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1953

VOLUME THIRTEEN

RADIO DIAGRAMS

and Servicing Information

THEORY

PRACTICE EXPERIENCE

Compiled by

M. N. BEITMAN

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September 1953

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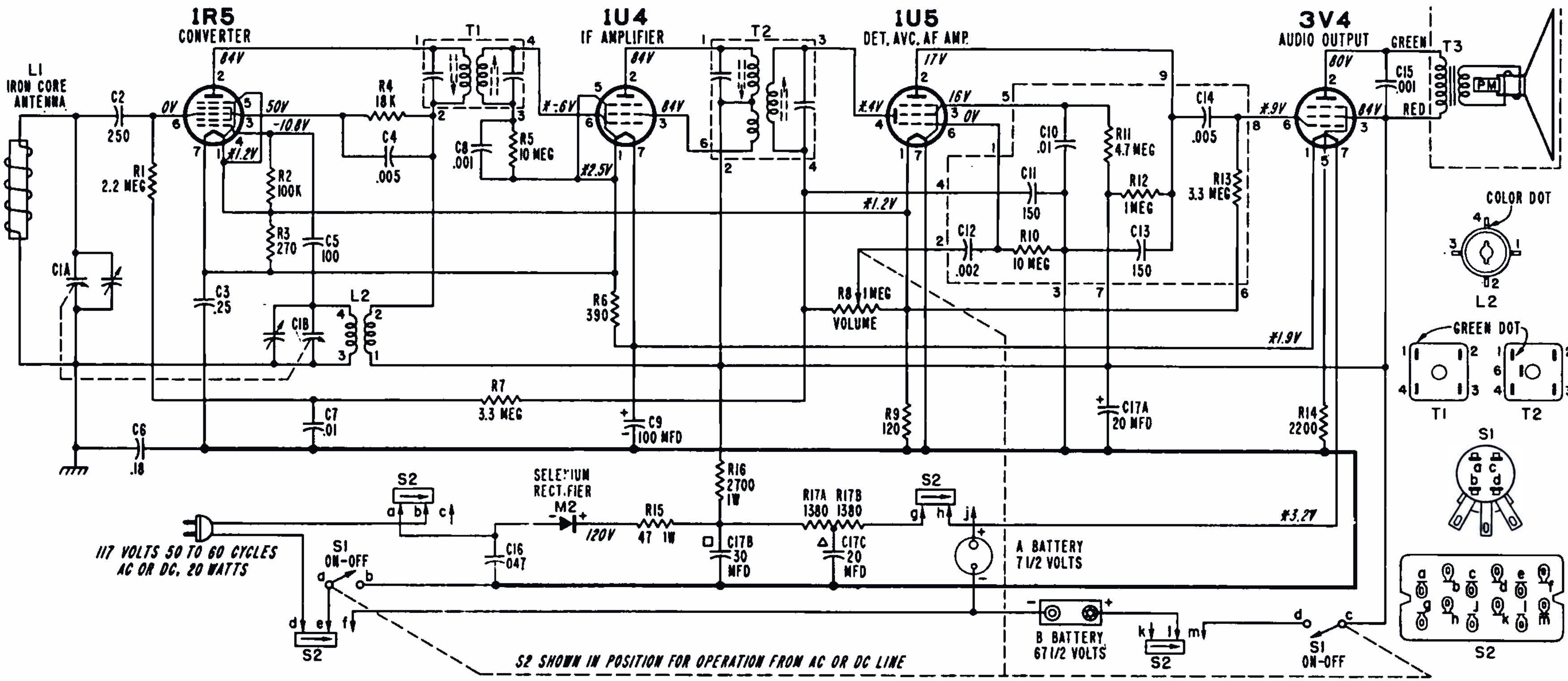
Admiral

CHASSIS 4Y1
MODELS 4Y11, 4Y12, 4Y18, 4Y19



*These voltage readings will be either lower or practically zero if taken with a 1000 ohms-per-volt meter.

IF=455 KC
COMMON GROUND (B-)
CHASSIS GROUND

DIAL CORD STRINGING

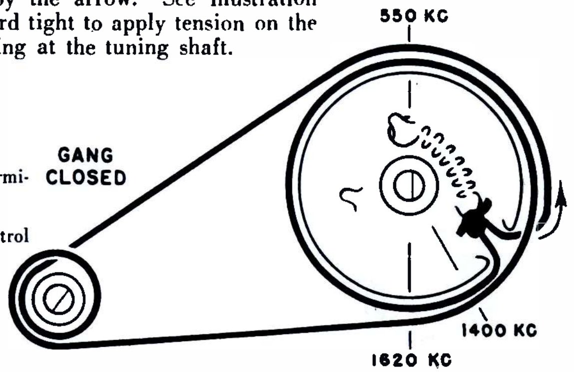
To string the dial cord, close the tuning gang. Start stringing at the tension spring and run the dial cord in the direction indicated by the arrow. See illustration below. Draw the dial cord tight to apply tension on the spring and prevent slipping at the tuning shaft.

VOLTAGE DATA

Voltages shown on schematic diagram.

All voltages taken between tube socket terminals and B minus (pin 7 of 1U5 tube).

Dial set at low frequency end; volume control at minimum.



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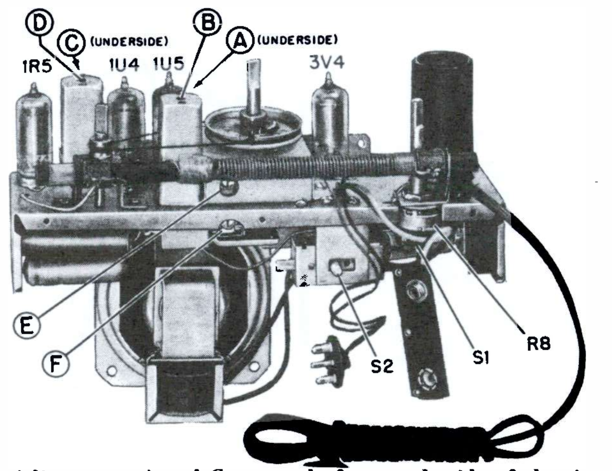


Adjustments A and C are made from underside of chassis.

Admiral

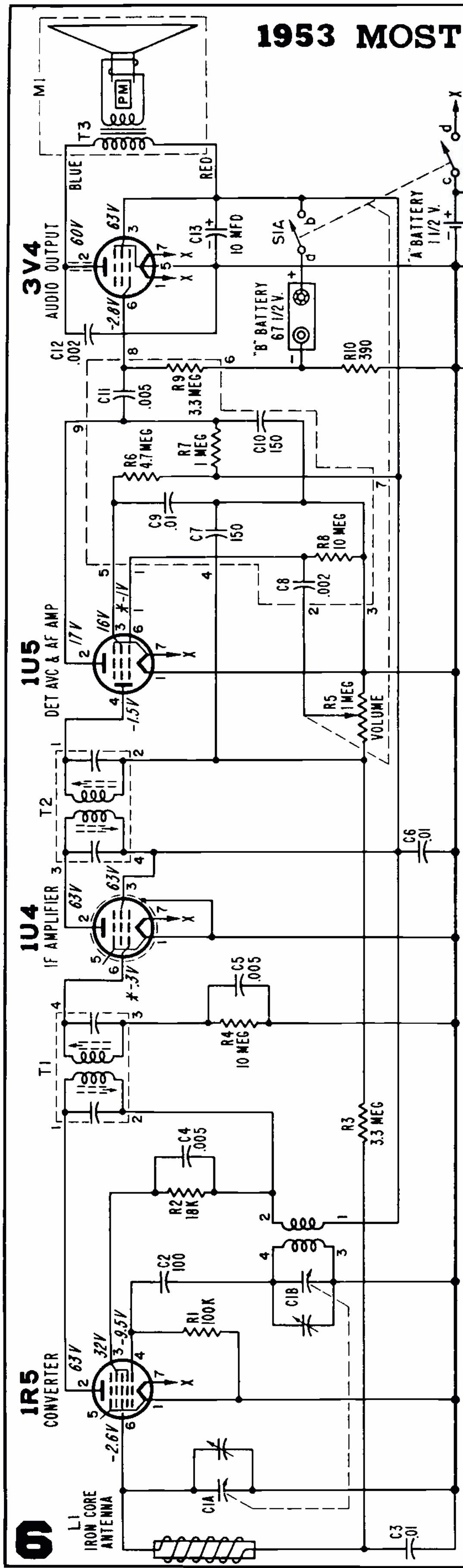
4X11 • 4X12 • 4X18 • 4X19

With 4X1 Radio Chassis

Frequency Range: Standard broadcast band, 535 to 1620 KC.

Intermediate Frequency: 455 KC.

Power Supply: Two 1½ volt "A" batteries and one 67½ volt battery.



*These voltage readings will be either lower or practically zero if taken with a 1000 ohms-per-volt meter.

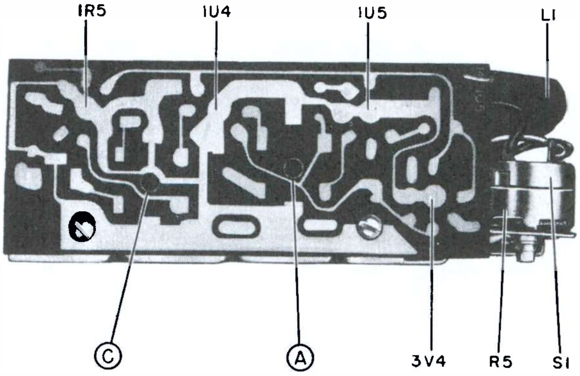
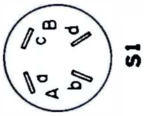
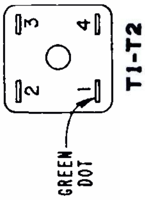
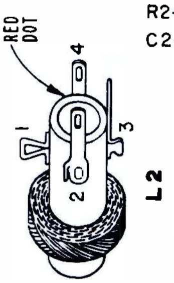


Figure 1. Bottom View of Chassis.







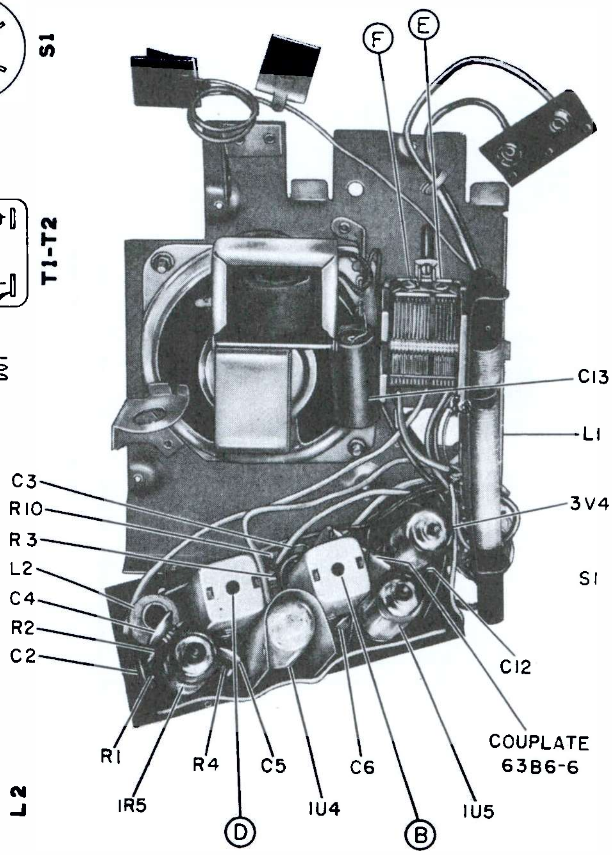
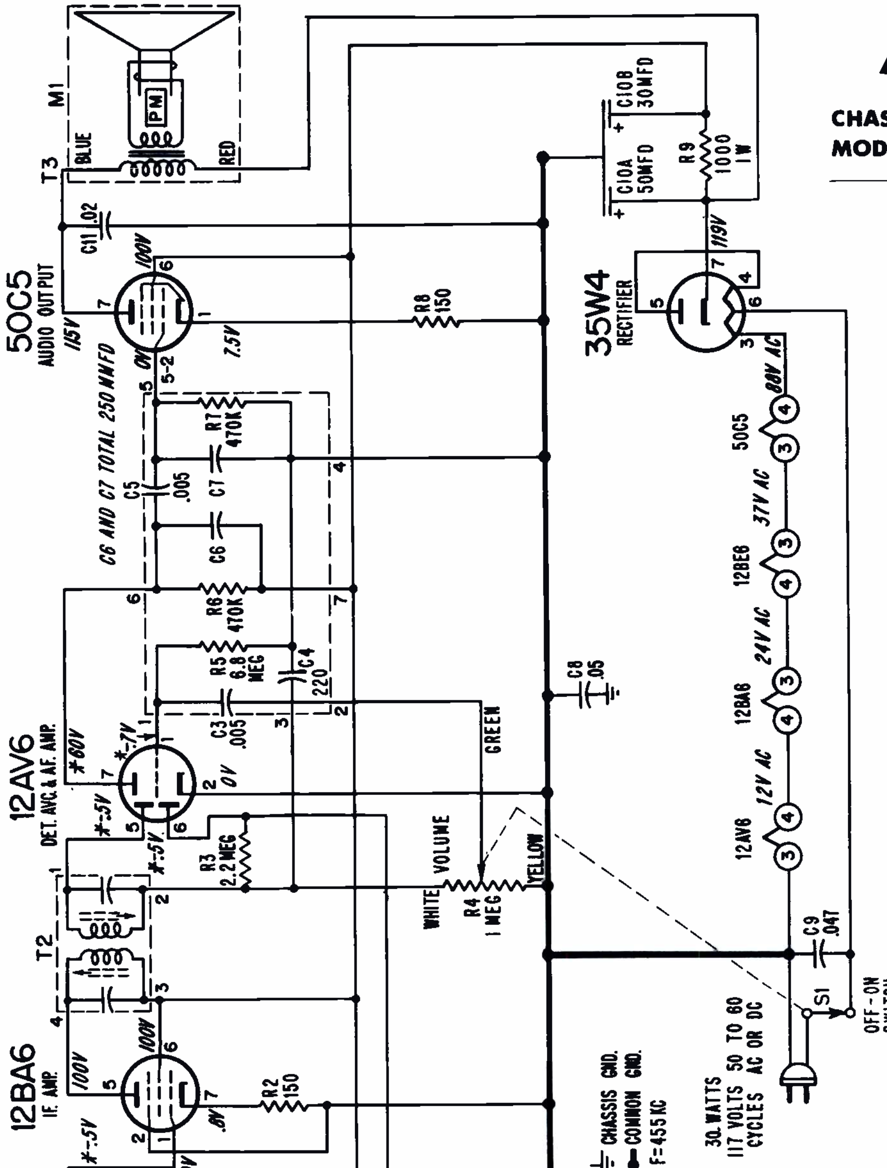
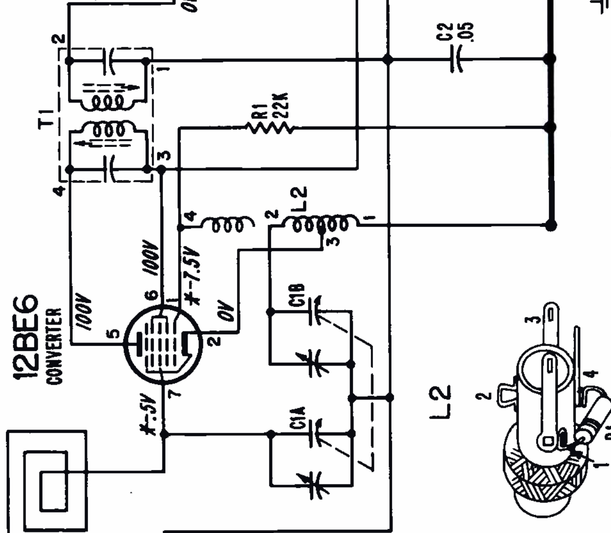


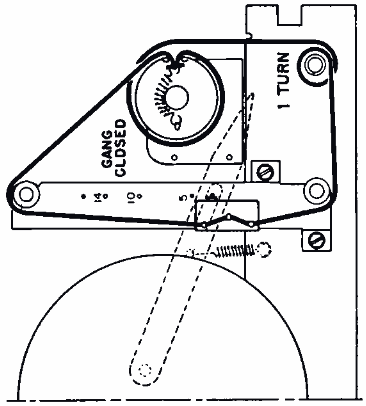
Figure 2. Top View of Chassis. Location of Components and Alignment Adjustments Shown.

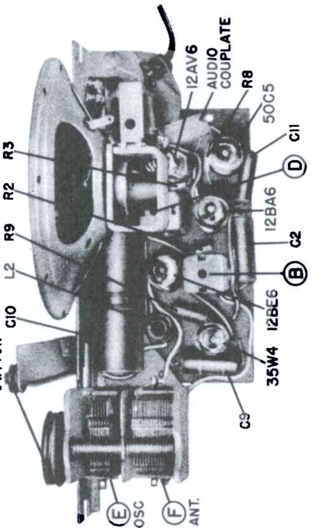
Admiral

CHASSIS 5C3
MODELS 5S21AN, 5S22AN, 5S23AN

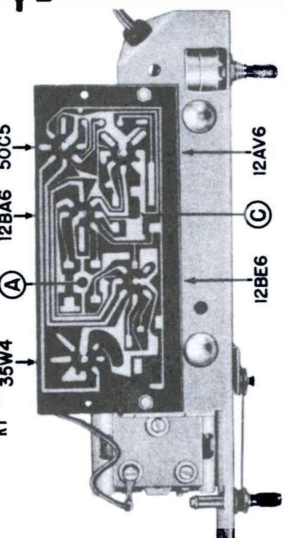




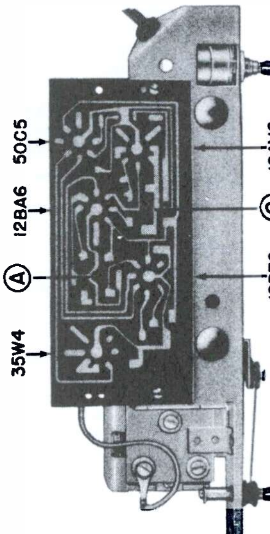




Top View of Chassis. Location of Components and Alignment Adjustments Shown.



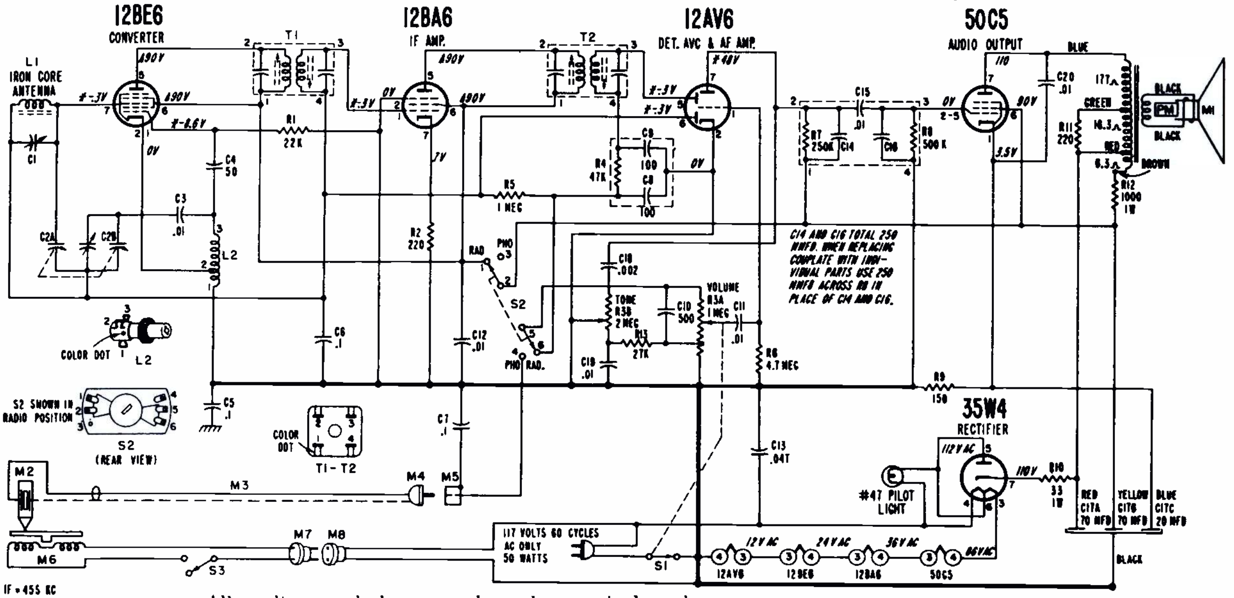
Bottom View of (Early Production) Chassis.



Bottom View of (Later Production) Chassis.

Admiral

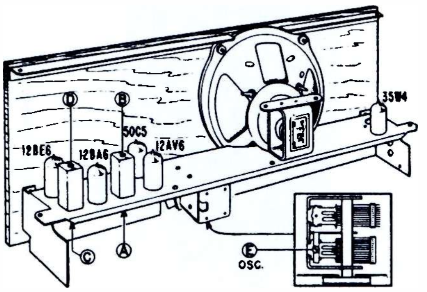
CHASSIS 5D3
MODELS 5D31, 5D32, 5D33



All readings made between tube socket terminals and B minus (terminal of On-Off switch).

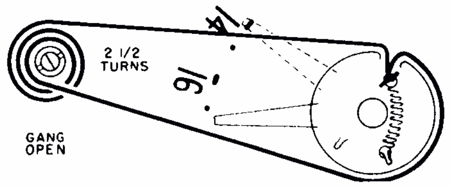
*These readings will be lower if taken with a 1000 ohms-per-volt meter.
▲These readings will be zero on "Phono"; other DC readings may be slightly higher.

OPERATING VOLTAGE
117 volts, 60 cycles AC only; 50 watts



TUBE AND TRIMMER LOCATION

Adjustments A and C made from underside of chassis. Adjustment F on antenna.



Solid lines show dial stringing and pointer position with tuning gang open. Dashed lines show pointer position (1400KC) when tuning gang is tuned to a generator signal.

ALIGNMENT PROCEDURE

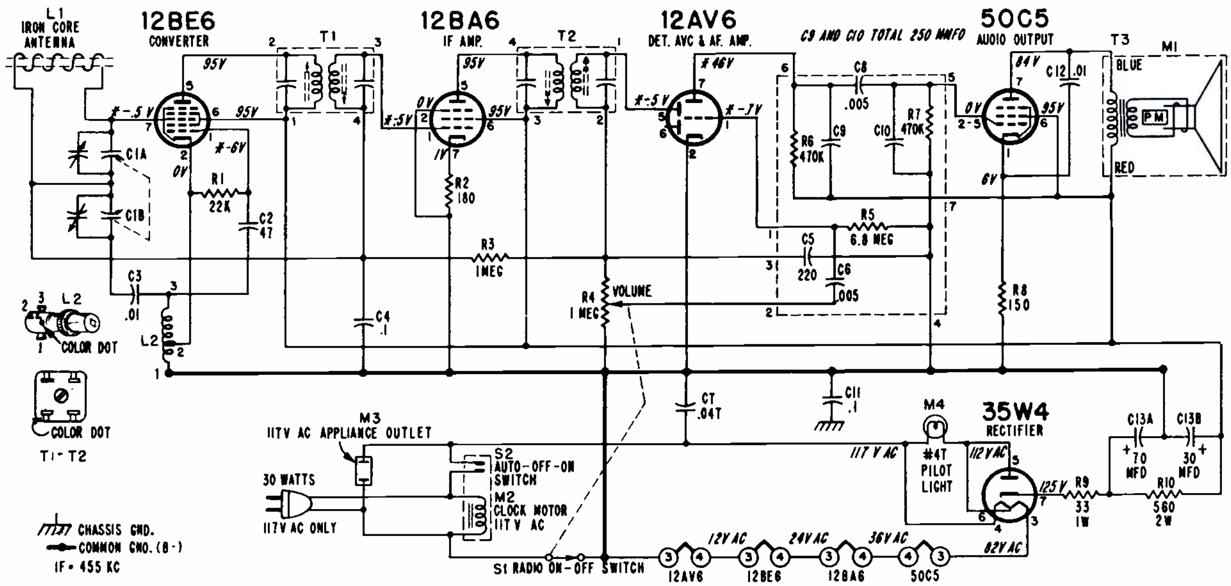
- Turn receiver volume control full on.
- Antenna must be connected and placed in the same relative position to the chassis as when in cabinet.
- Use an isolation transformer; otherwise, connect a .1 mfd. capacitor in series with low side of signal generator and connect to chassis. Caution: Do not connect a ground wire directly to chassis.
- Connect output meter across speaker voice coil.
- Use lowest output of signal generator necessary to produce midscale meter indication and proceed in the following sequence.
- Repeat adjustments to insure good results.

Step	Dummy Antenna in Series with Signal Generator	Connection of Signal Generator (High Side)	Signal Generator Frequency	Receiver Gang Setting	Trimmer Description	Trimmer Designation	Type of Adjustment
1	.001 mfd. capacitor	Tuning capacitor, antenna stator	455 KC	Gang fully open	2nd IF 1st IF	*A, B *C, D	Maximum output
2	.001 mfd. capacitor	Tuning capacitor, antenna stator	1620 KC	Gang fully open	Oscillator	E	Maximum output
3	Loop of several turns of wire, or place generator leads close to receiver antenna for adequate signal pickup.	No actual connection (signal by radiation)	1400 KC	Tune in generator signal	Antenna	†F	Maximum output

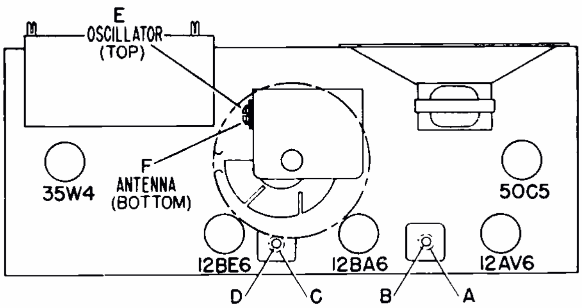
* Adjustments A and C made from the underside of the chassis. If IF transformers have hollow core slugs, these adjustments may all be made from the top of chassis, if you use alignment tool #98A30-7 obtainable from your Admiral distributor. The bottom IF slug adjustment may be reached through the hollow core in the upper slug. If IF transformers have slotted tuning slugs, use an alignment tool with a blade 3/32" wide.
† Antenna Trimmer "F" should be aligned after chassis and antenna are mounted in cabinet.

Admiral

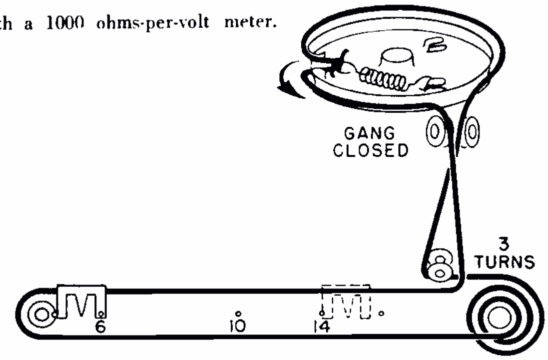
CHASSIS 5E3
MODELS 5E31, 5E32, 5E33, 5E38, 5E39



*These voltage readings will be either lower or practically zero if taken with a 1000 ohms-per-volt meter.



Adjustments A and C made from underside of chassis.



ALIGNMENT PROCEDURE

- Turn receiver volume control full on (fully clockwise).
- Use an isolation transformer if available; otherwise, connect a .1 mfd. capacitor in series with low side of signal generator and connect to chassis.
  Caution: Do not connect a ground wire directly to chassis.
- Connect output meter across speaker voice coil.
- Use lowest output of signal generator required for midscale meter indication and proceed in the following sequence.
- Repeat adjustments to insure good results.

Step	Dummy Antenna in Series with Signal Generator	Connection of Signal Generator (High Side)	Signal Generator Frequency	Receiver Gang Setting	Trimmer Description	Trimmer Designation	Type of Adjustment
1	250 mmfd. condenser	Antenna stator of tuning capacitor	455 KC	Gang fully open	2nd IF 1st IF	*A, B, *C, D	Maximum output
2	250 mmfd. condenser	Antenna stator of tuning capacitor	1620 KC	Gang fully open	Oscillator	E	Maximum output
Set tuning pointer with tuning gang tuned to 1400 KC generator signal; see illustration below.							
3	Loop of several turns of wire, or place generator lead close to receiver loop for adequate signal pickup.	No actual connection (signal by radiation)	1400 KC	Tune in generator signal	Antenna	F	Maximum output

*Adjustments A and C made from the underside of the chassis. If IF transformers have hollow core slugs, these adjustments may all be made from the top of the chassis, if you use alignment tool #98A30-7 obtainable from your Admiral distributor. The bottom IF slug adjustment may be reached through the hollow core in the upper slug. If IF transformers have slotted head tuning slugs, use an alignment tool with a blade 3/32" wide.

Admiral

CHASSIS 5X2
MODELS 5X21, 5X22, 5X23

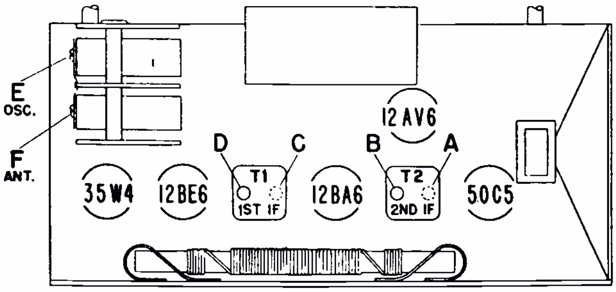
ALIGNMENT PROCEDURE

- Turn receiver volume control full on (fully clockwise).
- Use an isolation transformer if available, otherwise connect a .1 mfd. condenser in series with low side of signal generator and connect to chassis.
  Caution: Do not connect a ground wire directly to chassis.
- Connect output meter across speaker voice coil.
- Use lowest output setting of signal generator capable of producing adequate output meter indication and proceed in the following sequence.
- Use a NON-METALLIC alignment tool for IF transformers. See asterisk * note below.
- Repeat adjustments to insure good results.

Step	Dummy Antenna in Series with Signal Generator	Connection of Signal Generator (High Side)	Signal Generator Frequency	Receiver Gang Setting	Trimmer Description	Trimmer Designation	Type of Adjustment
1	250 mmfd. condenser	Antenna stator of tuning condenser	455 KC	Gang fully open	2nd IF 1st IF	*A, B *C, D	Maximum output
2	250 mmfd. condenser	Antenna stator of tuning condenser	1620 KC	Gang fully open	Oscillator (on gang)	E	Maximum output
3	Loop of several turns of wire, or place generator lead close to receiver antenna for adequate signal pickup.	No actual connection (signal by radiation)	1400 KC	Tune in generator signal	Antenna (on gang)	F	Maximum output

*Adjustments A and C made from the underside of the chassis. To avoid splitting the slotted head of the powdered iron core tuning slugs in IF transformers, use an alignment tool having a blade 1/8" wide.

TUBE AND TRIMMER LOCATION



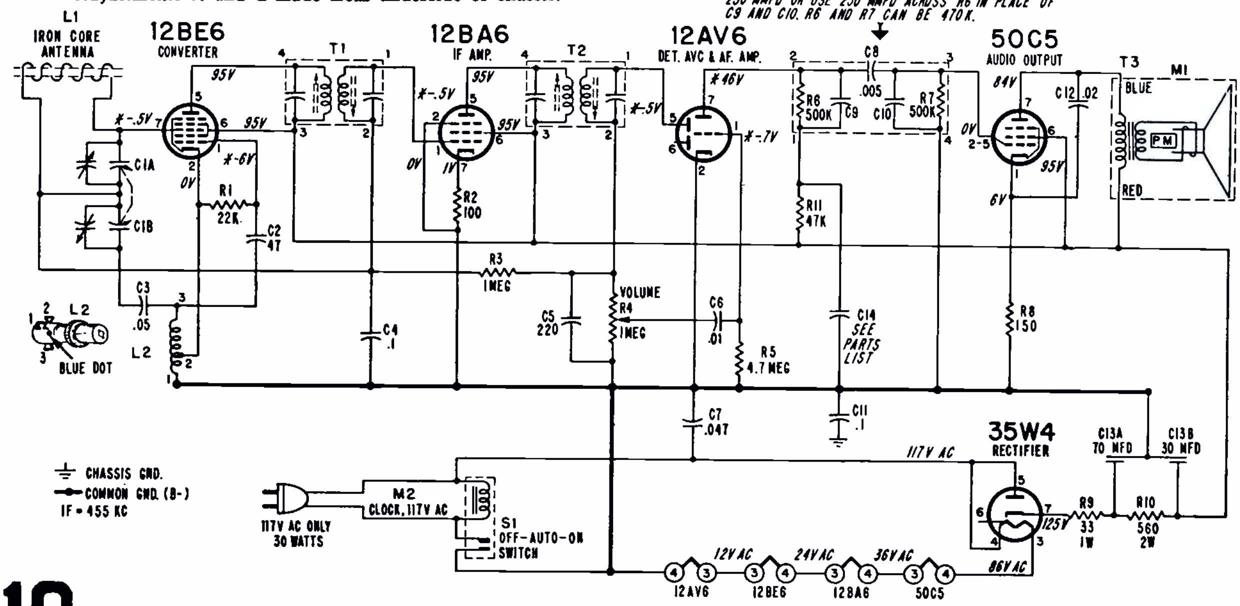
Adjustments A and C made from underside of chassis.

VOLTAGE DATA

Voltages shown on schematic diagram.

- All readings made between tube socket terminals and B minus (negative of electrolytic condenser C13).
- Measured on 117 Volt AC line.
- Volume control minimum; dial turned to low frequency end.
- Voltages measured with Vacuum Tube Voltmeter.

C9 AND C10 TOTAL 250 MMFD. WHEN REPLACING WITH INDIVIDUAL COMPONENTS, USE ANY COMBINATION TOTALING 250 MMFD OR USE 250 MMFD ACROSS R6 IN PLACE OF C9 AND C10. R6 AND R7 CAN BE 470K.



*These voltage readings will be either lower or practically zero if taken with a 1000 ohm-per-volt meter.

Admiral

RC600 RECORD CHANGER

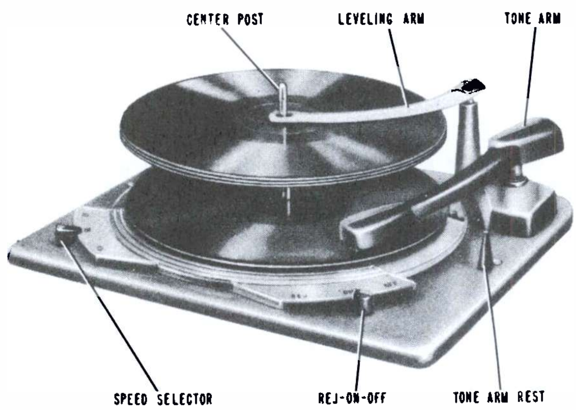


Figure 1. RC600 Record Changer, Top View.

This Admiral record changer will automatically play—

twelve of the 10-inch, 78 or 33 RPM records, or
ten of the 12-inch, 78 RPM records, or
twelve of the 12-inch, 33 RPM records, or
fourteen of the 7-inch, 45 RPM records, or
ten of the 7-inch, 33 RPM records.

The push-off is built into the record changer centerpost and operates automatically during the regular change cycle.

The tone arm set-down point is automatically selected during change cycle immediately after the first record drops to the turntable. The set-down index finger at the edge of the turntable rises momentarily to determine the correct set-down position for the tone arm.

SETTING THE SPEED SELECTOR KNOB: Correct turntable speed may be selected by sliding the speed selector pointer to the position indicated for 33, 78 or 45 RPM. See figure 2.

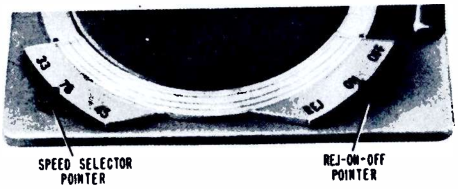


Figure 2. RC600 Record Changer Control Panel.

LOADING AND STARTING: Remove needle guard which protects phonograph needle during shipment. Select a stack of records of same size and speed. Grasp the leveling arm at the shaft end and lift it to clear the top of the centerpost. Swing the leveling arm toward the tone arm where it is out of the way of records.

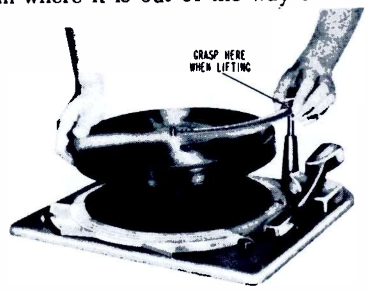


Figure 3. Loading Records.

Place the stack of records on the centerpost. Then, swing the leveling arm back over the centerpost and lower it on the record stack with the centerpost extending up through the opening. See figure 3.

REJECTING A RECORD: If the record changer will not trip into change cycle at the end of a record, or if you wish to stop playing a record and start playing the next one, merely slide the reject pointer to the "REJ" position momentarily.

STOPPING AND UNLOADING: Do not switch off the record changer or handle the tone arm during the change cycle. This record changer may be stopped manually only after the changer is out of change cycle and has begun playing a record. The tone arm may be carefully lifted off the playing surface of the record and placed on the tone arm rest at the side of the changer pan. Slide the reject pointer to the "OFF" position to stop the turntable. To restart, repeat procedure described for starting and operating the record changer.

This record changer will automatically switch off power to the turntable motor after the last record has played and the tone arm returned to the tone arm rest.

Grasp the leveling arm at the shaft end and lift it to clear the top of the centerpost. Swing the leveling arm toward the tone arm where it is out of the way of records. Lift the stack of records off the centerpost.

(Continued on the next 7 pages.)

CHANGE CYCLE

When following this change cycle, keep in mind that a velocity type trip is used, which depends upon a rapid movement of the tone arm toward the centerpost. Note that the Push-off, Trip, and Set-Down mechanisms function independently.

If at all possible, observe the change cycle of a record changer which is operating properly. It is a good idea to rotate the turntable by hand and repeat the change cycle until the function of each part is understood.

The changer operates as follows: The turntable is driven by the motor idler wheel (56), riding against its inside rim. The speed of the turntable is determined by the diameter of the shaft (either 78 RPM, 45 RPM, or 33 RPM) driving the idler wheel rubber tire (56).

The 78 RPM drive shaft is part of the motor armature. The 33 RPM drive shaft (51) and the 45 RPM drive shaft (52) are moved in and out of position mechanically by the speed selector link (34). See figure 6.

The changer mechanism is driven during its change cycle by the drive gear (42), which in turn is driven by the geared hub of the turntable. During normal record play, the "dead spot" on the drive gear is held next to the turntable hub by the gear indexing arm (39) and spring (40).

VELOCITY TRIP

This changer employs a velocity trip, consisting primarily of two parts: the trip motion arm (44), and the gear engagement pawl (46). These parts are mounted near the "dead spot" on the drive gear. See figure 4A.

During normal record play, the trip slider (49) is moved slowly by the stud on the tone arm control lever (64) which moves with the tone arm. The stud on the trip slider (49) rides against the trip motion arm (44), moving it very slightly. Since the gear engagement pawl (46) is held against the trip motion arm (44) by the trip friction washer (47), the gear engagement pawl (46) is also moved slightly toward the turntable hub. Since this movement is only slight, the vertical catch on the gear engagement pawl (46) is just touched and "kicked away" by the lug on the turntable hub. This occurs with each revolution of the turntable until the gear engagement pawl is moved in rapidly enough to position in front of the lug for the next turntable cycle.

This rapid movement only occurs when the trip slider (49) is moved rapidly, by the tone arm, as the needle enters the trip grooves of the record. The gear engagement pawl (46) then moves in front of and engages the lug on the turntable hub. This causes the drive gear (42) to be rotated far enough so that the teeth on the drive gear will engage the teeth on the turntable hub, starting the change cycle. See figure 4B.

The changer can also be tripped by sliding the reject pointer to the "REJ" position momentarily. The stud on the end of the reject arm (35) moves the gear engagement pawl (46) into position to engage the lug on turntable hub.

As the drive gear begins to rotate, the drive eccentric (82) also rotates, since both parts are mounted on the same shaft. See figure 6. As the drive eccentric rotates clockwise, the drive link (75) pivots the control plate (71). As the control plate pivots, the inclined cut-out moves from beneath the tone arm lift rod (65), raising the tone arm from the record. The safety arm (73) travels with the control plate (71). The stud on the safety arm engages the tone arm control lever (64) and moves the tone arm away from the centerpost.

PUSH-OFF

When the tone arm is clear of the turntable, the roller on the drive eccentric (82) engages the push-off link (84). The push-off link moves the push-off lever (85) which engages the push-off adjustment nut (92) on the end of the push-off shaft in the centerpost. As the push-off link is moved by the drive eccentric, the push-off lever moves the push-off shaft up into the centerpost. The push-off shaft engages the ejector and pushes it up and out at the shelf of the centerpost. See figure 9.

As the ejector moves up, it engages the center hole of the record at the bottom of the stack on the shelf. As the ejector moves out of the centerpost, the record moves with it until the center hole is clear of the shelf of the centerpost. The record drops down the centerpost to the turntable. The balance of the stack of records is held on the shelf by the centerpost slide above the ejector.

As the drive eccentric starts into the second half of the change cycle, the push-off return spring (93) returns the push-off lever (85) and the push-off link (84) to proper position and permits the push-off ejector to return into position for push-off for the next record on the shelf of the centerpost.

SET-DOWN

After push-off and during the second half of the change cycle, the tone arm is returned to the edge of the record on the turntable. The tone arm is mounted to the tone arm control lever (64). The engagement spring (66) presses the tone arm control lever against the cork friction washer on the set-down arm (63). As the set-down arm return spring (68) draws the set-down arm toward the centerpost, the cork friction washer returns the tone arm control lever with the set-down arm.

As the control plate (71) is returned by the drive link (75), the inclined cut-out moves beneath the tone arm lift rod (65). As the tone arm lift rod descends into the inclined cut-out, the tone arm is lowered to the record.

The **SET-DOWN INDEX** (69) automatically determines the correct set-down position of the tone arm for each record size. An index finger with a stepped rubber cap extends above the changer pan momentarily to de-

termine the size of the first record to be played. An index pin on the set-down arm (63) engages with the set-down index (69). As the long stud on the safety arm (73) moves the set-down arm (63), the index pin on the set-down arm releases the set-down index and permits it to pivot of its own weight and lift the index finger to the edge of the turntable.

A 7-inch record cannot obstruct the index finger. Therefore, the set-down index will pivot its full distance to the position which will permit the index pin on the set-down arm to enter the proper index slot for 7-inch set-down. The set-down arm return spring (68) draws the set-down arm toward the centerpost and the index pin on the set-down arm travels in to the end of the index slot. Since the index pin is held in the index slot against moving further toward the centerpost, the index slot will determine where set-down occurs.

A 10-inch record will extend past the edge of the turntable approximately ½ inch; the lower step of the index finger cap momentarily "feels" the edge of the record. The index finger cannot rise as high as it was when no record obstructed its rise, thus the set-down index is positioned to permit the index pin on the set-down arm to enter the index slot for 10-inch set-down.

A 12-inch record extends approximately 1¼ inches beyond the edge of the turntable. Thus, the index finger rises just slightly since the top step momentarily "feels" the record and the set-down index cannot lower enough to permit the index pin in either the slot for 7-inch or 10-inch set-down. As the set-down arm returns, the set-down index will hold the index pin in the proper position for 12-inch set-down for the tone arm.

AUTOMATIC SHUT-OFF

After the last record of the stack on the shelf has been ejected to the turntable, the leveling arm (26) drops about 3/16 of an inch beneath the shelf. The bottom end of the leveling arm shaft extends beneath the changer pan and will lower the shut-off delay stop (80). The shut-off link control arm on the shut-off link (76) is then permitted to pivot with the shut-off arm spring (77) fastened at its other end to the control plate (71). The shut-off link control arm will draw the shut-off link and engage its cam that positions the shut-off link in line with the stud on the reject arm (35).

As the shut-off link (76) is drawn toward the control plate (71), the stop on the shut-off link moves into the path of the stud on the tone arm control lever (64).

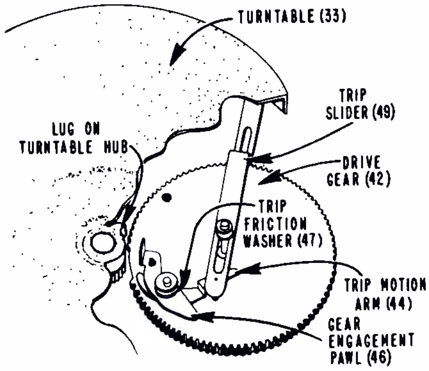


Figure 4A. Position of Drive Gear Out of Change Cycle.

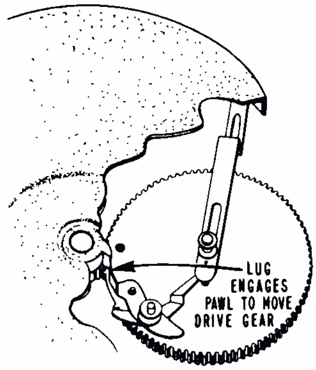


Figure 4B. Position of Drive Gear During Change Cycle.

When the control plate (71) begins to return in the second half of the change cycle, a stud on the control plate moves the shut-off link (76) to snap off the phonograph motor switch (99) and return the control knob lever (23) to "OFF".

FOR INDIVIDUAL PARTS DETAIL, SEE FIGURE 11, "RC600 RECORD CHANGER, EXPLODED VIEW"

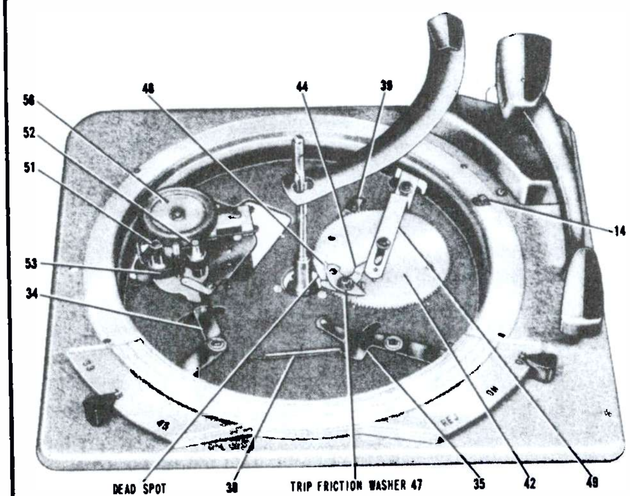


Figure 5. RC600 Record Changer with Turntable Removed.

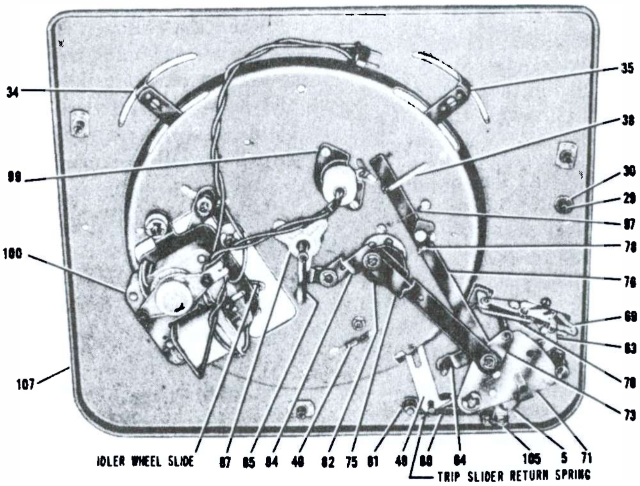


Figure 6. Bottom View, Changer Out of Cycle.

The tone arm control lever (64) is held by the tone arm stop on the shut-off link (76) while the control plate (71) is going through the second half of the change cycle; the tone arm is held suspended above the tone arm rest (29). As the inclined cut-out moves under the tone arm lift rod (65), the tone arm is lowered onto the tone arm rest.

ADJUSTMENTS

When making the following adjustments, keep in mind that the Push-off, Trip, and Set-Down mechanisms function independently.

VELOCITY TRIP MECHANISM

This record changer uses a velocity type trip, which depends upon a rapid movement of the tone arm toward the centerpost in any area between 2⅞" to ⅞" from the center of the record. **This trip requires no adjustment.** However, in order for the changer to trip properly, there must be sufficient friction between the trip motion arm (44) and the gear engagement pawl (46). Friction may be increased by placing a very slight amount of a silicone lubricanton the fibre washer (45). If necessary, replace the trip friction washer (47). See Figure 4A.

SET-DOWN ADJUSTMENT

The set-down adjustment may be made while the changer is in its compartment or cabinet. Adjustment of the set-down point is made by adjusting the set-down adjusting screw (6). See Figure 7. **The tone arm will automatically set-down properly on 7-inch or 12-inch records if the set-down adjustment is made properly on a 10-inch record.** The set-down adjusting screw is accessible through the hole in the left side of the tone arm. Turning this screw out (counterclockwise) moves the set-down point of the tone arm closer to the centerpost, and turning this screw in (clockwise) moves it away from the centerpost.

Be sure the record changer is level. Make the set-down adjustment as follows:

1. Grasp the leveling arm at the shaft end and swing the arm from the centerpost to its stop above the tone arm rest.
2. Place a standard 10-inch, 78 RPM record on the turntable.
3. When operating the record changer out of its cabinet, the television line cord with the interlock socket (Admiral part number 89A22-1) may be used as an adapter for power at the phonograph motor plug.
4. Slide the reject pointer to the "REJ" position momentarily and let it return to "ON". The changer will begin its automatic cycle. *Slide the reject pointer to the "OFF" position so that the turntable will stop **after** set-down has begun, but **before** the needle has touched the record.*
5. Place a ruler against the centerpost and measure the distance between the near side of the centerpost and the needle. This distance should be between 4-10/16" and 4-11/16".
6. When the 10-inch adjustment is correct, the needle should set-down between 5-19/32" and 5-22/32" from the near side of the centerpost on 12-inch records, and between 3¼" to 3-5/32" on 7-inch records.
7. Check the set-down point with each size of record. "Touch-up" set-down adjustment until the set-down has been optimized for all record sizes.

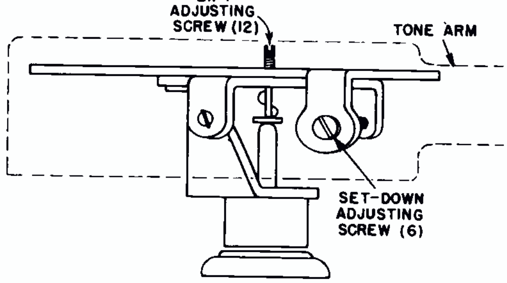


Figure 7. Set-Down and Lift Adjustments.

ADJUSTING THE TONE ARM LIFT

Be sure the record changer is level. The tone arm lift adjustment may be made while the changer is in its compartment or cabinet. The tone arm lift adjusting screw (12) is accessible through a hole on the top of the tone arm at the tone arm base. See figure 7. If the tone arm lift is too great, that is, the tone arm touches the record at the bottom of the stack on the shelf of the centerpost, turn the lift adjusting screw counterclockwise. If the tone arm lift is not great enough to pass above a stack of 12 standard 10", 78 RPM records on the turntable, turn the lift adjusting screw clockwise.

When the changer is not in change cycle, the end of the needle should be approximately ¼" above the changer pan. Lift the tone arm off the tone arm rest and let it suspend over the surface of the changer pan between the tone arm rest and the edge of the turntable escutcheon. See figure 8. The distance between the end

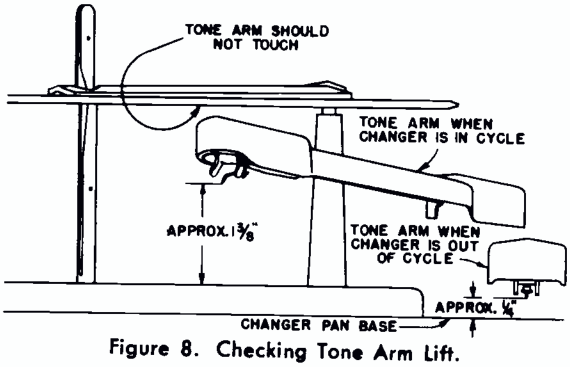


Figure 8. Checking Tone Arm Lift.

of the needle and the surface of the changer pan may be conveniently measured by passing an ordinary pencil between the needle and the pan.

When the changer is in change cycle, the needle must be approximately 1⅜" above the surface of the turntable; the tone arm must pass over 12 standard 10", 78 RPM records.

PUSH-OFF ADJUSTMENT

Push-off adjustment must be checked whenever the centerpost has been removed or changed. Record push-off is accomplished by means of an ejector and push-off shaft built into the centerpost. During change cycle, the ejector and push-off shaft are moved by the push-off lever (85). If ejector travel is not sufficient for record push-off, adjustment may be required.

Ejector travel is adjusted by the hexagonal adjustment nut (92). With proper push-off adjustment, the ejector should extend just slightly beyond the edge of the shelf on the centerpost. See figure 9.

Additional travel must be allowed for the push-off shaft and ejector after the push-off lever (85) has moved its full distance.

To adjust the push-off, proceed as follows:

1. Rotate the turntable by hand. Slide the reject pointer to "REJ" position and let it return to "ON".
2. Continue rotating turntable slowly until the roller on the drive eccentric (82) engages the push-off link (84). Rotate turntable until the roller has moved the link its full distance. The push-off lever (85) is now extended its maximum travel.
3. Check the position of the ejector at the shelf of the centerpost. The ejector should extend ***just beyond*** the edge of the shelf. See figure 9. If the ejector does not extend beyond the edge of the shelf, turn the push-off adjustment nut (92) counterclockwise to increase the amount of push-off. Use a ¼" open-end wrench for this adjustment.

   CAUTION: The push-off adjustment nut has been specially slotted to stay tight on the push-off shaft after adjustment is made. Do not turn the nut all the way on the push-off shaft; this will spread the slots and allow the nut to turn out of adjustment.
4. Press the hexagonal adjustment nut (92) to check for additional travel before the push-off shaft stops. The ejector should move out past the shelf slightly more than necessary for push-off before it stops.
5. Slide a 15 thousandths of an inch (.015) feeler gauge* between the flat surface of the adjustment nut (92) and the push-off lever (85) to check and adjust until gauge passes freely.

NOTE: The additional travel for the push-off shaft may vary, of course, in order to obtain proper push-off. However, the clearance of 15 thousandths of an inch (.015) must not vary more than plus or minus 5 thousandths.

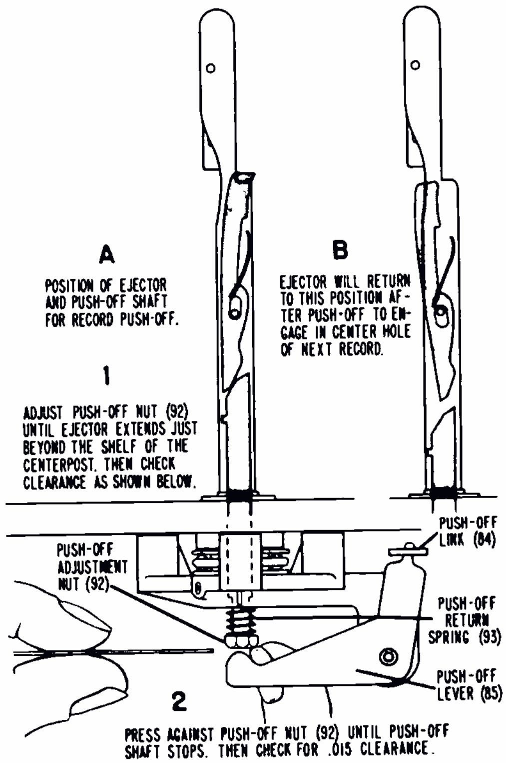


Figure 9. Adjusting for Correct Push-Off.

RECORD CHANGER TROUBLE SHOOTING

Records Do Not Push Off Or More Than One Record Drops To The Turntable.

1. Check for broken or weak ejector return spring in the centerpost.
2. Check for weak push-off return spring (93).
3. Check the push-off adjustment. See figure 9.
4. Check that no foreign material is between the record shelf and the ejector in the centerpost.

Changer Causes Rumble Or Noise.

1. BE SURE that the shipping screws (21) on each side of changer pan have been removed.
2. Check for any mechanical rub near the motor.
3. Check for broken float spring (104).
4. Be sure plastic escutcheon is securely held to changer pan by the four mounting screws.

* A dollar bill folded three times (eight thicknesses) will closely approximate 15 thousandths of an inch.

ADMIRAL, Continued

Model RC600

PARTS LIST

REF. No.	PART No.	DESCRIPTION
1	403C 60	Tone Arm
2	409A 13	Pickup Cartridge with Needle and Knurled Nut
	409A 13-1	Pickup Cartridge with Needle (push-in type) Cartridges (with needle) are interchangeable
	409A 13-2	Pickup Cartridge (export type) with Needle and Knurled Nut
3	98A 15-19	Needle for 409A13 Cartridge
	98A 15-18	Needle for 409A13-1 Cartridge
4	1A 72-1-20	Cartridge Mtg. Screw Shakeproof Type 25 (2 req.)
5	G400A 529-1	Tone Arm Lead and Pin Jack Assembly
6	45-750-C2-47	Set-Down Adjusting Screw, #4-40x¾ BMS
7	405A 137	Set-Down Adjusting Lock Spring
8	G400A 611	Tone Arm Mtg. and Pivot Plate Assembly
9	2B 10-5-59	Speed Nut (2 req.)
10	404A 40	Tone Arm Counterweight
11	1A 70-6-20	Counterweight Mtg. Screw, #4x⅝ (2 req.)
12	402A 290	Lift Adjusting Screw
13	405A 148	Lift Adjusting Spring
14	406A 27	Index Finger Rubber Cap
15	401A 355-1	Retaining Ring (12 req.)
16	414A 48	Pivot Shaft
17	G400A 610	Tone Arm Mount and Hub (includes Allen Set Screw)
18	402A 296	Allen Set Screw, #8-32x3/16 (2 req.)
19	403C 61	Tone Arm Plastic Base Assembly (includes bearings)
20	13A 2-8-57	Snap-In Buttons
21	103-1750-F2-52	"Held-Down" Screw, #10-32x1¾ (for shipping only)
22	403A 63	Plastic Control Pointer (Maroon) (2 req.)
23	401A 385	Control Knob Lever (2 req.)
24	402A 342	Control Knob Mtg. Screw, #4x¼ PHST (2 req.)
25	760-187-C2-57	Screw, #6-32x3/16, BH (includes lock washer) (2 req.)
26	G400B 625	Leveling Arm Assembly
27	405A 150	Leveling Arm Return Spring
28	401A 355-3	Retaining Ring (2 req.)
29	403A 65	Tone Arm Rest
30	2B 10-40-59	Speed Nut (3/16)
31	403D 64	Plastic Escutcheon (Gold)
32	1A 26-54-57	Screw (for mtg. Esc.) #2x¼
33	G400B 602	Turntable
34	G400A 607	Speed Selector Link Assembly
35	G400A 608	Switch and Reject Arm Assembly
36	4A 5-19-0	Spring Washer
37	401A 388	Flat Washer (6 req.)
38	405A 140	Reject Arm Return Spring; Shut-Off Link Return Spring
39	G400A 620	Gear Indexing Arm and Stud Assembly
40	405A 147	Gear Indexing Spring
41	4B 2-178-0	Flat Washer (5 req.)
42	G400A 587	Drive Gear and Stud Assembly
43	402A 292	Trip Pivot Hub
44	401A 351-1	Trip Motion Arm
45	412A 36	Fibre Washer
46	401A 352	Gear Engagement Pawl
47	401A 366	Trip Friction Washer
48	401A 355-6	Retaining Ring
49	G400A 575	Trip Slider
50	98A 15-9	Oil Retaining Felt Washer (2 req.)
51	98A 15-10	33 RPM Drive Shaft (60 cycles)
52	98A 15-11	45 RPM Drive Shaft (60 cycles)
53	406A 20	Drive Belt (2 req.)
54	98A 15-21	Idler Wheel Tie Lug
55	98A 15-20	Idler Wheel Spring
56	G400A 279	Idler Wheel Assembly
57	412A 30	Fibre Washer
58	405A 15	Idler Wheel Retaining Clip
59	401A 396-4	Retaining Ring
60	405A 149	Set-Down Pivot Retaining Spring
61	401A 396-5	Retaining Ring
62	415A 34	Spacer Washer
63	G400A 616	Set-Down Arm Assembly
64	F400A 615	Tone Arm Control Lever and Shaft Assembly
65	402A 284	Lift Rod
66	405A 144	Engagement Spring
67	4B 1-67-47	Washer (.196x5/16x1/32)
68	405A 146	Set-Down Arm Return Spring
69	G400A 618	Set-Down Index Assembly
70	405A 143	Set-Down Index Return Spring
71	G400A 621	Control Plate Assembly
72	401A 355-2	Retaining Ring
73	G400A 622	Safety Arm and Stud Assembly
74	405A 145	Safety Spring
75	401A 375	Drive Link
76	G400A 629	Shut-Off Link and Arm Assembly
77	405A 151	Shut-Off Arm Spring
78	405A 152	Cam Return Spring
79	401A 355-7	Retaining Ring
80	401A 398	Shut-Off Delay Stop
81	405A 153	Shut-Off Delay Stop Engagement Spring
82	G400A 605	Drive Eccentric Assembly
83	285-250-C2-47	Screw, #8-32x¼ BH (includes lock washer)
84	401A 379	Push-Off Link
85	G400A 603	Push-Off Lever and Stud Assembly
86	4B 1-68-47	Washer (.196x⅜x1/32)
87	404B 41	Turntable Hub Support and Shaft (less Allen set screw)
88	1A 70-10-47	Screw, Self-tapping, #6x⅝ (3 req.)
89	415A 31	Drive Gear Bearing
90	405A 99	Retaining Ring
91	415A 29	Turntable Thrust Bearing
92	402A 277	Push-Off Adjustment Nut
93	405A 142	Push-Off Shaft Return Spring
94	G400B 601	Centerpost Assembly (includes 92 and 93)
95	402A 263	Screw, Self-Tapping, #6x⅝ (3 req.)
96	9A 8-2	Tone Arm Lead Clamp
97	414A 49	Shut-Off Link Hold-Down
98	1A 27-53-47	Screw, Self-tapping, #6x3/16 (4 req.)
99	G400A 606	Switch and Mtg. Plate Assembly
100	*407C 20	*3-Speed Motor Complete, 117V., 60 cycles
	407C 20-1	3-Speed Motor Complete, 117V., 50 cycles
	407X 20-4	3-Speed Motor Complete, 230V., 50 cycles
101	406A 19	Motor Grommet
102	401A 355-4	Retaining Ring
103	406A 24	Speed Selector Link Grommet
104	19A 10-3	Float Spring, ⅞" high (3 req.)
	405A 139	Float Spring, ¾" high (3 req.)
105	10B 1-18	Terminal Board
106	413A 11-1	Audio Cable, 15" (includes plug)
107	G400D 627-1	Changer Pan Assembly (Gold)
108	48A 8-2	45 RPM Record Adapters
109	96B 18-8-10-0	Plastic Tubing, 1½"
	34E 60-1	Plastic Base (Ebony) for RP601
	34E 60-2	Plastic Base (Mahogany) for RP602

PARTS FOR CONVERTING 407C20 MOTOR FOR 50 CYCLES

78 RPM Drive Shaft Spring (50 cycles) 405A 113
45 RPM Drive Shaft (50 cycles) 98A 15-15
33 RPM Drive Shaft Spring (50 cycles) 405A 112

*407C 20 motor is not used on "Canadian Admiral" changers. For Canadian Admiral replacement motors order:
60 cycle, 105 to 125 volts.................. 407Y 20-60
25 cycle, 105 to 125 volts.................. 407Y 20-25

RC600 RECORD CHANGER, EXPLODED VIEW

To find part number and description for any part, locate part and reference number in illustration. Then, find reference number in list on opposite page.

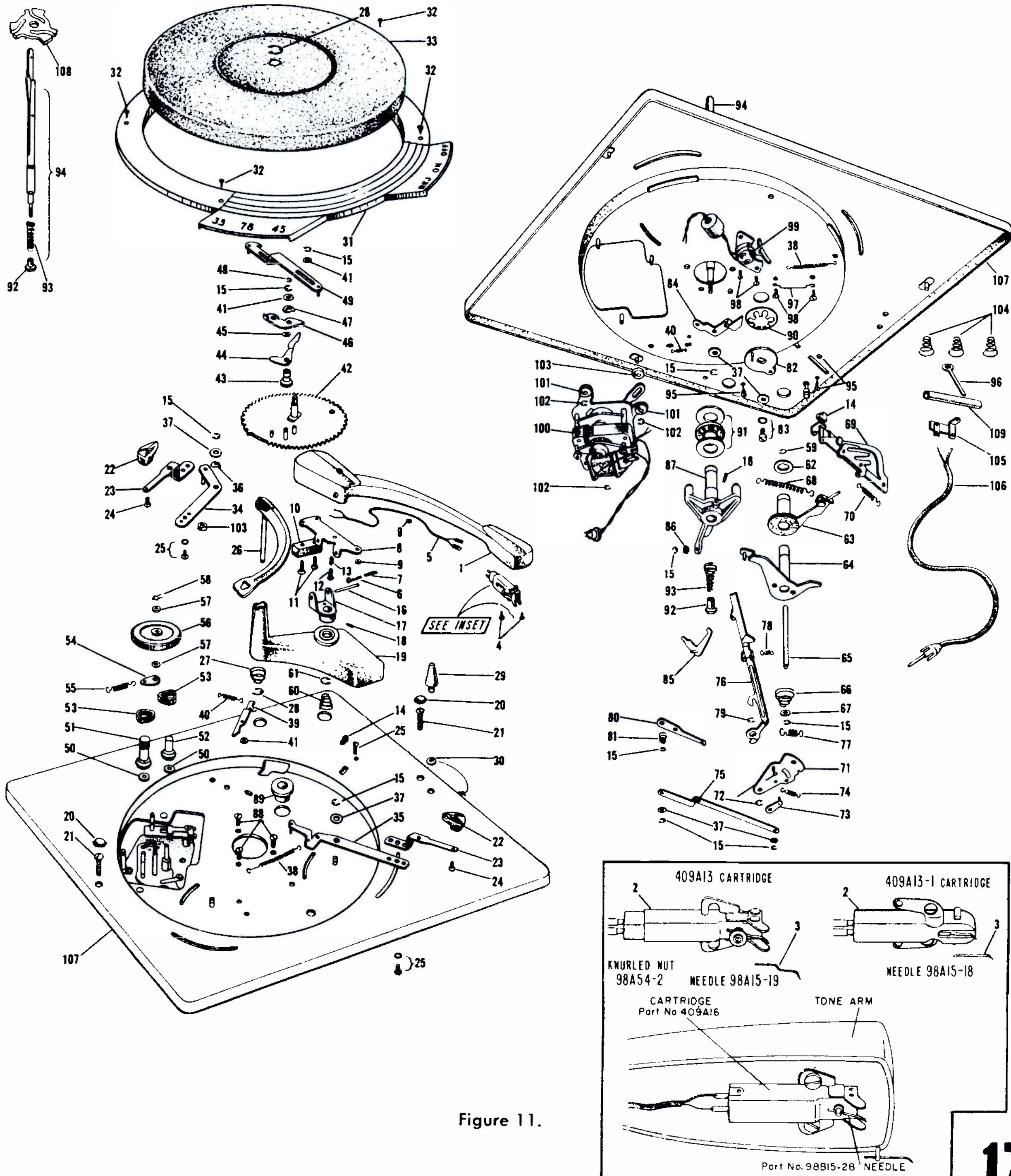


Figure 11.

SERVICE AND REPAIR

LUBRICATION

DO NOT apply GREASE to the TRIP SLIDER (49). Under normal operating conditions, the motor should never require lubricating. When lubricating the changer, keep oil or grease away from turntable.

Before lubricating the set-down index (69), see figure 10. Grease or oil must not exist at certain points of the set-down index. This assembly must be clean and dry at these points in order to pivot freely of its own weight.

Friction between the gear engagement pawl (46) and the trip motion arm (44) may be increased by placing a very slight amount of a silicone lubricant such as Cosmolube #1 (Admiral part number 418A50) on the fibre washer (45). Lubriplate #107 or vaseline petroleum jelly may be used as a substitute here, but, be sure others parts are free of oil or grease and dirt.

The shaft for the leveling arm (26) must be free of binding in its bearing in the tone arm base. Dry graphite powder perferably should be used to lubricate the shaft; graphite oil or a light machine oil may be used as a substitute here.

The oilite bearing in the turntable hub and the tone arm base should be lubricated with SAE No. 20 oil. Oil used here must be fluid in order that it may penetrate and be absorbed by the bearing material. Never use grease of any kind.

Other points of movement throughout the record changer should be cleaned and lubricated with Cosmolube #1 whenever the changer is serviced. A good automobile chassis lubricant may be used as a substitute.

Use carbon tetrachloride and remove any oil or grease which may be on the idler wheel tire, inside rim of the turntable, the rubber drive belts, or the rubber grommets.

REMOVING AND REPLACING TURNTABLE

CAUTION: Attempting to pry the turntable out of the changer pan will damage the plastic escutcheon. Do not remove the escutcheon to remove the turntable.

Remove the changer from its compartment or cabinet. Then, proceed as follows:

1. Remove the "E" retaining ring* at the top of the turntable hub.
2. Grasp leveling arm at shaft end and lift and swing arm aside.
3. Place the changer so that the front edge with the control panel is to the right. The tone arm base should be at the far left hand corner.
4. Grasp the changer pan between the palms of both hands and extend the fingers over the turntable.
5. Invert the changer pan and allow the turntable to drop into the fingers of both hands. Use care when removing the turntable to prevent losing the turntable thrust bearing (91).
6. Before replacing the turntable, be sure the rim of the turntable and the idler wheel tire are clean. Use carbon tetrachloride to remove finger marks, etc.
7. Do not force the turntable to engage the idler wheel with the turntable rim. Always move the idler wheel by moving the idler wheel slide which is accessible from the underside of the changer pan through the opening for the turntable motor. See figure 6. Do not handle the rubber tire on the idler wheel or attempt to pry the idler wheel with any tools.

REPLACING SET-DOWN INDEX (69)

Although the set-down index is factory assembled and requires no adjustment, some care is required when it is being replaced. The top surface of the set-down index bracket mounts to the changer pan and is positioned by two 1/8 inch diameter half-punches which interlock in holes in the changer pan. A #6-32 machine screw secures the set-down index in place. See figure 10.

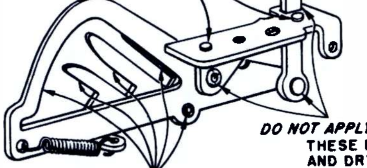


Figure 10. Set-Down Index Assembly.

REPLACING THE CENTERPOST

The centerpost is held in the turntable hub by an Allen set screw. The milled flat at the lower end of the centerpost (just above the push-off return spring) must be aligned with this set screw. The lower edge of the retaining ring groove on the centerpost must be flush with the top surface of the turntable shaft to within 5 thousandths of an inch above after the Allen set screw is tightened to hold the centerpost in place.

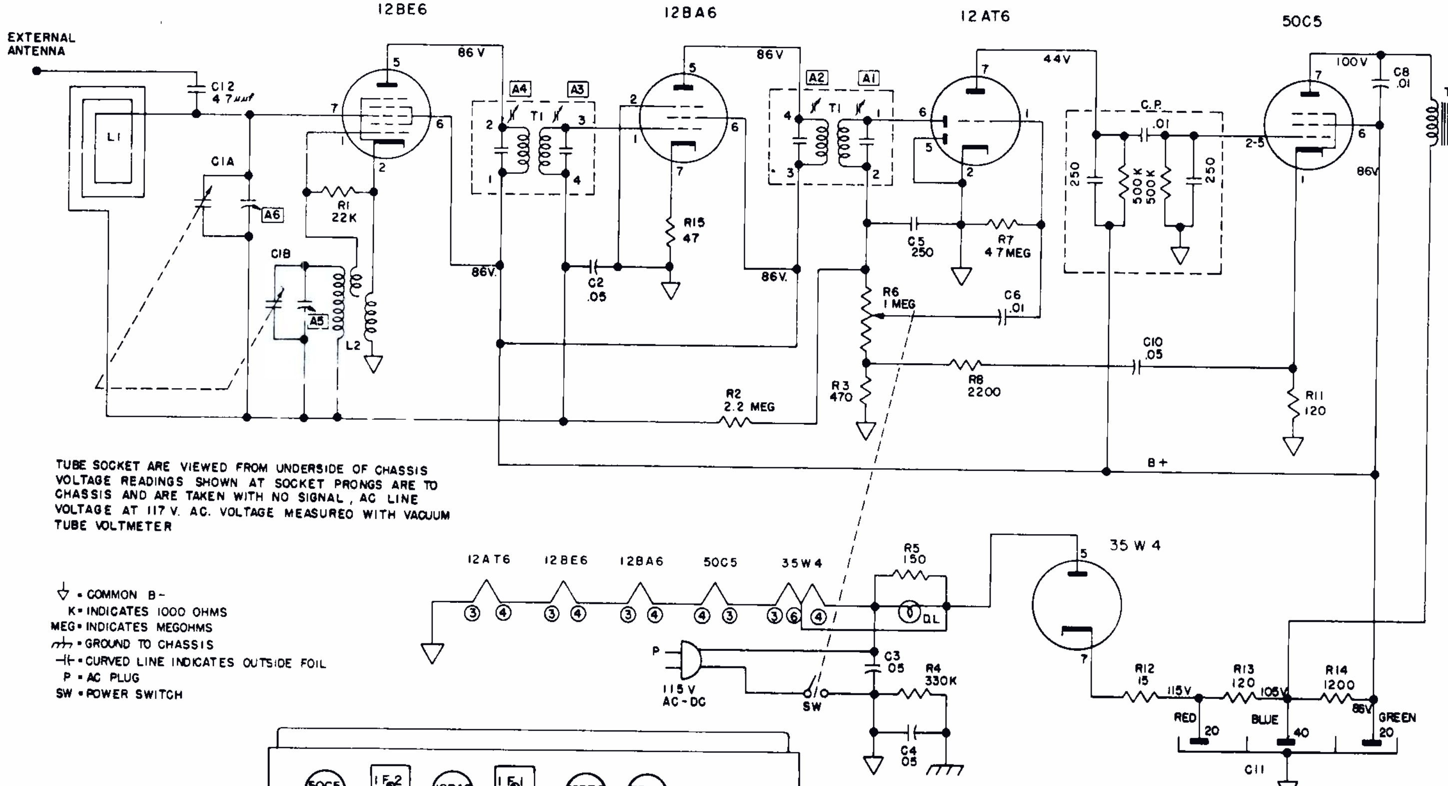
Whenever the centerpost has been removed or replaced, the push-off adjustment must be checked. The push-off adjustment nut on the push-off shaft is pre-adjusted at the factory and is ready for installation and *final* adjustment is made after centerpost is installed.

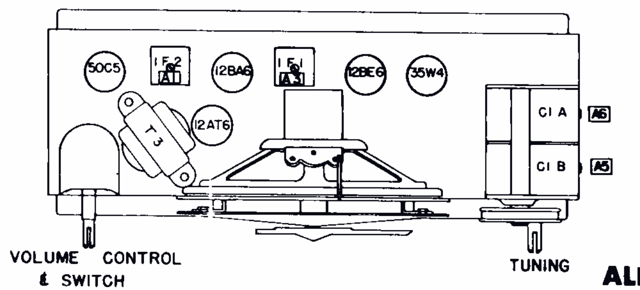
CAUTION: The push-off adjustment nut is slotted to stay tight on the push-off shaft after adjustment is made. Do not turn the nut all the way on the the push-off shaft; the slots will spread and allow the nut to turn.

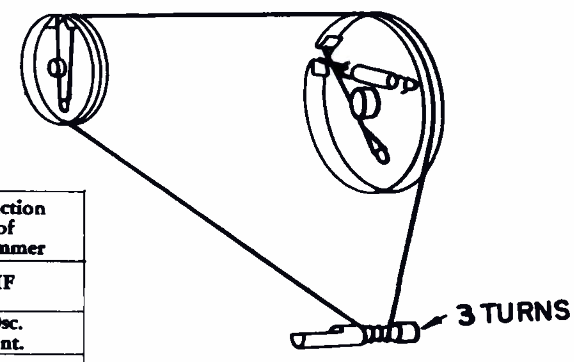
* Place one hand over the turntable hub while removing to prevent losing the retaining ring.

Arvin INDUSTRIES INC.

RADIO 651T CHASSIS RE 323







STRINGING DIAGRAM

ALIGNMENT PROCEDURE

Position of Variable	Frequency of Generator	Dummy Antenna	Generator Output Connection	Trimmers Adjusted in Order Shown for Maximum Output	Function of Trimmer
Open	455	.05 mfd.	12BE6 Grid (Stator of C1A)	A1, A2, A3, A4	IF
1400	1400		*Test Loop	A5, A6 on Variable Condenser	Osc. Ant.
600	600		*Test Loop	Check Point	

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

Arvin Industries Model 655 SWT, Chassis RE-327

ALIGNMENT PROCEDURE

AM Tuning range—540 Kc to 1600 Kc. Intermediate Frequency—455 Kc. I.F. and R.F. measurements made at 500 milliwatts output—approximately 1.27 volts on a rectifier type voltmeter connected across speaker voice coil.
Approximately input for 500 MW output: R.F. with standard loop: at 600 Kc, 480 uv/m, at 1000 Kc, 360 uv/m; at 1400 Kc, 240 uv/m.

PRELIMINARY:

Output meter connection....Across speaker voice coil
Output meter reading to indicate 500 MW....1.27 volts
Generator Modulation....30%, 400 cycles
Position of volume control....Fully clockwise
Set band switch....To left for AM alignment, to right for SW alignment

AM Alignment

Position of Variable	Generator Frequency	Dummy Ant.	(high) Generator Connection	Generator Connection Ground Lead	Adjust Trimmer In Order Shown For Max. Output	Trimmer Function
Open	455 Kc	.05 mfd.	Mixer Grid	Floating Grnd.	A1, A2, A3, A4,	I.F.
Open	1670 Kc		Test Loop	Test Loop	A6	Oscillator
Closed	535 Kc		Test Loop	Test Loop	A5	Osc. Pad.
1400 Kc	1400 Kc		Test Loop	Test Loop	A7	Antenna
600 Kc	600 Kc		Test Loop	Test Loop	A5	Osc. Pad.

Connect generator lead to a Standard Hazeltine Test Loop, Model 1150, place two feet from the set loop, or three turns of wire about six inches 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 A.V.C. action of the receiver ineffective.

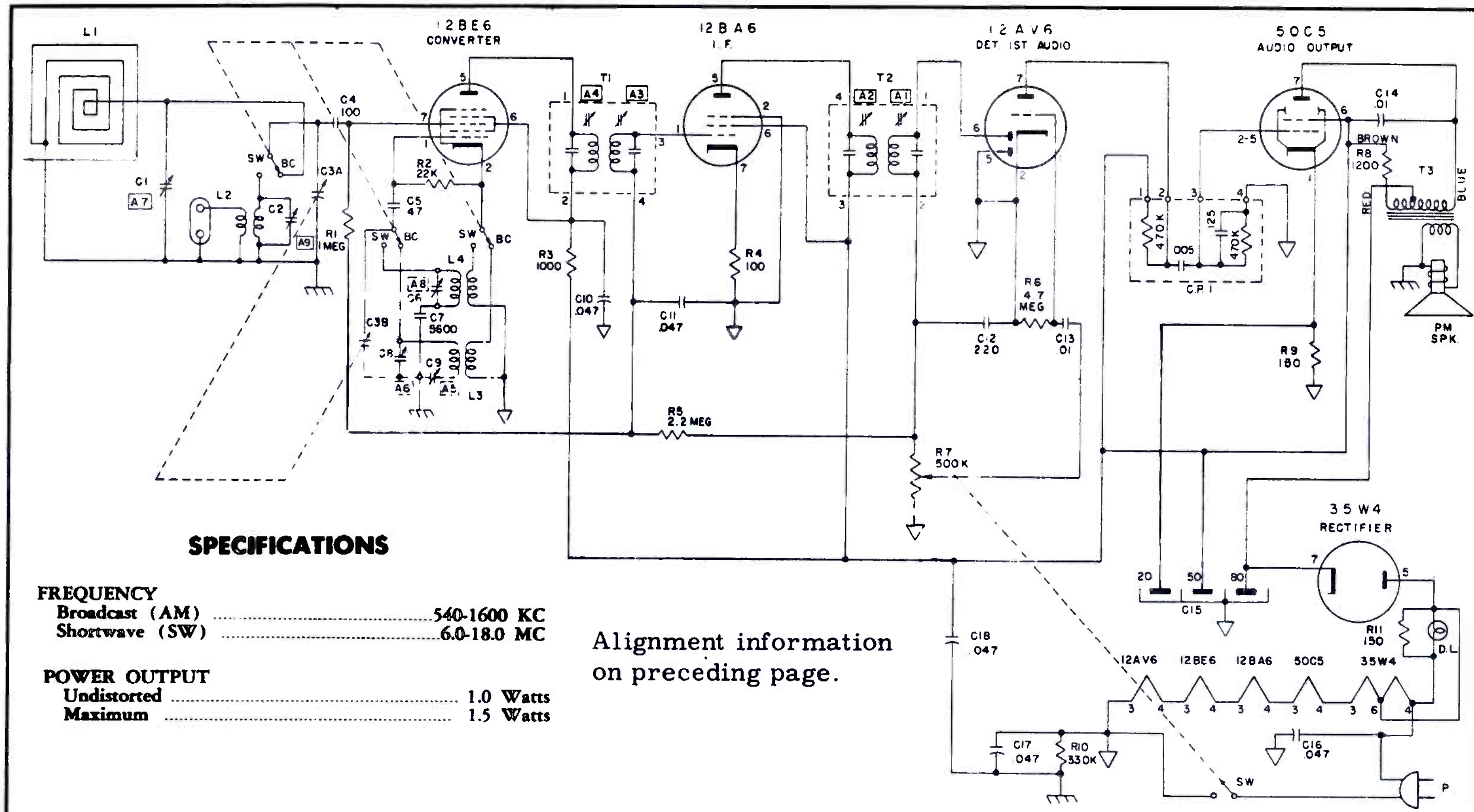
SHORT WAVE R.F.

A. Before attempting short wave alignment, the Broadcast IF Alignment procedure must be completed.
   1. Turn band switch clockwise to Short Wave position.
B. Connect the Signal Generator to the antenna terminals (hank disconnected). A 50 MMF "Dummy" must be used in the "high-side" of the generator-lead and the generator "groundlead" connects directly to the ground-terminal.
   2. In aligning the short wave band some trouble may be experienced with image frequencies. The image frequency is separated from the desired frequency by a 910 Kc difference. In order to identify which signal is being picked up, use the following procedure to assure the receiver oscillator is above the incoming signal:
      a. With variable condenser completely open and the trimmer, A8, loose set the signal generator to 18 Mc. Then gradually tighten the trimmer until a signal is heard. This is the correct frequency. Now if the variable condenser is closed slightly, another signal will be picked up. This is the image frequency and must not be confused with the above desired frequency. This relationship must be maintained throughout the following balancing procedure. The image frequency must always be found by closing the variable a slight amount.
   3. Set generator to 6 Mc. The set must tune to maximum output slightly before variable is completely closed.
   4. Set Generator to 16 Mc. Rotate variable until the 16 Mc signal is heard at two points near the open position of the variable. Again the desired signal is the one with the variable open the farthest. Adjust the trimmer, A9, as for maximum outut. Rotate variable very slightly for a new maximum and repeak trimmer A9. Repeat this operation until no further increase can be obtained.

Part Number	Schematic Location	Description
Capacitors		
C20067-473	C10, 11	Capacitor, .047 mfd., 200V
C20068-103	C14	Capacitor, .01 mfd., 400V
C20068-473	C16, 17, 18	Capacitor, .047 mfd., 400V
C20067-103	C13	Capacitor, .01 mfd., 200V
C20065-470	C5	Capacitor, 47 mmf
C20065-101	C4	Capacitor, 100 mmf
C20065-221	C12	Capacitor, 200 mmf
C23099-562	C7	Capacitor, 5600 mmf
A25830	C15	Capacitor, electrolytic
C25834	C3A, B	Capacitor, variable
A25832	C1, 8, 9	Caacitor, Trimmer
Resistors		
C20061-151	R9	Resistor, 150 ohm
C20061-101	R4	Resistor, 100 ohm
C20061-102	R3	Resistor, 1000 ohm
C20223-122	R8	Resistor, 1200 ohm 2w 10%
C20061-223	R2	Resistor, 22K ohm
C20061-334	R10	Resistor, 330K ohm
C20061-105	R1	Resistor, 1 megohm
C20061-225	R5	Resistor, 2.2 megohm
C20061-475	R6	Resistor, 4.7 megohm
Cabinet		
R23228-5		Cabinet, Sea-Mist
C23299		Cabinet, rear cover
A24464-5		Knob, Sea-Mist
Miscellaneou		
AC25843-1	L2	Antenna coil S.W.
D25844	L1	Antenna loop
B22953		Antenna loop mtg. brkt.
A25838		Antenna terminal board
A23237		Carton
C22963	R7	Control, volume & switch
A25873	CP1	Couplate
A19132		Dial Cord (10 for)
19133		Dial Cord Spring (10 for)
E40080		Dial crystal
A19351		Dial light bulb
A19628-2		Dial light socket
AC23302-5		Dial Plate Assembly
A19361		Hairpin clip (10 for)
A40474		I.F. Mtg. clip (5 for)
C20138-15		Line cord & plug
AC25871-1	L3	Oscillator coil B.C.
AC25843-1	L4	Oscillator coil S.W.
C23461-1		Pointer
A19124		Snap fasteners (10 for)
A20243-3		Socket, tube
A20243-1		Socket, tube plain
C25756	SPK	Speaker
A22941		Stud, flapper (10 for)
C25831		Switch, band
C25859		Switch band mtg. brkt.
C21797-6	T1, T2	Transformer I.F.
AC25868-1	T3	Transformer, output
A25832		Trimmer assembly
A22957-1		Tuning shaft
A25156		Tuning shaft brkt.

Arvin INDUSTRIES

RADIO 655 SWT
CHASSIS RE 327

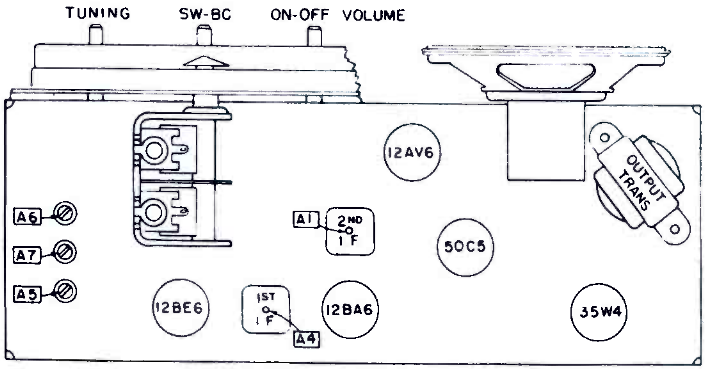


SPECIFICATIONS

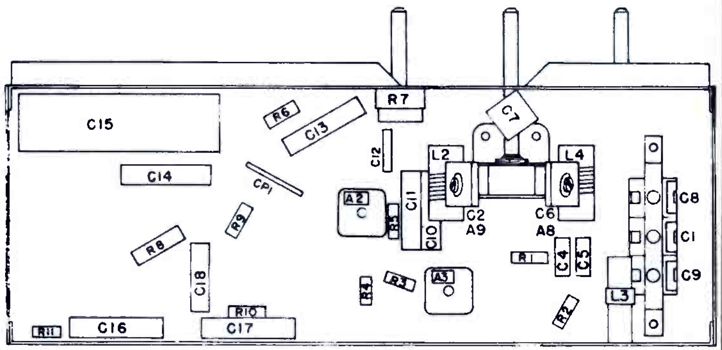
FREQUENCY
Broadcast (AM) .... 540-1600 KC
Shortwave (SW) .... 6.0-18.0 MC

POWER OUTPUT
Undistorted .... 1.0 Watts
Maximum .... 1.5 Watts

Alignment information on preceding page.



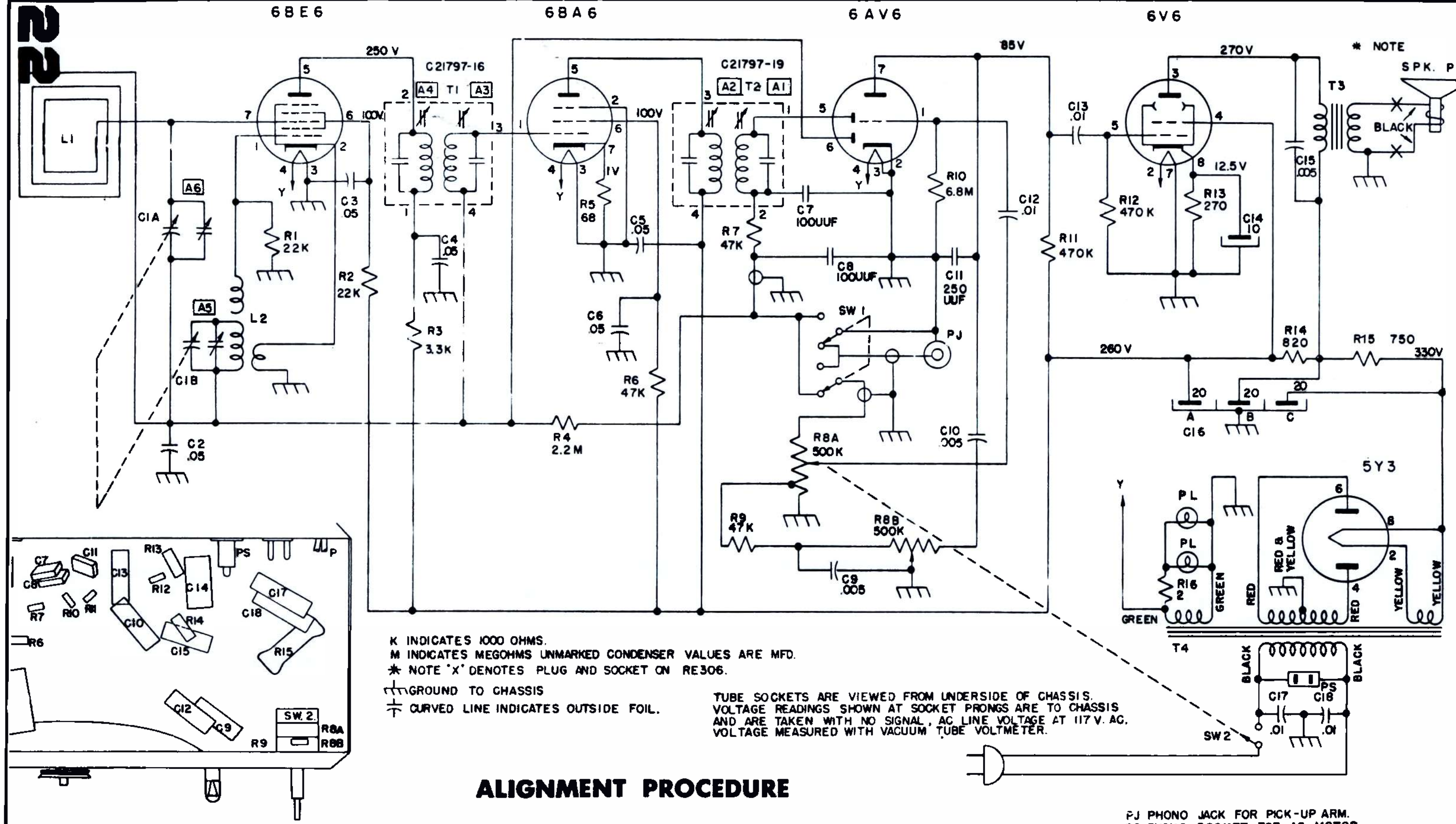
TUBE LAYOUT



LOCATION OF PARTS UNDER CHASSIS

Arvin INDUSTRIES

RADIO 751TM - TB CHASSIS RE 343



K INDICATES 1000 OHMS.
M INDICATES MEGOHMS UNMARKED CONDENSER VALUES ARE MFD.
* NOTE 'X' DENOTES PLUG AND SOCKET ON RE306.
GROUND TO CHASSIS
CURVED LINE INDICATES OUTSIDE FOIL.

TUBE SOCKETS ARE VIEWED FROM UNDERSIDE OF CHASSIS. VOLTAGE READINGS SHOWN AT SOCKET PRONGS ARE TO CHASSIS AND ARE TAKEN WITH NO SIGNAL, AC LINE VOLTAGE AT 117 V. AC. VOLTAGE MEASURED WITH VACUUM TUBE VOLTMETER.

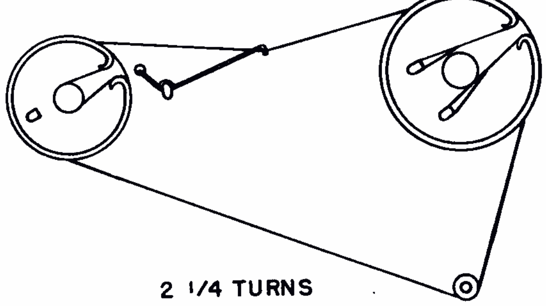
PJ PHONO JACK FOR PICK-UP ARM.
PS PHONO SOCKET FOR AC MOTOR.
SW-1 PHONO SWITCH SHOWN IN RADIO POSITION.

ALIGNMENT PROCEDURE

Position of volume & tone control..Fully clockwise
Position of dial pointer with variable fully closed..To left

1. Connect signal generator lead through a .05 uf condenser to converter grid. Open tuning condenser. Set signal generator to 455 Kc. Tune I.F. Trimmers A1, A2, A3 and A4 for maximum output.
2. Close tuning condenser and set pointer to left. Open tuning condenser. Connect signal generator to test loop or to blue lead on set loop. Set signal generator to 1650 Kc. Tune A5 trimmer on oscillator section of tuning condenser for maximum output.
3. Set signal generator to 1400 Kc. Adjust tuning shaft until maximum output is obtained. Tune antenna trimmer A6 on tuning condenser for greatest output. Reset tuning shaft until output is again maximum. Retune antenna trimmer. Repeat this cycle of operations at 1400 Kc. until no further increase of output can be obtained. Keep generator output at a low value to prevent detuning by A.V.C. action.
4. Set signal generator to 600 Kc. Adjust tuning shaft for maximum output. Adjust tuning condenser plate for maximum output if necessary.

Approximate sensitivities with 117 V. AC line voltage and .5 W. output across voice coil should be: Antenna lead 600 Kc.—600 uv/m., 1000 Kc.—400 uv/m., 1400 Kc.—300 uv/m.

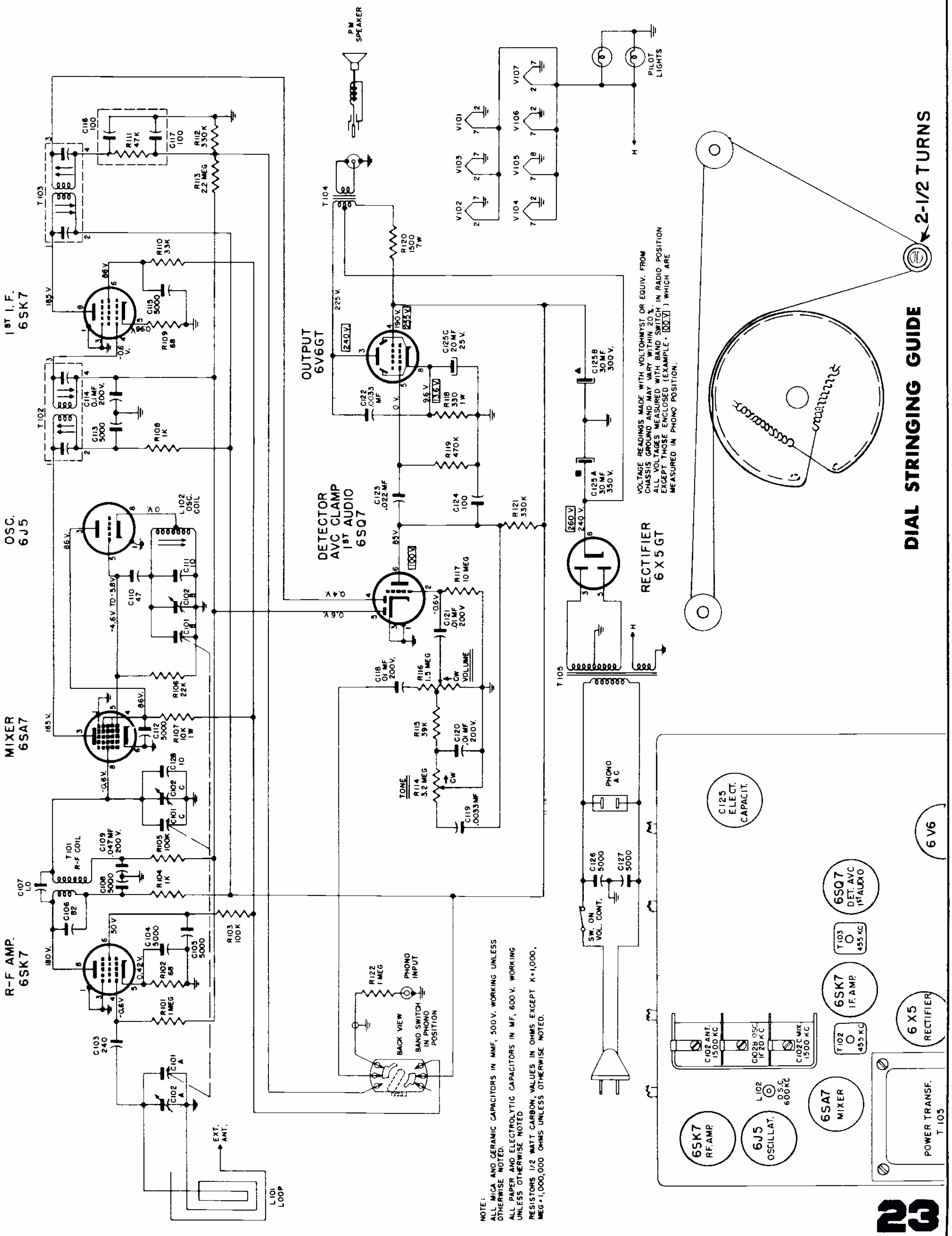


STRINGING DIAGRAM

MANUAL OF 1953 MOST-OFTEN-NEEDED RADIO DIAGRAMS

CAPEHART-FARNSWORTH CORPORATION

MODEL RP-152 — **RADIO CHASSIS** CR-70

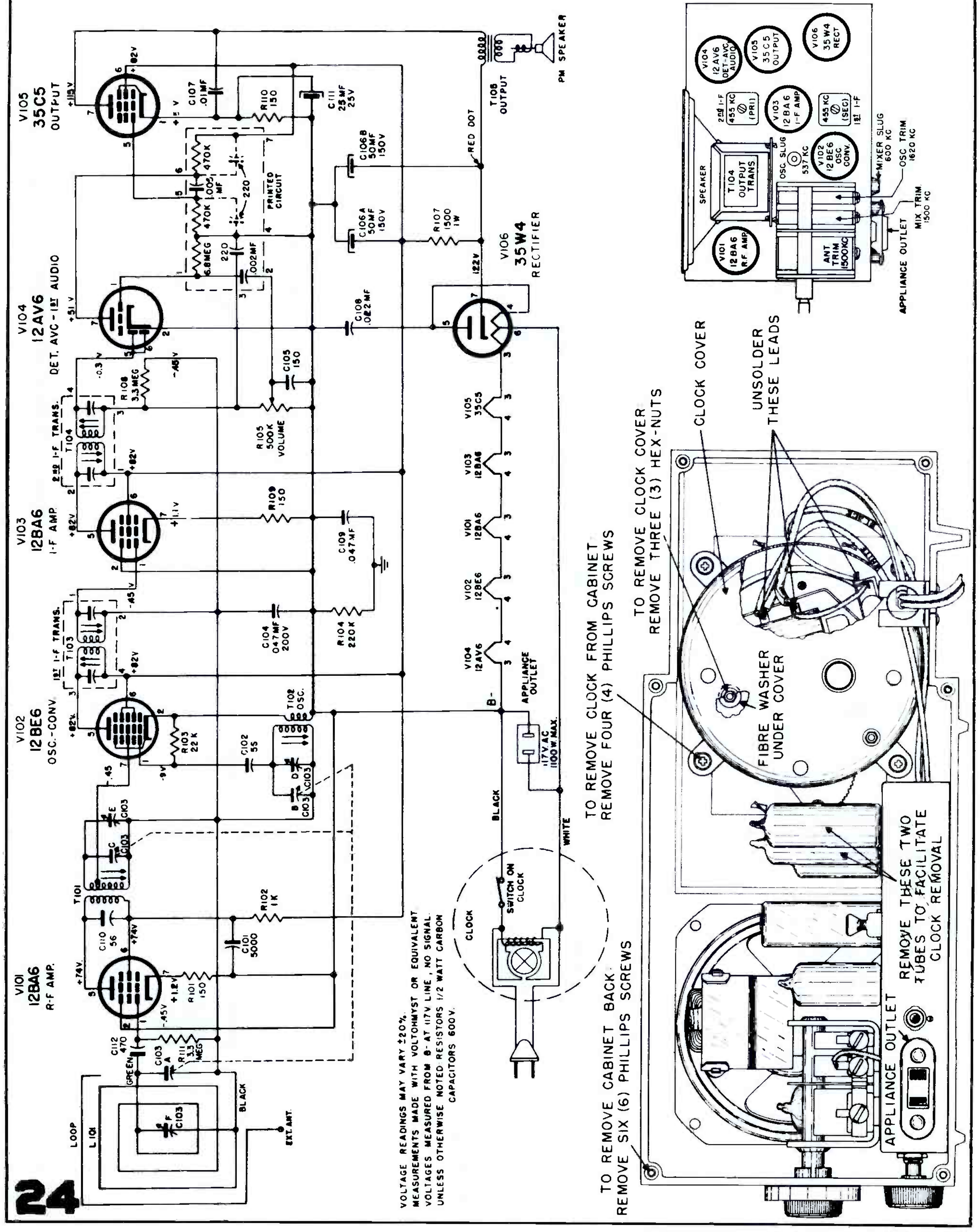


MANUAL OF 1953 MOST-OFTEN-NEEDED RADIO DIAGRAMS

CAPEHART-FARNSWORTH CORPORATION
AN I. T. & T. ASSOCIATE

MODEL TC-62

RADIO CHASSIS CR-71



Capehart-Farnsworth Corp. Model C-62, Chassis CR-71, continued.

TC-62 ALIGNMENT INSTRUCTIONS

Equipment required:

1. Calibrated R.F. Signal Generator (Signal from 455KC to 1620KC).
2. Low Range Output Meter.

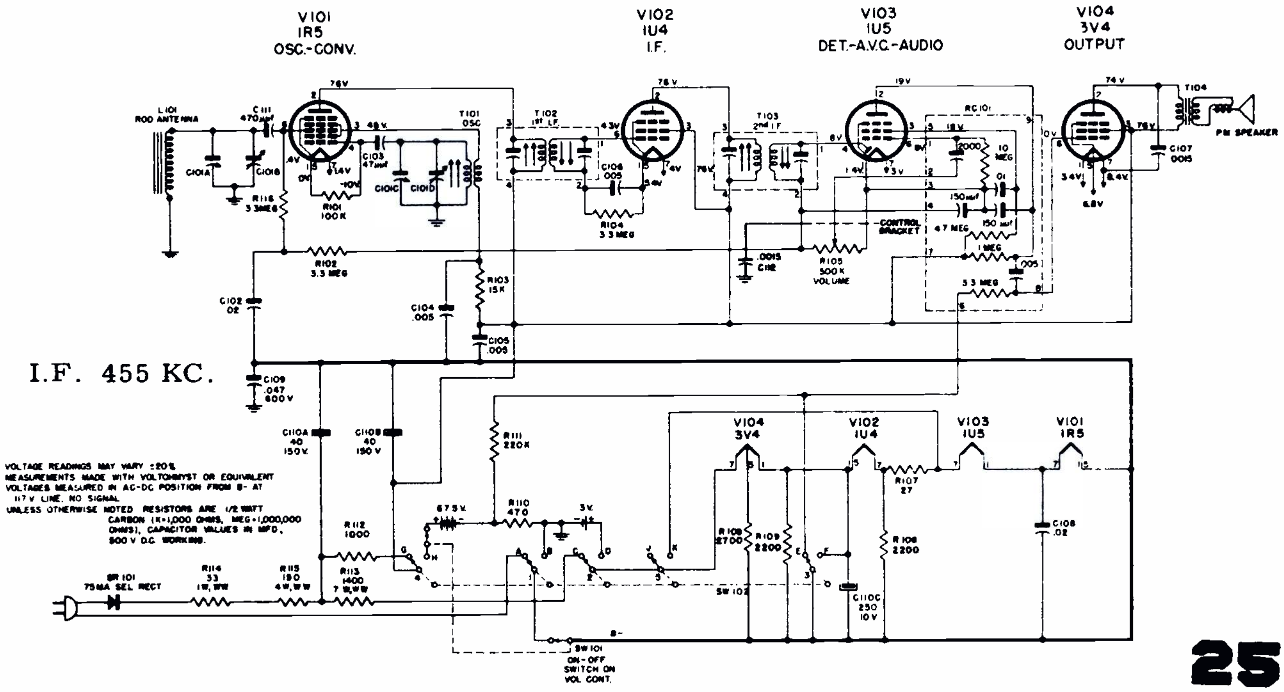
Alignment:

a. Turn set on, adjust volume to maximum.
b. See that dial pointer coincides with calibration marks at extremes of dial scale.
c. Connect output meter across speaker voice coil.

Step No.	Set R.F. Generator At	Connect Generator To	Set Gang Condenser To	Adjust	To Obtain
1	455 Kc.	Antenna section of Gang Condenser	Fully open. Disable osc. section of tuning gang.	I.F. slugs T103 T104	Max.
2	1620 Kc.	Antenna section of Gang Condenser	Fully open.	Osc. Trimmer C103D	Max.
3	537 Kc.	Antenna section of Gang Condenser	Fully closed.	Osc. Coil T102	Max.
4	1500 Kc.	Antenna section of Gang Condenser	1500 Kc.	Mixer Trimmer C103E	Max.
5	600 Kc.	Antenna section of Gang Condenser	600 Kc.	Mixer Coil T101	Max.
6	1500 Kc.	Loosely couple to Loop antenna	1500 Kc.	Antenna Trimmer C103F	Max.

CAPEHART-FARNSWORTH CORPORATION

THREE-WAY PORTABLE
MODEL 213

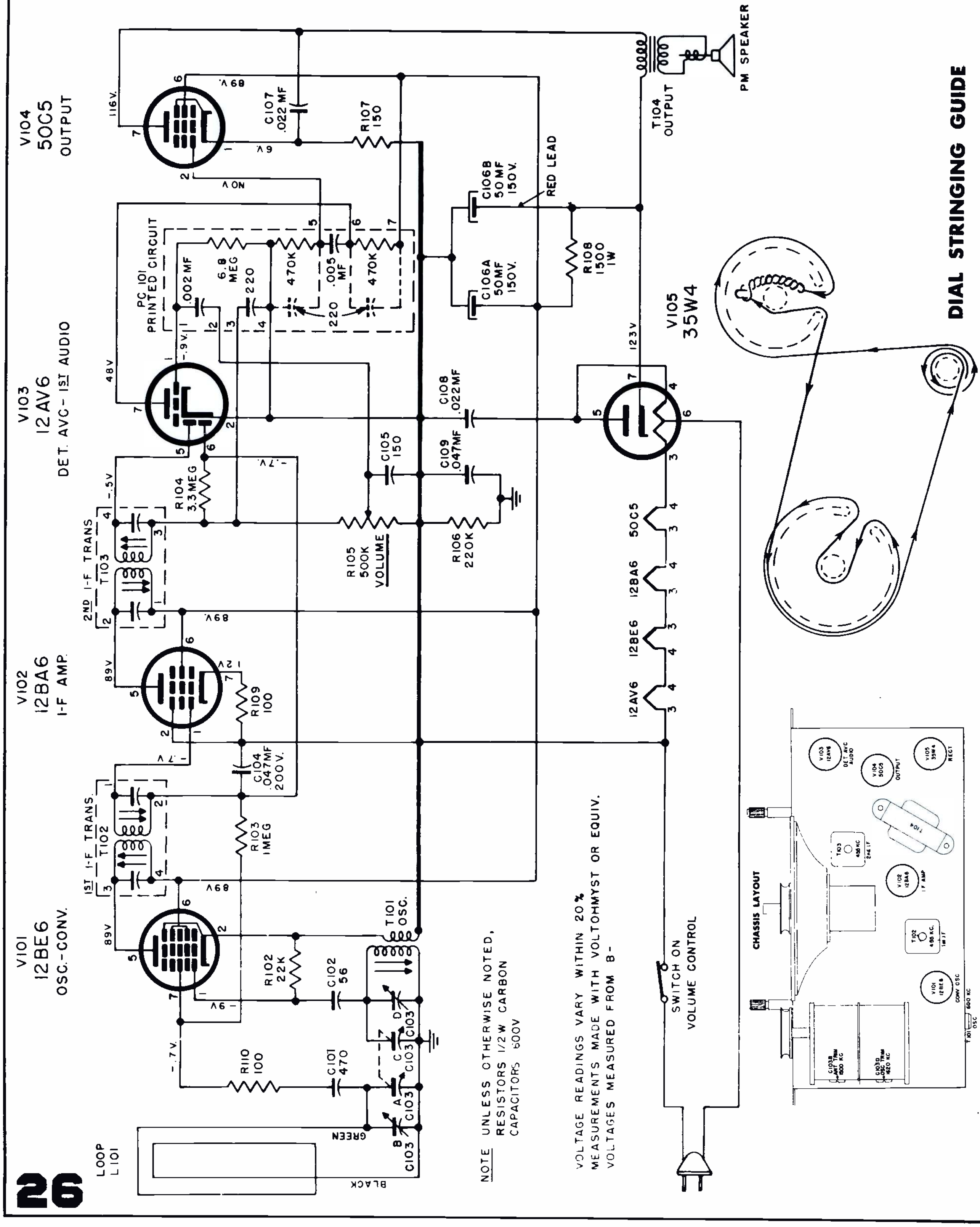


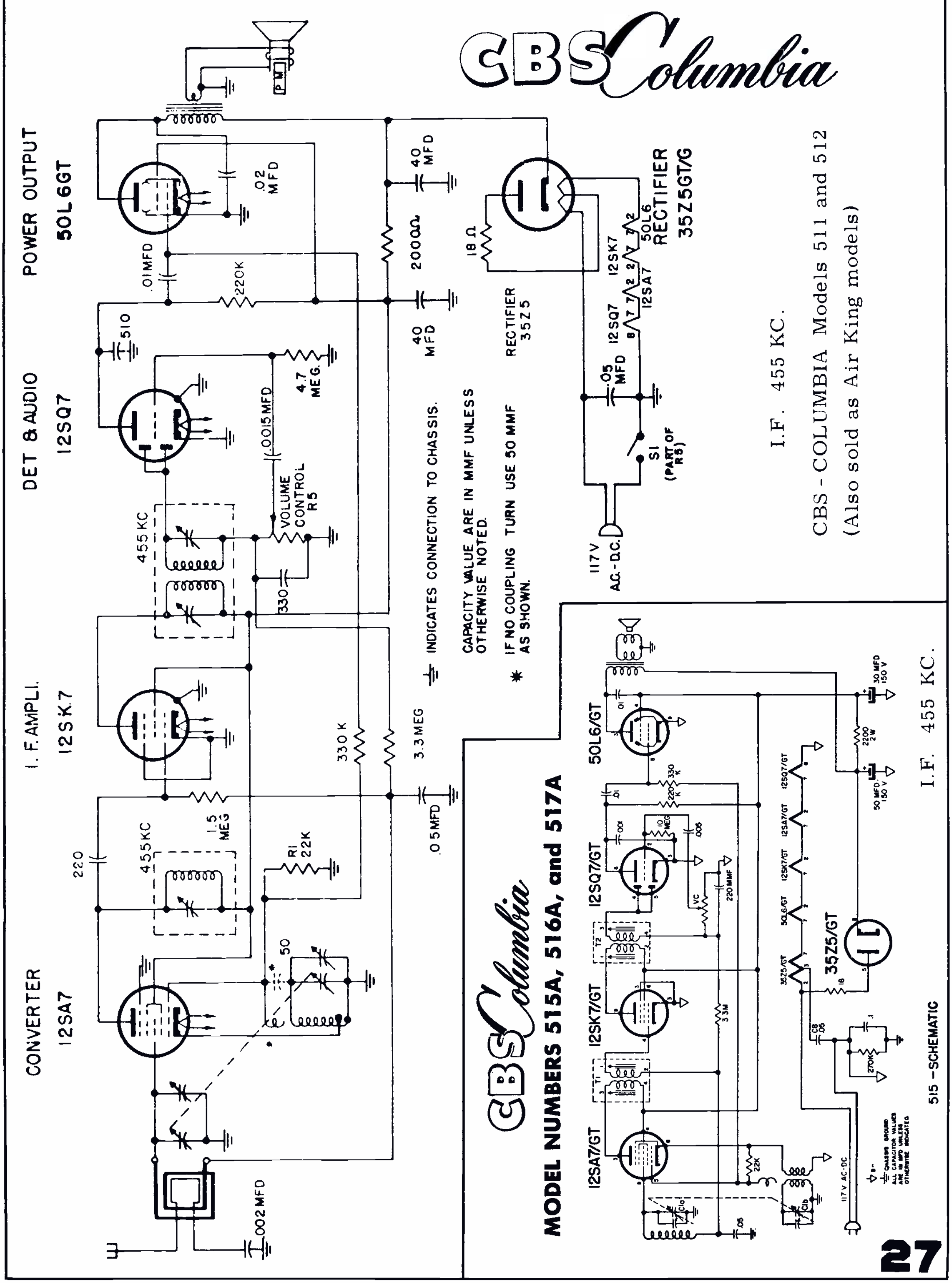
CAPEHART-FARNSWORTH CORPORATION

An IT&T Associate

MODEL T-522

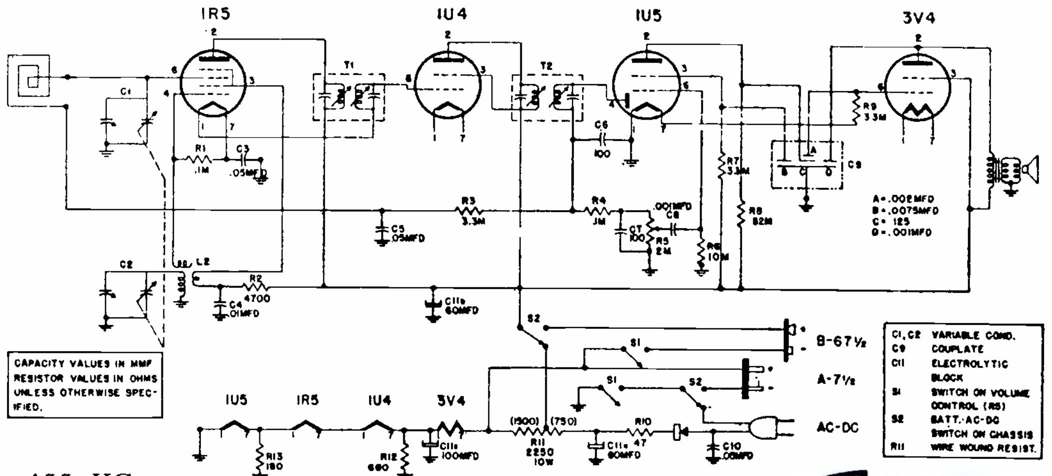
RADIO CHASSIS CR-76



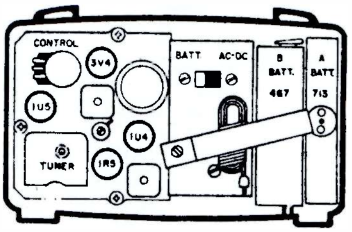

CBS Columbia
CONVERTER 12SA7
I. F. AMPLI. 12SK7
DET & AUDIO 12SQ7
POWER OUTPUT 50L6GT
RECTIFIER 35Z5GT/G
I.F. 455 KC.
CBS - COLUMBIA Models 511 and 512
(Also sold as Air King models)
INDICATES CONNECTION TO CHASSIS.
CAPACITY VALUE ARE IN MMF UNLESS OTHERWISE NOTED.
IF NO COUPLING TURN USE 50 MMF AS SHOWN.
117 V A.C.-D.C.
S1 (PART OF R5)
VOLUME CONTROL R5
455 KC
.002 MFD
0.5 MFD
3.3 MEG
330 K
1.5 MEG
R1 22K
220
330
.0015 MFD
4.7 MEG.
510
.01 MFD
220K
.02 MFD
40 MFD
2000Ω
18 Ω
.05 MFD
CBS Columbia
MODEL NUMBERS 515A, 516A, and 517A
12SA7/GT
12SK7/GT
12SQ7/GT
50L6/GT
35Z5/GT
30 MFD 150 V
50 MFD 150 V
2200 2W
I.F. 455 KC.
515 -SCHEMATIC
117 V AC-DC

CBS Columbia

Model 525-526



I. F. 455 KC.

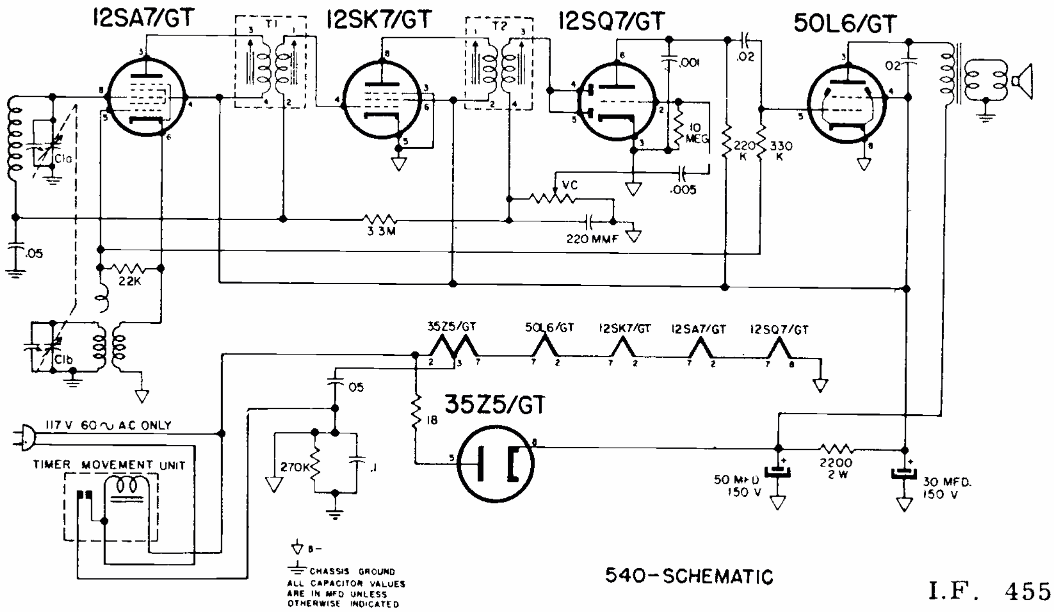


Snap fiber battery clip into position on the "B" Battery (Ray-O-Vac No. 4367, General No. W45A, National Carbon No. 467 or equivalent) and place it in position as shown in illustration. Next, plug the "A" Battery Connector into the "A" Battery (National Carbon No. 713 or Ray-O-Vac No. P551 or equivalent) and place it in position by turning the battery clamp and slipping the battery into its location as shown in the illustration.

NOTE—Diagram has Eveready numbers.

CBS Columbia

Model 540



540-SCHEMATIC

I.F. 455 KC.

CHEVROLET

986669

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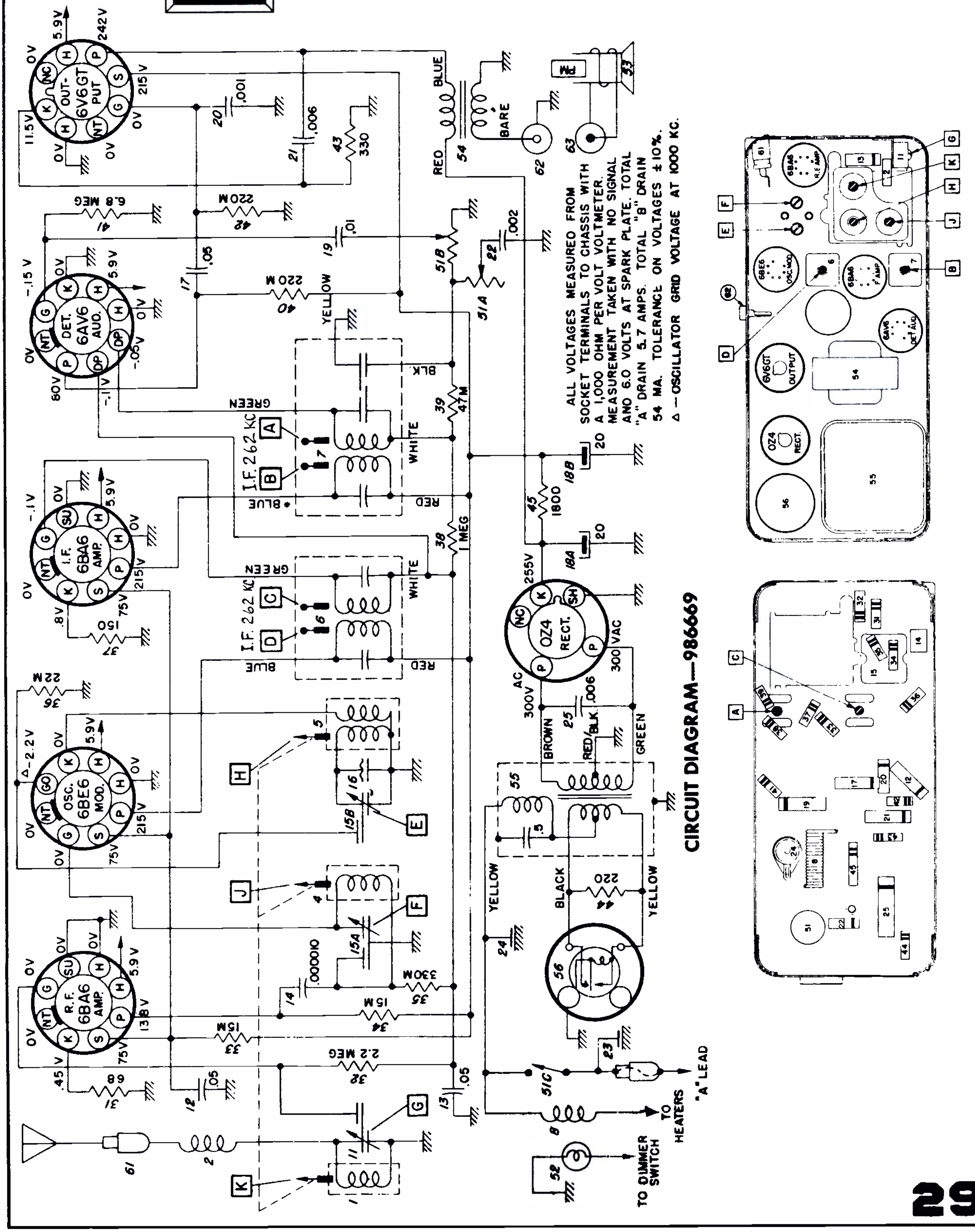
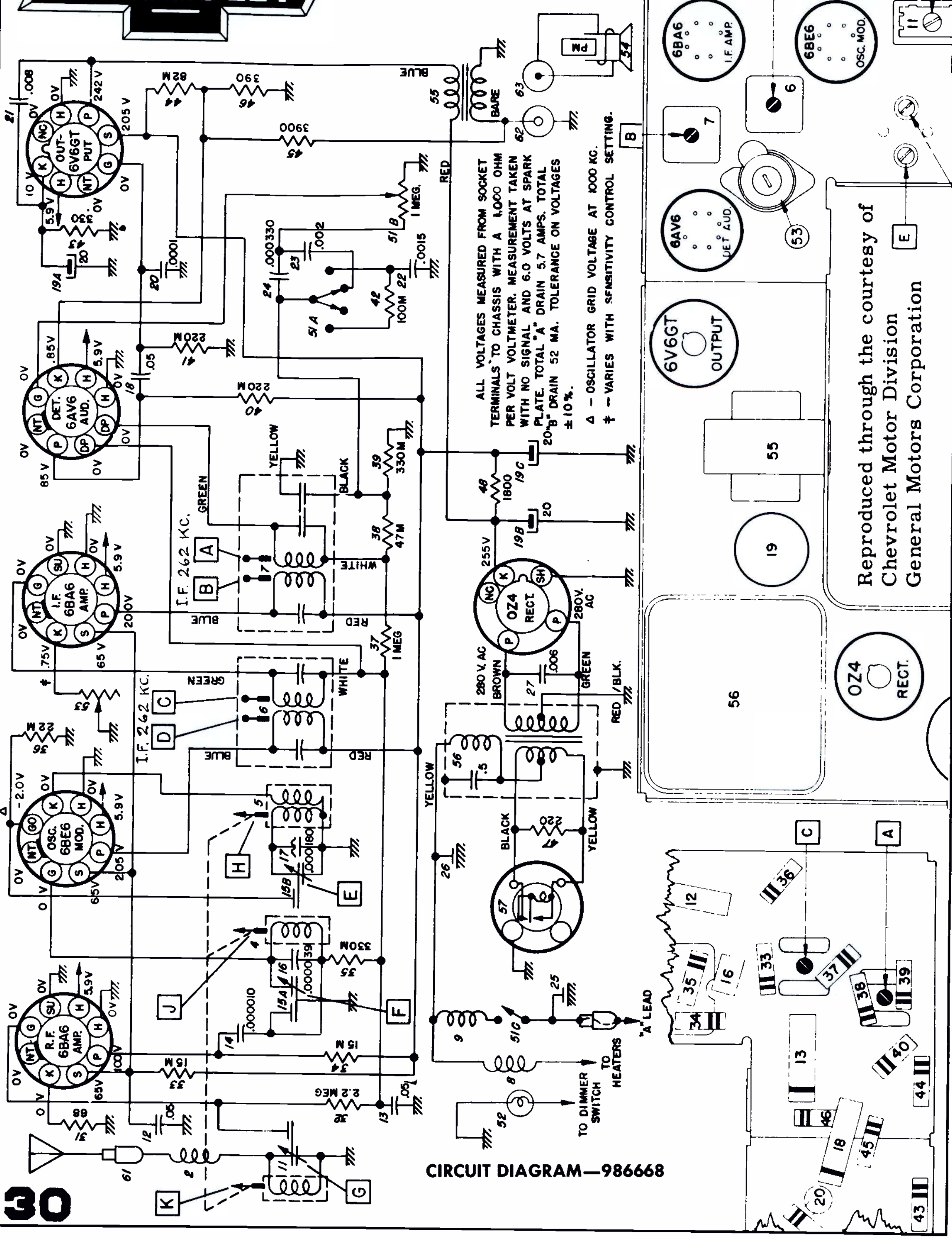
Chevrolet Motor Division
General Motors Corporation



CIRCUIT DIAGRAM—986669

CHEVROLET

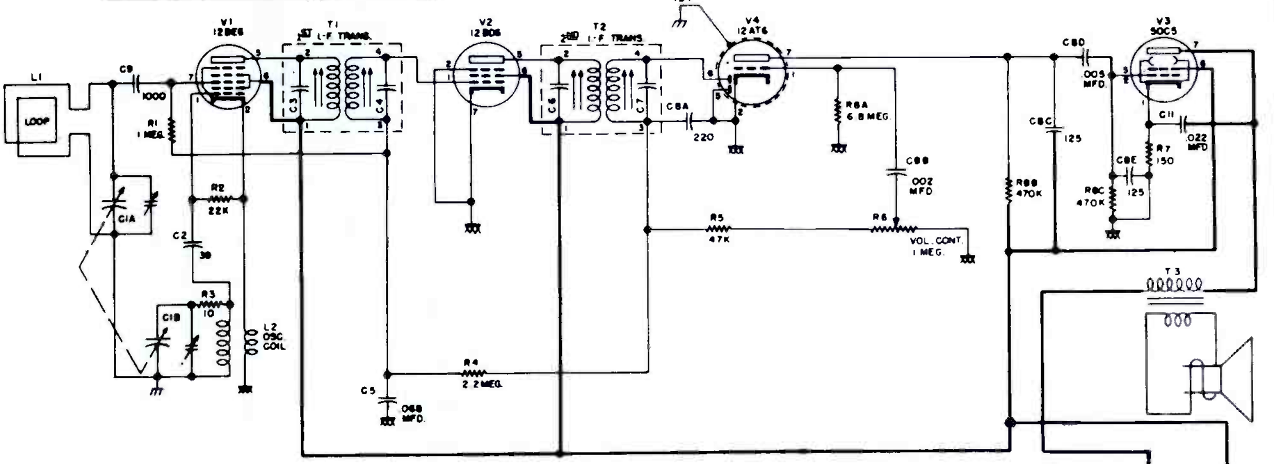
986668

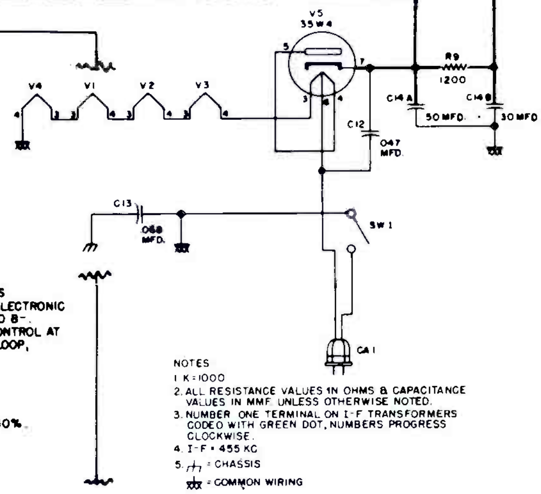


CIRCUIT DIAGRAM—986668

CROSLEY

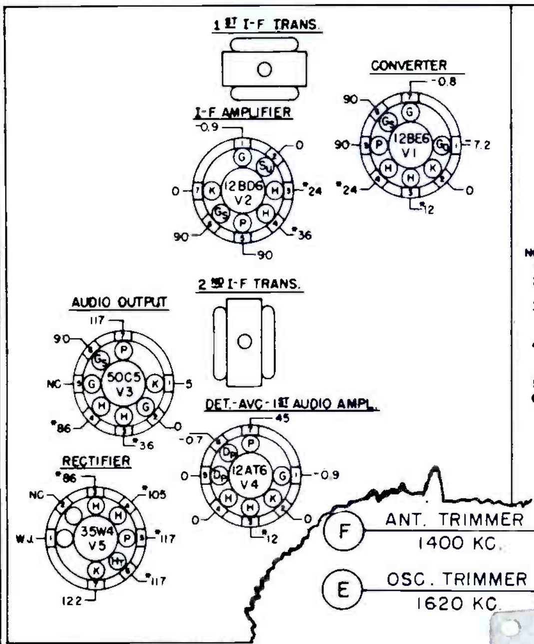
CHASSIS 5F
MODELS: F-5CE, F-5IY, F-5MY, F-5RD



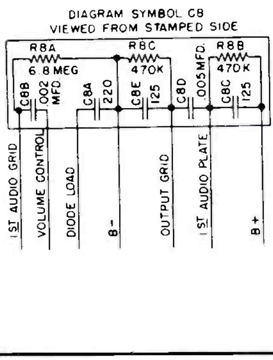


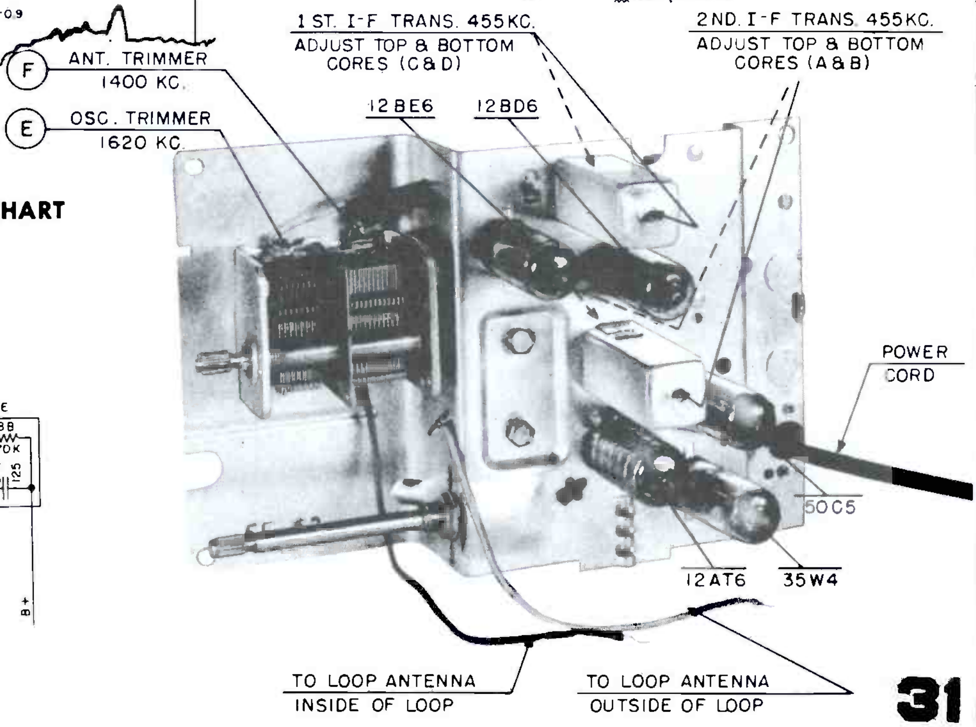
NOTES:
1. BOTTOM VIEW OF TUBE SOCKETS
2. VOLTAGES MEASURED WITH AN ELECTRONIC VOLTMETER FROM SOCKET LUG TO B-.
3. MEASURED WITH THE VOLUME CONTROL AT MINIMUM, NO SIGNAL INTO THE LOOP, TUNING GANG CLOSED.
4. W.J. = WIRING JUNCTION.
NC = NO CONNECTION
* = AC VOLTAGES
5. LINE VOLTAGE, 117V, 60~ AC.
6. SOCKET VOLTAGE TOLERANCE ±10%.

NOTES
1. K = 1000
2. ALL RESISTANCE VALUES IN OHMS & CAPACITANCE VALUES IN MMF. UNLESS OTHERWISE NOTED.
3. NUMBER ONE TERMINAL ON I-F TRANSFORMERS CODED WITH GREEN DOT, NUMBERS PROGRESS CLOCKWISE.
4. I-F = 455 KC.
5. = CHASSIS
= COMMON WIRING



SOCKET VOLTAGE CHART

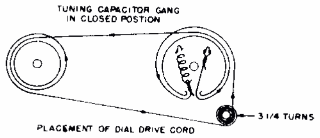


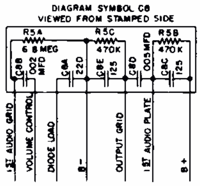


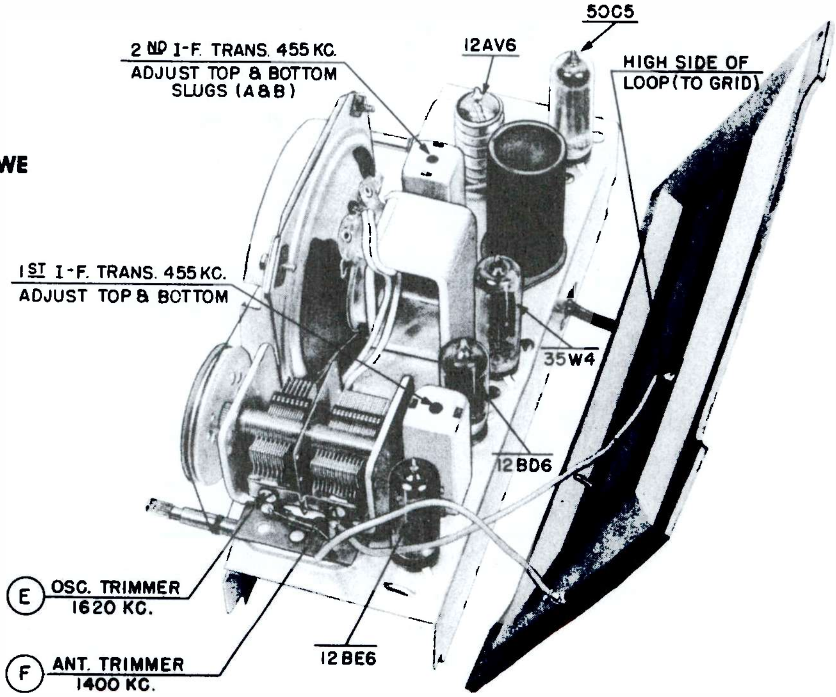
CROSLEY

MODELS: E10BE, E10CE, E10RD, E10WE

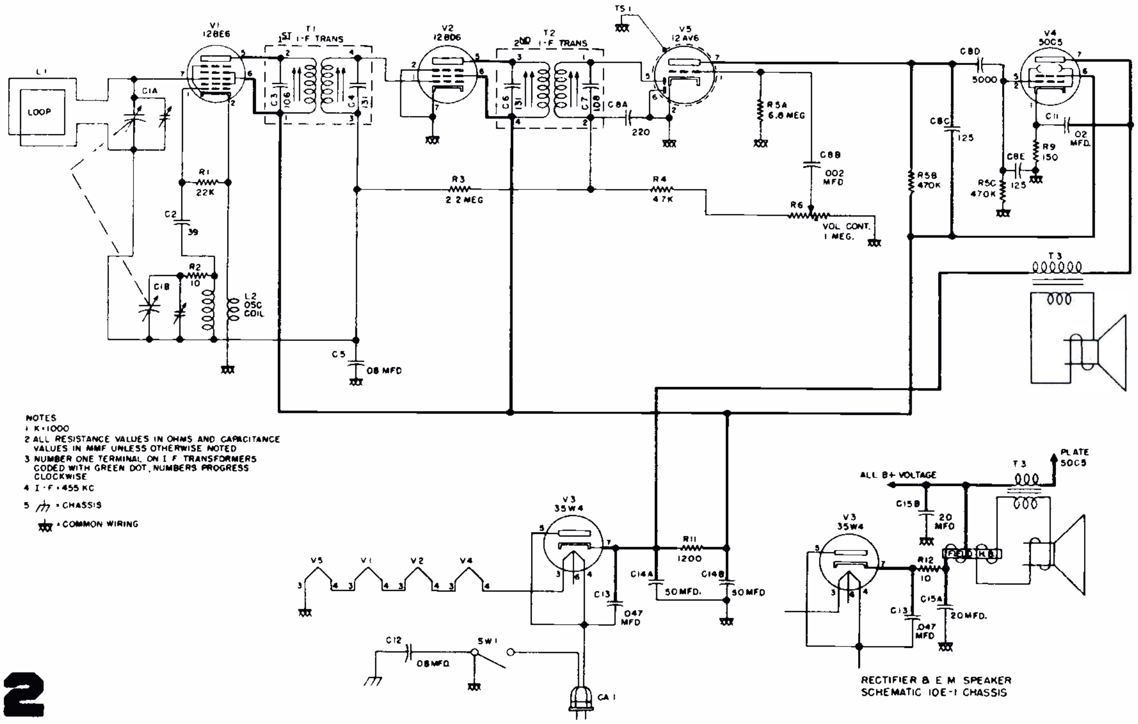
(Chassis 10E, 10E-1)







Alignment Sequence	Signal Generator Output: Frequency in KC	In Series with	To	Position of Dial pointer	Adjust for Maximum Output
1	455	200 mmf.	High Side of Loop	1620	A, B, C & D
2	1620	Radiated to Loop		1620	E
3	1400	Radiated to Loop		Tune to Signal	F



MANUAL OF 1953 MOST-OFTEN-NEEDED RADIO DIAGRAMS

CROSLEY

CHASSIS 90E

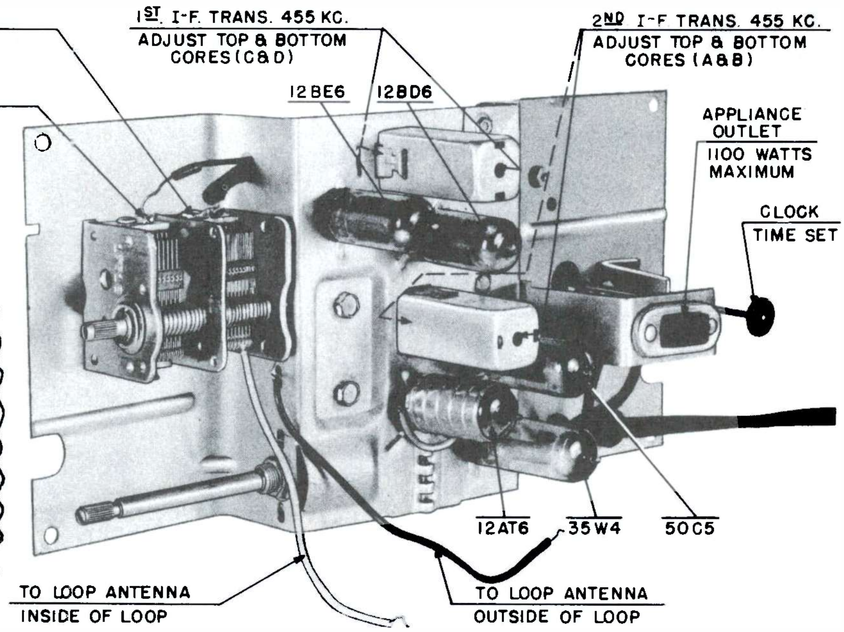
Models: E-90WE, E-90CE, E-90GY, E-90RD, E-90BK

Chassis 75E

Models: E-75 CE, E-75 RD, E-75 GN, E-75-TN

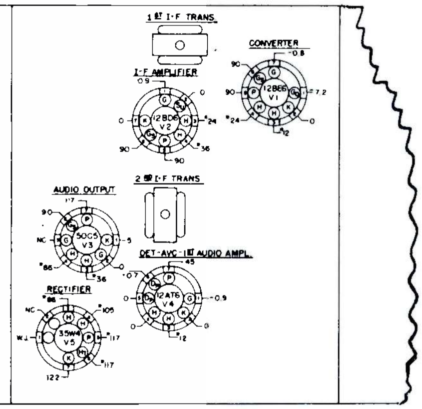
Chassis 85E

Models: E-85 CE, E-85 RD, E-85 GN, E-85 TN

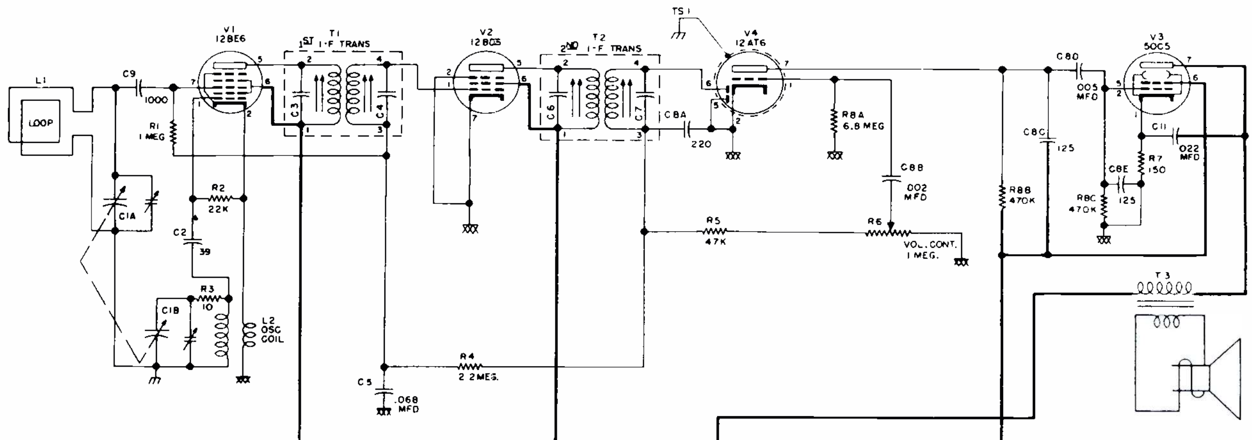


CHASSIS - TOP VIEW

SOCKET VOLTAGE CHART



NOTES:
1. BOTTOM VIEW OF TUBE SOCKETS
2. VOLTAGES MEASURED WITH AN ELECTRONIC VOLTMETER FROM SOCKET LUG TO B-
3. MEASURED WITH THE VOLUME CONTROL AT MINIMUM, NO SIGNAL INTO THE LOOP, TUNING GANG CLOSED
4. W.J. = WIRING JUNCTION
   NC = NO CONNECTION
   * = AC VOLTAGES
5. LINE VOLTAGE, 117V, 60 ∿ AC
6. SOCKET VOLTAGE TOLERANCE ±10%

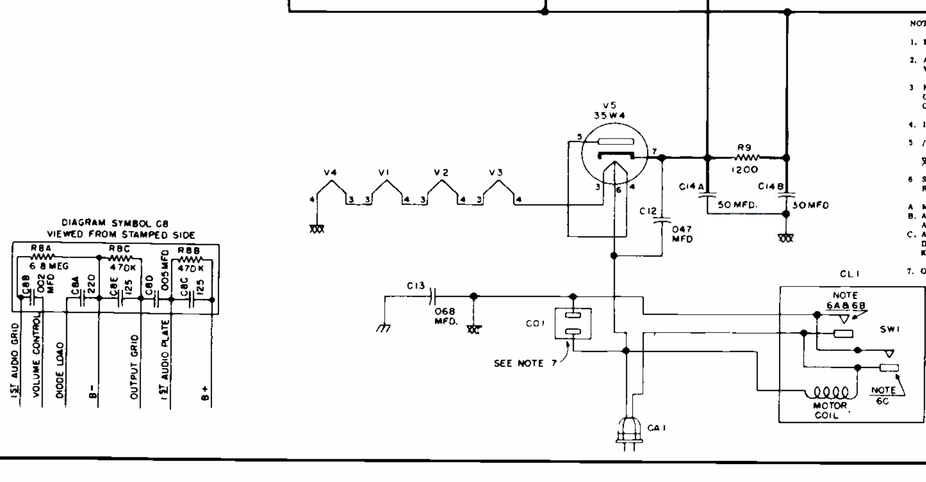


NOTES

1. K=1000
2. ALL RESISTANCE VALUES IN OHMS & CAPACITANCE VALUES IN MMF UNLESS OTHERWISE NOTED.
3. NUMBER ONE TERMINAL ON I-F TRANSFORMERS CODED WITH GREEN DOT, NUMBERS PROGRESS CLOCKWISE.
4. I-F = 455 KC
5. = CHASSIS
   = COMMON WIRING
6. SWITCH SW1 IS USED TO CONTROL OPERATION OF THE RADIO AND OUTLET AS FOLLOWS.

A. MANUALLY BY SETTING THE OPERATION KNOB AT "RADIO" ON OR OFF.
B. AUTOMATIC RADIO-ALARM (POWER ON) START BY PRESET OF ALARM CONTROLS WITH THE OPERATION KNOB SET AT "RADIO ALARM"
C. AUTOMATIC STOP (POWER OFF) AFTER NOT MORE THAN A 90 MINUTE INTERVAL BY SETTING THE SLEEP CONTROL WITH THE OPERATION KNOB AT OFF ON 85E AND 90E.

7. OUTLET ON 85E AND 90E.



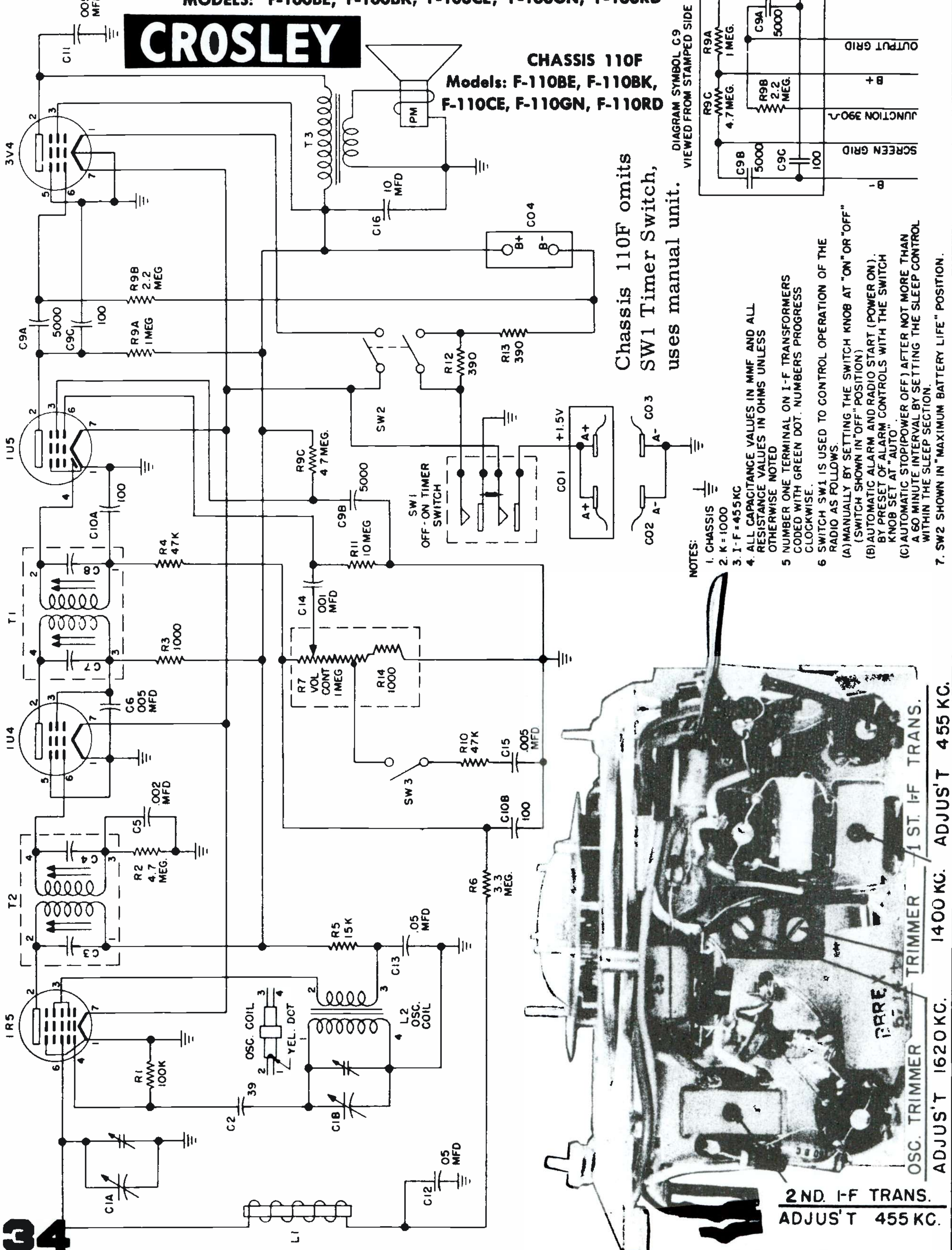
CHASSIS 100F

MODELS: F-100BE, F-100BK, F-100CE, F-100GN, F-100RD

CROSLEY

CHASSIS 110F

Models: F-110BE, F-110BK, F-110CE, F-110GN, F-110RD



Chassis 110F omits SW1 Timer Switch, uses manual unit.

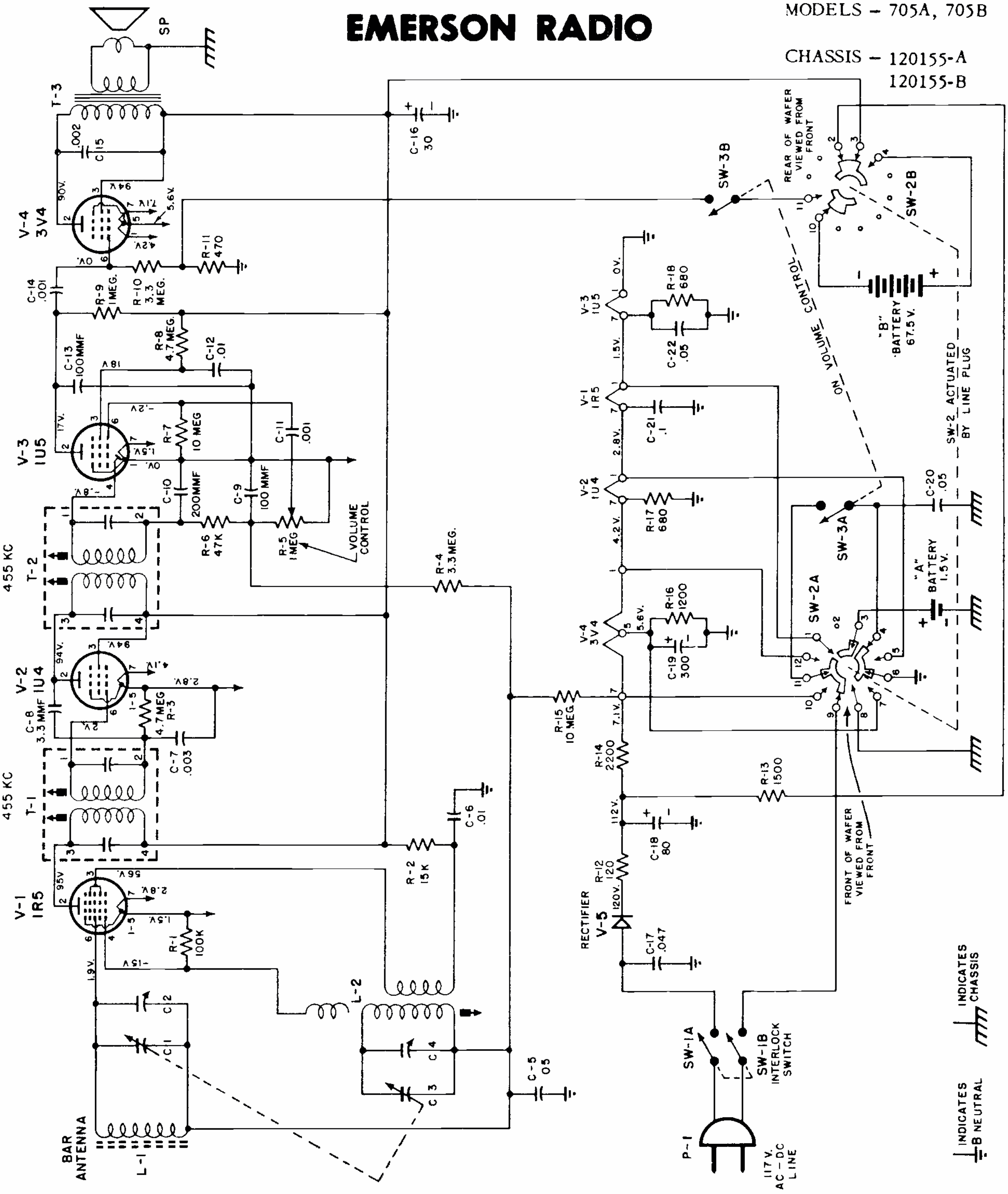
NOTES:

1. CHASSIS
2. K = 1000
3. I-F = 455KC
4. ALL CAPACITANCE VALUES IN MMF AND ALL RESISTANCE VALUES IN OHMS UNLESS OTHERWISE NOTED
5. NUMBER ONE TERMINAL ON I-F TRANSFORMERS CODED WITH GREEN DOT. NUMBERS PROGRESS CLOCKWISE.
6. SWITCH SW1 IS USED TO CONTROL OPERATION OF THE RADIO AS FOLLOWS.
   (A) MANUALLY BY SETTING THE SWITCH KNOB AT "ON" OR "OFF" (SWITCH SHOWN IN "OFF" POSITION)
   (B) AUTOMATIC ALARM AND RADIO START (POWER ON). BY PRESET OF ALARM CONTROLS WITH THE SWITCH KNOB SET AT "AUTO".
   (C) AUTOMATIC STOP (POWER OFF) AFTER NOT MORE THAN A 60 MINUTE INTERVAL BY SETTING THE SLEEP CONTROL WITHIN THE SLEEP SECTION.
7. SW2 SHOWN IN "MAXIMUM BATTERY LIFE" POSITION.

EMERSON RADIO

MODELS – 705A, 705B

CHASSIS – 120155-A
120155-B



RESISTANCE READINGS FOR CHASSIS 120155-A AND 120155-B

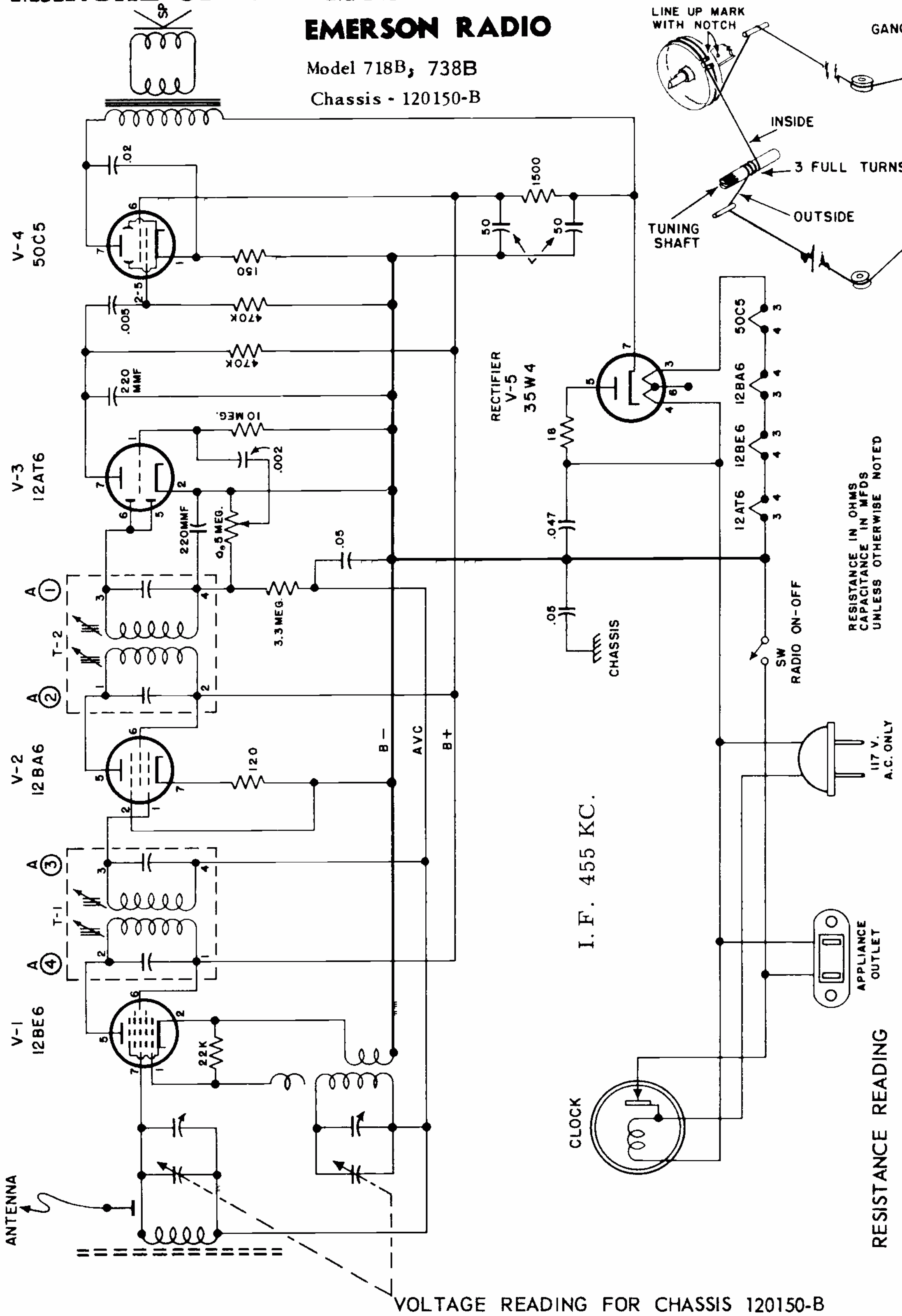
SYMBOL	TUBE	PIN 1	PIN 2	PIN 3	PIN 4	PIN 5	PIN 6	PIN 7
V-1	1R5	26	3.5 K	18 K	95 K	26	3 MEG	42
V-2	1U4	42	3.5 K	3.5 K	3.5 K	42	3.8 MEG	55
V-3	1U5	0	1 MEG	4 MEG	1 MEG	12 K	10 MEG	26
V-4	3V4	55	4 K	3.5 K	420	62	3.2 MEG	72
V-5	SELENIUM RECTIFIER							

VOLTAGE READINGS ON SCHEMATIC DIAGRAM

EMERSON RADIO

Model 718B, 738B

Chassis - 120150-B



RESISTANCE READING

SYMBOL	TUBE	PIN 1	PIN 2	PIN 3	PIN 4	PIN 5	PIN 6	PIN 7
V-1	12BE6	2.4 K	0.4	26	14	•1600	•1600	4 MEG.
V-2	12BA6	4 MEG.	0	26	38	•1600	•1600	130
V-3	12AT6	10 MEG.	0	0	14	.5 MEG.	.5 MEG.	•.5 MEG.
V-4	50C5	160	.5 MEG.	90	38	.5 MEG.	•1600	•200
V-5	35W4	N.C.	N.C.	90	125	150	120	•0

• with reference to Pin #7, 35W4.

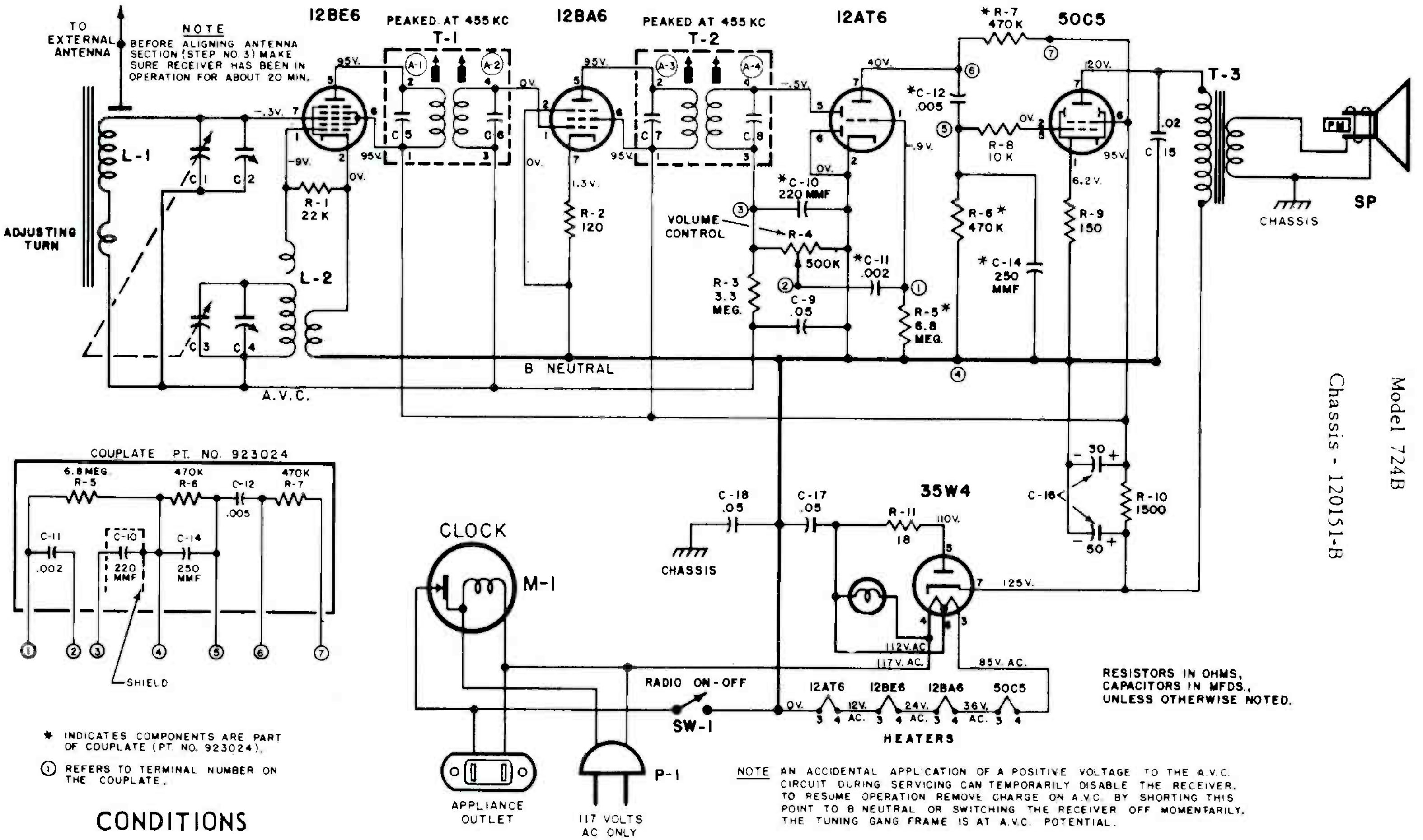
VOLTAGE READING FOR CHASSIS 120150-B

SYMBOL	TUBE	PIN 1	PIN 2	PIN 3	PIN 4	PIN 5	PIN 6	PIN 7
V-1	12BE6	-8.5 DC.	0	24 AC	12 AC	90 DC	90 DC	-.6 DC.
V-2	12BA6	-.6 DC.	0	24 AC	36 AC	90 DC	90 DC	1 DC
V-3	12AT6	-.7DC.	0	0	12 AC	-.8 DC.	-.8 DC.	42 DC
V-4	50C5	5.6 DC.	0	80 AC	36 AC	0	90 DC	110 DC
V-5	35W4	0	0	80 AC	117 AC	115 AC.	110 AC	120 DC

Emerson Radio

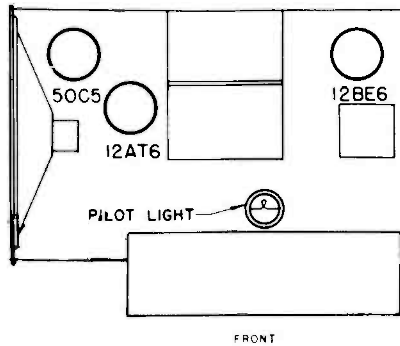
Model 724B

Chassis - 120151-B



* INDICATES COMPONENTS ARE PART OF COUPLATE (PT. NO. 923024).

① REFERS TO TERMINAL NUMBER ON THE COUPLATE.



CONDITIONS

1. Voltages indicated are positive d.c., resistances are in ohms, unless otherwise indicated.
2. Measurements made with voltohmyst or equivalent.
3. Line voltage maintained at 117 volts a.c. for voltage measurements.
4. Socket connections are shown as bottom views, with measurements from pin to common negative.
5. Volume control at maximum; no signal applied for voltage measurements.
6. Nominal tolerance on component values makes possible a variation of ± 15% in voltage and resistance readings.
7. NC denotes no connection, K is kilohms, MEG is megohms. Resistances marked • are measured to pin 7 of rectifier 35W4 (B +).

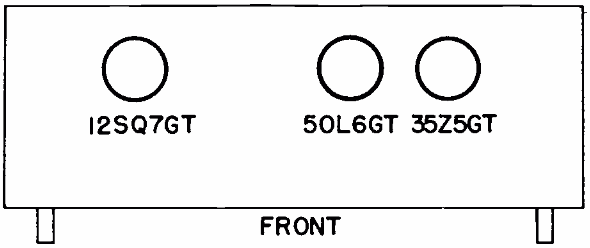
RESISTANT READINGS FOR CHASSIS 120151-B

TUBE	PIN 1	PIN 2	PIN 3	PIN 4	PIN 5	PIN 6	PIN 7
12BE6	23K	.5	12	24	1500•	1500•	4 MEG
12BA6	15	0	24	36	1500•	1500•	125
12AT6	6 MEG	0	0	12	500K	0	470•
50C5	150	470 K	36	85	470K	1500•	185•
35W4	N.C.	N.C.	85	115	110	115	0•

Emerson Radio

MODEL - 725A

CHASSIS - 120149-A



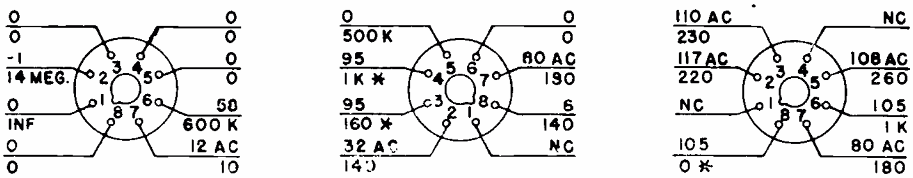
DISASSEMBLY INSTRUCTIONS

1. Remove two push-on knobs at front of cabinet.
2. Disconnect phono-motor leads by unscrewing wirenuts.
3. Remove phono pickup plug.
4. Unscrew two front cabinet feet and two chassis bolts at sides of cabinet. Lift out chassis.
5. Remove two base plate screws at center of chassis.

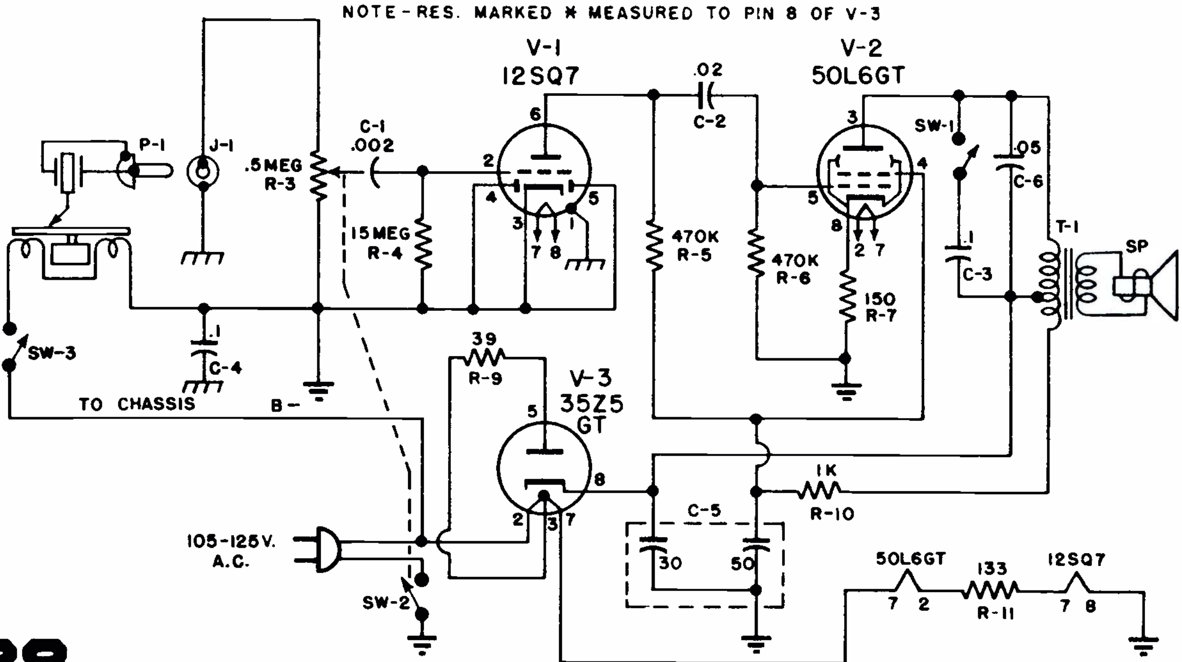
CONDITIONS FOR VOLTAGE AND RESISTANCE READINGS

1. Voltages indicated are positive d.c., resistances are in ohms, unless otherwise indicated.
2. Measurements made with voltohmyst or equivalent.
3. Line voltage maintained at 117 volts a.c. for voltage measurements.
4. Socket connections are shown as bottom views, with measurements from pin to common negative.
5. Volume control at maximum, for voltage measurements.
6. Nominal tolerance on component values makes possible a variation of ± 15% in voltage and resistance readings.
7. On the diagram, upper values are voltage and lower values are resistance. NC denotes no connection, K is kilohms, MEG is megohms, INF is infinity. Resistances marked * are measured to pin 8 of rectifier(B+).

VOLTAGE & RESISTANCE READINGS FOR CHASSIS 120149-A



NOTE - RES. MARKED * MEASURED TO PIN 8 OF V-3



Emerson Radio

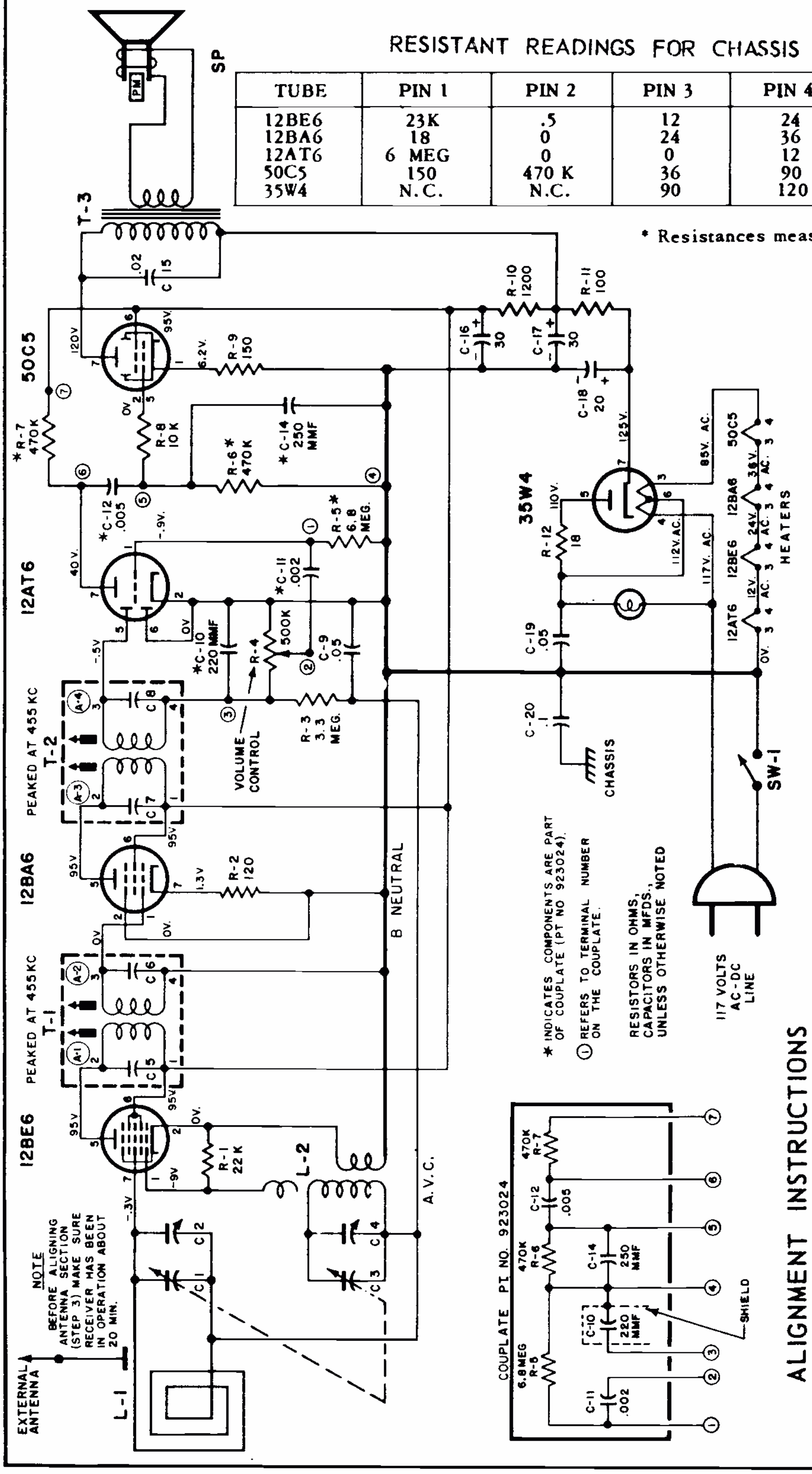
MODEL – 729B

CHASSIS – 120170-B

RESISTANT READINGS FOR CHASSIS 120170-B

TUBE	PIN 1	PIN 2	PIN 3	PIN 4	PIN 5	PIN 6	PIN 7
12BE6	23K	.5	12	24	1500*	1500*	4 MEG
12BA6	18	0	24	36	1500*	1500*	120
12AT6	6 MEG	0	0	12	500K	0	470*
50C5	150	470 K	36	90	470K	1500*	210*
35W4	N.C.	N.C.	90	120	135	115	0*

* Resistances measured to pin 7 of rectifier 35W4 (B+).



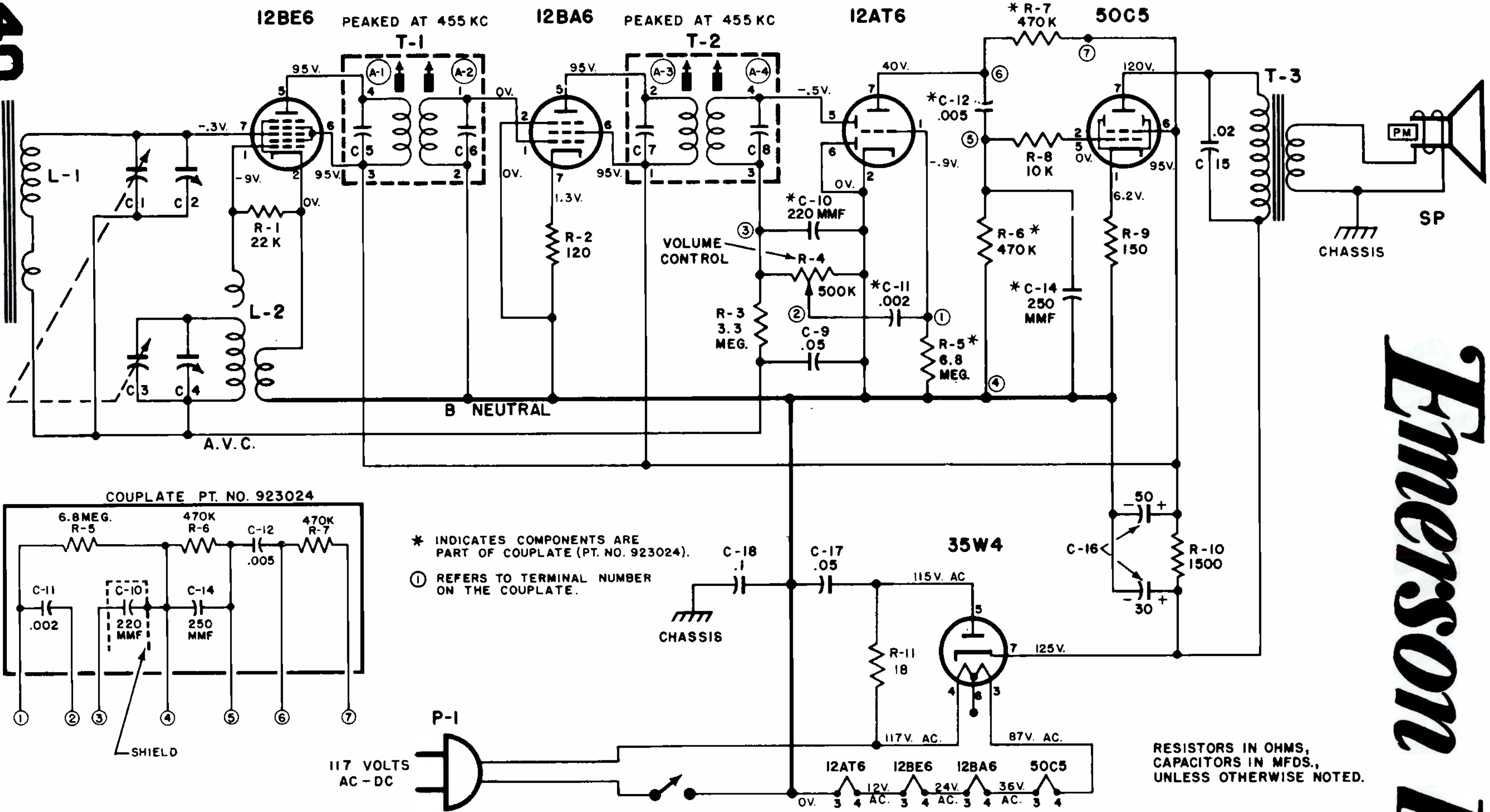
ALIGNMENT INSTRUCTIONS

STEP	DUMMY ANTENNA	SIGNAL GENERATOR COUPLING	SIGNAL GENERATOR FREQUENCY	RADIO DIAL SETTING	OUTPUT METER	ADJUST	REMARKS
1	.001 mfd.	High side to grid (pin 7) of V1 (12BE6). Low side to B-neutral	455 KC	Variable condenser fully open.	Across voice coil.	T2, T1 (A3, A4, A1, A2)	Adjust for maximum output.
2		Form loop of several turns and radiate signal into receiver	1620 KC	"	Across voice coil.	Trimmer C-4 (Osc.)	Adjust for maximum output.
3		"	1400 KC	Tune for maximum	Across voice coil.	Trimmer C-2 (Ant.)	Adjust for maximum output.

Emerson Radio

MODELS – 737A, 737B

CHASSIS – 120172-A
120172-B



* INDICATES COMPONENTS ARE PART OF COUPLATE (PT. NO. 923024).

① REFERS TO TERMINAL NUMBER ON THE COUPLATE.

RESISTORS IN OHMS, CAPACITORS IN MFDS., UNLESS OTHERWISE NOTED.

All measurements taken between points and common B neutral (black lead of electrolytic filter condenser).
Volume control at maximum, no signal applied, for voltage measurements.

RESISTANCE READINGS FOR CHASSIS 120172-A AND 120172-B

TUBE	PIN 1	PIN 2	PIN 3	PIN 4	PIN 5	PIN 6	PIN 7
12BE6	23K	.5	12	24	1500*	1500*	4 MEG
12BA6	15	0	24	36	1500*	1500*	125
12AT6	6 MEG	0	0	12	500K	0	470K*
50C5	150	470K	36	85	470K	1500*	185*
35W4	N.C.	N.C.	85	115	135	110	0*

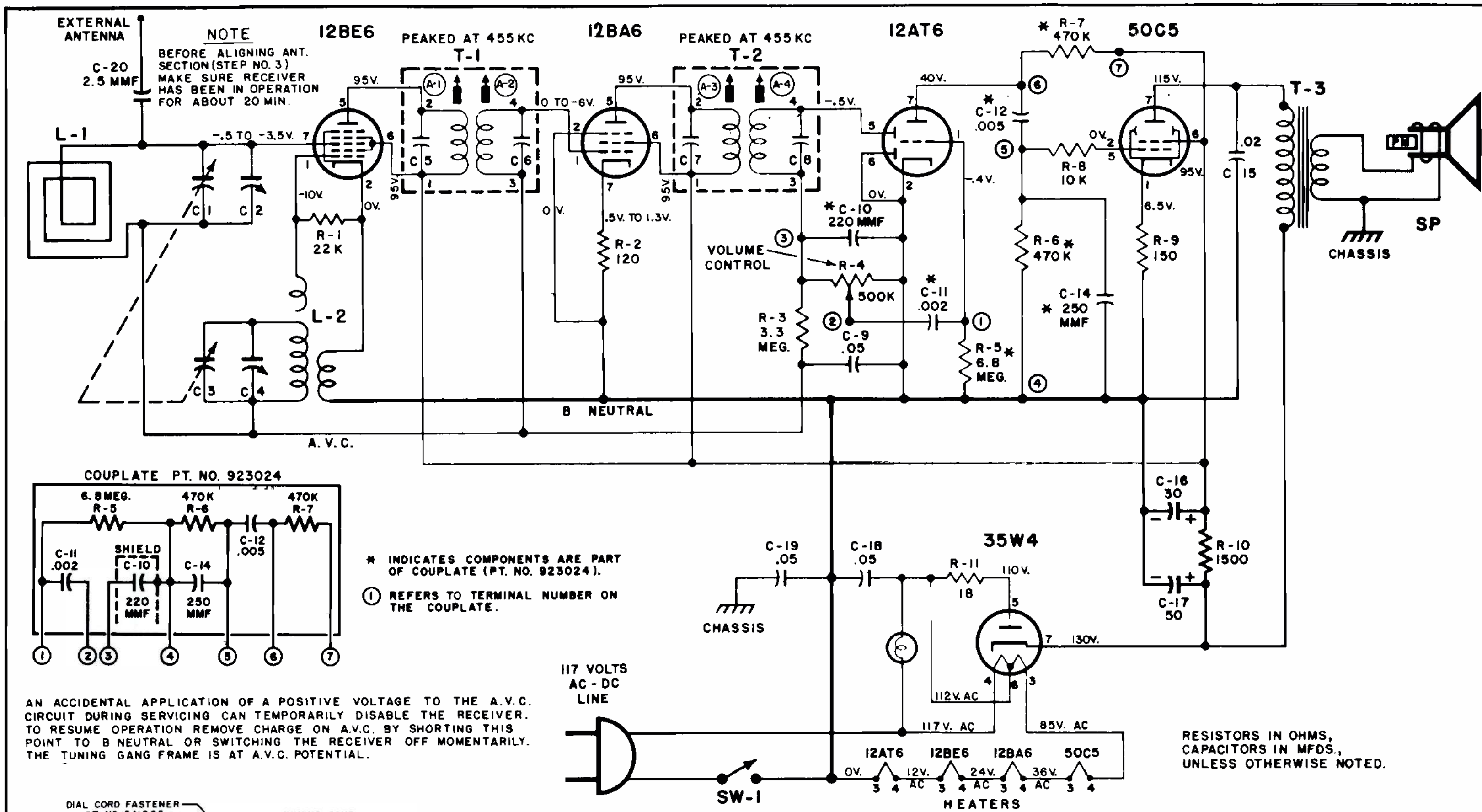
*Resistances Measured to Pin 7 of Rectifier 35W4 (B+).

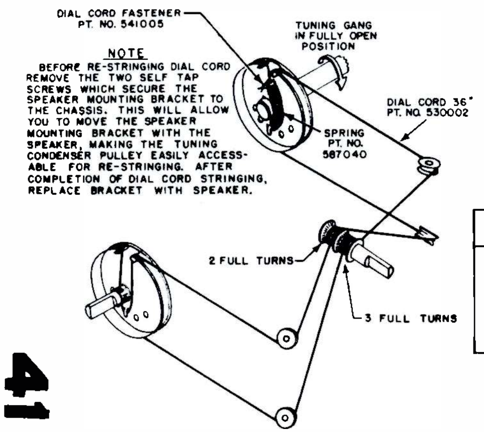
VOLTAGE READINGS ON SCHEMATIC DIAGRAM

Emerson Radio

MODEL – 744B

CHASSIS – 120175-B





Voltages indicated are positive d.c., resistances are in ohms, unless otherwise indicated.
Measurements made with voltohmyst or equivalent.
Line voltage maintained at 117 volts a.c. for voltage measurements.
Socket connections are shown as bottom views, with measurements from pin to common negative.
Volume control at maximum; no signal applied for voltage measurements.

RESISTANT READINGS FOR CHASSIS 120175-B

TUBE	PIN 1	PIN 2	PIN 3	PIN 4	PIN 5	PIN 6	PIN 7
12BE6	23K	.5	12	24	1500*	1500*	4 MEG
12BA6	3.2 MEG	0	24	36	1500*	1500*	120
12AT6	6 MEG	0	0	12	500K	0	470*
50C5	150	470 K	36	90	N.C.	1500*	210*
35W4	N.C.	N.C.	90	120	135	115	0*

* Resistances measured to pin 7 of rectifier 35W4 (B +).

VOLTAGE READINGS ON SCHEMATIC DIAGRAM

Gamble-Skogmo, Inc.

CORONADO RADIO MODEL 35RA2-43-5101A

IF Alignment:

1. Connect the hot lead of the signal generator through a .10 mfd. capacitor to Pin 7 of the converter (6BE6) tube. Apply a 400 cycle, 30% modulated carrier of 455 KC at about 150 microvolts.

2. Set the volume control at maximum and adjust the top and bottom cores of the first and second IF transformers (T4, and T5) for maximum output, as indicated on the output meter. Keep signal generator level low.

RF Alignment:

1. Set the signal generator to 1620 KC and turn tuning control fully counter-clockwise.

2. Adjust oscillator trimmer C8 for maximum deflection.

3. Disconnect the hot signal generator lead and .10 mfd capacitor and reconnect to the antenna jack through a 50 mmf capacitor.

4. Set the signal generator to 1300 KC and tune in the receiver for maximum reading on output meter. Keep signal generator level low.

5. Adjust antenna and R.F. trimmers C3 and C4 for maximum reading.

DIAL CORD REPLACEMENT

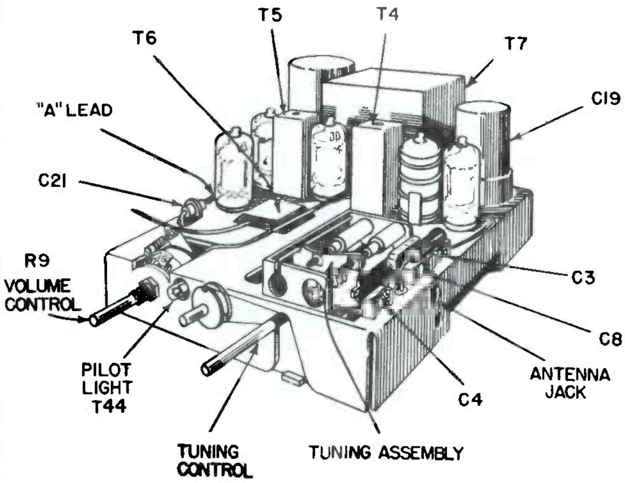
1. Turn the tuning shaft counterclockwise until it reaches a stop. Then turn two (2) complete turns clockwise.

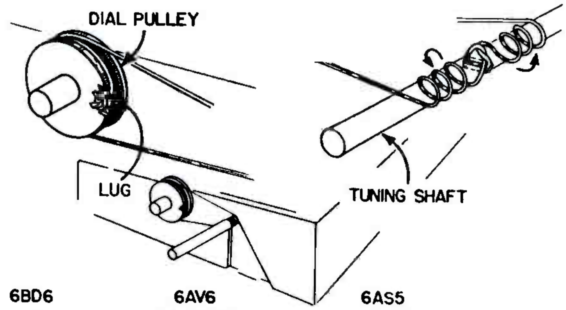
2. Place dial pulley in position shown in diagram. Lug pointing toward tuning shaft.

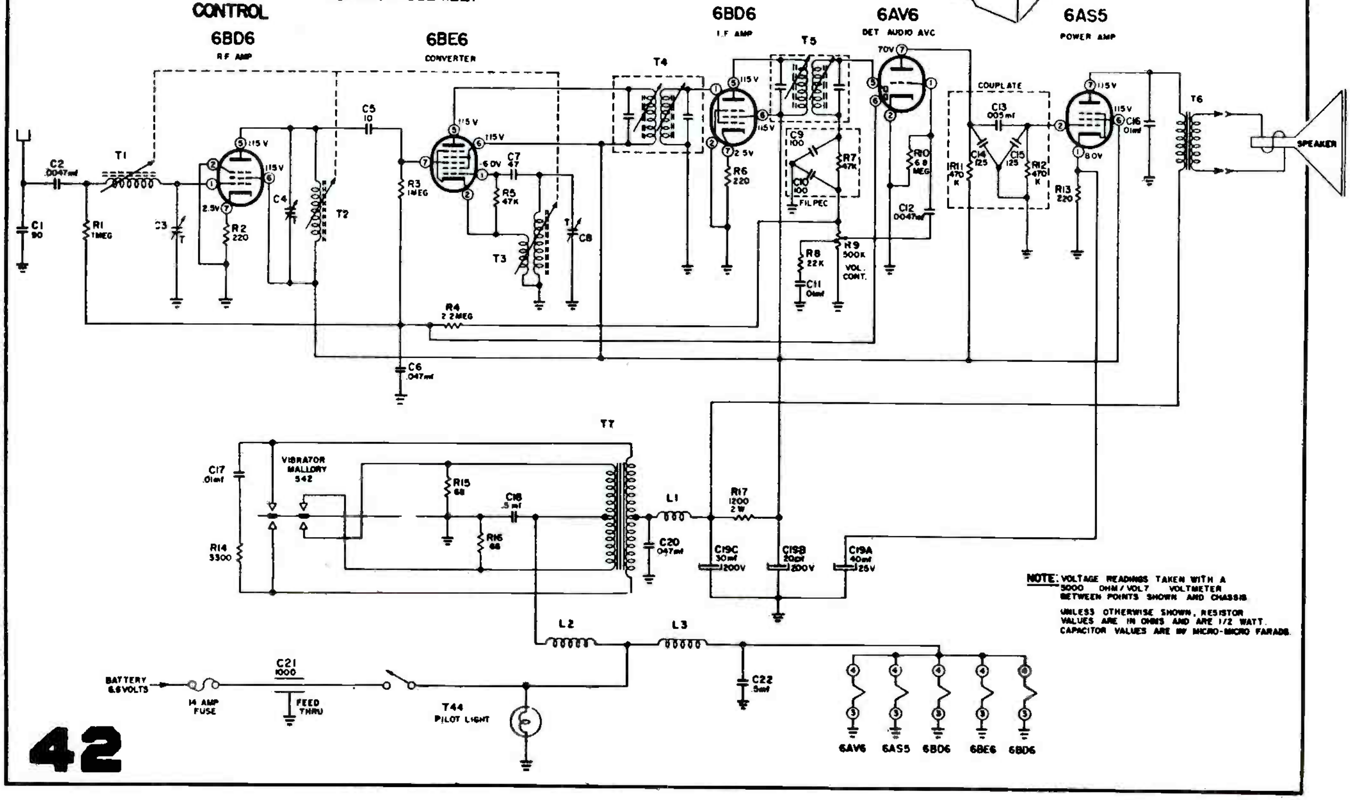
3. Insert dial cord through hole in tuning shaft and tie a knot as indicated.

4. Make three (3) complete turns around the tuning shaft in the direction indicated on either side of the knot and route to the dial pulley.

5. Make a three-quarter (3/4) turn around the pulley in either direction and tie a knot around the lug as indicated.



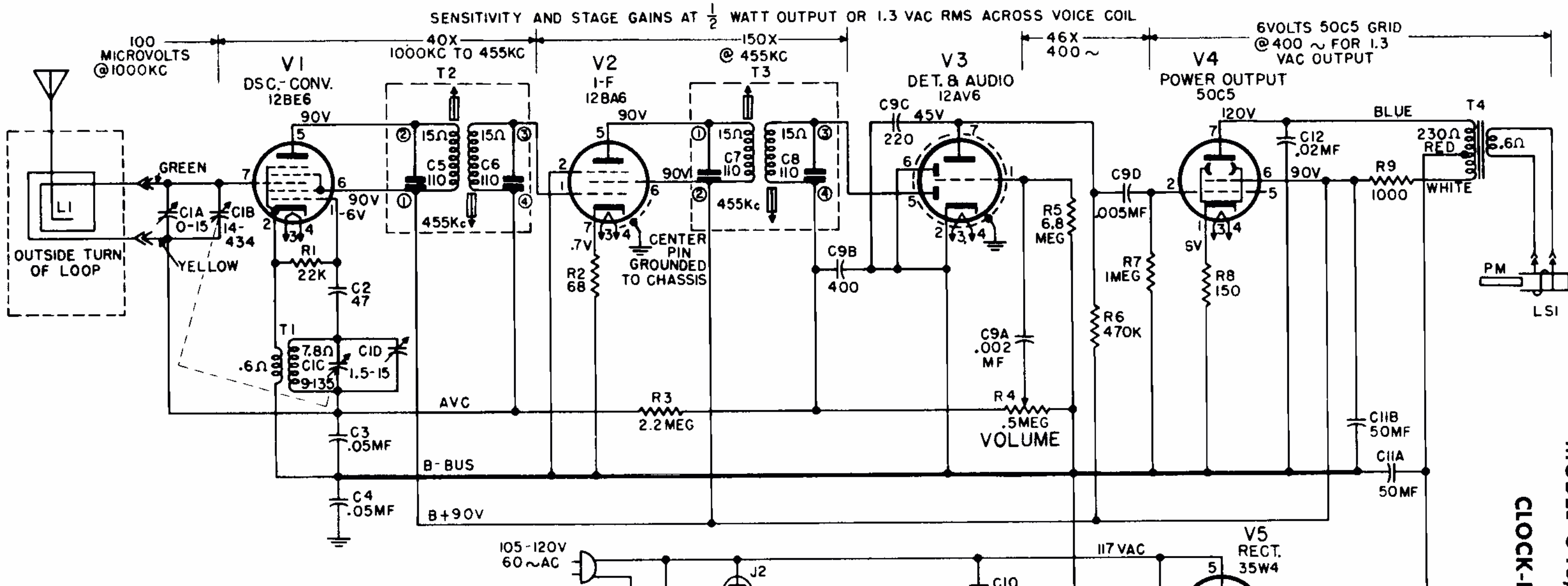




GENERAL ELECTRIC

MODEL 546, 547, 548 AND 549

CLOCK-RADIO RECEIVERS



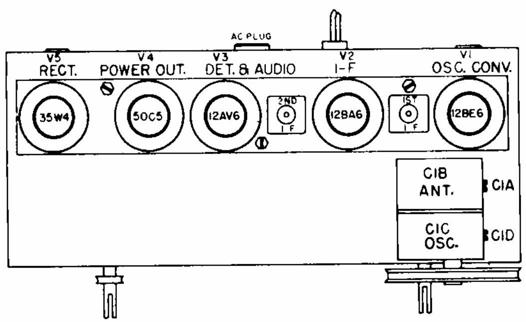
NOTE 1. CAPACITORS: VALUES ARE IN MMF UNLESS OTHERWISE NOTED.
2. RESISTORS: VALUES ARE OHMS, K=1000 MEG=1,000,000.
3. SOCKET CONNECTIONS: PIN #8 ON EACH SOCKET IS A DUMMY PIN USED FOR A SPARE TERMINAL. A SMALL HOLE IN THE TUBE SOCKET BETWEEN PINS #1 & 8 IS USED TO KEY THESE PINS.
4. ALL D.C. VOLTAGES MEASURED AT 117 VOLTS LINE ON A 20,000 OHMS PER VOLT METER. ALL VOLTAGES ARE D-C UNLESS OTHERWISE NOTED. READINGS TAKEN BETWEEN TUBE PIN TERMINALS & B-.

ALIGNMENT CHART

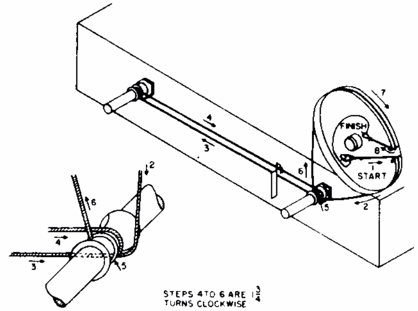
Step	Connect Test Oscillator to	Test Osc. Setting	Dial Drum Setting	Adjust for Max. Output
1	12BA6 grid (1) in series with 0.05 mf. capacitor	455 KC	Minimum capacity	2nd I-F transformer, T3, cores
2	12BE6 grid (7) in series with 0.05 mf. capacitor	455 KC	Minimum capacity	1st I-F transformer, T2, cores
3	Inductively coupled to Radio loop	1620 KC	Minimum capacity	C1D (osc.)
4	Inductively coupled to Radio loop	1500 KC	Tune for Max.	C1A (antenna)

ELECTRICAL RATING:

Voltage 105–120
Frequency .... 60 cycles only
Watts 30



Location of Tubes and Adjustments

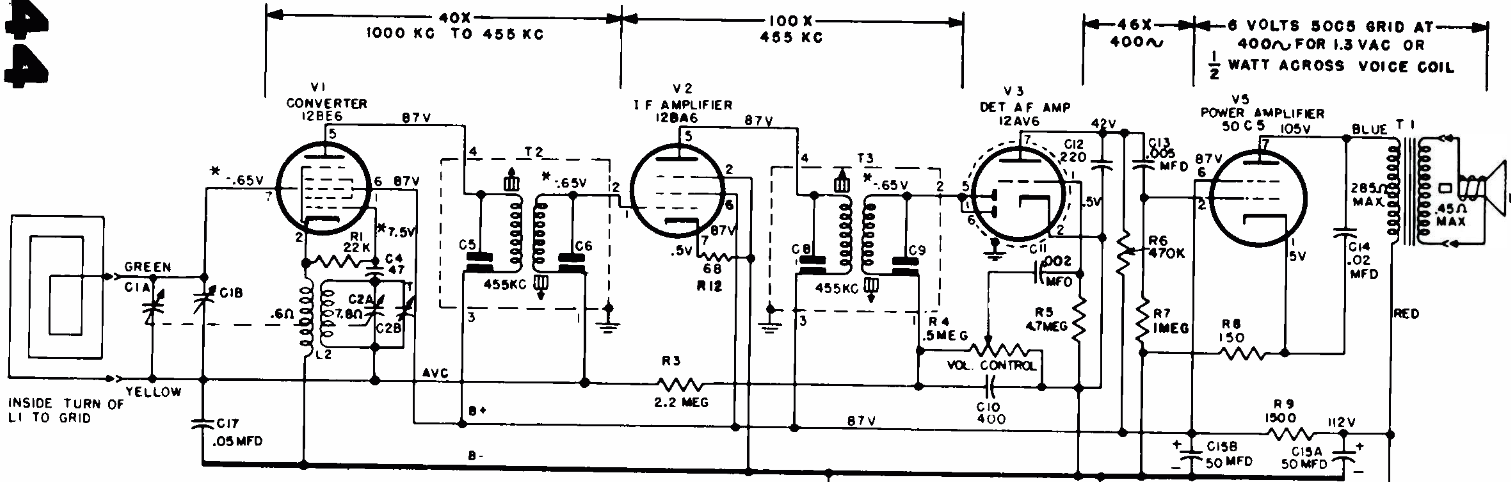


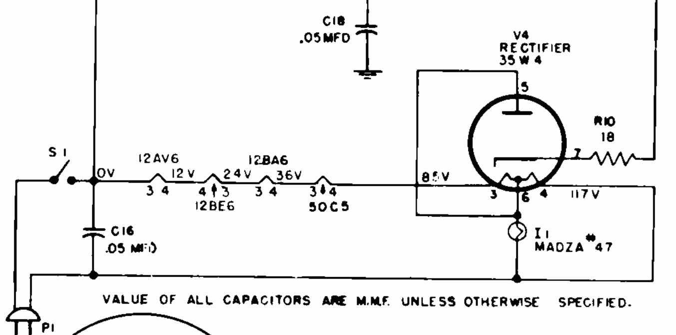
Dial Cording

MANUAL OF 1953 MOST-OFTEN-NEEDED

GENERAL ELECTRIC COMPANY

MODEL-412



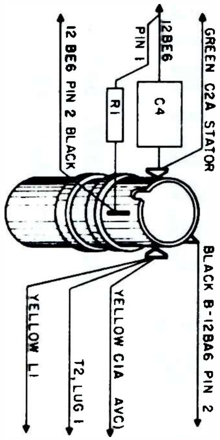


1 VOLTAGES ARE MEASURED TO B- BUS.
2. ALL VOLTAGES ARE DC EXCEPT FOR HEATERS WHEN USING AC INPUT.
3.* INDICATES VACUUM TUBE VOLTMETER READING WITH TUNING DIAL AT 1000 KC (IN CLEAR CHANNEL, NO SIGNAL) - THESE VOLTAGES NORMALLY VARY WITH SIGNAL.
4. ALL OTHER DC VOLTAGES MEASURED WITH 20,000 OHMS PER VOLTMETER.

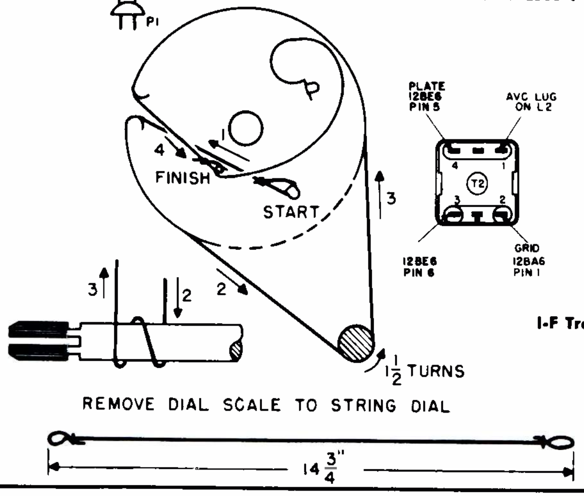
VALUE OF ALL CAPACITORS ARE M.M.F. UNLESS OTHERWISE SPECIFIED.

ALIGNMENT CHART

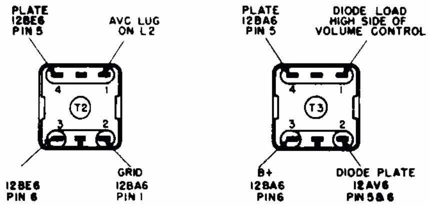
Step	Connect Test Oscillator to	Test Osc. Setting	Radio Dial Setting	Adjust for Maximum
I-F ALIGNMENT				
1	V2, 12BA6 grid (Pin 1) in series with .05 mfd.	455 kc		Cores of second I-F transformer, T3
2	V1, 12BE6 grid (Pin 7) in series with .05 mfd.	455 kc		Cores of first I-F transformer, T2
3	V1, 12BE6 grid (Pin 7) in series with .05 mfd.	455 kc		Recheck adjustment of T2 and T3, for max.
R-F ALIGNMENT				
4	Inductively coupled to radio loop	1620 kc	Minimum capacity C1A, C2A	C2B oscillator trimmer
5	Inductively coupled to radio loop	1500 kc	For Maximum	C1B, R-F trimmer
6	Set pointer to 150.			



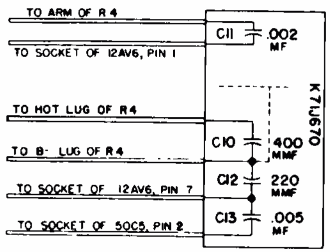
Oscillator Coil



REMOVE DIAL SCALE TO STRING DIAL



I-F Transformers



Couplate Unit, C10, 11, 12, 13

GENERAL ELECTRIC COMPANY

MODELS 614, 615

BOTTOM SHIELD REMOVAL:

For most services to the chassis such as i-f alignment, voltage measurement and component replacement it is not necessary to completely remove the radio from the cabinet. To gain access to the inside of the chassis to perform these services it is only necessary to remove the chassis bottom shield as follows:

1. Remove the hex head screw in cabinet bosses at each side of chassis.

2. Remove the three snap fasteners holding shield to back edge of chassis.

3. Remove the hex head screw holding bottom shield to each end of chassis.

4. Withdraw shield to position exposing chassis components.–

POWER SUPPLY:

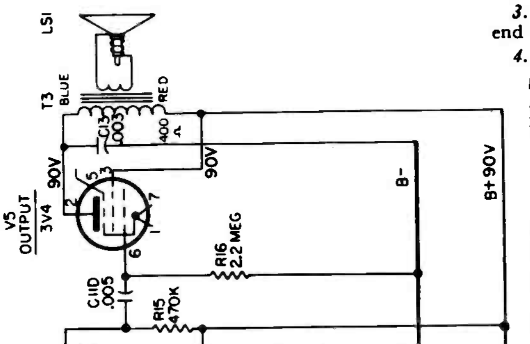
Power line..........105-120 volts, D-c or 60 cps A-c
Battery..............AB combination 9 and 90 volts
Eveready 753
Bright Star 66–50
Burgess F6A60
Rayovac AB994

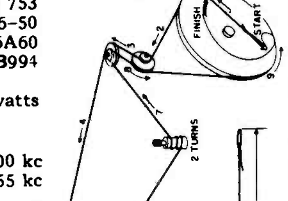
Power Consumption (connected to power line)..............................25 watts

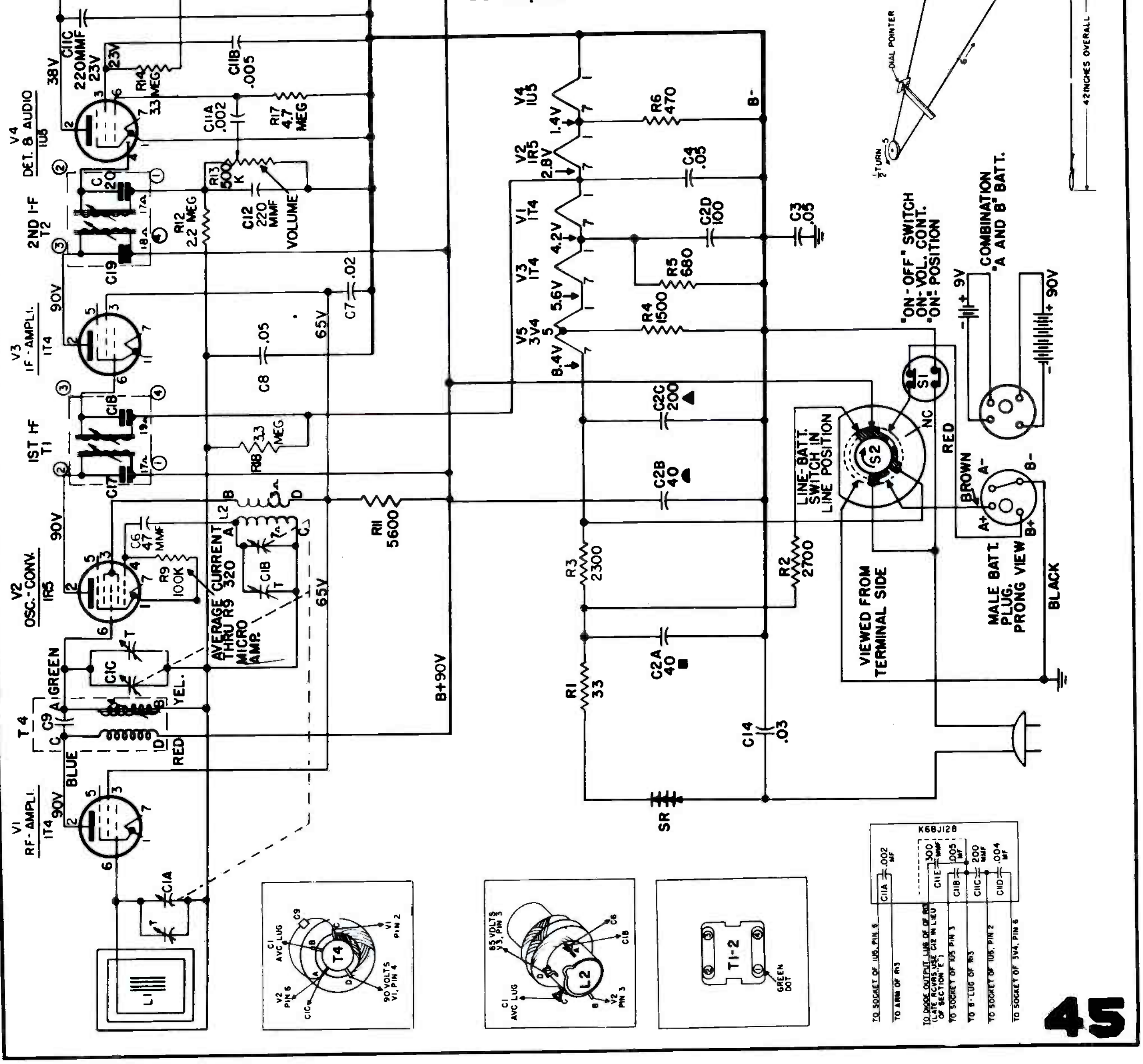
OPERATING FREQUENCIES:

Broadcast..........................540–1600 kc
I-F Amplifier..............................455 kc

NOTE: ALL CAPACITIES ARE IN MFD. UNLESS OTHERWISE INDICATED. ALL VOLTAGES ARE D-C MEASURED TO B- USING A 20,000 OHMS PER VOLT METER. READINGS ARE SIMILAR FOR 117 VOLTS LINE, OR BATTERY INPUT POWER.



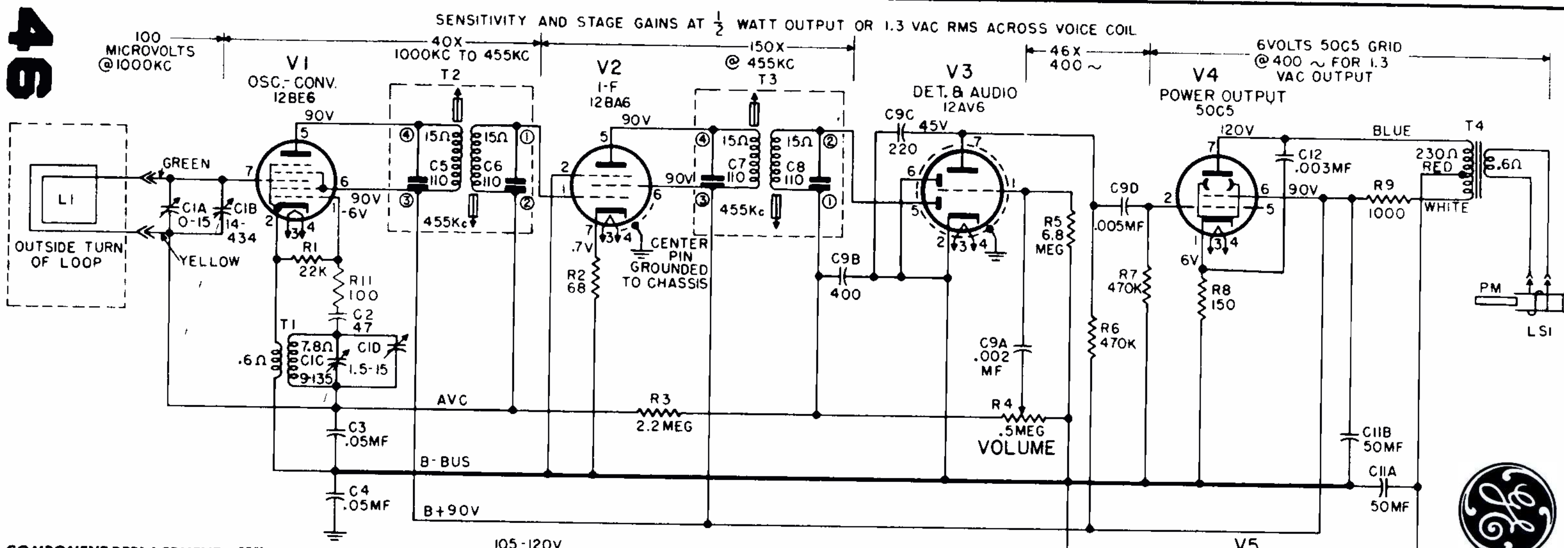


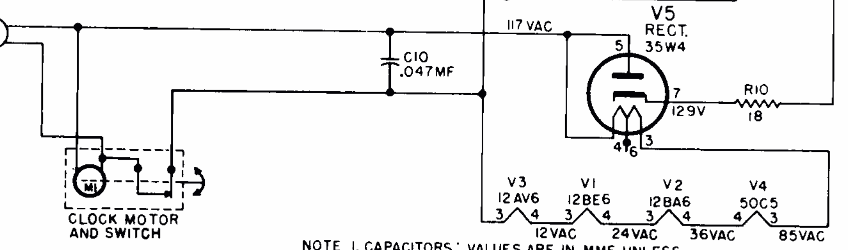


MANUAL OF 1953 MOST-OFTEN-NEEDED RADIO DIAGRAMS

GENERAL ELECTRIC COMPANY

MODELS 514, 542 AND 543

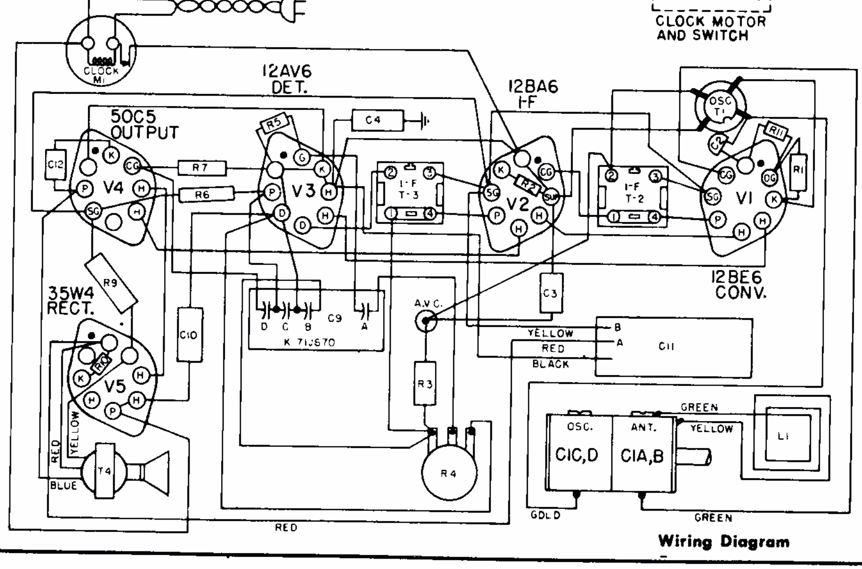




COMPONENT REPLACEMENT—When servicing mechanized chassis, time and effort otherwise spent to remove the shield, heat pin connections and free the components may be spared. A neater job can be done without the risk of damage to the tube sockets by using the following method in wiring a replacement part.

Clip the defective unit out, leaving enough of its leads attached to the tube socket so an eye loop may be formed in the leads. Each lead of the new component may then be passed through the proper loop, pruned to length, crimped and soldered.

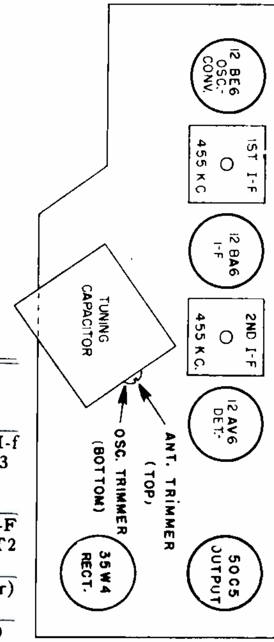
NOTE 1. CAPACITORS: VALUES ARE IN MMF UNLESS OTHERWISE NOTED.
2. RESISTORS: VALUES ARE OHMS, K=1000 MEG=1,000,000.
3. SOCKET CONNECTIONS: PIN #8 ON EACH SOCKET IS A DUMMY PIN USED FOR A SPARE TERMINAL. A SMALL HOLE IN THE TUBE SOCKET BETWEEN PINS #1 & 8 IS USED TO KEY THESE PINS.
4. ALL D.C. VOLTAGES MEASURED AT 117 VOLTS LINE ON A 20,000 OHMS PER VOLT METER. ALL VOLTAGES ARE D-C UNLESS OTHERWISE NOTED.



Wiring Diagram

ALIGNMENT CHART

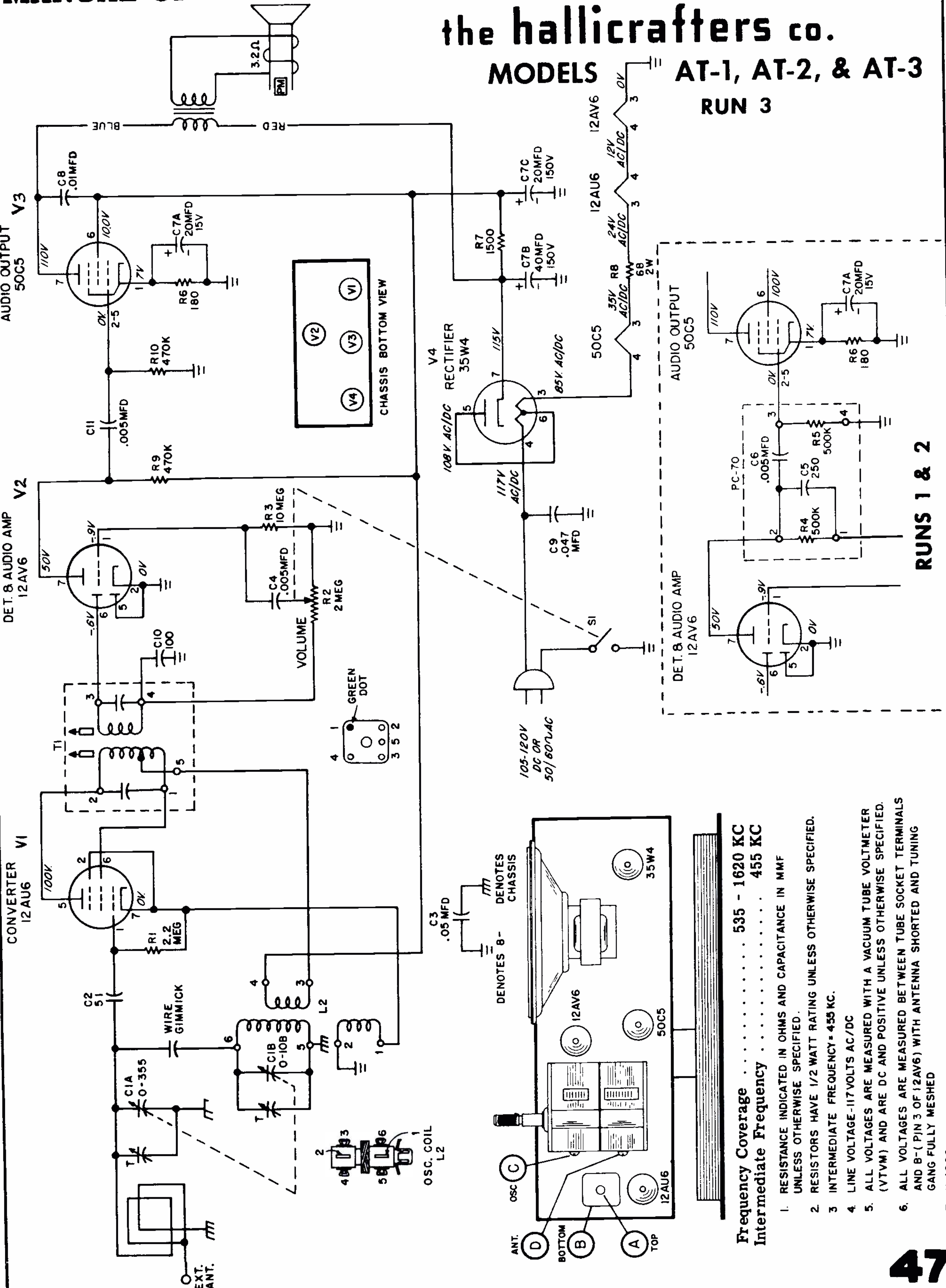
Step	Connect Test Oscillator to	Test Osc. Setting	Dial Drum Setting	Adjust for Maximum Output
1	12BA6 grid (1) in series with 0.05 mf. cap.	455 kc	Minimum capacity	Cores of 2nd I-f transformer T3
2	12BE6 grid (7) in series with 0.05 mf. cap			Cores of 1st I-F transformer, T2
3	Inductively coupled to Radio loop	1620 kc		C1D (oscillator)
4		1500 kc	Tune for max.	C1A (antenna)



the hallicrafters co.

MODELS AT-1, AT-2, & AT-3

RUN 3

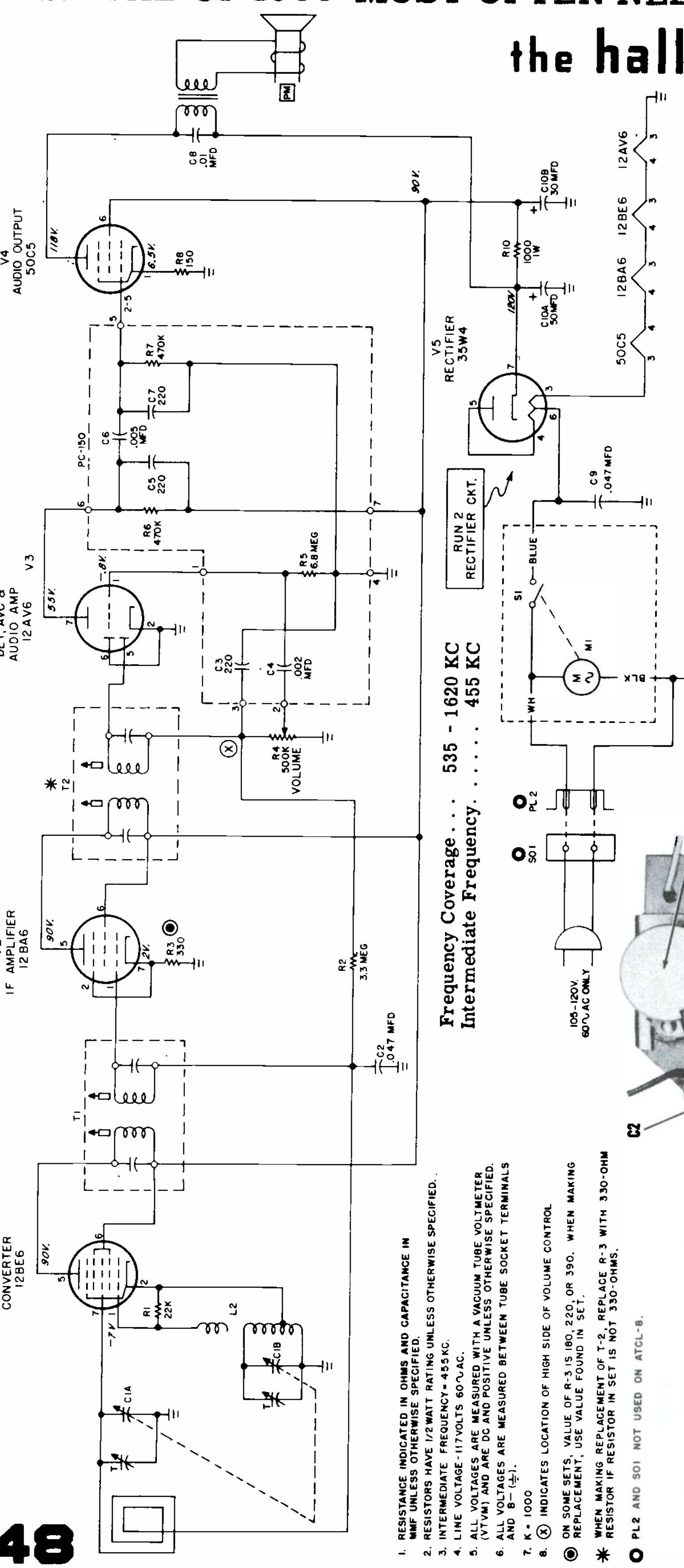


Frequency Coverage . . . . 535 - 1620 KC
Intermediate Frequency . . . . 455 KC

1. RESISTANCE INDICATED IN OHMS AND CAPACITANCE IN MMF UNLESS OTHERWISE SPECIFIED.
2. RESISTORS HAVE 1/2 WATT RATING UNLESS OTHERWISE SPECIFIED.
3. INTERMEDIATE FREQUENCY = 455 KC.
4. LINE VOLTAGE-117VOLTS AC/DC
5. ALL VOLTAGES ARE MEASURED WITH A VACUUM TUBE VOLTMETER (VTVM) AND ARE DC AND POSITIVE UNLESS OTHERWISE SPECIFIED.
6. ALL VOLTAGES ARE MEASURED BETWEEN TUBE SOCKET TERMINALS AND B-(PIN 3 OF 12AV6) WITH ANTENNA SHORTED AND TUNING GANG FULLY MESHED
7. K=1000

the hallicrafters co.

MODELS ATCL-5, 6 and 7 (RUNS 1 & 2) and ATCL-8 (Run 1)



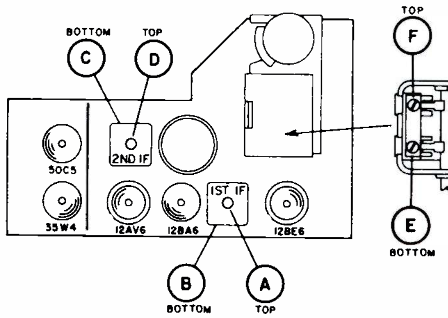
Frequency Coverage . . . 535 - 1620 KC
Intermediate Frequency. . . . . 455 KC

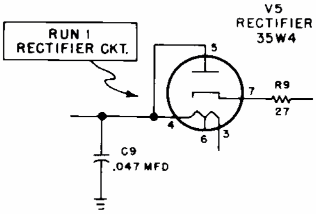
1. RESISTANCE INDICATED IN OHMS AND CAPACITANCE IN MMF UNLESS OTHERWISE SPECIFIED.
2. RESISTORS HAVE 1/2 WATT RATING UNLESS OTHERWISE SPECIFIED.
3. INTERMEDIATE FREQUENCY = 455 KC.
4. LINE VOLTAGE - 117 VOLTS 60∿AC.
5. ALL VOLTAGES ARE MEASURED WITH A VACUUM TUBE VOLTMETER (VTVM) AND ARE DC AND POSITIVE UNLESS OTHERWISE SPECIFIED.
6. ALL VOLTAGES ARE MEASURED BETWEEN TUBE SOCKET TERMINALS AND B− (⏚).
7. K = 1000
8. ⓧ INDICATES LOCATION OF HIGH SIDE OF VOLUME CONTROL

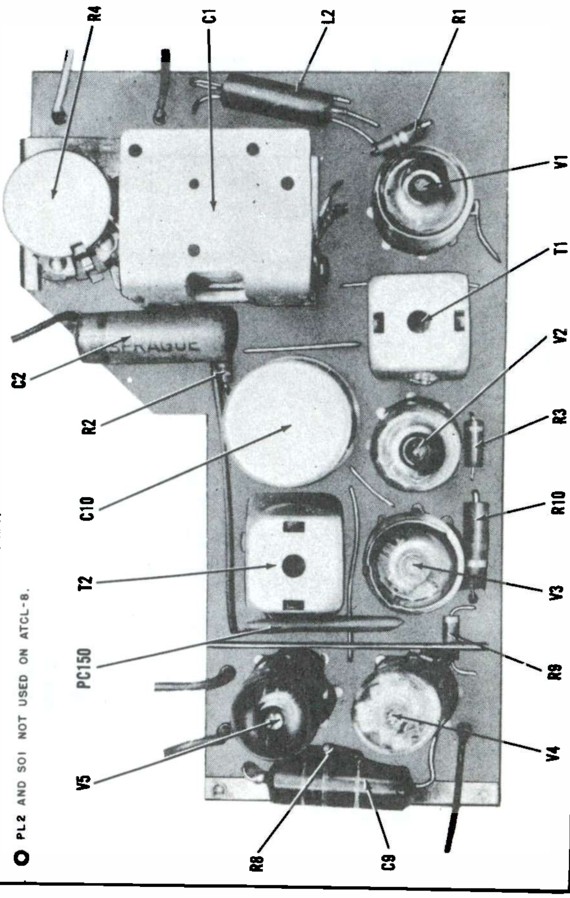
◉ ON SOME SETS, VALUE OF R-3 IS 180, 220, OR 390. WHEN MAKING REPLACEMENT, USE VALUE FOUND IN SET.

✱ WHEN MAKING REPLACEMENT OF T-2, REPLACE R-3 WITH 330-OHM RESISTOR IF RESISTOR IN SET IS NOT 330-OHMS.

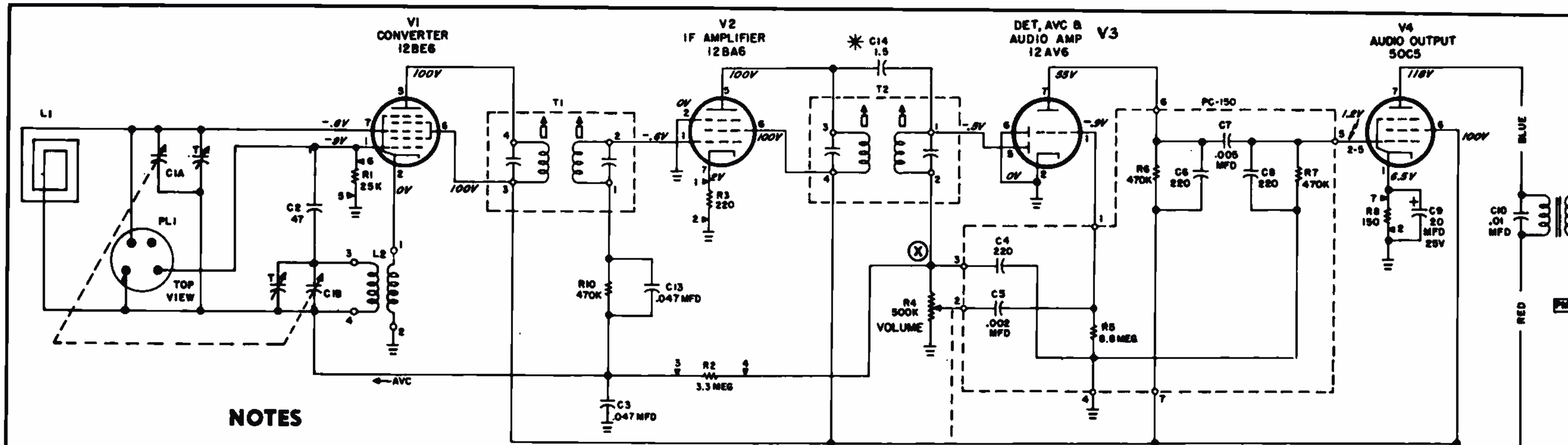
○ PL2 AND SO1 NOT USED ON ATCL-8.







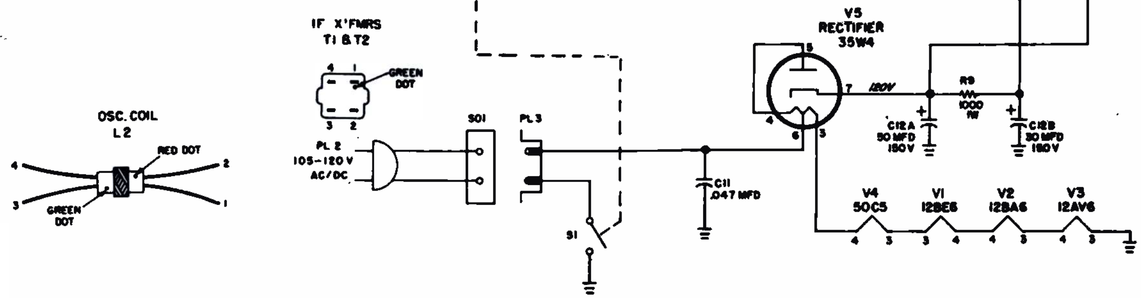
the hallicrafters co.

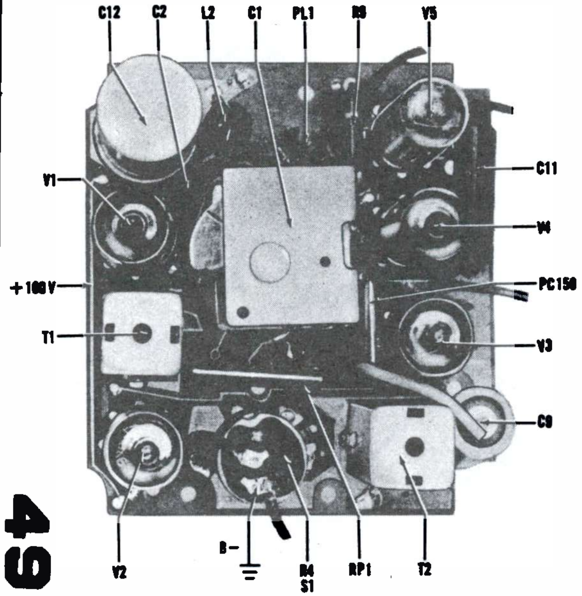


NOTES

1. Resistor values in ohms and capacitor values in MMF unless otherwise specified. K = 1000.
2. IF = 455 KC.
3. R-1, R-2, R-3 and R-8 are part of resistor plate RP-1
4. ▶ indicates numbered terminals on RP-1.
5. ⓧ indicates location of high side of Volume control

* Not used in some sets.

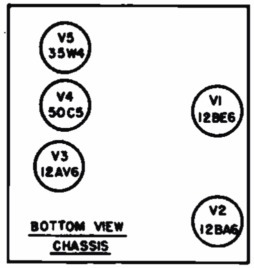


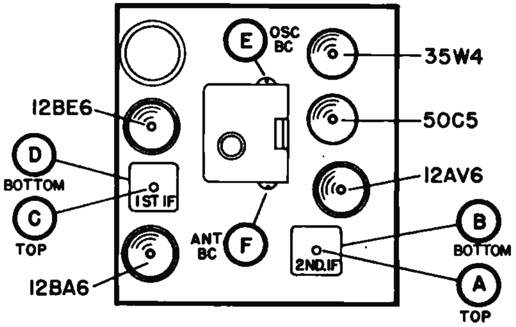


VOLTAGES

Voltage readings taken under following conditions:

1. Line voltage—117 volts DC or 50/60 cycle AC.
2. Voltages are DC and positive unless otherwise specified.
3. DC voltages measured with VTVM between tube socket terminals and B- (⏚).
4. AC voltages measured with 1000 ohms per volt meter.



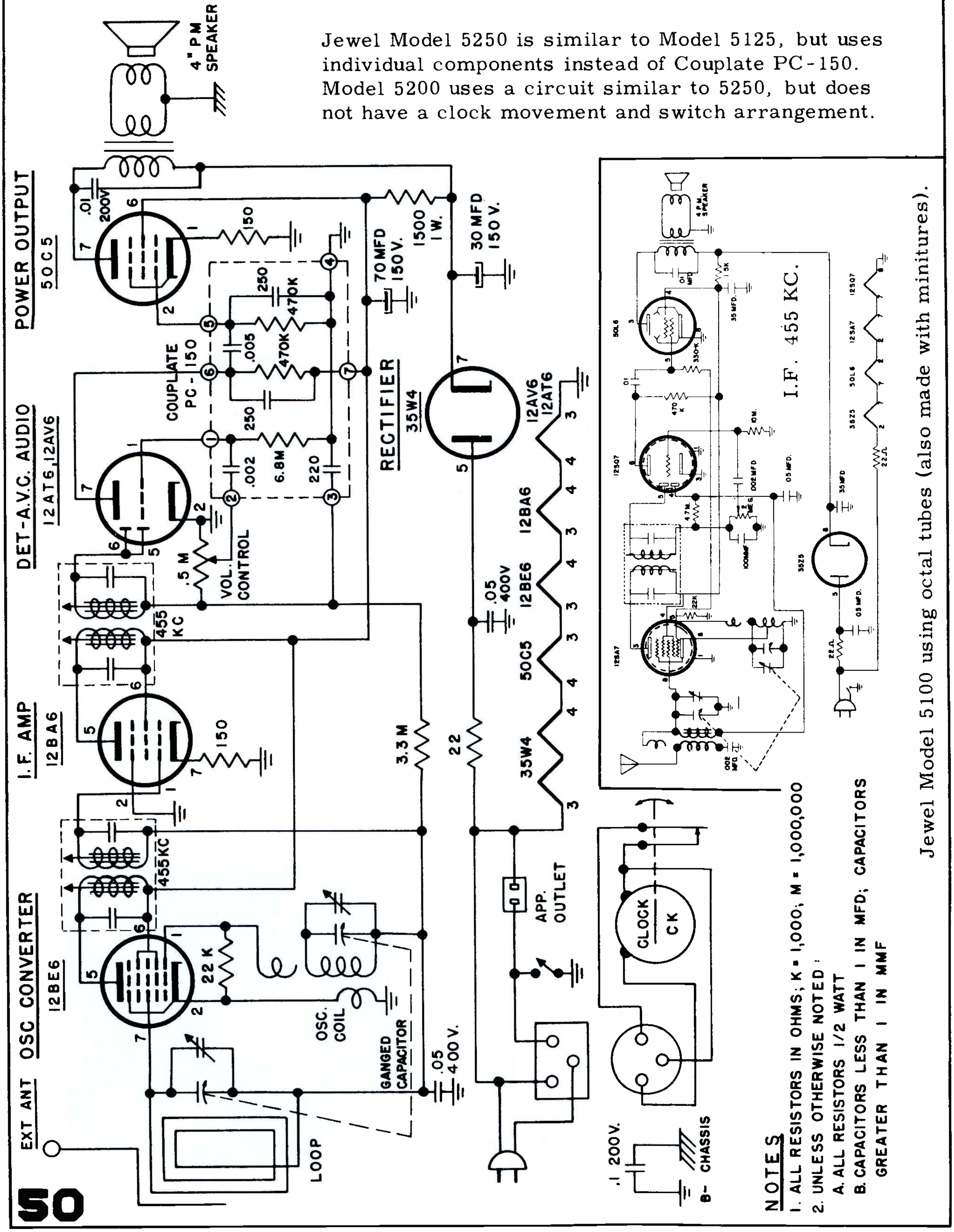


the hallicrafters co.

MODELS ATX-11, ATX-12 & ATX-13 (RUN 1)

JEWEL RADIO CORPORATION • *Model 5125*

Jewel Model 5250 is similar to Model 5125, but uses individual components instead of Couplate PC-150. Model 5200 uses a circuit similar to 5250, but does not have a clock movement and switch arrangement.

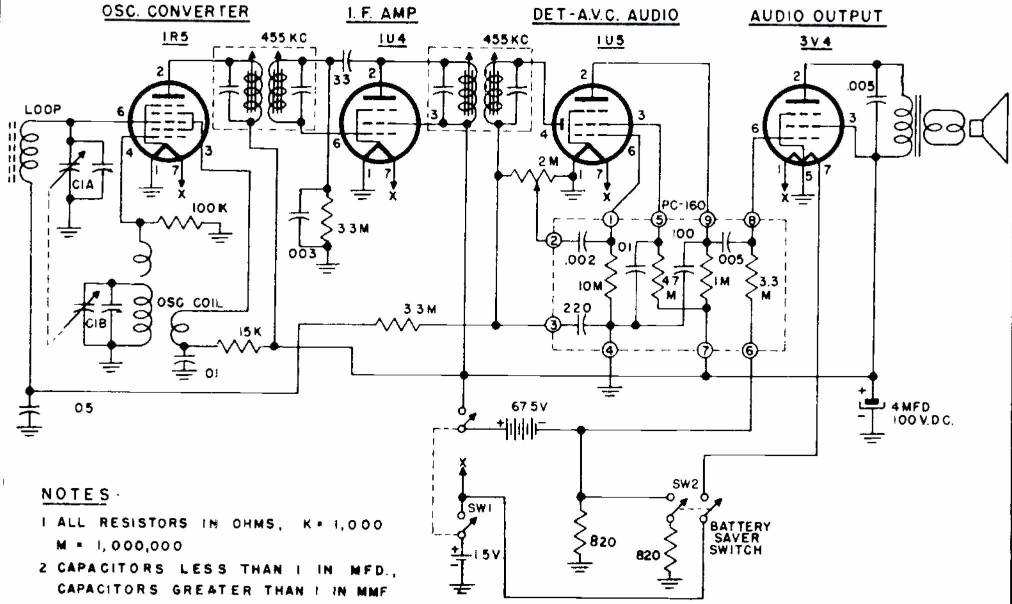


Jewel Model 5100 using octal tubes (also made with minitures).

JEWEL RADIO CORP.

PORTABLE RADIO
Model 5310

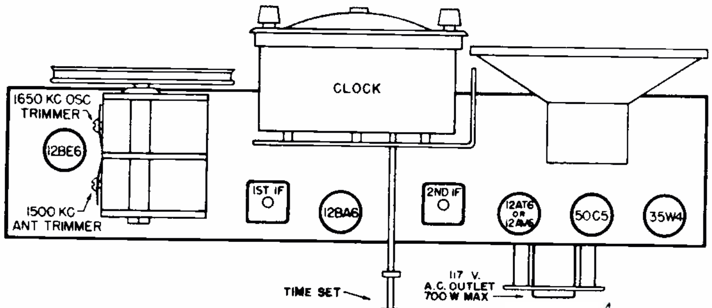
Signal Generator: Frequency	Coupling Capacitor	Connection to Receiver	Ground Connection	Capacitor Setting	Adjust Trimmers to Maximum Output
455 Kc	0.1 Mfd	IR5 Pin 6 Grid	Chassis	Full Capacitance	Input and Output I. F. Slugs
1680 Kc	0.1 Mfd	IR5 Pin 6 Grid	Chassis	Minimum Capacitance	Oscillator Trimmer
1500 Kc		Radiating Loop		1500 Kc	Antenna Trimmer

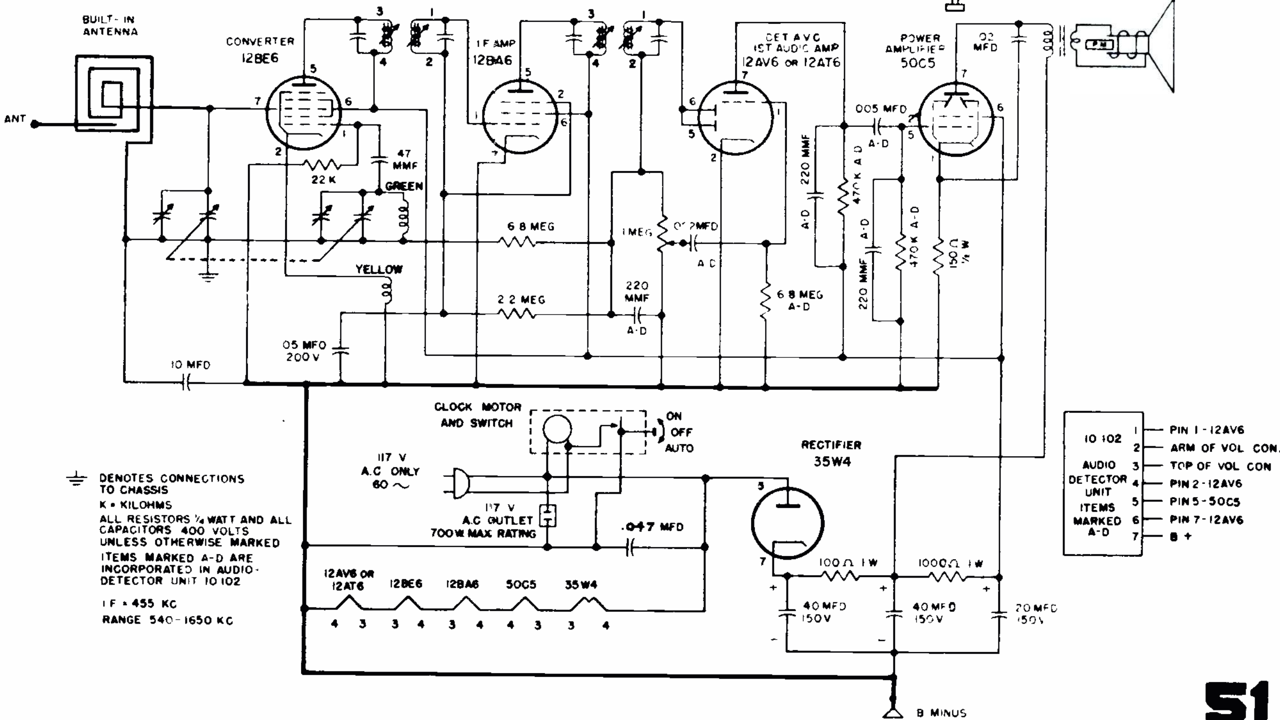


NOTES:
1 ALL RESISTORS IN OHMS, K = 1,000
M = 1,000,000
2 CAPACITORS LESS THAN 1 IN MFD., CAPACITORS GREATER THAN 1 IN MMF

Majestic

MODELS 5C-2, 5C-3



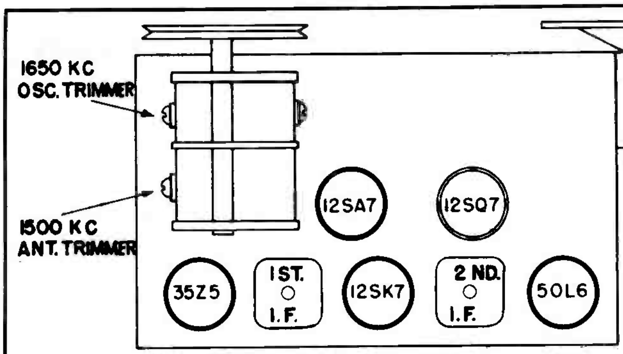


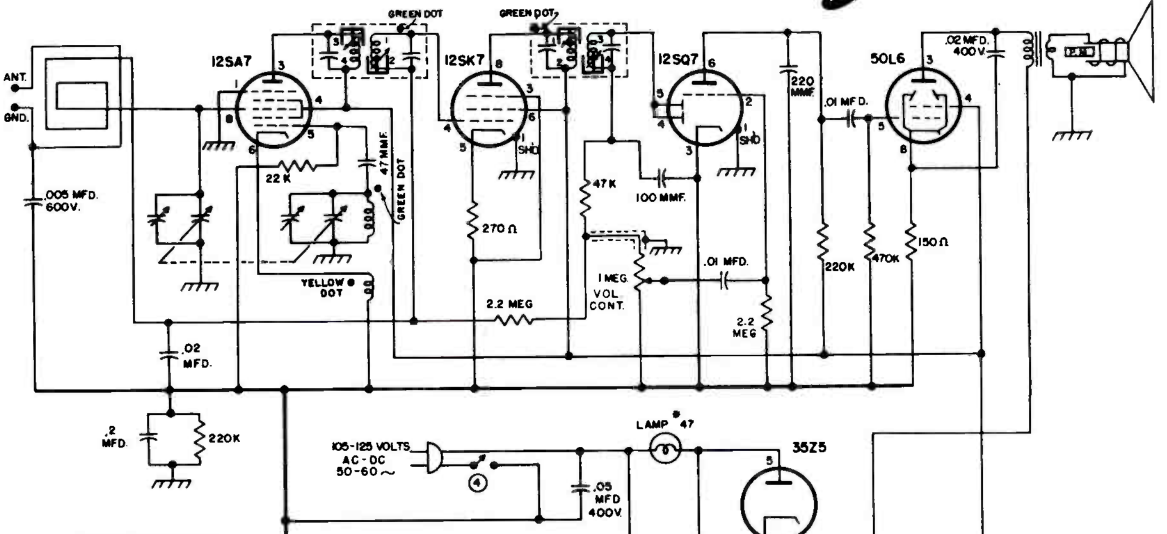
⏚ DENOTES CONNECTIONS TO CHASSIS
K = KILOHMS
ALL RESISTORS ¼ WATT AND ALL CAPACITORS 400 VOLTS UNLESS OTHERWISE MARKED
ITEMS MARKED A-D ARE INCORPORATED IN AUDIO-DETECTOR UNIT 10 102
I F = 455 KC
RANGE 540 - 1650 KC

RADIO DIAGRAMS

MODEL 5 LA7 5 LA8

Majestic





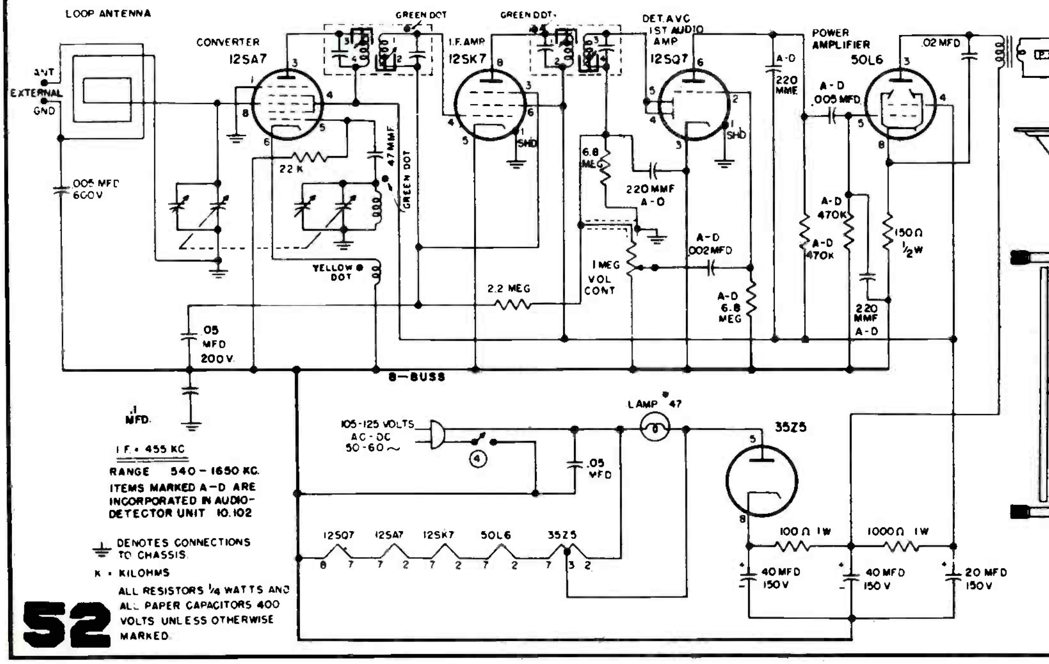
DENOTES CONNECTIONS TO CHASSIS.

K = KILOHMS

ALL RESISTORS ¼ WATTS AND ALL PAPER CAPACITORS 200 VOLTS UNLESS OTHERWISE MARKED.

I.F. = 455 KC.

MAJESTIC RADIO **MODEL 5 LA50, 5 LA60**



I.F. = 455 KC

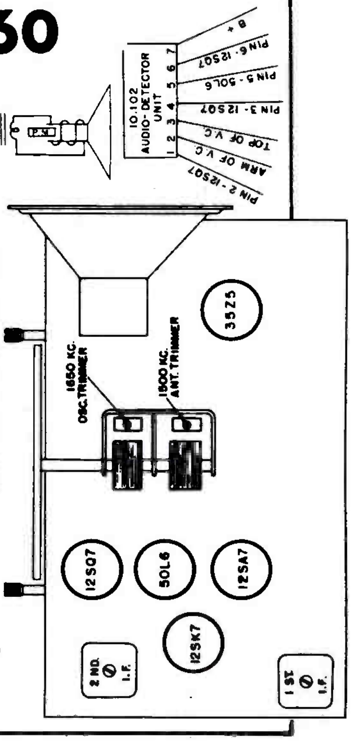
RANGE 540 – 1650 KC.

ITEMS MARKED A-D ARE INCORPORATED IN AUDIO-DETECTOR UNIT 10.102

DENOTES CONNECTIONS TO CHASSIS.

K = KILOHMS

ALL RESISTORS ¼ WATTS AND ALL PAPER CAPACITORS 400 VOLTS UNLESS OTHERWISE MARKED.



MONTGOMERY WARD

Airline

TABLE RADIO PHONO-COMBINATION

MODEL NO.
25GSG-2016A

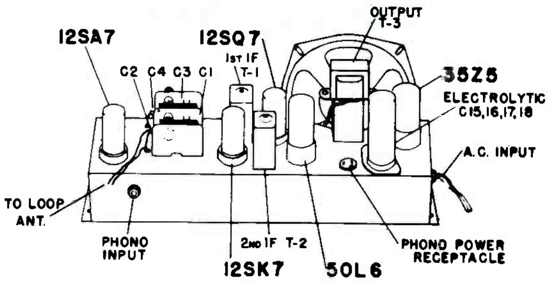
SERVICE DATA

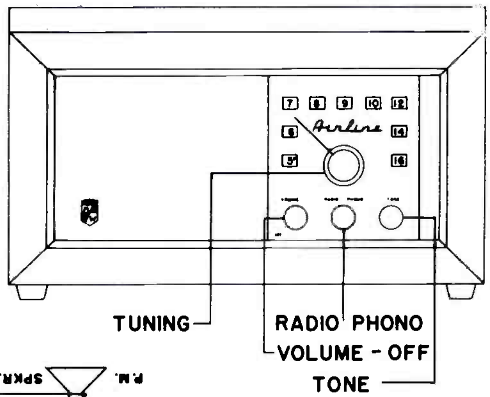
Power Supply . . . . 115 Volts Ac or Dc
46 watts Total
26 watts, radio alone

Frequency range . . . . 540 - 1600

Intermediate Freq. . . . .455 KC

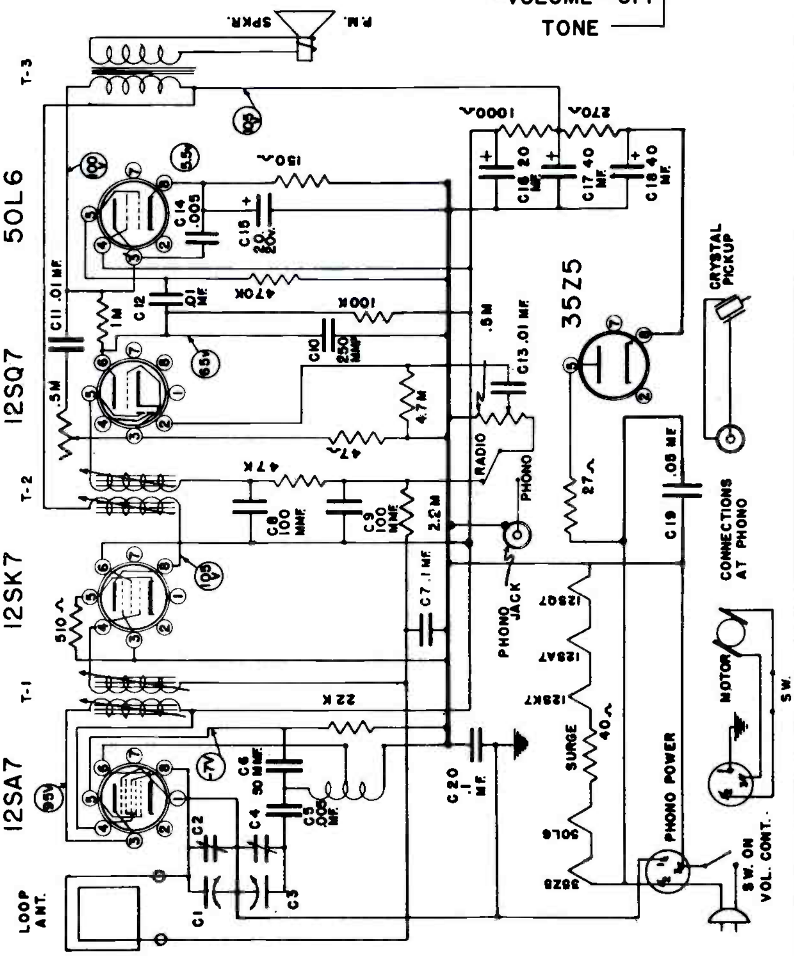
Selectivity . . . . At 1000 KC, 45 KC
At 1000 X signal



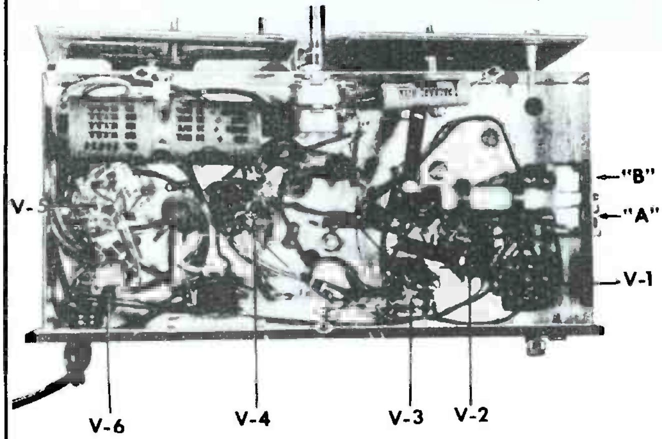


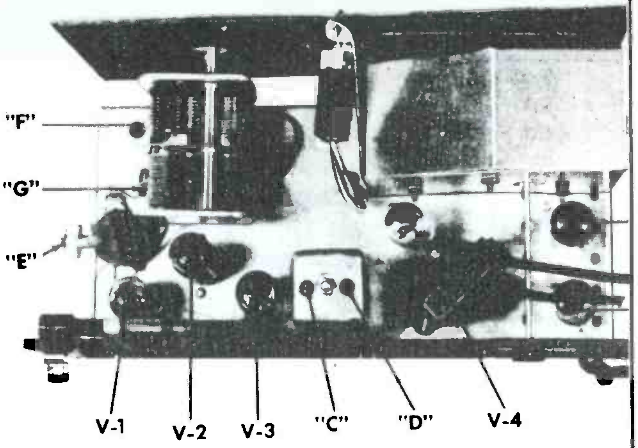
ALIGNMENT PROCEDURE

Frequency	Signal Generator: Coupling Capacitor	Signal Generator: Connection to Radio	Signal Generator: Ground Connection	Tuner Setting	Adjust for Max. Output
455 kc	.1 mf	12SA7, Pin 8	B-	Capacitor fully open (plates out of mesh)	Top and bottom Cores in output and input I.F. cans
1620 kc	.1 mf	12SA7, Pin 8	B-	Capacitor fully open (plates out of mesh)	Oscillator trimmer C-4 on gang
540 kc	.1 mf	12SA7, Pin 8	B-	Capacitor fully closed	Check for adequate range
1400 kc	———	Lay generator lead back of cabinet	B-	Tune in 1400 kc signal	Antenna trimmer on loop



Packard-Bell Company, Inc. MODEL 621





STEP	CONNECT TEST OSC. TO	TEST OSC. SETTING	POINTER SETTING	ADJUST FOR MAX. OUTPUT
1	Mixer Grid & Ground	455 KC	540 KC	Trimmers A,B,C & D
2	Mixer Grid & Ground	455 KC	540 KC	Trimmer E for minimum output
3	Mixer Grid & Ground	1620 KC	1620 KC	TrimmerF
4	Test Loop	1500 KC	1500 KC	TrimmerG
5	REPEAT STEPS 3 & 4			

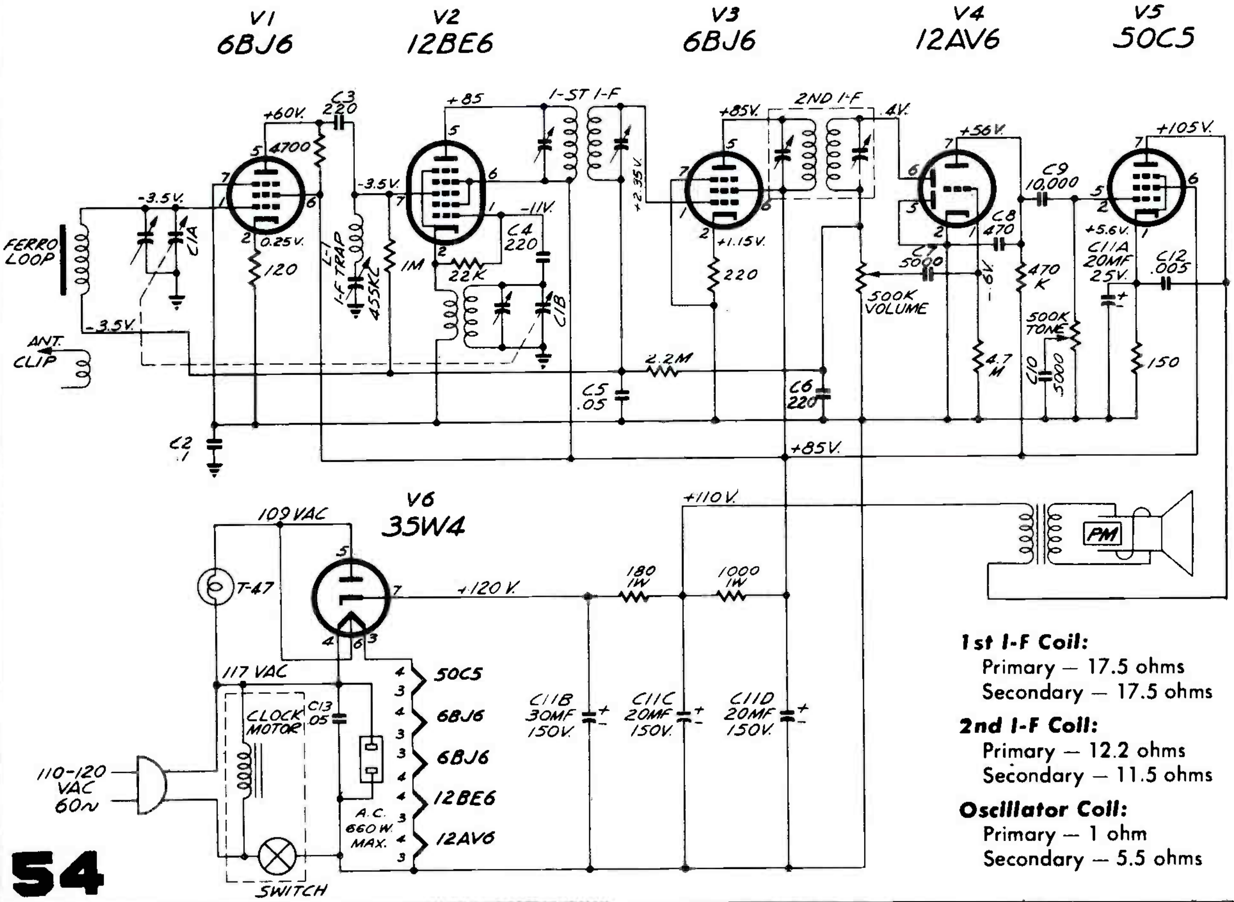
A, B, C, D — I-F Trimmers

E — I-F Trap

F — Osc. Trimmer

G — Ant. Trimmer

Note 1.



1st I-F Coil:
Primary — 17.5 ohms
Secondary — 17.5 ohms

2nd I-F Coil:
Primary — 12.2 ohms
Secondary — 11.5 ohms

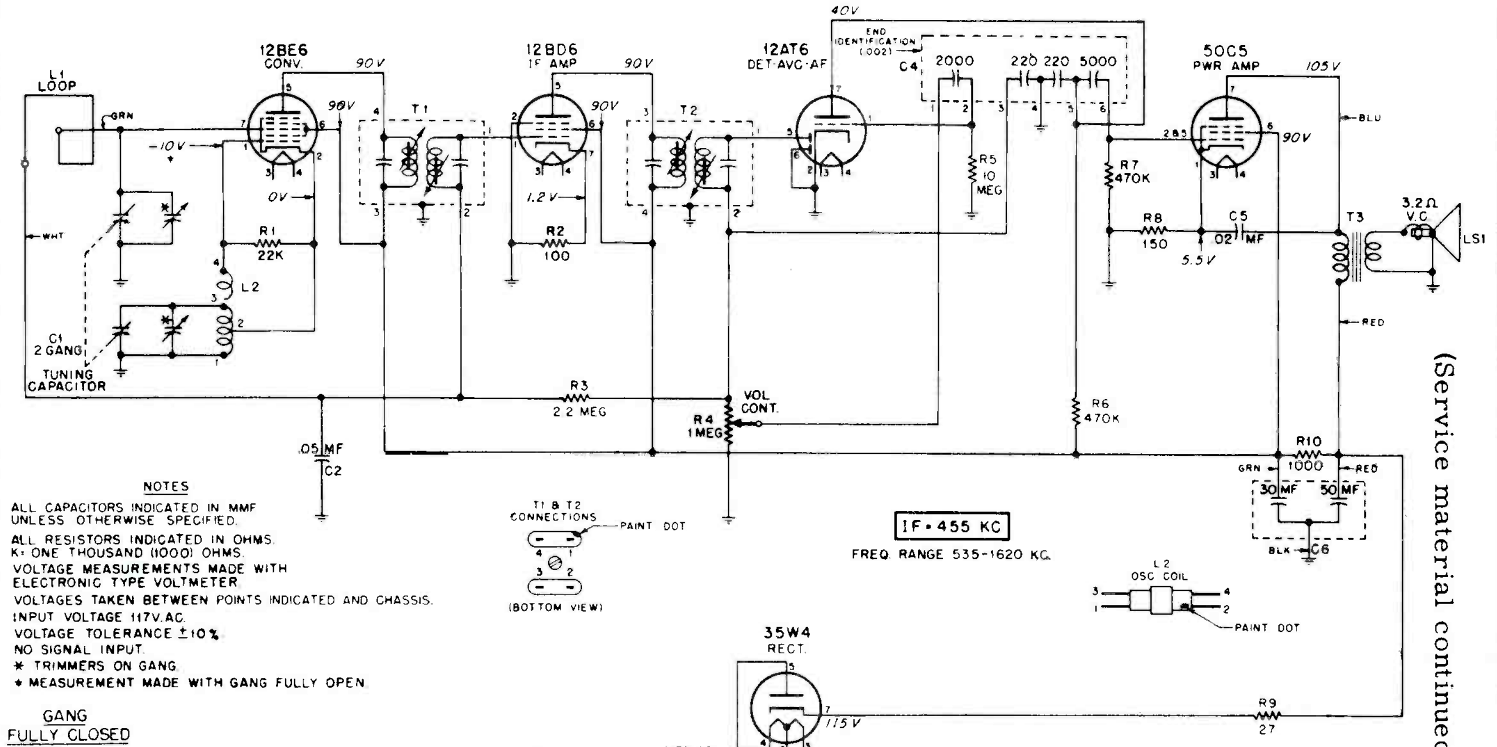
Oscillator Coil:
Primary — 1 ohm
Secondary — 5.5 ohms

Motorola

MODEL
52C1
52C1A

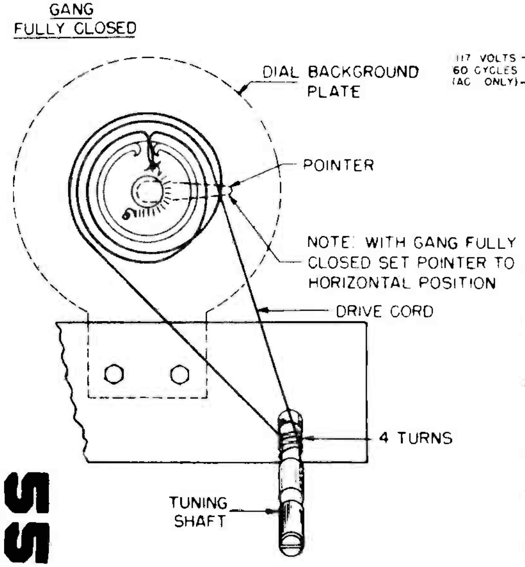
CHASSIS
HS-309

(Service material continued on next page)



NOTES

ALL CAPACITORS INDICATED IN MMF UNLESS OTHERWISE SPECIFIED.
ALL RESISTORS INDICATED IN OHMS.
K= ONE THOUSAND (1000) OHMS.
VOLTAGE MEASUREMENTS MADE WITH ELECTRONIC TYPE VOLTMETER.
VOLTAGES TAKEN BETWEEN POINTS INDICATED AND CHASSIS.
INPUT VOLTAGE 117V. AC.
VOLTAGE TOLERANCE ±10%.
NO SIGNAL INPUT.
* TRIMMERS ON GANG.
• MEASUREMENT MADE WITH GANG FULLY OPEN.



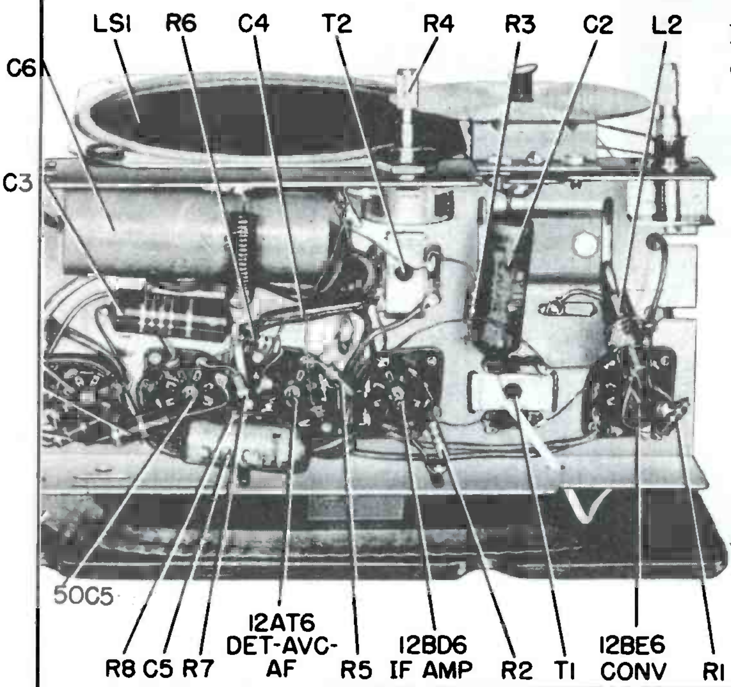
TO REMOVE RADIO CHASSIS FROM CABINET

1. Pull off the two radio control knobs.
2. Remove the three hex head screws which hold the loop to the cabinet.
3. From the back of the cabinet, remove the two hex head screws at the rear edge of the radio chassis.
4. Slide the radio chassis and loop from the cabinet.
5. Disconnect the power leads to the radio chassis.

TO REMOVE CLOCK FROM CABINET

1. Remove the radio chassis as above.
2. Pull off the two clock control knobs.
3. From the back of the cabinet, remove the three hex head screws which hold the clock and its fibre insulator.
4. Carefully remove the clock, to prevent damage to its hands or face.

MOTOROLA Model 52C1, Chassis HS-309, continued.



For circuit diagram and dial stringing data see preceding page.

ALIGNMENT

NOTE: It is recommended that an isolation transformer be placed between the power line and the receiver to avoid hum and electrical shocks. If an isolation transformer is not available, connect the low side of the signal generator to chassis through a .1 mf capacitor.

1. Connect a low range output meter across the speaker voice coil.

2. Connect the low side of the signal generator to chassis.

3. Set the signal generator for 400 cycle, 30% modulation.

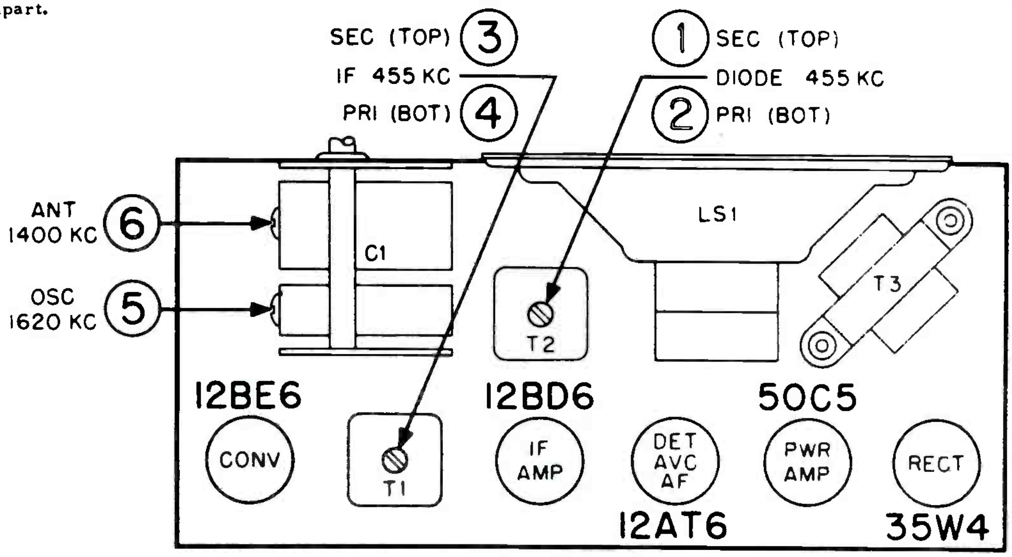
4. Turn the receiver volume control to maximum.

5. Use a small fibre screwdriver for aligning the IF and diode transformers.

6. As stages are brought into alignment, reduce the signal generator output to a level which produces less than .40 volts (.05 watts) across the voice coil to avoid overloading the receiver.

STEP	DUMMY ANTENNA	GENERATOR CONNECTION	GENERATOR FREQUENCY	GANG SETTING	ADJUST	REMARKS
IF ALIGNMENT						
1.	.1 mf	Grid of conv. (pin 7, 12BE6)	455 Kc	Fully open	1, 2, 3 & 4 (IF cores)	Adjust for maximum.
RF ALIGNMENT						
2.	-		-	Fully closed	-	Set pointer to horizontal position.
3.	.1 mf	Grid of conv. (pin 7, 12BE6)	1620 Kc	Fully open	5 (osc)	Adjust for maximum.
4.	-	Radiation loop*	1400 Kc	Tune for max	6 (Ant)	Adjust for maximum.

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

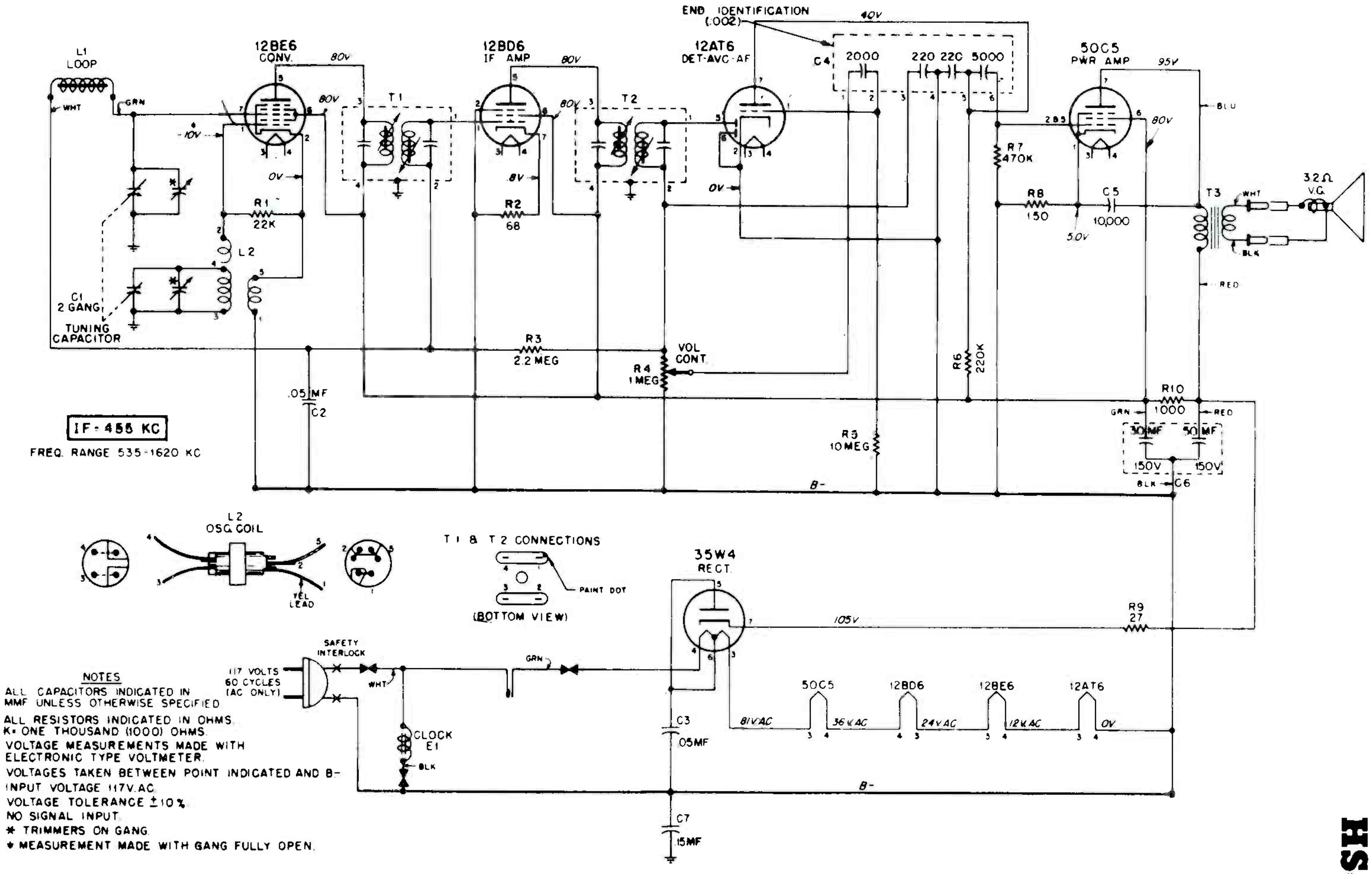


TUBE AND TRIMMER LOCATION

Motorola

MODELS
52CW1
52CW2
52CW3
52CW4

CHASSIS
HS-329



NOTES
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ALL RESISTORS INDICATED IN OHMS. K= ONE THOUSAND (1000) OHMS.
VOLTAGE MEASUREMENTS MADE WITH ELECTRONIC TYPE VOLTMETER.
VOLTAGES TAKEN BETWEEN POINT INDICATED AND B-
INPUT VOLTAGE 117V.AC.
VOLTAGE TOLERANCE ±10%.
NO SIGNAL INPUT.
* TRIMMERS ON GANG.
♦ MEASUREMENT MADE WITH GANG FULLY OPEN.

CLOCK OPERATION

The clock will start as soon as the receiver is plugged into an electrical outlet. To set the hands to the correct time, pull out knob "A" and rotate it in a clockwise direction only.

AUTOMATIC RADIO OPERATION

The clock controls may be pre-set to turn the radio on automatically at any time up to ten hours in advance.

Rotate knob "C" clockwise to the desired time on the automatic time dial scale. Rotate knob "B" to the "AUTO" position. At the pre-set time the radio will begin to play.

If the radio has been turned on automatically and is left unattended, with knob "B" in the "AUTO" position, it will shut off after approximately two hours. To permit continuous operation, rotate knob "B" to the "ON" position.

Alignment information continued on the next page, over.

MOTOROLA, INC. **ALIGNMENT** Chassis HS-329, continued.

NOTE: It is recommended that an isolation transformer be placed between the power line and the receiver to avoid hum and electrical shocks. If an isolation transformer is not available, connect the low side of the signal generator to B- through a .1 mf capacitor.

1. Connect a low range output meter across the speaker voice coil.

2. Connect the low side of the signal generator to B-.

3. Set the signal generator for 400 cycle, 30% modulation.

4. Turn the receiver volume control to maximum.

5. Use a small fibre screwdriver for aligning the IF and diode transformers.

6. As stages are brought into alignment, reduce the signal generator output to a level which produces less than .40 volts (.05 watt) across the voice coil to avoid overloading the receiver.

7. See Figure 4 for adjustment locations and the following chart for procedure.

STEP	DUMMY ANTENNA	GENERATOR CONNECTION	GENERATOR FREQUENCY	GANG SETTING	ADJUST	REMARKS
IF ALIGNMENT						
1.	.1 mf	Grid of conv. (pin 7, 12BE6)	455 Kc	Fully open	1, 2, 3 & 4 (IF cores)	Adjust for maximum.
RF ALIGNMENT						
2.	.1 mf	Grid of conv. (pin 7, 12BE6)	1620 Kc	Fully open	5 (Osc)	Adjust for maximum.
3.	-	Radiation loop*	1400 Kc	Tune for max	6 (Ant)	Adjust for maximum.

*Connect generator output across 5" diameter, 5 turn loop and couple inductively to receiver loop. Keep generator loop perpendicular to axis of and at least 12 inches from receiver iron core loop.

TO REMOVE CHASSIS FOR SERVICE

1. Pull off the two radio control knobs.
2. Remove the four screws from the back cover.
3. Pull off the back cover.
4. Disconnect the speaker leads.
5. Disconnect the three leads to the clock.

TO REMOVE CLOCK FROM CABINET

1. Remove the radio chassis as above.
2. Pull off the three clock control knobs.
3. Remove the clock dial scale.
4. Remove the three speed nuts which fasten the clock to the cabinet.
5. Remove the clock carefully, to prevent damage to its hands or face.

TO REPLACE CLOCK DIAL BACKGROUND

1. Remove the clock from the cabinet as above.
2. Carefully pull off the four hands.
3. Remove the clock dial background.
4. Install new background.
5. Turn the radio control shaft ("B") to "AUTO" position.
6. Slowly rotate the automatic time set shaft ("C") clockwise until a "click" is heard, indicating that the switch contacts have closed. Do not overshoot this point.
7. Reassemble all four hands in the 12 o'clock position.

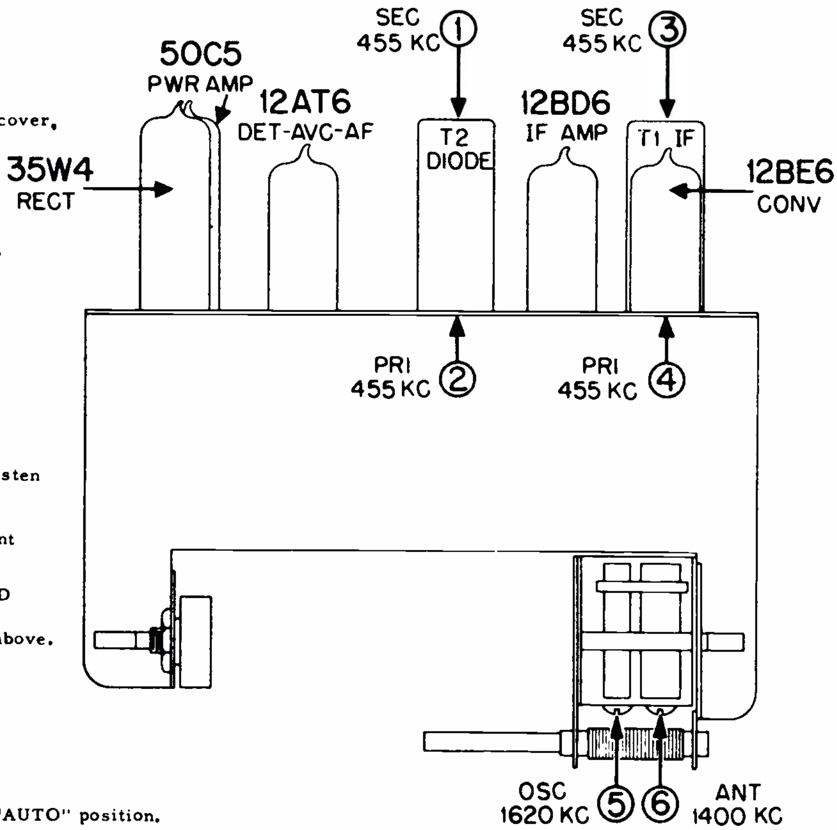


FIGURE 4. TUBE AND ALIGNMENT LOCATIONS

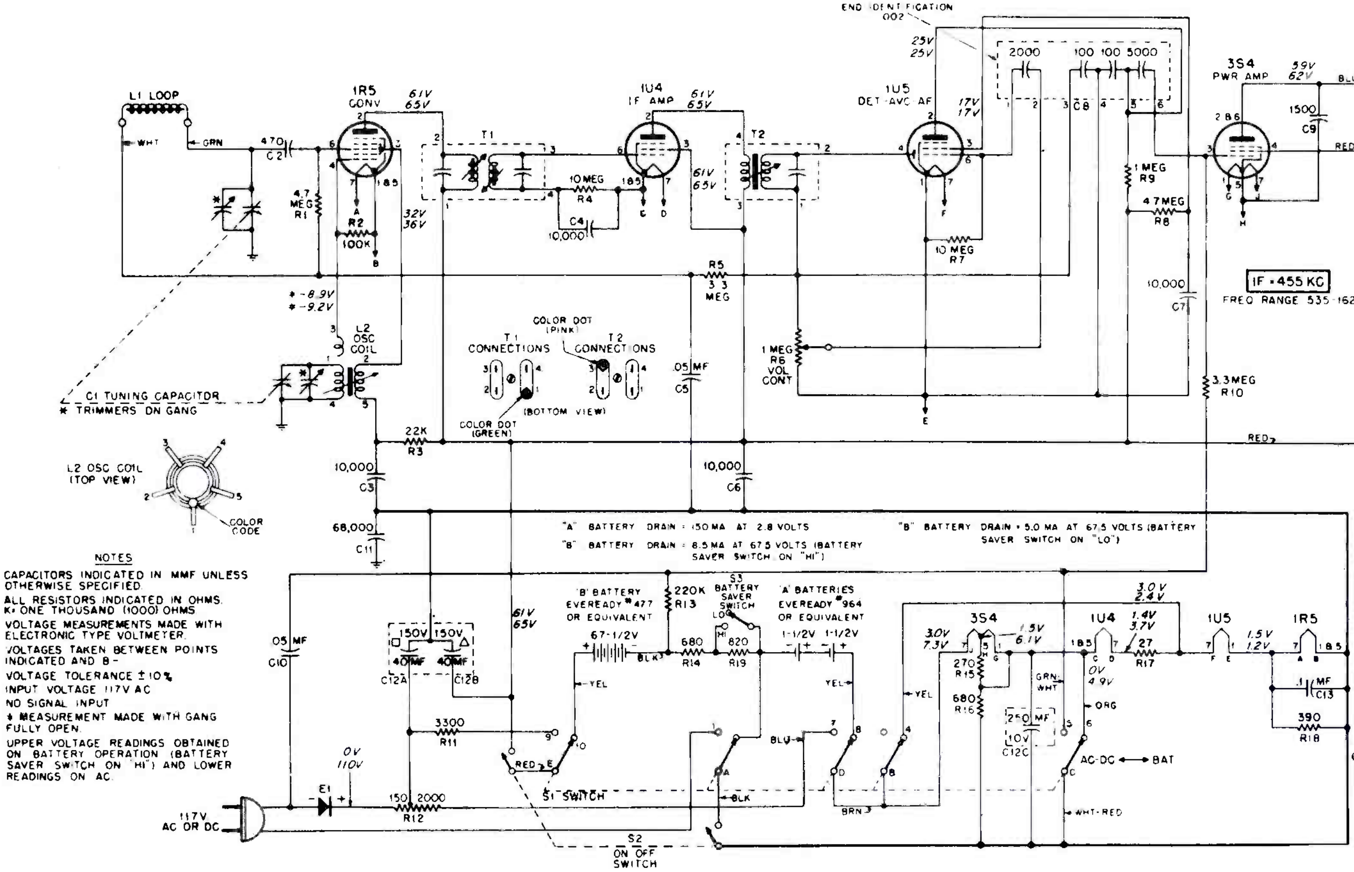
8. Check the operation of the clock to be sure the radio turns on at the time indicated on the automatic time dial scale.

Motorola

MODELS 52L1A 52L2A 52L3A

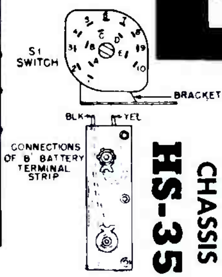
CHASSIS HS-357

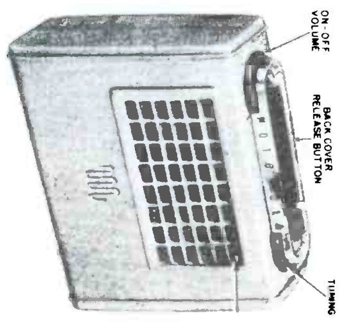
(Continued on next page)



NOTES

CAPACITORS INDICATED IN MMF UNLESS OTHERWISE SPECIFIED.
ALL RESISTORS INDICATED IN OHMS. K = ONE THOUSAND (1000) OHMS.
VOLTAGE MEASUREMENTS MADE WITH ELECTRONIC TYPE VOLTMETER.
VOLTAGES TAKEN BETWEEN POINTS INDICATED AND B-.
VOLTAGE TOLERANCE ±10%.
INPUT VOLTAGE 117V AC.
NO SIGNAL INPUT.
* MEASUREMENT MADE WITH GANG FULLY OPEN.
UPPER VOLTAGE READINGS OBTAINED ON BATTERY OPERATION (BATTERY SAVER SWITCH ON "HI") AND LOWER READINGS ON AC.





The tubes are exposed when the rear cover is opened. It is not necessary to remove the chassis to replace tubes.

TO REMOVE THE CHASSIS FROM THE CABINET

1. Open the back cover and remove the batteries.

2. Remove the two wire clips which hold the plastic retainer blocks at each end of the "A" battery compartment.

3. Remove the screw holding the cover stop cord to the chassis.

4. Remove the chassis mounting screws, at the four corners of the chassis.

5. Slide the chassis, with knobs and escutcheon, from the cabinet.

6. Remove one of the handle clips. (Squeeze the sides of the clip until it is released from the escutcheon.)

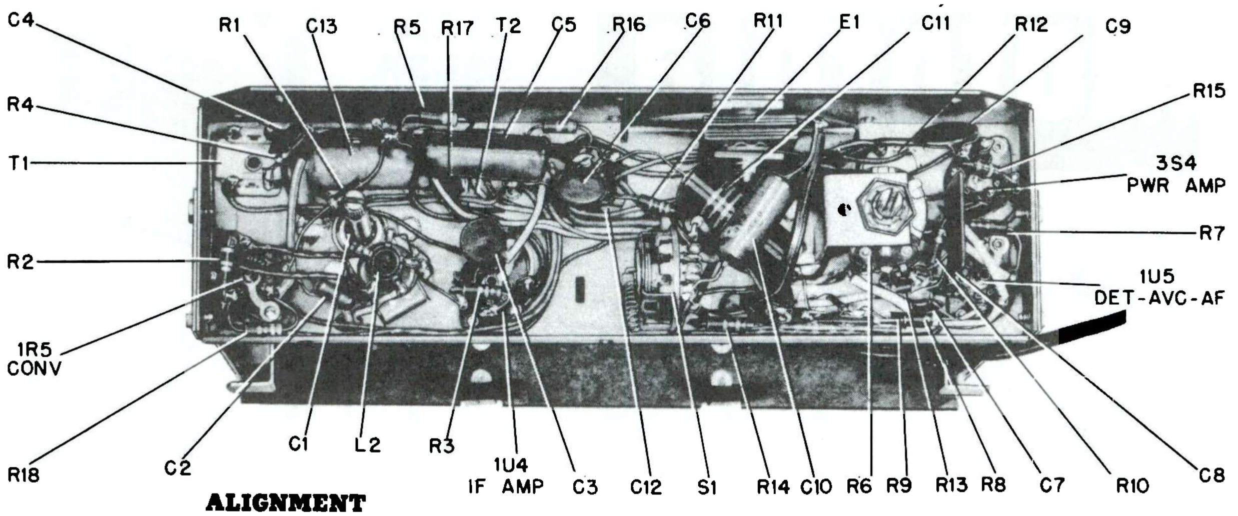
7. Remove the two screws located under the handle, and lift off the escutcheon.

8. Pull off the knobs.

BATTERY SAVER SWITCH. A battery saver switch, for reception of local stations, greatly increases the life of the batteries. Figure 1 shows the location of the switch. Move the switch to the right ("LO") for local reception and to the left ("HI") for distant stations.

ANTENNA. A Ferrite Magnetic Iron Core Antenna is built into this receiver. Because of the slightly directional characteristics of the built-in antenna, reception from some stations may be improved by rotating the receiver.

MOTOROLA Chassis HS-357, Models 52L1A, 52L2A, 52L3A, continued.



ALIGNMENT

1. Connect a low range output meter across the speaker voice coil.

2. Connect the low side of the signal generator to B-.

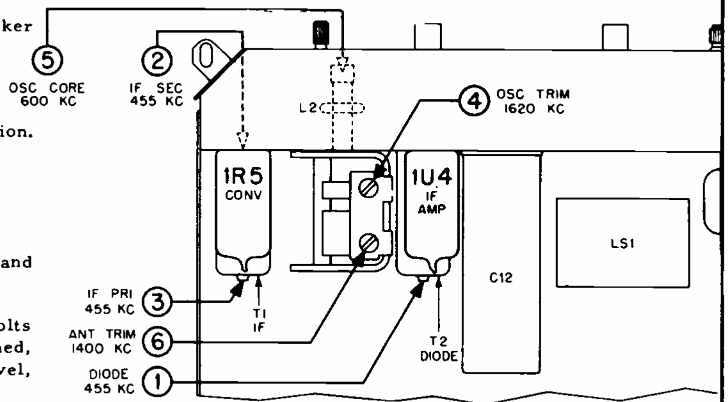
3. Set the signal generator for 400 cycle, 30% modulation.

4. Turn the receiver volume control to maximum.

5. Move the battery saver switch to the "HI" position.

6. Use a small fibre screwdriver for aligning the IF and diode transformers.

7. Adjust the signal generator output to produce .40 volts (.05 watts) across the voice coil. As stages are aligned, reduce the generator output to maintain the .40 volt level, to avoid overloading the receiver.



STEP	DUMMY ANTENNA	GENERATOR CONNECTION	GENERATOR FREOUENCY	GANG SETTING	ADJUST	REMARKS
IF ALIGNMENT						
1.	.1 mf	Ant section of gang (green loop lead)	455 Kc	Fully open	1, 2 & 3 (IF cores)	Adjust for maximum.
RF ALIGNMENT						
2.	-	-	-	-	-	Attach chassis bottom cover.
3.	-	-	-	-	-	Install batteries in chassis.
4.	.1 mf	Ant section of gang (green loop lead)	1620 Kc	Fully open	4 (Osc trim)	Adjust for maximum.
5.	-	Radiation loop*	1400 Kc	Tune for maximum	6 (Ant trim)	Adjust for maximum.
6.**	-	Radiation loop*	600 Kc	Tune for maximum	5 (Osc core)	Simultaneously tune gang and adjust core for maximum signal.
7.**	-	Radiation loop*	1620 Kc	Fully open	4 (Osc trim)	Readjust for maximum, if necessary.
8.**	-	Radiation loop*	1400 Kc	Tune for maximum	6 (Ant trim)	Readjust for maximum, if necessary.

*Connect generator output across 5" diameter, 5-turn loop and couple inductively to receiver loop. Keep loops at least 12" apart.

**Steps 6, 7, & 8 need not be performed unless receiver is off calibration or mistracks badly at low frequencies.

Motorola

CHASSIS
HS-289
HS-289A

MODEL
52R11
52R12
52R13
52R14
52R15
52R16

TO REMOVE CHASSIS FROM CABINET:

1. Remove the four screws which hold the back cover, and remove the cover and line cord.

2. Pull off the two control knobs from the front of the receiver.

3. Remove the Phillips head screw under the tuning knob, on the front of the receiver.

4. From the back, remove the screw which holds the line cord plug.

5. Disconnect the leads from the speaker.

6. From the back, remove the three screws which mount the chassis. CAUTION: Do not lose the insulating washers on the screws -they prevent damage to the printed circuit by the heads of the screws. See Figure 1.

7. Slide the chassis from the cabinet.

CIRCUIT DESCRIPTION

The circuit of this chassis is conventional - there are no built-in resistors or capacitors. Leads are printed on both sides of the chassis base, thereby replacing the usual connecting wires and making wiring more uniform.

Chassis HS-289A is the same as HS-289 except for the locations of electrical components

A dual 250 mmfd ceramic capacitor replaces capacitors C-3 and C-6 used in chassis HS-289.

SAFETY PRECAUTIONS

1. The chassis of this receiver is connected directly to the power line. However, the power cord circuit is broken by an interlock when the cabinet back is removed for replacing tubes. When aligning or servicing the chassis from AC, an isolation transformer should be inserted between the power line and the chassis.
2. Do not service the chassis on a metal plate, because of the possibility of a short circuit.
3. Use caution when handling the chassis with power applied, because all high voltage leads are exposed.
4. The outer edges of the chassis and the large printed areas in the center are at ground potential.

ANTENNA

Under certain circumstances, in early models, AC hum was induced into the loop antenna. This condition was corrected in later models by repositioning the loop. Figure 3 shows the revised location.

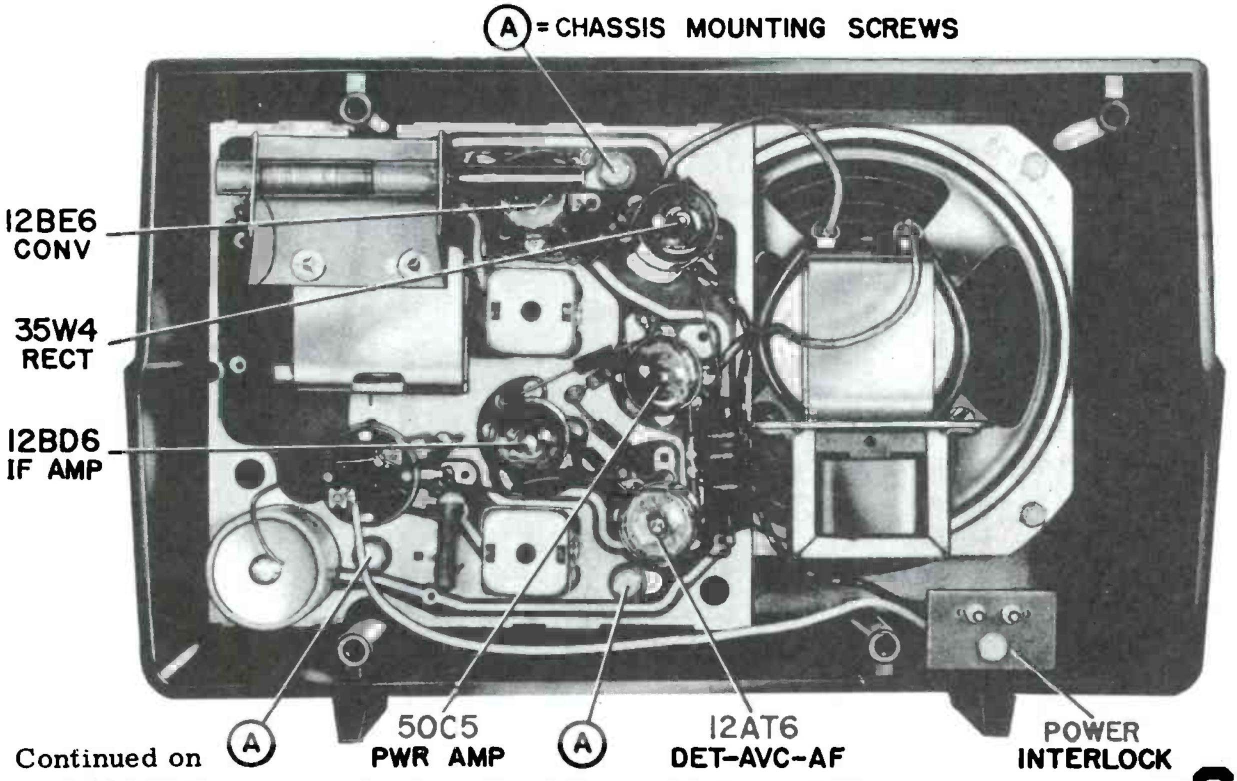


FIGURE 1. REAR VIEW OF RECEIVER (LATE MODEL)

Continued on next two pages.

MOTOROLA, INC. **ALIGNMENT** Chassis HS-289, continued.

NOTE: If AC power is used, insert an isolation transformer between the power line and the receiver to avoid hum and electrical shocks. If an isolation transformer is not available, connect the low side of the signal generator to ground (the outer edges of the chassis) through a .1 mf capacitor.

1. Connect a low range output meter across the speaker voice coil.

2. Connect the low side of the signal generator to ground.

3. Set the signal generator for 400 cycle, 30% modulation.

4. Turn the receiver volume control to maximum.

5. Use a small fibre screwdriver for aligning the IF and diode transformers (a "K-Tran" alignment tool is recommended).

6. As stages are brought into alignment, reduce the signal generator output to a level which produces less than .40 volts (.05 watt) across the voice coil to avoid overloading the receiver.

7. See Figure 2 for adjustment locations and the following chart for procedure.

ALIGNMENT CHART

STEP	DUMMY ANTENNA	GENERATOR CONNECTION	GENERATOR FREQUENCY	GANG SETTING	ADJUST	REMARKS
IF ALIGNMENT						
1.	.1 mf	Grid of conv. (pin 7, 12BE6)	455 Kc	Fully open	1, 2, 3 & 4 (IF cores)	Adjust for maximum.
RF ALIGNMENT						
2.	.1 mf	Grid of conv. (pin 7, 12BE6)	1620 Kc	Fully open	5 (Osc)	Adjust for maximum.
3.		Radiation loop*	1400 Kc	Tune for max	6 (Ant)	Adjust for maximum.

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

1. To prevent tube breakage, remove them before replacing components. CAUTION: Remove the tubes only by pulling them straight out. Wiggling a tube may bend a socket clip, causing poor contact with the tube pin.

2. WHEN REMOVING DEFECTIVE COMPONENTS USE ONLY A SMALL SOLDERING IRON (60 WATTS OR LESS) TO AVOID DAMAGE TO THE WIRING. DO NOT USE A SOLDERING GUN. WARNING: THE LEADS ARE VERY THIN, AND EXCESSIVE HEAT WILL BURN THEM OR LOOSEN THEM FROM THE BASE MATERIAL.

3. Printed connections or leads, if damaged, may be replaced with a jumper of regular hookup wire.

4. It is recommended that IF transformers, the volume control, or the electrolytic capacitor be removed by immersing all the lugs simultaneously into a small soldering pot. The component may then be lifted off the chassis easily. If a soldering pot is not available, heat each lug individually with a small soldering iron, and shake off as much molten solder as possible. Then, by alternately heating and loosening each lug, the entire component will be freed.

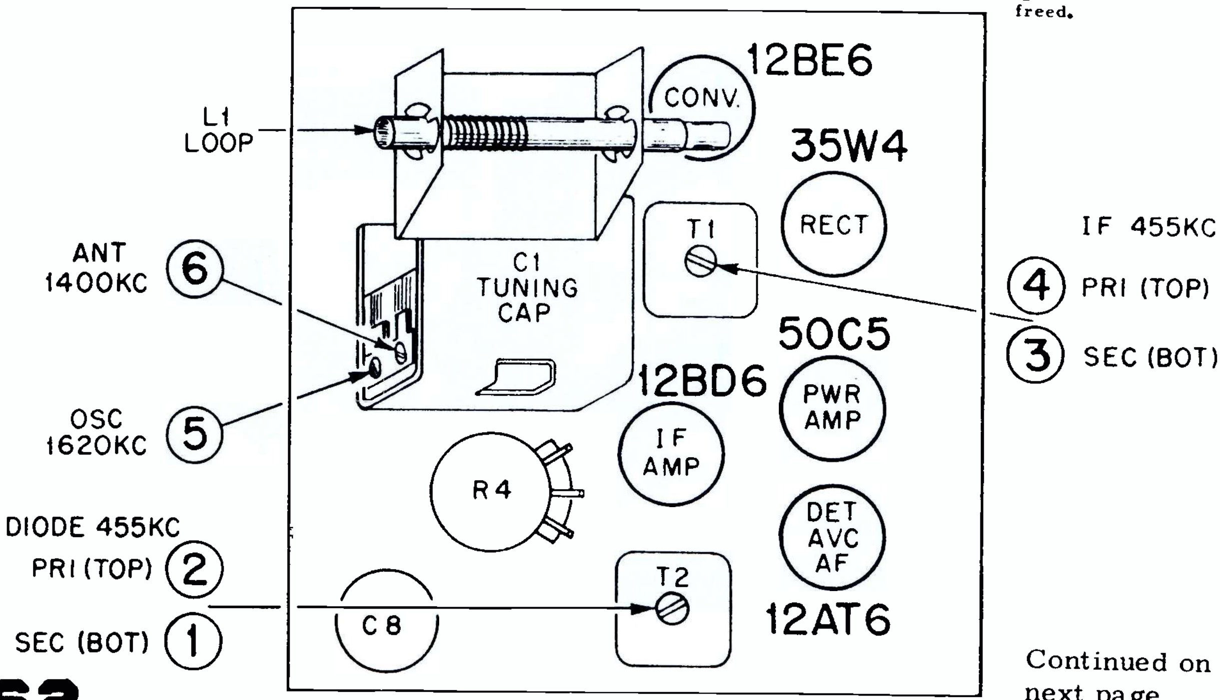


FIGURE 2. TUBE AND TRIMMER LOCATIONS (LATE MODEL)

Continued on next page.

MOTOROLA Chassis HS-289, continued from the two preceding pages.

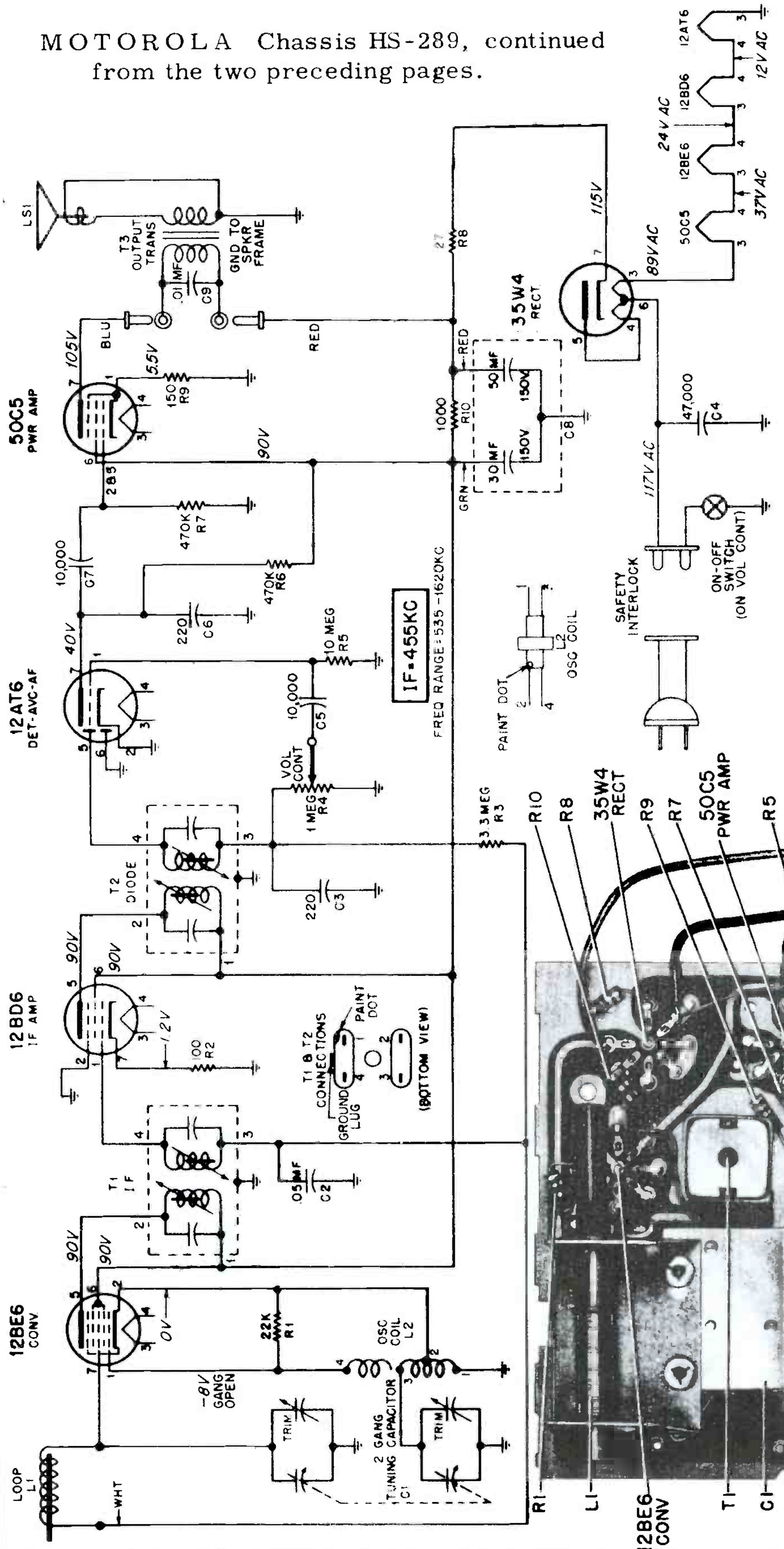


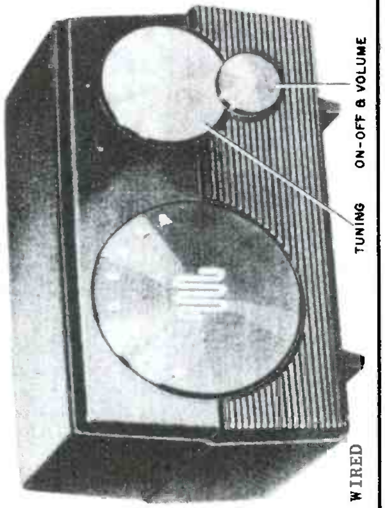
FIGURE 7. SCHEMATIC DIAGRAM

NOTES

CAPACITORS INDICATED IN MMF UNLESS OTHERWISE SPECIFIED.

RESISTORS INDICATED IN OHMS K=1000 OHMS.

1. VOLTAGE MEASUREMENTS MADE WITH ELECTRONIC TYPE VOLTMETER.
2. VOLTAGES TAKEN BETWEEN POINTS INDICATED AND CHASSIS.
3. VOLTAGE TOLERANCE ±10%.
4. INPUT VOLTAGE 117V AC
5. NO SIGNAL INPUT



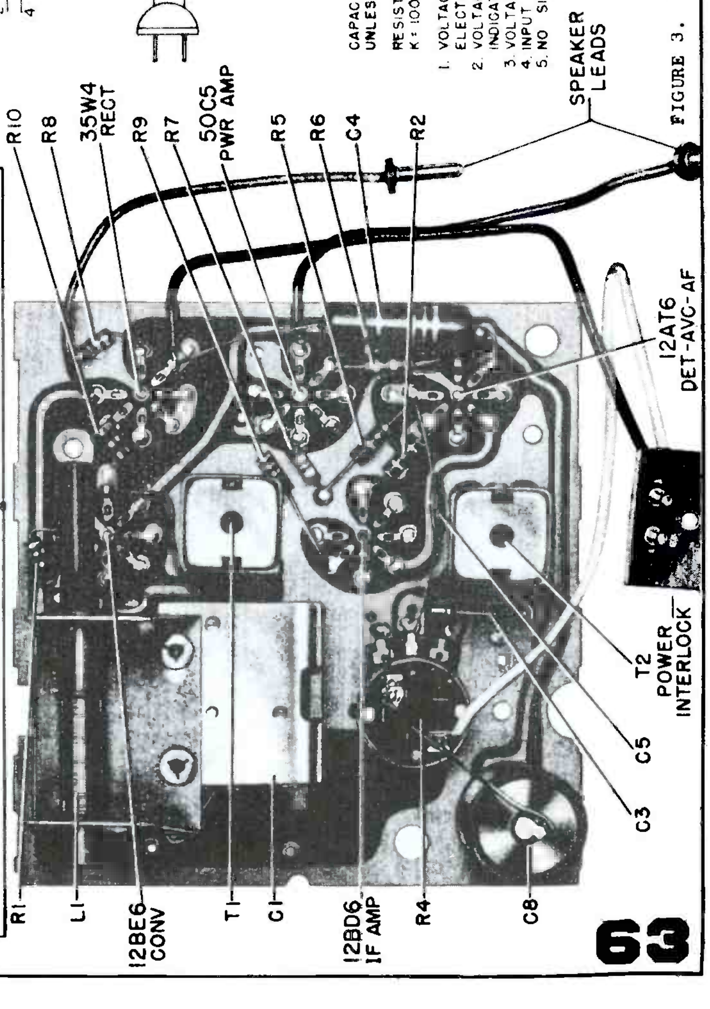


FIGURE 3. FRONT VIEW OF CHASSIS - WIRED

MANUAL OF 1953 MOST-OFTEN-NEEDED RADIO DIAGRAMS

MOTOROLA, Inc.
(Continued on the next page at right)

CHASSIS **HS-347**

MODELS **53LC1 53LC2 53LC3**

ALIGNMENT

NOTE: The receiver may be operated either from batteries or from the power line during alignment. If AC power is used, it is recommended that an isolation transformer be placed between the power line and the receiver to avoid hum and electrical shock. If an isolation transformer is not available, connect the low side of the signal generator to chassis through a .1 mf capacitor.

1. Remove chassis from cabinet. If operated from power line, during alignment, it will be necessary to TEMPORARILY place jumpers across interlock switch before power can be applied. Jumpers are not required if battery power is used.

2. Connect a low range output meter across the speaker voice coil.

3. Connect the low side of the signal generator through a .1 mf capacitor to chassis.

4. Set the signal generator for 400 cycle, 30% modulation.

5. Turn the receiver volume control to maximum.

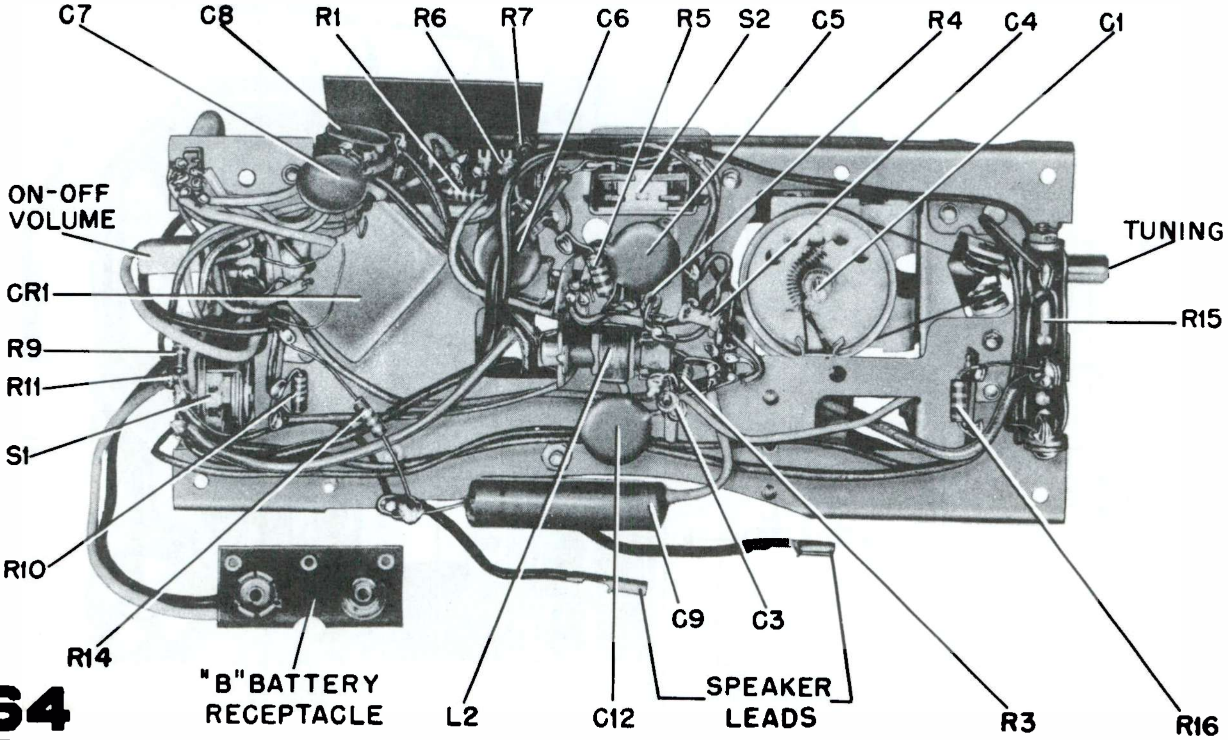
6. Use a small fibre screwdriver for aligning the IF and diode transformers.

7. Adjust the signal generator output to produce .40 volts (.05 watts) across the voice coil. As stages are aligned, reduce the generator output (not receiver volume control) to maintain the .40 volt level to avoid overloading the receiver.

8. See Figure 5 for adjustment locations and the following chart for procedure.

STEP	DUMMY ANTENNA	GENERATOR CONNECTION	GENERATOR FREQUENCY	GANG SETTING	ADJUST	REMARKS
IF ALIGNMENT						
.1	.1 mf	Grid of conv. (rear stator on gang)	455 Kc	Fully open	1, 2 & 3 (IF cores)	Adjust for maximum.
RF ALIGNMENT						
2.	.1 mf	Grid of conv. (rear stator on gang)	1620 Kc	Fully open	4 (Osc trimmer)	Adjust for maximum.
3.	-	Radiation loop*	1400 Kc	Tune for max	5 (Ant trim)	Adjust for maximum.

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



MOTOROLA, Inc.
(Continued from preceding page, at left)

CHASSIS
HS-347

MODELS
53LC1
53LC2
53LC3

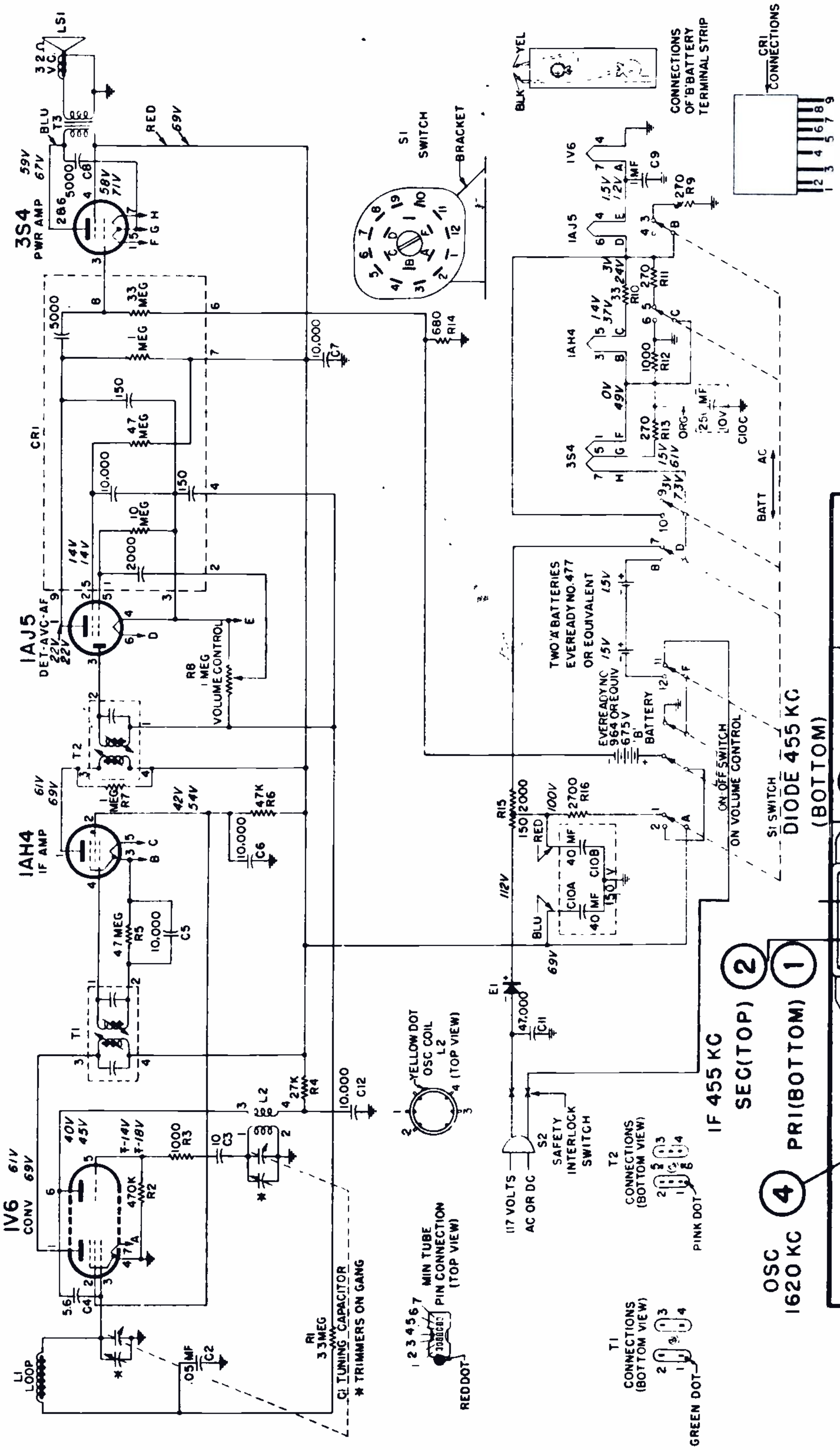


FIGURE 7. SCHEMATIC DIAGRAM

NOTES
CAPACITORS INDICATED IN MMF UNLESS OTHERWISE SPECIFIED.
ALL RESISTORS INDICATED IN OHMS K=ONE THOUSAND (1000) OHMS
VOLTAGES MEASUREMENTS MADE WITH ELECTRONIC TYPE VOLTMETER
VOLTAGES TAKEN BETWEEN POINTS INDICATED AND CHASSIS.
VOLTAGE TOLERANCE ± 10%
INPUT VOLTAGE 117 V. AC.
NO SIGNAL INPUT
† MEASUREMENT MADE WITH GANG FULLY OPEN.
UPPER VOLTAGE READINGS OBTAINED ON BATTERY OPERATION & LOWER ON A.C.

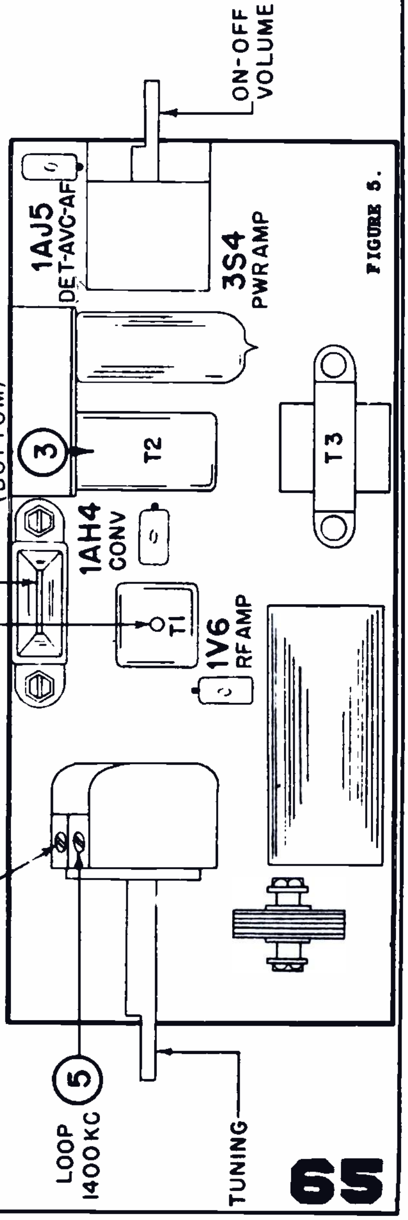


FIGURE 5.

Motorola

MODELS
62C1
62C2
62C3

MODELS
62C1A
62C2A
62C3A

CHASSIS
HS-299

(Continued on the next page, adjacent at right)

ALIGNMENT

NOTE: It is recommended that an isolation transformer be placed between the power line and the receiver to avoid hum and electrical shocks. If an isolation transformer is not available, connect the low side of the signal generator to B- through a .1 mf capacitor.

1. Connect a low range output meter across the speaker voice coil.

2. Connect the low side of the signal generator to B-.

3. Set the signal generator for 400 cycle, 30% modulation.

4. Turn the receiver volume control to maximum.

5. Use a small fibre screwdriver for aligning the IF and diode transformers.

6. As stages are brought into alignment, reduce the signal generator output to a level which produces less than .40 volts (.05 watt) across the voice coil to avoid overloading the receiver.

7. See Figure 2 for adjustment locations and the following chart for procedure.

STEP	DUMMY ANTENNA	GENERATOR CONNECTION	GENERATOR FREQUENCY	GANG SETTING	ADJUST	REMARKS
IF ALIGNMENT						
1.	.1 mf	Grid of conv (RF section of gang)	455 Kc	Fully open	1, 2, 3 & 4 (IF cores)	Adjust for maximum.
RF ALIGNMENT						
2.	.1 mf	Grid of conv. (RF section of gang)	1620 Kc	Fully open	5 (Osc trim)	Adjust for maximum.
3.	-	Radiation loop*	1400 Kc	Tune for max	6 (RF trim)	Adjust for maximum.
4.	-	Radiation loop*	1400 Kc	Tune for max	7 (Ant trim)	Adjust for maximum.

*Connect generator output across 5-inch diameter, 5 turn loop and couple inductively to receiver loop. Keep generator loop perpendicular to axis of and at least 12 inches from receiver iron core loop.

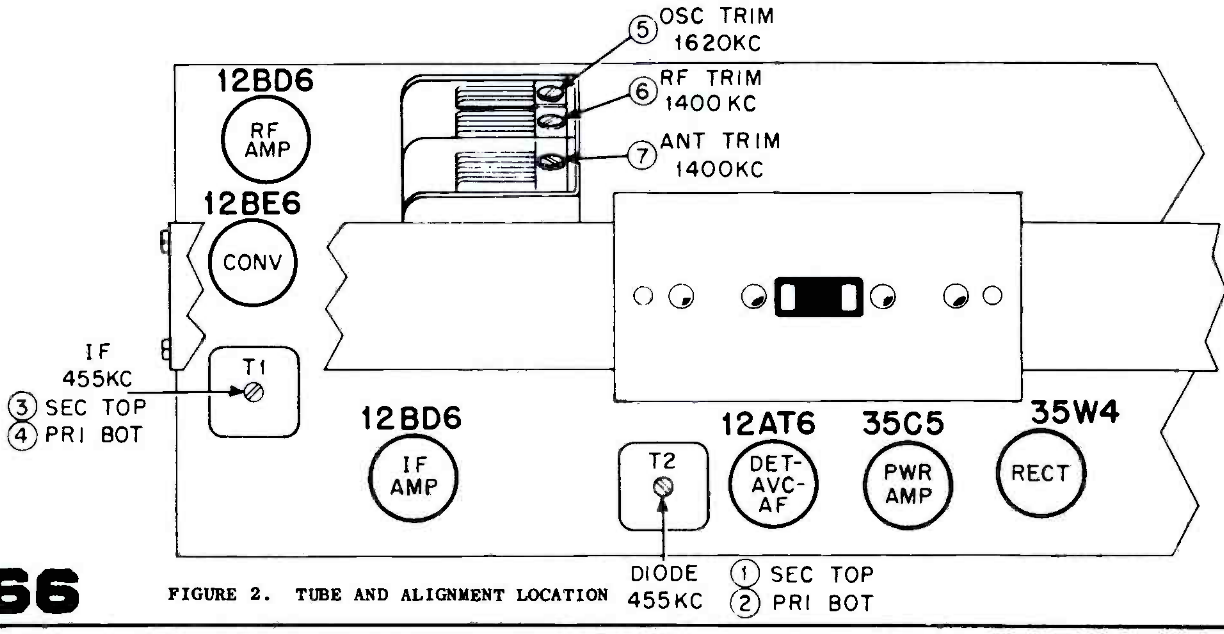


FIGURE 2. TUBE AND ALIGNMENT LOCATION

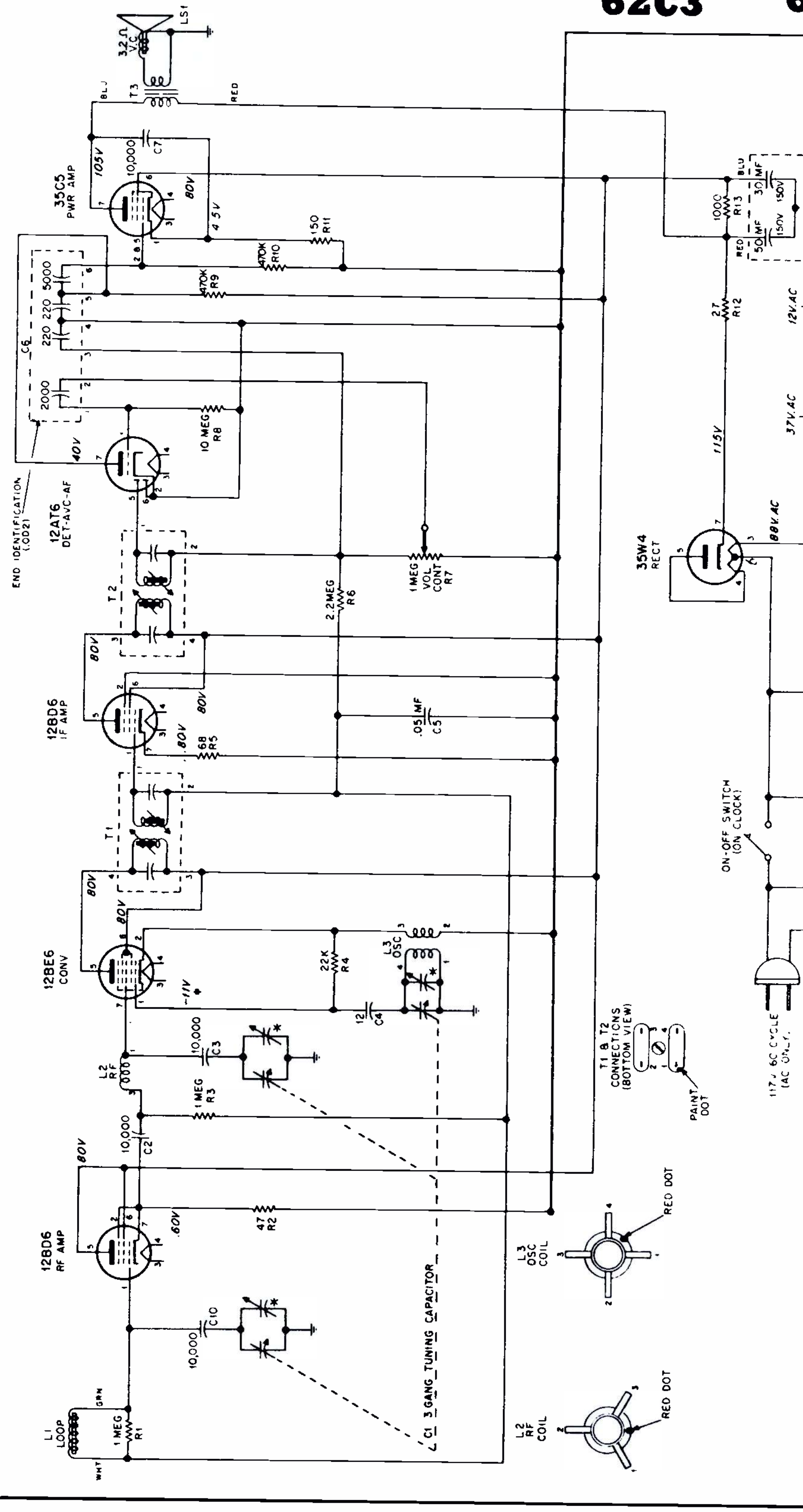
MANUAL OF 1953 MOST-OFTEN-NEEDED RADIO DIAGRAMS

MOTOROLA, Inc.
(Continued from preceding page)

MODELS
62C1
62C2
62C3

MODELS
62C1A
62C2A
62C3A

CHASSIS
HS-299



NOTES
1. CAPACITOR INDICATED IN MMF UNLESS OTHERWISE SPECIFIED
2. ALL RESISTORS INDICATED IN OHMS.
3. K=ONE THOUSAND (1000) OHMS.
4. VOLTAGE MEASUREMENTS MADE WITH ELECTRONIC TYPE VOLTMETER
5. VOLTAGES TAKEN BETWEEN POINT INDICATED AND B-
6. VOLTAGE TOLERANCE ±10%
7. INPUT VOLTAGE 117V AC
8. NO SIGNAL INPUT
9. ● MEASUREMENT MADE WITH GANG FULLY OPEN
10. ✱ TRIMMERS ON GANG

TO REMOVE CHASSIS FOR SERVICE

1. Remove the two screws from the bottom of the cabinet.
2. Remove the two screws from the back of the cabinet.
3. Pull the chassis and front cover from the cabinet.
4. Pull off radio and clock control knobs.
5. Insert a screwdriver into the loops on the ends of the front cover retainer springs, and pry the springs from their slots in the chassis.

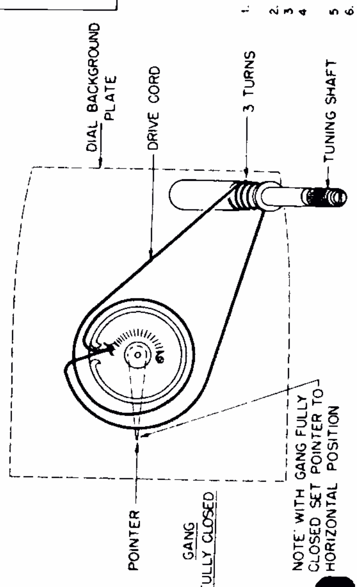
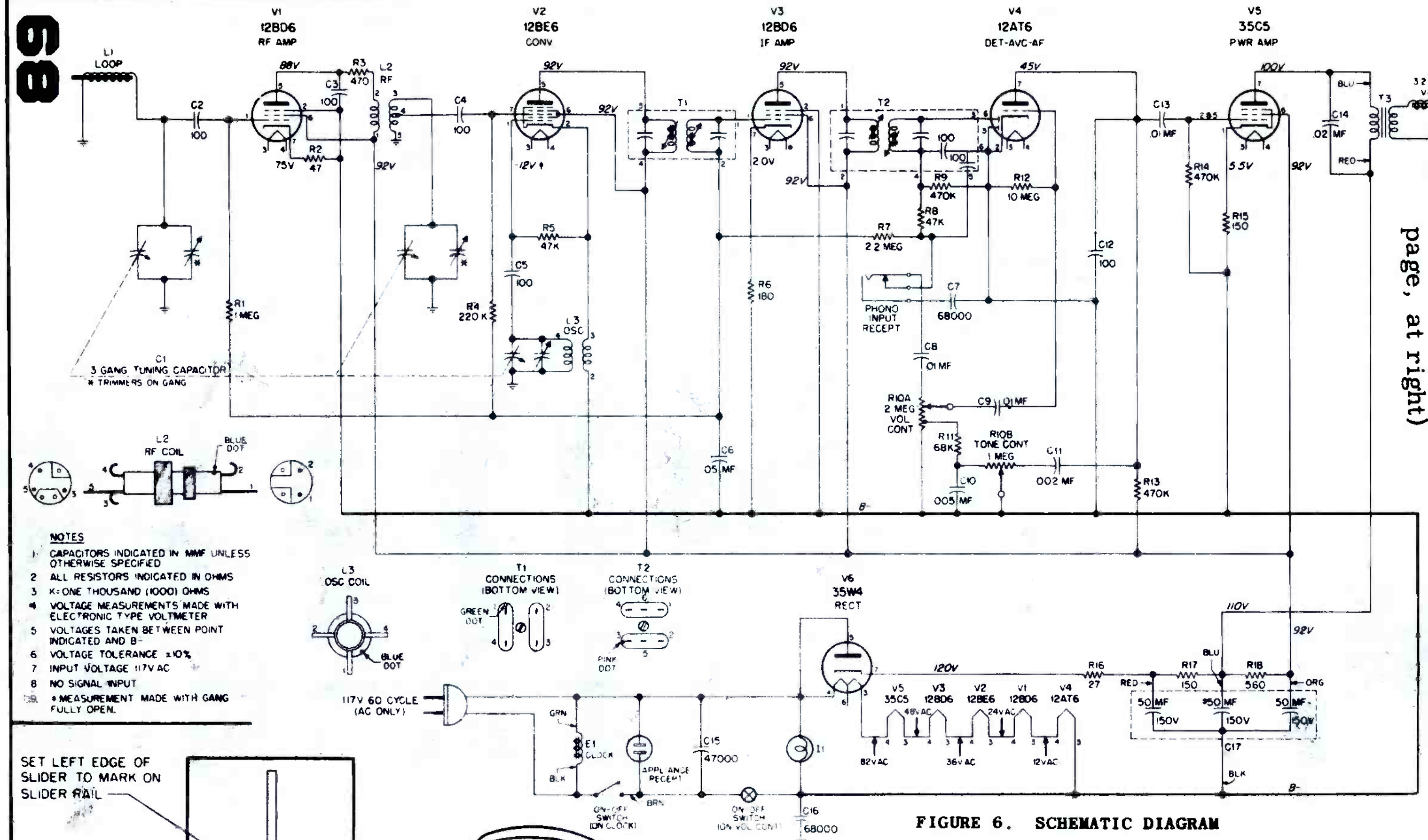


FIGURE 3. STRING DRIVE DETAIL

Motorola

MODEL
62CW1
CHASSIS
HS-324

(Continued on next page, at right)



NOTES
1. CAPACITORS INDICATED IN MMF UNLESS OTHERWISE SPECIFIED
2. ALL RESISTORS INDICATED IN OHMS
3. K=ONE THOUSAND (1000) OHMS
4. VOLTAGE MEASUREMENTS MADE WITH ELECTRONIC TYPE VOLTMETER
5. VOLTAGES TAKEN BETWEEN POINT INDICATED AND B-
6. VOLTAGE TOLERANCE ±10%
7. INPUT VOLTAGE 117V AC
8. NO SIGNAL INPUT
9. * MEASUREMENT MADE WITH GANG FULLY OPEN.

FIGURE 6. SCHEMATIC DIAGRAM

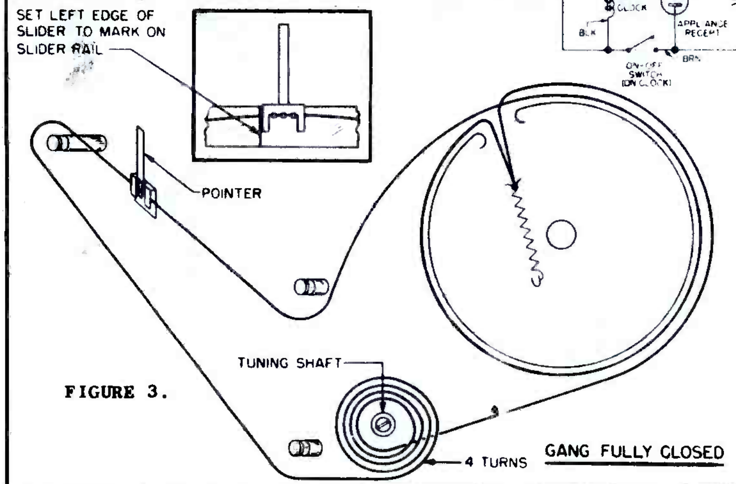


FIGURE 3.

TO REMOVE CHASSIS FROM CABINET

1. IMPORTANT: Before removing chassis, adjust all three clock hands to clear opening in dial plate, to avoid damage to hands.

2. Pull off the radio control knobs.

3. Remove the three screws from the bottom of the cabinet.

4. Remove the two screws at the upper corners of the cabinet back cover.

5. Pull the chassis from the cabinet.

MOTOROLA, Inc. **ALIGNMENT** Model 62CW1, Chassis HS-324

NOTE: It is recommended that an isolation transformer be placed between the power line and the receiver to avoid hum and electrical shocks. If an isolation transformer is not available, connect the low side of the signal generator to B- through a .1 mf capacitor.

1. Connect a low range output meter across the speaker voice coil.

2. Connect the low side of the signal generator to B-.

3. Set the signal generator for 400 cycle, 30% modulation.

4. Turn the receiver volume control to maximum.

5. Use a small fibre screwdriver for aligning the IF and diode transformers.

6. As stages are brought into alignment, reduce the signal generator output to a level which produces less than .40 volts (.05 watt) across the voice coil to avoid overloading the receiver.

7. See Figure 4 for adjustment locations and the following chart for procedure.

STEP	ANTENNA	GENERATOR CONNECTION	GENERATOR FREQUENCY	GANG SETTING	ADJUST	REMARKS
IF ALIGNMENT						
1.	.1 mf	Grid of conv. (pin 7, 12BE6)	455 Kc	Fully open	1, 2, 3 & 4 (IF cores)	Adjust for maximum.
RF ALIGNMENT						
2.	.1 mf	Grid of conv. (pin 7, 12BE6)	1620 Kc	Fully open	5 (Osc trim)	Adjust for maximum.
3.	-	Radiation loop*	1400 Kc	Tune for max	6 (RF trim)	Adjust for maximum.
4.	-	Radiation loop*	1400 Kc	Tune for max	7 (Ant trim)	Adjust for maximum.

*Connect generator output across 5-inch diameter, 5-turn loop and couple inductively to receiver loop. Keep generator loop perpendicular to axis of and at least 12 inches from receiver iron core loop.

TO REPLACE CLOCK DIAL BACKGROUND

1. Carefully pull off the three hands.

2. Remove the alarm dial and dial background.

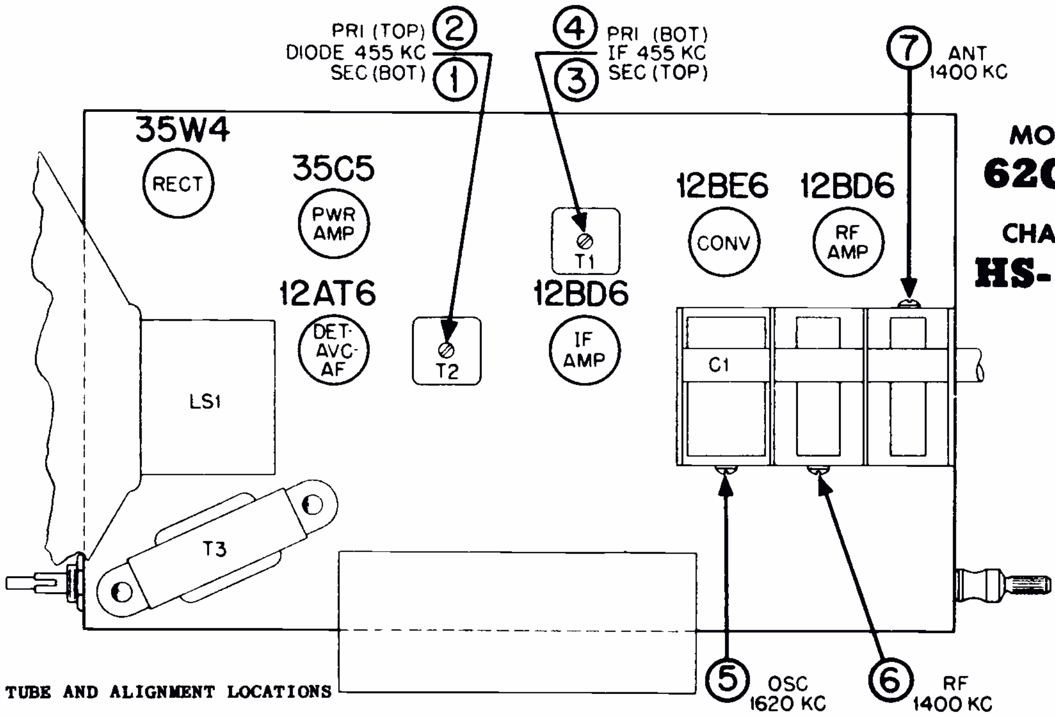
3. Install new background.

4. Turn the radio control shaft to "AUTO" position.

5. Slowly rotate the time set shaft clockwise until the switch contacts behind the radio control shaft close. Do not overshoot this point.

6. Reassemble the alarm dial and three hands. Set all the hands to indicate 12 o'clock. Set the figure "12" on the alarm dial to index with the small pointer on the hour hand.

7. Check the automatic operation to be sure the switch contacts close at the time indicated on the alarm dial.



MODEL **62CW1** CHASSIS **HS-324**

FIGURE 4. TUBE AND ALIGNMENT LOCATIONS

MOTOROLA, INC. **ALIGNMENT** Model 62X21, Chassis HS-326

NOTE: If AC power is used, it is recommended that an isolation transformer be placed between the power line and the receiver to avoid hum and electrical shocks. If an isolation transformer is not available, connect the low side of the signal generator to B- through a .1 mf capacitor.

1. Connect a low range output meter across the speaker voice coil.

2. Connect the low side of the signal generator to B-.

3. Set the signal generator for 400 cycle, 30% modulation.

4. Turn the receiver volume control to maximum.

5. Use a small fibre screwdriver for aligning the IF and diode transformers.

6. As stages are brought into alignment, reduce the signal generator output to a level which produces less than 1.25 volts (.5 watt) across the voice coil to avoid overloading the receiver.

7. See Figure 5 for adjustment locations and the following chart for procedure. NOTE: The BC band must be aligned before SW. If the BC trimmers are adjusted, the SW must also be realigned.

STEP	DUMMY ANTENNA	GENERATOR CONNECTION	GENERATOR FREQUENCY	GANG SETTING	ADJUST	REMARKS
IF ALIGNMENT						
1.	.1 mf	RF section of gang (rear stator)	455 Kc	Fully open	1, 2, 3 & 4 (IF cores)	Adjust for maximum.
BC BAND RF ALIGNMENT						
2.	-			Fully closed	Pointer (see Figure 4)	-
3.	.1 mf	RF section of gang (rear stator)	1600 Kc	1600 Kc on dial scale	5 (BC osc)	Adjust for maximum.
4.	.1 mf	RF section of gang (rear stator)	600 Kc	600 Kc on dial scale	6 (BC osc pad)	Simultaneously tune gang and adjust core for maximum signal.
5.	-	-	-	-	-	Repeat steps 3 & 4.
6.	-	Radiation loop*	1500 Kc	Tune for max	7 (BC RF)	Adjust for maximum.
SW BAND RF ALIGNMENT						
7.	-	-	-	-	-	Stop oscillator. (Place short across center section of gang). Connect VTVM to lug 4 of L-3 and B-; use lowest scale. Loosen SW Osc trim 8.
8.	400 ohms	SW Ant terminal	16 Mc	16 Mc on dial scale	9, 10 (SW Ant SW RF)	Set generator output to max. Adjust for max on VTVM.
9.	-	-	-	-	-	Remove short from gang.
10.	400 ohms	SW Ant terminal	16 Mc	16 Mc on dial scale	8 (SW Osc)	Generator output reduced to 25 microvolts. Adjust for max (1st peak on output meter) (Check image freq at 16.91 mc)

*Connect generator output to 5" diameter, 5 turn loop and couple inductively to receiver loop. Keep loops at least

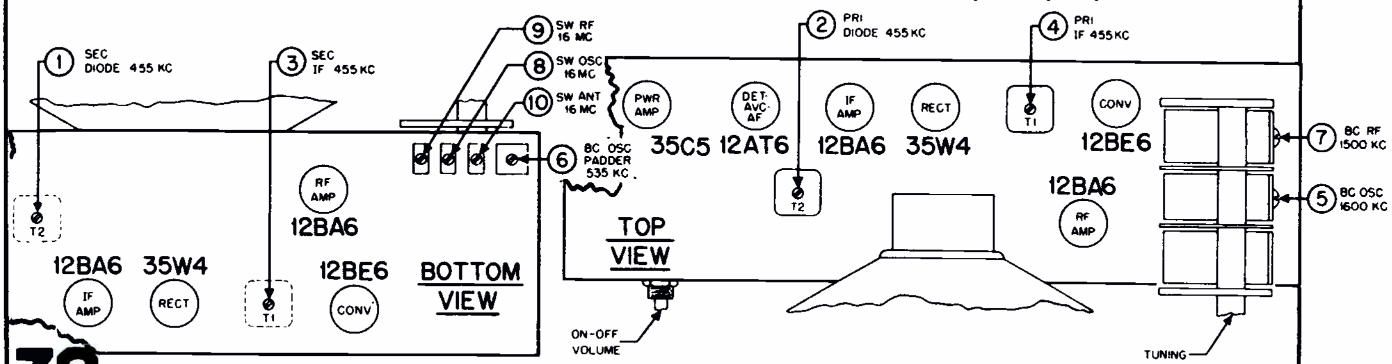
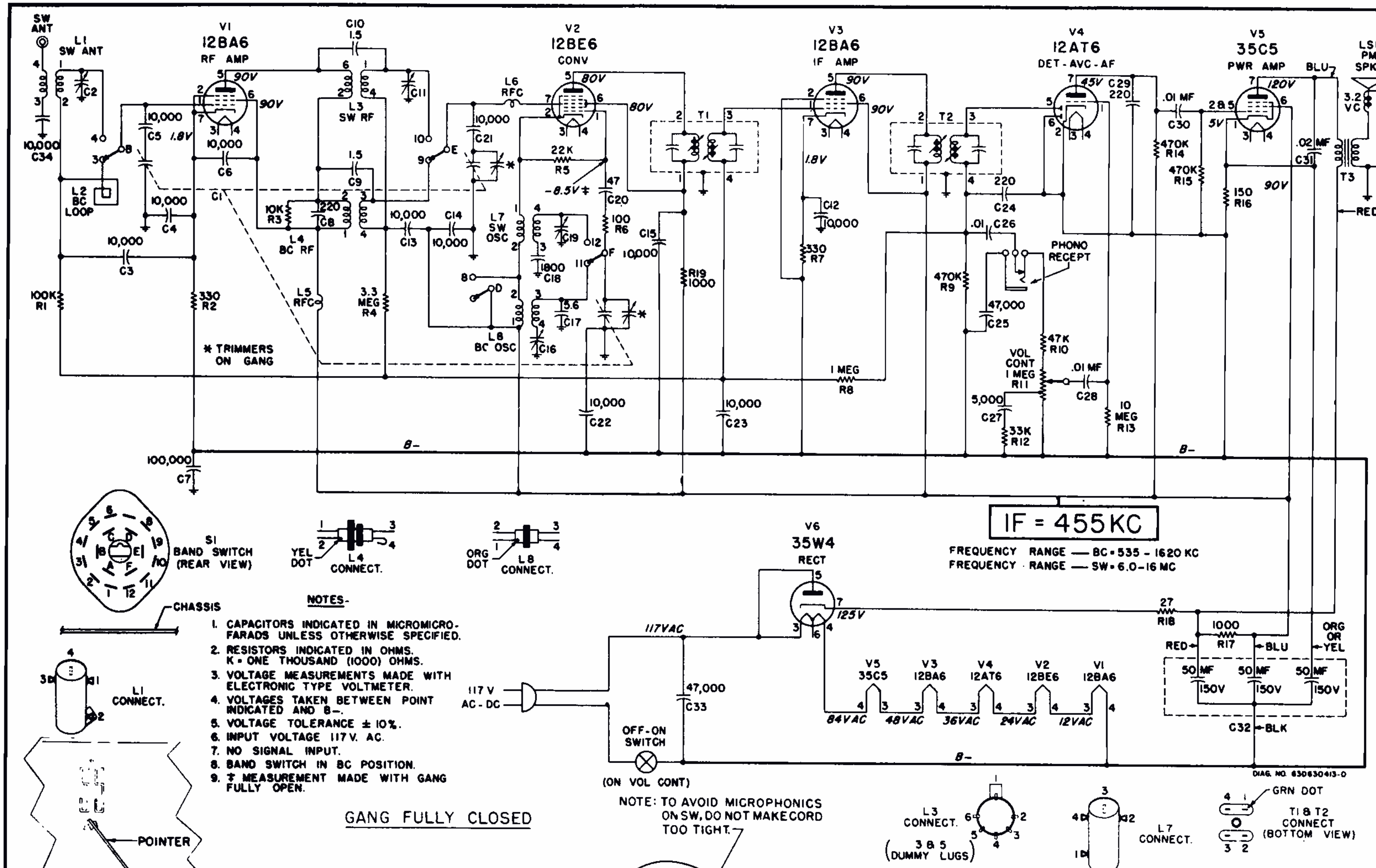


FIGURE 5. TUBE AND TRIMMER LOCATION

MOTOROLA, Inc.
(See preceding page, at left for alignment)

MODEL
62X21
CHASSIS
HS-326



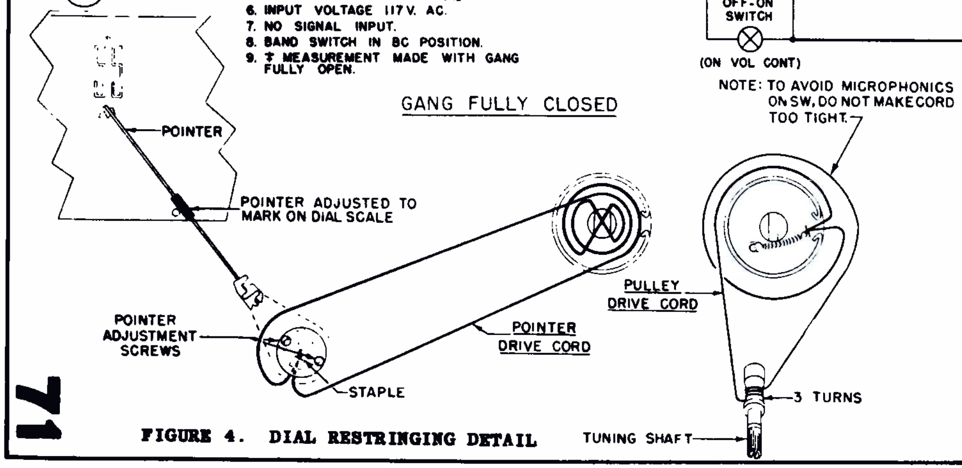


FIGURE 4. DIAL RESTRINGING DETAIL

TO REMOVE THE CHASSIS FROM THE CABINET

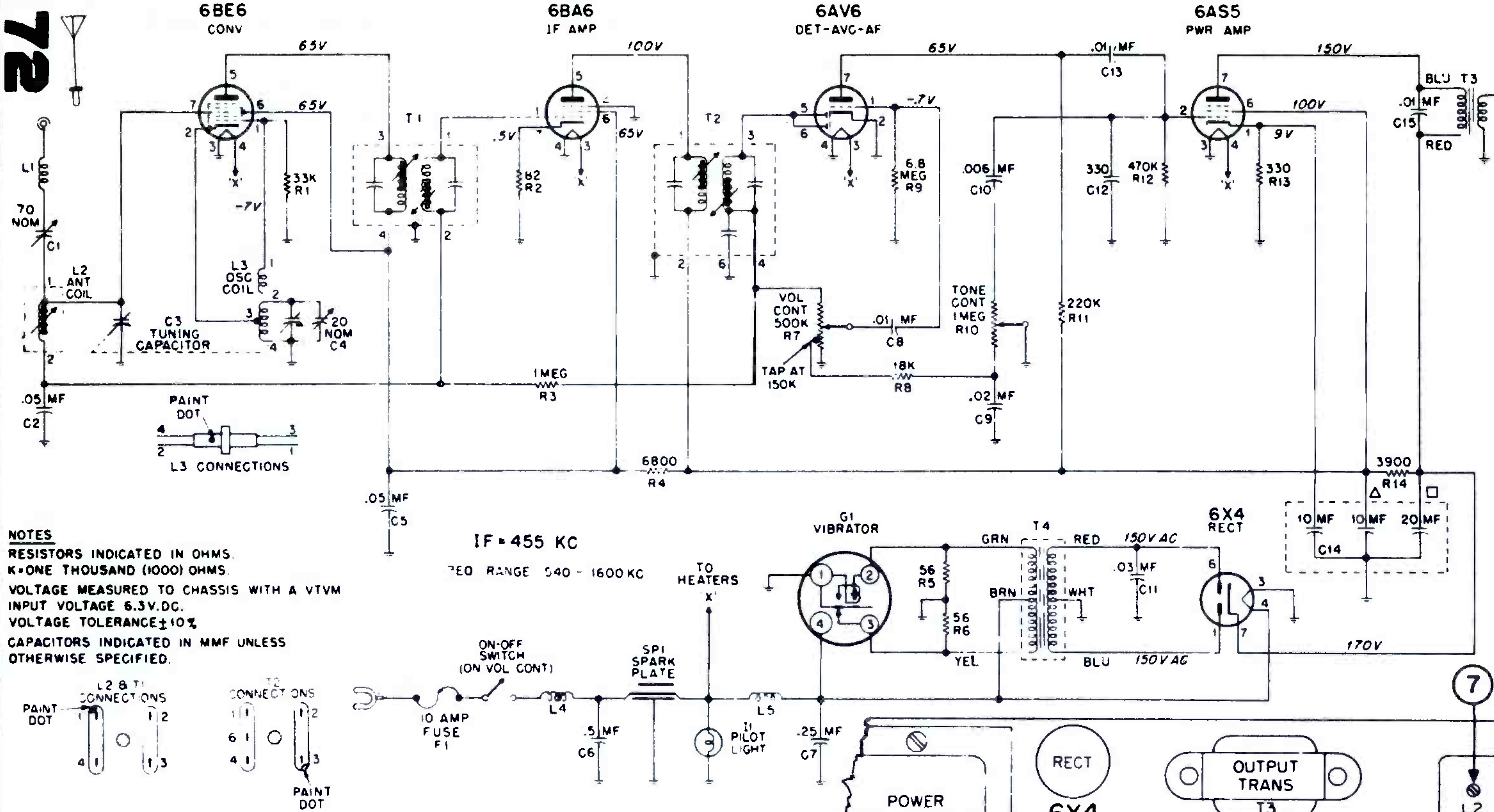
1. Pull off the two control knobs.
2. Remove split plugs which hold the loop to the cabinet.
3. From the back of the cabinet, remove the two hex head screws at the rear edge of the radio chassis.
4. Slide the radio chassis and loop from the cabinet.

Alignment on preceding page.

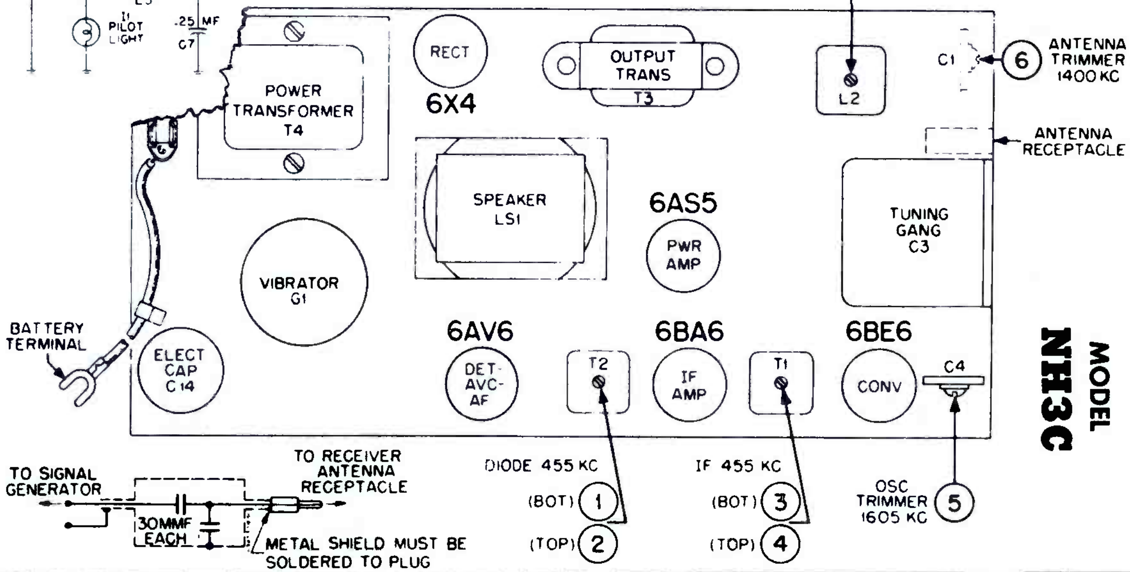
Motorola

MODEL NH3C

Specifically designed for installation in the Nash (Rambler Series cars only).



NOTES
RESISTORS INDICATED IN OHMS.
K=ONE THOUSAND (1000) OHMS.
VOLTAGE MEASURED TO CHASSIS WITH A VTVM
INPUT VOLTAGE 6.3V.DC.
VOLTAGE TOLERANCE ±10%
CAPACITORS INDICATED IN MMF UNLESS OTHERWISE SPECIFIED.



TO REPLACE TUBES. To replace tubes, it will be necessary to remove radio from car. Proceed as follows:

1. Disconnect "A" lead from car terminal located behind instrument panel.
2. Remove antenna plug from antenna receptacle located on right side of radio.
3. Pull off control knobs and pointer.
4. Remove two nuts, two washers and dial scale assembly.
5. Remove radio from behind instrument panel.
6. Remove back cover from radio to expose tubes.

RADIO NOISE SUPPRESSION. A capacitor installed on the car generator and a suppressor in the car's ignition system distributor circuit, eliminates noise from these sources.

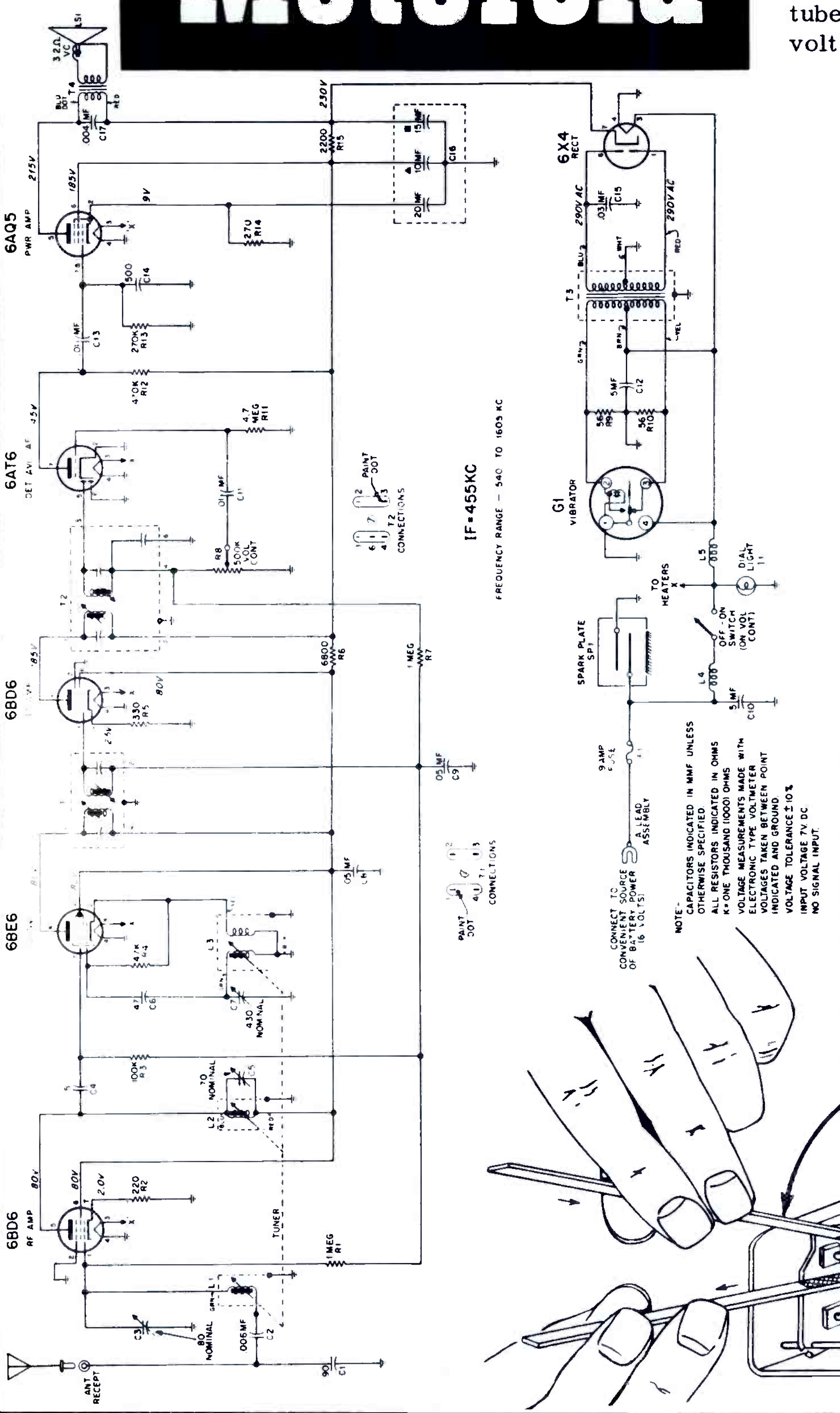
TO REPLACE VIBRATOR OR FUSE. The plug-in type vibrator and radio fuse are accessible from the rear of the instrument panel. Should these require replacement, it is only necessary to pull out the old vibrator or fuse and plug in a new one.

Motorola

MODEL

403

Model 412 uses similar circuit and parts, but tubes are of 12 volt series.



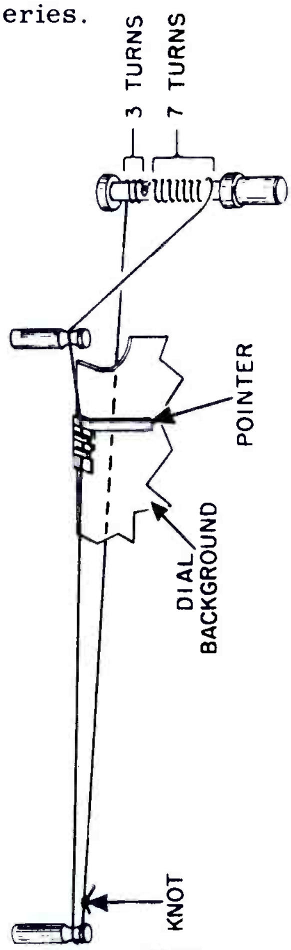


FIGURE 1. DIAL CORD RESTRINGING DETAIL

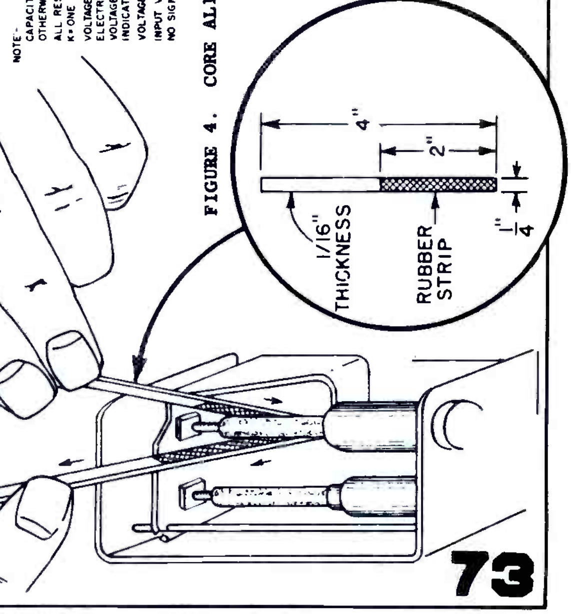


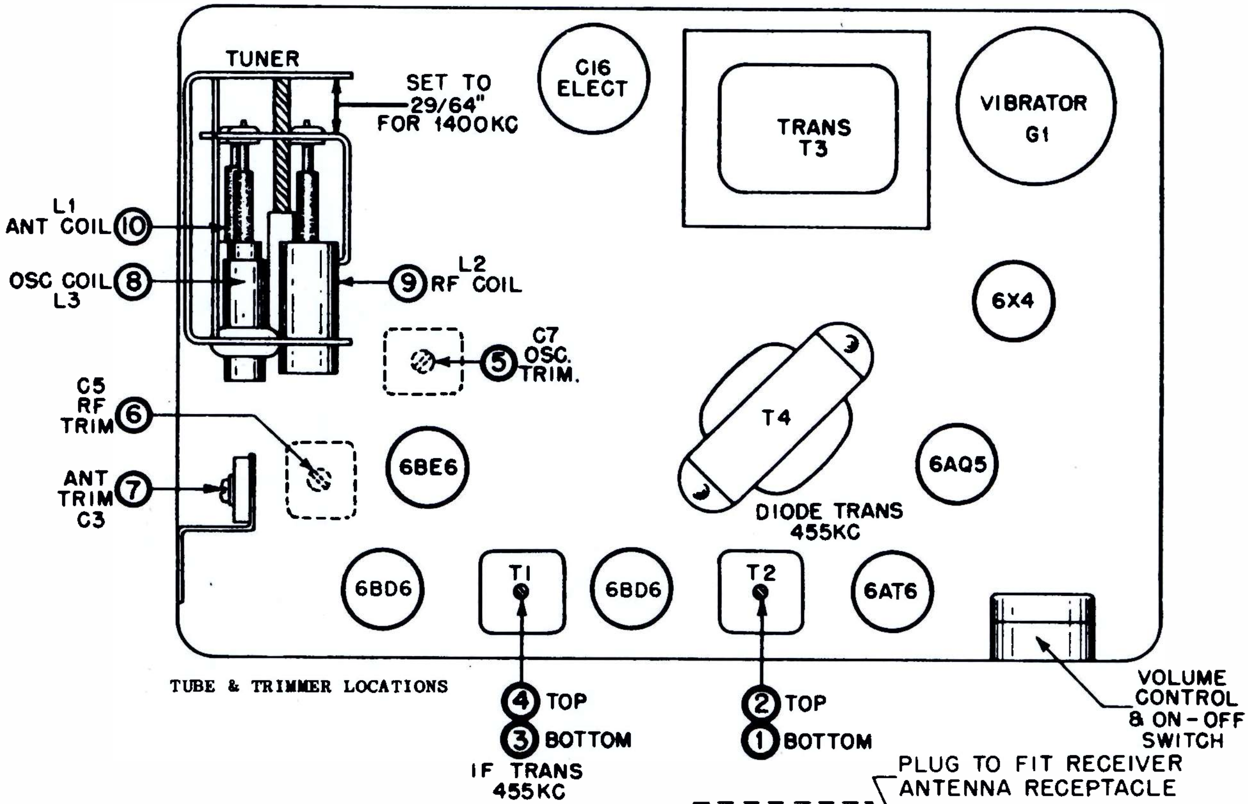
FIGURE 4. CORE ALIGNMENT DETAIL

MOTOROLA Auto Radio — Model 403, continued.

ALIGNMENT CHART

STEP	DUMMY ANTENNA	GENERATOR CONNECTION	GENERATOR FREQUENCY	TUNER SET TO	ADJUST	REMARKS
IF ALIGNMENT						
1.	.1 mf	6BE6 grid (pin #7)	455 Kc	High frequency end of dial (cores out)	1, 2, 3 & 4	Peak for maximum in order indicated
RF ALIGNMENT						
2.	See Fig. 3	Antenna receptacle through dummy	1605 Kc	"	5	Peak for maximum.
3.	"	"	1400 Kc	Tune for max.	6 & 7	"
TUNER ALIGNMENT						
NOTE: The tuner cores have been correctly aligned at the factory. Field alignment of the tuner is not recommended unless components have been replaced or tampered with. Construct two core alignment tools as shown in Figure 4. Refer to Figure 4 for proper use of tools, and proceed to align as follows:						
4.	See Fig. 3	Antenna receptacle through dummy	1610 Kc	High frequency end of dial; cores should project 1-1/32" from end of coil form - screw out if necessary	5, 6 & 7	Peak for maximum in order indicated.
5.	"	"	1400 Kc	1400 Kc-per Figure 2	8, 9 & 10	"

6. With receiver installed in car, the antenna fully extended and dial set to approximately 1400 Kc, adjust antenna trimmer (7) for maximum signal of a weak station or noise between stations.



TUBE & TRIMMER LOCATIONS

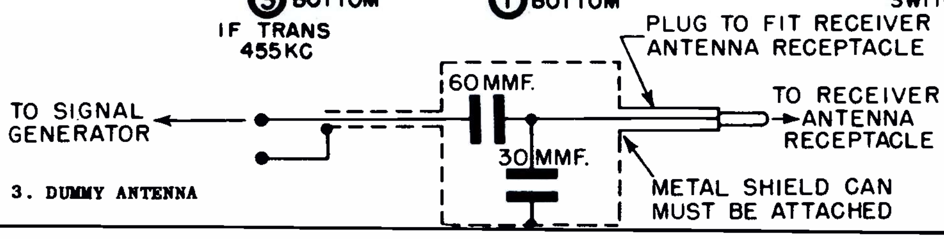
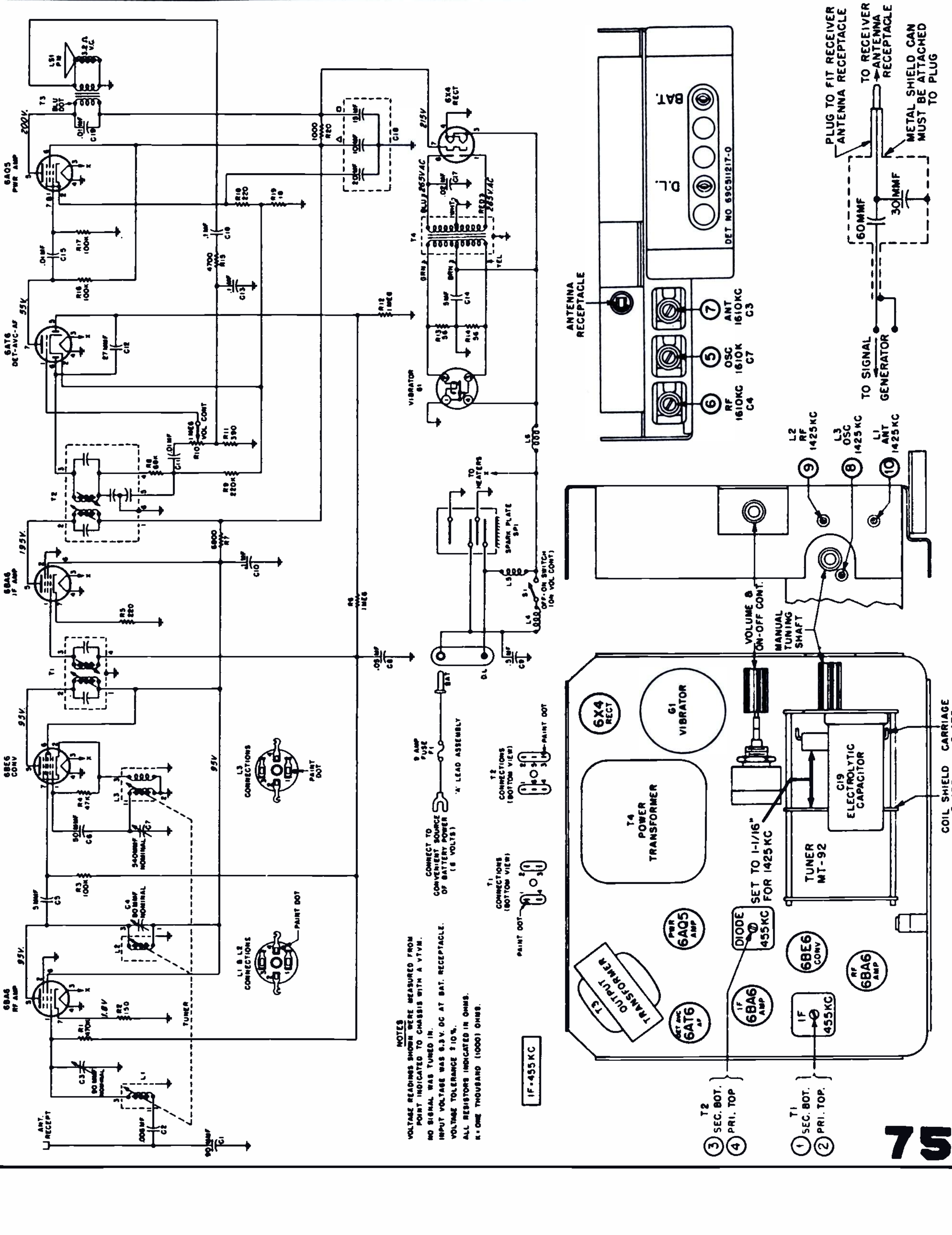


FIGURE 3. DUMMY ANTENNA

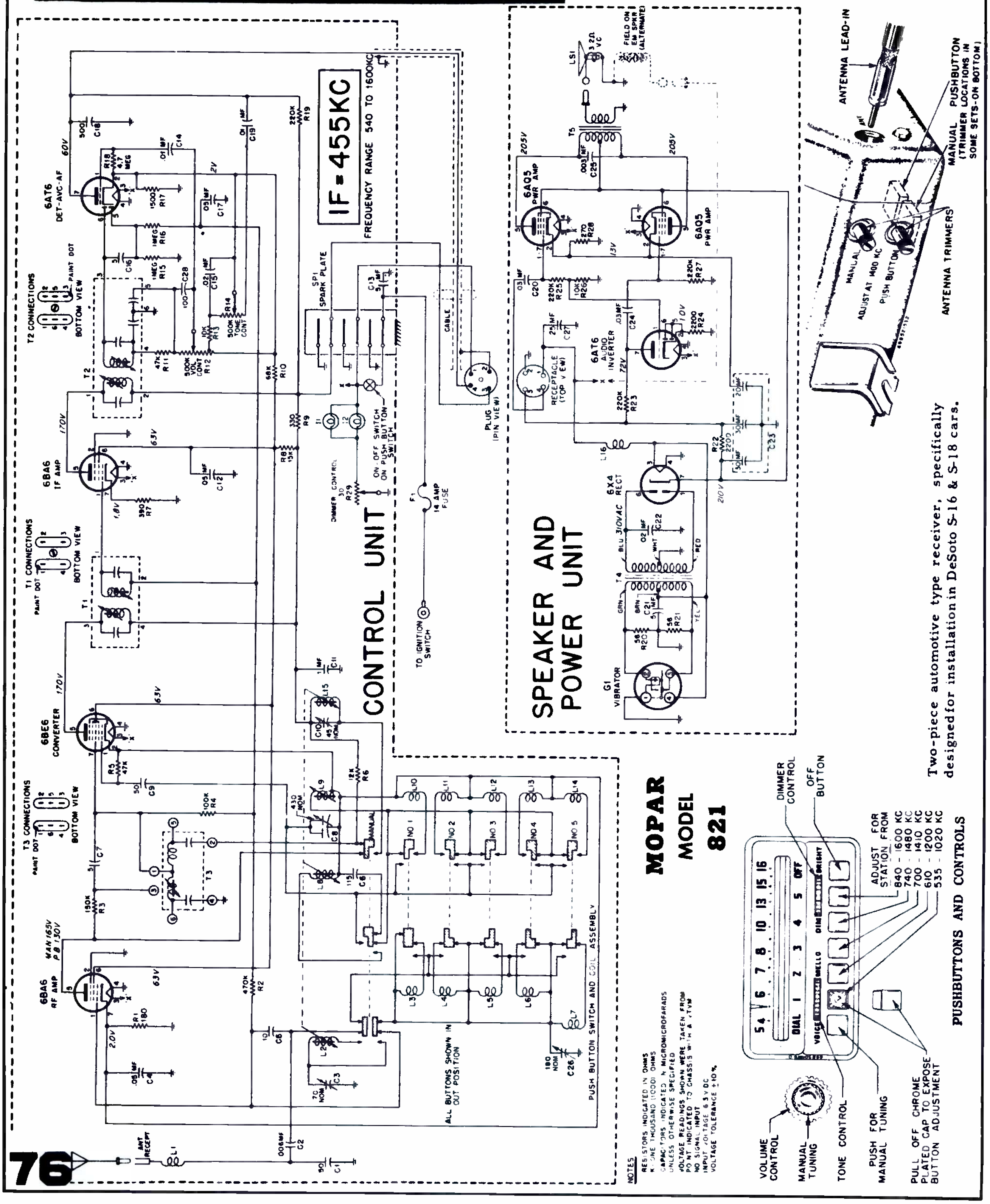
Motorola

MODEL 503



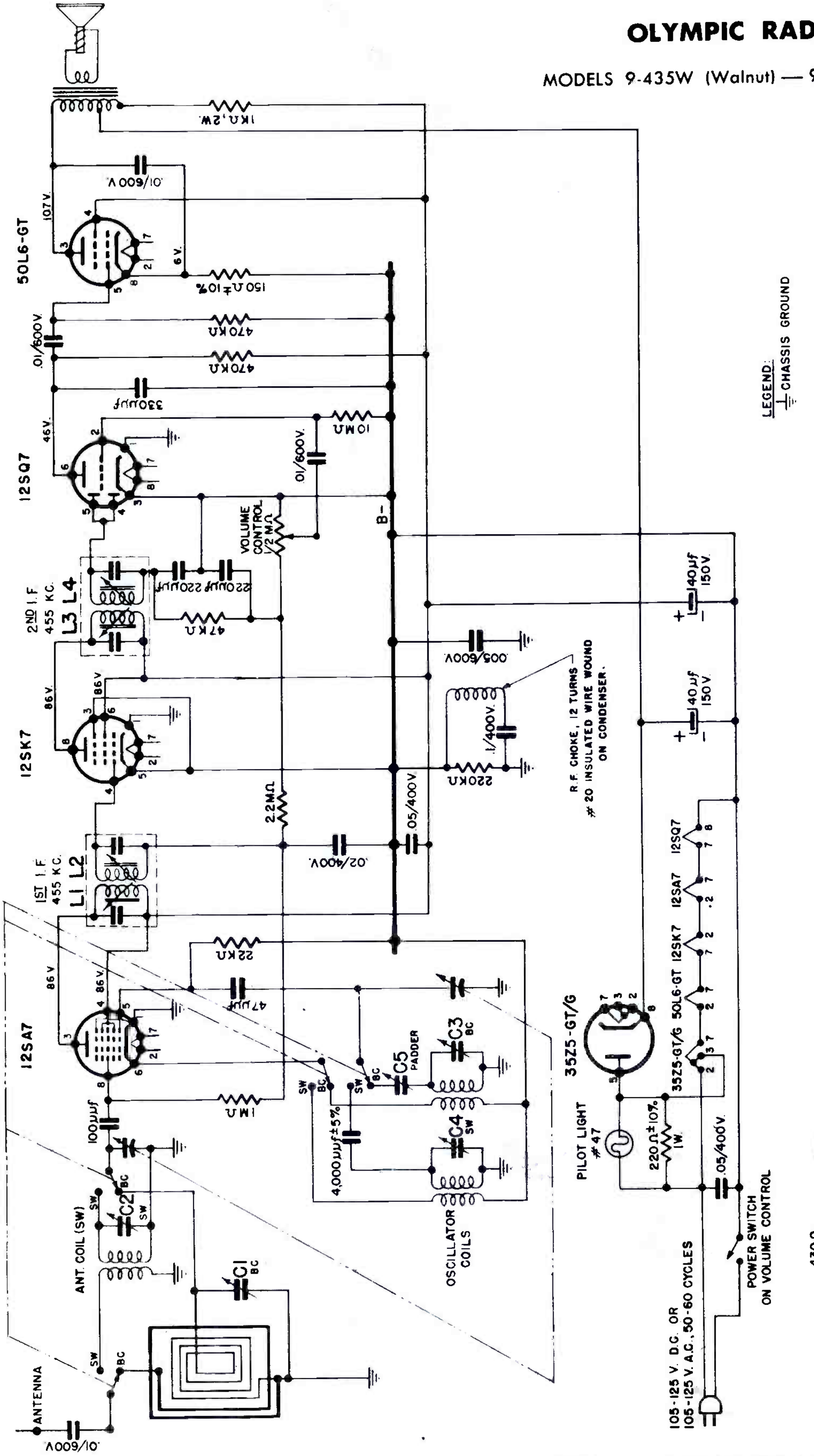
Motorola

MOPAR
MODEL
821



OLYMPIC RADIO

MODELS 9-435W (Walnut) — 9-435V (Ivory)



LEGEND:
CHASSIS GROUND

NOTES:

1. ALL RESISTORS ± 20% TOLERANCE, 1/2 WATT, UNLESS OTHERWISE SPECIFIED.
2. ALL MICA CONDENSERS ± 20% TOLERANCE, UNLESS OTHERWISE SPECIFIED.
3. ALL VOLTAGES MEASURED BETWEEN POINTS INDICATED AND B-, WITH VOLUME CONTROL FULL ON, AND WITH BAND SWITCH SET IN "BC" POSITION, USING 20,000 OHMS-PER-VOLT METER. ALL READINGS ± 10%, MEASURED WITH INPUT VOLTAGE OF 117 V., 60 CYCLES A.C.

See next page, over, for alignment data.

FOR 230 V. D.C. OR 230 V. 50-60 CYCLES A.C. OPERATION, USE LINE ADAPTER CORD, PART LC-530.

Frequency Range Broadcast 540 k-c to 1610 k-c — Shortwave 4.75 m-c to 16.1 m-c

Power Requirement 105-125 Volts d-c or 50 to 60 cycles a-c

Power Consumption 30 watts

OLYMPIC RADIO 9-435V and 9-435W, continued.

ALIGNMENT INSTRUCTIONS

Equipment required: Modulated r-f signal generator, output meter, insulated screw driver, two .1mfd. 400 V. Condensers, one 400 ohms resistor.

To align the receiver it is necessary to remove the chassis from the cabinet, check that the pointer is horizontal and coincides with the two horizontal reference lines on the dial. In this position the condenser should be completely closed. Turn volume control to maximum and connect the output meter across the voice coil.

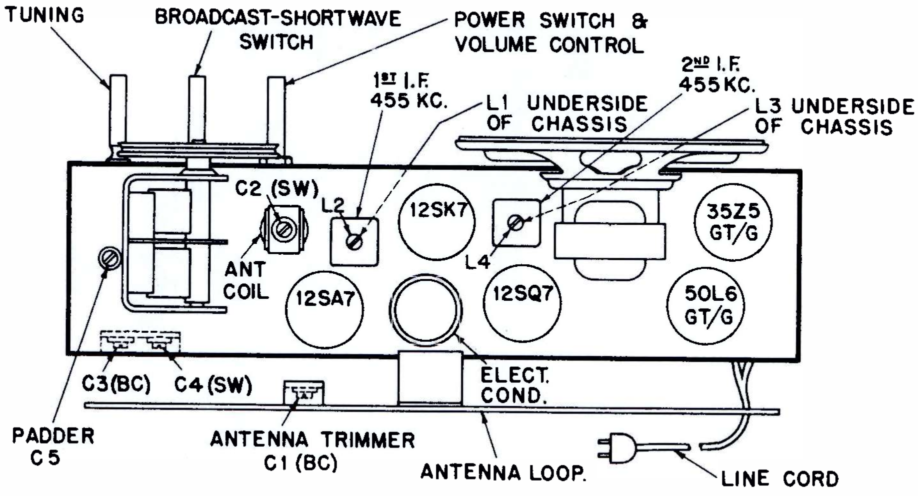
Then connect the low side of the signal generator to the receiver chassis through a .1 mfd. condenser and keeping the output as low as possible proceed in the sequence as shown on the alignment chart.

To insure alignment a radiated signal will be required during part of the alignment procedure. To radiate a signal connect a loop of about 6" to 8" diameter, (one turn of #14 or #12 wire) across the output of the signal generator and place this loop parallel to the loop of the receiver to be aligned, at a distance of about 8" or 10".

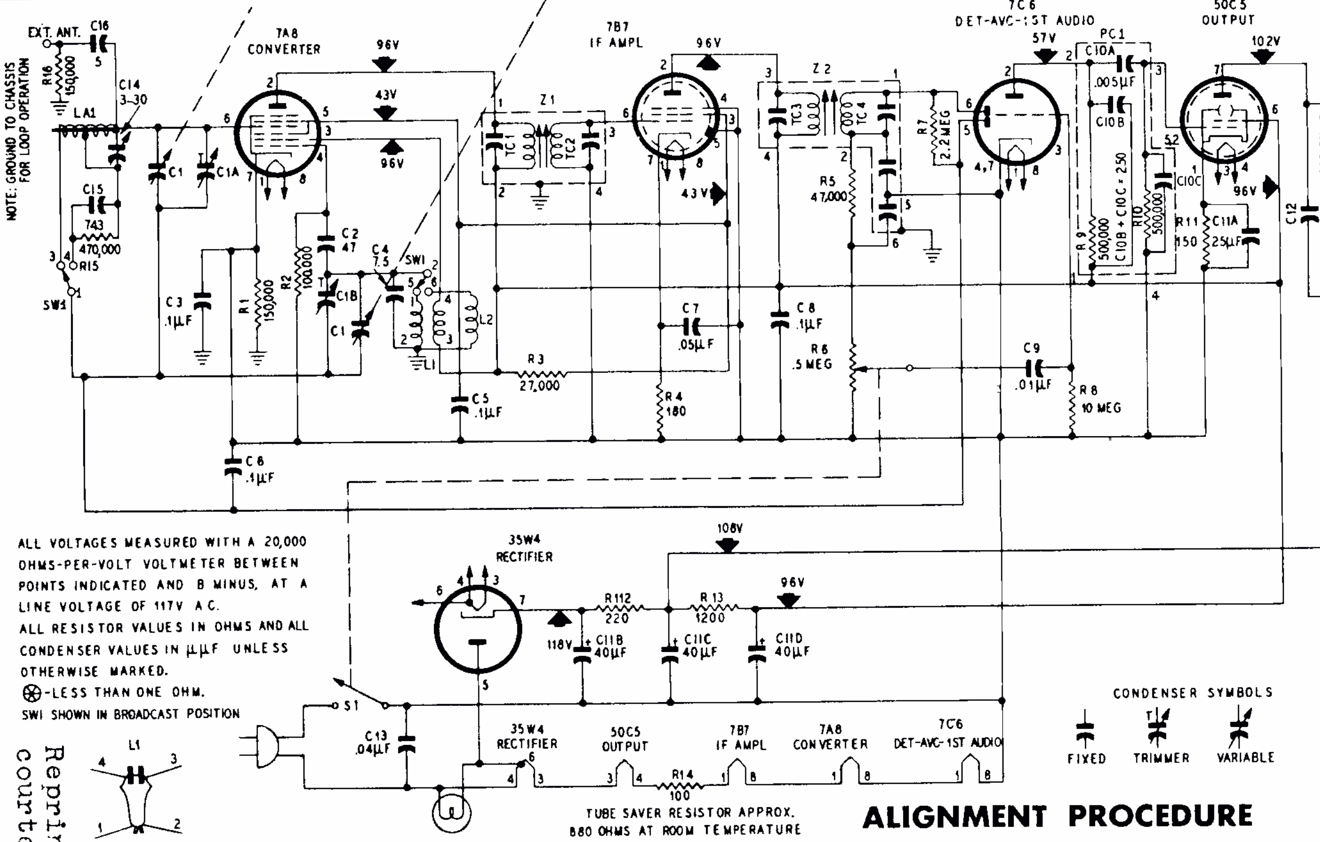
ALIGNMENT PROCEDURE CHART

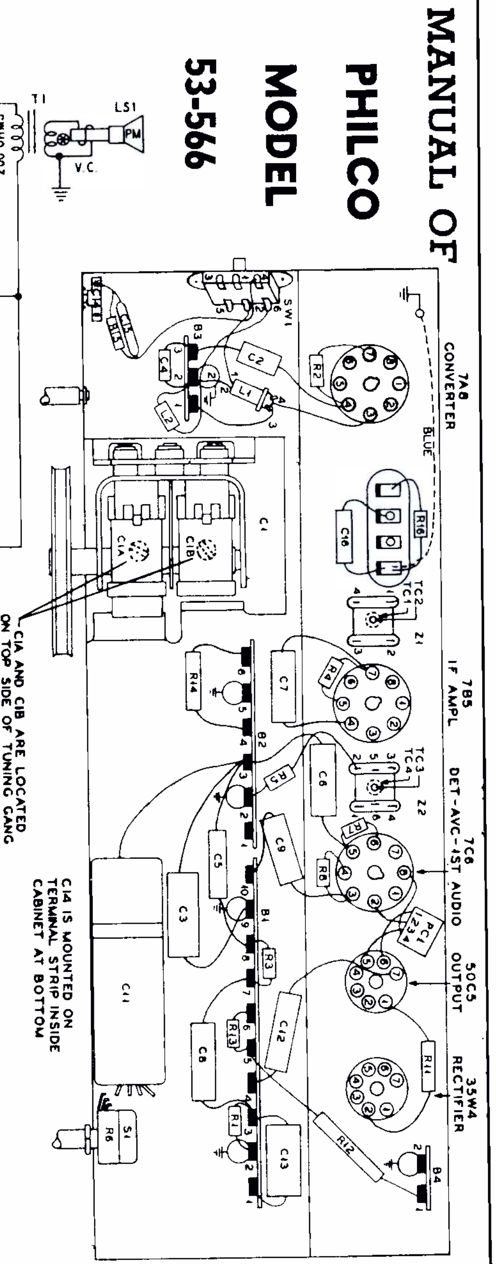
STEP	SET BAND SWITCH ON	CONNECT HIGH SIDE OF SIGNAL GENERATOR TO—	SET SIGNAL GENERATOR TO—	TURN RECEIVER DIAL TO—	ADJUST THE FOLLOWING FOR MAXIMUM OUTPUT. (KEEP SIGNAL FROM SIGNAL GENERATOR AS LOW AS POSSIBLE).
1	B.C.	R.F. SECTION OF VARIABLE CONDENSER OR PIN 4 OF THE 12SK7 TUBE IN SERIES WITH A .1 MFD. 400 VOLT CONDENSER.	455 KC.	FULL CLOCKWISE POSITION (CONDENSER PLATES FULLY OPEN).	L4 AND L3 (2ND I.F. TRANSFORMER)
2	B.C.	R.F. SECTION OF VARIABLE CONDENSER OR PIN 8 OF THE 12SA7 TUBE IN SERIES WITH A .1 MFD. 400 VOLT CONDENSER.	455 KC.	FULL CLOCKWISE POSITION (CONDENSER PLATES FULLY OPEN).	L2 AND L1 (1ST. I.F. TRANSFORMER)
3	B.C.	REPEAT STEPS 1 AND 2			
4	B.C.	USE RADIATED SIGNAL (CONNECT BOTH SIDES OF SIGNAL GENERATOR TO RADIATION LOOP).	1600 KC.	1600 KC. (160 ON DIAL)	C3 (OSCILLATOR TRIMMER)
5	B.C.		1400 KC.	MAXIMUM SIGNAL (APPROX. 140 ON DIAL)	C1 (ANTENNA TRIMMER)
6	B.C.		600 KC.	MAXIMUM SIGNAL (APPROX. 60 ON DIAL)	C5 (PADDER) ROCK VARIABLE FOR MAXIMUM SIGNAL
7	B.C.	REPEAT STEPS 4, 5, AND 6			
8	S.W.	ANTENNA WIRE ON LOOP IN SERIES WITH A 400 OHM RESISTOR.	15 MC.	15 MC. (APPROX. 15 ON DIAL)	C4 (OSCILLATOR TRIMMER) SECOND PEAK FROM TIGHT POSITION C2 (ANTENNA TRIMMER)
9	S.W.		5.5 MC.	RESONANCE (APPROX. 5.5 ON DIAL)	CHECK THAT POINTER (AT RESONANCE) COINCIDES WITH 5.5 MC. CALIBRATION POINT ON DIAL. IF NOT REPEAT STEP 8.

CAUTION: FOR 220 VOLT OPERATION USE ADAPTOR CORD, PART № LC-530.



MANUAL OF PHILCO MODEL 53-566





ALL VOLTAGES MEASURED WITH A 20,000 OHMS-PER-VOLT VOLTMETER BETWEEN POINTS INDICATED AND B MINUS, AT A LINE VOLTAGE OF 117V A.C.
ALL RESISTOR VALUES IN OHMS AND ALL CONDENSER VALUES IN $\mu\mu$F UNLESS OTHERWISE MARKED.
⊛-LESS THAN ONE OHM.
SW1 SHOWN IN BROADCAST POSITION

ALIGNMENT PROCEDURE

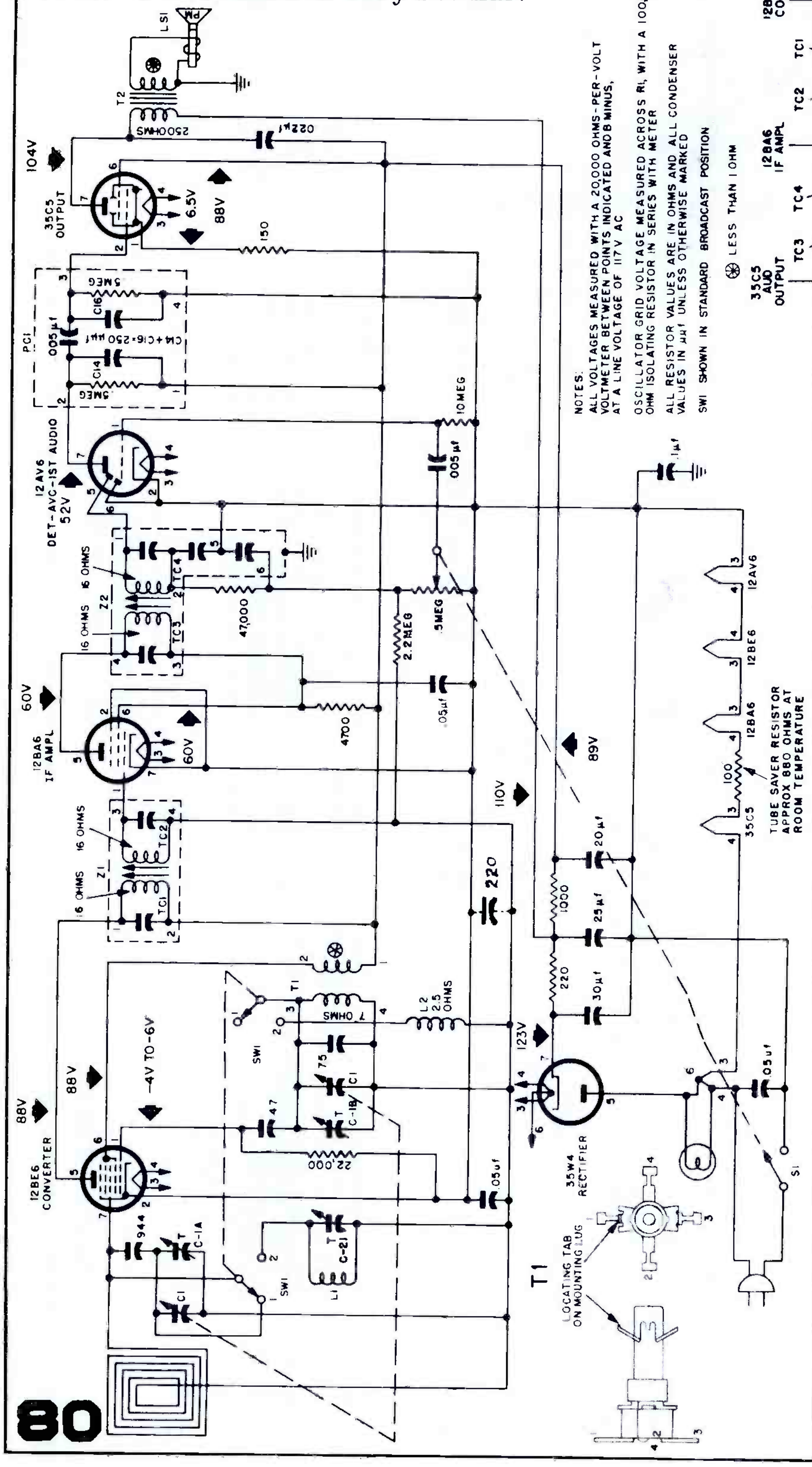
STEP	SIGNAL GENERATOR		RADIO		ADJUST TRIMMER
	CONNECTION TO RADIO	DIAL SETTING	DIAL SETTING	SPECIAL INSTRUCTIONS	
1	Through a .01-μf. condenser to grid (pin 6) of 7A8 converter tube.	455 kc.	Gang fully open.	Set broadcast-special services switch to broadcast position. Adjust, in order given, for maximum output.	TC4—2nd i-f sec. TC3—2nd i-f pri. TC2—1st i-f sec. TC1—1st i-f pri.
2	Radiating loop (see note below).	1630 kc.	1630 kc.	Adjust for maximum.	C1B—osc.
3	Same as step 2.	1500 kc.	1500 kc.	Adjust for maximum.	C1A—aerial.
4	Same as step 2.	3200 kc.	3200 kc.	Set broadcast-special services switch to special service position. Adjust for maximum.	C14—special services
5	Repeat steps 3 and 4.				

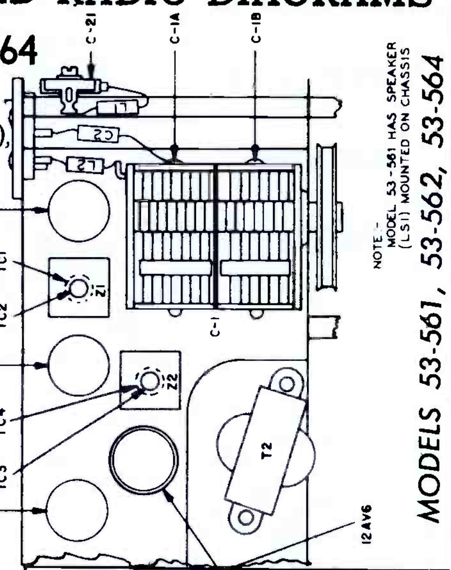
RADIATING LOOP: Make up a 6–8 turn, 8-inch-diameter loop from insulated wire, connect to signal-generator leads, and place near radio loop.

MANUAL OF 1953 MOST-OFTEN-NEEDED RADIO DIAGRAMS

PHILCO MODELS 53-561, 53-562 AND 53-564

This service material will also apply to the following Models 53-563, 53-565 (these are the same electrically), Model 53-560 (special services band omitted), and Model 53-568 which is very similar.

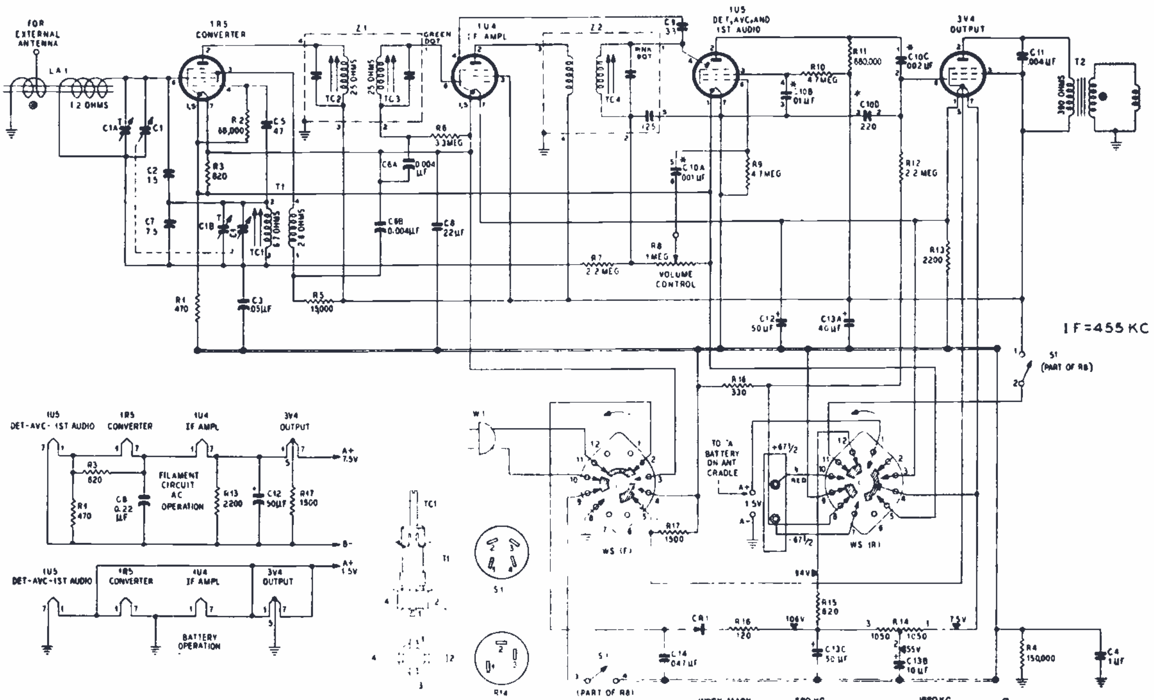


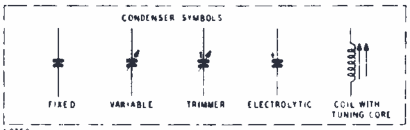


STEP	SIGNAL GENERATOR: CONNECTION TO RADIO	SIGNAL GENERATOR: DIAL SETTING	RADIO: DIAL SETTING	RADIO: BAND SWITCH SETTING	SPECIAL INSTRUCTIONS	ADJUST
1	Ground lead to B-; output lead through a .1-µf. condenser to grid (pin 7) of 12BE6.	455 kc.	Tuning gang fully open	Broadcast	Adjust tuning cores, in order given, for maximum output. TC1 and TC3 are located at top of transformers.	TC4—2nd i-f sec. TC3—2nd i-f pri. TC2—1st i-f sec. TC1—1st i-f pri.
2	Radiating loop	1620 kc.	1620 kc.	Broadcast	Adjust trimmer for maximum output.	C1-B—osc.
3	Same as step 2.	1500 kc.	1500 kc.	Broadcast	Adjust trimmer for maximum output.	C1-A—aerial (broadcast)
4	Same as step 2.	3200 kc.	3200 kc.	Special Services	Adjust trimmer for maximum output.	C21—aerial (special services).

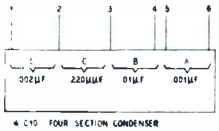
PHILCO PORTABLE RADIO MODEL 53-651

Philco Model 53-652 has almost an identical electrical circuit.





NOTES
ALL RESISTOR VALUES IN OHMS AND ALL CONDENSER VALUES IN UUF UNLESS OTHERWISE MARKED
✱ LESS THAN 1 OHM
ALL VOLTAGES SHOWN WERE MEASURED WITH A 20,000-OHMS-PER VOLT METER FROM POINTS INDICATED TO B-



TUBE SOCKET VOLTAGES

B SUPPLY	1R5 RF PLATE PIN 2	1R5 OSC PLATE PIN 3	1U4 PLATE PIN 2	1U4 SCREEN PIN 3	1U5 PLATE PIN 2	1U5 SCREEN PIN 3	3V4 PLATE PIN 2	3V4 SCREEN PIN 3
PWR LINE (AC OR DC)	90	55	90	91	18	16	86	90
[illegible] BATTERY	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	62	65

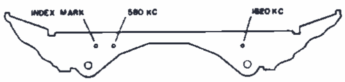


Figure 3. Front View of Pointer Rail, Showing Alignment Marks

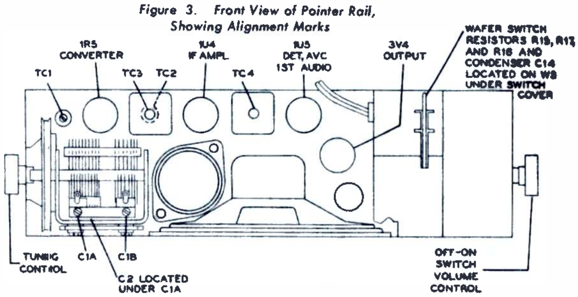


Figure 2. Top View, Showing Tuning Adjustments

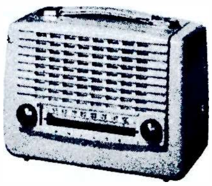
STEP	SIGNAL GENERATOR: CONNECTION TO RADIO	SIGNAL GENERATOR: DIAL SETTING	RADIO: DIAL SETTING	RADIO: SPECIAL INSTRUCTIONS	ADJUST
1	Output lead through a .1-μf. condenser to antenna section of tuning condenser or to pin 6 of converter (1R5). Ground lead to B–.	455 kc.	Tuning gang fully open.	Adjust, in order given, for maximum output.	TC4–2nd i-f sec. TC2–1st i-f pri. TC3–1st i-f sec.
2	Radiating loop. See NOTE below	1620 kc.	1620 kc.†	Adjust for maximum output.	C1B–osc. trimmer
3	Same as step 2.	Between 1400 and 1500 kc.	Tune radio to generator signal.	Adjust for maximum output.	C1A–antenna trimmer
4	Same as step 2.	580 kc.	580 kc.†	Adjust for maximum output. Rock tuning gang while making this adjustment.	TC1–osc. core
5	Repeat steps 2, 3, and 4 until no further improvement is obtained.				

NOTE: Use a 6–8 turn, 6-inch diameter loop made up of insulated wire. Connect to signal-generator leads, and place about 1 foot from radio loop antenna.
† The radio can be set to this frequency by tuning it until the dial pointer coincides with the proper alignment mark on the bottom of the chassis. See figure 3.

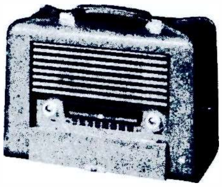
PHILCO RADIO

MODELS 53-656 AND 53-658

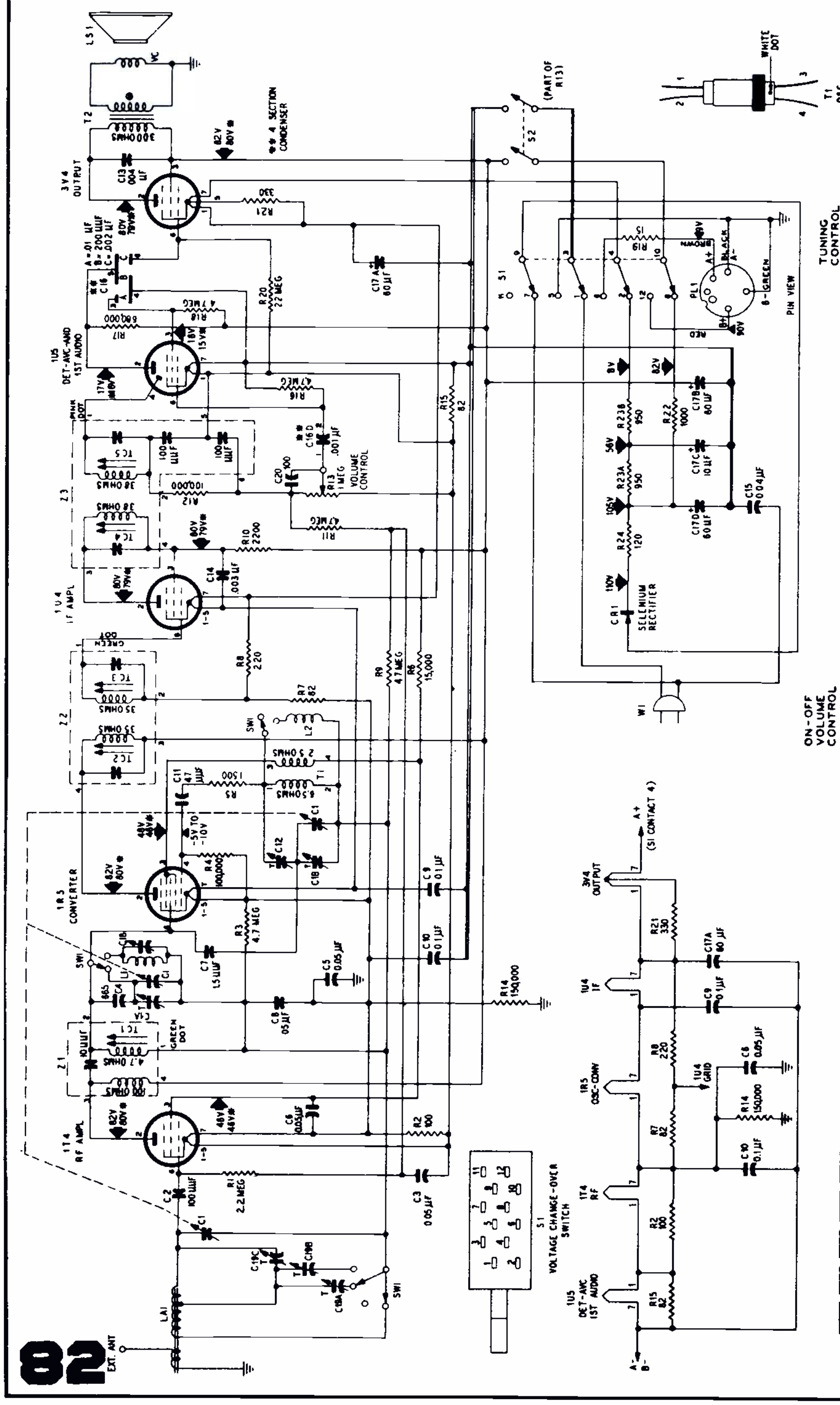
Alignment continued on page 83, adjacent at right.
(All Philco material is reproduced through the courtesy of the PHILCO CORP.)

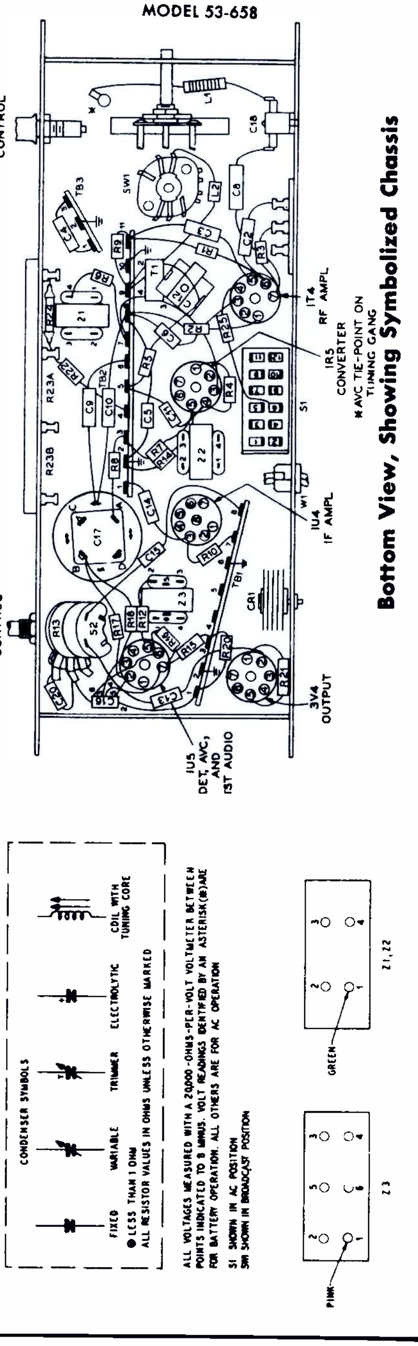


MODEL 53-656



MODEL 53-658





Bottom View, Showing Symbolized Chassis

ALIGNMENT PROCEDURE

MODELS 53-656 AND 53-658

POINTER—Set pointer to coincide with first index mark from left side of dial backplate (looking at front of dial backplate).

RADIO CONTROLS—Set volume control to maximum; set broadcast-special services switch, SW1, as indicated in chart.

OUTPUT METER—Connect across voice-coil terminals.

SIGNAL GENERATOR—Use modulated output.

OUTPUT LEVEL—During alignment, adjust signal-generator output to maintain output-meter indication below .5 volt.

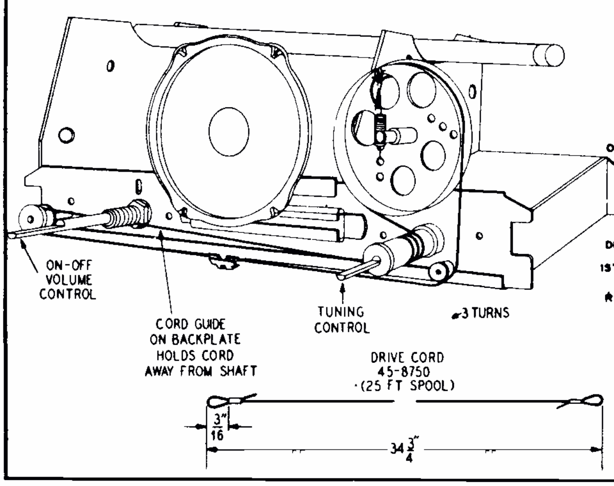
CRITICAL LEAD DRESS—To secure proper padding capacity, the green lead from pin 6 of the 1R5 tube to Z1 must be dressed over the wiring panel, away from the chassis. The white lead which connects the low end of the aerial (LA1) to the broadcast-special services switch (SW1), must be dressed taut between the low-end tie lug and the retaining spring.

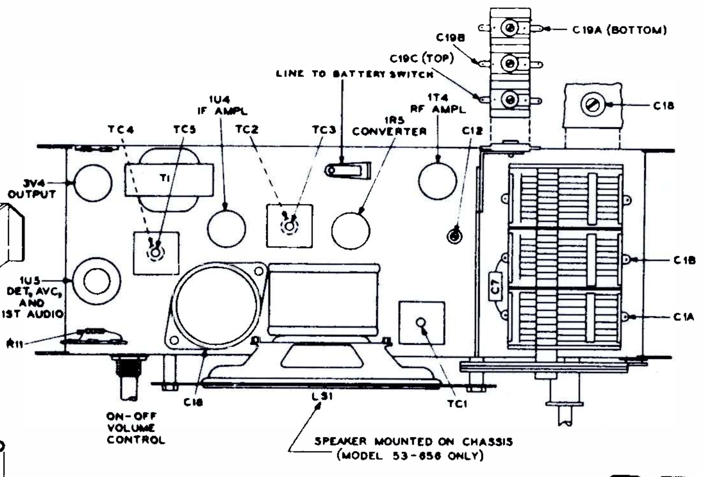
STEP	SIGNAL GENERATOR		RADIO		ADJUST TRIMMER
	CONNECTION TO RADIO	DIAL SETTING	DIAL SETTING	SPECIAL INSTRUCTIONS	
1	Through a .1-μf. condenser to pin 6 of 1R5 converter.	265 kc.	1630 kc. (gang fully open)	Set broadcast-special services switch to broadcast position. Adjust, in order given, for maximum output.	TC5—2nd i-f sec. TC4—2nd i-f pri. TC2—1st i-f pri. TC3—1st i-f sec.
2	Radiating loop. See note below.	1630 kc.	*1630 kc. (gang fully open)	Adjust for maximum output. If low-frequency dial tracking is far off, make adjustments in steps 3 and 4 before making this adjustment.	C1B—osc. shunt
3	Same as step 2.	580 kc.	580 kc.	Adjust for maximum output while rocking tuning control.	C12—osc. series
4	Same as step 2.	580 kc.	580 kc.	Adjust for maximum output. This adjustment should not be made unless dial tracking is off, or sensitivity is low at low-frequency end (580 kc.).	TC1—r-f sec.
5	Same as step 2.	1500 kc.	1500 kc. (index mark at right)	Adjust, in order given, for maximum output.	C1A—r-f C19A—BC aerial
6	Repeat steps 3 and 5 until no further improvement is obtained.				
7	Same as step 2.	3000 kc.	3000 kc.	Set broadcast-special services switch to special services position. Adjust, in order given, for maximum output.	C19C—SS aerial C18—r-f
8	Same as step 2.	1900 kc.	1900 kc.	Adjust, in order given, for maximum output.	C19B—SS aerial series tracker
9	Repeat steps 7 and 8, and then repeat step 5.				

NOTE: Make up a six-to-eight-turn, 6-inch diameter loop using insulated wire; connect to signal-generator leads and place near radio loop.

***For proper adjustment of the oscillator trimmer, fully open the tuning gang and insert a .006-inch, non-metallic shim between the heel of the rotor and the top of the stator plates. Close the tuning gang sufficiently to hold the shim in place, and then remove the shim without disturbing the gang setting.**

Drive-Cord Installation Details



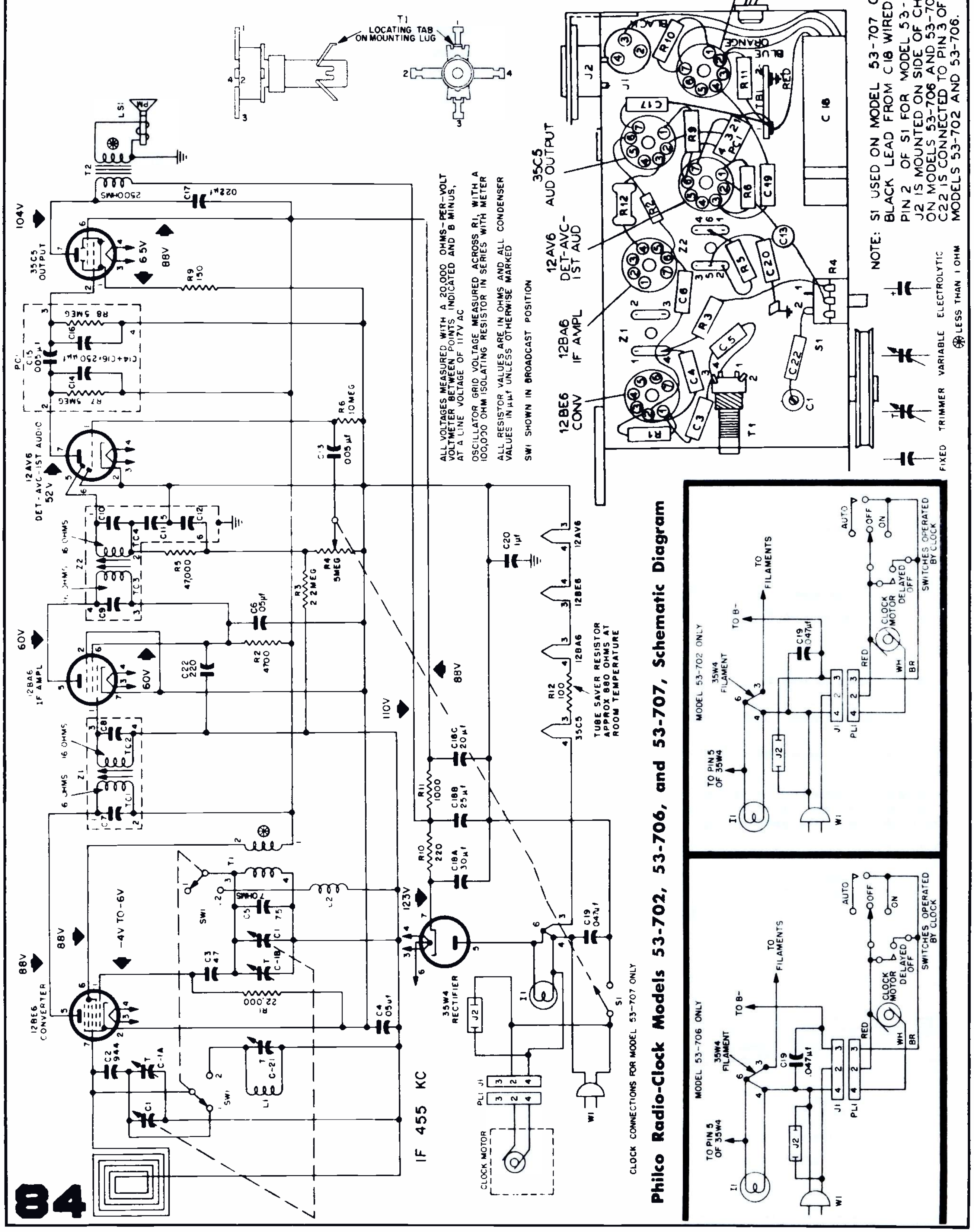


Top View, Showing Trimmer Locations

MANUAL OF 1953 MOST-OFTEN-NEEDED RADIO DIAGRAMS

PHILCO MODELS 53-702, 53-706 AND 53-707

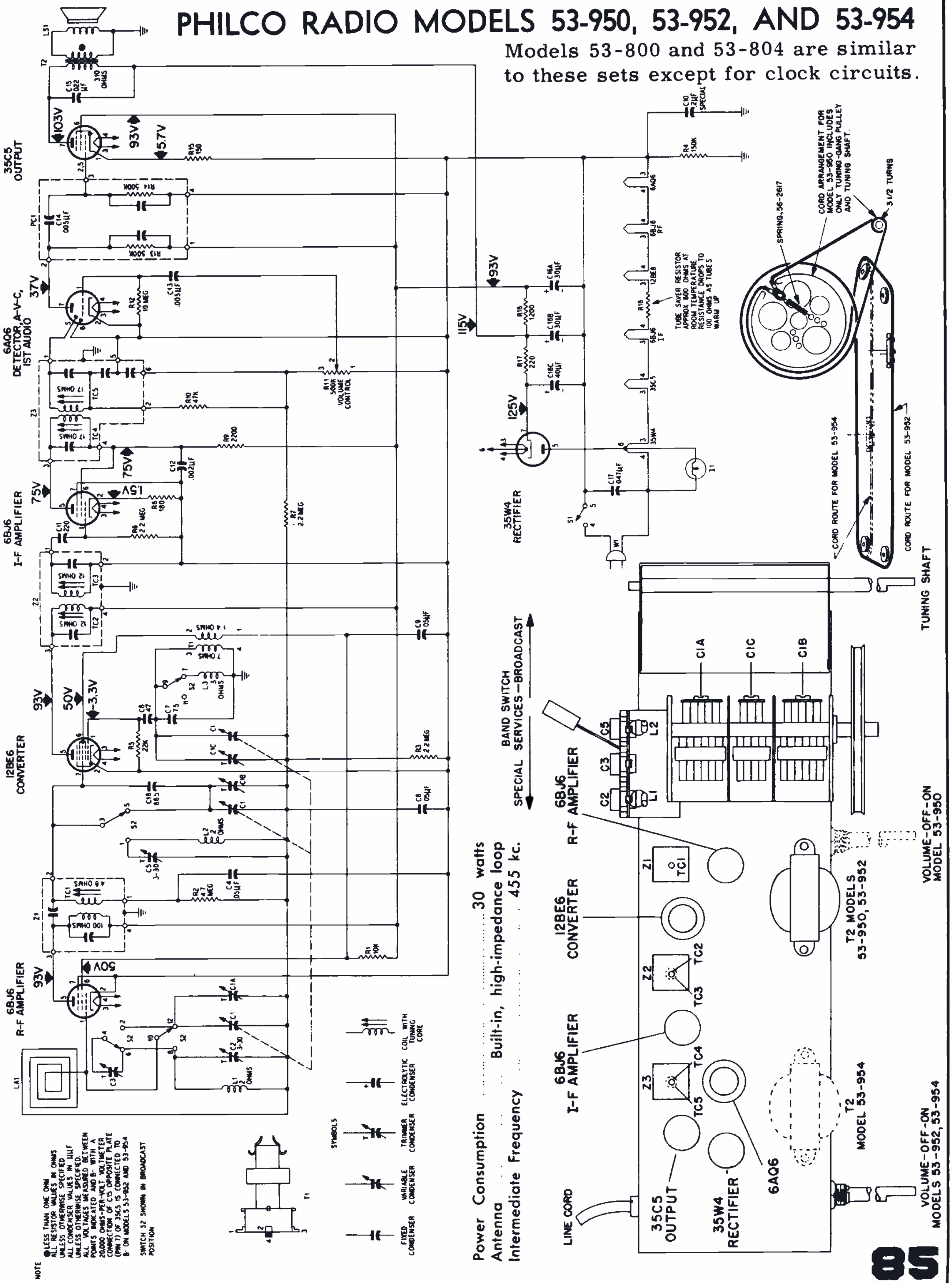
Similar Philco Models are 53-700, 53-701, & 53-701X



MANUAL OF 1953 MOST-OFTEN-NEEDED RADIO DIAGRAMS

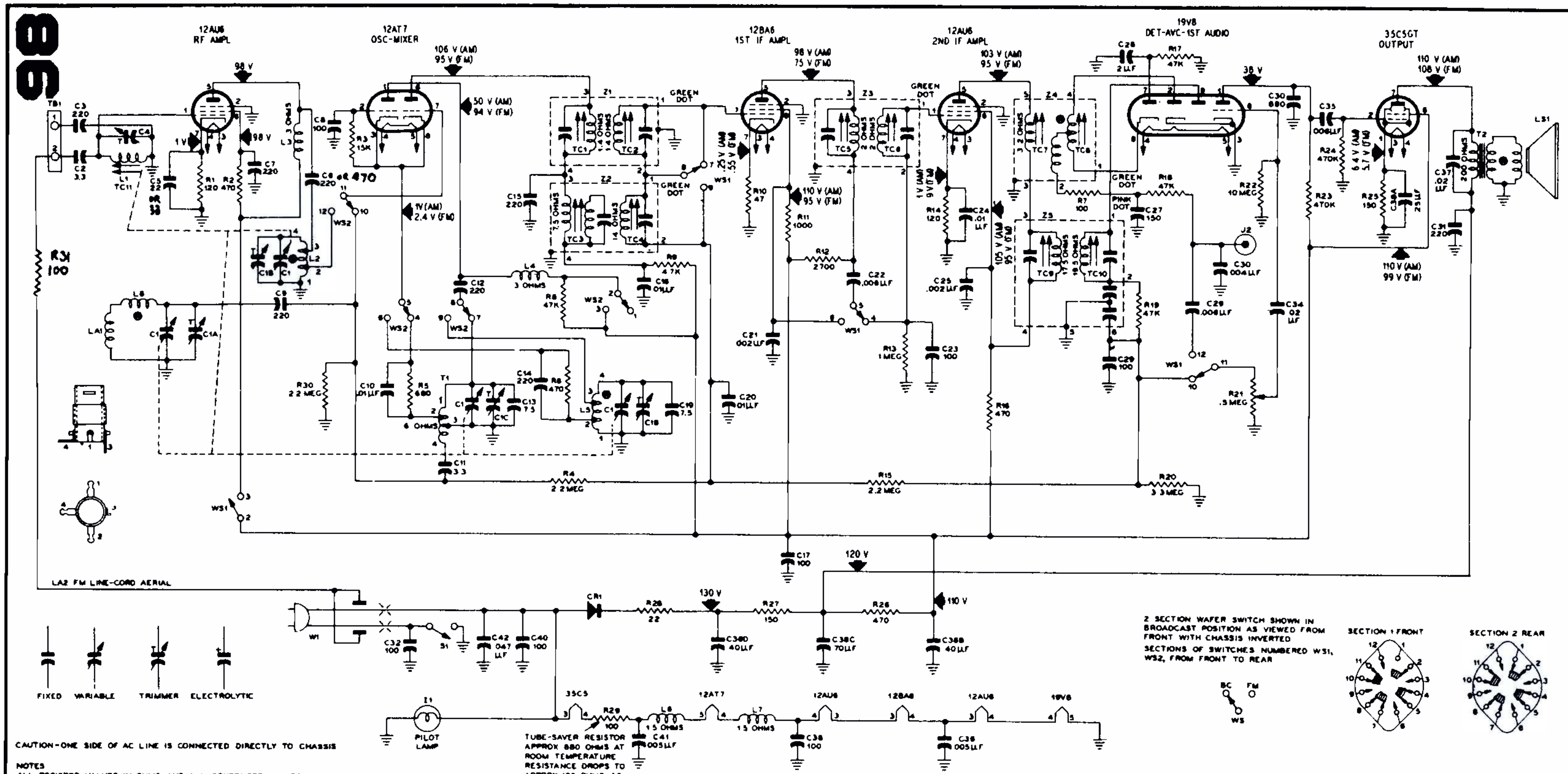
PHILCO RADIO MODELS 53-950, 53-952, AND 53-954

Models 53-800 and 53-804 are similar to these sets except for clock circuits.



PHILCO RADIO MODEL 53-956

(FM alignment information reprinted on page 87)



CAUTION—ONE SIDE OF AC LINE IS CONNECTED DIRECTLY TO CHASSIS

NOTES
- ALL RESISTOR VALUES IN OHMS AND ALL CONDENSER VALUES IN µµF UNLESS OTHERWISE MARKED
- ALL VOLTAGES MEASURED WITH A 20000-OHMS-PER-VOLT VOLTMETER BETWEEN POINTS INDICATED AND B MINUS, AT A LINE VOLTAGE OF 117 VAC
- ● LESS THAN ONE OHM

AM ALIGNMENT CHART

STEP	SIGNAL GENERATOR		RADIO		ADJUST
	CONNECTION TO RADIO	DIAL SETTING	DIAL SETTING	SPECIAL INSTRUCTIONS	
1	Ground lead to chassis. Output lead through a .1-μf. condenser to junction of LA1 and L8.	455 kc.	Gang fully open.	Adjust for maximum output, in order given.	TC10—2nd AM i-f sec. TC9—2nd AM i-f pri. TC4—1st AM i-f sec. TC3—1st AM i-f pri.
2	Radiating loop (see note below).	1620 kc.	1620 kc. (2nd index mark from right).	Adjust for maximum output.	C1C—osc. trimmer.
3	Same as step 2.	1500 kc.	1500 kc.	Adjust for maximum output.	C1A—aerial trimmer.

RADIATING LOOP: Make up a six-to-eight turn, 6-inch-diameter loop from insulated wire; connect to generator, place near radio loop aerial. Radio loop aerial must be connected.

AM ALIGNMENT PROCEDURE

Make alignment with loop aerial connected to radio. The AM alignment should be completed before the FM alignment is made.

DIAL POINTER—With tuning-condenser plates fully meshed, adjust pointer to coincide with index mark at low-frequency end of dial backplate.

RADIO CONTROLS—Set volume control to maximum, set band switch for broadcast reception, and set tuning control as indicated in chart.

OUTPUT METER—Connect across voice-coil terminals.

SIGNAL GENERATOR—Use AM r-f signal generator, with modulated output. Connect generator and set frequency as indicated in chart.

OUTPUT LEVEL—During alignment, signal-generator output must be attenuated to hold output-meter reading below 1.25 volts.

Philco Model 53-956, continued.

FM ALIGNMENT PROCEDURE

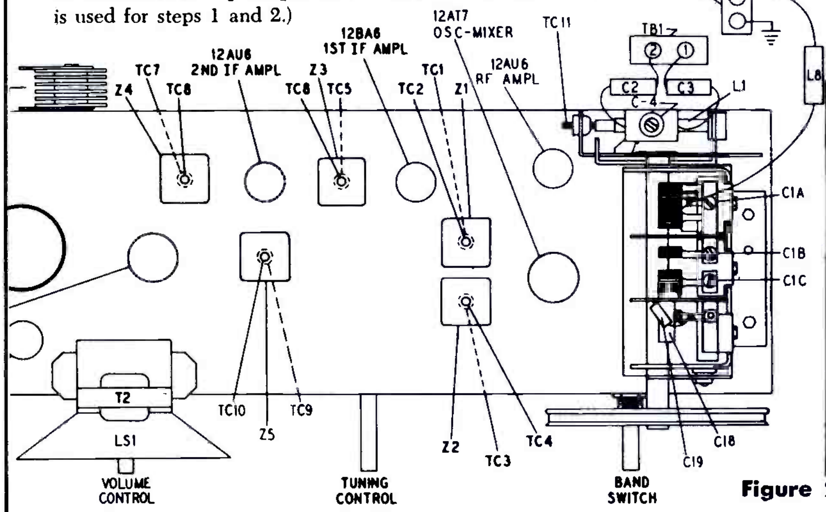
RADIO CONTROLS—Set volume control to maximum, set band switch for FM reception, and set tuning control as indicated in chart.

OSCILLOSCOPE—Connect ground lead to chassis. Connect vertical input to FM TEST jack, J2; connect horizontal input to horizontal sweep output of sweep generator. (Oscilloscope is used for steps 1 and 2.)

SWEEP GENERATOR—Use FM r-f sweep signal generator. Connect output lead as given in chart. Set frequency and sweep width as indicated in chart.

OUTPUT METER—Connect across voice-coil terminals.

Make AM alignment first



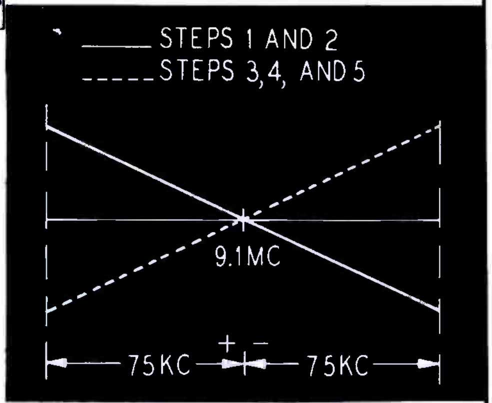


Figure 2. Characteristic Curve of FM Detector

STEP	SIGNAL GENERATOR		RADIO		ADJUST
	CONNECTION TO RADIO	DIAL SETTING	DIAL SETTING	SPECIAL INSTRUCTIONS	
1	Ground lead to chassis. Output lead through a .01-μf. condenser to control grid (pin 1) of 12AU6 2nd i-f amplifier.	9.1 mc. (75-kc. deviation).	88mc. (gang meshed).	Balance and adjust detector for maximum indication on scope, as shown in figure 2.	TC8—detector sec. TC7—detector pri.
2	Ground lead to chassis. Output lead through a .01-μf. condenser to FM tuning gang stator lug, junction of C1 and pin 4 of L2.	Same as step 1.	Same as step 1.	Adjust for maximum indication on scope, as shown in figure 2.	TC6—FM 2nd i-f sec. TC5—FM 2nd i-f pri. TC2—FM 1st i-f sec. TC1—FM 1st i-f pri.
3	Ground lead to lug 3 of TB1. Output lead to lug 2 of TB1. See note 1 below.	108.5 mc.	108.5 mc. (1st index mark from right).	Adjust for maximum indication on output meter.	C18—FM osc.
4	Same as step 3.	88 mc.	88 mc. (1st index mark from left).	Adjust for maximum indication on output meter. See note 2 below.	L5—FM osc.
5	Same as step 3.	105 mc.	105mc. (3rd index mark from right).	Adjust for maximum indication on output meter while rocking tuning condenser.	C1B—FM r-f.
6	Same as step 3.	105 mc.	105 mc.	Adjust for maximum indication on output meter.	C4—FM aerial.
7	Same as step 3.	92 mc.	92 mc. (3rd index mark from left).	Adjust for maximum indication on output meter. See note 3 below.	L2—FM r-f coil.
If FM aerial coil, L1, is replaced, it should be adjusted as directed in step 8, below.					
8	Same as step 3.	92 mc.	92 mc.	Adjust for maximum indication on output meter.	TC11—FM aerial.

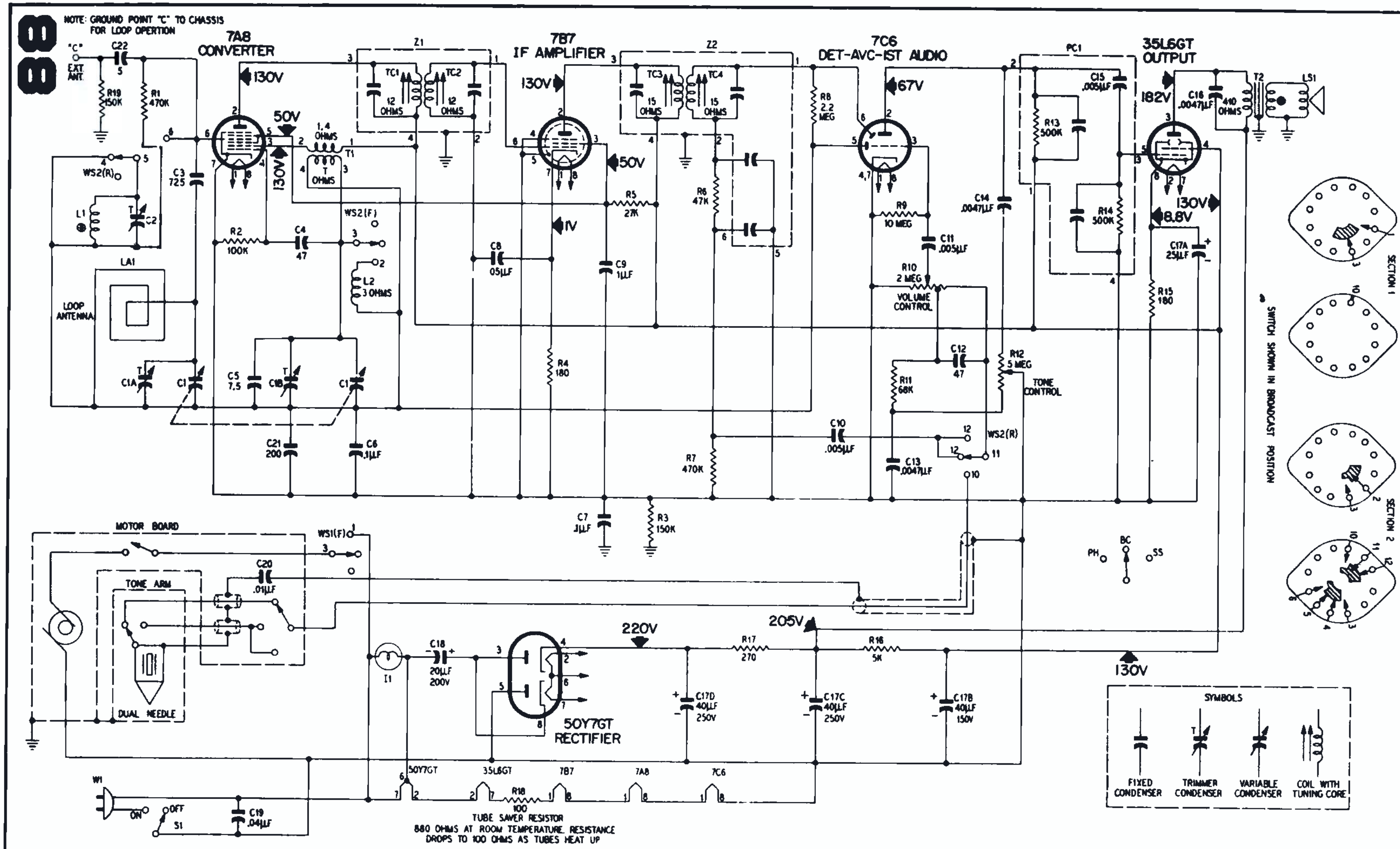
NOTE 1: For accurate results, the signal-generator output impedance must be 300 ohms, to match the input impedance of TB1. If the generator impedance is less than 300 ohms, a resistor of the proper value may be used in series with the output lead to make the impedance correct. For example, if the output impedance is 150 ohms, place a 150-ohm resistor in series with the output lead.

NOTE 2: If oscillator does not tune as low as 88 mc., compress the turns on the oscillator coil. If oscillator tunes too low, spread the turns slightly. After coil is adjusted, repeat step 3.

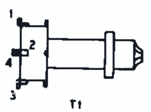
NOTE 3: Check resonance of coil L2 by inserting end of a tuning wand, such as Philco Part No. 56-6100, in the coil. If output increases when iron end is placed in coil, compress turns slightly. If output increases when brass end is placed in coil, spread the turns. If output decreases when either end is placed in coil, no adjustment is necessary. After the coil is adjusted, readjust C1B and repeat steps 3 through 8 until no further improvement is obtained.

MANUAL OF 1953 MOST-OFTEN-NEEDED RADIO DIAGRAMS

PHILCO RADIO-PHONOGRAPH MODEL 53-1350



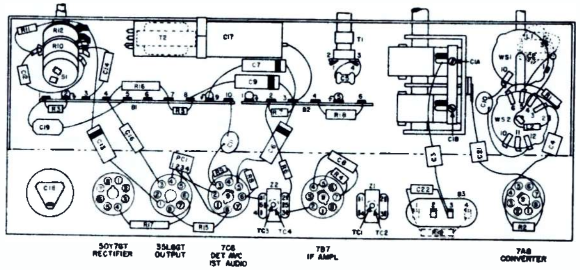
ALL RESISTOR VALUES IN OHMS UNLESS OTHERWISE SPECIFIED.
ALL CONDENSER VALUES IN µµF UNLESS OTHERWISE SPECIFIED.
⊕ LESS THAN 1 OHM.
ALL VOLTAGES MEASURED BETWEEN POINT INDICATED AND B-.



ALIGNMENT PROCEDURE

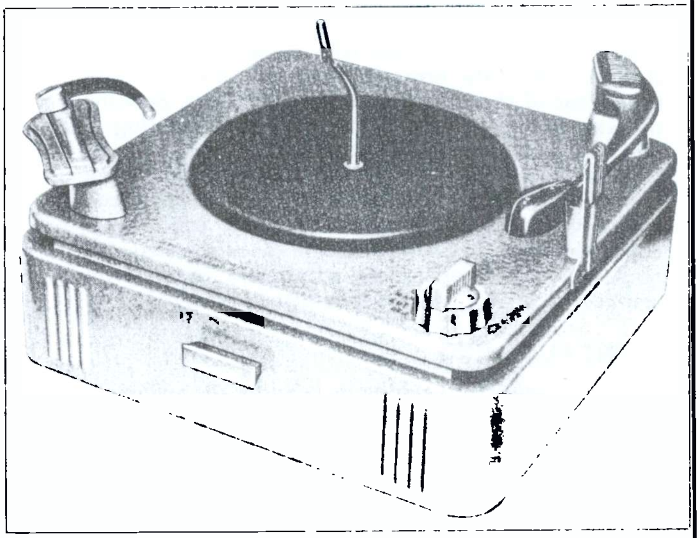
STEP	SIGNAL GENERATOR		RADIO		ADJUST TRIMMER
	CONNECTION TO RADIO	DIAL SETTING	DIAL SETTING	SPECIAL INSTRUCTIONS	
1	Output lead through a .01-µf condenser to grid (pin 6) of 7A8 converter tube	455 kc (modulated)	Gang fully open	Adjust in order given in next column, for maximum output. TC2 and TC4 are located at top of transformers	TC4—2nd i-f sec. TC3—2nd i-f pri. TC2—1st i-f sec. TC1—1st i-f pri.
2	Radiating loop (see note 1 below)	1620 kc	1620 kc (see note 2 below)	Adjust for maximum output	C1B—oscillator trimmer
3	Same as step 2	1500 kc	1500 kc	Adjust for maximum output	C1A—antenna trimmer (broadcast)
4	Same as step 2.	3200 kc	3200 kc.	Adjust for maximum output	C2 — antenna trimmer (special services)

NOTE 1 Make up a 6—8 turn, 6-inch-diameter loop from insulated wire connect to signal-generator leads, and place near radio loop.
NOTE 2 The tuning gang can be set to 1620 kc. by placing a piece of 6-mil flat shim stock between the heel of the rotor and the top of the stator plates, and moving the rotor until it holds the shim in place. Remove the shim before proceeding with the alignment.



PHILCO RECORD CHANGER

MODEL M-24



DESCRIPTION OF OPERATING CYCLE

At the completion of a record, the changer trips, and allows the dog latch to engage the spur of the turntable hub gear. This rotates the cam gear, allowing the teeth of the cam gear and hub gear to engage. As the cam rotates, it forces the lifter lever down, raising the tone arm from the record. As the tone arm reaches maximum height, the tone-arm actuator, motivated by the cam gear, contacts the trip-arm stud and swings the tone arm against the rest post. After the tone arm reaches the rest post, the push-off lever rotates, nodding the spindle and dropping the next record onto the turntable. After the record has dropped, the return lever contacts the stud of the trip arm, and starts the tone arm inward. The tone arm is now controlled by the actuator and return levers, in contact with the stud of the trip arm. The return lever continues swinging the tone arm inward until it is stopped by the set-down lever, whose position is dependent upon the setting of the record shelf. This stoppage of the inward travel of the tone arm by the established position of the return lever accomplishes the set-down indexing. The tone arm is thus held above the set-down point. The lifter lever now moves upward, slowly dropping the tone arm to the record surface. As the cam gear continues to rotate, the actuator lever is moved outward and away from the strip-arm stud. The tone-arm return lever then moves away from the trip-arm stud, but the spring portion of the actuator momentarily remains in contact with the stud, preventing a sudden release of the tone arm, which could cause the needle to jump into the modulated groove. The trip-plate supporting finger now engages the dog latch, and the index lever locks the cam gear in a neutral position. The tone arm is now free to play the record.

As the tone arm advances toward the spindle, the friction-clutch trip finger engages the end of the trip plate. Through the applied pressure of the friction finger (approximately 2 grams) against the trip plate, the trip-plate finger supporting the dog latch begins to move, lessening the engagement of the trip-plate finger and dog latch, preparatory to releasing the latch. This engagement is slowly lessened while the needle is in the playing grooves, giving the reset cam an opportunity (once each revolution of the turntable) to reset the trip plate into full engagement and slip the friction finger into the friction clutch. As the needle rides in the lead-out or eccentric groove of the record, the velocity of the friction finger is increased. The speed of the disengagement of the trip-plate supporting finger and the dog latch is also increased sufficiently to allow complete disengagement of the dog latch before it has been restored by the reset cam.

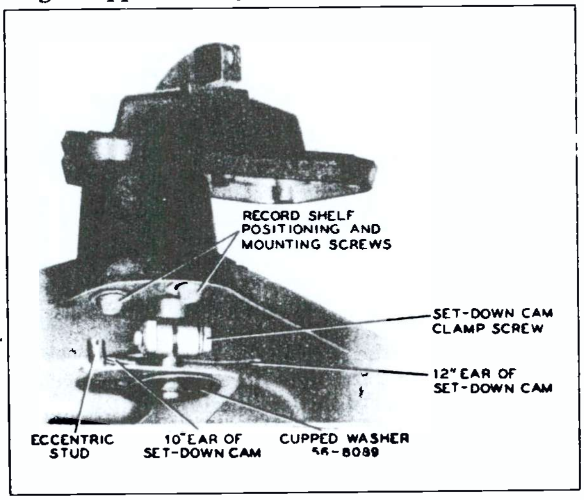


Figure 1. Record-Shelf Adjustment and 10-Inch, 12-Inch, and Fine Set-Down

ADJUSTMENTS

SPINDLE

The spindle should be checked for perpendicularity (use square on turntable surface) when the changer is out of cycle. To adjust, bend the ear on the push-off-lever assembly; bending the lever toward the spindle spring, throws the top of the spindle away from the record shelf. This is shown in figures 3 and 6.

RECORD SHELF

CAUTION: This adjustment must be made immediately after a change cycle is completed.

With the changer turned to the OFF position, place a record-shelf gauge, Part No. 45-6647, on the record shelf. The edge of the gauge should fit snugly against the edge of the raised portion of the shelf. Remove all play without flexing the spindle.

If the gauge does not fit properly, loosen the two saddle mounting screws which hold the record shelf to the base plate (figure 1), and adjust the position of the record shelf. Then tighten the screws.

(Continued on pages 90 to 96, inclusive)
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Philco Model M-24, continued.

TONE-ARM HEIGHT AND LIFT

With the changer out of cycle, and the tone arm over the base plate, the needle point should be 1/8 inch $\pm 1/16$ inch above the base plate. To adjust the clearance, bend the protruding ear of the swivel post, at the rear of the tone-arm heel. See figure 2. Bending the ear upward decreases the clearance, bending it downward increases the clearance. Raise the tone arm to its maximum height, and place it against the rest post. There should be approximately 3/32 inch clearance between the lower edge of the tone arm and the top of the rest-post hook. Bend the ear of the swivel to obtain the most satisfactory adjustment of both the rest-post clearance and the base-plate clearance.

VERTICAL TIMING

Adjust the vertical timing by bending the end of the lifter lever (shown in figure 2), which attaches to the pull-cord, so that there is approximately 1/32 inch to

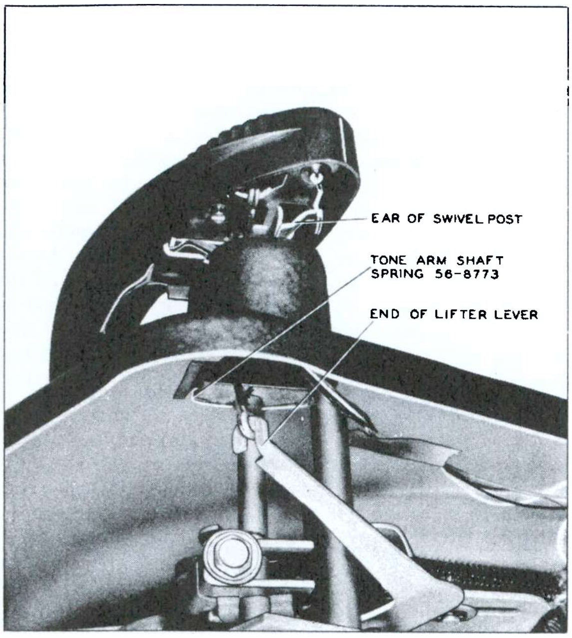


Figure 2. Tone-Arm Height and Lift Adjustments and Vertical Timing Adjustments

1/16 inch slack in the pull-cord for all tone-arm positions between the tone-arm rest post and the spindle, when the changer is out of cycle. Check by cycling the changer and note that the lifter lever and pull-cord will raise the tone arm straight up to its maximum height, and then move horizontally to the tone-arm rest post after the slack adjustment has been made.

SET-DOWN

Set the record shelf to the 12-inch position. Set the eccentric stud to its center position toward the corner of the base plate. This stud is accessible through a hole in the base plate near the tone-arm stanchion (see figure 5). Place a 7-inch record on the turntable, set the record shelf to the 7-inch position, and cycle the changer by hand until the tone arm is just above the record. Loosen the hex-head clamp screw on the trip arm (see figure 3), and swing the tone arm until the needle is 1/8 inch in from the edge of the record. Tighten the clamp screw, and check the adjustment by putting the changer through another cycle. If the set-down point is slightly incorrect, it may be corrected by means of the eccentric stud mentioned above. Recheck the needle set-down. The trip arm should be positioned vertically so that the friction finger is midway between the base plate and the lifter lever. Remove the 7-inch record. Set the record shelf to the 10-inch position, and place a 10-inch record on the turntable. Rotate the turntable until the needle is just above the record. If the needle is not 1/8 inch in from the edge of the record, an adjustment may be made by bending the ear of the set-down cam which is in contact with the eccentric stud. See figure 1. Bending the ear outward moves the set-down point away from the spindle; bending the ear in toward the shelf shaft moves the set-down point toward the spindle. Recheck the needle set-down. Using a 12-inch record, with the shelf set to the 12-inch position, repeat the adjustment, bending the corresponding ear of the set-down cam (figure 1).

The eccentric stud mentioned above (shown in figures 1 and 5) provides a fine adjustment of the set-down position. This adjustment varies the set-down position of *all* size records over a total range of 3/16 inch. Do not use this adjustment unless it is desired to change all three set-down positions by an equal amount.

TRIP

CAUTION: Do not adjust the friction clutch until the trip-plate engagement is properly set, as explained below.

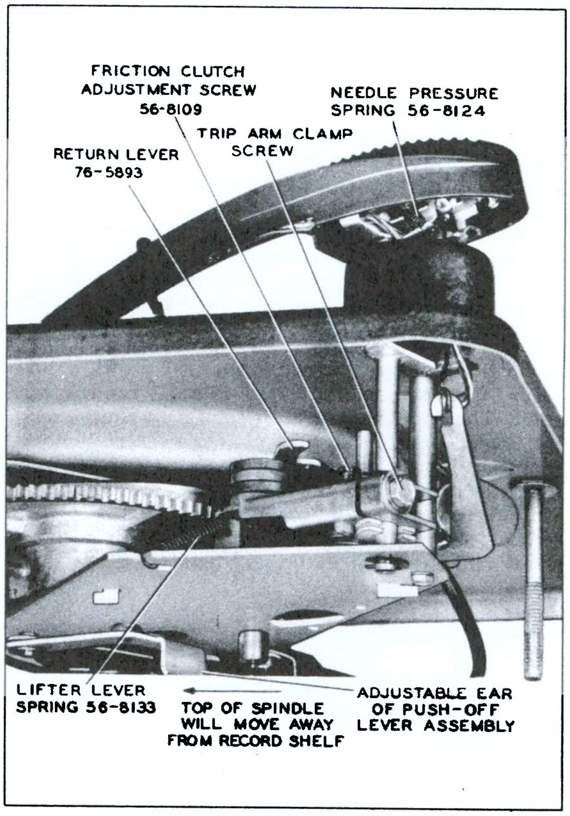


Figure 3. Adjustment of Trip Arm for 7-Inch Set-Down

The proper trip action is greatly dependent upon the proper engagement of the dog latch and the finger of the trip plate supporting it. The correct engagement is $\frac{5}{64}$ inch (or approximately one-half the width of the supporting finger of the trip plate) when the ear of the reset arm is contacting the peak point of the reset cam. This is shown in figure 4. The extent of this engagement is adjustable by bending the ear of the trip plate, shown in figure 6. Bending the ear inward decreases the amount of engagement, and bending the ear outward increases the amount of engagement. This

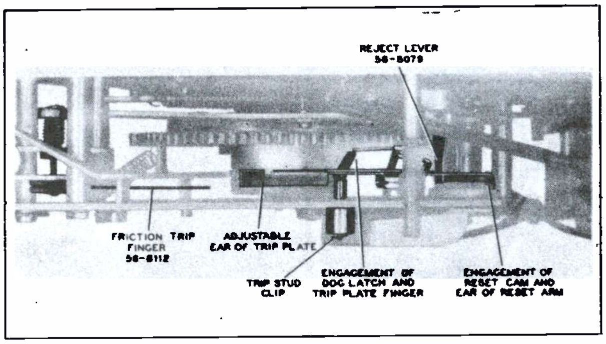


Figure 4. Trip Adjustment

adjustable ear is accessible through the large hole in the bridge, and should be bent by using long-nose pliers.

NOTE: Too much engagement will prevent tripping, while too little engagement will cause pre-tripping.

Philco Model M-24, continued.

After the trip-latch engagement is set, check the changer for trip action. If the trip action is faulty, i.e., if the changer pre-trips or does not trip at all, recheck the trip-latch adjustment. If the changer still does not operate properly, check for tight tone-arm lead dress or excessive friction in the tone-arm-shaft bearing. If this does not clear the trouble, the friction clutch can be adjusted, although this should not be necessary. This is a screw adjustment and it is accessible from under the motorboard. (See figures 3 and 15.) Adjust the screw which is located on the trip arm by turning it counter-clockwise until it is snug, (not tight); then loosen one turn. Check the adjustment by playing several records. If the changer pre-trips, loosen the screw (turn clockwise) a bit more. This trip arm and clutch assembly is shown in figure 15.

UNEVEN TURNTABLE SPEED (WOWS)

Uneven turntable speed may be caused by any of the following conditions:

1. Dirt under and around the idler-wheel assembly.
2. Idler-wheel spring loose or missing.
3. Flat spot on idler-wheel tire or turntable.
4. Loose, worn, or distorted pulley belt.
5. Oil or grease on idler-wheel tire, pulley, pulley belt, or drive shaft.
6. Speed-control knob not in proper position.

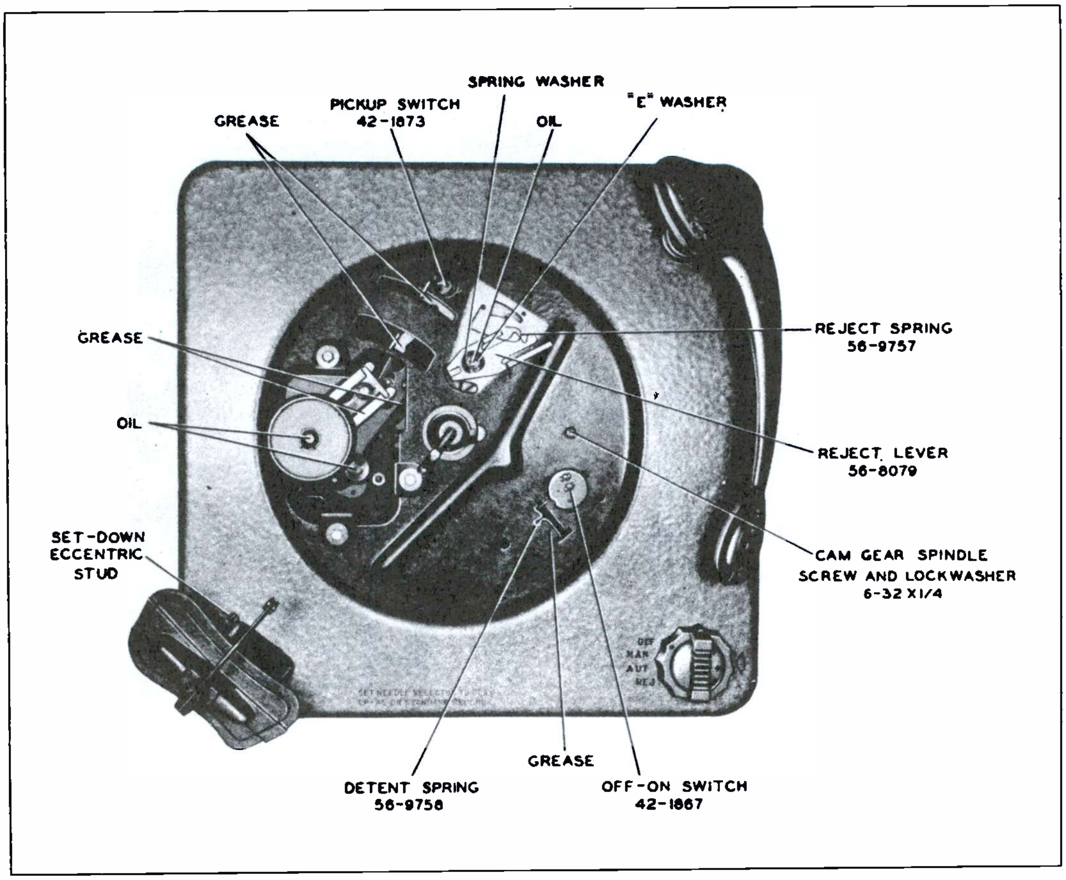


Figure 5. Top View, Showing Lubrication Points

Philco Record Changer Model M-24, continued.

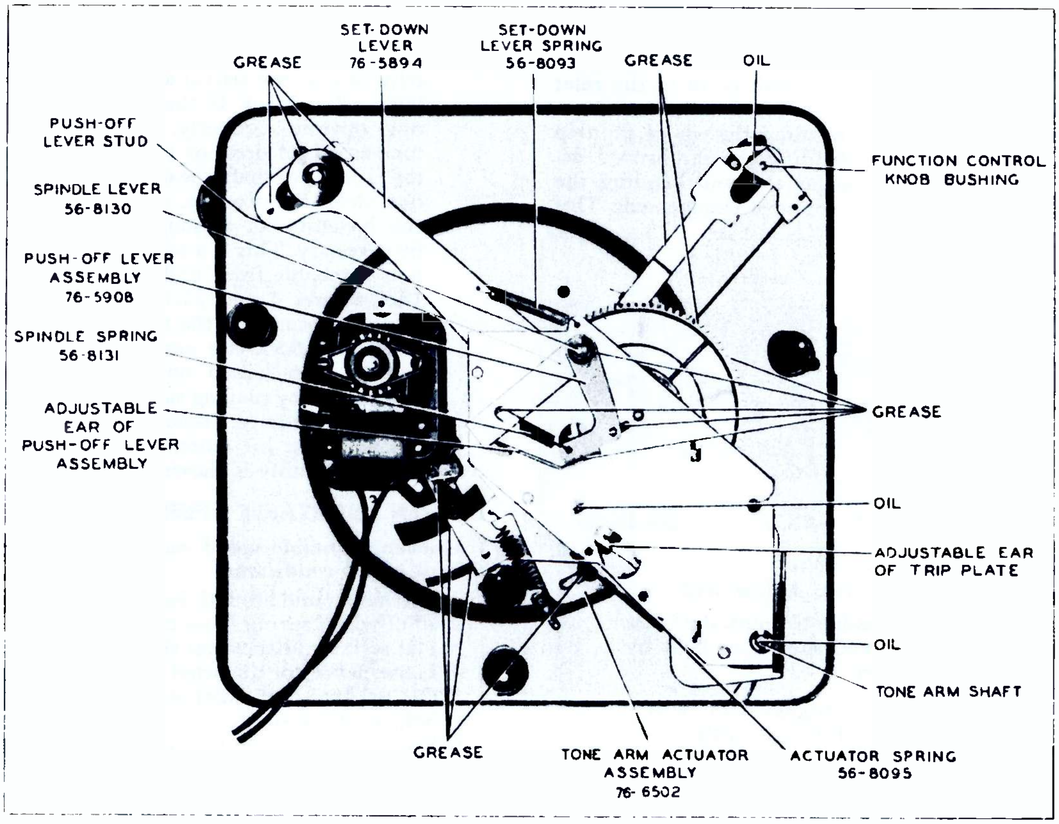


Figure 6. ***Bottom View, Showing Lubrication Points***

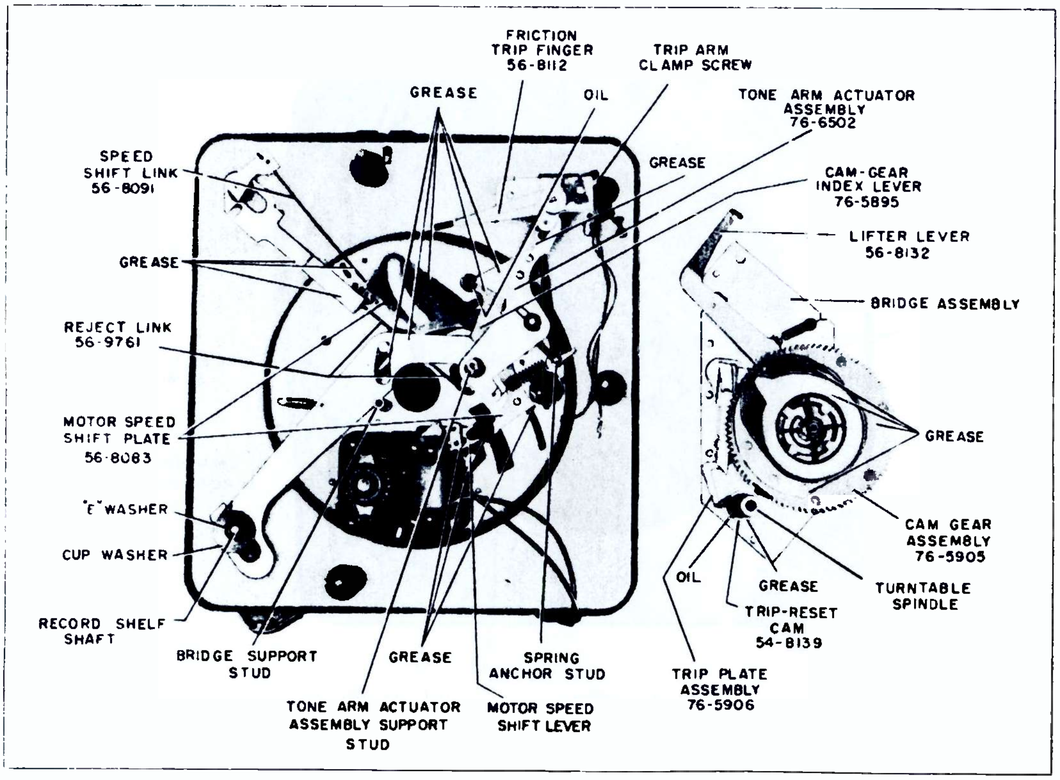


Figure 7. ***Bottom View, Bridge Removed, Showing Lubrication Points***

Philco Automatic Record Changer
MODEL M-24
(Continued)

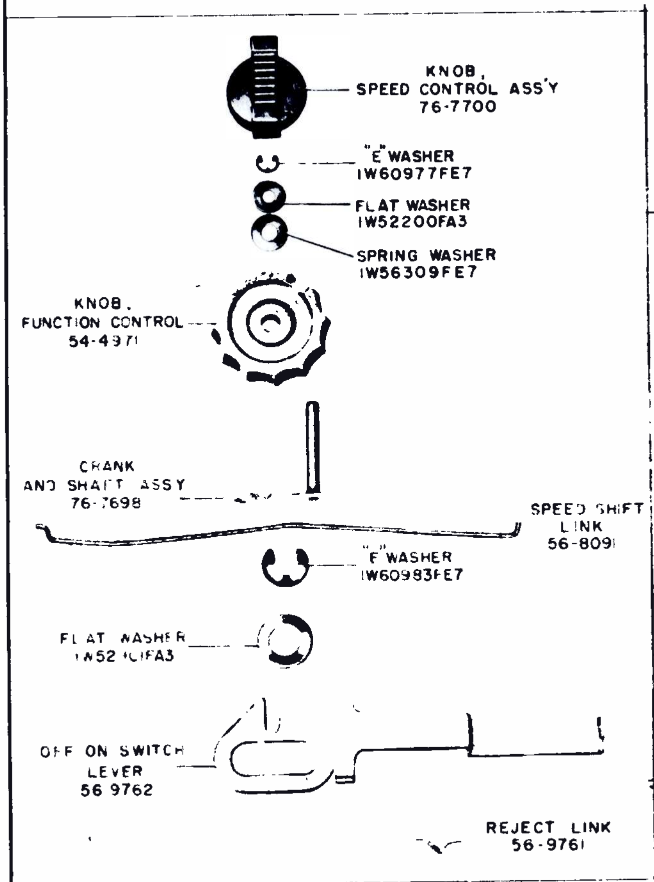


Figure 10. Control Assembly

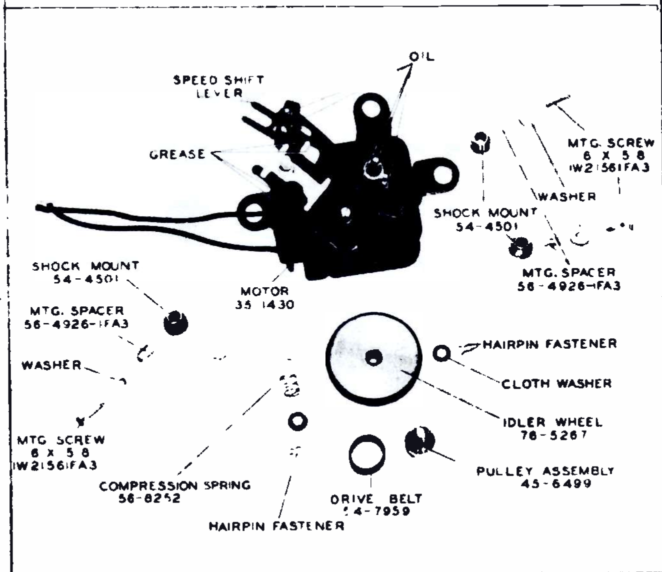


Figure 11. Motor Assembly—Part No. 35-1451

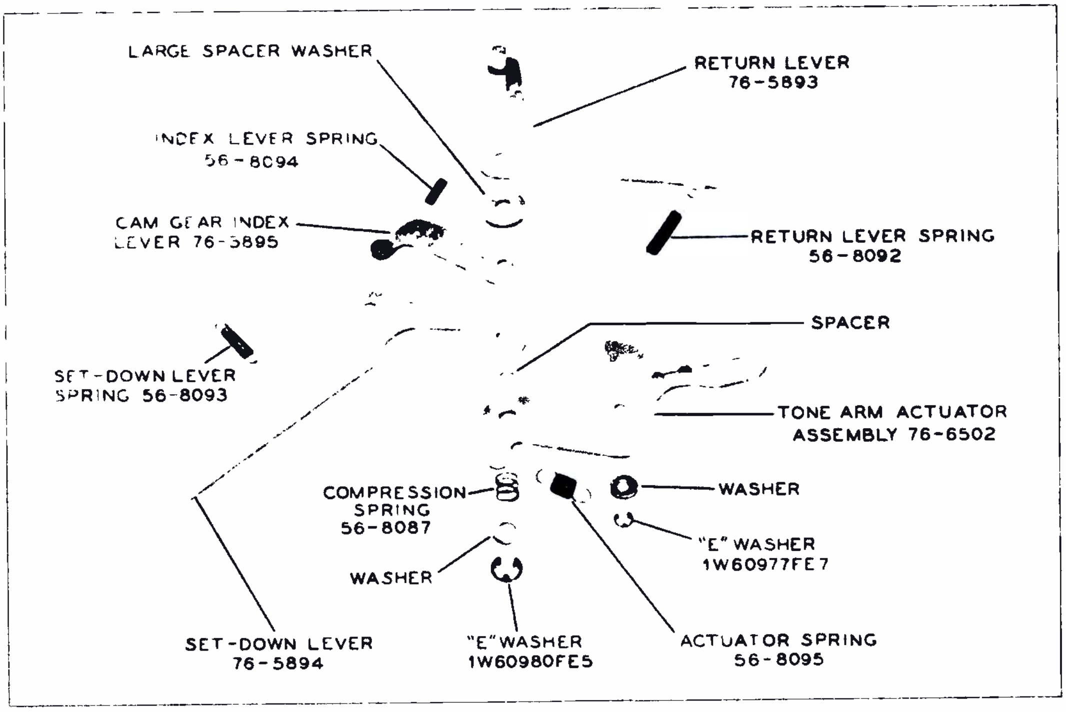


Figure 8. Actuator Assembly

Philco Automatic Record Changer Model M-24, continued.

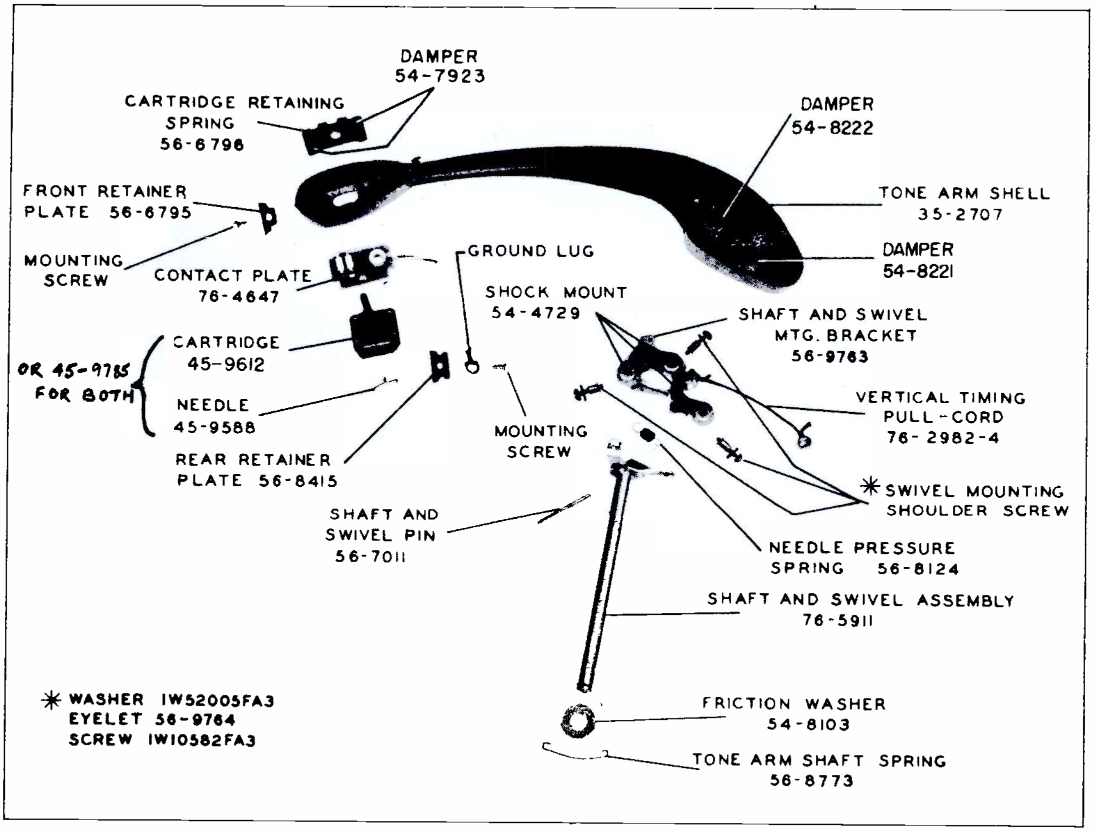


Figure 14. Tone-Arm Assembly

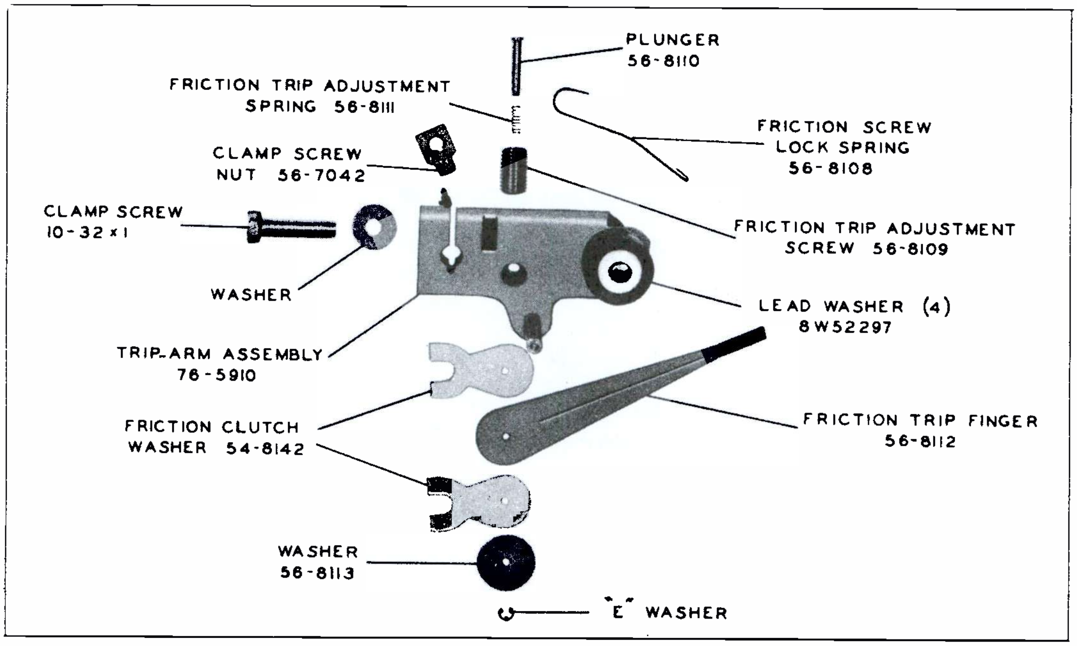
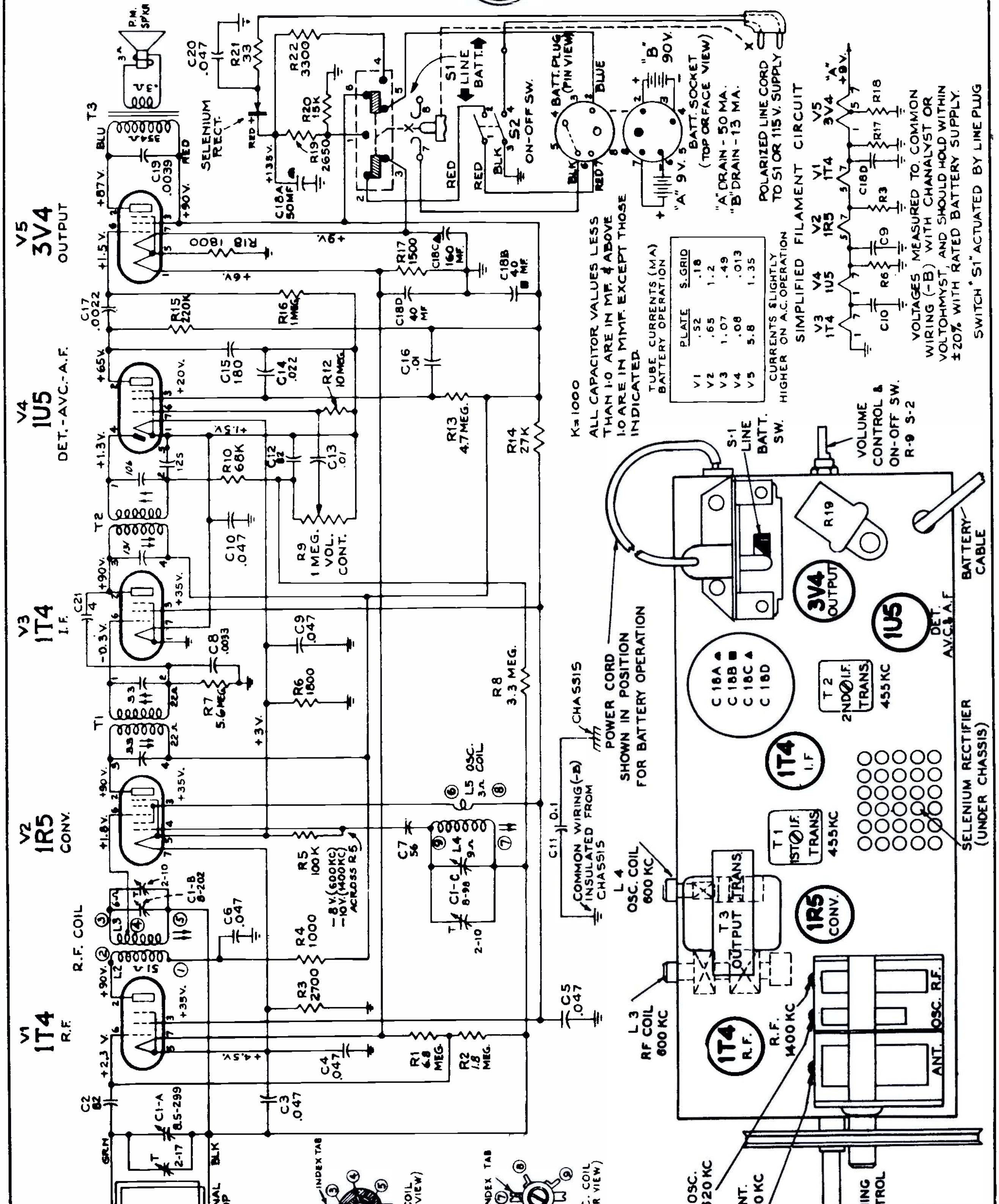


Figure 15. Trip-Arm Assembly

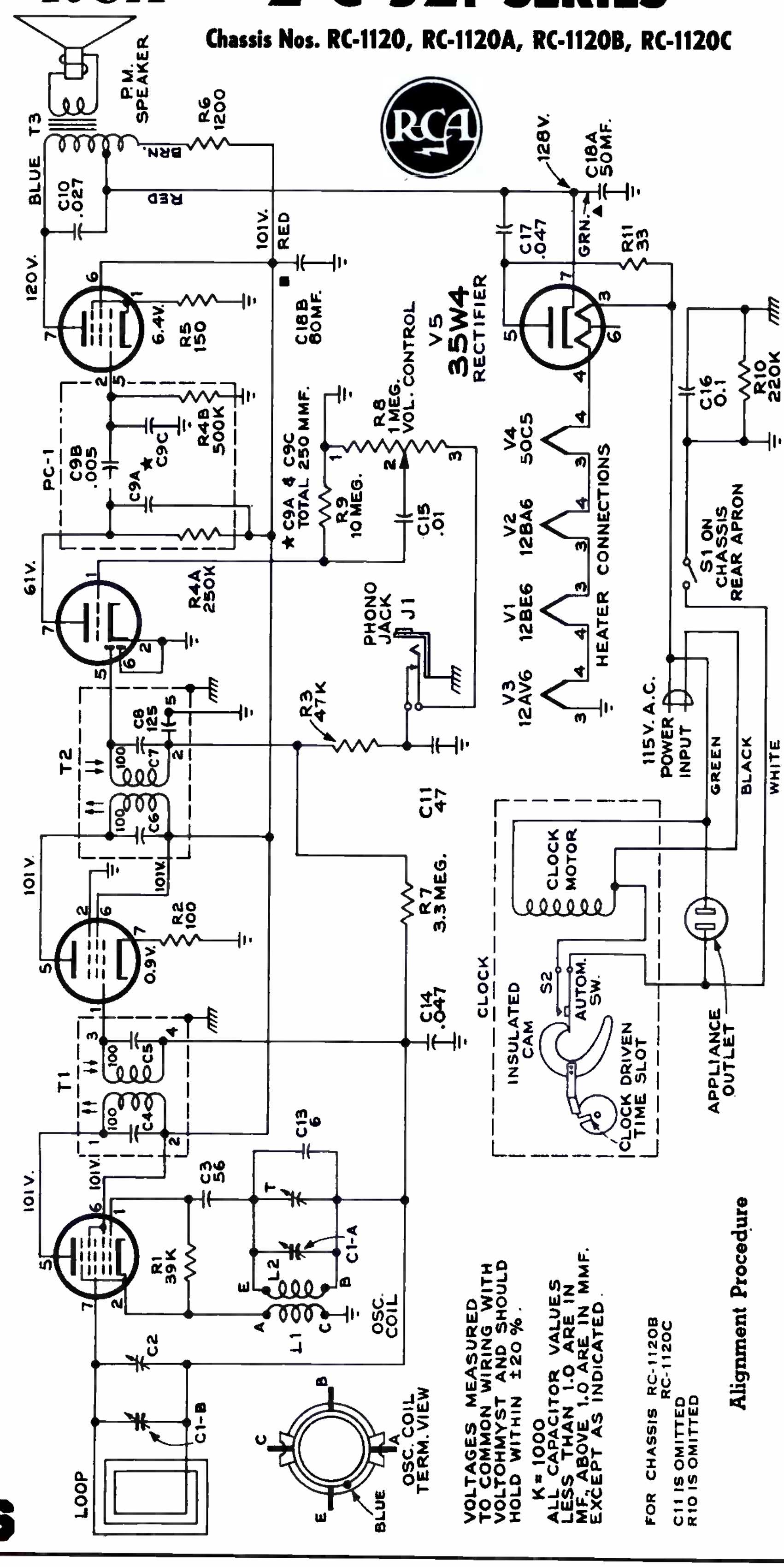
RCA VICTOR MODEL 2BX63

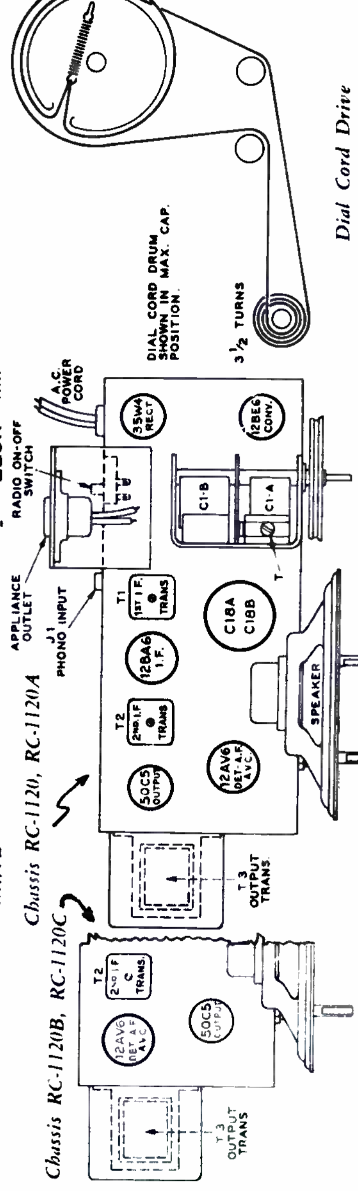
Chassis No. RC-1115



RCA 2-C-521 SERIES

Chassis Nos. RC-1120, RC-1120A, RC-1120B, RC-1120C





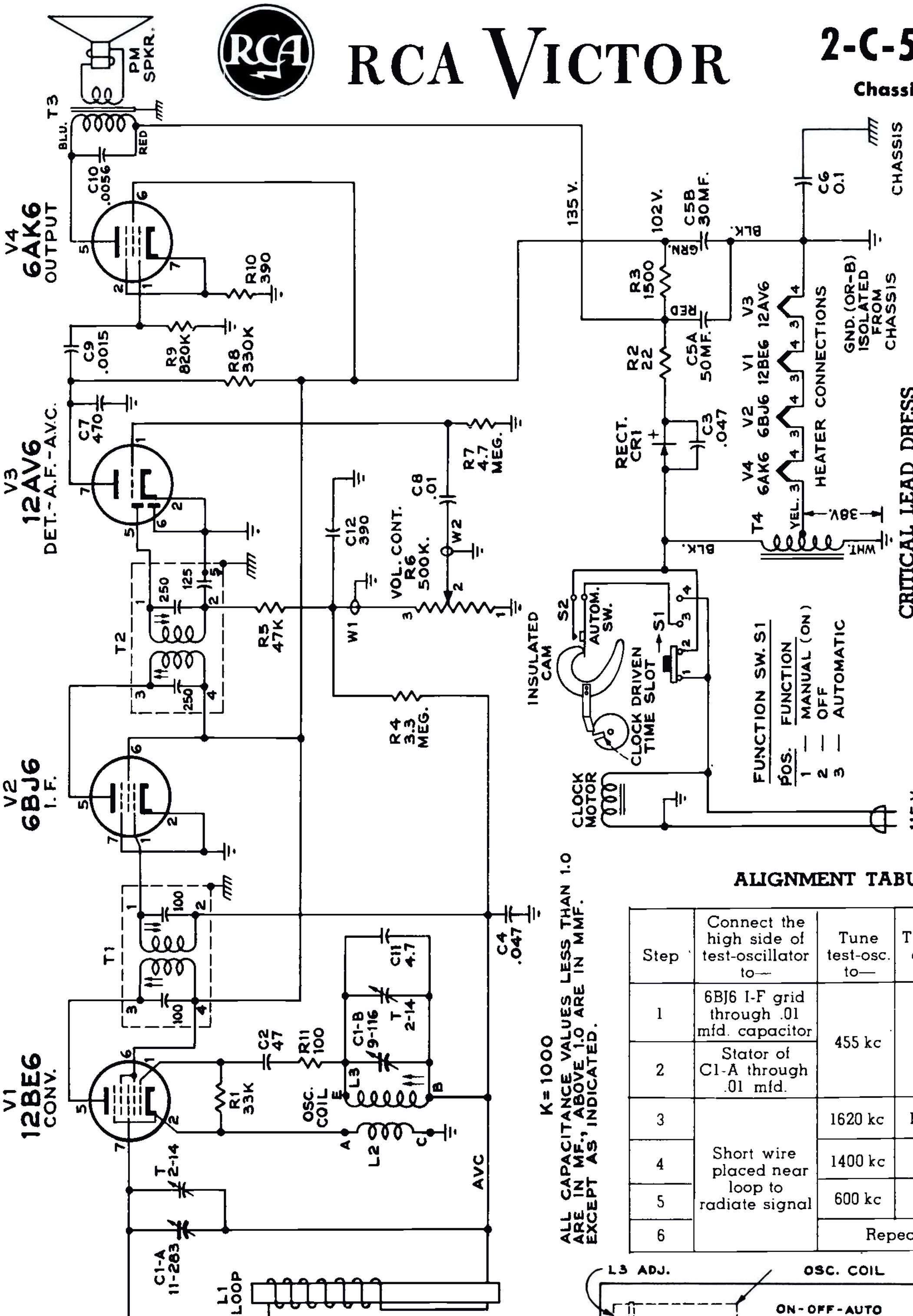
Alignment Procedure

Step	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 .1 mfd. capacitor	455 kc	Quiet-point 1600 kc end of dial	T2 (top and bottom) 2nd I-F trans.
2	Stator of C1-2 through .1 mfd.			T1 (top and bottom) 1st I-F trans.
3	Short wire placed near loop to radiate signal	1620 kc	Min. cap.	osc. trimmer
4		1400 kc	1400 kc signal	ant. trimmer
5	Repeat steps 3 and 4.			

RCA VICTOR

2-C-511 SERIES

Chassis No. RC1118

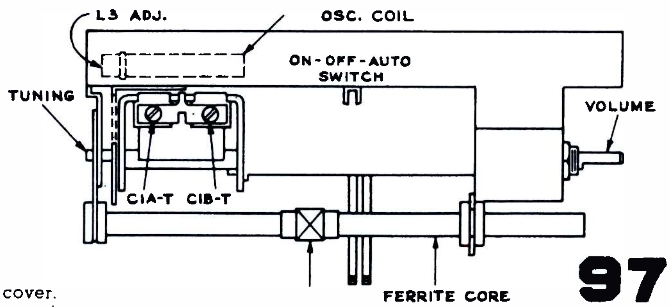


CRITICAL LEAD DRESS

1. Filament leads should be dressed away from secondary output lead, terminal #1, of 2nd I.F. Transformer and secondary output lead, terminal #1, of 1st I.F. transformer.
2. Connect the outside foil of capacitors as shown on schematic.
3. Dress electrolytic capacitor leads and filament transformer leads away from selenium rectifier.
4. Plate and grid leads of 12BE6 and 6BJ6 tubes should be kept as short and direct as possible.

ALIGNMENT TABULATION

Step	Connect the high side of test-oscillator to—	Tune test-osc. to—	Turn radio dial to—	Adjust the following for max. output
1	6BJ6 I-F grid through .01 mfd. capacitor	455 kc	Quiet-point 1600 kc end of dial	T2 (top and bottom) 2nd I-F trans.
2	Stator of C1-A through .01 mfd.			T1 (top and bottom) 1st I-F trans.
3	Short wire placed near loop to radiate signal	1620 kc	Min. cap.	osc. trimmer C1B-T
4		1400 kc	1400 kc signal	ant. trimmer C1A-T
5		600 kc	600 kc (rock)	(osc. coil) Slug L3
6		Repeat steps 3, 4, and 5		



TUBE SERVICE—Disassembly—To make tubes accessible for testing, remove the volume and tuning control knobs by pulling off. Unscrew counterclockwise the alarm and time knobs from their shafts. Invert the cabinet and remove only the two cross-head screws along the back underside of the cabinet. Place the cabinet in its normal position. Using only firm hand pressure, press down alternately at front right and left sides of the cabinet top, midway between the "ON-OFF-AUTO" slide switch lever and the cabinet sides, forcing down and backward, to disengage the molded-in plastic catches. Then lift off the cabinet rear cover.

RCA VICTOR SERVICE DATA

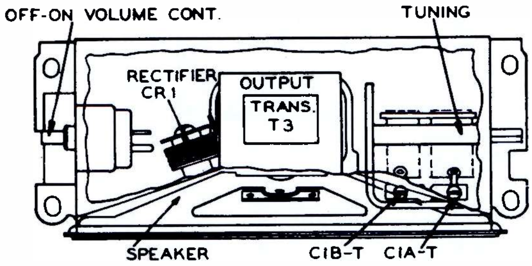
A-C Operated Radio Receiver

MODELS 2-R-51, 2-R-52

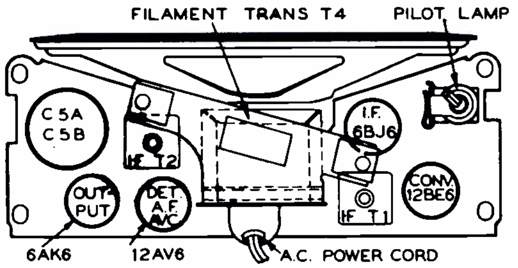
Chassis No. RC1119

Tuning Range .... 540-1600 kc
Intermediate Frequency .... 455 kc
Tube Complement:
(1) RCA 12BE6 .... Converter
(2) RCA 6BJ6 .... I.F. Amplifier
(3) RCA 12AV6 .... Det.-AVC-A.F. Amp.
(4) RCA 6AK6 .... Output
RCA Stock No. 77292 .... Rectifier

Top View



Tube and Trimmer Locations



Bottom View

CRITICAL LEAD DRESS

1. Oscillator coil should be centered in space provided and have at least 1/4 inch between winding and chassis.
2. The filament wiring should be dressed down on chassis and away from audio leads and audio coupling condensers.
3. The I.F. plate and grid leads, including the 2nd I.F. diode lead should be as short as practical.
4. The output plate by pass condenser should be dressed against the side of the chassis and away from the 1st audio grid condenser and the diode filter resistor.
5. Output transformer primary leads should be dressed away from the selenium rectifier.
6. The loop antenna should be accurately centered in its position on the fishpaper cover. The ends must not project beyond the fishpaper.

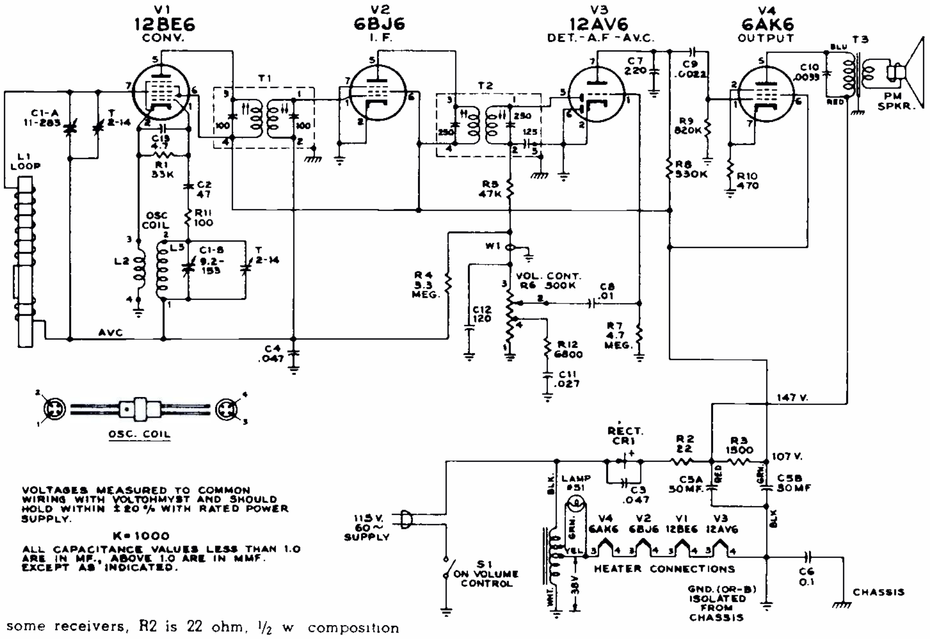
ALIGNMENT PROCEDURE

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

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

Step	Connect the high side of test-oscillator to—	Tune test-osc. to—	Turn radio dial to—	Adjust the following for max. output
1	6BJ6 I-F grid through .01 mfd. capacitor	455 kc	Quiet-point 1600 kc end of dial	T2 (top and bottom) 2nd I-F. trans.
2	Stator of C1A through .01 mfd.			T1 (top and bottom 1st I-F trans.
3	Short wire placed near loop to radiate signal	1620 kc	Min. cap.	osc. trimmer C1B-T
4		1400 kc	1400 kc signal	ant. trimmer C1A-T
5		Repeat steps 3 and 4		



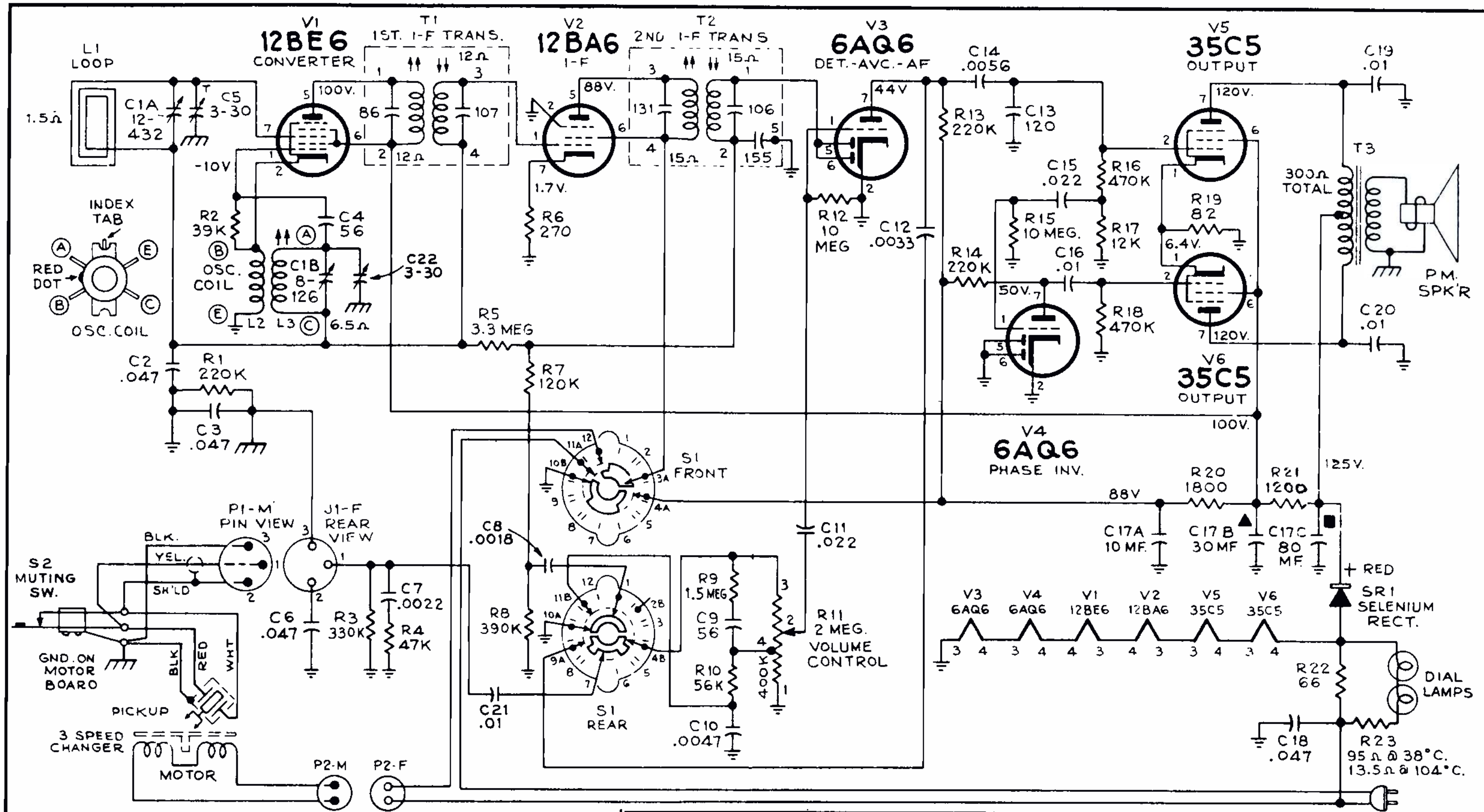
Note: In some receivers, R2 is 22 ohm, 1/2 w composition

RCA VICTOR

MODEL 2-S-7

Radio Phonograph Combination

Chassis No. RC-1117D



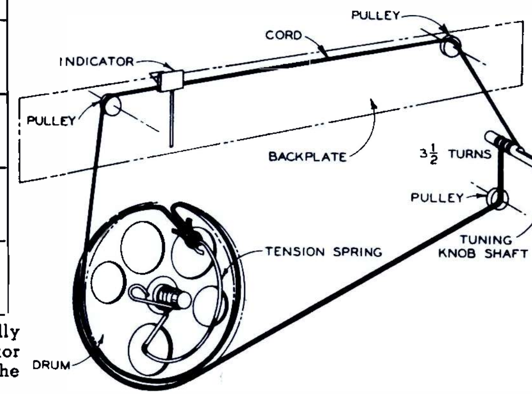
Alignment Procedure

Test Oscillator.—Connect low side of test oscillator to common wiring in series with a .1 mf. capacitor. If the test oscillator is a.c. operated it may be necessary to use an isolation transformer for the receiver during alignment and the low side of the test oscillator connected directly to common wiring at the electrolytic capacitor. Keep the oscillator output low to prevent a-v-c action.

Steps	Connect the high side of test-oscillator to—	Tune test-osc. to—	Turn radio dial to—	Adjust the following for max. output
1	I.F. grid, in series with .1 mfd.	455 kc	Quiet point 1,600 kc end of dial	Pri. & Sec. 2nd I.F. transformer
2	Converter grid in series with .1 mfd.			Pri. & Sec. 1st I.F. transformer

NOTE.—ANTENNA LOOP MUST BE IN CABINET FOR THE FOLLOWING

3	Short wire placed near loop for radiated signal	1,620 kc	Extreme R. H. end (gang open)	C22 (osc.)
4		1,400 kc	1,400 kc	C5 (ant.)
5		600 kc	600 kc Signal	L3 (Rock Gang)
6	Repeat steps 3, 4 & 5 if necessary			



Dial Pointer Adjustment.—Rotate tuning condenser fully counterclockwise (plates fully meshed). Adjust indicator pointer so that it is 3 15/16" from the left hand edge of the dial back plate.

RCA VICTOR

AC-DC Radio Receiver

Models 2X61, 2X62

Chassis No. RC-1080C RC-1080D

ALIGNMENT PROCEDURE

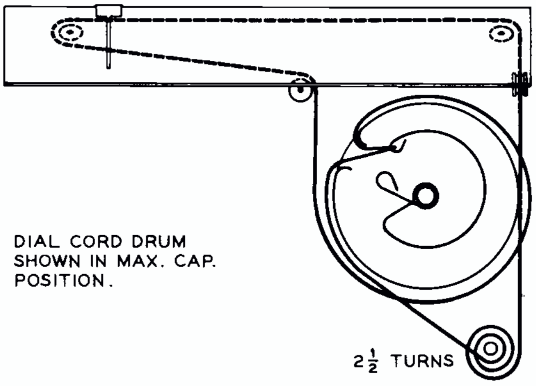
Cathode Ray Alignment is the preferable method. Connections for the oscilloscope are shown on the schematic diagram.

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

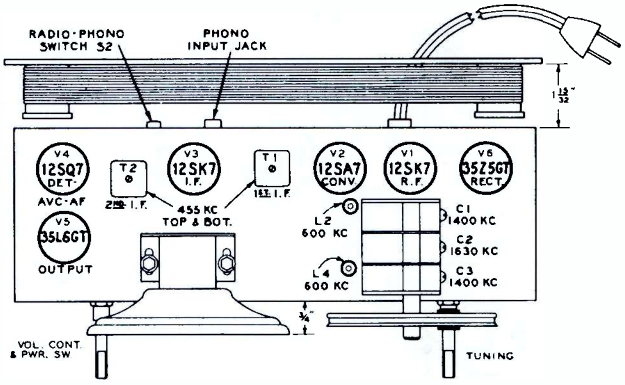
Test Oscillator.—Connect low side of test oscillator to common wiring in series with a .1 mf. capacitor. If the test oscillator is a. c. operated it may be necessary to use an isolation transformer for the receiver during alignment and the low side of the test oscillator connected directly to common wiring at the electrolytic capacitor. Keep the oscillator output low to prevent a-v-c action.

Step	Connect high side of sig. gen. to—	Sig. gen. output	Turn radio dial to—	Adjust for peak output
1	Pin No. 4 of 12SK7 tube	455 kc	Quiet point near 600 kc	Top and bottom cores of T2
2	Pin No. 8 of 12SA7 tube			Top and bottom cores of T1
3	"External Antenna" terminal through 100 mmf. capacitor	1620 kc 1400 kc	1620 kc 1400 kc.	C6 Osc. C5 R.F. C4 Ant.
4		Shunt C5 with 22,000 ohm resistor		
		600 kc	600 kc	L4 Osc. (Rock gang)
5		Remove 22,000 ohm resistor from C5		
		600 kc	600 kc	L2 R.F.
6		Repeat steps 3, 4 and 5		

The position of the loop antenna in relation to the chassis affects adjustment of C4. The correct position is indicated on the illustration "Tube and Trimmer Locations."



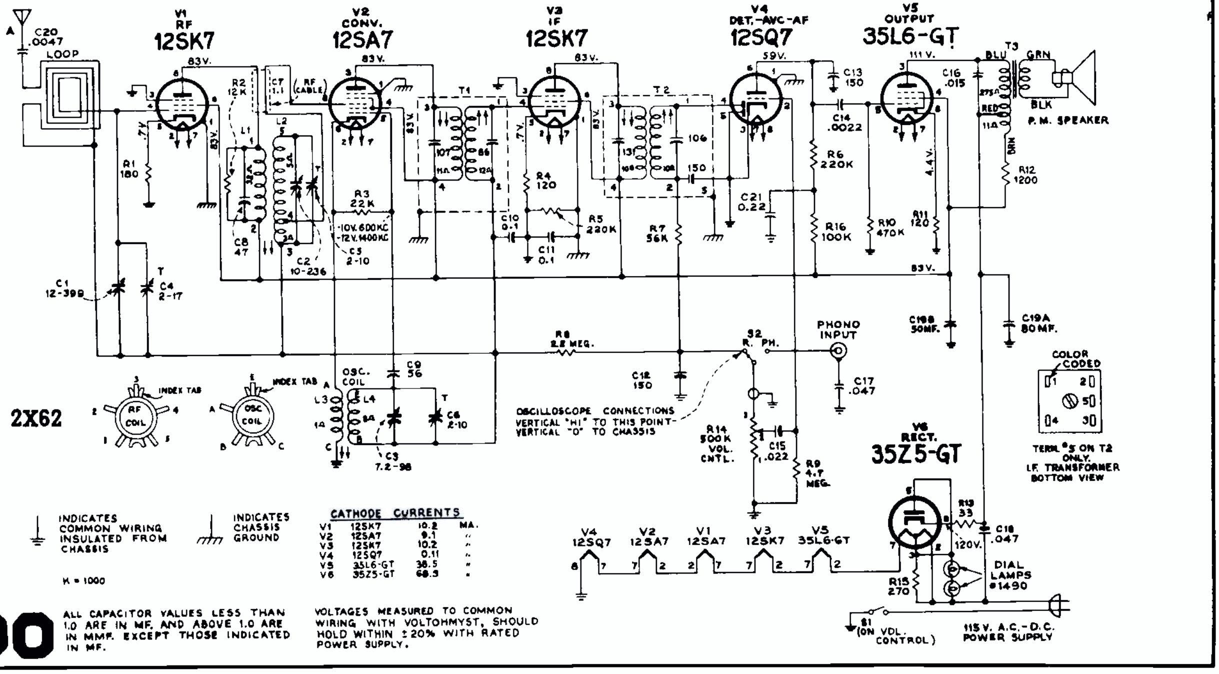
Dial Indicator and Drive Mechanism



Tube and Trimmer Locations

NOTE.—If reception is not obtained on d. c. operation, reverse plug in outlet receptacle. On a. c. operation this may reduce hum.

The position of the speaker is adjustable; the correct position is indicated on the illustration "Tube and Trimmer Locations."



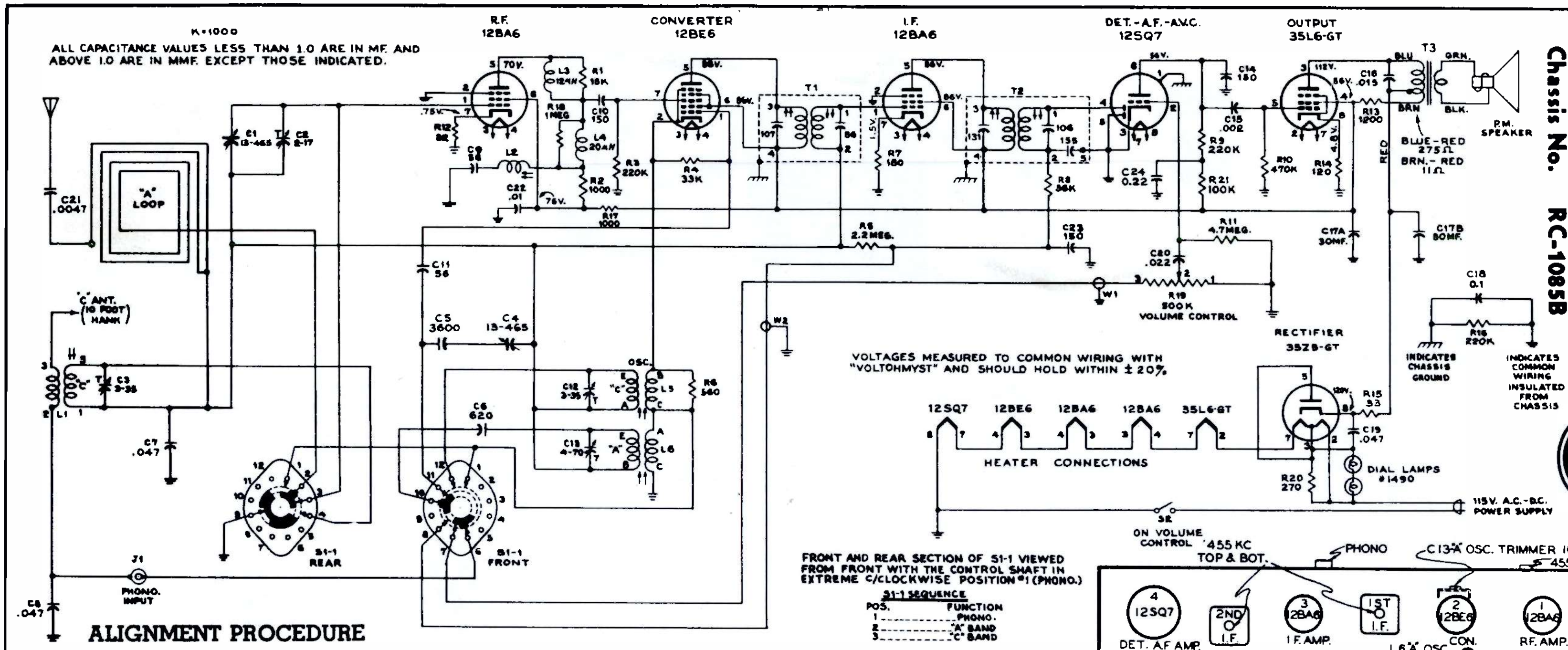
2X61, 2X62

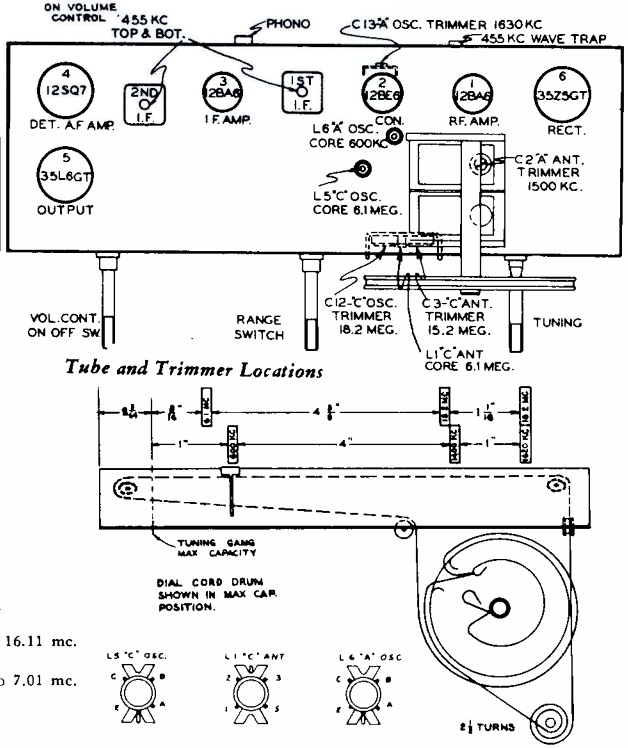
MANUAL OF 1953 MOST-OFTEN-NEEDED RADIO DIAGRAMS

AC-DC Radio Receiver

MODEL 2-X-621

Chassis No. RC-1085B





Tube and Trimmer Locations

ALIGNMENT PROCEDURE

Steps	Connect the High Side of The Test Osc. to—	Tune Test Osc. to—	Range Switch to—	Turn Radio Dial to—	Adjust for maximum output
1	Pin No. 1 of 12BA6 I.F. amp. tube in series with 0.1 mfd.	455 kc.	"A"	Quiet Point near 1600 kc.	Top and bottom T2 2nd I.F. Trans.
2	Pin No. 7 of 12BE6 Converter tube in series with 0.1 mfd.				*Top and bottom T1 1st I.F. Trans.
3	Pin No. 1 of 12BA6 R.F. tube in series with 0.1 mfd.				L2 wave trap for minimum output.
4	(Radiated signal) short piece of wire placed near ant.	1620 kc.	"A"	1620 kc. (Cap. min.)	C-13 "A" Osc.
5		1400 kc.		1400 kc.	C-2 "A" ant.
6		600 kc.		600 kc.	L6 "A" Osc. Rocking gang.
7	Repeat steps 4, 5 and 6.				
8	Center terminal on loop antenna Term. board through 47 mfd. Low side to loop primary terminal	18.2 mc.	"C"	18.2 mc. (Min. cap.)	**C-12 "C" Osc.
9		15.2 mc.		15.2 mc.	***†C-3 "C" Ant.
10		6.1 mc.		6.1 mc.	††L-5 "C" Osc. L-1 "C" Ant.
11	Repeat steps 8, 9, and 10 as necessary.				

*Use 18K resistor across primary when aligning secondary, across secondary when aligning primary.

**Two peaks should be found, use one having lowest capacity.

***Two peaks should be found, use one having highest capacity.
Note: Check for image frequences.

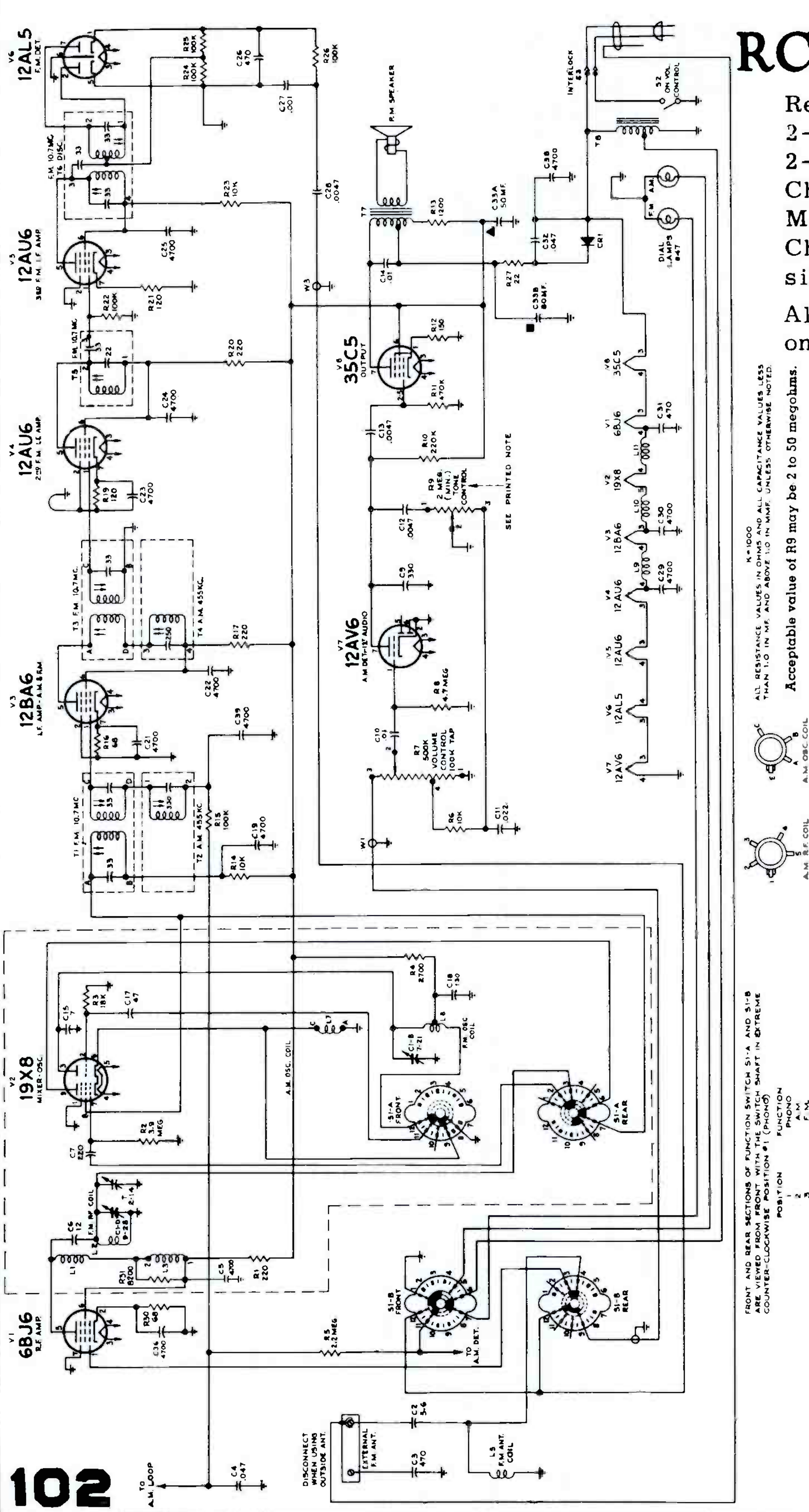
†Radio dial tuned to 15.2 mc. as in step 9, tune test osc. to 16.11 mc. where a weaker signal should be heard.

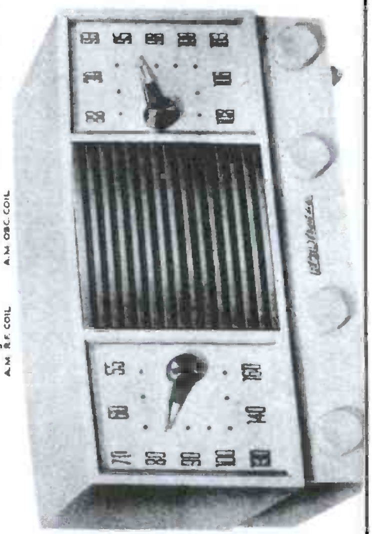
††Radio dial tuned to 6.1 mc. as in step 10, tune test osc. to 7.01 mc. where a weaker signal should be heard.

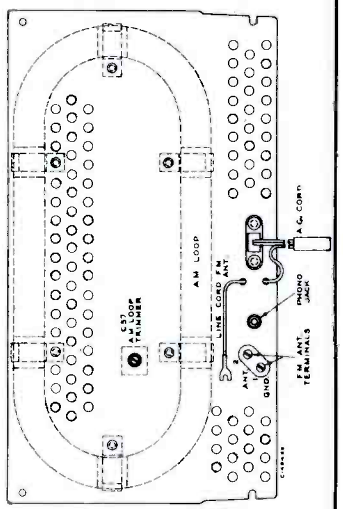
RCA VICTOR

Receivers 2-XF-931, 2-XF-932, 2-XF-933, 2-XF-934, 2-XF-935, Chassis RC-1121A. Model 2-XF-91, using Chassis RC-1121, is similar to RC-1121A.

Alignment continued on the next page.







MANUAL OF 1953 MOST-OFTEN-NEEDED RADIO DIAGRAMS

RCA Victor
(Continued from preceding page)

Receivers 2-XF-931, 2-XF-932, 2-XF-933, 2-XF-934, 2-XF-935, using Chassis RC-1121A. Model 2-XF-91, Chassis RC-1121, is similar.

ALIGNMENT PROCEDURE

ALIGNMENT INDICATORS:

An RCA VoltOhmyst or equivalent meter is necessary for measuring developed d-c voltage during FM alignment. Connections are specified in the alignment tabulation. An output meter is also necessary to indicate maximum audio output during AM 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 AVC voltage. When audio output is being measured, the volume control should be turned to maximum. Adjust tone control to mid-position.

SIGNAL GENERATOR:

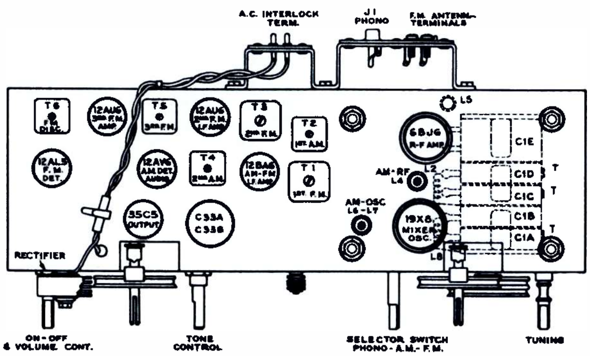
For all alignment operations, connect the low side of the signal generator to the receiver chassis. If output measurement is used for AM alignment, the output of the signal generator should be kept as low as possible to avoid AVC action.

If an FM sweep generator is used for FM alignment, adjust for 10.7 mc, 0.4 mc sweep. Connect oscilloscope across C26, adjusting discriminator T6 top core for 10.7 mc crossover, and T6 bottom core for balanced peaks. Peak separation should be approximately 330 kc. When aligning the other FM tuned circuits, connect oscilloscope lead through a 220K resistor to pin 1 of V5. Follow alignment table sequence, adjusting for maximum gain and symmetrical curves.

Tube Socket Voltages

Tube Type and Function	Tube Element	Pin No.	AM	FM	Phono
V1 6BJ6	Plate	5	94	92	92
	Screen	6	94	92	92
R.F. Amp.	Cathode	2	0.7	0.9	0.5
	Grid	1	–0.5	0	–0.6
V2 19X8	Plate	9	75	80	80
	Screen	1	75	80	80
Mixer	Cathode	6	0	0	0
	Grid	7	–1.6	–2.3	–2.3
	Plate	3	85	85.6	74
Osc.	Grid	2	–3.3	–3	–0.3
	Cathode	6	—	—	—
V3 12BA6	Plate	5	94	92	90
	Screen	6	94	92.3	90
I.F. Amp.	Cathode	7	0.8	0.9	0.8
	Grid	1	–0.4	–0.2	–0.2
V4 12AU6	Plate	5	95	93.5	92
2nd I.F.	Screen	6	95	94.1	92
	Cathode	7	0.8	0.8	0.8
Amp. (F.M.)	Grid	1	0	0	0
V5 12AU6	Plate	5	74	73	72
3rd I.F.	Screen	6	74	73	72
	Cathode	7	0.3	0.3	0.4
Amp. (F.M.)	Grid	1	–0.2	–0.4	–0.2
V6 12AL5	Plate	2	—	—	—
	Cathode	5	—	—	—
F.M. Det.	Plate	7	—	—	—
	Cathode	1	—	—	—
V7 12AV6	Plate	7	58	57	57
A.M. Det.	Grid	1	–0.8	–0.8	–0.8
Audio Amp.	Plate (Diode)	5	–0.5	–0.3	–0.3
V8 35C5	Plate	7	130	130	130
Audio	Screen	6	96	94.5	94.5
Output	Cathode	1	5.1	5.0	5.0
	Grid	2-5	—	—	—

Rectifier output should be approximately 139 volts, 70 ma.



Tube and Trimmer Locations

AM Alignment

FUNCTION SWITCH IN AM POSITION

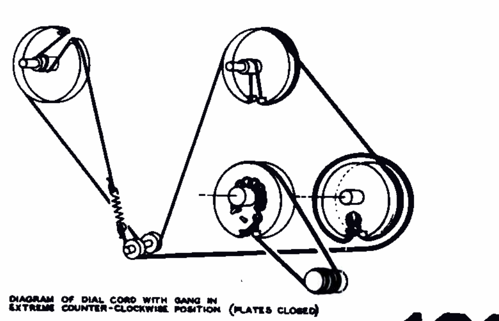
Steps	Connect high side of sig. gen. to—	Sig. gen. output	Turn radio dial to—	Adjust for peak output
1	Pin No. 1 of V3 in series with .01 mfd.	455 kc. (mod.)	Quiet point at high freq. end	T4 bottom core (sec.) T4 top core (pri.)
2	Tap lug 4 on AM RF coil			T2 bottom core (sec.) T2 top core (pri.)
3	Short wire placed near loop for radiated signal	1620 kc. (mod.)	1620 kc.	C1A-T (osc.)
4		1400 kc. (mod.)	1400 kc.	C37 (ant.) C1C-T (rf.)
5		600 kc. (mod.)	600 kc.	L6 (osc.) with 10,000 ohm resistor from C1C RF stator to gnd. (rocking gang)
6				L4 (RF) with the 10,000 ohms removed
7	Repeat steps 4, 5 and 6 until maximum gain is obtained			

FM Alignment

FUNCTION SWITCH IN FM POSITION—VOLUME CONTROL MINIMUM—TONE CONTROL CENTER

Steps	Connect high side of sig. gen. to—	Sig. gen. output	Turn radio dial to—	Adjust for max. output
1	Pin No. 1 of V5-12AU6	10.7 mc.	Quiet point at low frequency end	T6 top core for zero d.c. (across C26) T6 bottom core for maximum d.c. (junction of R24 and R25)
2	Pin No. 1 of V4-12AU6			†T5 top core
3	Pin No. 1 of V3-12BA6			T3 top core †*T3 bottom core
4	C1D Stator			T1 top core †*T1 bottom core
5	FM Ant. terminals thru 270 ohm resistor	90 mc.	90 mc.	†FM osc. L8
6		106 mc.	106 mc.	†FM R.F. C1D-T
7		90 mc.	90 mc.	†FM R.F. L2
8		Repeat steps 6 and 7 until maximum gain is obtained		
9		100 mc.	100 mc.	†FM Ant. coil L5

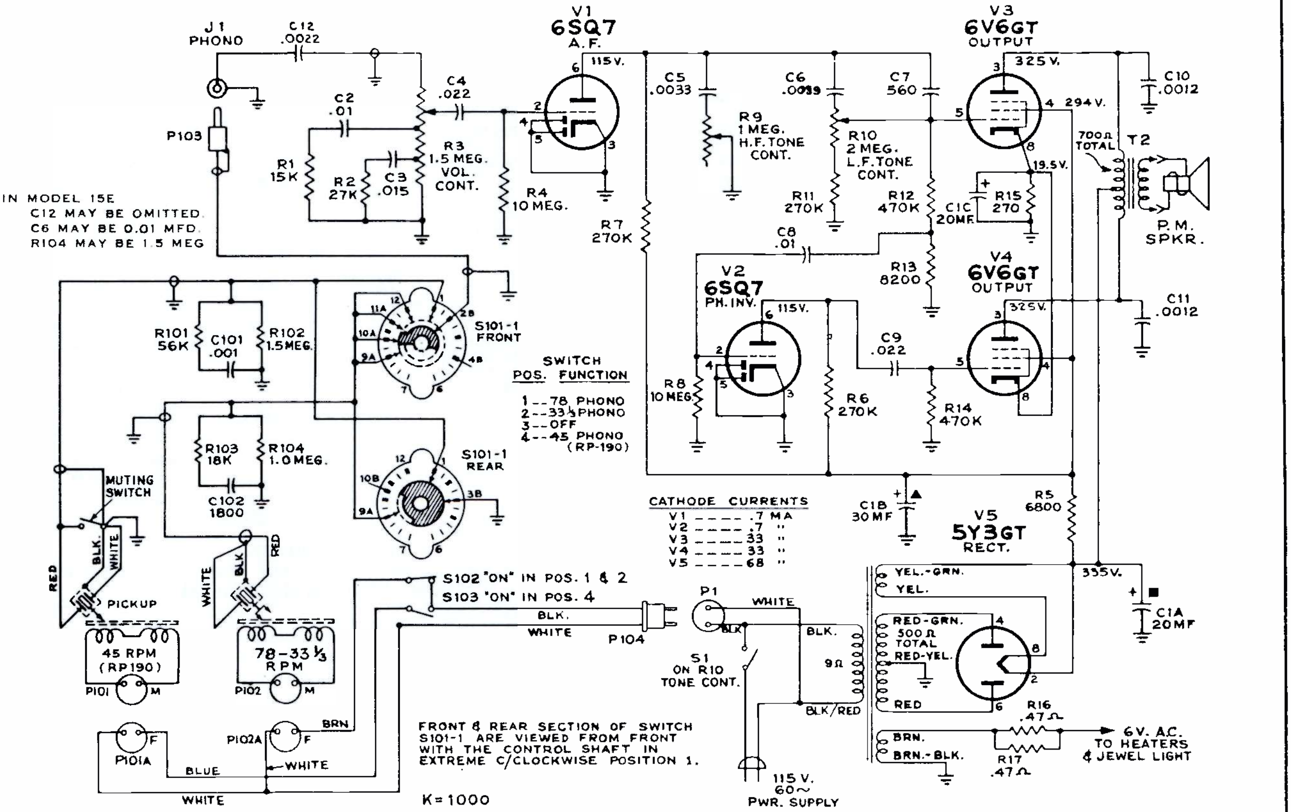
*If necessary for accurate peaking, the winding in the same transformer not being peaked should be loaded with a 680 ohm resistor.
†Connect VoltOhmyst to pin 1 of V5 through a 220K isolating resistor with ¼ inch maximum exposed lead at grid terminal end. Output adjusted for 1 volt d.c. Dress VoltOhmyst lead away from input circuits.
Oscillator frequency is above signal frequency on both AM and FM



Dial and Drive Cord Drive

RCA VICTOR — MODELS 15-E, 15-E-1

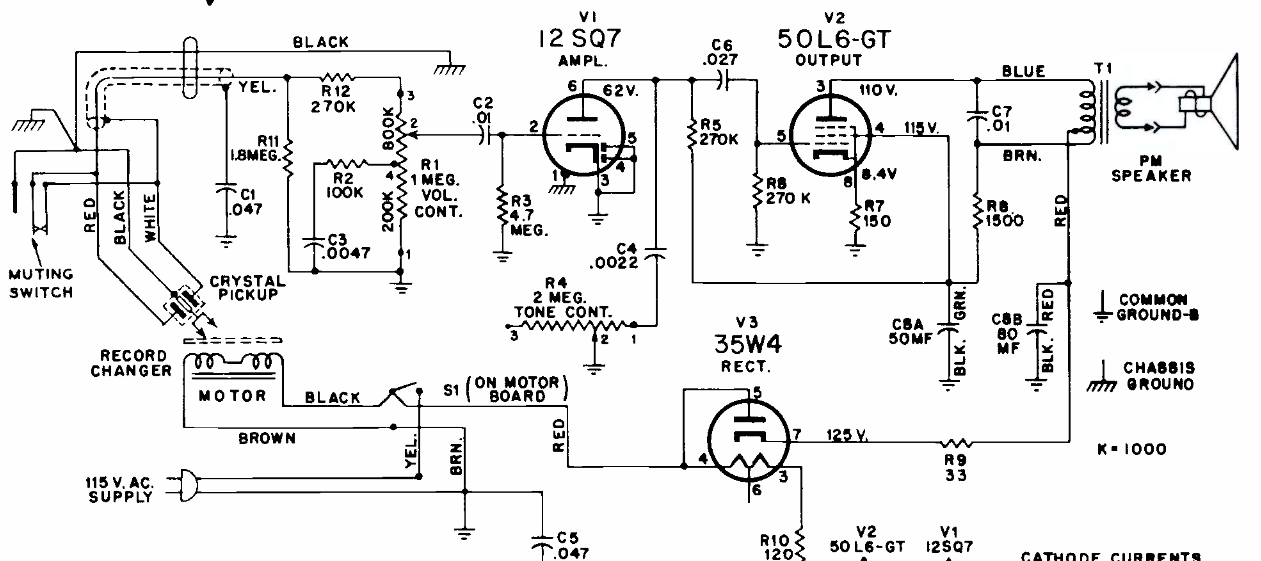
Chassis No. RS-139A,



ALL RESISTANCE VALUES IN OHMS. ALL CAPACITANCE VALUES LESS THAN 1.0 ARE IN MF., AND ABOVE 1.0 ARE IN MMF. EXCEPT THOSE INDICATED.
VOLTAGES MEASURED TO COMMON WIRING WITH CHANALYST OR VOLTOHMYST, AND SHOULD HOLD WITHIN ±20% WITH RATED POWER LINE SUPPLY.

RCA VICTOR — MODELS 2 ES 31E, 2 ES 31Q, 2 ES 38E, 2 ES 38Q

Chassis No. RS-142, RS-142A



VOLTAGES MEASURED TO COMMON WIRING WITH "VOLTOHMYST." SHOULD HOLD WITHIN ±20%.

CATHODE CURRENTS

12SQ7	0.2 MA
50L6-GT	52.0 MA
35W4	52.2 MA

RCA VICTOR

930409 SERIES

Automatic Record Changer

SERVICE DATA

The material covering RCA Series 930409 Record Changers is presented on pages 105 to 116, inclusive.

SPECIFICATIONS

Turntable speed .... 33⅓, 45 or 78 r.p.m.
Record capacity .... Up to 14 seven-inch or 12 ten-inch or 10 twelve-inch or 10 ten- and twelve-inch intermixed

930409-3	115 v. 60 cycle motor convertible to 50 cycles. Ceramic pickup Stock No. S-5652.
930409-4	115 v. 25 cycle motor. Ceramic pickup Stock No. 162A001. Used in Model 35QU.
930409-5	115 v. 60 cycle motor. Crystal pickup Stock No. 75475. Used in Models 2ES3, 2ES31, 2ES38, 2ES38E, 2JS1, 2JS1E, 2S10, 2US7, 21T197DE, 21T242 and 21T244.
930409-6	115 v. 60 cycle motor convertible to 50 cycles. Ceramic pickup Stock No. 162A001. Used in Models 2ES31Q, 2ES38Q, 2JS1Q and 35QU.
930409-9	230 v. 50 cycle motor convertible to 60 cycles. Crystal pickup Stock No. 75044.
930409-10	Same as 930409-5 except light color. Used in Models 2S10, 2US7 and 21T242.
930409-11	115 v. 50 cycle motor convertible to 60 cycles. Crystal pickup Stock No. 75475. Used in Model 2US7.

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Record Stabilizer Arm 106
50/60 Cycle Conversion 106
Adjustments 107
Cycle of Operation .... 108 to 111
Exploded View of Mechanism 112
Replacement Parts .... 113 to 116

CONTROLS

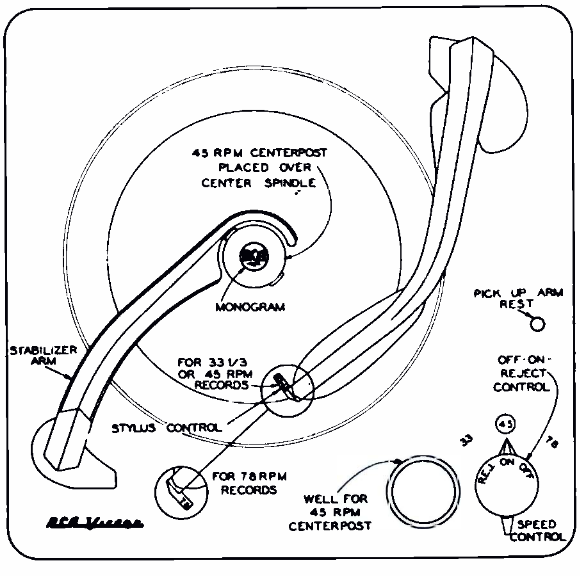
The record changer has a dual control on the motorboard and a stylus selector control on the pickup arm. The inner control (circular knob) is the OFF-ON-REJECT control. Turning this knob to the center position energizes the motor and starts the turntable, when turned to the right (clockwise) it starts the mechanism into complete automatic operation. The mechanism will shut off automatically after the last record has been played but can be shut off manually by turning this knob to the left (counter-clockwise).

The outer control (double ended lever) is the speed control. It has three normal positions, "33", "45", "78" to select the turntable speed desired and a neutral position (midway between "45" and "78"). The control should be turned to this neutral position if the changer is not expected to be in use for an extended period of time.

The stylus control has two normal positions (right and left) and one shipping position (lever pointing up). When playing 33⅓ or 45 r.p.m. records the lever is turned so that "33-45" is visible on the TOP of the lever; likewise for 78 r.p.m. records "78" should be visible on the TOP.

The removable centerpost is for use with 45 r.p.m. records having the large centerhole. It must be placed over the center spindle with the "RCA" trademark monogram FACING to the FRONT. When not in use it is placed in a well at the front of the motorboard.

To load or remove records, the record stabilizer is lifted and turned off-side. After loading it is turned to the center where it rests on top of the stack of records.



Controls

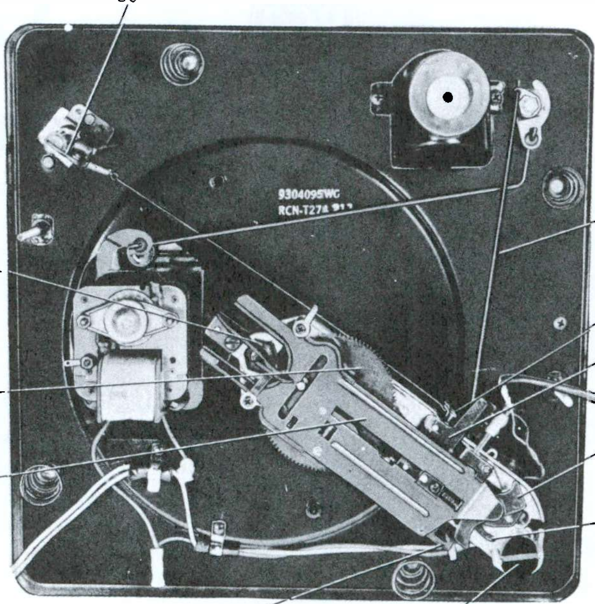


Figure 1—Bottom View

LUBRICATION

The mechanism is properly lubricated when it leaves the factory, additional lubrication should not be necessary for a long period of time. If the mechanism has unusual use or high operating temperatures, it may be necessary to lubricate more frequently.

It is suggested to use Lubriplate or STA-PUT No. 512 on:

1. Pickup arm pivot.
2. Points of sliding contact with cycling slide, including:
   a. elevating rod
   b. lift arm
   c. roller on cycling cam
   d. pickup arm return lever
   e. pickup arm lever
3. End of selector lever contacting tab on cycling gear.
4. Turntable thrust bearing.
5. Sparingly on a trip slide.
6. All points of sliding contact.

Apply a small quantity of light machine oil to:

1. Trip pawl pivot.
2. Cycling engagement pawl pivot.
3. Bearing of record stabilizer.
4. Elevating rod.
5. Bearing of lift arm.
6. Bearing of reject lever.
7. Bearing of stop lever.
8. Bearing of cycling gear.
9. Motor bearings.

NOTE: Keep oil or grease away from all rubber parts.

Stylus Replacement

PICKUPS NO. 75044 and S-5652

The styli are held in position by small thumb nuts (one for each stylus). Loosen the nut to remove stylus.

PICKUP NO. 75475

The styli are held in position by small hex nuts (one for each stylus). Remove the nut and push threaded end of stylus through the cartridge.

PICKUP NO. 162A001

The styli are held in position by pressure fit. To remove stylus, grip with tweezers and pull straight to the front of pickup.

CAUTION:

The internal element of the pickups can be fractured by use of excessive force. It is advisable to grip stylus with pliers instead of holding pickup case while removing nuts.

Although the 78 and the 45-33⅓ styli are mechanically interchangeable, they should be replaced in such manner that the stylus which is coded red will contact the record when "33-45" on the stylus selector knob is visible from the top.

Record Stabilizer Arm

Two types of stabilizer arms are in use. Type "A" when raised and moved outward will remain projected beyond the edge of the motorboard. Use Stock Number 76941 (plum) or Stock Number 76942 (beige) record stabilizer housing. Type "B" when raised and moved outward will return to within the edge of the motorboard. Use Stock Number 77256 (plum) record stabilizer housing, and Stock Number 77257 record stabilizer return spring.

The replacement stabilizer arm (plum) Stock Number 77255 can be used with either Type "A" or Type "B"

50/60 Cycle Conversion

Models 930409-3 and 930409-6 are made for 60 cycle operation but may be converted to 50 cycle operation.

Models 930409-9 and 930409-11 are made for 50 cycle operation but may be converted to 60 cycle operation.

To convert the above listed models it is necessary to remove the original spring sleeve from the motor shaft and install the alternate spring sleeve (in envelope attached to record changer). This is easily accomplished by holding the rotor of the motor while removing or installing the spring sleeve with a twisting motion.

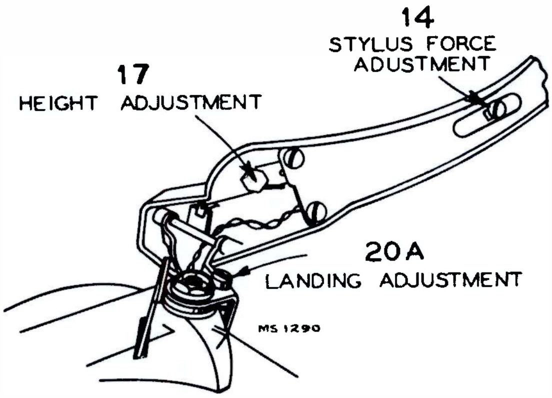


Figure 2—Adjustments

ADJUSTMENTS

LANDING ADJUSTMENT

Only one landing adjustment is necessary. The landing position of the stylus is adjusted by means of the eccentric stud (20A), mounted on the pickup arm support bracket. When adjusted for correct landing on one size of record, the landing position for other sizes of records is automatically corrected.

PICKUP ARM HEIGHT ADJUSTMENT

The pickup arm height during cycle is adjusted by means of the hex head screw (17), located in the pickup arm.

Turn control knob to "REJ" and rotate turntable by hand until arm has risen to its maximum height. Adjust screw so that stylus is 1⅜" above turntable.

STYLUS FORCE ADJUSTMENT

Stylus force should be 7½ to 9½ grams. Loosen screw (14), and move slide until the correct force is obtained.

TRIPPING

The tripping method used in this mechanism is a combination of velocity and fixed diameter. Velocity tripping is effective between 4¾" and 3¼" diameters, when the stylus moves inward ⅛" or more per revolution of the turntable. No adjustment is required.

Figure 3—Slide Assembly (Complete)

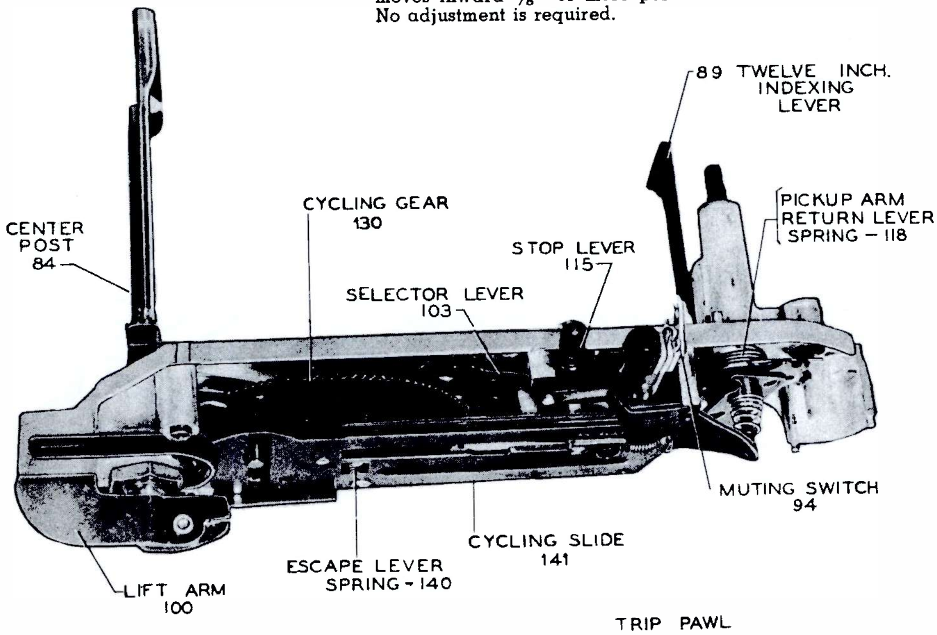
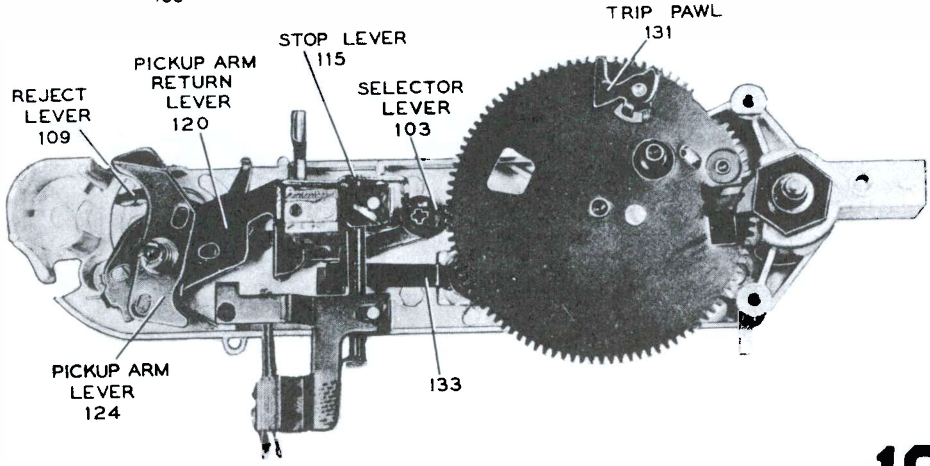


Figure 4—Slide Assembly (View with Slide Removed)



TURN ON-OFF-REJECT CONTROL KNOB TO REJECT POSITION & RELEASE

1. The on-off-reject control knob, through the linkage of the function control lever (54), reject rod (52), and reject lever (109) actuates the power switch and the trip slide (139).
2. The closing of the power switch energizes the motor and starts the turntable rotating.

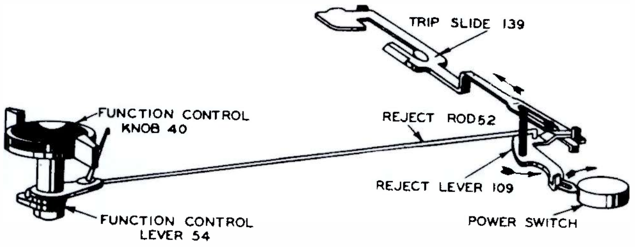


Figure 5

CYCLING STARTS

1. The trip slide (139) in its movement contacts the lower trip pawl (131) and moves both the lower and the upper trip pawls which are linked together. The movement of the upper trip pawl (129) actuates the cycling engagement pawl (130A) sufficiently to cause it to engage with the projection on the hub of the rotating turntable.
2. The contact between the cycling engagement pawl (130A) and the projection on the turntable hub gives the necessary push for the teeth in the cycling gear (130) to engage the teeth in the shaft of the turntable and thus start the change cycle.

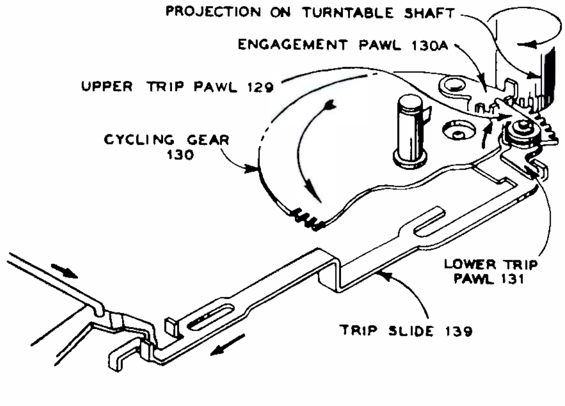


Figure 6

PICKUP ARM RISES & MOVES OUTWARD

1. As the cycling gear rotates, the stud (130B) mounted on the underside of the gear, rides inside a slot cut in the cycling slide (141). The rotation of the cycling gear pushes the cycling slide back, and later, allows it to return.
2. As the slide moves away from the center post, an incline formed on the end of the slide causes the elevating rod (123) to rise and lift the pickup arm.
3. At the same time that the elevating rod is pushed upward, the pickup arm lever (124) is also pushed up by the force transferred through the spring (125). The raising of the pickup arm lever causes the two formed dimples in the pickup arm lever to engage the two holes in the pickup arm return lever (120), and couple them together. This directs the movement of the pickup arm during change cycle.
4. The cycling slide continues to move away from the center post until the formed end of the slide pushes against the pickup arm return lever. This relieves the force of pickup arm return lever against stop lever (115). This permits the stop lever return spring (114) to return the stop lever to the normal (raised) position.
5. The end (115A) of stop lever (115) pushes trip slide back ready for the next change cycle.

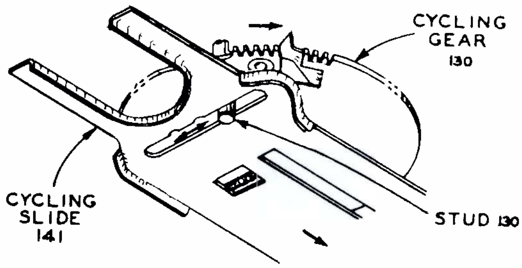


Figure 7

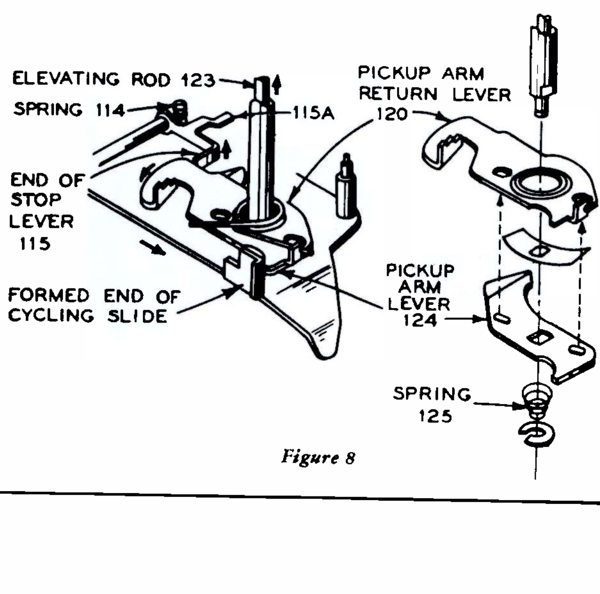


Figure 8

RECORD DROPS TO TURNTABLE

1. After the cycling slide has raised the pickup arm and is moving it outward, the lift arm (100) is actuated by the cycling slide.
2. The lift arm pushes up on the shaft extending from the bottom end of the center post. This shaft actuates the push-off mechanism inside the center post, and the record drops to the turntable.

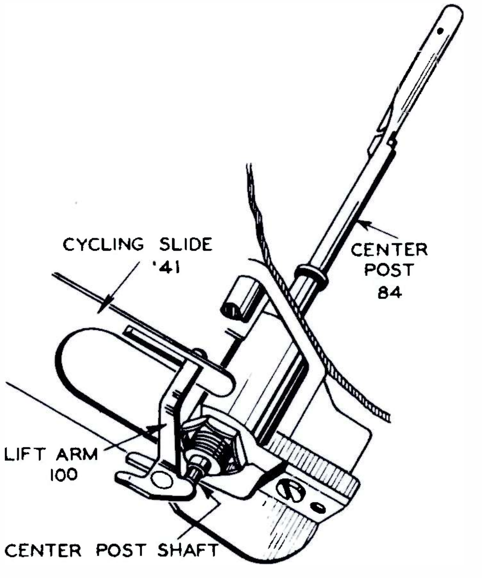


Figure 9

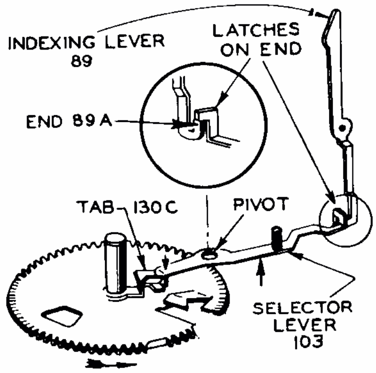
SELECTION OF LANDING POSITION

1. During rotation of the cycling gear the riveted tab (130C) near the center of the gear, pushes down on one end of the selector lever (103) (which is pivoted in the center) thereby raising the other end causing it to latch on the end (89A) of the twelve-inch indexing lever (89).
2. The mechanism is thus automatically indexed to land on a ten inch record unless the selector lever (139) is disengaged from the end of the twelve-inch indexing lever.

7 Inch Indexing:

The ten-inch indexing lever (133) is pivoted in the center and one end (133A) is held (by tension of spring) against the top surface of the cycling gear. A hole in the gear will permit the end of the indexing lever to lower and thus raise the opposite end of the lever. A projection (133B) on the lever will at the same time lift the selector lever, permitting it to engage the top step of the pickup arm return lever (120). This position allows the pickup arm to land on the edge of the seven-inch record.

Figure 10

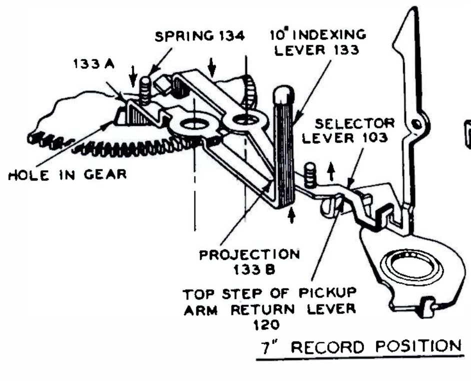


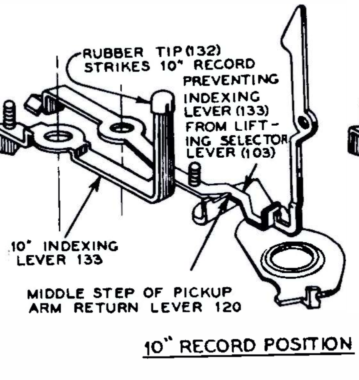
10 Inch Indexing:

The ten-inch indexing lever will lift the selector lever unless a record on the turntable contacts the rubber tip of the ten-inch indexing lever (133), and prevents it from rising. When the lever is prevented from rising, the selector lever will remain in position to engage the middle step of the pickup arm return lever.

12 Inch Indexing:

When a twelve-inch record drops to the turntable, it strikes the twelve-inch indexing lever (89) and forces it backward. This disengages the end of the selector lever (103) from the edge of the indexing lever and permits the selector lever to drop down into the recess (89B) at the end of the indexing lever. This position of the selector lever causes it to engage the bottom step of the pickup arm return lever (120) and will push the pickup arm to land on the edge of a twelve-inch record.





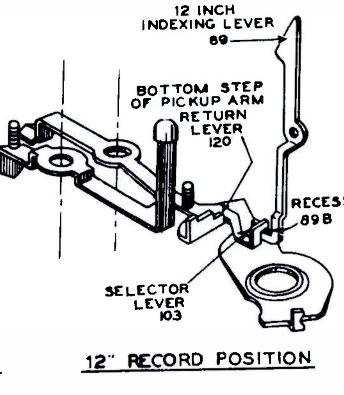


Figure 11 *Figure 12* *Figure 13*

PICKUP MOVES IN FOR LANDING

1. As the cycling slide returns, the formed end (141A) on the slide moves back, permitting the pickup arm return lever spring (118) to expand. This causes the pickup arm return lever (120) to move the pickup inward until the pickup arm return lever comes against the selector lever (103). The pickup is now directly above the point of landing.

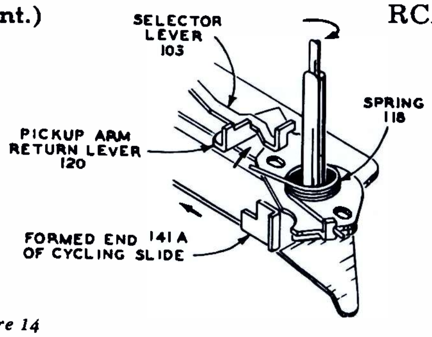


Figure 14

PICKUP LANDS ON RECORD

1. The elevating rod (123) slides down the incline on the slide permitting the pickup to land on the start of the record.
2. A cut-away portion (130D) of the teeth of the cycling gear stops the return movement of the slide before completion of cycle. The stud (130B) in the cycling gear rests in the first indentation (offset from center) of the slide to stabilize it in this position.
3. Just before the cycling gear completes cycle, a small tab (141C) on cycling slide makes contact with lower trip pawl (131) thereby moving upper trip pawl and cycling engagement pawl back. This prevents the re-engagement with the projection on the turntable hub which would start a new change cycle.
4. On the next revolution the projection on the hub of the turntable engages with a formed lug (130E) on the outer edge of the cycling gear. The cycling gear will then rotate until the second cut-away portion (130F) of the teeth again stops the movement of the slide, this time at completion of the cycle. The stud on the cycling gear rests in the second indentation (center) of the slide to stabilize it in this position.

   The purpose of this pause in the cycle is to allow the pickup to enter the starting groove of the record before the full effect of the feed-in spring is applied to the pickup arm.

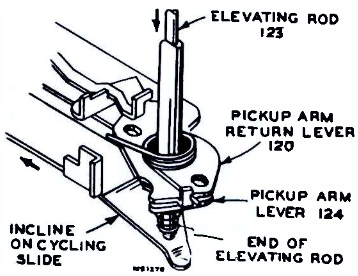


Figure 15

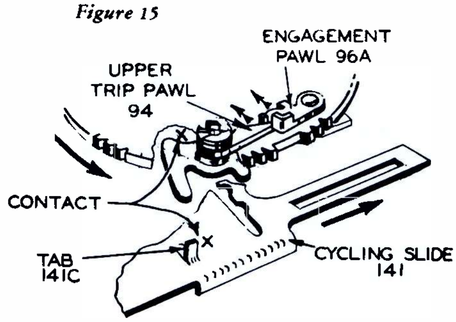


Figure 16

RECORD PLAYS

1. As the record plays, the pickup moves in toward the center of the record carrying the trip slide along. This is due to the contact made with the pickup arm lever which turns with the pickup arm pivot.
2. The trip slide contacts the lower trip pawl, causing both (lower and upper) trip pawls and the cycling engagement pawl to move slightly with each revolution of the record. This slight movement of the pawls is reversed each time the projection on the turntable hub comes in contact with the cycling engagement pawl. The back movement is taken up in the friction connection between the upper and lower trip pawls.

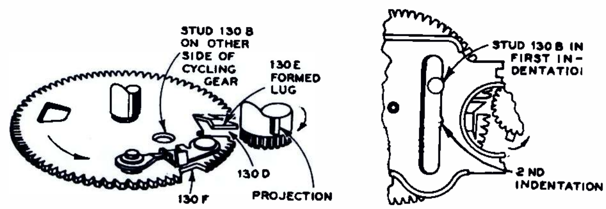


Figure 17

TRIPPING

This slight movement of the pawls continues as long as the pickup moves in at a constant rate of speed. When the stylus leaves the recorded section of the record, the rapid acceleration results in rapid movement of the cycling engagement pawl. The cycling engagement pawl assumes a position in which the projection on the turntable hub makes a positive contact and the cycling cam is pushed sufficiently for engagement between the teeth of the cycling gear and the teeth on the turntable hub. This starts change cycle.

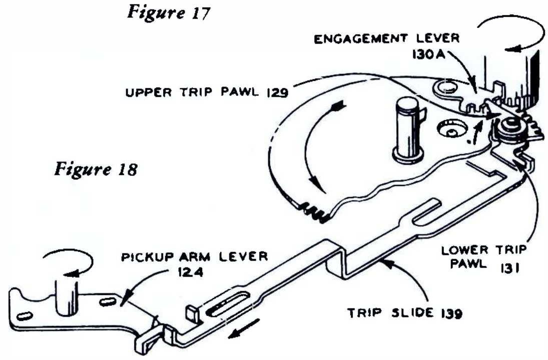


Figure 18

MECHANISM STOPS AFTER PLAYING OF LAST RECORD

After the mechanism has been tripped it again follows the preceding sequence of cycling and playing the records until the last record of the stack has been played.

1. As the last record of the stack drops to the turntable the record stabilizer drops and actuates the stop arm (115). This stop arm in turn applies force to stop lever (115) through spring (115B) and connecting wire (137). At this moment the cycling slide is in the outermost position (away from centerpost) and the end (115B) of stop lever is forced against escape lever (141B) which prevents it from lowering any further.
2. As the cycling slide returns to the out of cycle position the end (115B) of stop lever slides off the escape lever permitting the end to extend down through the slot in the cycling slide. At this time the pickup arm return lever has rotated too far to be blocked by the other end (115C) of the stop lever and the pickup is permitted to land on the record.
3. After the last selection has been played the mechanism again goes into change cycle, and the cycling slide moves into its outermost position. At this moment the force which has been applied to the stop lever from the record stabilizer causes the end (115B) to lower, thus extending further through the cycling slide. The other end (115C) of stop lever raises and blocks the pickup arm return lever which at this moment is held back by the cycling slide.
4. As the cycling slide moves back, it carries the raised trip slide along until finally the formed end (139A) of the trip slide pushes reject lever which in turn actuates the power switch (110). This removes the power from the drive motor and mechanism stops.
5. The elevating rod (124) lowers the pickup arm to the rest.

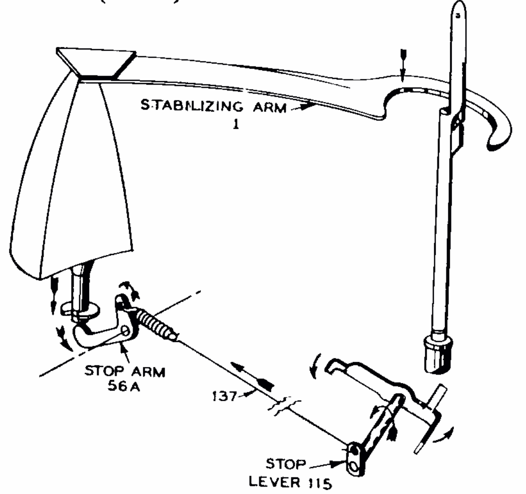


Figure 19

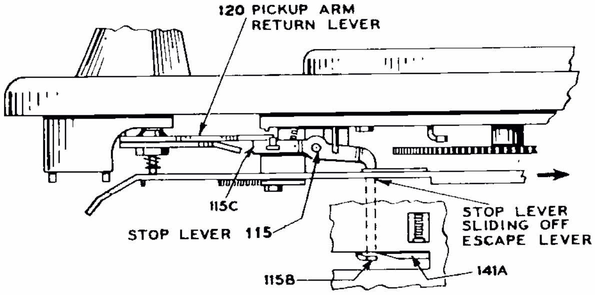


Figure 20

45 R.P.M. CENTERPOST

For playing of 45 r.p.m. records which have a 1½ inch center hole, the 45 r.p.m. centerpost is placed over the ¼ inch centerpost. The push-off finger (84A), which is part of the ¼ inch centerpost actuates the slide (24), this slide actuates the separator knives (25A & 25B) and separator shelves (26A & 26B) of the 45 r.p.m. centerpost.

As the push-off finger moves up it engages a finger (24B) of the slide (24) in the 45 r.p.m. centerpost; and, as it moves horizontally, it pushes the slide against the tension of the slide return spring (27). A projecting pin (24C) on the bottom of the slide engages both shelves and both knives and forces them to turn on their pivots. The shelves are pivoted near their center and are caused to retract as the slide is forced to move by the push-off finger. The knives are pivoted at their ends and are forced outward at the same time that the shelves are retracted. A formed spring (28) returns the shelves to the extended position.

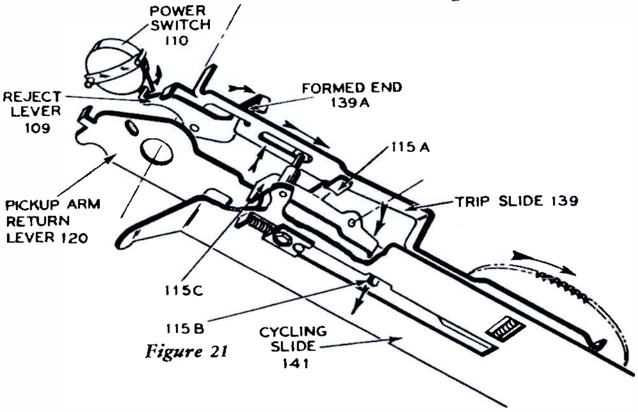


Figure 21

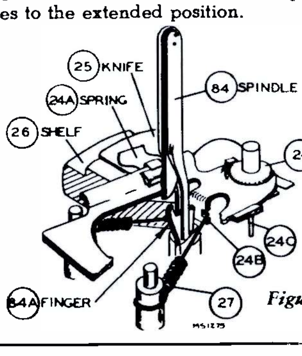


Figure 22

Figure 23

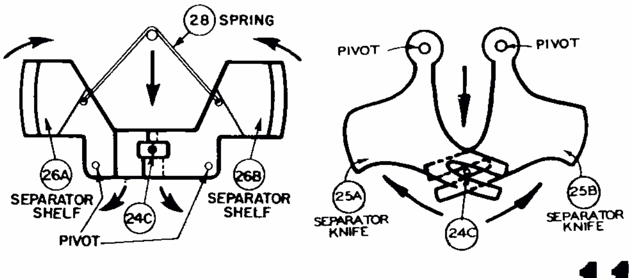


Figure 24

930409 Series

RCA, continued

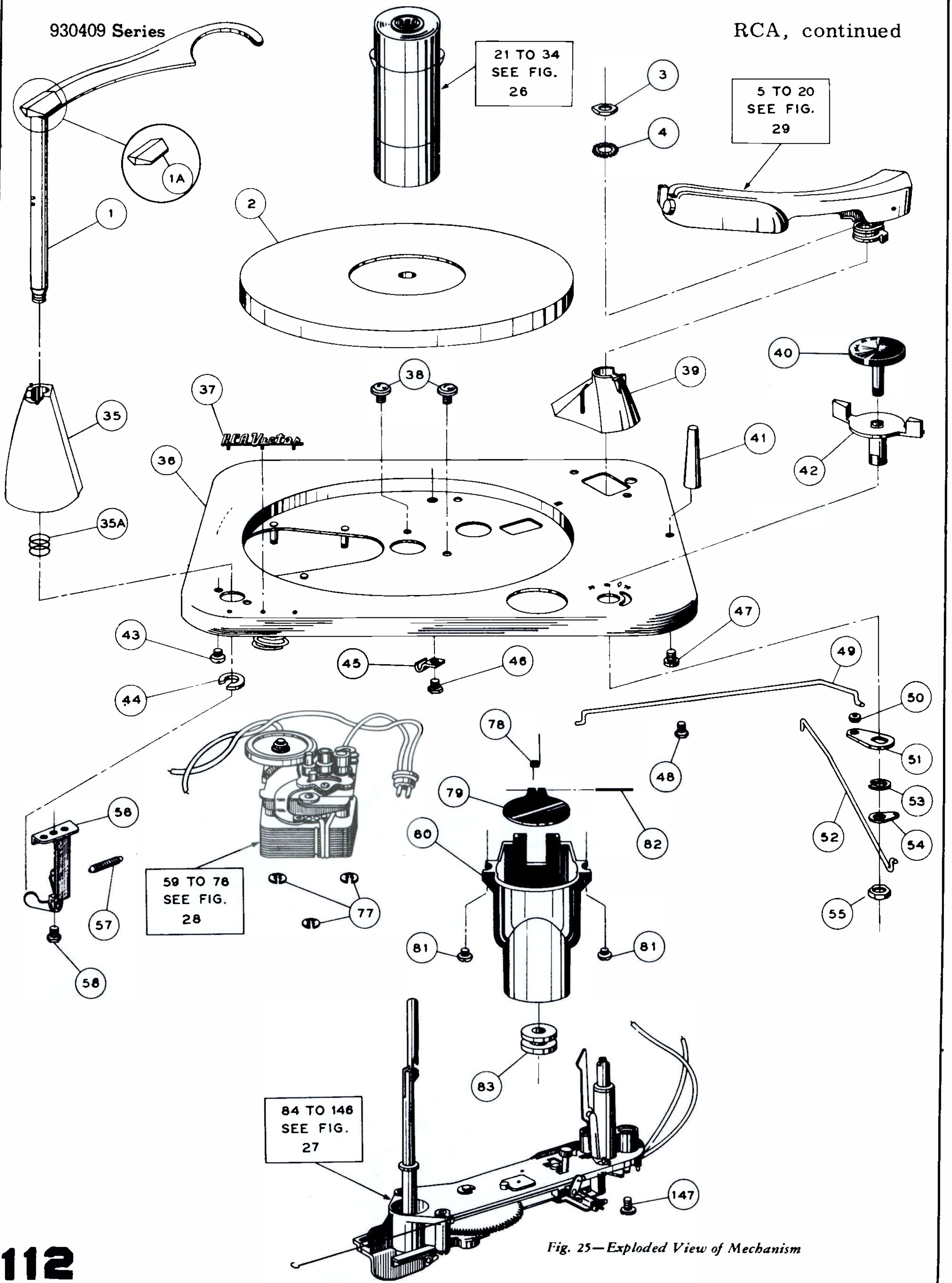


Fig. 25—Exploded View of Mechanism

REPLACEMENT PARTS

930409 Series

ILL. NO.	STOCK NO.	DESCRIPTION
1	76913	Stabilizer—Record stabilizer—plum—complete with plastic cap for 930409-3, -4, -5, -6, -9 and -11
1	76914	Stabilizer—Record stabilizer—beige—complete with plastic cap for 930409-10
1A	75804	Cap—Plastic cap—maroon—for record stabilizer for 930409-3, -4, -5, -6, -9 and -11
1A	75805	Cap—Plastic cap—beige—for record stabilizer for 930409-10
2	77118	Turntable—Turntable and hub assembly—maroon flock.
2	77119	Turntable—Turntable and hub assembly—tan flock—for 930409-10
3	76905	Nut—1/4—28 hex nut (jam) for pickup arm bracket
4	———	Lockwasher—1/4 external type lockwasher for pickup arm shaft
35	76941	Housing—Record stabilizer housing—plum—Type "A" (see Page 2) for 930409-3, -4, -5, -6, -9 and -11
35	77256	Housing—Record stabilizer housing—plum—Type "B" (see Page 2)
35A	77257	Spring—Record stabilizer return spring for use with Type "B" record stabilizer housing
35	76942	Housing—Record stabilizer housing—beige—for 930409-10
36	———	Motorboard—Motorboard—complete
37	74782	Emblem—"RCA Victor" emblem
38	———	Screw—#10-24 x 3/8" binding head machine screw and internal lockwasher
39	75829	Housing—Pickup arm pivot shaft housing—plum —for 930409-3, -4, -5, -6, -9 and -11
39	75873	Housing—Pickup arm pivot shaft housing—beige—for 930409-10
40	76915	Knob—Reject control knob and shaft—maroon—for 930409-3, -4, -5, -6, -9 and -11
40	76916	Knob—Reject control knob and shaft—beige—for 930409-10
41	75827	Rest—Pickup arm rest (maroon) for 930409-3, -4, -5, -6, -9 and -11
41	75828	Rest—Pickup arm rest (beige) for 930409-10
42	76937	Knob—Motor speed control knob and shaft
43	———	Screw—#6-32 x 1/4" hex head screw
44	75385	Washer—"C" washer to mount record stabilizer
45	———	Clamp—Cable clamp
46	———	Screw—Screw for mounting cable clamp
47	75830	Screw—#10 x 1/2 cross recessed pan head screw to mount pickup arm rest
48	———	Screw—#6-32 x 1/4" hex head screw
49	76920	Rod—Motor speed control rod
50	77229	Grommet—Rubber grommet for motor speed control rod
51	76918	Lever—Motor speed control lever
52	76919	Rod—"On-Off"—"Reject" rod
53	75825	Washer—"C" washer for motor speed control knob and shaft
54	76917	Lever—Switch control lever
55	77227	Nut—Pal nut for reject control knob and shaft
56	76927	Arm—Stop arm assembly
57	76926	Spring—Return spring (coil type) for stop arm (1/8" I.D. x 19/32)
58	———	Screw—6-32 x 5/16" cross recessed round head screw
77	75876	Washer—"C" washer to mount motor
78	76925	Spring—Spring for 45 r.p.m. centerpost housing hinge pin
79	76922	Lid—45 r.p.m. centerpost housing lid—maroon—for 930409-3, -4, -5, -6, -9 and -11
79	76923	Lid—45 r.p.m. centerpost housing lid—beige—for 930409-10
80	76921	Housing—45 r.p.m. centerpost housing well—less lid and rubber bumper
81	———	Screw—#10-32 x 3/16" cross recess pan head screw to mount 45 r.p.m. centerpost housing
82	76924	Pin—Hinge pin for 45 r.p.m. centerpost housing lid
83	76940	Bumper—45 r.p.m. centerpost housing rubber bumper
147	———	Screw—#10-24 x 3/8" binding head machine screw and internal lockwasher
		45 RPM CENTERPOST ASSEMBLY
21	76928	Cap—Nose cap
22	76930	Spring—Nose spring (formed)
23	76909	Screw—#4-40 x 1/4" cross recessed binding head screw for nose spring
24	76933	Plate—Slider plate assembly complete with springs 24A
25	76932	Knife—Record separator knife (1 set)
26	76931	Shelf—Record support shelf (1 set)
27	76934	Spring—Slider return spring (coil type—2 in 1)
28	76935	Spring—Shelf return spring (formed)
29	———	Body—Spindle body assembly
30	76936	Screw—#4-40 x 7/8" fillister head screw for nose cap
31	———	Rotor—Die-cast rotor
32	76954	Spring—Rotor lift spring (coil) (1.168" O.D. x 1"—4-5 turns)
33	———	Lift—Rotor lift
34	76929	Bearing—Bottom bearing

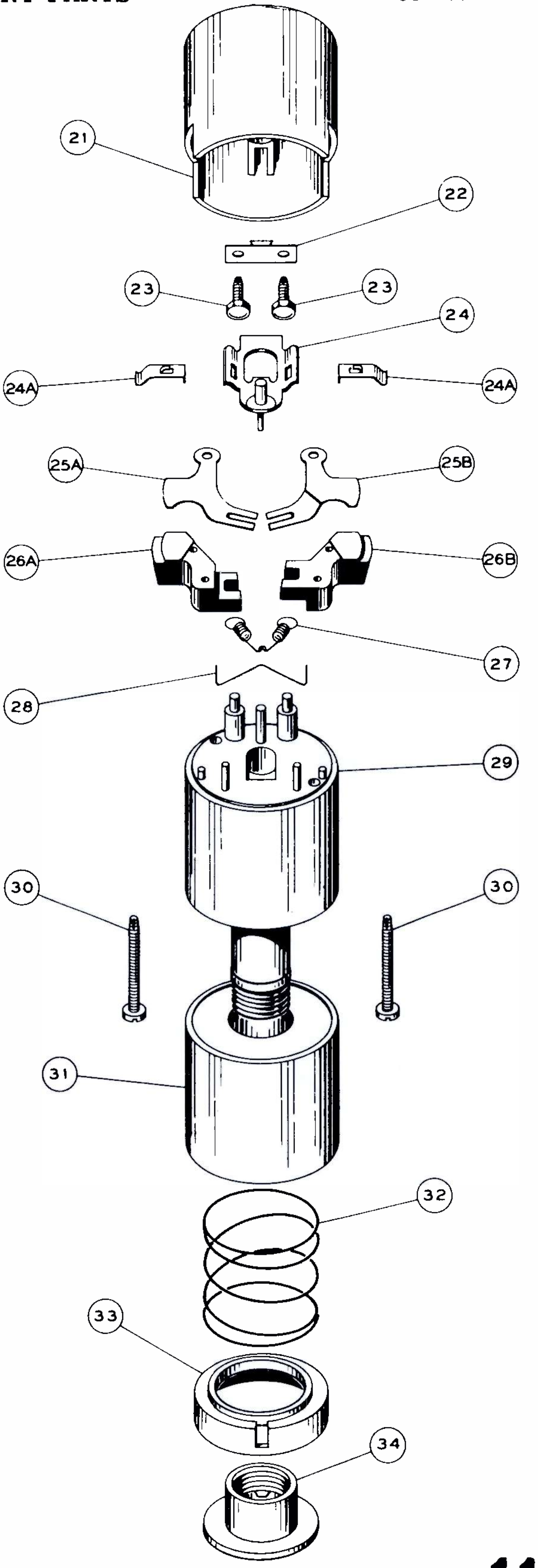


Fig. 26—45 r.p.m. Centerpost Assembly

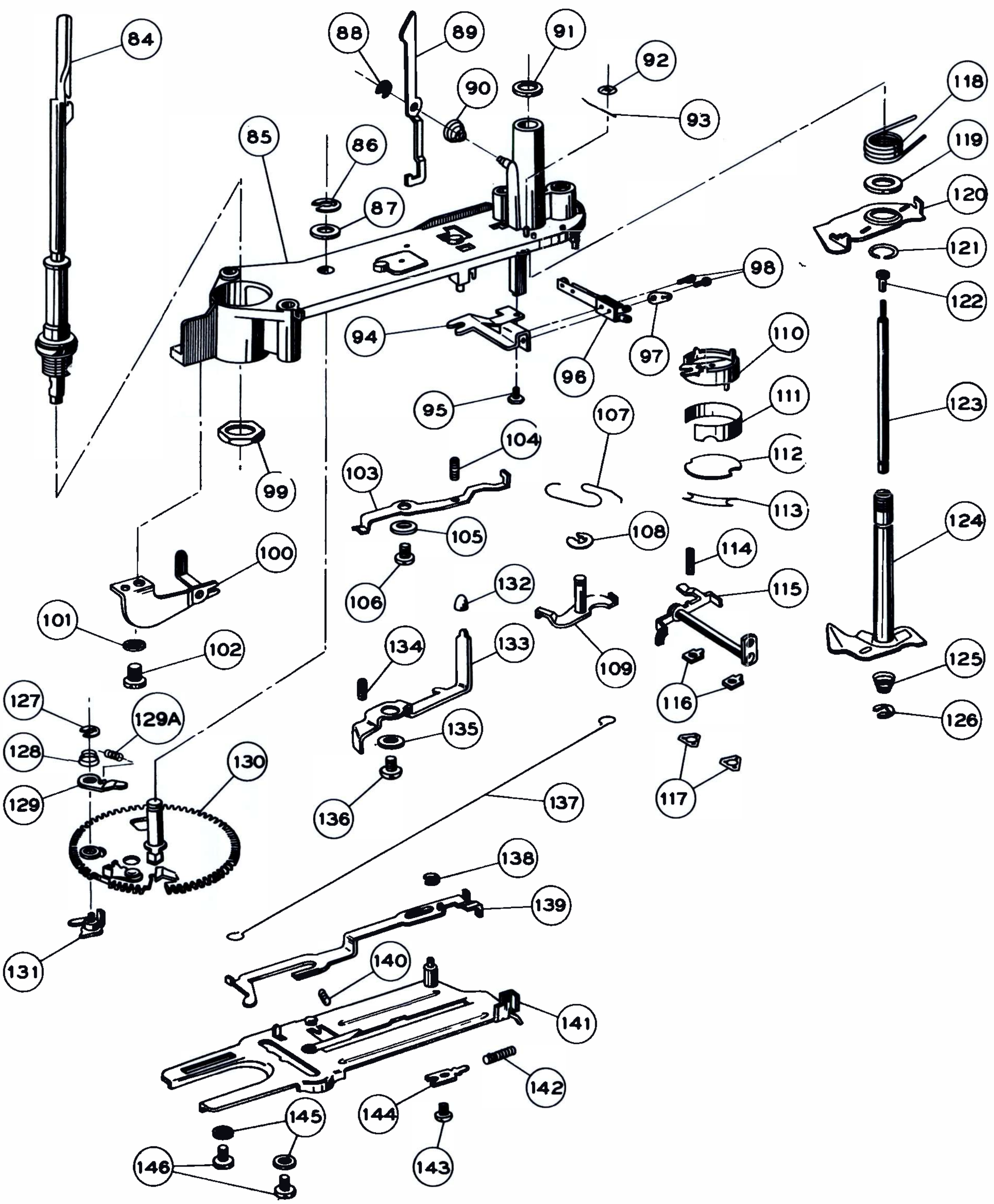


Fig. 27—Slide Assembly

RCA

REPLACEMENT PARTS (Cont.)

930409 Series

ILL. NO.	STOCK NO.	DESCRIPTION
		MOTOR ASSEMBLIES Motors stamped: 5046 for 930409-3 & -6 5355 for 930409-5 & -10 5047 for 930409-9 5432 for 930409-11
59	76744	Spring—Hairpin spring for idler wheel
60	76743	Washer—Flat metal washer
61	76750	Wheel—Idler wheel for #5046, #5047 and #5432 motor (930409-3, -6, -9 & -11)
61	77130	Wheel—Idler wheel for #5355 motor (930409-5 & -10)
62	77132	Plate—Speed pulley mounting plate complete with three (3) pulleys
63	———	Screw—Screw to mount drive pulley plate
64	———	Lockwasher—Lockwasher for drive pulley plate screw
65	———	Lever—Speed shift lever for #5046 and #5047 motors (930409-3, -6 and -9)
65	77183	Lever—Speed shift lever for #5355 motor (930409-5 & -10)
65	77685	Lever—Speed shift lever for #5432 motor (930409-11)
66	77229	Grommet—Rubber grommet for speed shift lever
67	75432	Spring—Hairpin spring for idler wheel plate and support
68	77131	Plate—Idler wheel slide plate and support assembly
69	76745	Spring—Idler wheel tension spring
70	76751	Grommet—Rubber grommet
71	76743	Washer—Flat metal washer
72	76749	Pulley—Spring pulley for 60 cycle operation for motor #5355 and #5432 (930409-5, -10 & -11)
72	77686	Pulley—Spring pulley for 50 cycle operation for motor #5432 and #5046 (930409-3, -6 & -11)
72	———	Pulley—Spring pulley for 50 cycle operation for motor #5047 (930409-9)
72	———	Pulley—Spring pulley for 60 cycle operation for motor #5046 and #5047 (930409-3, -6 & -9)
73	30870	Connector—2 contact male connector
74	———	Motor—117 volt, 60 cycle motor for 930409-3 & -6
74	77135	Motor—117 volt, 60 cycle motor complete with mounting plate—less pulleys and idler wheel for 930409-5 & -10
74	———	Motor—234 volt, 50 cycle motor for 930409-9
74	77687	Motor—117 volt, 50 cycle motor complete with mounting plate, speed pulleys and idler wheel for 930409-11
75	76755	Spring—Detent spring
76	77134	Collar—Speed shift lever collar
		MOTOR ASSEMBLIES For 930409-4 Order by description

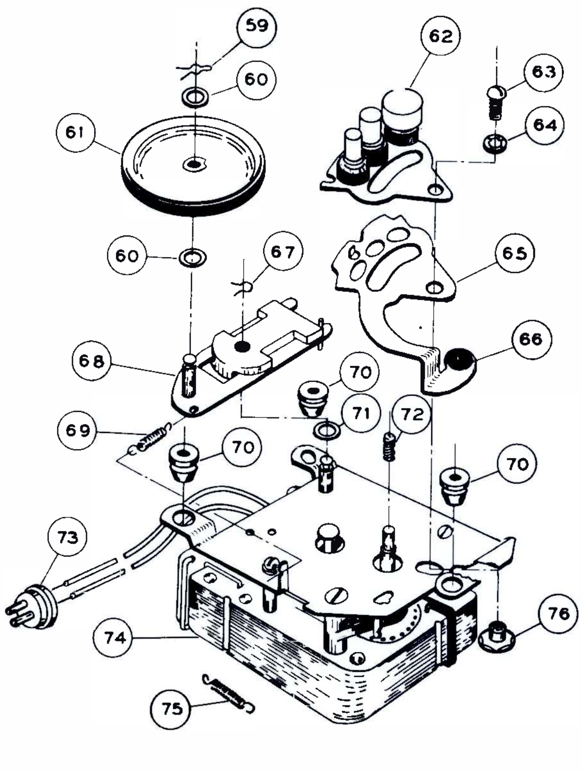


Fig. 28—Motor Assembly

ILL. NO.	STOCK NO.	DESCRIPTION
		SLIDE ASSEMBLIES
84	76904	Centerpost—33⅓-78 r.p.m. centerpost complete with bearing
85	76910	Frame—Main frame—(die-cast)
86	75373	Washer—"C" washer for mounting cycling gear
87	75845	Washer—Fibre washer for mounting cycling gear
88	75397	Washer—"C" washer for 12" indexing lever
89	75844	Lever—12" record indexing lever
90	76309	Spring—12" record indexing lever spring
91	76903	Washer—Pickup thrust washer (fibre)
92	75841	Nut—Speed nut for 12" indexing lever return spring
93	75842	Spring—12" indexing lever return spring (formed)
94	———	Bracket—Muting switch bracket
95	———	Screw—#4-40 x ¼" hex head (indented) thread cutting screw to mount muting switch assembly
96	77191	Switch—Muting switch—less mounting bracket
97	———	Terminal—#4 locking terminal for muting switch assembly
98	———	Screw—#3-48 x 13/32" binding head machine screw for muting switch
99	———	Nut—½-20 pal nut for mounting 33⅓-78 r.p.m. spindle
100	75864	Arm—Lift arm
101	———	Screw—#10-24 x ⅜" binding head machine screw and internal lockwasher
102	———	Screw—#10-24 x ⅜" binding head machine screw and internal lockwasher
103	75859	Lever—Landing selector lever
104	75860	Spring—Return spring (coil type) for landing selector lever (.110" O.D. x ⅜"—14 turns)
105	———	Washer—Metal washer (steel) (1/32" x 7/16" O.D. x .140)
106	———	Screw—#6-32 x ¼" hex head screw
107	76312	Spring—Reject spring (special)
108	75392	Washer—"C" washer for mounting reject lever
109	75856	Lever—Reject lever
110, 111, 112	75857	Switch—"On-Off" switch complete with insulating strip (111) and cover (112)
113	76908	Retainer—Switch cover retainer (flat)
114	76314	Spring—Return spring (coil type) (.125" O.D. x 7/16"—14 turns)
115	76313	Lever—Stop lever
116	77258	Strip—Bearing strip for stop lever shaft
117	76912	Nut—Speed nut for mounting stop lever bearing shafts
118	76944	Spring—Pickup arm return lever spring (coil) (.593" O.D.—3½ turns)
119	75848	Washer—Fibre washer for pickup arm pivot shaft
120	75849	Lever—Pickup arm return lever
121	75850	Retainer—Retaining ring for pickup arm return lever
122	76952	Nut—Elevating rod adjustment nut
123	76951	Rod—Elevating rod
124	76946	Shaft—Pickup arm pivot shaft and lever
125	76906	Spring—Thrust spring (conical) for elevating rod
126	77269	Ring—Retaining ring
127	75397	Washer—"C" washer
128	76309	Spring—Trip pawl spring
129	77250	Pawl—Trip pawl—upper
129A	77249	Spring—Trip pawl cushion spring (coil)
130	76955	Gear—Cycling gear complete with shaft and engagement pawl 130A
131	76953	Pawl—Trip pawl—lower
132	76900	Bumper—Rubber bumper for 10" indexing lever
133	76901	Lever—10" indexing lever
134	76314	Spring—Return spring (coil type) (.125" O.D. x 7/16"—14 turns)
135	———	Washer—Metal washer (steel) (1/32" x 7/16" O.D. x .140)
136	———	Screw—#6-32 x ¼" hex head screw
137	75862	Link—Control link
138	75397	Washer—"C" washer
139	76950	Slide—Trip slide
140	75861	Spring—Escape lever spring (coil) (.120" O.D. x ½"—21 turns)
141	76956	Slide—Cycling slide and cam assembly—less escape lever spring
142	77228	Spring—Stabilizing spring (coil) for cycling slide (.146" O.D. x ¾"—14½ turns)
143	———	Screw—#6-32 x ¼" hex head screw
144	75872	Plate—Bearing plate for cycling slide
145	76897	Washer—Metal washer (brass) for cycling slide
146	———	Screw—#6-32 x ¼" hex head screw

930409 Series — REPLACEMENT PARTS (Cont.) — RCA

ILL. NO.	STOCK NO.	DESCRIPTION
		PICKUP ASSEMBLIES For 930409-3 and 930409-9
10	S-5652	Pickup—Ceramic pickup complete with two styli —for 930409-3
10	75044	Pickup—Crystal pickup complete with two styli —for 930409-9
10A	75046	Stylus—Osmium tip stylus and holder (.003" r., uncoded) for 78 r.p.m.
10B	75045	Stylus—Osmium tip stylus and holder (.001" r., coded red) for 45-33⅓ r.p.m.
10C	75274	Nut—Knurled nut to mount stylus
		PICKUP ASSEMBLIES For 930409-4 and 930409-6
10	162A001	Pickup—Ceramic pickup complete with two styli
10A	490B001	Stylus—Osmium tip stylus (.003" r., uncoded) for 78 r.p.m.
10B	490A001	Stylus—Osmium tip stylus (.001" r., coded red) for 45-33⅓ r.p.m.
		PICKUP ASSEMBLIES For 930409-5, 930409-10 and 930409-11
10	75475	Pickup—Crystal pickup complete with two styli
10A	75497	Stylus—Osmium tip stylus (.003" r., uncoded) for 78 r.p.m.
10B	75496	Stylus—Osmium tip stylus (.001" r., coded red) for 45-33⅓ r.p.m.
10C	74230	Nut—#00-112 nut and washer to mount stylus
		PICKUP ARM ASSEMBLIES
5	76902	Knob—Stylus selector knob less screw
6	76898	Screw—#2-56 x 3/16" headless set screw for stylus selector knob
7	76949	Arm—Pickup arm shell (plastic) for 930409-5, -10 and -11
7	100A001	Arm—Pickup arm shell (plastic) for 930409-3, -4, -6 and -9
7A	76948	Screw—Pickup arm mounting bracket pivot screw
7B	76947	Bearing—Pickup arm mounting bracket pivot bearing
8	75808	Cable—Three (3) wire pickup cable complete with connectors for 930409-5, -10 and -11
8	163A001	Cable—Three (3) wire pickup cable complete with connectors for 930409-3, -4, -6 and -9
9	———	Screw—#4-40 x ⅛" fillister head screw to mount pickup cartridge
11	76957	Swivel—Pickup cartridge mount and swivel assembly for 930409-5, -10 and -11
11	130A001	Swivel—Pickup cartridge mount and swivel assembly for 930409-3, -4, -6 and -9
12	75809	Spring—Pickup arm counterbalance spring
13	75810	Bracket—Pickup arm weight adjustment bracket (slide)
14	76899	Screw—#6-32 x ⅛" round head screw for pickup arm weight adjustment bracket
15	76896	Screw—#4 x ¼" binding head sheet metal screw to mount swivel assembly in arm
16	75812	Spring—Lock spring (coil type) for height adjustment screw
17	75813	Screw—Height adjustment screw (hex head—#5-40 thread)
18	76943	Spring—Tension spring (coil) for landing adjustment stud
19	76911	Cam—Landing adjustment cam
20	76907	Bracket—Pickup arm mounting bracket complete with pin
20A	75816	Stud—Landing adjustment stud (eccentric)
20B	75818	Nut—Speed nut for landing adjustment stud

APPLY TO YOUR RCA DISTRIBUTOR FOR PRICES OF REPLACEMENT PARTS

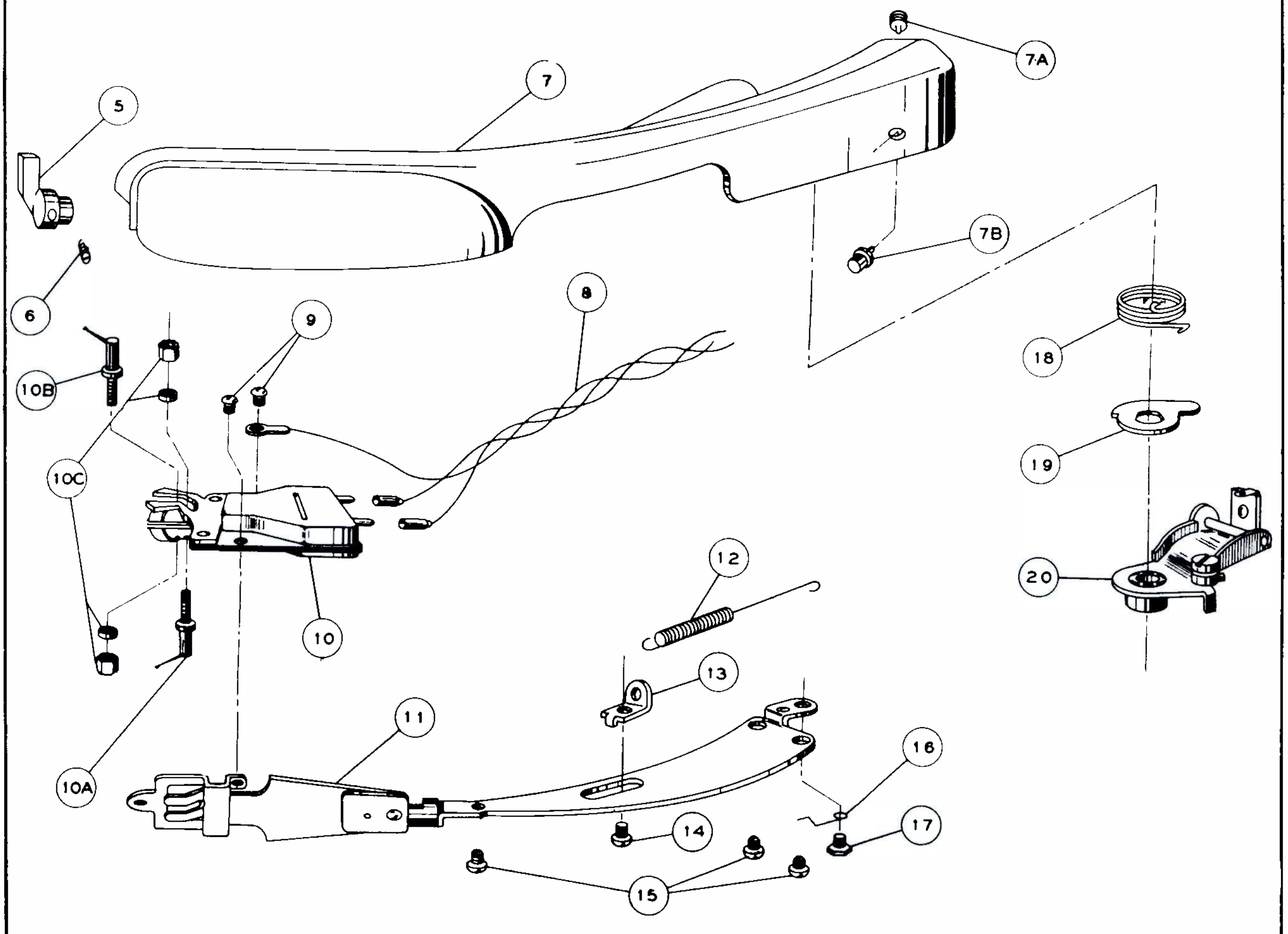
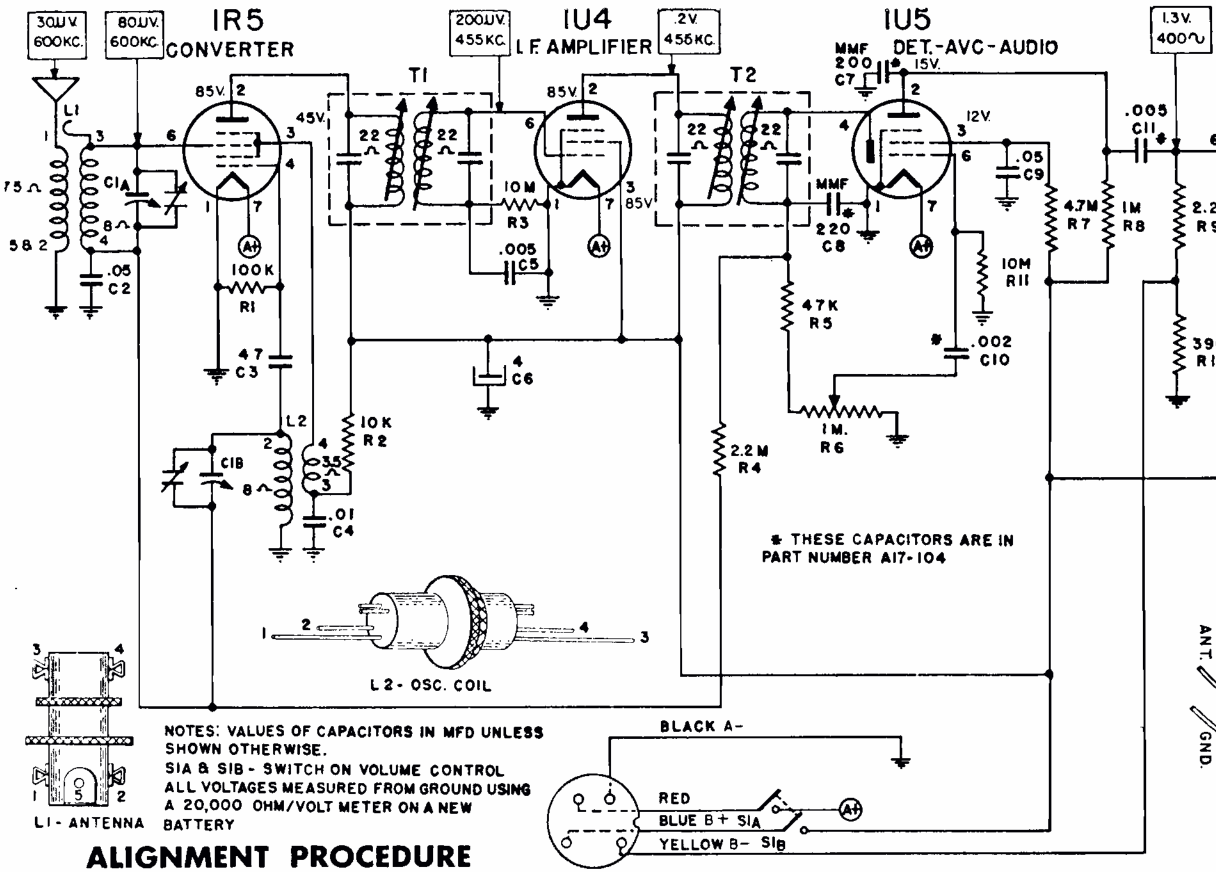
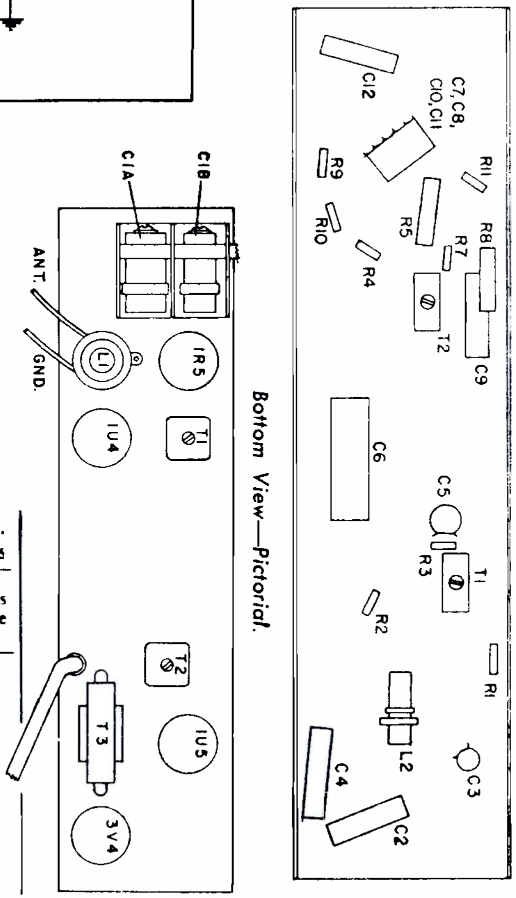


Fig. 29—Pickup Arm Assembly for 930409-5 and -10

Sears, Roebuck & Co. Set Catalog No. 2028, Chassis 528.230



NOTES: VALUES OF CAPACITORS IN MFD UNLESS SHOWN OTHERWISE.
S1A & S1B - SWITCH ON VOLUME CONTROL
ALL VOLTAGES MEASURED FROM GROUND USING A 20,000 OHM/VOLT METER ON A NEW BATTERY



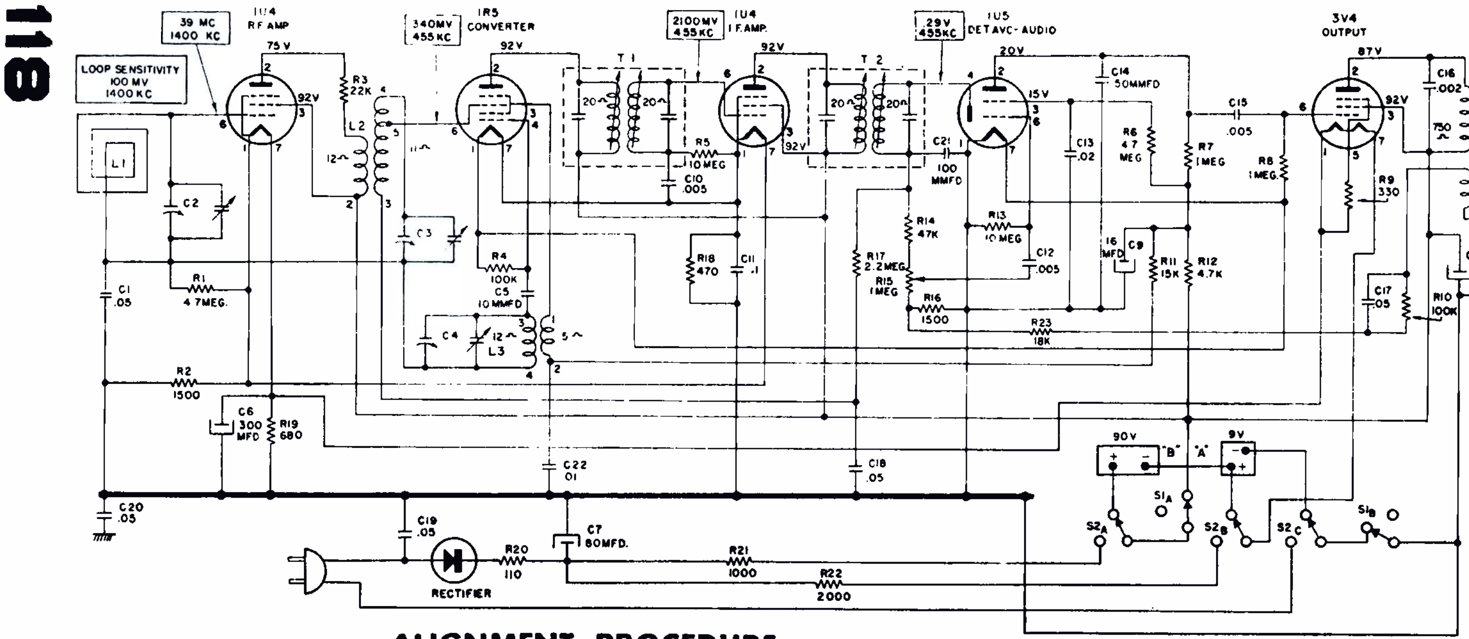
Bottom View—Pictorial.

ALIGNMENT PROCEDURE

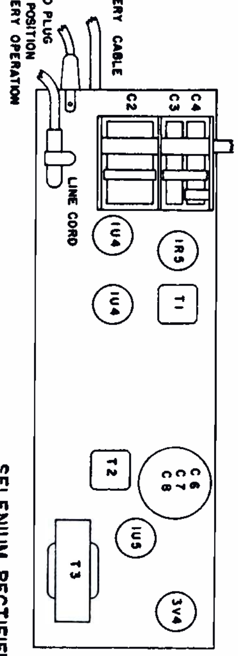
Output meter reading to indicate 0.05 watt across voice coil .... 0.4 v.
Generator ground lead connected .... To chassis

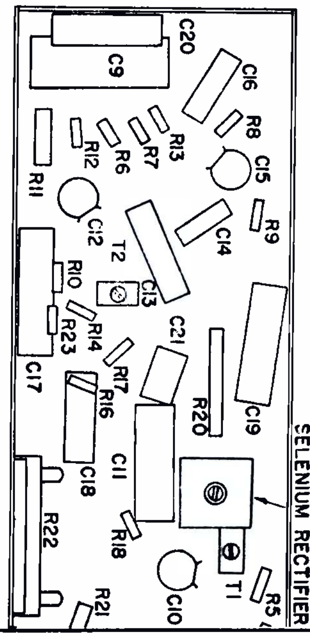
Position of Tuner	Generator Freq.	Dummy Antenna	Generator Connection	Adjustments to be made (in order shown) for max. output	Function	Max. Microvolts Input to produce .05 w. output
Min. Cap.	455 kc	0.1 mfd.	Pin #6 of 1U4 I-F Amp.	T2 (top and bottom)	I.F.	5000
Min. Cap.	455 kc	0.1 mfd.	Pin #6 of 1R5 Conv.	T1 (top and bottom)	I.F.	100
Min. Cap.	1625 kc	0.1 mfd.	Stator ant. tuner	C1B	Osc.	
1400 kc	1400 kc	200 mmfd.	Antenna lead	C1A	Antenna coil	35

Sears, Roebuck & Co. Sets Catalog Nos. 2200, 2202, and 2203
Chassis 528.229 and 528.259



NOTES:
VALUES OF CAPACITORS IN MFD. UNLESS SHOWN OTHERWISE.
$S1_A, S1_B$ - SWITCH ON VOLUME CONTROL.
$S2_A, S2_B, S2_C$ - AC/DC & BATTERY SWITCH.
ALL VOLTAGES MEASURED FROM COMMON NEGATIVE USING A 20,000 OHM/VOLT METER. LINE VOLTAGE SET AT 117 V.A.C. VOLTAGES SHOULD BE AS SHOWN 20 PER CENT.





Location Of Parts Under Chassis

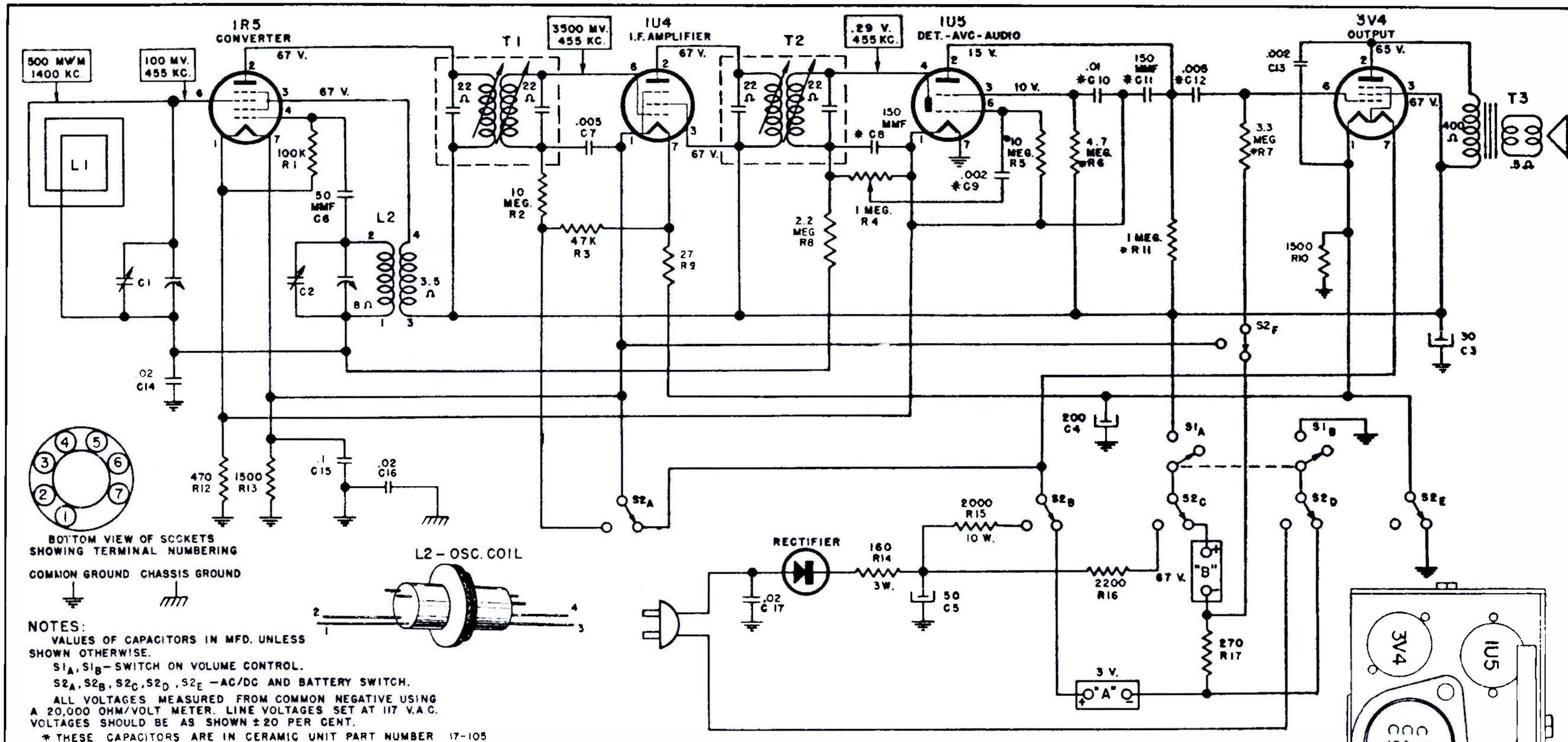
ALIGNMENT PROCEDURE

Output meter reading to indicate 0.05 watt across voice coil .... 0.4 v.
Generator ground lead connected .... To B- through 0.1 mfd. capacitor
Generator modulation .... 30%, 400 cycles
Position of volume control .... Fully on
Position of pointer with tuner fully closed .... Center of pointer lined up with extreme left dot on dial backing plate.

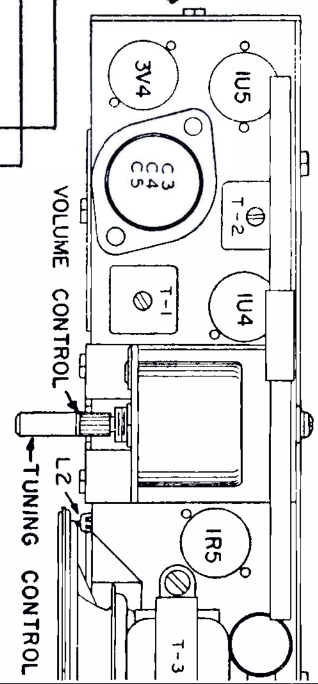
Position of Tuner	Generator Freq.	Dummy Antenna	Generator Connection	Adjustments (in order shown)	Function	Max. Microvolts Input to produce .05 w. output
Min. Cap.	455 kc	0.1 mfd.	Pin #6 of 1U4 I-F Amp.	T2 (top and bottom)	I.F.	5000
Min. Cap.	455 kc	0.1 mfd.	Pin #6 of 1R5 Conv.	T1 (top and bottom)	I.F.	250
Min. Cap.	1610 kc	0.1 mfd.	Stator ant. tuner	C4	Osc.	
1400 kc	1400 KC	0.1 mfd.	Stator ant. tuner	C3	R.F.	30
1400 kc	1400 kc		Hazeltine Test Loop	C2	Loop	100

ALIGNMENT NOTES:
1. It is recommended that this set be connected to an isolation transformer when aligning on AC.
2. The alignment must be done in the order given above.
3. While making the above adjustments, keep the volume control set for maximum output and the signal generator output attenuated to avoid AVC action.

Sears, Roebuck & Co. Chassis 528.238, Sets Catalog Nos. 2215, 2217, 2218



NOTES:
VALUES OF CAPACITORS IN MFD. UNLESS SHOWN OTHERWISE.
$S1_A$, $S1_B$ – SWITCH ON VOLUME CONTROL.
$S2_A$, $S2_B$, $S2_C$, $S2_D$, $S2_E$ – AC/DC AND BATTERY SWITCH.
ALL VOLTAGES MEASURED FROM COMMON NEGATIVE USING A 20,000 OHM/VOLT METER. LINE VOLTAGES SET AT 117 V.A.C. VOLTAGES SHOULD BE AS SHOWN ± 20 PER CENT.
* THESE CAPACITORS ARE IN CERAMIC UNIT PART NUMBER 17-105

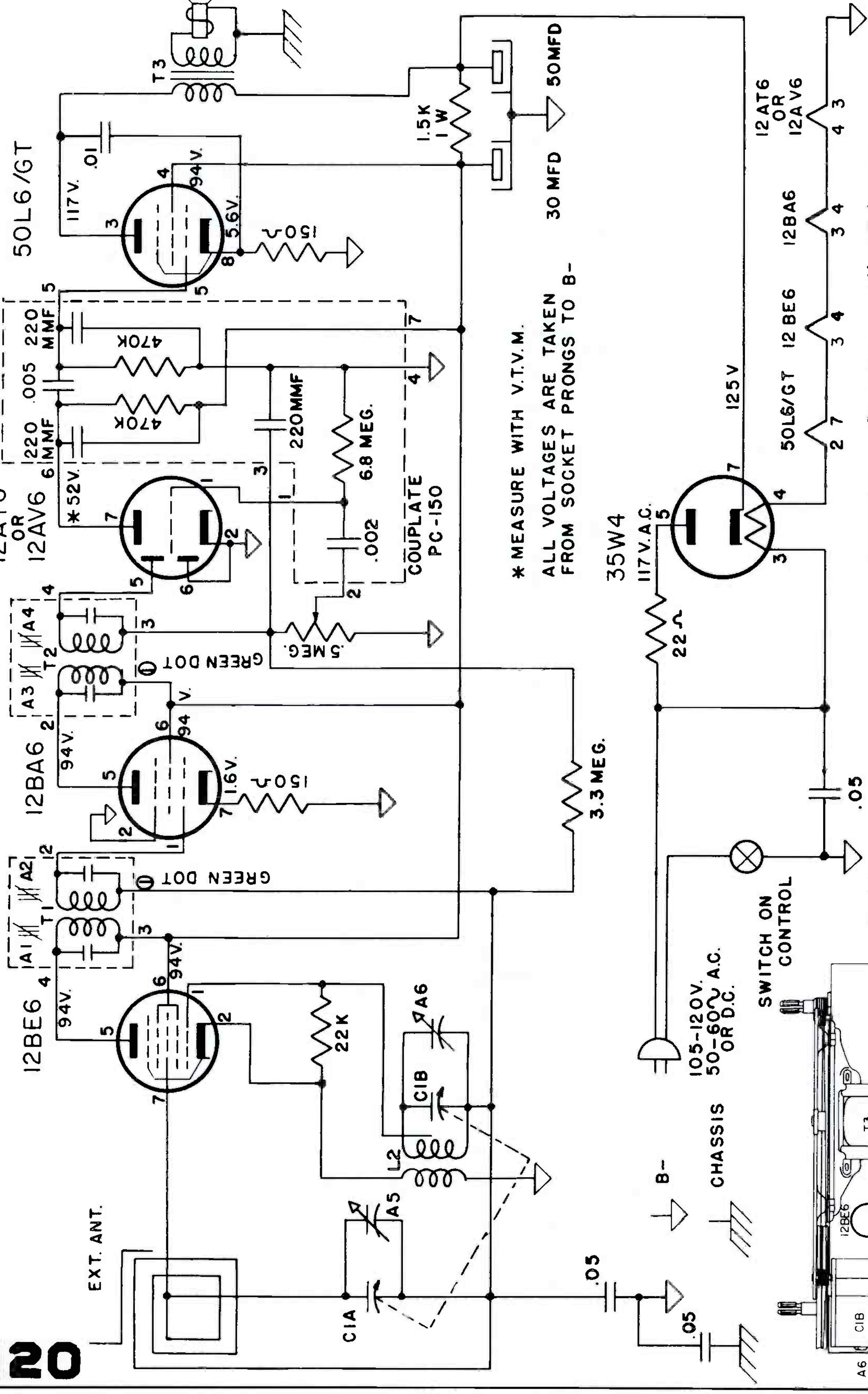


ALIGNMENT PROCEDURE

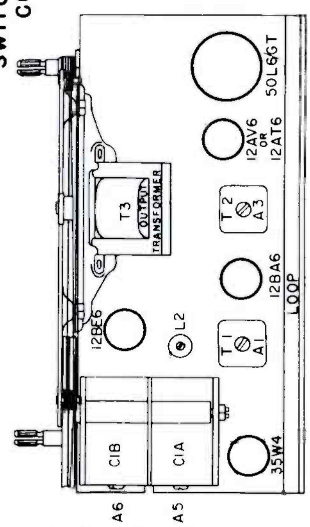
Output meter reading to indicate 0.05 watt across voice coil .... 0.4 v.
Generator ground lead connected .... To B- through 0.1 mfd. capacitor
Generator modulation .... 30%, 400 cycles

Position of Tuner	Generator Freq.	Dummy Antenna	Generator Connection	Adjustments to be made (in order shown) for max. output	Function	Max. Microvolts Input to produce .05 w. output
Min. Cap.	455 kc	0.1 mfd.	Pin #6 of 1U4 I-F Amp	T2 (top and bottom)	I.F.	5000
Min. Cap.	455 kc	0.1 mfd.	Pin #6 of 1R5 Conv.	T1 (top and bottom)	I.F.	250
Min. Cap.	1630 kc	0.1 mfd.	Stator ant. tuner	C2	Osc.	
1400 kc	1400 kc		Hazeltine Test Loop	C1	Loop	900 uv/M

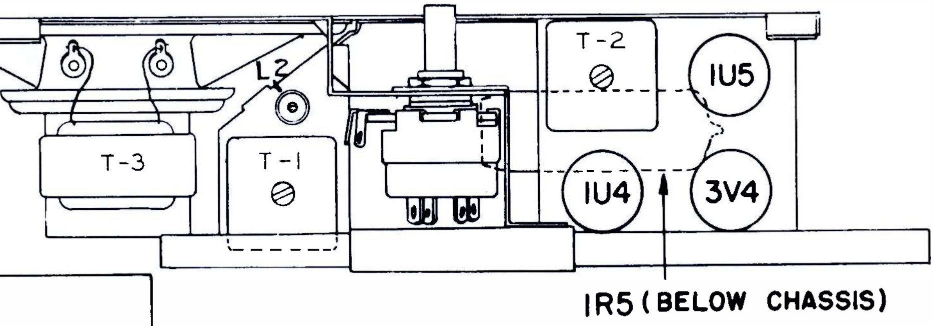
Sears, Roebuck & Co. Chassis 757.110, Models 2003, 2004, 2005, and 2006



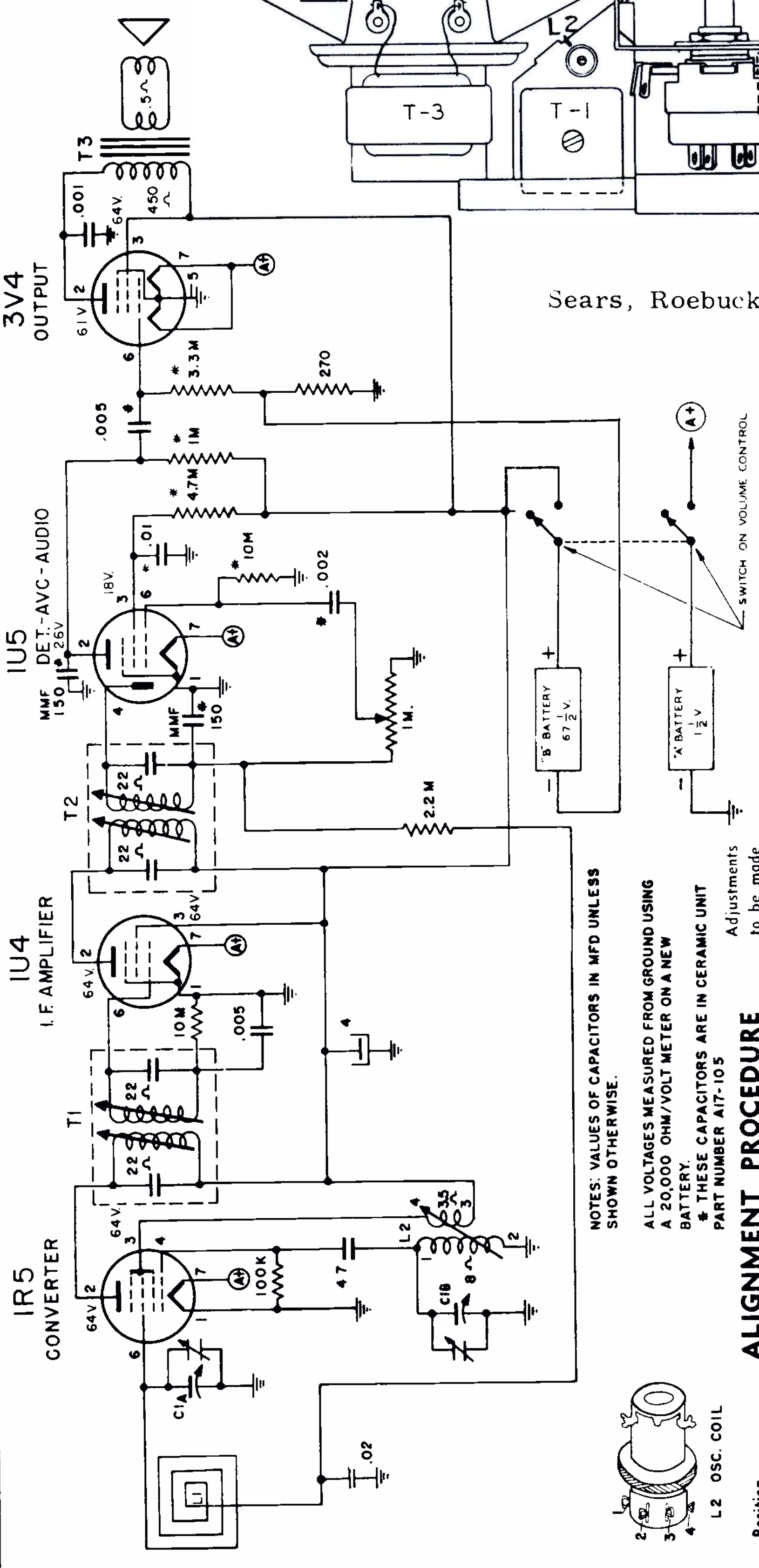
Position of Variable	Generator Frequency	Dummy Ant.	Generator Connection (high)	Generator Connection (low)	Adjust Trimmers (In order shown)	Trimmer Function
Open	455 Kc	.05 mfd	Mixed Grid	Float Gnd.	A4, A3, A2, A1	I.F.
Open (Fully)	1640 Kc	50 mmf	Ext. Ant. Conn.	Float Gnd.	A6	Osc.
1400 Kc	1400 Kc	50 mmf	Ext. Ant. Conn.	Float Gnd.	A5	Ant.
1000 Kc	1000 Kc	50 mmf	Ext. Ant. Conn.	Float Gnd.	Check Point	
600 Kc	600 Kc	50 mmf	Ext. Ant. Conn.	Float Gnd.	Check Point	



SEARS



Sears, Roebuck & Co. Chassis 528.241-1
Set Catalog No. 3210



NOTES: VALUES OF CAPACITORS IN MFD UNLESS SHOWN OTHERWISE.

ALL VOLTAGES MEASURED FROM GROUND USING A 20,000 OHM/VOLT METER ON A NEW BATTERY.

* THESE CAPACITORS ARE IN CERAMIC UNIT PART NUMBER A17-105

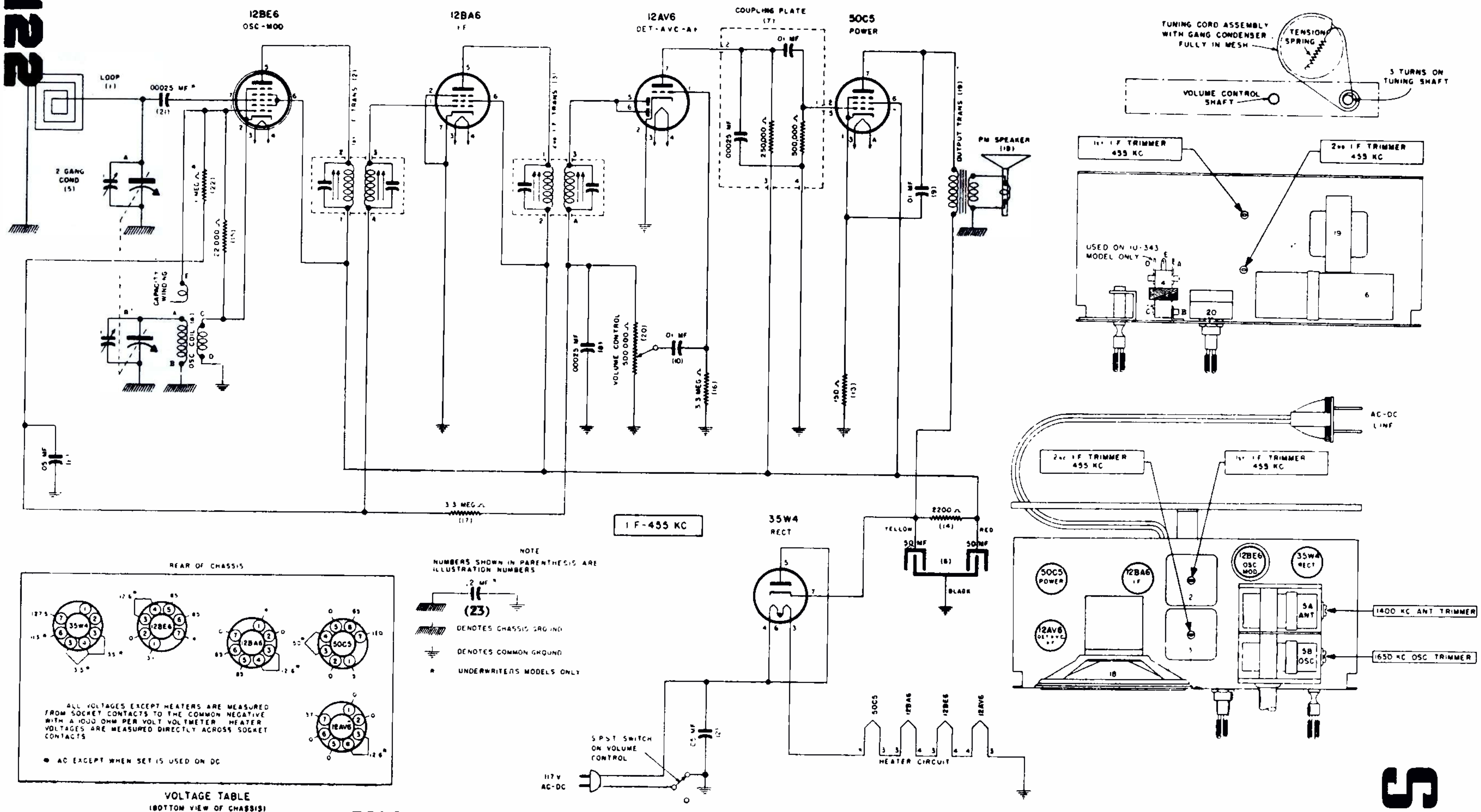
ALIGNMENT PROCEDURE

Position of Tuner	Generator Freq.	Dummy Antenna	Generator Connection	Adjustments to be made (in order shown) For Maximum Output	Function	Input to produce .05 w. output
Min. Cap.	455 kc	0.1 mfd	Pin #6 of 1U4 I-F Ampt.	T2 (top and bottom)	I.F.	5000
Min. Cap.	455 kc	0.1 mfd	Pin #6 of 1R5 Conv.	T1 (top and bottom)	I.F.	250
Min. Cap.	1625 kc	0.1 mfd	Stator ant. tuner	C1B	Osc.	
1400 kc	1400 kc		Hazeltine Test Loop	C1A	Loop	900 uV/M
600 kc	600 kc		Hazeltine Test Loop	L2	Osc.	900 uV/M

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

Sentinel

MODELS 343 1U-343



ALIGNMENT PROCEDURE

Check tuning dial adjustment by tuning gang condenser until plates touch maximum capacity stop (completely in mesh) at which point the dial needle must be exactly even with the last line at the low frequency end of the dial calibration.

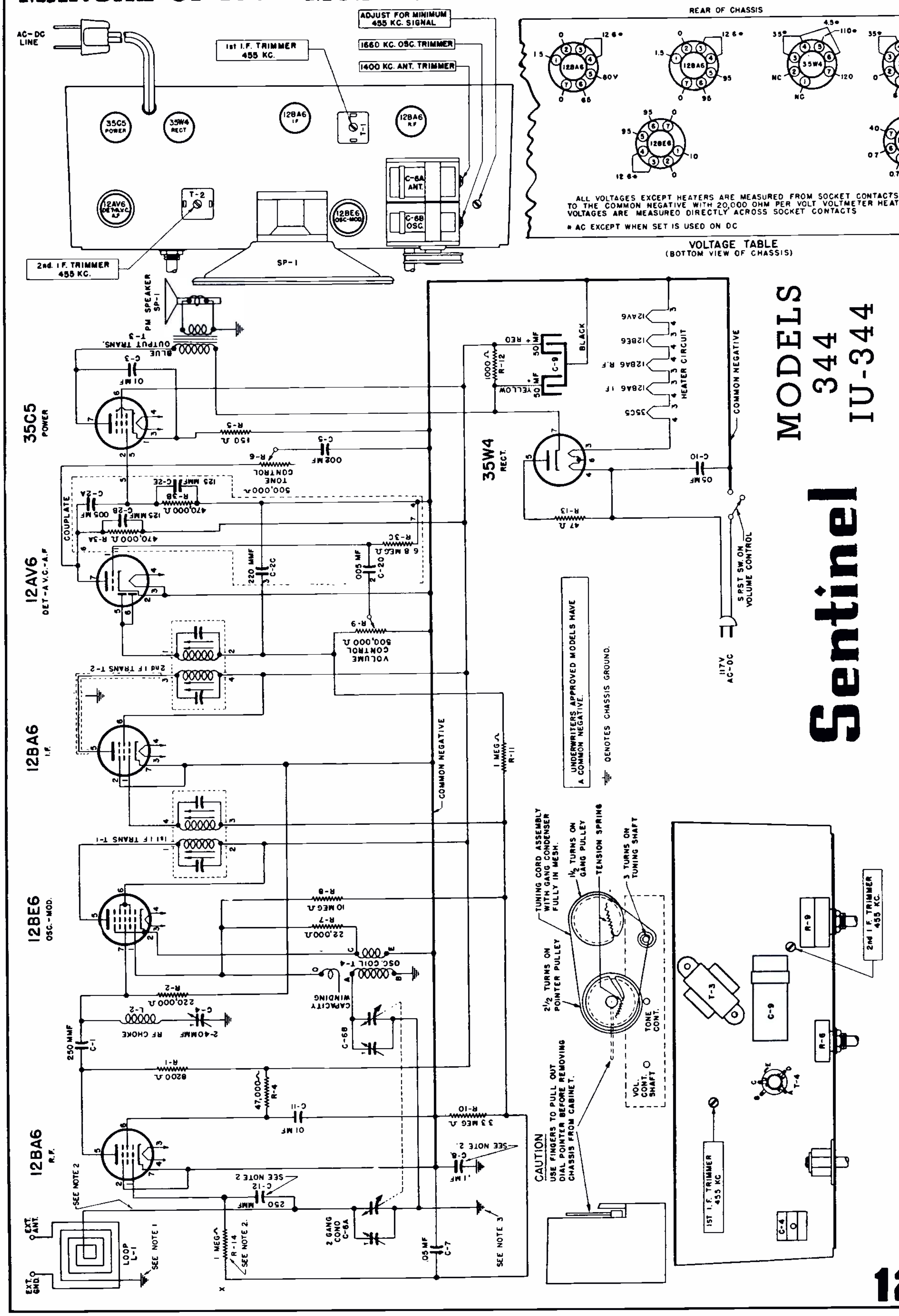
WHEN ADJUSTING THE 1650 KC OSCILLATOR TRIMMER, remove chassis from cabinet and disconnect the loop connection wires from the loop. Attach a 1 megohm resistor across these connections and feed output of test oscillator across the 1 megohm resistor.

THE 1400 KC LOOP ANTENNA TRIMMER should be adjusted only after all other adjustments have been made. PLACE LOOP ANTENNA IN THE SAME POSITION IT WILL BE IN WHEN THE SET IS IN THE CABINET — APPROXIMATELY 5/8" SPACE BETWEEN LOOP AND CHASSIS.

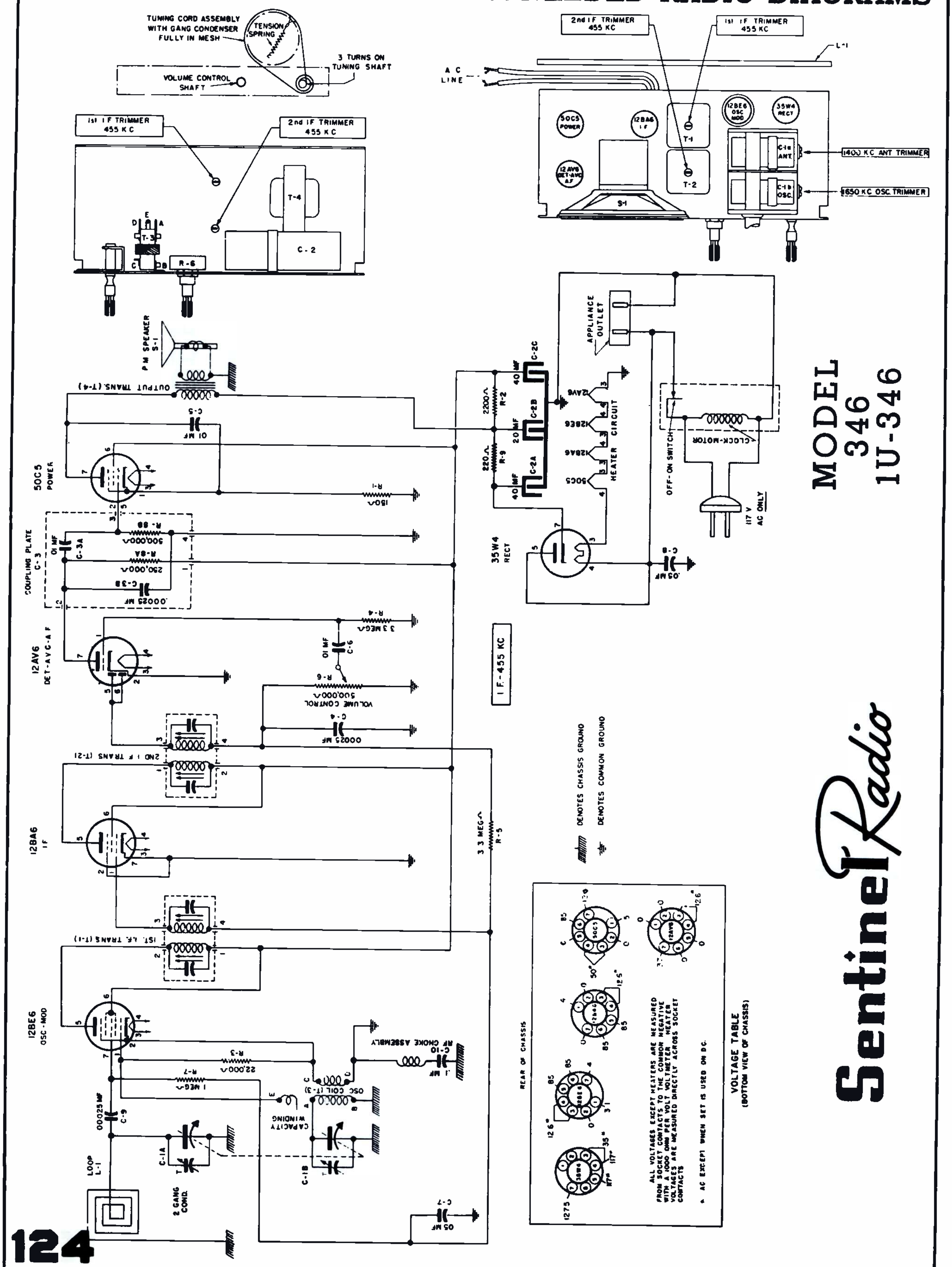
When aligning the 1400 KC Antenna Trimmer, couple test oscillator to receiver loop by: (1) make loop consisting of five to ten turns of No. 20 to No. 30 size wire, wound on a 2" or 3" form; (2) connect this loop across output of test oscillator; (3) place test oscillator loop near radio loop. BE SURE THAT NEITHER LOOP MOVES WHILE ALIGNING.

NOTE 1: Connected as shown in Model 1U343 only. Loop return connected to A.V.C. at point X in Model 343.

NOTE 2: Items with illustration numbers (21), (22) and (23) used in 1U343 only. Loop and gang connected directly to pin #7 on 12BE6 in Model 343.

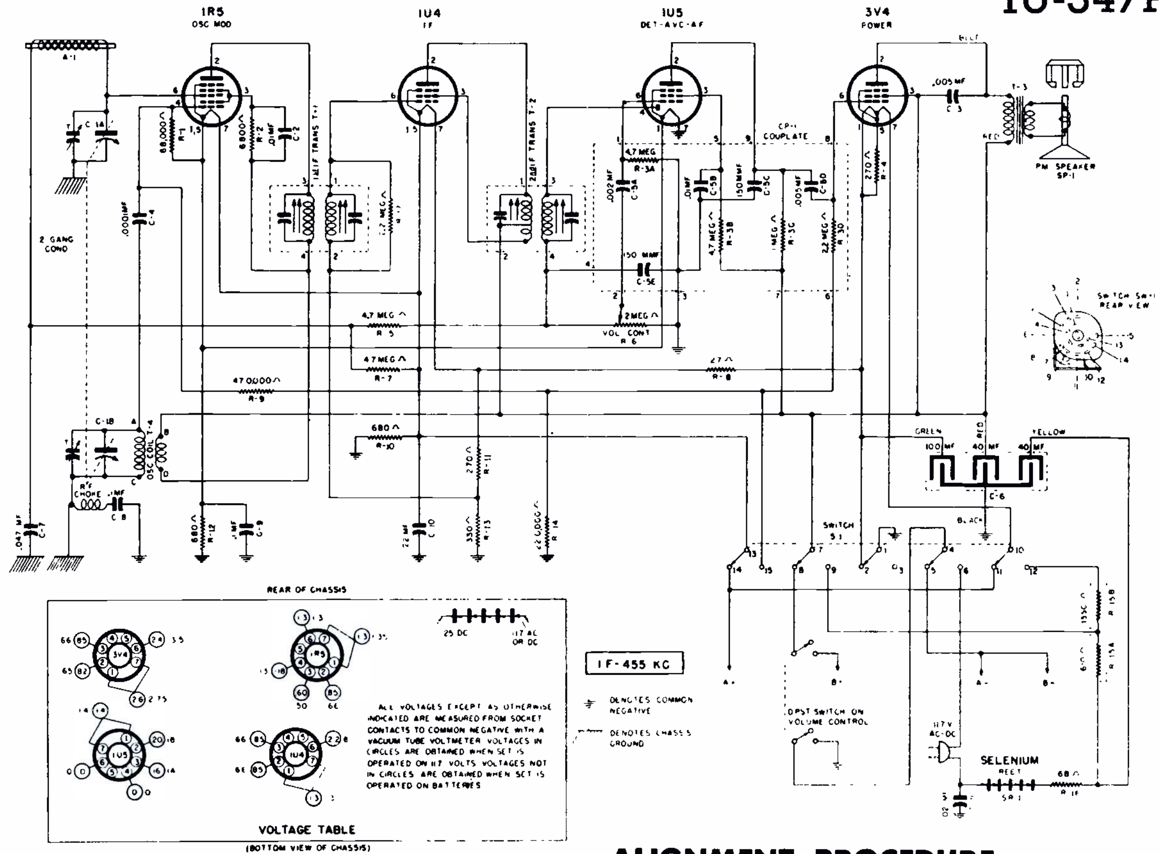


NOTE 1: Connected as shown in MODEL IU-344 only. Loop return connected to AVC at point X in MODEL 344.
NOTE 2: Condensers C-8, C-12, and resistor R-14 are used in MODEL IU-344 only. Loop and gang connected directly to pin No. 1 (grid) in MODEL 344.
NOTE 3: Connected as shown in MODEL IU-344 only. Gang stator connected to AVC, terminal 3 of 1st IF transformer in MODEL 344.


TUNING CORD ASSEMBLY WITH GANG CONDENSER FULLY IN MESH
TENSION SPRING
3 TURNS ON TUNING SHAFT
VOLUME CONTROL SHAFT
1st I F TRIMMER 455 K C
2nd IF TRIMMER 455 K C
T-4
T-3
R-6
C-2
2nd I F TRIMMER 455 KC
1st IF TRIMMER 455 KC
L-1
A C LINE
50C5 POWER
12BA6 I F
12BE6 OSC MOD
35W4 RECT
12AV6 DET-AVC AF
T-1
T-2
S-1
1400 KC ANT TRIMMER
1650 KC OSC TRIMMER
MODEL 346 1U-346
Sentinel Radio

Sentinel Radio

MODELS 347P 1U-347P



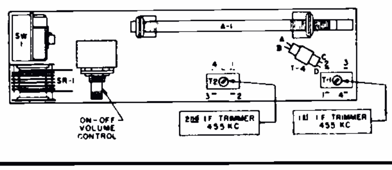
ALIGNMENT PROCEDURE

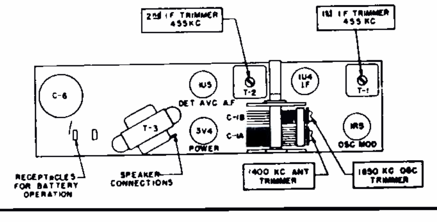
When aligning the I.F. slugs use a non-metallic screwdriver.

Use an accurately calibrated test oscillator with some type of output measuring device.

TO ALIGN 1650 KC OSCILLATOR AND 1400 KC ANTENNA TRIMMERS: Couple oscillator to receiver by; (1) make loop of five turns of No. 20 to 30 size wire, wound on a 2" or 3" form; (2) connect this loop across output of oscillator; (3) place test loop near radio antenna. BE SURE THAT NEITHER LOOP OR RADIO MOVES WHILE ALIGNING.

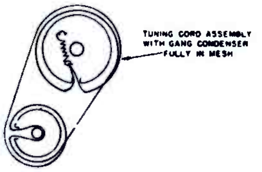
	TEST OSCILLATOR			
Set receiver dial to:	Adjust test oscillator frequency to:	Use dummy antenna in series with output of test oscillator consisting of:	Attach output of test oscillator to	Refer to parts layout diagram for location of trimmers mentioned below:
Any point where no interfering signal is received	Exactly 455 K. C.	0.2 Mfd. Condenser	High side to pin 6 grid of 1R5 tube. Low side to common negative through a .02 MFD blocking condenser.	Adjust each of the 2nd I.F. transformer slugs for maximum output, then adjust each of the 1st I.F. transformer slugs for maximum output.
Rotate gang condenser to minimum capacity	Exactly 1650 K. C.	See Alignment Procedure above	See Alignment Procedure above	Adjust 1650 K. C. oscillator trimmer for maximum output.
Approximately 1400 K. C.	Approx. 1400 K. C.	See Alignment Procedure above	See Alignment Procedure above	Adjust 1400 K. C. antenna trimmer for maximum output.

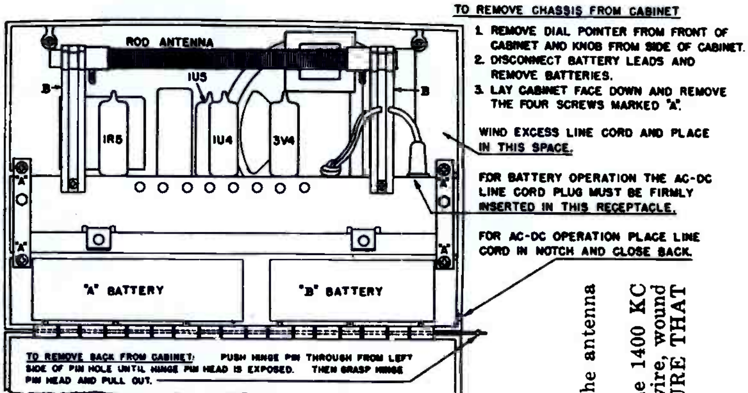


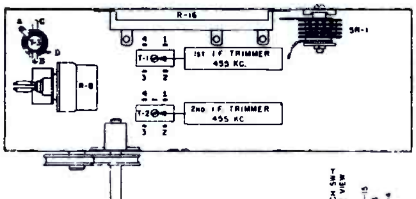


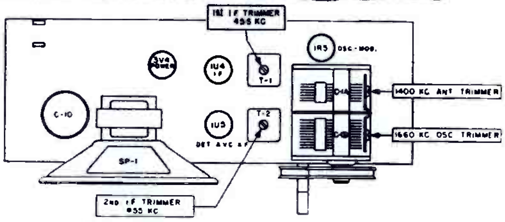
Sentinel

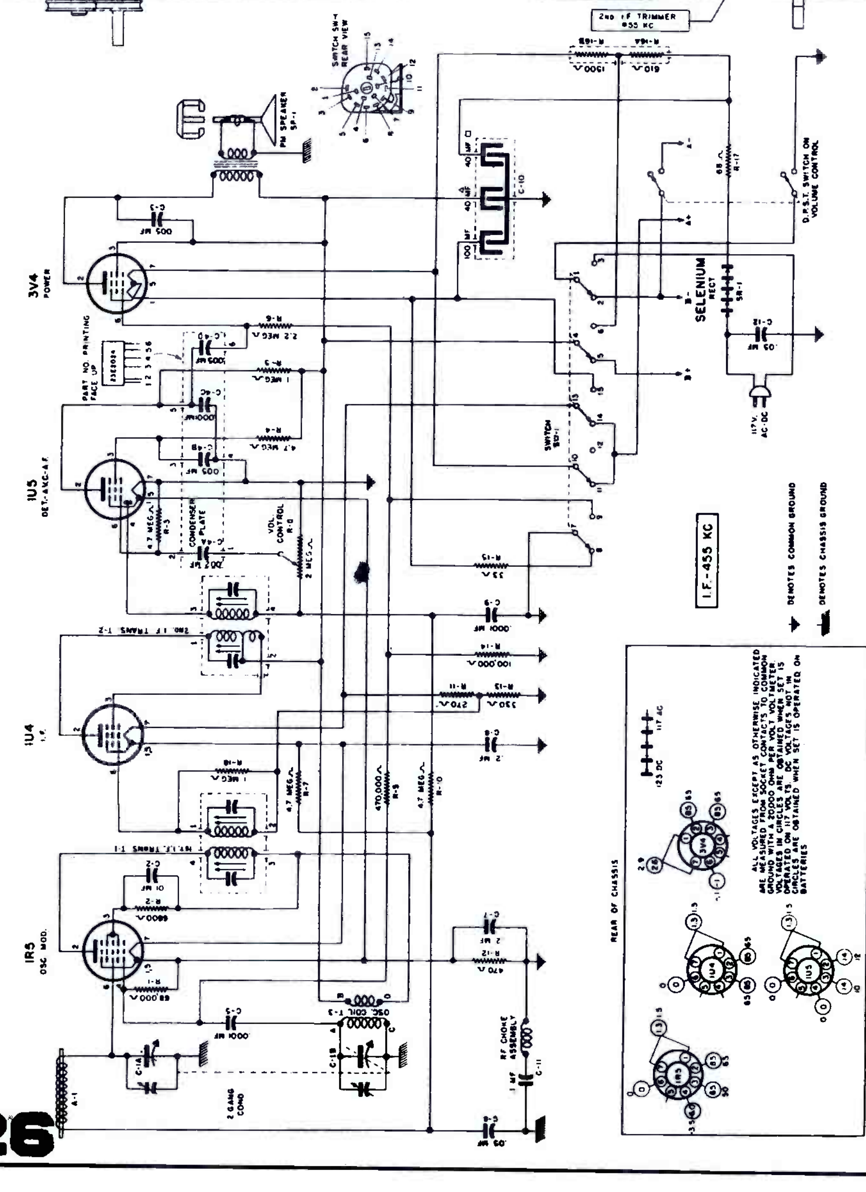
MODELS 348P 1U-348P











ALIGNMENT PROCEDURE

(A) Use an accurately calibrated test oscillator with some type of output measuring device.

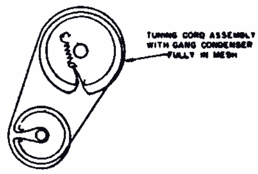
(B) WHEN ADJUSTING THE 1660 KC OSCILLATOR TRIMMER connect the high side of the test oscillator to the connection on the antenna rod closest to the tuning condenser. Connect the low side of the test oscillator to common negative.

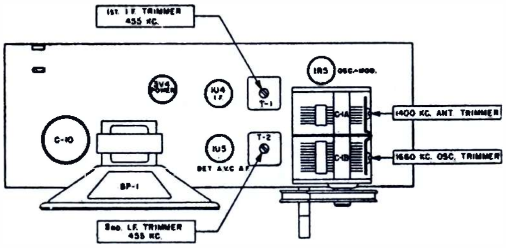
(C) THE 1400 KC ANTENNA TRIMMER should be adjusted only after all other adjustments have been made. When aligning the 1400 KC Antenna Trimmer, couple test oscillator to receiver by; (1) make loop consisting of five to ten turns of No. 20 to No. 30 size wire, wound on a 2" or 3" form; (2) connect this loop across output of test oscillator; (3) place test oscillator loop near radio antenna. BE SURE THAT NEITHER LOOP NOR ANTENNA MOVES WHILE ALIGNING.

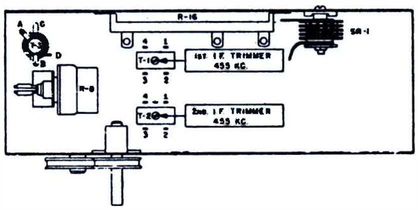
IMPORTANT: WHEN ADJUSTING THE I.F. TRIMMERS USE A THIN NON-METALLIC SCREWDRIVER.

Sentinel Radio

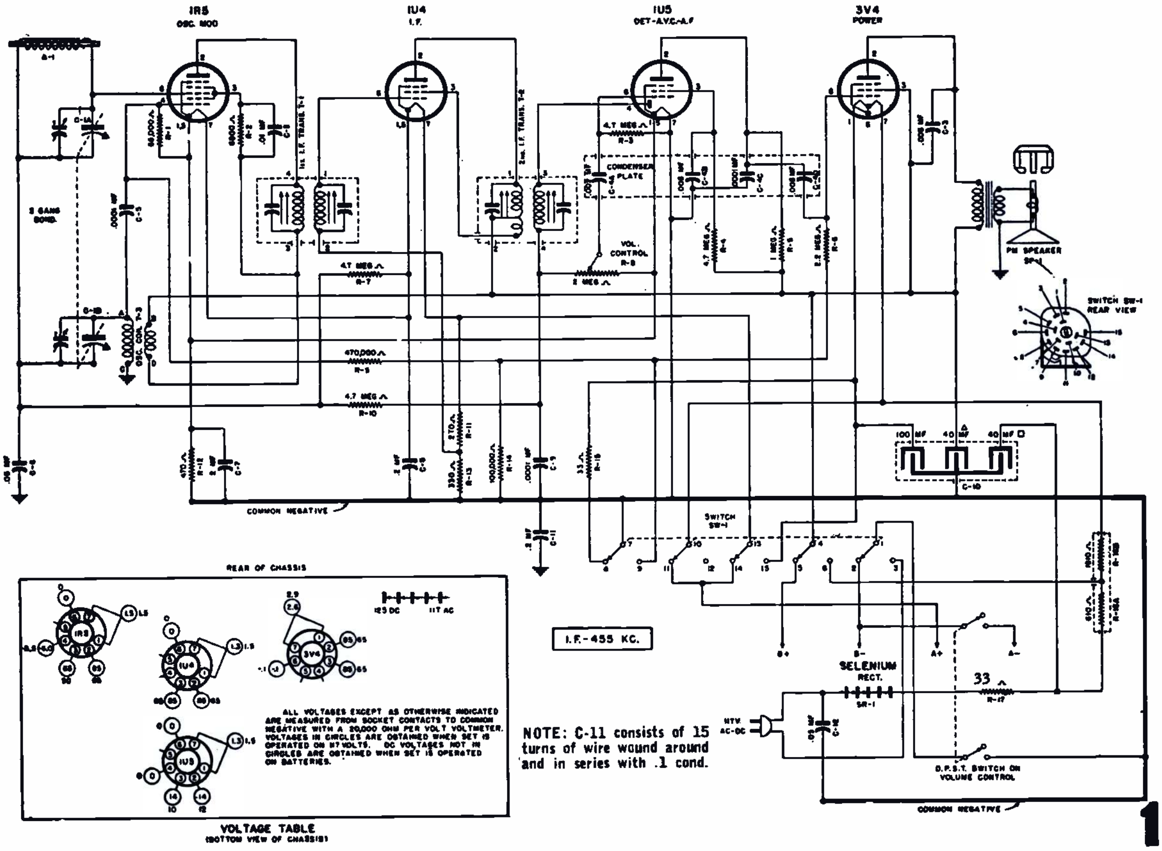
MODELS 345P 1U-345P







Steps	Set receiver dial to:	Adjust test oscillator frequency to:	Use dummy antenna in series with output of test oscillator consisting of:	Refer to parts layout diagram for location of trimmers mentioned below:
1	Any point where no interfering signal is received	Exactly 455 K. C.	0.2 Mfd. Condenser	Adjust each of the 2nd I.F. transformer trimmer adjustment screws for maximum output, then adjust each of the 1st I.F. transformer trimmer adjustment screws for maximum output.
2	Rotate gang condenser to minimum capacity	Exactly 1660 K. C.	See paragraph (B) above	Adjust 1660 K. C. oscillator trimmer for maximum output.
3	Approximately 1400 K. C.	Approx. 1400 K. C.	See paragraph (C) above	Adjust 1400 K. C. antenna trimmer for maximum output.

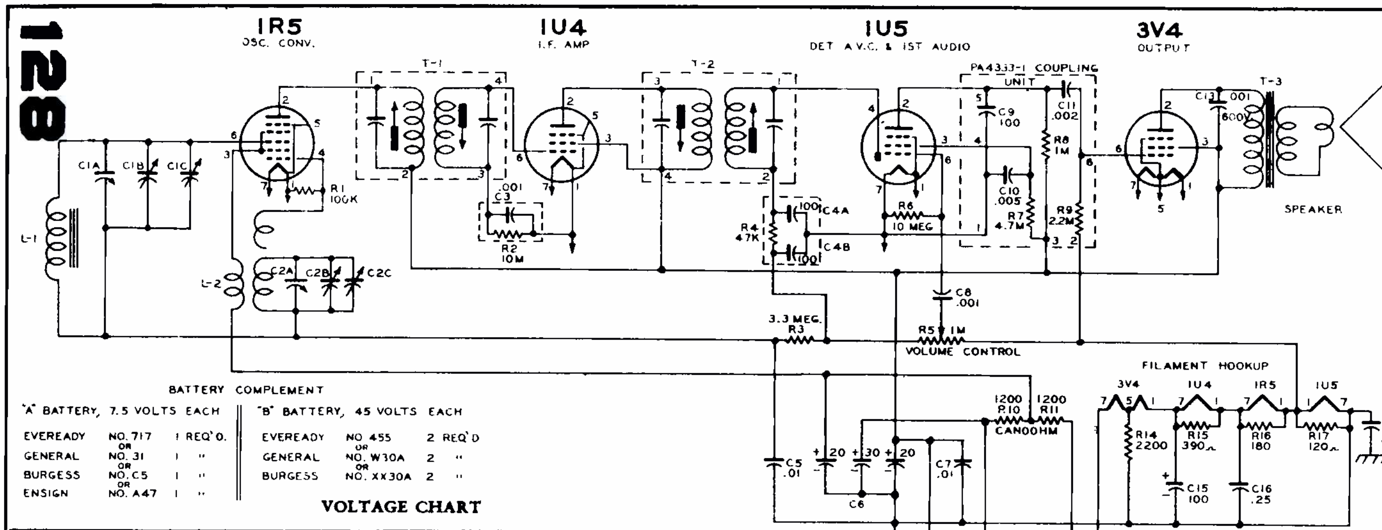


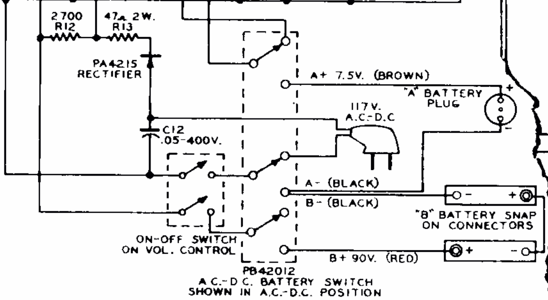
SPARTON RADIO

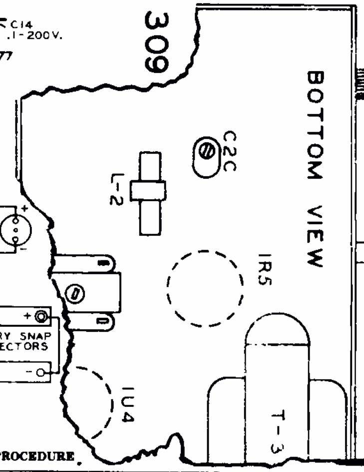
THE SPARKS-WITHINGTON COMPANY

CHASSIS TYPE 4E3

MODELS 301, 305 & 309







BATTERY COMPLEMENT

"A" BATTERY, 7.5 VOLTS EACH			"B" BATTERY, 45 VOLTS EACH		
EVEREADY	NO. 717	1 REQ'D.	EVEREADY	NO. 455	2 REQ'D
GENERAL	OR NO. 31	1 "	GENERAL	OR NO. W30A	2 "
BURGESS	OR NO. C5	1 "	BURGESS	OR NO. XX30A	2 "
ENSIGN	OR NO. A47	1 "			

VOLTAGE CHART

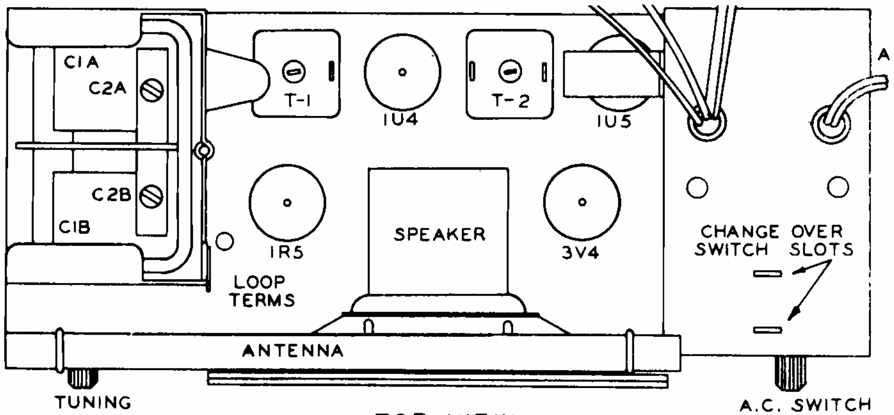
Line Voltage: 117 Volts AC

Position of volume control: Full with set tuned to quiet channel.

TUBE	FUNCTION	Voltage of Sockets Prongs to -B See Prong Nos. on schematic.						
		No. 1	No. 2	No. 3	No. 4	No. 5	No. 6	No. 7
1R5	Osc. Converter	1.37	93	60	**	1.37	0	2.7
1U4	I.F. Amplifier	2.7	93	93	0	2.7	0	4.1
1U5	Det. A.V.C. & 1st Audio	1.37	15	11.5	0	0	0	0
3V4	Output	4.1	93	93	0	5.9	0	7.5

All DC measurements made with 20,000 ohms per volt voltmeter. All AC voltages made with rectifier type voltmeter.

** Cannot be measured with 20,000 Ohms per volt voltmeter.



TOP VIEW

STEP BY STEP ALIGNMENT PROCEDURE.

OPER ATION	ALIGNMENT OF	GENERATOR CONNECTED TO	DUMMY ANTENNA	GENERATOR FREQUENCY	TUNING COND. SETTING	TRIMMER	REMARKS
1.	I.F.	Pin #6 1R5 Tube	.1 Mfd. Cond.	456 KC.	Open	Slug T-2 Top & Bottom	Peak accurately
						Slug T-1 Top & Bottom	Peak accurately
2.	Osc.	Separate Loop	*	1620 KC.	Open	C2B Osc. Tr.	Peak accurately
3.	R.F.		*	1500 KC.	1500 KC	C2A Ant. Tr.	Peak accurately
4.	Repeat Operation #3.						
5.	Check calibration at 600 KC., 1000 KC. and 1500 KC.						
6.	Check Operations #1 to #6 inclusive.						

* Use driver loop.
The generator must be connected to the dummy loop antenna and not to the loop of the receiver for R.F. alignments.
Trimmer C2C as shown on schematic is preset at factory and only on certain conditions will have to be moved. However, should it become necessary to adjust this trimmer on the bottom of the gang a cutout in the chassis base has been provided.

SPARTON SUPERHETERODYNE RADIO RECEIVER

CHASSIS TYPE 5B3 & 5B3C

MODELS 320C, 325C, 321C, 329C, 360, 361, 365 & 369

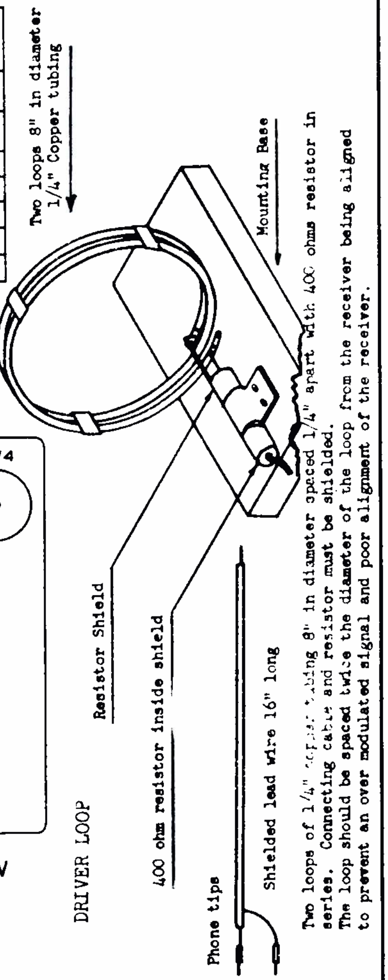
STEP BY STEP ALIGNMENT PROCEDURE

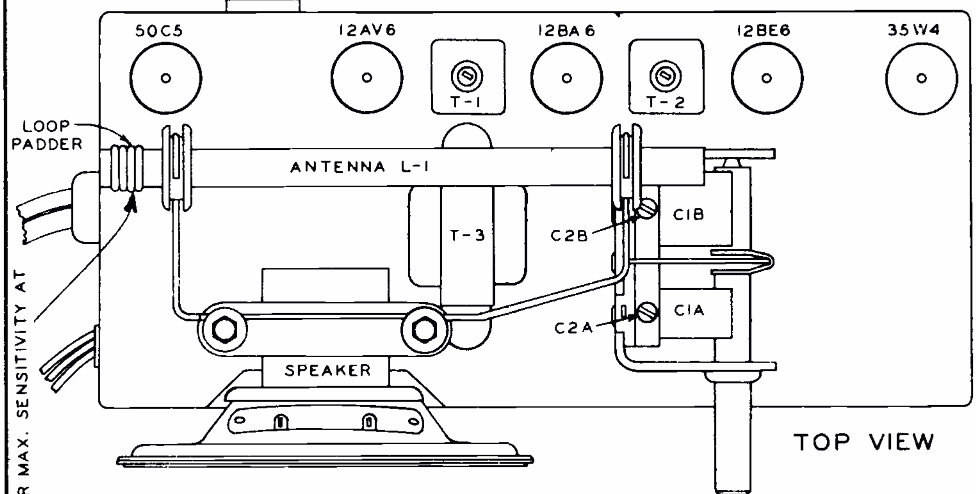
OPER-ATION	ALIGNMENT OF	GENERATOR CONNECTED TO	DUMMY ANTENNA	GENERATOR FREQUENCY	TUNING COND. SETTING	TRIMMER	REMARKS
1.	I.F.	Pin #7 on 12BE6	.02 MFD. Cond.	456 KC.	Fully Open	Slug T-2 Top & Bottom	Peak Accurately
						Slug T-1 Top & Bottom	Peak Accurately
2.	Broadcast	*	Driver Loop	1500 KC.	1500 KC.	C2A Osc. Tr.	Peak Accurately
						C2D Osc. Tr.	* *
						C2B Ant. Tr.	* * *
3.	Repeat operations 1 and 2						
4.	Check calibrations at 600, 1000 and 1500 KC.						

* Use driver loop.

** Trimmer C2D as shown on schematic is preset at factory and only on certain conditions will have to be re-adjusted in the field. This trimmer is located on bottom side of gang.

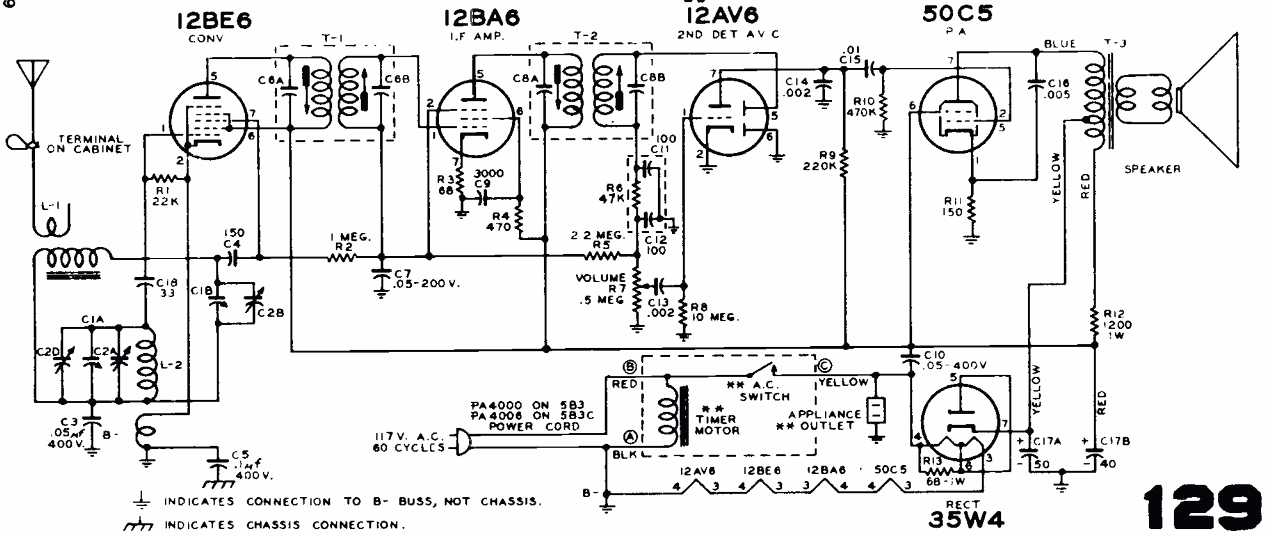
*** Rock dial while adjusting for maximum output.





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

** TIMER UNIT & APPLIANCE OUTLET ON 5B3C ONLY.
A C SWITCH IN 5B3 ON VOLUME CONTROL.
A C SWITCH IN 5B3C IN TIMER UNIT



MANUAL OF 1953 MOST-OFTEN-NEEDED RADIO DIAGRAMS

SPARTON RADIO

THE SPARKS-WITHINGTON COMPANY

CHASSIS TYPE 5C3

MODELS 342, 345 & 349

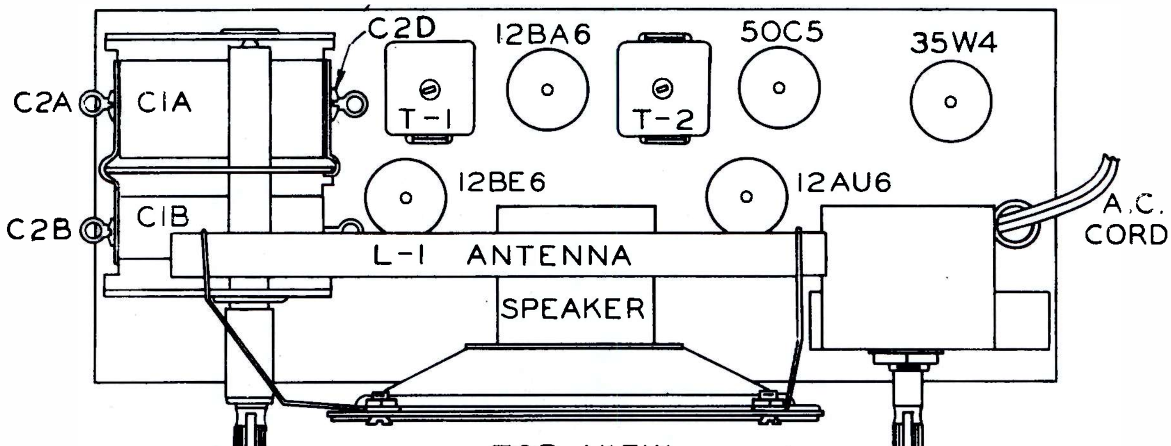
STEP BY STEP ALIGNMENT PROCEDURE

OPERATION	ALIGNMENT OF	GENERATOR CONNECTED TO	DUMMY ANTENNA	GENERATOR FREQUENCY	TUNING COND. SETTING	TRIMMER	REMARKS
1.	I.F.	Pin #7 on 12BE6	.02 MFD. Cond.	456 KC.	Fully Open	Slug T-2 Top & Bottom	Peak Accurately
						Slug T-1 Top & Bottom	Peak Accurately
2.	Broadcast	*	Driver Loop	1500 KC.	1500 KC.	C2A Osc. Tr.	Peak Accurately
						C2D Osc. Tr.	* *
						C2B Ant. Tr.	* * *
3.	Repeat operations 1 and 2						
4.	Check calibrations at 600, 1000 and 1500 KC.						

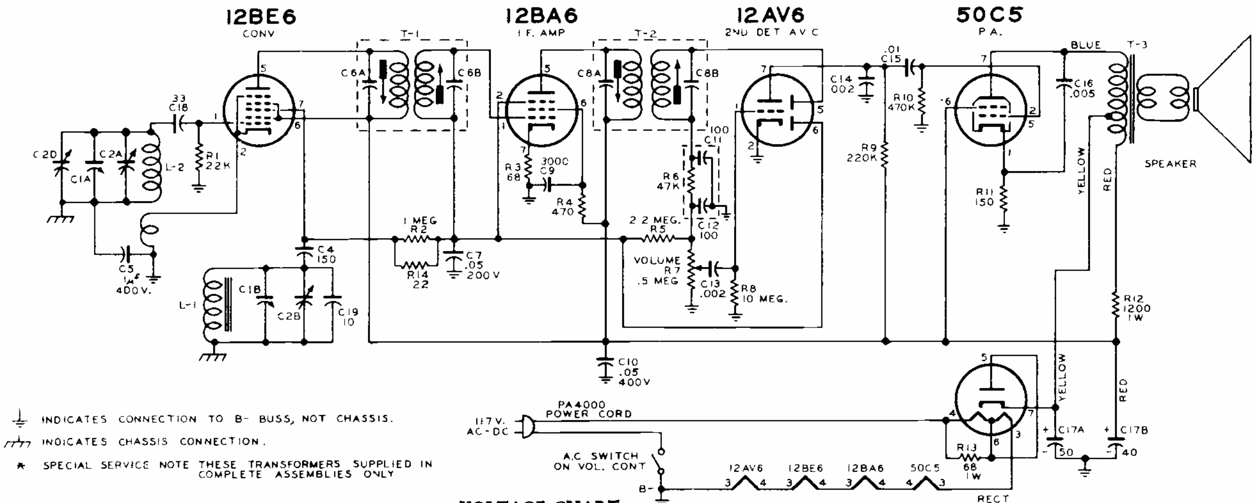
* Use driver loop.

** Trimmer C2D as shown on schematic is preset at factory and only on certain conditions will have to be re-adjusted in the field. This trimmer is located on side of gang.

*** Rock dial while adjusting for maximum output.



TOP VIEW



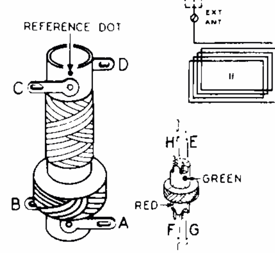
VOLTAGE CHART

Line Voltage: 117 Volts AC		Position of volume control: Full with set tuned to quiet channel.							
TUBE	FUNCTION	Voltage of Sockets Prongs to B- See Prong Nos. on Schematic.							
		No. 1	No. 2	No. 3	No. 4	No. 5	No. 6	No. 7	No. 8
12BE6	Converter	**	0	23*	11.5*	95	95	**	
12BA6	I.F. Amp.	**	0	23*	34.5*	95	93	0.55	
12AV6	2nd Det. & Audio Amp.	**	0	11.5*	0	**	0	48	
50C5	Power Amp.	6.3	0	84.5*	34.5*	0	95	115	0
35W4	Rectifier	0	118	84.5*	117*	117*	108*	120	

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

STEWART-WARNER MODELS 9165-A & 9165-B

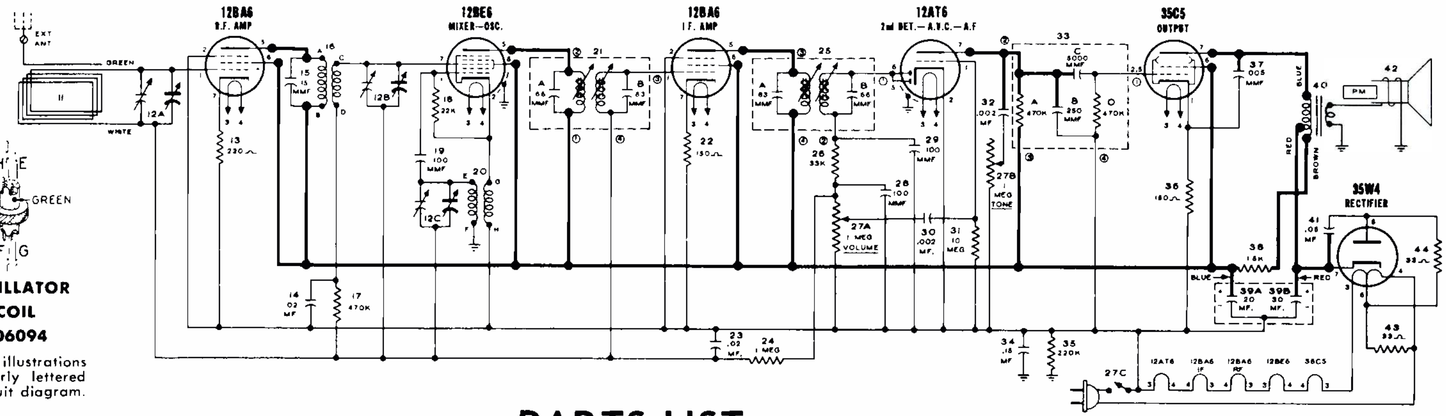
Continued on the next page, over.



R.F. COIL
508692

OSCILLATOR COIL
506094

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



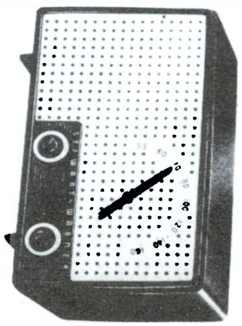
PARTS LIST

DIAGRAM NO.	PART NO.	DESCRIPTION
		CONDENSERS
12-A,B,C	520388	Condenser—variable gang (includes drum)
14	512016	Condenser—.02 Mfd. 400 volt
15	513405	Condenser—ceramic 15 Mmfd. 500 volt (Temperature Compensating)
19	512503	Condenser—mica 100 Mmfd. 500 volt
21-A	505867	Condenser—ceramic 66 Mmfd. (Part of 1st I.F. transformer)
21-B	505867	Condenser—ceramic 83 Mmfd. (Part of 1st I.F. transformer)
23	512016	Condenser—.02 Mfd. 400 volt
25-A	505867	Condenser—ceramic 83 Mmfd. (Part of 2nd I.F. transformer)
25-B	505867	Condenser—ceramic 66 Mmfd. (Part of 2nd I.F. transformer)
28,29	512503	Condenser—mica 100 Mmfd. 500 volt
30	512002	Condenser—.002 Mfd. 600 volt
32	512002	Condenser—.002 Mfd. 600 volt
33-B	505858	Condenser—ceramic 250 Mmfd. 450 volt (Part of Audio Coupling Unit)
33-C	505858	Condenser—ceramic 5000 Mmfd. 450 volt (Part of Audio Coupling Unit)
34	512040	Condenser—.15 Mfd. 400 volt
37	512006	Condenser—.005 Mfd. 600 volt
39-A,B	508147	Condenser—electrolytic A—20 Mfd. 150 v. B—30 Mfd. 150 v.
41	512030	Condenser—.05 Mfd. 600 volt
		RESISTORS
13	510125	Resistor—carbon 220 Ohms ½ watt
17	510185	Resistor—carbon 470,000 Ohms ½ watt
18	510161	Resistor—carbon 22,000 Ohms ½ watt
22	510121	Resistor—carbon 150 Ohms ± 10% ½ watt
24	510191	Resistor—carbon 1 Meg. ½ watt
26	510164	Resistor—carbon 33,000 Ohms ½ watt
27-A,B,C	520390	Volume and Tone control (includes ON-OFF switch) A—Volume control; 1 Meg. B—Tone control; 1 Meg. C—On-Off switch (If this component is mounted on an auxiliary bracket, remove this bracket and mount new control directly to side of chassis.)
31	510197	Resistor—carbon 10 Meg. ½ watt

DIAGRAM NO.	PART NO.	DESCRIPTION
		RESISTORS—Continued
33-A	505858	Resistor—carbon 470,000 Ohms ⅕ watt (Part of Audio Coupling Unit)
33-D	505858	Resistor—carbon 470,000 Ohms ⅕ watt (Part of Audio Coupling Unit)
35	510179	Resistor—carbon 220,000 Ohms ½ watt
36	510121	Resistor—carbon 150 Ohms ± 10% ½ watt
38	510240	Resistor—carbon 1500 Ohms 1 watt
43,44	510210	Resistor—carbon 33 Ohms 1 watt
		COILS AND TRANSFORMERS
11	508740	Loop antenna
16	508692	Coil—R.F.
20	506094	Coil—oscillator
21	505867	Transformer—1st I.F. (Includes condensers 21-A and 21-B)
25	505867	Transformer—2nd I.F. (Includes condensers 25-A and 25-B)
40	508146	Transformer—output
		OTHER ELECTRICAL PARTS
33-A to D	505858	Audio Coupling Unit A—Resistor—carbon 470,000 Ohms ⅕ w. B—Condenser—ceramic 250 Mmfd. 450 v. C—Condenser—ceramic 5000 Mmfd. 450 v. D—Resistor—carbon 470,000 Ohms ⅕ w.
42	508699	Speaker—P.M. Dynamic (5")
		MISCELLANEOUS
	508244	Back for cabinet
	505368	Base for tube shield (miniature)
	505165	"C" washer for tuning shaft
	520391	Cabinet (complete) for Model 9165-A (Black and Yellow)
	520392	Cabinet (complete) for Model 9165-B (Rust and Tan)
	520383-A	Cabinet body for Model 9165-A (Black)
	520383-B	Cabinet body for Model 9165-B (Rust)
	520382-A	Cabinet front for Model 9165-A (Black and Yellow)
	520382-B	Cabinet front for Model 9165-B (Rust and Tan)
	505101	Clip for mounting I.F. transformer
	500473	Clip for mounting front panel to cabinet body
	508149	Clip for mounting loop antenna
	112745	Clip for mounting R.F. coil
	114955	Clip—retainer on end of dial cord

PART NO.	DESCRIPTION
	MISCELLANEOUS—Continued
508235	Clip—retains cabinet back
117057	Cord—dial drive (2 ft. required) per ft.
520387-A	Knob—"TONE" for Model 9165-A (Yellow)
520387-B	Knob—"TONE" for Model 9165-B (Tan)
520385-A	Knob—"TUNING" for Model 9165-A (Black and Yellow)
520385-B	Knob—"TUNING" for Model 9165-B (Rust and Tan)
520386-A	Knob—"VOLUME ON" for Model 9165-A (Black)
520386-B	Knob—"VOLUME ON" for 9165-B (Rust)
520384-A	Pointer for Model 9165-A (Black)
520384-B	Pointer for Model 9165-B (Rust)
520186	Rubber washer for mounting front panel to cabinet body
18785	Screw—#8 - ⅞" chassis mounting
170819	Screw—#8 - 32 x ⅜" plastic thread cutting; mounts clip for cabinet back
170820	Screw—#8 - 32 x ½" plastic thread cutting; retains cabinet back
520389	Shaft—tuning
505367	Shield—tube; miniature
507364	Socket—miniature (7 pin)
505161	Spring—dial cord tension

I.F. 455 K.C.



Stewart-Warner Models 9165-A and 9165-B, continued from preceding page.

ALIGNMENT PROCEDURE

1. During the alignment of this receiver, the pointer will have to be set to a specific frequency. Since the dial scale is an integral part of the cabinet, the receiver chassis must be in the cabinet for correct positioning of the gang condenser and pointer.

   Before setting the pointer to the desired frequency, it will be necessary to check the position of pointer with respect to the gang condenser. To accomplish this, rotate tuning knob fully counter-clockwise until gang condenser is fully meshed. With gang in this position, pointer should be **parallel** with base of cabinet.

   If the pointer is not properly positioned, hold the Tuning Knob steady and move the pointer manually to the proper place.

2. Before removing chassis from cabinet, it will be necessary to take off the Volume Control knob, Tone knob, Tuning knob and cabinet back and to remove the two chassis mounting screws at bottom of cabinet. Then turn the tuning **shaft** until pointer is set to desired frequency for alignment and taking care not to change this setting, remove pointer.

3. Connect an output meter across the speaker voice coil or from the plate of the 35C5 tube to B— (see voltage chart for convenient connection point) through a 0.1 Mfd. condenser.

4. Connect ground lead of signal generator to B— lug.

   CAUTION: If your signal generator is designed with an AC-DC power supply, connect ground lead to B— lug through a .25 Mfd. condenser. (See voltage chart for convenient B— connection.)

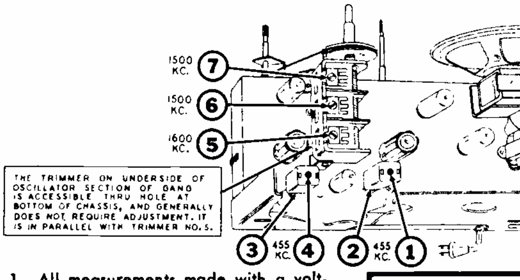
5. Set tone control to its maximum clockwise position.

6. Set volume control at maximum volume position and use a weak signal from the signal generator.

7. After alignment has been completed and chassis reassembled in cabinet and pointer properly positioned, check calibration over entire dial and should the calibration error be objectionable, repeat procedure, exercising greater precaution in the initial setting of the pointer.

DUMMY ANT. IN SERIES WITH SIGNAL GENERATOR	SIGNAL GENERATOR CONNECTION	SIGNAL GENERATOR FREQUENCY	RECEIVER DIAL SETTING	TRIMMER AND SLUG NUMBER	TRIMMER AND SLUG DESCRIPTION	TYPE OF ADJUSTMENT
0.1 Mfd. Condenser	Lug on R.F. Trimmer #6	**455 KC** 400 cycle Modulation	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	**1600 KC** 400 cycle Modulation	1500 KC	**5**	Broadcast Oscillator	Adjust for maximum output.
200 Mmfd. Mica Condenser	External Antenna Terminal on Loop Frame	**1500 KC** 400 cycle Modulation	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** 400 cycle Modulation	Tune to 1500 KC generator signal	**7**	Broadcast Antenna	Adjust for maximum output.

TRIMMER LOCATION CHART



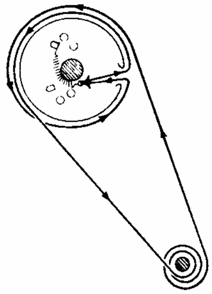
POINTER AND DRIVE CORD ARRANGEMENT

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

114955 Clip on end of cord

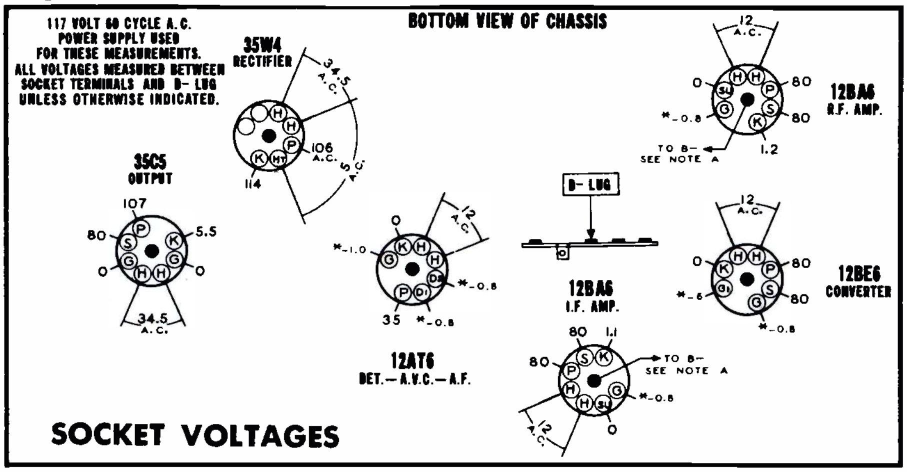
117057 Cord (2 feet)

505161 Tension Spring



1. All measurements made with a voltmeter having a sensitivity of 20,000 ohms per volt except where indicated by (*). The (*) symbol designates a vacuum tube voltmeter measurement.
2. Terminals on loop antenna are shorted together to minimize noise signal pickup.
3. Dial tuned to 540 Kc.
4. Volume control set to maximum with no signal.
5. Tone control set at its maximum clockwise position.

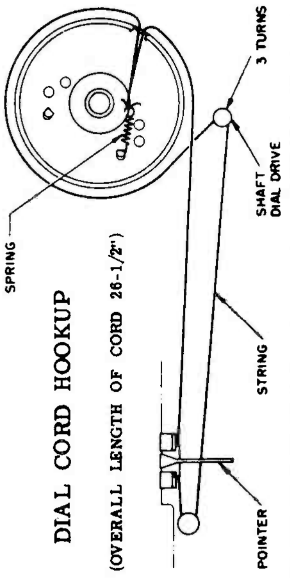
NOTE A: The center stud of this tube must be connected to B— to reduce capacity coupling between pins. Oscillation may result if this connection is omitted.

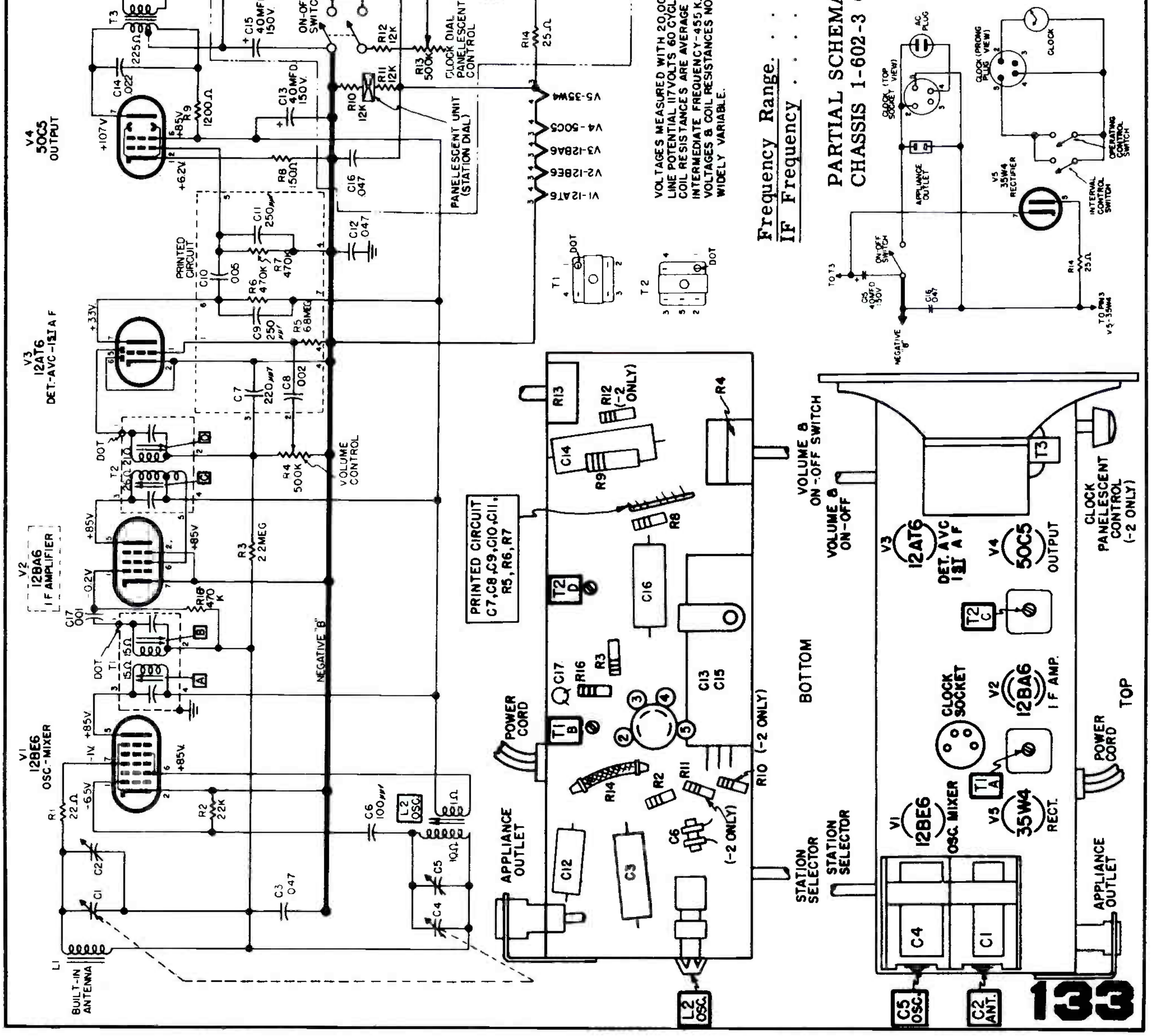


REAR OF CHASSIS

SYLVANIA ELECTRIC PRODUCTS INC.

CHASSIS 1-602-2 and 1-602-3 *used in* MODEL 543 and 593 RADIO CLOCKS



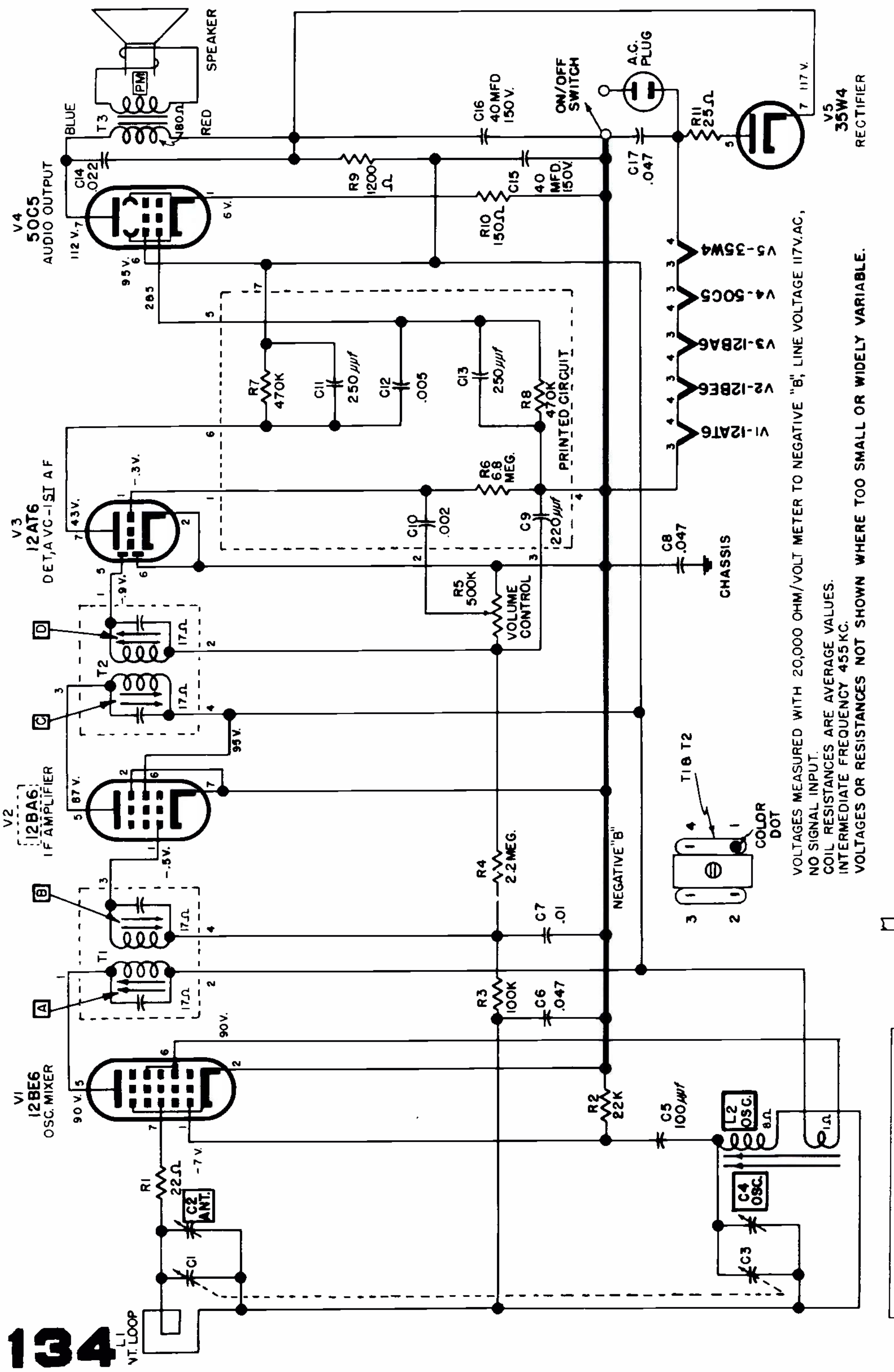


MANUAL OF 1953 MOST-OFTEN-NEEDED RADIO

SYLVANIA CHASSIS 1-601-2, 1-601-3

used in

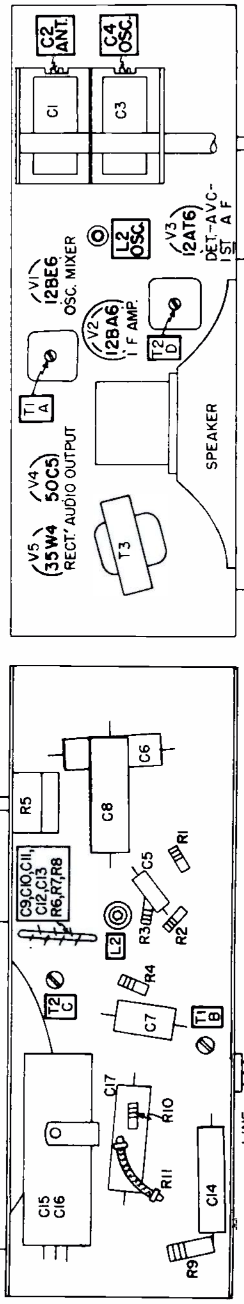
MODEL 513 and 563 TABLE RADIOS



VOLTAGES MEASURED WITH 20,000 OHM/VOLT METER TO NEGATIVE "B", LINE VOLTAGE 117V.AC,
NO SIGNAL INPUT.
COIL RESISTANCES ARE AVERAGE VALUES.
INTERMEDIATE FREQUENCY 455 KC.
VOLTAGES OR RESISTANCES NOT SHOWN WHERE TOO SMALL OR WIDELY VARIABLE.

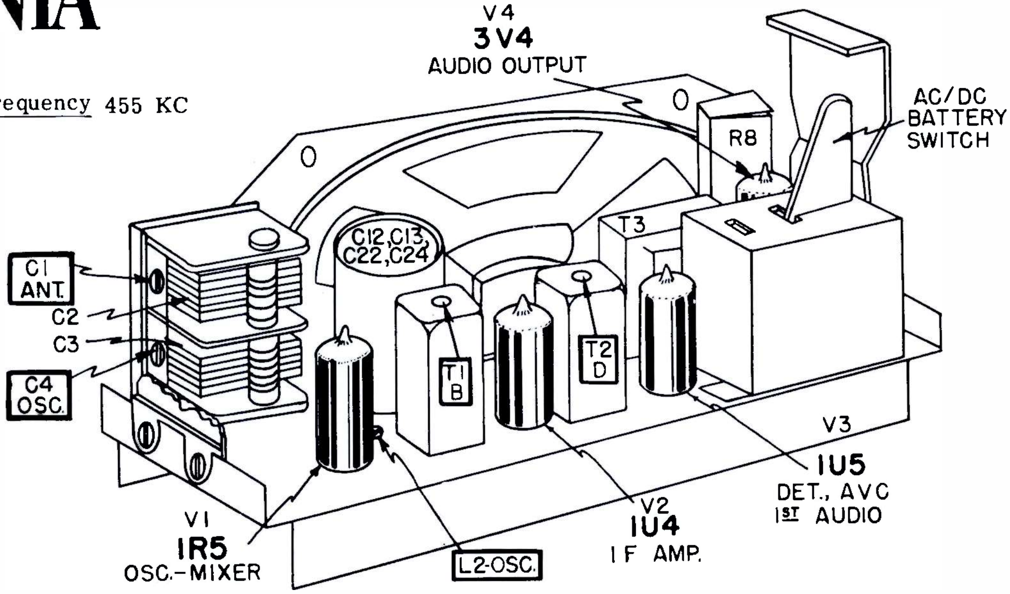
SPECIFICATIONS

Power Supply . . . . . . 105-128 Volts
25 to 60 Cycle AC or DC, 35 Watts
Frequency Range . 540 KC to 1650 KC
Intermediate Frequency . . . 455 KC
Loudspeaker . . . . 5" P.M.



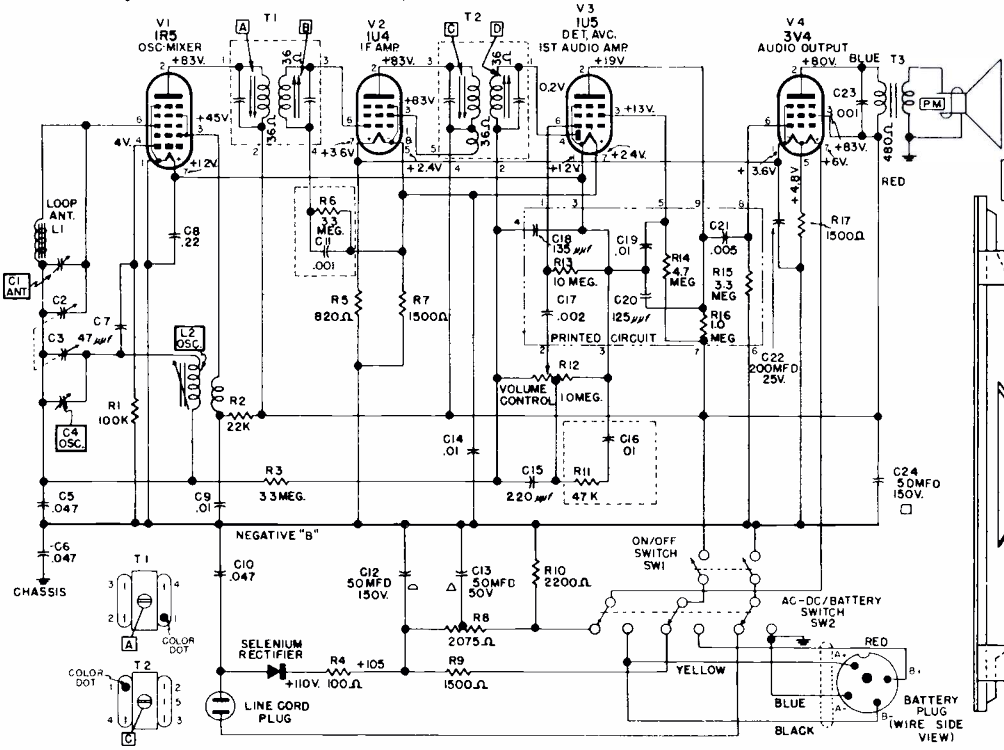
SYLVANIA CHASSIS 1-604-1 used in Model 433 Radio

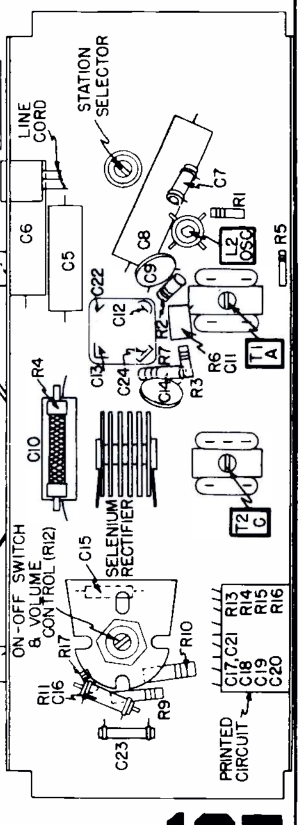
Intermediate Frequency 455 KC



CHASSIS REMOVAL

1. Remove control knobs, station selector pointer and base. Remove station selector pointer by gripping it with either a bent wire hook or needle nose pliers inserted in the center slots.
2. Remove the four screws securing chassis and dial caps to the cabinet. Note assembly of the handle and dials,and that chassis slides through grooves in cabinet. The chassis may now be removed.
3. To facilitate calibration,turn volume control until it clicks "Off" and Station Selector until tuning capacitor is fully meshed. Line up indicator marks accordingly, and press on knobs.

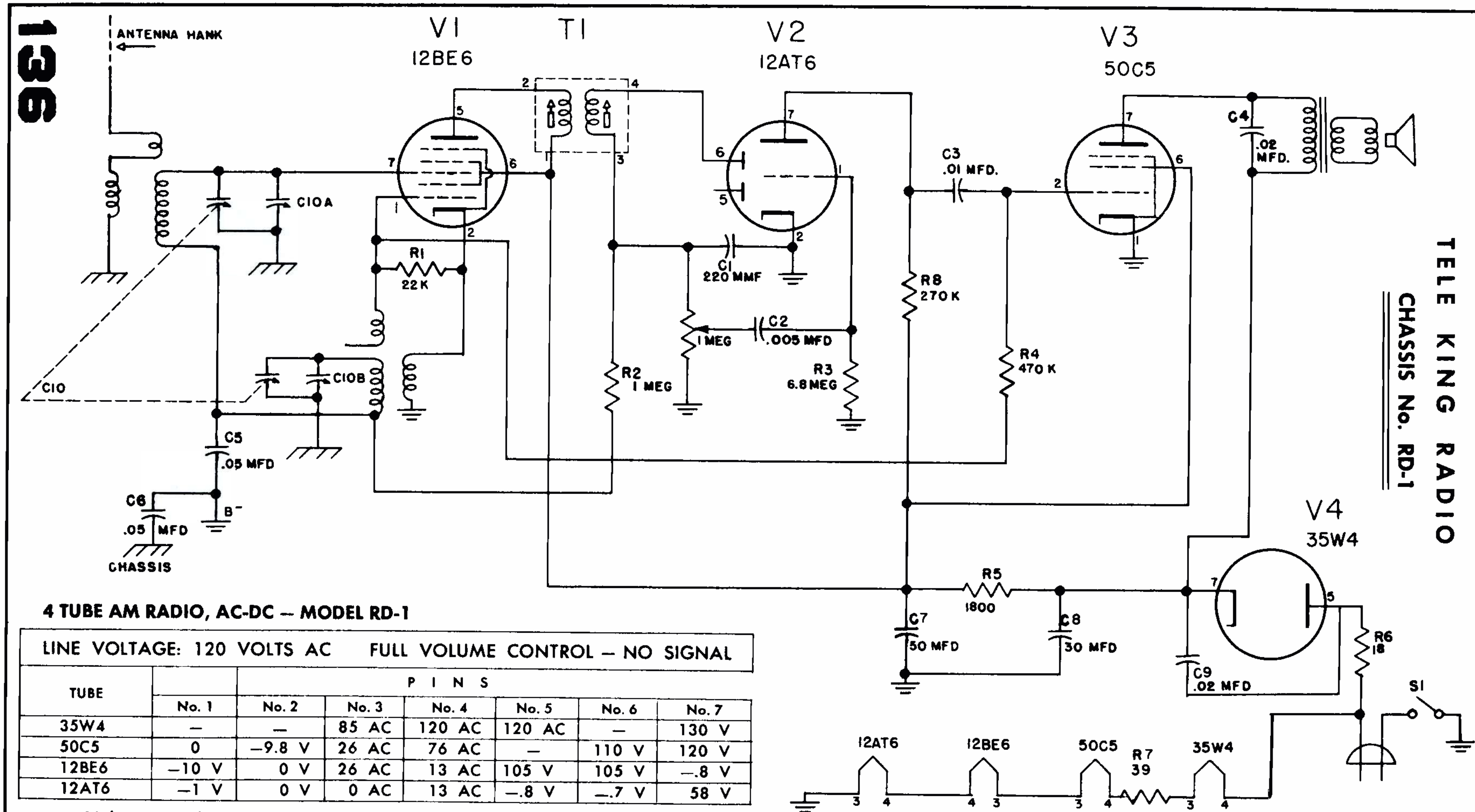




NOTES:
1. VOLTAGES MEASURED WITH 20,000 OHM/VOLT METER TO NEGATIVE "B", SWITCH SW2 SET TO AC/DC POSITION, LINE VOLTAGE 117 V. AC, NO SIGNAL INPUT.
2. COIL RESISTANCES ARE AVERAGE VALUES. INTERMEDIATE FREQUENCY 455 KC.
3. BATTERY-EVEREADY NO. 755 "AB" PACK OR EQUIVALENT SUPPLYING 7.5 V "A" AND 75 V. "B". (NO. 756 "AB" PACK OR EQUIVALENT SUPPLYING 7.5V. "A" AND 90 V. "B" IS OPTIONAL.)
4. VOLTAGES OR RESISTANCES NOT SHOWN WHERE TOO SMALL OR WIDELY VARIABLE.

TELE KING RADIO

CHASSIS No. RD-1



4 TUBE AM RADIO, AC-DC — MODEL RD-1

LINE VOLTAGE: 120 VOLTS AC   FULL VOLUME CONTROL — NO SIGNAL

TUBE	PINS No. 1	No. 2	No. 3	No. 4	No. 5	No. 6	No. 7
35W4	—	—	85 AC	120 AC	120 AC	—	130 V
50C5	0	−9.8 V	26 AC	76 AC	—	110 V	120 V
12BE6	−10 V	0 V	26 AC	13 AC	105 V	105 V	−.8 V
12AT6	−1 V	0 V	0 AC	13 AC	−.8 V	−.7 V	58 V

Voltage readings made with V.T.VM from pins designated to B—.

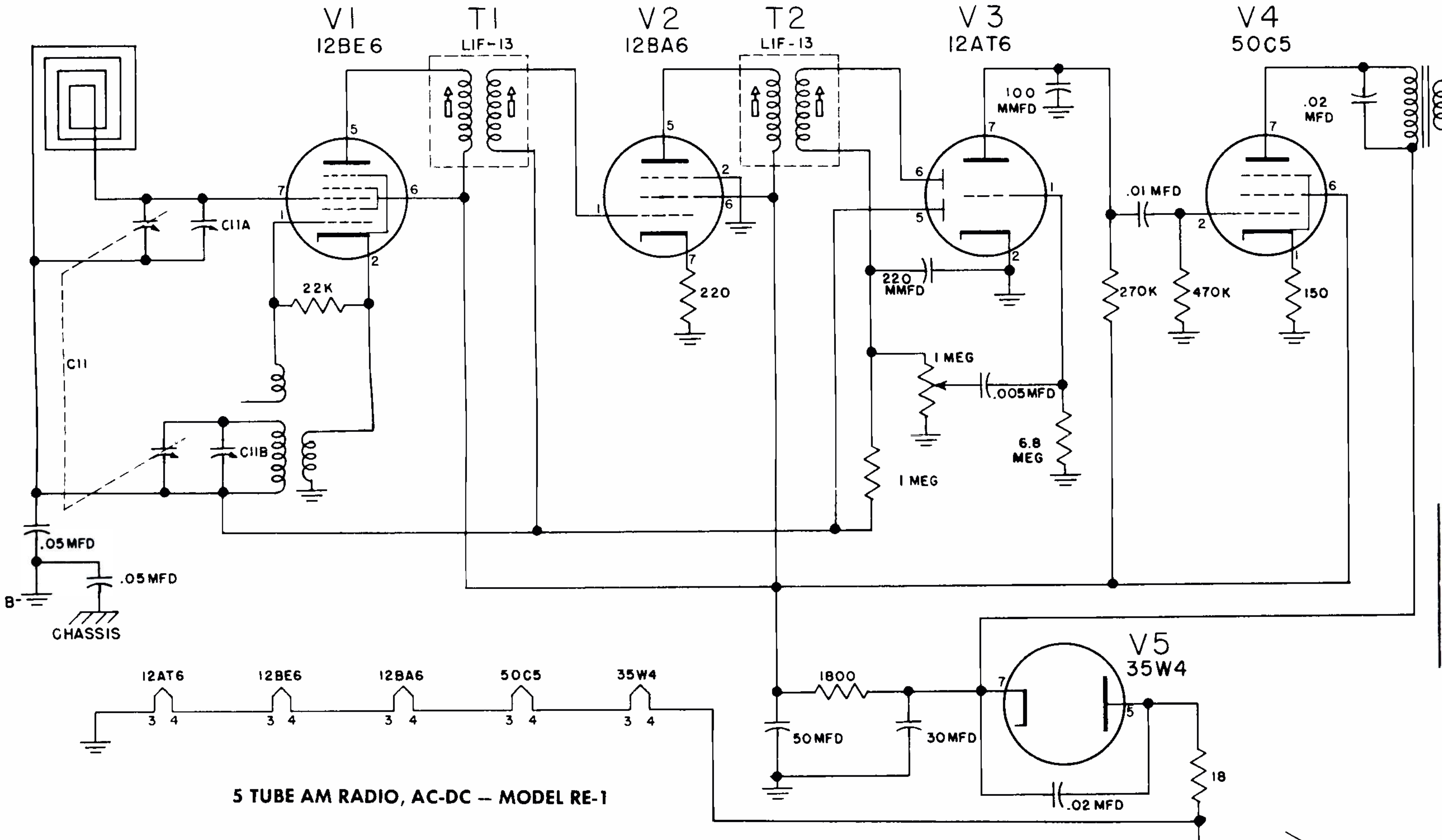
ALIGNMENT CHART

STEPS	ALIGN	DUMMY ANTENNA	GENERATOR FREQUENCY	DIAL SETTING	CONNECT GENERATOR TO	ADJUST	OUTPUT METER ACROSS VOICE COIL
1	I.F.	.05	455 KC	High Freq. End	Pin 7—12BE6 Converter Grid	T-1 Double Slug	Peak for Max.
2	Osc.	.05	1650 KC	High Freq. End	Pin 7—12BE6 Converter Grid	C10B Osc. Tuner Trim	Peak for Max.
3	Hank Ant.	100 mmf.	1500 KC	1500 KC	Ant. Lead	C10A R.F. Tuner Trim	Peak for Max.
4	Repeat Steps 2 and 3						

Symbol No.	Description	Part Reference No.
C-1	220 Mmfd	CC 322
C-2	.005 Mfd 400V	CP-2-25
C-3	.01 Mfd 400V	CP-4-11
C-4	.02 Mfd 400V	CP-4-12
C-5	.05 Mfd 200V	CP-2-15
C-6	.05 Mfd 400V	CP-4-15
C-7, C-8	50-30 Mfd 150V Electrolytic	Cet-13
R-1	22K ohms ½W	RC-223-2
R-2	1 Megohm ½W	RC-105-2
R-3	6.8 Megohms ½W	RC-685-1
R-4	470K ohms ½W	RC-474-1
R-5	1800 ohms 1W	RC-182-4
R-6	18 ohms ½W	RC-180-2
R-7	39 ohms 1W	RC-390-5
R-8	270K ohms ½W	RC-274-1

TELE KING RADIO

CHASSIS — RE-1



5 TUBE AM RADIO, AC-DC — MODEL RE-1

ALIGNMENT CHART

STEPS	ALIGN	DUMMY ANTENNA	GENERATOR FREQUENCY	DIAL SETTING	CONNECT GENERATOR TO	ADJUST	OUTPUT METER ACROSS VOICE COIL
1	2nd I.F.	.05	455 KC	High Freq. End	Pin 7—12BE6 Converter Grid	T-2 Double Slug	Peak for Max.
2	1st I.F.	.05	455 KC	High Freq. End	Pin 7—12BE6 Converter Grid	T-1 Double Slug	Peak for Max.
3	Osc.	.05	1650 KC	High Freq. End	Pin 7—12BE6 Converter Grid	C11B Osc. Tuner Trim	Peak for Max.
4	Loop Ant.	Radiate into Loop Ant.	1500 KC	1500 KC	Several Turns Around Loop	C11A Loop Tuner Trim	Peak for Max.
5	Repeat Steps 3 and 4						

Schmematic Symbol No.	Description	TeleKing Part Reference No.
R-1	22K ohms ½W	RC-223-2
R-2	220 ohms ½W	RC-221-2
R-3	1 Megohm ½W	RC-105-1
R-4	270K ohms ½W	RC-274-1
R-5	470K ohms ½W	RC-474-1
R-6	150 ohms ½W	RC-151-2
R-7	6.8 Megohms ½W	RC-685-1
R-8	1800 ohms 1W	RC-182-4
R-9	18 ohms ½W	RC-180-2

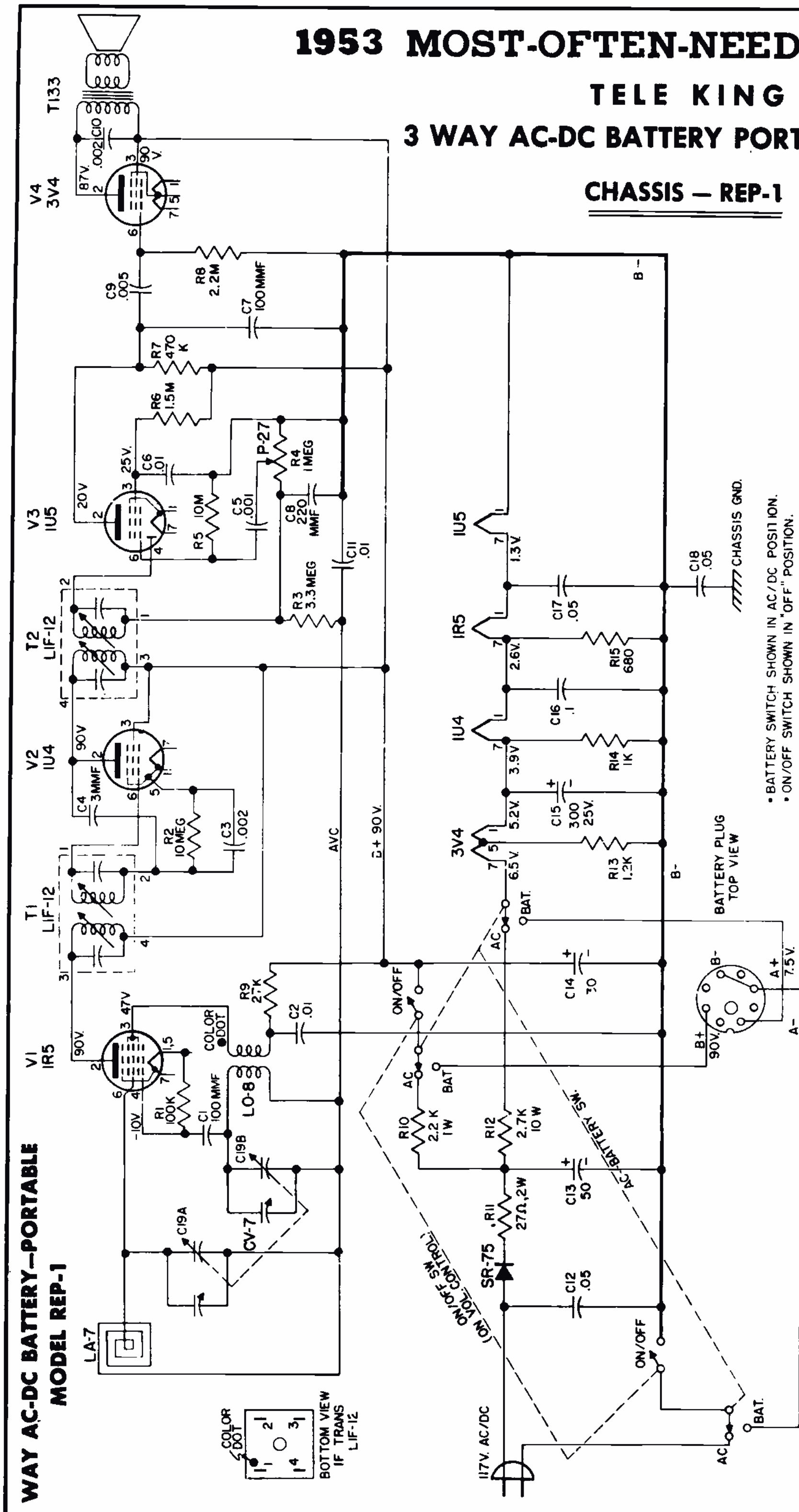
1953 MOST-OFTEN-NEEDED RADIO DIAGRAMS

TELE KING

3 WAY AC-DC BATTERY PORTABLE RADIO

CHASSIS — REP-1

3 WAY AC-DC BATTERY—PORTABLE
MODEL REP-1



• BATTERY SWITCH SHOWN IN AC/DC POSITION.
• ON/OFF SWITCH SHOWN IN "OFF" POSITION.
• VOLTAGES MEASURED TO COMMON WIRING (B-) WITH A VTVM AND SHOULD HOLD WITHIN ± 10% WITH 117 V. AC LINE.
• VALUE OF ALL CAPACITORS IN MFD. UNLESS OTHERWISE SPECIFIED.

ALIGNMENT CHART

STEPS	ALIGN	DUMMY ANTENNA	GENERATOR FREQUENCY	DIAL SETTING	CONNECT GENERATOR TO	ADJUST	OUTPUT METER ACROSS VOICE COIL
1	2nd I.F.	.05	455 KC	High Freq. End	Pin 6—1R5 Converter Grid	T-2 Double Slug	Peak for Max.
2	1st I.F.	.05	455 KC	High Freq. End	Pin 6—1R5 Converter Grid	T-1 Double Slug	Peak for Max.
3	Osc.	.05	1650 KC	High Freq. End	Pin 6—1R5 Converter Grid	C19B Osc. Tuner Trim	Peak for Max.
4	Loop Ant.	Radiate into Loop Ant.	1500 KC	1500 KC	Several Turns Around Loop	C19A Loop Tuner Trim	Peak for Max.
5	Repeat Steps 3 and 4						

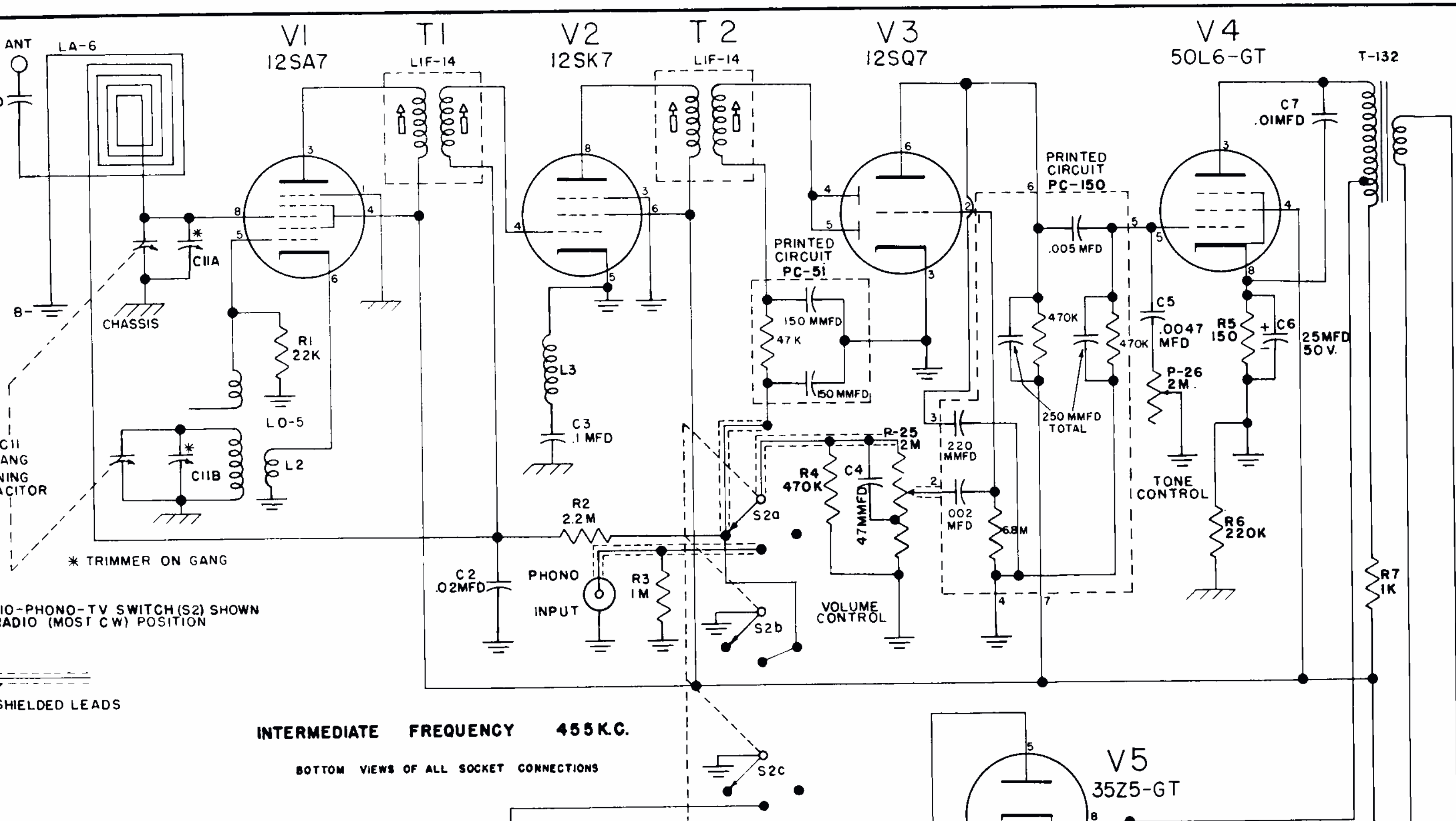
Schematic Symbol No.	Description
LO-8	Oscillator Coil
P-27 (R-4)	Volume Control 1 Meg. with Switch
R-1	100K ohms ½W
R-2, R-5	10 Meg ohm ½W
R-3	3.3 Meg ohm ½W
R-6	1.5 Meg ohm ½W
R-7	470K ohm ½W
R-8	2.2 Meg ohm ½W
R-9	27K ohm ½W
R-10	2.2K ohm 1W
R-11	27 ohm 2W
R-12	2.7K ohm 10W Wire Wound
R-13	1.2K ohm ½W
R-14	1K ohm ½W
R-15	680 ohm ½W
C-1, C-7	100 MMfd—500V Tubular
C-2, C-6, C-11	.01 Mfd—200V
C-3, C-10	.002—600V
C-4	3 MMfd—500V Miniature
C-5	.001 Mfd—200V
C-8	220 MMfd—500V
C-9	.005 Mfd—200V
C-12, C-18, C-17	.05 Mfd—200V
C-13, C-14, C-15	50-30 Mfd 150V 300 Mfd—25V Electrolytic (Can)
C-16	.1 Mfd—200V

LINE VOLTAGE: 117 VOLTS AC — FULL VOLUME CONTROL — NO SIGNAL

TUBE	Pin #1	Pin #2	Pin #3	Pin #4	Pin #5	Pin #6	Pin #7	
1R5	1.25 V	98 V	48 V	—10 V	1.25 V	—.4 V	2.5 V	
1U5	0 V	25 V	26 V	—.4 V	0 V	—.2 V	1.25 V	PORTABLE RADIO
1U4	2.5 V	98 V	97 V	0 V	2.5 V	1.3 V	3.75 V	
3V4	3.75 V	93 V	97 V	0 V	5.1 V	0 V	6.3 V	

Voltage readings made with V.T. VM from pins designated to B—.

B+ at input filter — 125V DC.
B+ at output filter — 98V DC.

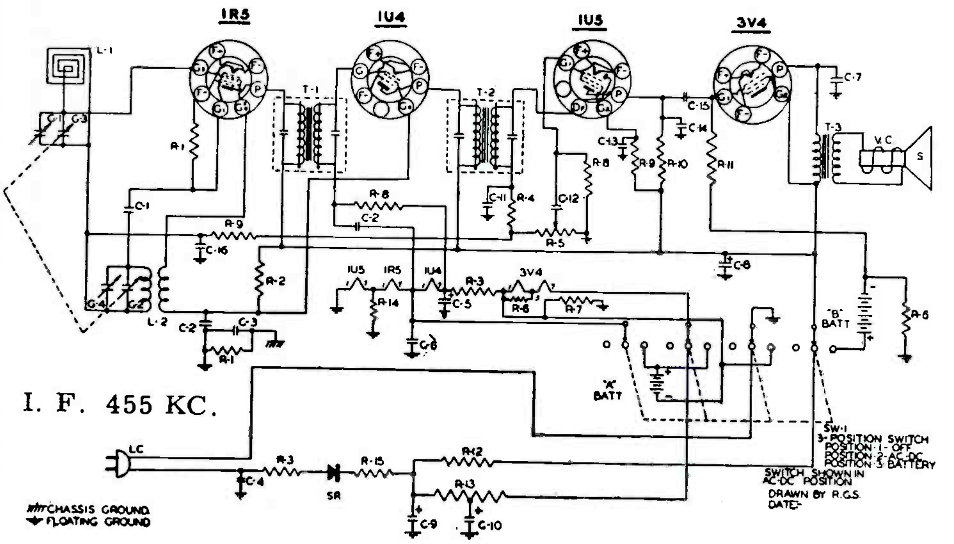


5 TUBE AM RADIO MODEL RE-2A USED IN COMBINATIONS

Schmematic Symbol No	Description	TeleKing Part Reference No
C 1 C 7	.01 Mfd 400V	CP 4 11
C-2	.02 Mfd 400V	CP 4 12
C 3	.1 Mfd 600V	CP 6 01
C 4	47 Mfd 500V	CM 447
C 5	.0047 Mfd 500V	CET 17
C 6	25 Mfd 50V Electrolytic	CP-4 427
C 8	.05 Mfd 600V	CP 6 15
C 9 C 10	40 40 Mfd 150V Electrolytic	CEM-19
C 11	2-Gang Variable Cond w Drum	CV 5
C 11a C 11b	Trimmer Condenser on Gang	C 11a, C 11b
L 1	B cast Loop Antenna	LA 6
L 2	B cast Oscillator Coil	LO 5
PC 51	Printed Circuit	CRP 6
PC 150	Printed Circuit	CRP 5
PL 3	Pilot Lamp GE 1490	PL 3
P 25	Volume Control 2 Megohms	P 25
P 26	Tone Control w Switch 2 Megohms	P 26
R 1	22K ohms ½W	RC 223 2
R 2	2 2 Megohms ½W	RC-225 1
R 3	1 Megohm ½W	RC 105 2
R 4	470K ohms ½W	RC 474 2
R 5	150 ohms ½W	RC 151 1
R 6	220K ohms ½W	RC 224 2
R 7	1000 ohms 2W	RC-102 7
R 8	330 ohms 1W	RC 331 4
T 1, T 2	I F Transformer	LIF 14
T 132	Audio Output Transformer	T 132

MANUAL OF 1953 MOST-OFTEN-NEEDED RADIO DIAGRAMS

TRAV-LER RADIO CORPORATION Model No. 5301



I. F. 455 KC.

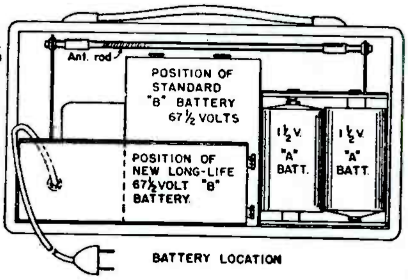
PART NO.		DESCRIPTION
IR-20	R-1	220M~ RESISTOR 1/2W 20 %
IR-37	R-2	10M~ RESISTOR 1/2W 20 %
IR-17	R-3	33~ RESISTOR 1/2W 20 %
IR-31	R-4	82M~ RESISTOR 1/2W 10 %
VC-11	R-5	1MEG. VOLUME CONTROL
IR-33	R-6	270~ RESISTOR 1/2W 10 %
IR-39	R-7	620~ RESISTOR 1/2W 5 %
IR-3	R-8	10MEG. RESISTOR 1/2W 20 %
IR-23	R-9	3.3MEG. RESISTOR 1/2W 20 %
IR-12	R-10	1MEG. RESISTOR 1/2W 20 %
IR-13	R-11	2.2MEG. RESISTOR 1/2W 20 %
IR-40	R-12	3800~ RESISTOR 1W 10 %
WR-7	R-13	1050-1050 CANDOHM RESISTOR 5W 5 %
IR-1	R-14	470~ RESISTOR 1/2W 20 %
IR-41	R-15	47~ RESISTOR 1W 10 %
MC-2	C-1	100MMFD. MICA CONDENSER
PC-7	C-2	.01MFD. CONDENSER 400 W.V.
PC-8	C-3	.1 MFD. CONDENSER 400 W.V.
PC-5	C-4	.05 MFD. CONDENSER 400 W.V.
EC-6	C-5	70MFD. 10W.V. ELECTROLYTIC
PC-3	C-6	.1 MFD. CONDENSER 200 W.V.
PC-6	C-7	.005MFD. CONDENSER 600 W.V.
EC-14	C-8	40 MFD. 150 W.V. ELECTROLYTIC
	C-9	40 MFD.
	C-10	20 MFD.
MC-7	C-11	150MMFD.
	C-12	.002MFD.
	C-13	.005MFD.
	C-14	100 MFD.
	C-15	.005MFD.
PC-2	C-16	.05MFD. CONDENSER 200 W.V.
SA-2	SR	SELENIUM RECTIFIER
CO-1	LC	LINE CORD
SW-8	SW-1	5 POLE 3 POSITION SWITCH
	"A" BATT	2 "D" SIZE FLASHLITE CELLS. 1½ VOLTS
	"B" BATT	1-67½ VOLT BATTERY
LI-5	T-1	INPUT IF TRANSFORMER
LI-5	T-2	OUTPUT IF TRANSFORMER
SPK-16	T-3	SPEAKER OUTPUT TRANSFORMER
	V.C.	VOICE COIL
	S	3½" P.M. SPEAKER
	C-4'	OSC. TRIMMER
TU-39	—	1R5-1U4-1U5-3V4
GC-12 or GC-14	G-1, G-2	GANG CONDENSER
LL-29 or LL-31		ANT. ROD: LL-29 FOR GC-12; LL-31 FOR GC-14
LO-17 or LO-19		OSC. COIL: LO-17 FOR GC-12; LO-19 FOR GC-14

Eveready 67½ vlt. #467

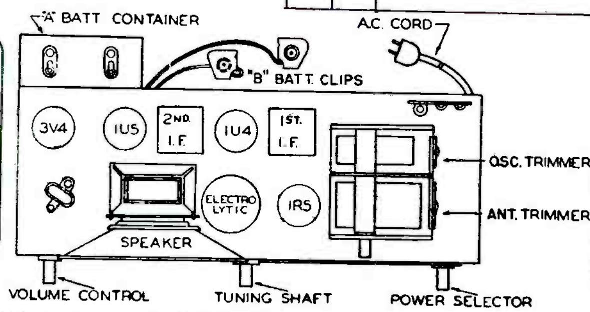
Burgess 67½ vlt. #XX45

RCA 67½ vlt. #VS016

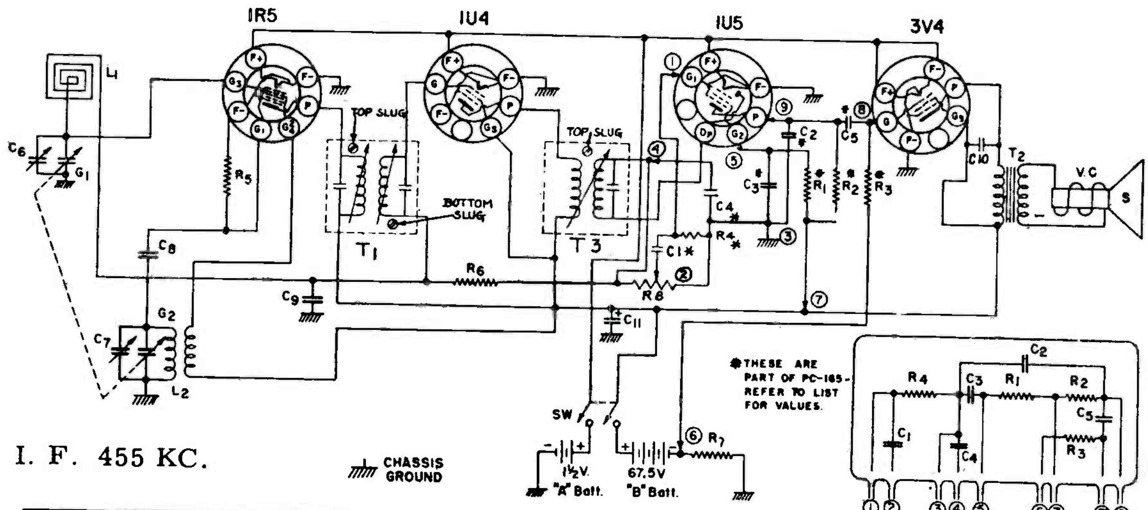
Ray-O-Vac 67½ vlt. #4367



BATTERY LOCATION



TRAV-LER RADIO CORPORATION MODEL NO. 5300



I. F. 455 KC.

PC-165 WIRING DIAGRAM

R_1 = 4.7 Meg.
R_2 = 1.0 Meg.
R_3 = 3.3 Meg.
R_4 = 10 Meg.

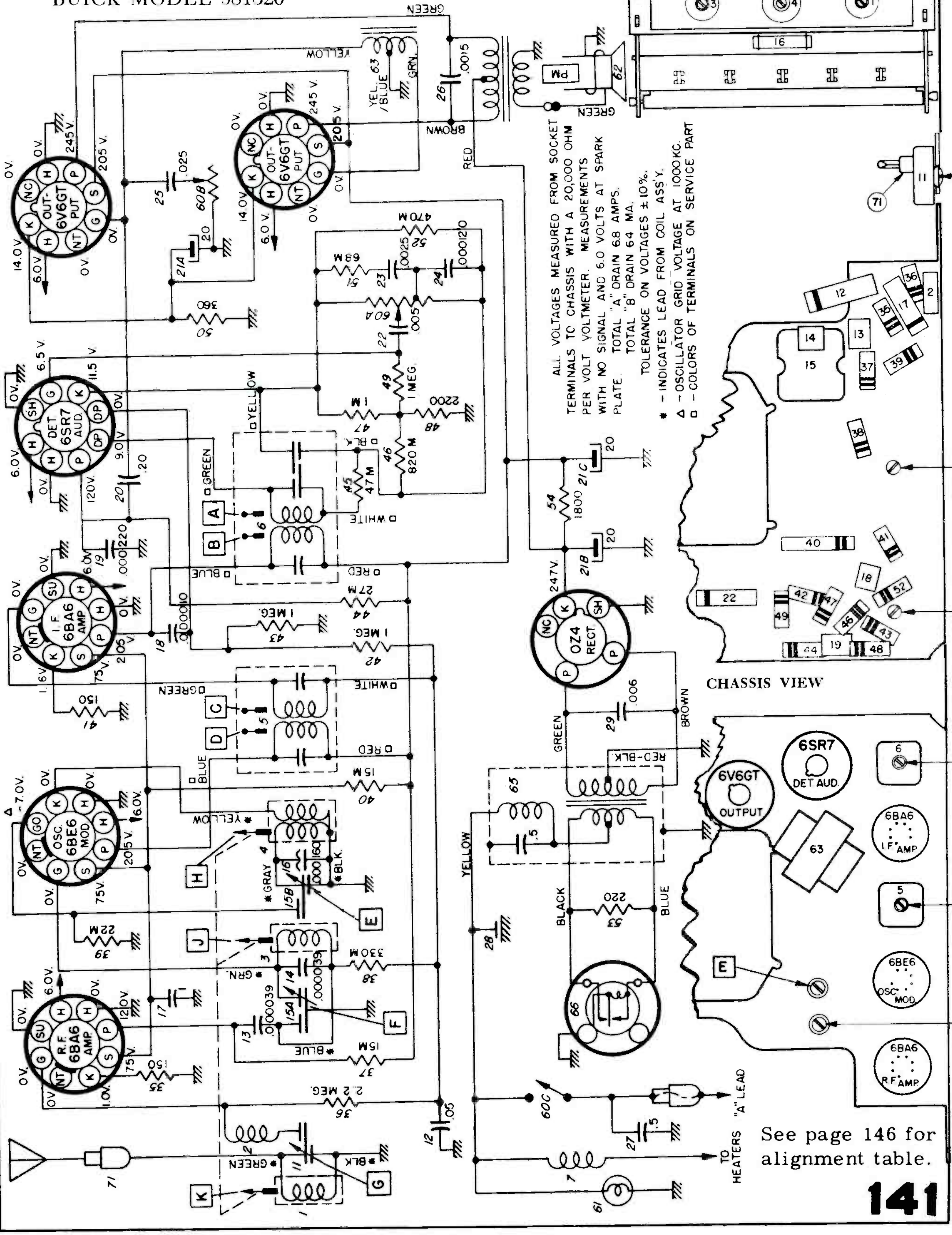
C_1 = 2000 mmf.
C_2 = 150 mmf.
C_3 = .01 mfd.
C_4 = 150 mmf.
C_5 = 5000 mmf.

PART NO.	SYMBOL	DESCRIPTION
	C_6	ANTENNA TRIMMER ON GANG.
	C_7	OSC. TRIMMER ON GANG.
CC-5	C_8	100 mmf. CERAMIC CONDENSER.
CC-3	C_9	.005 mfd. CERAMIC CONDENSER.
CC-20	C_{10}	.0015 mfd. CERAMIC CONDENSER.
EC-11	C_{11}	10 mfd. 70 V. ELECTROLYTIC COND.
IR-20	R_5	220 K. ±20% ½ Watt. RESISTOR.
IR-23	R_6	3.3 meg. ±20% ½ Watt. RESISTOR.
IR-39	R_7	620 ~ ±10% ½ Watt. RESISTOR.
VC-40	R_8	1 meg. VOLUME CONTROL.
GC-12	G_1, G_2	GANG CONDENSER

PART NO.	SYMBOL	DESCRIPTION
LL-30	L_1	LOOP ANTENNA.
LO-18	L_2	OSC. COIL.
LI-10	T_1	I.F. TRANSFORMER INPUT.
	SW	D.P.S.T. SWITCH (Part of Vol. control)
SPK-21	T_2	SPEAKER TRANSFORMER.
	V.C	VOICE COIL.
	S	P.M. SPEAKER
LI-11	T_3	I.F. TRANSFORMER OUTPUT
TU-40		RADIO TUBES 1R5, 1U4, 1U5, 3V4

UNITED MOTORS SERVICE

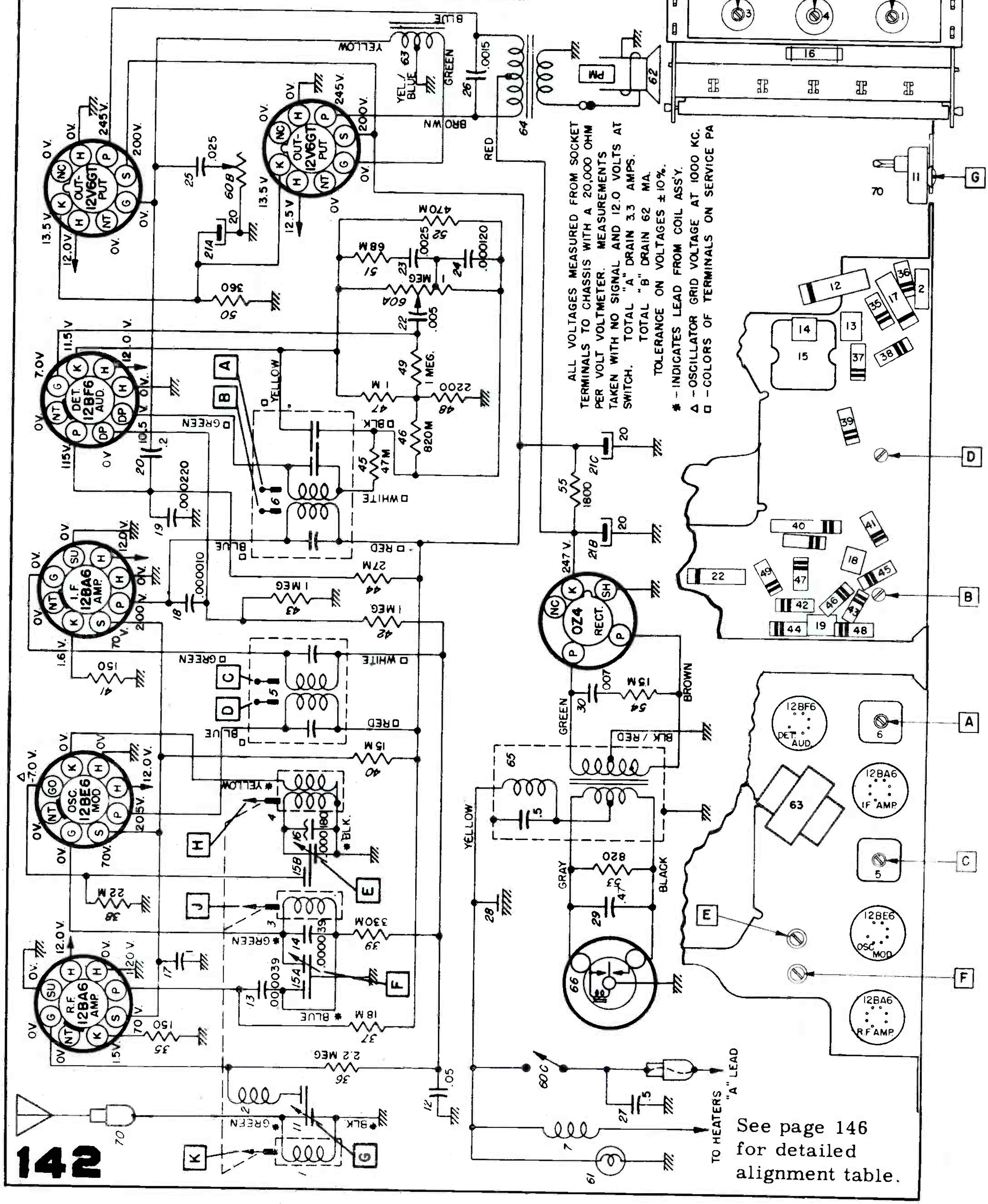
BUICK MODEL 981320



See page 146 for alignment table.

UNITED MOTORS SERVICE

BUICK MODEL 981321 - 12 VOLT



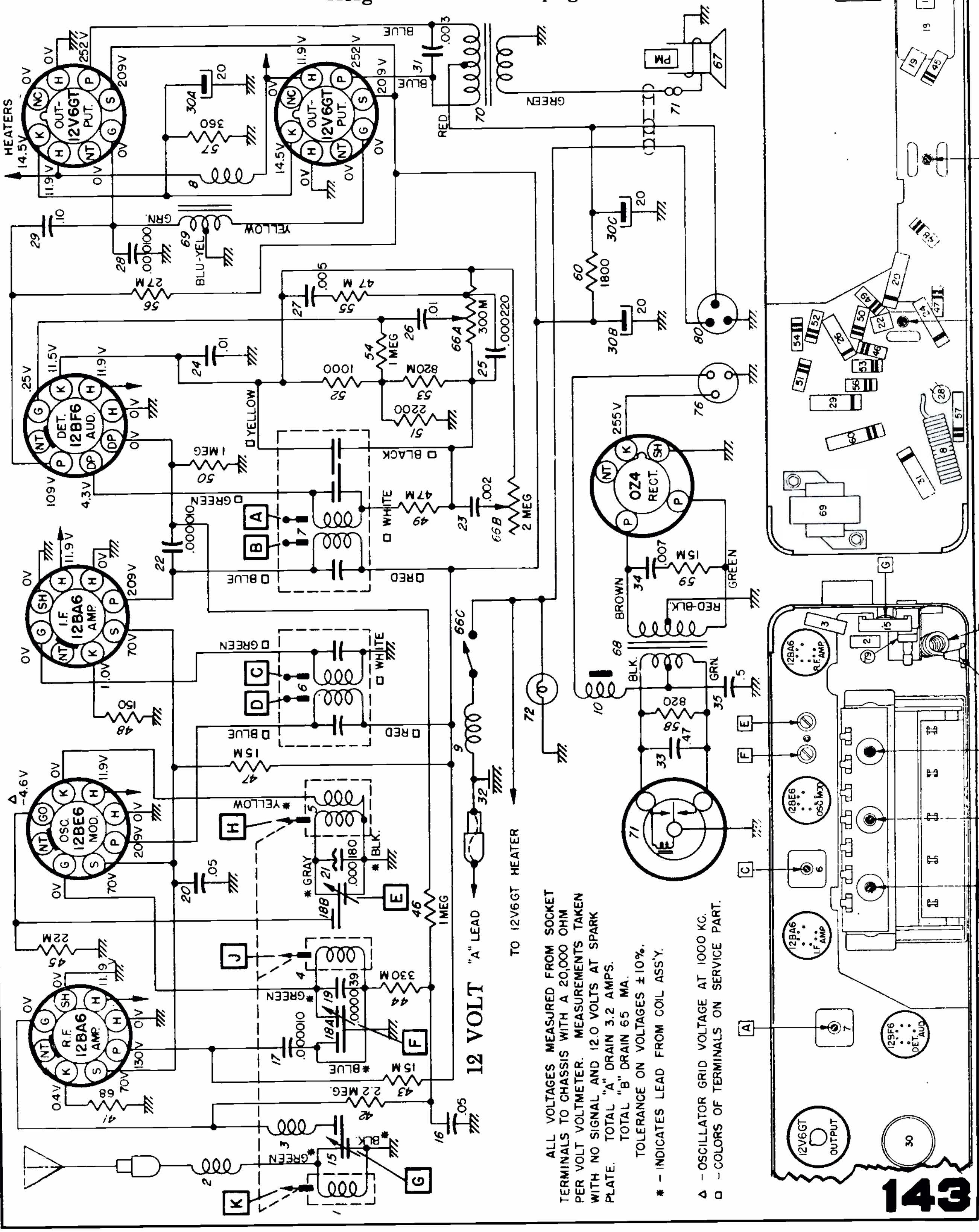
See page 146 for detailed alignment table.

MANUAL OF 1953 MOST-OFTEN-NEEDED RADIO DIAGRAMS

UNITED MOTORS SERVICE

OLDSMOBILE DELUXE MODEL 982990

Alignment table on page 146.



ALL VOLTAGES MEASURED FROM SOCKET TERMINALS TO CHASSIS WITH A 20,000 OHM PER VOLT VOLTMETER. MEASUREMENTS TAKEN WITH NO SIGNAL AND 12.0 VOLTS AT SPARK PLATE. TOTAL "A" DRAIN 3.2 AMPS. TOTAL "B" DRAIN 65 MA. TOLERANCE ON VOLTAGES ±10%.

* - INDICATES LEAD FROM COIL ASS'Y.

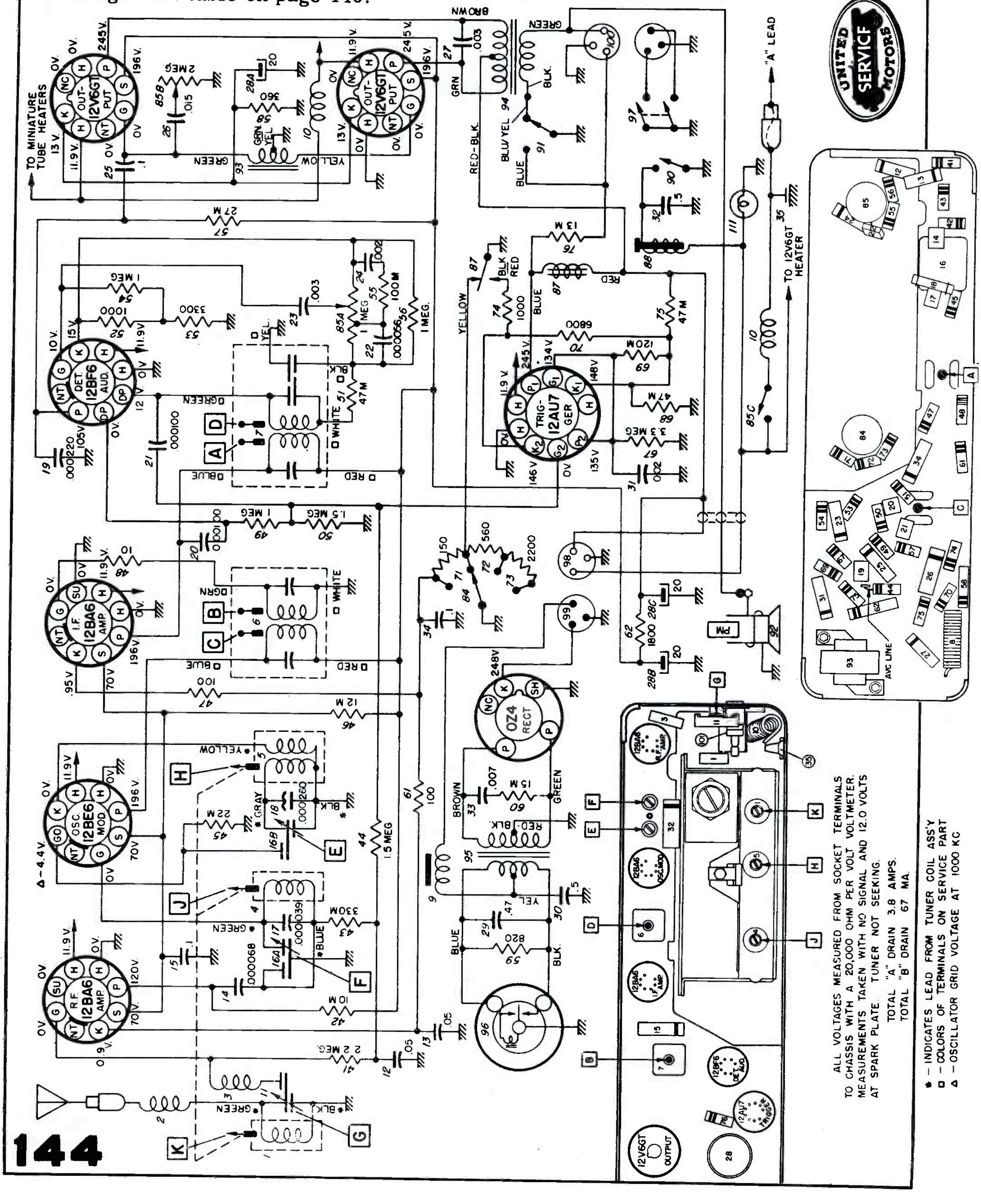
Δ - OSCILLATOR GRID VOLTAGE AT 1000 KC.

□ - COLORS OF TERMINALS ON SERVICE PART.

UNITED MOTORS SERVICE

SERVICE INSTRUCTIONS - OLDSMOBILE SUPER DELUXE MODEL 983004

Alignment table on page 146.

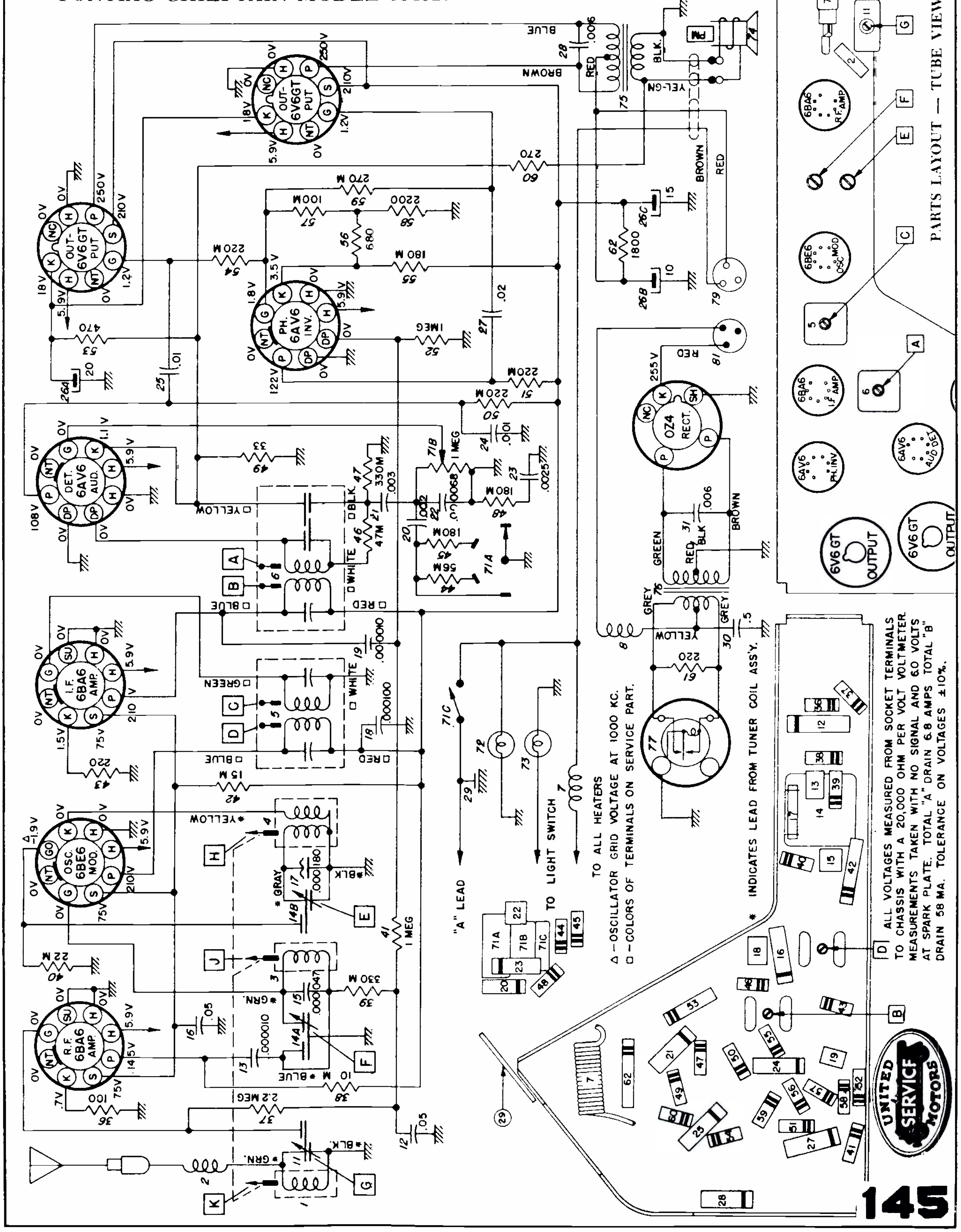


MANUAL OF 1953 MOST-OFTEN-NEEDED RADIO DIAGRAMS

UNITED MOTORS SERVICE

PONTIAC CHIEFTAIN MODEL 984817

Additional alignment data is on page 146.



UNITED MOTORS SERVICE

DIVISION OF GENERAL MOTORS CORPORATION

Alignment procedure for models listed below. For circuit diagrams and alignment points see corresponding models as shown on pages 141 to 145.

Volume Control Position .... Maximum Volume

Tone Control Position .... Treble

Generator Output .... Minimum for Readable Indication

BUICK 981320

Steps	Series Condenser or Dummy Antenna	Connect Signal Generator to	Signal Generator Frequency	Tune Receiver to	Adjust in Sequence For Max. Output
1	0.1 Mfd.	6BE6 Grid (Pin #7)	262 KC	High Frequency Stop	A, B, C, D
2	0.000082 Mfd.	Antenna Connector	1615 KC	High Frequency Stop	*E, F, G
3	0.000082 Mfd.	Antenna Connector	1000 KC	Signal Generator Signal	J, K
4	0.000082 Mfd.	Antenna Connector	1615 KC	High Frequency Stop	F, G
5	0.000082 Mfd.	Antenna Connector	1000 KC	Signal Generator Signal	L**

BUICK 981321

1	0.1 Mfd.	12BE6 Grid (Pin #7)	262 KC	High Frequency Stop	A, B, C, D
2	0.000082 Mfd.	Antenna Connector	1615 KC	High Frequency Stop	*E, F, G
3	0.000082 Mfd.	Antenna Connector	1000 KC	Signal Generator Signal	J, K
4	0.000082 Mfd.	Antenna Connector	1615 KC	High Frequency Stop	F, G
5	0.000082 Mfd.	Antenna Connector	1000 KC	Signal Generator Signal	L**

OLDSMOBILE MODEL 982990

1	0.1 Mfd.	12BE6 Grid (Pin # 7)	260 KC	High Frequency Stop	A, B, C, D
2	0.000068 Mfd.	Antenna Connector	1615 KC	High Frequency Stop	*E, F, G
3	0.000068 Mfd.	Antenna Connector	1000 KC	Signal Generator Signal	J, K
4	0.000068 Mfd.	Antenna Connector	1615 KC	High Frequency Stop	F, G
5	0.000068 Mfd.	Antenna Connector	1000 KC	Signal Generator Signal	**L

OLDSMOBILE MODEL 983004

1	0.1 mfd.	12BE6 Grid (Pin 7)	260 KC	# High Frequency Stop	A, B, C (Max.)
2	0.1 mfd.	12BE6 Grid (Pin 7)	260 KC	High Frequency Stop	D (Min.)
3	0.000068 mfd.	Antenna Connector	1615 KC	High Frequency Stop	*E, F, G (Max.)
4	0.000068 mfd.	Antenna Connector	600 KC	Signal Generator Signal	J, K (Max.)
5	0.000068 mfd.	Antenna Connector	1615 KC	Signal Generator Signal	F, G (Max.)
6	0.000068 mfd.	Antenna Connector	1000 KC	Signal Generator Signal	**L

MODEL 984817

1	0.1 Mfd.	6BE6 Grid (Pin #7)	260 KC	High Freq. Stop	A, B, C, D
2	0.000068 Mfd.	Antenna Connector	1615 KC	High Freq. Stop	*E, F, G
3	0.000068 Mfd.	Antenna Connector	1000 KC	Signal Gen. Signal	J, K
4	0.000068 Mfd.	Antenna Connector	1615 KC	High Freq. Stop	F, G
5	0.000068 Mfd.	Antenna Connector	1000 KC	Signal Gen. Signal	L**

*Before making this adjustment check the mechanical setting of the oscillator core "H." The slotted end of core should be $1\frac{25}{32}$" from the mounting end of the coil form. (This measurement is readily made by inserting a suitable plug in the mounting end of the coil form.) If adjustment is necessary, first dissolve the glyptal seal on the studs. Core adjustment should be made with an insulated screwdriver and core studs should be re-sealed in place with glyptal or household cement after alignment.

**"L" is the pointer adjustment screw which is on the pointer connecting link (see tuner drawing) and should be adjusted so the pointer reads 1000 KC. (On first "0" of "100.")

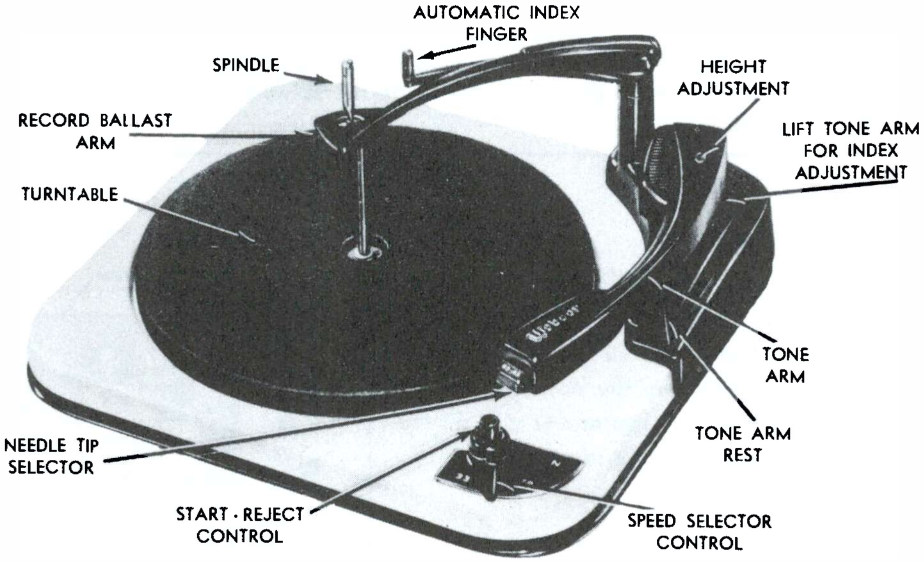
With the radio installed and the car antenna plugged in adjust the antenna trimmer "G" for maximum volume with the radio tuned to a weak station between 600 and 1000 KC. (See sticker on case.)

To tune to high frequency, put a 0.070" feeler gauge (or bare #13 wire) in slot against the high frequency stop. (See tuner pictures). Depress station selector bar and allow the planetary arm to run against the feeler gauge. Turn the radio off and then on.

WEBSTER-CHICAGO

WEBCOR DISKCHANGERS

Models 121, 122, 123, 124, 125



BASIC MODEL 121 DISKCHANGER

DESCRIPTION

Model 121 is a three speed Automatic record changer. Simple in design and operation, it provides automatic playing of up to a 1" stack of 7-inch, 10-inch and 12-inch records at speeds of 33⅓, 45 or 78 rpm.

Model 121 returns the Pickup Arm to the Rest position and automatically shuts off after playing the last record.

The motor switch is a function of the Tone Arm position and the power is off when the Tone Arm is on the Tone Arm Rest. Placing the arm on the record or depressing the reject button starts the motor.

FOR "MANUAL" RECORD PLAY

Lift the Record Ballast Arm and swing it and the Automatic Index Finger away from the spindle. When both arms are in full "open" position use a slight downward pressure to firmly seat them in place. Move the Speed Control Lever and Cartridge Knob to the correct speed and needle for the record being played and then place the needle gently on the record. To stop the mechanism at any time place the tone arm on its rest.

OPERATION

FOR "AUTOMATIC" RECORD CHANGE

1. Lift the Record Ballast Arm and swing it away from the spindle and exert a slight downward pressure until it "latches."
2. Place up to a 1-inch stack of any one size of records on the Spindle and swing the Record Ballast Arm back to the spindle allowing it to drop in position with the spindle in the hole. The Automatic Index Finger will remain away from the record until the change cycle starts. It will then move in to feel the diameter of the record and automatically index the pickup needle to the proper playing position.
3. Then turn Needle Tip Selector to correct position for records being played. Move the Speed Selector Lever to the correct speed for the records being played and depress the START - REJECT control. (Hold down until Tone Arm moves.)

(Continued on the next thirteen pages)

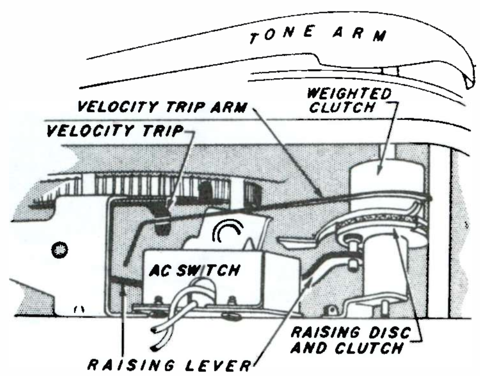
THE CHANGE CYCLE

A 4 pole shaded pole motor is used to drive the changer mechanism. The power is transmitted to the turntable by a rubber rim idler wheel. Turntable speed is determined by the positioning of the wheel on one of the three "steps" of the drive sleeve on the rotor shaft. When the speed selector is turned to "33" the idler wheels is positioned on the "33 step" or contacts the smallest diameter portion of the sleeve. Turning the speed selector to "78" positions the wheel on a larger diameter of the sleeve (3rd step down).

It is recommended that the change cycle operation be observed by rotating the turntable by hand. The action described below can then be readily followed and the function of each part more easily understood. To observe the setdown action a single record should be placed on the spindle to correctly position the index arm for proper setdown of tone arm.

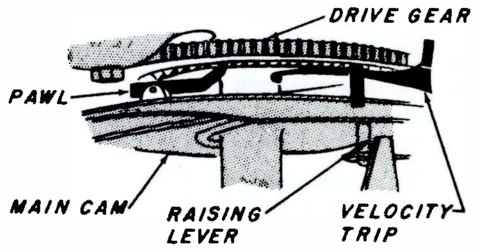
1

As the tone arm tracks on the record toward the spindle the velocity trip arm is moved inward by the action of the weighted friction clutch on the tone arm shaft. When the tone arm follows the eccentric groove at the finish of record the velocity trip arm is also moved suddenly inward and "trips" velocity trip.



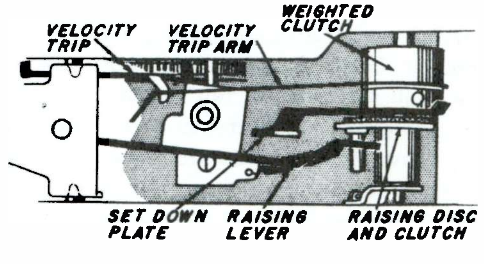
2

In this tripping action the actuating pawl on the main cam is released from the velocity trip and is able to engage the cam drive gear which is continuously rotating with the motor driven turntable. The drive gear now locked with the main cam drives the changer through the change cycle. The main cam is the heart of the change mechanism.



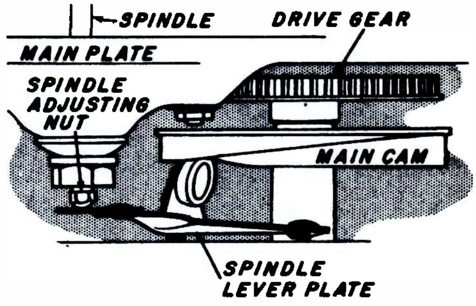
3

The main cam actuates the raising lever causing it to raise and pivot outward. The motion is transmitted to the tone arm by a clutch action between the raising disc and the set down plate which is attached to the tone arm shaft. The tone arm is then raised and carried on its outward excursion.



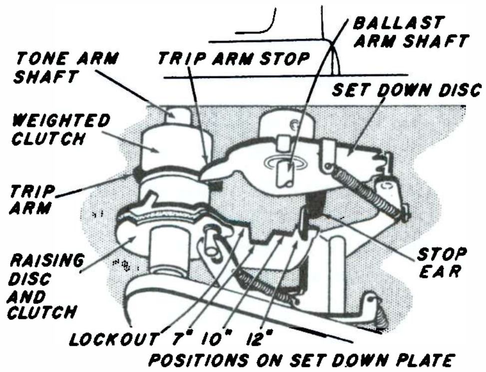
4

When the tone arm has reached its farthest outward excursion the main cam, by reason of its contour, causes the spindle lever plate to move upward at point of contact with spindle actuating rod. This upward movment forces the actuating rod up into spindle moving the push-off finger forward, resulting in the lowering of the records.



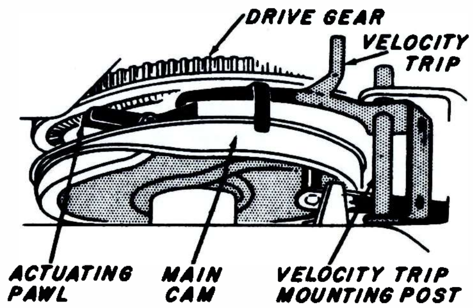
5

After the record has dropped the raising lever (following the recessed contour of the main cam) carries the set down plate, and consequently the tone arm, inward. This travel is stopped when the 7", 10" or 12" extension of the plate contacts the stop ear on the set down disc assembly. The position of this ear was predetermined when the record (now on the turntable) rested on the spindle step and influenced the position of the index arm. The stop ear, being a function of the index arm, stops the set down plate at the proper point so when the raising lever returns and lowers to its normal position the tone arm lowers and correctly sets down on the lead in groove of the record. (The slipping clutch allows the Raising Disc and Lever to continue its inward travel when the Set Down Plate and Tone Arm is stopped.)



6

The velocity trip is also returned to its normal position by the reset points on the drive gear. The hooked end on the trip disengages the actuating pawl from the drive gear thus unlocking main cam and drive gear. The changer has now completed its change cycle.



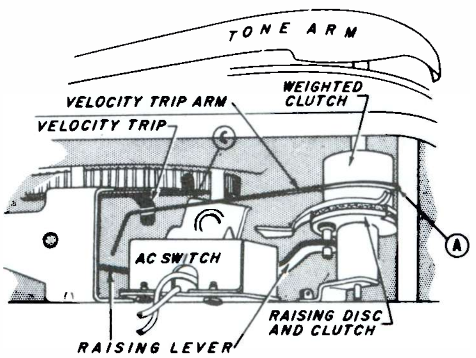
TROUBLE — SOURCE — ADJUSTMENTS	PARTS CONCERNED

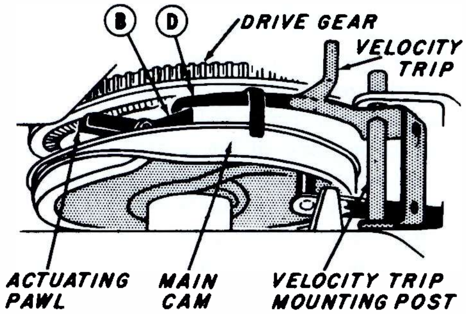
FAILS TO CHANGE RECORDS AUTOMATICALLY

Check for:

1. Dirt or grease on the weighted Friction clutch. Cleanse with alcohol so the trip arm may move freely. See A.
2. Velocity Trip binding on its mounting post.
3. Burr on the end of the actuating pawl or on the underside of the hooked end of the Velocity Trip. See B.
4. Velocity Trip Arm bent and not hitting the ear of the Velocity Trip.
5. The Velocity Trip Arm catching on the AC Switch Cover.
6. Trip arm has become positioned on the wrong side of the Velocity Trip ear. Illustration shows correct position.
7. Rubber bumper on the Velocity Trip damaged — needs replacing.
8. See spindle adjustment (Does not Push off records).
9. The end of the Velocity Trip catching on the top of the Raising Lever Bracket. See C.
10. The Velocity Trip rubbing on the underside of the Drive Gear. There should be approximately $\frac{1}{16}''$ clearance between the Trip and Drive Gear. Bend end of Trip to adjust for this clearance. See D.

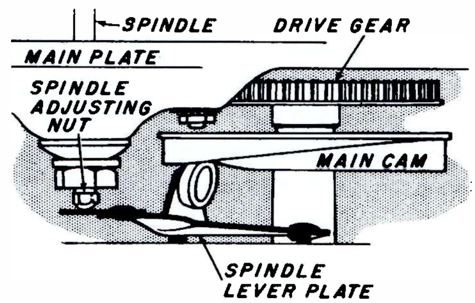
    This condition can also produce a chatter during operation.
11. Sticking Actuating Pawl.
12. Defective Record.
13. Badly bent or worn needle.





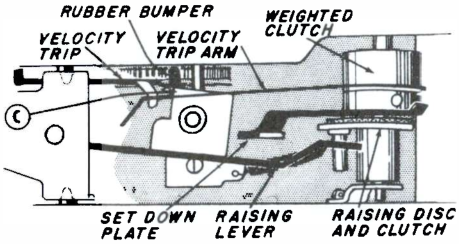
DOES NOT PUSH OFF RECORDS

1. If bottom record of stack is not lowered to the turntable, turn the adjusting nut on Spindle Assembly counter-clockwise a little at a time until record is pushed off. Do not turn too far or changer will stall in cycle.
2. Check for foreign matter in the spindle openings.
3. Defective Spindle — needs replacing.



PARTS CONCERNED	TROUBLE—SOURCE—ADJUSTMENTS

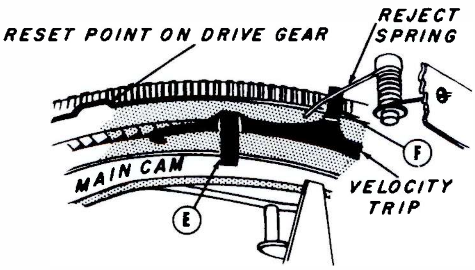
CHANGES RECORDS PREMATURELY OR CYCLES CONTINUOUSLY



Check for:

1. Vertical clearance between the lip of the Velocity Trip and the edge of the Main Cam. This may be too small and is preventing the Velocity Trip from properly engaging the Actuating Pawl. Clearance between lip and cam at Ⓔ should be $1/64''$ to $1/32''$ when the rubber bumper is contacting a reset point on the Drive Gear.
2. See Par. 10, "Fails to change automatically".
3. Reject Trip Spring binding.
4. Worn Rubber Bumper on the Trip. Replace if required.
5. Velocity Trip scraping on Raising Lever Bracket. See Ⓒ.

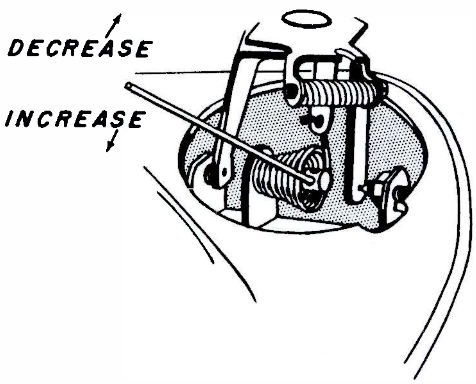
CANNOT "REJECT" RECORDS



Check for:

1. Bent ear on Velocity Trip. Cannot contact reject spring. See Ⓕ.
2. Bent Reject Spring. Cannot contact ear on Velocity Trip. See Ⓕ.
3. Reject Spring may not be threaded through hole in the Reject Lever. See illustration.
4. Bottom of Velocity Trip scraping on Raising Lever Bracket. See Ⓒ.
5. See Page 154 - Does not turn on" for Reject Lever adjustment.
6. Reject spring may be positioned on the wrong side of Velocity Trip Ear.

NEEDLE FORCE INCORRECT



1. Lift the tone arm to a vertical position.
2. Insert a small steel rod in the hole of the mounting stud. (The rod may be bent to more conveniently reach the hole.)
3. To increase the needle pressure, turn in a downward direction. An upward turning will decrease the pressure.
4. CAUTION: A slight movement of the stud will have great effect. An accurate gauge is necessary to insure correct needle pressure. Most cartridges require 9 to 11 grams for proper tracking and best reproduction.

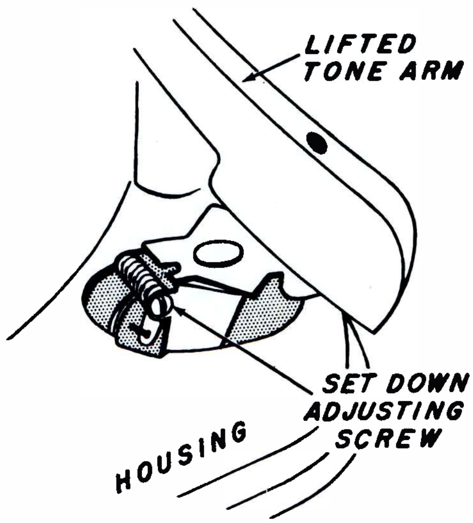
SERVICE INSTRUCTIONS Model 121, continued. WEBSTER-CHICAGO

TROUBLE—SOURCE—ADJUSTMENTS	PARTS CONCERNED

NEEDLE SET-DOWN POINT IS INCORRECT

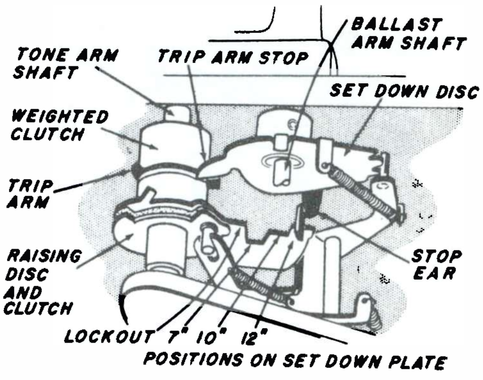
To Adjust:

1. Place a 7" record on spindle and permit index finger to rest against edge of the record.
2. With Speed Selector in "N" position, press the reject button and revolve turntable by hand, thereby putting changer through change cycle. When record has fallen to turntable and tone arm is at its farthest inward position, it will begin its downward travel to set on record. Stop rotation of turntable when needle is approximately ¼" above record.
3. Check to see if needle is directly above lead-in groove of record. If not adjust by turning screw beneath tone arm as indicated. (Clockwise turning of screw will move tone arm away from spindle.)
4. If adjustment on 7" is correct, 10" and 12" set down will also be correct.



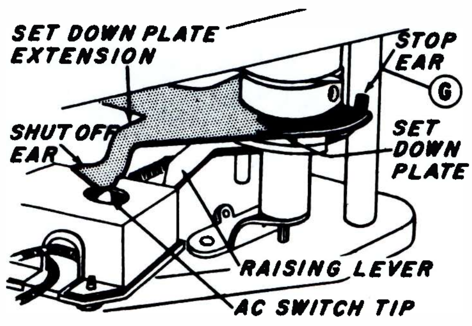
ERRATIC INDEXING—NO LOCKOUT

1. If the Tone Arm swings into the center of a record and cycles or erratic indexing occurs, the stop ear on the Set Down Disc *Assembly* is bent and is not stopping the Set Down Plate. The ear should be bent back into position so that it stops the Plate at the correct set down point.
2. If the arm does not come to rest after the last record has been played:
   Check to see if the stop ear on the set down *disc* is stopping the set down plate at the lockout position. If not, bend the ear slightly so it contacts the plate at lockout position. Recheck set down.
3. See "Tone arm swing" adjustment below.

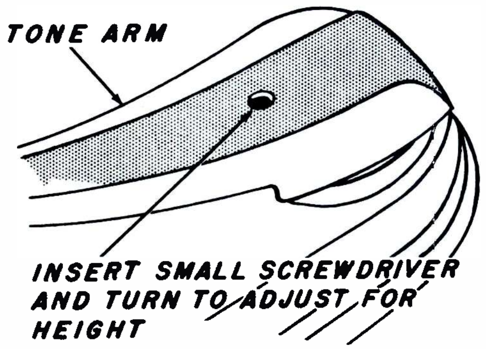


TONE ARM WILL NOT SWING FAR ENOUGH OUTWARD TO SET ON THE TONE ARM REST PROPERLY

1. Bend the stop ear on the Set Down Plate so that the Tone Arm swings out no further than ½" beyond the Tone Arm Rest before starting its inward travel. (Bending the ear up will increase the swing — bending down will restrict it.) G.
2. If the set down is affected by this adjustment, readjust set down.



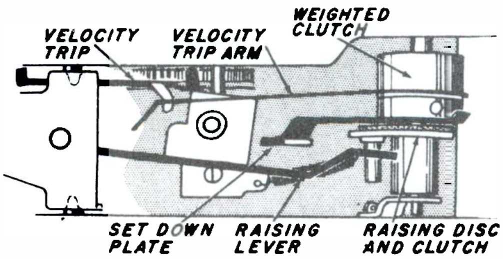
PARTS CONCERNED	TROUBLE—SOURCE—ADJUSTMENTS



TONE ARM WILL NOT CLEAR REST DURING CHANGE CYCLE

To Adjust:

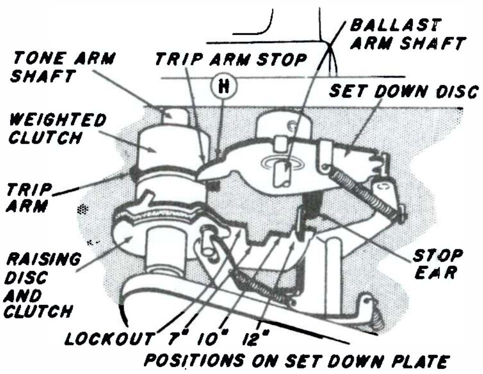
1. The tone arm height is a function of the contour of the RAISING LEVER. This lever is properly formed at the factory during production of the record changer.
2. For vernier adjustment of tone arm height, a set screw is accessible through a hole on the top and at the rear of the tone arm.
3. The tone arm should clear the tip of the tone arm rest by $\frac{1}{16}$" to $\frac{1}{8}$" during the change cycle. Clockwise turning of the adjusting screw will raise the arm—counter-clockwise turning will lower it. (Caution: Do not turn excessively.)
4. Lift the tone arm and place a dab of Purple Glyptal (or plastic cement) on the base of the screw after making this adjustment so it will not move, once accurately adjusted. (Do not use a permanent type of cement and be sure it is not placed on the shoulder or end of the screw.)



TONE ARM WILL NOT SET DOWN ON SINGLE RECORD ON TURNTABLE

1. Adjust by tone arm method. If this fails follow 2.
2. Although the raising lever has in most cases been properly formed at the factory it may be necessary to very slightly bend the raising lever to allow the needle to properly set down on a single record on the turntable.

   This is very seldom necessary and most height adjustments can be made by the tone arm adjustment.



WILL NOT PLAY RECORDS MANUALLY

1. If the Changer trips and cycles at the end of a record the Trip Arm stop ear on the Set Down *Disc Assembly* is not restricting the movement of the Arm toward the Velocity Trip. The stop on the *Disc* Assembly or the finger on the Trip Arm should be bent so that the Arm cannot travel inward when the changer is in a Manual position. (H).
2. The Velocity Trip does not have proper clearance from Main Cam or Drive Gear. See "Changes Records Prematurely", and "Fails to Change Records Automatically".

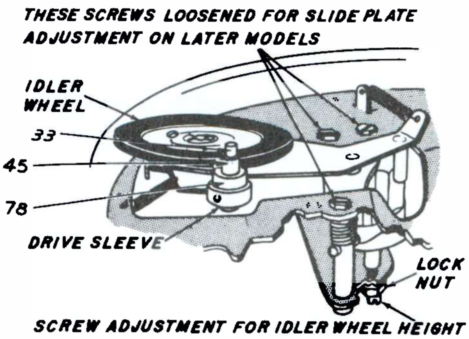
TROUBLE—SOURCE—ADJUSTMENTS	PARTS CONCERNED

INCORRECT TURNTABLE SPEED

1. Defective Idler Wheel or Wheel is cocked at an angle.
2. The Idler Wheel does not rest on the steps of the Drive Sleeve correctly. To adjust place the Speed Selector in 45 rpm position, loosen nut as indicated, then turn screw to raise or lower Idler Wheel so that its edge is vertically centered on the 45 step of the Sleeve. (Second Step from top.) Tighten Nut.

ERRATIC SPEED

1. Defective Idler Wheel. (Flat spots.)
2. Dirt or grease on rubber rim of the Idler Wheel, Drive Sleeve or on the rim of the Turntable. Cleanse with alcohol.
3. If the rubber composition of the Idler Wheel is slick and shiny replace with new wheel.

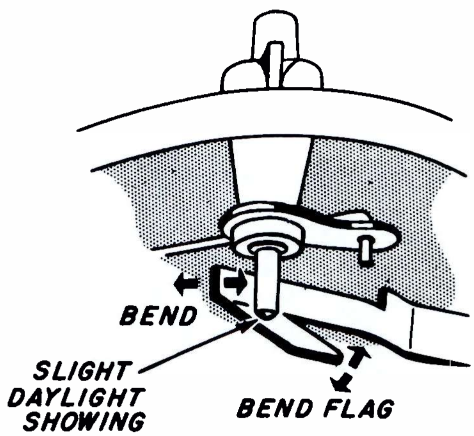


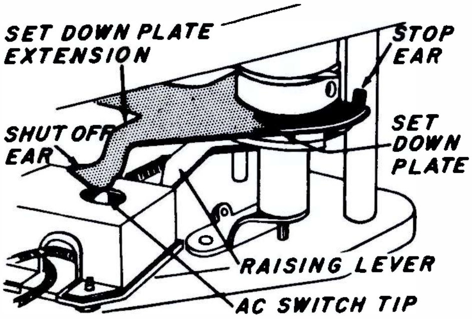
STALLS DURING CHANGE CYCLE

1. See *Erratic* Speed (Par. 2 and 3).
2. Check position of Idler Wheel on Drive Wheel Sleeve as in "*Incorrect* Speed" (Par. 2) above.
3. See "Does not push off records", Spindle adjustment may be required.
4. Check for low line voltage.
5. In later models the Idler Wheel Slide Plate Assembly can be re-positioned by loosening screws holding it to mainplate. The idler Wheel can be placed in firmer contact with the Drive Sleeve by moving the slide plate assembly accordingly. (Caution: Do not move assembly excessively so that the Idler presses too tightly against Sleeve thus affecting correct speed.)

DOES NOT TURN ON OR TURNTABLE DOES NOT ROTATE WHEN TONE ARM IS PLACED ON RECORD OR WHEN REJECT BUTTON IS DEPRESSED

1. Be sure Speed Selector is on a speed setting.
2. Reject Lever stroke is insufficient. Lever can be bent slightly at points indicated by arrows to increase the Lever stroke so that the AC switch tip clears the extension of the Set Down Plate when reject button is depressed. Slight daylite should show between flag end of Lever and shaft of Reject Button.
3. Defective AC Switch or defective Motor.
4. Binding or frozen motor.
5. Check idler wheel adjustment. See "Incorrect turntable speed" above.



PARTS CONCERNED	TROUBLE—SOURCE—ADJUSTMENTS
	**DOES NOT SHUT OFF AUTOMATICALLY OR WHEN THE TONE ARM IS PLACED ON ITS REST** 1. The ear on the Stop Plate extension is bent and does not strike switch tip properly in its downward travel or when tone arm is placed on its rest. 2. Defective AC Switch. 3. There may be a burr on the plastic switch tip which restricts the movement of tone arm when the arm is manually placed on its rest. Do not force arm but rather smooth off tip for easy shut off operation. 4. See "Tone arm swing". 5. See "No lockout".

MISCELLANEOUS TROUBLES

GLIDE-IN ON 12" RECORDS

The term "glide-in" is used to describe the action of the tone arm and needle when the needle glides over the first two or three grooves of the record before seating itself properly. If glide-in occurs:

The pickup cord may be dressed too tight or in such a manner that it interferes with the free movement of the pickup arm. Make certain there is sufficient play in the pickup cord.

SLIDE-IN OR NEEDLE JUMPS GROOVES

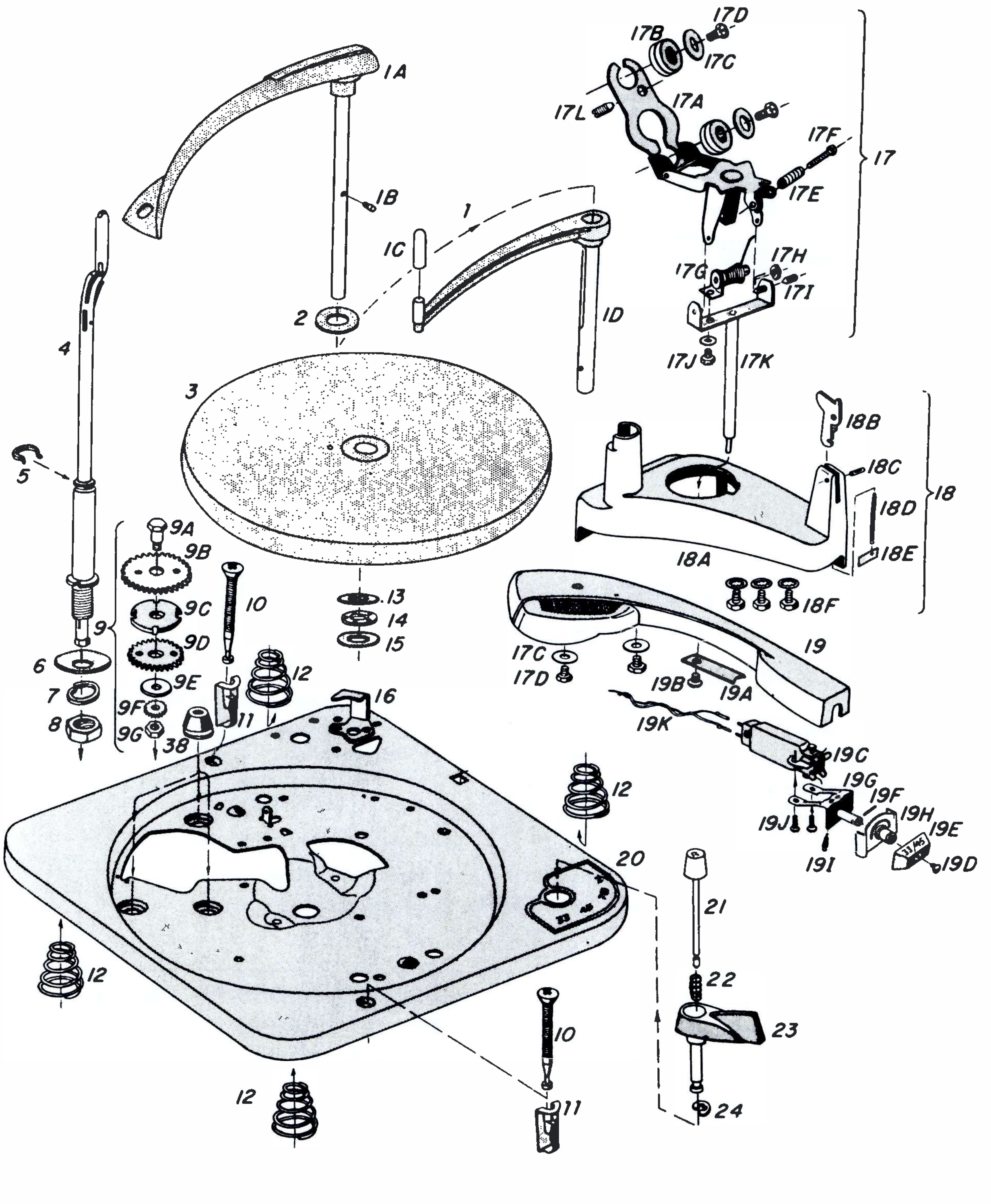
Slide-in describes the condition where the needle will touch the first groove of the record properly but will jump the grooves forward or back as though the needle pressure was too light.

To correct slide-in, check for:

1. Incorrect needle tip. The standard "78" tip will be especially likely to jump grooves of a microgroove record. Be certain the "micro" or "35-45" tip is used for either the 33⅓ or 45 rpm microgroove records.
2. Chipped or damaged needle.
3. Tight pickup cord.
4. Needle pressure too light.

MORE THAN ONE RECORD IS DROPPED DURING A CHANGE CYCLE

1. Foreign matter in spindle recess causing the latch to stick.
2. Exceptionally thin records.
3. Bent spindle.



Exploded View — Above Mainplate

PARTS LIST—ABOVE MAINPLATE

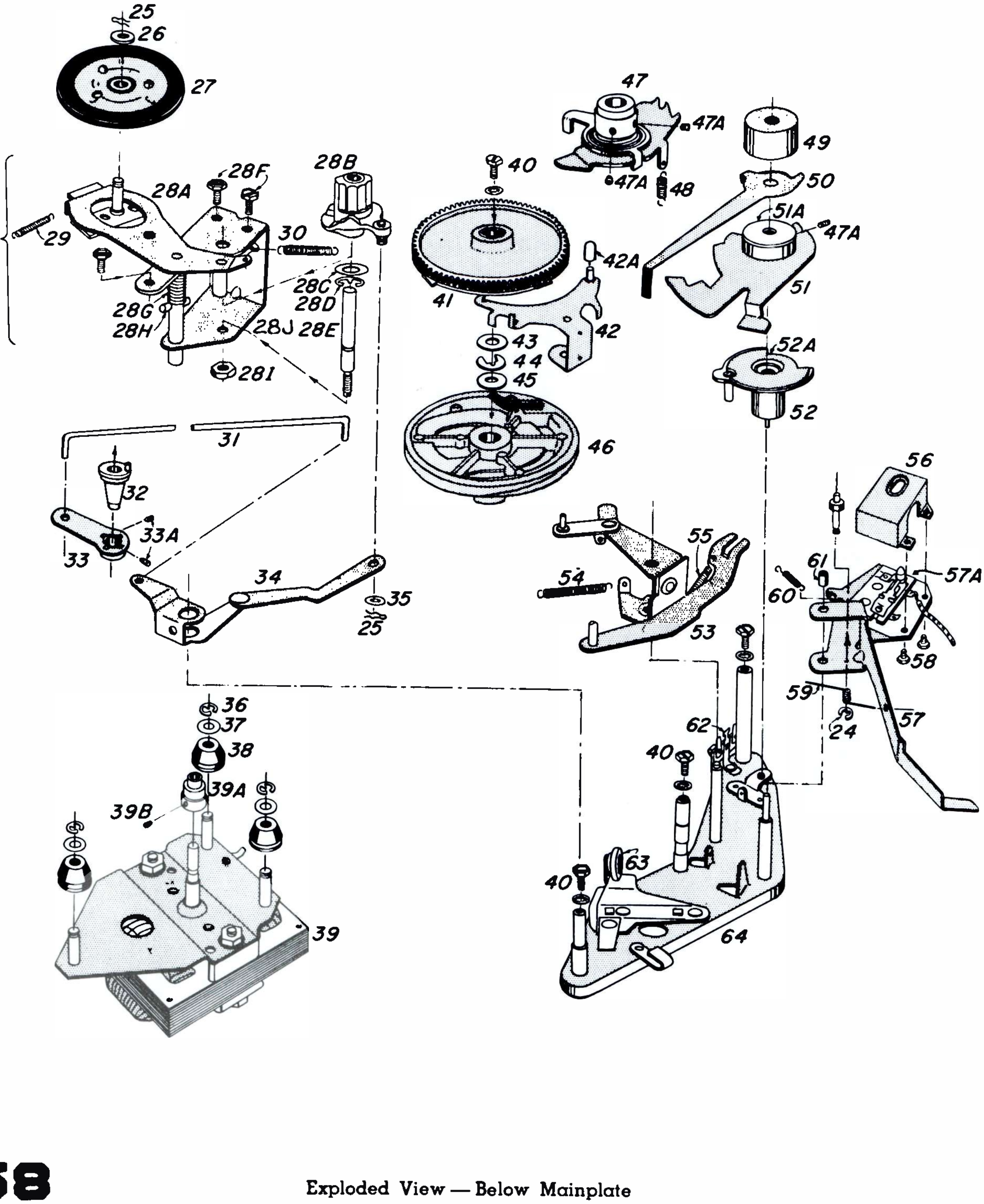
(NUMBERS REFER TO EXPLODED VIEW)

Fig. No.	*Part No.*	*Description*
1	—11X956-E 11X956-LY	Model B121 Model F121 Record Ballast Arm and Index Finger Assembly
1A	—11X925-E 11X925-LY	Model B121 Model F121 Record Ballast Arm
1B	—41P1146	Knurled Pin for 11X956
1C	—24P048	Rubber Cushion for Index Finger
1D	—42X299-E 42X299-LY	Model B121 Model F121 Index Finger Arm
2	—25P454	Rubber Washer (Early models only)
3	—11X878-E 11X878-DJ	Model B121 Model F121 Turntable Assembly
4	—11X976	Spindle
5	—50P221	Retainer for Turntable
6	—25P289	Cup Washer — Spindle Mounting
7	—25P403	Lock Washer — Spindle Mounting
8	—26P687	Nut — Spindle Mounting
9	—11X132	Idler Gear Assembly
9A	—41P333	Shoulder Screw
9B	—47P024	Idler Gear — Large
9C	—45P342	Coupler for 11X132
9D	—47P023	Idler Gear — Small
9E	—25P284	Washer for 11X132
9F	—25P222	Lock Washer for 11X132
9G	—26P046	Nut for 11X132
10	—26P1045-1	Mounting Screw
11	—50P252	Mounting Clip
12	—46P307	Mounting Spring
13	—25P269	Washer for Bearing Race
14	—11X058	Turntable Bearing Race
15	—25P269	Washer for Bearing Race
16	—45P191	Stop Bracket for Tone Arm
17	—21X344	Tone Arm Hinge and Shaft Assembly
*17A	—21X331	Tone Arm Hinge (See footnote)
17B	—25P558	Grommet
17C	—25P257	Washer
17D	—26P965	Mounting Screw — Tone Arm
17E	—46P299	Compression Spring
17F	—26P1246	Adjusting Screw — Set Down
17G	—21X335	Tone Arm Counter Balance
17H	—26P1247	Hex Nut
17I	—26P1267	Pivot Screw
17J	—26P1253	Screw
*17K	—21X343	Tone Arm Shaft (See footnote)
17L	—26P1285	Adjusting Screw — Height
†18	—11X981E 11X981-LY	Model B121 Model F121 Housing and Tone Arm Rest Assembly (See footnote)
†18A	—42P296-E 42P296-LY	Model B121 Model F121 Housing (See footnote)
18B	—49P178	Latch Lever
18C	—27P278	Pin
18D	—46P303	Tension Spring
18E	—45P1511	Spring Anchor Plate
18F	—26P747	Mounting Screws — Housing
19	—42P300-1E 42P300-1LY	Model B121 Model F121 Tone Arm
19A	—45P1509	Tone Arm Latch Plate
19B	—26P1191	Self Tapping Screw
19C		Cartridge (Order from Distributor by Mfgrs. name and number)
19D	—19I—11X915—	Complete Turnover Mechanism Assembly
	19D-26P1250	Screw — Cartridge Knob
	19E-49P176-E 49P176M	Model B121 Model F121 Cartridge Knob
	19F-27P276	Groove Pin
	19G-11X912	Mounting Bracket
	19H-11X907	Hub and Mounting Plate
	19I-46P296	Spring
19J	—26P474	Screws — Cartridge Mounting
19K	—20P1769	Pickup Cord and Lug Assembly
20	—78P593-1 78P593-2	Model B121 Model F121 Speed Indicator Plate
21	—49X171-E 49X171-LY	Model B121 Model F121 Reject Button
22	—46P297	Compression Spring
23	—42X290-E 42X290-LY	Model B121 Model F121 Speed Selector
24	—25P447	"C" Washer

*On changers bearing numbers (located on tag on underside of mainplate) 375-245 or earlier: Do not order these parts. Replace entire hinge and shaft assembly—order improved part No. 21X344.

†18—11X981-1E and 11X981-1LY for B123 and F123 respectively.

†18A—42P314-E and 42P314-LY for B123 and F123 respectively.



Exploded View — Below Mainplate

PARTS LIST—BELOW MAINPLATE

(NUMBERS REFER TO EXPLODED VIEW)

Fig. No.	*Part No.*	*Description*
25	—50P125	Retainer Clip
26	—25P430	Washer
27	—11X935	Idler Wheel
28	—11X950	Idler Wheel Slide Plate Assembly
28A	—11X946	Pivot and Slide Plate Assembly
28B	—11X949	Cam and Stud Assembly
28C	—25P578	Washer
28D	—25P574	"C" Washer
28E	—41P1159	Cam Shaft
28F	—26P251	Mounting Screws for 11X950
28G	—46P305	Compression Spring
28H	—27P282	Groove Pin
28I	—26P077	Hex Nut
28J	—45P1565	Idler Bracket
29	—46P314	Tension Spring—Slide Plate
30	—46P315	Tension Spring—Slide Plate
31	—45P1549	Speed Change Rod
32	—42P289	Bushing for Mounting 11X954
33	—11X954	Selector Link and Hub Assembly
34	—11X936	Link Assembly (Speed Selector)
35	—25P549	Washer
36	—25P535	"C" Washer
37	—25P394	Washer
38	—24P078	Rubber Grommet
39	—15X152	Motor and Top Bridge Assembly (Incl. Drive Sleeve)
*39A	—41P1248	Drive Sleeve
39B	—26P1292	Set Screw—Drive Sleeve
40	—26P748	Screw
41	—11X032	Main Actuating Gear
42	—11X320	Velocity Trip
42A	—24P023	Rubber Bumper for Trip
43	—25P343	Washer for 11X545
44	—25P342	"C" Washer for 11X545
45	—25P083	Washer for 11X545
46	—11X545	Main Cam
47	—11X953	Set Down Disc Assembly
47A	—26P629	Set Screw for 11X953 and 11X938
48	—46P319	Tension Spring—11X953
49	—41P1152	Clutch Weight
50	—45P1552	Velocity Trip Arm
51	—11X938	Set Down Plate
51A	—23P009	Washer for Weighted Clutch (Felt)
52	—11X939	Raising Disc
52A	—28P010	Clutch
53	—11X942	Raising Lever Assembly
54	—46P323	Spring for 11X942
55	—46P022	Spring for 11X942
56	—11X876	AC Switch Cover Assembly
57	—11X875	Reject Lever Assembly
57A	—32P089	AC Switch
	61P359	Spacer Plate for Switch
	61P360	Insulator for Switch
58	—26P779	Screws for AC Cover
59	—46P288	Torsion Spring—Reject
60	—46P318	Tension Spring—Reject Lever
61	—41P1097	Spacer
62	—70P045	Standoff Lug Assembly
63	—11X941	Spindle Actuating Lever
64	—27P217	Rivets for Mounting 11X941

*39A—41P1165 For 15X142 motor on earlier production. (Number is stamped on motor.)

REPLACEMENT OF PARTS

CARTRIDGE REPLACEMENT

1. To remove cartridge raise the Tone Arm to a vertical position.
2. Remove the pickup lead lugs from the terminals of the cartridge.
3. Unscrew the mounting screws so that the cartridge can be removed from the Arm.
4. Replace with like Cartridge ordering through your distributor. Specify the Manufacturer of the Cartridge and his number.
5. Be sure cartridge is aligned correctly on bracket so that needle setdown is correct for both needles. If setdown is not correct for both needles after installation realign cartridge on bracket. (For turnover cartridges.)

REPLACEMENT OF THE MOTOR ASSEMBLY

1. The Four pole Motor is mounted suspended from the Mainplate. Remove the "C" Washers from the mounting posts on the Motor Assembly.
2. Support Motor Assembly with one hand while removing washers and lower it from the Mainplate.
3. Replace the new Assembly reversing above procedure.

REPLACEMENT OF TONE ARM BRACKET AND SHAFT ASSEMBLY

1. Unsolder Cartridge leads from terminal strip beneath Mainplate.
2. Loosen the Bristol Screw in the hub of the Set Down Plate.
3. Remove the Weighted Clutch, Trip Arm, Set Down Plate and Raising Disk by sliding them off the bottom of the Tone Arm Shaft and pull the shaft out of the Changer.
4. Replace by reversing procedure.

REPLACEMENT OF THE IDLER WHEEL SLIDE PLATE ASSEMBLY

1. Remove the Motor Assembly as instructed above.
2. Remove the Idler Wheel.
3. Remove the Retainer Clip (or "C" Washer) at the bottom of the Slide Plate Assembly where the Cam and Stud Assembly fastens to the Speed Selector Linkage Assembly.
4. Drop the Slide Plate Assembly from the Mainplate by removing the Mounting Screws holding the Assembly to the Mainplate.
5. Replace using reverse procedure.

LUBRICATION

Model 121 Record Changers leave the factory completely oiled and lubricated. Under normal conditions this should be sufficient for approximately one year or 1,000 hours of operation.

Do not permit oil or grease to get on the rubber Idler Drive Wheel, the Motor Sleeve, Turntable Drive Rim, the Automatic Trip Arm clutch or Raising Disc clutch. Any oil or grease on these points should be removed using alcohol. The recommended lubricants and points of lubrication are as follows:

A — No. 10 OIL (Apply With Small Oil Can or Medicine Dropper)

1. Motor Bearings — (1 drop).
2. Pickup Arm Shaft.
3. Ball Bearing Assembly.

B — A NON FLUID LUBRICANT (Apply With Small Brush)

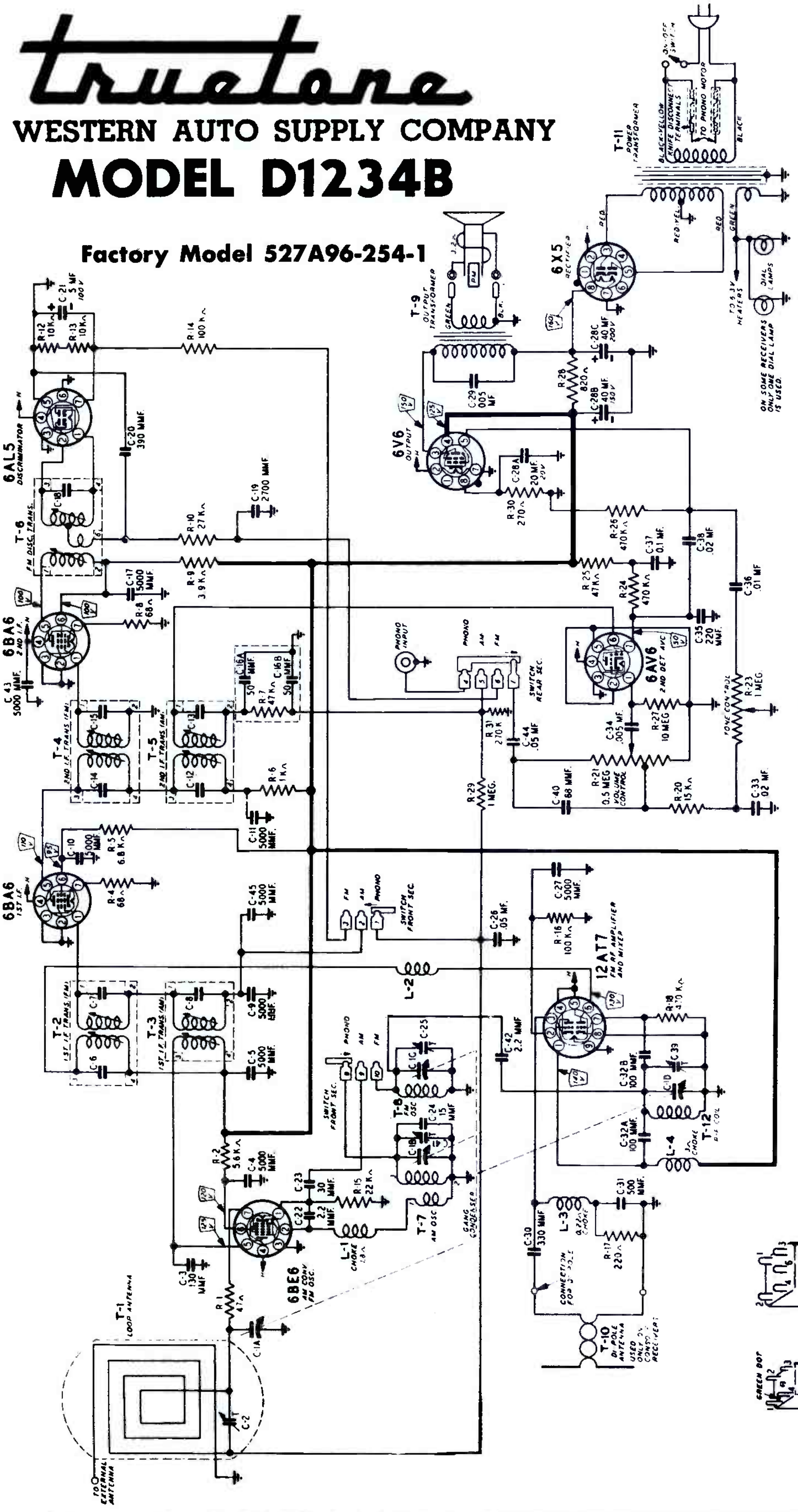
1. Idler Wheel Link.
2. Turntable Shaft Stud.
3. Pickup Arm Hinge Pins.
4. Cam and Follower — Slide Plate Assembly.
5. Teeth of Main Cam Actuating Gear.
6. Track of Main Cam Gear.
7. Teeth of Large and Small idler gears.
8. Raising lever Bracket bearing surface.
9. Spindle adjusting nut at bottom.

truetone

WESTERN AUTO SUPPLY COMPANY

MODEL D1234B

Factory Model 527A96-254-1



TUBE SOCKET VOLTAGES

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

Line voltage ....117 Volts AC
Signal Input ....None
A variation of ±10% is usually permissible.

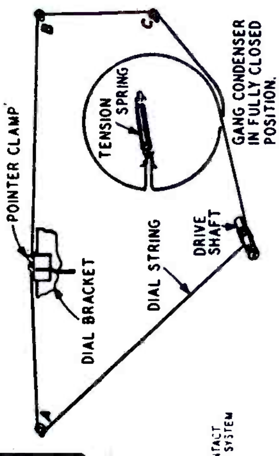
Frequency Ranges—
Broadcast 540-1600 KC
Frequency modulation 88-108 MC

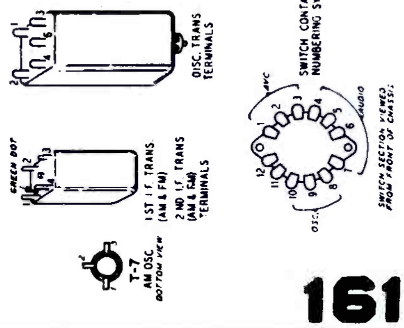
Intermediate Frequency—
AM 455 KC — FM 10.7 MC

Selectivity — AM — 45 KC broad at 1000 times signal, measured at 1000 KC

I.F. FM—200 KC broad at 2 times down

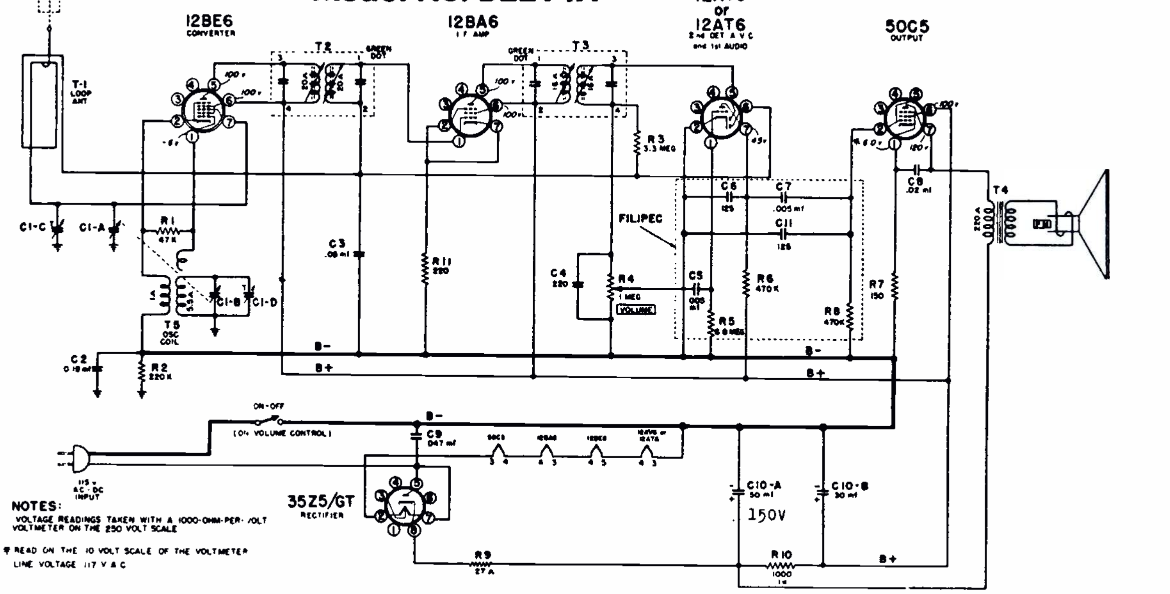
I.F. FM—950 KC broad at 200 times down





Western Auto Supply Company

Model No. D2214A



NOTES:
VOLTAGE READINGS TAKEN WITH A 1000-OHM-PER-VOLT VOLTMETER ON THE 250 VOLT SCALE
* READ ON THE 10 VOLT SCALE OF THE VOLTMETER
LINE VOLTAGE 117 V A C

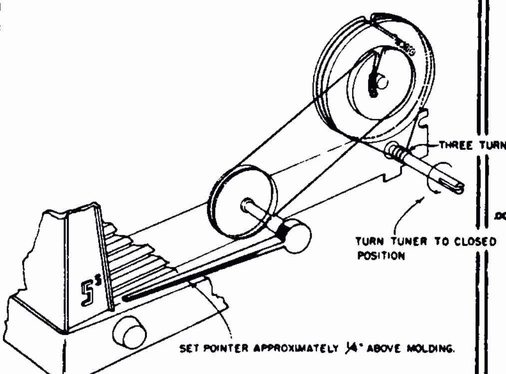
ALIGNMENT PROCEDURE

- Loop must be connected and set volume to maximum.

NOTE: Capacitor C4 is included in filpec.
Capacitor C2 should be .09 mmf.

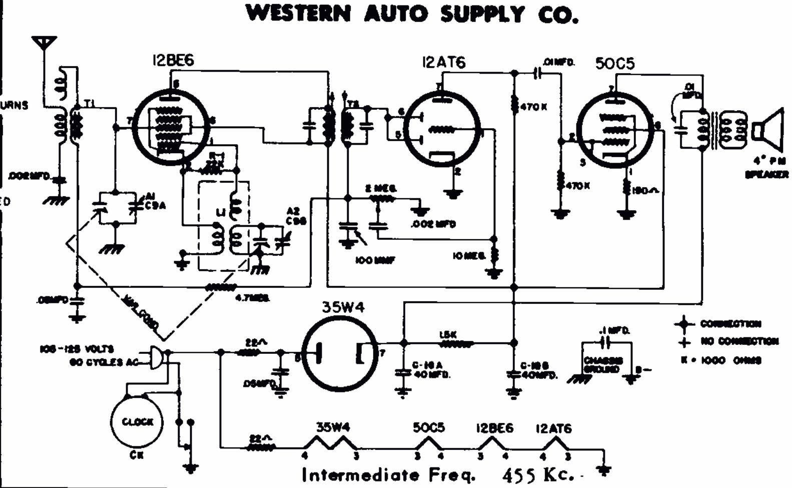
SIGNAL GENERATOR						
Frequency	Coupling Capacitor	Connection to Radio	Ground Connection	TUNER SETTING	ADJUST FOR MAXIMUM OUTPUT	INPUT FOR 50-MILLIWATT OUTPUT
455 kc.	.1 mf	12BE6, Pin 7	HEAVY BUSS LEAD ACROSS CENTER OF CHASSIS	Capacitor fully open (plates out of mesh)	Top and bottom Cores in output and input I.F. cans	65 microvolts
1620 kc.	.1 mf	12BE6, Pin 7		Capacitor fully open (plates out of mesh)	Oscillator trimmer C1-D on gang	70 microvolts
535 kc.	.1 mf	12BE6, Pin 7		Capacitor fully closed	Check for adequate range	70 microvolts
1400 kc.	------	Lay generator lead near back of cabinet		Tune in 1400 kc. signal	Antenna trimmer C-1C on gang	200 to 400 microvolts
400 cycles	.1 mf	12AT6, Pin 1		------	------	.06 volts

Dial Stringing Diagram



MODEL D-2205

WESTERN AUTO SUPPLY CO.

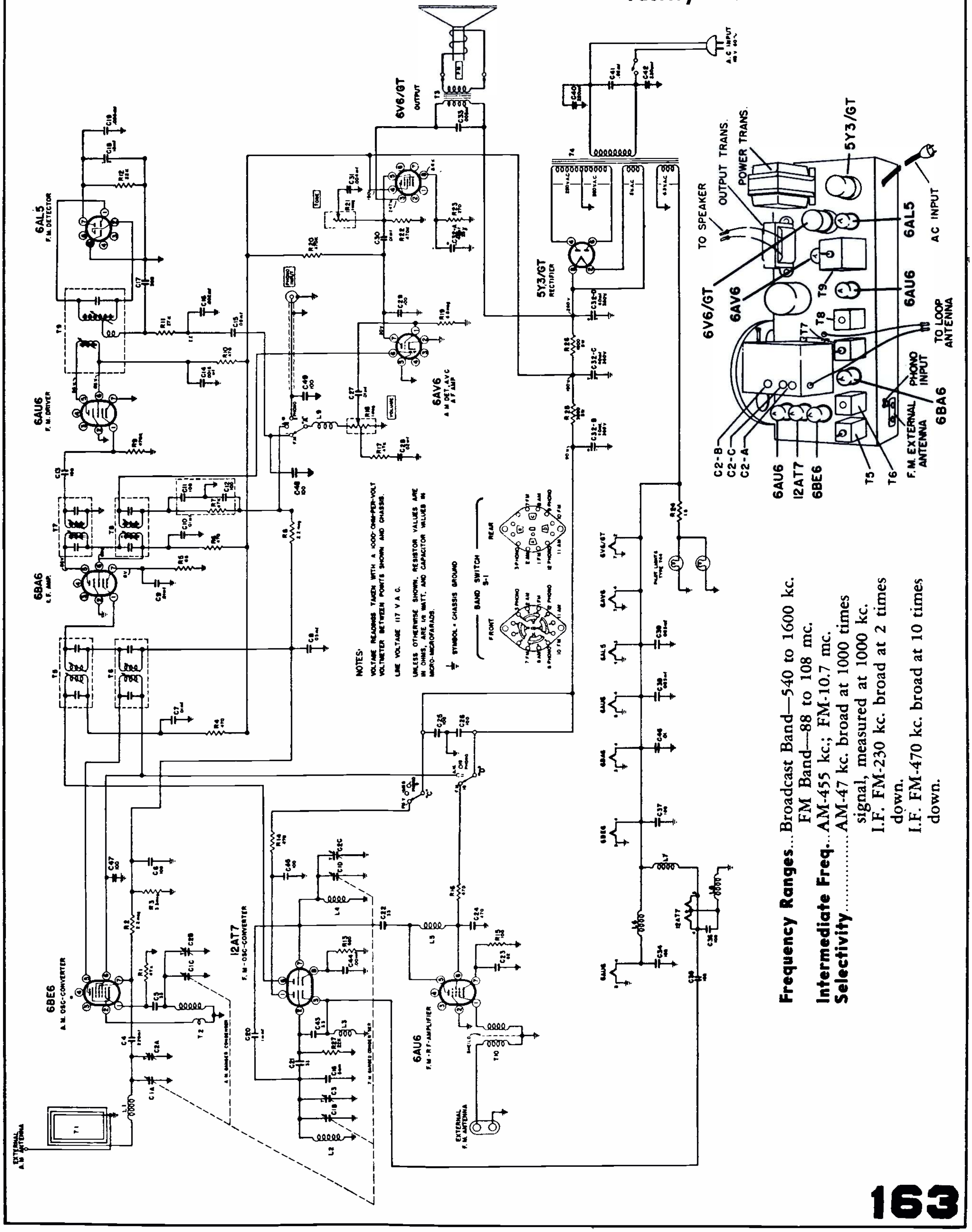


Intermediate Freq. 455 Kc.

WESTERN AUTO SUPPLY CO.

MODEL D-2226A

Factory Model 9AF25B

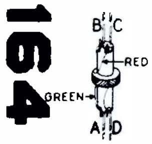


Frequency Ranges...Broadcast Band—540 to 1600 kc.
FM Band—88 to 108 mc.
Intermediate Freq...AM-455 kc.; FM-10.7 mc.
Selectivity..........AM-47 kc. broad at 1000 times signal, measured at 1000 kc.
I.F. FM-230 kc. broad at 2 times down.
I.F. FM-470 kc. broad at 10 times down.

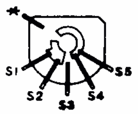
WESTERN AUTO SUPPLY COMPANY

MODEL D2255

CODE S-WC-9167A



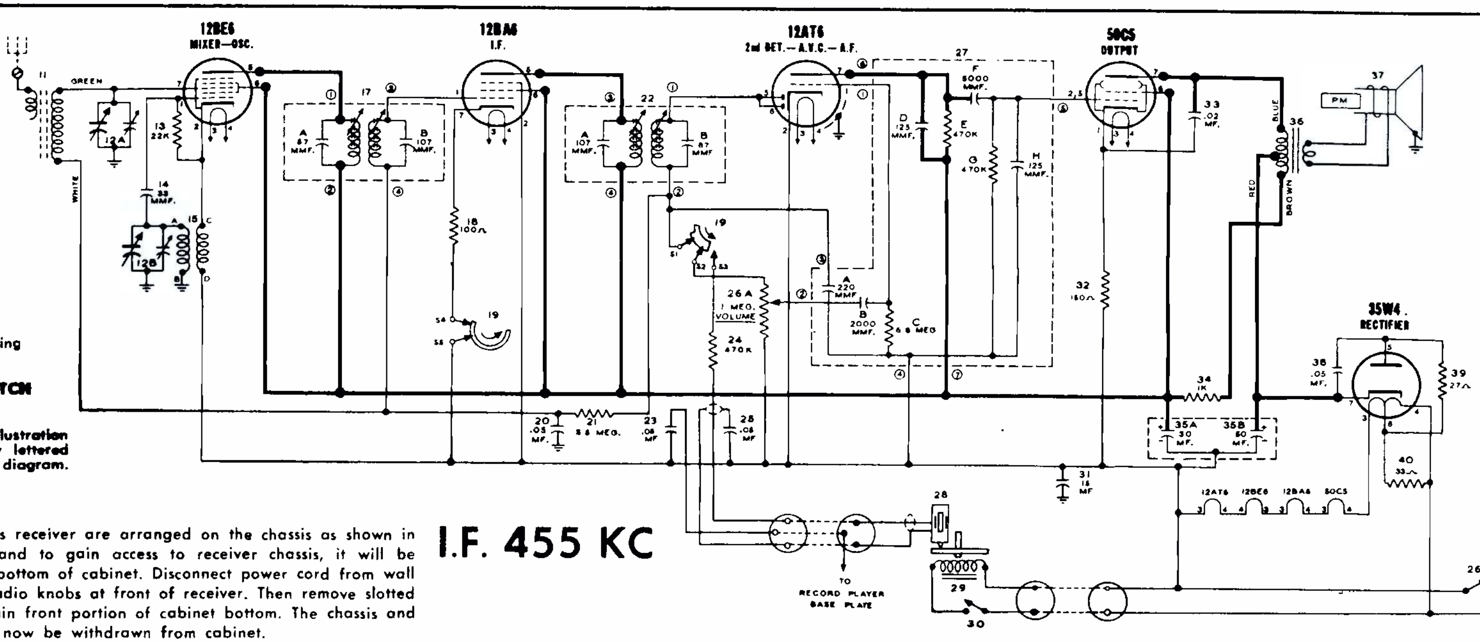
OSC. COIL
509832



* May serve as a wiring point.

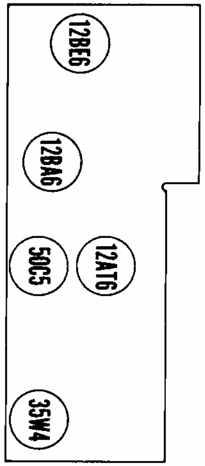
RADIO-PHONO SWITCH
520604

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



I.F. 455 KC

The tubes used in this receiver are arranged on the chassis as shown in adjacent illustration and to gain access to receiver chassis, it will be necessary to remove bottom of cabinet. Disconnect power cord from wall outlet and take off radio knobs at front of receiver. Then remove slotted head screws that retain front portion of cabinet bottom. The chassis and mounting board may now be withdrawn from cabinet.



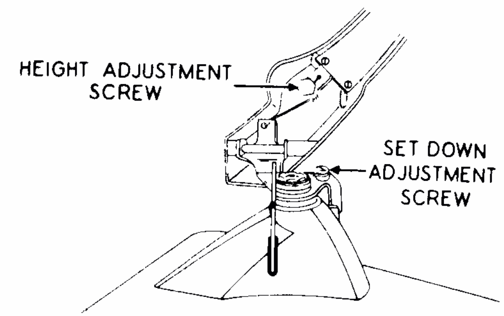
REAR OF CHASSIS

PHONOGRAPH ADJUSTMENTS

1. **NEEDLE SET-DOWN ADJUSTMENT**—The set-down position of the needle can be changed by means of the Set-down Adjustment Screw mounted on the hinge assembly (see illustration). Observe set-down point of needle and turn screw so that set-down is correct for a ten inch record. When correct set-down is obtained for the 10" position the 12" and 7" set-down points will also be correct.

2. **PICK-UP ARM HEIGHT ADJUSTMENT**—The Pick-up Arm height can be changed by the Height Adjustment Screw located near the rear of Pick-up Arm (see illustration). To raise the height of the Pick-up Arm, turn this screw counter-clockwise. To lower the Pick-up Arm, turn clockwise. The Pick-up Arm height should be adjusted so that with a 1⅛" stack of records on the Turntable, the Pick-up Arm lifts ¼" straight up as the change cycle starts.

PHONOGRAPH ADJUSTMENT SCREWS

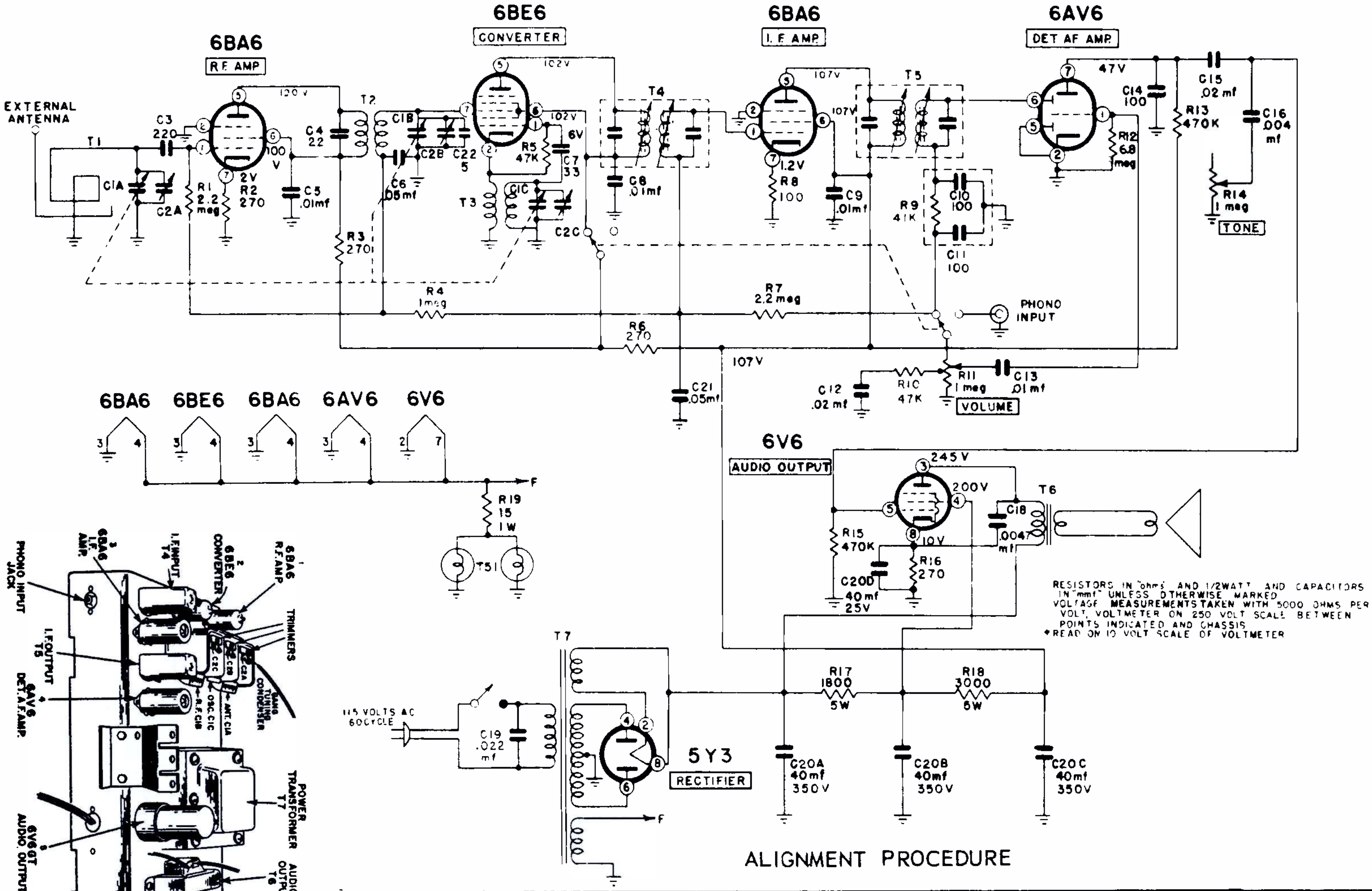


CAUTIONS: Observe the following precautions in order to insure proper operation.

1. Never try to force the Control Knob to remain in the **"REJ."** position.
2. Never use force to stop and start the Turntable or Pick-up Arm. If the radio "On-Off Switch" (or the Record Changer Control Knob) is turned off while record changer is going thru its change cycle, the Pick-up Arm may stop in a suspended position. Where this occurs, merely turn switch on again and start the Turntable by rotating it clockwise with your hand. After the Pick-up Arm completes its cycle and lands on the record then turn off switch and lift arm to the Rest Post.
3. Never leave Pick-up Arm and needle resting on a record when radio is turned off.
4. Do not leave record on the supports for an extended period of time as they may warp.
5. Exercise care not to bend the Center Post.

Western Auto Supply Company

Model No. D2325-A



ALIGNMENT PROCEDURE

SIGNAL GENERATOR						
	FREQUENCY	COUPLING CAPACITY	CONNECTION TO RADIO	GROUND SIDE	TUNER SETTING	ADJUST FOR MAXIMUM OUTPUT
I.F.	455 KC	.1 mfd.	Pin 7 6BE6	CHASSIS	GANG OPEN (plates out of mesh)	Top and Bottom cores T4 and T5
Osc.	1620 KC	.1 mfd.	Pin 7 6BE6	CHASSIS	GANG OPEN (plates out of mesh)	C2C Osc. trimmer on gang
R.F.	1400 KC	.1 mfd.	Pin 1 6BA6	CHASSIS	TUNE TO (1400 KC signal)	C2B R.F. trimmer on gang
Ant.	1400 KC	Connect 3 turn loop to generator place near loop on receiver			TUNE TO (1400 KC signal)	C2A Antenna trimmer on gang

WESTERN AUTO SUPPLY COMPANY

MODEL D-2383

TRUETONE BROADCAST AND SHORT WAVE RECEIVER

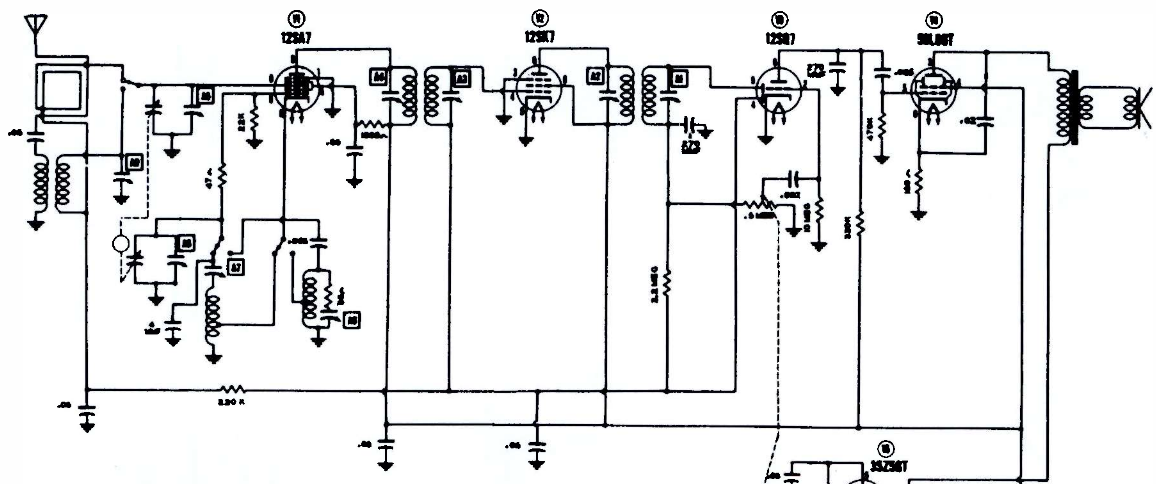
ALIGNMENT PROCEDURE

To set dial pointer, turn tuning gang fully closed and set left hand edge of the pointer 1 11/16" from the left hand edge of the dial backplate.

Use isolation transformer if available. If not connect a .1 MFD. cap. in series with low side of signal generator and B-.

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

DUMMY ANTENNA	SIGNAL GENERATOR COUPLING	SIGNAL GENERATOR FREQUENCY	BAND SWITCH POS.	RADIO DIAL SETTING	OUTPUT METER	ADJUST	REMARKS
.05MFD	High side to rear stator of tuning gang. Low side to chassis.	455KC	BC	Tuning gang fully open.	Across voice coil.	A1, A2 A3, A4	Adjust for maximum output If isolation transformer is not used reduce dummy antenna to .001 MFD to reduce hum modulation.
.05MFD	"	1650KC	BC	"	"	A5	Adjust for maximum output
	Loop	1400KC	BC	Tune for max. signal	"	A6	Fashion loop of several turns of wire and radiate signal into loop of receiver. Adjust for maximum output.
	Loop	600KC	BC	600KC (2 3/16" from left edge of dial backplate.)	"	A7	Adjust for maximum output
400Ω Carbon Resistor	High side to external antenna lead. Low side to chassis.	18.3MC	SW	Tuning gang fully open.	"	A8	Adjust for maximum output
400Ω Carbon Resistor	"	16MC	SW	Tune for max. signal	"	A9	Adjust for maximum output



1. DC Voltage measurements are at 20,000 ohms per volt; AC Voltages measured at 1,000 ohms per volt.
2. Socket connections are shown as bottom views.
3. Measured values are from socket pin to common negative.
4. Line voltage maintained at 117 volts for voltage readings.
5. Nominal tolerance on component values makes possible a variation of ± 10% in voltage and resistance readings.
6. Volume control at maximum, no signal applied for voltage measurements.

IF=455 KC

VOLTAGE READINGS

Sym.	Tube	Pin 1	Pin 2	Pin 3	Pin 4	Pin 5	Pin 6	Pin 7	Pin 8
V 1	12SA7GT	0V	[illegible]VAC	80VDC	[illegible]VDC	[illegible]	0V	12VAC	-.[illegible]VDC
V 2	12SK7GT	0V	24VAC	0V	-.6VDC	0V	80VDC	[illegible]VAC	80VDC
V 3	12SQ7	0V	-.7VDC	0V	-.4VDC	-.3VDC	80VDC	12VAC	0V
V 4	50L6GT	-.3VDC	[illegible]VAC	113VDC	80VDC	0V	-.4VDC	[illegible]VAC	5.8VDC
V 5	35Z5GT	80VDC	117VAC	113VAC	-.8VDC	110VAC	-.4VDC	[illegible]VAC	110VDC

RESISTANCE READINGS

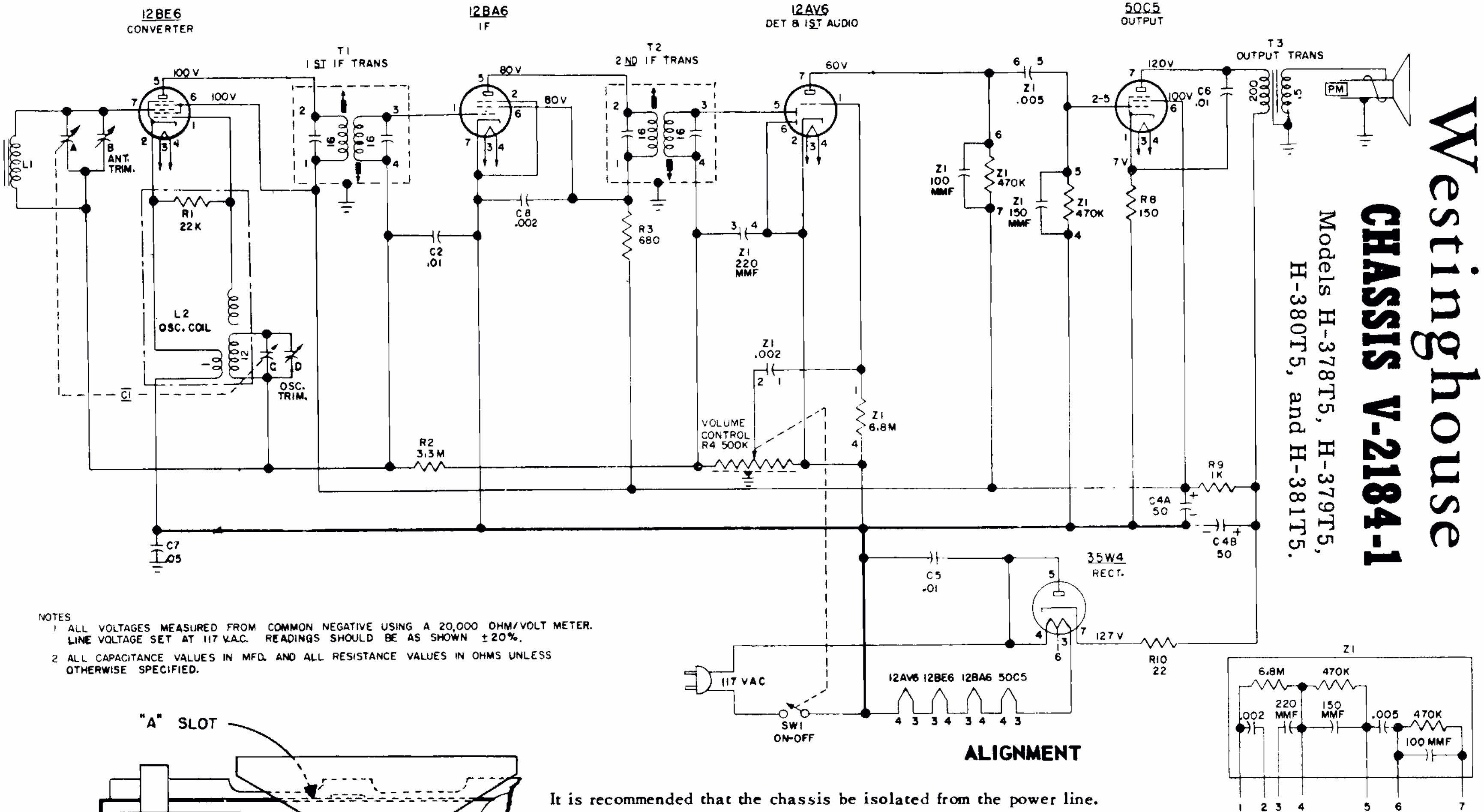
Sym.	Tube	Pin 1	Pin 2	Pin 3	Pin 4	Pin 5	Pin 6	Pin 7	Pin 8
V 1	12SA7GT	0Ω	34Ω	†1000Ω	†[illegible]	25KΩ	.0Ω	12Ω	3 Meg.
V 2	12SK7GT	0Ω	36Ω	0Ω	3 Meg.	0Ω	†1000Ω	24Ω	†1000Ω
V 3	12SQ7	0Ω	10 Meg.	0Ω	3 Meg.	54KΩ	†[illegible]	12Ω	0Ω
V 4	50L6GT	500KΩ	87Ω	†[illegible]	†1000Ω	500KΩ	3 Meg.	24Ω	150Ω
V 5	35Z5GT	†1000Ω	120Ω	116Ω	†2 Meg.	130Ω	†3 Meg.	87Ω	[illegible]

† Measured From Pin 8 Of V5.

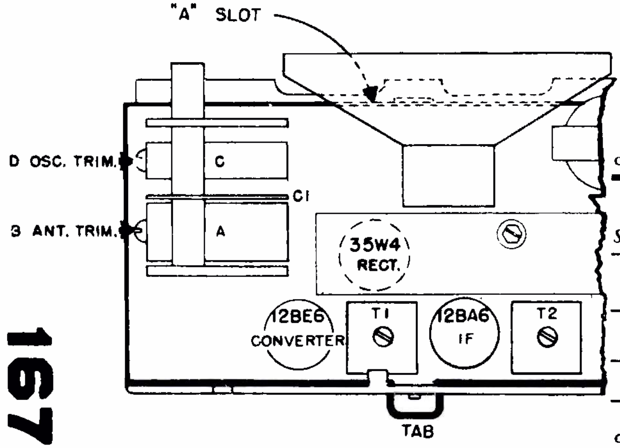
Westinghouse

CHASSIS V-2184-1

Models H-378T5, H-379T5,
H-380T5, and H-381T5.



NOTES
1 ALL VOLTAGES MEASURED FROM COMMON NEGATIVE USING A 20,000 OHM/VOLT METER. LINE VOLTAGE SET AT 117 V.A.C. READINGS SHOULD BE AS SHOWN ±20%.
2 ALL CAPACITANCE VALUES IN MFD. AND ALL RESISTANCE VALUES IN OHMS UNLESS OTHERWISE SPECIFIED.



ALIGNMENT

It is recommended that the chassis be isolated from the power line.

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

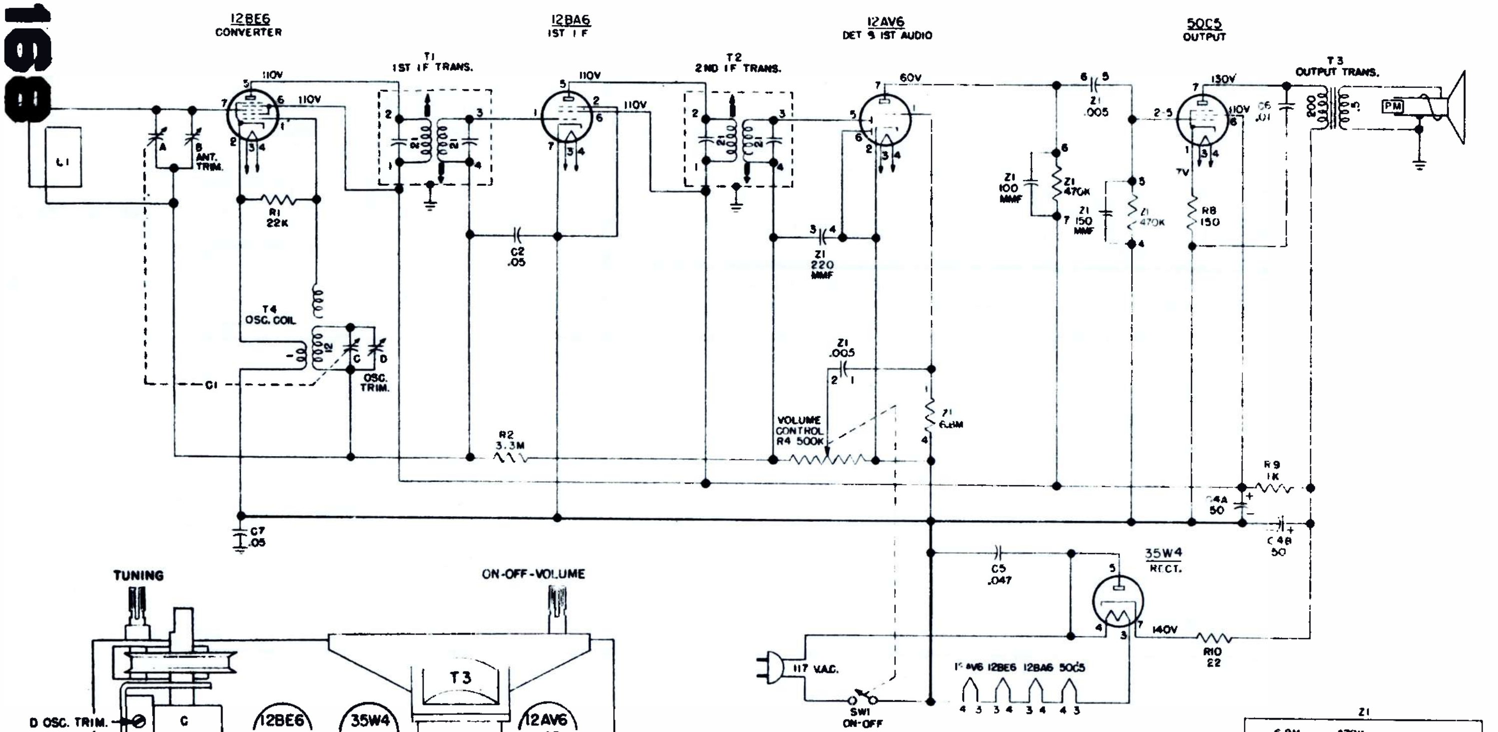
Step	Connect Signal Generator to —	Signal Generator Frequency	Radio Dial	Adjust for Maximum Output —
1	Stator of ant. tuning capacitor (A) through a 200 mmf capacitor	455 kc.	Minimum capacity	Bottom and top slugs of T2 and T1 in order given*
2	Same as step 1	1625 kc.	Minimum capacity	Oscillator trimmer (D)
3	Radiated signal	1400 kc.	1400 kc.	Antenna trimmer (B)

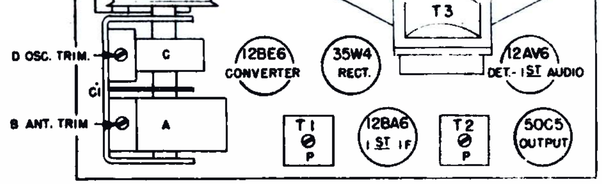
*It is recommended that a fiber aligning tool that snugly fits the slot in the powdered iron core be used to prevent chipping of the slot.

Westinghouse
RADIO TELEVISION

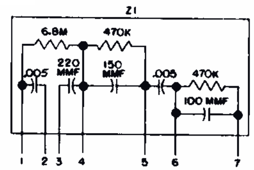
CHASSIS V-2157-10

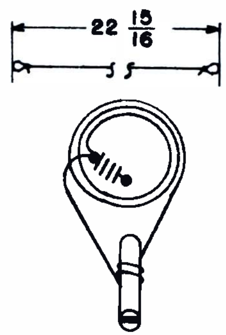
MODELS H-382T5 AND H-383T5





NOTES:-
1. ALL VOLTAGES MEASURED FROM COMMON NEGATIVE USING A 20,000 OHM/VOLT METER. LINE VOLTAGE SET AT 117 V.A.C. READINGS SHOULD BE AS SHOWN ±20 PER CENT.
2. ALL CAPACITANCE VALUES IN MFD. AND ALL RESISTANCE VALUES IN OHMS UNLESS OTHERWISE SPECIFIED.





DRIVE STRINGING

ALIGNMENT

It is recommended that the chassis be isolated from the power line by means of an isolation transformer.

Make certain that the dial pointer is correctly positioned.

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

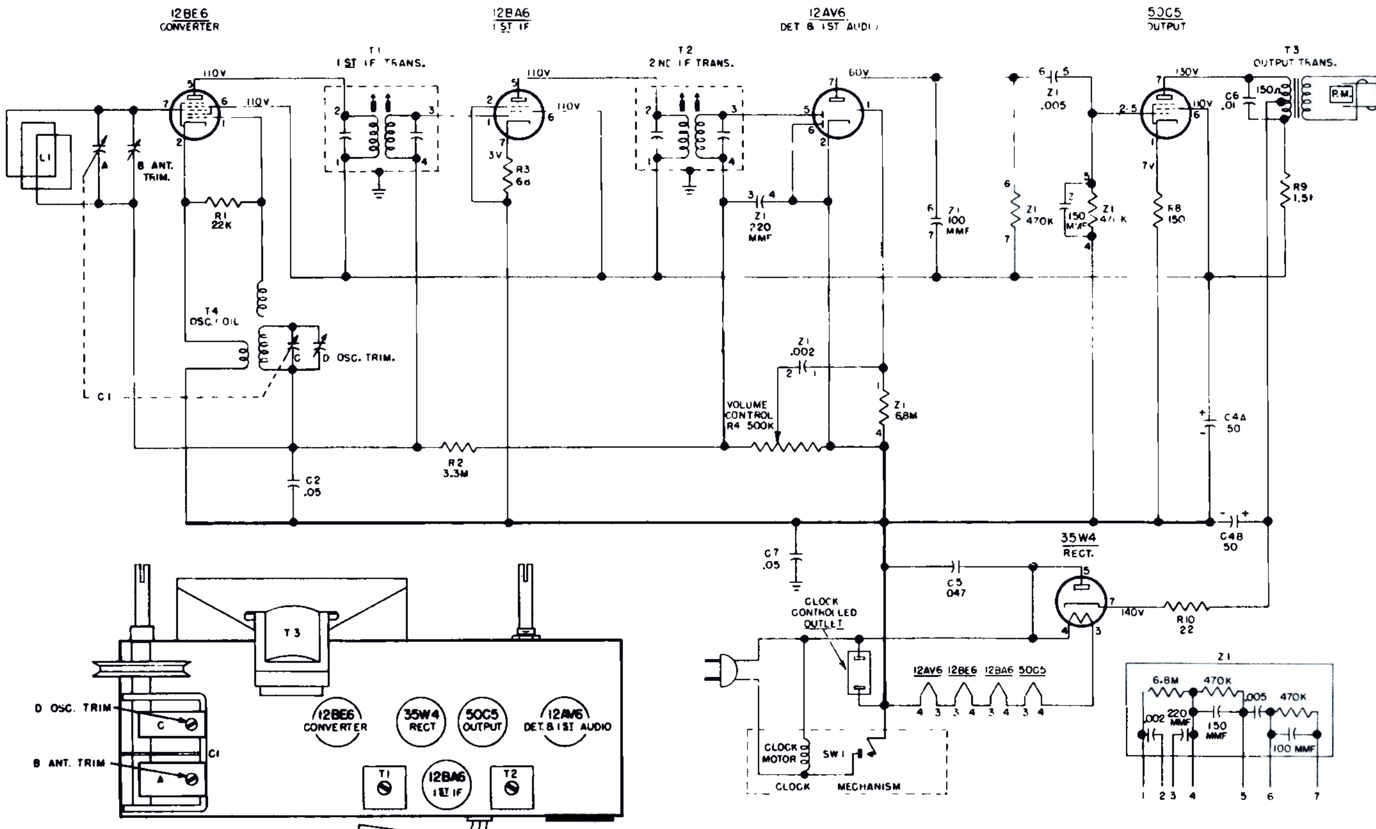
Step	Connect Signal Generator to —	Signal Generator Frequency	Radio Dial	Adjust for Maximum Output —
1.	Stator of ant. tuning capacitor (A) through a 200 mmf capacitor	455 kc.	Minimum capacity	Bottom and top slugs of T2 and T1 in order given*
2.	Same as step 1	1625 kc.	Minimum capacity	Oscillator trimmer (D)
3.	Radiated signal	1400 kc.	1400 kc.	Antenna trimmer (B)

*It is recommended that a fiber aligning tool that snugly fits the slot in the powdered iron core be used to prevent chipping of the slot.

Westinghouse CHASSIS V-2157-11, V-2157-12

RADIO TELEVISION

MODELS H-385T5, H-386T5 H-387T5, AND H-388T5



NOTES-
1. ALL VOLTAGES MEASURED FROM COMMON NEGATIVE USING A 20,000 OHM / VOLT METER. LINE VOLTAGE SET AT 117 V.A.C. READINGS SHOULD BE AS SHOWN ±20%.
2. ALL CAPACITANCE VALUES IN MFD. AND ALL RESISTANCE VALUES IN OHMS, UNLESS OTHERWISE SPECIFIED.

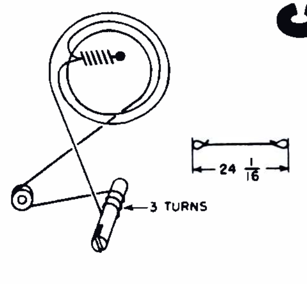
ALIGNMENT

Make certain that the dial pointer is correctly positioned.

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

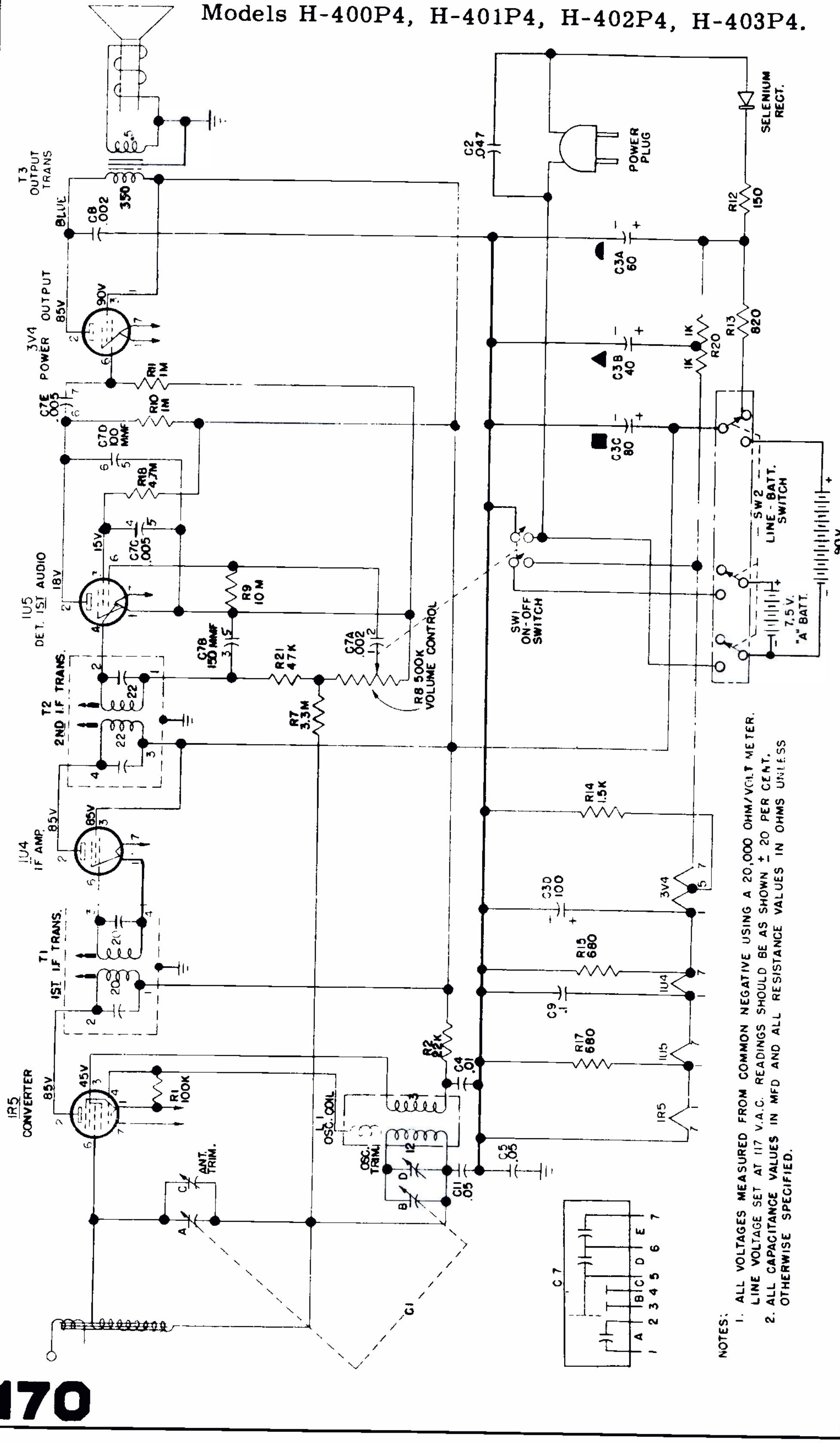
Step	Connect Signal Generator to —	Signal Generator Frequency	Radio Dial	Adjust for Maximum Output —
1.	Stator of ant. tuning capacitor (A) through a 200 mmf capacitor	455 kc.	Minimum capacity	Top and bottom slugs of T2 and T1 in order given*
2.	Same as step 1	1625 kc.	Minimum capacity	Oscillator trimmer (D)
3.	Radiated signal	1400 kc.	1400 kc.	Antenna trimmer (B)

*It is recommended that a fiber aligning tool that snugly fits the slot in the powdered iron core be used to prevent chipping of the slot.

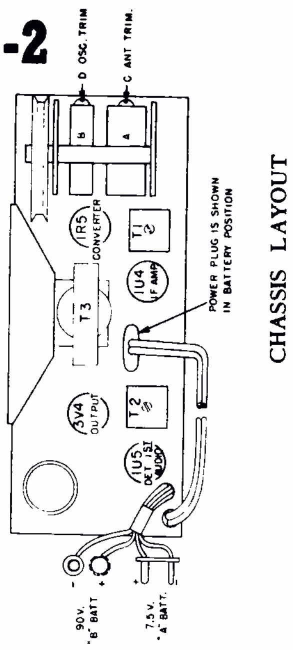


Westinghouse CHASSIS V-2164-2

Models H-400P4, H-401P4, H-402P4, H-403P4.



NOTES:
1. ALL VOLTAGES MEASURED FROM COMMON NEGATIVE USING A 20,000 OHM/VOLT METER. LINE VOLTAGE SET AT 117 V.A.C. READINGS SHOULD BE AS SHOWN ± 20 PER CENT.
2. ALL CAPACITANCE VALUES IN MFD AND ALL RESISTANCE VALUES IN OHMS UNLESS OTHERWISE SPECIFIED.



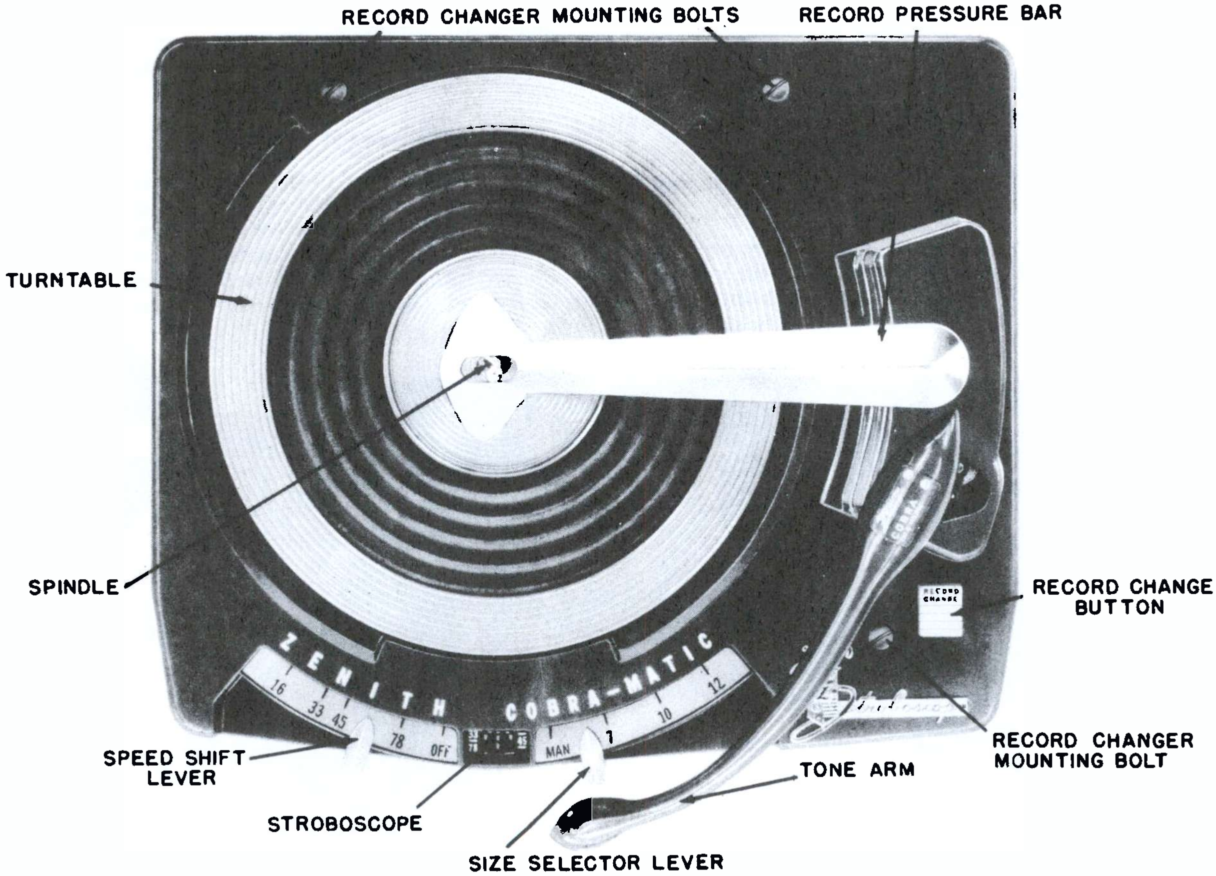
CHASSIS LAYOUT

Connect Signal Generator to —	Signal Generator Frequency	Radio Dial	Adjust for Maximum Output —
Stator of R-F tuning capacitor (A) through a 0.1 mfd	455 kc.	minimum capacity	Top and bottom slugs in 2nd and 1st I-F trans. in order given
Same as step 1	1625 kc.	minimum capacity	Osc. trimmer (D)
Radiated Signal	1400 kc.	1400 kc.	Ant. trimmer (C)

ZENITH RADIO CORPORATION

COBRA-MATIC RECORD CHANGERS

MODELS S-14053, S-14054, S-14056, and S-14057



GENERAL DESCRIPTION

The Zenith Models S-14053, S-14054, S-14056 and S-14057 Record Changers are designed to play standard 78, 45, 33-1/3 and 16-2/3 RPM records of standard commercial dimensions. With few minor exceptions these four changers are alike electrically. The S-14054 is the basic record changer. S-14053 is practically identical to S-14054 except that it has added parts for the stroboscope feature. The S-14057 is very similar to S-14054 except that it is the export version, it has a 50/60 cycle motor and minor electrical changes.

The S-14056 is similar to the S-14053 except that it is the export version, it has a 50/60 cycle motor and minor electrical changes.

The S-14053 deluxe domestic changer as well as the S-14056, a deluxe export changer have an added feature incorporated in their mechanism in that they have a stroboscope built in, this enables the most discriminating user to adjust the record speed to an extremely precise point.

Features of these changers include playing and automatically changing as many as ten 12" or ten 10" records. Ten inch and twelve inch records of the same type cannot be intermixed.

A full stack of 7" 33-1/3 RPM, or a full stack of 7" 45 RPM records (with adapter inserted in the records) can also be played on this changer. These changers do not shut off after the last record, however, all that is required to turn the changer off is to move the speed change lever (24) to OFF position.

Connect this changer only to an outlet supplying 117 volt 60 cycle A.C. unless specified otherwise. Power consumption is 20 watts.

LOADING THE RECORD CHANGER

1. Pull straight up on the record pressure arm until the record pressure arm clears the spindle. Swing the record pressure arm towards the front of the changer until pins in pressure arm shaft (1) drop into locating slot on record pressure arm housing.

2. Changer will automatically play ten 12" either standard or Long Play, ten 10" either standard or Long Play or ten 7" Long Play or Fine Groove records.

NOTE: Standard, Fine Groove and Long Play records cannot be played in the same stack of records. Speed change lever (24) must be re-set for each type of recording.

(Continued on the next seven pages)

ZENITH Record Changers Models S-14053 to S-14057, continued

3. Place records on spindle and lower them to offset shelf. Level records and replace record pressure arm (1) over spindle and lower this until it rests on the top of the record stack.

To play standard 78 RPM recordings:

1. Motor speed control lever (24) must be set to 78 position. This will set the record changer to proper speed position and cause the turntable to rotate.

2. Set-up lever (33) must be moved to the size records being played.

3. Place the changer in cycle by depressing record change switch knob (37). The changer will play the remaining records automatically. The changer will continue to play the last record until speed change lever (24) is moved to OFF position.

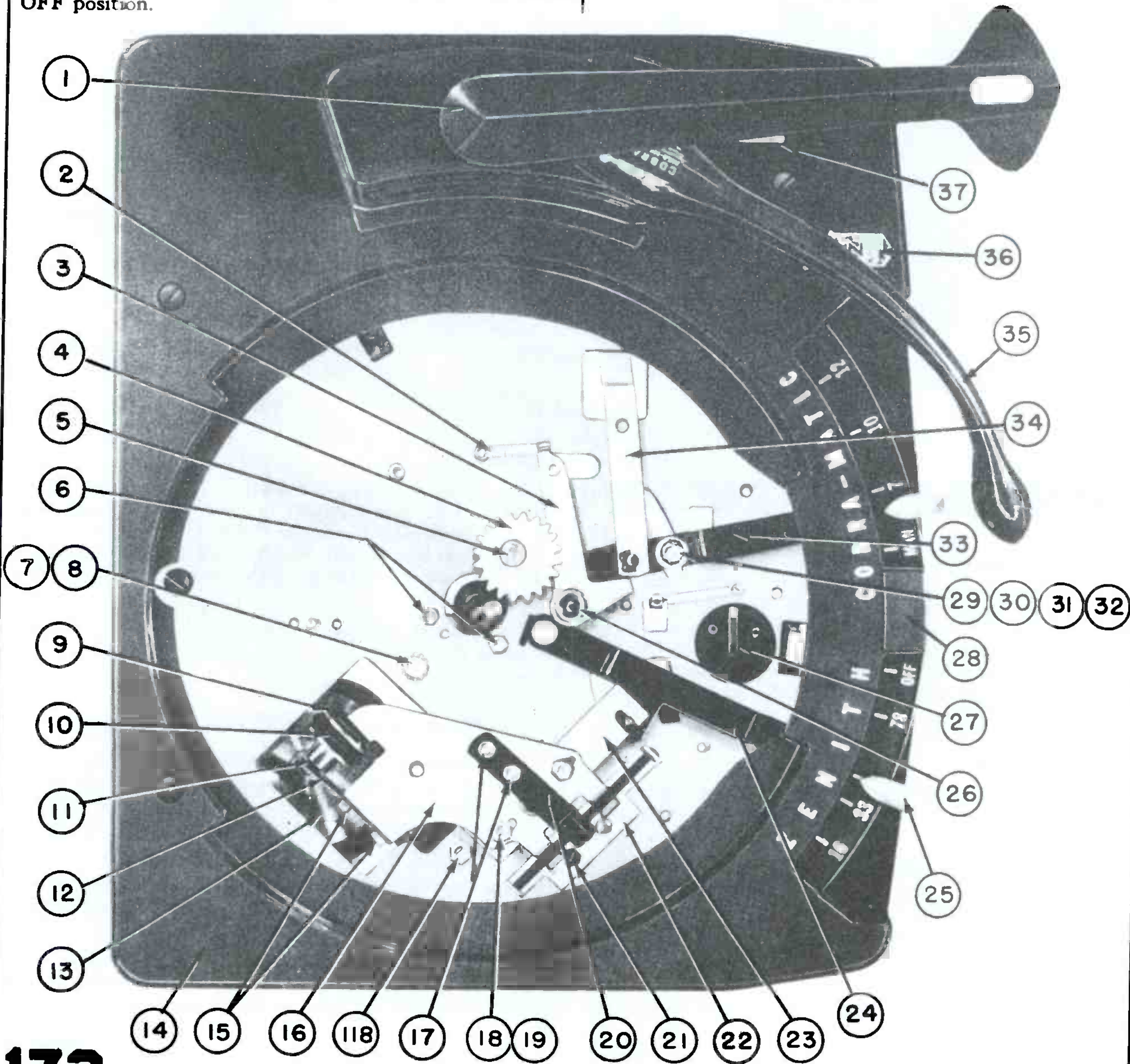
To play 33-1/3 RPM records:

1. Motor speed change lever (24) must be in 33-1/3 position.

2. Set-up lever (33) should then be moved to either 12", 10" or 7" position depending on the size record being played.

To play Fine Groove (45 RPM) records:

1. Speed change lever (24) should be moved to 45 position and set-up lever (33) should be in 7" position. It must be remembered that these records are manufactured with a 1½" spindle hole so it is essential that a record adapter be inserted into each 45 RPM record to be played. This is necessary to reduce the spindle hole to conventional size.



S-14054—Record Changer Top View with Turntable Removed

ZENITH Record Changers
Models S-14053, etc., continued

REJECTING

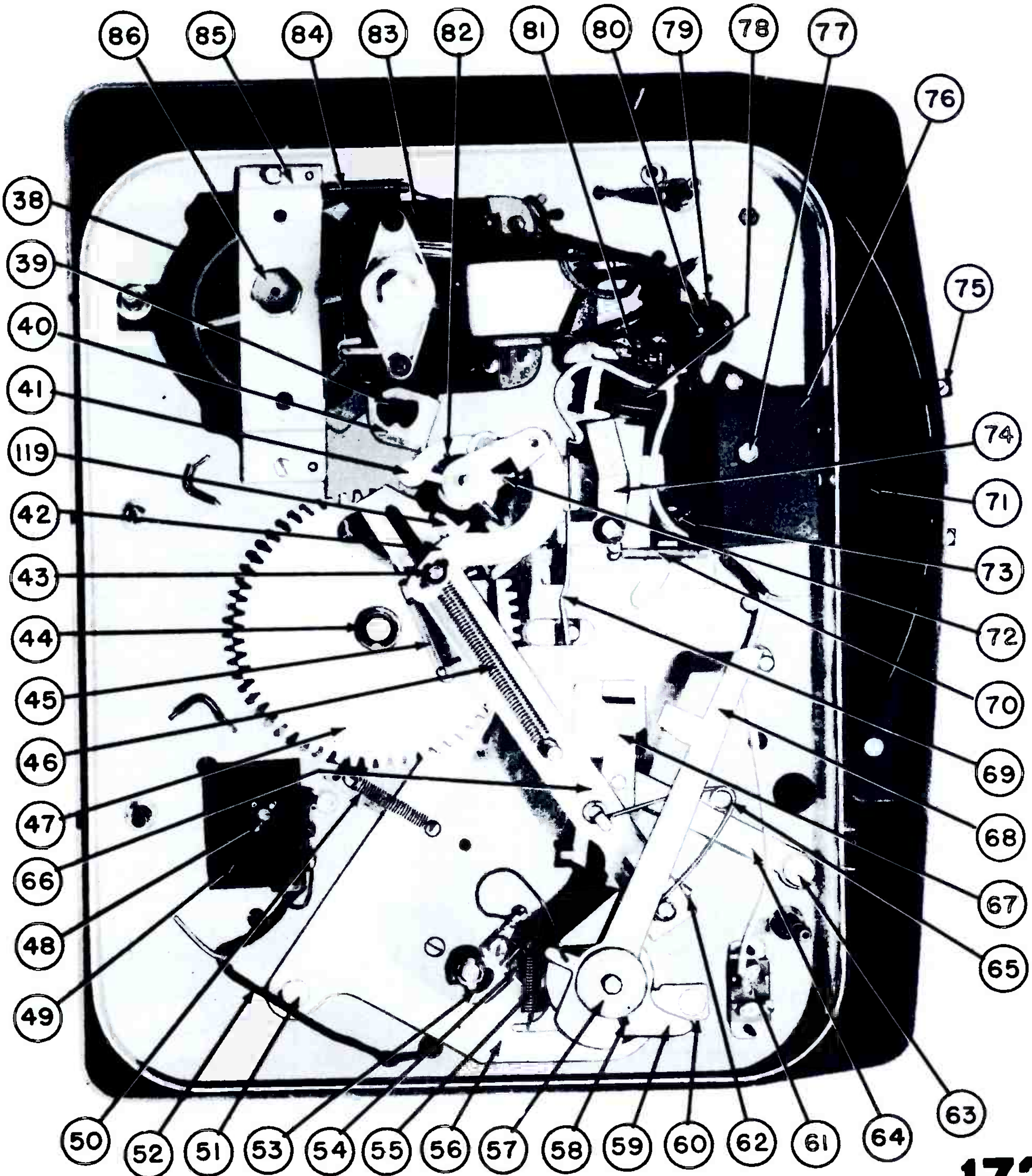
To reject a record anytime, while the changer is operating, depress record change switch button (37) and release. This will automatically cause the record changer to go through cycle and begin playing the next record.

STOPPING

To turn off the record changer all that is required is to move the speed shift lever (24) to OFF position.

UNLOADING

Lift the record pressure arm (1) and swing it to the front until the pin on the shaft drops into the locating groove on record pressure arm shaft housing. Lift stack of records straight up on spindle.



S-14054—Record Changer Bottom View

ZENITH Record Changers Models S-14053 to S-14057, continued

MANUAL OPERATION

To play single records or home recordings, lift up the record pressure arm and turn it toward the front of the changer. Place record on spindle and lower to the spindle shelf. Gently push record towards record pressure arm shaft and lower to turntable. Move speed change lever (24) to proper speed for type of record being played and move set-up lever (33) to manual position. Pick up tone arm and place the needle on the lead-in groove of the record.

DESCRIPTION OF CYCLING

The motor shaft contacts drive wheel assembly (38) and causes it to rotate by friction contact with its rubber surface. Drive wheel assembly (38) drives idler wheel (10). The underside of the turntable is in contact with idler wheel (10) and is driven in this manner. Speed of the turntable is controlled by changing the position of the idler wheel (10) on drive wheel (38). When idler wheel is moved to the center of drive wheel (38) it will rotate more slowly than when moved to the outer edge. In this manner the turntable can be driven at any speed from 10 to 85 RPM. Minor adjustments for proper tonal pitch can be made by simply moving speed change lever (24) back and forth to compensate for turntable speed which may vary due to line voltage changes. When record change button (37) is depressed it energizes solenoid (78) which then attracts trip pawl assembly (74). The same thing occurs when the forward movement of the tone arm causes friction lever and weight assembly (68) to contact the silver plated contact on trip switch assembly (69). When gear segment (119) is released, gear pawl spring (42) causes the gear segment (119) to engage the rotating pinion gear under the turntable thus causing clutch assembly (47) to rotate.

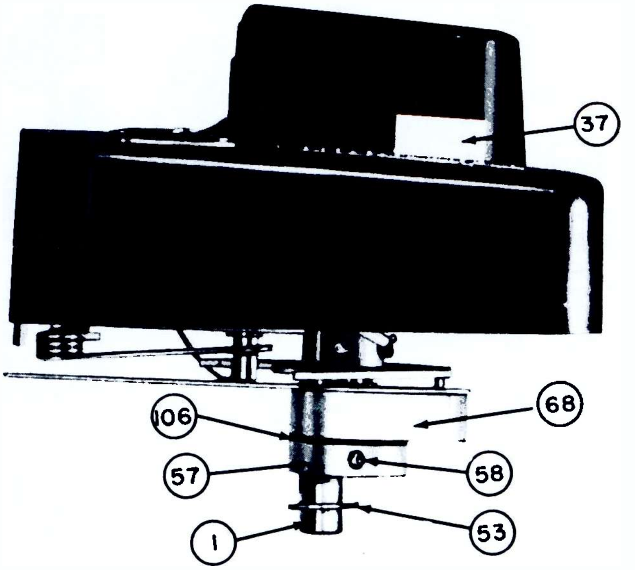
As clutch assembly (47) rotates, tone arm lift lever (56) swings in such a manner that it contacts tone arm lift pin and raises the tone arm. Simultaneously, tone arm link and stud assembly (66) slides towards, and contacts one finger of tone arm lever assembly (59) forcing the tone arm towards the outer edge of the turntable and then on its return swing contacts the other finger of tone arm lever assembly (59) swinging the tone arm back over the records. The position to which it swings the tone arm over the records is determined by the position of record size discriminator (64). There are three steps on the record size discriminator (64) which determines set-down position for 7", 10" and 12" records. The tone arm lift lever (56) returns and releases brake lever assembly (60) which keeps the tone arm from moving erratically during cycle. Simultaneously, ejector lever and link assembly (42) rotates and this in turn causes the spindle shaft to rotate and the ejector cam to push the record off the spindle shelf. Operation of the tone arm set-down adjustment can be observed by raising the tone arm so the adjustment mechanism can be viewed.

VELOCITY TRIP

This changer is provided with what is commonly known as a velocity trip rather than a ratchet and positive trip mechanism. A velocity trip depends for the tripping action on the rate of forward motion of the pickup arm with respect to the turntable rotation. The changer will trip only when the tone arm advances more in one revolution

SPEED INDICATOR ADJUSTMENT MODELS S-14054 & S-14057

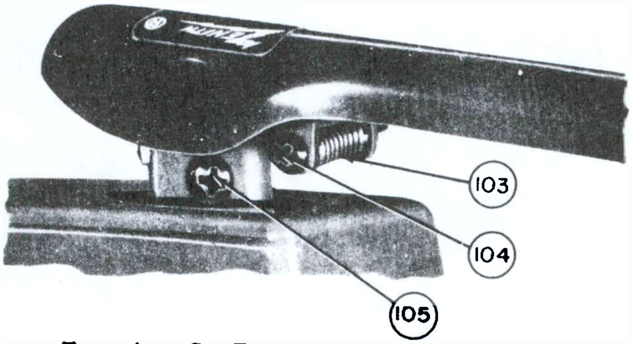
It is possible that the speed of the record changer may not conform to the speed stop on escutcheon (23). Proper adjustments can be made in the following manner. Put a stroboscopic disc on the turntable, adjust speed change lever (24) until the turntable is turning at exactly 78 RPM. Stop the record changer by pulling the AC plug, remove the turntable, loosen the two adjusting screws (18), (19) and move speed change lever (24) so that the point on the control knob indexes exactly at the 78 mark on the escutcheon. Then re-tighten adjusting screws (18), (19) and replace the turntable. The turntable should now rotate at exactly 78 RPM, however, as a precaution, again check with the stroboscope disc. On models equipped with the built in stroboscope disc mechanism, it can be used instead of a disc placed on the turntable.



Tone Arm Friction Lever Detail

SET DOWN ADJUSTMENT

When adjusting the tone arm for proper set-down on the edge of the record, move set-up change lever to 7" position, place a 7" record on the turntable, turn the record changer through cycle by rotating the turntable by hand. Watch closely where the needle point of the Cobra cartridge lands on the record and adjust tone arm set-down adjustment screw (104) until proper landing position is obtained.



Tone Arm Set-Down and Height Adjustments

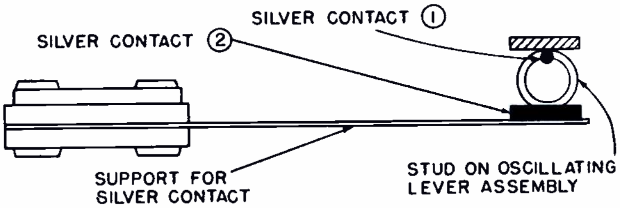
ZENITH Record Changers Models S-14053 to S-14057, continued

TONE ARM HEIGHT ADJUSTMENT

The tone arm height adjustment determines vertical rise of the tone arm. If the tone arm does not rise sufficiently it will not play a full stack of twelve records. On the other hand, if the tone arm raises too high it may hit the records resting on the record shelf. Set the tone arm height adjustment screw (105) so that the needle clears twelve unwarped records on the turntable. The tone arm housing must not hit the under side of the records on the record shelf when the changer is cycled after adjustment.

TRIP CONTACT ASSEMBLY

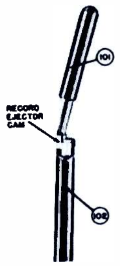
For proper automatic rejecting, silver contact No. 2 on trip switch assembly (69) should be in proper relation to silver contact No. 1 on friction lever (68). The adjustment should be made with the record changer resting on the side nearest to the idler wheel and trip assembly (38). The turntable should be rotated sufficiently to move oscillating lever (3) and stud to its maximum upward travel. The distance between the silver contact No. 1 on the friction lever (68) and silver contact No. 2 on trip switch (69) should be 1/16". If the distance is greater or less than 1/16", the support for the silver contact on trip switch assembly (69) should be bent until this 1/16" gap is attained.



Trip Contact Adjustment

SPINDLE

The spindle on this record changer is composed of five separate parts. Spindle shaft and ejector cam are pressure-fit together and if either breaks, they cannot be replaced since their assembly is a machine operation. The spindle housing is composed of two separate portions which once again are pressure-fit together and require a machine operation for assembly. It is possible that spindle cap (101) may be pulled off spindle assembly (102) and if this does occur, it can easily be replaced by sliding a new spindle cap down over the spindle and then pressing in on the detent portion, which acts as a stop to keep the spindle cap from sliding off. If breakage occurs other than loss of the spindle cap (101), the entire spindle assembly (102) must be replaced.

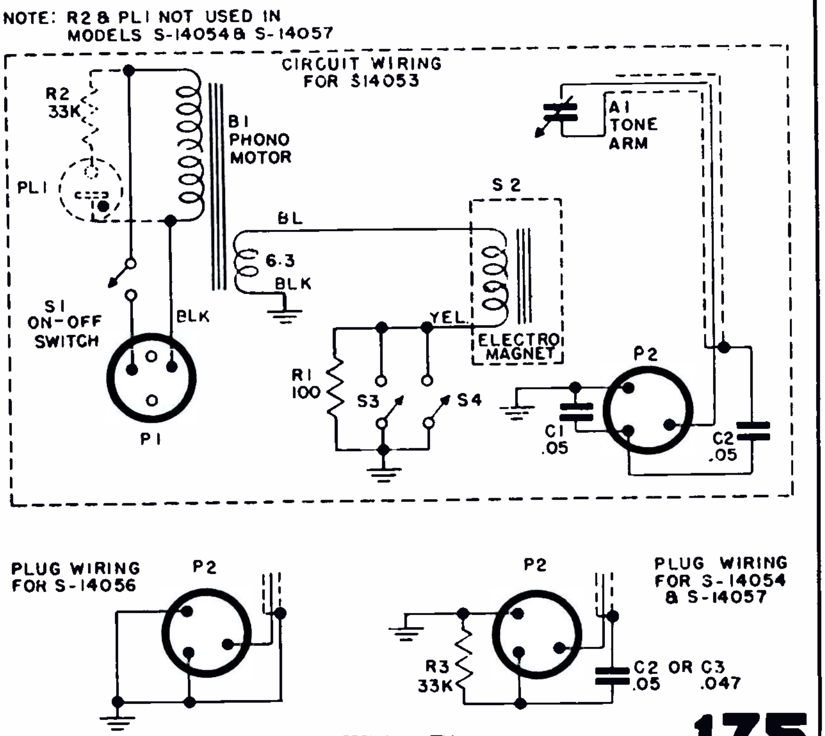


Spindle S-19926

LEVELING THE RECORD CHANGER

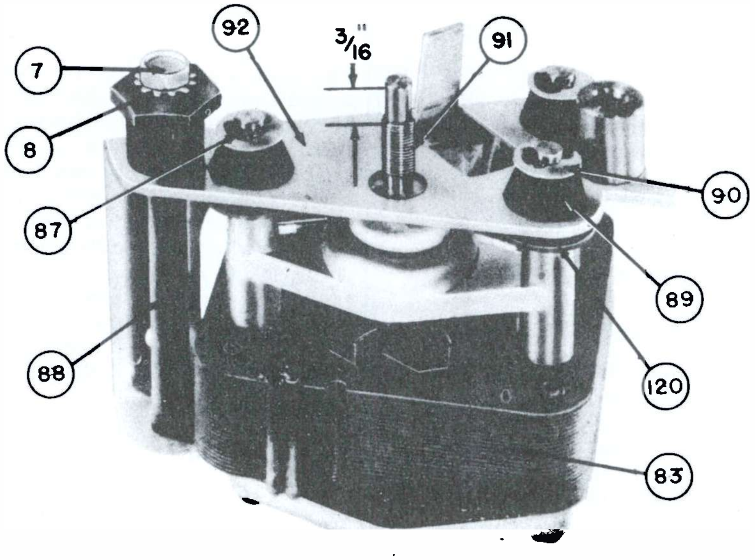
It is essential to have the record changer absolutely level. Use either a torpedo or similar type level on the record changer base plate. Use adequate shims to level the record changer pan or the combination cabinet to achieve perfect level.

DIAG. No.	PART No.	DESCRIPTION	
A1	S-19918	Tone Arm	
B1	141-129	Phono Motor	
B1	141-131	Phono Motor (Exp. 50-60 Cyc.)	
B1	141-132	Phono Motor (Alt. for 141-129)	
C1	22-829	.05 Mfd	200V
C2	22-829	.05 Mfd	200V
C3	22-1775	.047 Mfd	400V
P1	58-213	2 Prong Plug	
P2	58-212	Connector Plug	
PL1	100-160	Neon Lamp - GE No. NE54	
R1	63-1774	100 Ohm	½W
R2	63-1849	33K Ohm	½W
R3	63-1849	33K Ohm	½W
S1	85-527	S.P.S.T. Switch	
S1	85-482	S.P.S.T. Switch	
S2	S-13913	Electro Magnet Assembly	
S3	85-483	Phono Reject Switch	
S4	S-16933	Trip Switch Assembly	



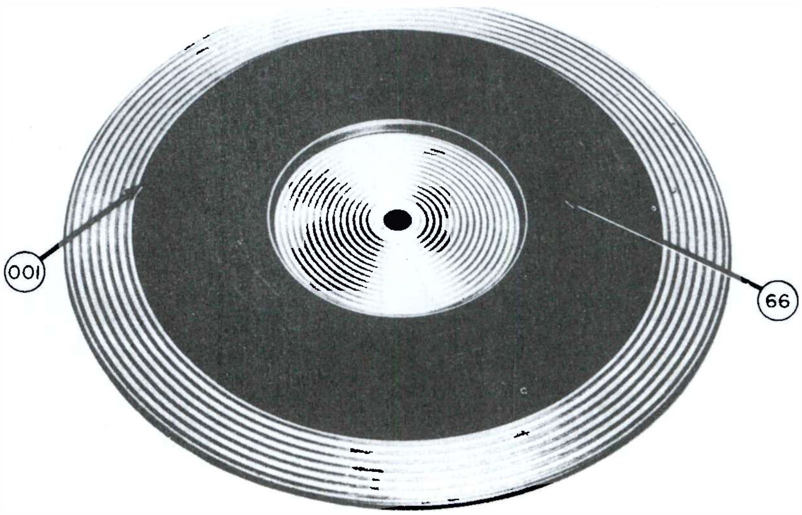
Wiring Diagram

ZENITH Record Changers Models S-14053 to S-14057, continued



MOTOR AND MOUNTING MECHANISM

The motor (83) is shock mounted by the means of rubber grommets (89) and fibre washers (90) to mounting plate and stud assembly (92). The entire motor (83) and motor mounting plate (92) revolve about motor mounting stud (88). The point at which motor mounting stud (88) passes through motor mounting plate should be well lubricated to allow free action of the motor. The motor drive shaft is kept in contact and in constant pressure with drive wheel assembly (38) by the means of motor tension spring (84). This insures the proper friction contact between the motor drive shaft and drive wheel (38). The drive wheel (38) is firmly mounted in drive wheel bracket and bearing assembly and is pivoted on bearings at two points eliminating possible lateral motion. This reduces the possibility of WOWS. When the record changer is in shipment, the entire motor and bracket assembly (92), (83) is fastened to a second point by motor mounting screw (118). This eliminates the possibility of indentations forming in drive wheel (38) as a result of constant pressure and pounding of the motor drive shaft during shipment.



TURNTABLE S-19920

There is little possibility of any damage occurring to the turntable through normal usage. However it is possible that the turntable may be removed and dropped thus damaging the gear so that it will have to be replaced, in this case the entire turntable (100) should be replaced. There is a possibility that the rubber turntable pad (99) may become damaged, if this occurs it can be replaced by removing the defective pad and glueing the new one on the turntable plate.

ZENITH Record Changers Models S-14053 to S-14057, continued

TROUBLE SHOOTING

NEEDLE DOES NOT TRACK ACROSS RECORD PROPERLY

a. Clean foreign material from around needle.

b. Check needle to see if the tip is bent or broken. Replace needle.

c. Hinge bearing binds. Check lateral movement of tone arm. It must move freely without binding.

d. Excessive vibration while playing an LP record. Any vibration cause by (1) unsteady mounting, (2) floor vibration, or (3) passing of heavy vehicles may cause the pickup to glide across the record grooves.

MECHANISM STARTS SLOWLY AND MOTOR GETS HOT

a. Check line voltage and frequency.

b. Check lubrication.

c. Motor windings damaged.

d. Room temperature abnormally low.

MOTOR FAILS TO RUN EVEN WHEN IT IS DISCONNECTED FROM CHANGER AND PROPER VOLTAGE OF FREQUENCY APPLIED DIRECTLY TO THE TWO INPUT LEADS OF THE WINDING

a. Open windings.

b. Damaged or frozen bearings.

c. Lower rear support bracket bent. Remove and straighten bracket — re-center armature.

NEEDLE SETS DOWN PROPERLY ON RECORD BUT SLIDES OVER THE RECORD GROOVES

a. Cabinet tilted.

b. Badly worn or broken needle cartridge.

TONE ARM FALLS OFF RECORD

a. Check tone arm set-down adjustment.

b. Check tone arm pivot bracket.

c. Changer not level.

SQUEAKS OR NOISES DURING PLAYING OF RECORDS

a. Friction between the records on the turntable and the spindle will occasionally cause squeaks. A thin coat of wax applied to the spindle will remedy this condition.

b. Check lubrication.

RECORD IS NOT HEARD ALTHOUGH CHANGER OPERATES

a. See that the receiver is set for Phono.

b. Check receiver audio by listening to radio.

c. Check needle cartridge.

d. Check tone arm housing for broken leads.

RUMBLE, WOW AND MICROPHONICS DURING REPRODUCTION

a. Changer not "floated" properly. Remove packing strip. Loosen mounting bolts.

b. Motor leads pulled too tight preventing motor from "floating" freely.

c. Impression on idler wheel.

d. Check rubber motor shock mounts.

e. Check the motor drive shaft and be certain the plane of the shaft's diameter is parallel to the rubber surface of drive wheel assembly (38).

NEEDLE FAILS TO CLEAR MAXIMUM LOAD OF RECORDS ON THE TURNTABLE

a. Check tone arm height adjustment.

TONE ARM SETS DOWN TOO FAR IN OR OUT ON RECORD

a. Check tone arm set-down adjustment.

TONE ARM SET DOWN VARIES

a. Tone arm pivots loose.

CHANGER CONTINUES TO CYCLE

a. Check the trip switch adjustment.

b. Trip pawl sticks.

CHANGER WILL NOT CYCLE UPON COMPLETION OF RECORD.

a. Be certain that the record has an eccentric center groove.

b. Check velocity trip mechanism.

CHATTER OF TRIP PAWL ASSEMBLY

a. Remove mounting bolt which fastens trip pawl assembly (74) to shoulder stud. Then load shoulder stud with Sta-Put Grease and replace and fasten trip pawl assembly.

ELECTRICAL NOISE WHEN TONE ARM IS MOVED

a. Stud on oscillating lever and stud assembly (3) should be covered with vinylite tubing to prevent contact with friction lever and weight assembly (68).

b. Friction lever (68) at its most outward swing may contact wire guide stud on changer base plate. Cover this stud with vinylite tubing.

FRICTION LEVER (68) FAILS TO MOVE WITH TONE ARM

a. Check felt washer (106) for proper friction surface. If worn, replace.

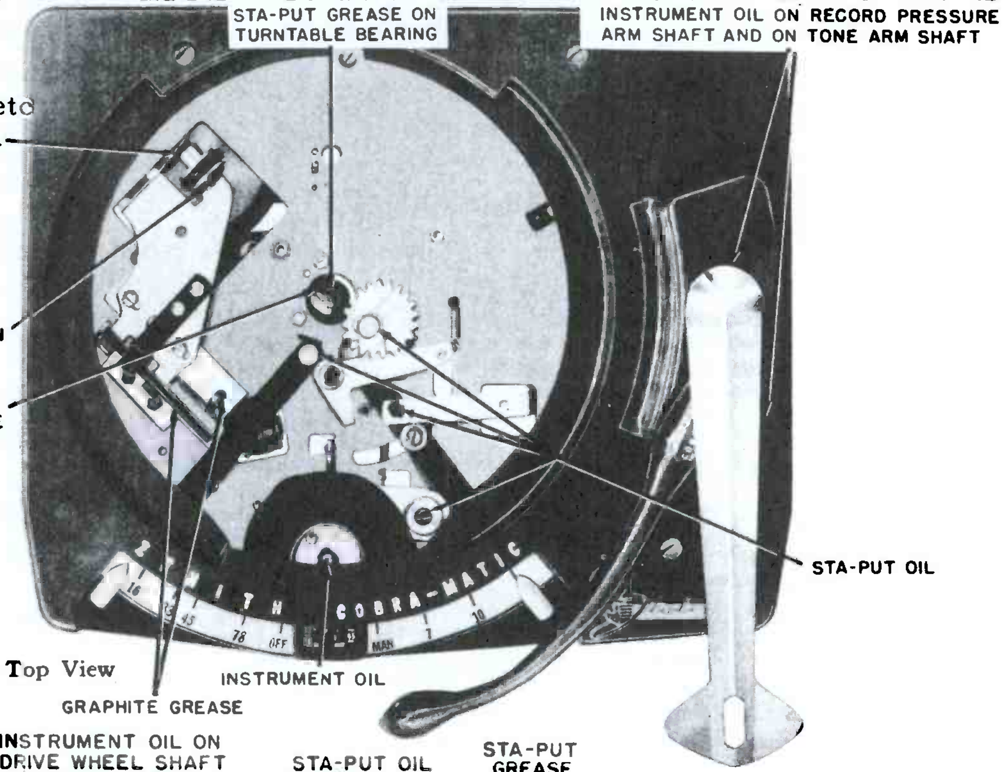
LUBRICATION

Additional lubrication should not be required for the life of the changer, but in cases of unusual use or high operating temperatures the changer should be lubricated as follows:

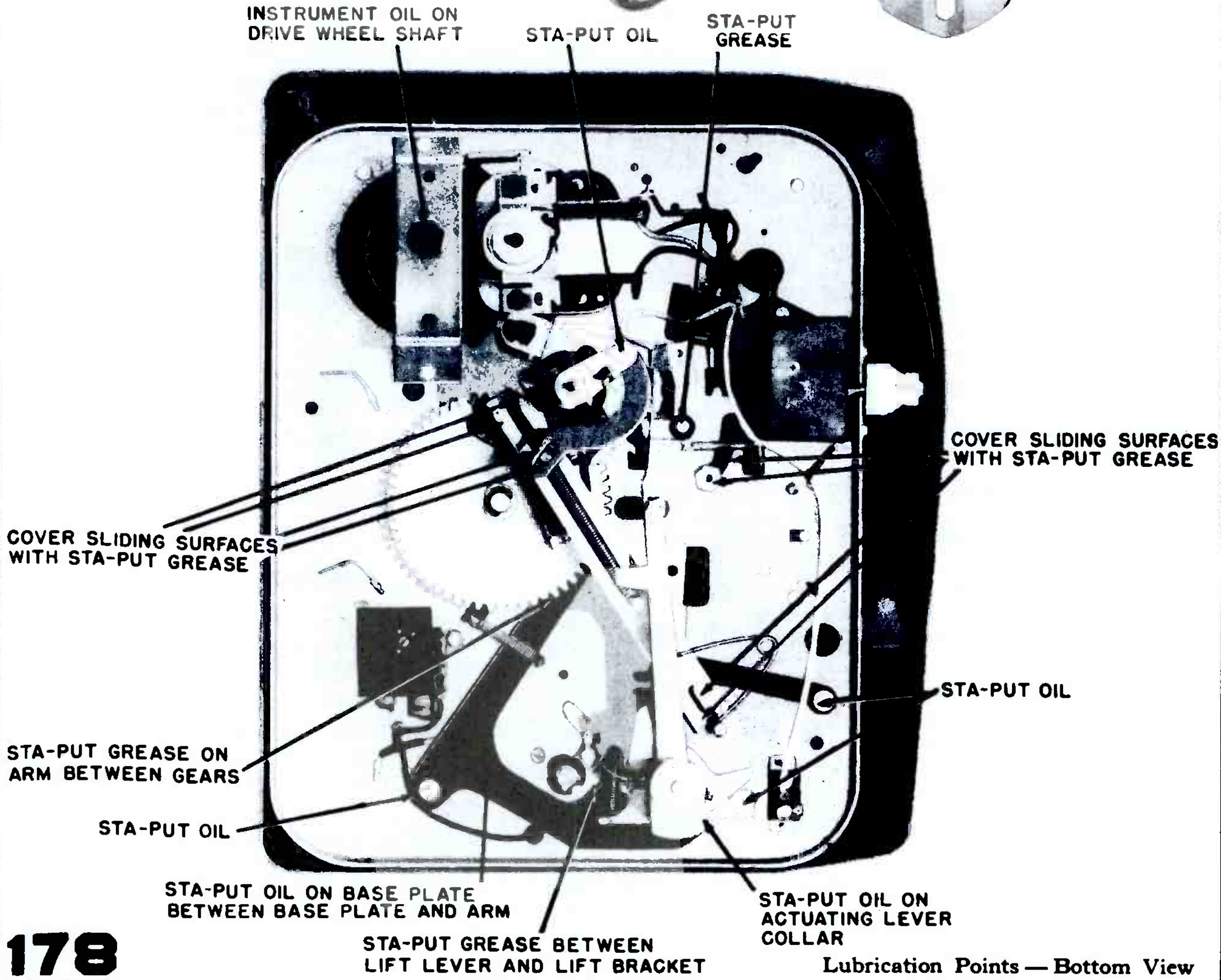
All shoulder rivets which hold moving parts, all stud shoulder mounting points on which moving parts operate and all C washers should be lubricated with a few drops of fine instrument oil.

The other moving surfaces should be coated either with Sta-Put Grease or Sta-Put Oil as indicated in the following two illustrations. The purpose of using the extremely fine instrument oil is its ability to penetrate into the moving metal parts.

ZENITH
Record Changers
Models S-14053,etc
(Continued)

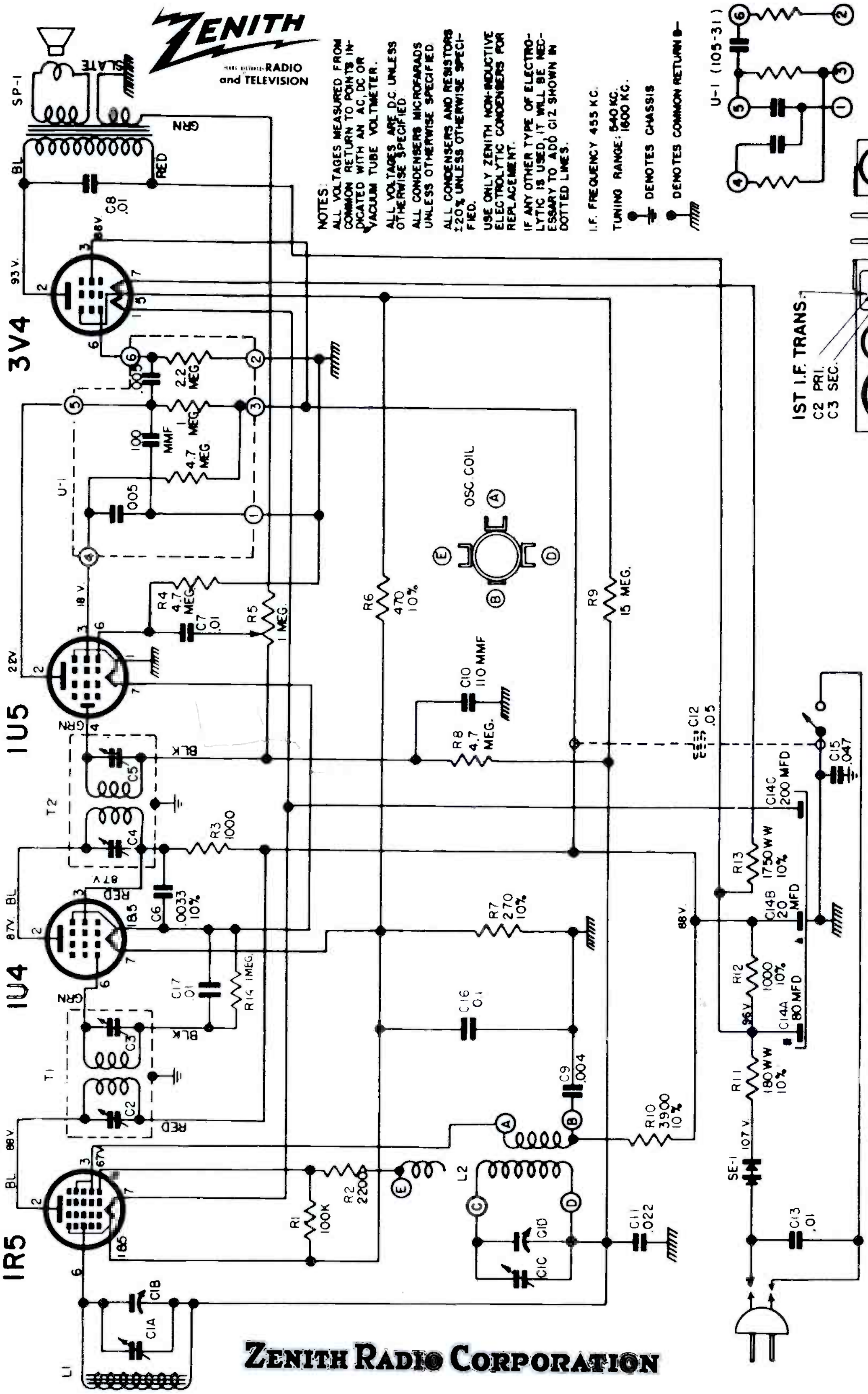


Lubrication Points — Top View



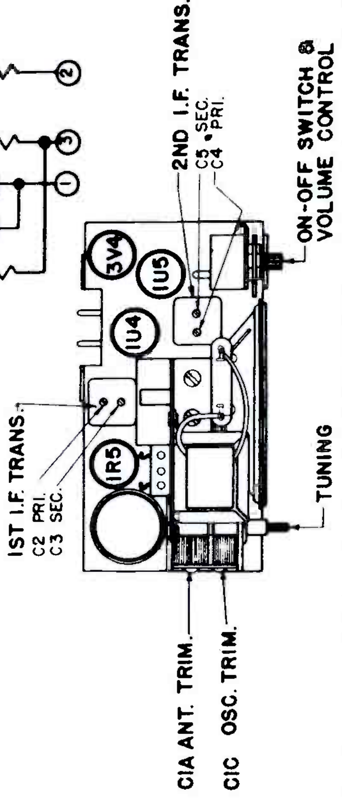
Lubrication Points — Bottom View

MODEL K412 CHASSIS 4K01



NOTES:
ALL VOLTAGES MEASURED FROM COMMON RETURN TO POINTS INDICATED WITH AN AC, DC OR VACUUM TUBE VOLTMETER.
ALL VOLTAGES ARE D.C. UNLESS OTHERWISE SPECIFIED
ALL CONDENSERS MICROFARADS UNLESS OTHERWISE SPECIFIED
ALL CONDENSERS AND RESISTORS ±20% UNLESS OTHERWISE SPECIFIED.
USE ONLY ZENITH NON-INDUCTIVE ELECTROLYTIC CONDENSERS FOR REPLACEMENT.
IF ANY OTHER TYPE OF ELECTROLYTIC IS USED, IT WILL BE NECESSARY TO ADD C12 SHOWN IN DOTTED LINES.

I.F. FREQUENCY 455 KC.
TUNING RANGE: 540 KC. 1600 KC.
DENOTES CHASSIS
DENOTES COMMON RETURN B−



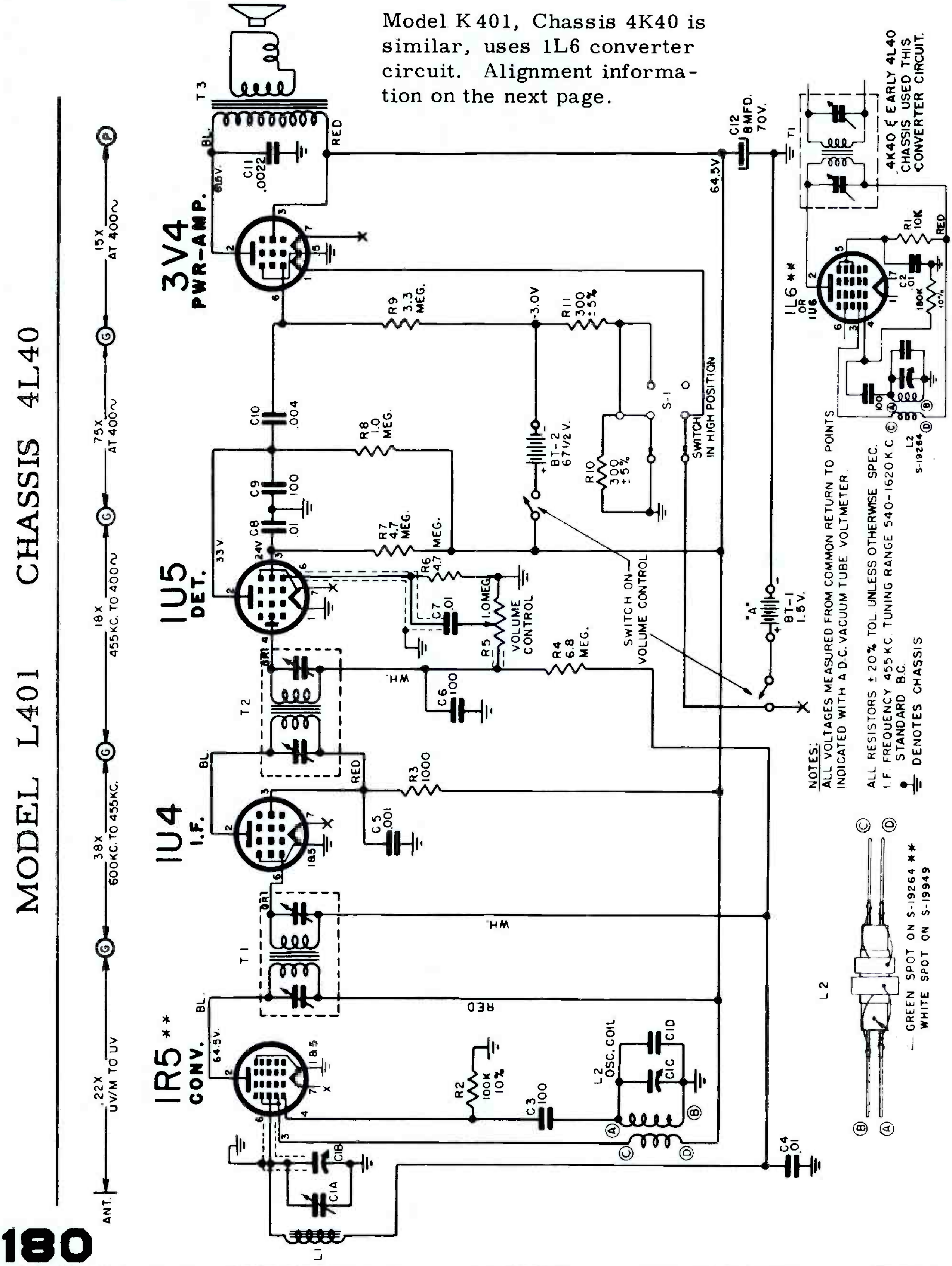
ZENITH RADIO CORPORATION

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.	C2, 3, 4 & 5	For I.F. Alignment
2	Single Turn Loosely Coupled to Wave Magnet	--	1600 Kc.	1600 Kc.	C1C	Set Oscillator to Dial Scale.
3		--	1400 Kc.	1400 Kc.	C1A	Antenna Alignment

ZENITH RADIO CORPORATION Model L401, Chassis 4L40

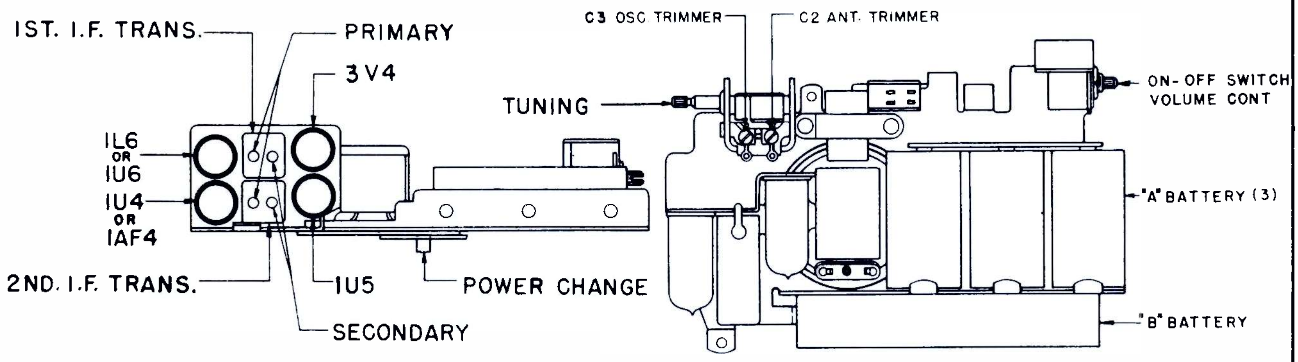
Model K401, Chassis 4K40 is similar, uses 1L6 converter circuit. Alignment information on the next page.



ZENITH Alignment Model L 401, Chassis 4L40, continued from the page at left.

ALIGNMENT PROCEDURE

OPERA-TION	CONNECT OSCILLATOR TO	DUMMY ANTENNA	INPUT SIG. FREQUENCY	BAND	SET DIAL TO	TRIMMERS	PURPOSE
1	Converter Grid	.1 Mfd	455 Kc.	BC	600 Kc.	Adjust pri. and sec. trimmers for maximum output.	I.F. Alignment
2	Connect a .1 mfd capacitor across the generator output. Advance the generator output and place the capacitor approximately six inches from the receiver.		1600 Kc.	BC	1600 Kc.	Osc. Trim. C3	Set Oscillator to scale
3			1400 Kc.	BC	1400 Kc.	Ant. Trim. C2	Align Wavemagnet



ZENITH RADIO Model L 406, Chassis 4L42, continued on next page.

The 4L42 chassis is an AC, DC or battery operated superheterodyne. The chassis is isolated from the DC circuit, and all measurements must be made from a common negative point. The most convenient place to reach this negative point is the negative side or container of the electrolytic. When the change-over Switch S1 is in AC position, the DC resistance from chassis to any circuit must be almost infinite. If an circuit becomes grounded a hum will result.

The I.F. transformers incorporated in this receiver are of the new permeability tuned type The advantage of an I.F. transformer of this type is its extreme stability under various humidity and temperature conditions. The upper coil is the secondary and the lower the primary. When adjusting these I.F. transformers the tuning wrench 68-19 can be inserted into the top slug, rotated until maximum output is obtained and then dropped down to the lower slug and the same operation repeated.

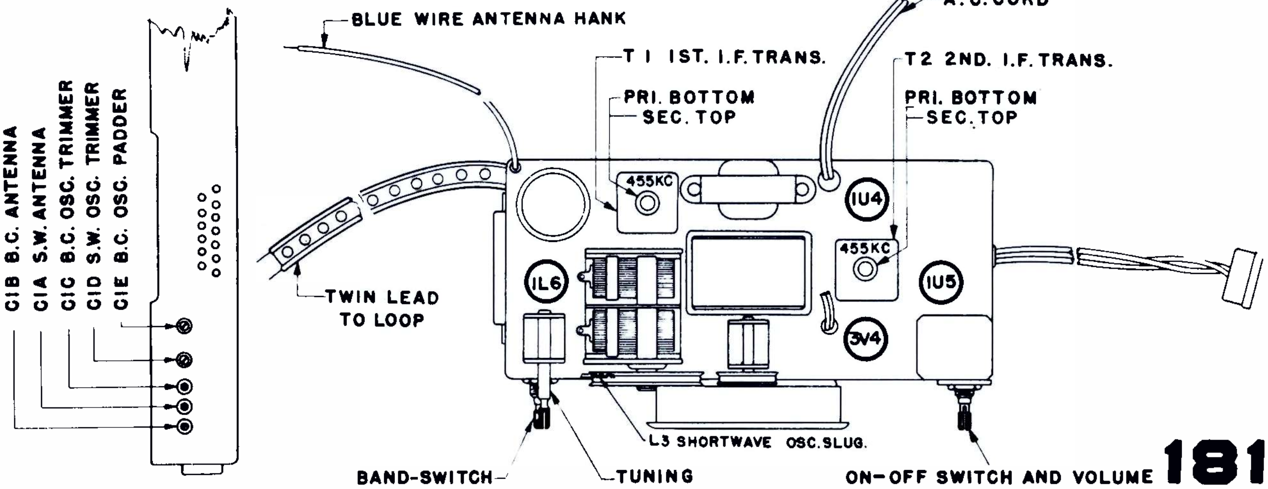
IF Alignment: Remove the chassis from the cabinet and arrange the units so that the wavemagnet can be connected. All the connections and adjustments can be made from the top of the chassis. Connect a signal generator, through a .1 mfd. dummy antenna, to the converter grid and B-(common return). Connect an output meter across the voice coil of the speaker. Set the signal generator to 455 Kc. and adjust Pri. & Sec. of T1 & T2 for the maximum indication on the output meter

SW-RF Alginment: Set the generator to 16.1 mc., open the gang and adjust trimmer CID for maximum output. Then close the gang, set the generator to 4.6 mc. and adjust L3 for maximum output. Set the generator to 15.5 mc. and tune in the signal and rock gang, adjusting CIA for maximum signal. Caution: Do not tune in the image which is 15.5 mc. plus 2x the IF frequency.

BC RF Alignment: Connect a two turn loop across the leads of the signal generator, loosely couple this loop to the wavemagnet. Set the signal generator and the dial pointer of the receiver to 1620 Kc. and adjust C1C oscillator trimmer to resonance. Set the signal generator and dial pointer to 1400 and adjust C1B antenna trimmer to resonance

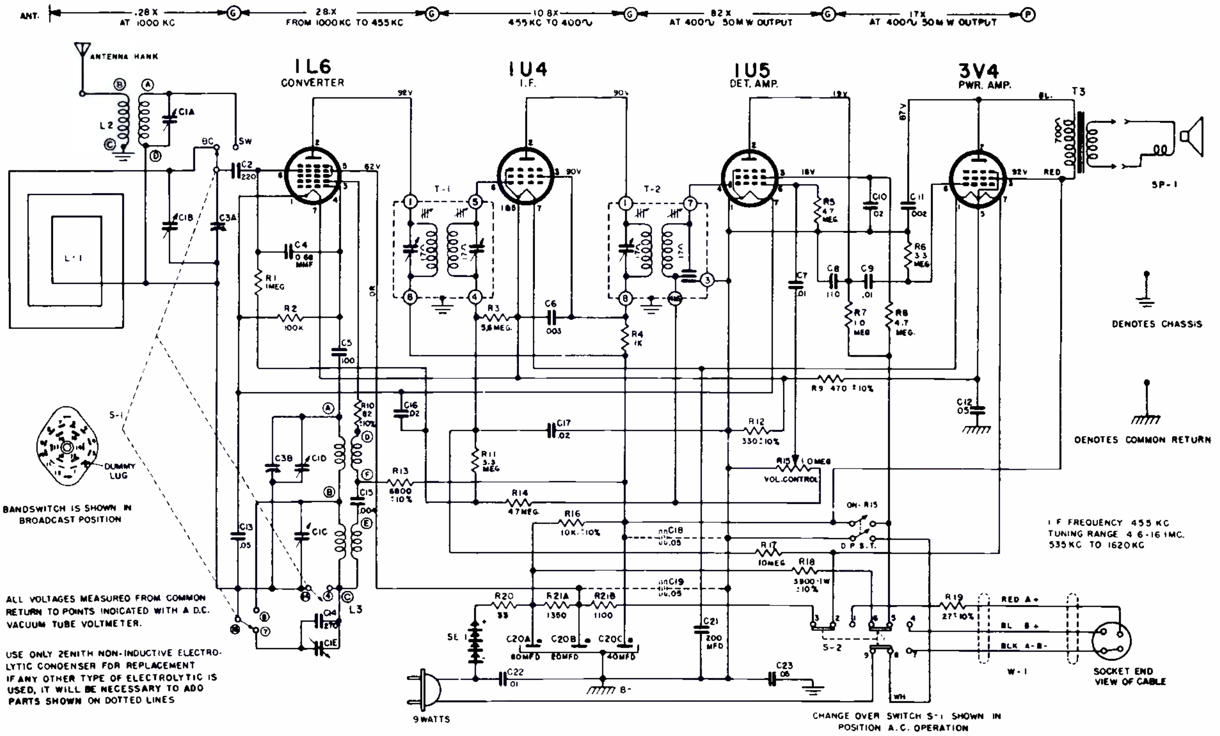
Set the signal generator to 600 KC, turn the gang to approximately 600 KC, and then rock the gang and adjust, C1E trimmer for maximum output.

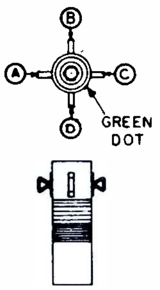
To track the BC band during final alignment the chassis must be installed in the cabinet, the Wavemagnet installed in the normal position and the battery pack placed on top of the cabinet to simulate actual operating conditions.



ZENITH RADIO CORPORATION

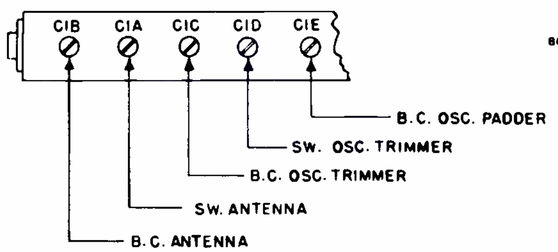
MODEL L406 CHASSIS 4L42



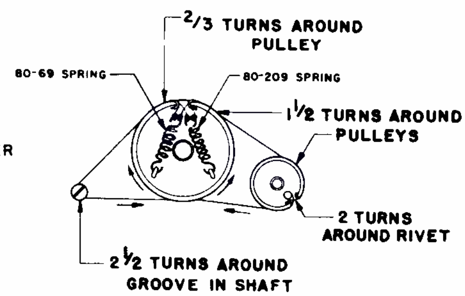


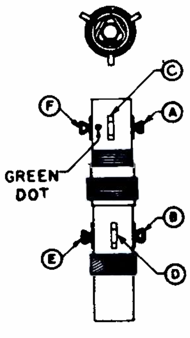
ANTENNA COIL

For alignment information
see preceding page.



DIAL CABLE DRAWING





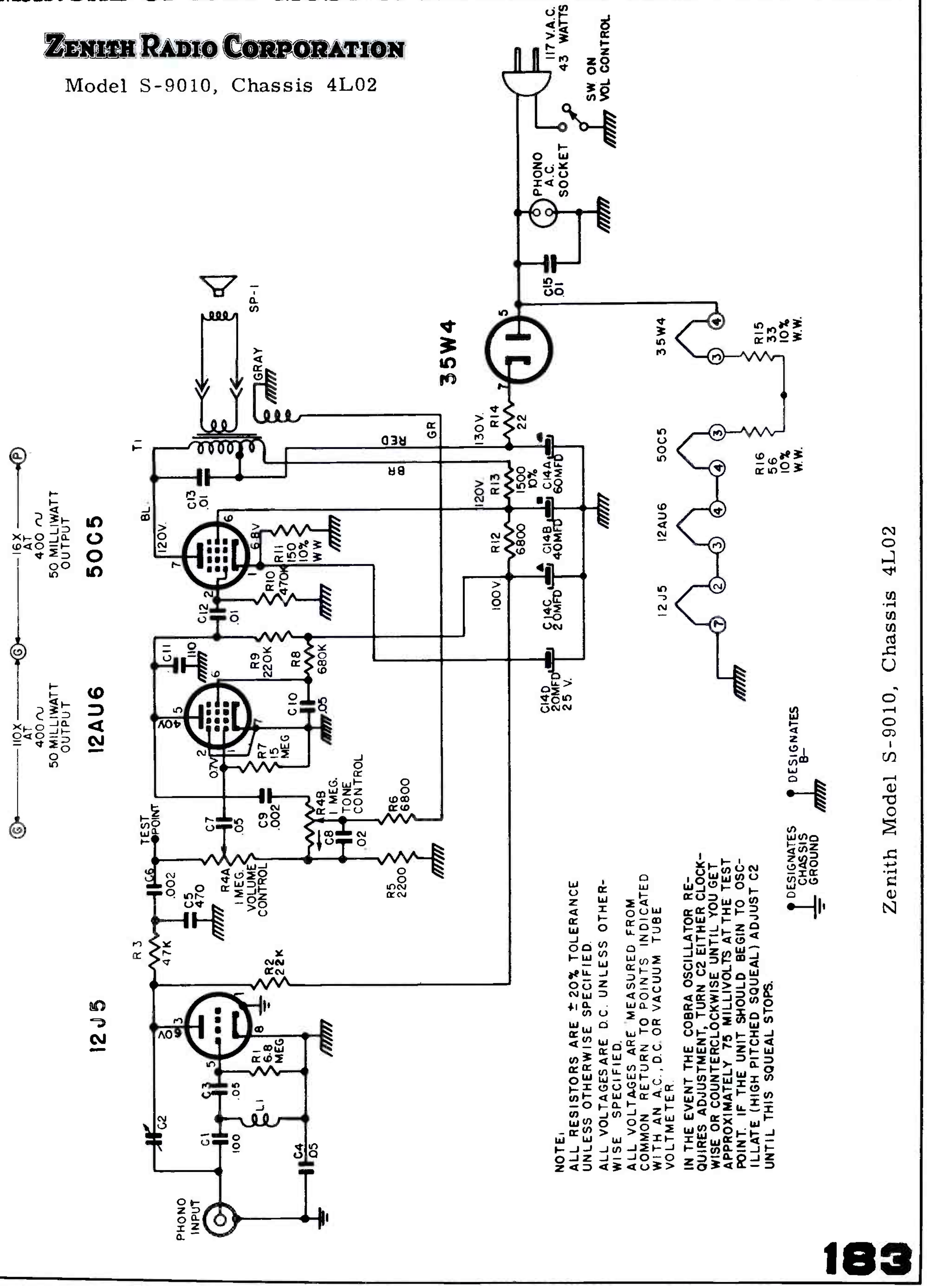
OSCILLATOR COIL

ALIGNMENT PROCEDURE

Operation	Connect Osc. to	Dummy Ant.	Input Sig. Freq.	Band	Set Dial at	Trimmer	Purpose
1	Converter Grid	.1 mfd.	455 Kc.	BC	600 Kc.	Align Pri & Sec. T1 & T2	Align I.F.
2	Antenna & Chassis	200 mmfd. in series with 400 ohm carbon resistor	16.1 Mc.	SW	Open Gang	C1D	Set Osc. to Scale
3			4.6 Mc.	SW	Close Gang	L3	Set Osc. to Scale
4			15.5 Mc.	SW	Rock at 15.5 mc.	C1A	Align SW
5	Two turns loosely coupled to Wavemagnet		16 20 Kc.	BC	Open Gang	C1C	Set Osc. to Scale
6			1400 Kc.	BC	1400	C1B	Align Ant.
7			600 Kc.	BC	Rock at 600 kc.	C1E	Set Padder

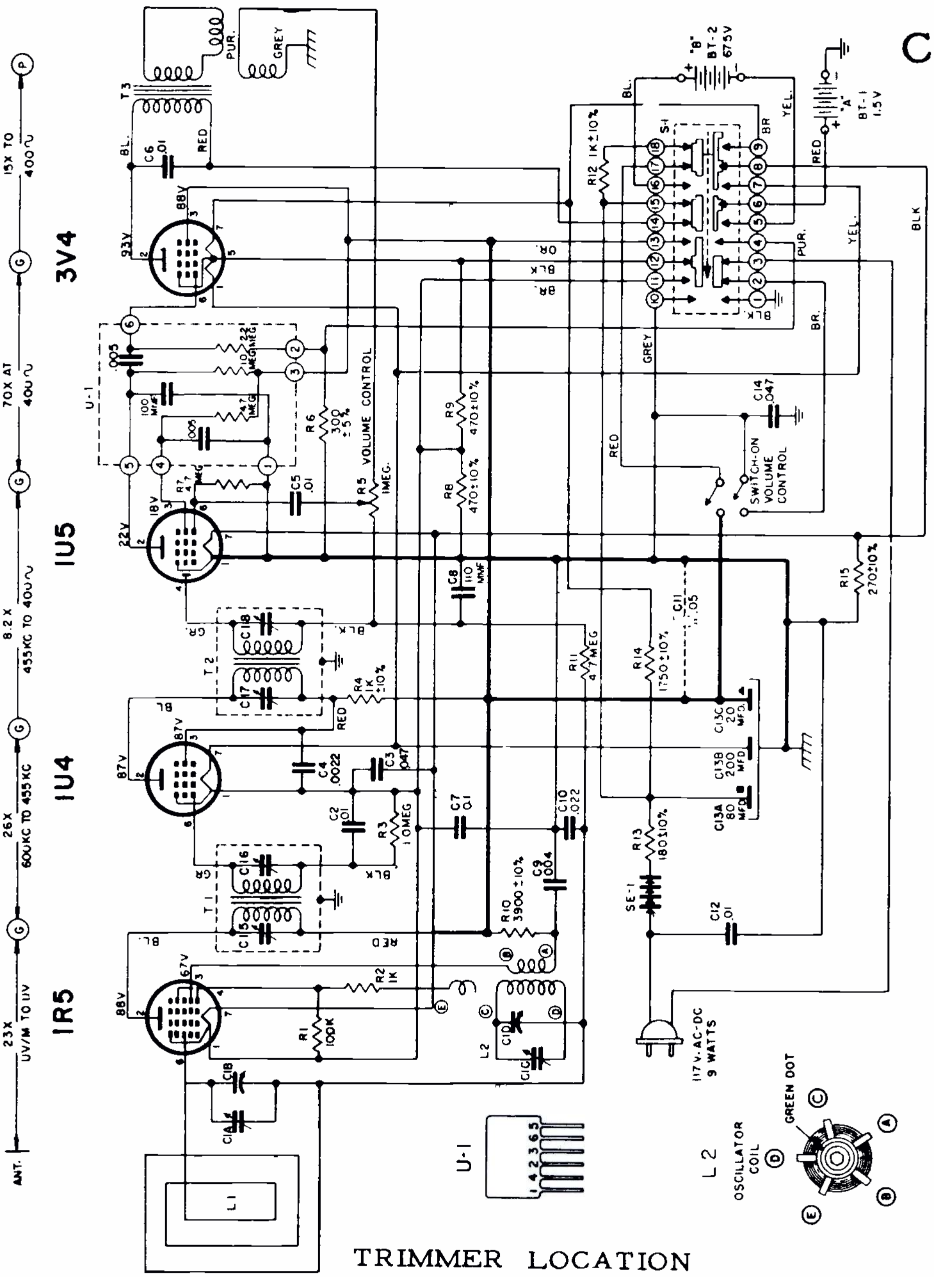
ZENITH RADIO CORPORATION

Model S-9010, Chassis 4L02



ZENITH RADIO MODEL L403Y, R, G, F

CHASSIS 4L41



CHANGE OVER SWITCH S-1 SHOWN IN POSITION FOR A.C.-D.C. OPERATION.

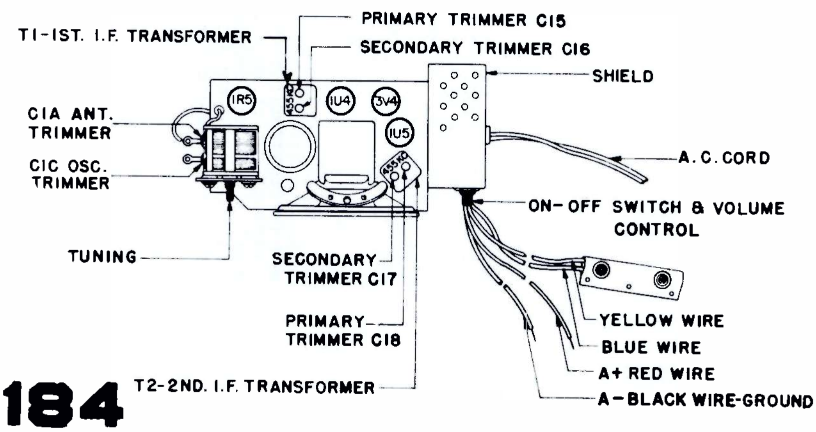
NOTE: USE ONLY ZENITH NON-INDUCTIVE ELECTROLYTIC CONDENSER FOR REPLACEMENT. IF ANY OTHER TYPE OF ELECTROLYTIC IS USED IT WILL BE NECESSARY TO ADD PARTS SHOWN IN DOTTED LINES

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

ALL RESISTORS ARE ±20% TOLERANCE UNLESS OTHERWISE SPECIFIED.

I.F. FREQUENCY 455 KC   TUNING RANGE 535-1620 KC   STANDARD B.C.

TRIMMER LOCATION



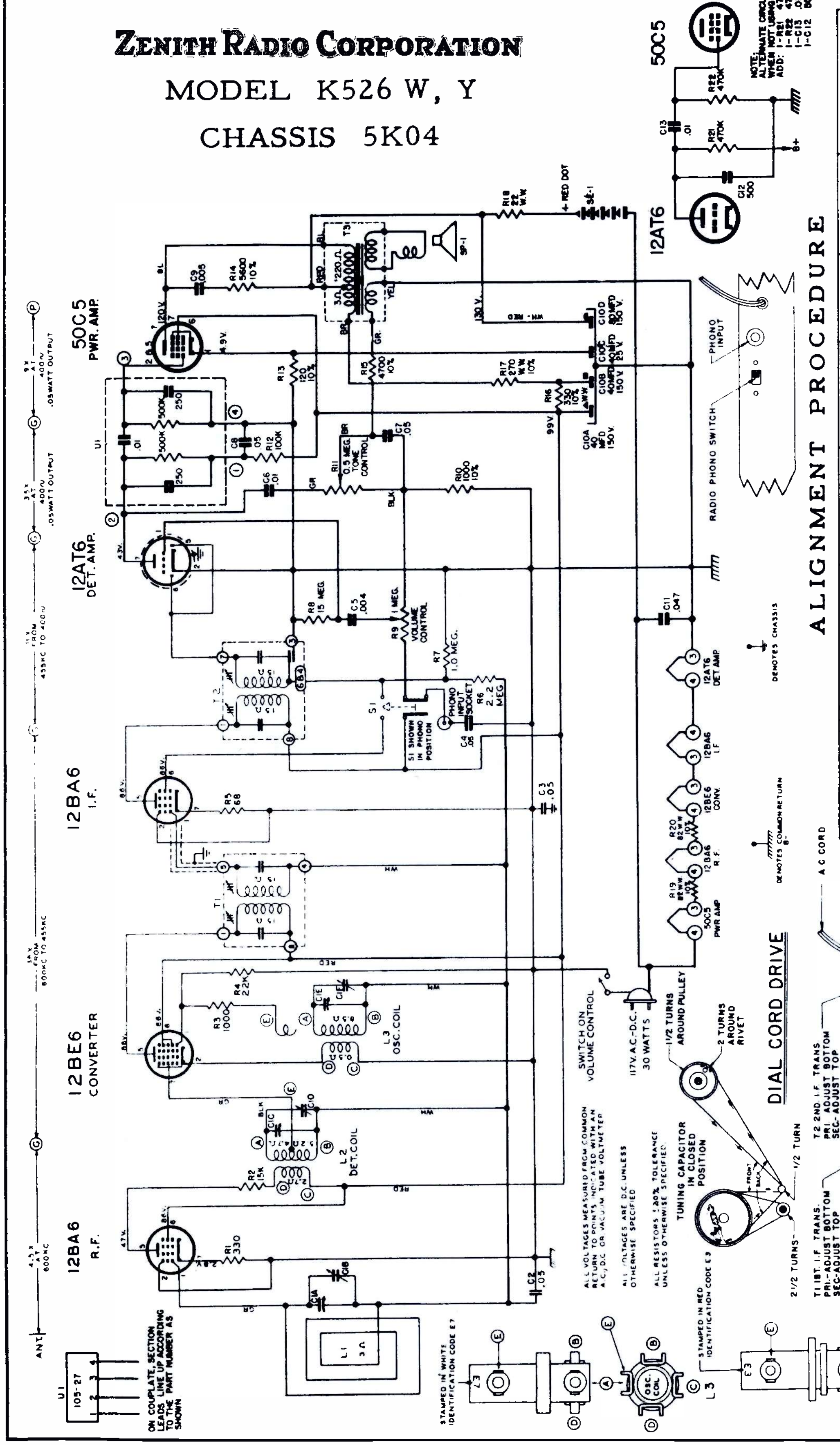
ALIGNMENT PROCEDURE

OPERATION	CONNECT OSCILLATOR TO	DUMMY ANTENNA	INPUT SIG. FREQUENCY	SET DIAL AT	TRIMMERS	PURPOSE
1	Convertor Grid	.5 Mfd.	455 Kc.	600 Kc.	C15, 16, 17, 18	For I.F. Alignment
2	Single Turn Loosely Coupled to Wavemagnet	----	1600 Kc.	1600 Kc.	C1C	Set Oscillator to Dial Scale
3		----	1400 Kc.	1400 Kc.	C1A	Antenna Alignment

ZENITH RADIO CORPORATION

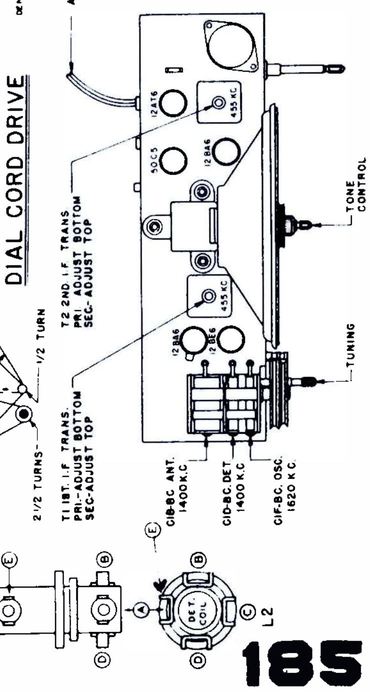
MODEL K526 W, Y

CHASSIS 5K04



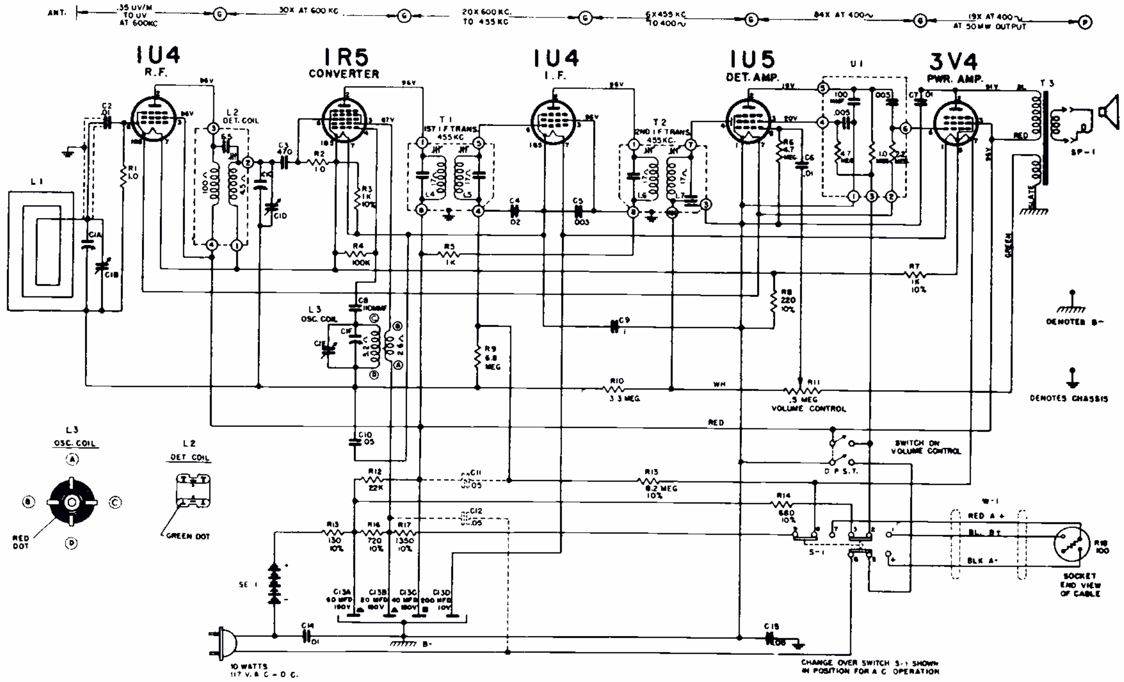
ALIGNMENT PROCEDURE

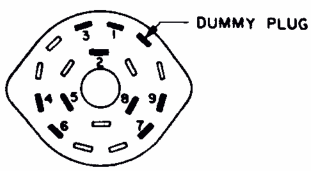
OPERATION	CONNECT OSCILLATOR TO	DUMMY ANTENNA	INPUT SIG. FREQUENCY	SET DIAL AT	TRIMMERS	PURPOSE
1	Convertor Grid	.5 Mfd.	455 Kc.	600 Kc.	Adjust Primary & Secondary Slug	For I.F. Alignment
2	Single Turn Loosely Coupled to Wave Magnet	----	1600 Kc.	1600 Kc.	C1F	Set Oscillator to Dial Scale
3		----	1400 Kc.	1400 Kc.	C1D	Detector Alignment
4		----	1400 Kc.	1400 Kc.	C1B	Antenna Alignment



ZENITH RADIO CORPORATION

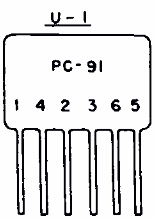
MODEL L505 CHASSIS 5L41





POSITION OF TERMINALS SWITCH S-1

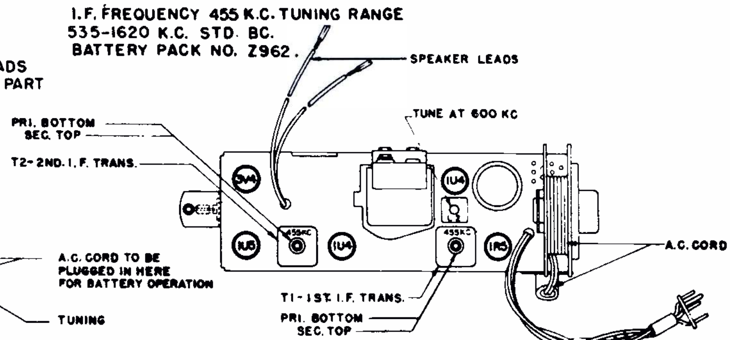
U-1

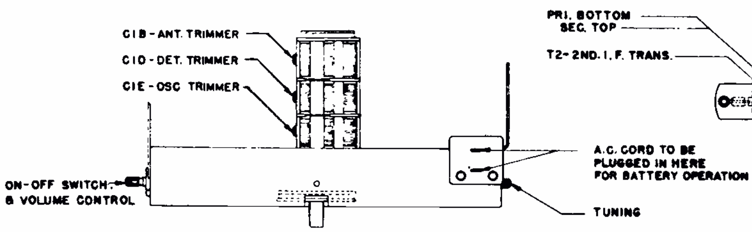


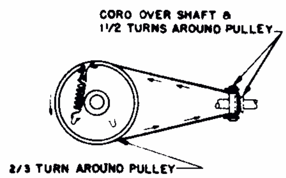
ON COUPLATE, SECTION LEADS LINE UP ACCORDING TO THE PART NUMBER AS SHOWN.

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.
I. F. TRANSFORMER NUMBERING STARTS WITH NO. I TERMINAL AS FIRST TERMINAL CLOCKWISE AND ADJACENT TO MARKER AS VIEWED FROM BOTTOM OF CHASSIS.
ALL VOLTAGES MEASURED FROM COMMON RETURN TO POINTS INDICATED WITH A D.C. VACUUM TUBE VOLTMETER.
ALL RESISTORS ±20% TOLERANCE UNLESS OTHERWISE SPECIFIED.

I.F. FREQUENCY 455 K.C. TUNING RANGE
535-1620 K.C. STD. BC.
BATTERY PACK NO. Z962.







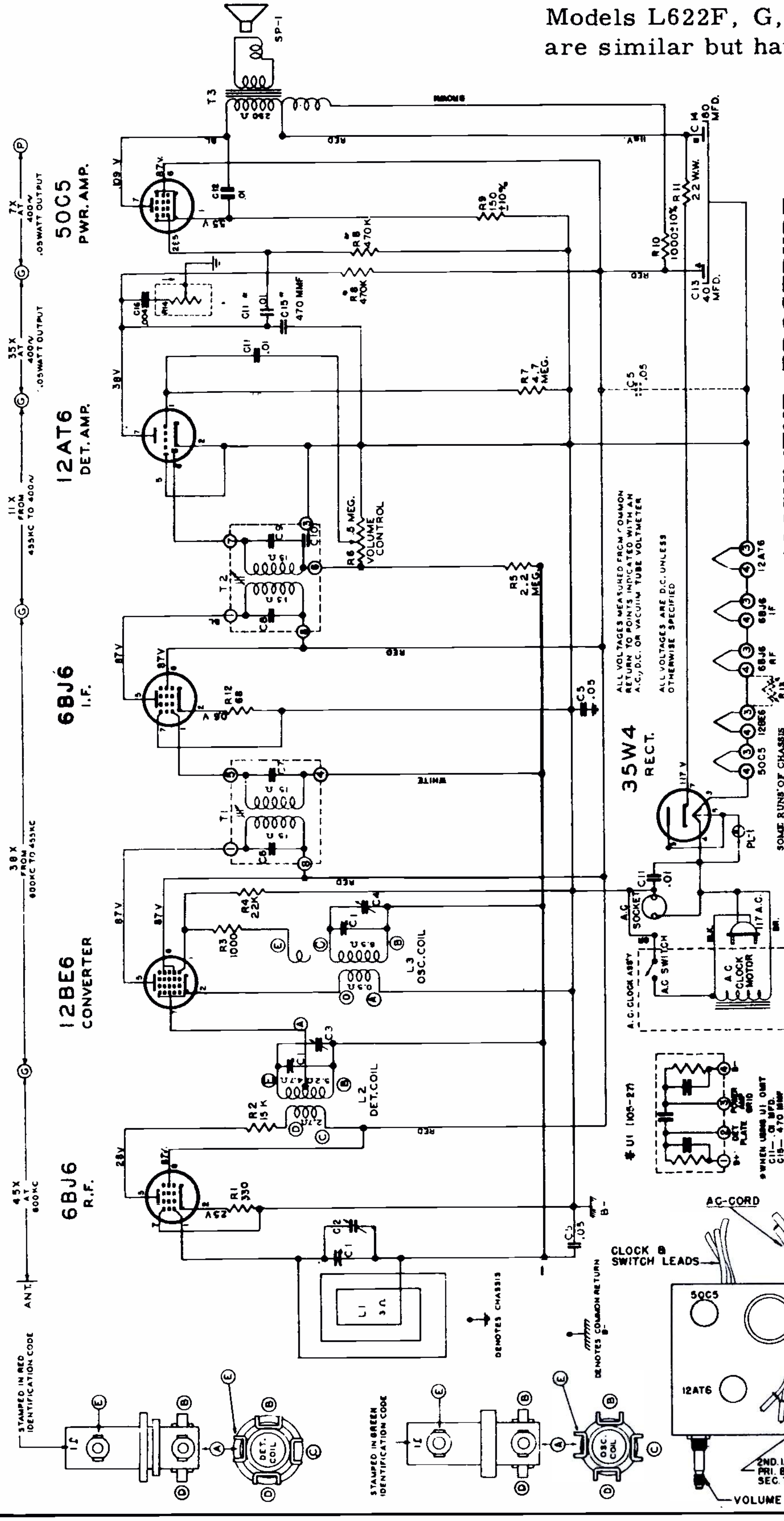
DIAL DRIVE CORD

OPERATION	CONNECT OSCILLATOR TO	DUMMY ANTENNA	INPUT SIG. FREQUENCY	BAND	SET DIAL TO	TRIMMERS	PURPOSE
1	Converter Grid	.1 Mfd	455 Kc	BC	600 Kc.	Pri. & Sec. 1st. & 2nd. I. F.	I. F. Alignment
2	Two turns Loosely coupled to Wavemagnet		1600 Kc.	BC	1600 Kc.	Osc. Trim. C1E	Set Oscillator to scale
3	Two turns loosely coupled to Wavemagnet		1400 Kc.	BC	1400 Kc.	Ant. & Det. Trims. C1B & C1D	Align Wave-magnet

ZENITH RADIO CORPORATION

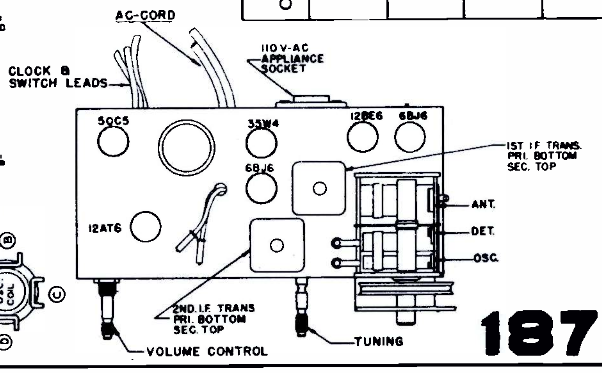
MODELS K622, F, G, W, CHASSIS 6K03

Models L622F, G, W, using Chassis 6L03, are similar but have phone input and switch.



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.	OSC	Set Oscillator to Dial Scale
3		--	1400 Kc.	1400 Kc.	DET	Detector Alignment
4		--	1400 Kc.	1400 Kc.	ANT	Align Antenna Stage



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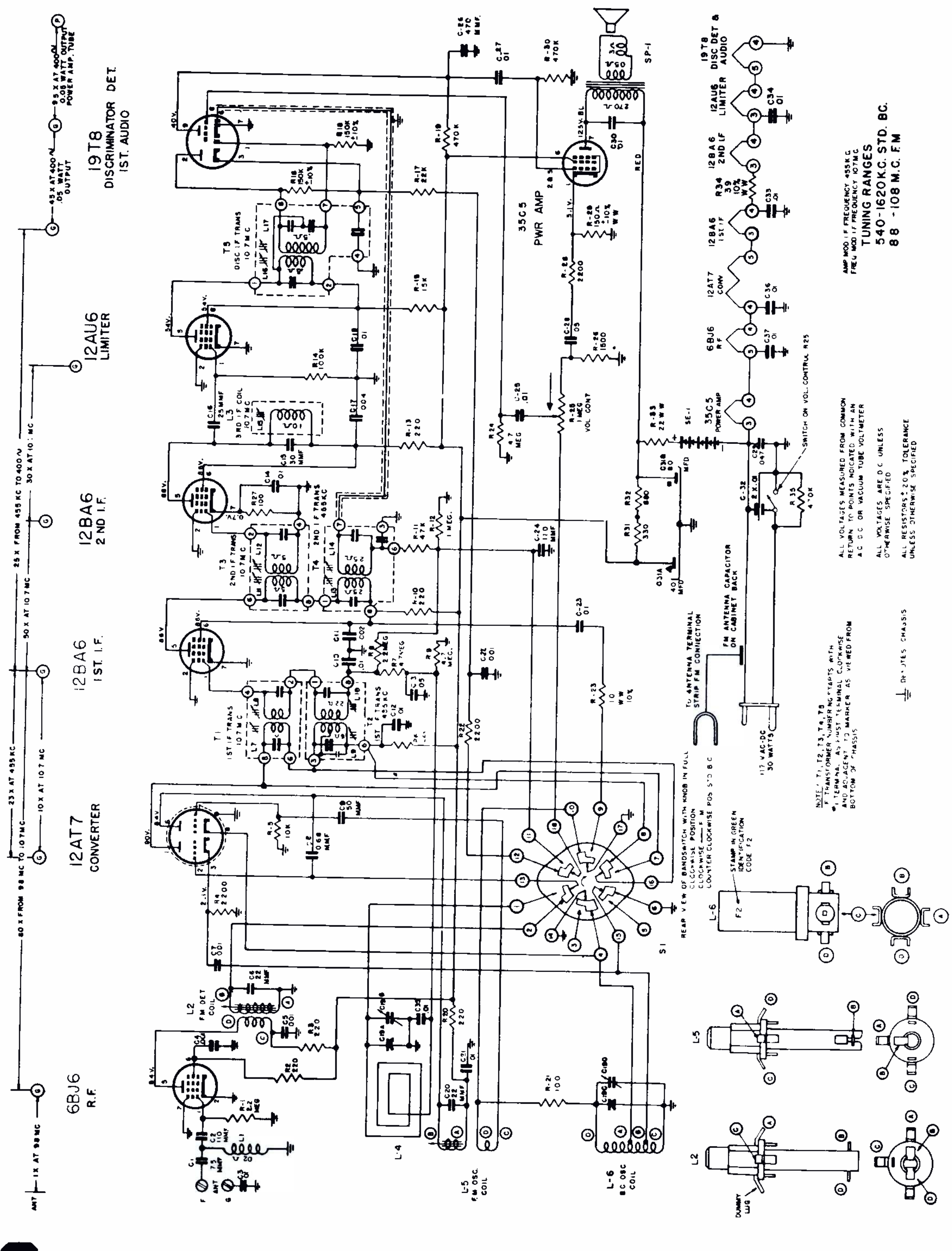
Model L721, Chassis 7L05

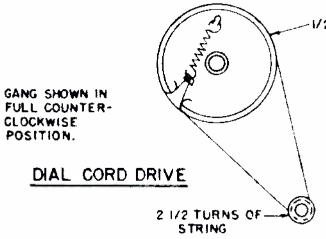
Alignment material on page 189, adjacent.

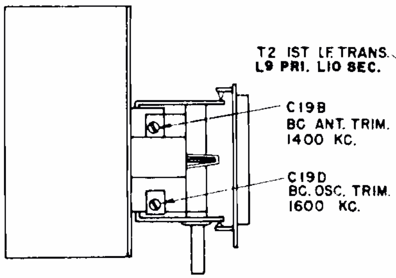


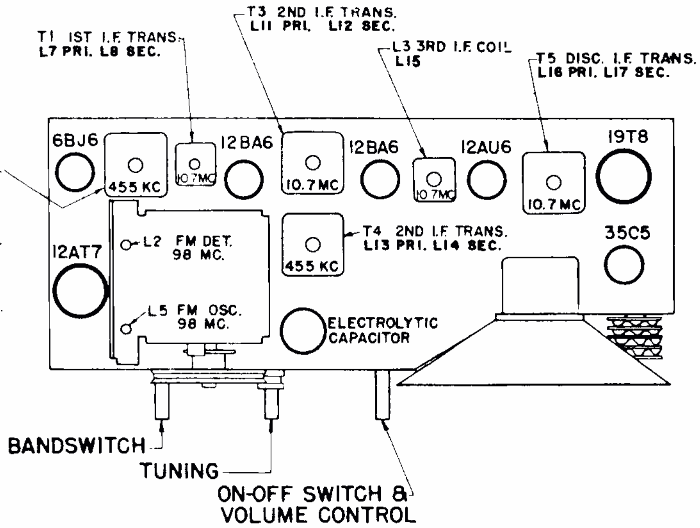
ZENITH RADIO CORPORATION

Model L721, Chassis 7L05

Continued from page 188.







ALIGNMENT PROCEDURE

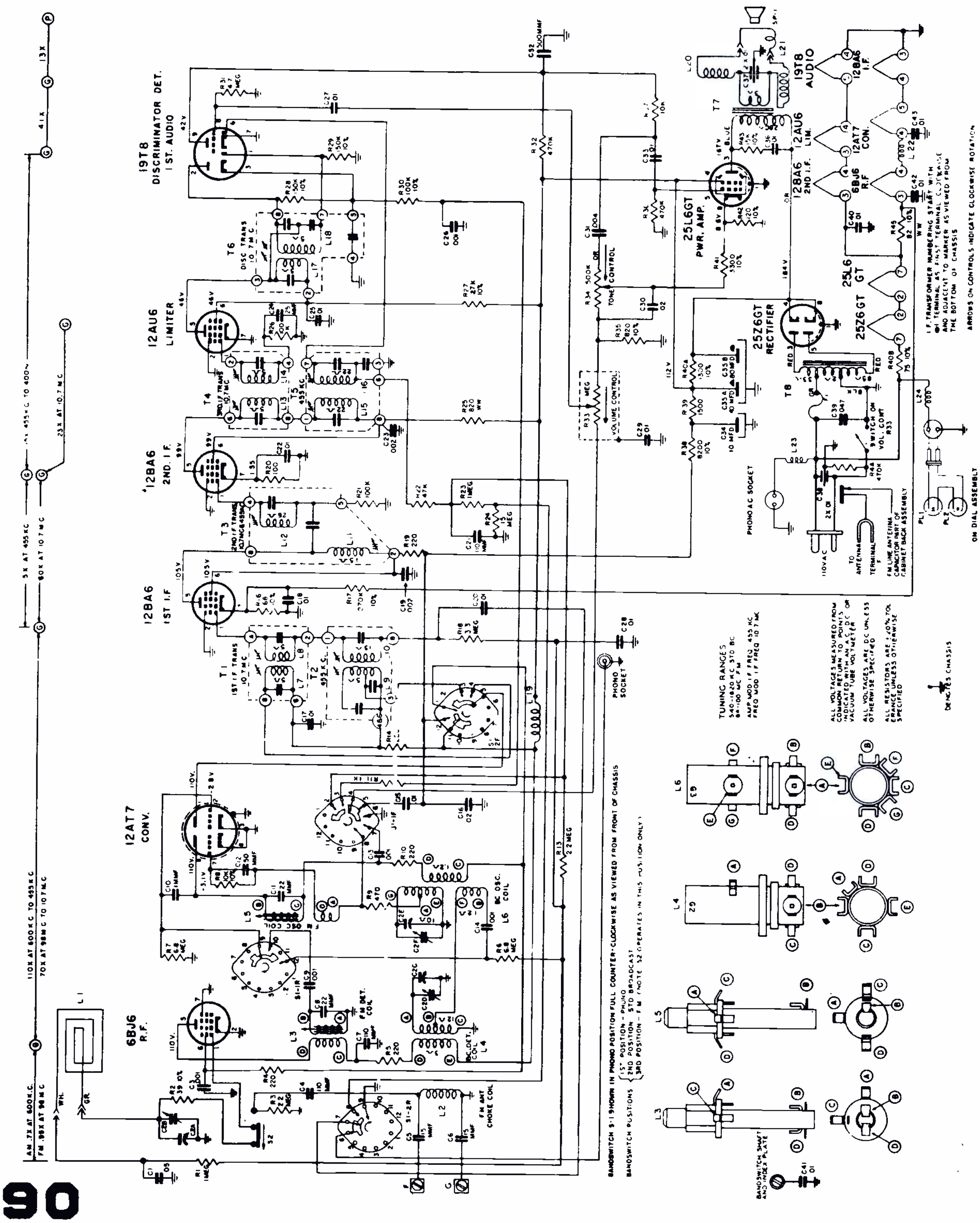
Operation	Connect Oscillator To	Dummy Antenna	Input Signal Frequency	Band	Set Dial To	Adj. Trimmers	Purpose
1	Pin 2 12AT7 Converter	.05 Mfd.	455 Kc. Modulated	BC	600 Kc.	L9,10,13,14	Align I. F. channel for maximum output.
2	2 turns loosely cpld. to wavemagnet		1600 Kc. Modulated	BC	1600 Kc.	C19D	Set oscillator to dial scale.
3	2 turns loosely cpld. to wavemagnet		1400 Kc. Modulated	BC	1400 Kc.	C19B	Align antenna stage.
4 (a)	Pin 1 (grid) on 12AU6 limiter.	.05 Mfd.	10.7 Mc. Unmodulated	FM 100		L16 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		L17 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		L15 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		L11 and L12 Prim. and Sec. of 2nd. IF Transformer.	Align 2nd IF transformer for maximum reading.
8 (c)	Pin 2 (grid) on 12AT7 converter tube socket.	.05 Mfd.	10.7 Mc. Unmodulated	FM 100		L7 and L8 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.	L5 Osc. Coil Slug	Set Oscillator to dial scale.
10 (c) (d)		270 ohms	98 Mc. Unmodulated	FM 100	98 Mc.	L2 Det. Coil Slug	Align det. stage to maximum reading.

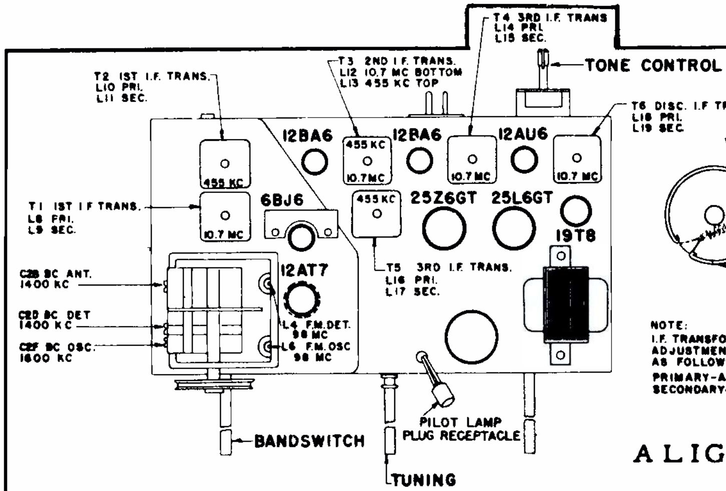
(a) Vacuum Tube Voltmeter Lug 7 on discriminator transformer to chassis (half discriminator load).
(b) Vacuum Tube Voltmeter Lug 5 on discriminator transformer to chassis (full discriminator load).
(c) Vacuum Tube Voltmeter from Limiter Grid to Chassis.
(d) Loosen Slugs by applying a hot iron to the cement.

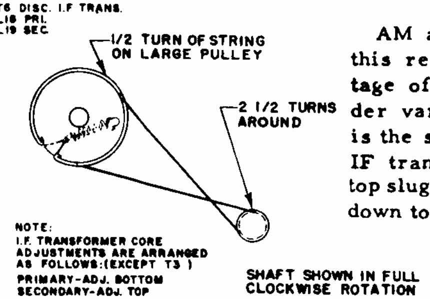
ZENITH RADIO CORPORATION

Models L845R, L846E & L846 H — Chassis 8L21

Alignment information on page 191, adjacent at right.

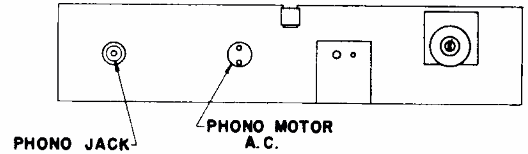






Zenith Radio Chassis 8L21, continued from page 190.

AM and FM IF Alignment: The AM and FM IF transformers in this receiver are of the new permeability tuned type. The advantage of an IF transformer of this type is its extreme stability under various humidity and temperature conditions. The upper coil is the secondary and the lower the primary. When adjusting these IF transformers the tuning wrench 68-19 can be inserted into the top slug, rotated until maximum output is obtained and then dropped down to the lower slug and the same operation repeated.



ALIGNMENT PROCEDURE

Operation	Connect Oscillator To	Dummy Antenna	Input Signal Frequency	Band	Set Dial To	Adj. Trimmers	Purpose
1	Pin 2 12AT7 Converter	.05 Mfd.	455 Kc. Modulated	BC	600 Kc.	L9, 10, 12 15 & 16	Align I. F. channel for maximum output.
2	2 turns loosely cpld. to wavemagnet		1600 Kc. Modulated	BC	1600 Kc.	C2F	Set oscillator to dial scale.
3	2 turns loosely cpld. to wavemagnet		1400 Kc. Modulated	BC	1400 Kc.	C2D, C2B	Align detector and antenna stage.
4 (a)	Pin 1 (grid) on 12AU6 limiter.	.05 Mfd.	10.7 Mc. Unmodulated	FM 100		L17 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		L18 coil slug sec. of discr.	Adjust secondary of discriminator for zero reading.
6 (c)	Pin 1 (grid) on 12BA6 2nd. I F.	.05 Mfd.	10.7 Mc. Unmodulated	FM 100		L13 and L14 Pri. & Sec. of 3rd. IF trans.	Align 3rd. IF transformer for maximum reading.
7 (c)	Pin 1 (grid) on 12BA6 1st. IF.	.05 Mfd.	10.7 Mc. Unmodulated	FM 100		Adjust L11 for maximum reading.	Align 2nd IF transformer for maximum reading.
8 (c)	Pin 2 (grid) on 12AT7 converter tube socket.	.05 Mfd.	10.7 Mc. Unmodulated	FM 100		L7 and L8 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.	L6 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.

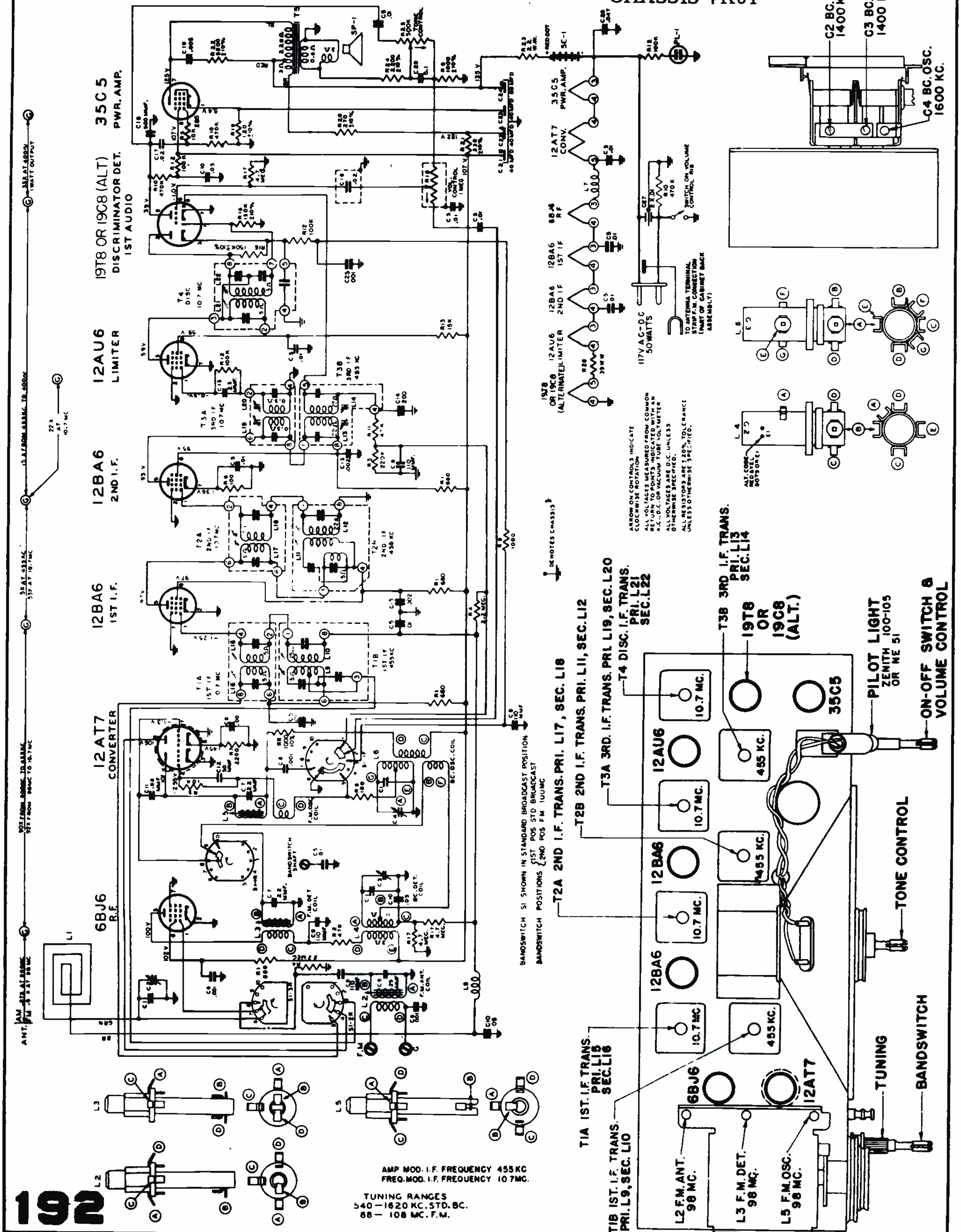
(a) Vacuum Tube Voltmeter Lug 7 on discriminator transformer to chassis (half discriminator load).
(b) Vacuum Tube Voltmeter Lug 5 on discriminator transformer to chassis (full discriminator load).
(c) Vacuum Tube Voltmeter from Limiter Grid to Chassis.
(d) Loosen Slugs by applying a hot iron to the cement.

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

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

ZENITH RADIO CORPORATION

MODEL K725
CHASSIS 7K01



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