6 V1
12SQ7 V4
120V
87V
PM
NOTE—All voltages read on 1000 ohms/volt-meter to B minus. Voltages below 10 volts read on 10-volt scale. Remaining voltages read on 250 volt scale
NOTE
SOME SETS HAVE 50-30 MF ELECTROLYTICS

WARDS 84BR-1507B, 1508B

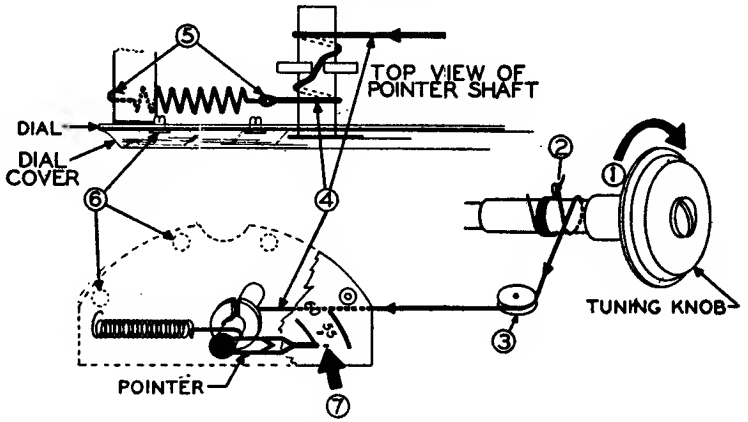
ALIGNMENT PROCEDURE

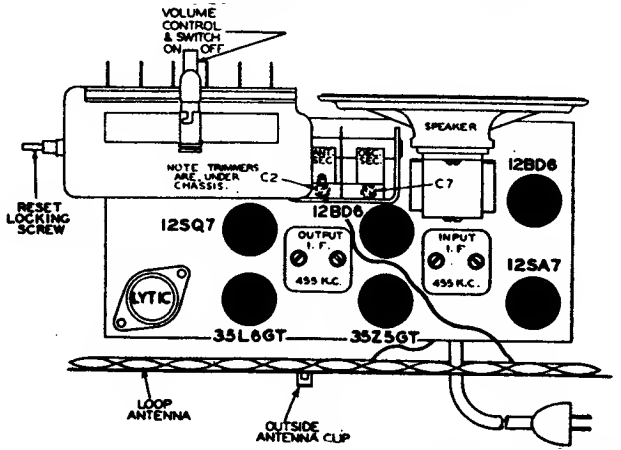
The signal source must be an accurately calibrated signal generator capable of supplying R. F. signals modulated 30% with a 400-cycle audio signal. A 400-cycle source is necessary for the audio measurement.

The table below lists the sensitivity at various points. All measurements are based on an output of 50-milliwatts. This may be measured by disconnecting the speaker voice coil and substituting a 3.2-ohm, 5-watt resistor across the secondary winding of the output transformer. A reading of .4 volts AC across this resistor will be equivalent to a 50-milliwatt output with the speaker connected. Variations of plus or minus 25% are usually permissable. Volume control at maximum for all adjustments.

SIGNAL GENERATOR				TUNER SETTING	ADJUST FOR MAXIMUM OUTPUT	INPUT FOR 50-MILLIWATT OUTPUT
Frequency	Coupling Capacitor	Connection to Radio	Ground Connection			
455 kc.	.1 mf.	Pin No. 8 of 12SA7	12SQ7 Pin 3	Rotor full open	Trimmers on output and input I.F. cans	100 microvolts
1650 kc.	.1 mf.	Pin No. 8 of 12SA7	12SQ7 Pin 3	Rotor full open	Oscillator trimmer C7 (on bottom)	———
1400 kc.	none	See note A	none	Set dial at 1400	Antenna trimmer C2 (on bottom)	———
1400 kc.	.1 mf.	External antenna clip	12SQ7 Pin 3	1400 kc.	———	13 microvolts
400 cycles	.1 mf.	12SQ7, Pin 2	12SQ7 Pin 3	———	———	.05 volts

Note A: Lay output lead of generator in back of loop antenna. Turn up generator output. Loop antenna will pick up energy.





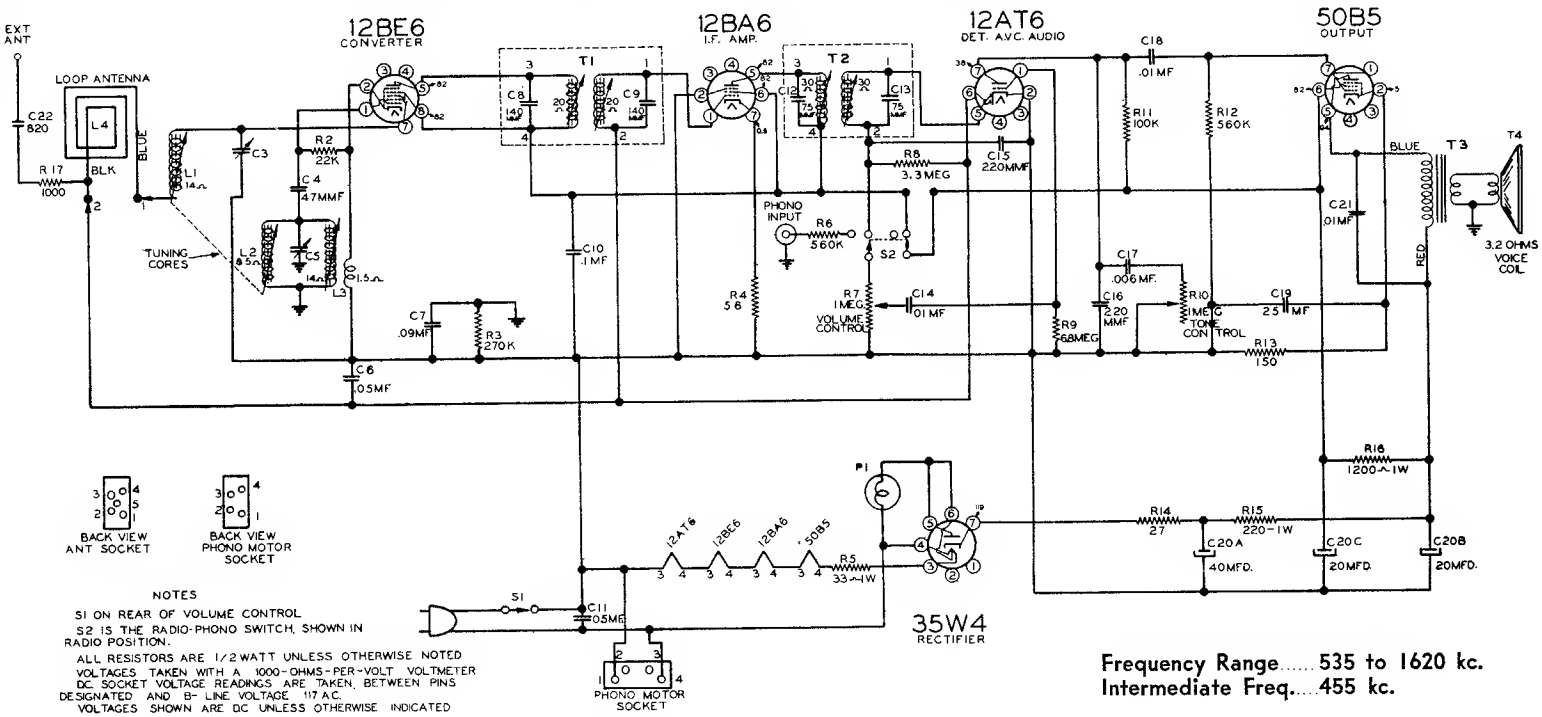
NOTE: On some sets slug tuned I.-F.'s are used instead of trimmer tuned I.-F.'s. 108-140H and 108-145 are trimmer tuned. B-13A-12023 and B-13B-12022 are slug tuned. The slug tuned I.-F.'s are tuned from the top and bottom (secondary on top, primary on bottom).

When slug tuned I. F.'s are used, R5 is 270 ohms.

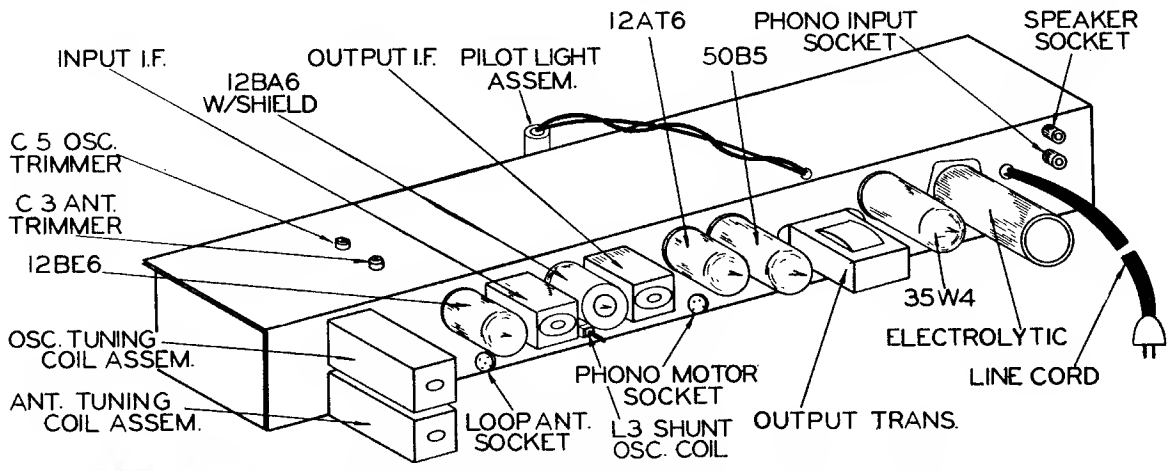
MANUAL OF 1949 MOST-OFTEN-NEEDED RADIO DIAGRAMS

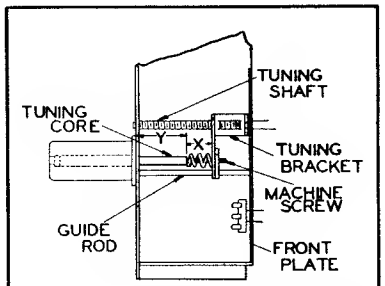
MONTGOMERY WARD

MODEL 84BR-2003C



Frequency Range.....535 to 1620 kc.
Intermediate Freq.....455 kc.





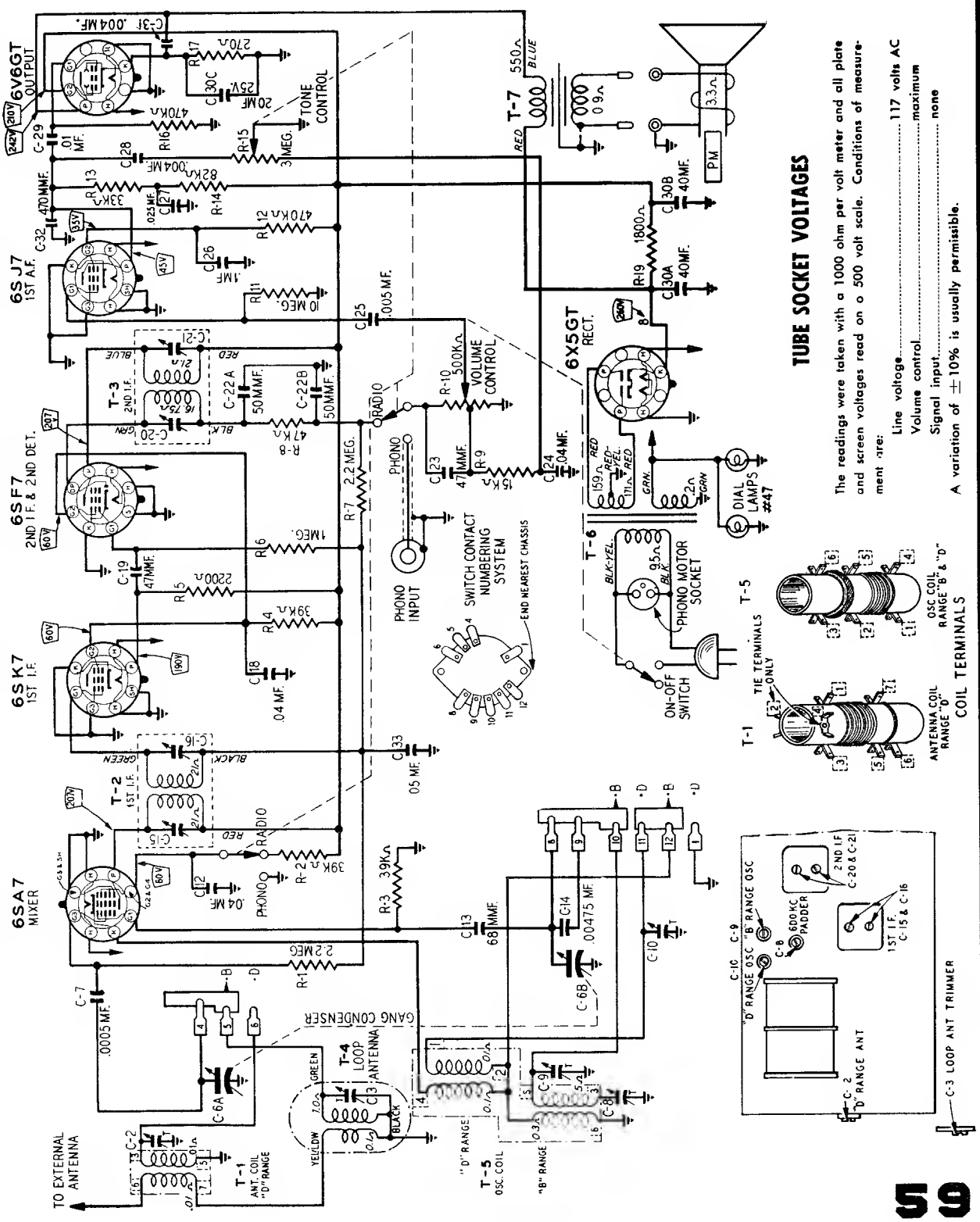
BOTH TUNING CORES PROTRUDE 19/32" OUT OF BASE OF TUNING COIL ASSEMBLIES, WHEN THE TUNING BRACKET IS AGAINST THE FRONT PLATE AS SHOWN IN DRAWING, (DIMENSION Y.)
THE TOTAL LENGTH OF MACHINE SCREW IS 3/4 IN. DIMENSION X-APPROX. 7/16 IN.

NOTE: On some sets, the loop antenna socket is eliminated and leads are brought out thru the hole.

MONTGOMERY WARD

MODEL 84 WG-2704D

Frequency Range.....B range—540-1600 KC
D range—5.75 to 18.3 MC
Intermediate Frequency..455 KC

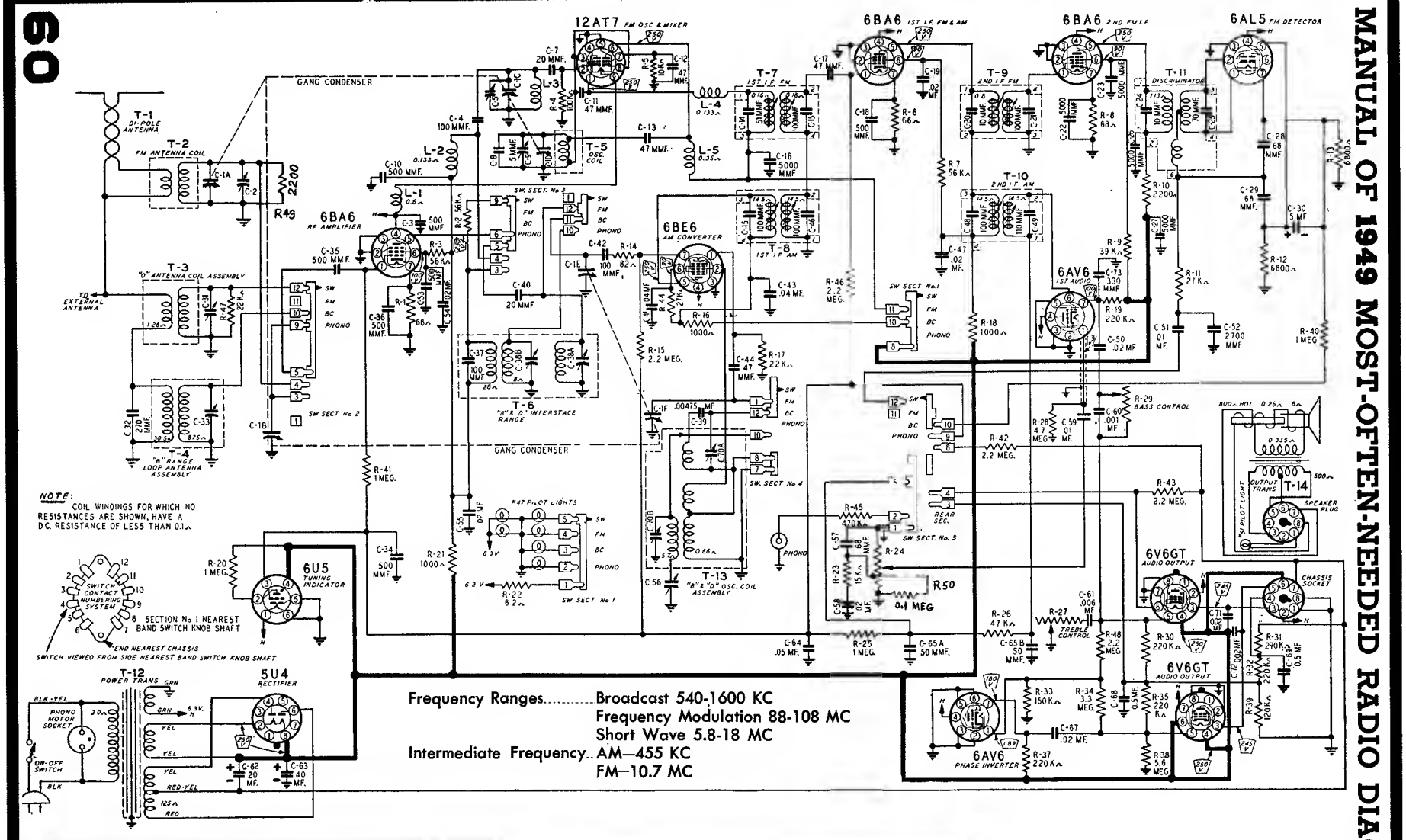


TUBE SOCKET VOLTAGES

The readings were taken with a 1000 ohm per volt meter and all plate and screen voltages read on o 500 volt scale. Conditions of measurement are:

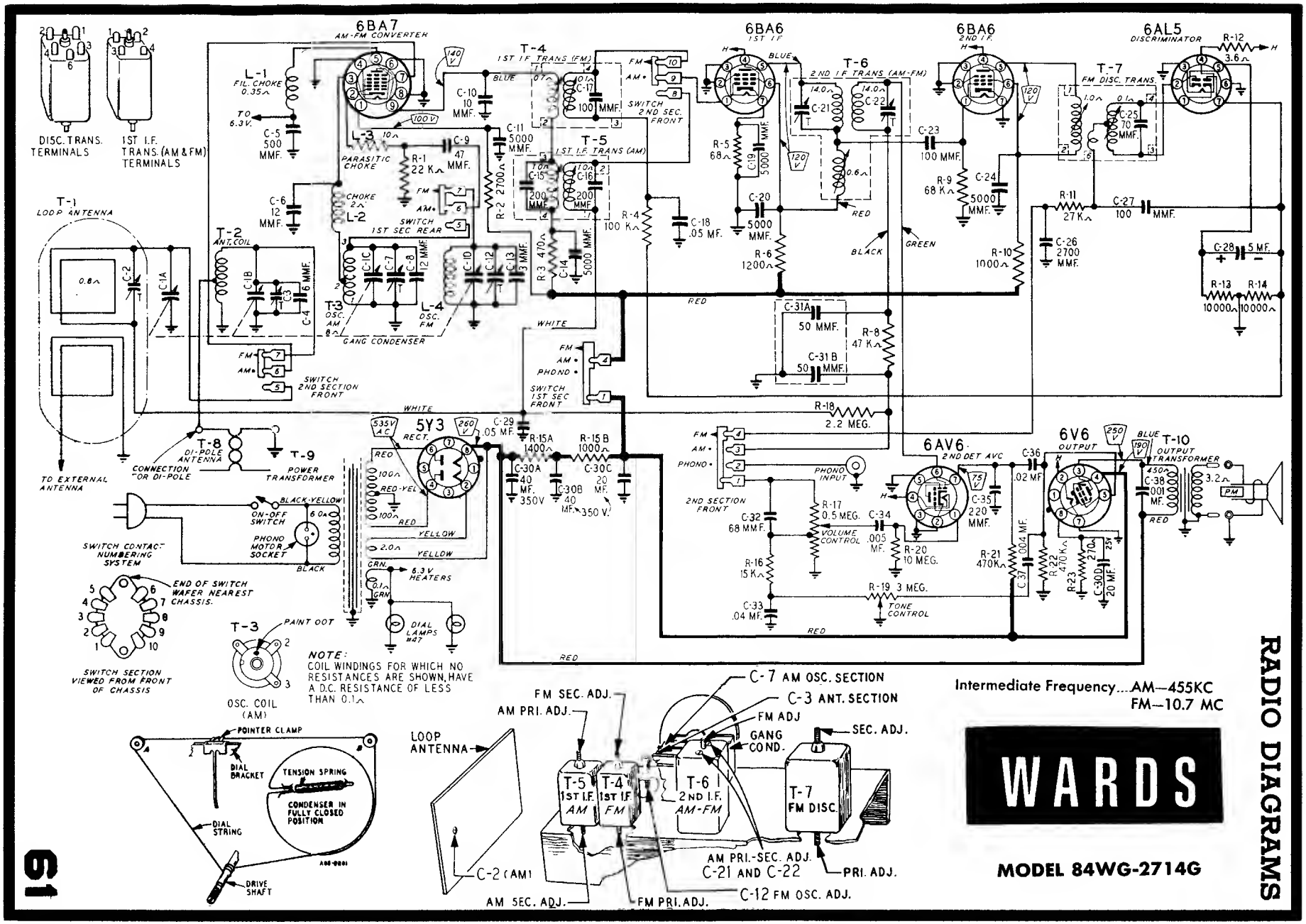
Line voltage.....117 volts AC
Volume control.....maximum
Signal input.....none

A variation of ±10% is usually permissible.



WARDS Airline RADIO

MODEL 84WG-2712A


6BA7
AM-FM CONVERTER
6BA6
1ST I.F.
6BA6
2ND I.F.
6AL5
DISCRIMINATOR
5Y3
RECT.
6AV6
2ND DET AVC
6V6
OUTPUT
DISC. TRANS. TERMINALS
1ST I.F. TRANS. (AM & FM) TERMINALS
T-1 LOOP ANTENNA
T-2 ANT. COIL
T-3 OSC. AM
T-4 1ST I.F. TRANS (FM)
T-5 1ST I.F. TRANS (AM)
T-6 2ND I.F. TRANS (AM-FM)
T-7 FM DISC. TRANS.
T-8 DI-POLE ANTENNA
T-9 POWER TRANSFORMER
T-10 OUTPUT TRANSFORMER
L-1 FIL. CHOKE 0.35Ω
L-2 CHOKE 2Ω
L-3 PARASITIC CHOKE
L-4 OSC. FM
GANG CONDENSER
SWITCH 1ST SEC REAR
SWITCH 2ND SECTION FRONT
SWITCH 2ND SEC. FRONT
SWITCH 1ST SEC FRONT
TO EXTERNAL ANTENNA
CONNECTION FOR DI-POLE
ON-OFF SWITCH
PHONO MOTOR SOCKET
SWITCH CONTACT NUMBERING SYSTEM
END OF SWITCH WAFER NEAREST CHASSIS.
SWITCH SECTION VIEWED FROM FRONT OF CHASSIS
PAINT DOT
OSC. COIL (AM)
DIAL LAMPS #47
6.3 V HEATERS
PHONO INPUT
VOLUME CONTROL
TONE CONTROL
2ND SECTION FRONT
NOTE:
COIL WINDINGS FOR WHICH NO RESISTANCES ARE SHOWN, HAVE A D.C. RESISTANCE OF LESS THAN 0.1Ω
POINTER CLAMP
DIAL BRACKET
TENSION SPRING
CONDENSER IN FULLY CLOSED POSITION
DIAL STRING
DRIVE SHAFT
LOOP ANTENNA
C-2 (AM)
AM SEC. ADJ.
FM SEC. ADJ.
AM PRI. ADJ.
FM PRI. ADJ.
C-7 AM OSC. SECTION
C-3 ANT. SECTION
FM ADJ
GANG COND.
SEC. ADJ.
T-5 1ST I.F. AM
T-4 1ST I.F. FM
T-6 2ND I.F. AM-FM
T-7 FM DISC.
AM PRI.-SEC. ADJ. C-21 AND C-22
PRI. ADJ.
C-12 FM OSC. ADJ.
Intermediate Frequency....AM—455KC
FM—10.7 MC
WARDS
MODEL 84WG-2714G
RADIO DIAGRAMS
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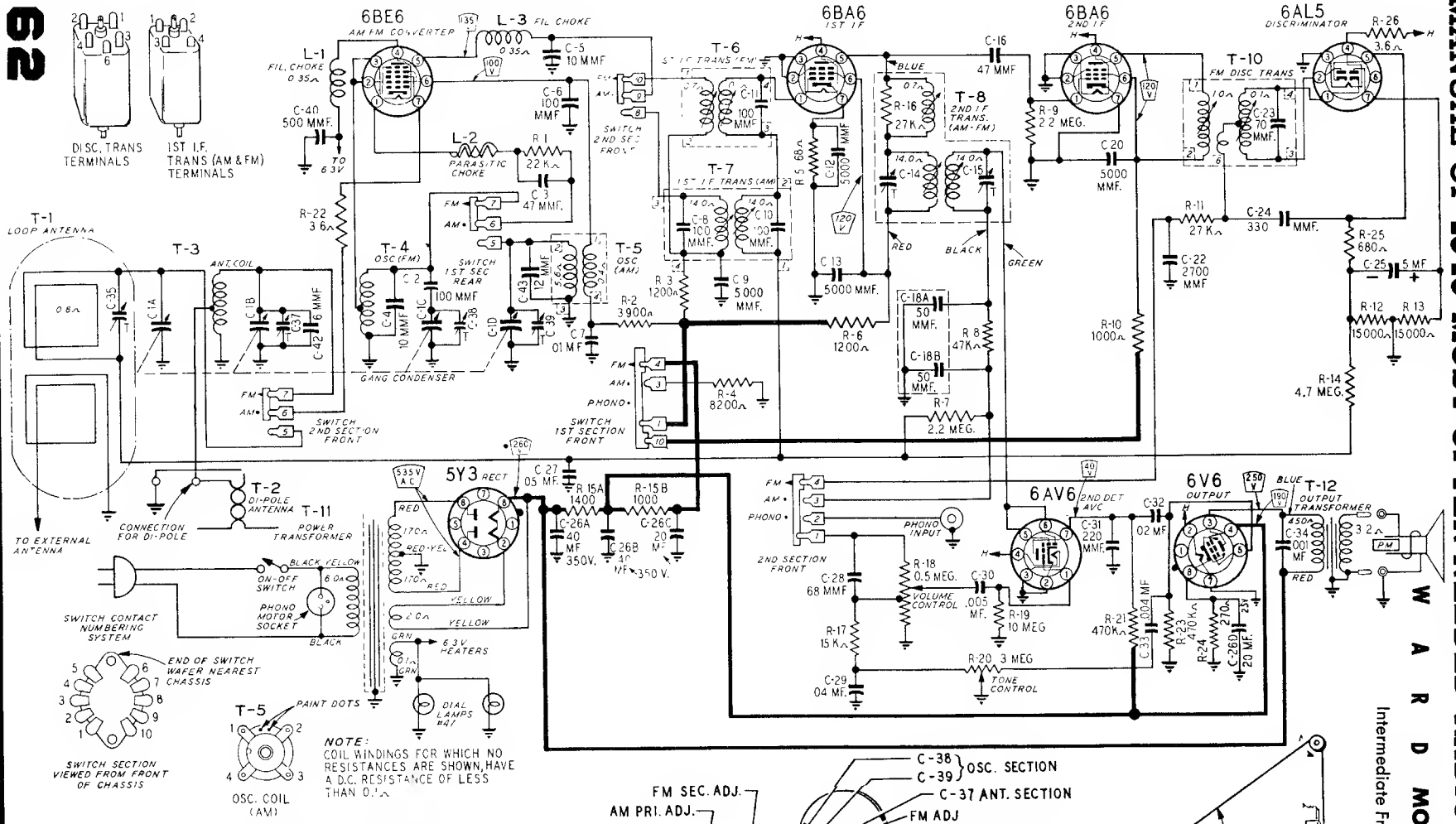
MANUAL OF 1949 MOST-OFTEN-NEEDED RADIO DIAGRAMS

W A R D MODEL 84WG-2721C

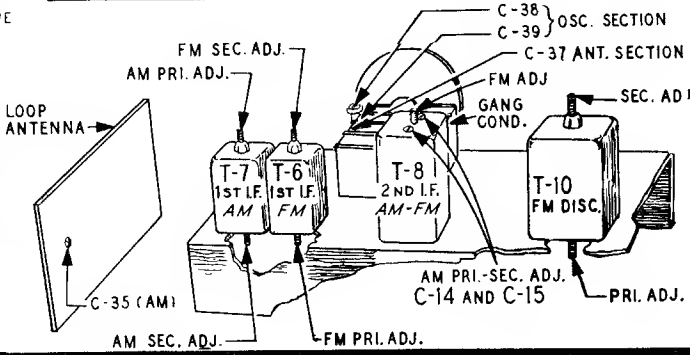
Intermediate Frequency...AM—455KC
FM—10.7 MC

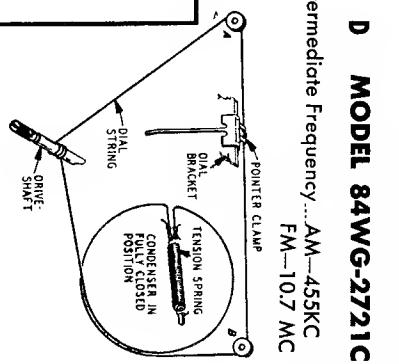


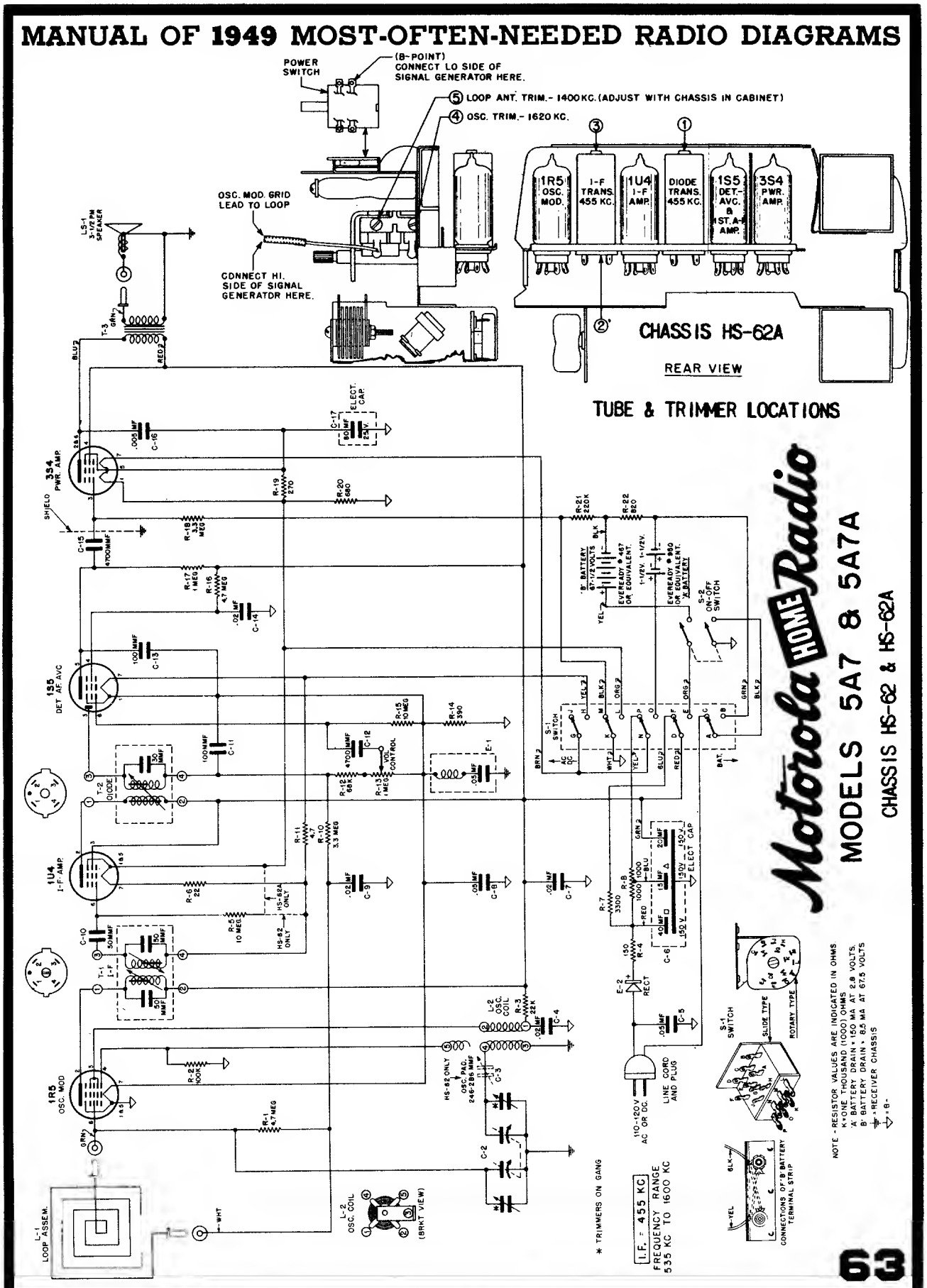
NOTE: COIL WINDINGS FOR WHICH NO RESISTANCES ARE SHOWN, HAVE A D.C. RESISTANCE OF LESS THAN 0.1Ω

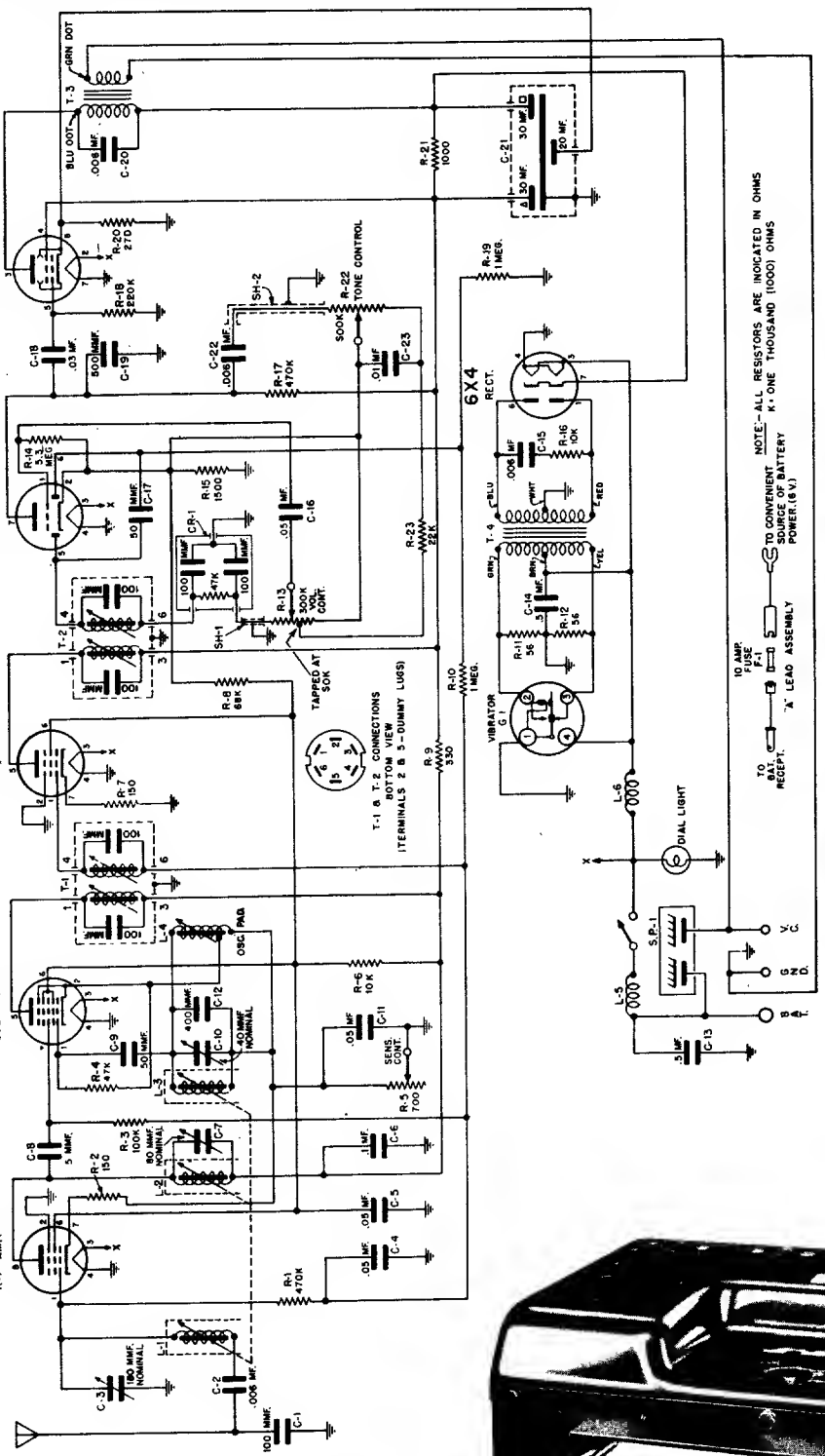
Socket voltages are shown on the schematic diagram at the tube socket terminals. All voltages are between the socket terminal and chassis ground. Plate, screen and cathode voltages were taken with a 1000 ohm-per-volt meter with a 300 volt scale used for plate and screen voltages. Audio grid voltages were read with a vacuum tube volt-meter. Conditions of measurement are:

Line voltage.....117 Volts AC
Signal Input.....None






POWER SWITCH
(8-POINT) CONNECT LO SIDE OF SIGNAL GENERATOR HERE.
5 LOOP ANT. TRIM.- 1400 KC. (ADJUST WITH CHASSIS IN CABINET)
4 OSC. TRIM.- 1620 KC.
OSC. MOD. GRID LEAD TO LOOP
CONNECT HI. SIDE OF SIGNAL GENERATOR HERE.
1R5 OSC. MOD.
I-F TRANS. 455 KC.
1U4 I-F AMP.
DIODE TRANS. 455 KC.
1S5 DET.- AVC. & 1ST. A- AMP.
3S4 PWR. AMP.
CHASSIS HS-62A
REAR VIEW
TUBE & TRIMMER LOCATIONS
Motorola HOME Radio
MODELS 5A7 & 5A7A
CHASSIS HS-62 & HS-62A
LS-1 3-1/2" PM SPEAKER
T-3
S-1 SWITCH
S-2 ON-OFF SWITCH
'B' BATTERY 67-1/2 VOLTS
EVEREADY #467 OR EQUIVALENT.
1-1/2V. 1-1/2V.
'A' BATTERY
EVEREADY #950 OR EQUIVALENT.
T-1 I-F
T-2 DIODE
L-1 LOOP ASSEM.
L-2 OSC. COIL
E-1
E-2 RECT
S-1 SWITCH
SLIDE TYPE
ROTARY TYPE
110-120V AC OR DC.
LINE CORD AND PLUG
CONNECTIONS OF 'B' BATTERY TERMINAL STRIP
* TRIMMERS ON GANG
I.F. = 455 KC
FREQUENCY RANGE
535 KC TO 1600 KC
NOTE - RESISTOR VALUES ARE INDICATED IN OHMS
K=ONE THOUSAND (1000) OHMS
'A' BATTERY DRAIN = 150 MA AT 2.8 VOLTS.
'B' BATTERY DRAIN = 8.5 MA AT 67.5 VOLTS
= RECEIVER CHASSIS
= B-

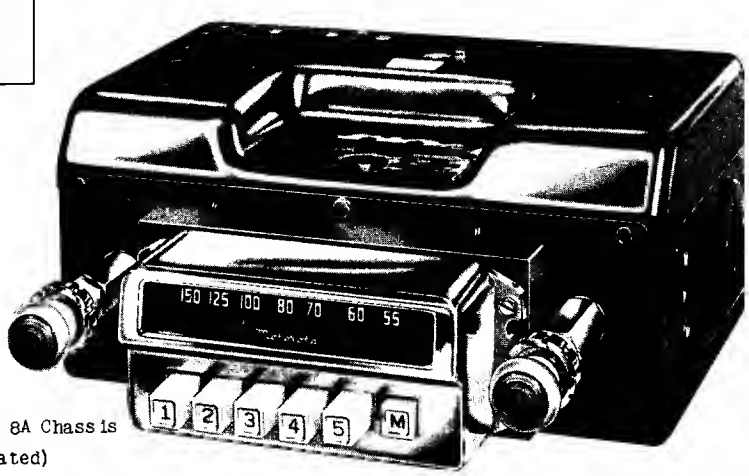


Motorola AUTO Radio

Motorola 8A Chassis is a 8-tube (including rectifier) automotive superheterodyne receiver. This chassis is universal and is used in Motorola Models FD8, CT8, NH8, OE2, OE8, SR6, BK8, BK8X, PC2, PC8, KR8, HN8, 8FDT, 8GMT, etc. An external speaker is used with these receivers.

TUNING RANGE - 535 to 1600 Kc

IF FREQUENCY - 455 Kc

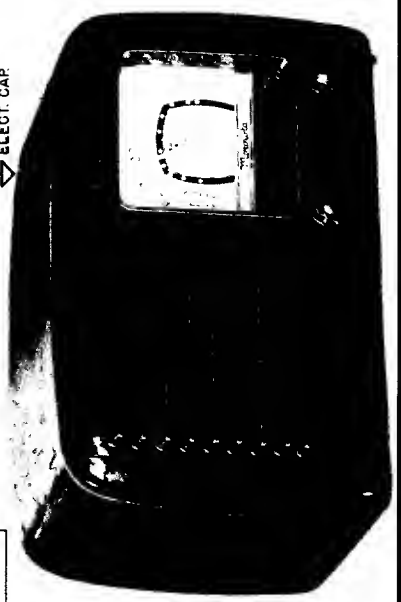


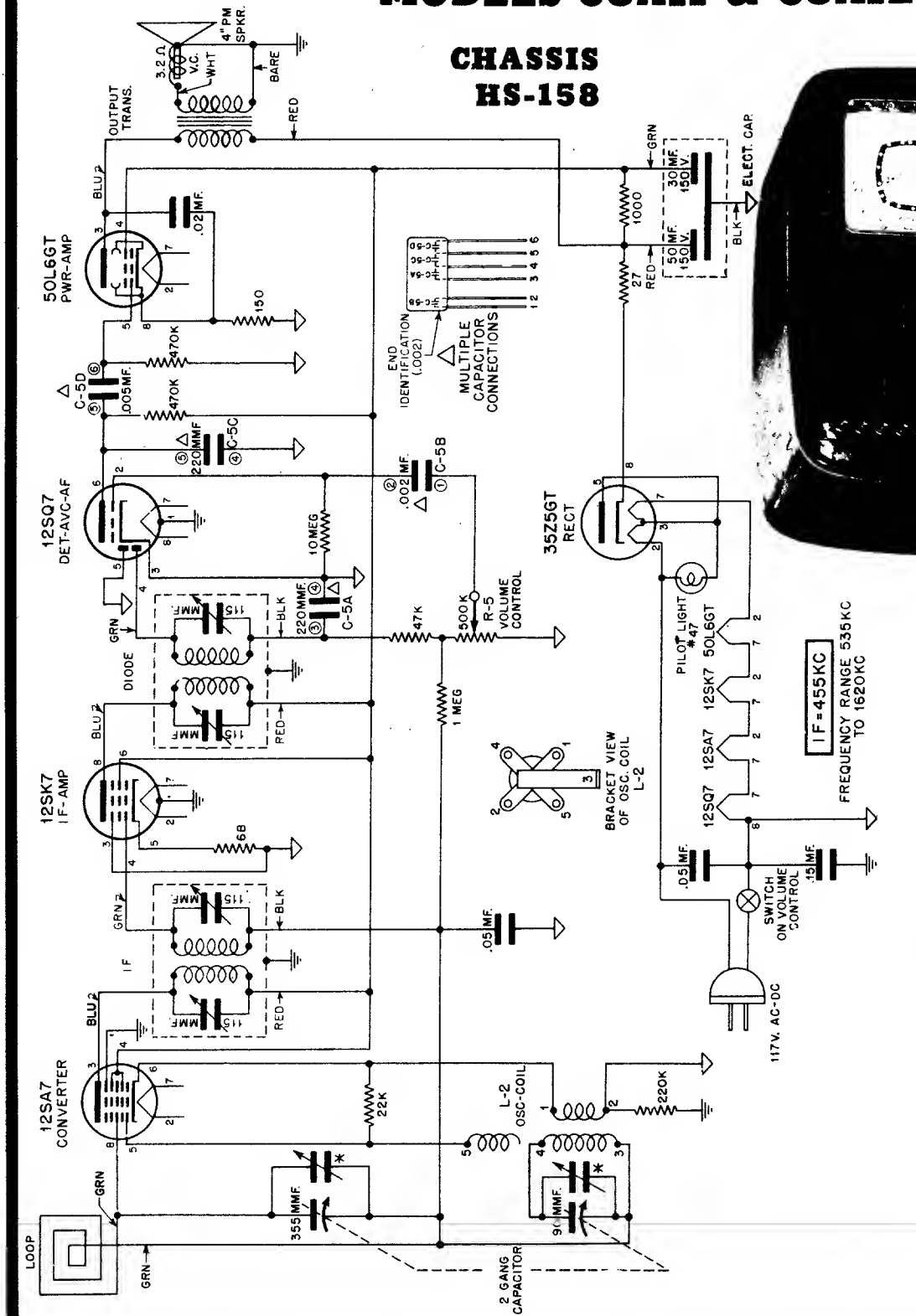
Typical Auto Receiver Using 8A Chassis
(Model CT8 Illustrated)

Motorola HOME Radio

MODELS 58A11 & 58A12

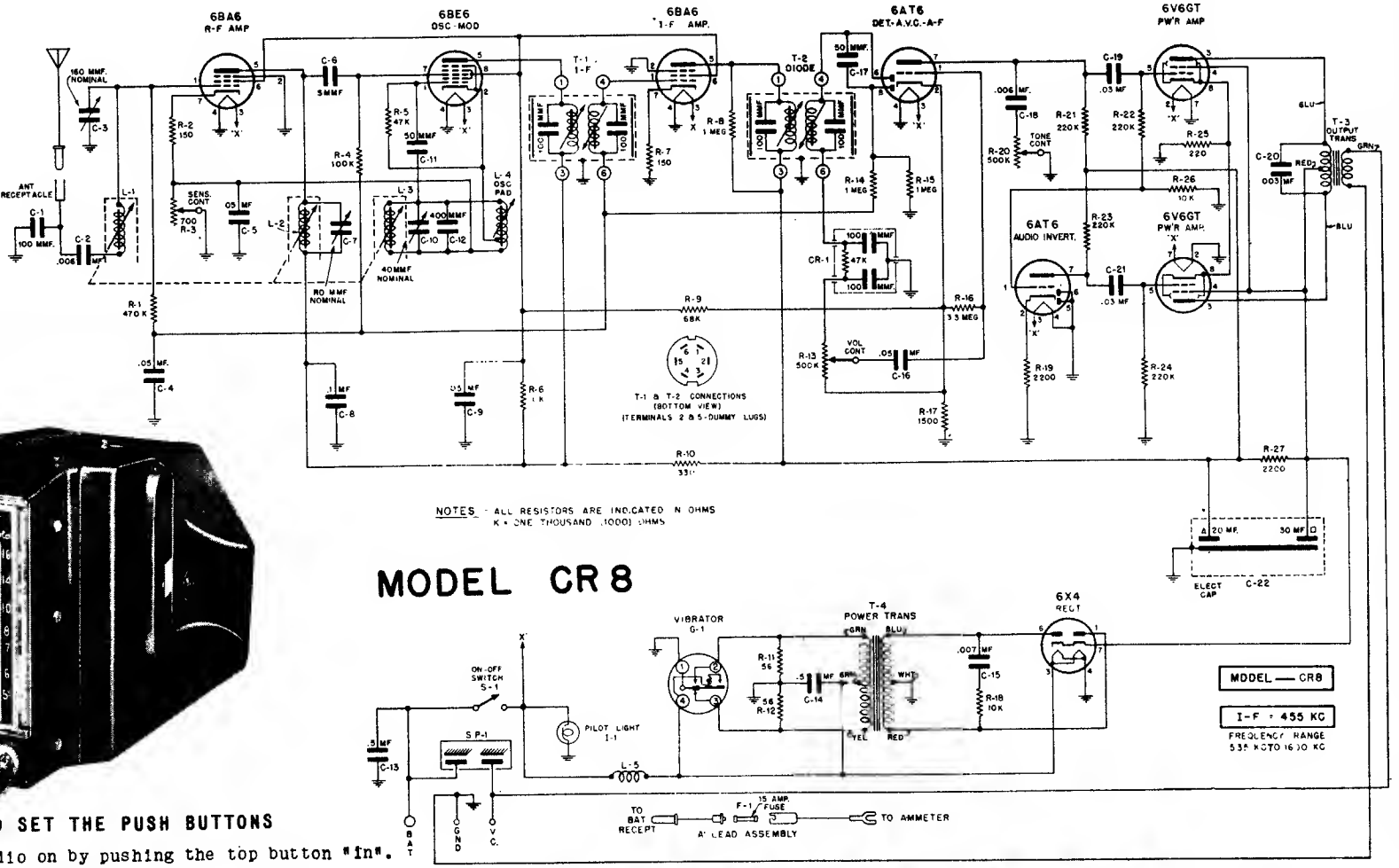
CHASSIS HS-158





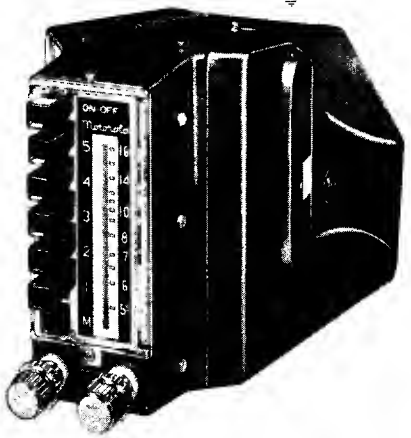
NOTES

= GROUND TO COMMON NEGATIVE.
= GROUND TO CHASSIS.
* = TRIMMER ON GANG.
K = ONE THOUSAND (1000) OHMS.
ALL RESISTORS INDICATED IN OHMS.
△ = MULTIPLE CAPACITOR.



NOTES - ALL RESISTORS ARE INDICATED IN OHMS
K = ONE THOUSAND (1000) OHMS

MODEL CR8



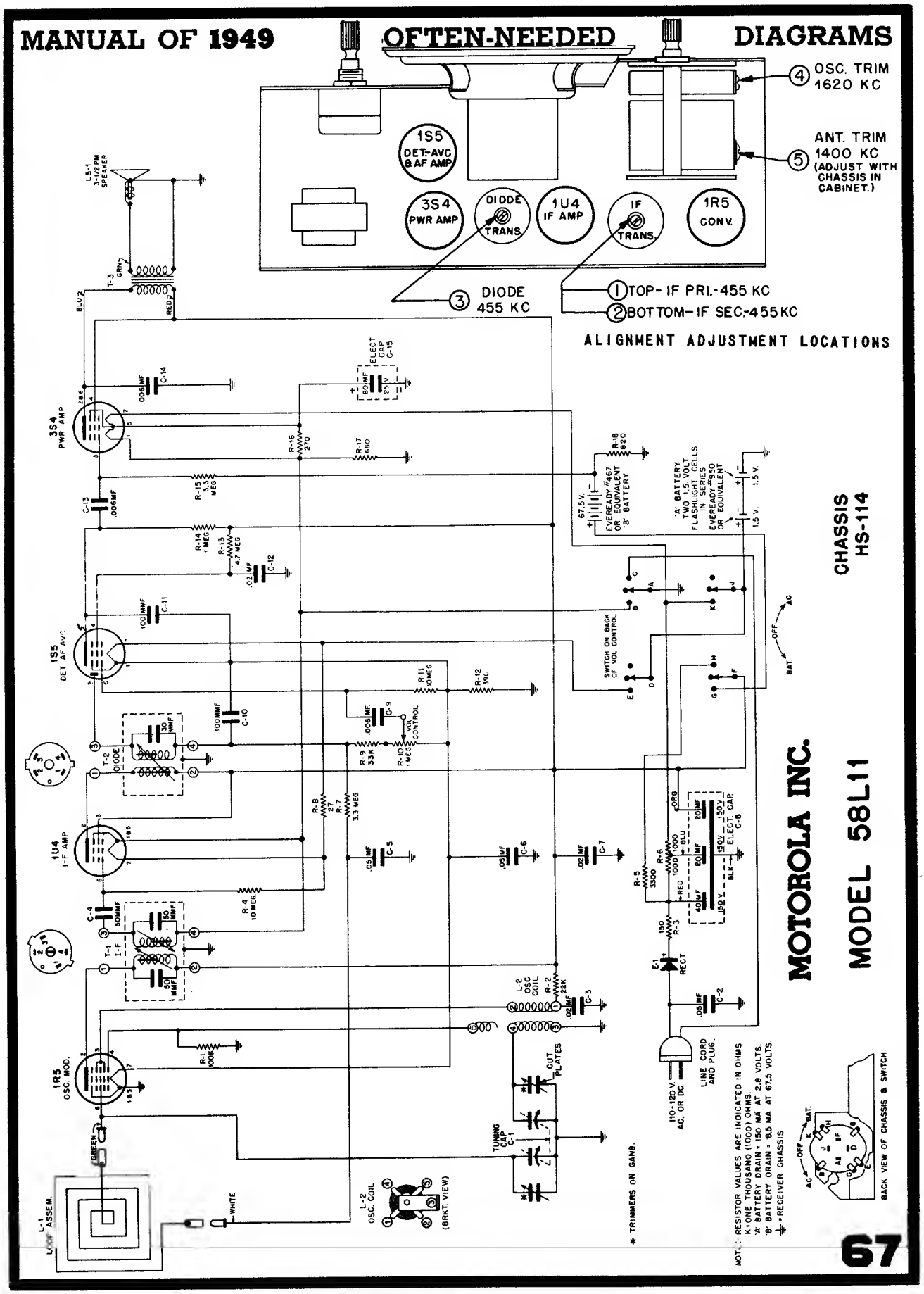
TO SET THE PUSH BUTTONS

1. Turn radio on by pushing the top button "in". Allow radio to warm up for a few minutes.
2. Push the number "1" button in as far as it will go and HOLD IT THAT WAY.
3. With the tuning knob, tune in the station you desire to set up. The pointer will indicate the frequency of the station. Tune carefully until you are exactly on the station; tuning to either side of it will result in poor tone quality. Release button and knob after tuning in station.
4. Follow above steps 2 and 3 for the remaining four buttons.

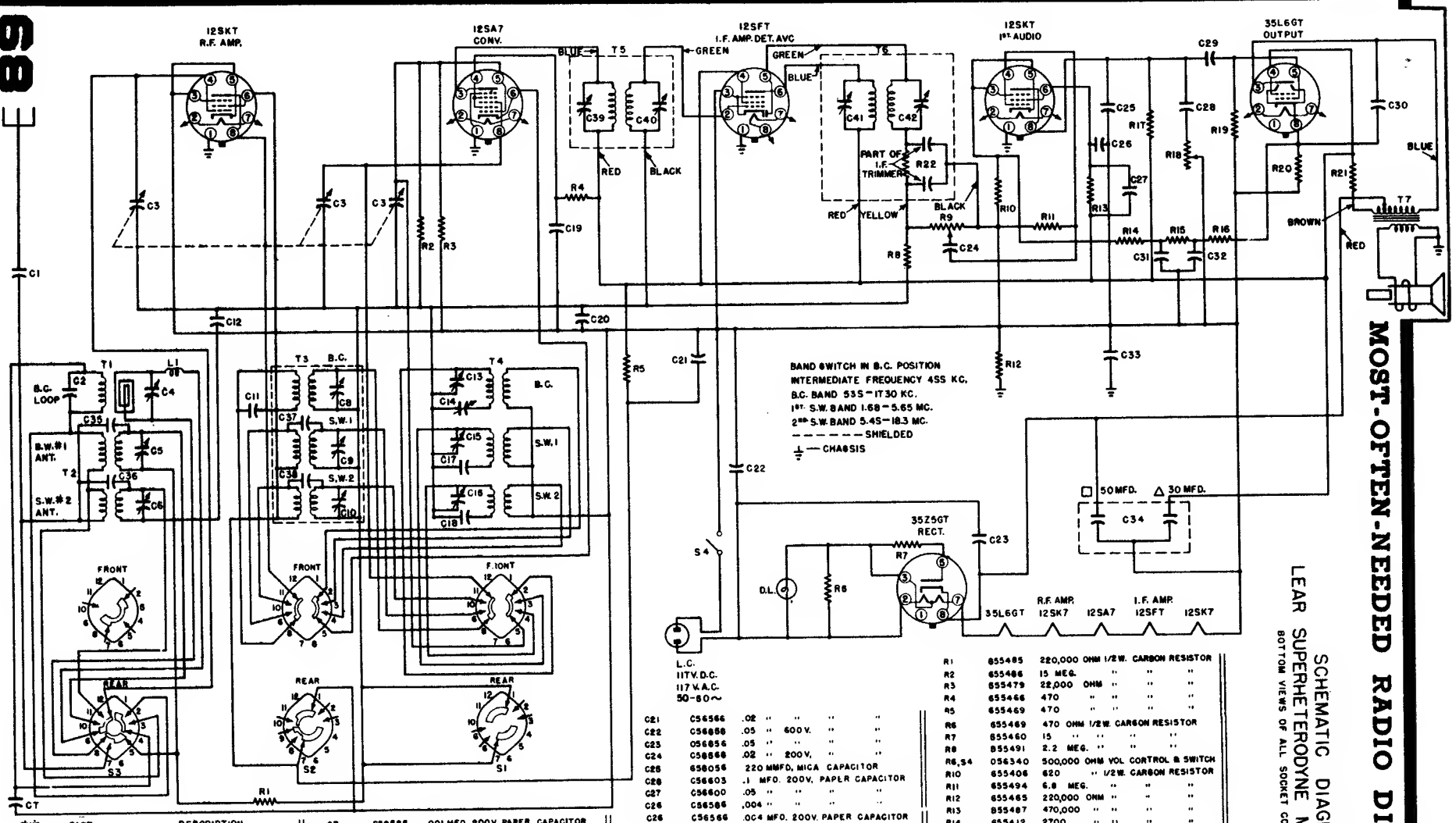
Motorola AUTO Radio

Motorola Model CR8 is an 8-tube (including rectifier) automotive superheterodyne receiver using an external speaker.

This receiver is specifically designed for installation in 1948 Plymouth, Dodge, DeSoto & Chrysler cars. It will also accommodate 1940, 1941, 1942, 1946 & 1947 Plymouth, Dodge, DeSoto & Chrysler cars.


1S5 DET.-AVC & AF AMP
3S4 PWR AMP
DIODE TRANS.
1U4 IF AMP
IF TRANS.
1R5 CONV.
④ OSC. TRIM 1620 KC
⑤ ANT. TRIM 1400 KC (ADJUST WITH CHASSIS IN CABINET.)
③ DIODE 455 KC
① TOP-IF PRI.-455 KC
② BOTTOM-IF SEC.-455 KC
ALIGNMENT ADJUSTMENT LOCATIONS
CHASSIS HS-114
MOTOROLA INC.
MODEL 58L11
67.5 V. EVEREADY #467 OR EQUIVALENT 'B' BATTERY
'A' BATTERY TWO 1.5 VOLT FLASHLIGHT CELLS IN SERIES EVEREADY #950 OR EQUIVALENT
SWITCH ON BACK OF VOL CONTROL
VOL CONTROL
LINE CORD AND PLUG.
110-120 V. AC. OR DC.
BACK VIEW OF CHASSIS & SWITCH
* TRIMMERS ON GANG.
NOTE:- RESISTOR VALUES ARE INDICATED IN OHMS K=ONE THOUSAND (1000) OHMS.
'A' BATTERY DRAIN = 150 MA AT 2.8 VOLTS.
'B' BATTERY DRAIN = 8.5 MA AT 67.5 VOLTS.
⏚ = RECEIVER CHASSIS

MOST-OFTEN-NEEDED RADIO DIAGRAMS



SCHEMATIC DIAGRAM
LEAR SUPERHETERODYNE MODEL 661

BOTTOM VIEWS OF ALL SOCKET CONNECTIONS

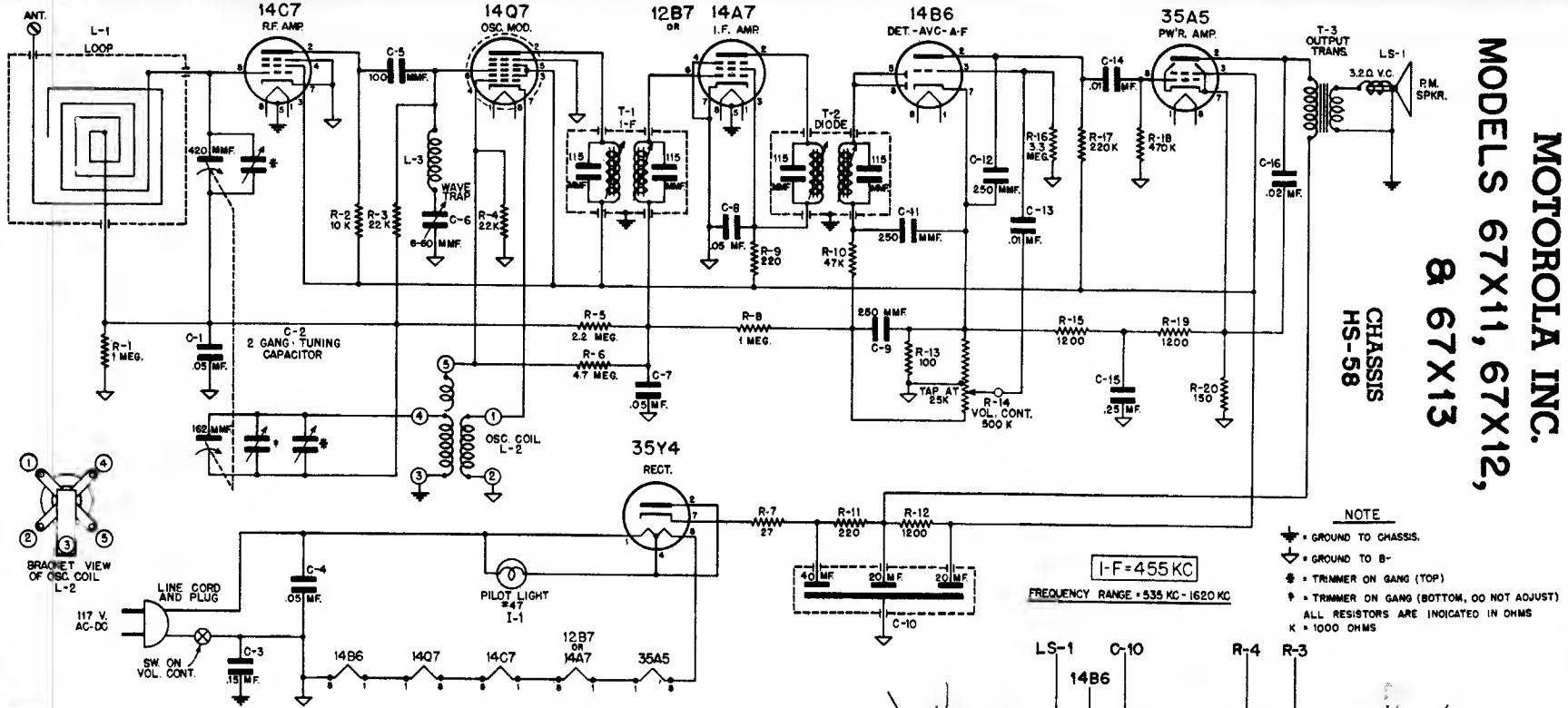
DWG. SYM.	PART NO.	DESCRIPTION
T1	652851	B.C. LOOP ASSEMBLY
T2	650525	S.W. BAND 1 & 2 ANT. COIL ASSEMBLY
T3	650528	B.C.-S.W. 1 & S.W. 2 R.F. " "
T4	650522	" " " " " OSC. "
T5	653350	NO. 1 I.F. TRANSFORMER "
T6	653361	" 2 " " "
T7	852456	OUTPUT "
C1	856059	220 MMFD. MICA CAPACITOR
C2	856053	22 " " "
C3	852642	3 GANG VARIABLE " WITH PULLEY
C4	A52666	B.C. ANT. TRIMMER ASSEMBLY
C5	A52664	S.W. 1 " " "
C6		" 2 " " "
C7	C56585	.001 MFD. 200V. PAPER CAPACITOR
C8	A52644	B.C. R.F. TRIMMER ASSEMBLY
C9		S.W. 1 " " "
C10		" 2 " " "
C11	856055	47 MMFD. MICA CAPACITOR
C12	C56566	.02 MFD. 200V PAPER CAPACITOR
C13	A52665	B.C. OSC. TRIMMER ASSEMBLY
C14		" " PADDER "
C15	A52664	S.W. 1 " TRIMMER "
C16		" 2 " " "
C17	A50235	1250 MMFD. MICA CAPACITOR. TOL. ± 5%
C18	A51931	3900 " " " " "
C19	C56596	.02 MFD. 200V. PAPER CAPACITOR
C20	C56596	.02 " " " "
C21	C56566	.02 " " " "
C22	C56586	.05 " 600V. " "
C23	C56856	.05 " " " "
C24	C56586	.02 " 200V. " "
C25	856056	220 MMFD. MICA CAPACITOR
C26	C56603	.1 MFD. 200V. PAPER CAPACITOR
C27	C56600	.05 " " " "
C28	C56586	.004 " " " "
C29	C56566	.004 MFD. 200V. PAPER CAPACITOR
C30	C56622	.01 " 400V. " "
C31	C56603	.1 " 200V. " "
C32	C56603	.1 " " " "
C33	C56631	.1 " 400V " "
C34	852327	60-30 MFD 150 V ELECTROLYTIC
C35	A52655	3 MMFD. FIXED CAPACITOR
C36	A52655	3 " " "
C37	A52674	3 " " "
C38	A52674	3 " " "
C39,C40		NO. 1 I.F. TRIMMERS (PART OF ASS'Y.)
C41, C42		NO. 2 " " (" " ")
R1	855485	220,000 OHM 1/2W. CARBON RESISTOR
R2	855486	15 MEG. " " "
R3	855479	22,000 OHM " " "
R4	855466	470 " " " "
R5	855469	470 " " " "
R6	855469	470 OHM 1/2W. CARBON RESISTOR
R7	855460	15 " " " "
R8	855491	2.2 MEG. " " "
R9,S4	056340	500,000 OHM VOL CONTROL & SWITCH
R10	855406	620 " 1/2W. CARBON RESISTOR
R11	855494	6.8 MEG. " " "
R12	855465	220,000 OHM " " "
R13	855487	470,000 " " "
R14	855412	2700 " " "
R15	855475	4700 " " "
R16	855476	6800 " " "
R17	855483	100,000 " " "
R18	056339	500,000 " TONE CONTROL
R19	855487	470,000 " 1/2W. CARBON RESISTOR
R20	855466	150 " " "
R21	855940	1200 " 2W. "
R22		47,000 " 1/2W. "
L1	853383	LOADING COIL
S1,S2,S3	652848	BAND SWITCH ASSEMBLY
D.L.	A70855	DIAL LIGHT, TYPE 47
L.C.	A53091	LINE CORD

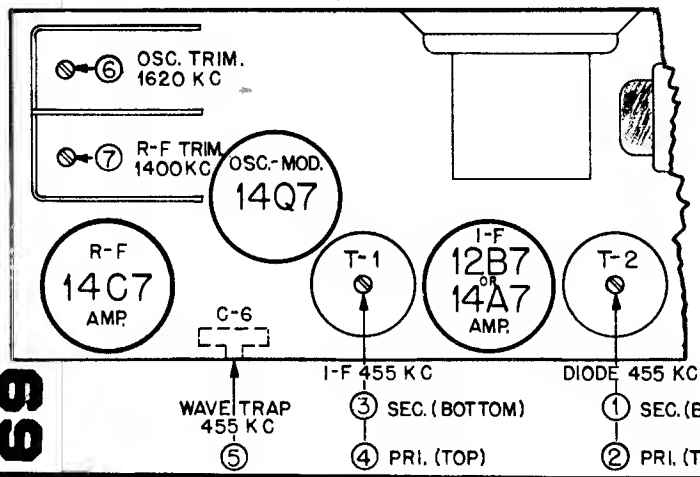
MANUAL OF 1949 MOST-OFTEN-NEEDED RADIO DIAGRAMS

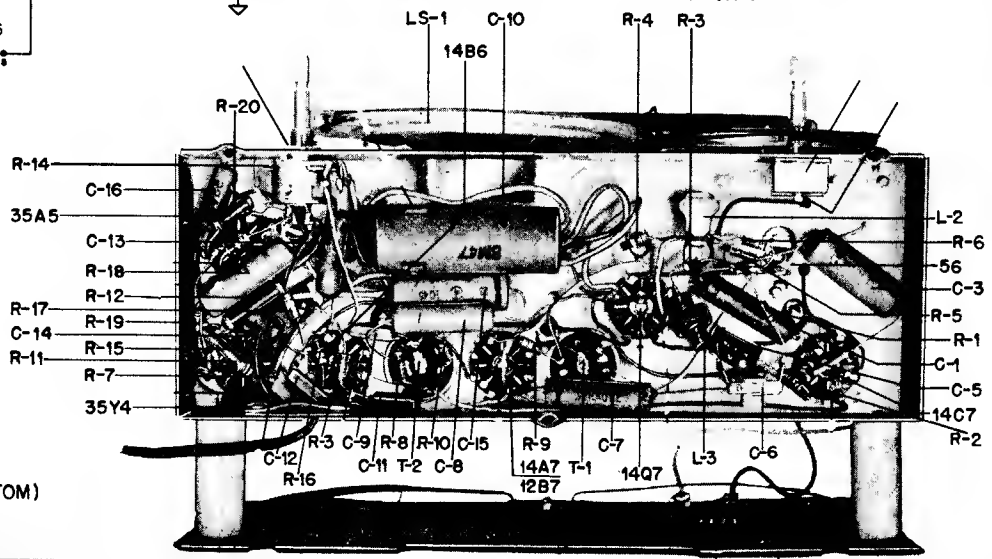
MOTOROLA INC.

MODELS 67X11, 67X12, & 67X13

CHASSIS HS-58



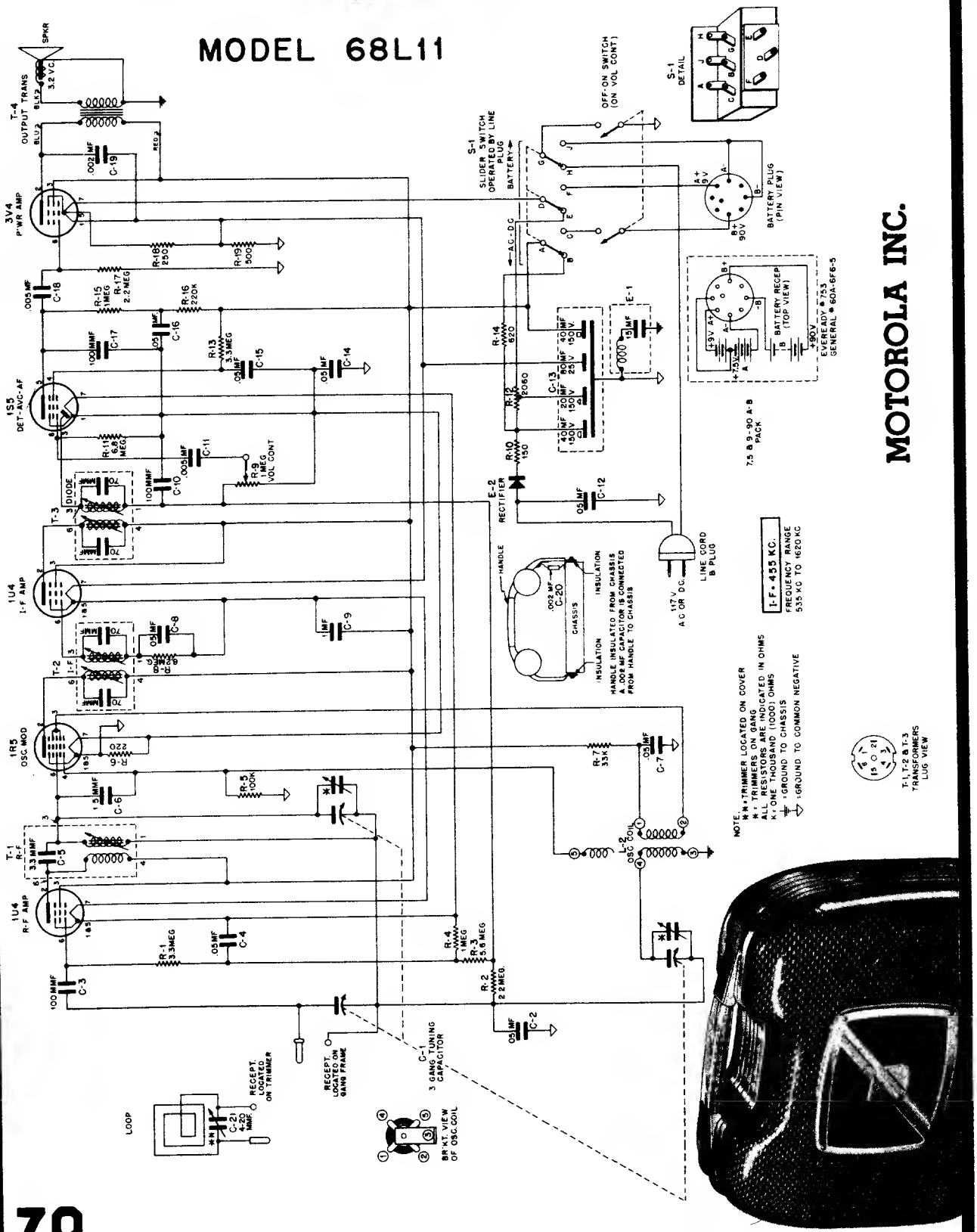


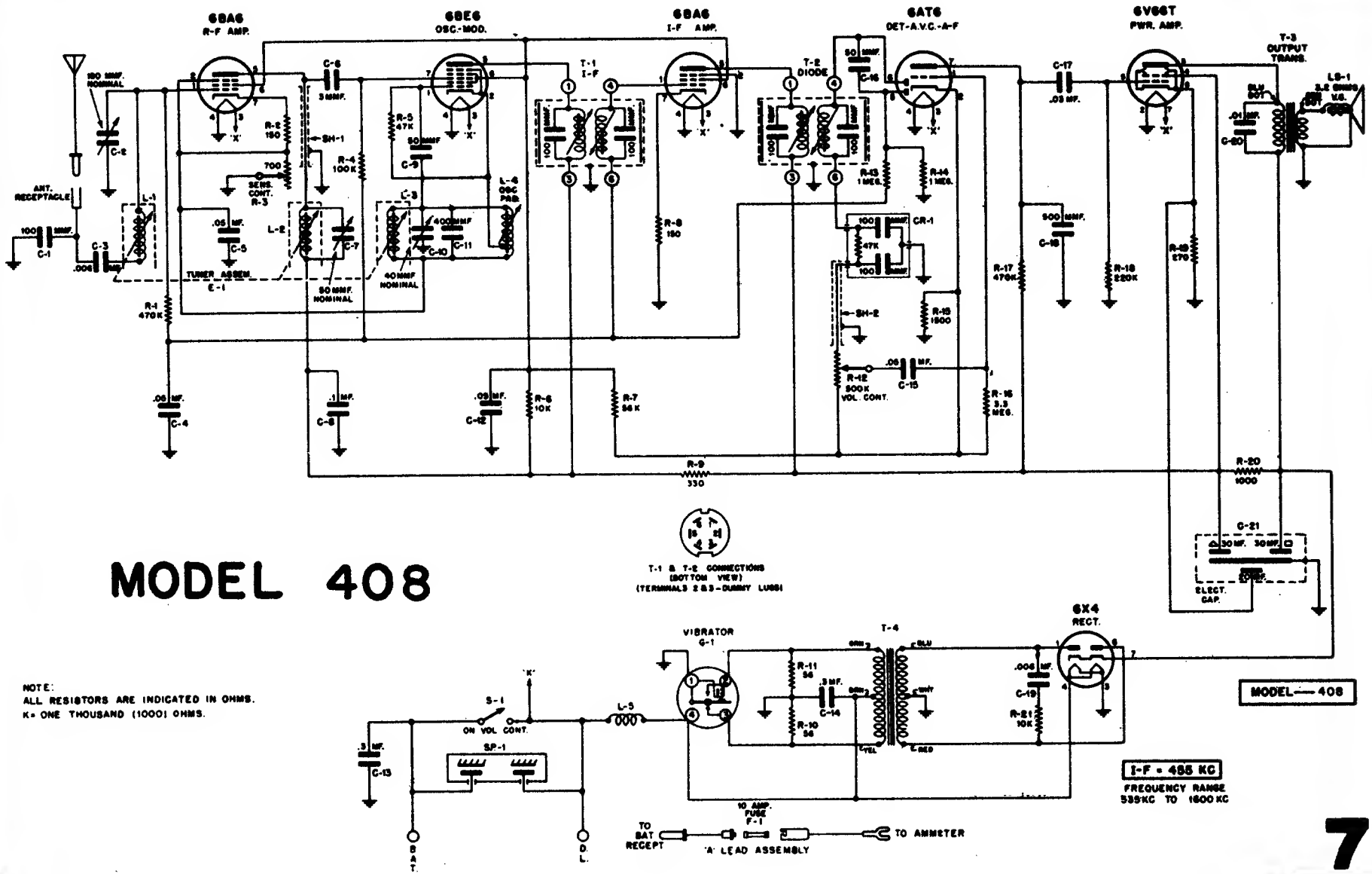


Motorola HOME Radio

CHASSIS
HS-119

MODEL 68L11



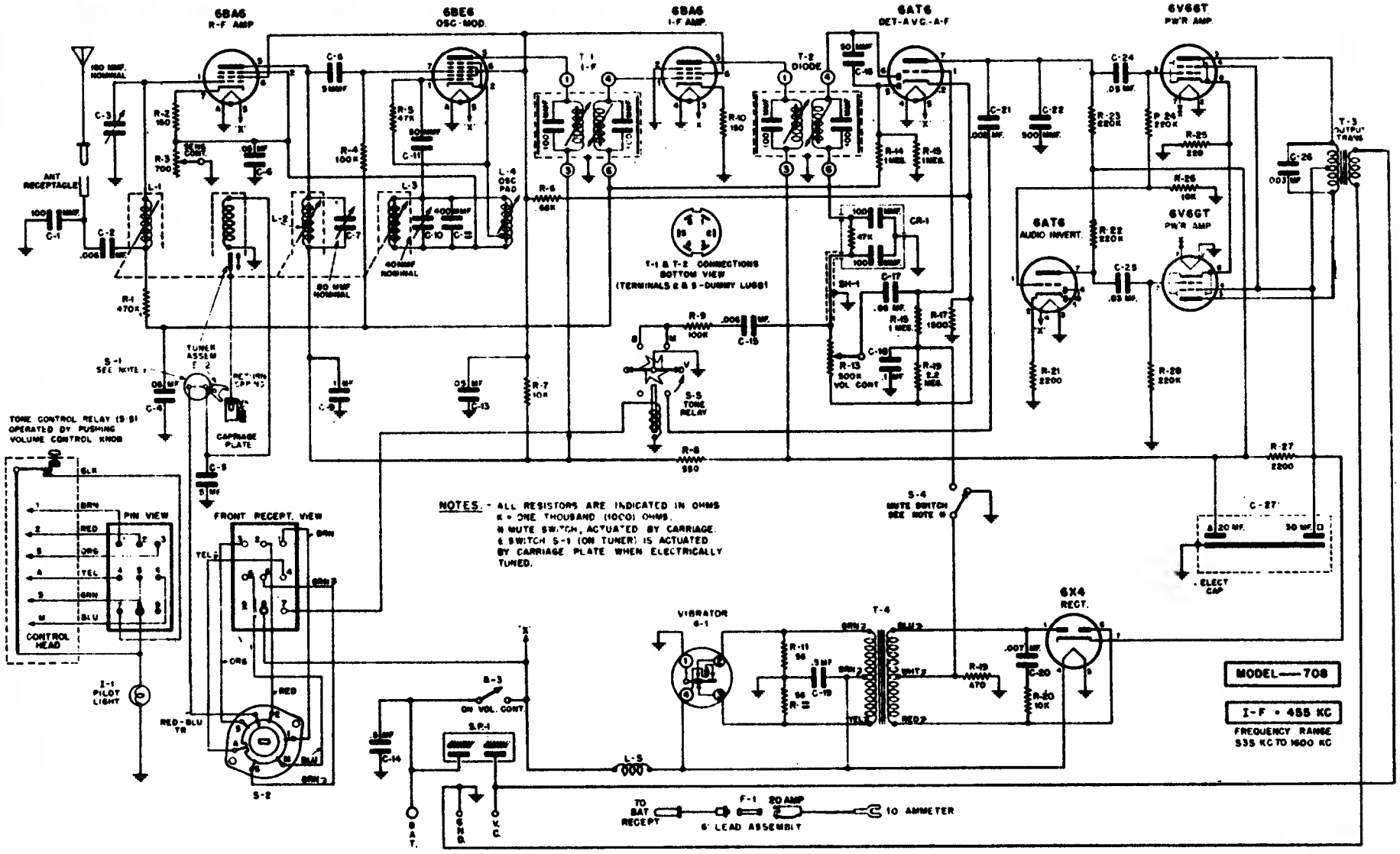


NOTE:
ALL RESISTORS ARE INDICATED IN OHMS.
K= ONE THOUSAND (1000) OHMS.

MANUAL OF 1949 MOST-OFTEN-NEEDED RADIO DIAGRAMS

Motorola AUTO Radio

MODEL 708

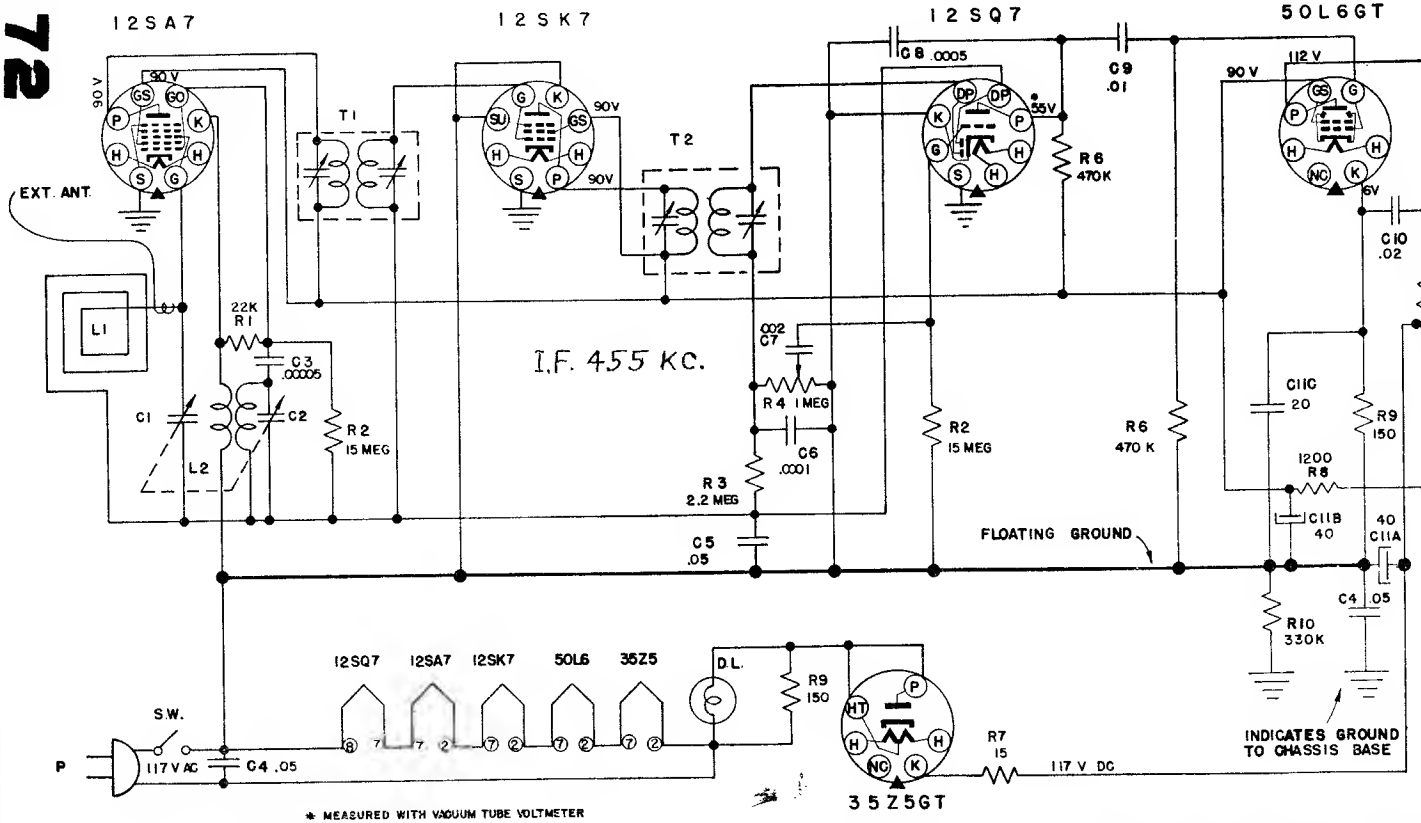


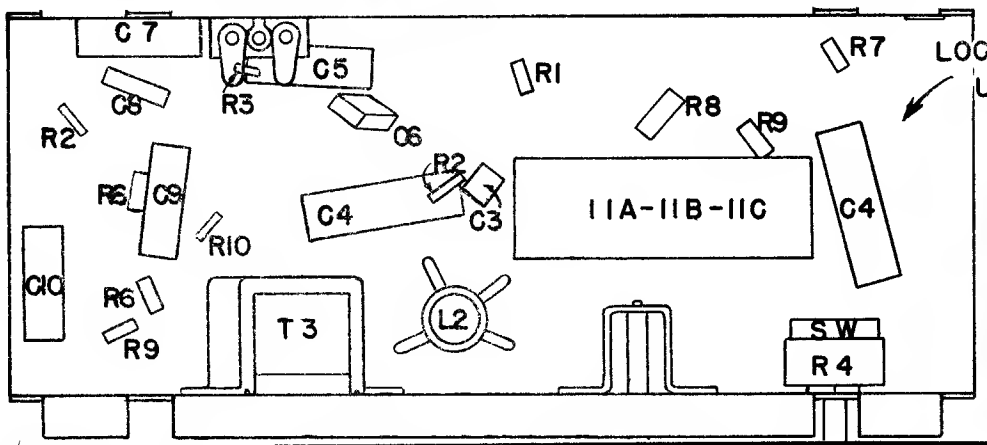
MANUAL OF 1949 MOST-OFTEN-NEEDED RADIO DIAGRAMS

ARVIN RADIOS, MODELS 152T AND 153T

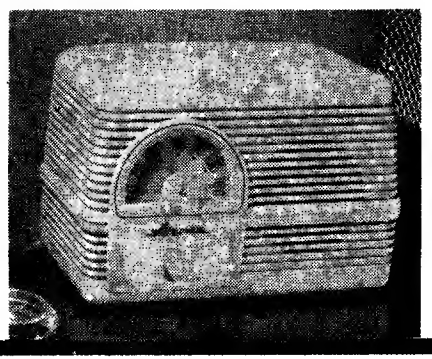
CHASSIS RE-233, 5 TUBE AC-DC

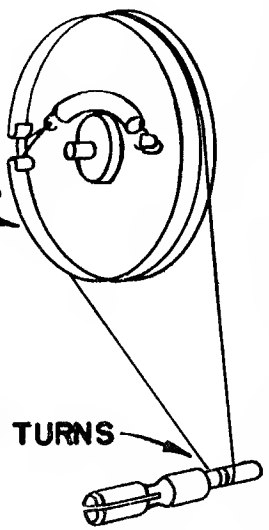
NOBLITT - SPARKS INDUSTRIES, INC., COLUMBUS, IND.





LOCATION OF PARTS UNDER CHASSIS

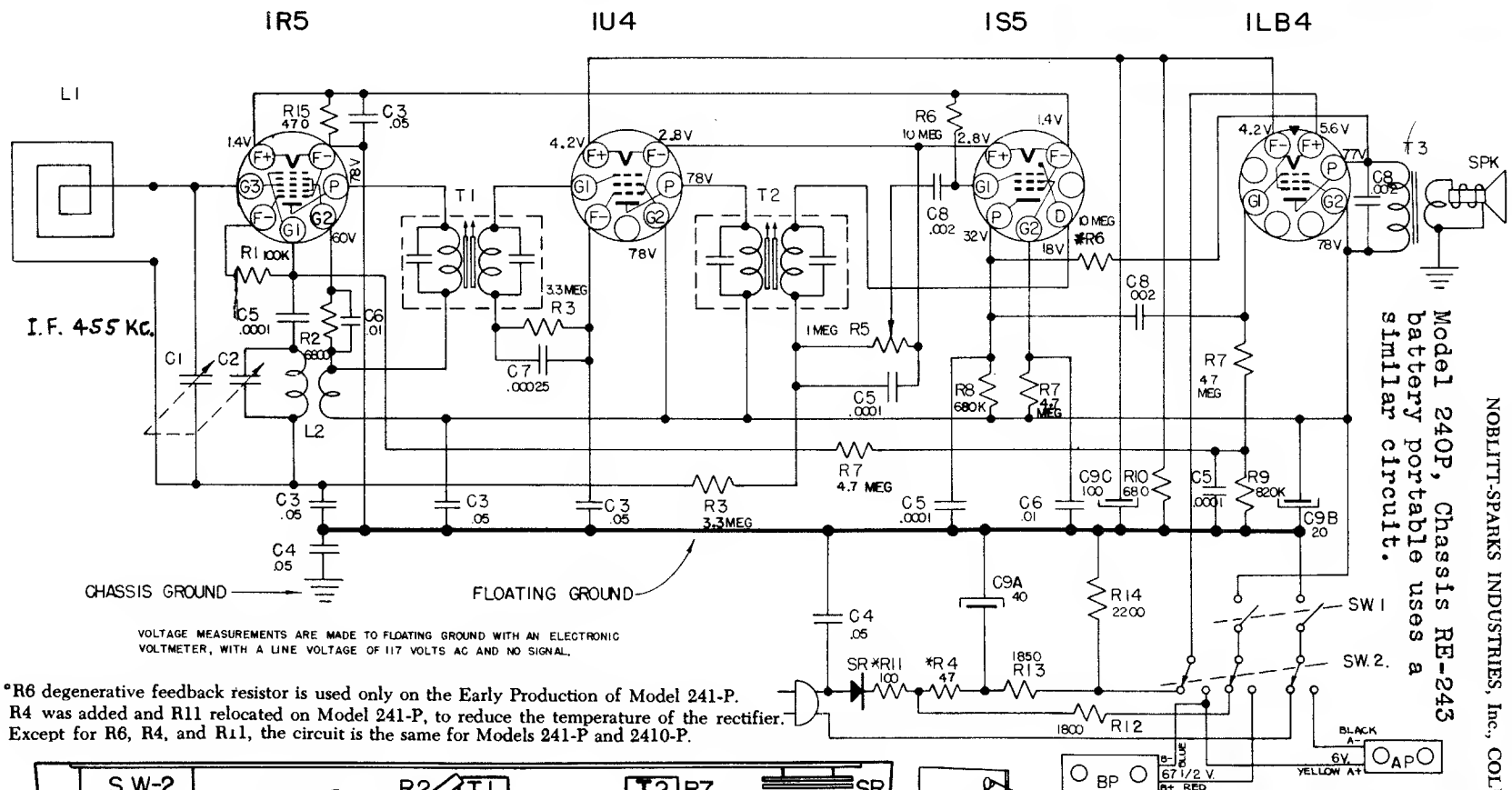




MANUAL OF 1949 MOST-OFTEN-NEEDED RADIO DIAGRAMS

ARVIN RADIOS, MODELS 241P, 244P & 2410P; CHASSIS–RE-244, RE-255, RE-256, RE-259 & RE-254
4 TUBE, AC-DC, BATTERY, PORTABLE

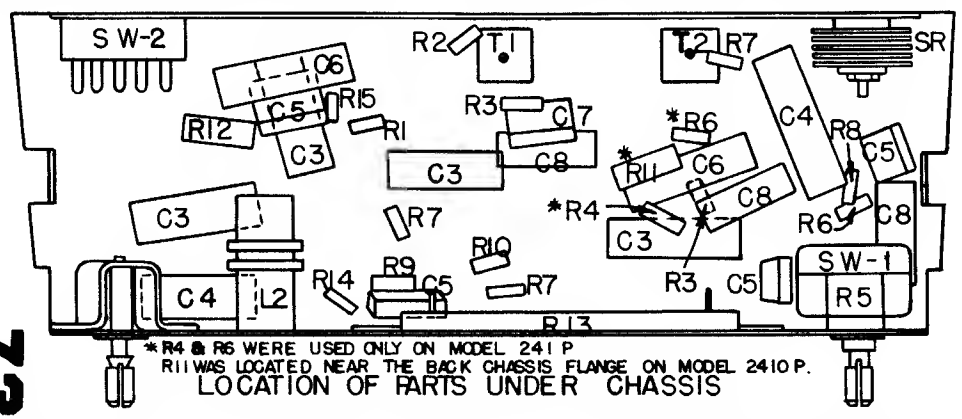
NOBLITT-SPARKS INDUSTRIES, Inc., COLUMBUS, INDIANA



VOLTAGE MEASUREMENTS ARE MADE TO FLOATING GROUND WITH AN ELECTRONIC VOLTMETER, WITH A LINE VOLTAGE OF 117 VOLTS AC AND NO SIGNAL.

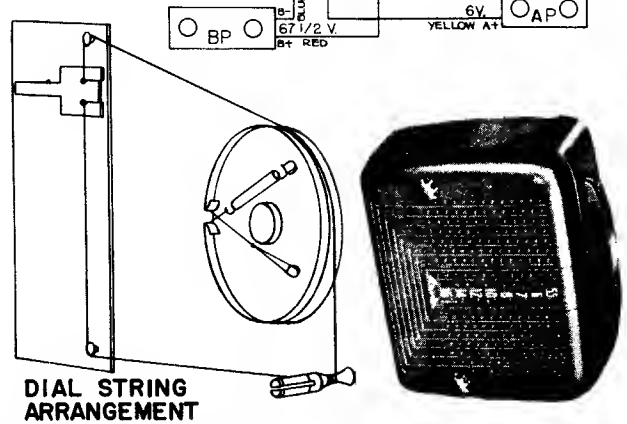
Model 240P, Chassis RE-243 battery portable uses a similar circuit.

*R6 degenerative feedback resistor is used only on the Early Production of Model 241-P. R4 was added and R11 relocated on Model 241-P, to reduce the temperature of the rectifier. Except for R6, R4, and R11, the circuit is the same for Models 241-P and 2410-P.



*R4 & R6 WERE USED ONLY ON MODEL 241P
R11 WAS LOCATED NEAR THE BACK CHASSIS FLANGE ON MODEL 2410P.

LOCATION OF PARTS UNDER CHASSIS



DIAL STRING ARRANGEMENT

ARVIN RADIOS – MODELS 280TFM & 281TFM CHASSIS RE – 253

8 TUBE AC – DC, AM – FM

MANUFACTURED BY NOBLITT-SPARKS INDUSTRIES, Inc., COLUMBUS, IND.

FREQUENCY RANGE

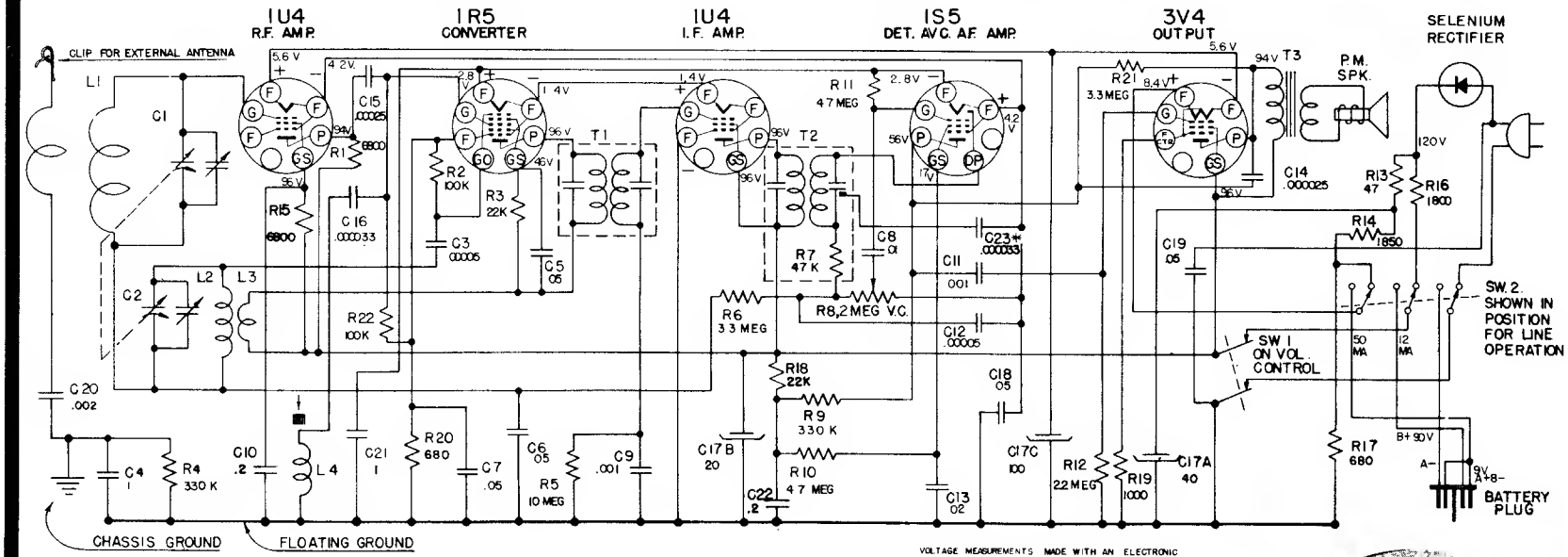
Broadcast Band	540-1600 KC
AM-IF	455 KC
FM Band	88-108 MC
FM-IF	10.7 MC

RED DOT ON FIRST I.F. TRANS., GREEN DOT ON SECOND I.F. TRANS.
(LUGS ARE COUNTED IN A CLOCKWISE DIRECTION, BEGINNING AT THIS DOT.

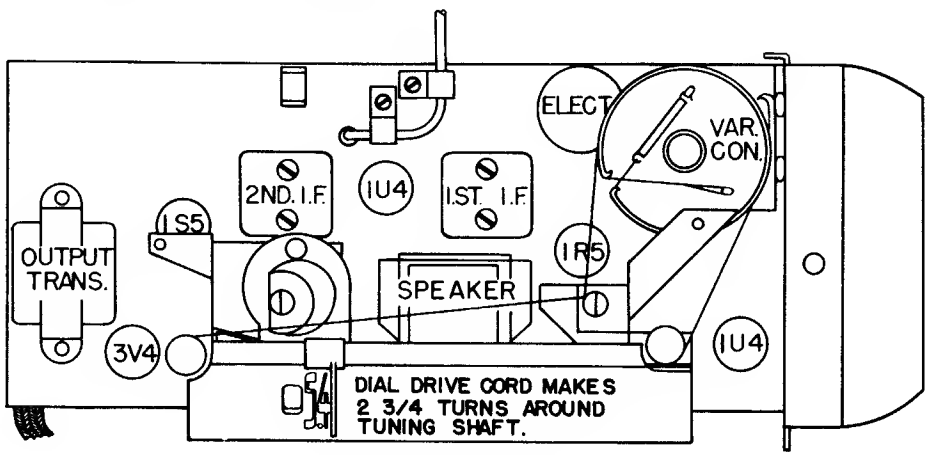
MANUAL OF 1949 MOST-OFTEN-NEEDED RADIO DIAGRAMS

ARVIN RADIO – MODEL 250P CHASSIS RE-248

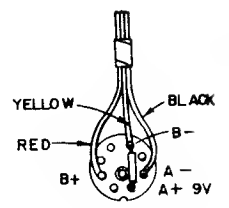
5 TUBE AC – DC, BATTERY, PORTABLE



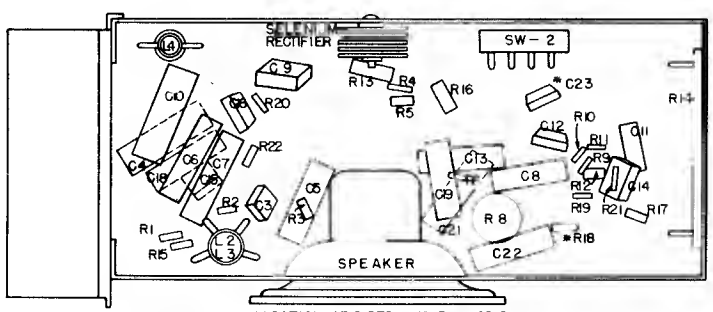
VOLTAGE MEASUREMENTS MADE WITH AN ELECTRONIC VOLTMETER WITH 117V AC LINE VOLTAGE AND NO SIGNAL



TUBE LAYOUT



BATTERY PLUG TOP VIEW



LOCATION OF PARTS UNDER CHASSIS

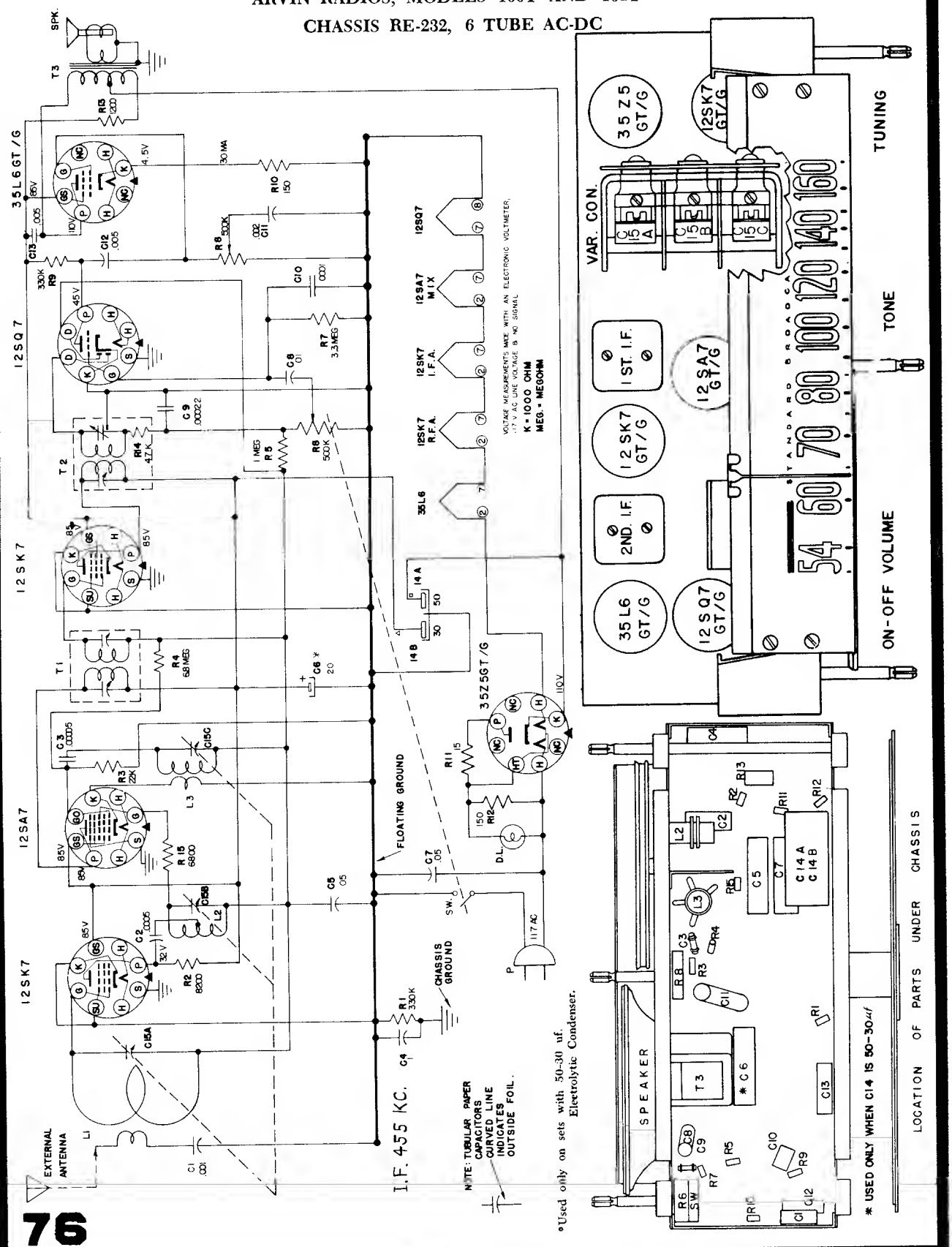
On battery operation, the B+ voltage measured to floating ground should be the sum of the A & B battery voltages or approximately 99 Volts with new batteries.

FREQUENCY RANGE

Broadcast	540-1600	kc
IF	455	kc

ARVIN RADIOS, MODELS 160T AND 161T

CHASSIS RE-232, 6 TUBE AC-DC



ARVIN RADIOS – MODELS 547 AND 547A

CHASSIS RE – 242; 5 TUBE AC – DC

ALIGNMENT PROCEDURE

PRELIMINARY:

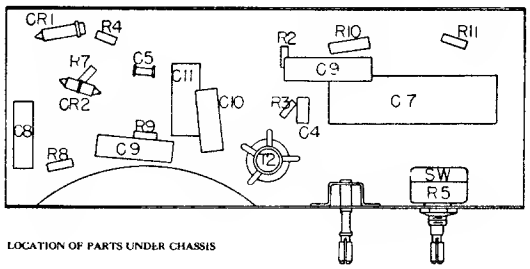
Output meter connection ..... Across loudspeaker voice coil
Output meter reading to indicate 200 milliwatts (standard output) ..... 0.8 volts
Dummy antenna to be used in series with generator output ..... See chart below
Connection of generator output lead ..... See chart below
Connection of generator ground lead ..... Floating ground
Generator modulation ..... 30% 400 cycles
Position of Volume Control ..... Fully clockwise
Position of dial pointer with variable fully closed ..... Horizontal

Place the set loop in the same position with respect to the rear of the chassis, and the same distance from the chassis, as it would be with the set mounted in the cabinet.

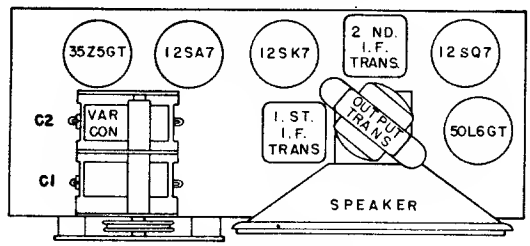
Position of Variable	Frequency of Generator	Dummy Antenna	Generator Output Connection	Trimmers Adjusted In Order Shown For Maximum Output	Function of Trimmer
Open	455	.05 mfd.	12SA7 Grid (Stator of C-1)	Top of 2nd & 1st IF trans. T2 & T1	IF
1400	1400		*Test Loop	C2; C1, Trimmers on Variable Condenser	Osc. Ant.
600	600		*Test Loop	Check Point (If weak, adjust variable plates for maximum output.)	

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

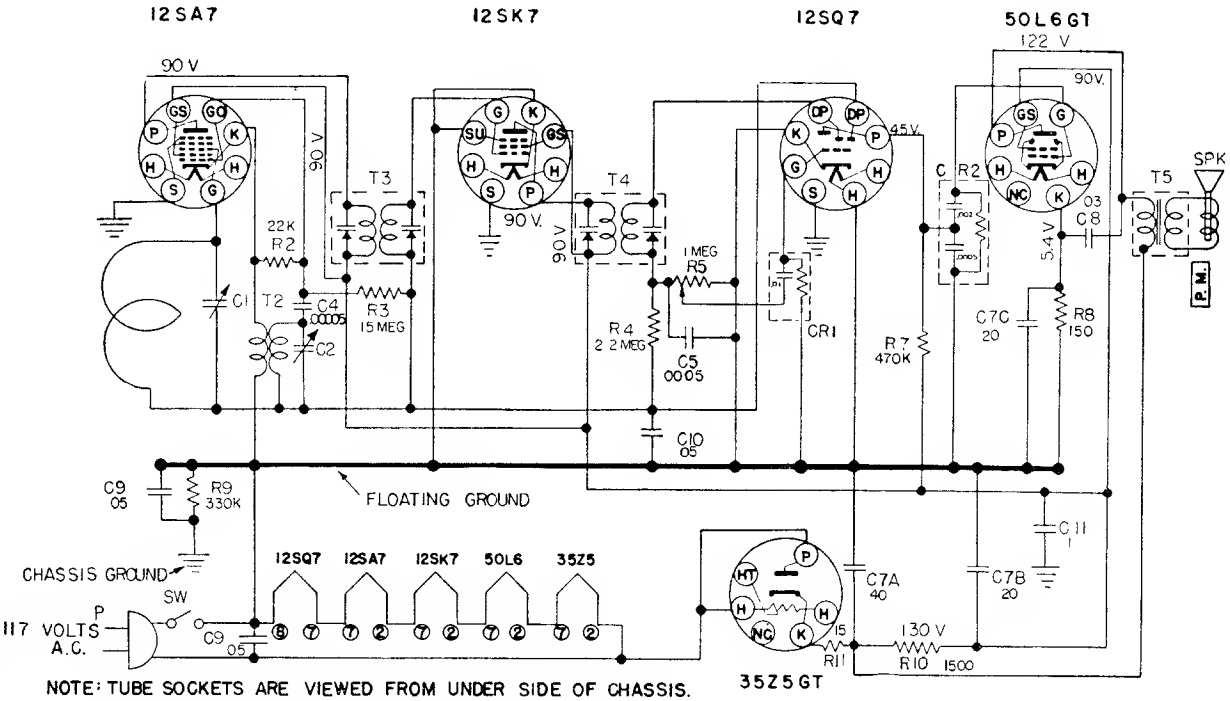
The alignment procedure should be repeated in the original order for greatest accuracy. Always keep the output from the signal generator at its lowest possible value to make the AVC action of the receiver ineffective.



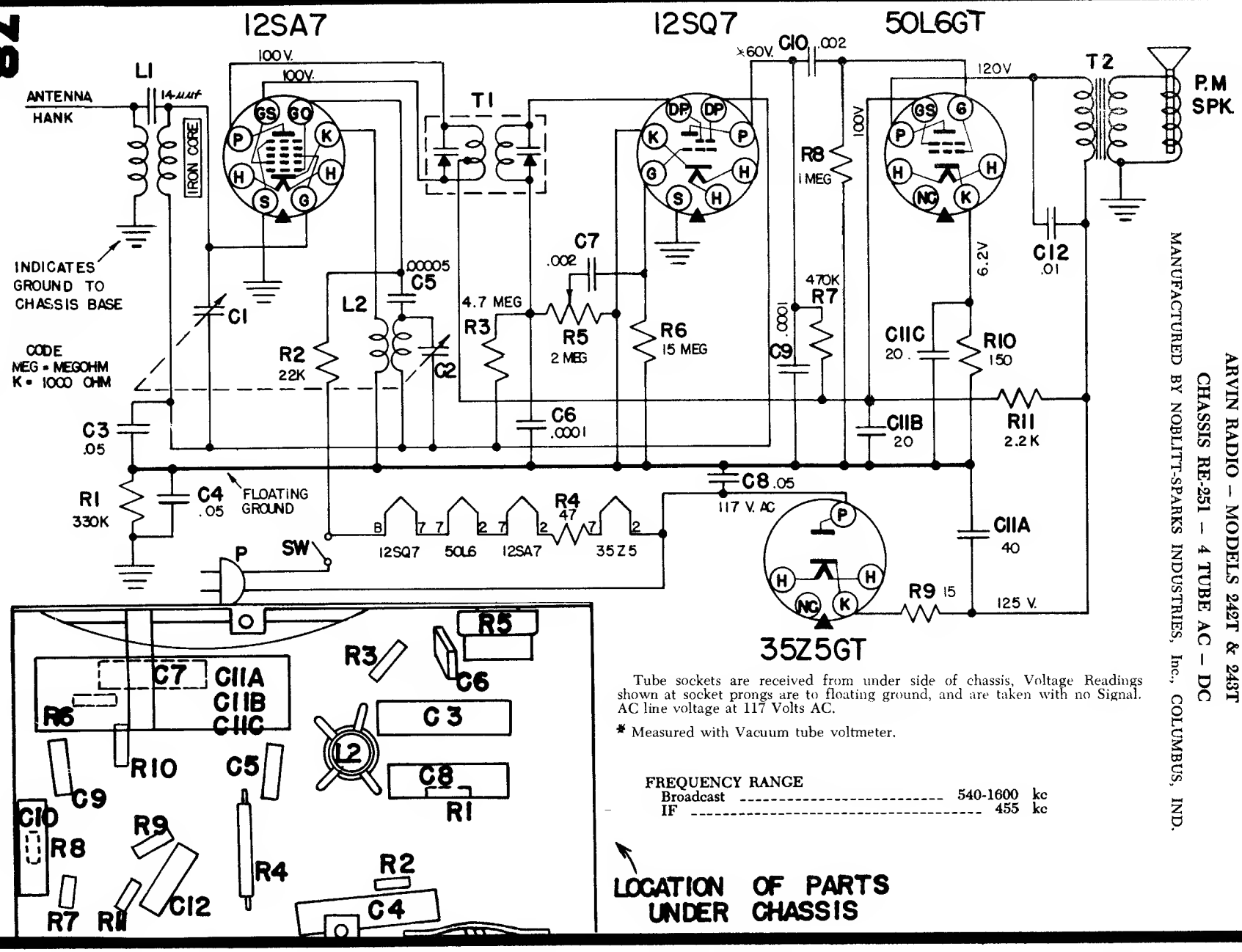
LOCATION OF PARTS UNDER CHASSIS



OUTLINE FOR TUBE LAYOUT



NOTE: TUBE SOCKETS ARE VIEWED FROM UNDER SIDE OF CHASSIS. VOLTAGE READINGS SHOWN AT SOCKET PRONGS ARE TO FLOATING GROUND AND ARE TAKEN WITH NO SIGNAL. A.C. LINE VOLTAGE AT 117 VOLTS. WHERE NO READING IS GIVEN, THE VOLTAGE IS ZERO OR TOO LOW TO READ.



Tube sockets are received from under side of chassis, Voltage Readings shown at socket prongs are to floating ground, and are taken with no Signal. AC line voltage at 117 Volts AC.

* Measured with Vacuum tube voltmeter.

FREQUENCY RANGE

Broadcast	540-1600	kc
IF	455	kc

LOCATION OF PARTS UNDER CHASSIS

MANUAL OF 1949 MOST-OFTEN-NEEDED RADIO DIAGRAMS

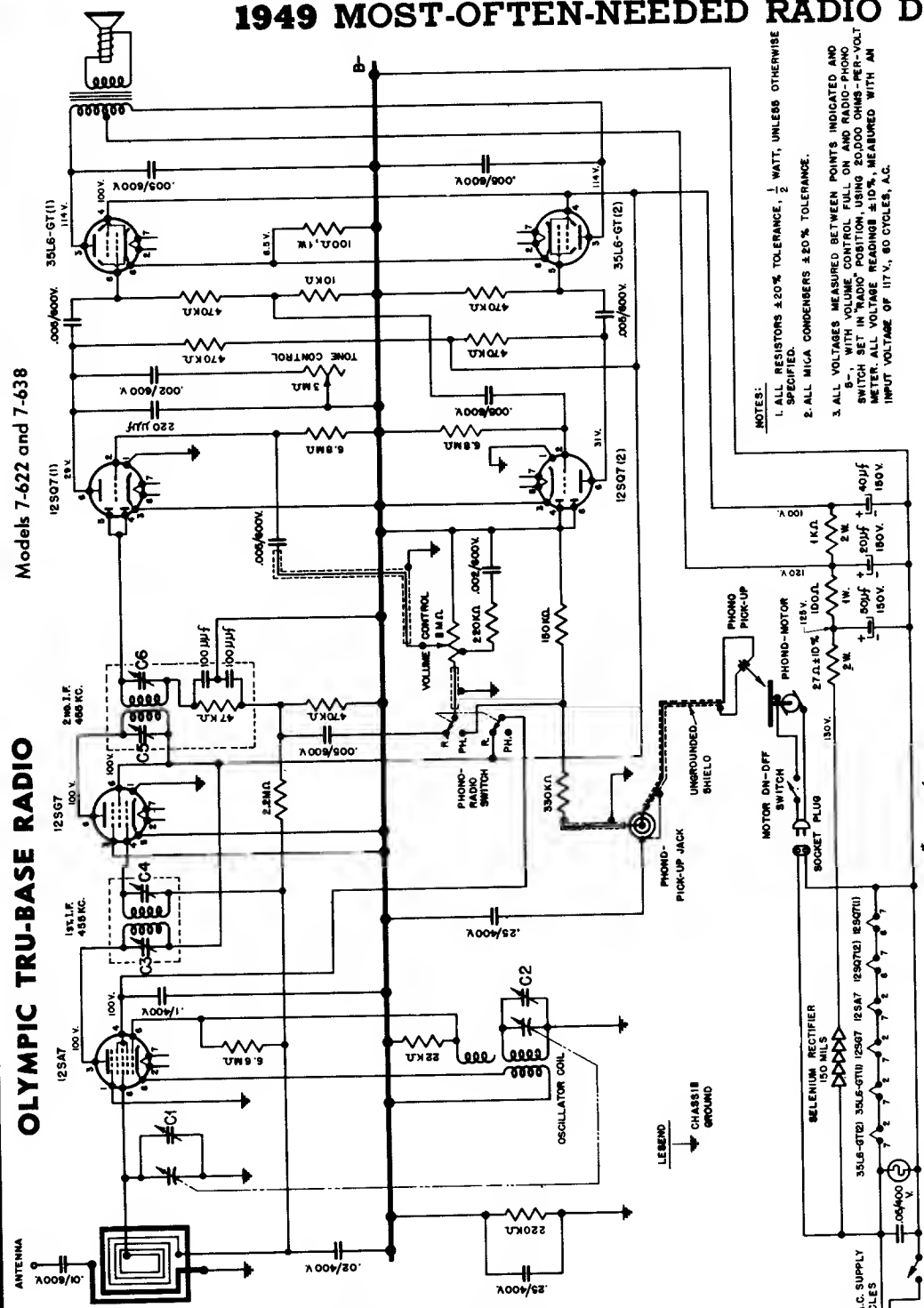
ARVIN RADIO – MODELS 242T & 243T

CHASSIS RE-251 – 4 TUBE AC – DC

MANUFACTURED BY NOBLITT-SPARKS INDUSTRIES, Inc., COLUMBUS, IND.

OLYMPIC TRU-BASE RADIO

Models 7-622 and 7-638

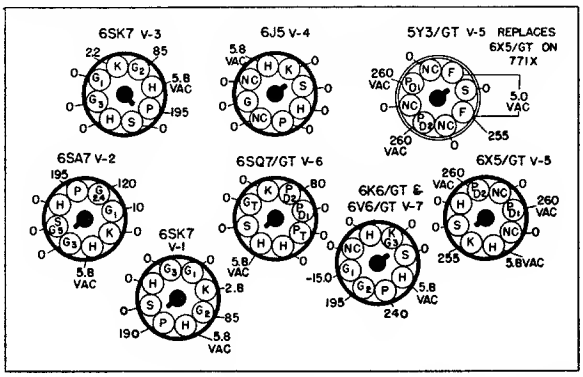


ALIGNMENT PROCEDURE CHART

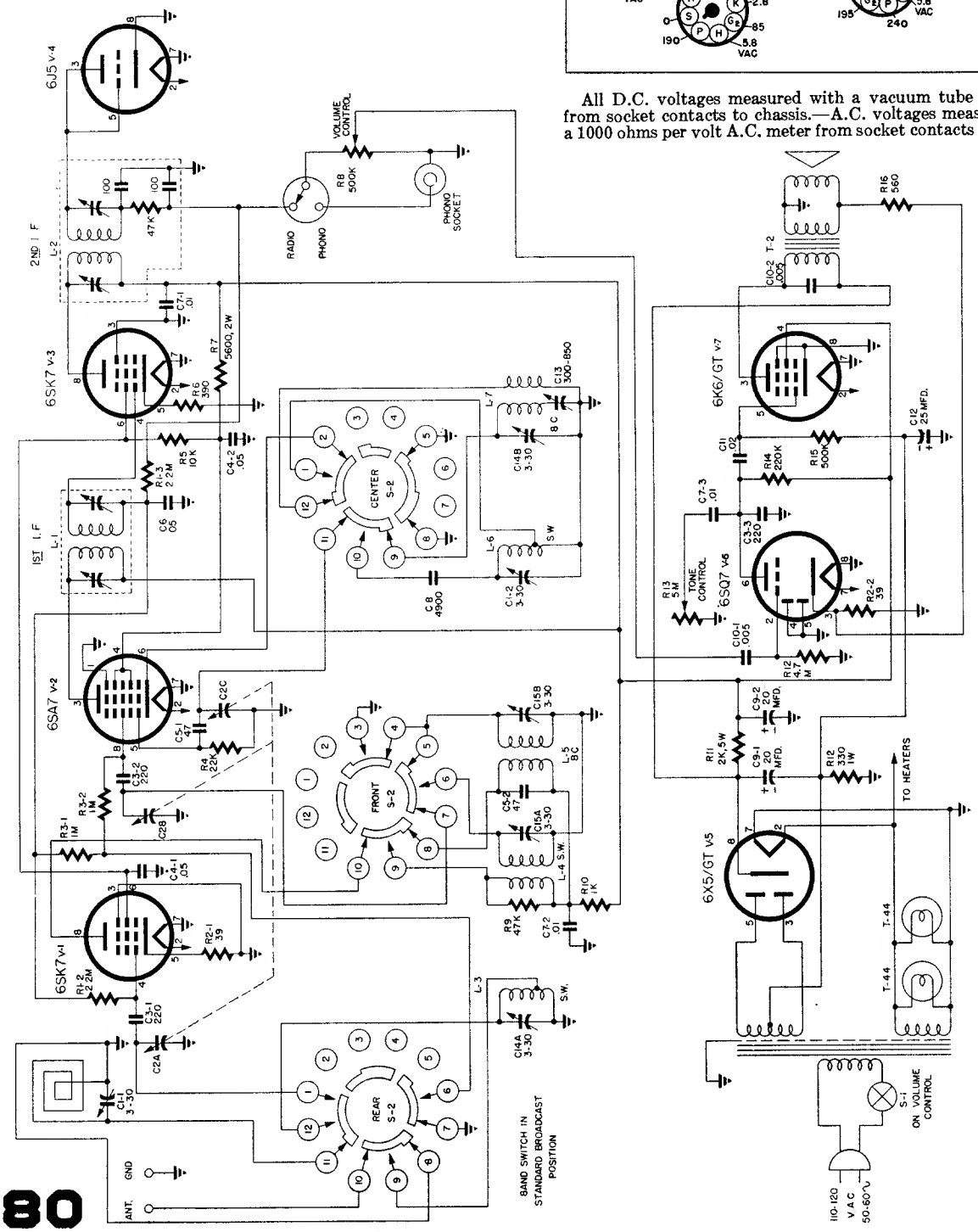
STEP	CONNECT HIGH SIDE OF SIGNAL GENERATOR TO-	SET SIGNAL GENERATOR TO-	SET EDGE OF POINTER CARRIAGE TO-	ADJUST THE FOLLOWING FOR MAXIMUM OUTPUT. (KEEP SIGNAL FROM SIGNAL GENERATOR AS LOW AS POSSIBLE)
1	R.F. SECTION OF VARIABLE CONDENSER IN SERIES WITH A .1 MFD. 400 VOLT CONDENSER.	455 KC.	EXTREME RIGHTHAND POSITION. (CONDENSER PLATES FULLY OPEN.)	C6, C5, C4, C3 AND REPEAT IN SAME ORDER. (1ST AND 2ND I.F. TRANSFORMERS.)
2	USE RADIATED SIGNAL (CONNECT BOTH SIDES OF SIGNAL GENERATOR TO RADIATION LOOP)	1400 KC.	1400 KC. CALIBRATION POINT.	C2 AND C1 OSCILLATOR AND R.F. TRIMMERS
3		600 KC.	RESONANCE (APPROXIMATELY 600 KC. CALIBRATION POINT.)	CHECK THAT EDGE OF POINTER CARRIAGE (AT RESONANCE) COINCIDES WITH 600 KC. CALIBRATION POINT.

Packard-Bell

MODEL 771 AND 771X



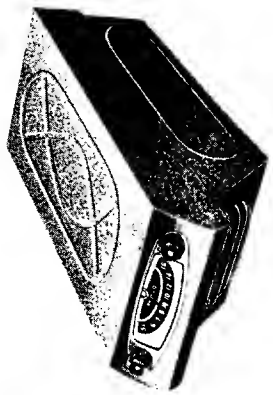
All D.C. voltages measured with a vacuum tube voltmeter from socket contacts to chassis.—A.C. voltages measured with a 1000 ohms per volt A.C. meter from socket contacts to chassis.



Intermediate Frequency:
455 KC

Tuning Frequency Range:
Standard Broadcast . . . 540 to 1620 KC
Short Wave . . . . . 6 to 18 MC

Philco diagram and service information on this page and on the Philco pages following are reproduced through the courtesy of the Philco Corporation from material supplied by the Philco Corporation.



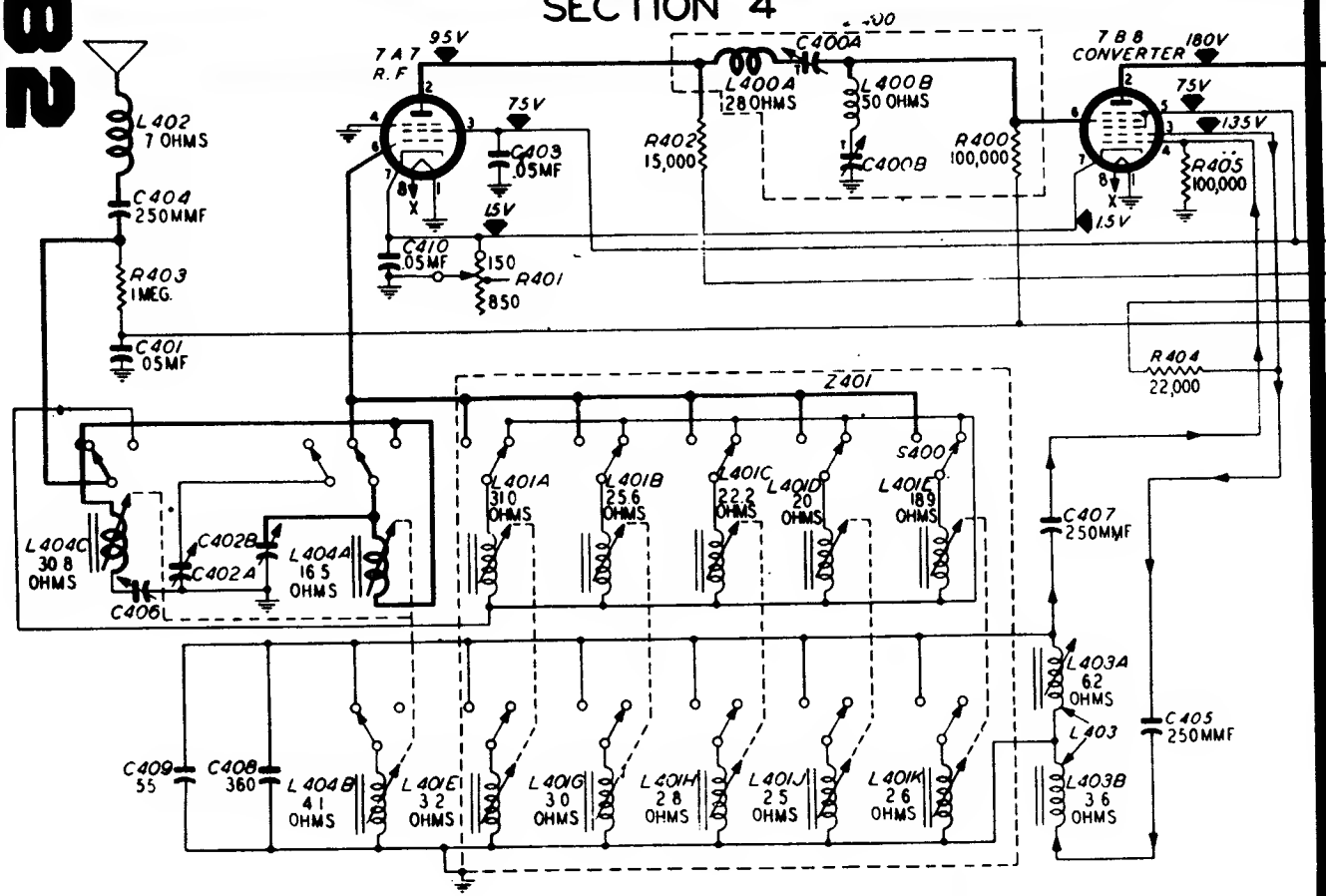
MODEL UN6-100

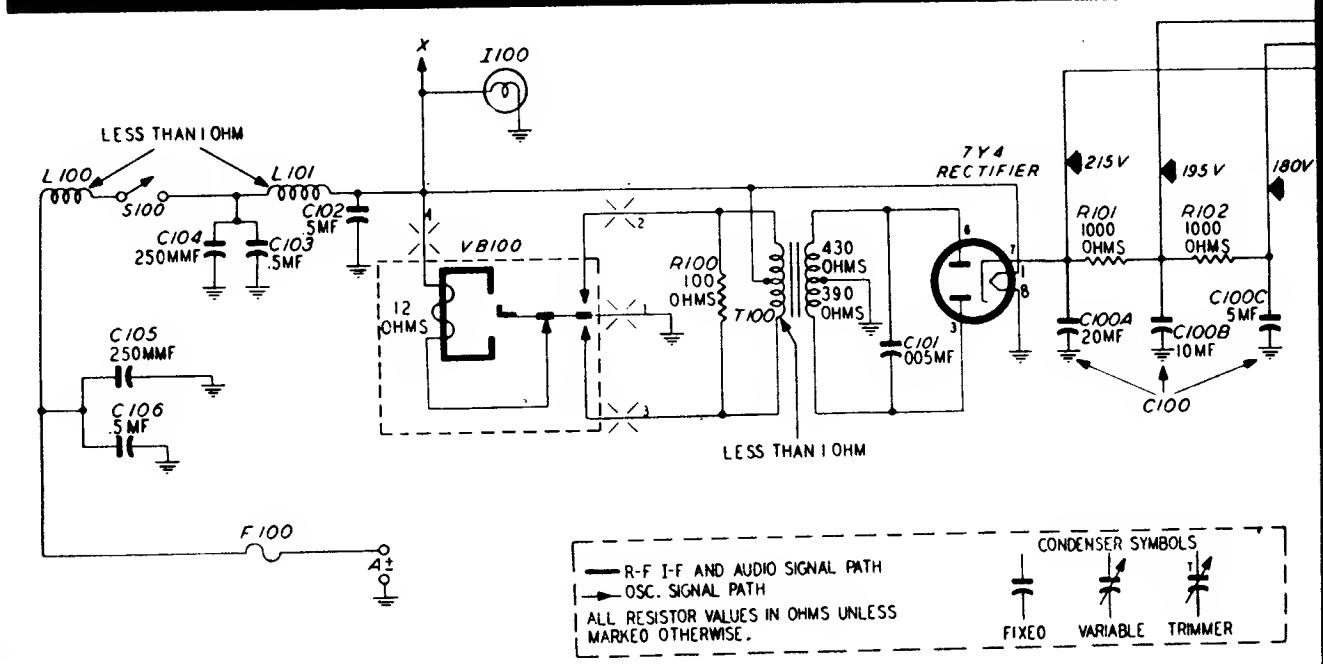
PHILCO AUTO RADIO, MODEL UN6-100

Model CR-2 is similar to Model UN6-100 illustrated.

NOTE: All voltage, capacity, and resistance values shown are average. The voltages were measured between the points indicated and the receiver chassis (B–), using a 20,000-ohms-per-volt meter, with 6.3 volts d-c input to the receiver power supply; the volume control was set at minimum, and the tuning condenser at 550 kc.

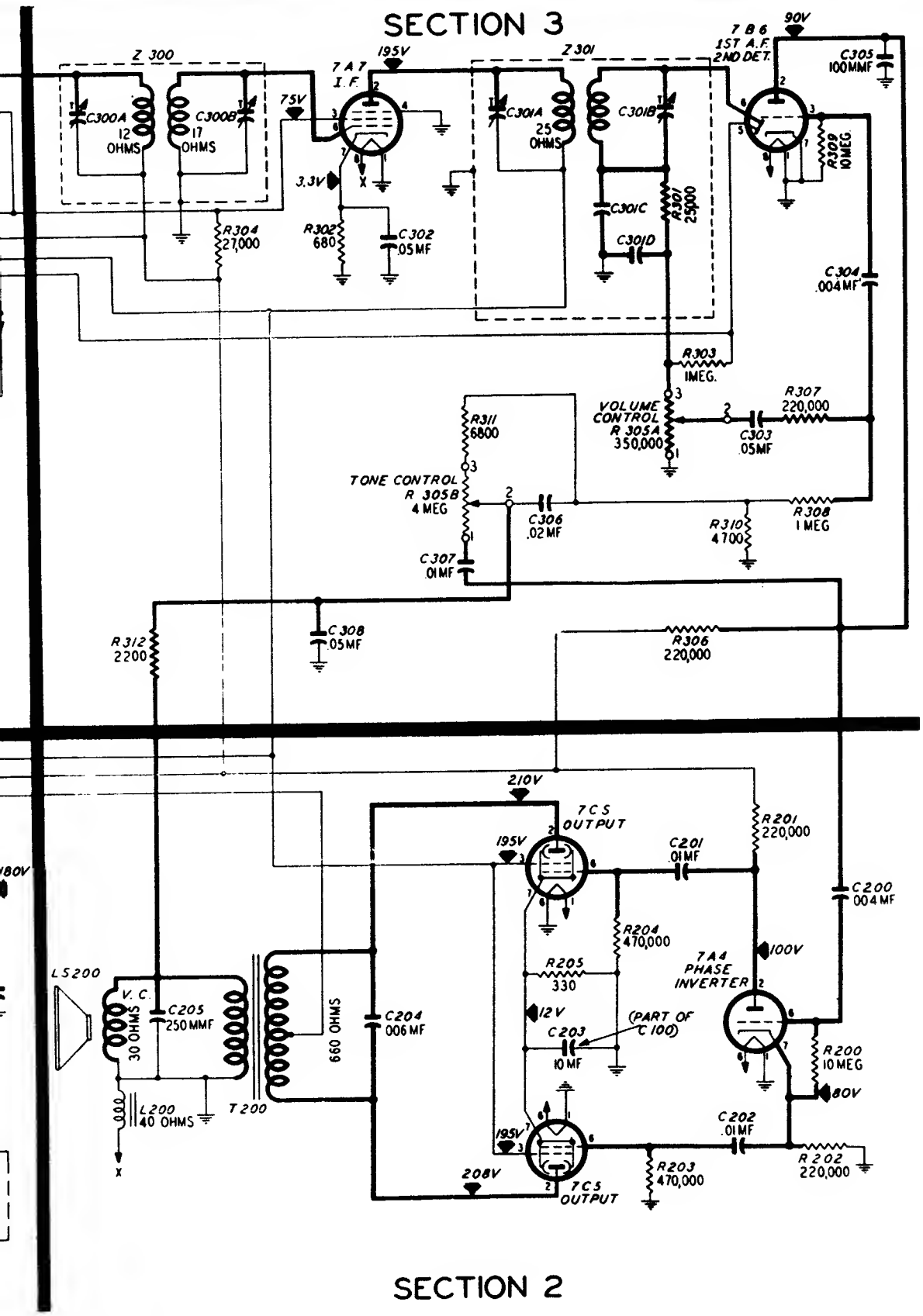
SECTION 4





SECTION 1

NOTE: All voltage, capacity, and resistance values show
points indicated were measured with a 20,000 ohms-per-vo
control at 550 kc.



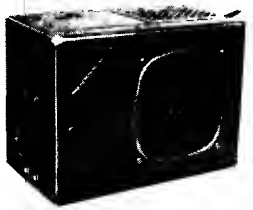
SECTION 2

nown are average. The voltages between B– (chassis) and other
-volt meter, with the volume control at minimum and the tuning

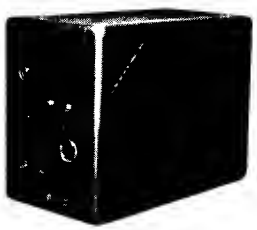
INTERMEDIATE FREQUENCY .....**455 kc.**

PHILCO AUTO RADIO MODELS CR-4 AND CR-6

Philco Auto Radio Models CR-4 and CR-6 are six-tube superheterodynes of the universal-mounting type. Both models are the same, with this exception: in the CR-4, the speaker is self-contained; in the CR-6, the speaker is separately mounted. The control head is separately mounted. Custom-style control heads are available



MODEL CR-4

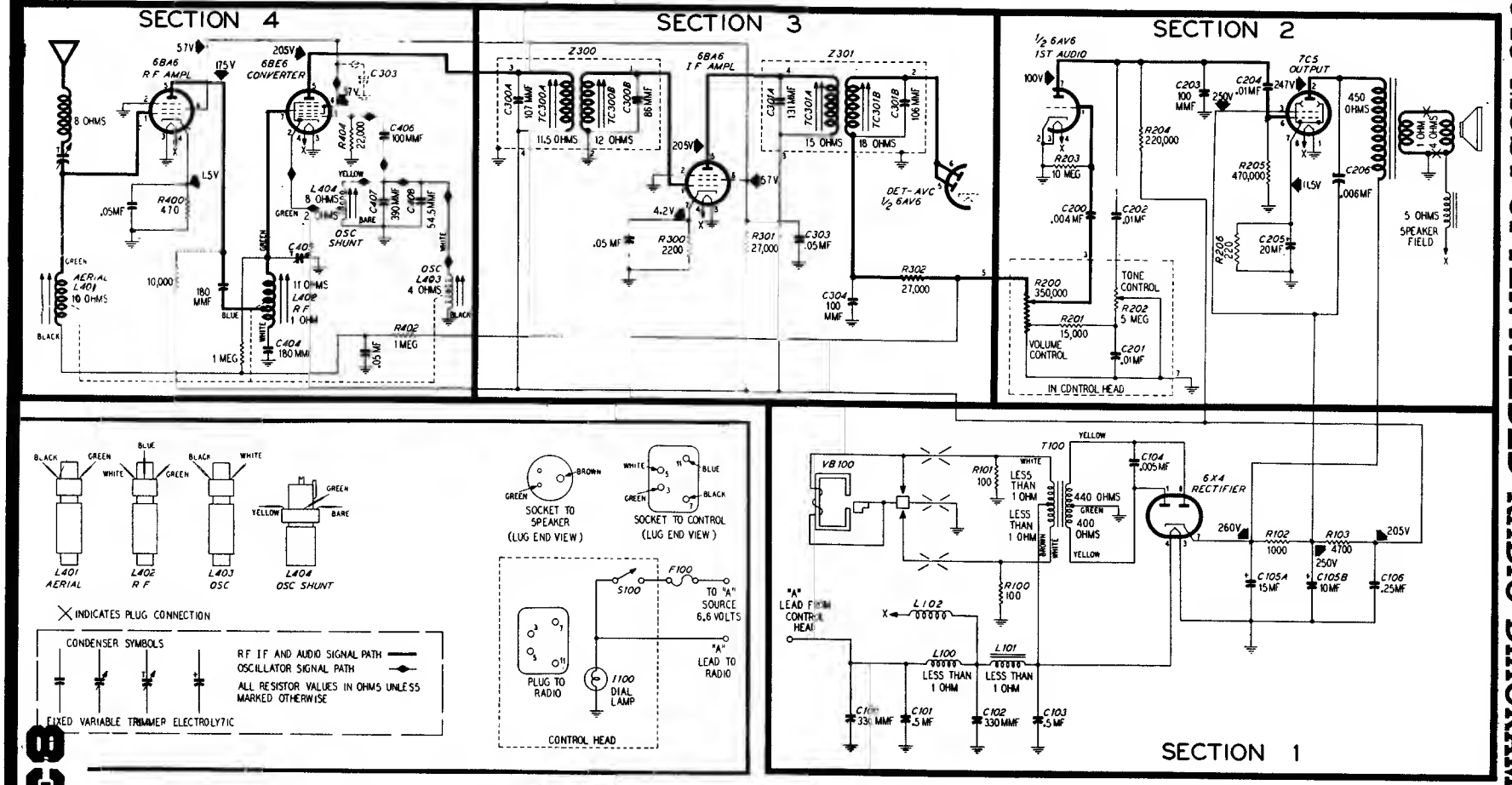


MODEL CR-6

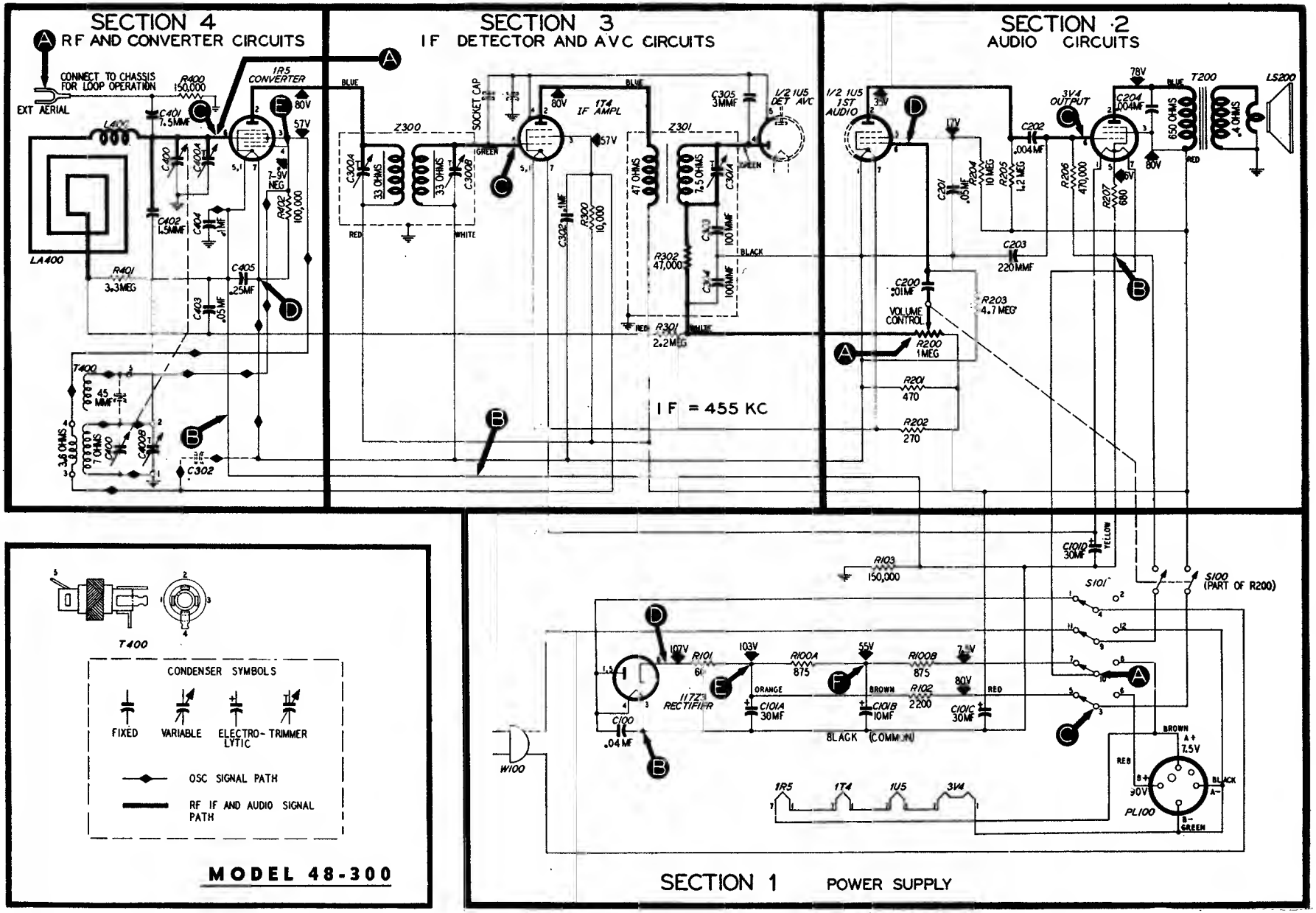
SPECIFICATIONS

CIRCUIT	Six-tube superheterodyne
FREQUENCY RANGE	535—1600 kc.
INTERMEDIATE FREQUENCY	455 kc.
AUDIO OUTPUT	3 watts (approx.)
POWER INPUT	7 amperes at 6.6 volts, d.c.
AERIAL	Any Philco auto-radio aerial
PHILCO TUBES (6)	6BA6 (2), 6BE6, 6AV6, 7C5, 6X4

Philco Corporation



Philco Auto Radio Models CR-4 and CR-6, Schematic Diagram (Revised)



PHILCO RADIO MODEL 48-300, SECTIONALIZED SCHEMATIC DIAGRAM, SHOWING TEST POINTS

MANUAL OF 1949 MOST-OFTEN-NEEDED RADIO DIAGRAMS

Section 1

POWER SUPPLY

TROUBLE SHOOTING

Make the tests in this section with a d-c voltmeter connecting the leads between B–, test point B, and the test points indicated in the chart. The voltage readings given were taken with a 20,000-ohms-per-volt meter, at a line voltage of 117 volts, a.c.

With the power-cord plug connected to a source of power (a.c. or d.c.), turn on the power, and set the volume control to minimum (clockwise).

Follow the steps in the order given. If the "NORMAL INDICATION" is obtained in step 1, proceed with the tests for Section 2 (audio circuits); if not, isolate and correct the trouble in this section.

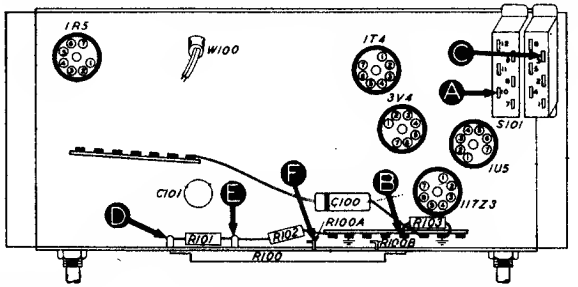


FIGURE 1. BOTTOM VIEW, SHOWING SECTION 1 TEST POINTS

STEP	TEST POINT	NORMAL INDICATION	ABNORMAL INDICATION	POSSIBLE CAUSE OF ABNORMAL INDICATION
1	A C	7.5v 00v		Trouble in this section. Isolate by the following tests.
2	D	107v	Low voltage No voltage	Defective: 117Z3. Open C101A. Defective: 117Z3. Open: S100, S101.
3	E	103v	Low voltage No voltage	Changed Resistance: R101. Leaky: C101A. Open: R101. Shorted: C101A.
4	F	55v	Low voltage No voltage	Changed Resistance: R100A. Leaky: C101B. Open: R100A. Shorted: C101B.
5	A	7.5v	Low voltage High voltage No voltage	Changed Resistance: R100A. Open: filament of one or more tubes. Open: R100A.
6	C	00v	Low voltage High voltage No voltage	Changed Resistance: R102. Leaky: C101C. Open: R207*, T200*. Open: R102. Shorted: C101C.
Listening Test: Hum may be caused by open C101B, C101C, C100, or R103.				

* This part, located in another section, may cause abnormal indication in this section.

BATTERY VOLTAGE: Replace battery when (with radio turned on) "B" voltage falls below 60 volts, or "A" voltage falls below 6 volts.

Section 2

AUDIO CIRCUITS

TROUBLE SHOOTING

For the tests in this section, use an audio-frequency signal generator. Connect the generator ground lead to B–, test point B; connect the output lead through a .1-mf. condenser to the test points indicated in the chart.

With the power-cord plug connected to a source of power (a.c. or d.c.), set the volume control to maximum (counterclockwise). Adjust the signal-generator output as required for each step.

If the "NORMAL INDICATION" is obtained in step 1, proceed with the tests for Section 3 (i-f, detector, and a-v-c circuits); if not, isolate and correct the trouble in this section.

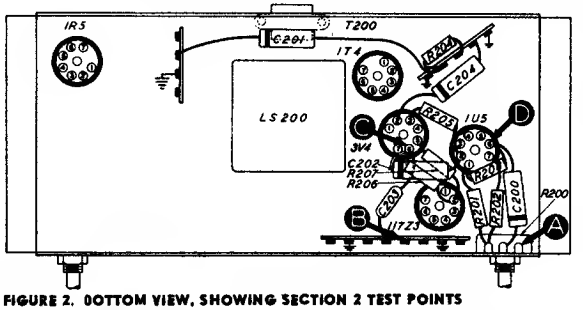


FIGURE 2. BOTTOM VIEW, SHOWING SECTION 2 TEST POINTS

STEP	TEST POINT	NORMAL INDICATION	POSSIBLE CAUSE OF ABNORMAL INDICATION
1	A	Loud, clear signal with weak signal input.	Trouble in this section. Isolate by the following tests.
2	C	Clear signal with strong signal input.	Defective: 3V4, LS300. Open: R205, R207, T200. Shorted or leaky: C202, C203, C204, T200.
3	D	Same as step 1.	Defective: 1U5. Open: R204. R305. Shorted or leaky: C201, C203.
4	A	Same as step 1.	Open: R200 (rotate through range), R201. R203. C300, R203, C304*.
Listening Test: If speech or music is distorted (with section 1 operating normally), check R203, R201, and R202 for opens, and C200 for leakage.			

* This part located in another section, may cause abnormal indication in this section.

Section 3

I-F, DETECTOR, AND A-V-C CIRCUITS

MODEL 48-300

For the tests in this section, use an r-f signal generator, with modulated output, set at 455 kc. Connect the generator ground lead to B–, test point B; connect the output lead through a .1-mf. condenser to the test points indicated in the chart.

With the power-cord plug connected to a source of power (a.c. or d.c.), set the volume control to maximum (counterclockwise).

If the "NORMAL INDICATION" is obtained in step 1, proceed with the tests for Section 4 (r-f and converter circuits); if not, isolate and correct the trouble in this section.

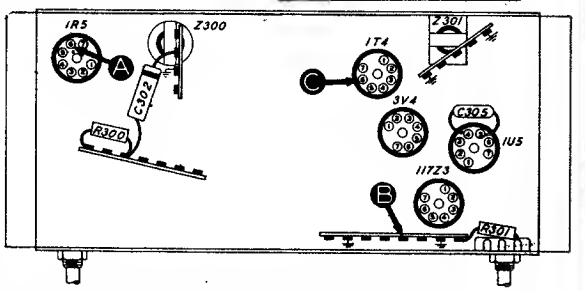


FIGURE 3. BOTTOM VIEW, SHOWING SECTION 3 TEST POINTS

Since the circuit location of test point A for this section is the same as that of test point C for section 4, the effectiveness of step 1 as a master check is dependent upon the condition of certain parts in section 4; these parts are listed below under "POSSIBLE CAUSE OF ABNORMAL INDICATION."

STEP	TEST POINT	NORMAL INDICATION	POSSIBLE CAUSE OF ABNORMAL INDICATION
1	A	Loud, clear signal with weak signal input.	Trouble in this section. Isolate by the following tests.
2	C	Loud, clear signal with moderate signal input.	Defective: 1T4. Open: R300, Z301 pri. or sec., R302. Shorted: C300B, C301A, C303. C302.
3	A	Same as step 1.	Defective: 1R5*. Shorted: C400*, C400A*, C300A, C300B Open: Z300* pri. or sec., T400*
Listening Test: Oscillation or instability may be caused by open C305.			

* This part located in another section, may cause abnormal indication in this section.

Section 4

R-F AND CONVERTER CIRCUITS

TROUBLE SHOOTING

For the tests in this section, with the exception of the oscillator test, use an r-f signal generator, with modulated output. Connect the generator ground lead to B–, test point B; connect the output lead through a .1-mf. condenser to the test points indicated in the chart.

Set the volume control to maximum (counterclockwise).

Set the tuning control and signal-generator frequency as indicated in the chart.

If the "NORMAL INDICATION" is not obtained in step 1, isolate the trouble by following the remaining steps.

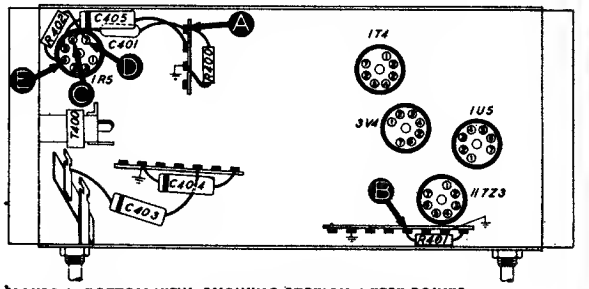
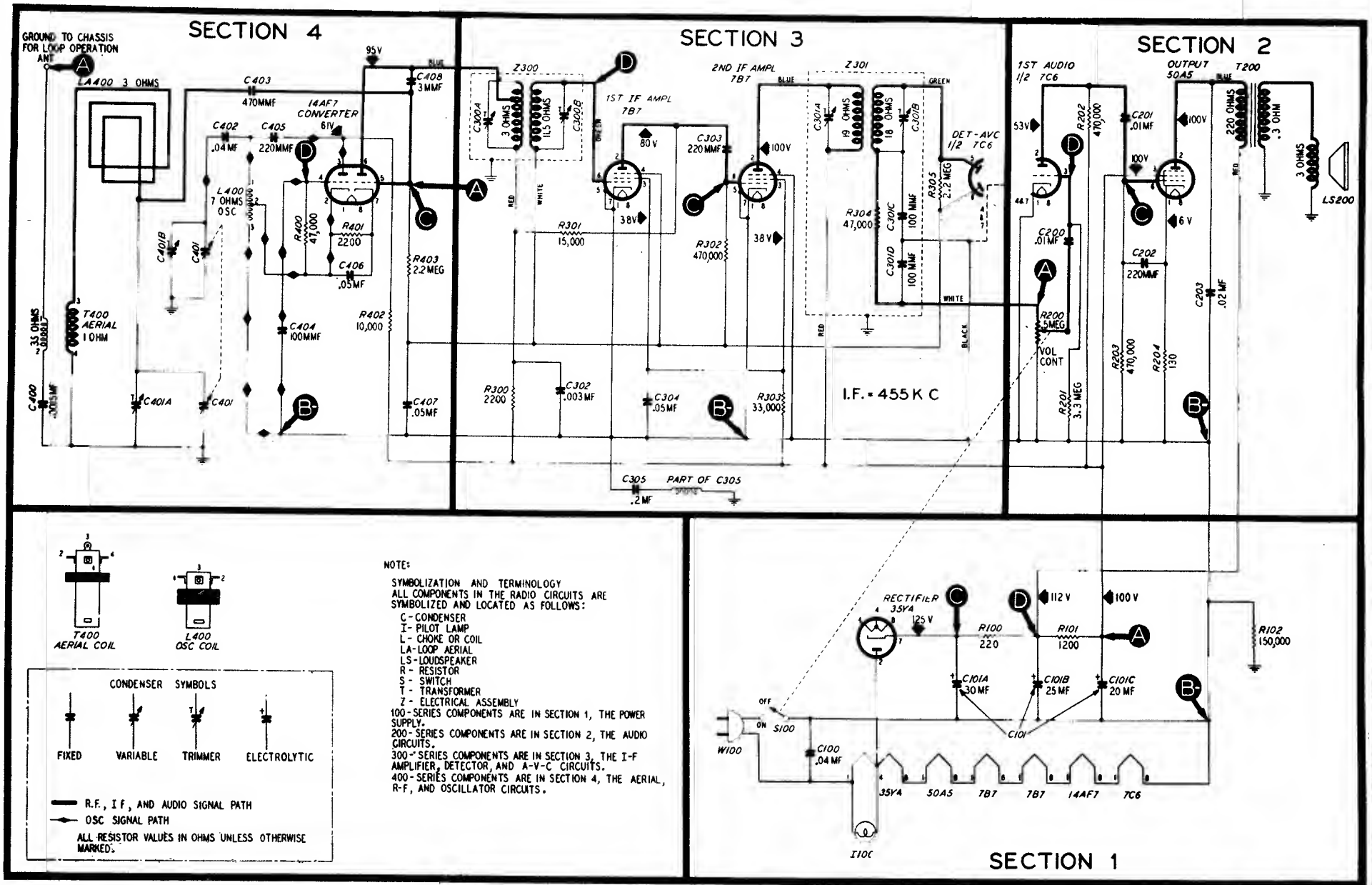


FIGURE 4. BOTTOM VIEW, SHOWING SECTION 4 TEST POINTS

STEP	TEST POINT	SIG. GEN. FREQ.	RADIO TUNING	NORMAL INDICATION	POSSIBLE CAUSE OF ABNORMAL INDICATION
1	A	1000 kc.	Tune to signal.	Loud, clear signal with weak signal input.	Trouble in this section. Isolate by the following tests.
2	C	1000 kc.	Tune to signal.	Same as step 1.	Shorted: C400, C400A, C405, C402. Trouble in oscillator circuit (step 3).
3	E to D (Osc. test: see note below.)		Rotate through range.	Negative 7 to 9 volts.	Defective: 1R5. Open: R402, T400. Shorted: C400, C400B.
4	A	1000 kc.	Tune to signal.	Same as step 1.	Open: C401, L400, LA400, R401.

OSCILLATOR TEST: Connect the positive lead of a high-resistance voltmeter to the 1R5 positive filament terminal, pin 7 (test point D); connect the prod end of the negative lead through a 100,000-ohm isolating resistor to the 1R5 oscillator grid, pin 4 (test point E). Use a suitable meter range, such as 0—10 volts. Absence of negative grid voltage throughout the tuning range indicates that the oscillator is not operating. The normal grid voltage given in the chart was measured with a 20,000-ohms-per-volt meter.



PHILCO RADIO MODEL 48-461, SECTIONALIZED SCHEMATIC, SHOWING TEST POINTS.

MANUAL OF 1949 MOST-OFTEN-NEEDED RADIO DIAGRAMS

PHILCO RADIO MODEL 48-461

Section 1 TROUBLE SHOOTING

For the tests in this section, use a d-c voltmeter; connect negative lead to test point B–, and positive lead to test points indicated in chart. The voltage readings given were taken with a 20,000-ohms-per-volt meter, at a line voltage of 117 volts, a.c.

Set volume control to minimum.

Follow steps in sequence. If the "NORMAL INDICATION" is obtained in step 1, proceed with the tests for Section 2; if not, isolate and correct the trouble in this section.

It will be noted that certain parts in other sections of the radio are listed under "POSSIBLE CAUSE OF ABNORMAL INDICATION", since they may cause abnormal voltage readings in this section.

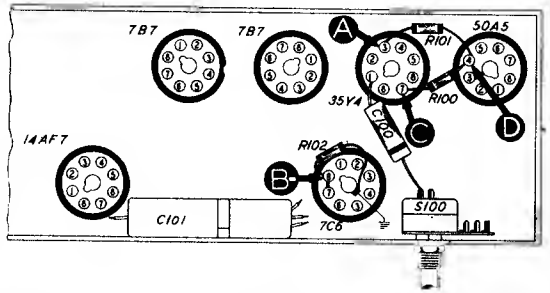


FIGURE 1. BOTTOM VIEW, SHOWING SECTION 1 TEST POINTS.

STEP	TEST POINT	NORMAL INDICATION	ABNORMAL INDICATION	POSSIBLE CAUSE OF ABNORMAL INDICATION
1	A	100v		Trouble in this section. Isolate by the following tests.
2	C	125v	Low voltage	Defective 35Y4. Leaky or open C101A. Shorted C101B, C101C, C203, or R100.
			No voltage	Defective 35Y4. Shorted C101A.
3	D	112v	Low voltage No voltage	Leaky C101B or C101C. Defective R100. Shorted C303. Shorted C101B. Open R100.
4	A	100v	Low voltage No voltage	Leaky C101C. Defective R101. Shorted C302. Shorted C101C. Open R101.

Listening Test: Abnormal hum may be caused by open C101A, C101B, or C101C.

Section 2 TROUBLE SHOOTING

For the tests in this section, use an audio-frequency signal generator. Connect generator ground lead to test point B–; connect output lead through .1-mf condenser to test points indicated in chart.

Set radio volume control to maximum. Adjust signal-generator output as required for each step.

If the "NORMAL INDICATION" is obtained in step 1, proceed with the tests for Section 3; if not, isolate and correct the trouble in this section.

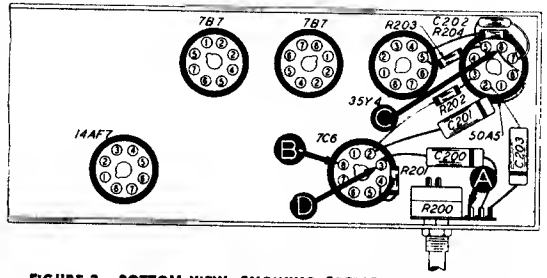


FIGURE 2. BOTTOM VIEW, SHOWING SECTION 2 TEST POINTS.

STEP	TEST POINT	NORMAL INDICATION	POSSIBLE CAUSE OF ABNORMAL INDICATION
1	A	Loud, clear signal with weak signal input.	Trouble in this section. Isolate by the following tests.
2	C	Moderate, clear signal with strong signal input.	Defective 50A5, LS200, T200, R204, or R203. Leaky C201 or C302.
3	D	Loud, clear signal with weak signal input.	Defective 7C6, R202, or R201. Open, shorted, or leaky C201.
4	A	Loud, clear signal with weak signal input.	Defective R200. Open C300.

Section 3 TROUBLE SHOOTING

For the tests in this section, use an r-f signal generator, with modulated output, set at 455 kc. Connect generator ground lead to test point B–; connect output lead through .1-mf condenser to test points indicated in chart.

Set radio volume control to maximum.

If the "NORMAL INDICATION" is obtained in the first step, proceed with the tests for Section 4; if not, isolate and correct the trouble in this section.

It will be noted that for this section the circuit location of the test point for step 1 (the master check), and also for step 4, is the same as for test point C in Section 4; therefore, certain components in Section 4 may cause an abnormal indication. These components are listed under "POSSIBLE CAUSE OF ABNORMAL INDICATION".

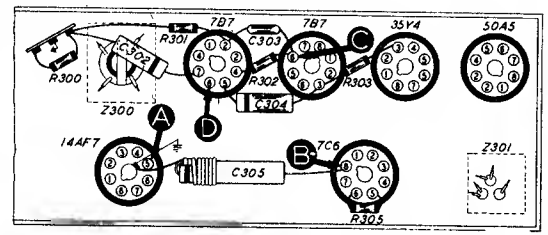


FIGURE 3. BOTTOM VIEW, SHOWING SECTION 3 TEST POINTS.

STEP	TEST POINT	NORMAL INDICATION	POSSIBLE CAUSE OF ABNORMAL INDICATION
1	A	Loud, clear signal with weak signal input.	Trouble in this section. Isolate by the following tests.
2	C	Loud, clear signal with moderate signal input.	Defective 7B7 (2nd i-f ampl.) or R305. Open R303. Shorted C304. Misaligned Z301.
3	D	Loud, clear signal with weak signal input.	Defective 7B7 (1st i-f ampl.). Open or leaky C303. Shorted C302. Open R300 or R301.
4	A	Loud, clear signal with weak signal input.	Defective 14AF7. Defective or misaligned Z300. Open C302, R300, R401, or R403. Shorted C302.

Section 4 TROUBLE SHOOTING

For the tests in this section, with the exception of the oscillator test, use an r-f signal generator with modulated output. Connect generator ground lead to test point B–; connect output lead through .1-mf condenser to test points indicated in chart.

Set radio volume control to maximum.

Set tuning control and signal-generator frequency as indicated in chart.

If the "NORMAL INDICATION" is not obtained in step 1, isolate the trouble by proceeding with the remaining steps.

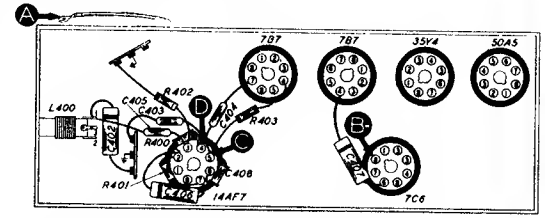
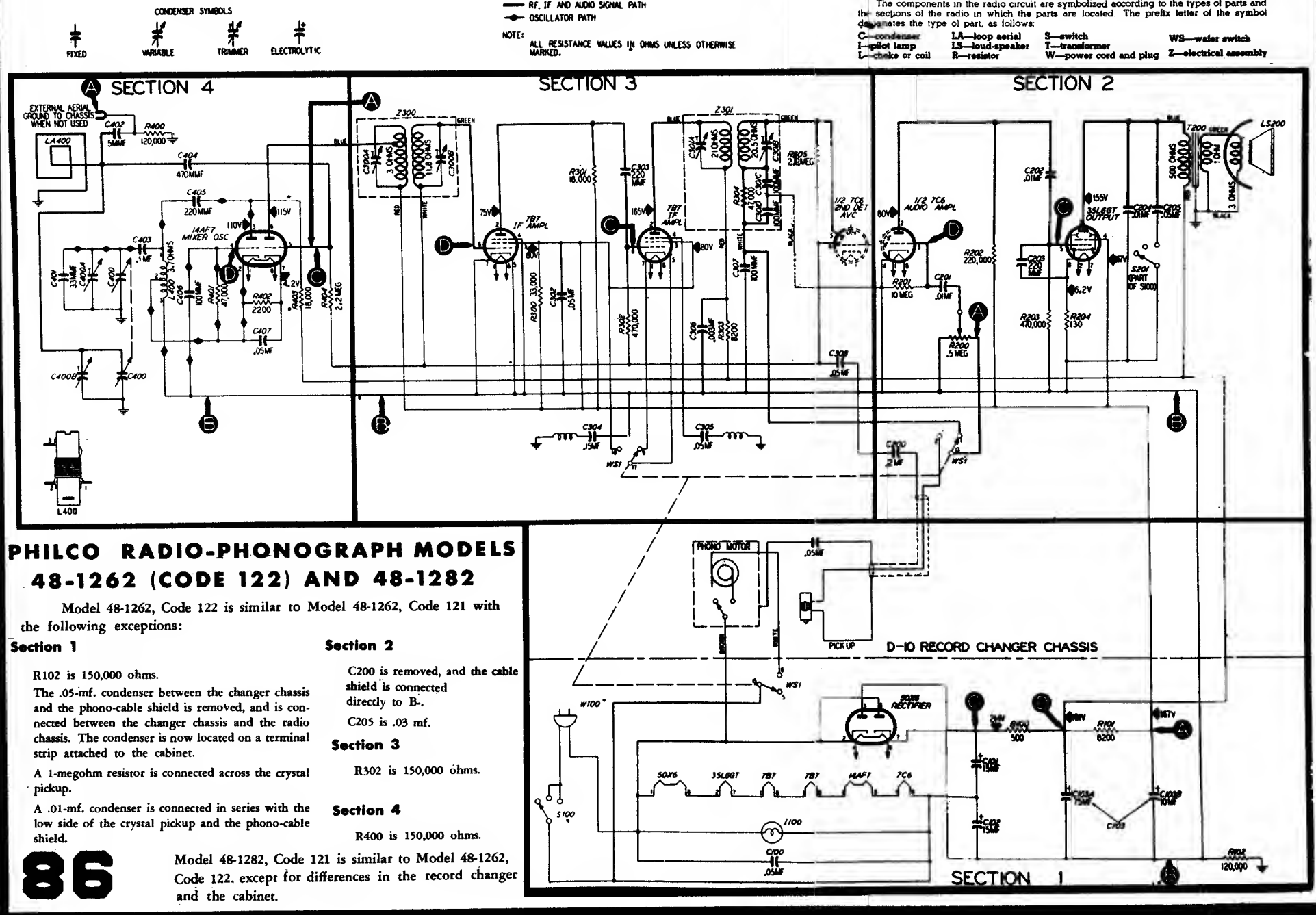


FIGURE 4. BOTTOM VIEW, SHOWING SECTION 4 TEST POINTS.

STEP	TEST POINT	DIAL SETTINGS		NORMAL INDICATION	POSSIBLE CAUSE OF ABNORMAL INDICATION
		SIG. GEN.	RADIO		
1	A	1000 kc	1000 kc	Loud, clear signal with weak signal input.	Trouble in this section. Isolate by the following tests.
2	C	1000 kc	1000 kc	Loud, clear signal with weak signal input.	Defective 14AF7. Open C400. Shorted or leaky C400. Trouble in oscillator circuit (see step 3).
3	D Osc. test (See note below.)		Turn tuning control through range.	Negative 1 to 2 volts.	Defective 14AF7 or L400. Open or shorted C404 or C405. Open R400, R402, or C402. Shorted plates of tuning condenser (osc. section).
4	A	1000 kc	1000 kc	Loud, clear signal with weak signal input.	Defective T400 or LA400. Open C403 or C400. Shorted plates of tuning condenser (ant. section).

NOTE: Connect positive lead of high-resistance d-c voltmeter to test point B–; connect prod end of negative lead through 100,000-ohm isolating resistor to oscillator grid, test point D. Use suitable meter range, such as 0—10 volts. Proper operation of oscillator is indicated by negative voltage throughout range of tuning condenser.



PHILCO RADIO-PHONOGRAPH MODELS 48-1262 (CODE 122) AND 48-1282

Model 48-1262, Code 122 is similar to Model 48-1262, Code 121 with the following exceptions:

Section 1

R102 is 150,000 ohms.

The .05-mf. condenser between the changer chassis and the phono-cable shield is removed, and is connected between the changer chassis and the radio chassis. The condenser is now located on a terminal strip attached to the cabinet.

A 1-megohm resistor is connected across the crystal pickup.

A .01-mf. condenser is connected in series with the low side of the crystal pickup and the phono-cable shield.

Section 2

C200 is removed, and the cable shield is connected directly to B-.

C205 is .03 mf.

Section 3

R302 is 150,000 ohms.

Section 4

R400 is 150,000 ohms.

Model 48-1282, Code 121 is similar to Model 48-1262, Code 122, except for differences in the record changer and the cabinet.

MANUAL OF 1949 MOST-OFTEN-NEEDED RADIO DIAGRAMS

PHILCO RADIO-PHONOGRAPH, MODEL 48-1262

Section 1 TROUBLE SHOOTING

For the tests in this section, use a d-c voltmeter. Connect the negative lead to the B— bus, test point B; connect the positive lead to the test points indicated in the chart. The voltage readings given were taken with a 20,000-ohms-per-volt meter, at a line voltage of 117 volts, a.c.

With the radio-phono switch set to the radio position, turn the volume control to minimum and turn the tone control fully clockwise.

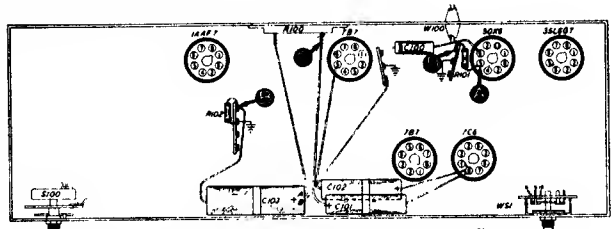


Figure 1. Bottom View, Showing Section 1 Test Points

Follow the steps in sequence; if the "NORMAL INDICATION" is obtained in step 1, proceed with the tests for Section 2; if not, isolate and correct the trouble in this section.

STEP	TEST POINT	NORMAL INDICATION	ABNORMAL INDICATION	POSSIBLE CAUSE OF ABNORMAL INDICATION
1	A	167 v.		Trouble within this section. Isolate by the following tests.
2	C	214 v.	No voltage.	Defective: 50X6, S100, W100. Shorted: C101, C103.
			Low voltage.	Defective: 50X6. Open: C101, C102. Leaky: C101, C102, C103A, C103B.
			High voltage.	Open: R100, T200,* R204.*
3	D	181 v.	No voltage.	Shorted: C103A.
			Low voltage.	Open: C103A. Leaky: C103A, C204.*
			High voltage.	Open: R101, R204,* T200.*
4	A	167 v.	No voltage.	Shorted: C103B.
			Low voltage.	Leaky: C103B.
			High voltage.	Open: R204,* T200.*
Listening Test: Abnormal hum may be caused by open C103A, C103B, or R102.				

* This part, located in another section, may cause abnormal indication in this section.

Section 2 TROUBLE SHOOTING

For the tests in this section, use an audio-frequency signal generator. Connect the generator ground lead to the B— bus, test point B; connect the generator output lead through a .1-mf. condenser to the test points indicated in the chart.

Set the volume control to maximum, and the tone control fully clockwise. Adjust the signal-generator output as required for each step.

If the "NORMAL INDICATION" is obtained in step 1, proceed to the tests in Section 3; if not, isolate and correct the trouble in this section.

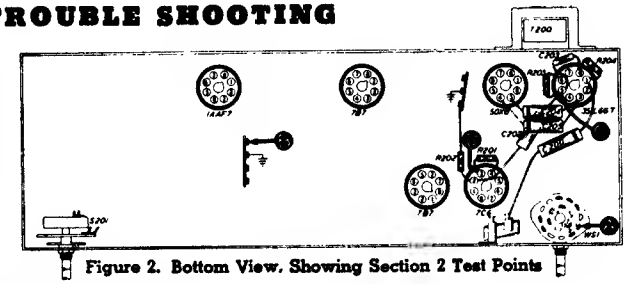


Figure 2. Bottom View, Showing Section 2 Test Points

STEP	TEST POINT	NORMAL INDICATION	POSSIBLE CAUSE OF ABNORMAL INDICATION
1	A	Loud, clear signal with weak signal input.	Tronble within this section. Isolate by the following tests.
2	C	Leud, clear signal with strong signal input.	Defective: 35L6GT, LS200, T200. Shorted: C202, C203, C204, C205. Leaky: C202, C203, C204, C205. Open: R203, R204.
3	D	Loud, clear signal with weak signal input.	Defective: 7C6. Open: C202, R202, R201. Leaky: C202.
4	A	Loud, clear signal with weak signal input. (Rotate R200 through its range.)	Defective: WS1, R200. Open: C201. Shorted: C301D.*
Listening Test: Distortion on strong signals may be caused by short-circuited or leaky C201, or open-circuited R201.			

* This part, located in another section, may cause abnormal indication in this section.

Section 3 TROUBLE SHOOTING

For the tests in this section, use an r-f signal generator, with modulated output, set at 455 kc. Connect the generator ground lead to the B— bus, test point B; connect the generator output lead through a .1-mf. condenser to the test points indicated in the chart.

Set the radio-phono switch to radio, turn the volume control to maximum, and set the tone control fully clockwise.

If the "NORMAL INDICATION" is obtained in step 1, proceed with the tests for Section 4; if not, isolate and correct the trouble in this section.

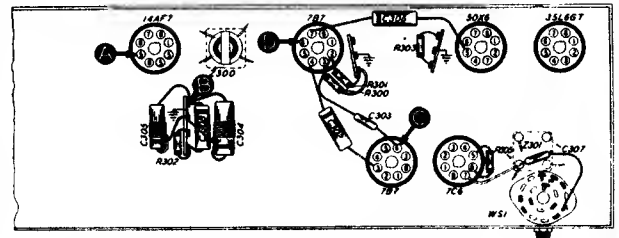


Figure 3. Bottom View, Showing Section 3 Test Points

NOTE: Since the circuit location of test point A for this section is the same as that of test point C for Section 4, the effectiveness of step 1 as a master check is dependent upon the condition of certain parts in Section 4; these parts are listed below under "POSSIBLE CAUSE OF ABNORMAL INDICATION."

STEP	TEST POINT	NORMAL INDICATION	POSSIBLE CAUSE OF ABNORMAL INDICATION
1	A	Loud, clear signal with weak signal input.	Trouble within this section. Isolate by the following tests.
2	C	Loud, clear signal with strong signal input.	Defective: WS1, 7B7 (2nd i.f.), 7C6, Z301. Open: C302, C306, R300, R302. Shorted: C302, C306. Leaky: C302, C306.
3	D	Loud, clear signal with moderate signal input.	Defective: 7B7 (1st i.f.). Open: C303, C304, C305, C308, R301, R302. Shorted: C303. Leaky: C303.
4	A	Loud, clear signal with weak signal input.	Defective: 14AF7,* Z300. Misaligned: Z300. Open: R402,* R401.*

* This part, located in another section, may cause abnormal indication in this section.

Section 4 TROUBLE SHOOTING

For the tests in this section (with the exception of the oscillator test), use an r-f signal generator with modulated output. Connect the generator ground lead to the B— bus, test point B; connect the generator output lead through a .1-mf. condenser to the test points indicated in the chatr.

Set the radio-phono switch to radio, turn the volume control to maximum, and set the tone control fully clockwise.

Except as noted for the oscillator test, set the radio and signal-generator dials to 540 kc.

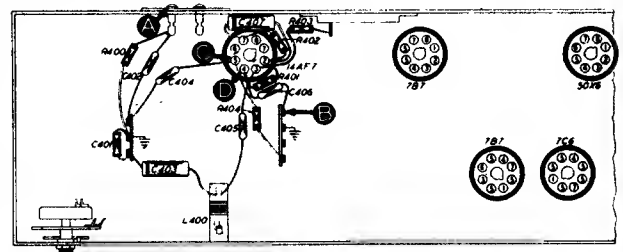


Figure 4. Bottom View, Showing Section 4 Test Points

STEP	TEST POINT	NORMAL INDICATION	POSSIBLE CAUSE OF ABNORMAL INDICATION
1	A	Loud, clear signal with weak signal input.	Trouble within this section. Isolate by the following tests.
2	C	Loud, clear signal with weak signal input.	Defective: 14AF7, osc. circuit. Open: C407, R402. Shorted: C407. Leaky: C407.
3	D (Osc. test; see Note below.)	Negative 3.3 to 4.2 volts.	Defective: L400. Open: C403, C405, C406, R401, R403. Shorted: C400, C400A, C401, C402, C405, C406.
4	A	Loud, clear signal with weak signal input.	Defective: LA400. Shorted: C400, C400A, C402, C404. Open: C402, C404. Leaky: C402, C404.

OSCILLATOR-TEST NOTE: Connect positive lead of high-resistance d-c voltmeter to B— bus, test point B; connect prod end of negative lead through 100,000-ohm isolating resistor to oscillator grid, test point D. Use suitable meter range, such as 0—10 volts. Proper operation of oscillator is indicated by negative voltage of 3.3 to 4.2 volts (measured with 20,000-ohms-per-volt meter) throughout range of tuning control.

SYMBOLIZATION

AM ALIGNMENT CHART

STEP	SIGNAL GENERATOR		RADIO		ADJUST
	CONNECTIONS TO RADIO	DIAL SETTING	DIAL SETTING	SPECIAL INSTRUCTIONS	
1	Ground lead to B–; output lead through .1-mf. condenser to terminal 1 of TB401.	455 kc.	540 kc.	Adjust trimmers ONCE ONLY, in the order given, for maximum output.	C302A C301D C300C TC300
2	Radiating loop (see note *).	1600 kc.	1600 kc.	Adjust for maximum.	C413A
3	Same as step 2.	1500 kc.	1500 kc.	Adjust for maximum.	C413B

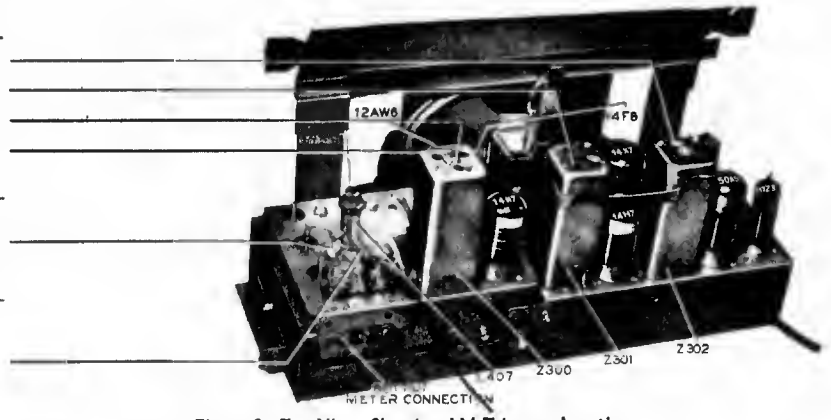


Figure 8. Top View, Showing AM Trimmer Locations

FM ALIGNMENT CHART

STEP	SIGNAL GENERATOR		RADIO		ADJUST
	CONNECTIONS TO RADIO	DIAL SETTING	DIAL SETTING	SPECIAL INSTRUCTIONS	
1	Through .1-mf. condenser to pin 1 of 12AW6 tube (test point E).	9.1 mc.	88 mc.	Adjust for maximum d-c meter reading; attenuate signal to maintain approximately 10-volt reading. Repeat until no further improvement is noted. After this step, do not touch any of these trimmers except C302C (in step 3).	C302C TC302 C301C C301A
2	Through .1-mf. condenser to pin 8 of 14F8 tube (test point C).	9.1 mc.	88 mc.	Adjust for maximum d-c meter reading; attenuate signal to maintain approximately 10-volt reading. Repeat until no further improvement is noted. After this step, do not touch these trimmers.	C300B C300A
3	Same as step 2.	9.1 mc.	88 mc.	Double-check adjustment of C302C to make certain that minimum audio output is obtained. This is a critical adjustment; turn trimmer very slowly.	C302C
4	To pin 3 of J400.	105 mc.	105 mc.	Maximum d-c meter reading. This is the oscillator high-frequency trimmer adjustment.	C400C
5	Same as step 4.	105 mc.	105 mc.	Adjust for maximum while rocking tuning control.	C400B
6	Same as step 4.	105 mc.	105 mc.	Adjust for maximum.	C400A
7	Same as step 4.	92 mc.	92 mc.	Adjust L403 (see ADJUSTING R-F COILS).	
8	Same as step 4.	92 mc.	92 mc.	Adjust L402 (see ADJUSTING R-F COILS).	
9	Same as step 4.	92 mc.	92 mc.	Adjust L400 (see ADJUSTING R-F COILS).	
10	Repeat steps 4 through 9 until no further increase is obtained.				

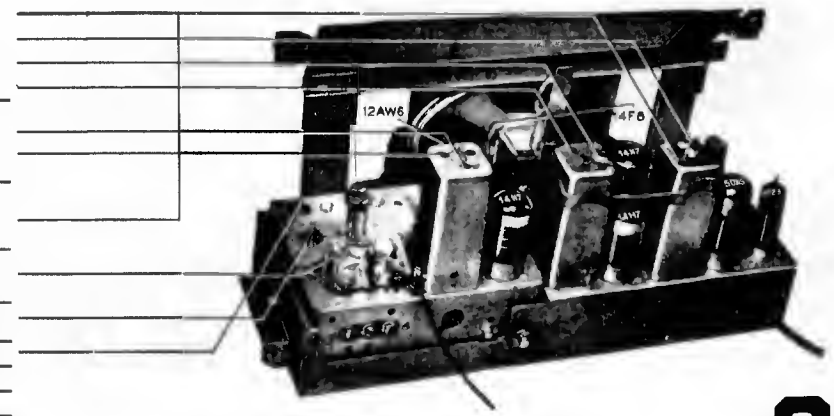
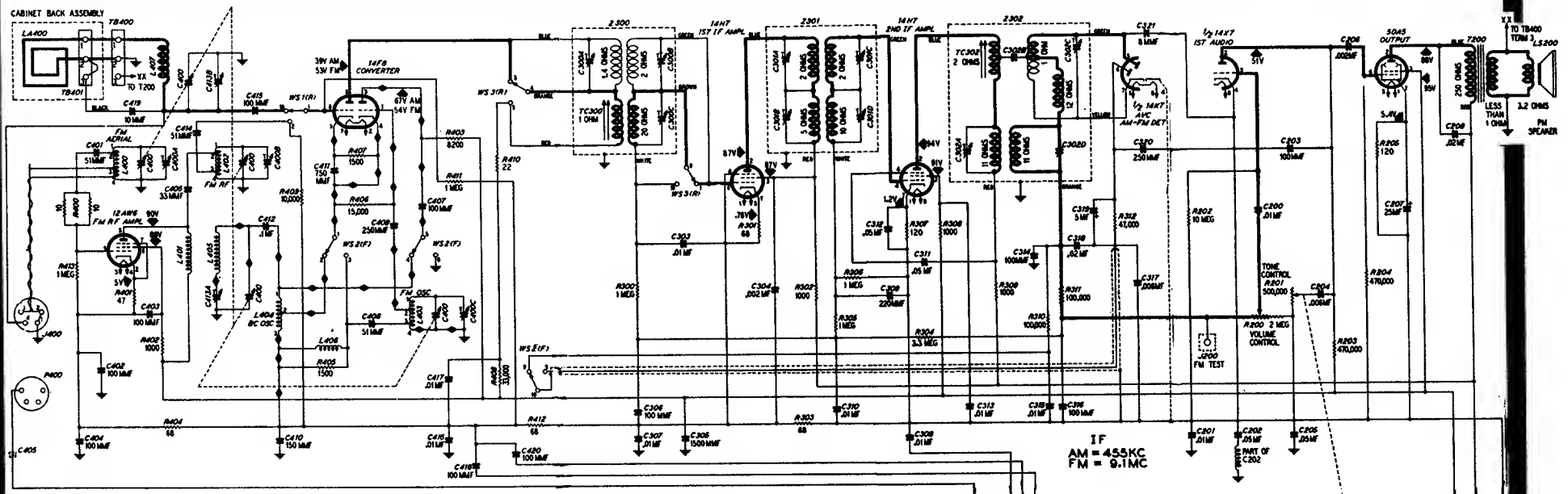


Figure 9. Top View, Showing FM Trimmer Locations

MANUAL OF 1949 MOST-OFTEN-NEEDED RADIO DIAGRAMS

PHILCO RADIO MODELS 48-472 AND 48-472-1



AM ALIGNMENT PROCEDURE

Make alignment with loop connected to radio. AM alignment should be completed before making FM alignment.

OUTPUT METER—Connect between terminal 3 (voice-coil connection) of aerial terminal board, TB400, and chassis.

SIGNAL GENERATOR (AM)—Connect as indicated in chart.

CONTROLS—Set volume control to maximum, turn on radio power, and set tone control to counter-clockwise (treble) position. Set wafer switch to broadcast position.

OUTPUT LEVEL—During alignment, adjust signal-generator output to maintain output-meter indication below 1.25 volts.

*RADIATING LOOP (steps 2 and 3): Make up a six-to-eight-turn, 6-inch-diameter loop, using insulated wire; connect to signal-generator leads and place near radio loop.

FM ALIGNMENT PROCEDURE

Make AM Alignment First.

OUTPUT METER (used only in step 3)—Same connections as for AM alignment.

D-C ALIGNMENT INDICATOR—Connect 20,000-ohms-per-volt meter across 5-mf. condenser, C319, in FM detector circuit—negative lead to pin 6 of 14X7 tube and positive lead to B–. Use 10-volt range.

SIGNAL GENERATOR (AM)—Use MODULATED output for entire alignment. Generator must have sufficient output to give d-c meter reading greater than 8.5 volts. Connect generator ground to lead B–; connect output lead as indicated in chart.

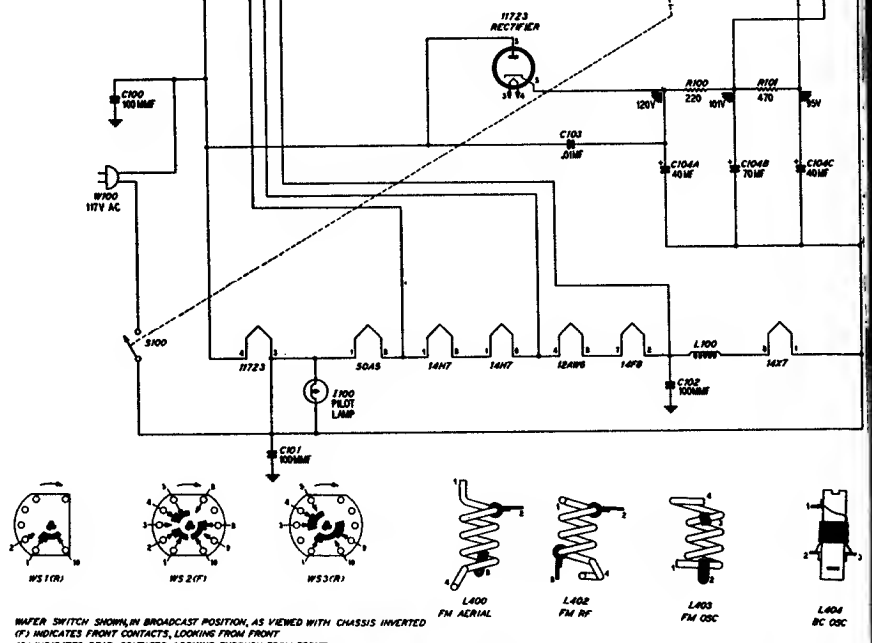
CONTROLS—Same settings as for AM alignment, except wafer switch, which should be set to FM position. Allow radio and generator to warm up for 15 minutes before starting alignment.

ADJUSTING R-F COILS: In steps 7, 8, and 9, the resonance of the circuits using coils L400, L402, and L403 may be checked by the use of a powdered-iron tuning core, such as Part No. 56-6100. If the signal strength (meter reading) increases when the iron end is inserted in the coil, compress the turns slightly. If the signal strength increases whan the brass end is inserted, spread the turns. If the signal strength decreases when either the brass or iron end is inserted, no adjustment of the coil is necessary. Do not spread or compress turns excessively, since only a small change is required at these frequencies.

Oscilletor coil, L403: Adjust coil for maximum meter reading.

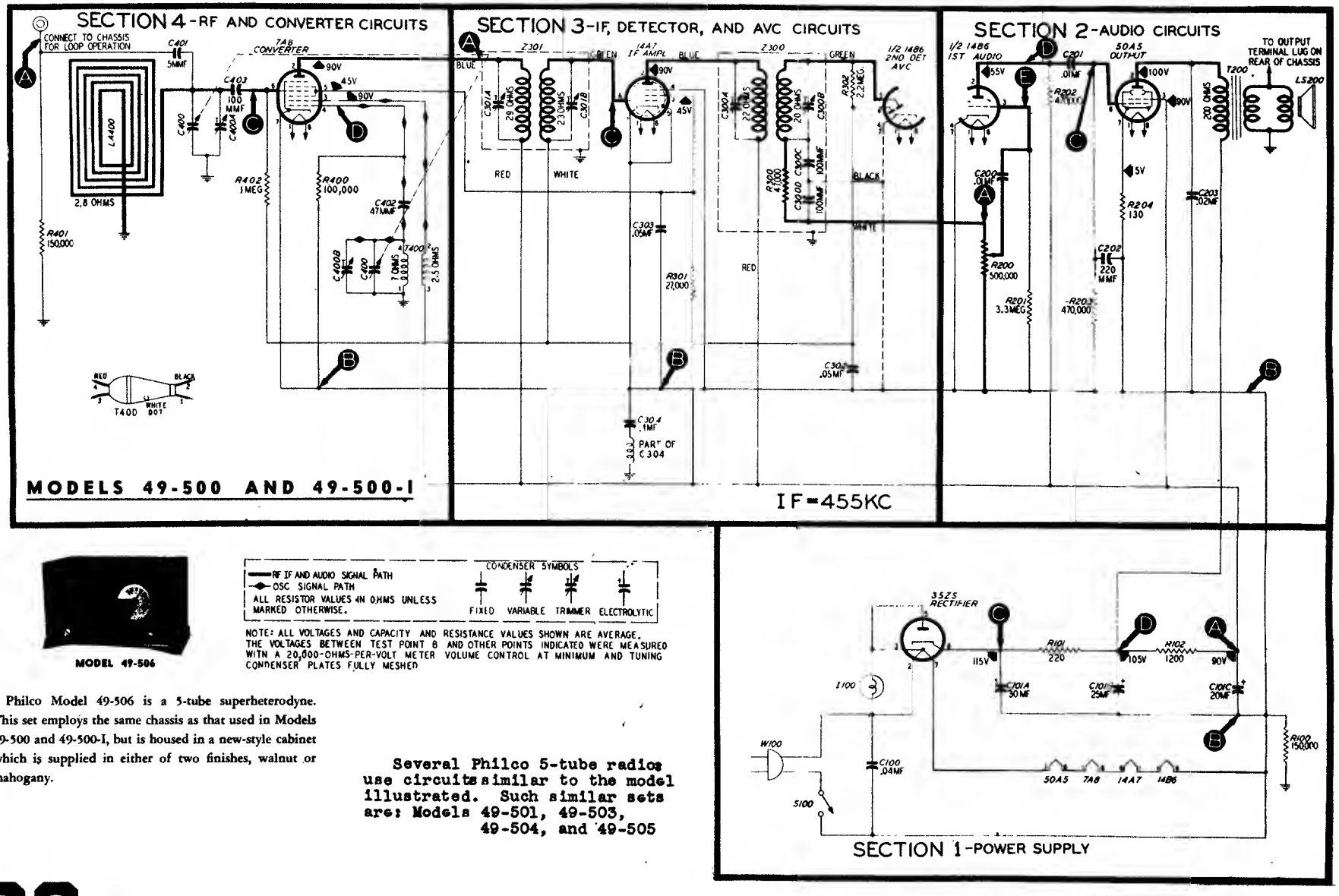
R-f coil, L402: Adjust coil for maximum meter reading while rocking tuning control.

Aetial coil, L400: Adjust coil for maximum meter reading.



WAFER SWITCH SHOWN IN BROADCAST POSITION, AS VIEWED WITH CHASSIS INVERTED
(F) INDICATES FRONT CONTACTS, LOOKING FROM FRONT
(R) INDICATES REAR CONTACTS, LOOKING THROUGH FROM FRONT
FRONT OF WAFERS 1 AND 3, REAR OF WAFER 2, NOT USED FOR SWITCHING BANDS

AM ALIGNMENT CHART



MODEL 49-506

RF IF AND AUDIO SIGNAL PATH
OSC SIGNAL PATH
ALL RESISTOR VALUES IN OHMS UNLESS MARKED OTHERWISE.

CONDENSER SYMBOLS: FIXED, VARIABLE, TRIMMER, ELECTROLYTIC

NOTE: ALL VOLTAGES AND CAPACITY AND RESISTANCE VALUES SHOWN ARE AVERAGE. THE VOLTAGES BETWEEN TEST POINT B AND OTHER POINTS INDICATED WERE MEASURED WITH A 20,000-OHMS-PER-VOLT METER VOLUME CONTROL AT MINIMUM AND TUNING CONDENSER PLATES FULLY MESHED

Philco Model 49-506 is a 5-tube superheterodyne. This set employs the same chassis as that used in Models 49-500 and 49-500-I, but is housed in a new-style cabinet which is supplied in either of two finishes, walnut or mahogany.

Several Philco 5-tube radios use circuits similar to the model illustrated. Such similar sets are: Models 49-501, 49-503, 49-504, and 49-505

PHILCO RADIO MODELS 49-500 AND 49-500-I, SECTIONALIZED SCHEMATIC DIAGRAM, SHOWING TEST POINTS

MANUAL OF 1949 MOST-OFTEN-NEEDED RADIO DIAGRAMS

PHILCO RADIO — MODELS 49-500 AND 49-500-1

Section 1 — Power Supply — TROUBLE SHOOTING

For the tests in this section, use a d-c voltmeter; connect the leads to the test points indicated in the chart. The voltages shown were taken with a 20,000-ohms-per-volt meter at a line voltage of 117 volts, 60 cycles.

Turn the volume control to minimum, and set the dial pointer at 540 kc.

If the "NORMAL INDICATION" is obtained in step 1, proceed with tests for Section 2 (audio circuits); if not, isolate and correct the trouble within this section.

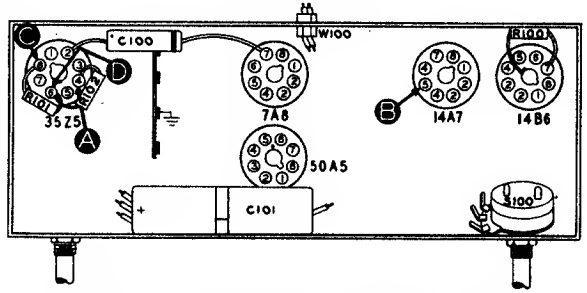


FIGURE 1. BOTTOM VIEW, SHOWING SECTION 1 TEST POINTS

STEP	TEST POINT	NORMAL INDICATION	ABNORMAL INDICATION	POSSIBLE CAUSE OF ABNORMAL INDICATION
1	A to B	90v		Trouble within this section; isolate by the following tests.
2	C to B	115v	No voltage Low voltage High voltage	Defective 35Z5GT. Shorted: C181A. Defective: 35Z5GT. Open: C101A or 1103. Leaky: C101A. Open: R101.
3	D to B	105v	No voltage Low voltage High voltage	Shorted: C181B. Open: C101B. Leaky: C101B or C203. Open: R102. T203. or R204.
4	A to B	80v	No voltage Low voltage High voltage	Shorted: C101C. Leaky: C101C. Open: R204.

Listening Test: Abnormal hum may be caused by open C101A, C101B, or C101C.

Section 2 — Audio Circuits — TROUBLE SHOOTING

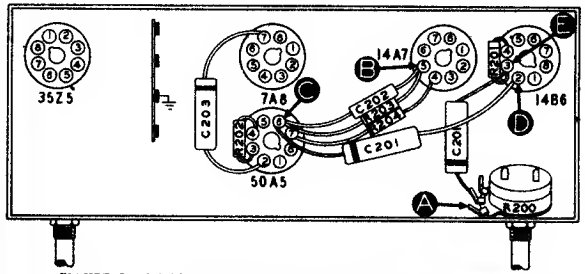


FIGURE 2. BOTTOM VIEW, SHOWING SECTION 2 TEST POINTS

For the tests in this section, use an audio-signal generator. Connect the ground lead of the generator to B; connect the output lead through a .1-mf. condenser to the test points indicated in the chart. Set the volume control at maximum. If the "NORMAL INDICATION" is obtained in step 1, proceed with the tests for Section 3 (i-f, detector, and a-v-c circuits); if not, isolate and correct the trouble within this section.

STEP	TEST POINT	NORMAL INDICATION	POSSIBLE CAUSE OF ABNORMAL INDICATION
1	A	Loud, clear signal with weak signal-generator input.	Trouble within this section; isolate by the following tests.
2	C	Clear signal with weak signal-generator input.	No signal — Open or shorted: LS202 or T288. Shorted: C283. Open: R304. Defective: 50A5. Weak or distorted signal — Defective: 50A5 or LS200. Leaky: C202 or C281. Open: R383. Shorted: R204.
3	D	Same as step 2.	No signal — Open: C201. Weak or distorted signal — Leaky: C281.
4	E	Same as step 1.	No signal — Open: R202. Defective: 14B8. Weak or distorted signal — Shorted: C200. Open: R381. Defective: 14B6.
5	A	Same as step 1.	No signal — Open: C203. Shorted: C300D. Weak or distorted signal — Open: R203 (rotate through range).

Section 3 — I-F, Detector, and A-V-C Circuits — TROUBLE SHOOTING

For the tests in this section, use an r-f signal generator, with modulated output; set to 455 kc. Connect the ground lead of the signal generator to B; connect the output lead through a .1-mf. condenser to the test points indicated in the chart. Set the volume control at maximum. If the "NORMAL INDICATION" is obtained in step 1, proceed with the tests for Section 4 (r-f and converter circuits); if not, isolate and correct the trouble within this section.

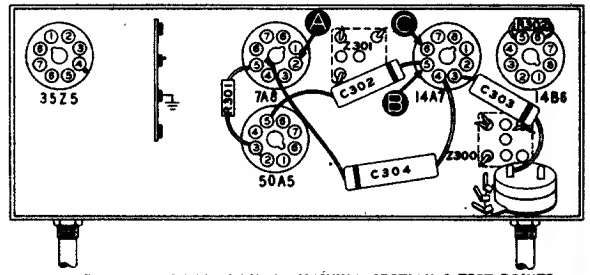


FIGURE 3. BOTTOM VIEW, SHOWING SECTION 3 TSST POINTS

STEP	TEST POINT	NORMAL INDICATION	POSSIBLE CAUSE OF ABNORMAL INDICATION
1	A	Clear signal with weak signal-generator input.	Trouble within this section; isolate by the following tests.
2	C	Same as step 1.	No signal — Open or shorted: Z300. Defective: 14B6 or 14A7. Open: R301. Shorted: C303. Weak or distorted signal — Leaky: C303. Open: C303 or C304. Defective: 14B6 or 14A7. Misaligned: Z300. Leaky or open: C302.
3	A	Same as step 1.	No signal — Open or shorted: Z301. Weak or distorted signal — Misaligned: Z301.

Section 4 — R-F and Converter Circuits — TROUBLE SHOOTING

For the tests in this section, use an r-f signal generator, with modulated output. Connect the generator ground lead to B; connect the output lead through a .1-mf. condenser to the test points indicated in the chart.

Inspect the tuning condensers for bent plates, dirt, or poor wiper contacts; any or all of these will cause noise. If the "NORMAL INDICATION" is not obtained in step 1, isolate the trouble by following the remaining steps.

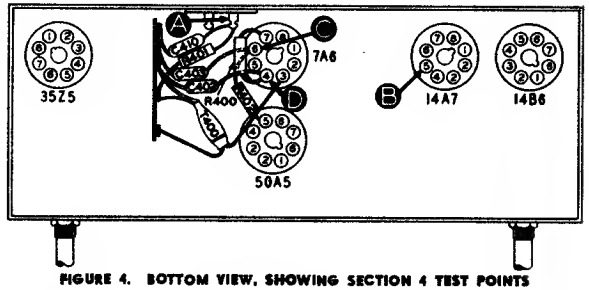


FIGURE 4. BOTTOM VIEW, SHOWING SECTION 4 TEST POINTS

STEP	TEST POINT	DIAL SETTINGS: SIG. GEN.	DIAL SETTINGS: RADIO	NORMAL INDICATION	POSSIBLE CAUSE OF ABNORMAL INDICATION
1	A	540 kc.	540 kc.	Clear signal with weak signal-generator input.	Trouble within this section; isolate by the following tests.
2	D (Osc. test; see note below.)		540 to 1620 kc.	Negative 9 to 12 volts.	Open or shorted: T400, C402, or R400. Shorted: C402 or C402B. Defective: 7A8.
3	C	548 kc.	548 kc.	Same as step 1.	No signal — Open or shorted: Z301. Shorted: C402 or C402A. Defective 7A8. Weak or distorted signal — Shorted or open: LA400. Defective: 7A8.
4	A	548 kc.	540 kc.	Same as step 1.	Weak signal — Open: C401.

OSCILLATOR-TEST NOTE: Connect positive lead of a 20,000-ohms-per-volt meter to B; connect prod end of negative lead through a 100,000-ohm isolating resistor to test point D. Proper operation of oscillator is indicated by a negative voltage of 8 to 12 volts throughout range of tuning condenser.

MANUAL OF 1949 MOST-OFTEN-NEEDED RADIO DIAGRAMS

PHILCO RADIO MODEL 49-602

Section 1—Power Supply

TROUBLE SHOOTING

Make the tests for this section with a d-c voltmeter. Connect the negative lead to B—, test point B; connect the positive lead to the test points indicated in the chart. The voltage readings given were taken with a 20,000-ohms-per-volt meter at a line voltage of 117 volts, a.c.

Set the volume control to minimum.

The battery pack should be replaced when the "A" voltage drops below 5 volts, or the "B" voltage drops below 60 volts.

If the "NORMAL INDICATION" is obtained in step 1, proceed with the tests for Section 2 (audio circuits); if not, isolate and correct the trouble in this section.

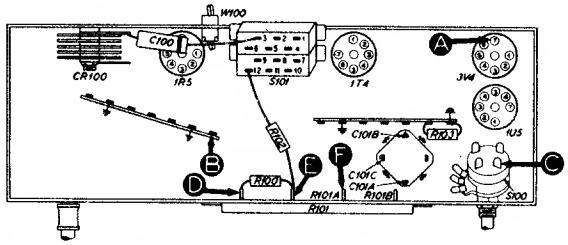


Figure 1. Bottom View, Showing Section 1 Test Points

STEP	TEST POINT	NORMAL INDICATION	ABNORMAL INDICATION	POSSIBLE CAUSE OF ABNORMAL INDICATION
1(a) 1(b)	A C	7.5v 90v		Trouble in this section. Isolate by the following tests.
2	D	125v	Low voltage No voltage	Defective: CR100. Open C101A. Defective: CR100. Open: S100. S101.
3	E	120v	Low voltage No voltage	Changed resistance: R100. Leaky: C101A. Open: R100. Shorted: C101A.
4	F	85v	Low voltage No voltage	Changed resistance: R101A. Leaky: C101B. Open: R101A. Shorted: C101B.
5	A	7.5v	Low voltage High voltage No voltage	Changed resistance: R101B. Open: One or more filaments, R205*. Open: R101B, S101.
6	C	90v	Low voltage High voltage No voltage	Changed resistance: R102. Leaky: C101C. Open: R205*, T203*. S100. Open: R102. S101. Shorted: C101C.
Listening Test: Abnormal hum may be caused by open C101B, C101C, or C202*.				

*This part, located in another section, may cause abnormal indication in this section.

Section 2—Audio Circuits

TROUBLE SHOOTING

For the tests in this section, use an audio-frequency signal generator. Connect the generator ground lead to B—, test point B; connect the output lead through a .1-mf. condenser to the test points indicated in the chart.

Set the radio volume control to maximum.

If the "NORMAL INDICATION" is obtained in step 1, proceed with the tests for Section 3 (i-f, detector, and a-v-c circuits); if not, isolate and correct the trouble in this section.

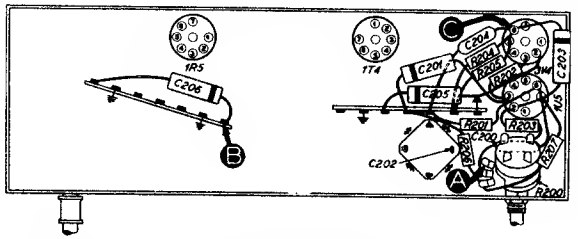


Figure 2. Bottom View, Showing Section 2 Test Points

STEP	TEST POINT	NORMAL INDICATION	POSSIBLE CAUSE OF ABNORMAL INDICATION
1	A	Loud, clear speaker output with moderate generator input.	Trouble in this section. Isolate by the following tests.
2	C	Clear speaker output with strong generator input.	Defective: 3V4. LS200. Open: R204. T200. Shorted: C203. C204. C205. T200.
3	A	Same as step 1.	Defective: 1U5. R200 (rotate). Open: C200. R201. R202. R203. C203. Shorted: C201. C301C*.
Listening Test: Distortion may be caused by leaky or shorted C203, or by changed resistance of R202. Distortion or strong signals may be caused by leaky or shorted C200.			

*This part, located in another section, may cause abnormal indication in this section.

Section 3—I-F, Detector, And A-V-C Circuits

TROUBLE SHOOTING

For the tests in this section, use an r-f signal generator, with modulated output, set at 455 kc. Connect the generator ground lead to B—, test point B; connect the output lead through a .1-mf. condenser to the test points indicated in the chart.

Set the radio volume control to maximum.

If the "NORMAL INDICATION" is obtained in step 1, proceed with the tests for Section 4 (r-f and converter circuits); if not, isolate and correct the trouble in this section.

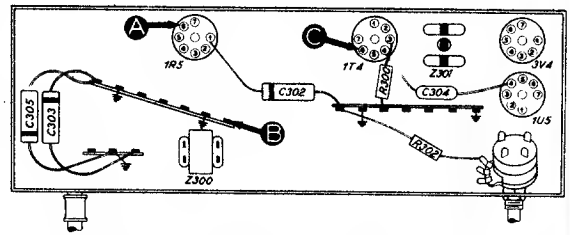


Figure 3. Bottom View, Showing Section 3 Test Points

To provide a complete i-f amplifier check, test point A for this section is placed at the grid of the mixer in Section 4; therefore, the effectiveness of step 1 as a master check is dependent upon the condition of certain parts in the mixer circuit. These parts are listed below under "POSSIBLE CAUSE OF ABNORMAL INDICATION."

STEP	TEST POINT	NORMAL INDICATION	POSSIBLE CAUSE OF ABNORMAL INDICATION
1	A	Loud, clear speaker output with weak generator input.	Trouble in this section. Isolate by the following tests.
2	C	Loud, clear output with moderate input.	Defective: 1T4. 1U5 (diode section). Misaligned: Z301. Open: R303, C303, L301A, R301, L301B, C301A. Shorted: C300B, C303, L301A, L301B, C301A, C201B.
3	A	Same as step 1.	Defective: 1R5*. Misaligned: Z300. Open: C300A, L303A, L300B, C300B, T400*. Shorted: C400A*, C400B*, C300A, L300A, L303B, C303B.

*This part, located in another section, may cause abnormal indication in this section.

Section 4—R-F And Converter Circuits

TROUBLE SHOOTING

For the tests in this section, with the exception of the oscillator test, use an r-f signal generator with modulated output. Connect the generator ground lead to B—, test point B; connect the output lead through a .1-mf. condenser to the test points indicated in the chart.

Set the radio volume control to maximum. Set the tuning control and signal-generator frequency as indicated in the chart.

If the "NORMAL INDICATION" is obtained in step 1, further tests should be unnecessary; if not, isolate and correct the trouble in this section. If the trouble is not revealed by the tests for this section, check the alignment.

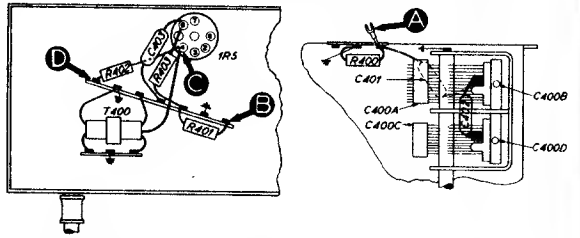
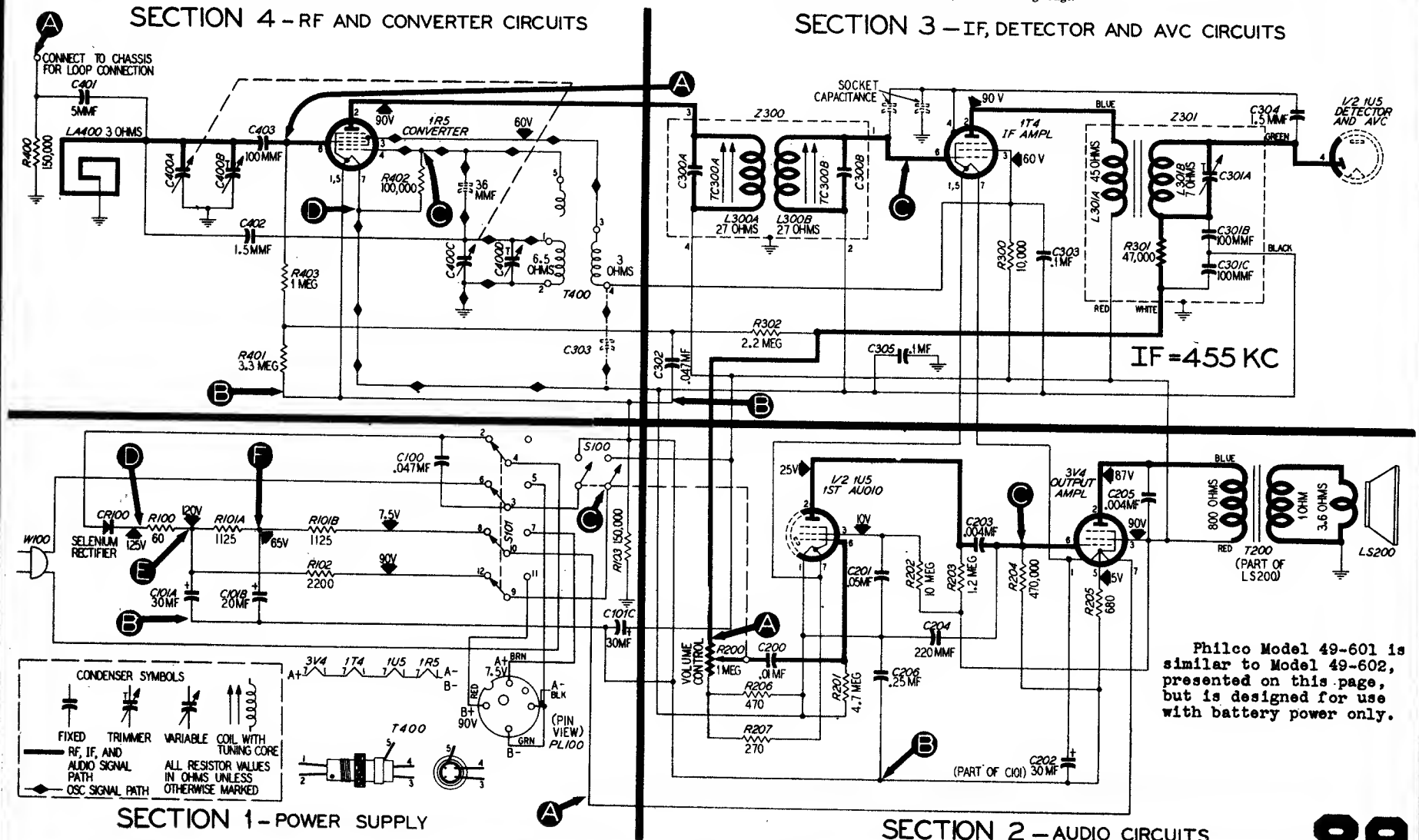


Figure 4. Bottom View, Showing Section 4 Test Points

STEP	TEST POINT	SIGNAL GEN. FREQUENCY	RADIO TUNING	NORMAL INDICATION	POSSIBLE CAUSE OF ABNORMAL INDICATION
1	A	1000 kc.	Tune to signal.	Loud, clear speaker output with weak generator input.	Trouble in this section. Isolate by the following tests.
2	C to D (Osc. test: see note below.)		Rotate through range.	Negative 5 to 10 volts.	Defective: 1R5. Open: R402. T400. Shorted: C402, C400C, C403D.
3	A	1000 kc.	Tune to signal.	Same as step 1.	Open: C401, C403, R401, R403, LA400.

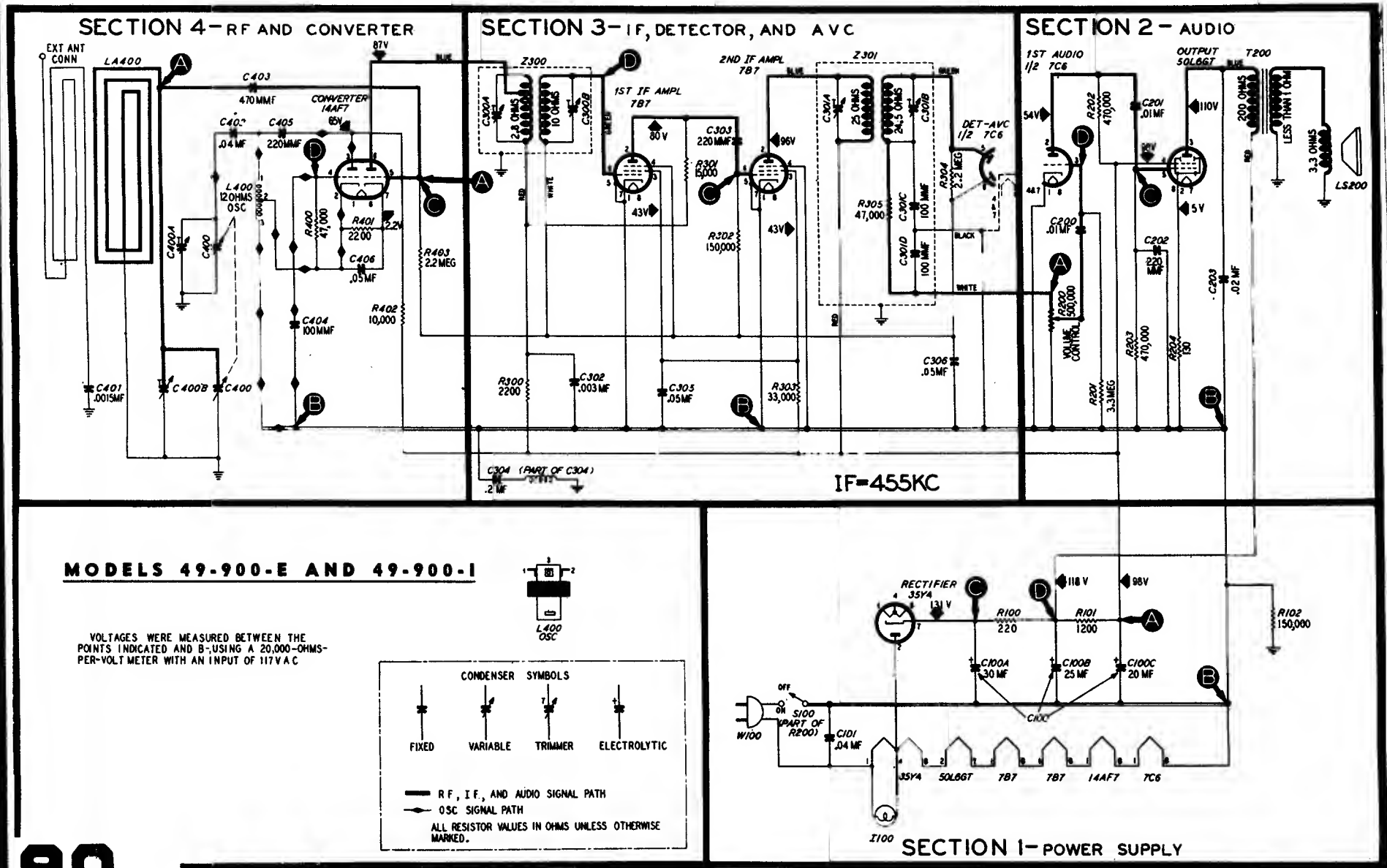
OSCILLATOR TEST: Connect the positive lead of a high-resistance voltmeter to test point D; connect the prod end of the negative lead through a 100,000-ohm isolating resistor to the oscillator grid (pin 4 of the 1R5), test point C. Use a suitable meter range, such as 0—10 volts. Proper operation of the oscillator is indicated by negative voltage within the range given in the chart (measured with a 20,000-ohms-per-volt meter) throughout the tuning range.

OSCILLATOR TEST: Connect the positive lead of a high-resistance voltmeter to test point D; connect the prod end of the negative lead through a 100,000-ohm isolating resistor to the oscillator grid (pin 4 of the 1R5), test point C. Use a suitable meter range, such as 0—10 volts. Proper operation of the oscillator is indicated by negative voltage within the range given in the chart (measured with a 20,000-ohms-per-volt meter) throughout the tuning range.



Philco Model 49-601 is similar to Model 49-602, presented on this page, but is designed for use with battery power only.

Philco Model 49-602, Sectionalized Schematic Diagram, Showing Test Points



PHILCO RADIO, MODELS 49-900-E AND 49-900-I, SECTIONALIZED SCHEMATIC DIAGRAM, SHOWING TEST POINTS

MANUAL OF 1949 MOST-OFTEN-NEEDED RADIO DIAGRAMS

Section 1 TROUBLE SHOOTING

For the tests in this section, use a d-c voltmeter. Connect the negetive lead to the B– bus, test point B; connect the positive lead to the test points indicated in the chart. The voltage readings given were taken with a 20,000-ohms-per-volt meter, at a line voltage of 117 volts, a.c.

Turn the power switch "on," and set the volume control to minimum.

If the "NORMAL INDICATION" is obtained in step 1, proceed with the tests for Section 2; if not, isolate and correct the trouble in this section.

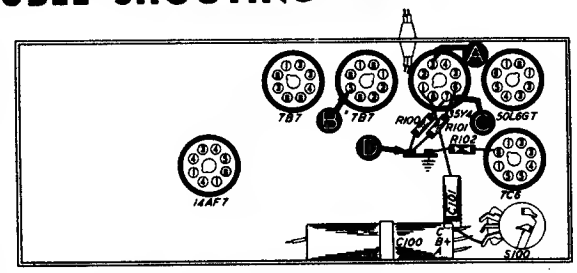


FIGURE 1. BOTTOM VIEW, SHOWING SECTION 1 TEST POINTS

STEP	TEST POINT	NORMAL INDICATION	ABNORMAL INDICATION	POSSIBLE CAUSE OF ABNORMAL INDICATION
1	A	88 volts		Trouble within this section. Isolate by the following tests.
2	C	131 volts	No voltage. Low voltage. High voltage.	Defective: 35Y4, W100, S100. Shorted: C100A. Defective: 35Y4. Open: C100A, I100. Leaky: C103A. Open: R100.
3	D	110 volts	No voltage. Low voltage. High voltage.	Shorted: C103B. Leaky: C100B, C100C, C203*. Open: R101, T203*, R204*.
4	A	93 volts	No voltage. Low voltage. High voltage.	Shorted: C100C. Open: R101. Leaky: C100C. Open: R204*.
Listening Test: Abnormal hum may be caused by open C103A, C103B, C100C, or R102.				

* This part, located in another section, may cause abnormal indication in this section.

Section 2 TROUBLE SHOOTING

For the tests in this section, use an audio-frequency signal generator. Connect the generator ground lead to B–, test point B; connect the output lead through a .1-mf. condenser to the test points indicated in the chart.

Set the radio volume control to maximum. Adjust the signal-generator output as required for each step.

If the "NORMAL INDICATION" is obtained in step 1, proceed with the tests for Section 3. If not, isolate and corsect the trouble in this section.

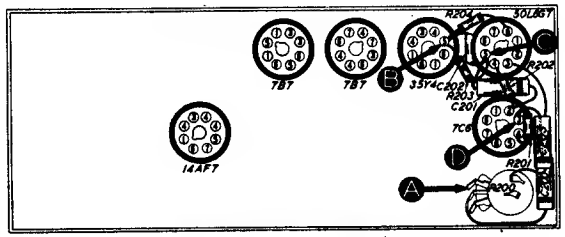


FIGURE 2. BOTTOM VIEW, SHOWING SECTION 2 TEST POINTS

STEP	TEST POINT	NORMAL INDICATION	POSSIBLE CAUSE OF ABNORMAL INDICATION
1	A	Loud, clear signal with weak signal input.	Trouble within this section. Isolate by the following tests.
2	C	Clear signal with strong signal input.	Defective: 50L6GT, T203, L5203. Shorted or leaky: C203, C300. Open: R204, R203.
3	D	Same as step 1.	Defective: 7C8. Shorted or leaky: C201. Open: R201, R202, C301.
4	A	Same as step 1. Note: Rotate R203 through range.	Defective: R203. Shorted or leaky: C200. Open: R201, C203.
Listening Test: Distortion on strong signals may be caused by leaky C203 or open R201.			

Section 3 TROUBLE SHOOTING

For the tests in this section, use an r-f signal generator, with modulated output, set at 455 kc. Connect the generator ground lead to B–, test point B; connect the output lead through a .1-mf. condenser to the test points indicated in the chart.

Set the radio volume control to maximum.

If the "NORMAL INDICATION" is obtained in step 1, proceed with the tests for Section 4; if not, isolate and correct the trouble in this section.

Since the circuit location of test point A for this section is the same as that of test point C for Section 4, the effectiveness of step 1 as a master check is dependent upon the condition of certain parts in Section 4; these parts are listed under "POSSIBLE CAUSE OF ABNORMAL INDICATION."

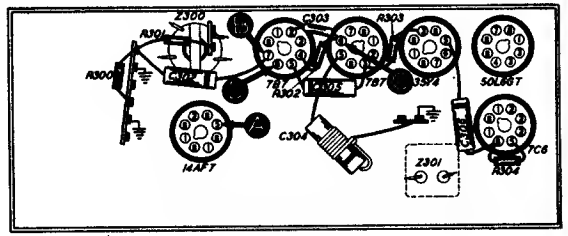


FIGURE 3. BOTTOM VIEW, SHOWING SECTION 3 TEST POINTS

STEP	TEST POINT	NORMAL INDICATION	POSSIBLE CAUSE OF ABNORMAL INDICATION
1	A	Loud, clear signal with weak signal input.	Trouble within this section. Isolate by the following tests.
2	C	Loud, clear signal with strong signal input.	Defective: 7B7 (2nd I.f.), 7C6 (diode section), Z301. Shorted or leaky: C308. Open: R303. Misaligned: Z301.
3	D	Loud, clear signal with moderate signal input.	Defective: 7B7 (1st I.f.). Shorted or leaky: C303, C302. Open: R301, R300, R305, C308, C302.
4	A	Loud, clear signal with weak signal input.	Defective: 14AF7*, Z300. Open: R401*, R403*, C308. Shorted or leaky: C308. Misaligned: Z300.

* This part, located in another section, may cause abnormal indication in this section.

Section 4 TROUBLE SHOOTING

For the tests in this section, use an r-f signal generator, with modulated output. Connect the generator ground lead to B–, test point B; connect the output lead through a .1-mf. condenser to the test points indicated in the chart.

Set the radio volume control to maximum.

If the "NORMAL INDICATION" is not obtained in step 1, isolate tha trouble by following the remaining steps.

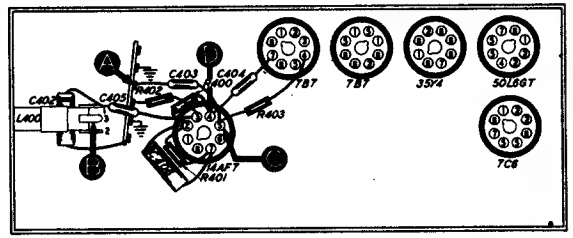
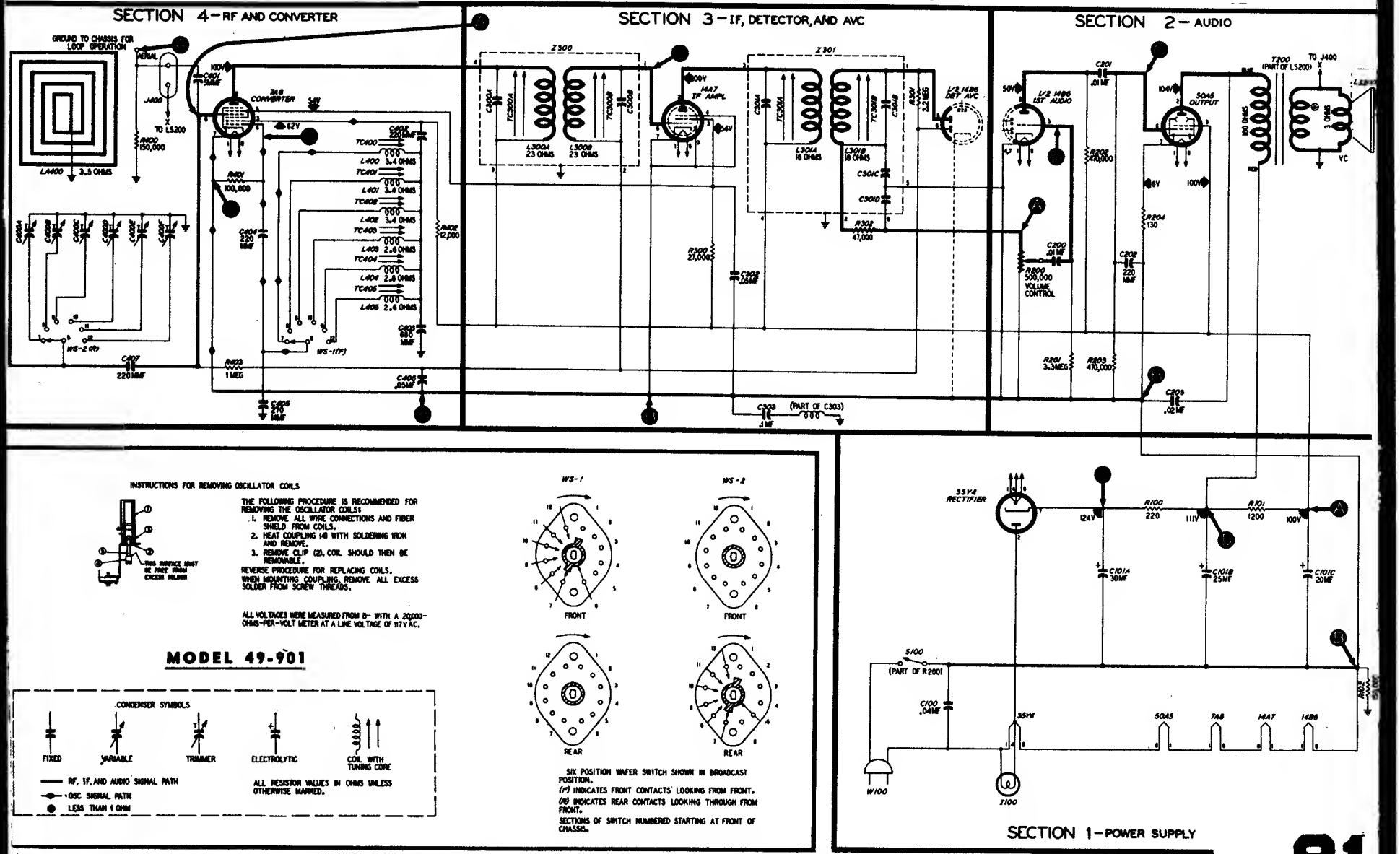


FIGURE 4. BOTTOM VIEW, SHOWING SECTION 4 TEST POINTS (LOCATION OF C401 SHOWN IN FIGURE 6)

STEP	TEST POINT	DIAL SETTINGS		NORMAL INDICATION	POSSIBLE CAUSE OF ABNORMAL INDICATION
		SIG. GEN.	RADIO		
1	A	540 kc.	540 kc.	Loud, clear signal with weak signal input.	Trouble within this section. Isolate by the following tests.
2	C	540 kc.	540 kc.	Same as step 1.	Defective: 14AF7. Open: C406, R402. Trouble in oscillator circuit. See step 3.
3	D Osc. Test (See note below.)		540 kc. to 1620 kc.	Negative voltage 1.6 volts to 1.8 volts.	Defective: L400. Open: R400, R402, C405, C404. Shorted: C402, C405, C405, C404, C400A.
4	A	540 kc.	540 kc.	Same as step 1.	Defective: LA400, C405, C406B. Open or shorted: C403.

OSCILLATOR TEST: Connect positive lead of a high-resistance voltmeter to B–, test point B; connect prod end of negative lead through a 100,000-ohm isoleting resistor to 14AF7 oscillator grid, test point D. Use a suitable range, such as 0–10 volts. Proper operation of oscillator is indicated by negative voltage of 1.6v to 1.8v (measured with 20,000-ohms-per-volt meter) throughout range of tuning condensers.



Philco Radio Model 49-901, Sectionalized Schematic Diagram, Showing Test Points

TROUBLE SHOOTING

Section 1

Power Supply

For the tests in this section, use a d-c voltmeter. Connect the negative lead to B—, test point B; connect the positive lead to the test points indicated in the chart. The voltage readings given were taken with a 20,000-ohms-per-volt meter at a line voltage of 117 volts, a.c.

Turn on the power, and set the volume to minimum.

If the "NORMAL INDICATION" is obtained in step 1, proceed with the tests for Section 2 (audio circuits); if not, isolate and correct the trouble in this section.

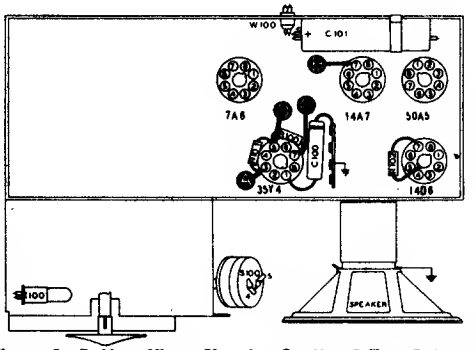


Figure 1. Bottom View, Showing Section 1 Test Points

STEP	TEST POINT	NORMAL INDICATION	ABNORMAL INDICATION	POSSIBLE CAUSE OF ABNORMAL INDICATION
1	A	100 volts		Trouble within this section. Isolate by the following tests.
2	C	124 volts	No voltage	Defective: 35Y4. Open: W100, S100. Shorted: C101A.
			Low voltage	Leaky: C101A. Open: C101A.
			High voltage	Open: R100.
3	D	111 volts	No voltage	Shorted: C101B. Open: R100.
			Low voltage	Leaky: C101A, C101B. Shorted: C203*.
			High voltage	Open: R101, T200*, R204*.
4	A	100 volts	No voltage	Shorted: C101C. Open: R101.
			Low voltage	Leaky: C101C.
Listening Test: Abnormal hum may be caused by open C101A, C101B, or C101C.				

* This part, located in another section, may cause abnormal indication in this section.

TROUBLE SHOOTING

Section 2

Audio Circuits

For the tests in this section, use an audio-frequency signal generator. Connect the generator ground lead to B—, test point B; connect the output lead through a .1-mf. condenser to the test points indicated in the chart.

Set the volume to maximum.

If the "NORMAL INDICATION" is obtained in step 1, proceed with the tests for Section 3 (i-f, detector, and a-v-c circuits); if not, isolate and correct the trouble in this section.

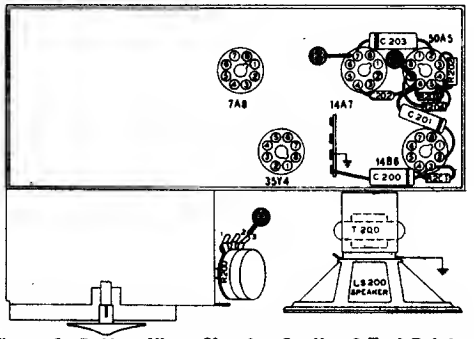


Figure 2. Bottom View, Showing Section 2 Test Points

STEP	TEST POINT	NORMAL INDICATION	POSSIBLE CAUSE OF ABNORMAL INDICATION
1	A	Loud, clear speaker output with moderate signal-generator input.	Trouble within this section. Isolate by the following tests.
2	C	Loud, clear output with strong input.	Defective: 50A5, LS200. Shorted: C202, C201, C203. Open: T200, R204.
3	D	Loud, clear output with moderate input.	Defective: 14B6. Open: R202, R201, C201.
4	A	Same as step 3.	Shorted: C200, C301D*. Open: C200, R200 (rotate through range).
Listening Test: Distortion may be caused by shorted or leaky C201.			

* This part, located in another section, may cause abnormal indication in this section.

TROUBLE SHOOTING

Section 3

I-F, Detector, and A-v-c Circuits

For the tests in this section, use an r-f signal generator, with modulated output, set at 455 kc. Connect the generator ground lead to B—, test point B; connect the output lead through a .1-mf. condenser to the test points indicated in the chart.

Set the volume to maximum.

If the "NORMAL INDICATION" is obtained in step 1, proceed with the tests for Section 4 (r-f and converter circuits); if not, isolate and correct the trouble in this section.

To provide a complete i-f-amplifier check, test point A for this section is placed at the grid of the mixer in Section 4; therefore, the effectiveness of step 1 as a master check is dependent upon the condition of certain parts in the mixer circuit. These parts are listed below under "POSSIBLE CAUSE OF ABNORMAL INDICATION."

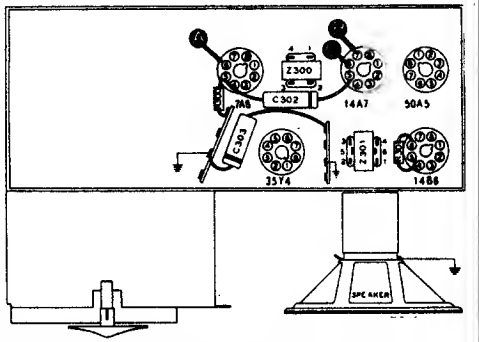


Figure 3. Bottom View, Showing Section 3 Test Points

STEP	TEST POINT	NORMAL INDICATION	POSSIBLE CAUSE OF ABNORMAL INDICATION
1	A	Loud, clear speaker output with moderate signal-generator input.	Trouble within this section. Isolate by the following tests.
2	C	Loud, clear output with moderate input.	Defective: 14A7, 14B6 (diode section). Shorted: C302, Z301. Open: Z301, R300, R201, R302. Misaligned: Z301.
3	A	Same as step 2.	Defective: 7A8*. Shorted: Z300. Open: Z300. Misaligned: Z300.

* This part, located in another section, may cause abnormal indication in this section.

TROUBLE SHOOTING

Section 4

R-F and Converter Circuits

For the tests in this section, with the exception of the oscillator test, use an r-f signal generator with modulated output. Connect the generator ground lead to B—, test point B; connect the output lead through a .1-mf. condenser to the test points indicated in the chart.

Set the volume to maximum, and set the drum tuner and the signal-generator frequency as indicated in the chart.

If the "NORMAL INDICATION" is not obtained in step 1, isolate and correct the trouble in this section. If the trouble is not revealed by the tests for this section, check the alignment.

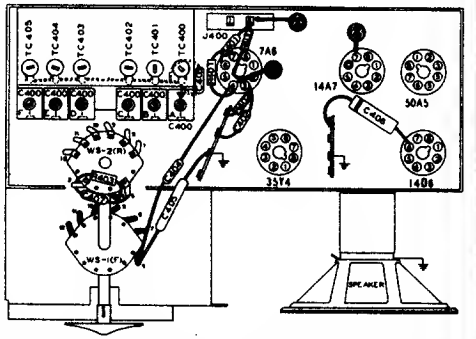
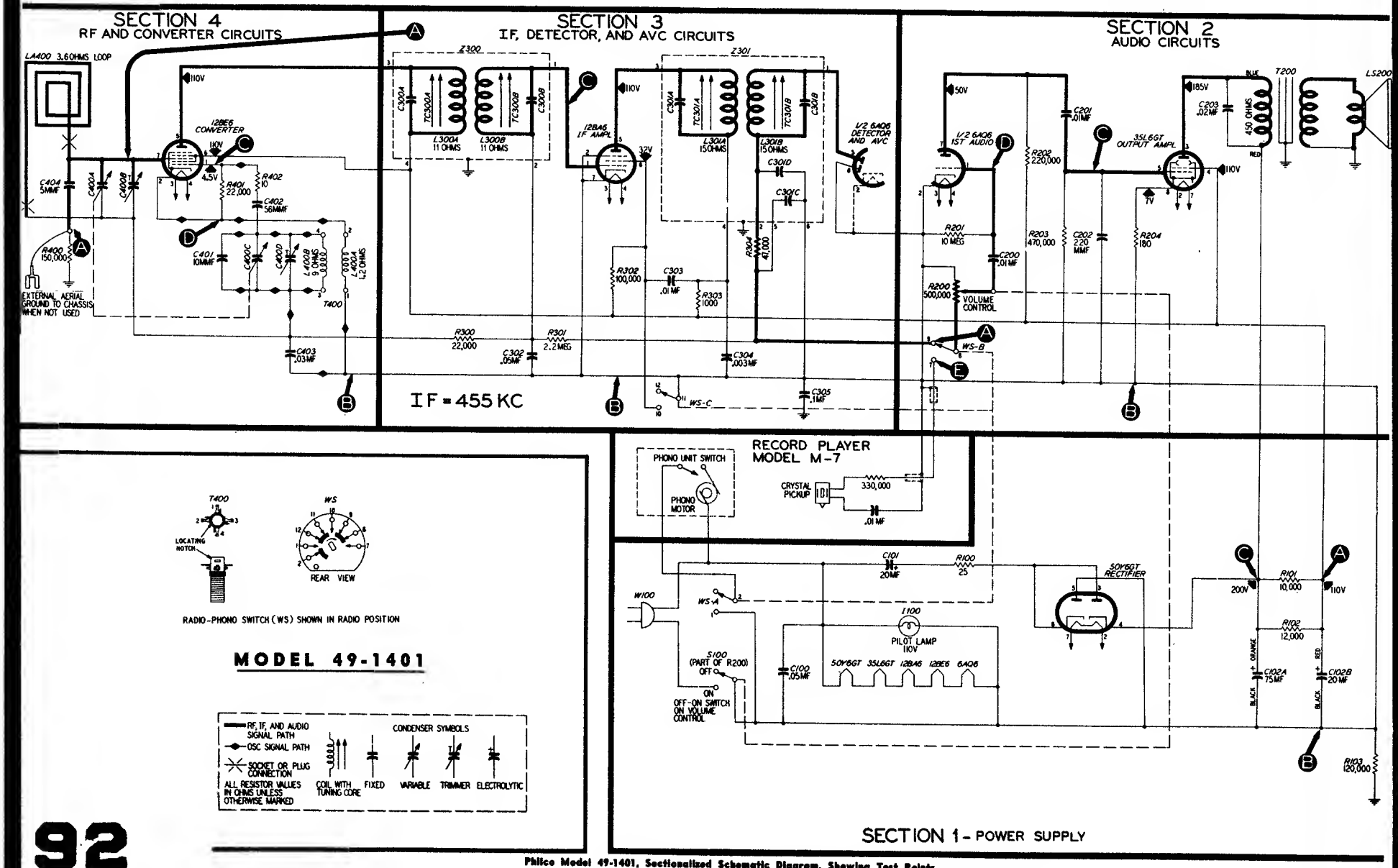


Figure 4. Bottom View, Showing Section 4 Test Points

STEP	TEST POINT	SIG. GEN. FREQ.	DRUM TUNER	NORMAL INDICATION	POSSIBLE CAUSE OF ABNORMAL INDICATION
1	A	Adjust to frequency of each station setting.	Depress drum tuner for each station setting, in turn.	Loud, clear speaker output with weak signal-generator input.	Trouble in circuits associated with each position of the station-selector drum tuner. Isolate by steps 2 and 3.
2	C to B Osc. Test (see Note below)		Same as step 1.	-3.5v to -4.5v.	No voltage for any station setting—Defective: 7A8. Shorted: C402, C402, C404, C405, L400 to L405, WS-1(F). Open: L400 to L403, C404, C403, R401.
3	A	Same as step 1.	Same as step 1.	Same as step 1.	Shorted: C407, WS-2(R), C400A—F. Open: C401, C407, R403, WS-2(R), C400A—F.

OSCILLATOR TEST: Connect the positive lead of a high-resistance voltmeter to B-, test point B; connect the prod end of the negative lead through a 100,000-ohm isolating resistor to the oscillator grid (pin 4 of 7A8), test point C. Use a suitable meter range, such as 0—10 volts. Proper operation of the oscillator is indicated by negative voltage of approximately the value given in the chart (measured with 20,000-ohms-per-volt meter) throughout the tuning range.



Philco Model 49-1401, Sectionalized Schematic Diagram, Showing Test Points

TROUBLE SHOOTING

Section 1 — Power Supply

Make the tests for this section with a d-c voltmeter. Connect the negative lead to B–, test point B; connect the positive lead to the test points indicated in the chart. The voltage readings given were taken with a 20,000-ohms-per-volt meter, at a line voltage of 117 volts, a.c.

Set the volume control to minimum, and the radio-phono switch to the radio position.

If the "NORMAL INDICATION" is obtained in step 1, proceed with the tests for Section 2 (audio circuits); if not, isolate and correct the trouble in this section.

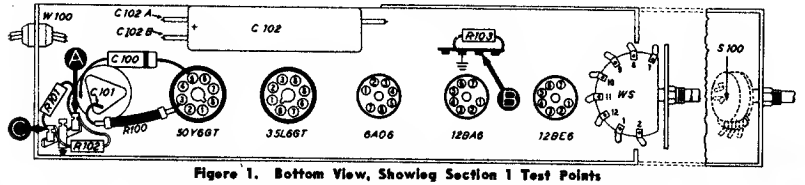


Figure 1. Bottom View, Showing Section 1 Test Points

STEP	TEST POINT	NORMAL INDICATION	ABNORMAL INDICATION	POSSIBLE CAUSE OF ABNORMAL INDICATION
1	A	110v		Trouble in this section. Isolate by the following tests.
2	C	200v	No voltage	Defective: 50Y6GT. Open: W100, S100, R100, C101. Shorted: C100.
			Low voltage	Defective: 50Y6GT. Open: C102A. Leaky: C102A, C101. Shorted: C101.
			High voltage	Open: R101, R102, C102B, R204*, T200*.
3	A	110v	No voltage	Shorted: C102B. Open: R101 and R102.
			Low voltage	Leaky: C102B. Shorted: C304. Open: R101, R102.
Listening Test: Abnormal hum may be caused by open or leaky C102A or C102B.				

*This part, located in another section, may cause abnormal indication in this section.

TROUBLE SHOOTING

Section 2 — Audio Circuits

For the tests in this section, use an audio-frequency signal generator. Connect the generator ground lead to B–, test point B; connect the output lead through a .1-mf. condenser to the test points indicated in the chart.

Set the radio volume control to maximum, and the radio-phono switch as indicated in the chart.

If the "NORMAL INDICATION" is obtained in step 1, proceed with the tests for Section 3 (i-f, detector, and a-v-c circuits); if not, isolate and correct the trouble in this section.

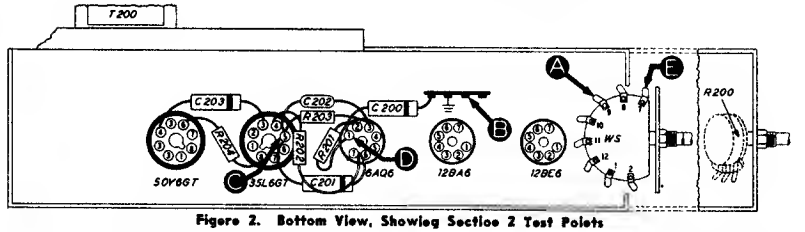


Figure 2. Bottom View, Showing Section 2 Test Points

STEP	TEST POINT	RADIO-PHONO SWITCH	NORMAL INDICATION	POSSIBLE CAUSE OF ABNORMAL INDICATION
1 (a)	A	Radio	Loud, clear speaker output with moderate generator input.	Trouble in this section. Isolate by the following tests.
1 (b)	E	Phono		
2	C	Radio	Clear output with strong input.	Defective: 1S200, 35L6GT. Shorted: T200, C203, C201, C202. Open: T200, R204, R203. Leaky: C203.
3	D	Radio	Loud, clear output with moderate input.	Defective: 6AQ6. Sherted: C200. Opeo: C201, R202, R201. Leaky: C201.
4	A	Radio	Loud, clear output with moderate input.	Opeo: R200 (rotate), C200, WS. Shorted: WS.
5	E	Phono	Same as step 4.	Open or shorted: WS.
Listening Test: Distortion may be caused by leaky C201. Distortion on strong signals may be caused by shorted or leaky C200.				

TROUBLE SHOOTING

Section 3 — I-F, Detector, and A-V-C Circuits

For the tests in this section, use an r-f signal generator, with modulated output, set at 455 kc. Connect the generator ground lead to B–, test point B; connect the output lead through a .1-mf. condenser to the test points indicated in the chart.

Set the radio volume control to maximum, and the radio-phono switch to the radio position. Rotate the tuning control until the tuning condenser is fully meshed.

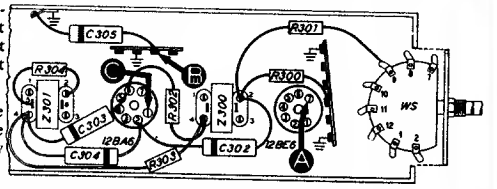


Figure 3. Bottom View, Showing Section 3 Test Points

If the "NORMAL INDICATION" is obtained in step 1, proceed with the tests for Section 4 (r-f and converter circuits); if not, isolate and correct the trouble in this section.

To provide a complete i-f amplifier check, test point A for this section is placed at the grid of the converter in Section 4; therefore, the effectiveness of step 1 as a master check is dependent upon the condition of certain parts in the converter circuit. These parts are listed below under "POSSIBLE CAUSE OF ABNORMAL INDICATION."

STEP	TEST POINT	NORMAL INDICATION	POSSIBLE CAUSE OF ABNORMAL INDICATION
1	A	Loud, clear speaker output with weak generator input.	Trouble in this section. Isolate by the following tests.
2	C	Loud, clear output with strong input.	Defective: 12BA6, 6AQ6. Shorted: C300B, C301A, C301B, C301C, C301D, C303, C304, WS, L300B, L301A, L301B. Open: R202, R303, R304, L300B, L301A, L301B, R301, C301A, C301B. Leaky: C303, C304. Misaligned: Z301.
3	A	Loud, clear output with weak input.	Defective: 12BE6*. Shorted: C400A*, C400B*, C300A, L300A, L300B, C302. Open: L300A, R300, C300A, C300B. Misaligned: Z300.

*This part, located in another section, may cause abnormal indication in this section.

TROUBLE SHOOTING

Section 4 — R-F and Converter Circuits

For the tests in this section, with the exception of the oscillator test, use an r-f signal generator with modulated output. Connect the generator ground lead to B–, test point B; connect the output lead through a .1-mf. condenser to the test points indicated in the chart.

Set the radio volume control to maximum, and the radio-phono switch to the radio position. Set the tuning control and signal-generator frequency as indicated in the chart.

If the "NORMAL INDICATION" is obtained in step 1, further tests should be unnecessary; if not, isolate and correct the trouble in this section. If the trouble is not revealed by the tests for this section, check the alignment.

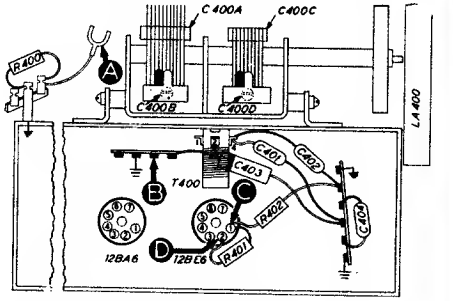
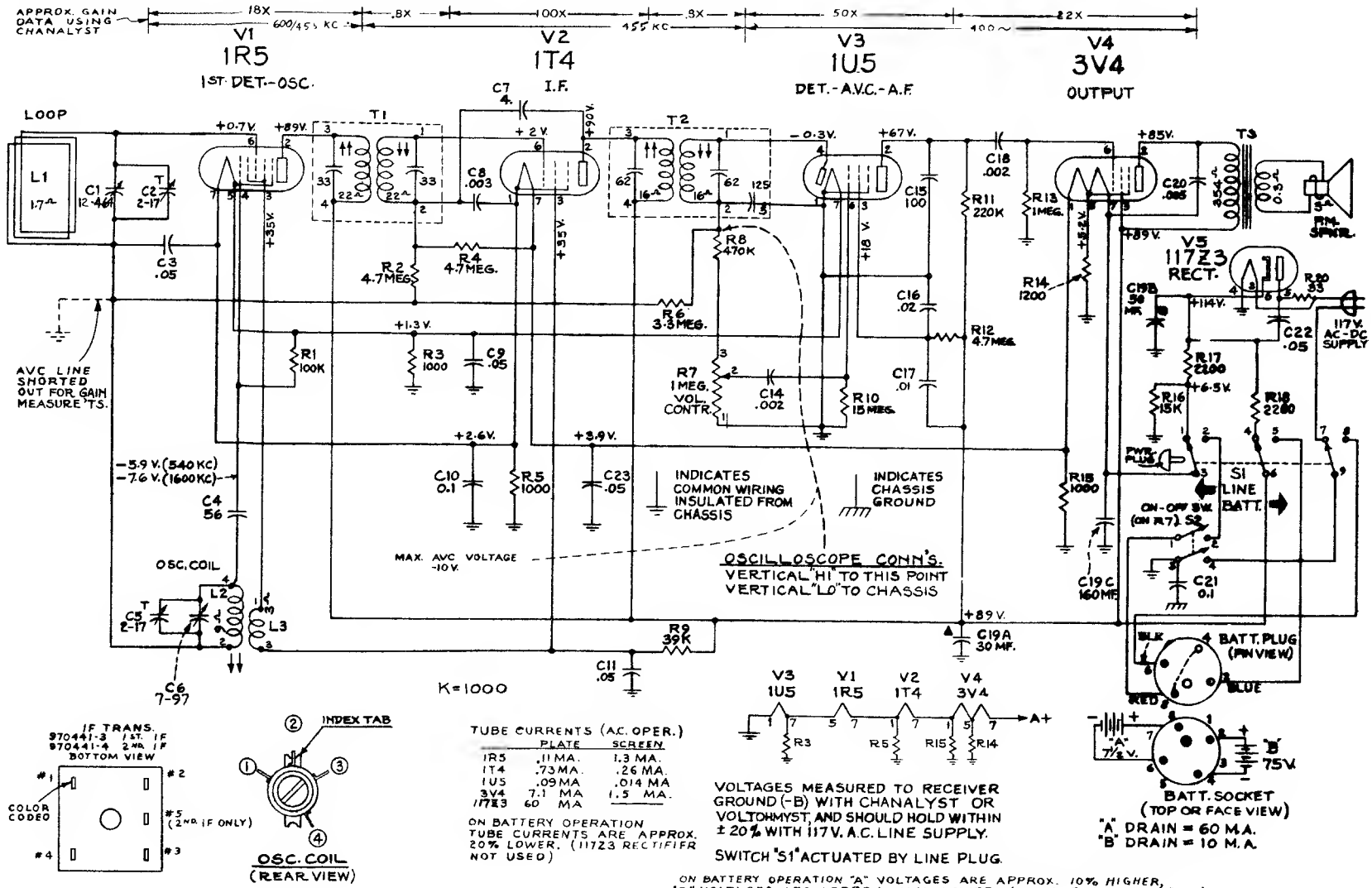


Figure 4. Bottom View, Showing Section 4 Test Points

STEP	TEST POINT	SIG. GEN. FREQ.	RADIO TUNING	NORMAL INDICATION	POSSIBLE CAUSE OF ABNORMAL INDICATION
1	A	1000 kc.	Tune to signal.	Loud, clear speaker output with weak generator input.	Trouble in this section. Isolate by the following tests.
2	C — D (Osc. test: see note below.)		Rotate through range.	Negative 4 to 5 volts.	Defective: 12BE6. Shorted: C400C, C400D, C402, C401, L400A, L400B. Open: C402, L400A, L400B, R401, R402.
3	A	1000 kc.	Tune to signal.	Same as step 1.	Shorted: LA400, C400A, C400B. Open: LA400, C404.

OSCILLATOR TEST: Connect the positive lead of a high-resistance voltmeter to the oscillator cathode (pin 2 of 12BE6), test point D; connect the prod end of the negative lead through a 100,000-ohm isolating resister to the oscillator grid (pin 1 of 12BE6), test point C. Use a suitable meter range, such as 0—10 volts. Proper operation of the oscillator is indicated by negative voltage within the range given in the chart (measured with a 20,000-ohms-per-volt meter) throughout the tuning range.



TUBE CURRENTS (A.C. OPER.)

	PLATE	SCREEN
1R5	.11 MA.	1.3 MA.
1T4	.73 MA.	.26 MA.
1U5	.09 MA	.014 MA
3V4	7.1 MA	1.5 MA.
117Z3	60 MA	

ON BATTERY OPERATION TUBE CURRENTS ARE APPROX. 20% LOWER. (117Z3 RECTIFIER NOT USED)

VOLTAGES MEASURED TO RECEIVER GROUND (-B) WITH CHANALYST OR VOLTOHMYST, AND SHOULD HOLD WITHIN ± 20% WITH 117 V. A.C. LINE SUPPLY.

SWITCH "S1" ACTUATED BY LINE PLUG.

ON BATTERY OPERATION "A" VOLTAGES ARE APPROX. 10% HIGHER, "B" VOLTAGES ARE APPROX. 10% LOWER. (117Z3 RECT. NOT USED)

RCA VICTOR

MODEL 8BX5

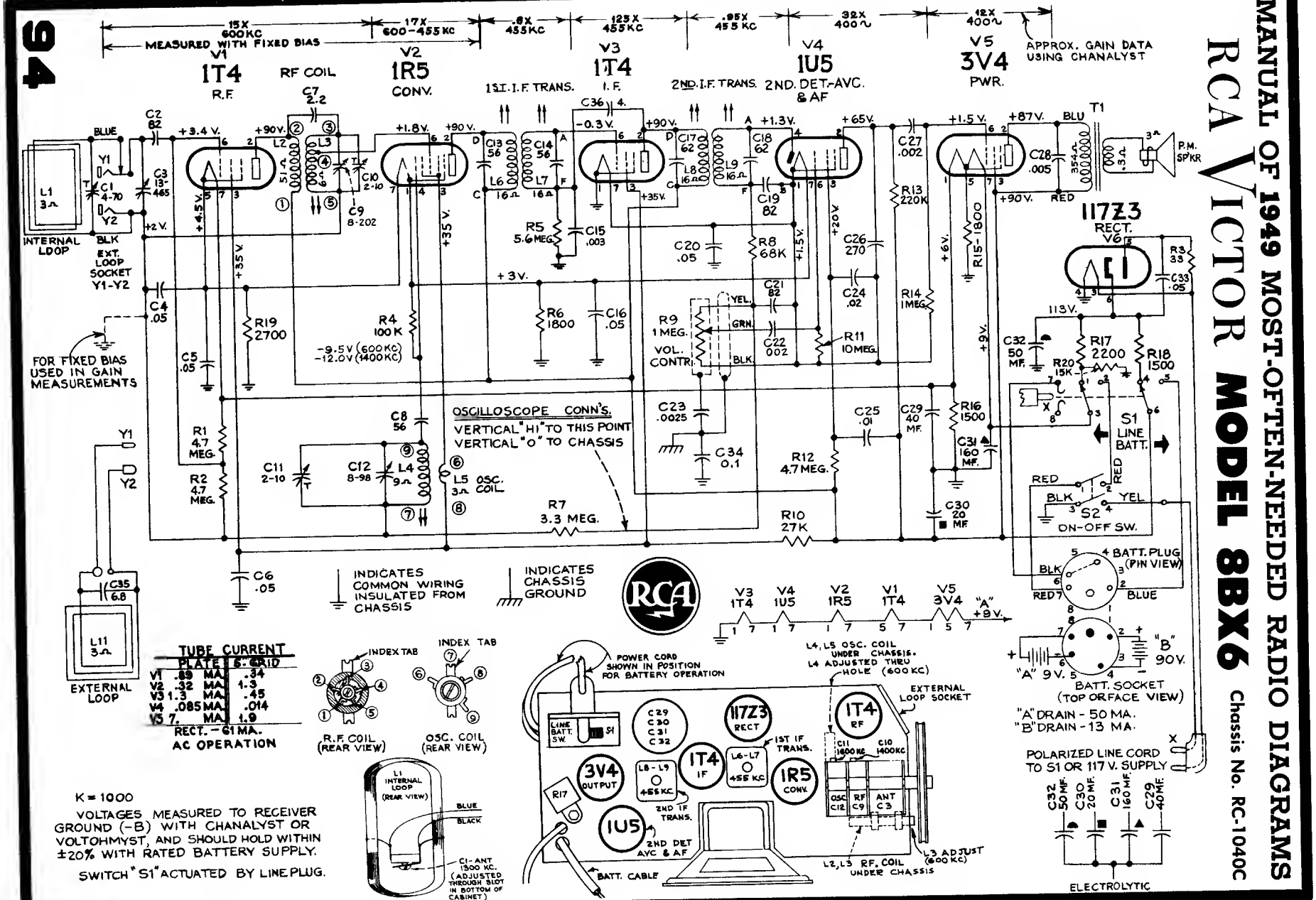
Chassis No. RC-1059

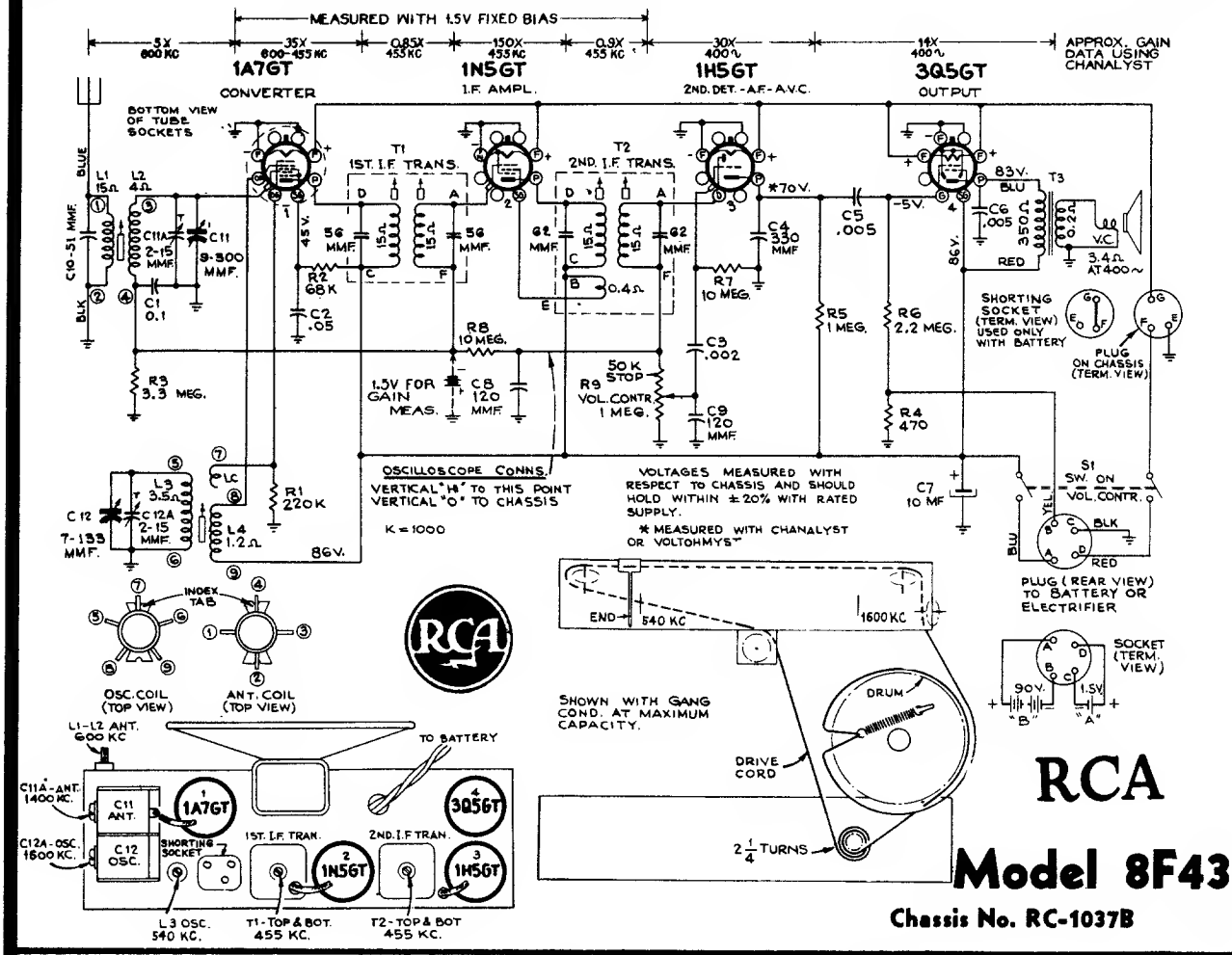
Frequency Range . . . . . 540-1,600 kc

Intermediate Frequency . . . . . 455 kc

MANUAL OF 1949 MOST-OFTEN-NEEDED RADIO DIAGRAMS

RCA VICTOR MODEL 8BX6 Chassis No. RC-1040C

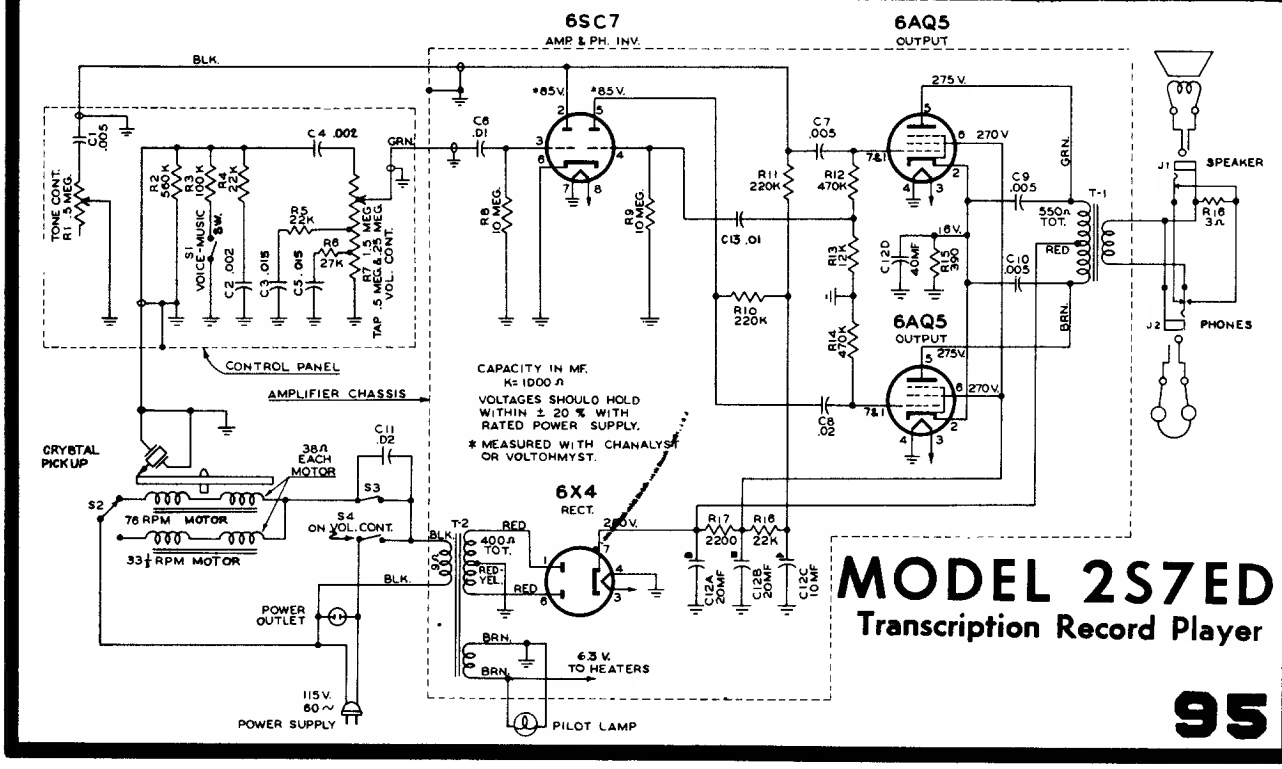




RCA

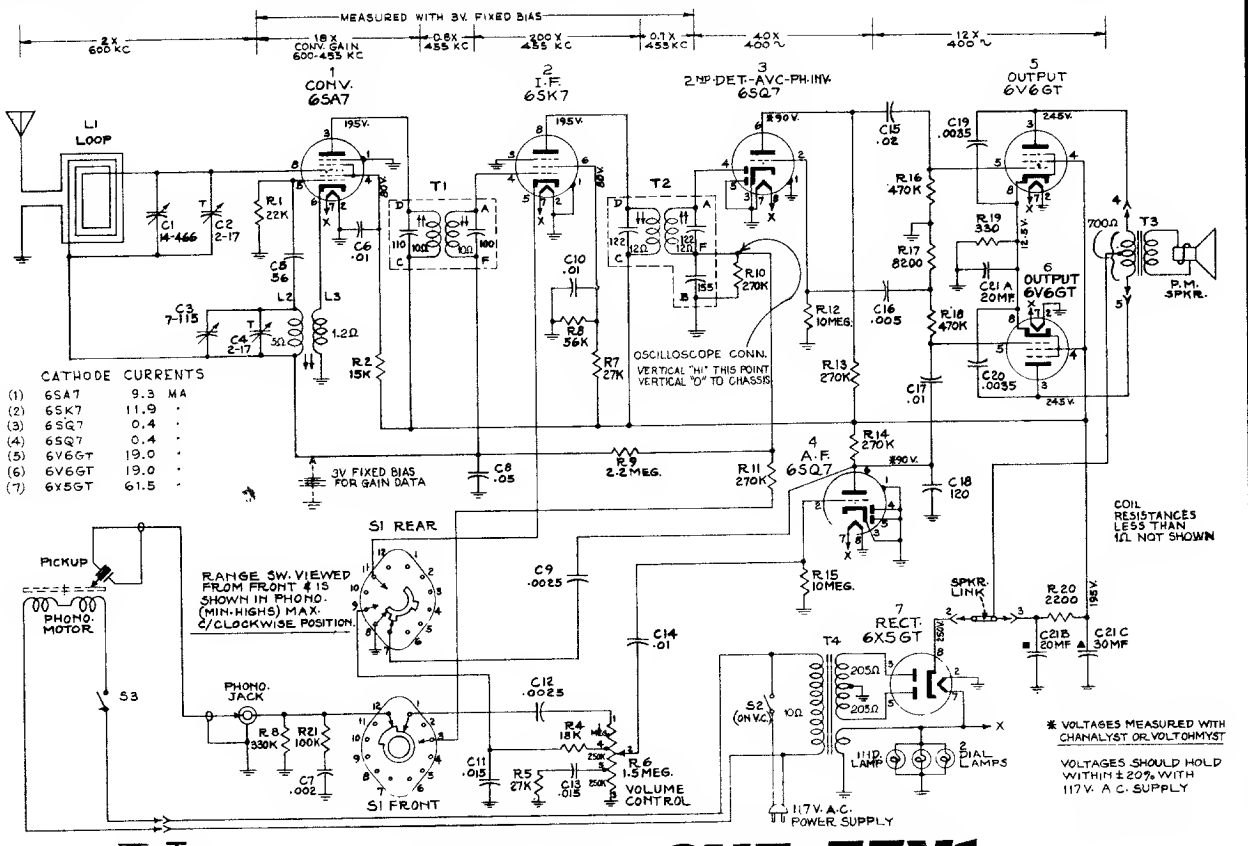
Model 8F43

Chassis No. RC-1037B



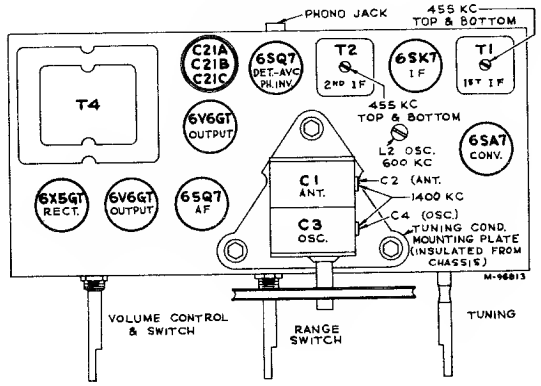
MODEL 2S7ED

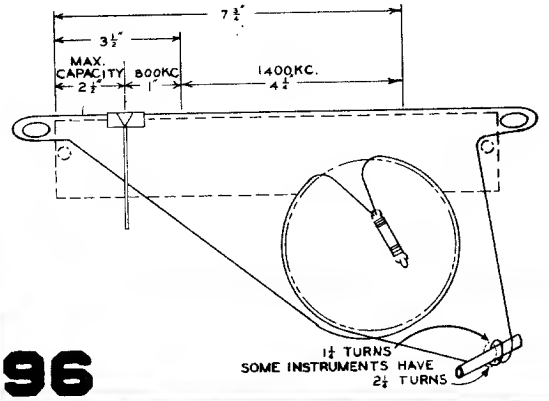
Transcription Record Player



RCA VICTOR MODEL 8V7, 77V1

Chassis No. RC-615





Alignment Procedure

Cathode-Ray Alignment is the preferable method. Connections for the oscilloscope are shown on the Schematic Diagram.

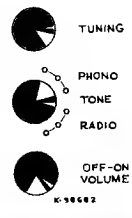
Output Meter Alignment.—If this method is used, connect the meter across the voice coil, and turn the receiver volume control to maximum.

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

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

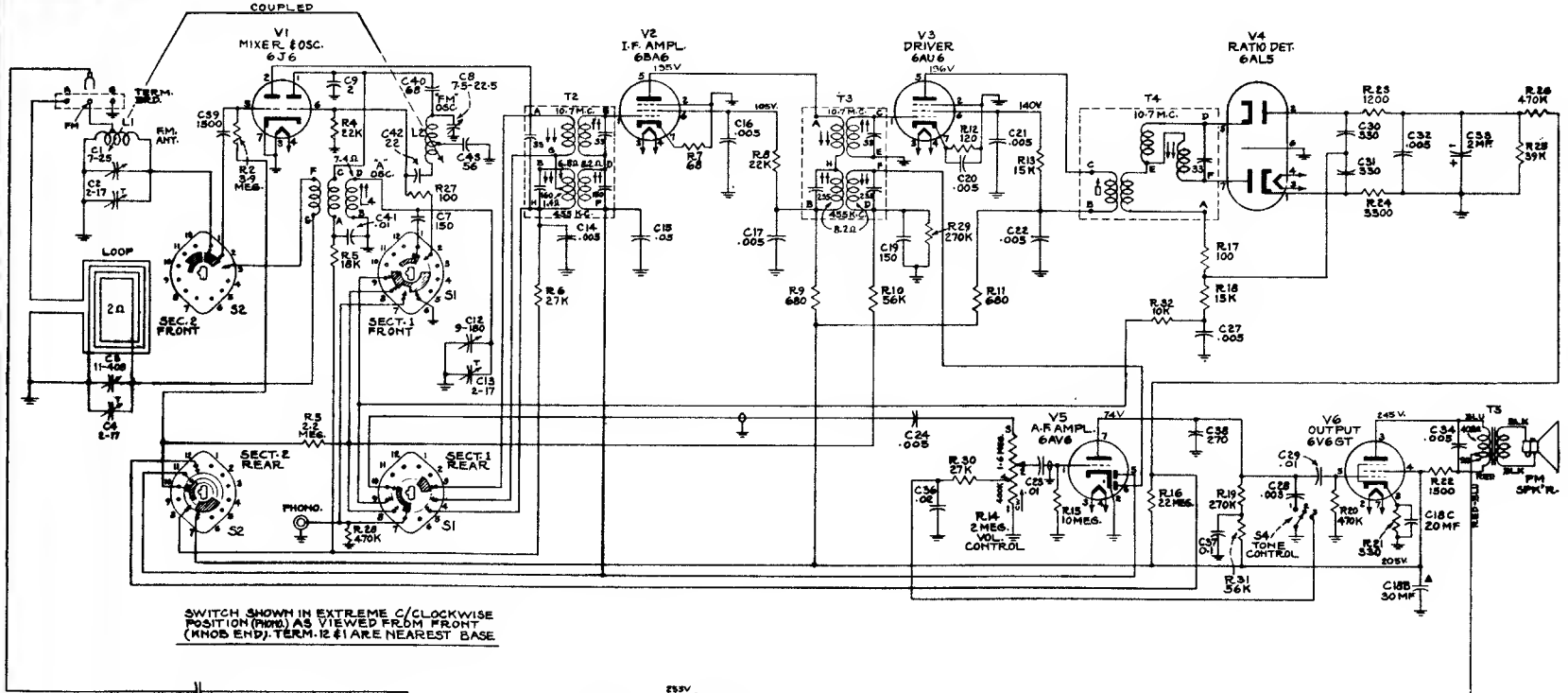
Critical Lead Dress:

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

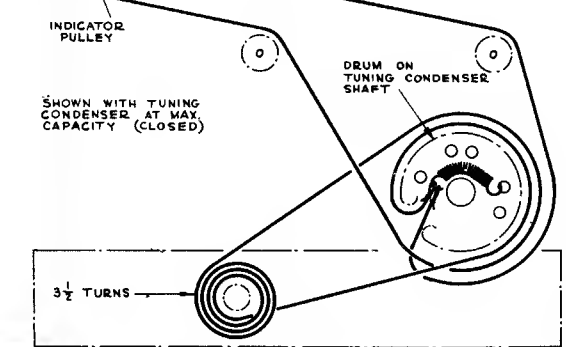


MANUAL OF 1949 MOST-OFTEN-NEEDED RADIO DIAGRAMS

RCA Victor Models 8R71, 8R74, 8R75, -*- 8R72, 8R76
(Alignment on next page) Chassis RC-1060 -*- RC-1060A



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



CRITICAL LEAD DRESS

1. Keep leads of C7 short.
2. Dress R27 away from range switch and pin No. 5 of V1.
3. The ground lead of pin No. 2 of V2 and V3 should be down against chassis. Its length is critical.
4. The AVC lead from R26 to range switch should be dressed against chassis and on front apron side of the output transformer.
5. C43 should have short leads and the color code of the capacitor should go to the coil L4. The capacitor should be cemented down with polystyrene cement at the same time L2 is cemented.
6. The lead from the high side of the loop should be dressed away from tubes.
7. Lead from pin No. 2 of V1 to terminal "A" of 1st I. F. transformer should be dressed against the chassis.
8. Connect C40 directly between the gang condenser and pin No. 1 of V1.
9. Make all FM leads as short as possible.
10. Dress lead from pin No. 5 of V2 to terminal "A" of 2nd I. F. transformer down against chassis.
11. Dress resistor R15 near chassis base.
12. Dress all A. C. leads away from volume control.
13. The lead from "FM" terminal of antenna terminal board to L1 tap should be run around the outside of the 1st I. F. transformer and away from V2.
14. The taps on L1 and L2 are critical. L1 tap should be ⅛ turn from the ground end. L2 tap should be 2½ turns from the gang condenser C8.
15. The lead from R32 to terminal No. 9 of S1 should be dressed away from the output transformer.
16. Dress C25 and C26 against the chassis with the shortest lead length possible.
17. The position of L1 and L2 is critical. L1 should be midway between V1 and the 1st I. F. transformer. The end of L2 should be approximately 3/16" from V1.

RCA VICTOR 8R71, 8R74, 8R75 8R72, 8R76

Chassis No. RC-1060 **Chassis No. RC-1060A**

Alignment Procedure

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

Alignment Indicators:

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

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

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

Signal Generator:

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

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

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

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

AM Alignment

RANGE SWITCH IN BC POSITION

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

† Use alternate loading.

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

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

FM Alignment

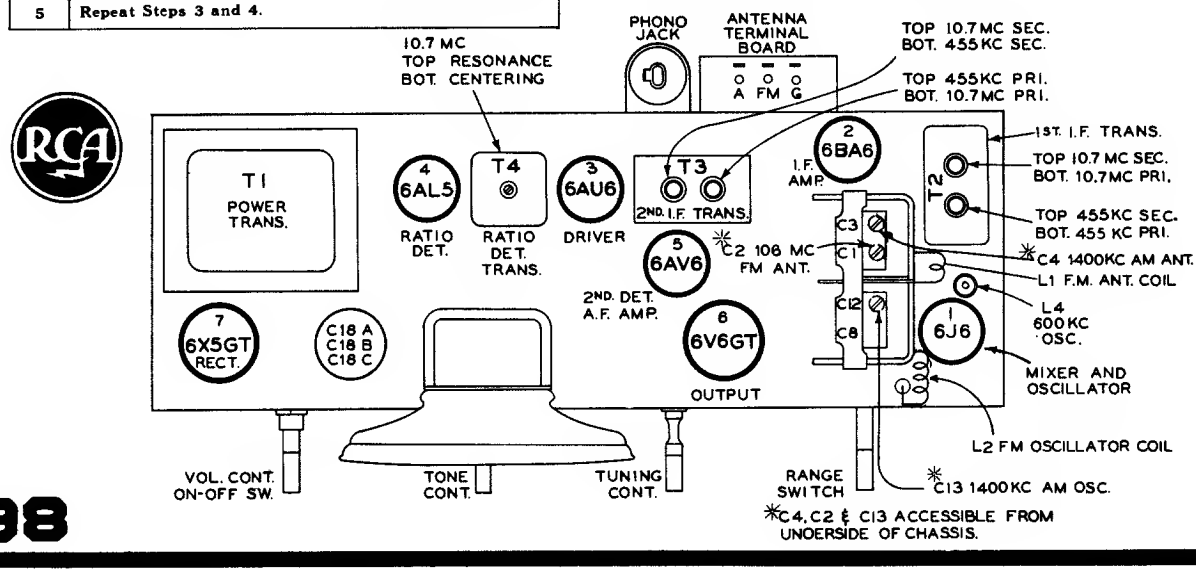
RANGE SWITCH IN FM POSITION — VOLUME CONTROL MAXIMUM

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

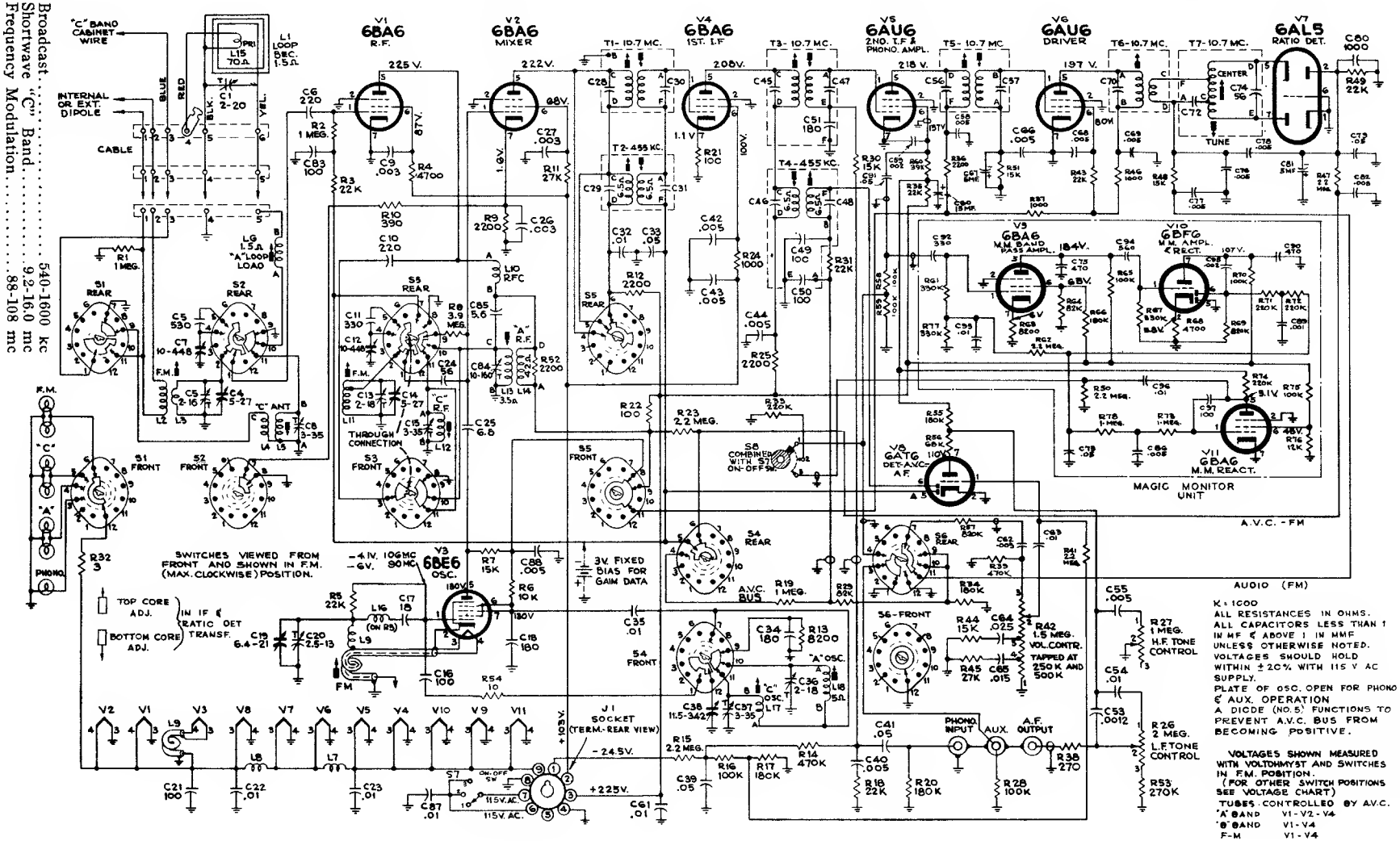
* Two or more points may be found which lower the audio output. At the correct point the minimum audio output is approached rapidly and is much lower than at any incorrect point.

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

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



Broadcast.....540-1600 kc
Shortwave "C" Band.....9.2-16.0 mc
Frequency Modulation.....88-108 mc



Complete Schematic Diagram RK-121C — Range Switch shown in FM position.

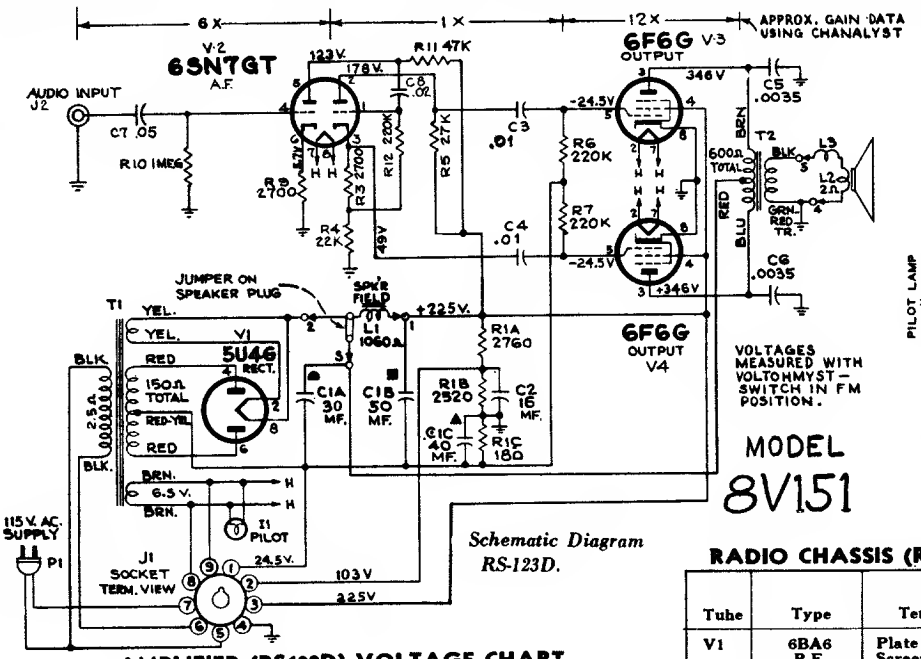
Continued on the next page.

RCA VICTOR

Model 8V151

RK-121C RF-IF Chassis

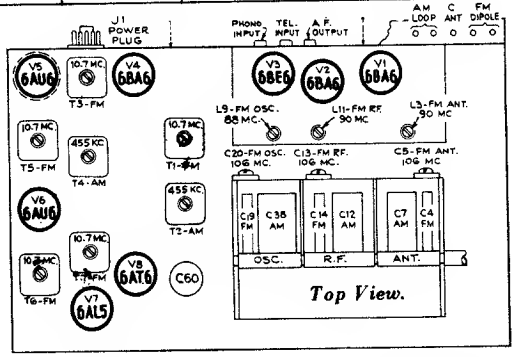
RS-123D Power Supply & AF Chassis

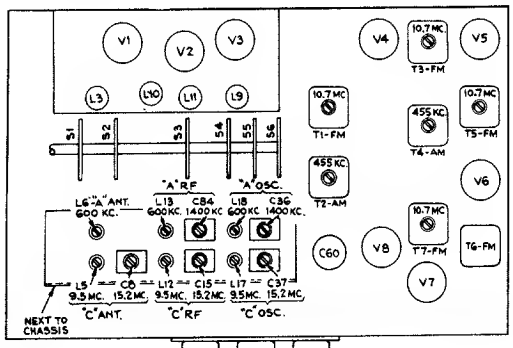


Schematic Diagram RS-123D.

AMPLIFIER (RS123D) VOLTAGE CHART

Tube	Type	Terminal	Aux or PH	BC or SW	FM
V1	5U4G Rect.	Fil. No. 8	360	355	350
V2	6SN7 A. F. & Ph. Inv.	Plate No. 2 Plate No. 5 Cathode No. 3 Cathode No. 6	201 142 56 6.4	190 134 53 6.1	178 123 49 5.7
V3	6F6G Output	Plate No. 3 Screen No. 4 Grid No. 5	353 268 −24	351 245 −24.1	346 225 −24.5
V4	6F6G Output	Same ae V3			





RADIO CHASSIS (RK-121C) VOLTAGE CHART

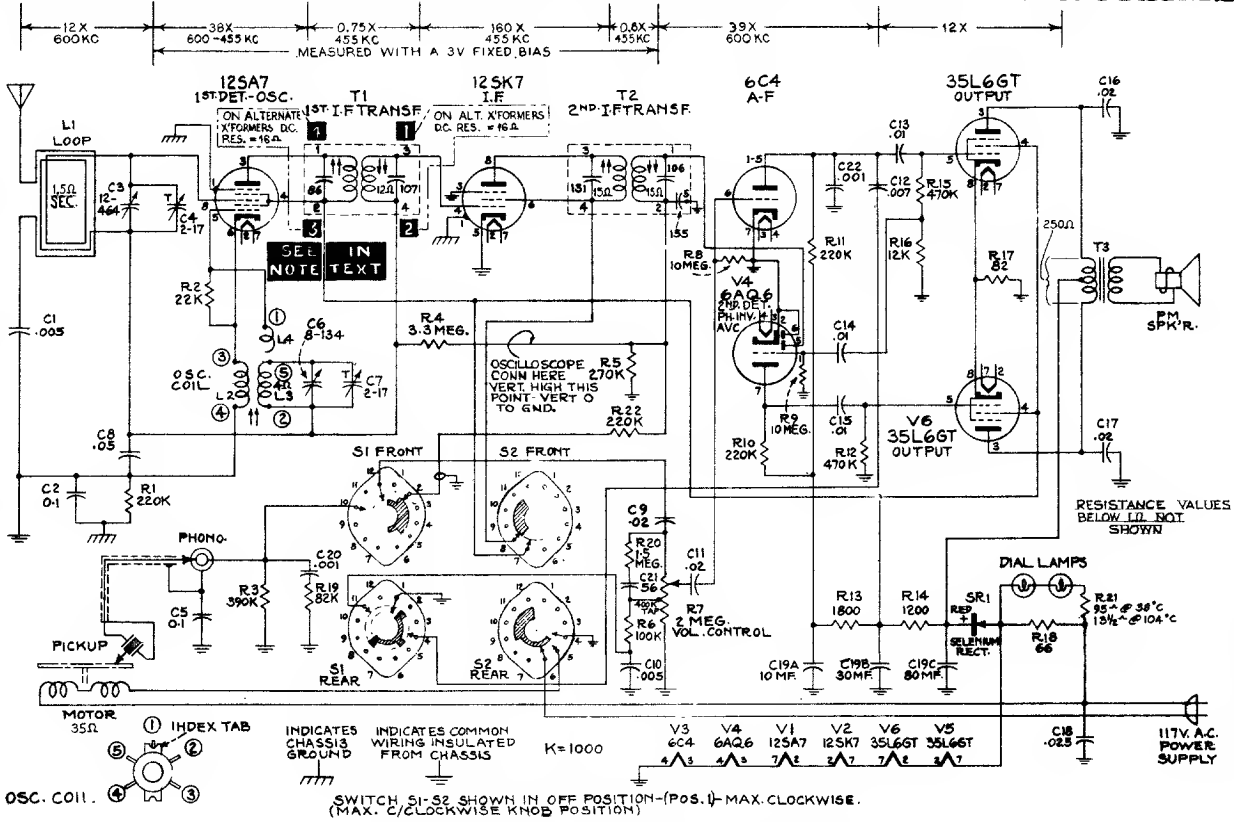
Tube	Type	Terminal	Aux or PH	BC	SW	FM
V1	6BA6 R.F.	Plate No. 5 Screen No. 6	260 100	247 96	245 94	225 87
V2	6BA6 Mixer	Plate No. 5 Screen No. 6 Cathode No. 7	260 96 6.1	245 87 7	240 71 1.9	222 68 1.6
V3	6BE6 Oec.	Plate No. 5 Screen Nos. 6 & 7 *Grid No. 1 †Grid No. 1	.. ..	160 160 −26 −18	157 157 −11 −10.5	130 130 −4.1 −6
V4	6BA6 1et I.F.	Plate No. 5 Screen No. 6 Cathode No. 7	240 118 1.2	232 110 1.2	225 108 1.2	208 100 1.1
V5	6AU6 2nd I.F.	Plate No. 5 Screen No. 6	.. 115	.. 112	.. 112	218 137
V6	6AU6 Driver	Plate No. 5 Screen No. 6	.. ..	.. ..	.. ..	197 80
V7	6AL5 R. Det.	.....	..	..	..	..
V8	6AT6 Det.-AF.	Plate No. 7	110	108	108	110
V9	6BA6 M.M. Amp.	Plate No. 5 Screen No. 6 Cathode No. 7	210 70 7	200 68 6.6	200 68 6.6	184 63 6
V10	6BF6 M.M. Amp.&Rect.	Plate No. 7 Cathode No. 2	121 6.6	117 6.4	117 6.4	107 5.8
V11	6BA6 Reactor	Plate No. 5 Screen No. 6	2.6 36	2.6 35	2.6 35	3.1 45

*Tuning condenser at high frequency end.
†Tuning condenser at low frequency end.

RADIO CHASSIS CATHODE CURRENTS (MA)

V1	6BA6	Ne. 7	16.9	16.5	16.5	14
V2	6BA6	No. 7	3.1	3.2	3.8	4.9
V3	6BE6	No. 2	0	14.1	14.1	15.8
V4	6BA6	No. 7	14	13.8	13.8	13.2
V5	6AU6	No. 7	1.8	1.8	1.8	3.9
V6	6AU6	No. 7	0	0	0	18.3
V7	6AL5	....	0	0	0	0
V8	6AT6	No. 2	.25	.25	.25	.25
V9	6BA6	No. 7	.9	.9	.9	.88
V10	6BF6	No. 2	1.3	1.3	1.3	1.2
V11	6BA6	No. 7	1.36	1.35	1.35	1.3

Voltagee measured with Chanalyst or VoltOhmyet and ehould hold within ± 20% with rated power eupply. No signal. Tuning condeneer closed except ae stated.



RCA VICTOR 77U

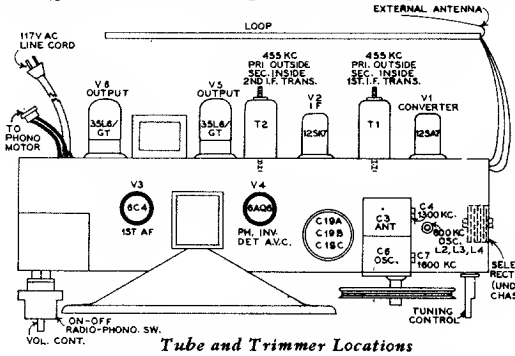
Radio-Phonograph Combination

Chassis No. RC-1057A

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

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

Dial Pointer Adjustment.—Rotate tuning condenser fully counter-clockwise (plates fully meshed). Adjust indicator pointer so that it is 3⅜" from the left hand edge of the dial back plate.



Tube and Trimmer Locations

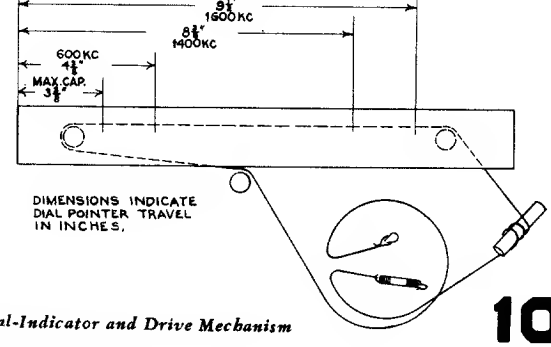
Tubes 6C4 and 6AQ6 may be replaced by removing the sloping panel (remove four wood screws) in the front of the record changer compartment. Before removing the chassis from the cabinet it is advisable to loosen the two hex screws holding the speaker horizontally. This will allow the chassis to be removed and replaced easily. When the chassis is replaced the dial lights should be adjusted so as not to be visible from the front of the cabinet, and yet to give correct dial lighting. Move the speaker so it is flush against the baffle before retightening the hex nuts. The chassis mounting board should be flush against the front of the cabinet, and the chassis mounting holes should be centered over the holes in the board.

The first I-F transformer shown in the schematic is stamped 970441-1. Some chassis will have a first I-F transformer stamped 970441-5. Connections to this alternate transformer are as shown in the block letters. Performance will be identical for both sets.

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

Steps	Connect the high side of test-oscillator to—	Tune test-osc. to—	Turn radio dial to—	Adjust the following for max. peak output
1	I.F. grid, in series with .01 mfd.	455 kc	Quiet point 1,600 kc end of dial	Pri. & Sec. 2nd I.F. transformer
2	1st Det. grid in series with .01 mfd.			Pri. & Sec. 1st I.F. transformer
NOTE.—ANTENNA LOOP AND RECORD CHANGER MUST BE IN CABINET				
3	Antenna terminal in series with 220 mmfd.	1,600 kc	1,600 kc	C7 (osc.)
4		1,400 kc	1,400 kc	C4 (ant.)
5		600 kc	600 kc	Osc. Coil L2, L3 Rock gang
6	Repeat steps 3, 4, & 5 if necessary			

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



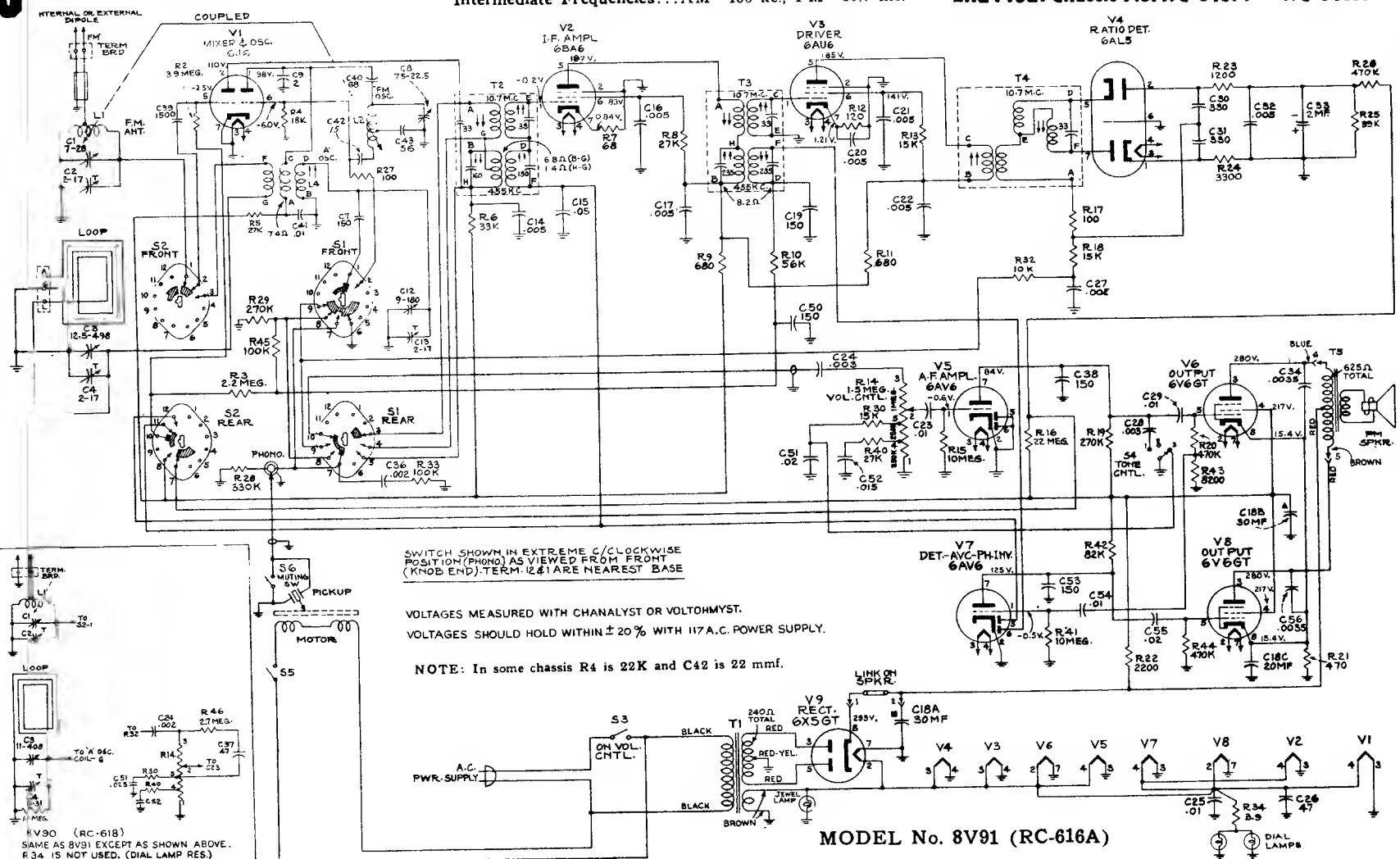
Dial-Indicator and Drive Mechanism

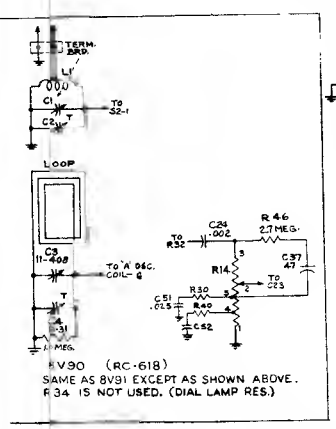
RCA VICTOR

Tuning Ranges
Standard Broadcast (AM)..... 540-1,600 kc.
Frequency Modulation (FM)..... 88-108 mc.
Intermediate Frequencies...AM—455 kc., FM—10.7 mc.

Models 8V90, 8V91

1st Prod. Chassis No. RC-618 **RC-616A**
2nd Prod. Chassis No. RC-618A **RC-616H**





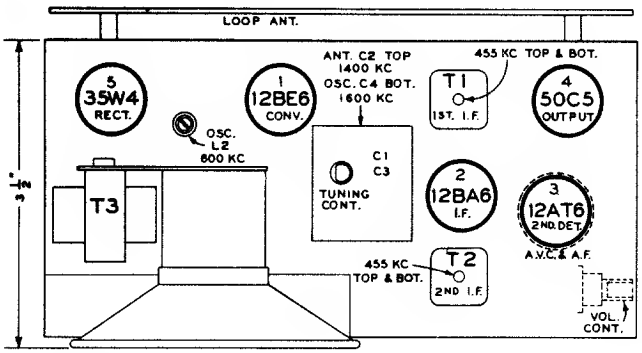
8V90 (RC-618)
SAME AS 8V91 EXCEPT AS SHOWN ABOVE. R34 IS NOT USED. (DIAL LAMP RES.)

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

RCA VICTOR

8X521, 8X522

Chassis No. RC-1066 RC-1066A



POWER SUPPLY POLARITY. — For operation on d-c, the power plug must be inserted in the outlet for correct polarity. If the set does not function, reverse the plug. On a-c, reversal of the plug may reduce hum.

Critical Lead Dress

1. Dress all heater leads close to chassis.
2. Dress output plate bypass capacitor C11 inside of terminal board.
3. Dress all exposed leads away from each other and away from chassis.

Alignment Procedure

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

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

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

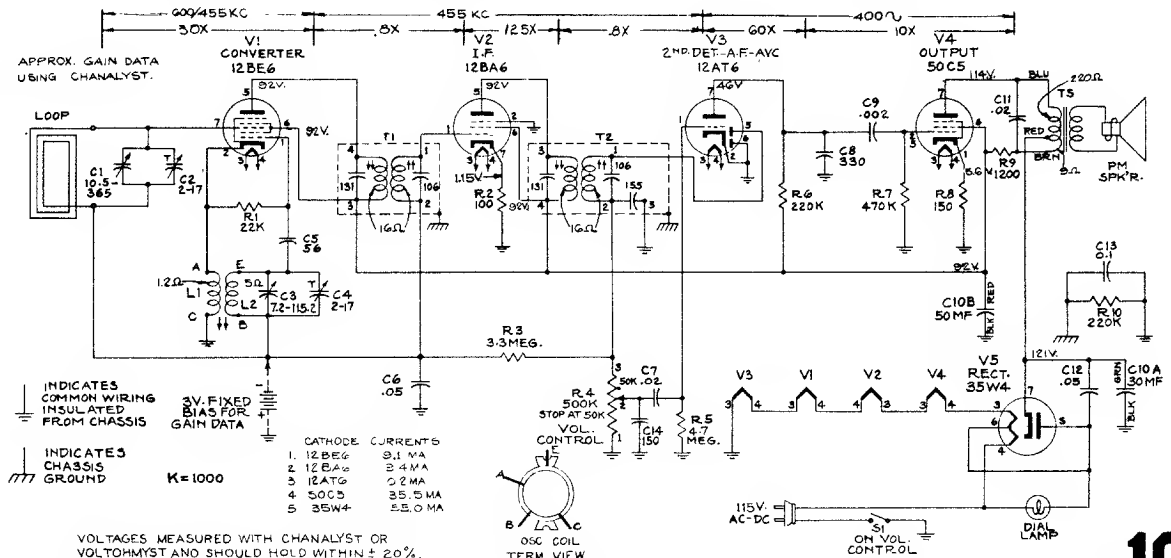
On AC operation an isolation transformer (115 v./115 v.) may be necessary for the receiver if the test oscillator is also AC operated.

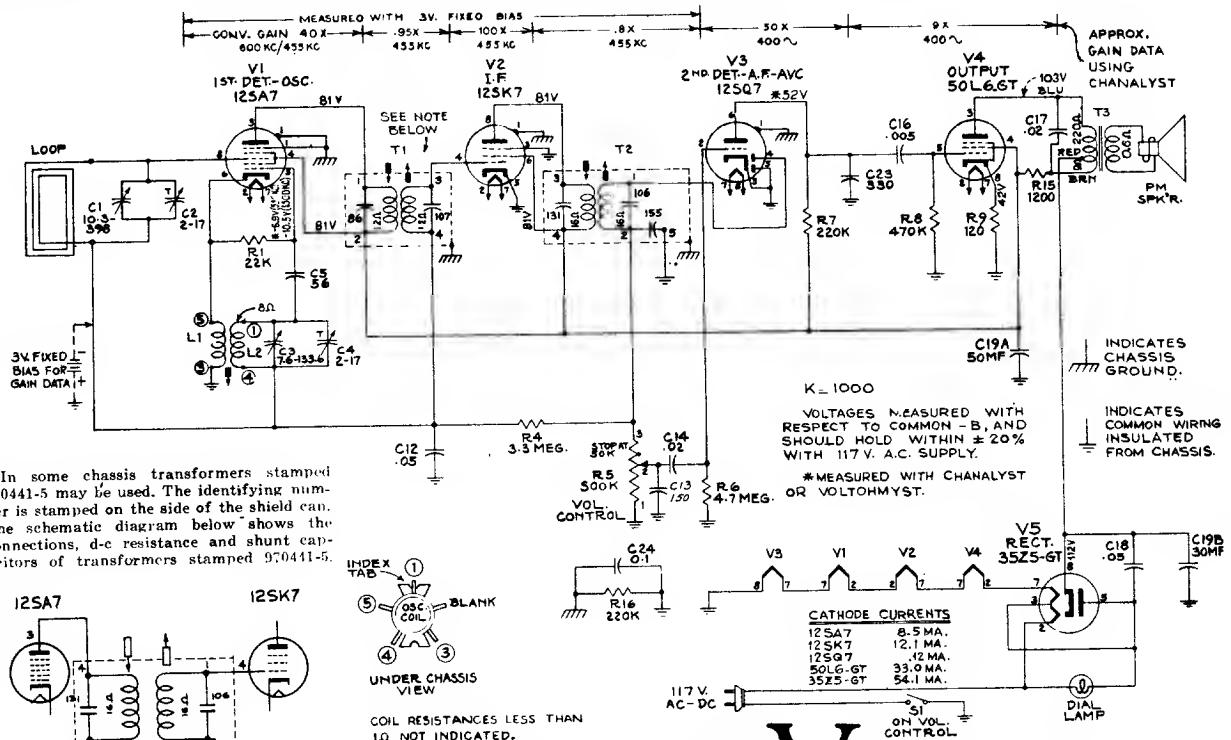
For additional information refer to booklet "RCA Victor Receiver Alignment."

NOTE.—If the speaker should be removed in servicing, its position should be checked when re-assembling. The distance between the front of the speaker and the rear chassis apron should be maintained at 3½ inches.

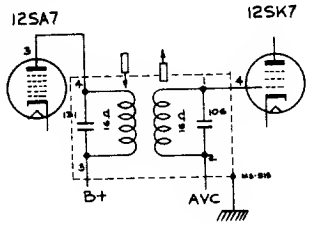
Steps	Connect the high side of test-oscillator to—	Tune test-osc. to—	Turn radio dial to—	Adjust the following for max. output
1	12BA6 I-F grid through 0.1 mfd. capacitor	455 kc	Quiet-point 1,600 kc end of dial	T-2 (top and bottom) 2nd I-F trans.
2	Stator of C1 through 0.1 mfd.			T-1 (top and bottom) 1st I-F trans.
3	Short wire placed near loop to radiate signal.	1,600 kc	1,600 kc	C4 (osc.)
4		1,400 kc	1,400 kc	C2 (ant.)
5		600 kc	600 kc	L2 (osc.) Rock gang
6		Repeat steps 3, 4 and 5.		

*Do not readjust T-2 when test oscillator is connected to C1.





In some chassis transformers stamped 970441-5 may be used. The identifying number is stamped on the side of the shield can. The schematic diagram below shows the connections, d-c resistance and shunt capacitors of transformers stamped 970441-5.



COIL RESISTANCES LESS THAN 1Ω, NOT INDICATED.

RCA VICTOR

Model 8X53

Chassis No. RC-1064

Alignment Procedure

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

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

Calibration Scale.—The glass tuning dial may be removed from the cabinet and mounted above the pointer for reference during alignment. The extreme left hand mark of the Standard Broadcast scale must be in line with the left hand mark on the dial backing plate.

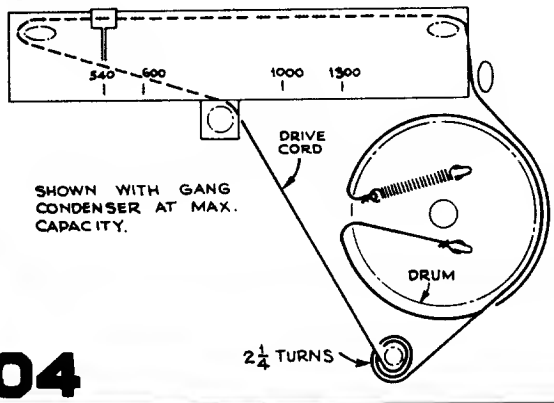
Dial Backing Plate.—In the event that only the chassis is returned for service, the marks on the dial backing plate may be used during alignment; refer to the Dial Indicator and Drive Mechanism drawing for corresponding frequencies.

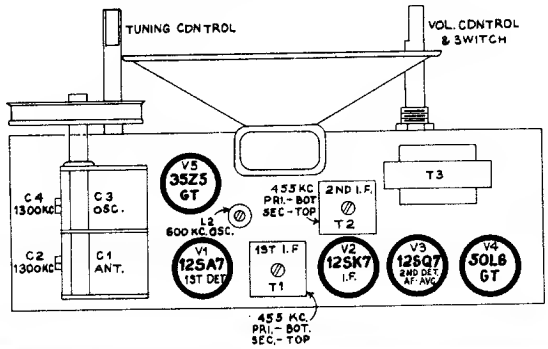
Dial Pointer.—With the gang condenser in full mesh the dial pointer should be set to the left hand reference mark on the dial backing plate.

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

Steps	Connect the high side of test-oscillator to—	Tune test-osc. to—	Turn radio dial to—	Adjust the following for max. peak output
1	12SK7 I-F grid through 0.1 mfd. capacitor	455 kc	Quiet-point 1,600 kc end of dial	T2 Top & bottom 2nd. I-F trans.
2	Stator of C1 through 0.1 mfd.			*T1 Top & bottom 1st. I-F trans.
3	Short wire placed near loop antenna	1,300 kc	1,300 kc	C4 (osc.) C2 (ant.)
4		600 kc	600 kc "A" Band	L2 (osc.) Rock gang
5	Repeat steps 3 and 4			

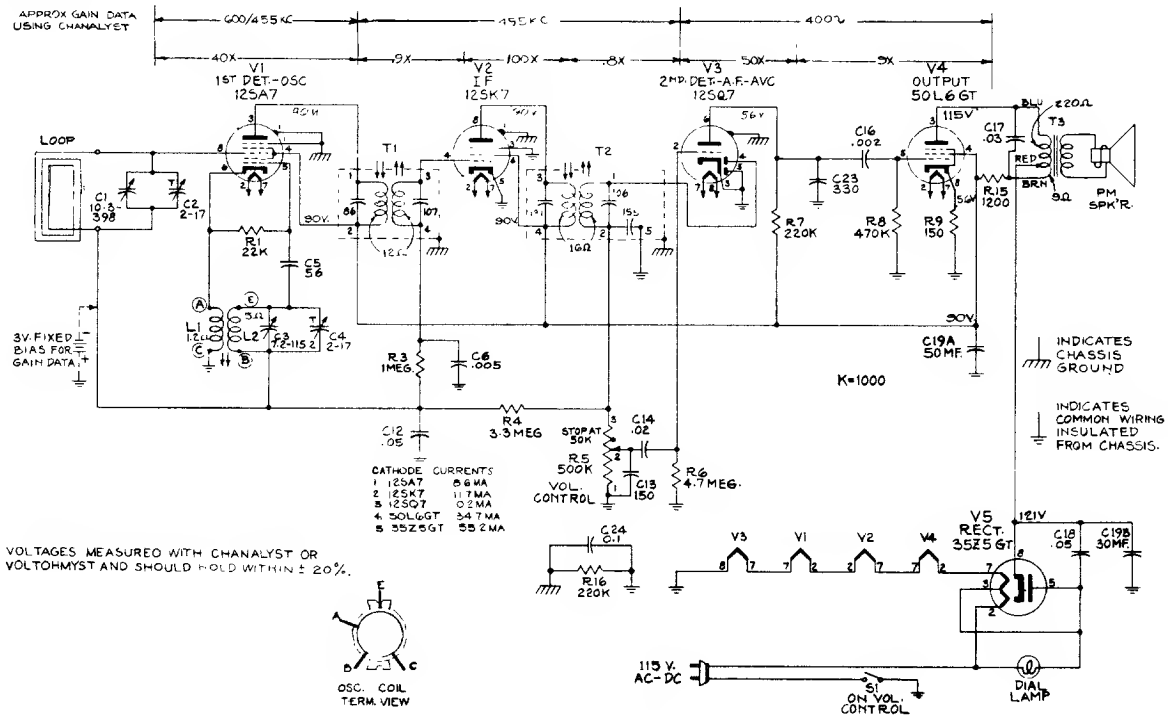
*Do not readjust T2 when test oscillator is connected to C1.





RCA VICTOR 8X541, 8X542, 8X547

Chassis No. RC-1065, RC-1065A



Alignment Procedure

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

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

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

On AC operation an isolation transformer (115 v./115 v.) may be necessary for the receiver if the test oscillator is also AC operated.

Steps	Connect the high side of test-oscillator to—	Tune test-osc. to—	Turn radio dial to—	Adjust the following for max. output
1	12SK7 1-F grid through 0.1 mfd. capacitor	455 kc	Quiet-point 1600 kc end of dial	T2 (Top and bottom) 2nd 1-F trans.
2	Stator of C1 through 0.1 mfd.			*T1 (top and bottom) 1st 1-F trans.
3	Short wire placed near loop to radiate signal	1600 kc	1600 kc	C4 (osc.)
4		1400 kc	1400 kc	†C2 (ant.)
5		600 kc	600 kc	L2 (osc.) Rock gang
6		Repeat steps 3, 4 and 5.		

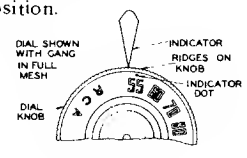
*Do not readjust T2 when test oscillator is connected to C1.

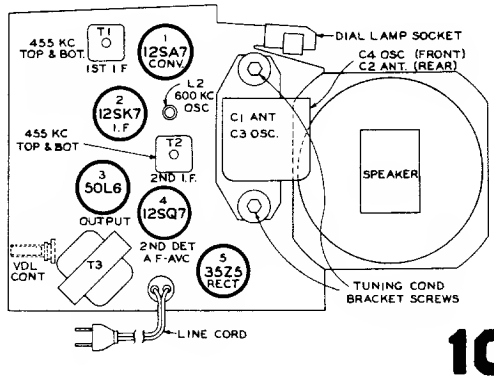
†When adjusting C2 (ant. trimmer) it is necessary to have the loop in the same position and spacing as it will have when assembled in the cabinet. This spacing is 3¼" from chassis to loop.

Dial Centering:

If the mounting of the tuning condenser has been disturbed, it may be necessary to adjust its position after replacing the chassis in the cabinet. This may be done in the following manner:

1. Install chassis and tighten the three mounting screws.
2. Replace tuning knob.
3. Loosen the two screws which hold the tuning condenser mounting bracket to the chassis.
4. Adjust the position of the tuning condenser mounting bracket so that the tuning knob may be rotated without binding on the cabinet. With tuning condenser plates fully meshed the dial should be in the position indicated below.
5. The two screws should then be tightened to maintain this position.



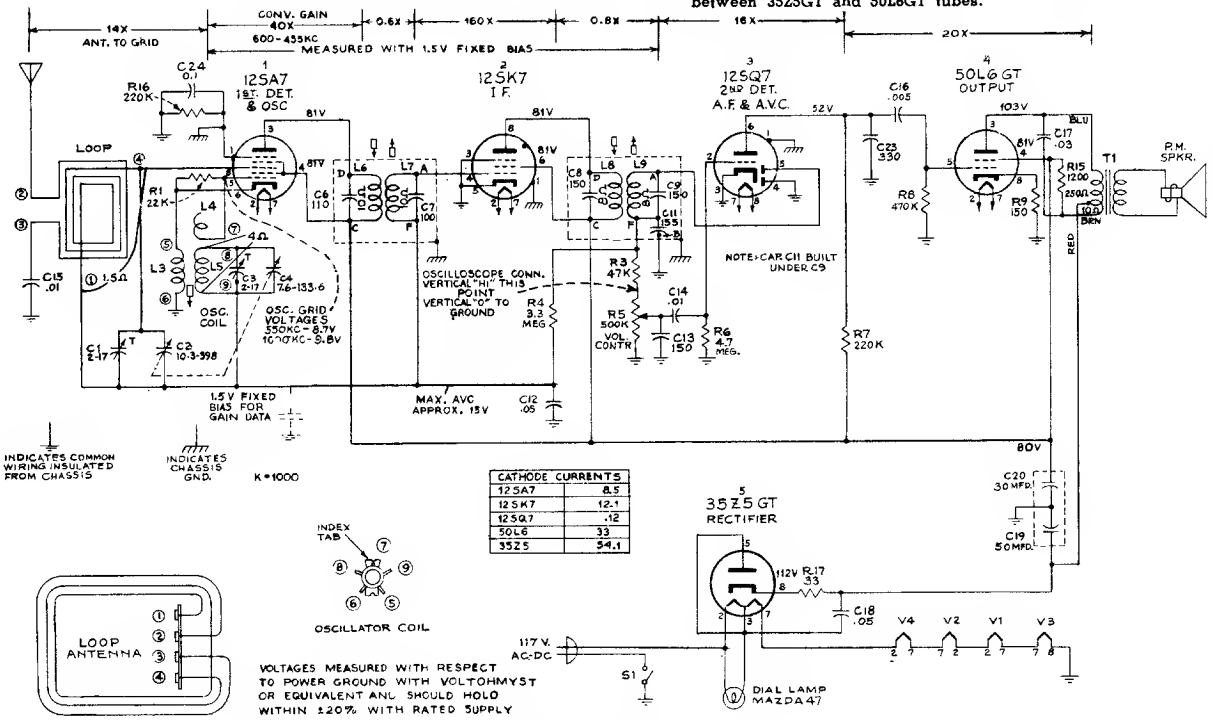


RCA VICTOR

75X11, 75X12 Chassis No. RC-1050

Critical Lead Dress

1. Dress all heater leads close to chassis.
2. Dress AVC resistor R4 away from 12SK7 tube socket.
3. Dress diode load resistor R3 away from 12SQ7 tube socket.
4. Dress 12SQ7 plate resistor R7 over 2nd IF transformer terminal.
5. Dress output plate bypass capacitor C17 close to rear of chassis.
6. Dress power cord lead along rear and bottom of chassis between 35Z5GT and 50L6GT tubes.



CATHODE CURRENTS	
12SA7	8.5
12SK7	12.1
12SQ7	.12
50L6	33
35Z5	34.1

Alignment Procedure

COIL RESISTANCES LESS THAN 1Ω NOT SHOWN.

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

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

Calibration Scale.—The tuning dial can not be used for accurate alignment. Use of the procedure given in the alignment tabulation will provide satisfactory calibration.

Dial Pointer.—With the tuning condenser in full mesh the dial pointer should be adjusted to approx. 17.0° counterclockwise from the vertical position. It should be adjusted before re-assembling the bezel to the cabinet.

Dis-assembly.—To remove bezel and dial assembly:

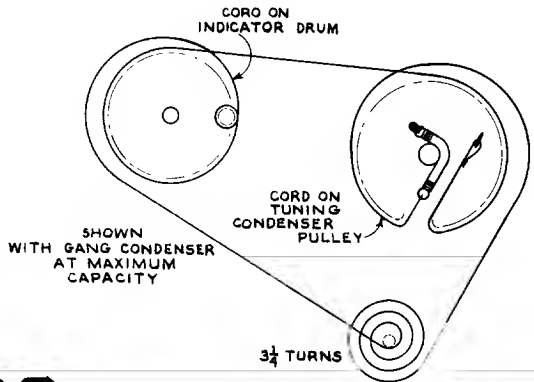
Remove the four hex head screws in the feet.

To remove chassis from cabinet:

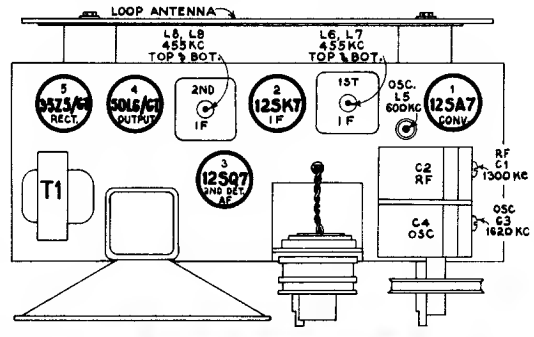
Remove bezel and dial assembly described above, remove the pointer by pulling straight to the front, remove four round head screws which hold the chassis to the cabinet.

Steps	Connect the high side of test-oscillator to—	Tune test-osc. to—	Turn radio dial to—	Adjust the following for max. peak output
1	12SK7 I-F grid through 0.1 mfd. capacitor	455 kc	Quiet-point 1,600 kc end of dial	L8 and L9 2nd I-F transformer
2	Stator of C2 through 0.1 mfd.			L8 and L7 1st I-F transformer
3	Ant. lead in series with 200 mmfd.	1,620 kc	full clock-wise	C3 (osc.)
4		1,400 kc	1,400 kc	C1 (ant.)
5		600 kc	600 kc "A" Band	L5 (osc.) Rock gang
6	Repeat steps 3, 4 and 5.			

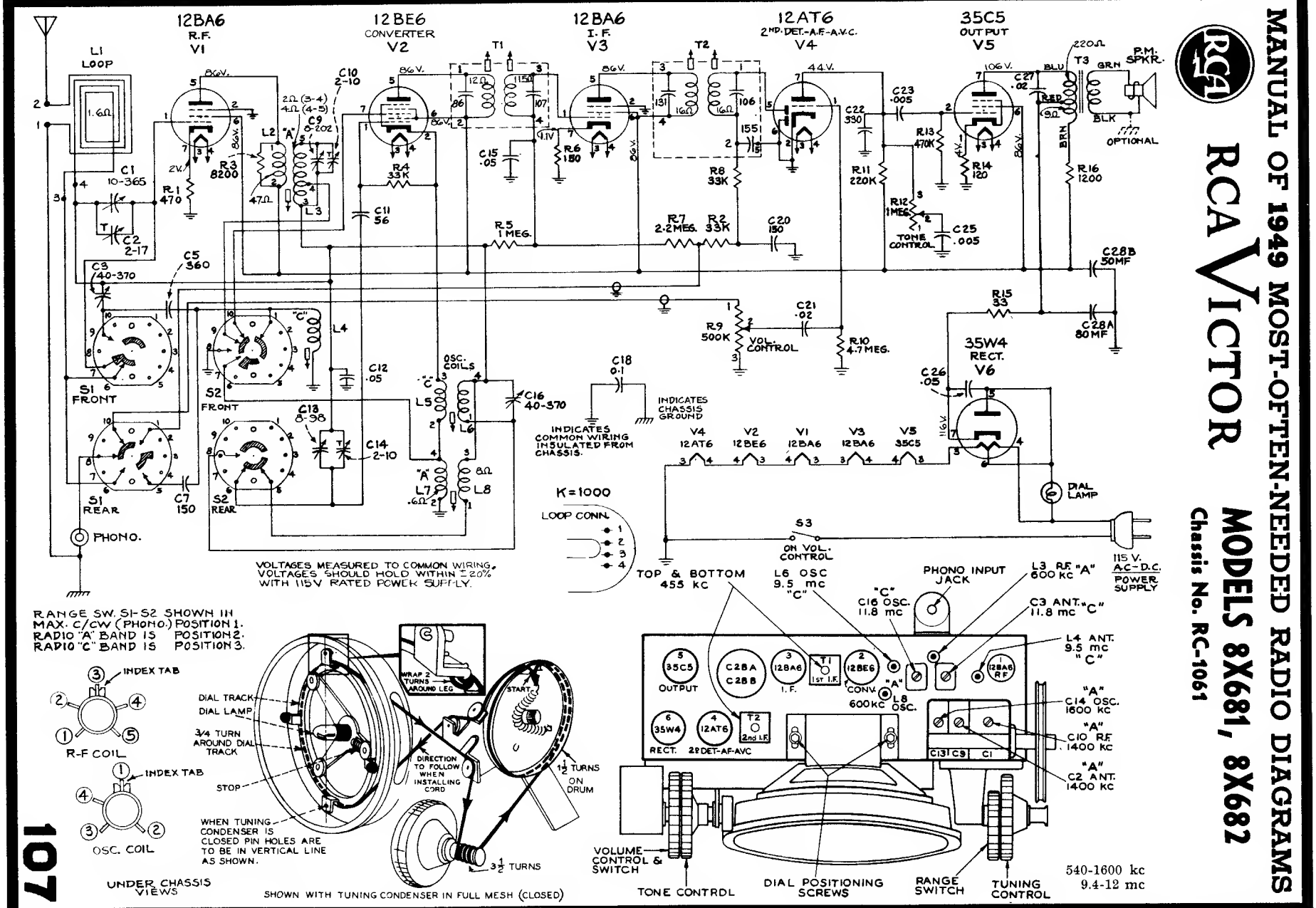
* Do not readjust L8 or L9 when test oscillator is connected to C2.



Dial-Indicator and Drive Mechanism



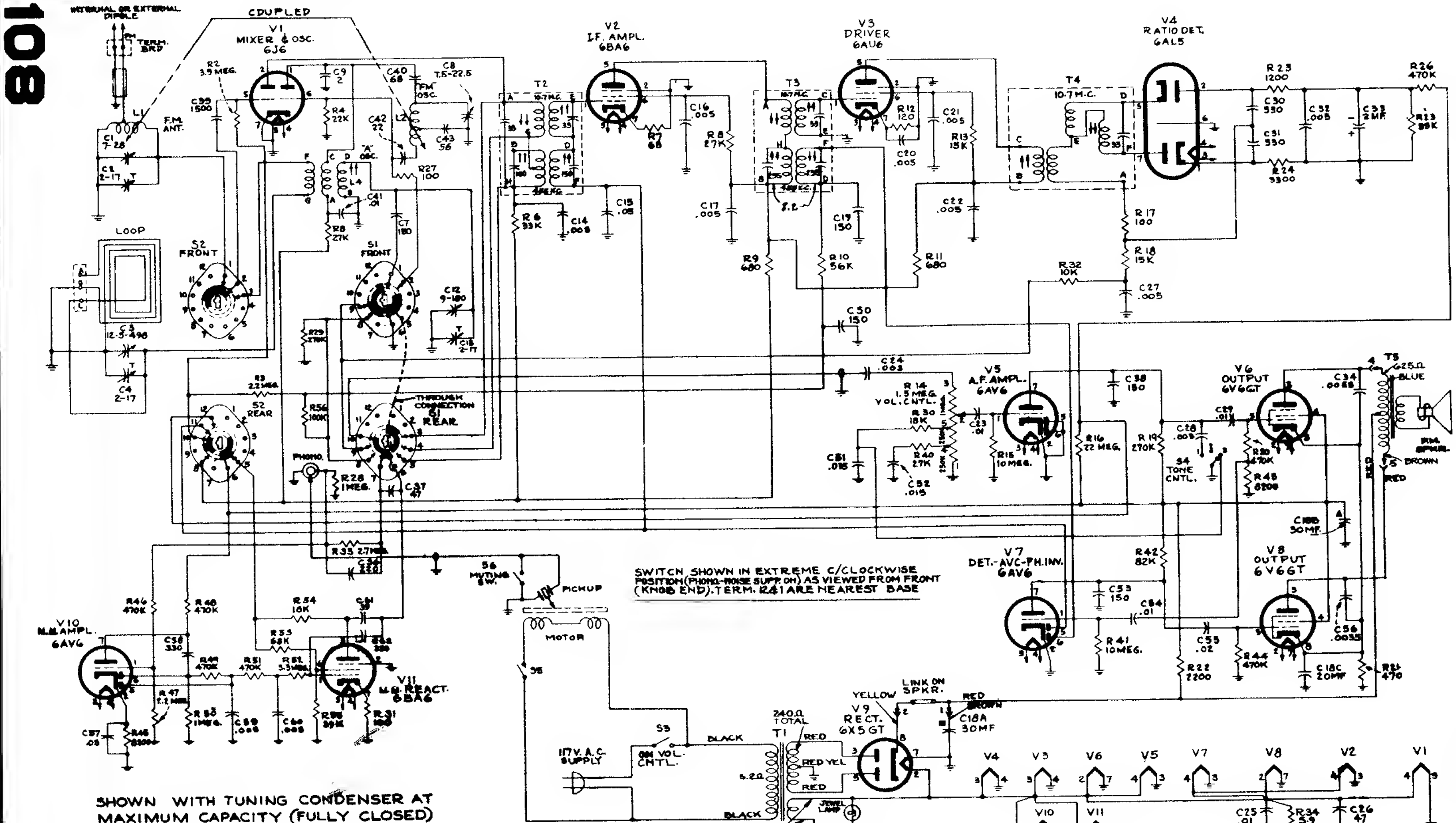
Tube and Trimmer Locations

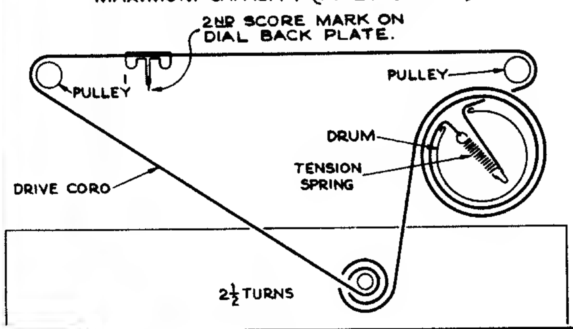

MANUAL OF 1949 MOST-OFTEN-NEEDED RADIO DIAGRAMS
RCA VICTOR
MODELS 8X681, 8X682
Chassis No. RC-1061
12BA6 R.F. V1
12BE6 CONVERTER V2
12BA6 I.F. V3
12AT6 2ND. DET.-A.F.-A.V.C. V4
35C5 OUTPUT V5
35W4 RECT. V6
L1 LOOP
1.6Ω
C1 10-365
C2 2-17
C3 40-370
C5 360
R1 470
R3 8200
R4 33K
R5 1 MEG.
R6 150
R7 2.2MEG.
R8 33K
R9 500K VOL. CONTROL
R10 4.7 MEG.
R11 220K
R12 1MEG. TONE CONTROL
R13 470K
R14 120
R15 33
R16 1200
C7 150
C9 8-202
C10 2-10
C11 56
C12 .05
C14 2-10
C15 .05
C16 40-370
C18 8-98
C18 0.1
C20 150
C21 .02
C22 330
C23 .005
C25 .005
C26 .05
C27 .02
C28A 80MF
C28B 50MF
T1
T2
T3
220Ω
9Ω
P.M. SPKR.
OPTIONAL
S1 FRONT
S1 REAR
S2 FRONT
S2 REAR
S3 ON VOL. CONTROL
PHONO.
DIAL LAMP
115 V. A.C.-D.C. POWER SUPPLY
OSC. COILS
L4
L5
L6
L7
L8
8Ω
.6Ω
K=1000
LOOP CONN.
INDICATES CHASSIS GROUND
INDICATES COMMON WIRING INSULATED FROM CHASSIS.
VOLTAGES MEASURED TO COMMON WIRING. VOLTAGES SHOULD HOLD WITHIN ±20% WITH 115V RATED POWER SUPPLY.
RANGE SW. S1-S2 SHOWN IN MAX. C/CW (PHONO.) POSITION 1.
RADIO "A" BAND IS POSITION 2.
RADIO "C" BAND IS POSITION 3.
R-F COIL
OSC. COIL
INDEX TAB
DIAL TRACK
DIAL LAMP
3/4 TURN AROUND DIAL TRACK
STOP
WRAP 2 TURNS AROUND LEG
START
DIRECTION TO FOLLOW WHEN INSTALLING CORD
1/2 TURNS ON DRUM
3 1/2 TURNS
WHEN TUNING CONDENSER IS CLOSED PIN HOLES ARE TO BE IN VERTICAL LINE AS SHOWN.
UNDER CHASSIS VIEWS
SHOWN WITH TUNING CONDENSER IN FULL MESH (CLOSED)
TOP & BOTTOM 455 KC
L6 OSC 9.5 mc "C"
"C" C16 OSC. 11.8 mc
PHONO INPUT JACK
L3 R.F. "A" 600 kc
C3 ANT. "C" 11.8 mc
L4 ANT. 9.5 mc "C"
"A" C14 OSC. 1600 kc
"A" C10 R.F. 1400 kc
"A" C2 ANT. 1400 kc
L8 OSC. 600 kc
VOLUME CONTROL & SWITCH
TONE CONTRDL
DIAL POSITIONING SCREWS
RANGE SWITCH
TUNING CONTROL
540-1600 kc
9.4-12 mc
107

RCA VICTOR

Model 8V112

Chassis No. RC-616





MAGIC MONITOR

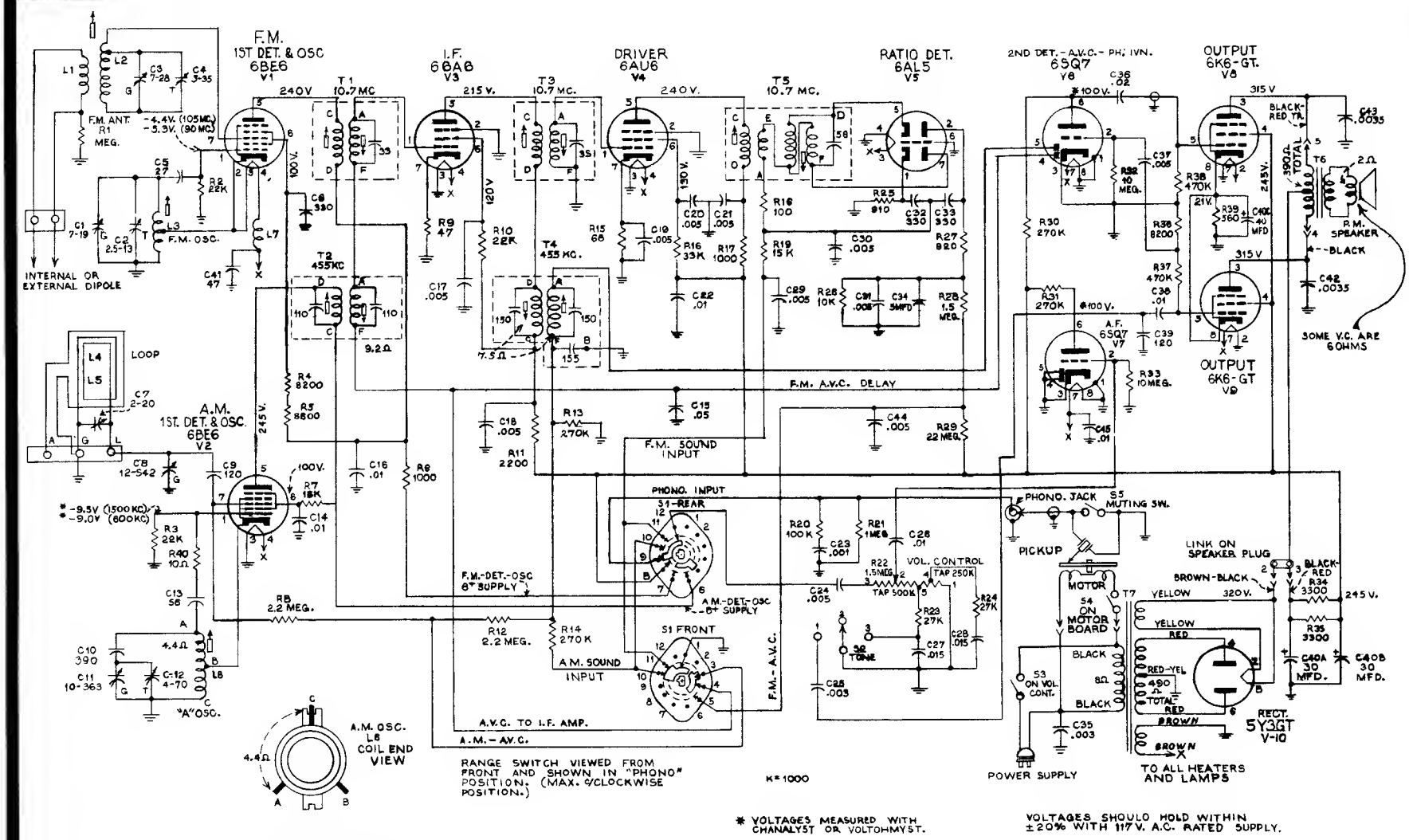
Circuit Description

The Magic Monitor circuit acts as a capacity shunt across the audio input to the volume control when the selector switch is turned to M. M. position. This shunt is variable, diminishing with increasing input level and increasing with increase of frequency. The phono signal input is applied to the grid of V10 (6AV6 M. M. amp.), is amplified and fed through a resistance-capacity network to the diode plates of V10 which rectifies it and produces a grid voltage on V11 in proportion to the level of the high frequencies contained in the audio signal.

Tuning Ranges

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

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



Circuit Description

Model 710V2 has individual built-in antennas for FM and AM coupled to individual 1st Det.-Osc. tubes (6BE6 V1 and V2). The outputs of these two tubes are connected to separate IF transformers (T1 and T2) whose secondaries are in series and connected to the IF amplifier tube (6BA6 V3). The output of V3 is connected to separate IF transformers (T3 and T4) whose primaries are in series. The secondary of T3 (FM IF) is connected to the driver tube (6AU6 V4). The secondary of T4 (AM IF) is connected to the AM second detector (6SQ7 V6). The output of the driver tube (V4) is coupled thru the ratio detector transformer (T5) to the FM ratio detector tube (6AL5 V5).

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

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

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

R.C.A. Victor
Model 710V2
Chassis RC-613A
Alignment on next page

RCA VICTOR
MODEL 710V2

AM-FM Radio-Phonograph Combination

Chassis No. RC-613A

FREQUENCY RANGES

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

Aligoment Indicators:

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

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

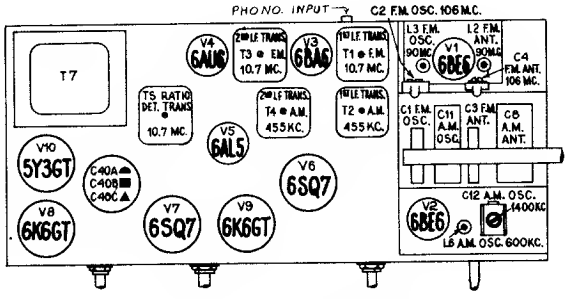
When audio output is being measured the volume control should be turned to maximum.

Signal Generator:

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

Critical Lead Dress

1. Dress capacitor C5 near chassis base.
2. Dress lead from pin 5, V-1, to terminal C, of transformer T1, as near bottom of FM shelf as possible.
3. The lead from capacitor C24 to the high side of the volume control must be dressed next to chassis along front apron.
4. Dress resistors R32 & R33 near chassis base.
5. Dress all A.C. leads away from volume control.
6. Solder FM antenna coil primary leads to terminal board with as short a lead length as is practical.
7. Make all FM leads as short as possible.
8. The lead from pin 2, V-3, to chassis ground must be dressed as close to base and as near to the back apron as possible. This lead provides degeneration for the IF stage and neither its length nor the point at which it is grounded to the chassis should be changed.
9. Dress all leads away from the 3300 ohm resistors R34 and R35.



TOP VIEW OF CHASSIS

The FM i-f alignment may be checked by means of an FM sweep generator and cathode-ray oscilloscope. Connect the output from the sweep generator, which is set to 10.7 mc., to the FM 1st Det.-Osc. grid (6BE6 Pin No. 7) low side to chassis. Disconnect the 5 mfd. capacitor C34 from the Ratio Detector circuit.

Connect the high side of the oscilloscope to the junction of R27 and R28, low side to chassis. Adjust the sweep generator and oscilloscope to obtain the response curve.

The Ratio Detector characteristic may be viewed by connecting the oscilloscope across the volume control R22. Capacitor C34 should be re-connected before checking the Ratio Detector characteristic.

FM Alignment

RANGE SWITCH IN FM POSITION—VOLUME CONT. MAXIMUM

Steps	Connect sig. gen.	Sig. gen. output	Turn radio dial to—	Adjustment for peak output
1	Connect the d-c probe of a VoltOhmyst to the negative lead of the 5 mfd. capacitor C34 and the common lead to chassis. Turn gang condenser to max. capacity (fully meshed).			
2	High side to Pin 1 of driver tube 6AU6 in series with .01 mfd. low side to chassis	10.7 mc. modulated 30% 400 cycles AM (Approx. .1 volt)	Max. capacity (fully meshed)	T5 top core for max. d-c voltage across C34. T5 bottom core for min. audio output
3	High side to one FM ant. term. in series with .01 mfd. Low side to the other FM ant. term.	10.7 mc. 30% modulation, 400 cycles AM. Adjust to provide 2 to 3 volts indication on VoltOhmyst during alignment.		†Using alternate loading: T3 bottom core (sec.) T3 top core (pri.) T1 bottom core (sec.) T1 top core (pri.)
4	High side to one FM ant. term. in series with a 120 ohm resistor. Low side to the other FM ant. term in series with a 120 ohm resistor.	106 mc	106 mc	C2 osc. C4 ant.
5		90 mc	90 mc	L3 osc. L2 ant.
6	Repeat Steps 4 and 5 until further adjustment does not improve calibration.			

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

AM Alignment

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

RANGE SWITCH IN BC POSITION

Steps	Connect high side of sig. gen. to—	Sig. gen. output	Turn radio dial to—	Adjust for peak output
1	AM converter grid 6BE6 V-2 in series with .01 mfd.	455 kc	Quiet point at low freq. end.	†T4 top core (sec.) †T4 bottom core (pri.)
2				†T2 bottom core (sec.) †T2 top core (pri.)
3	"A" terminal of terminal board at rear of chassis in series with 200 mmf. (link open)	1400 kc	1400 kc	C12 osc. C 7 ant. (loop)
4		600 kc	600 kc	L6 osc. (Rock gang)
5	Repeat Step 3.			
6	After chassis and loop have been installed in cabinet, adjust C7 for max. output on a weak station near 1400 kc.			

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

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

FRONT PANEL CONTROLS

RCA VICTOR

RP-178 Series
Automatic Record Changer

SERVICE DATA

Continued on the next seven pages

RADIO CORPORATION OF AMERICA
RCA VICTOR DIVISION
CAMDEN, N. J., U. S. A.

RP-178 Series Record Changer

RP-178
Uses 117V. 60 cycle motor. For operation on 50 cycle power supply; a spring, Stock No. 73158 is added to the motor shaft.
Used in the following models:
8TV321, 8TV323, 8V7, 8V90, 8V91, 8V112, 75ZU, 77U, 77V1.

RP-178-2
Uses 117V. 25 cycle motor.
Used in instruments manufactured by RCA Victor Company Limited (Canada).

RP-178-3
Uses 117V./234V. 60 cycle motor. For operation on 50 cycle power supply; a spring, Stock No. S-4774 is added to the motor shaft.
Used in Models 6QU3 and 6QV3.

Index

FEATURES

1. This mechanism is designed to play automatically a series of twelve 10-inch or ten 12-inch standard records of the 78 r.p.m. type.
2. It will play manually records up to 12 inches in diameter.
3. Tripping system is of "eccentric" type, insuring reliable automatic operation on all records made to RMA proposed standards.
4. It is a simple operation of sliding the record support to change from 10- to 12-inch records or vice versa.
5. Cycling mechanism is disconnected completely while records are being played. This reduces the load on the drive motor, thereby reducing the tendency for "wow" or rumble.
6. Low noise sapphire point pickup cartridge.

AUTOMATIC OPERATION

1. With the power switch in the off position slide the record support shelf as required for 10- or 12-inch records.
2. Place the records to be played in a stack with desired selections upward and in proper sequence with the last record on top. Load them on the changer by placing them over the center post and resting on the record support shelf. Place record stabilizing clamp on top of the record stack.
3. Turn power switch on and press the reject button. The changer will play automatically one side of each record in the stack.
   The tone arm can be moved to the rest position any time the mechanism is not in cycle.
4. Turn the power switch off, lift the stabilizing clamp and remove the stack from the turntable by placing fingers of both hands directly opposite and under the stack. Then lift straight up—"don't tilt" or squeeze stack.

MANUAL OPERATION

1. Slide the record support shelf in towards the center post for 10-inch or away from the center post for 12-inch position.
2. Place the record to be played on the turntable and turn the power switch on.
3. Place the pickup on the start of the record.

   Note: The mechanism should be allowed to complete cycle before attempting to move tone arm to the rest position.
4. Turn power switch off manually.
5. Remove the record by raising straight up without tilting.

CAUTIONS

1. Avoid handling the tone arm or sliding the record support assembly while mechanism is in cycle.
2. Never turn the power switch off, leaving the mechanism in cycle for an extended period of time.
3. Do not allow the records to remain on supports when not in use.
4. Do not allow oil or grease to come in contact with any rubber parts.
5. Do not install instrument near source of heat. Excessive heat may damage the pickup cartridge.

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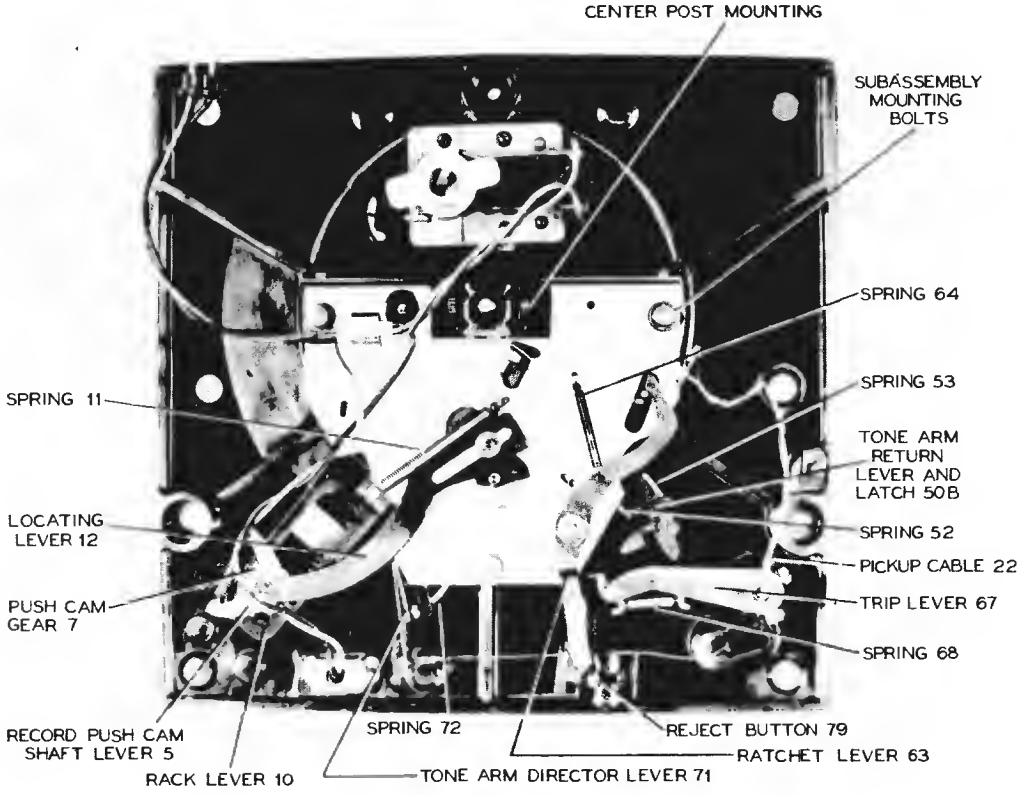

Figure 1

FUNCTION OF PRINCIPAL PARTS

Trip Lever—67

When the sapphire is riding the eccentric groove, the trip pawl engages the ratchet lever, starting cycle.

Ratchet Lever—63

Portion of the lever acts as a ratchet and the other portion incorporates a catch for the stud on the cycling cam carriage. The engagement of this stud prevents the mechanism from going into cycle.

Center Post—32

The center post performs the function of supporting and aids in the separation of the records.

Tone Arm Return Lever and Latch—53B

The tone-arm return lever, together with the latch, locks and stabilizes the tone arm in its outermost position. It also gives the necessary inward motion to the tone arm.

Cycling Cam Carriage—50A

This carriage provides a movable support for the cycling cam.

Tone Arm Director Lever—71

The roller on one end of this lever follows a channel in the cycling cam and thereby pulls on the cable directing the vertical and outward motion of the tone arm.

Locating Lever—12

The sloped portion of the lever forms a stop for the stud on the tone arm return lever thereby determining the landing position of the pickup.

Record Push Cam Gear Assembly—5, 7

Provides a means of coupling the push cam to the rack lever.

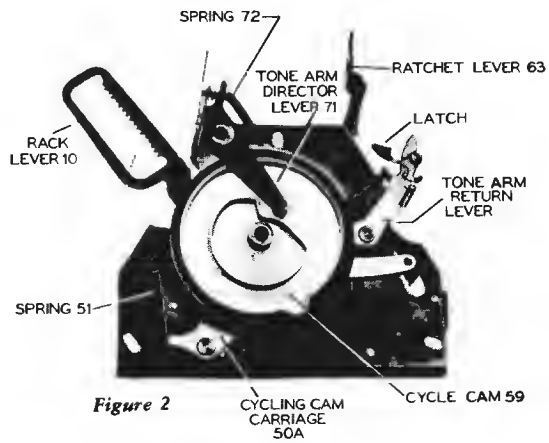

Figure 2

Record Support—1A, B, C, D

Provides a support for the edge of the records and a mounting for the record push cam.

Rack Lever—10

One end of the lever follows the eccentric elevated portion of the cycling cam causing the lever to move in and out from the center of the mechanism. The teeth on the rack lever engage the teeth in the record push cam gear producing a rotary motion necessary to push the record off the step in the center post.

Record Push Cam—4

The oval shaped cam located in the record support, rotates during change cycle. This cam engages and pushes the record from the step in the center post.

ADJUSTMENTS

Tone arm (out of cycle) height adjustment

1. Rotate the turntable until the change cycle is completed.
2. Move the tone arm to a position off the edge of the record and allow it to rest freely in air.
3. Bend portion of the tone arm bracket so that the sapphire is 3/16 inches above the flat surface of the motorboard. (Figure 3.)

Tone arm height adjustment while in change cycle

1. Press the reject button and rotate the turntable by hand until the pickup has raised, to the maximum height in the change cycle.
2. Turn the adjustment screw "A" until the sapphire is 1⅜ inches above the turntable.
   This adjustment will permit the pickup to land and play one record placed on the turntable. At the same time it prevents the tone arm from touching the record resting on the centerpost while the mechanism is going through cycle.
   (If this height cannot be reached by the adjustment screw, take up on the cotter pin.) (Figures 4 and 5.)

Pickup landing adjustment

1. Slide the record support as required for playing 10-inch records.
2. Place a ten-inch record on the turntable and rotate the turntable by hand until the sapphire is just ready to land.
   Loosen set screws "B" (Figure 6).
3. Hold the trip lever to keep it from moving while the pickup is moved to the start of the record.
4. Tighten the black screw "B" and allow the mechanism to run through cycle automatically. If landing is correct, tighten copper plated screw "B." (Figure 6.)
   (Note) No separate 12-inch landing adjustment is necessary.

Record push cam and gear assembly adjustment

1. Have the mechanism out of cycle.
2. With the push cam in place and the record support in the 10-inch position, assemble and engage the teeth of the push cam gear with the rack lever so the eye in the lever is approximately in line with the centerpost as shown in drawing. (Figure 7.)
3. Set the push cam parallel to the front edge of the record support, make certain the thin edge of the cam is on the left side, viewed from the front or centerpost side of the support. (Figure 8.)

Removing the turntable

1. Loosen the two screws mounting the centerpost. (Figure 10.)
2. The centerpost, turntable and thrust bearing can now be easily lifted out.

Replacing the turntable

1. Slip the turntable over the lower end of the centerpost until it comes against the stop or ears. (Figure 9.)
2. Place the thrust bearing and washers on the bottom end of the centerpost and place the centerpost and turntable in position as shown. (Figure 9.)
3. Turn the spindle so the step in the centerpost is away from the record support. (Figure 11.)
4. Tighten the two mounting screws. (Figure 10.)

Turntable centering

If for any reason the sub-assembly had been removed from the motorboard it is necessary to re-center the turntable.

1. Loosen the three sub-assembly mounting bolts. (Figure 12.)
2. Place the turntable in place with the center post extending down through the mounting as shown. (It is not necessary to have the thrust bearing in place for this operation.) (Figure 9.)
3. Center the turntable in respect to the recess in the motorboard by shifting the position of the sub-assembly slightly. (Figure 11.)
4. Tighten the nut on the end of the square head mounting bolt. (Figure 12.)
5. Remove the turntable and tighten the other two mounting bolts. (Figure 12.)

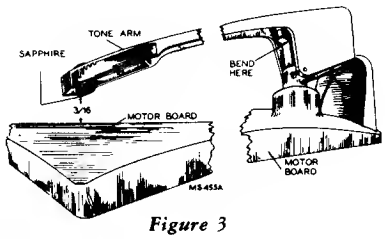

Figure 3

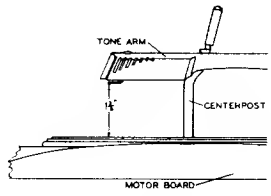

Figure 4

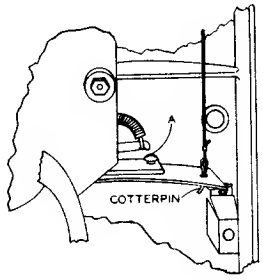

Figure 5

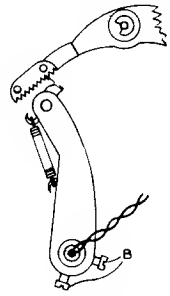

Figure 6

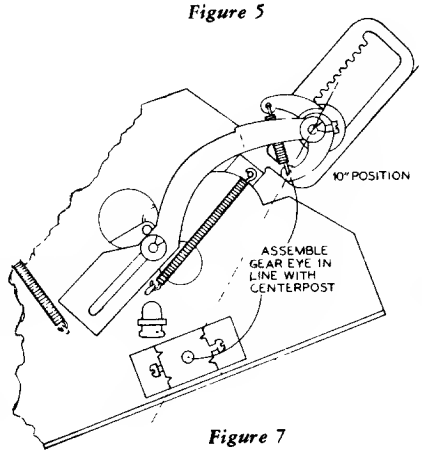

Figure 7

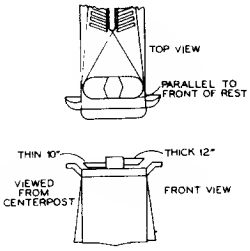

Figure 8

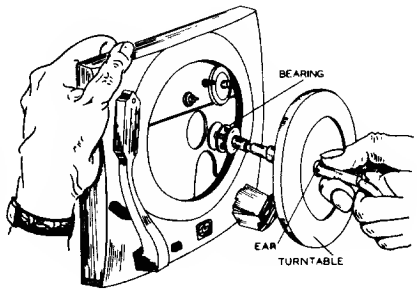

Figure 9

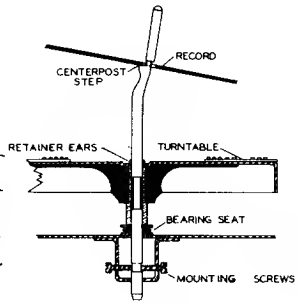

Figure 10

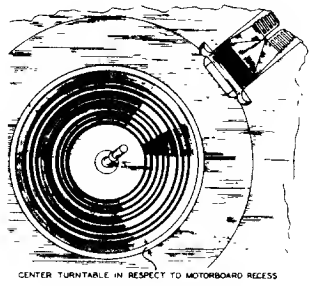

Figure 11

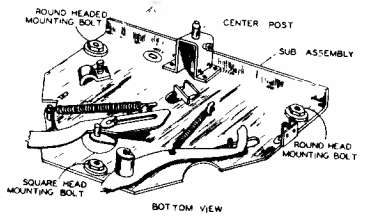

Figure 12

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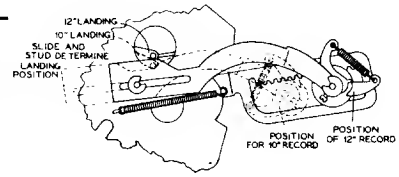
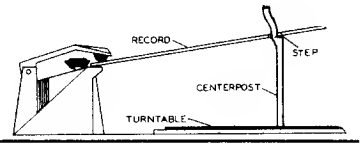
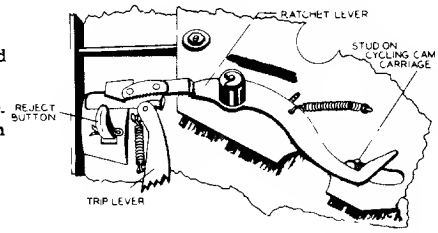
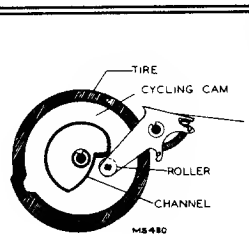
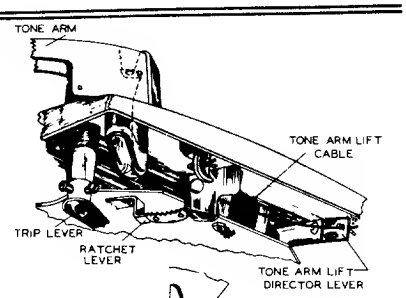
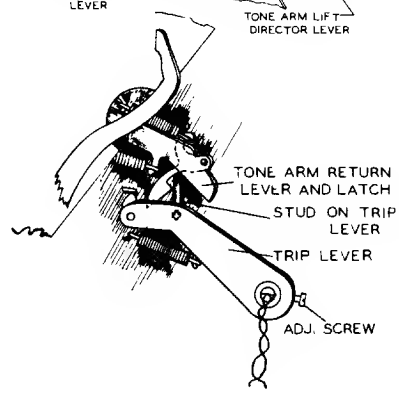
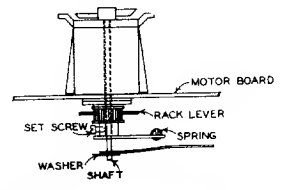
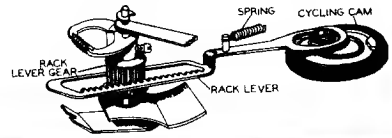
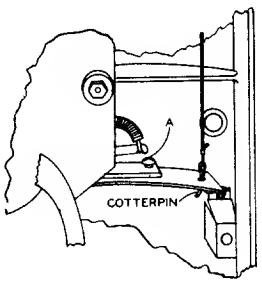
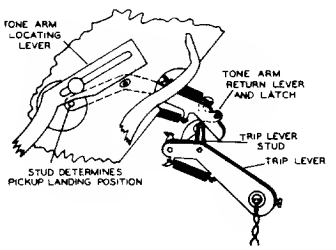
CYCLE OF OPERATION

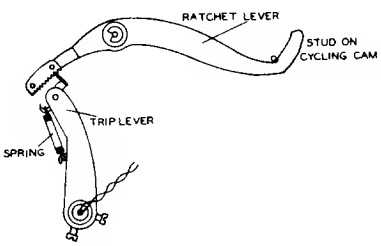
	Function	Explanation	
Operator	Lift and slide the record support to 10 or 12 inch position as desired	1. Record support locks in position and at the same time the record push cam and gear rotates and assumes a position as required for 10- or 12-inch records.	
	Place the stack of records over the center post	1. The lower record of the stack is sitting on the step in the centerpost, and the edge is resting on the record support.	
	Push reject button	1. The end of the reject button extending through the motorboard contacts and moves ratchet lever. 2. Ratchet lever unlatches stud which is mounted on cycling carriage. This allows the tension spring to pull the cycling cam against the rotating knurled roller and start cycle.	
Automatic Cycle	Tone arm rises and moves out	1. As the cycling cam rotates the small roller on the tone arm director lever follows the channel in the cam and in so doing pulls on the cable connected to the tone arm. 2. The hole in the motorboard provides a guide for the tone arm cable. It is so placed as to allow the cable to pull at an angle slightly off 90 degrees thus giving the necessary rising and outward motion of the tone arm. 3. The trip lever which is rigidly connected to the tone arm through the tone arm pivot shaft is moved out with the tone arm. 4. The tone arm return lever has moved out slightly ahead of the trip lever. The tone arm return lever together with the small latch assumes such a position so as to engage the stud on the trip lever and stabilize the tone arm in its outermost position.	  
	The record push cam together with the "step" in the centerpost separates the lower record of the stack allowing it to drop to the turntable	1. While the cycling cam is continuing to rotate, the rack lever is being pushed outward by the small eccentric elevated cam, with which it is engaged. 2. The teeth in the rack lever being engaged with record push cam gear, converts the sliding action of the rack lever into a rotary motion. 3. The rotary motion of the record push cam pushes the record off the step in the centerpost.	 

CYCLE OF OPERATION

Function	Explanation
Tone arm moves in and lands on record	1. As the cycling cam is returning to normal position, the tone arm director lever is gradually allowing a slack in the tone arm cable. 2. While the tone arm director lever is gradually allowing slack in cable, the tone arm return lever is tending to retain the tension on the cable by returning the tone arm to the landing position. 3. The distance the tone arm return lever travels, while moving the pickup in for landing, is determined by the contact between the tone arm locating lever and the stud on the tone arm return lever. 4. After the tone arm return lever has moved the tone arm to the landing position the tone arm director lever continues to move and allow enough slack in the cable so the pickup can sit down on the start of the record.
Sapphire moves into record groove. Record begins to play	1. As the sapphire moves into the playing groove, the cycling cam becomes disengaged from the rotating knurled roller as the roller falls into the step in the cam. 2. The change cycle is completed as the stud on the cycling cam carriage becomes engaged with the ratchet lever. This engagement prevents the cycling cam from contacting the knurled roller, starting a new cycle.
The record plays	1. After the playing of the record, the pickup moves into the eccentric groove. 2. The movement of the pickup in the eccentric groove causes the trip pawl to engage the ratchet lever starting a new cycle. (The mechanism plays one side of each record in the stack then repeats the playing of the last record until the pickup is manually placed on the rest or the power removed from the mechanism.)







REPLACEMENT OF SAPPHIRE

Caution: Never bend the sapphire support wire.

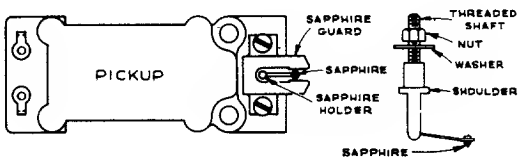
Extreme care should be used when loosening the sapphire mounting nut so that the twisting motion does not break the crystal.

Remove the two screws holding the sapphire guard in place and remove guard. Remove the small nut and washer on the threaded shaft of the sapphire holder and gently push the shaft through the hole in the armature shaft until the sapphire holder assembly comes free.

Do not use force as the crystal may be broken.

Insert threaded shaft of replacement sapphire holder through armature shaft and replace the washer and nut. Make sure that the sapphire is in the correct position. Take hold at the lower end of the shaft with a pair of pliers while tightening the nut, being very careful so as not to strip the threads or break the crystal. Replace the sapphire guard, positioning it by means of the oversize screw slots. Make certain that the sapphire and its supporting wire are centered in the guard. Tighten the guard screws. Before using, check to see that the sapphire projects far enough (approx. .020) beyond the guard so that the guard will not strike the record. If necessary, bend the guard a little.

Note: Pickup pressure should be approximately 1 to 1¼ oz.



LUBRICATION

Motor

Motor is lubricated at factory to provide normal operation for a long period of time.

If it becomes necessary to lubricate, use SAE #10 motor oil to saturate the felt wicks on the motor bearings.

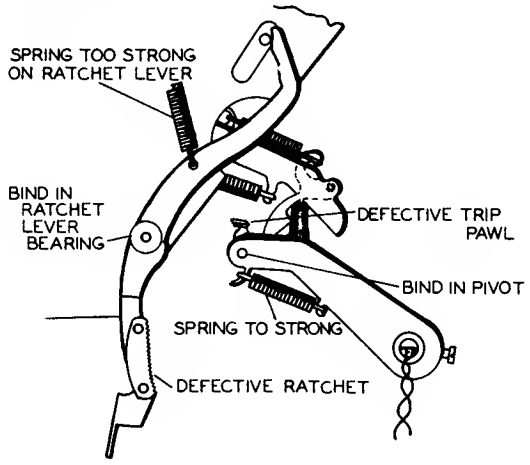
Main Bearing

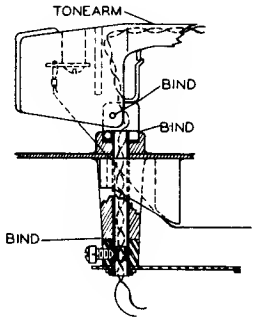
Use STA-PUT #512 or SAE #30 motor oil.

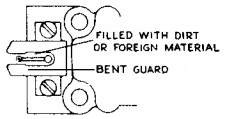
Slides and Levers

Use STA-PUT #512.

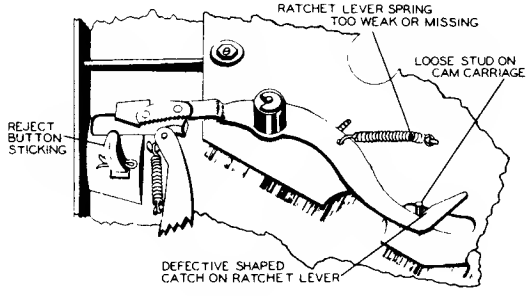
Pickup Repeats Grooves



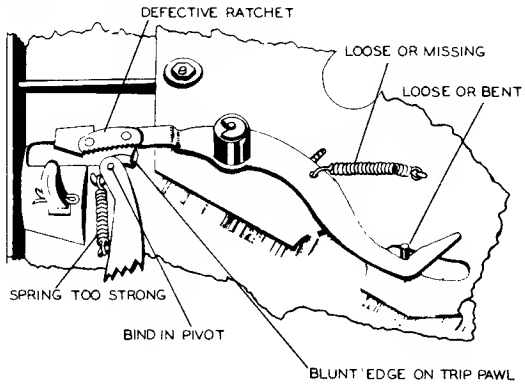




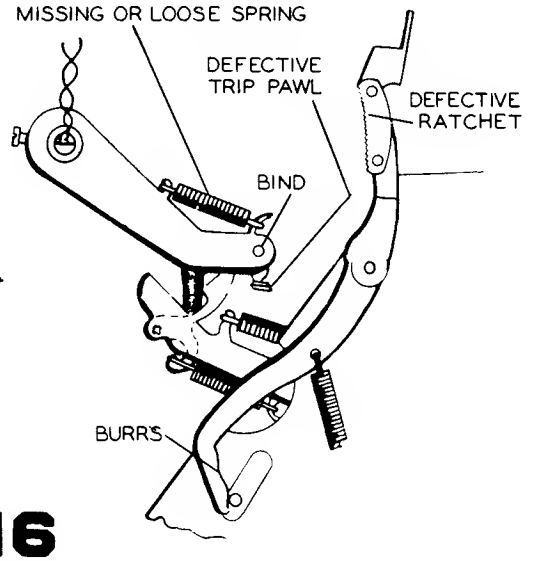
Continuous Tripping

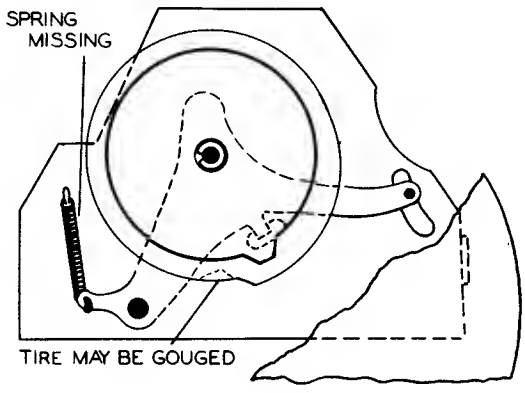


Premature Tripping

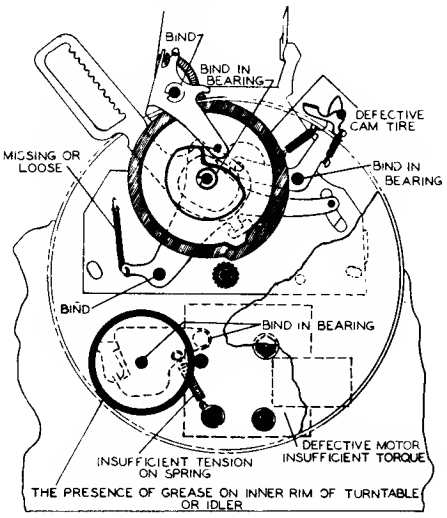


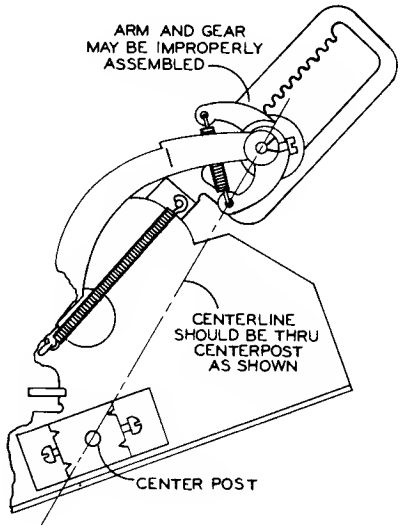
Failure To Trip or Go Into Cycle



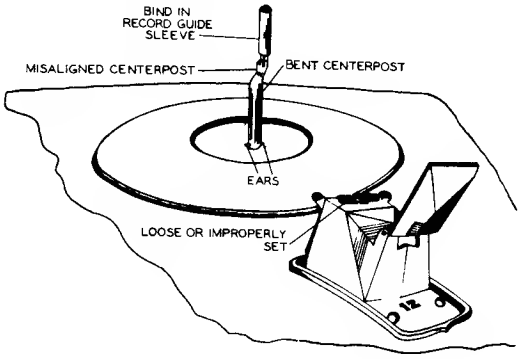


Changer Will Not Complete Cycle

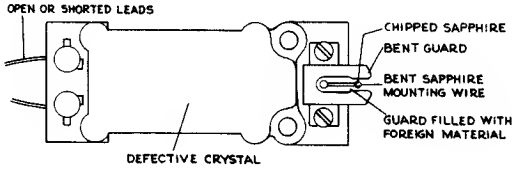




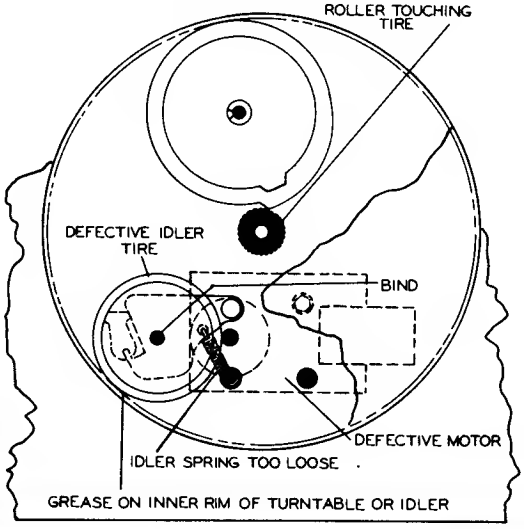
Records Do Not Separate or Drop Properly

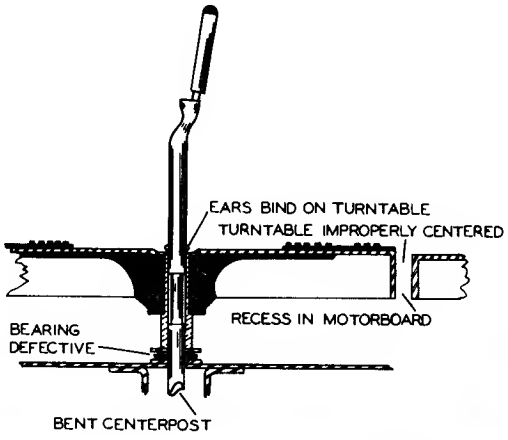


Distorted Output

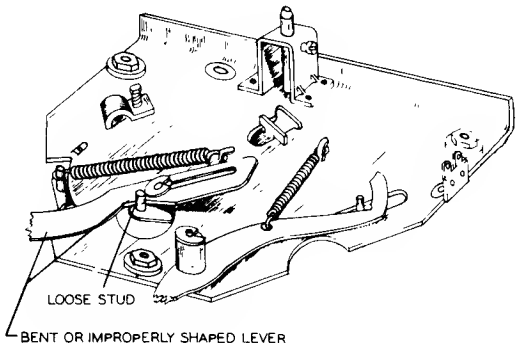


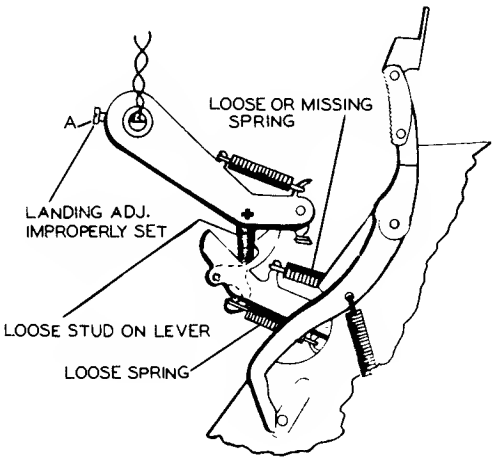
"Wow" or Slow Turntable Speed

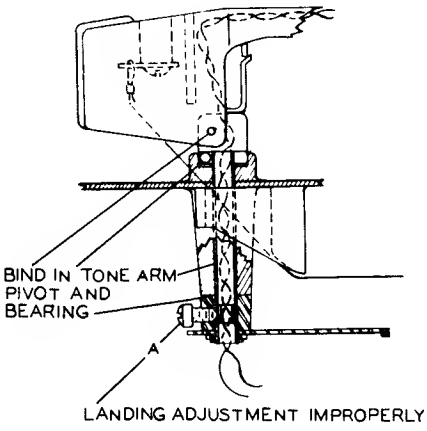


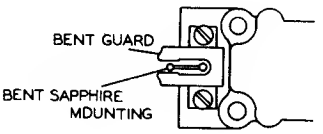


Improper Pickup Landing

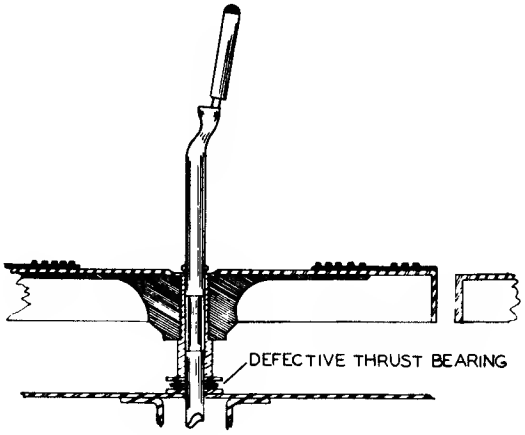


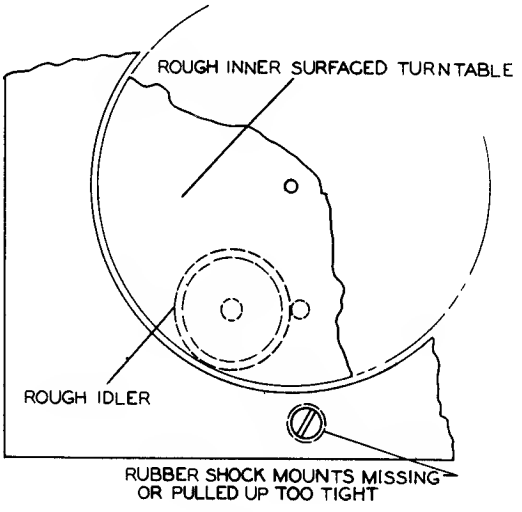






Rumble





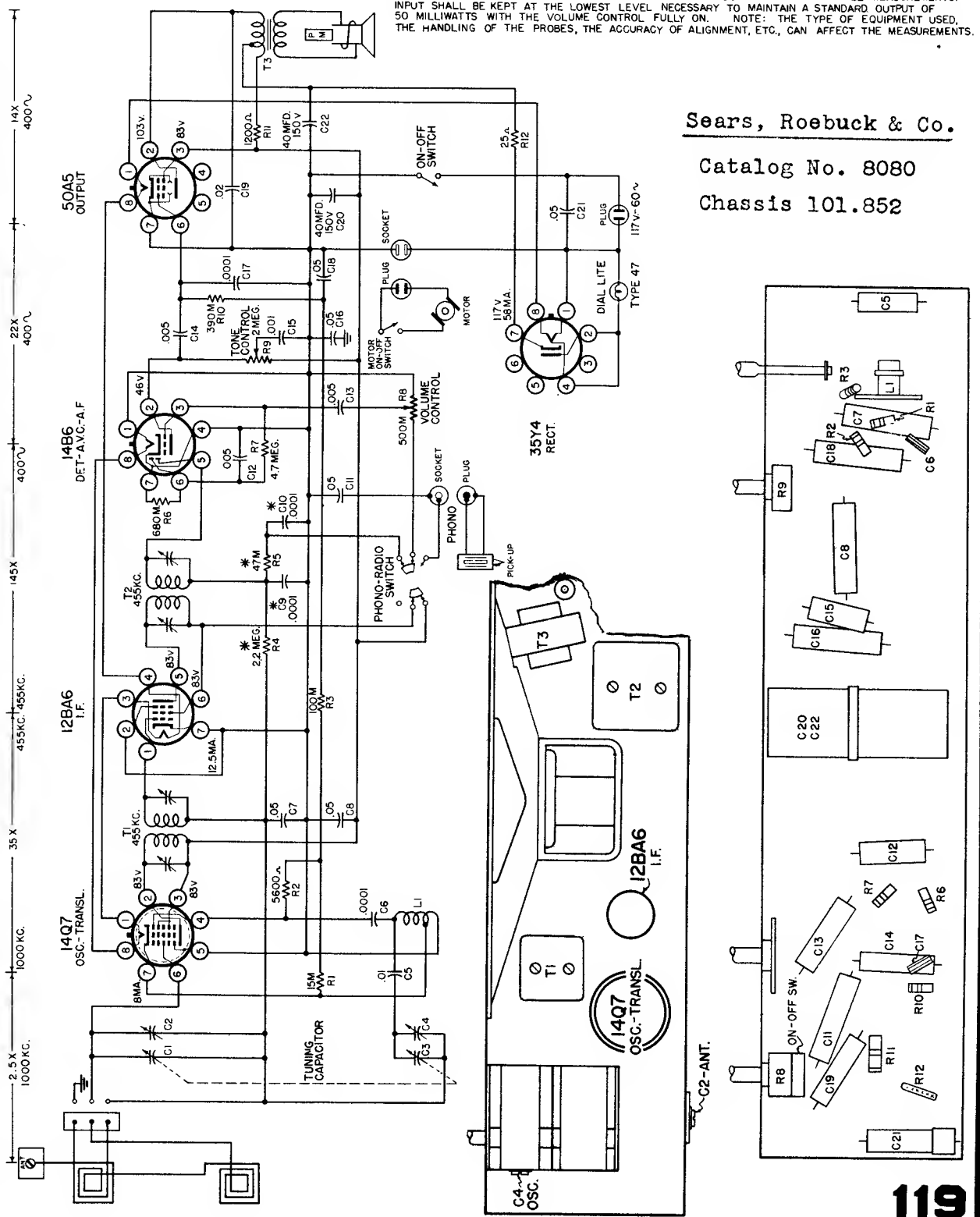
Silvertone

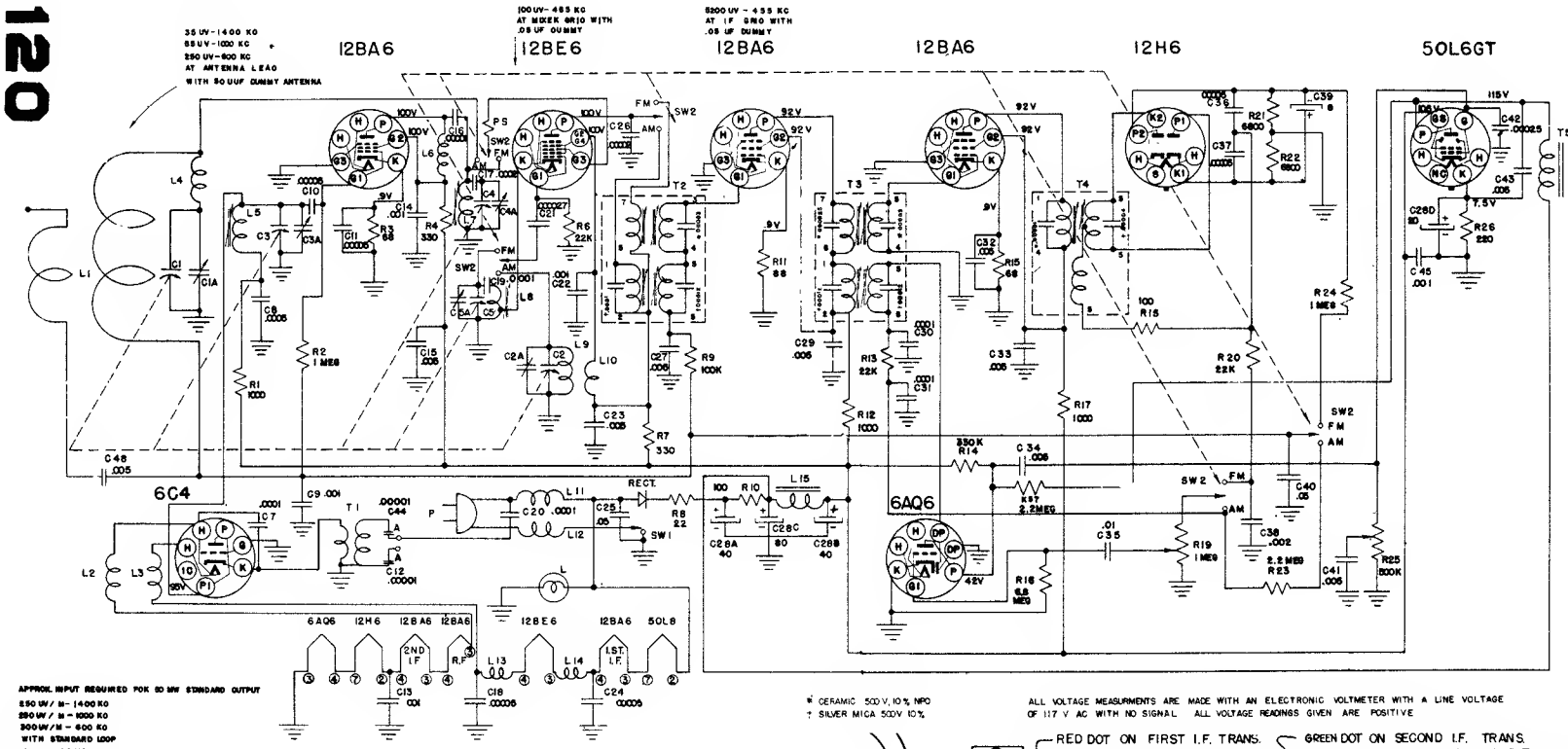
* - PART OF T2
TUBE SOCKETS ARE VIEWED FROM UNDERSIDE OF CHASSIS. VOLTAGE READINGS SHOWN AT SOCKET-PRONGS ARE TO NEGATIVE "B" AND ARE TAKEN WITH PHONO-RADIO SWITCH IN RADIO POSITION AND WITH LINE VOLTAGE AT 117 VOLTS. WHERE NO READING IS GIVEN, THE VOLTAGE IS ZERO OR TOO LOW TO READ. VOLTAGE READINGS ARE TAKEN WITH A VOLTMETER HAVING A RESISTANCE OF ONE THOUSAND OHMS PER VOLT.
THE GAIN PER STAGE VALUES AS NOTED ABOVE ARE APPROXIMATE VALUES FOR AN AVERAGE STAGE, RATHER THAN AN ABSOLUTE VALUE. A 0.1 MFD. DUMMY IS USED FOR ALL MEASUREMENTS. INPUT SHALL BE KEPT AT THE LOWEST LEVEL NECESSARY TO MAINTAIN A STANDARD OUTPUT OF 50 MILLIWATTS WITH THE VOLUME CONTROL FULLY ON. NOTE: THE TYPE OF EQUIPMENT USED, THE HANDLING OF THE PROBES, THE ACCURACY OF ALIGNMENT, ETC., CAN AFFECT THE MEASUREMENTS.

Sears, Roebuck & Co.

Catalog No. 8080

Chassis 101.852

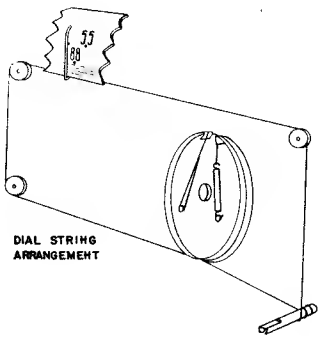




APPROX. INPUT REQUIRED FOR 50 MW STANDARD OUTPUT
550 UV/M - 1400 KC
550 UV/M - 1000 KC
300 UV/M - 600 KC
WITH STANDARD LOOP
40 UV - 100 MC
30 UV - 51 MC
TO FM ANTENNA TERMINALS
WITH 300 OHM GUMMY ANTENNA

* CERAMIC 500 V, 10% NPO
† SILVER MICA 500V 10%

ALL VOLTAGE MEASURMENTS ARE MADE WITH AN ELECTRONIC VOLTMETER WITH A LINE VOLTAGE OF 117 V AC WITH NO SIGNAL. ALL VOLTAGE READINGS GIVEN ARE POSITIVE

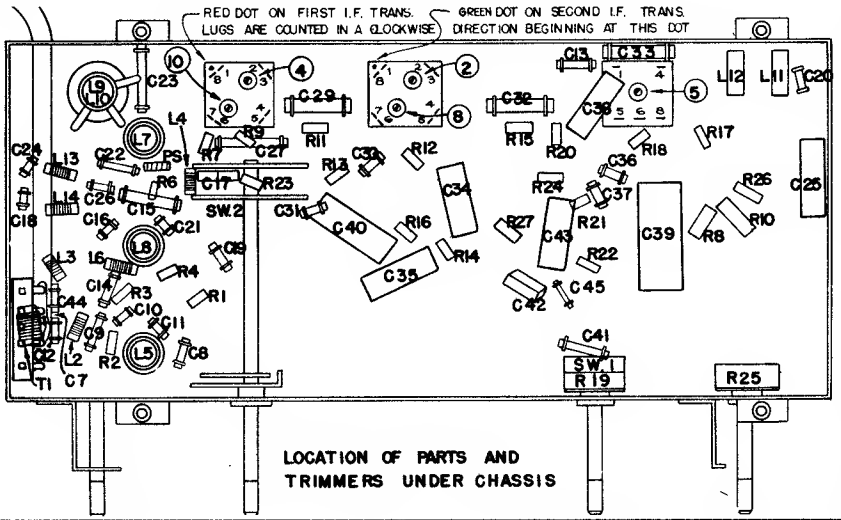


Sears, Roebuck & Co.

Catalog No. 8020

Chassis 132.841

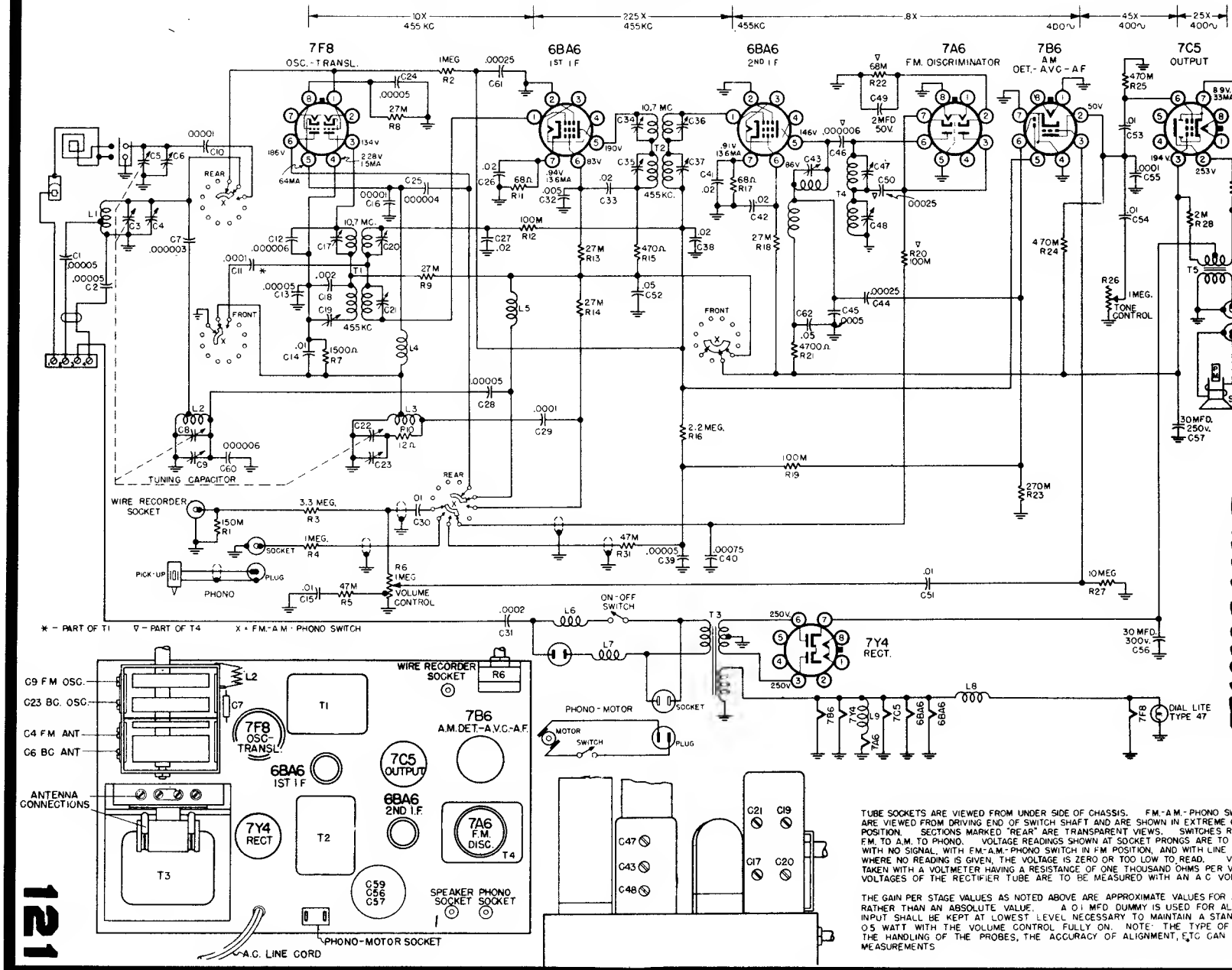
FM I.F. 10.7 MC.
AM I.F. 455 KC.



MANUAL OF 1949 MOST-OFTEN-NEEDED RADIO DIAGRAMS

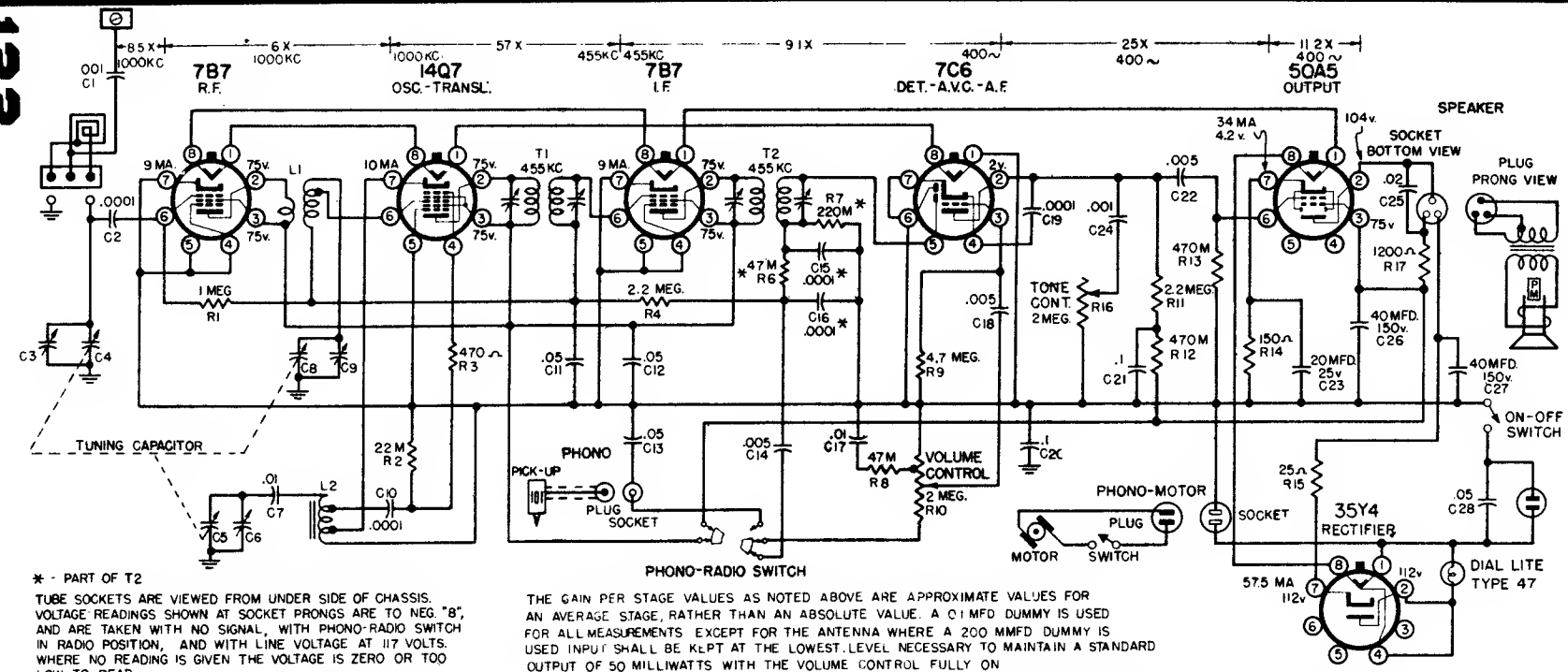
Sears, Roebuck & Co. Catalog Nos. 8107A, 8108, 8108A
Chassis 101.851

Silvertone



TUBE SOCKETS ARE VIEWED FROM UNDER SIDE OF CHASSIS. F.M.-A.M.-PHONO SWITCH SECTIONS ARE VIEWED FROM DRIVING END OF SWITCH SHAFT AND ARE SHOWN IN EXTREME COUNTER-CLOCKWISE (FM) POSITION. SECTIONS MARKED "REAR" ARE TRANSPARENT VIEWS. SWITCHES ROTATE CLOCKWISE FROM F.M. TO A.M. TO PHONO. VOLTAGE READINGS SHOWN AT SOCKET PRONGS ARE TO CHASSIS, AND ARE TAKEN WITH NO SIGNAL, WITH F.M.-A.M.-PHONO SWITCH IN FM POSITION, AND WITH LINE VOLTAGE AT 117 VOLTS. WHERE NO READING IS GIVEN, THE VOLTAGE IS ZERO OR TOO LOW TO READ. VOLTAGE READINGS ARE TAKEN WITH A VOLTMETER HAVING A RESISTANCE OF ONE THOUSAND OHMS PER VOLT. THE PLATE VOLTAGES OF THE RECTIFIER TUBE ARE TO BE MEASURED WITH AN A C VOLTMETER

THE GAIN PER STAGE VALUES AS NOTED ABOVE ARE APPROXIMATE VALUES FOR AN AVERAGE STAGE, RATHER THAN AN ABSOLUTE VALUE. A 0.1 MFD DUMMY IS USED FOR ALL MEASUREMENTS. INPUT SHALL BE KEPT AT LOWEST LEVEL NECESSARY TO MAINTAIN A STANDARD OUTPUT OF 0.5 WATT WITH THE VOLUME CONTROL FULLY ON. NOTE: THE TYPE OF EQUIPMENT USED, THE HANDLING OF THE PROBES, THE ACCURACY OF ALIGNMENT, ETC CAN AFFECT THE MEASUREMENTS

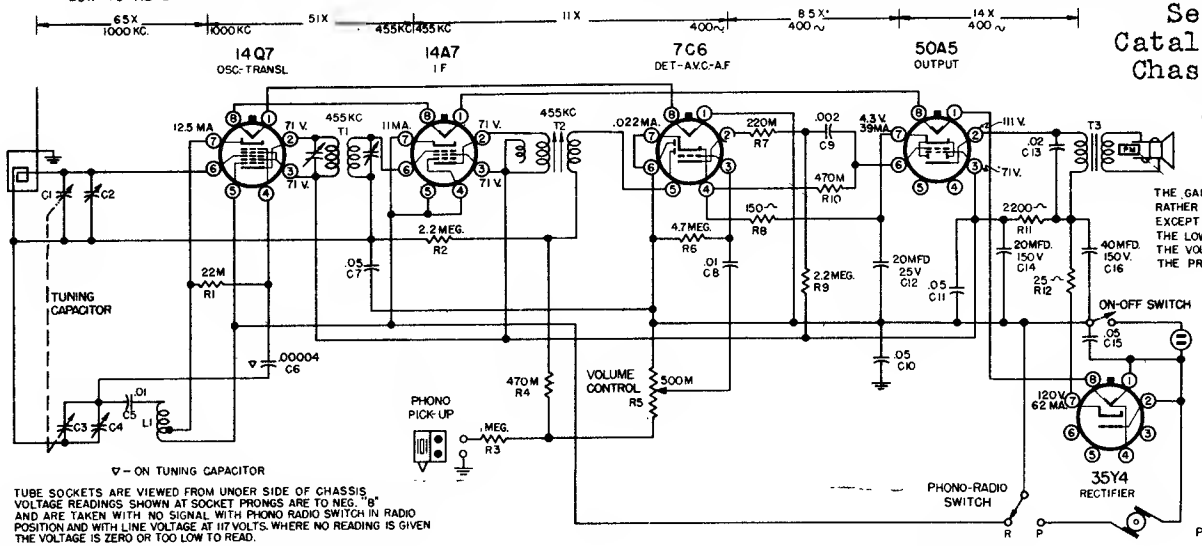


* - PART OF T2

TUBE SOCKETS ARE VIEWED FROM UNDER SIDE OF CHASSIS. VOLTAGE READINGS SHOWN AT SOCKET PRONGS ARE TO NEG. "8", AND ARE TAKEN WITH NO SIGNAL, WITH PHONO-RADIO SWITCH IN RADIO POSITION, AND WITH LINE VOLTAGE AT 117 VOLTS. WHERE NO READING IS GIVEN THE VOLTAGE IS ZERO OR TOO LOW TO READ

THE GAIN PER STAGE VALUES AS NOTED ABOVE ARE APPROXIMATE VALUES FOR AN AVERAGE STAGE, RATHER THAN AN ABSOLUTE VALUE. A .01 MFD DUMMY IS USED FOR ALL MEASUREMENTS EXCEPT FOR THE ANTENNA WHERE A 200 MMFD DUMMY IS USED INPUT SHALL BE KEPT AT THE LOWEST LEVEL NECESSARY TO MAINTAIN A STANDARD OUTPUT OF 50 MILLIWATTS WITH THE VOLUME CONTROL FULLY ON

Sears, Roebuck & Co.
Catalog Nos. 8083, 8084, 7080, 8101
Chassis 101.809-1A, -1B, -2, -3C



▽ - ON TUNING CAPACITOR

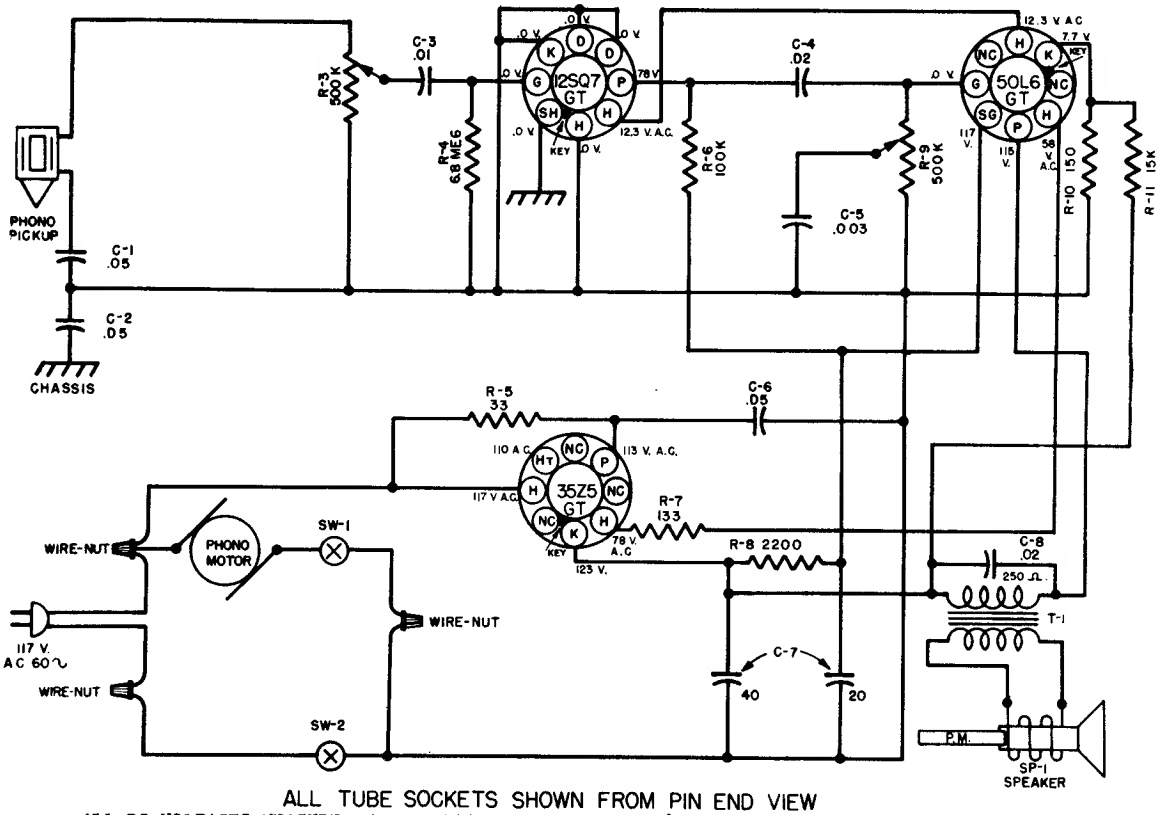
TUBE SOCKETS ARE VIEWED FROM UNDER SIDE OF CHASSIS. VOLTAGE READINGS SHOWN AT SOCKET PRONGS ARE TO NEG. "8" AND ARE TAKEN WITH NO SIGNAL WITH PHONO RADIO SWITCH IN RADIO POSITION AND WITH LINE VOLTAGE AT 117 VOLTS. WHERE NO READING IS GIVEN THE VOLTAGE IS ZERO OR TOO LOW TO READ.

THE GAIN PER STAGE VALUES AS NOTED ABOVE ARE APPROXIMATE FOR AN AVERAGE STAGE, RATHER THAN AN AN ABSOLUTE VALUE. A .01 MFD. DUMMY IS USED FOR ALL MEASUREMENTS EXCEPT FOR THE ANTENNA WHERE A 200 MMFD. DUMMY IS USED. INPUT SHALL BE KEPT AT THE LOWEST LEVEL NECESSARY TO MAINTAIN A STANDARD OUTPUT OF 50 MILLIWATTS WITH THE VOLUME CONTROL FULLY ON. NOTE: THE TYPE OF EQUIPMENT USED, THE HANDLING OF THE PROBES THE ACCURACY OF ALIGNMENT, ETC. CAN AFFECT THE MEASUREMENTS.

Sears, Roebuck & Co.
Catalog No. 8070
Chassis 101.817-2A

Silvertone

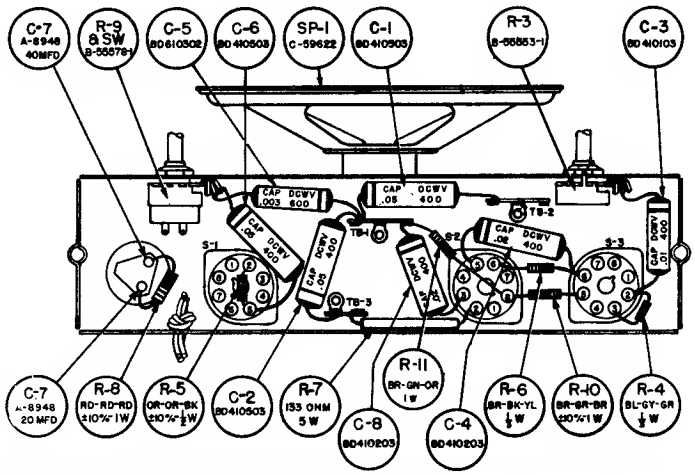
Sears, Roebuck & Co.
Catalog Nos. 8153, 8153A
Chassis 109.635, 109.635-1



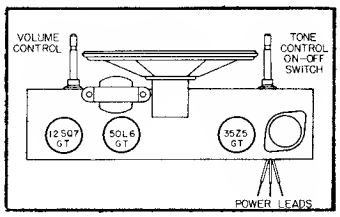
ALL TUBE SOCKETS SHOWN FROM PIN END VIEW

NOTE: ALL DC VOLTAGES MEASURED WITH A 1000 OHM PER VOLT METER FROM B- TO SOCKET CONTACT INDICATED. ALL VOLTAGES ARE POSITIVE DC UNLESS OTHERWISE MARKED. VOLUME CONTROL FULL ON. ZERO SIGNAL INPUT. TONE CONTROL IN CLOCKWISE POSITION. LINE VOLTAGE 117 VOLTS AC. RESISTANCE VALUES ARE IN OHMS UNLESS OTHERWISE NOTED. "K" EQUALS 1000 OHMS, "MEG." EQUALS 1,000,000 OHMS. CAPACITY VALUES ARE IN MICROFARADS UNLESS OTHERWISE NOTED.

Bottom View—Parts Layout



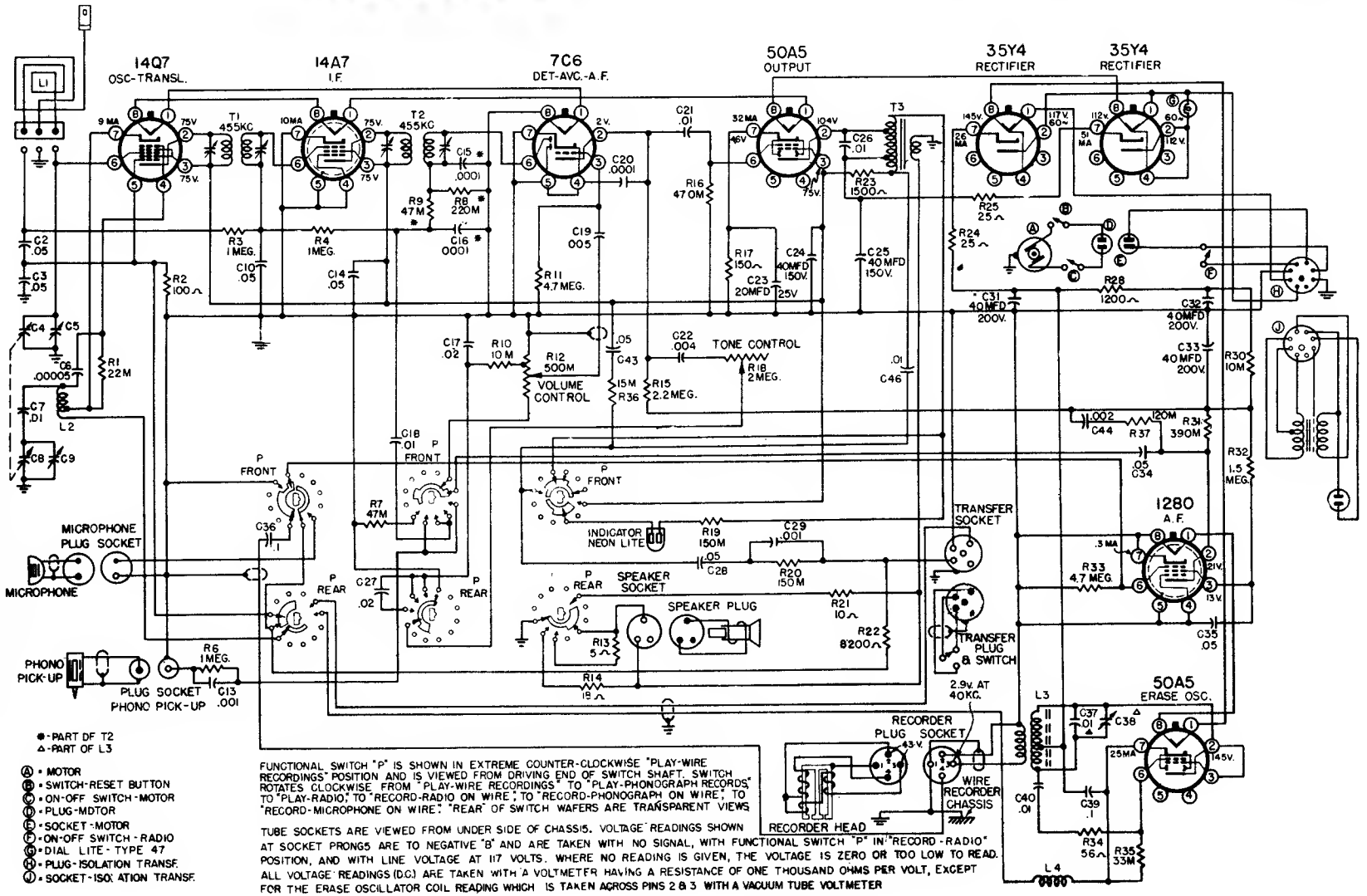
Tube Layout



Note: Only difference between Chassis 109.635 and 109.635-1 is, output transformer on chassis 109.635 is located directly behind speaker instead of as shown above.

Silvertone

SEARS, ROEBUCK & CO.
Catalog Nos. 8102, 8102B, Chassis 101.814-2B
(Catalog Nos. 8102A, 8086, -A, -B are similar)



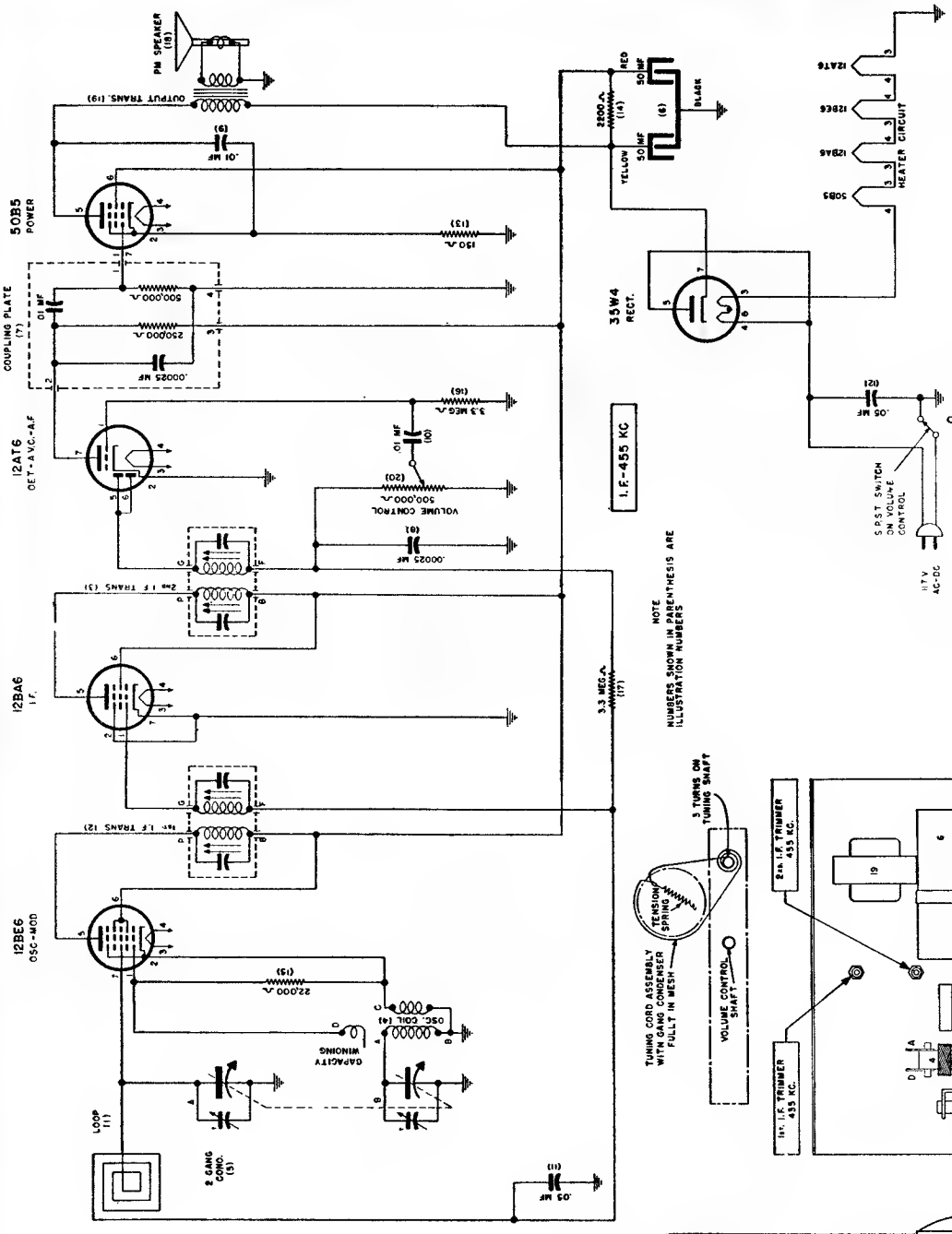
*-PART OF T2
△-PART OF L3

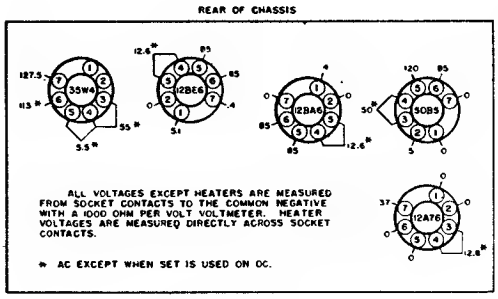
Ⓐ = MOTOR
Ⓑ = SWITCH-RESET BUTTON
Ⓒ = ON-OFF SWITCH-MOTOR
Ⓓ = PLUG-MOTOR
Ⓔ = SOCKET-MOTOR
Ⓕ = ON-OFF SWITCH-RADIO
Ⓖ = DIAL LITE-TYPE 47
Ⓗ = PLUG-ISOLATION TRANSF.
Ⓙ = SOCKET-ISOLATION TRANSF.

FUNCTIONAL SWITCH "P" IS SHOWN IN EXTREME COUNTER-CLOCKWISE "PLAY-WIRE RECORDINGS" POSITION AND IS VIEWED FROM DRIVING END OF SWITCH SHAFT. SWITCH ROTATES CLOCKWISE FROM "PLAY-WIRE RECORDINGS" TO "PLAY-PHONOGRAPH RECORDS," TO "PLAY-RADIO," TO "RECORD-RADIO ON WIRE," TO "RECORD-PHONOGRAPH ON WIRE," TO "RECORD-MICROPHONE ON WIRE." "REAR" OF SWITCH WAFERS ARE TRANSPARENT VIEWS.

TUBE SOCKETS ARE VIEWED FROM UNDER SIDE OF CHASSIS. VOLTAGE READINGS SHOWN AT SOCKET PRONGS ARE TO NEGATIVE "B" AND ARE TAKEN WITH NO SIGNAL, WITH FUNCTIONAL SWITCH "P" IN "RECORD-RADIO" POSITION, AND WITH LINE VOLTAGE AT 117 VOLTS. WHERE NO READING IS GIVEN, THE VOLTAGE IS ZERO OR TOO LOW TO READ. ALL VOLTAGE READINGS (D.C.) ARE TAKEN WITH A VOLTMETER HAVING A RESISTANCE OF ONE THOUSAND OHMS PER VOLT, EXCEPT FOR THE ERASE OSCILLATOR COIL READING WHICH IS TAKEN ACROSS PINS 2 & 3 WITH A VACUUM TUBE VOLTMETER

SCHEMATIC DIAGRAM FOR 101.814-2B



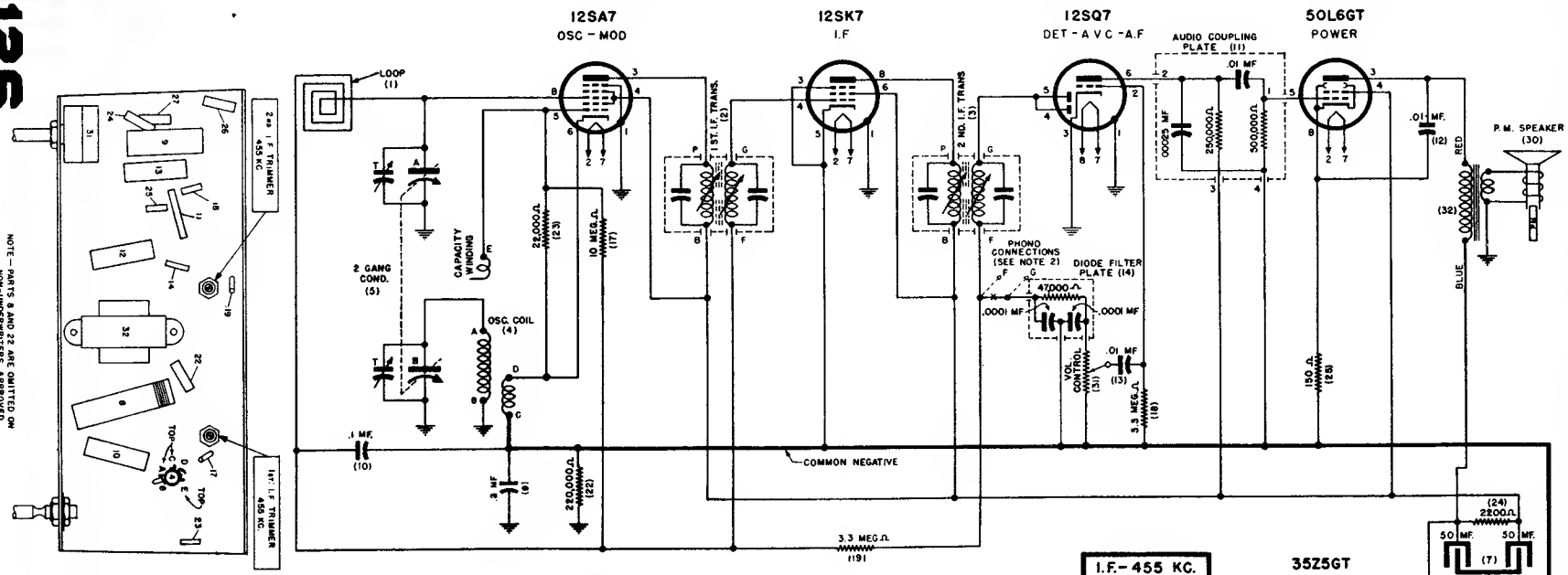


VOLTAGE TABLE
(BOTTOM VIEW OF CHASSIS)

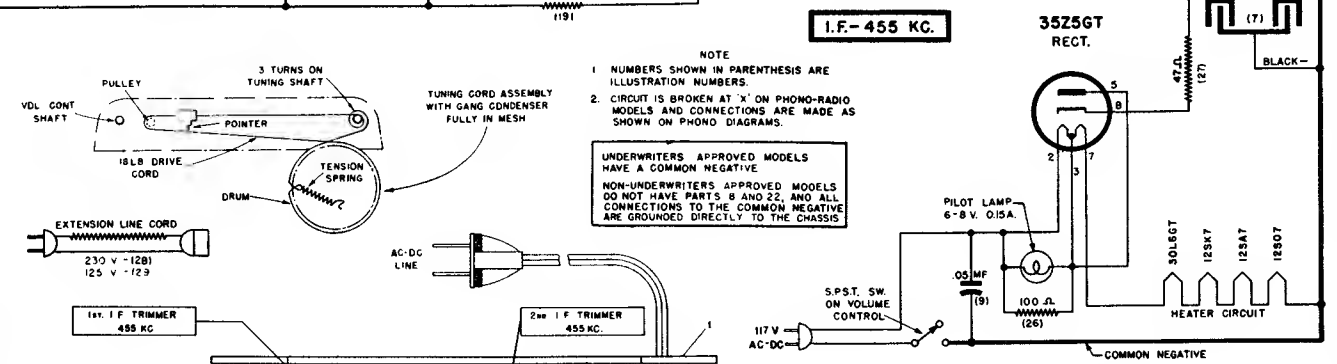
MODELS 329-W, 329-I, 329-R
SERIES "B"

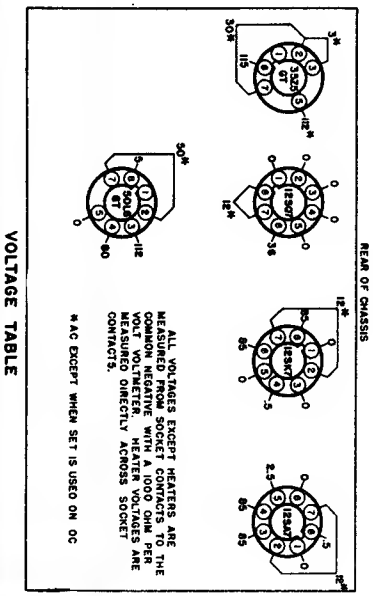
Sentinel Radio

MANUAL OF 1949 MOST-OFTEN-NEEDED RADIO



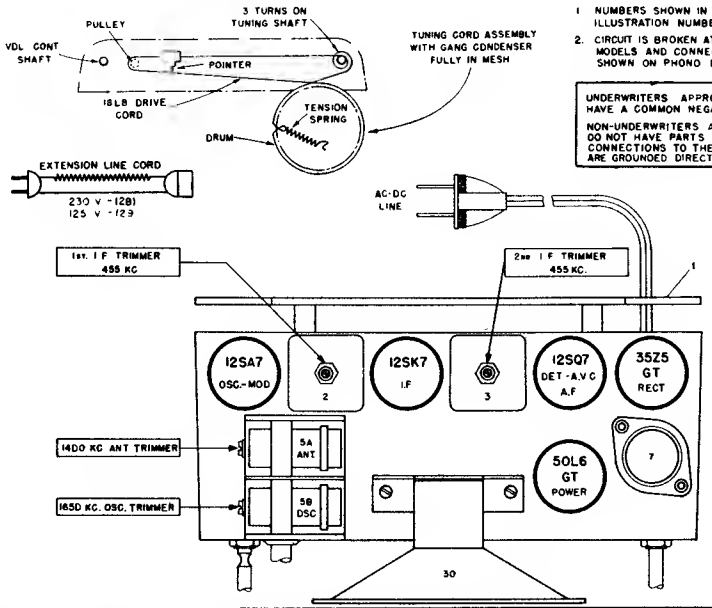
I.F. - 455 KC.





ALL VOLTAGES EXCEPT HEATERS ARE MEASURED FROM SOCKET CONTACTS TO THE COMMON NEGATIVE WITH A 1000 OHM PER VOLT VOLTMETER. HEATER VOLTAGES ARE MEASURED DIRECTLY ACROSS SOCKET CONTACTS.

*A.C. EXCEPT WHEN SET IS USED ON D.C.



NOTE

1. NUMBERS SHOWN IN PARENTHESIS ARE ILLUSTRATION NUMBERS.
2. CIRCUIT IS BROKEN AT 'X' ON PHONO-RADIO MODELS AND CONNECTIONS ARE MADE AS SHOWN ON PHONO DIAGRAMS.

UNDERWRITERS APPROVED MODELS HAVE A COMMON NEGATIVE

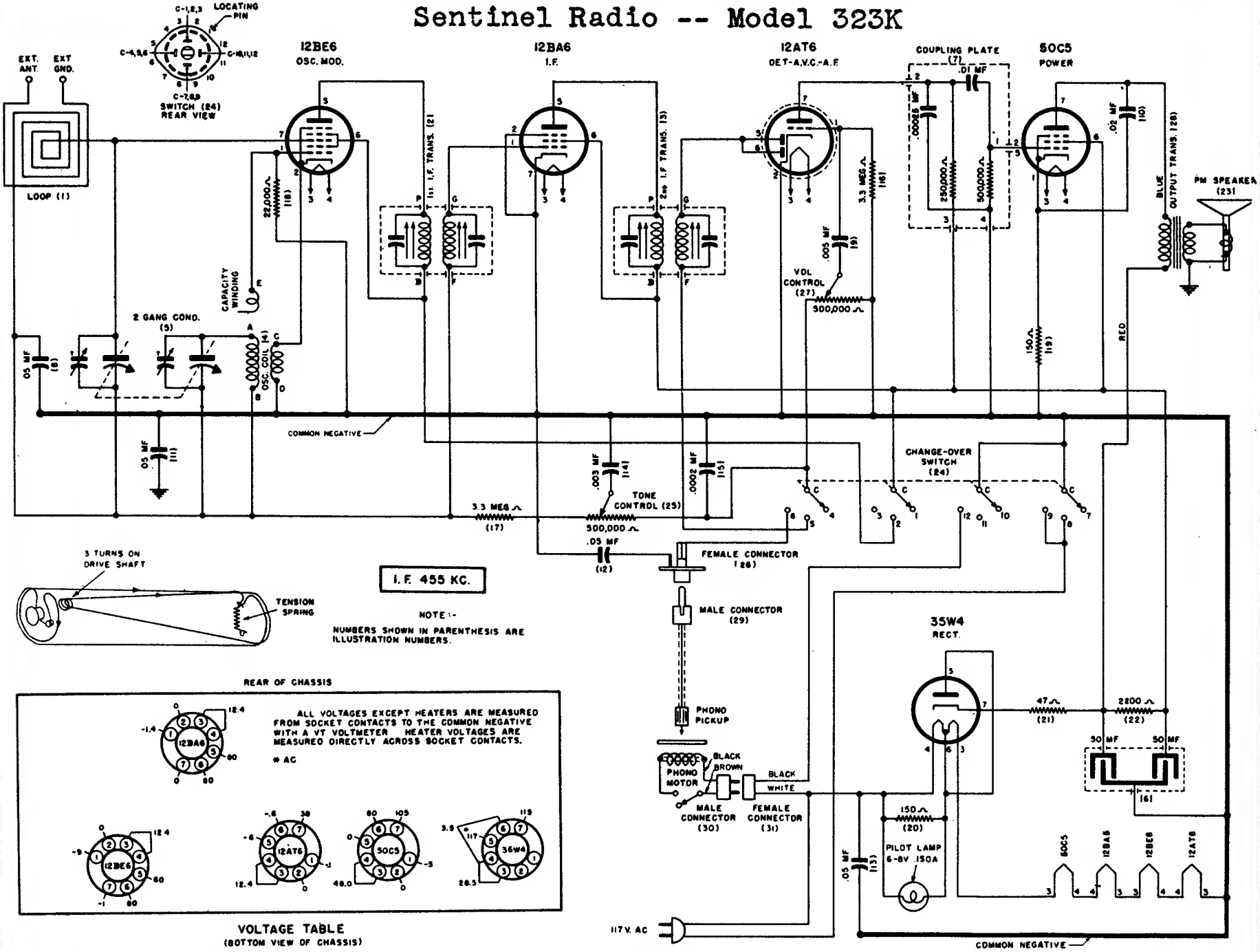
NON-UNDERWRITERS APPROVED MOOELS DO NOT HAVE PARTS 8 AND 22, AND ALL CONNECTIONS TO THE COMMON NEGATIVE ARE GROUNDED DIRECTLY TO THE CHASSIS

Sentinel Radio

MODELS
314W, 314-I, and 314E
1U-314W, 1U-314-I, and 1U-314E

MANUAL OF 1949 MOST-OFTEN-NEEDED RADIO DIAGRAMS

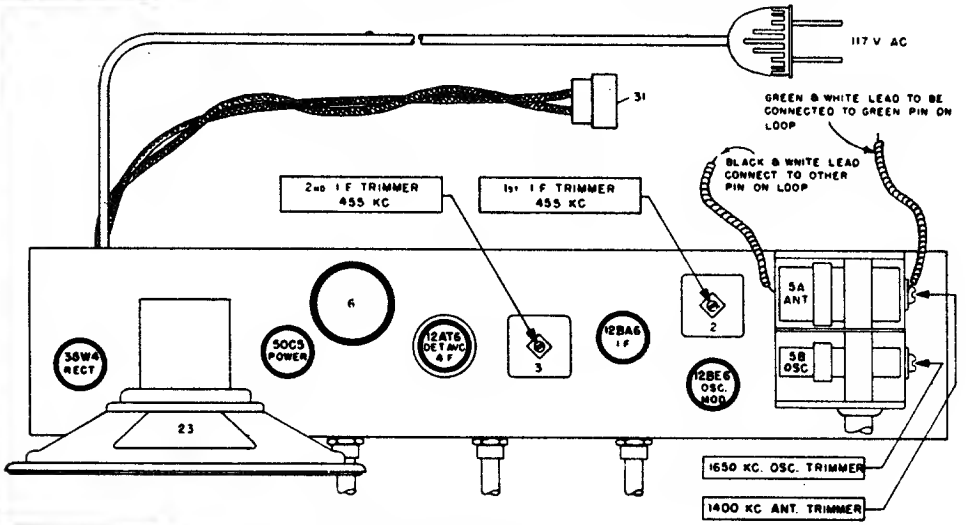
Sentinel Radio -- Model 323K

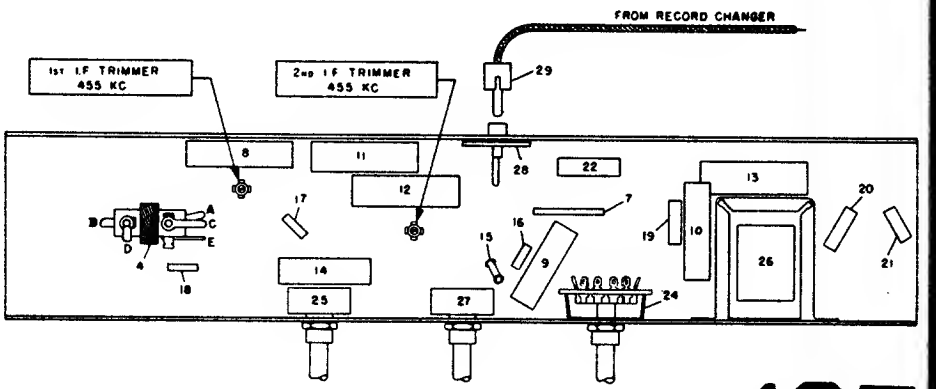


ALIGNMENT (C) Couple test oscillator to receiver loop by: (1) make loop consisting of 5 to 10 turns of No. 20 to No. 30 size wire, wound on a 2" or 3" form; (2) connect this loop across output of test oscillator; (3) place test oscillator loop near radio loop. BE SURE THAT NEITHER LOOP MOVES WHILE ALIGNING.

ALIGNMENT (C) Couple test oscillator to receiver loop by: (1) make loop consisting of 5 to 10 turns of No. 20 to No. 30 size wire, wound on a 2" or 3" form; (2) connect this loop across output of test oscillator; (3) place test oscillator loop near radio loop. BE SURE THAT NEITHER LOOP MOVES WHILE ALIGNING.

Steps	Set receiver dial to:	TEST OSCILLATOR			Refer te parts layout diagram for location of trimmers mentioned below:
		Adjust test esciliator frequency te:	Use dummy antenna in series with output of test escillater consisting of:	Attach eutput of test oscillator to:	
1	Any point where no interfering signal is received	455 K. C.	.02 MFD. See Paragraph (C) Above	High side to rear stator plates of tuning condenser. Low side to frame of condenser through a .02 Mfd. blocking condenser.	Adjust each of the second I. F. transformer trimmers for maximum output—then adjust each of the first I. F. trimmers for maximum output.
2	Exactly 1650 K. C.	Exactly 1650 K. C.	See Paragraph (C) Above	See Paragraph (C) Above	Adjust 1650 K. C. oscillator trimmer for maximum output.
3	Approx. 1400 K. C.	Approx. 1400 K. C.	See Paragraph (C) Above	See Paragraph (C) Above	Adjust 1400 K. C. antenna trimmer for maximum output.





Sonora

Model 102

IR5 CONVERTER

IU4 I.F.

IU5 DIODE AUDIO

3V4 OUTPUT

ALIGNMENT PROCEDURE

GENERAL DATA. The alignment of this receiver requires the use of a test oscillator that will cover the frequencies of 455, 600, 1400 and 1620 KC and an output meter to be connected across the primary or secondary of the output transformer. If possible, all alignments should be made with the volume control on maximum and the test oscillator output as low as possible to prevent the AVC from operating and giving false readings.

CORRECT ALIGNMENT PROCEDURE. The intermediate frequency (I.F.) stages should be aligned properly as the first step. After the I.F. transformers have been properly adjusted and peaked, the broadcast band should be adjusted.

I.F. ALIGNMENT: Remove the chassis and batteries from the cabinet and remove the bottom enclosure plate from the chassis. With the gang condenser set at minimum, adjust the test oscillator to 455 KC and connect the output to the grid of the first detector tube (1R5) through a .05 or .1 MFD condenser. The ground of the test ascillator should be connected to the buss. Align all four I.F. slugs to peak or maximum reading on the output meter. Each I.F. has an adjustment at the top and bottom of the can. The peaks on the slugs must be the ones farthest out of the coils.

R.F. ALIGNMENT: Place the cabinet on its face and open cabinet back to a 90° angle. Lay a board across the body of cabinet ahead of the loop. Replace the bottom chassis enclosure and set the chassis and batteries on the board so that they occupy the same relative position to the loop as they do in the cabinet. Care should be taken to have no iron or other metal near the loop.

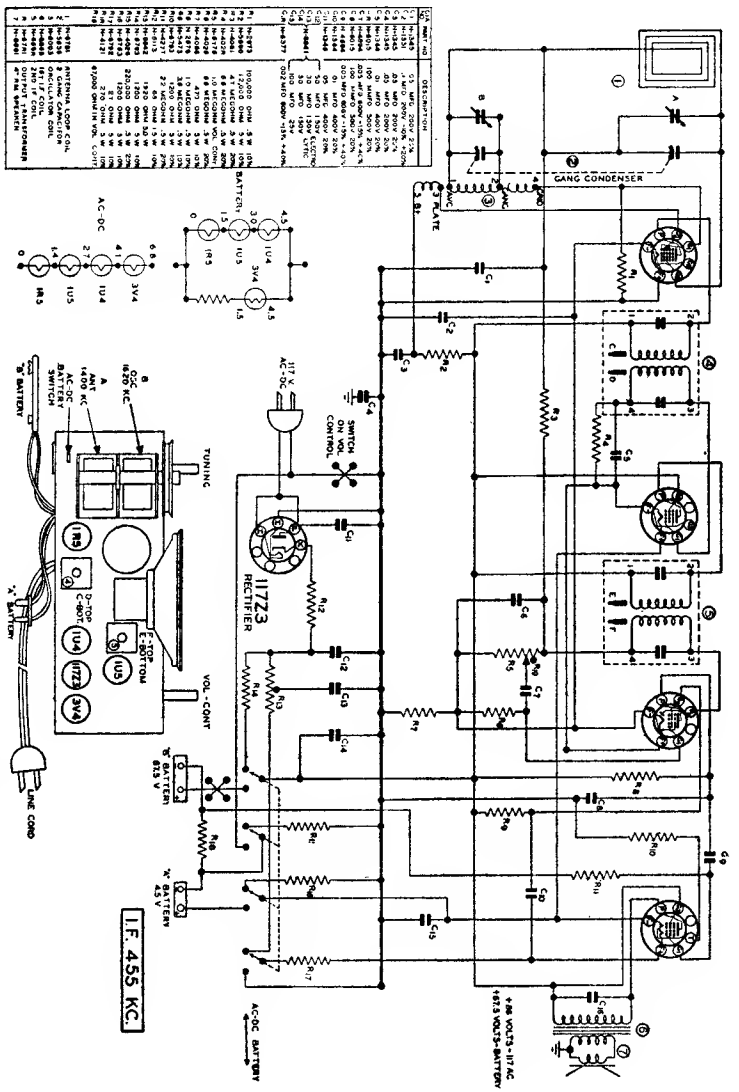
Connect the test oscillator to a dummy loop which can be made by coiling 2 turns of hookup wire about 6" in diameter. Place this dummy loop about a foot from the loop on the receiver and in the same plane as the receiver loop. With the gang condenser set at minimum capacity, set the test oscillator at 1620 KC, and adjust the oscillator (or 1620 KC trimmer) on the gang condenser. Next set the test oscillator at 1400 KC, and tune in the signal on the gang condenser. Adjust the antenna trimmer (or 1400 KC trimmer) for maximum signal. Next set the test oscillator at 600 KC, and tune in signal on condenser to check alignment of coils.

BATTERY. To operate this receiver on battery, it will first be necessary to insert one prong of power cord plug into the switch through the slot located at the lower left hand corner of the top of the Chassis Base.

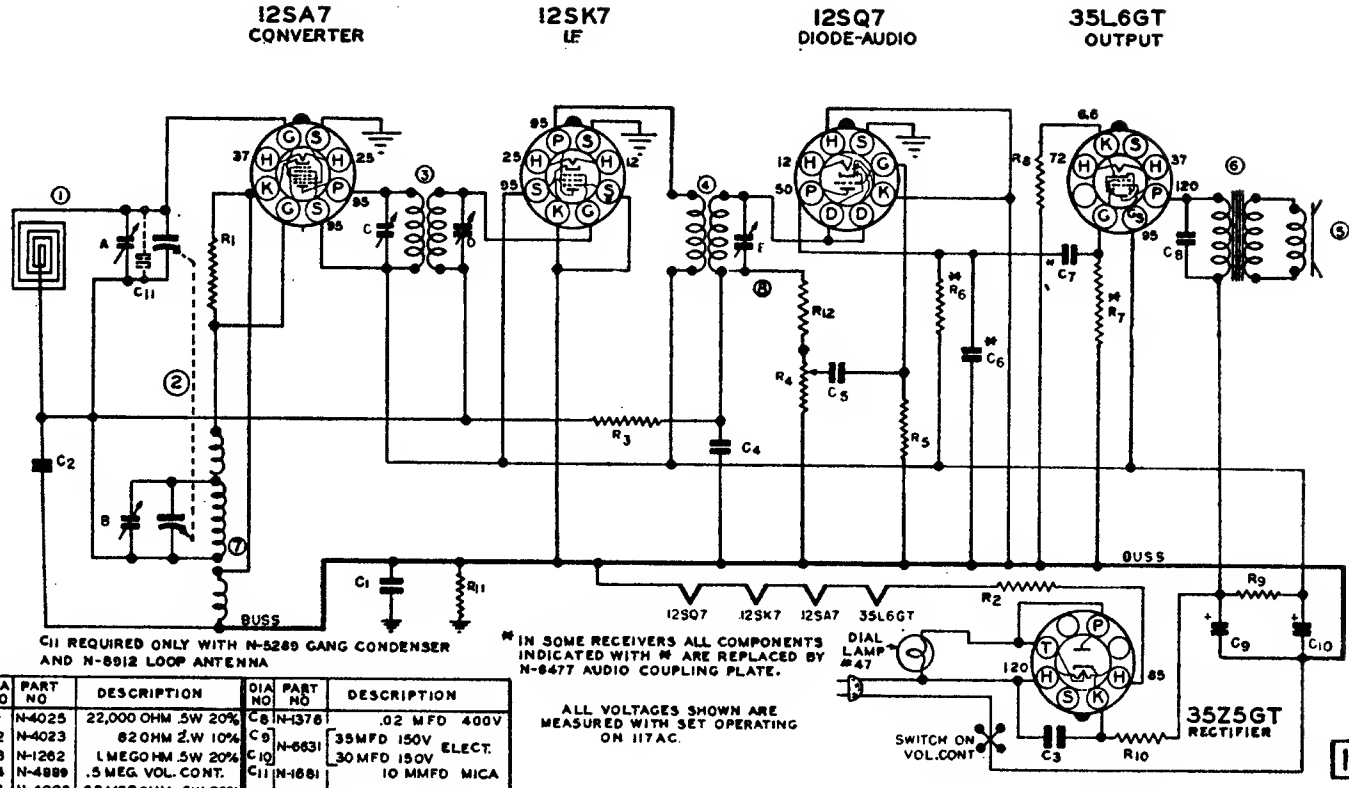
Before installing new batteries or replacing old ones, turn the volume control to the extreme left or "OFF" position, then the following sequence should be followed. Attach the connector with the snap-on fasteners to the "B" battery (67½ V.) and insert battery into left side of battery compartment as viewed from rear of cabinet so that the connector faces the rear of cabinet. Insert the prongs of the other battery connector into the socket of the "A" battery (4½ V.) and place battery into cabinet so that the socket of the "A" battery faces the "B" battery.

This receiver will accommodate any of the batteries listed below:

Manufacturer	Manufacturer's Type Number "A" Battery	"B" Battery
National Carbon	**746**	**467**
General Dry Battery	**3H3**	**W45A**
Ray-O-Vac	**P83A**	**4367**
Burgess Battery	**G3**	**XX45**



MANUAL OF 1949 MOST-OFTEN-NEEDED RADIO DIAGRAMS



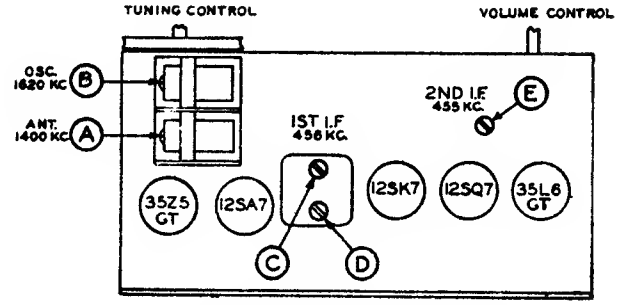
C11 REQUIRED ONLY WITH N-5289 GANG CONDENSER AND N-8912 LOOP ANTENNA

* IN SOME RECEIVERS ALL COMPONENTS INDICATED WITH * ARE REPLACED BY N-8477 AUDIO COUPLING PLATE.

ALL VOLTAGES SHOWN ARE MEASURED WITH SET OPERATING ON 117 AC.

DIA NO	PART NO	DESCRIPTION
R1	N-4025	22,000 OHM .5W 20%
R2	N-4023	82 OHM 2W 10%
R3	N-1262	1 MEGOHM .5W 20%
R4	N-4889	.5 MEG. VOL. CONT.
R5	N-4028	68 MEGOHM .5W 20%
R6	N-4026	220,000 OHM .5W 20%
R7	N-4027	470,000 OHM .5W 20%
R9	N-4024	220 OHM .5W 10%
R8	N-5358	1000 OHM 1.0W 10%
R10	N-4022	33 OHM .5W 20%
R11	N-4028	220,000 OHM .5W 20%
R12	N-4063	47,000 OHM .5W 20%
C1	N-1345	.06 MFD 200V
C2	N-1345	.05 MFD 200V
C3	N-1346	.05 MFD 400V
C4	N-1374	100 M MFD MICA
C5	N-4894	.005 MFD 600V
C6	N-4890	.0005 MFD 600V
C7	N-1344	.01 MFD 400V

DIA NO	PART NO	DESCRIPTION
C8	N-1376	.02 MFD 400V
C9, C10	N-6631	35 MFD 150V ELECT. 30 MFD 150V
C11	N-1681	10 MMFD MICA
1	N-6629	ANTENNA LOOP COIL
2	N-5836	2 GANG CONDENSER
	OR	
1	N-6812	ANTENNA LOOP COIL
2	N-5286	2 GANG CONDENSER
3	N-4813	IST I.F TRANSFORMER
4	N-4846	2ND I.F TRANSFORMER
5	N-4318	4" P.M SPEAKER
6	N-3899	OUTPUT TRANSF.
7	N-4810	OSCILLATOR COIL
8	N-4048	TRIMMER
	#47	DIAL LAMP



TUBE AND TRIMMER LOCATIONS

5 TUBE AC-DC

Sonora
Clear as a Bell

Model 100

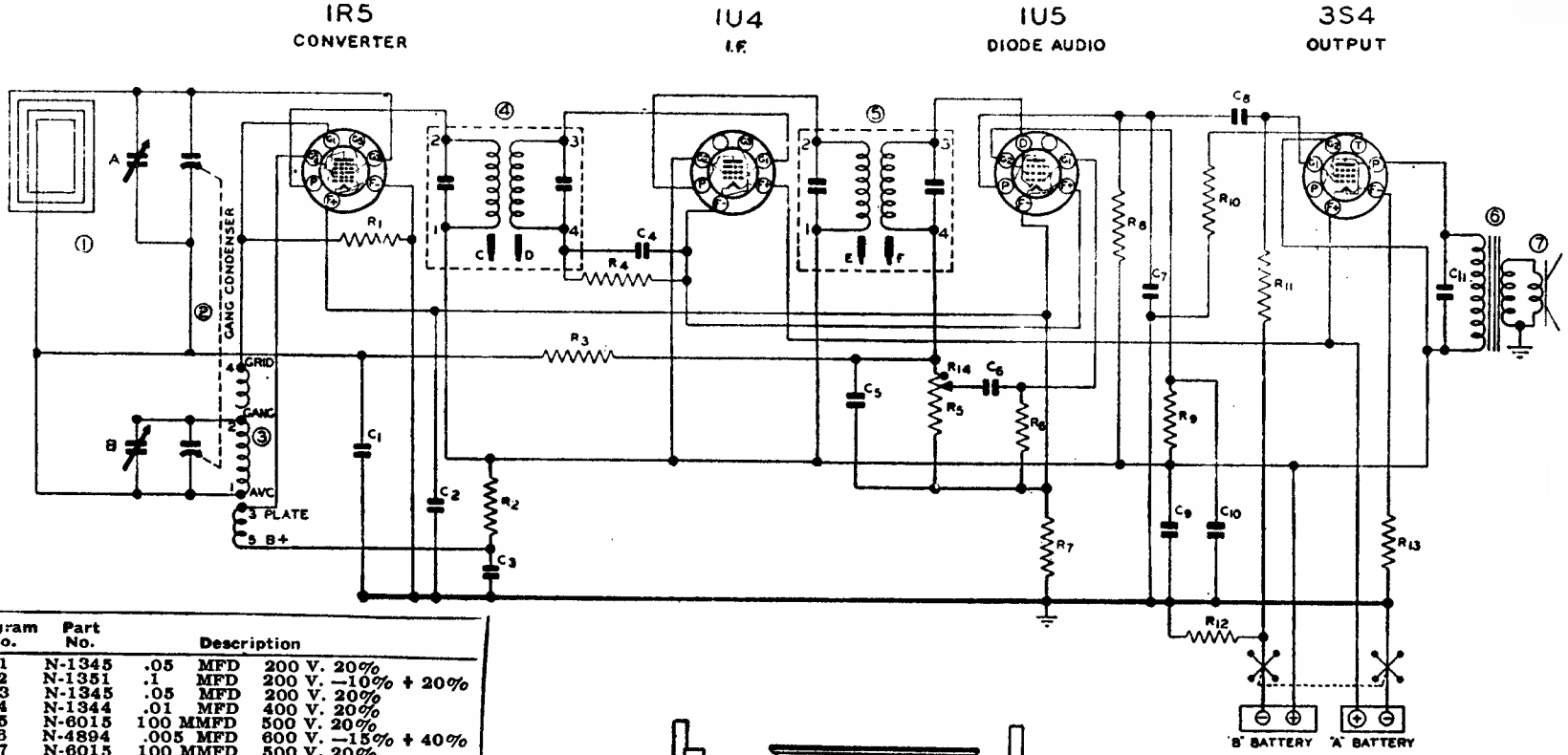
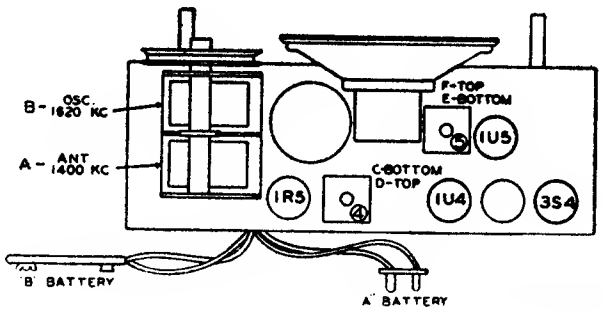


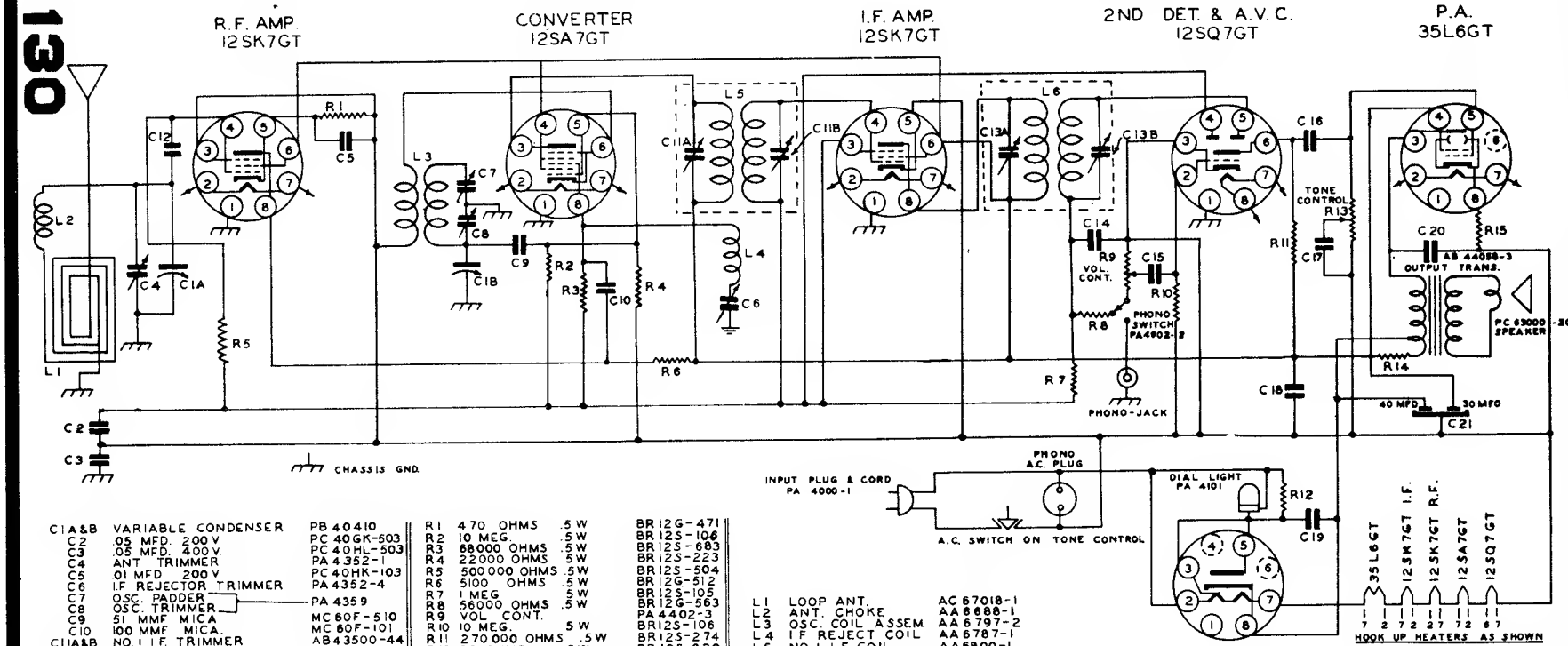
Diagram No.	Part No.	Description
C1	N-1345	.05 MFD 200 V. 20%
C2	N-1351	.1 MFD 200 V. —10% + 20%
C3	N-1345	.05 MFD 200 V. 20%
C4	N-1344	.01 MFD 400 V. 20%
C5	N-6015	100 MMFD 500 V. 20%
C6	N-4894	.005 MFD 600 V. —15% + 40%
C7	N-6015	100 MMFD 500 V. 20%
C8	N-4894	.005 MFD 600 V. —15% + 40%
C9	N-1367	6 MFD 150 V. Electrolytic
C10	N-1344	.01 MFD 400 V. 20%
C11	N-6377	.002 MFD 600 V. —15% + 40%
R1	N-2973	100,000 Ohm .5 W. 10%
R2	N-5690	12,000 Ohm .5 W. 10%
R3	N-4061	4.7 Megohm .5 W. 20%
R4	N-4028	6.8 Megohm .5 W. 20%
R5	N-6779	1.0 Megohm Volume Control
R6	N-4028	6.8 Megohm .5 W. 20%
R7	N-4279	820 Ohm .5 W. 10%
R8	N-1262	1.0 Megohm .5 W. 20%
R9	N-5473	3.9 Megohm .5 W. 10%
R10	N-6793	1,200 Ohm .5 W. 10%
R11	N-4277	2.2 Megohm .5 W. 20%
R12	N-4228	680 Ohm .5 W. 10%
R13	N-6792	27 Ohm .5 W. 10%
R14		47,000 Ohm (In Volume Control)
1	N-6781	Antenna Loop Coil
2	N-5986	2 Gang Capacitor
3	N-6003	Oscillator Coil
4	N-6865	Coil, 1st I.F.
5	N-6866	Coil, 2nd I.F.
6	N-6791	Output Transformer
7	N-6681	4" PM Speaker



I.F. 455 KC.

Sonora Radio
Clear as a Bell

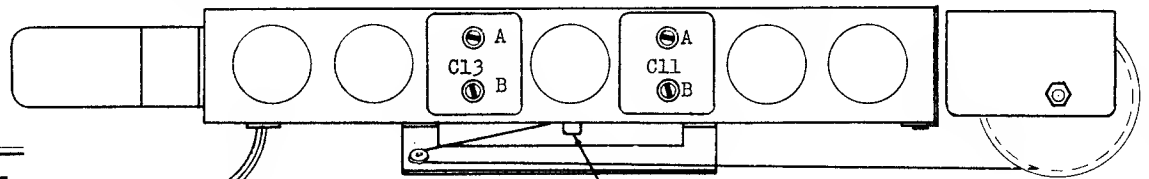
Model 101

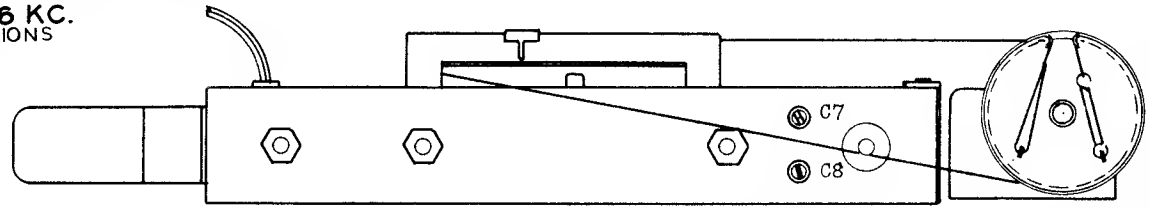


C1A&B	VARIABLE CONDENSER	PB 40410
C2	.05 MFD. 200 V.	PC 40GK-503
C3	.05 MFD. 400 V.	PC 40HL-503
C4	ANT. TRIMMER	PA 4352-1
C5	.01 MFD. 200 V.	PC 40HK-103
C6	I.F. REJECTOR TRIMMER	PA 4352-4
C7	OSC. PADDER	PA 4359
C8	OSC. TRIMMER	
C9	51 MMF MICA	MC 60F-510
C10	100 MMF MICA.	MC 60F-101
C11A&B	NO. 1 I.F. TRIMMER	AB 43500-44
C12	150 MMF MICA.	MC 60F-151
C13A&B	NO. 2 I.F. TRIMMER	AB 43500-45
C14	510 MMF. MICA.	MC 60G-511
C15	.01 MFD. 200 V.	PC 40HK-103
C16	.01 MFD. 200 V.	PC 40HK-103
C17	.001 MFD. 400 V.	PC 40GL-102
C18	.1 MFD. 200 V.	PC 40HK-104
C19	.05 MFD. 400 V.	PC 40HL-503
C20	.03 MFD. 400 V.	PC 40GL-303
C21	40-30 MFD. ELECT COND.	PA 4304-1

R1	470 OHMS .5 W	BR 12G-471
R2	10 MEG. .5 W	BR 12S-106
R3	68000 OHMS .5 W	BR 12S-683
R4	22000 OHMS .5 W	BR 12S-223
R5	500000 OHMS .5 W	BR 12S-504
R6	5100 OHMS .5 W	BR 12G-512
R7	1 MEG .5 W	BR 12S-105
R8	56000 OHMS .5 W	BR 12G-563
R9	VOL CONT.	PA 4402-3
R10	10 MEG. .5 W	BR 12S-106
R11	270,000 OHMS .5 W	BR 12S-274
R12	82 OHMS .5 W	BR 12S-820
R13	TONE CONT. & .5 W	PA 4400-2
R14	1200 OHMS 1 W	CR 12S-122
R15	180 OHMS 5 W	BR 12S-181

L1	LOOP ANT.	AC 67018-1
L2	ANT. CHOKE	AA 6688-1
L3	OSC. COIL ASSEM.	AA 6797-2
L4	I.F. REJECT COIL	AA 6787-1
L5	NO. 1 I.F. COIL	AA 6800-1
L6	NO. 2 I.F. COIL	AA 6800-4

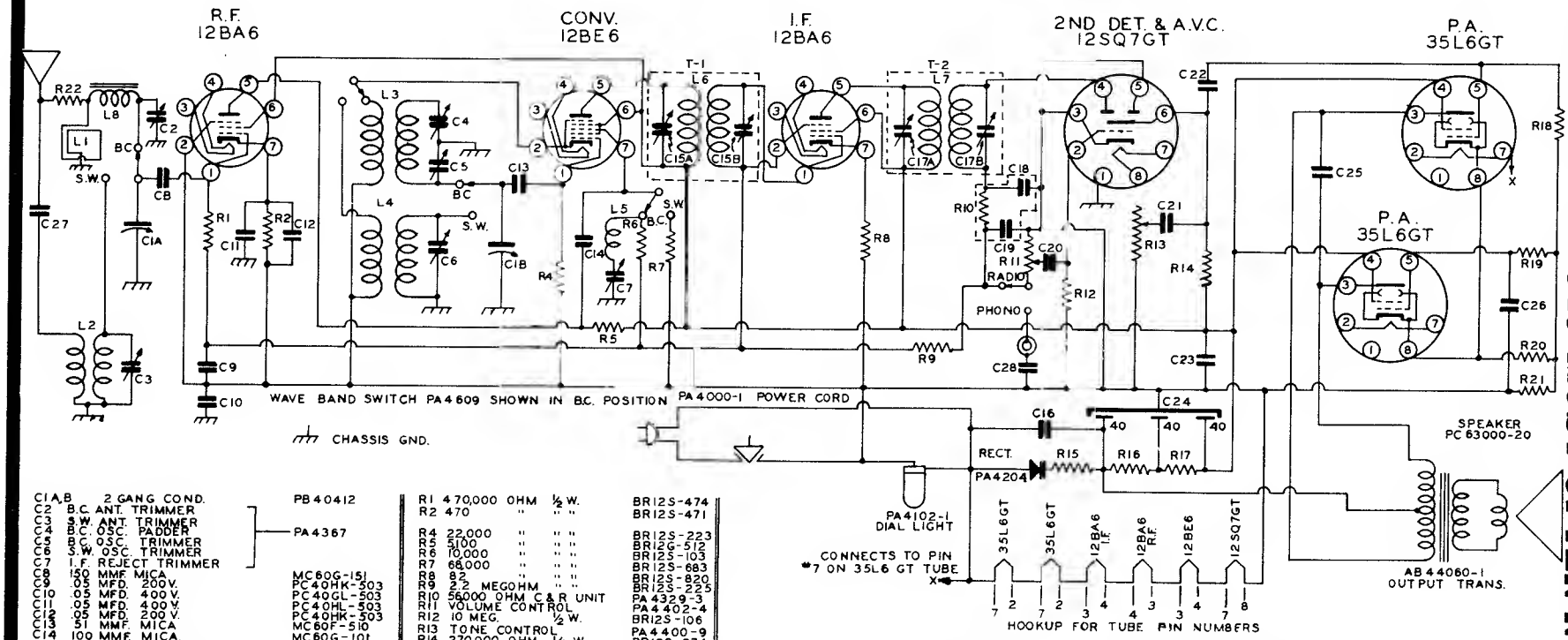




SPARKS-WITHINGTON COMPANY

SPARTON SUPERHETERODYNE MODEL 6L8
INTERMEDIATE FREQUENCY 456 KC.
BOTTOM VIEW OF ALL SOCKET CONNECTIONS

MODEL - 1030 &1030A



C1A,B	2 GANG COND.	PB40412
C2	B.C. ANT. TRIMMER	PA4367
C3	S.W. ANT. TRIMMER	
C4	B.C. OSC. PADDER	
C5	B.C. OSC. TRIMMER	
C6	S.W. OSC. TRIMMER	
C7	I.F. REJECT TRIMMER	
C8	150 MMF. MICA	MC60G-151
C9	.05 MFD. 200V.	PC40HK-503
C10	.05 MFD. 400V.	PC40GL-503
C11	.05 MFD. 400V.	PC40HL-503
C12	.05 MFD. 200V.	PC40HK-503
C13	51 MMF. MICA	MC60F-510
C14	100 MMF. MICA	MC60G-101
C15A,B	NO. 1 I.F. TRIMMER	PC40HL-503
C16	.05 MFD. 400V.	
C17A,B	NO. 2 I.F. TRIMMER	PA4329-3
C18	100 MMF.	
C19	100 MMF. C & R UNIT	
C20	.01 MFD. 200V.	PC40HK-103
C21	.005 MFD. 400V.	PC40GL-502
C22	.01 MFD. 200V.	PC40HK-103
C23	.1 MFD. 200V.	PC40HK-104
C24	40-40-40 ELECTROLYTIC	PA4300-9
C25	.006 MFD. 1000V.	PC40GN-602
C26	.01 MFD. 200V.	PC40HK-103
C27	82 MMF. MICA	MC60F-820
C28	.05 MFD. 400V.	PC40GL-503

R1	470,000 OHM ½ W.	BR12S-474
R2	470 " "	BR12S-471
R4	22,000 " "	BR12S-223
R5	5100 " "	BR12G-512
R6	10,000 " "	BR12S-103
R7	68,000 " "	BR12S-683
R8	82 " "	BR12S-820
R9	2.2 MEGOHM " "	BR12S-225
R10	56,000 OHM C & R UNIT	PA4329-3
R11	VOLUME CONTROL	PA4402-4
R12	10 MEG. ½ W.	BR12S-106
R13	TONE CONTROL	PA4400-9
R14	270,000 OHM ½ W.	BR12S-274
R15	27 " 2 W.	DR12S-270
R16	120 " 1 W.	CR12S-121
R17	1200 " 1 W.	CR12S-122
R18	1 MEG. ½ W	BR12S-105
R19	1 " "	BR12G-105
R20	100 " 1 W.	CR12S-101
R21	100 " 1 W.	CR12S-101
R22	2700 " ½ W.	BR12S-272

L1	LOOP ANT.	PB41927-1
L2	S.W. ANT. COIL	AA6758-8
L3	B.C. OSC. COIL	AA6797-3
L4	S.W. OSC. COIL	AA6753-7
L5	I.F. REJECT COIL	AA6787-1
L6	NO. 1 I.F. COIL	AA6800-1
L7	NO. 2 I.F. COIL	AA6800-2
L8	ANT. CHOKE COIL	AA6686-4

T1	NO. 1 I.F. TRANSFORMER ASSEM.	AB43502-24
T2	NO. 2 I.F. TRANSFORMER ASSEM.	AB43502-25

SERVICE NOTE: THESE TRANSFORMERS SUPPLIED IN COMPLETE ASSEMBLIES ONLY.

SPARTON SUPERHETERODYNE MODEL 6B9
INTERMEDIATE FREQUENCY 456 KC.
BOTTOM VIEW OF ALL SOCKET CONNECTIONS

Line Voltage: 117 Volts AC

Position of Volume Control: Full with set tuned to quiet channel.
Position of Band Switch: B.C.

TUBE	FUNCTION	Voltage of Socket Prongs to B- See Prong Nos. on Schematic.								
		No. 1	No. 2	No. 3	No. 4	No. 5	No. 6	No. 7	No. 8	G.Cap
35L6	P.A.	0	80*	82	90	0.25	117*	117*	11	
35L6	P.A.	0	80*	82	90	0.25	5.6	48*	11	
12 SQ 7	1st Audio,Det. & A.V.C.	0	-0.6	0	-0.5	0	61	12*	0	
12 BA 6	I.F. AMP.	0	0	48*	36*	90	90	0.8	-	
12 BA 6	R.F. AMP.	0	0	24*	36*	75	90	2.3	-	
12 BE 6	CONV. & OSC.	-3.8	0	24*	12*	90	90	0	-	

* AC Volts.
** Cannot be measured with 20,000 ohms per volt voltmeter.

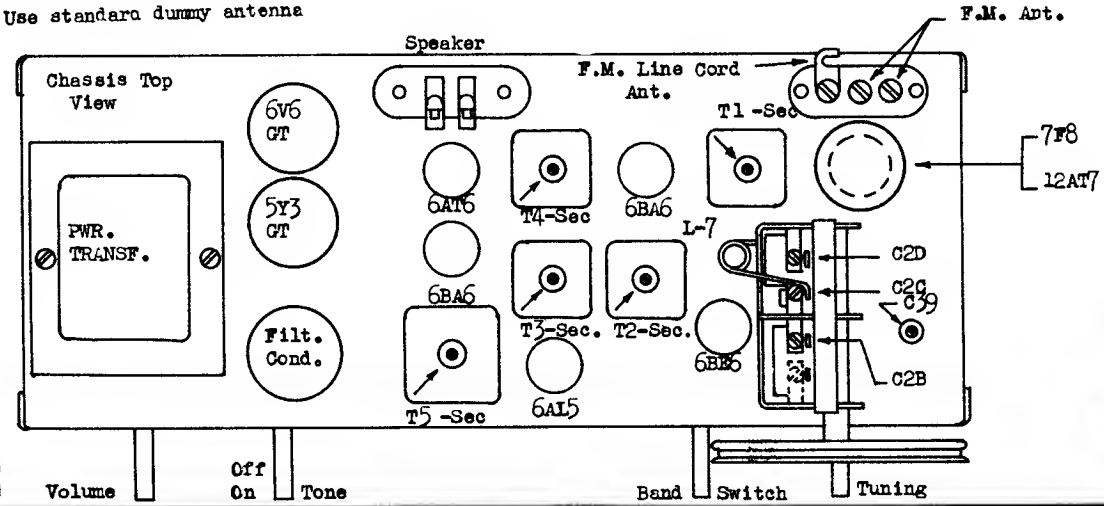
Sparton Superheterodyne

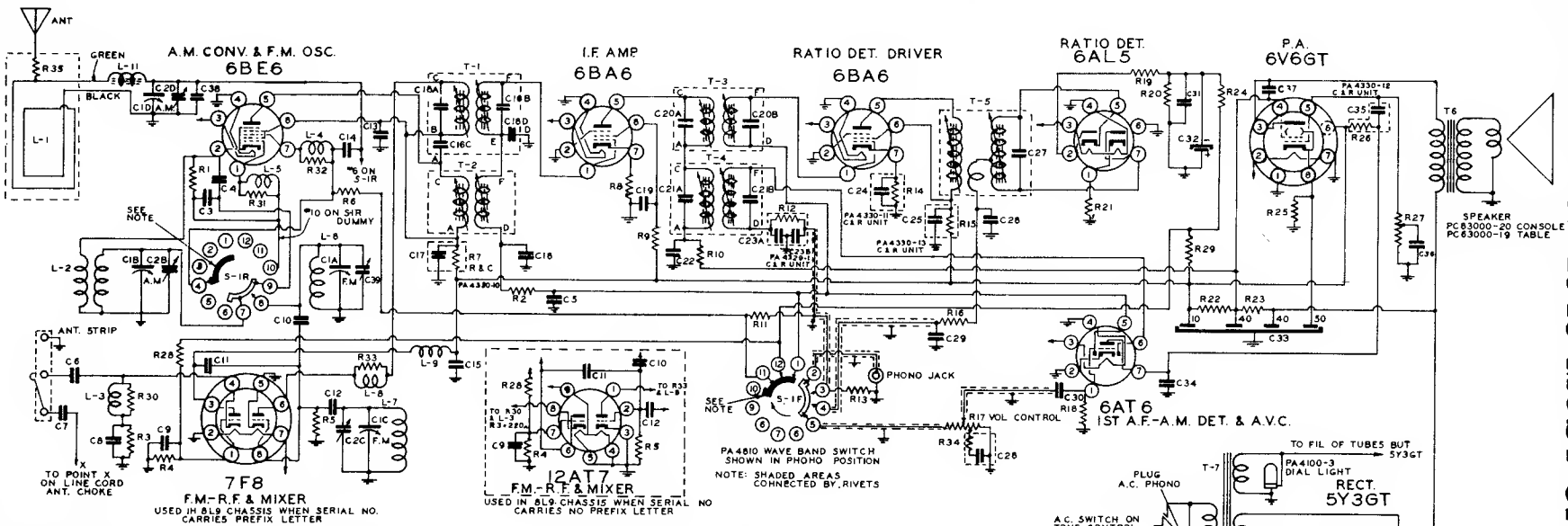
CHASSIS - 8L9
MODEL - 121, 1058, 1059, 1060
1061, 1064, 1072

STEP BY STEP ALIGNMENT PROCEDURE

OPER-ATION	ALIGNMENT OF	GENERATOR CONNECTED TO	DUMMY ANT.	GENERATOR FREQUENCY	BAND SWITCH SETTING	TUNING COND. SETTING	TRIMMER	REMARKS
1.	Set dial pointer even with left-hand stop line with condenser gang closed.							
2.	Connect output meter across speaker terminals.							
3.	A.M. - I.F.	Pin #7 of 6BE6 Conv. Tube	.02 MFD. Cond.	456 KC.	A.M.	Open	T4 Sec. Slug	Max. Reading
							T4 Pri. Slug	Max. Reading
							T2 Sec. Slug	Max. Reading
							T2 Pri. Slug	Max. Reading
4.	Repest operation #3.							
5.	A.M. - R.F.	A.M. Ant. On Cabinet	*	1500 KC.	A.M.	1500 KC.	C2B Osc. Tri.	Peak Accurstely
6.				1500 KC.		1500 KC.	C2D Ant. Tri.	Peak Accurately
7.	Repest operations #5 and #6.							
8.	Check Calibrstions at 600, 1000 and 1500 KC.							
10.	F.M. - I.F. Alignment using an A.M. Generstor and Output Meter.							
11.	T5 F.M. Ratio Det.	Pin #1 of 2nd 6BA6 Tube	.02 MFD. Cond.	10.7 MC.	F.M.	Open	T5 Sec. Slug	Max. Reading
							T5 Pri. Slug	Max. Reading
12.	NOTE: Operations 11, 13, 14, 15, 18 and 19 must be made with generator output as low as possible, consistent with a usable output meter reading.							
13.	T3 2nd F.M. - I.F.	Pin #1 1st 6AB6 Tube	.02 MFD. Cond.	10.7 MC.	F.M.	Open	T3 Sec. Slug	Max. Reading
							T3 Pri. Slug	Max. Reading
14.	T1 1st F.M. - I.F.	Pin #8 on 7F8 Conv. Tube	.02 MFD. Cond.	10.7 MC.	F.M.	Open	T1 Sec. Slug	Max. Reading
							T1 Pri. Slug	Max. Reading
15.	Adjust secondary slug on T5 rstio detector traneformer to minimum deflection or dip on output meter. Under certain conditions it is possible to adjust T5 sec. slug to minimum noise with the receiver tuned to a wesk station. This operation is very critical and the receiver must be tuned to the center response only.							
16.	F.M. - R.F. alignment using an A.M. generator with frequencies of 88 to 108 MC. and a vacuum tube voltmeter, or D.C. voltmeter. (20,000 OHMS per volt).							
17.	Place meter across C32 elect. condenser. (Meter resding approx. 1 volt.)							
18.	F.M. - R.F.	F.M. Ant.	Match Gen. to 300 OHMS	106 MC.	F.M.	106MC.	C39 Osc. Tri.	Max. A.V.C.V.
							C2C Ant. Tri.	Peak Accurately
19.	Check calibration at 88 MC.							

* Use standard dummy antenna





SPECIAL SERVICE NOTE: THESE TRANSFORMERS SUPPLIED IN COMPLETE ASSEMBLIES ONLY.

	DESCRIPTION	PART NO
C1A,C	F.M GANG CONDENSER	PC65002
C1B,D	A.M. " "	
C2C	F.M. TRIMMER ON GANG	
C2B,D	A.M. " "	
C3	30 MMF. CERAMIC	CC30H-300K
C4	2 MMF. "	CC30H-020K
C5	.02 MFD. "	HK35G-203
C6	110 MMF. CERAMIC	CC30H-111A
C7	110 MMF. "	CC30H-111A
C8	510 MMF. "	HK35G-511
C9	5000 MMF. "	HK35G-502
C10	2 MMF. "	CC30H-020K
C11	110 MMF. "	CC30H-111A
C12	110 MMF. "	CC30H-111A
C13	510 MMF. "	HK35G-511
C14	110 MMF. "	CC30H-111A
C15	10000 MMF. "	HK35G-103
C16A	(F.M PRI) & C16B (F.M SEC) I.F TRIMMERS	*
C17	.01 MFD. C&R UNIT	PA4330-10
C18	.02 MMF. CERAMIC	HK35G-203
C19	.01 MFD. DISC. TYPE	PA4334-2
C20A	(F.M PRI) C20B (F.M SEC.) I.F TRIMMERS	*
C21A	(A.M. PRI) C21B (A.M SEC) I.F TRIMMERS	*
C22	.01 MFD. 015C TYPE	PA4334-2
C23A	100 MMF. C&R UNIT	PA4329-1
C23B	100 MMF. C&R UNIT	
C24	.01 MFD C&R UNIT	PA4330-11
C25	.01 MFD. C&R UNIT	PA4330-13
C26	10,000 MMF C&R UNIT	PA4330-14
C27	.33 MMF. MICA	*
C28	1000 MMF. CERAMIC	HK35G-102
C29	1000 MMF. "	HK35G-102
C30	10,000 MMF. "	HK35G-103
C31	10000 MMF. "	HK35G-103
C32	3 MFD. 50V ELECT.	PA4308-1
C33	10-40-40-50 MFD ELECT	PA4307-4
C34	100 MMF CERAMIC	HK35F-101
C35	.02 MFD. C&R UNIT	PA4330-12
C36	10000 MMF. CERAMIC	HK35G-103
C37	.002 MFD. 1000 V.	PC40GN-202
C38	5 MMF. MICA	MC80F-05D
C39	TRIMMER F.M. OSC	PA4366

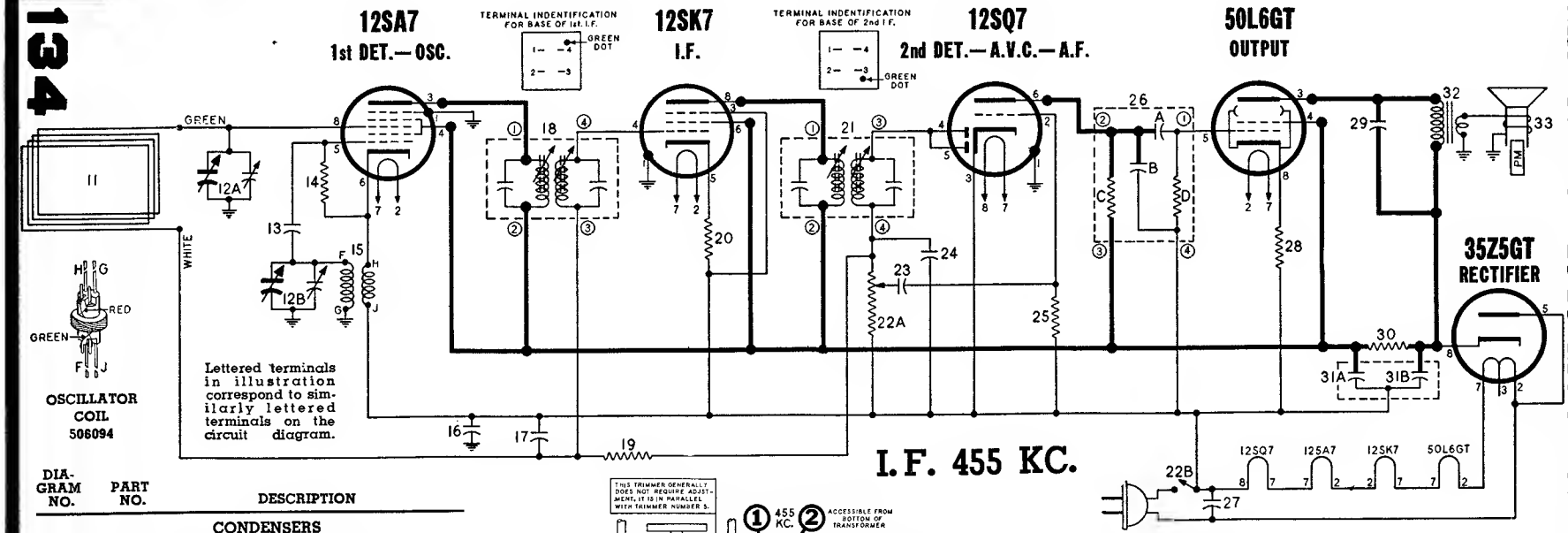
	DESCRIPTION		PART NO
R1	22,000 OHMS	½ W.	BR12S-223
R2	470,000 "	" "	BR12S-474
R3	470 "	" "	BR12S-471
R4	470,000 "	" "	BR12S-474
R5	470,000 "	" "	BR12S-474
R6	2.2 MEGOHM	" "	BR12S-225
R7	470 OHMS C&R UNIT		PA4330-10
R8	68 "	" "	BR12S-680
R9	1000 "	" "	BR12S-102
R10	1000 " C&R UNIT		PA4330-12
R11	1 MEGOHM "		BR12S-105
R12	47000 OHMS C&R UNIT		PA4329-1
R13	1 MEGOHM	½ W	BR12S-105
R14	68 OHMS C&R UNIT		PA4330-11
R15	1000 " " "		PA4330-13
R16	47000 OHMS " "		BR12S-473
R17	VOLUME CONTROL	(½ MEG)	PA4408-2
R18	15 MEGOHM	½ W	BR12S-156
R19	220 OHMS	" "	BR12S-221
R20	15,000 "	" "	BR12S-153
R21	470 "	10 "	BR12S-471
R22	3500 "	" "	PA4200-9
R23	470 "	½ W	DR12S-471
R24	220,000 OHMS	" "	BR12S-224
R25	330 "	" "	CR12S-331
R26	220,000 " C&R UNIT		PA4330-12
R27	1 MEG TONE CONTROL		PA4400-10
R28	2.2 MEGOHM	½ W	BR12S-225
R29	3.3 "	" "	BR12S-335
R30	1500 OHMS (IN L-3)	2 "	DR12S-152
R31	22 " (IN L-5)	½ "	BR12S-220
R32	22 " (IN L-4)	" "	BR12S-220
R33	820 " (IN L-8)	" "	BR12S-821
R34	22,000 OHMS C&R UNIT	½ W	PA4330-14
R35	3300 "	" "	BR12S-332

	DESCRIPTION	PART NO
L1	LOOP ANTENNA	AC67020-1
L2	B.C OSC COIL	AA8685-1
L3	100 MC. CHOKE COIL (1500 OHM FORM)	AA6798-3
L4	" " (22 " ")	AA 6798-5
L5	" " (22 " ")	AA 6798-5
L6	FM OSC. COIL	PA5200-4
L7	FM RF COIL	PA5200-5
L8	CHOKE COIL (820 OHM FORM)	AA6798-4
L9	" "	AA8798-2
L10	LINE CORD ANT CHOKE	AA8864-1
L11	ANT CHOKE COIL	AA6886-5
T1	NO 1 FM-I F TRANS	AA6667-2
T2	NO 1 A M-I F "	AA 6668-5
T3	NO 2 FM-I F "	AA6667-4
T4	NO 2 A.M.-I F "	AA6668-2
T5	RATIO DET.	AA6664-1
T6	OUTPUT TRANS	AB44061-1
T7	POWER "	AB44013-1

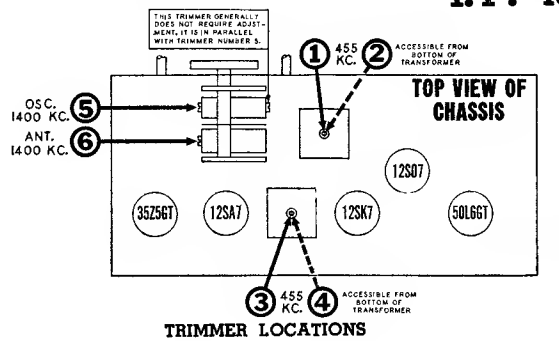
Sparton Superheterodyne

CHASSIS - 8L9

MODEL - 121, 1058, 1059, 1060
1061, 1064, 1072



DIA-GRAM NO.	PART NO.	DESCRIPTION
		CONDENSERS
12-A, B.	506081	Condenser—variable gang (with drum)
13	502931	Condenser—mica 100 Mmfd. 500 volt
16	502158	Condenser—.15 Mfd. 400 volt
17	502153	Condenser—.05 Mfd. 200 volt
23	504726	Condenser—.01 Mfd. 200 volt
24	502931	Condenser—mica 100 Mmfd. 500 volt
26-A	505858	Condenser—ceramic .005 Mfd. 450 volt (part of audio coupling unit)
28-B	505858	Condenser—ceramic 250 Mmfd. 450 volt (part of audio coupling unit)
27	502154	Condenser—.05 Mfd. 600 volt
29	504726	Condenser—.01 Mfd. 200 volt
31-A, B.	506090	Condenser—electrolytic A—20 Mfd. 150 volt B—30 Mfd. 150 volt
		RESISTORS
14	510061	Resistor—carbon 22,000 Ohms ¼ watt
19	510094	Resistor—carbon 3.3 Meg. ¼ watt
20	510022	Resistor—carbon 150 Ohms ¼ watt
22-A, B.	506087	Volume control 1 Meg. (with switch)
25	510097	Resistor—carbon 10 Meg. ¼ watt
26-C, D.	505858	Resistor—carbon 470,000 Ohms 1/5 watt (part of audio coupling unit)
28	510128	Resistor—carbon 330 Ohms ½ watt
30	510243	Resistor—carbon 2,200 Ohms 1 watt
		OTHER ELECTRICAL PARTS
11	506088	Loop antenna and cabinet back
15	506094	Coil—oscillator
18	506083	Transformer—1st I.F.
21	506084	Transformer—2nd I.F.
26	505858	Audio coupling unit A—Condenser—ceramic .005 Mfd. 450 volt B—Condenser—ceramic 250 Mmfd. 450 volt C—Resistor—carbon 470,000 Ohms 1/5 watt D—Resistor—carbon 470,000 Ohms 1/5 watt
32	506089	Transformer—output
33	506079	Speaker—P.M. dynamic (4 inch)

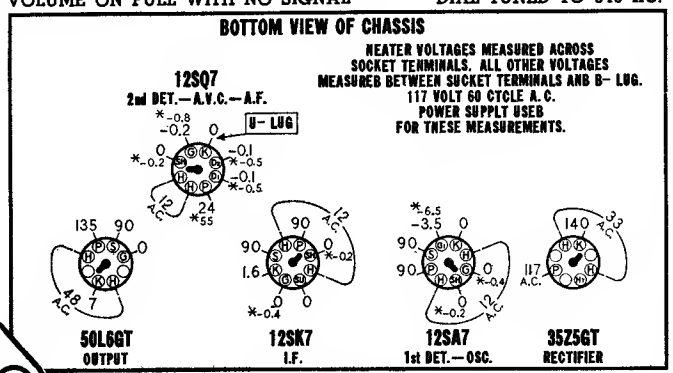


TRIMMER LOCATIONS

SOCKET VOLTAGES

Measured with voltmeter having sensitivity of 1000 ohms per volt except where indicated by (*). The (*) symbol designates a vacuum tube voltmeter measurement.

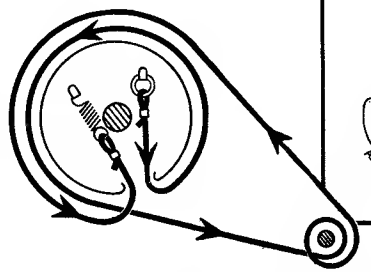
VOLUME ON FULL WITH NO SIGNAL — DIAL TUNED TO 540 KC.



DIAL AND POINTER DRIVE CORD ARRANGEMENT

To string dial cord, turn the main drive drum to maximum counter - clockwise position and use following parts:

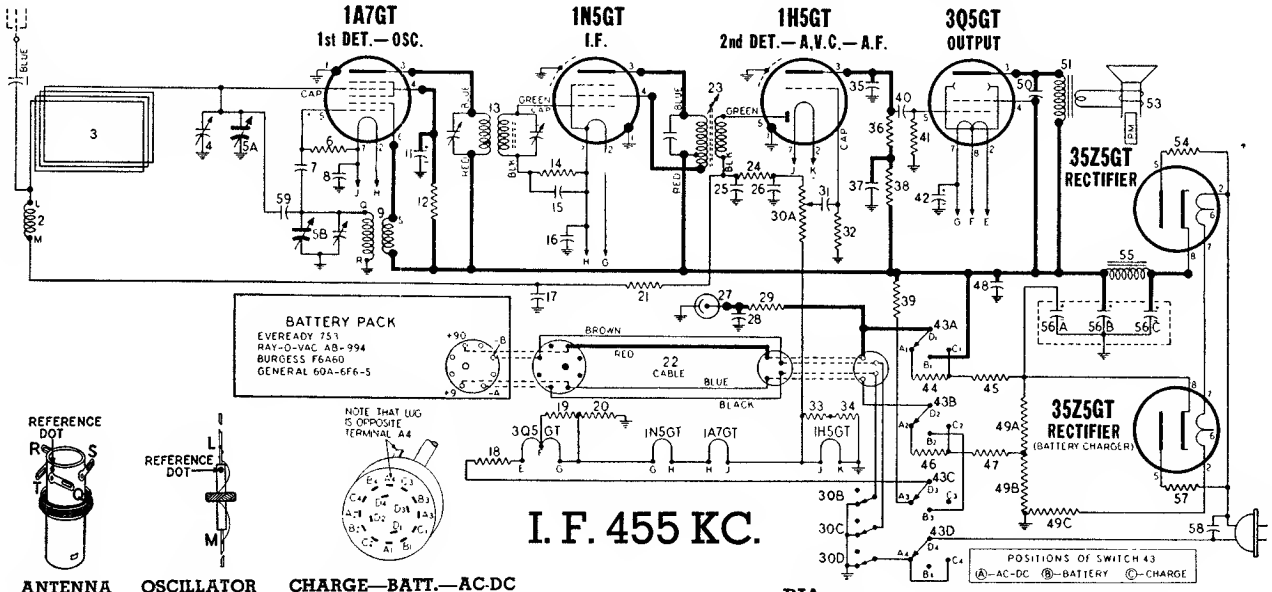
114955 Clip on end of cord
117057 Cord (2 feet)
119087 Ring for dial cord
5C5161 Tension Spring



STEWART-WARNER MODELS [C51T1 9045-A] & [C51T2 9045-B]

MANUAL OF 1949 MOST-OFTEN-NEEDED RADIO DIAGRAMS

STEWART-WARNER MODELS [A61P1 9036-A][A61P2 9036-B][A61P3 9036-C]



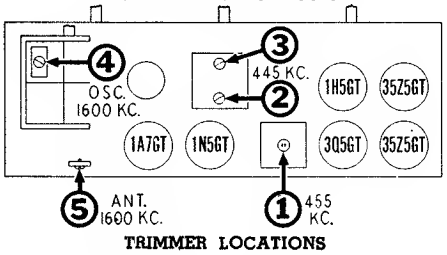
ANTENNA COIL 505781

OSCILLATOR COIL 502498

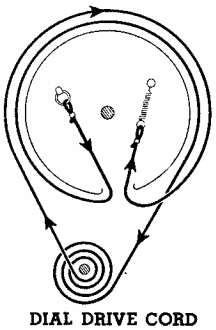
CHARGE—BATT.—AC-DC SWITCH 502526

Lettered terminals in illustrations correspond to similarly lettered terminals on the circuit diagram.

TOP VIEW OF CHASSIS



TRIMMER LOCATIONS



DIAL DRIVE CORD ARRANGEMENT

To string dial cord, set gang condenser to fully open position and use following parts:

114955	Clip on end of cord
117057	Cord (3 feet)
119087	Ring for dial cord
161384	Tension Spring

INDICATOR LAMP

The flashing neon lamp on the dial face indicates condition of batteries. This lamp is included in an oscillating (R-C) circuit which is designed to oscillate at approximately 3 pulses per second when batteries are in a fully charged condition. As the battery voltage decreases with use, number of pulses per second decreases.

Measured with voltmeter having sensitivity of 1000 ohms per volt except where indicated by (*). The (*) symbol designates a vacuum tube voltmeter measurement.

VOLUME ON FULL WITH NO SIGNAL — DIAL TUNED TO 540 KC.

"CHARGE—BATT.—AC-DC" SWITCH IN "AC-DC" POSITION

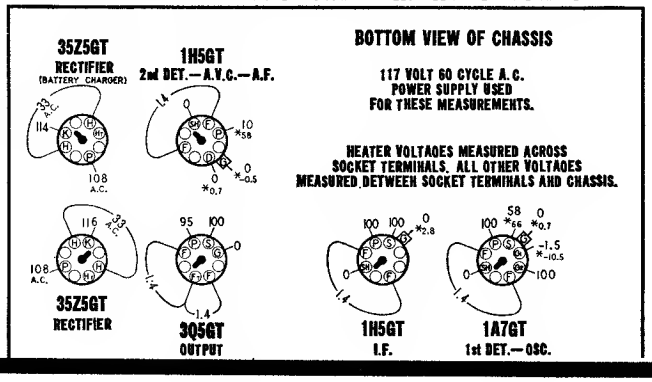
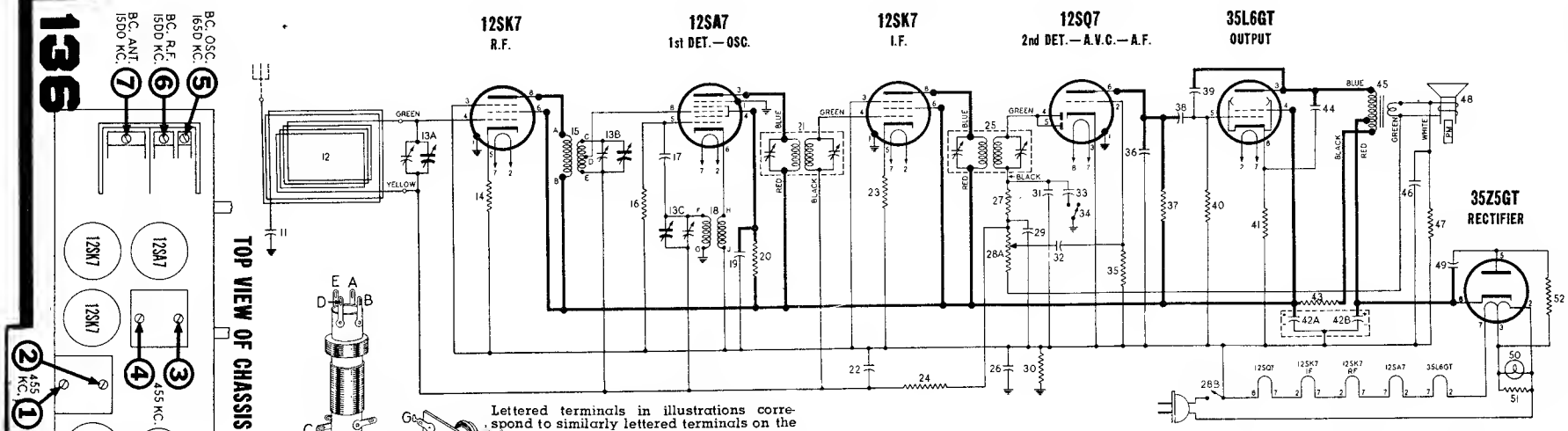
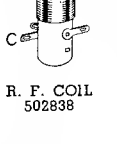
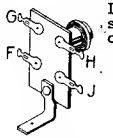


DIAGRAM NO.	PART NO.	DESCRIPTION
		CONDENSERS
1	502160	Condenser—110 Mmfd. 500 volt
4-A, B	502494	Condenser—variable gang (with drum)
5	119132	Condenser—trimmer 2 to 15 Mmfd.
7	502159	Condenser—mica 50 Mmfd. 500 volt
8	502153	Condenser—.05 Mfd. 200 volt
11	502547	Condenser—electrolytic 4 Mfd. 150 volt
15	502153	Condenser—.05 Mfd. 200 volt
16	502155	Condenser— .1 Mfd. 200 volt
17	502153	Condenser—.05 Mfd. 200 volt
25, 26	502159	Condenser—mica 50 Mmfd. 500 volt
28	502155	Condenser— .1 Mfd. 200 volt
31	502156	Condenser—.004 Mfd. 400 volt
35	502160	Condenser—mica 110 Mmfd. 500 volt
37	502155	Condenser— .1 Mfd. 200 volt
40	502151	Condenser—.01 Mfd. 400 volt
42	502527	Condenser—electrolytic 50 Mfd. 25 volt
48	502155	Condenser— .1 Mfd. 200 volt
50	502453	Condenser—.002 Mfd. 400 volt
56-A, B, C	500714	Condenser—electrolytic A—20 Mfd. 150 volt B—20 Mfd. 200 volt C—20 Mfd. 200 volt
58	502153	Condenser—.05 Mfd. 200 volt
59	502411	Condenser—2 Mmfd. 500 volt
		RESISTORS
6	502133	Resistor—carbon 220,000 ohms 1/4 watt
12	504710	Resistor—carbon 33,000 ohms 1/4 watt.
14	502136	Resistor—carbon 10 Meg. 1/4 watt
18	502455	Resistor—carbon 27 ohms 1/4 watt
19	502457	Resistor—carbon 330 ohms 1/4 watt
20	502458	Resistor—carbon 430 ohms 1/4 watt
21	502269	Resistor—carbon 3.3 Meg. 1/4 watt
24	502132	Resistor—carbon 100,000 ohms 1/4 watt
29	502269	Resistor—carbon 3.3 Meg. 1/4 watt
30-A,B,C,D	502525	Volume control 1 Meg. (with switch)
32	502269	Resistor—carbon 3.3 Meg. 1/4 watt
33, 34	502456	Resistor—carbon 220 ohms 1/4 watt
36	502268	Resistor—carbon 1 Meg. 1/4 watt
38	502134	Resistor—carbon 470,000 ohms 1/4 watt
39	500712	Resistor—wire wound 1830 ohms 5 watt
41	502135	Resistor—carbon 2.2 Meg. 1/4 watt
44	502266	Resistor—carbon 15,000 ohms 1/4 watt.
45	502459	Resistor—carbon 6800 ohms 1/4 watt
46	502457	Resistor—carbon 330 ohms 1/4 watt
47	502455	Resistor—carbon 27 ohms 1/4 watt
49-A, B, C	500715	Resistor—wire wound A—1460 ohms 10 watt B— 155 ohms 1 watt C— 310 ohms 10 watt
54	502454	Resistor—wire wound 47 ohms 1 watt
57	502454	Resistor—wire wound 47 ohms 1 watt
		COILS AND TRANSFORMERS
2	505781	Coil—antenna (series)
3	505440	Loop antenna
9	502498	Coil—oscillator
13	502495	Transformer—1st I.F.
23	500749	Transformer—2nd I.F.
51	502902	Trans.—output for A-502491 speaker
	502492	Trans.—output for R-502491 speaker
55	502528	Filter choke





R. F. COIL
502838



OSC. COIL
507211

Lettered terminals in illustrations correspond to similarly lettered terminals on the circuit diagram.

STEWART-WARNER MODELS [B61T1 9046-A] [B61T2 9046-B]

ALIGNMENT PROCEDURE

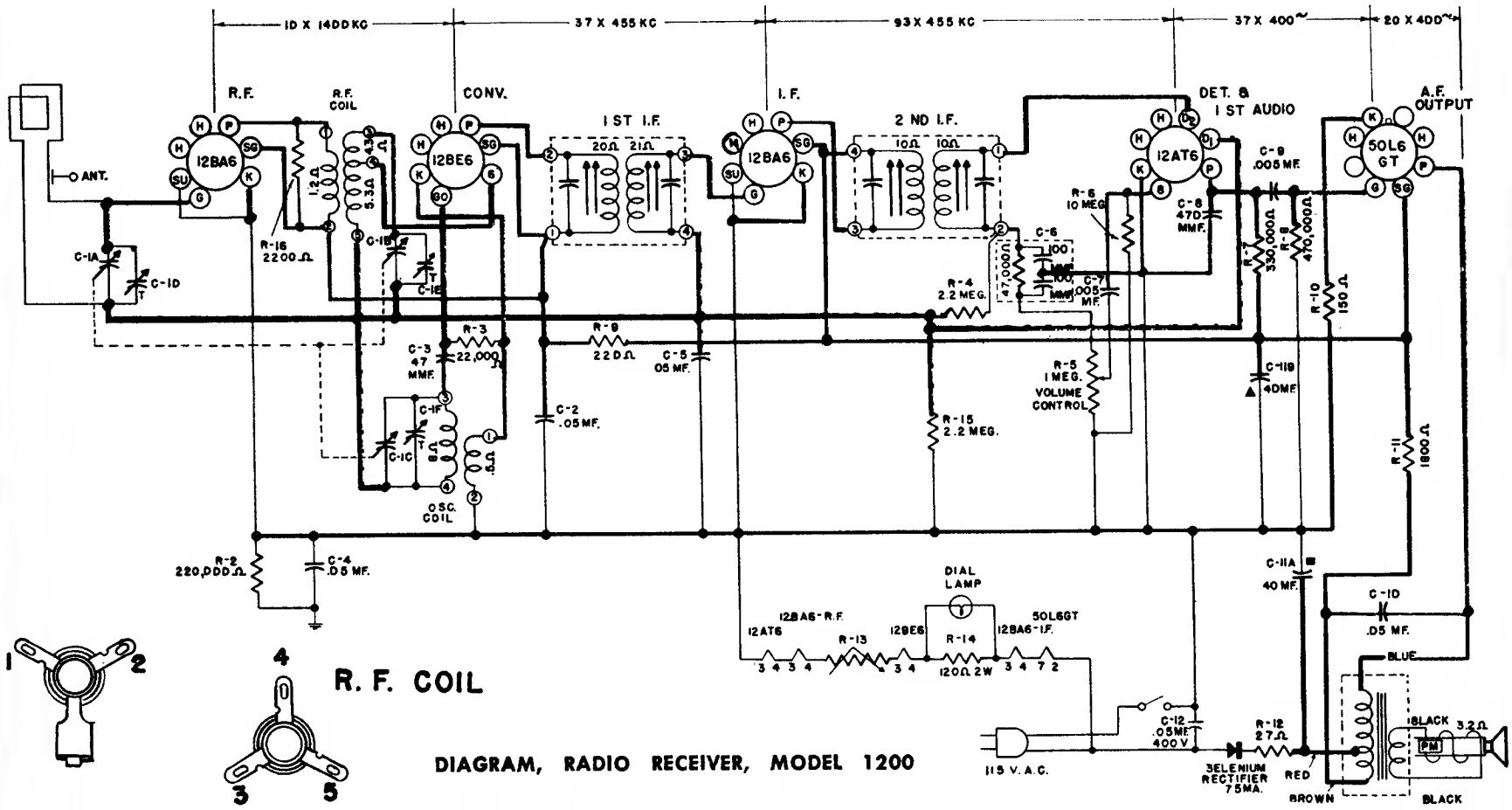
1. Remove chassis from cabinet—allow loop antenna to remain attached to chassis.
2. Note that there are four calibrating lines stamped into front edge of the metal dial frame. When gang condenser is fully meshed, dial pointer should be in the position indicated by first line at the left. If it is set incorrectly, release pointer clip on dial cord and reposition pointer.
3. Connect an output meter across the speaker voice coil or from plate of 35L6GT tube to B— through a .1 Mfd. condenser (see voltage chart for convenient B— connection).
4. Connect ground lead of signal generator to B— lug. CAUTION: If your test oscillator is designed with an AC-DC power supply, connect ground lead of signal generator to B— lug through a .25 Mfd. condenser.
5. Set volume control to maximum volume position and use a weak signal from the signal generator.

DUMMY ANT. IN SERIES WITH SIGNAL GENERATOR	CONNECTION OF SIG. GENERATOR OUTPUT TO RECEIVER	SIGNAL GENERATOR FREQUENCY	RECEIVER DIAL SETTING	TRIMMER NUMBER	TRIMMER DESCRIPTION	TYPE OF ADJUSTMENT
200 MMFD. Mica Condenser	Control Grid of 12SA7	455 KC	Any point where it does not affect the signal.	1-2	2nd I.F.	Adjust for maximum output. Then repeat adjustment.
				3-4	1st I.F.	
200 MMFD. Mica Condenser	External Antenna Terminal on Loop Frame	1650 KC	Gang condenser fully open.	5	Broadcast Oscillator (Shunt)	Adjust for maximum output.
200 MMFD. Mica Condenser	External Antenna Terminal on Loop Frame	1500 KC	Tune to 1500 KC generator signal	6	Broadcast R.F.	Adjust for maximum output.
200 MMFD. Mica Condenser	External Antenna Terminal on Loop Frame	1500 KC	Tune to 1500 KC generator signal	7	Broadcast Antenna	Adjust for maximum output.

DIAGRAM NO.	PART NO.	DESCRIPTION
		CONDENSERS
11	502152	Condenser—.02 Mfd. 400 volt
13-A, B, C	502123	Condenser—variable gang (with drum).
17	502159	Condenser—mica 50 Mmfd. 500 volt
19	502262	Condenser—.25 Mfd. 200 volt
22	502155	Condenser—.1 Mfd. 200 volt
26	502158	Condenser—.15 Mfd. 400 volt
29	505026	Condenser—ceramic 150 Mmfd. 350 volt.
31	505026	Condenser—ceramic 150 Mmfd. 350 volt.
32, 33	504977	Condenser—ceramic .002 Mfd. 150 volt
36	502160	Condenser—mica 110 Mmfd. 500 volt
38	505028	Condenser—.05 Mfd. 150 volt
39	504973	Condenser—ceramic 22 Mmfd. 500 volt
42-A, B	500256	Condenser—electrolytic A—20 Mfd. 150 volt) B—40 Mfd. 150 volt)
44	502151	Condenser—.01 Mfd. 400 volt
46	505071	Condenser—.2 Mfd. 400 volt
49	502157	Condenser—.05 Mfd. 400 volt
		RESISTORS
14	510025	Resistor—carbon 220 Ohms ¼ watt
16	510061	Resistor—carbon 22,000 Ohms ¼ watt
20	510049	Resistor—carbon 4700 Ohms ¼ watt
23	510021	Resistor—carbon 150 Ohms ¼ watt ± 10%
24	510091	Resistor—carbon 1 Meg. ¼ watt
27	510064	Resistor—carbon 33,000 Ohms ¼ watt
28-A, B	504967	Volume control 1 Meg. (with switch)
30	510079	Resistor—carbon 220,000 Ohms ¼ watt.
35	510097	Resistor—carbon 10 Meg. ¼ watt
37	510085	Resistor—carbon 470,000 Ohms ¼ watt
40	510085	Resistor—carbon 470,000 Ohms ¼ watt.
41	510121	Resistor—carbon 150 Ohms ½ watt ± 10%
43	510239	Resistor—carbon 1,500 Ohms 1 watt ± 10%
47	510073	Resistor—carbon 100,000 Ohms ¼ watt.
51	510029	Resistor—carbon 390 Ohms ¼ watt ± 10%
52	510210	Resistor—carbon 33 Ohms 1 watt

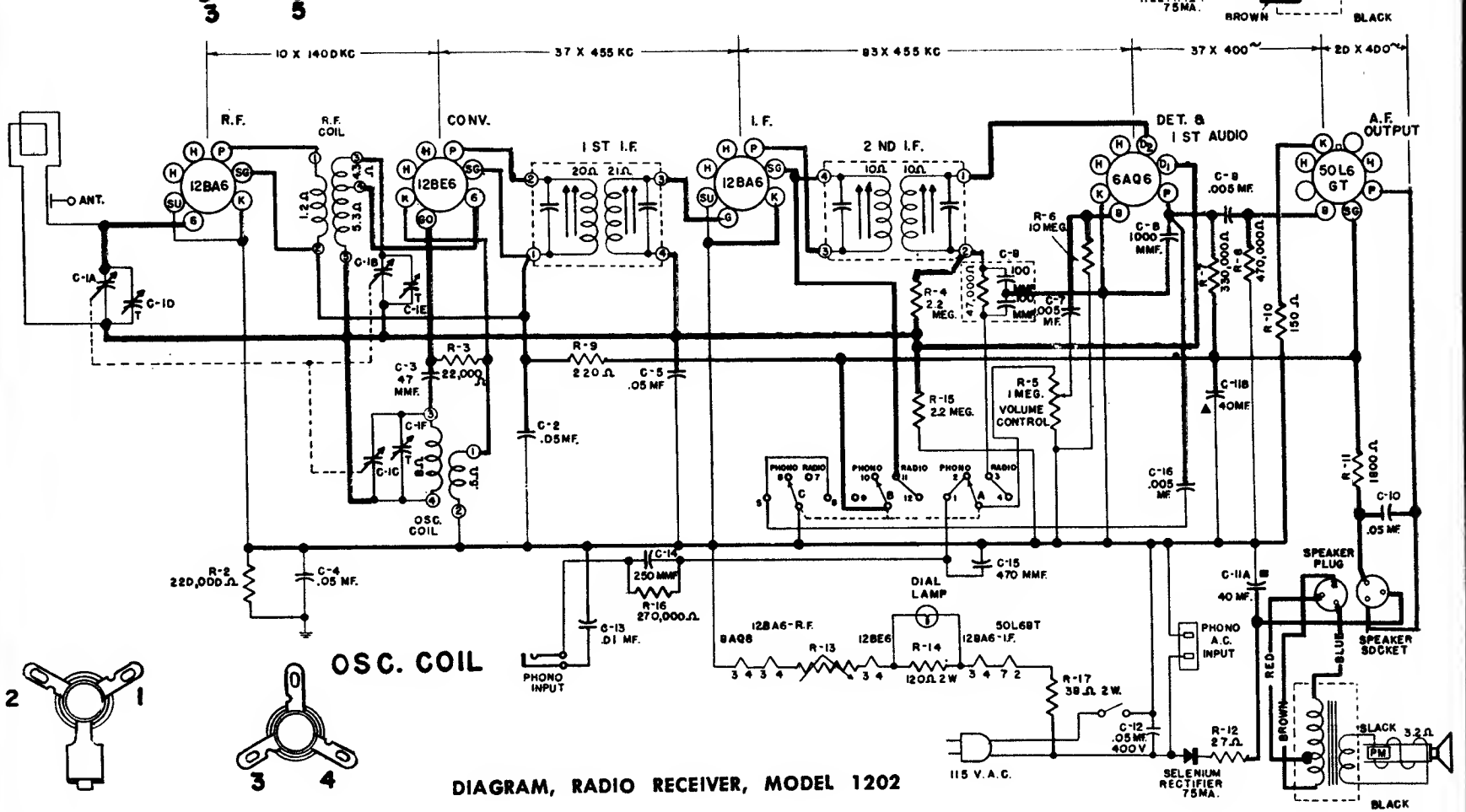
MANUAL OF 1949 MOST-OFTEN-NEEDED RADIO DIAGRAMS

STROMBERG - CARLSON



R. F. COIL

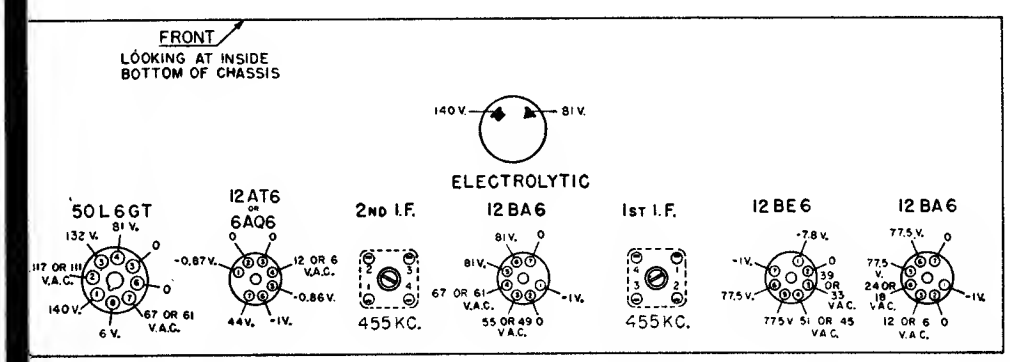
DIAGRAM, RADIO RECEIVER, MODEL 1200

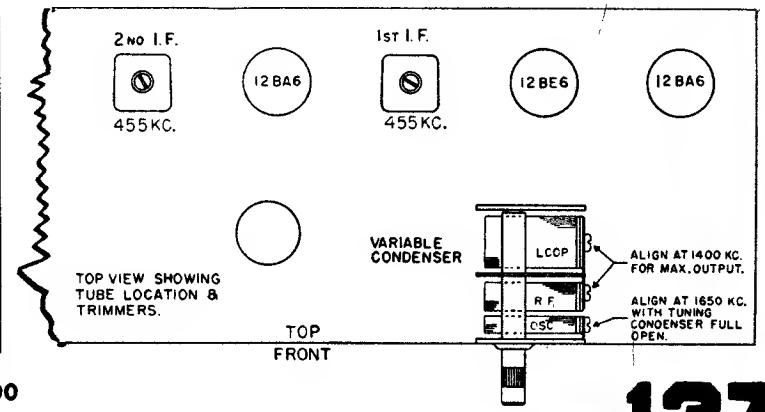


2 1 3 4

OSC. COIL

DIAGRAM, RADIO RECEIVER, MODEL 1202



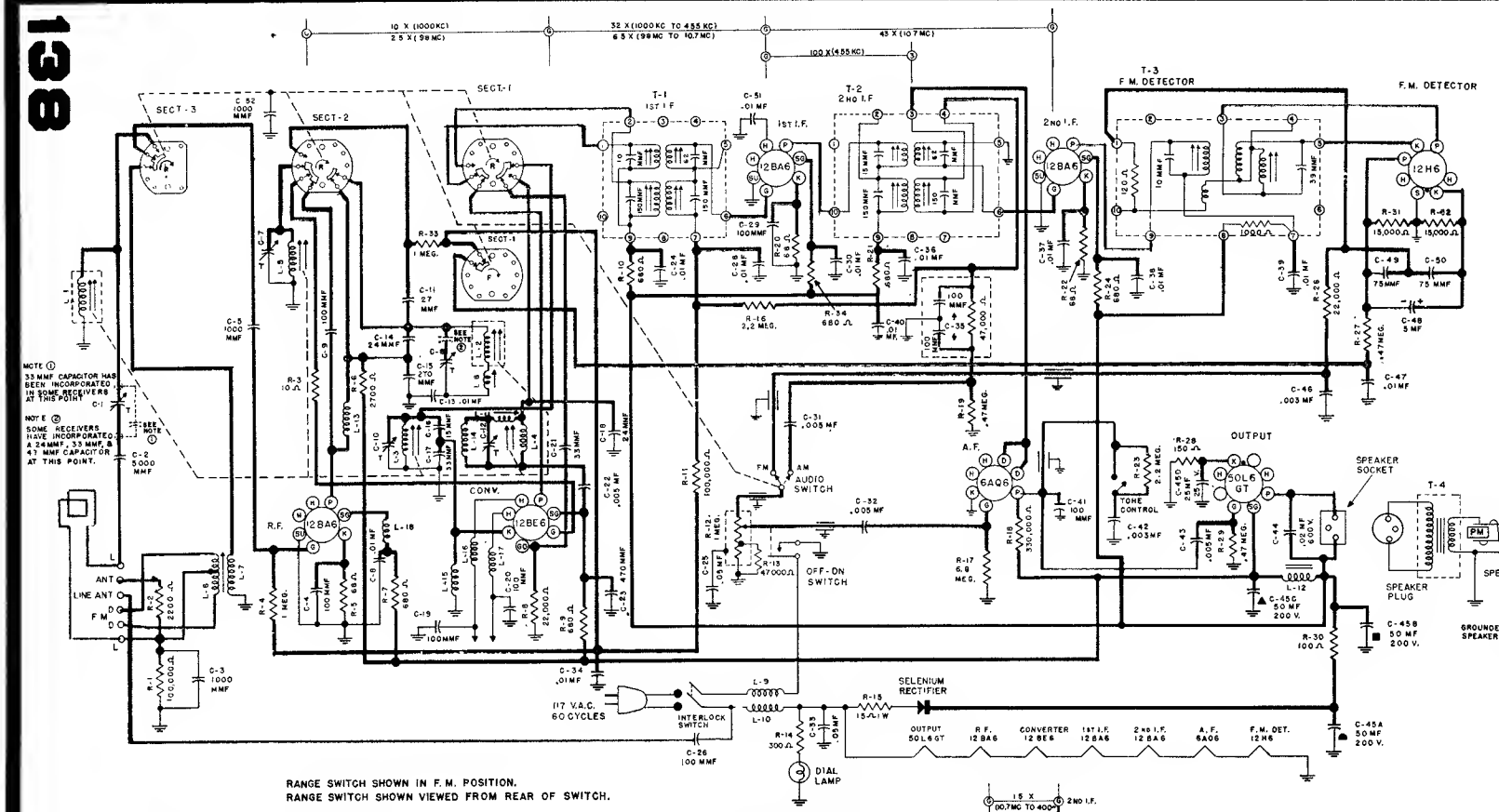


***Where two tube types or voltage values are shown, the first is for the 1200 chassis, the second is for the 1202 chassis**

MANUAL OF 1949 MOST-OFTEN-NEEDED RADIO DIAGRAMS
STROMBERG-CARLSON SERVICE NOTES

A-C-D-C RADIO RECEIVER NO. 1204

SERIES NO. 10—11



RANGE SWITCH SHOWN IN F. M. POSITION.
RANGE SWITCH SHOWN VIEWED FROM REAR OF SWITCH.

IDENTIFICATION TABLE

MODEL	CHASSIS	CABINET	SPEAKER
HI	112021	108056	155030
HB	112021	108044	155030
HME	112021	108063	155030
HMG	112021	108062	155030

SPECIFICATIONS

Voltage Rating.....105-125 Volts AC-DC
Type of Circuit.....Superheterodyne
Tuning Range.....A.M.—540 KC.—1600 KC.
F.M.—88 MC.—108 MC.

Number & Type of Tubes—7

3—12BA6..... R.F. Amp. and two I.F. Amp.
1—12BE6.....Convertor
1—6AQ6.....1st Audio Amp.—A.M. Det. & AVC
1—12H6..... F.M. Det.
1—50L6GT.....Power Output

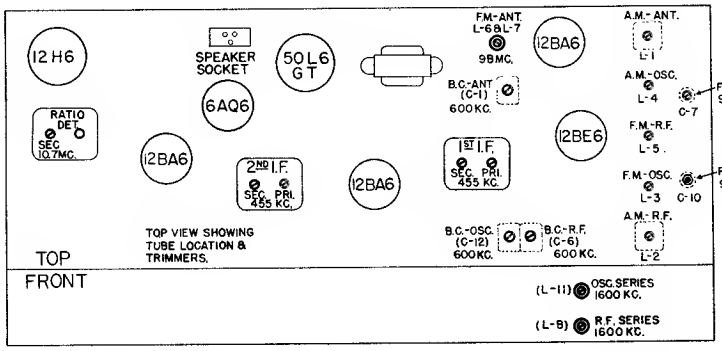
Input Power Rating..... 40 Watts
Intermediate Frequency.....A.M. 455 KC. F.M. 10.7 MC.
Speaker Voice Coil Impedance (PM).....3 Ohms
Power Output.....1.25 Watts at less than 10% distortion

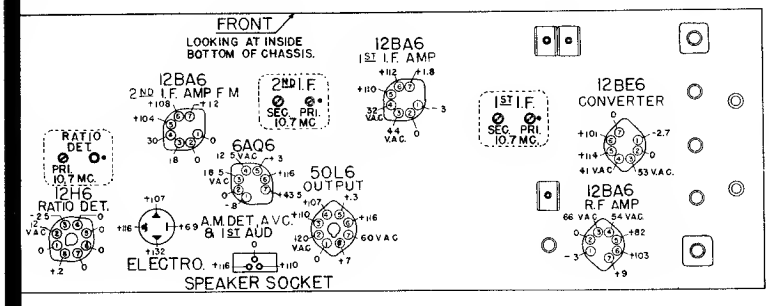
STROMBERG-CARLSON

ALIGNMENT PROCEDURE 1204

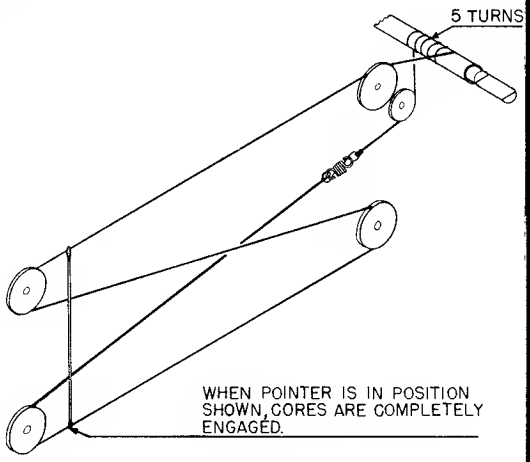
Band and Pointer Setting	Generator Setting	Input and Dummy	VTVM Connection and Scale	Trimmer Adj. and Notes
	A.M. I.F. ALIGNMENT			
(1) AM-Pointer near middle of dial	455 kc. 400 cy. mod.	Junction C-13, 6 and L-8 200 mmf. dummy	Junction C-31, 35 3VDC scale	Adj. Pri. and Sec. cores two AM IF transformers top of chassis. Highest voltage
	F.M. I.F. ALIGNMENT			
(1) FM-Pointer near middle of dial	10.7 mc 400 cy mod.	Junction C-10, 16 and L-3	AVC buss (Green and White Wire) —3VDC scale	Detune Sec. Ratio Det. Transformer adjust four FM IF cores, bottom of chassis, in following order counting from band switch—One, Four, Two Three for highest voltage. DO NOT REPEAT
(2) "	"	"	"	Adjust Pri. Ratio Det. Transformer for highest voltage.
(3) "	"	"	Center terminal audio switch —3 VDC scale	Adjust Sec. Ratio Det. Transformer for ZERO voltage.
(4) Repeat (2) and (3)				
	A.M. R.F. ALIGNMENT			
(1) AM-600 kc	600 kc 400 cy. mod.	Loop and link connected 200 mmf dummy to Ant. terminal	Junction C-31, 35 —3 VDC scale	Adjust C-12, 6 and 1 for highest voltage.
(2) AM-1600 kc Repeat (1) and (2)	1600 kc	"	"	Align L-8, 11 for highest voltage.
	F.M. R.F. ALIGNMENT			
FM Pointer at 98 to 100 mc.	98 to 100 mc. 400 cy mod.	"	AVC buss (Green and White Wire) —3 VDC scale	Adjust C-7, 10 and core L-6 and 7 for highest voltage.

Voltage and Tube Location Chart

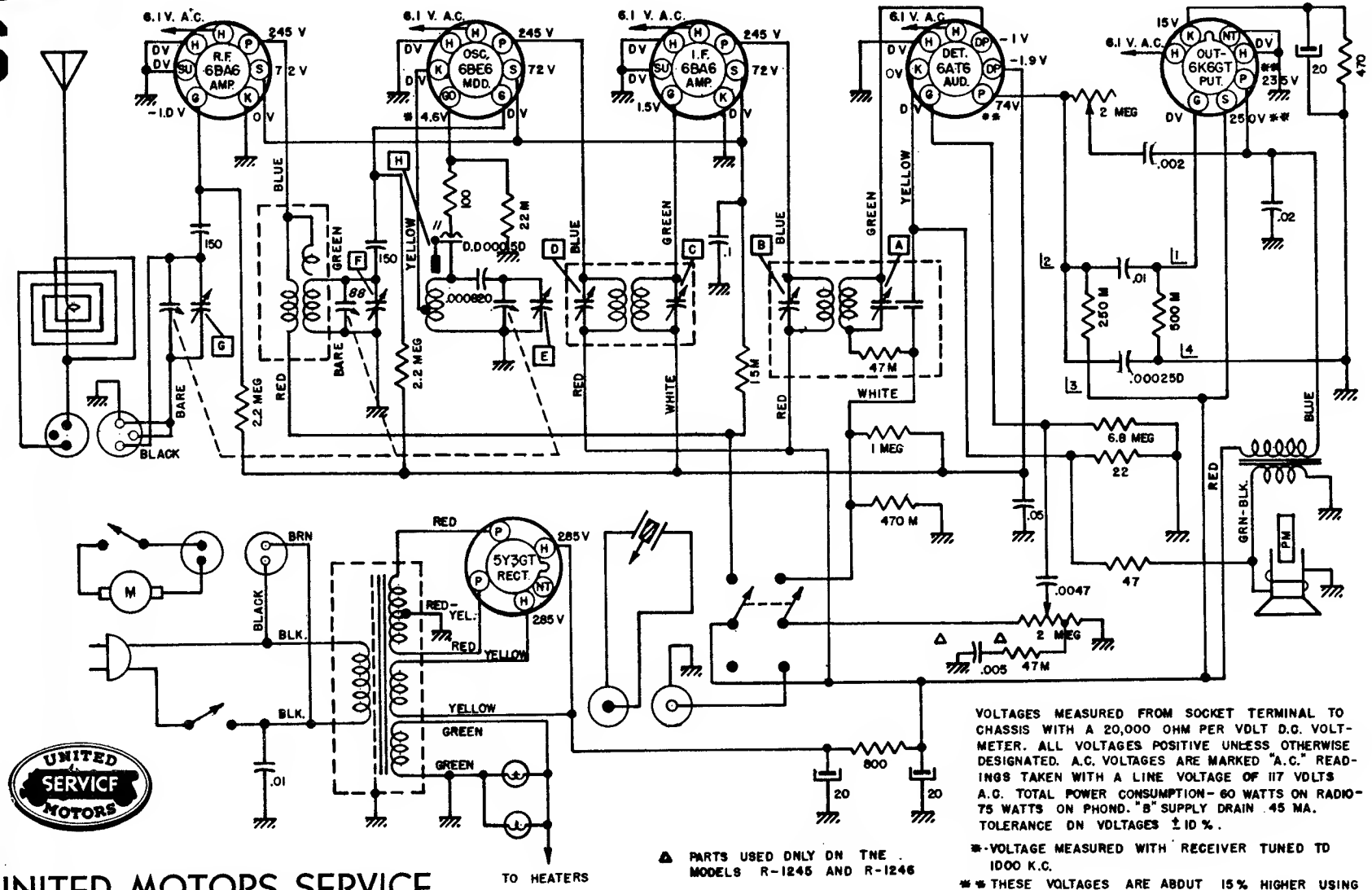




Dial Stringing Chart



Measurements are made at 117V line, using electronic Voltmeter. Except where otherwise indicated, voltages are D.C. and are positive with respect to the reference point which is the chassis.



VOLTAGES MEASURED FROM SOCKET TERMINAL TO CHASSIS WITH A 20,000 OHM PER VOLT D.C. VOLTMETER. ALL VOLTAGES POSITIVE UNLESS OTHERWISE DESIGNATED. A.C. VOLTAGES ARE MARKED "A.C." READINGS TAKEN WITH A LINE VOLTAGE OF 117 VOLTS A.C. TOTAL POWER CONSUMPTION - 60 WATTS ON RADIO - 75 WATTS ON PHONO. "B" SUPPLY DRAIN .45 MA. TOLERANCE ON VOLTAGES ± 10 %.

* - VOLTAGE MEASURED WITH RECEIVER TUNED TO 1000 K.C.

** THESE VOLTAGES ARE ABOUT 15% HIGHER USING "PHONO."

△ PARTS USED ONLY ON THE MODELS R-1245 AND R-1246

UNITED MOTORS SERVICE

DIVISION OF GENERAL MOTORS CORPORATION

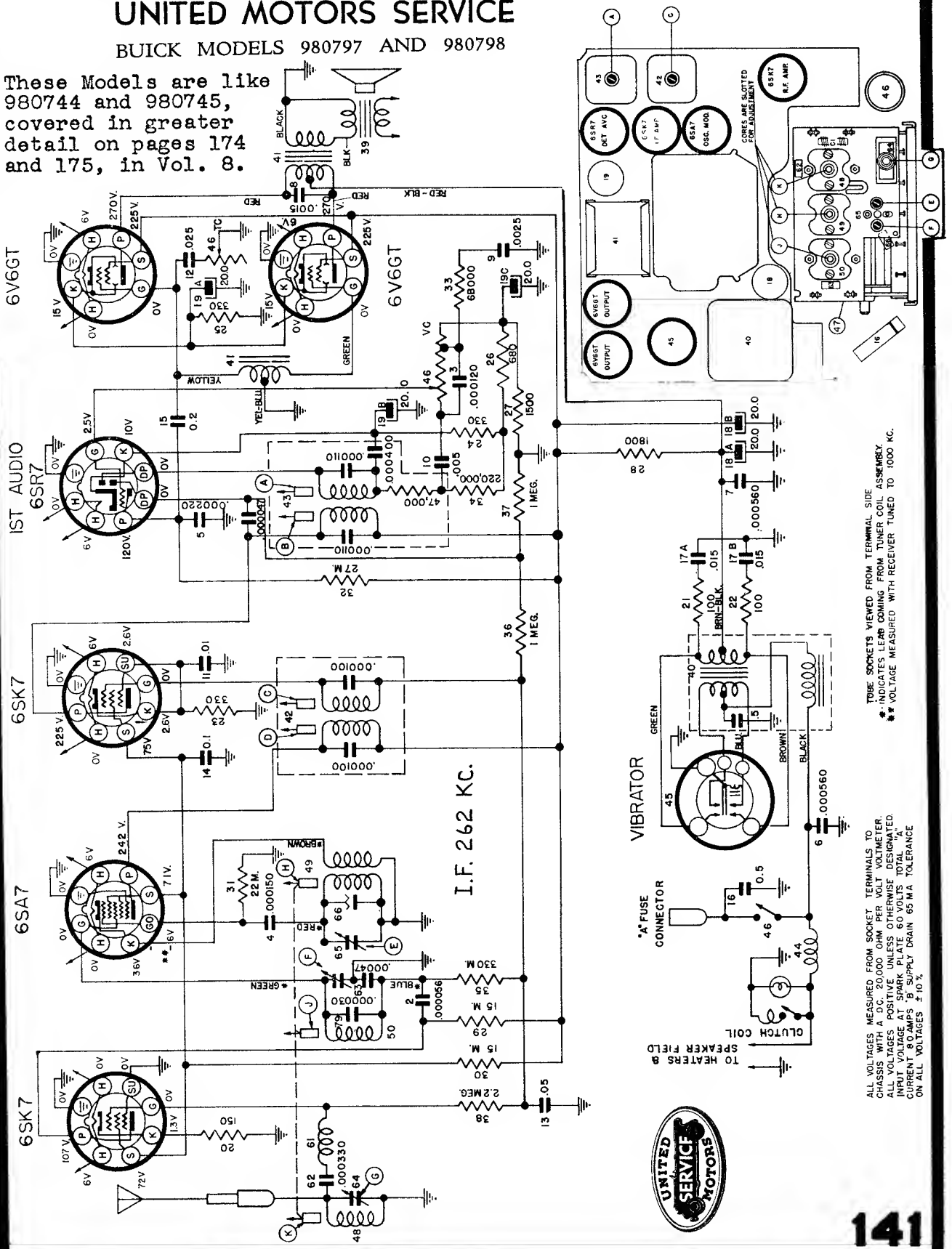
DELCO RADIO MODELS R-1244, R-1245 and R-1246

I.F. 262 KC.

UNITED MOTORS SERVICE

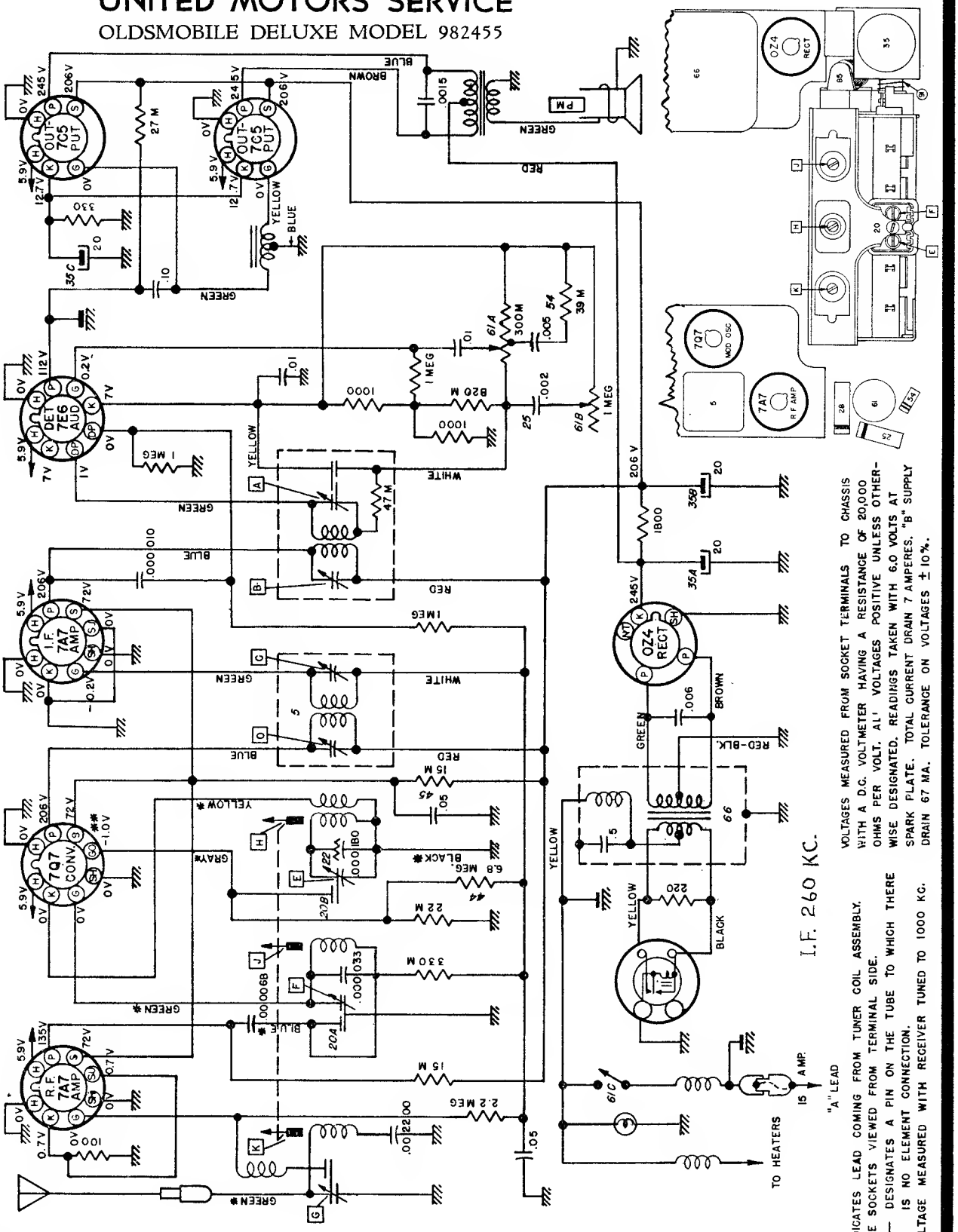
BUICK MODELS 980797 AND 980798

These Models are like 980744 and 980745, covered in greater detail on pages 174 and 175, in Vol. 8.



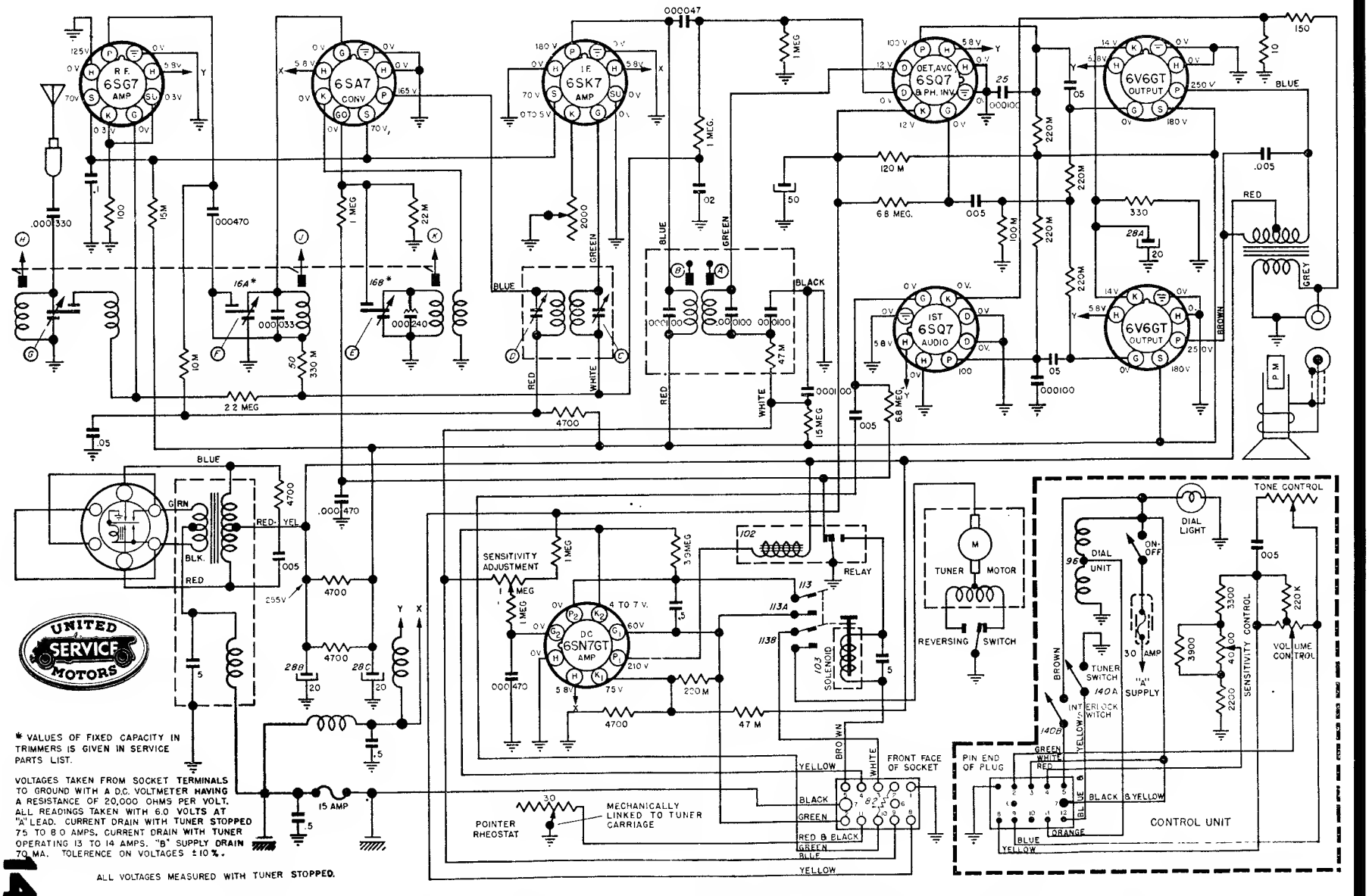
UNITED MOTORS SERVICE

OLDSMOBILE DELUXE MODEL 982455



VOLTAGES MEASURED FROM SOCKET TERMINALS TO CHASSIS WITH A D.C. VOLTMETER HAVING A RESISTANCE OF 20,000 OHMS PER VOLT. ALL VOLTAGES POSITIVE UNLESS OTHERWISE DESIGNATED. READINGS TAKEN WITH 6.0 VOLTS AT SPARK PLATE. TOTAL CURRENT DRAIN 7 AMPERES, "B" SUPPLY DRAIN 67 MA. TOLERANCE ON VOLTAGES ± 10%.

*INDICATES LEAD COMING FROM TUNER COIL ASSEMBLY.
TUBE SOCKETS VIEWED FROM TERMINAL SIDE.
NT— DESIGNATES A PIN ON THE TUBE TO WHICH THERE IS NO ELEMENT CONNECTION.
**VOLTAGE MEASURED WITH RECEIVER TUNED TO 1000 KC.



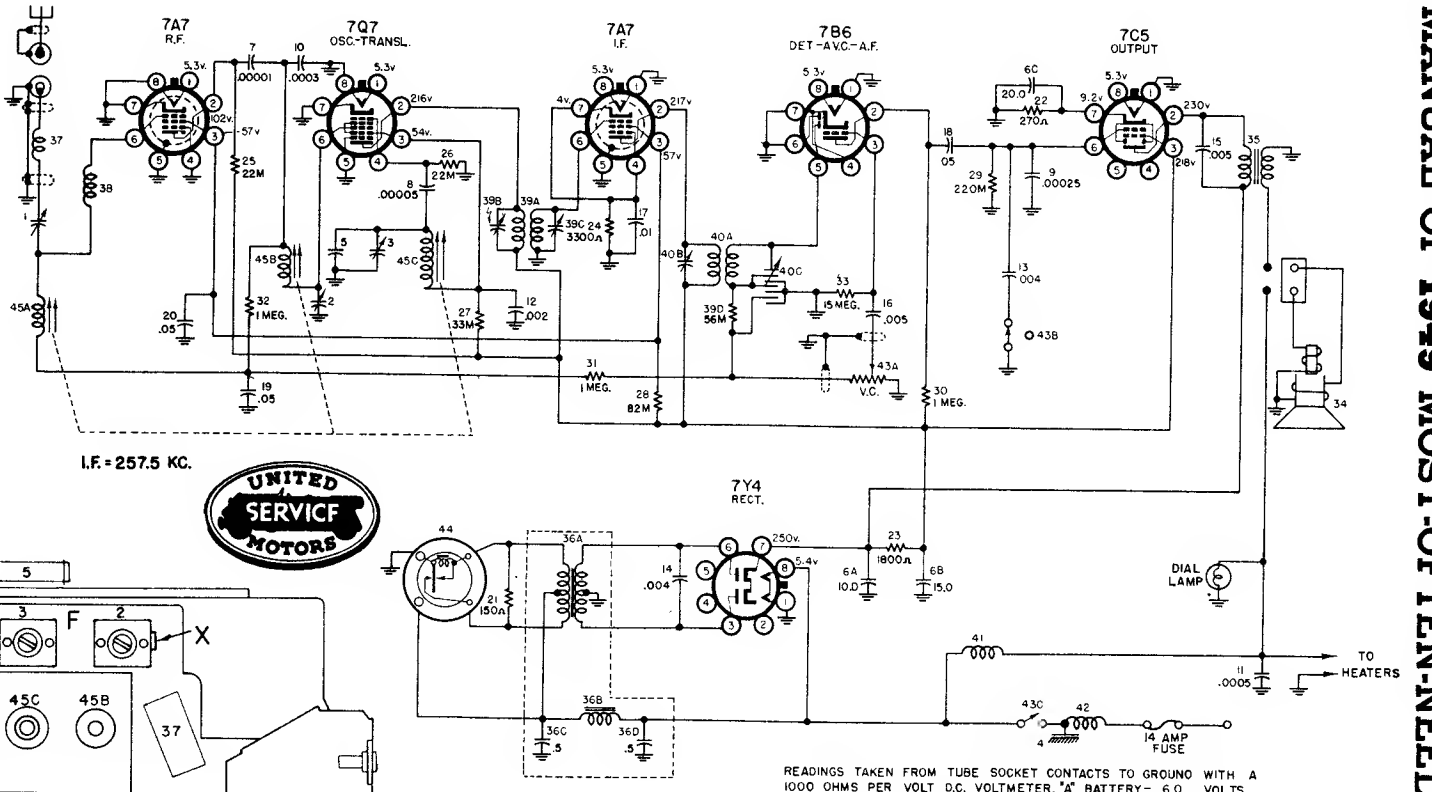
* VALUES OF FIXED CAPACITY IN TRIMMERS IS GIVEN IN SERVICE PARTS LIST.

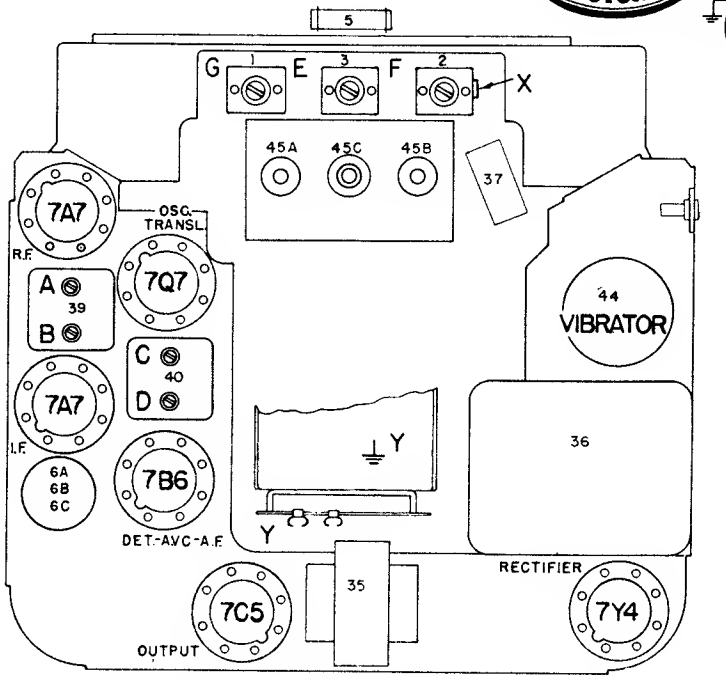
VOLTAGES TAKEN FROM SOCKET TERMINALS TO GROUND WITH A D.C. VOLTMETER HAVING A RESISTANCE OF 20,000 OHMS PER VOLT. ALL READINGS TAKEN WITH 6.0 VOLTS AT "A" LEAD. CURRENT DRAIN WITH TUNER STOPPED 75 TO 80 AMPS. CURRENT DRAIN WITH TUNER OPERATING 13 TO 14 AMPS. "B" SUPPLY DRAIN 70 MA. TOLERENCE ON VOLTAGES ±10%.

ALL VOLTAGES MEASURED WITH TUNER STOPPED.

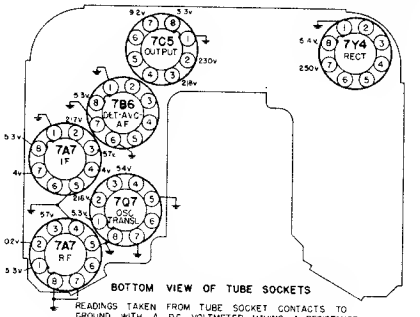
UNITED MOTORS SERVICE DELCO MODEL R-705 I.F. 260 KC.

UNITED MOTORS SERVICE
DIVISION OF GENERAL MOTORS CORPORATION
Pontiac 984247

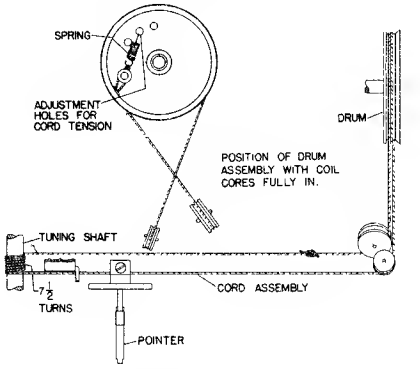




SOCKET VOLTAGES

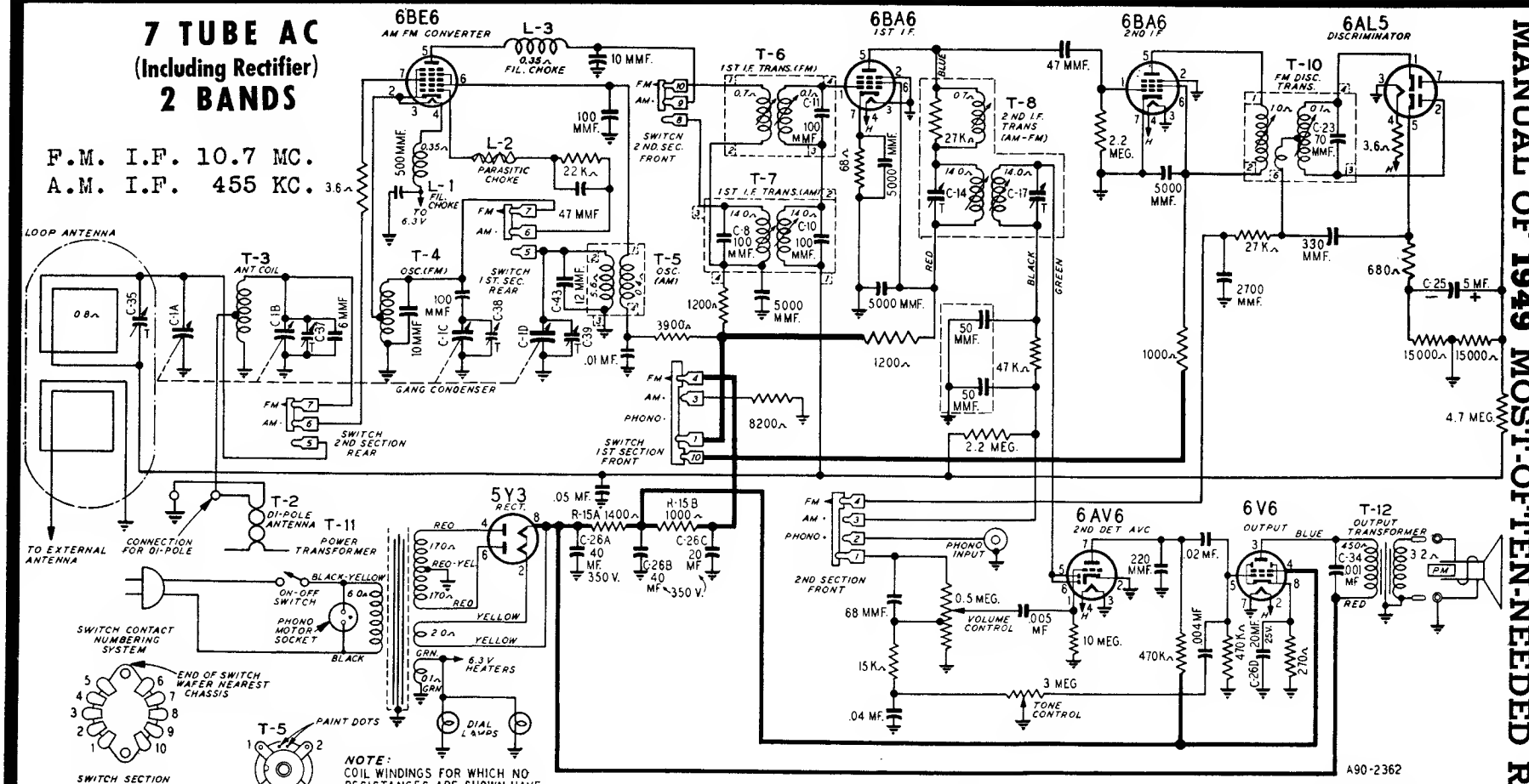


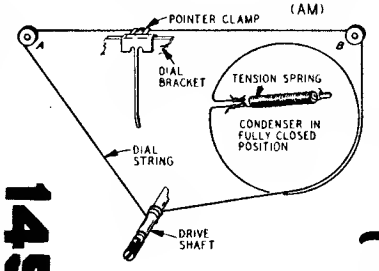
DIAL CORD HOOKUP



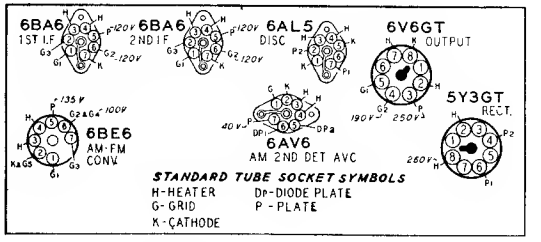
7 TUBE AC
(Including Rectifier)
2 BANDS

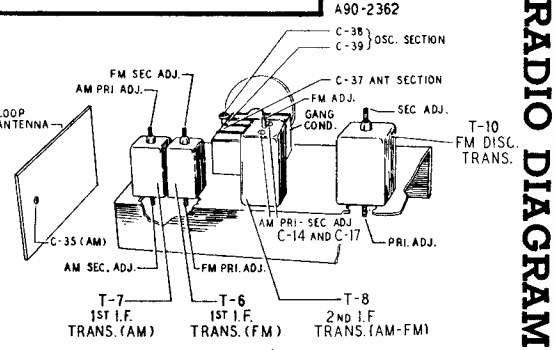
F.M. I.F. 10.7 MC.
A.M. I.F. 455 KC.





Western Auto Model D-2819 is similar in many respects.

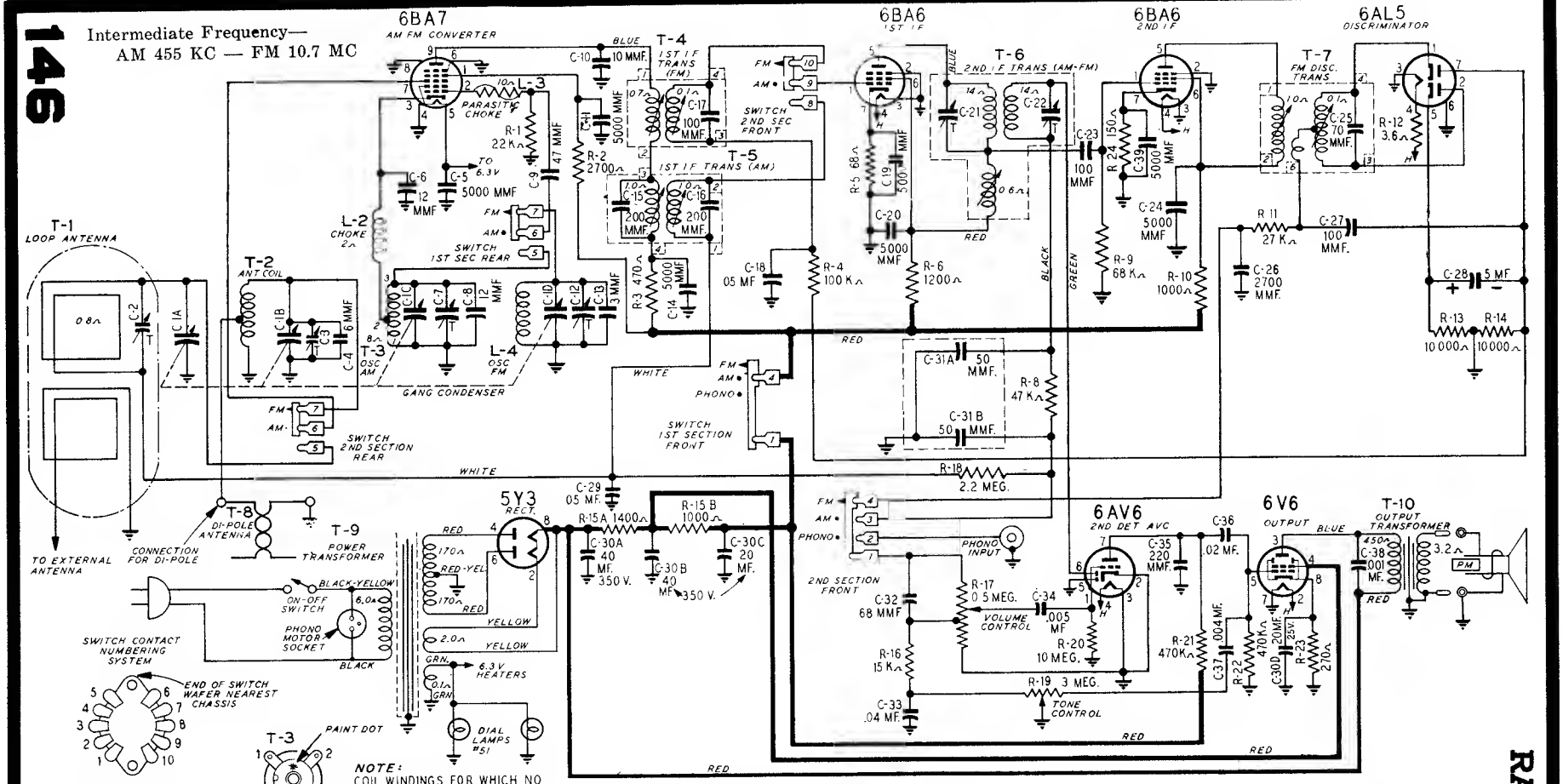




Truetone Model D1836

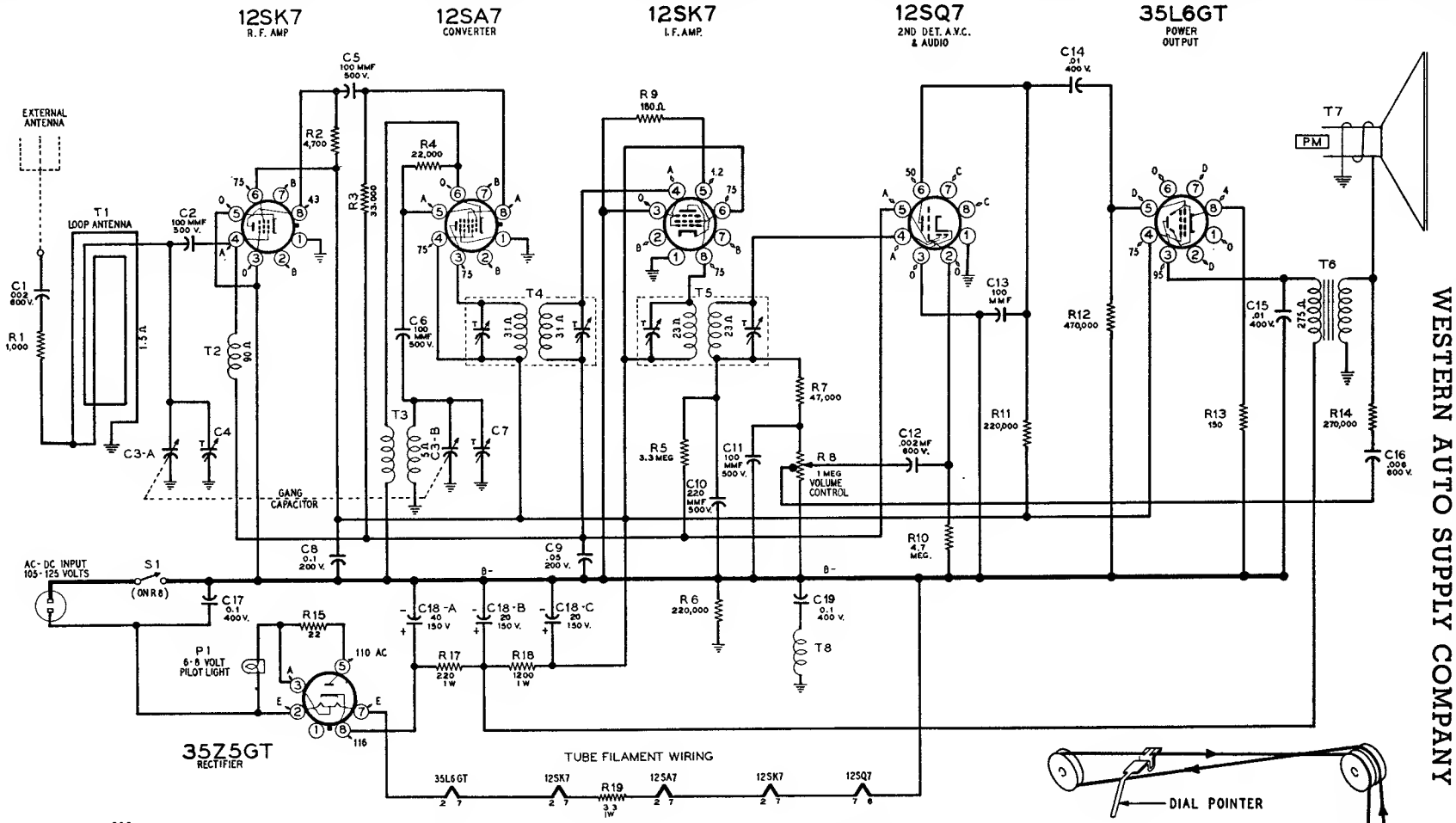
SERIAL No. 105,027 UP

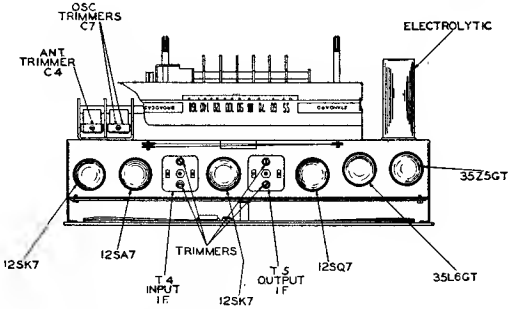
Intermediate Frequency—
AM 455 KC — FM 10.7 MC



Truetone Model D1846

RADIO DIAGRAMS





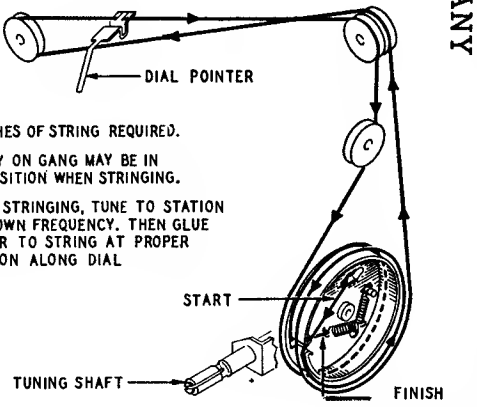
Western Auto Supply Co.

Truetone Radio

MODEL D2815

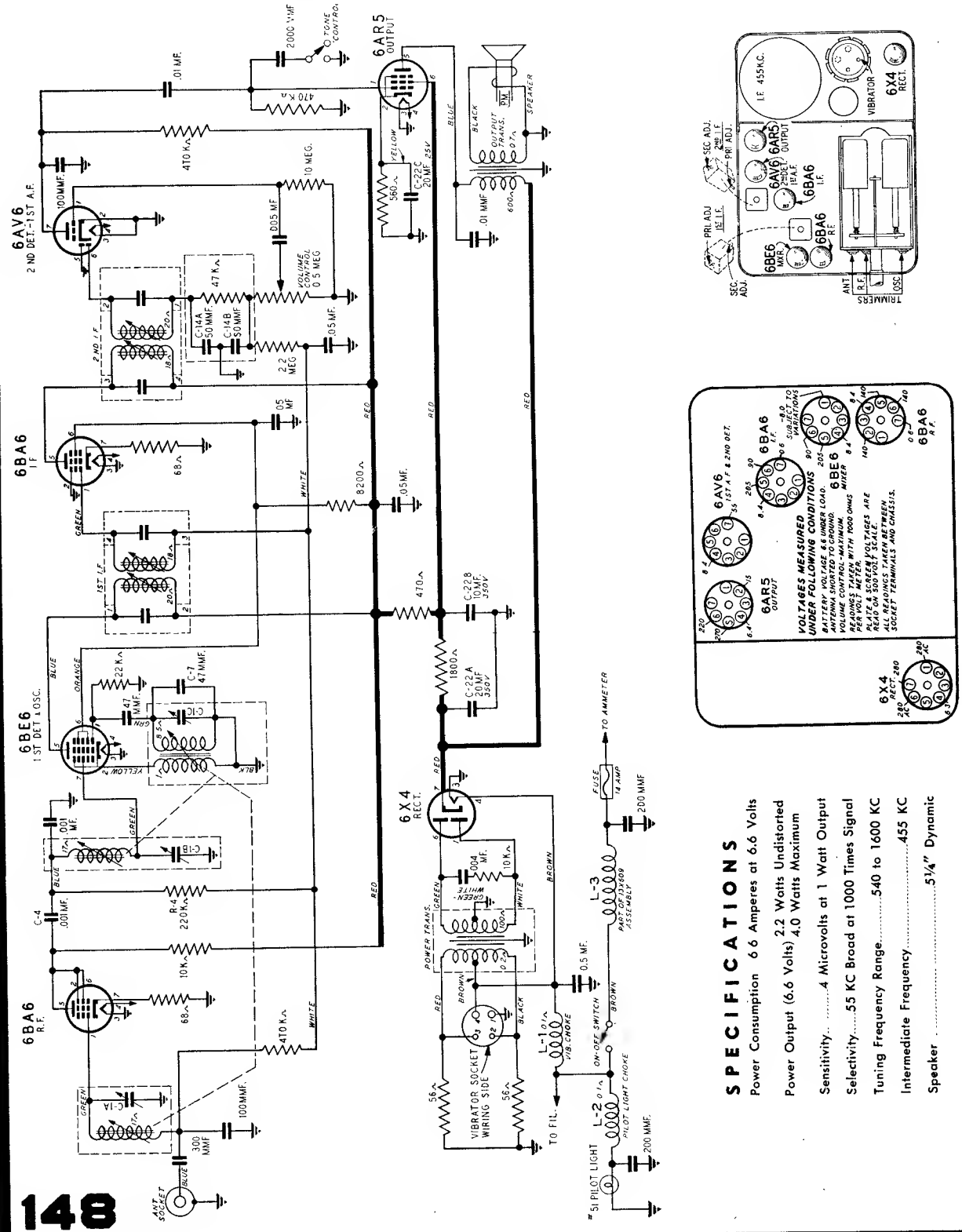
SERIES A

Tuning range	530 to 1600 kc
Intermediate frequency	455 kc
Power consumption	30 watts



1. 60 INCHES OF STRING REQUIRED.
2. PULLEY ON GANG MAY BE IN ANY POSITION WHEN STRINGING.
3. AFTER STRINGING, TUNE TO STATION OF KNOWN FREQUENCY. THEN GLUE POINTER TO STRING AT PROPER POSITION ALONG DIAL

Truetone Model D4832



SPECIFICATIONS

Power Consumption 6 6 Amperes at 6.6 Volts

Power Output (6.6 Volts) 2.2 Watts Undistorted
4.0 Watts Maximum

Sensitivity.....4 Microvolts at 1 Watt Output

Selectivity.....55 KC Broad at 1000 Times Signal

Tuning Frequency Range.....540 to 1600 KC

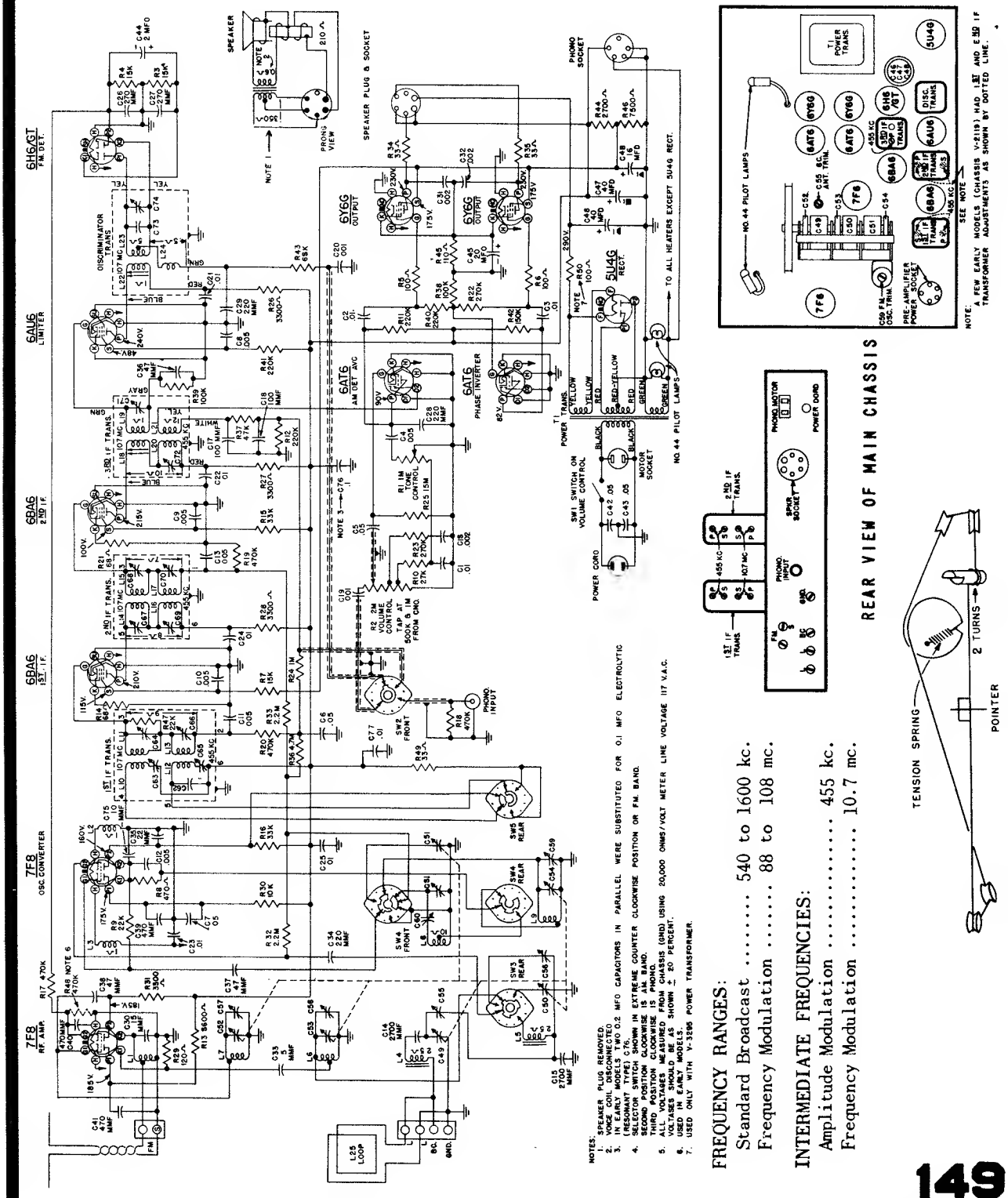
Intermediate Frequency.....455 KC

Speaker .....5¼" Dynamic

Westinghouse

RADIO • TELEVISION

H-164 H-166 & H-166A H-167



NOTES:
1. SPEAKER PLUG REMOVED.
2. VOICE COIL DISCONNECTED.
3. VOLTAGES SHOWN TO 0.2 MFD CAPACITORS IN PARALLEL WERE SUBSTITUTED FOR 0.1 MFD ELECTROLYTIC (RESONANT TYPE) C76.
4. SELECTOR SWITCH SHOWN IN EXTREME COUNTER CLOCKWISE POSITION OR FM. BAND.
   SECOND POSITION CLOCKWISE IS AM. BAND.
   THIRD POSITION CLOCKWISE IS PHONO.
5. ALL VOLTAGES MEASURED FROM CHASSIS (GND) USING 20,000 OHMS/VOLT METER LINE VOLTAGE 117 V.A.C. VOLTAGES SHOULD MEASURE AS SHOWN ± 20 PERCENT.
6. USED IN EARLY MODELS.
7. USED ONLY WITH V-3285 POWER TRANSFORMER.

FREQUENCY RANGES:

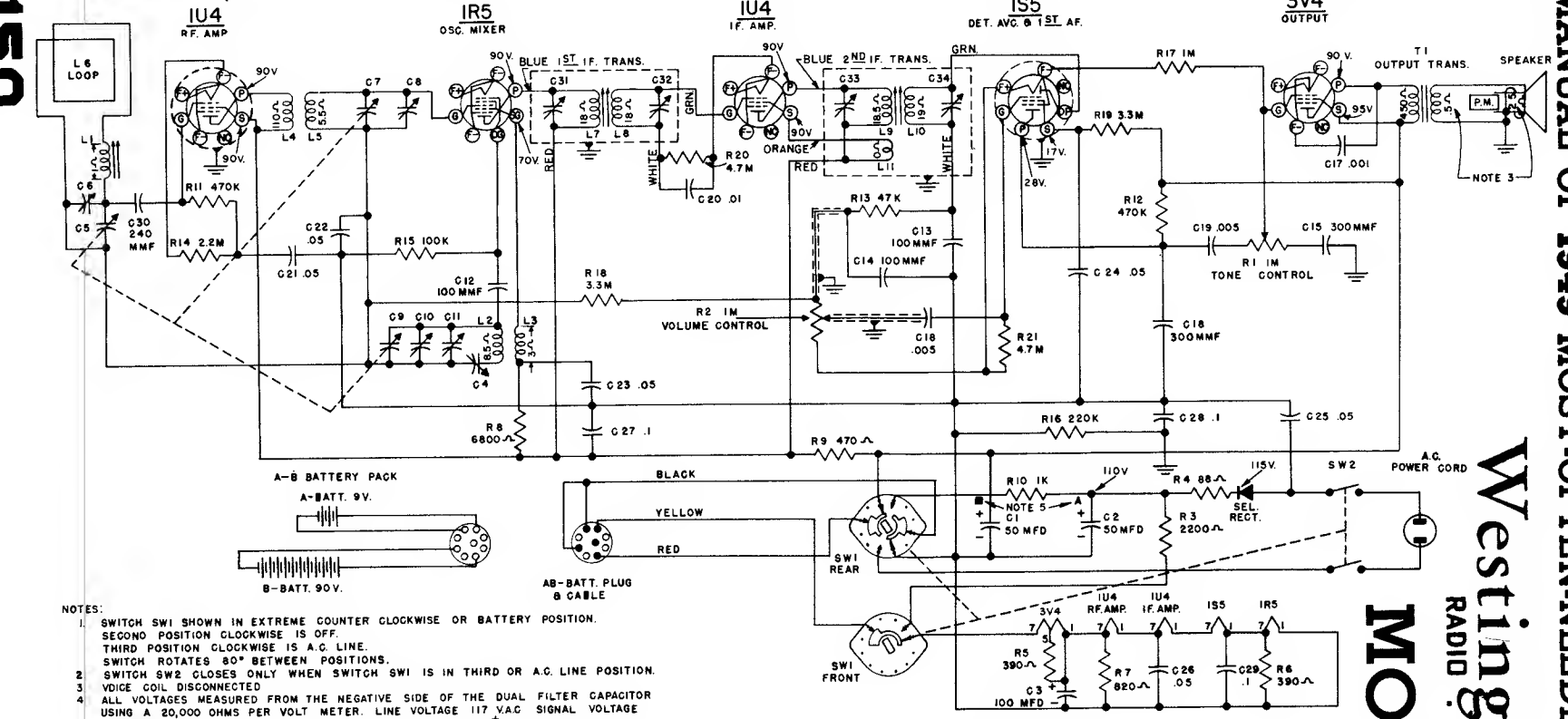
Standard Broadcast	540 to 1600 kc.
Frequency Modulation	88 to 108 mc.

INTERMEDIATE FREQUENCIES:

Amplitude Modulation	455 kc.
Frequency Modulation	10.7 mc.

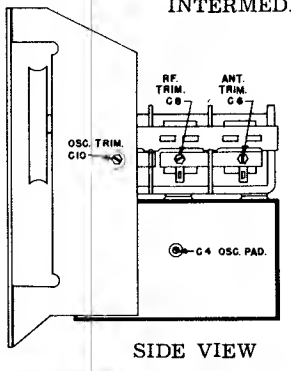
Westinghouse
RADIO - TELEVISION

MODEL H-165

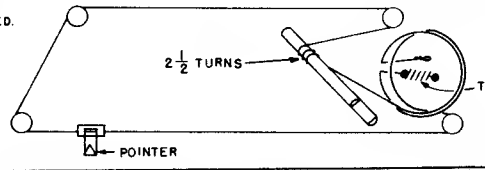


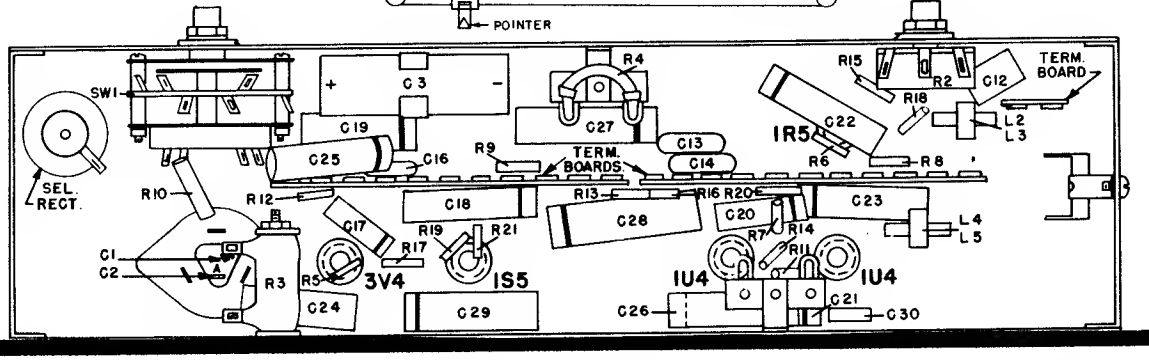
NOTES:
1. SWITCH SW1 SHOWN IN EXTREME COUNTER CLOCKWISE OR BATTERY POSITION.
   SECOND POSITION CLOCKWISE IS OFF.
   THIRD POSITION CLOCKWISE IS A.C. LINE.
   SWITCH ROTATES 80° BETWEEN POSITIONS.
2. SWITCH SW2 CLOSES ONLY WHEN SWITCH SW1 IS IN THIRD OR A.C. LINE POSITION.
3. VOICE COIL DISCONNECTED
4. ALL VOLTAGES MEASURED FROM THE NEGATIVE SIDE OF THE DUAL FILTER CAPACITOR USING A 20,000 OHMS PER VOLT METER. LINE VOLTAGE 117 V.A.C. SIGNAL VOLTAGE ZERO. READINGS SHOULD APPROXIMATE THE VALUES SHOWN ± 20 PERCENT.
5. IN LATER PRODUCTION, THE POSITIONS OF C1 & C2 IN THE CIRCUIT WERE REVERSED.

INTERMEDIATE FREQUENCY .....455 kc



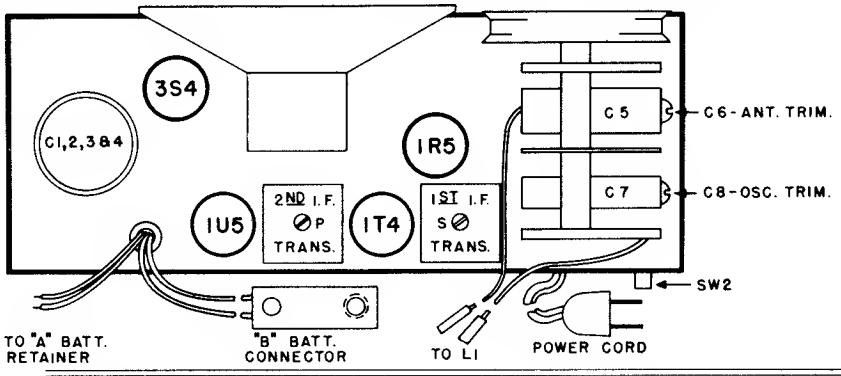
SIDE VIEW

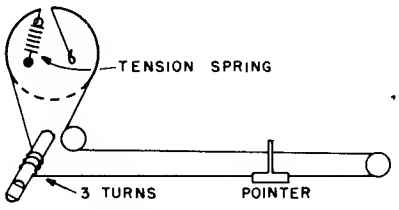




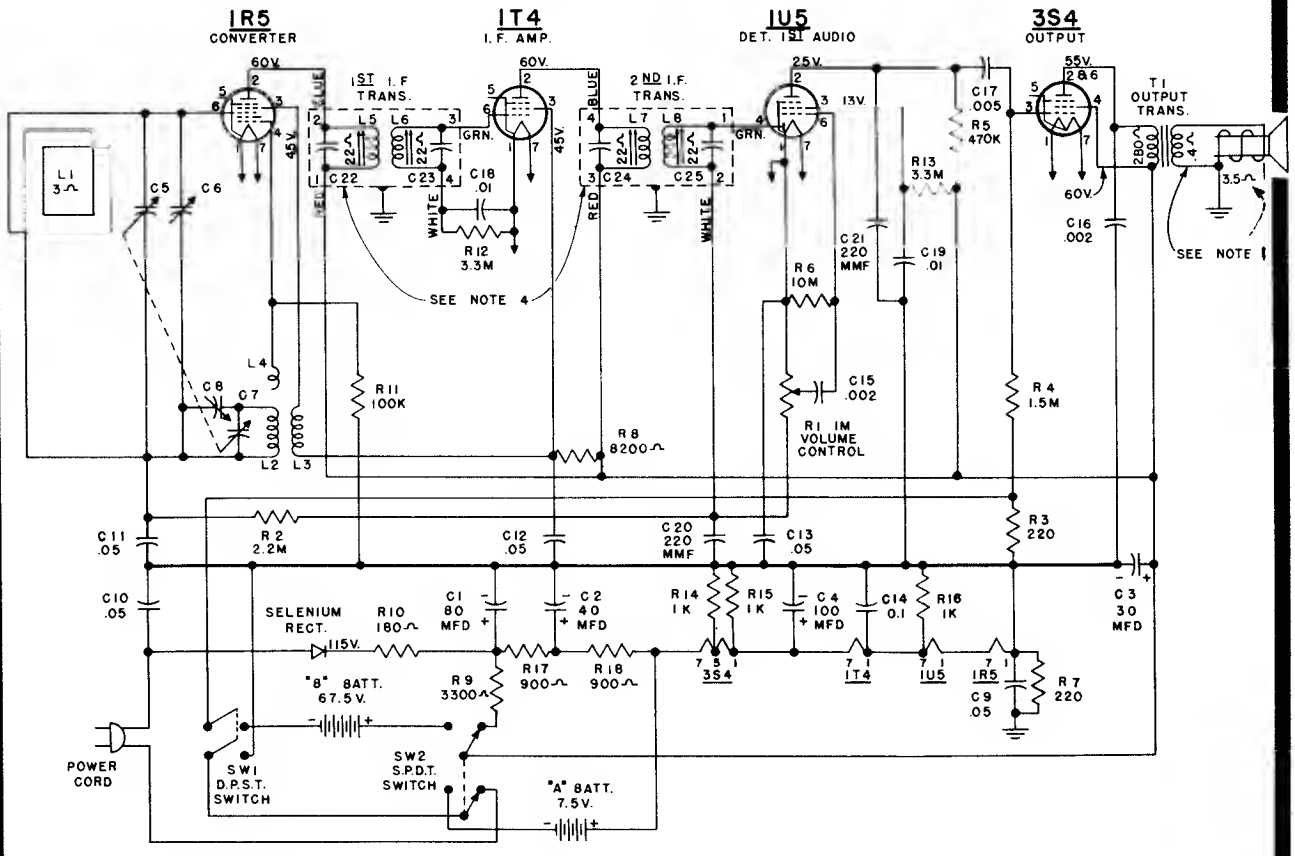
Westinghouse Electric

Models H-185, H-195





Step	Connect Signal Generator to -	Signal Generator Frequency	Radio Dial	ALIGNMENT Adjust for Maximum Output
1	Stator of R-F tuning capacitor (C5) through a 200 mmf capacitor	455 kc	455 kc	Pri. and Sec. of 2nd I-F trans.
2	Stator of R-F tuning capacitor (C5) through a 200 mmf capacitor	455 kc	455 kc	Pri. and Sec. of 1st I-F trans.
3	Recheck steps 1 and 2			
4	Radiated Signal	1615 kc	1615 kc	Oscillator Trimmer (C8)
5	Radiated Signal	1400 kc	1400 kc	R-F Trimmer (C6)

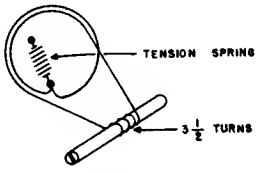


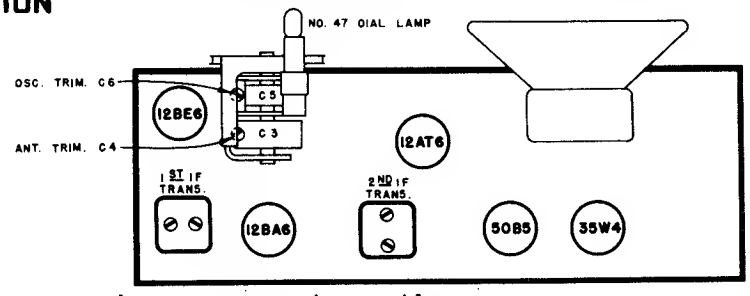
NOTE:
1. VOICE COIL DISCONNECTED
2. SWITCH NO. 2 SHOWN IN AC/DC POSITION.
3. ALL VOLTAGES MEASURED FROM CIRCUIT (GND) USING A 20,000 OHMS/VOLT METER - LINE VOLTAGE AT 117 V.A.C. VOLTAGES SHOULD BE AS SHOWN ± 20 PER CENT.
4. SOME MODELS MAY HAVE CAPACITOR TRIMMERS.

CHASSIS NO. V-2131 AND V-2131-1

Westinghouse RADIO • TELEVISION

MODEL H-188



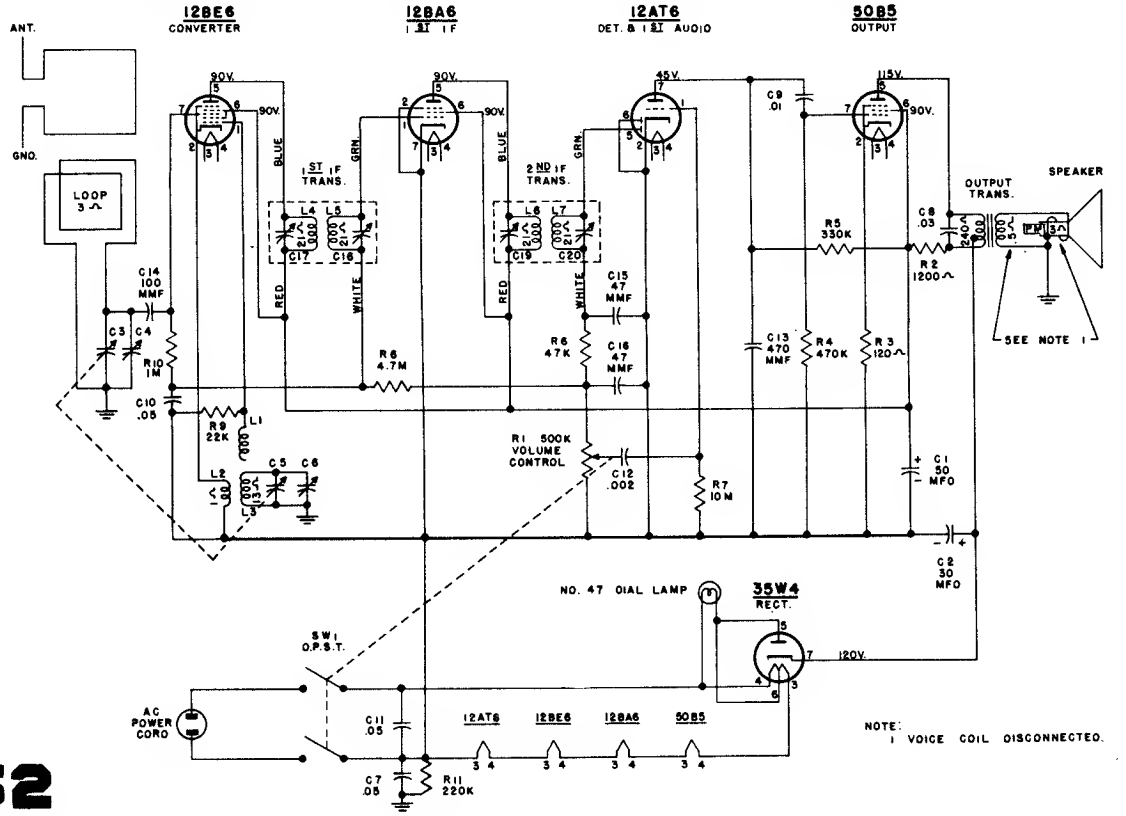


ALIGNMENT

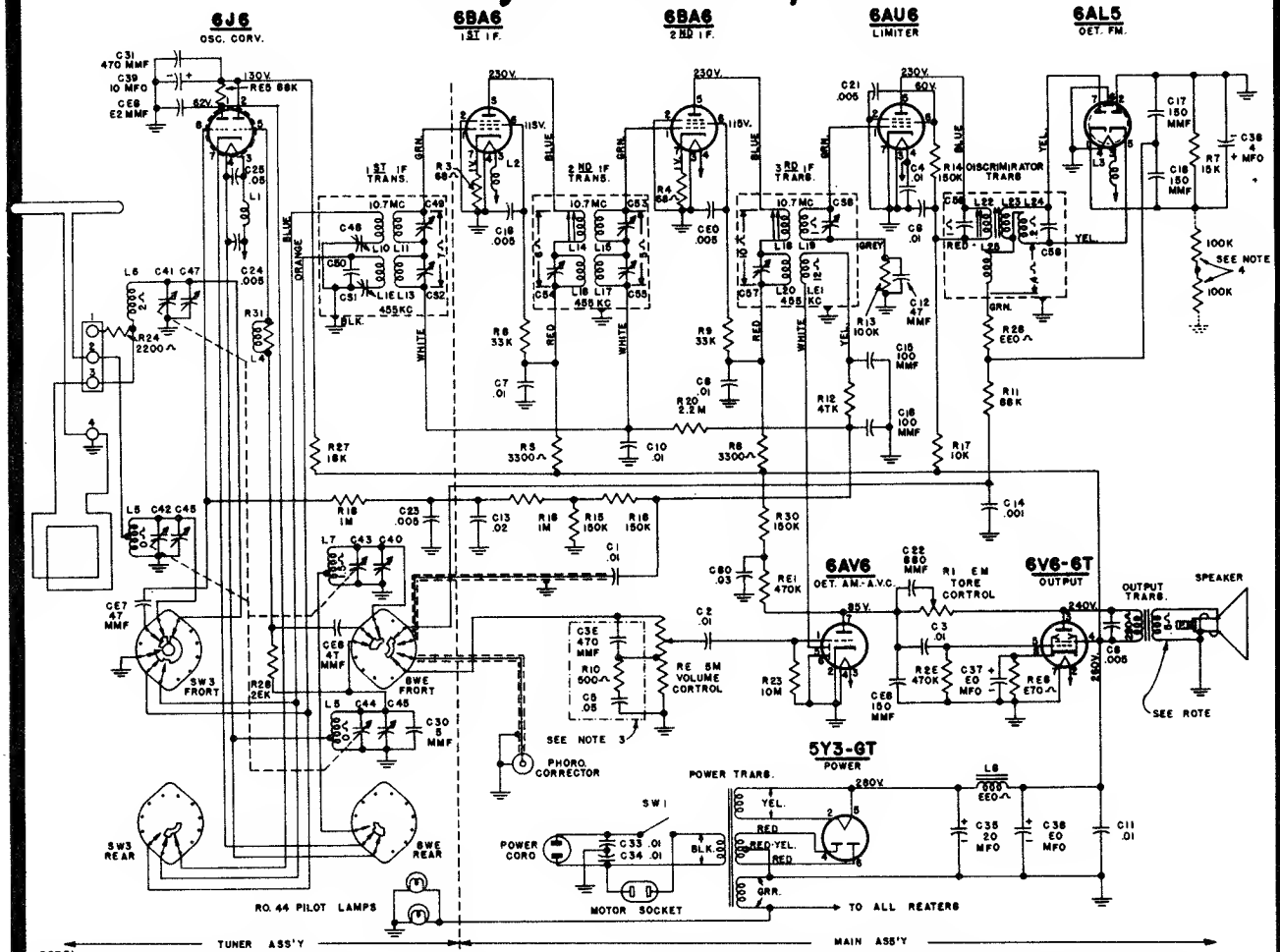
Connect an output meter across the speaker voice coil.

While making the following adjustments, keep the volume control set for maximum output and the signal generator attenuated to avoid AVC action.

Step	Connect Signal Generator to —	Signal Generator Frequency	Radio Dial Setting	Adjust
1.	Stator of antenna tuning capacitor (C3) through a 0.1 mfd capacitor	455 kc	minimum capacity	Trimmers in 1st and 2nd I-F trans. for max. output
	NOTE: If the I-F transformers are badly mis-aligned, it may be impossible to obtain sufficient output using the above system. In this event, it will be necessary to align each transformer separately. Start with the last I-F transformer and work forward, connecting the signal generator to the control grid of the tube preceding the transformer under alignment.			
2.	Recheck Step 1 adjustments.			
3.	Radiated signal (no actual connection)	1615 kc	minimum capacity	Osc. trimmer (C6) for max. output
4.	Radiated signal (no actual connection)	1400 kc	tune to signal	Ant. trimmer (C4) for max. output (rock-in adjustment)



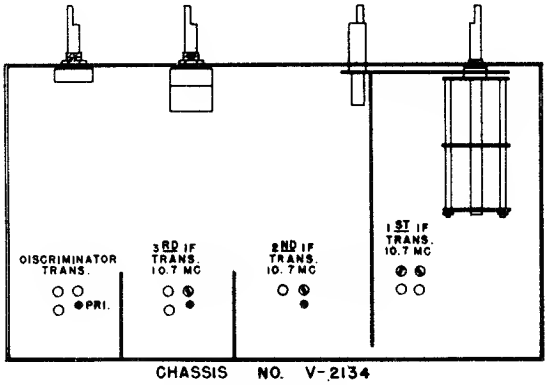
Westinghouse Electric Corporation



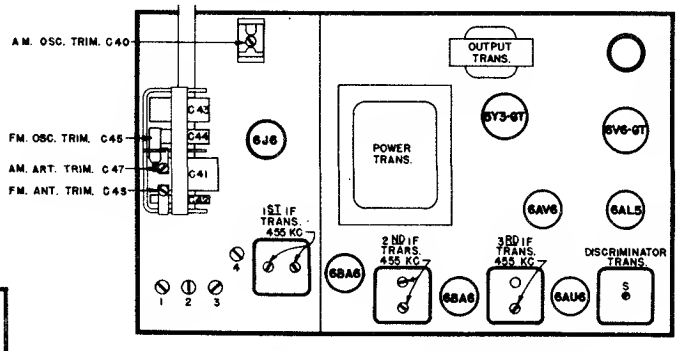
NOTE:
1. SPEAKER DISCONNECTED.
2. SELECTOR SWITCHES SW2 AND SW3 ARE SHOWN IN EXTREME COUNTER CLOCKWISE POSITION OR FM BAND.
   SECOND POSITION CLOCKWISE IS AM BAND.
   THIRD POSITION CLOCKWISE IS PHONO.
3. NOT USED ON EARLY MODELS.
4. TO BE INSTALLED TEMPORARILY BY SERVICE TECHNICIAN FOR ALIGNMENT PURPOSES ONLY.
5. ALL VOLTAGES MEASURED FROM CHASSIS (GND.) USING 20,000 OHM / VOLT METER-LINE VOLTAGE 117 V.A.C. VOLTAGES SHOULD BE AS SHOWN ± 20 PER CENT.

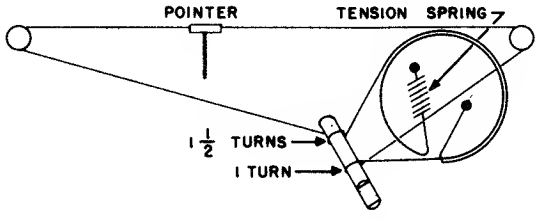
Westinghouse
RADIO · TELEVISION

H-190, H-191, & H-191A



CHASSIS NO. V-2134
BOTTOM VIEW

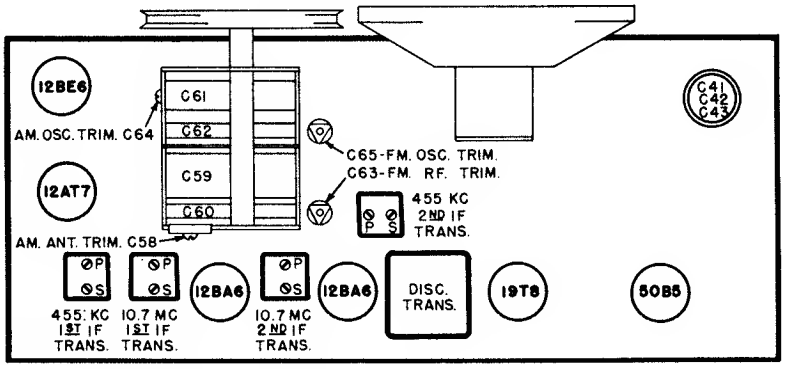




DIAL DRIVE

Westinghouse RADIO • TELEVISION

H-202 H-204



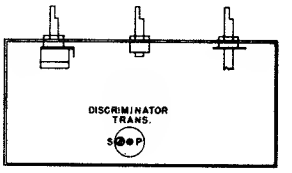


FIG. 1 - UNDER CHASSIS ADJUSTMENT

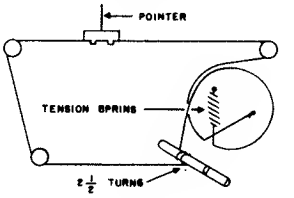


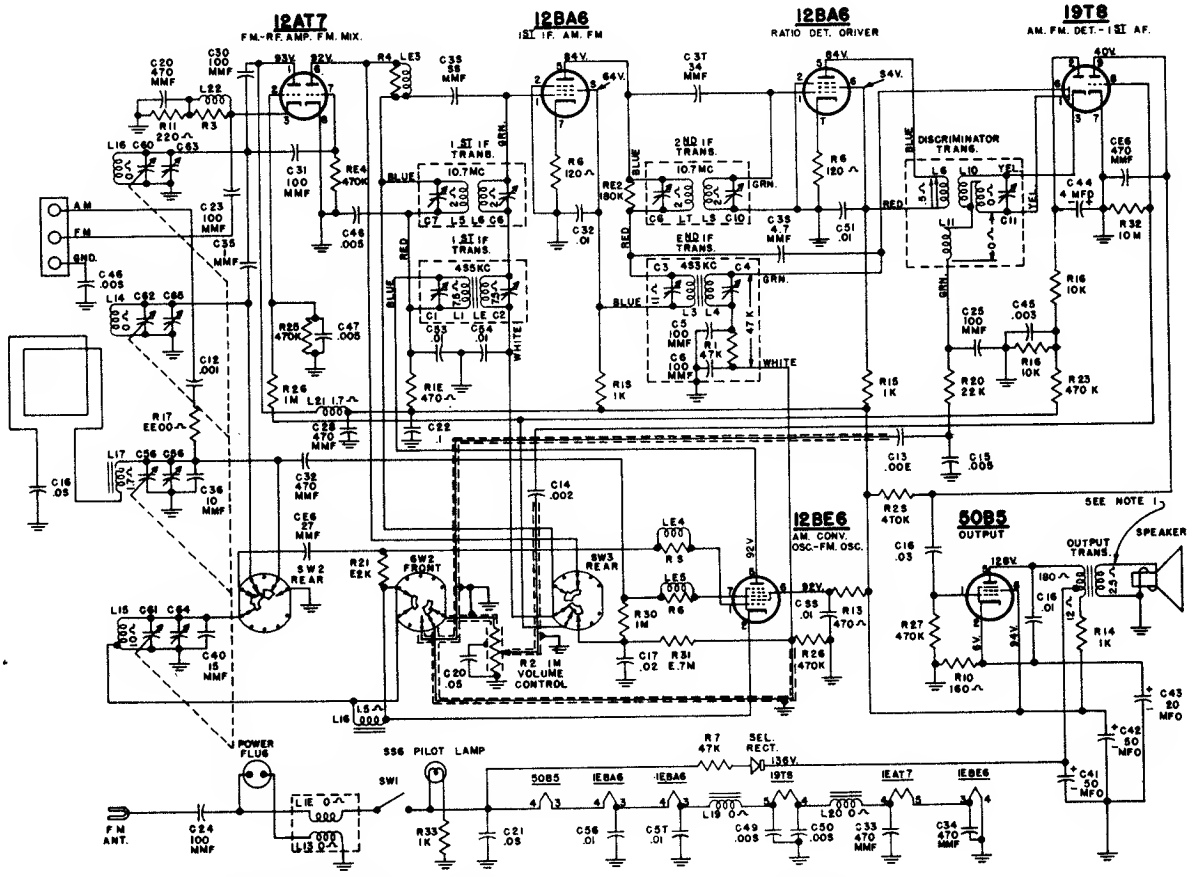
FIG., 2 - DIAL DRIVE

FREQUENCY RANGES:

Standard Broadcast ... 540 to 1600 kc.
Frequency Modulation ... 88 to 108 mc.

INTERMEDIATE FREQUENCIES:

Amplitude Modulation ..... 455 kc.
Frequency Modulation ..... 10.7 mc.

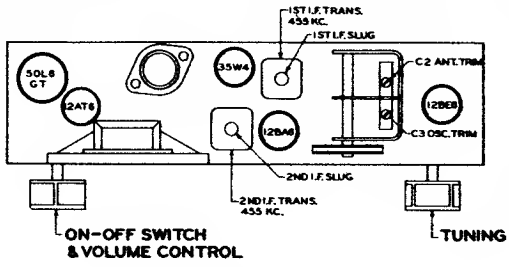


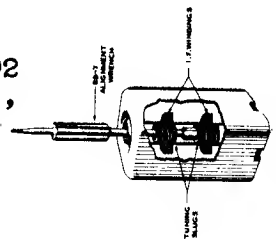
NOTE:
1. VOICE COIL DISCONNECTED.
2. SELECTOR SWITCH SW1 - SW3 SHOWN IN EXTREME COUNTER CLOCKWISE POSITION OR AM BAND. SECOND POSITION CLOCKWISE IS FM BAND.
3. ALL VOLTAGES MEASURED FROM CHASSIS (GND.) USING 20,000 OHM/VOLT METER-LINE VOLTAGE 117 V.A.C. VOLTAGES SHOULD BE AS SHOWN ± 20 PER CENT.

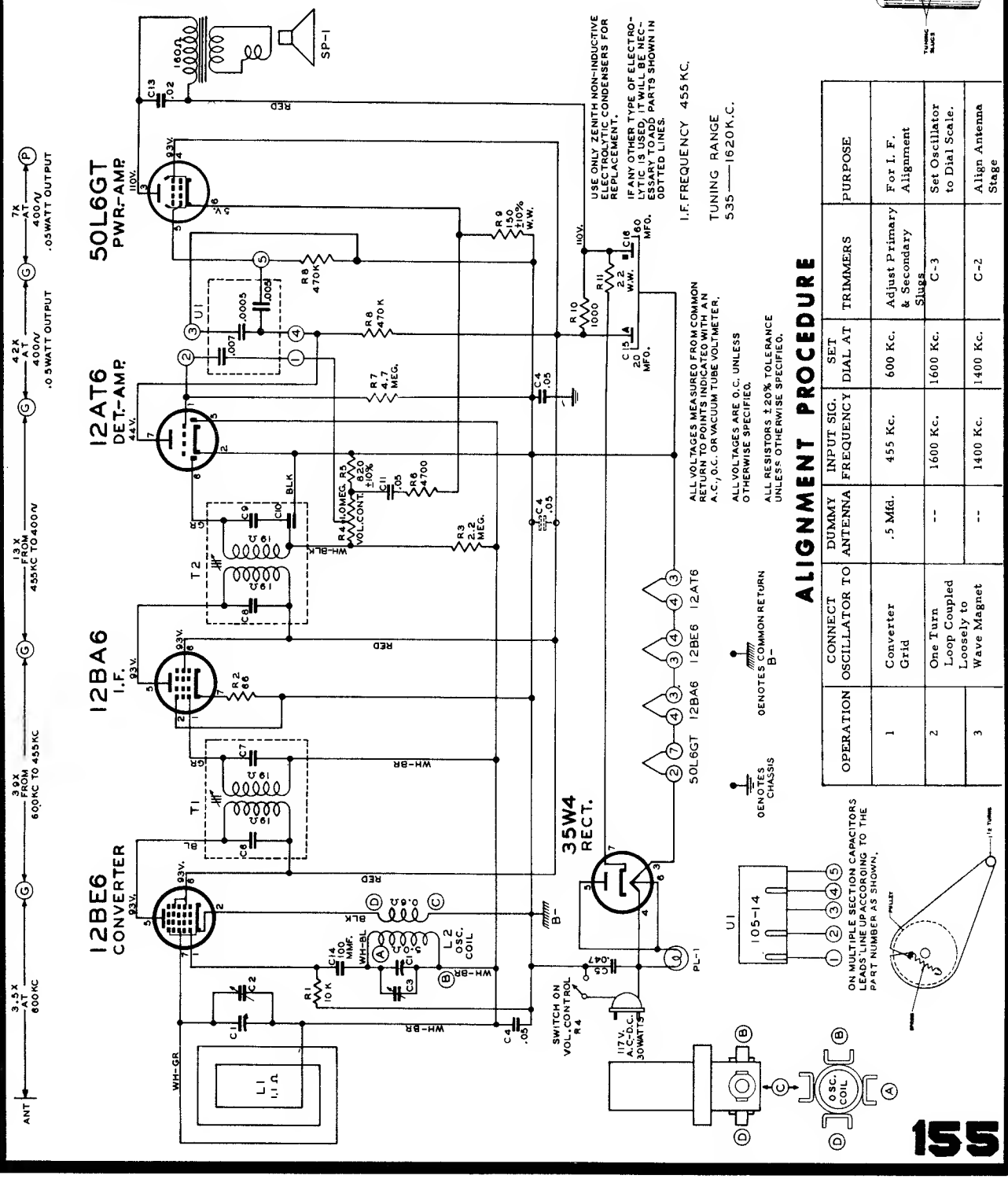
MODELS 5D811 CHASSIS 5E01

Zenith Radio Corp.

(Model 5D810, Chassis 5E02 is similar to Model 5D811, Chassis 5E01 shown here.)



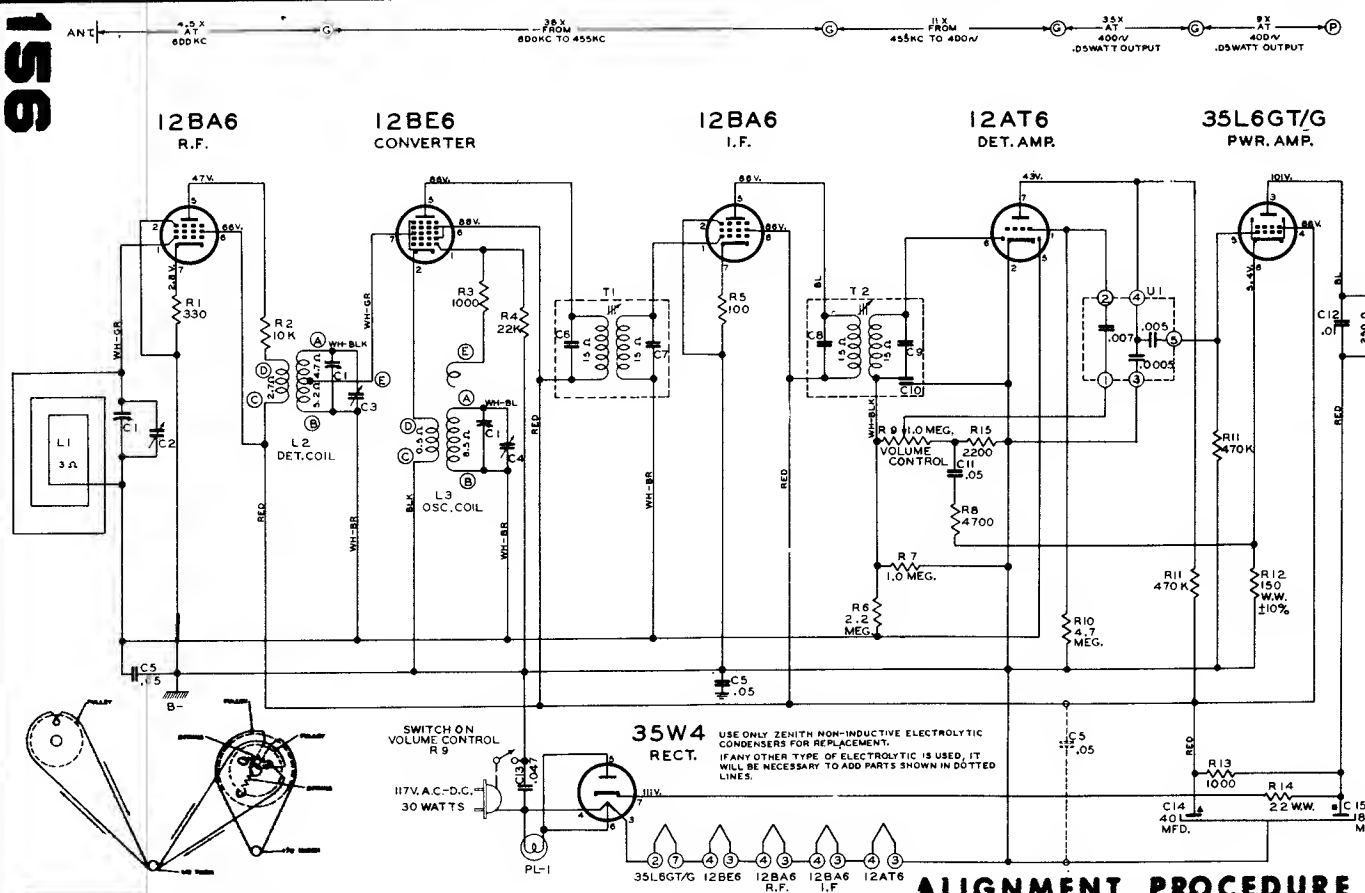


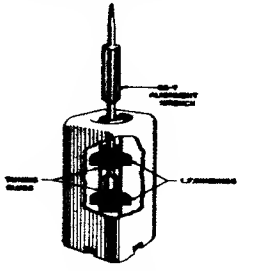


ALIGNMENT PROCEDURE

OPERATION	CONNECT OSCILLATOR TO	DUMMY ANTENNA	INPUT SIG. FREQUENCY	SET DIAL AT	TRIMMERS	PURPOSE
1	Converter Grid	.5 Mfd.	455 Kc.	600 Kc.	Adjust Primary & Secondary Slugs	For I. F. Alignment
2	One Turn Loop Coupled Loosely to Wave Magnet	--	1600 Kc.	1600 Kc.	C-3	Set Oscillator to Dial Scale.
3		--	1400 Kc.	1400 Kc.	C-2	Align Antenna Stage

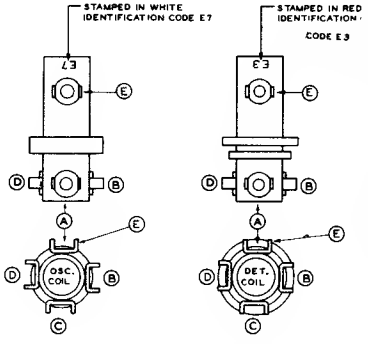
MANUAL OF 1949 MOST-OFTEN-NEEDED RADIO DIAGRAMS





I.F. FREQUENCY 455KC.

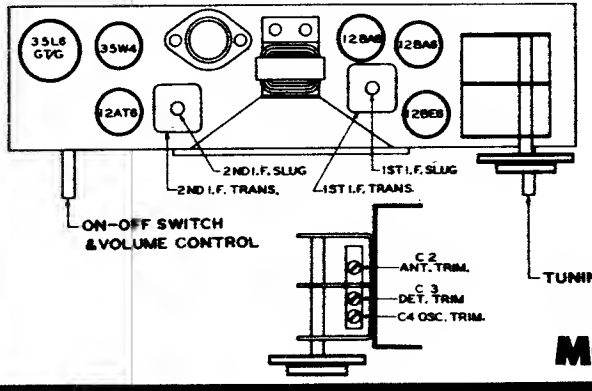
TUNING RANGE 535 — 1620 KC.



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

ALL VOLTAGES ARE D.C. UNLESS OTHERWISE SPECIFIED

ALL RESISTORS ±20% TOLERANCE UNLESS OTHERWISE SPECIFIED.

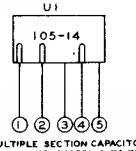


ALIGNMENT PROCEDURE

OPERATION	CONNECT OSCILLATOR TO	DUMMY ANTENNA	INPUT SIG. FREQUENCY	SET DIAL AT	TRIMMERS	PURPOSE
1	Convertor Grid	.5 Mfd.	455 Kc.	600 Kc.	Adjust Primary & Secondary Slugs	For I.F. Alignment
2	Single Turn Loosely Coupled to Wave Magnet	--	1600 Kc.	1600 Kc.	C-4	Set Oscillator to Dial Scale.
3		--	1400 Kc.	1400 Kc.	C-3	Detector Alignment
4		--	1400 Kc.	1400 Kc.	C-2	Antenna Alignment

DENOTES CHASSIS

DENOTES COMMON RETURN B-

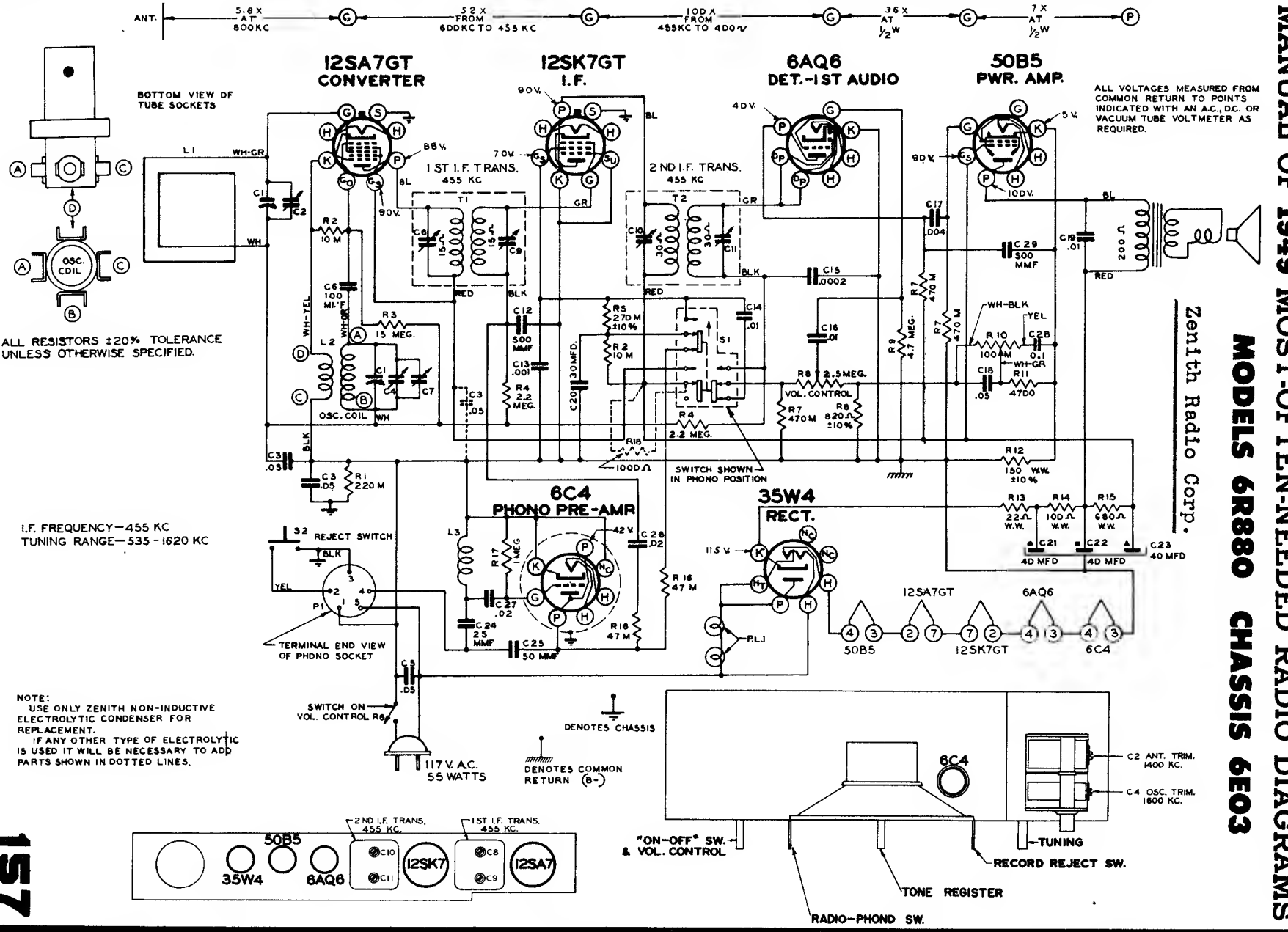


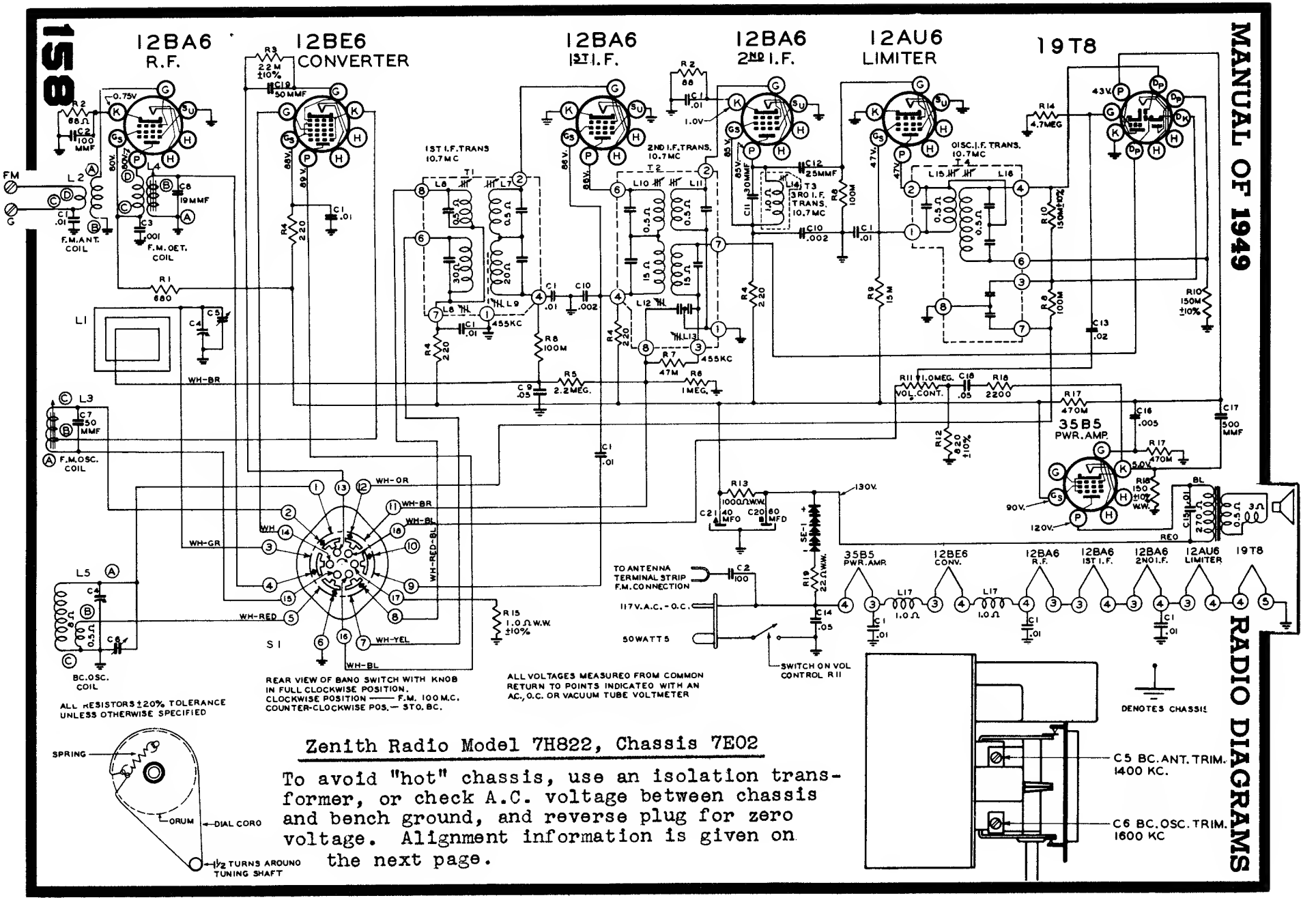
ON MULTIPLE SECTION CAPACITORS LEADS LINE UP ACCORDING TO THE PART NUMBER AS SHOWN.

MODELS 6D815 CHASSIS 6E05 Zenith Radio

MODELS 6R880 CHASSIS 6E03

Zenith Radio Corp.





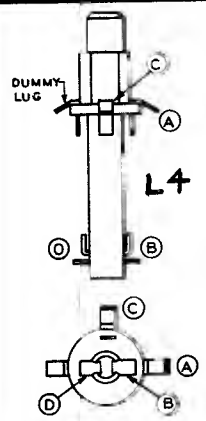
REAR VIEW OF BAND SWITCH WITH KNOB IN FULL CLOCKWISE POSITION. CLOCKWISE POSITION —— F.M. 100 M.C. COUNTER-CLOCKWISE POS.— STD. BC.

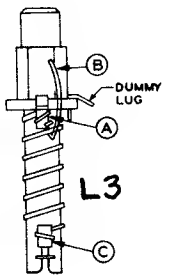
ALL VOLTAGES MEASURED FROM COMMON RETURN TO POINTS INDICATED WITH AN A.C., D.C. OR VACUUM TUBE VOLTMETER

ALL RESISTORS ±20% TOLERANCE UNLESS OTHERWISE SPECIFIED

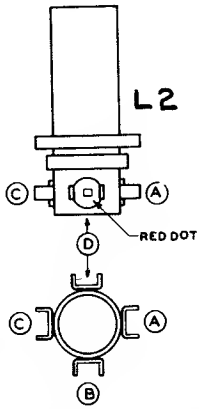
Zenith Radio Model 7H822, Chassis 7E02

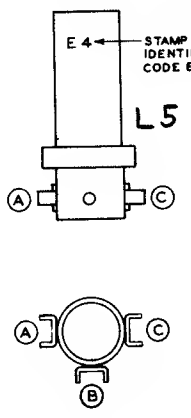
To avoid "hot" chassis, use an isolation transformer, or check A.C. voltage between chassis and bench ground, and reverse plug for zero voltage. Alignment information is given on the next page.

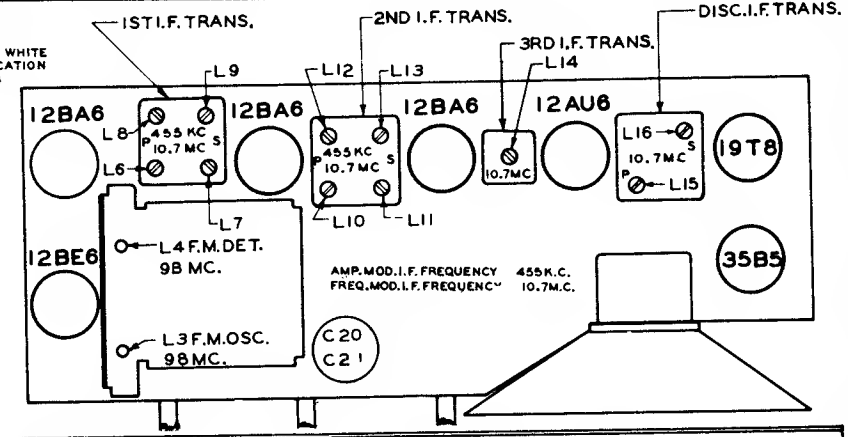




TUNING RANGES
540-1620 K.C. STD.BC.
88-108 M.C. F.M. 100







Operation	Connect Oscillator to	Dummy Antenna	Input Signal Frequency	Band	Set Dial To	Adj. Trimmers	Purpose
1	Pin 7 12BE6 Converter	.05 Mfd.	455 KC. Modulated	BC	600 Kc.	L8, 9, 12, 13	Align I. F. channel for maximum output.
2	2 turns loosely cpld. to wavemagnet		1600 Kc. Modulated	BC	1600 Kc.	C6	Set oscillator to dial scale.
3	2 turns loosely cpld. to wavemagnet		1400 Kc. Modulated	BC	1400 Kc.	C5	Align antenna stage.
4 (a)	Pin 1 (grid) on 12AU6 limiter.	.05 Mfd.	10.7 Mc. Unmodulated	FM 100		L15 coil slug Primary discr.	Align primary of discriminator for maximum reading.
5 (b)	Pin 1 (grid) on 12AU6 limiter.	.05 Mfd.	10.7 Mc. Unmodulated	FM 100		L16 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 100		L14 Prim. 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 100		L10 and L11 Prim. and Sec. of 2nd IF transformer	Align 2nd IF transformer for maximum reading.
8 (c)	Pin 7 (grid) on 12BE6 converter tube socket.	.05 Mfd.	10.7 Mc. Unmodulated	FM 100		L6 and L7 Prim. and Sec. of 1st IF transformer.	Align 1st IF transformer for maximum reading.
9 (c)	Antenna Post FM (Remove line ant.)	270 ohms	98 Mc. Unmodulated	FM 100	98 Mc.	L3 Osc. Coil Slug	Set Oscillator to dial scale.
10 (c) (d)		270 ohms	98 Mc. Unmodulated	FM 100	98 Mc.	L4 Det. Coil Slug	Align det. stage to maximum reading.

A vacuum tube voltmeter with an isolation resistor of 2,000,000 ohms in series with the hot lead will serve for FM adjustments.
An AC output meter connected across the primary or secondary of the output transformer will be satisfactory for all AM adjustments.
The signal generator output should be kept just high enough to get an indication on the meter.
(a) Vacuum Tube Voltmeter Lug 6 on discriminator transformer to chassis (half discriminator load).
(b) Vacuum Tube Voltmeter Lug 3 on discriminator transformer to chassis (full discriminator load).
(c) Vacuum Tube Voltmeter from Limiter Grid to Chassis.
(d) Loosen Slugs by applying a hot iron to the cement.

MODEL 7H822
CHASSIS 7E02

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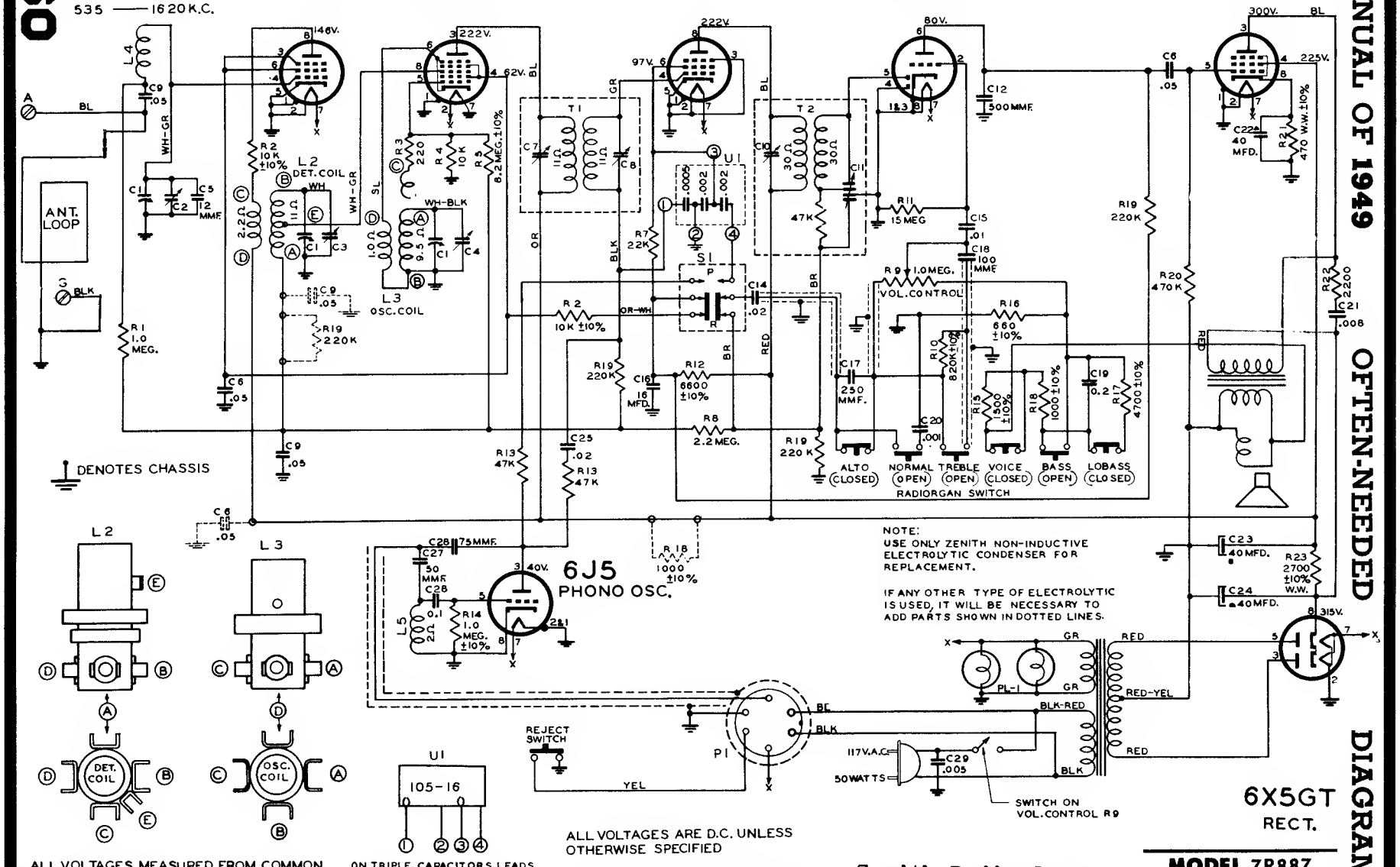
I.F. FREQUENCY 455K.C.

TUNING RANGE 535 — 1620 K.C.

6SK7GT R.F. | 6SA7GT CONVERTER | 6SK7 I.F. | 6SQ7GT DET.-AMP. | 6K6GT PWR.-AMP.



NOTE:
USE ONLY ZENITH NON-INDUCTIVE ELECTROLYTIC CONDENSER FOR REPLACEMENT.

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

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

ON TRIPLE CAPACITORS LEADS LINE UP ACCORDING TO THE PART NUMBER AS SHOWN.

ALL VOLTAGES ARE D.C. UNLESS OTHERWISE SPECIFIED

ALL RESISTORS ±20% TOLERANCE UNLESS OTHERWISE SPECIFIED

Zenith Radio Corp.

MODEL 7R887

CHASSIS 7E22

MANUAL OF 1949 OFTEN-NEEDED DIAGRAMS