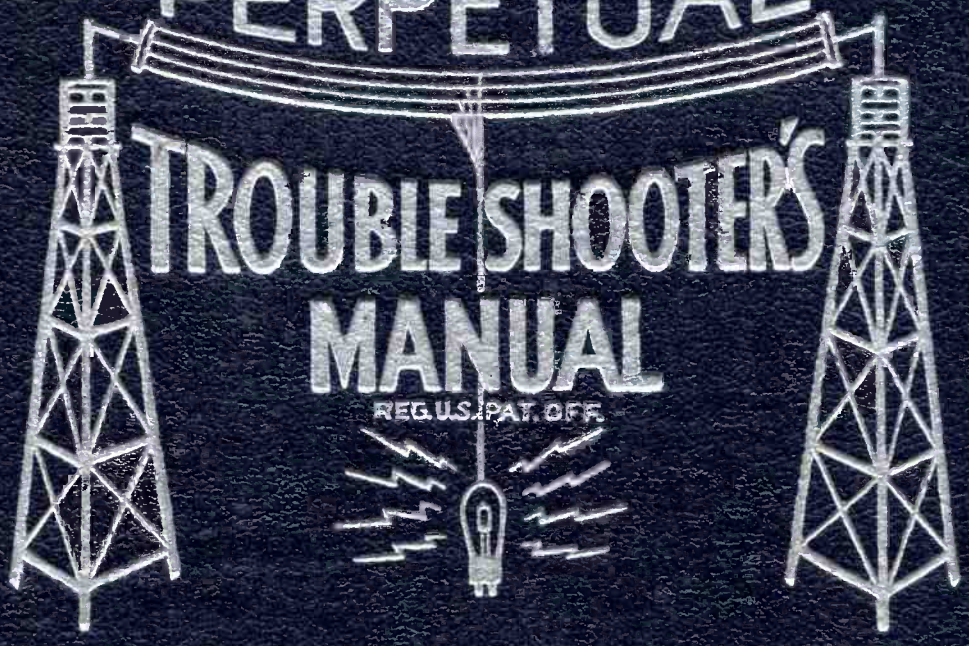
VOLUME VIII

PERPETUAL TROUBLE SHOOTER'S MANUAL

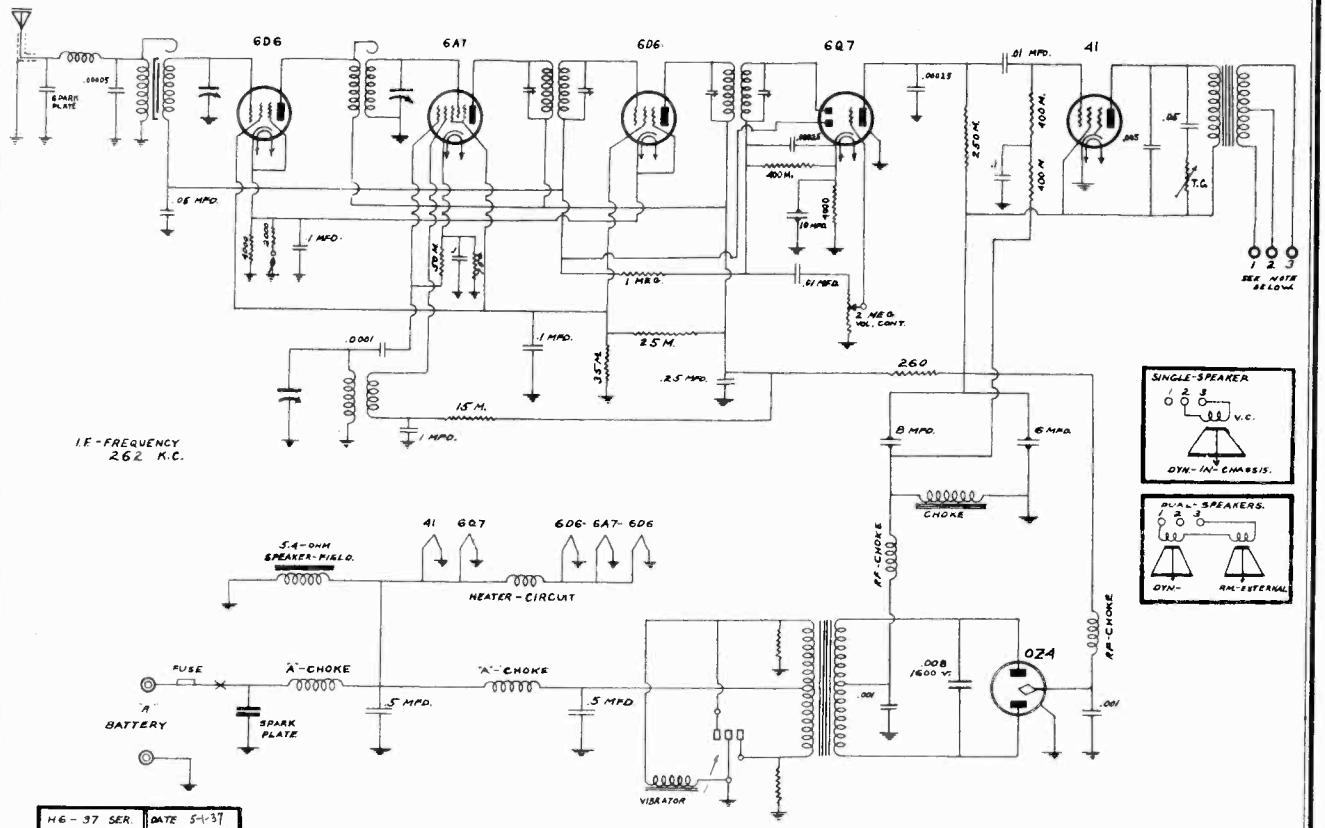
REG. U.S. PAT. OFF.

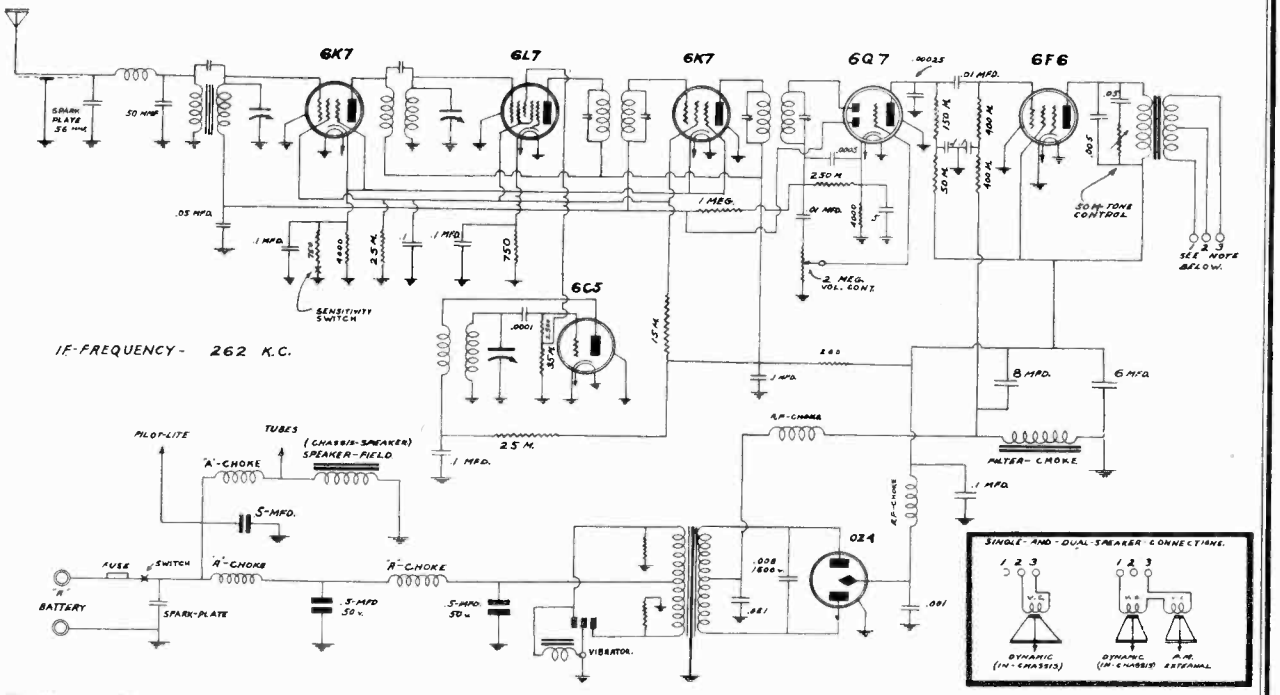


JOHN F. RIDER

PACIFIC RADIO CORP.

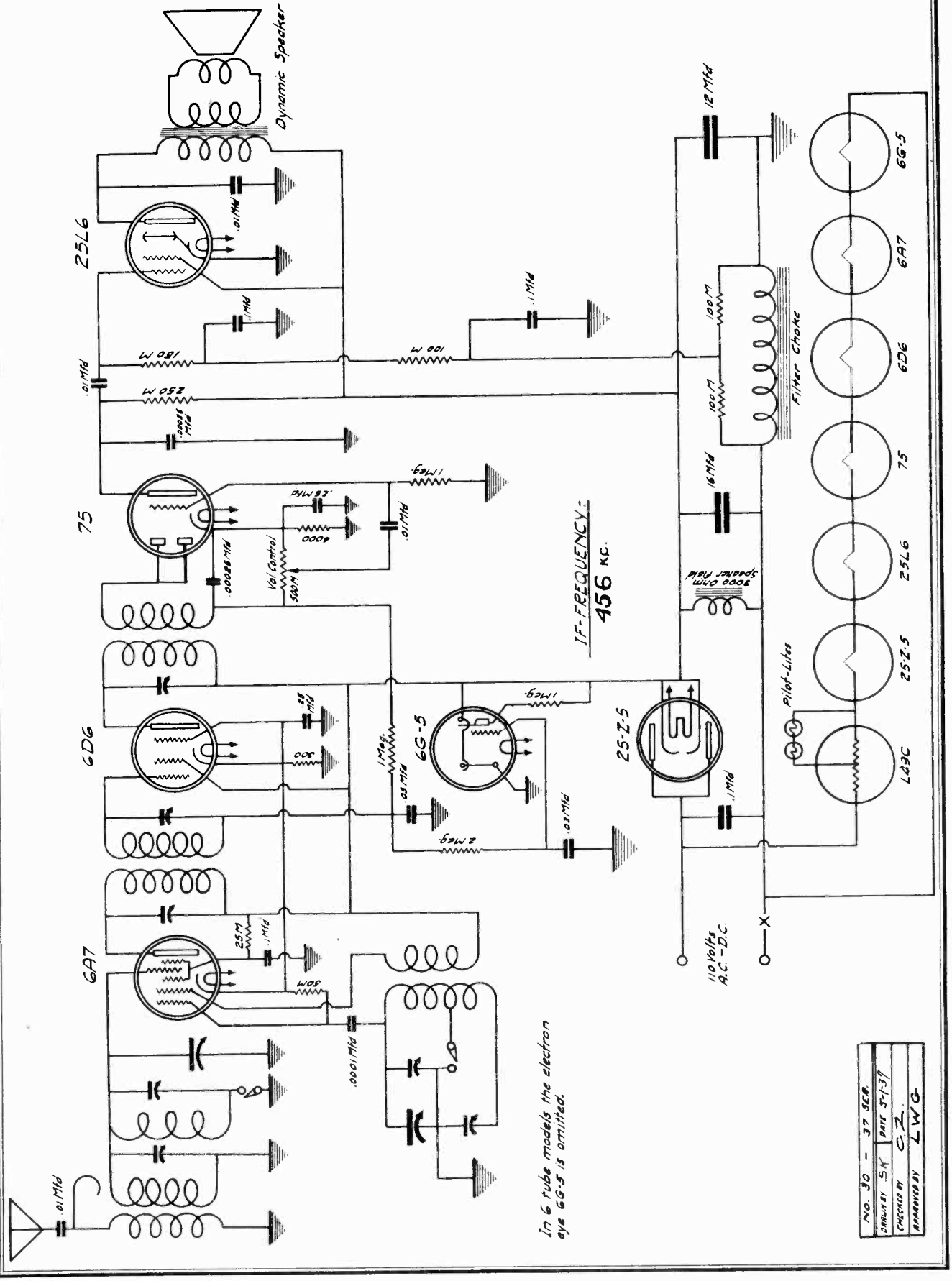
MODEL H6
MODEL H7
Schematics





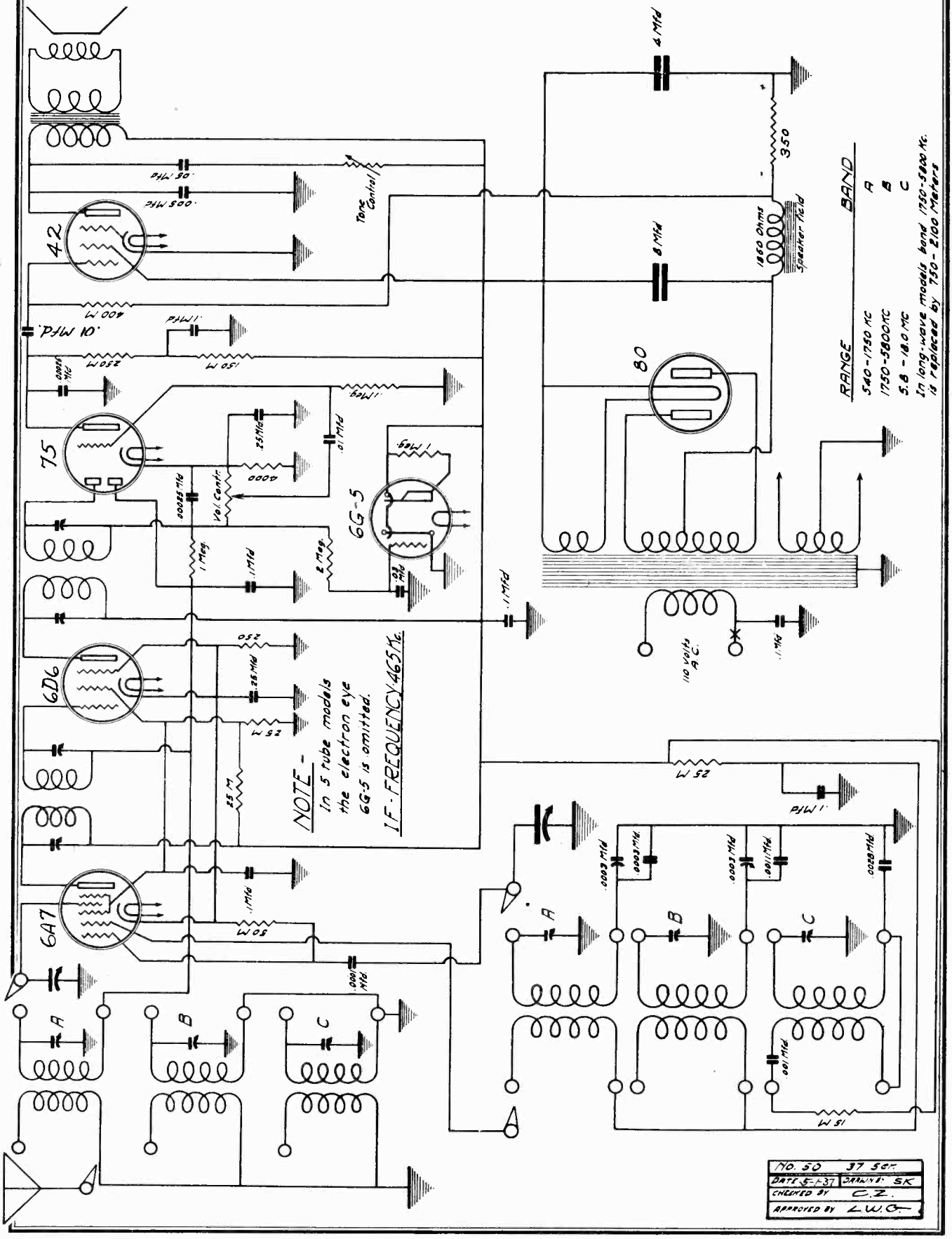
MODEL 30
Schematic

PACIFIC RADIO CORP.



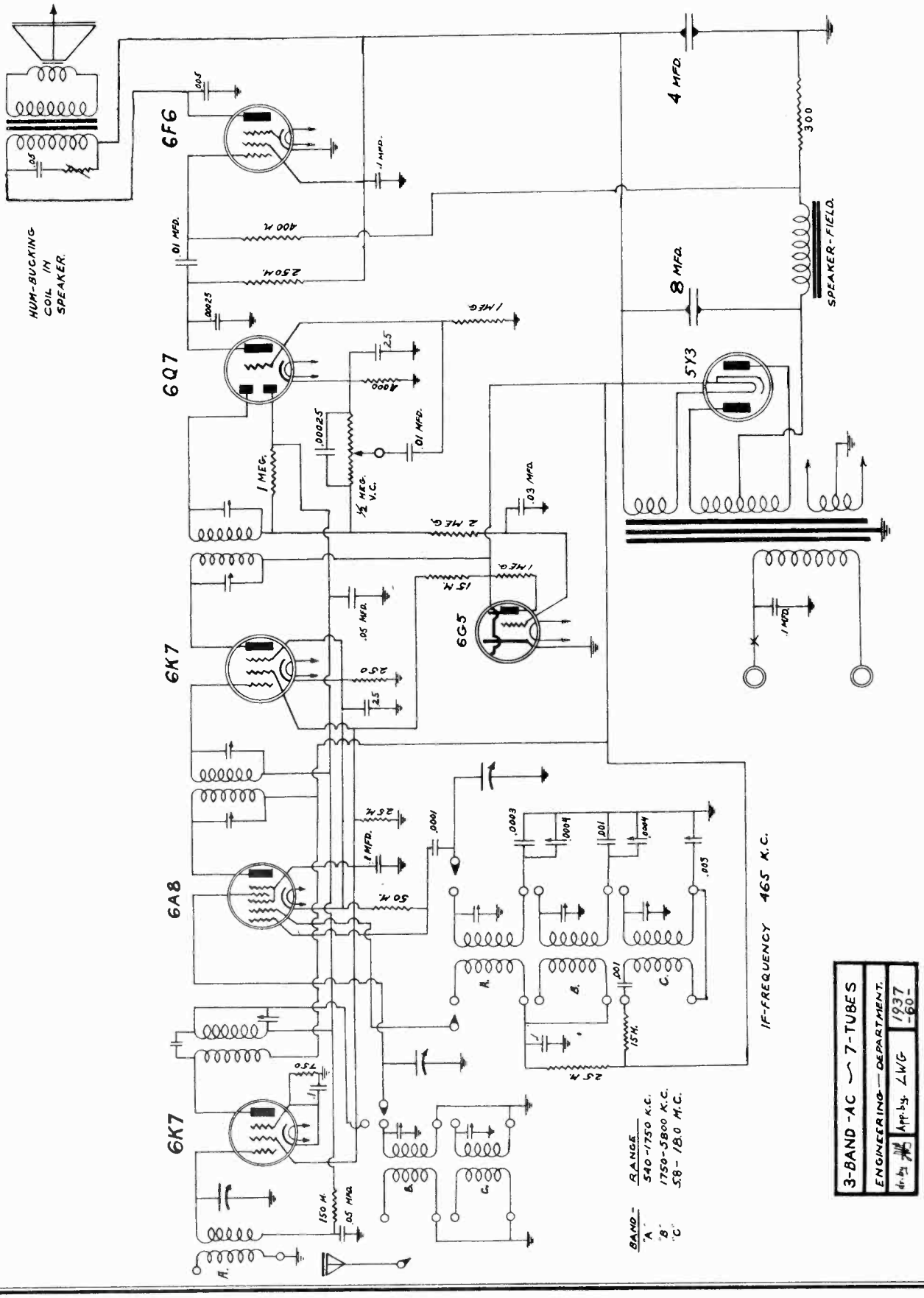
MODEL 50
Schematic

PACIFIC RADIO CORP.



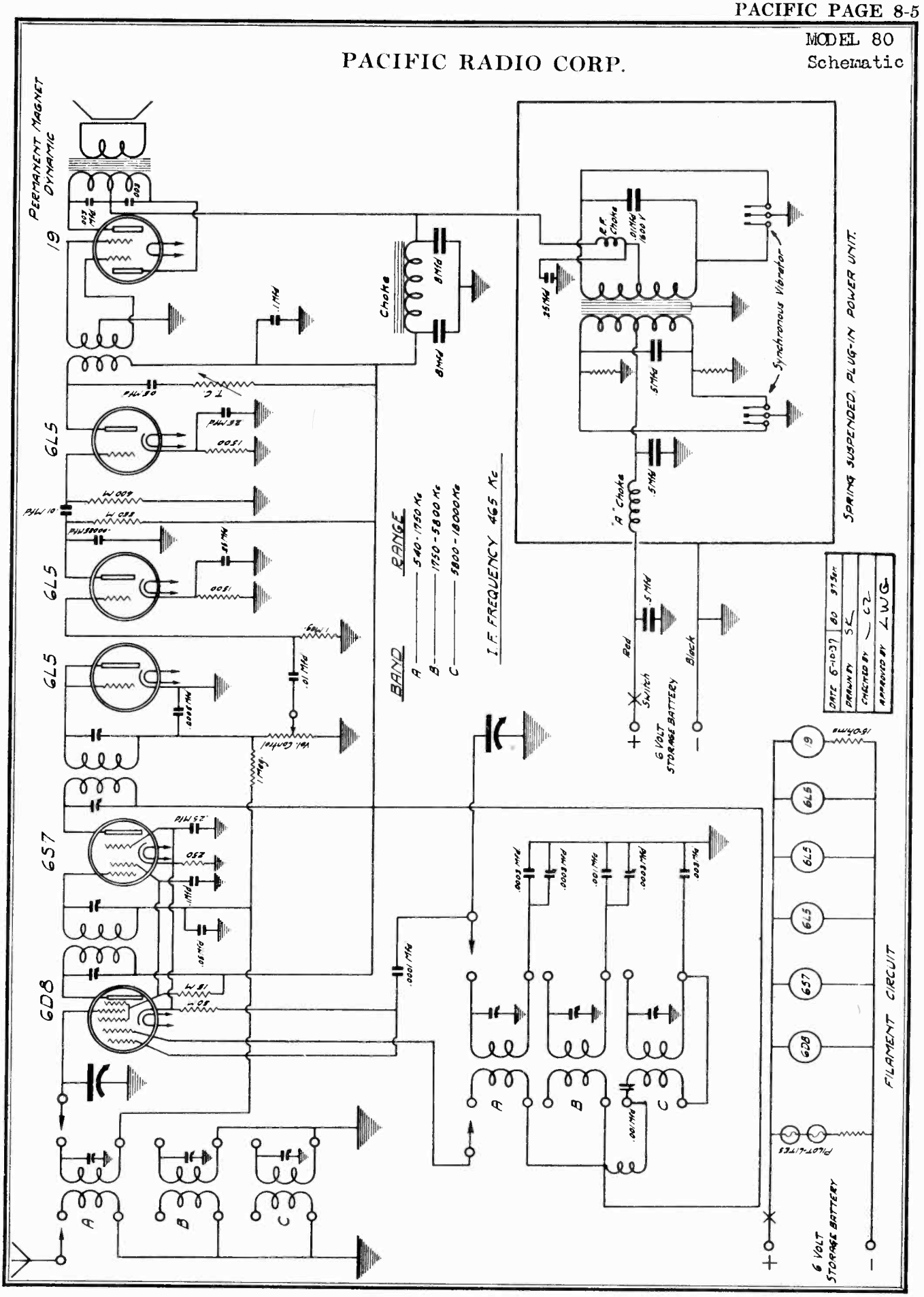
MODEL 60
Schematic

PACIFIC RADIO CORP.



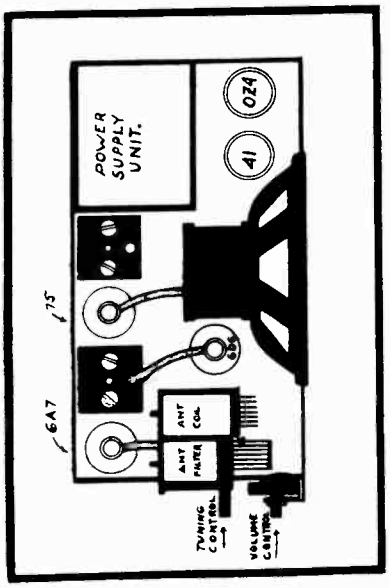
MODEL 80
Schematic

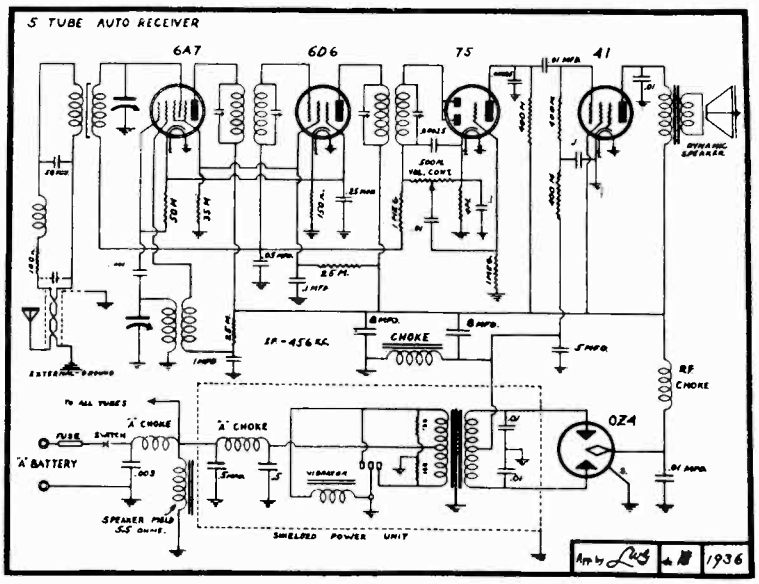
PACIFIC RADIO CORP.



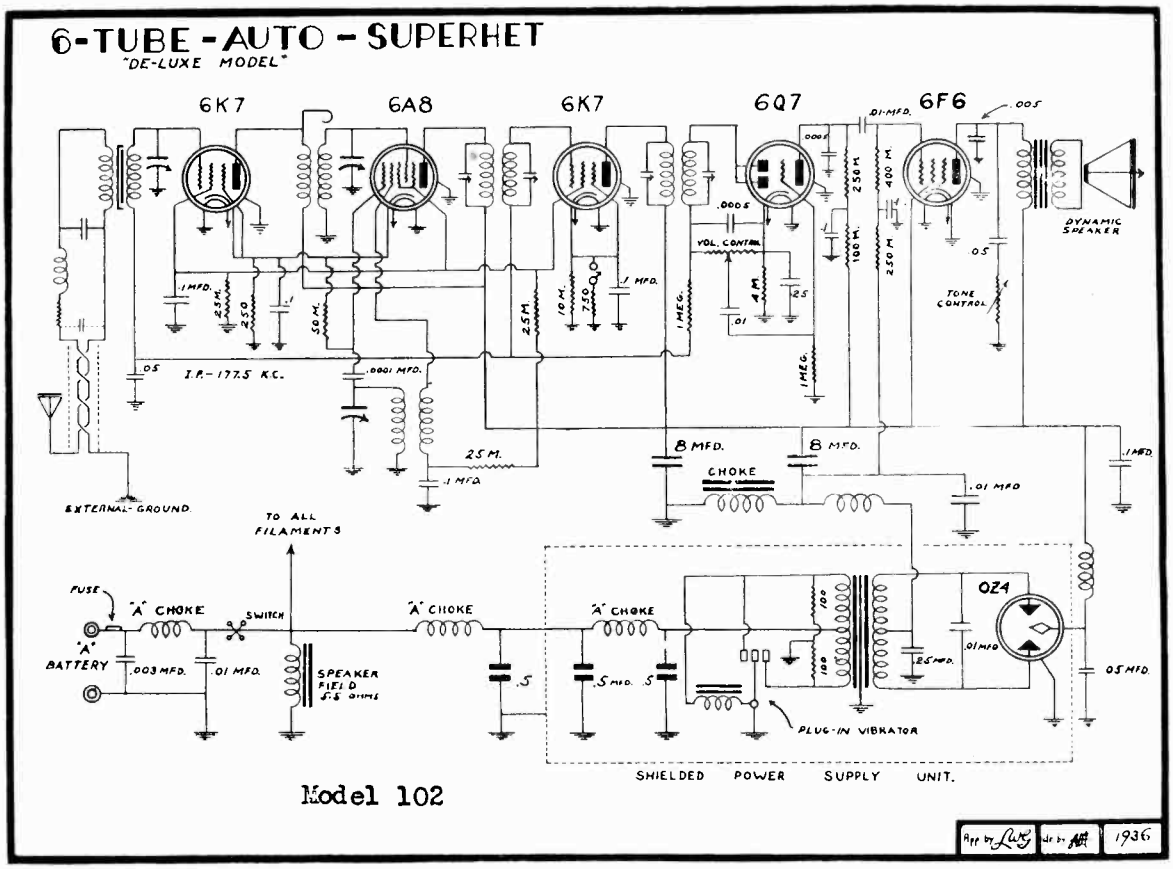
MODEL 101
Schematic, Socket
MODEL 102
Schematic

PACIFIC RADIO CORP.





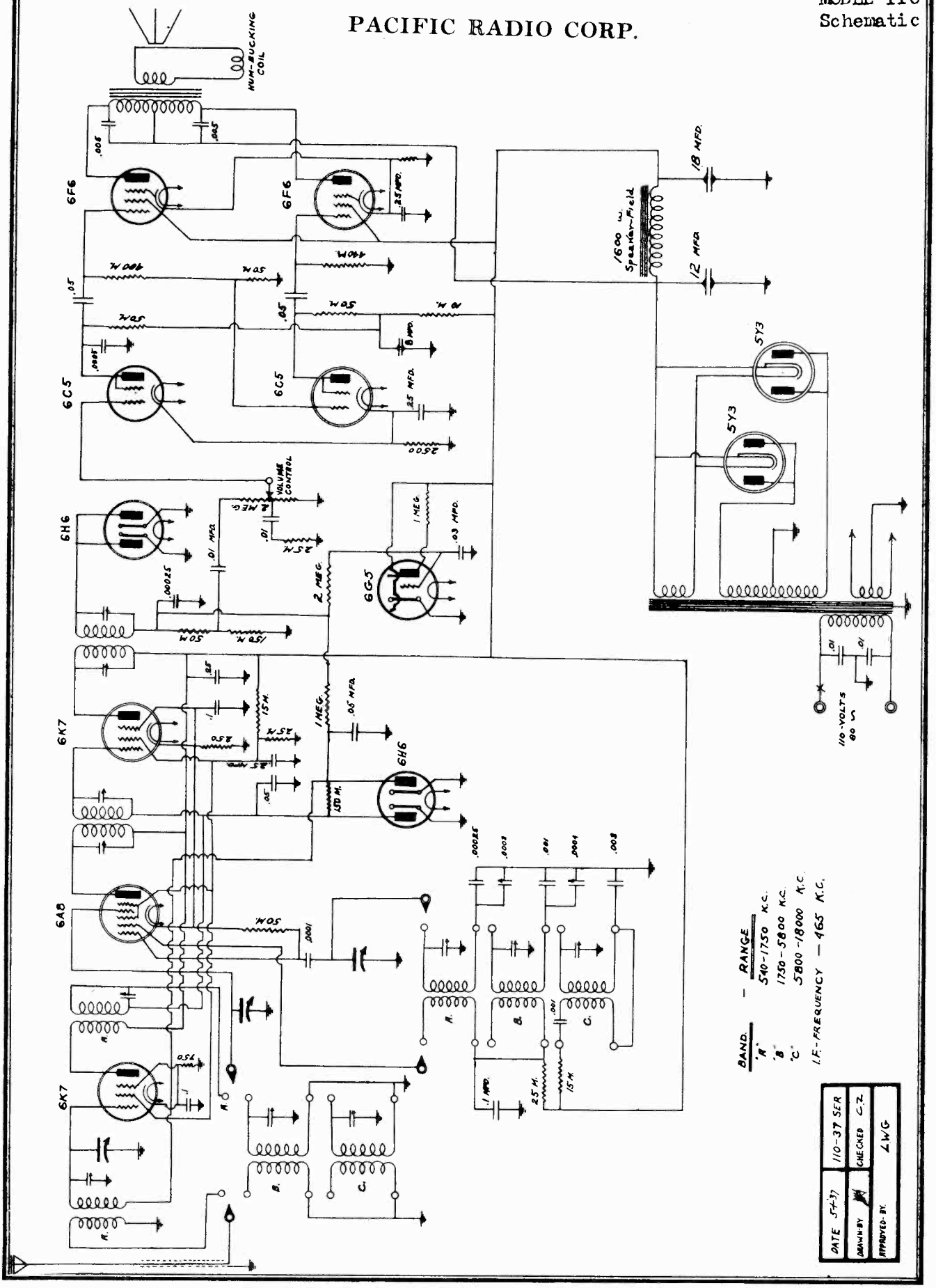
Model 101



Model 102

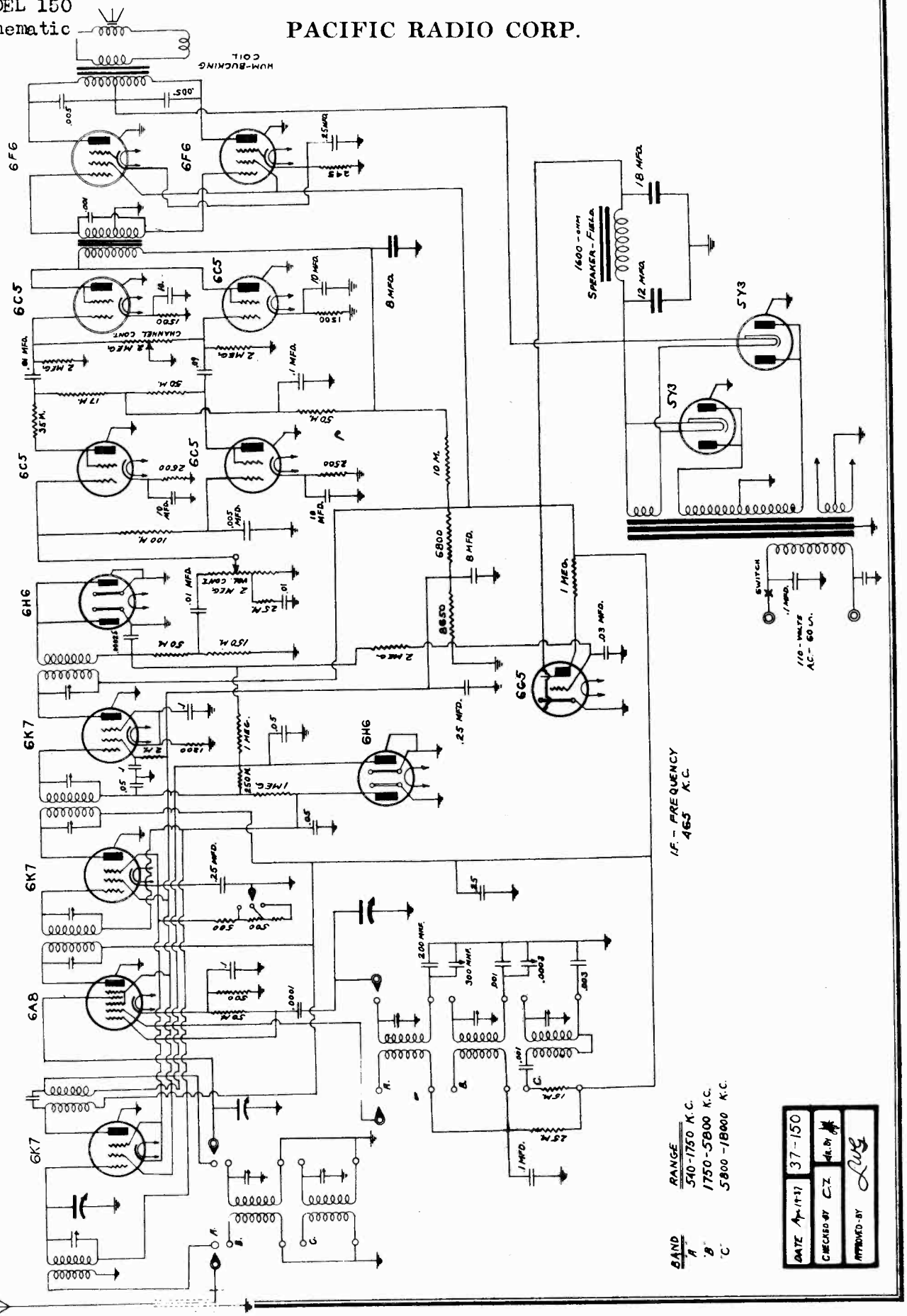
MODEL 110
Schematic

PACIFIC RADIO CORP.



MODEL 150
Schematic

PACIFIC RADIO CORP.

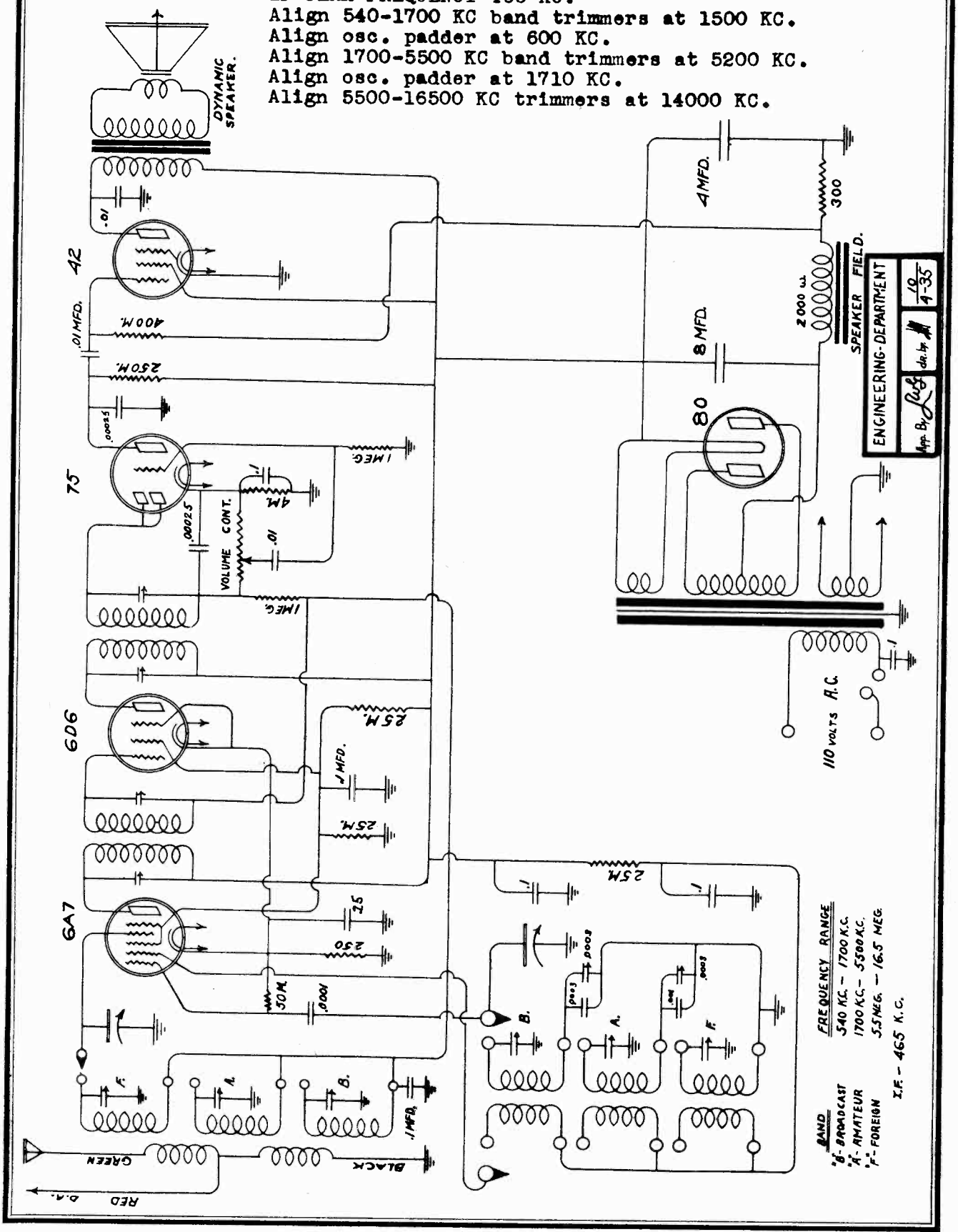


PACIFIC RADIO CORP.

MODEL 321-36
Schematic, Alignment

ALIGNMENT:-

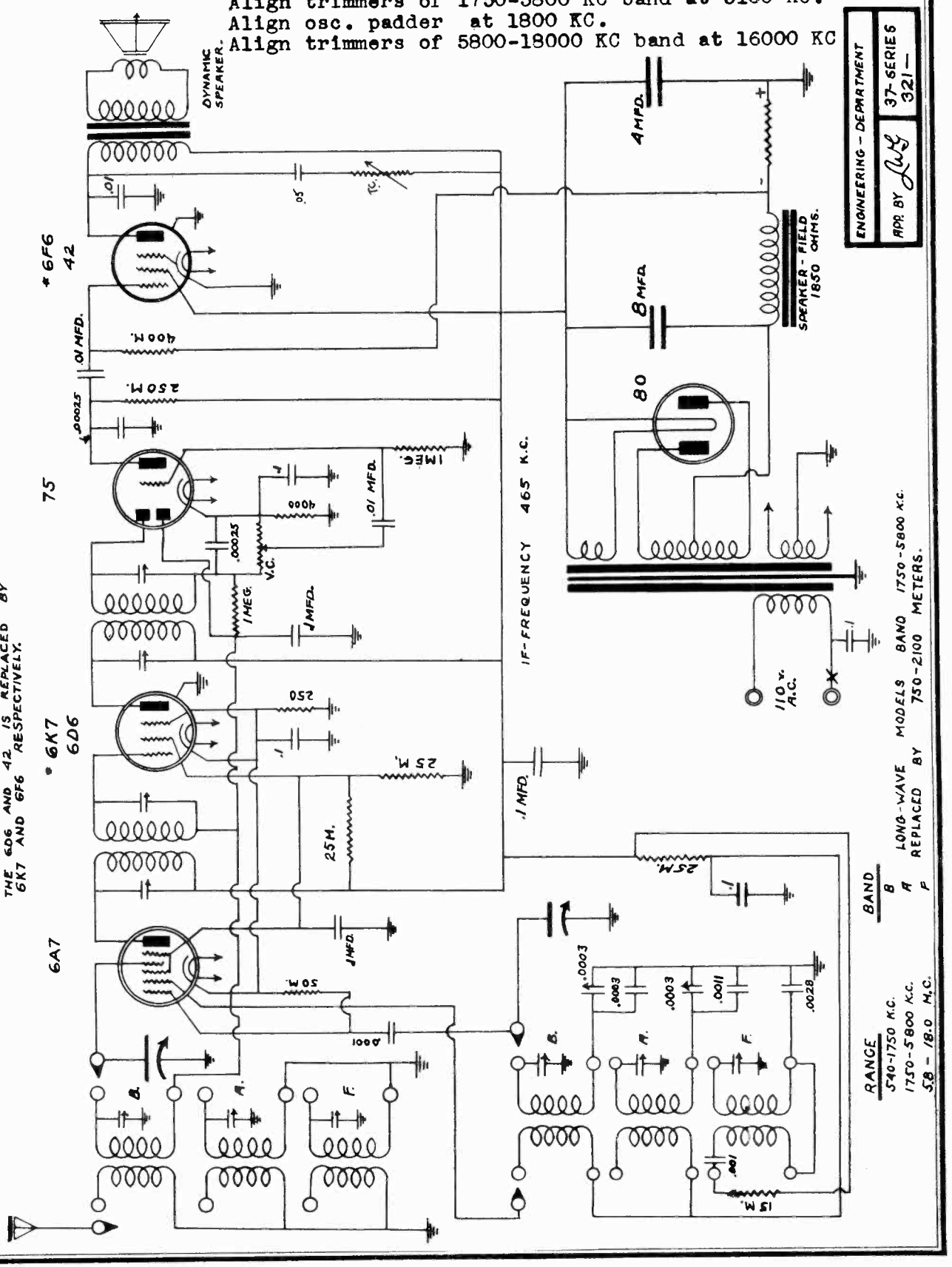
IF PEAK FREQUENCY 465 KC.
Align 540-1700 KC band trimmers at 1500 KC.
Align osc. padder at 600 KC.
Align 1700-5500 KC band trimmers at 5200 KC.
Align osc. padder at 1710 KC.
Align 5500-16500 KC trimmers at 14000 KC.



MODEL 321-37
Schematic, Alignment

PACIFIC RADIO CORP.

ALIGNMENT:- IF PEAK FREQUENCY 465 KC.
Align trimmers of 540-1750 KC band at 1500 KC.
Align osc. padder at 600 KC.
Align trimmers of 1750-5800 KC band at 5100 KC.
Align osc. padder at 1800 KC.
Align trimmers of 5800-18000 KC band at 16000 KC



* NOTE:- IN CHASSIS OF SERIES M2 THE 6D6 AND 42 IS REPLACED BY 6K7 AND 6F6 RESPECTIVELY.

BAND

B	LONG-WAVE MODELS BAND 1750-5800 K.C.
A	REPLACED BY 750-2100 METERS.
F	

RANGE

540-1750 K.C.	
1750-5800 K.C.	
5.8 - 18.0 M.C.	

MODEL 120 Console
Schematic, Alignment

MODEL 5 Kompak
Schematic, Socket, Trimmers

PACKARD BELL CO.

MODEL 50 High-Fidelity
Schematic, Socket, Trimmers
Alignment

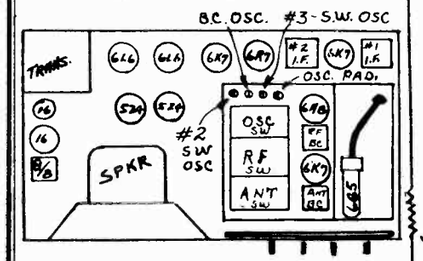
IF PEAKED AT
460 KC

NOTE:-

EARLY MODEL SERIES USED A OSCILLATOR PADDER CONDENSER OF 4600 MMFD FOR THE #3 BAND.

IN THIS SERIES THERE WAS ALSO A DIFFERENT DIAL CALIBRATION.

CHASSIS LAYOUT



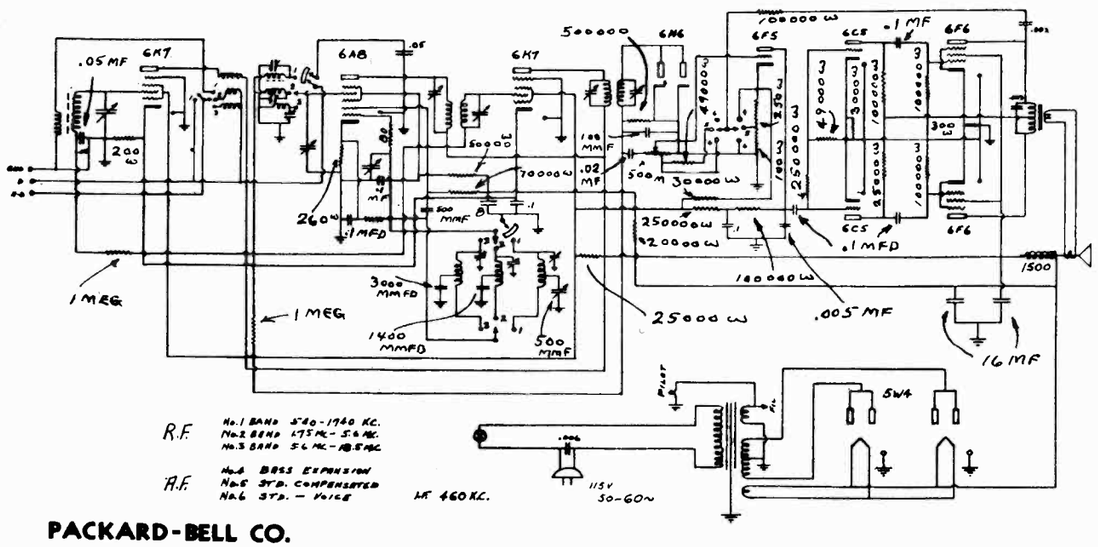
TRIMMER LOCATIONS

R.F. No.1 BAND 540-1740 KC.
No.2 BAND 1.75 MC.- 5.6 MC.
No.3 BAND 5.6 MC.- 18.5 MC.

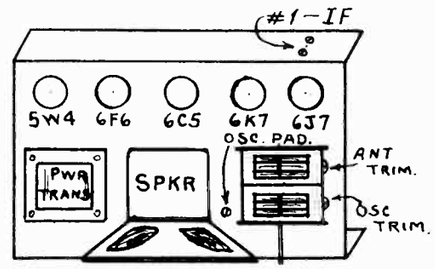
A.F. No.4 HIGH FIDELITY
No.5 STANDARD
No.6 BASS

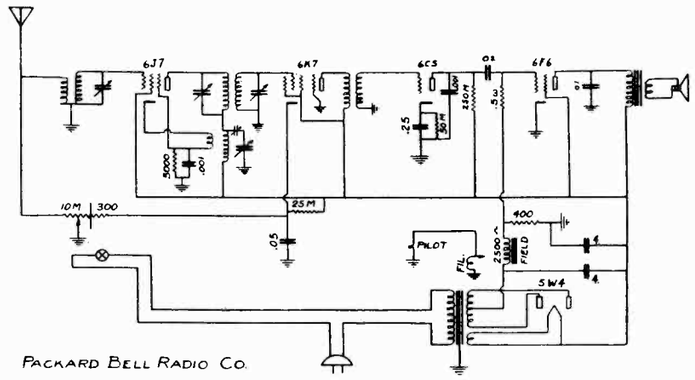
PACKARD BELL CO.
LOS ANGELES, CAL.
MODEL 50 HIGH-FIDELITY

115V 50-60~



PACKARD-BELL CO.
MODEL 120 CONSOLE

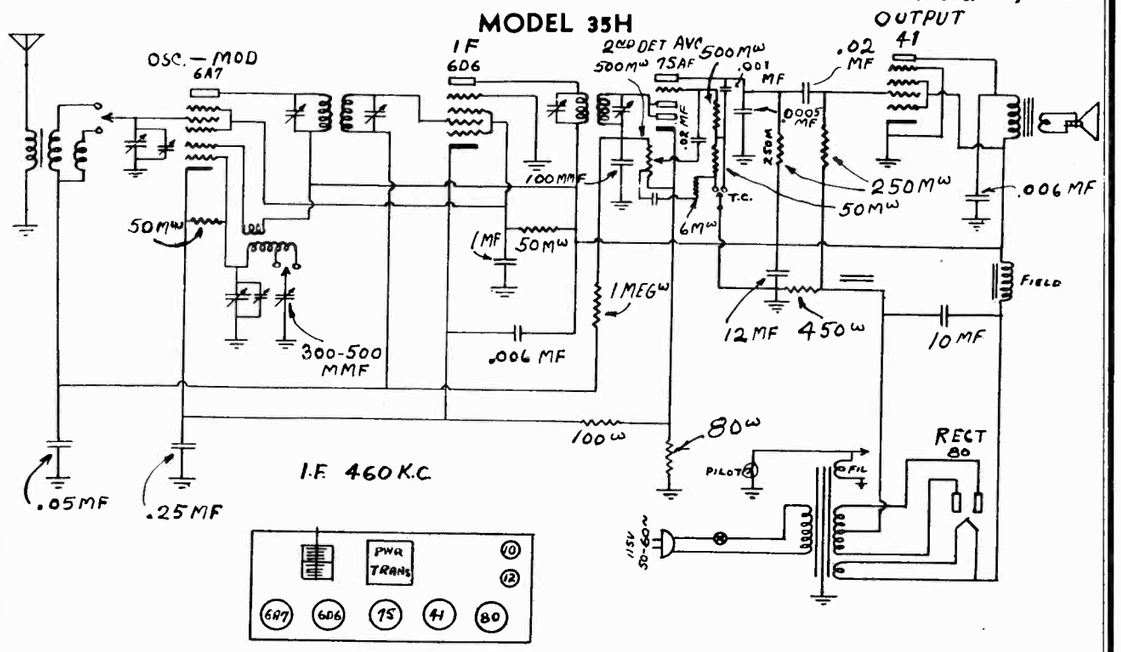




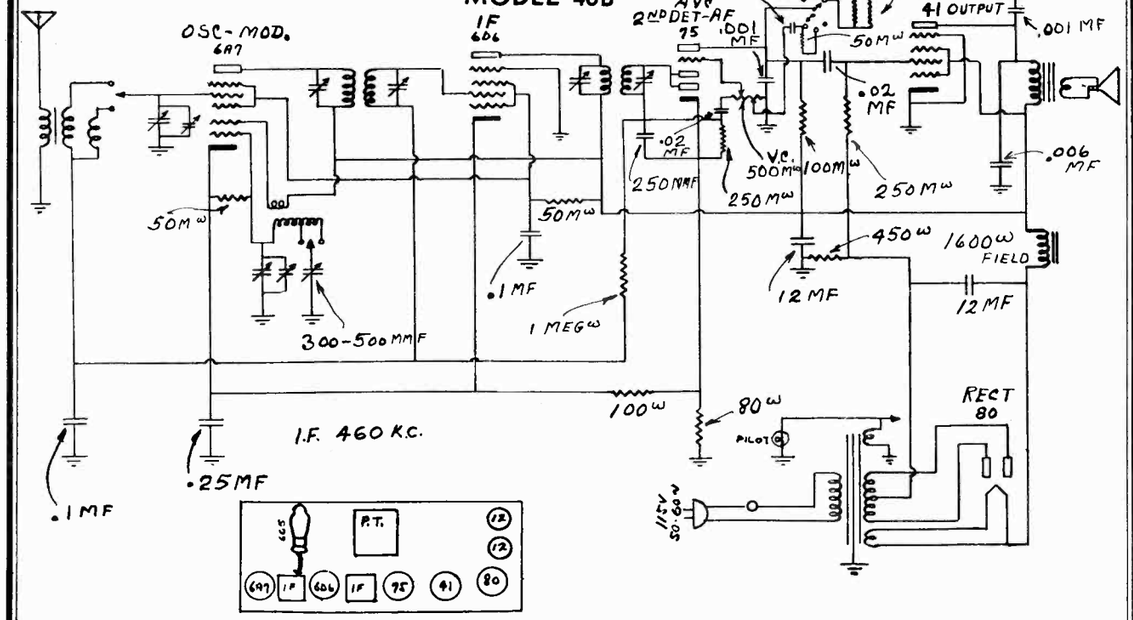
PACKARD BELL CO.

MODEL 35H
Schematic, Socket
MODEL 46B
Schematic, Socket

MODEL 35H

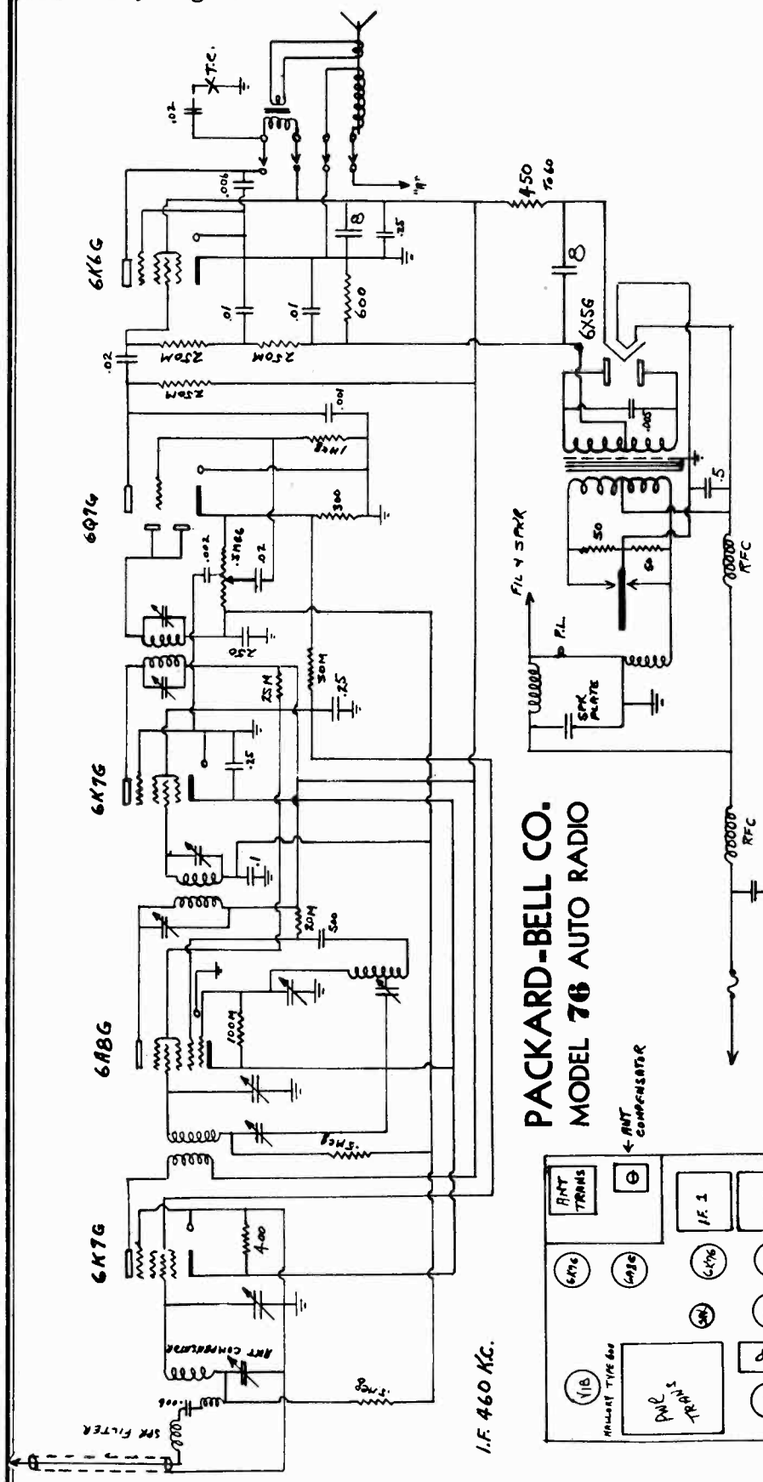


PACKARD-BELL CO. MODEL 46B



MODEL 76 Auto
Schematic, Socket
Trimmers, Alignment

PACKARD BELL CO.



PACKARD-BELL CO. MODEL 76 AUTO RADIO

ADJUSTMENT OF DIAL is accomplished by removing pilot light in rear of control head and inserting small screw-driver in slot provided for this purpose, turning pointer to desired setting.

ANTENNA COMPENSATOR is located in front corner of box and may be trimmed with a small screw driver, preferably insulated. To do so, remove button in box.

Turn station selector knob to right until stop is reached; adjust dial pointer to right hand stop line mark on dial face. **This sets** pointer for calibration.

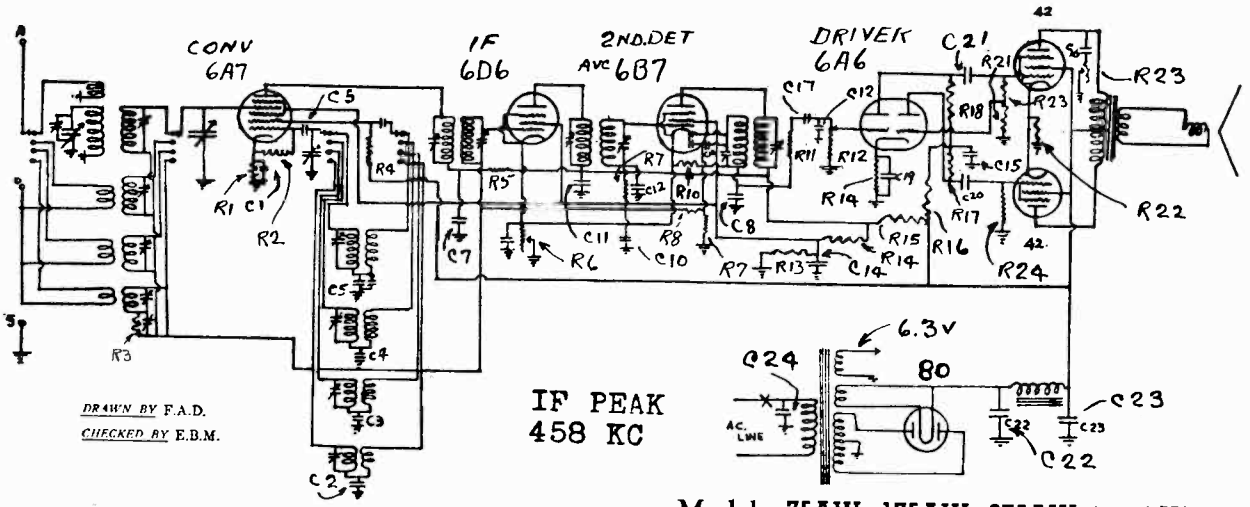
Tune in a weak signal between 550 and 650 Kcs. and adjust compensator for maximum volume . . . no other adjustments are necessary as radio will be perfectly matched to your antenna.

In cases where antenna or lead wire contribute excessive capacity to system a small series by-pass condenser of from 250 to 500 micromicrofarads capacity must be connected in series at the receiver and shielded.

Excessive antenna capacity may be detected by an apparent broad trimming action when adjusting compensator.

PATTERSON RADIO CO.

MODELS 75AW, 175AW
275AW, 375AW
Schematic, Alignment



Models 75AW, 175AW, 275AW 375AW

PART	VALUE	PART	VALUE	
R 1	300 OHMS	C 1	.05 MFD	200v.
R 2	50,000 "	C 2	.0004 "	
R 3	250,000 "	C 3	.008 "	
R 4	25,000 "	C 4	.00026 "	
R 5	5,000 "	C 5	.00025 "	
R 6	SENSITIVITY CONTROL	C 6	.0001 "	
R 7	50,000 OHMS	C 7	.1 "	400v.
R 8	1 MEGOHM	C 8	.00025 "	
R 9	250,000 OHMS	C 9	.5 "	200v.
R 10	250,000 "	C 10	.1 "	400v.
R 11	100,000 "	C 11	.25 "	400v.
R 12	VOLUME CONTROL 1 MEG.	C 12	.05 "	200v.
R 13	20,000 OHMS	C 13	.0005 "	
R 14	15,000 "	C 14	.25 "	200v.
R 15	5,000 "			
R 16	50,000 "	C 16	.1 "	400v.
R 17	100,000 "	C 17	.05 "	200v.
R 18	100,000 "	C 18	.0001 "	
R 19	5,000 "	C 19	10 "	25v.
R 20	250,000 "	C 20	.05 "	600v.
R 21	15,000 "	C 21	.05 "	600v.
R 22	350 "	C 22	16 "	475v.
R 23	250,000 "	C 23	8 "	450v.
R 24	250,000 "	C 24	.006 "	400v.

Frequency bands referred to in the following instructions as:

1st Band—Broadcast 1500-550 K.C.
2nd Band—1.6-4.5 Megacycles
3rd Band—4.5-12 Megacycles
4th Band—11-20 Megacycles

USE OF DOUBLET

Remove link on antenna terminal strip on back of chassis. Connect doublet leads to terminals A and D. The usual ground connection may be used on terminal G but link connecting D and G must always be removed when a doublet is used.

A word of caution concerning the use of doublet antennas is deemed advisable. A properly engineered and installed doublet antenna is very efficient for short wave reception but unless properly engineered will give very poor results.

ALIGNMENT OF INTERMEDIATE AMPLIFIER—Connect the grid of the vacuum tube voltmeter to any point on the AVC bus and the ground lead of the vacuum tube voltmeter to ground on the chassis. Remove grid clips from 6B7—second I.F. tube, 6D6—first I.F. tube and 6A7—detector—oscillator tube. Place oscillator in operation on 458 KC. Apply output of oscillator to grid of 6B7 and adjust trimmers on I.F. transformer at right of 6B7 until loudest sound is heard in speaker and meter on vacuum tube voltmeter swings farthest toward "O." Replace cap and shield on 6B7 and apply oscillator signal to grid of 6D6. Adjust trimmers on I.F. transformer to left of 6D6 as described above, reducing oscillator output if nesessary to obtain a good readable swing on meter. Alignment of 1st I.F. being completed replace clip and shield on 6D6. Apply oscillator output to grid of 6A7 and adjust trimmers on I.F. transformer, located at right of 6A7 for maximum swing towards zero of vacuum tube voltmeter. If these instructions have been carefully followed, the intermediate frequency amplifier will be properly aligned.

CALIBRATION OF BROADCAST BAND—Turn switch to broadcast position. With vacuum tube voltmeter connected to AVC bus as described under Intermediate Amplifier alignment, place service oscillator in operation at 1400 KC. Turn set dial to 1400 KC and adjust oscillator trimmer for resonance as indicated by farthest swing toward "0" of vacuum tube voltmeter. Now adjust service oscillator to 600 KC. Turn set dial to 600 KC and adjust low frequency pad for resonance as indicated by vacuum tube voltmeter. Set service oscillator again at 1400 KC and turn set dial to 1400 KC. Readjust oscillator trimmer for resonance as indicated by vacuum tube voltmeter. Without moving dial setting, adjust detector and R.F. trimmers for maximum swing toward "0."

CALIBRATION OF 2ND BAND (1.6-4.5 Megacycles)—Turn switch to second band position. Turn set dial to 4.0 megacycles, place service oscillator in operation at 4.0 megacycles and adjust set oscillator and detector trimmers to resonance as described under 1400 KC adjustment of broadcast band. (Note—On some models detector trimmer is unnecessary and is omitted from chassis assembly.)

CALIBRATION OF 3RD BAND (4.5-12 Megacycles)—Turn switch to third band position. Place service oscillator in operation at 12 megacycles. Turn set dial to 12 megacycles. Adjust oscillator trimmer until signal is heard loudest and then adjust detector trimmer for greatest vacuum tube voltmeter swing toward "0".

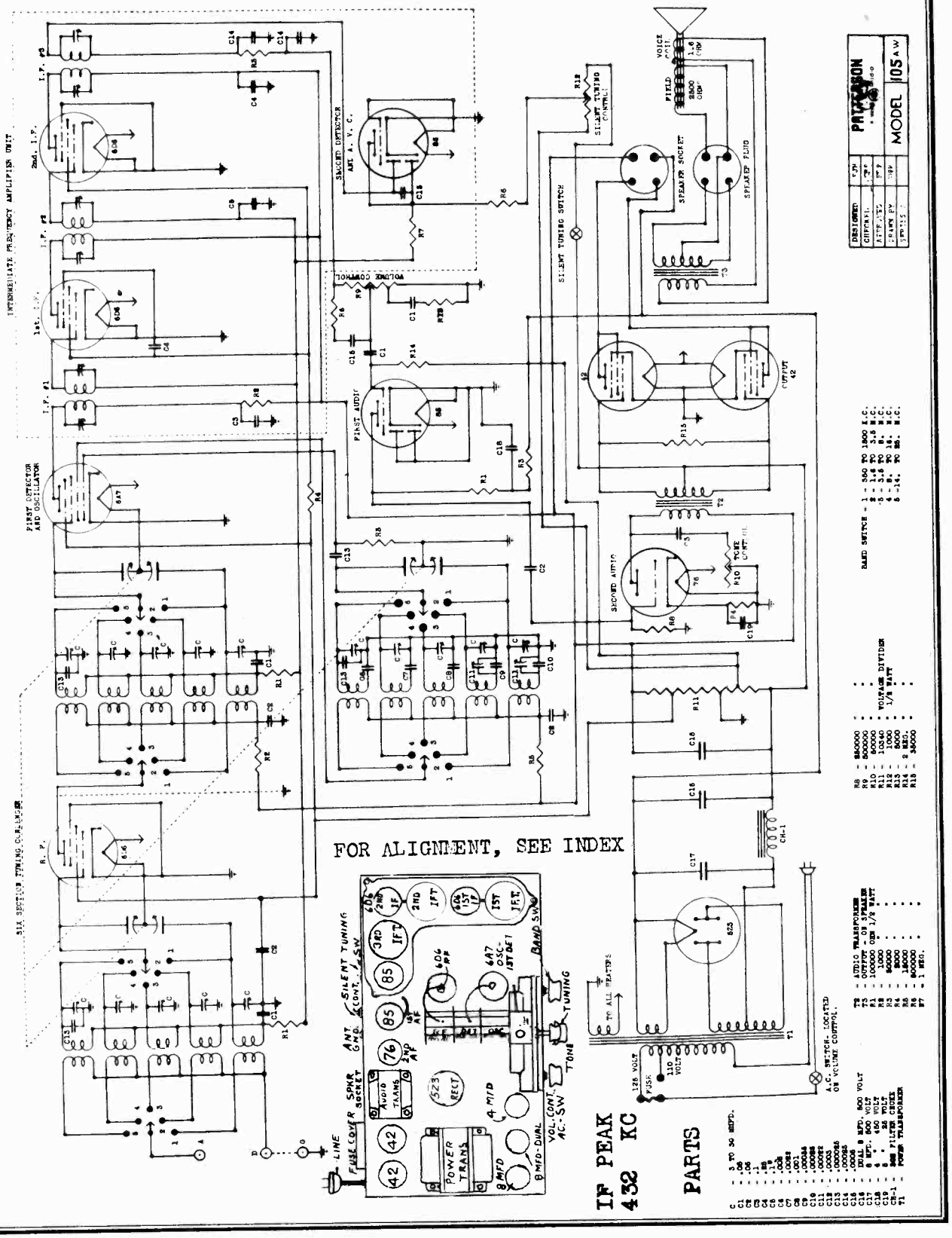
CALIBRATION OF 4TH BAND (11-20 Megacycles)—Before attempting any calibration of this band it will be necessary to determine the oscillator tracking. Some models were produced in which the oscillator beats SLOWER than the incoming signal. This is not the usual mode of operation but was used for more uniform tracking. In other production series the oscillator beats faster than the incoming signal, which is the usual method of operation.

To determine which model your set is, proceed as follows: Place service oscillator in operation at 15 megacycles. Tune signal in on set. If oscillator BEATS SLOWER, the real signal will come in at 15 megacycles and the image will come in at 15.916, i.e. The image will be almost 1 megacycle faster than the true signal. If oscillator BEATS FASTER, the real signal will come in at 15 megacycles and the image will come in at 14.084 megacycles, i.e., almost 1 megacycle slower than the incoming signal. After having determined which oscillator tracking is used in your set be sure to keep this setting, i.e., either faster or slower, as determined, throughout the entire band.

Place service oscillator in operation at 20 megacycles. Turn set dial to 20 megacycles. Adjust oscillator to a point faster or slower, as determined from above, where signal comes in loudest. Now adjust high frequency trimmer until vacuum tube voltmeter shows greatest swing toward "0". Now, place oscillator in operation at 12 megacycles. Turn dial slowly toward 12 megacycles until TRUE SIGNAL is heard. Adjust low frequency pad (the one on the end of the chassis which has ¼ megohm resistor across it) until the vacuum tube voltmeter shows greatest swing toward zero.

MODEL 105AW
Schematic
Socket

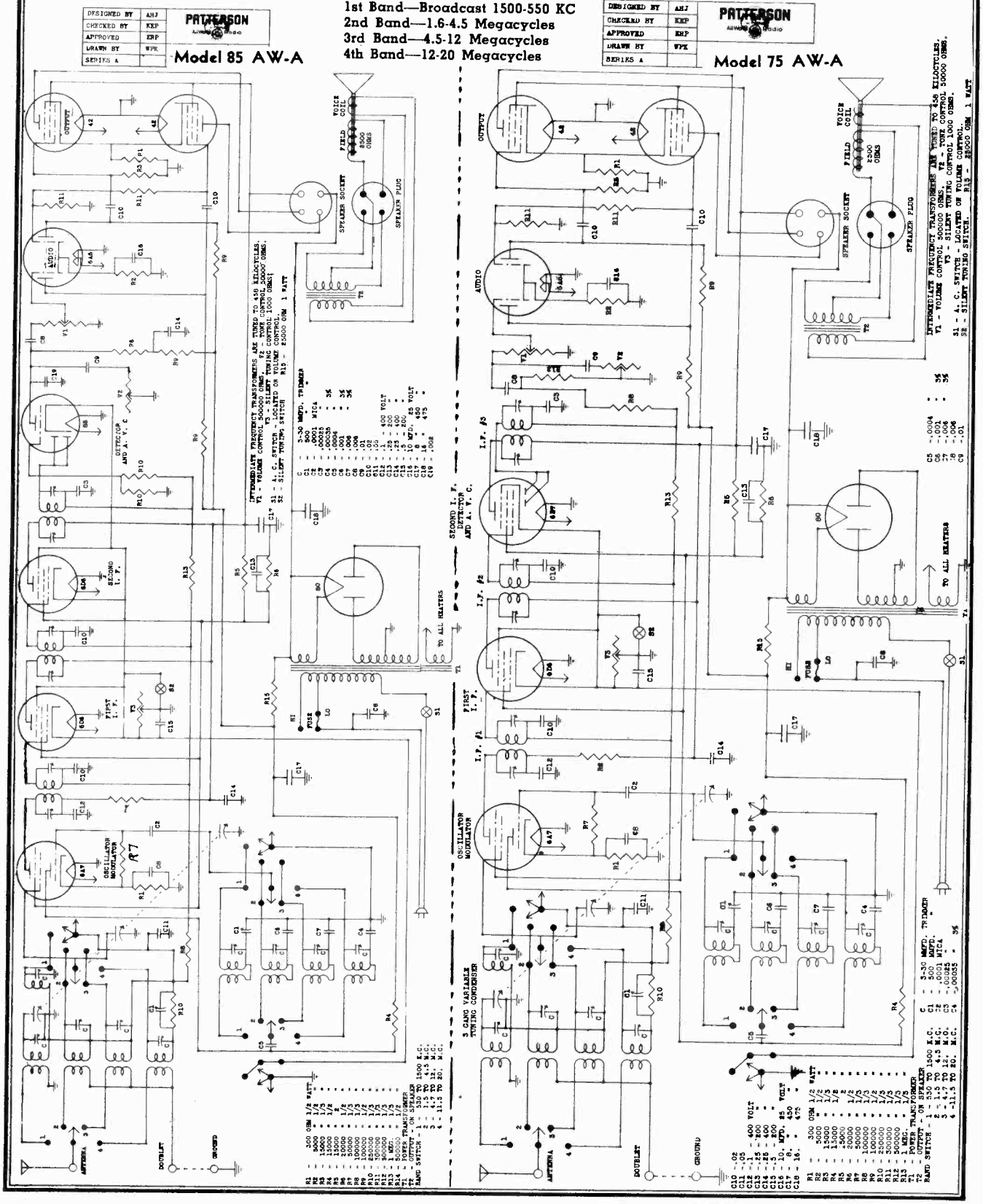
PATTERSON RADIO CO.



PATTERSON RADIO CO.

MODELS 75AW-A, 175AW-A
275AW-A, 375AW-A
MODELS 85AW-A, 185AW-A
285AW-A, 385AW-A
Schematics

Frequency bands
1st Band—Broadcast 1500-550 KC
2nd Band—1.6-4.5 Megacycles
3rd Band—4.5-12 Megacycles
4th Band—12-20 Megacycles



MODELS 75AW-A,175AW-A
275AW-A,375AW-A
MODELS 85AW-A,185AW-A
285AW-A,385AW-A

Trimmers,Alignment

PATTERSON RADIO CO.

ALIGNMENT OF INTERMEDIATE AMPLIFIER—Turn the band change switch to the 4th band setting. Remove the grid clips from the 6A7, 1st and 2nd I.F. tubes. Connect the grid of the vacuum tube voltmeter to AVC bus and ground lead of the vacuum tube voltmeter to ground on the chassis. In these and the following instructions for alignment, the term "voltmeter" is understood to mean "vacuum tube voltmeter" as shown in Figure 1, and the expression "voltmeter indicates resonance" means that the vacuum tube voltmeter shows greatest swing towards zero.

Place the oscillator in operation on 458 kilocycles. Apply the oscillator output to the grid of the 2nd I.F. tube (Model 76-6B7; Model 86-6D6) and adjust the trimmers until loudest sound is heard in the speaker and the voltmeter indicates resonance. It should be noted that adjustment of the I.F. amplifier trimmers is very critical and extreme care must be taken to obtain exact adjustment. When alignment of the third I.F. transformer is completed, replace the clip and shield on the 2nd I.F. tube and apply the oscillator output to the grid of the 1st I.F. tube, reducing the oscillator output, if necessary, to obtain a good readable swing on the meter. Adjust the trimmers on the 2nd I.F. transformer until resonance is indicated on the meter. Alignment of the 2nd I.F. transformer being completed, replace the cap and shield on the 1st I.F. tube and apply the oscillator output to the grid of the 6A7. Adjust the trimmers on the 1st I.F. transformer until the meter indicates resonance. Replace the grid cap and shield on the 6A7. If these instructions have been carefully followed, the intermediate frequency amplifier will be properly aligned.

CALIBRATION OF BROADCAST BAND—(See Figure 2 for location of trimmers.) Turn switch to broadcast position. With vacuum tube voltmeter connected to AVC bus as described under Intermediate Amplifier Alignment, place service oscillator in operation at 1400 KC. Turn set dial to 1400 KC and adjust oscillator trimmer for resonance as indicated by vacuum tube voltmeter. Now, set service oscillator to 600 KC. Turn set dial to 600 KC and adjust low frequency pad for resonance as indicated by vacuum tube voltmeter.

CALIBRATION OF 2ND BAND (1.6-45 Megacycles)—Turn switch to second band position. Place high frequency oscillator in operation on 4 megacycles. Turn the dial to 4 megacycles. Turn the detector trimmer clear in. Adjust oscillator trimmer until the voltmeter indicates resonance with H.F. oscillator signal. Without moving the dial setting, adjust the detector trimmer for resonance as indicated by voltmeter.

CALIBRATION OF 3RD BAND (4.5-12 Megacycles)—Turn the switch to the third band position. Place the high frequency oscillator in operation on 12 megacycles. Turn the dial to 12 megacycles. Adjust the detector trimmer clear in. Adjust the oscillator trimmer until the voltmeter shows resonance with H. F. oscillator signal. Without moving the dial setting, adjust detector trimmer for resonance as indicated by voltmeter.

CALIBRATION OF 4TH BAND (12-20 Megacycles)—Turn the switch to the fourth band position. Place the high frequency oscillator in operation on 18 megacycles. Turn the dial to 18 megacycles. Turn the detector trimmer clear in. Loosen 4th band low frequency RF pad as far as possible. Adjust oscillator trimmer until voltmeter shows resonance with H.F. oscillator signal. Without moving the dial setting, adjust the detector trimmer for resonance as indicated by voltmeter. Now place H.F. oscillator in operation on 12 megacycles. Turn dial until voltmeter indicates resonance with H.F. oscillator signal. Without moving the dial, adjust 4th band low frequency RF pad for further voltmeter swing. On most sets, the correct setting of this pad is almost as loose as it can be set. Now, turn the dial back to 18 megacycles and verify the setting of the detector trimmer.

A word of caution concerning the use of doublet antennas is deemed advisable. A properly engineered and installed doublet antenna is very efficient for short wave reception but unless properly engineered will give very poor results. There are several well engineered doublets on the market and these, if installed exactly according to directions, will give excellent results. If in doubt, consult a reliable service man. We wish to discourage the use of home-made doublets as being in general, unsatisfactory.

USE OF PHONOGRAPH PICKUP—A terminal strip marked 1—2—3 is provided for the purpose of using a phonograph pick-up without making any changes in the set itself. Terminal 1 is the ungrounded filament terminal and can be used to light a turntable light in case of permanent installation. To use a phonograph pickup, connect the output of the pickup across terminals 2 and 3, and ground terminal 2 to the chassis. If a low impedance pickup is used, a suitable matching transformer must be used. When playing radio the pickup must be removed from terminals 2 and 3 and terminal 2 must be disconnected from ground. In case of a permanent installation this change may be easily accomplished by the use of a double pole double throw switch. The use and connections of switch for this purpose is obvious and no connection diagram is considered necessary.

ADJUSTMENT OF SILENT TUNING CONTROL—The switch and the screwdriver adjustment on back of chassis are for silent tuning adjustment. When the switch is pushed downward the silent tuning feature is disconnected. It should be remembered that silent tuning is intended to cut out noise between stations for local and semi-distant reception from powerful stations; it is not intended to operate for distant reception. For distant reception, switch should always be thrown to the downward position. The band change switch automatically renders the silent tuning inoperative on all except the broadcast band. To adjust, turn band change switch to broadcast position. Tune in a local station at the noisiest point on the dial. Now turn dial until station disappears and noise level comes up. Throw switch on back of chassis to the up position. Turn screwdriver adjustment to the right until noise disappears. In an abnormally noisy location it may not be possible to eliminate noise between stations entirely without affecting quality of reception. In these cases a compromise setting must be made, in which case the noise level between stations is materially reduced and the quality of reception is not destroyed. DO NOT try to play distant stations on the broadcast band with silent tuning switch in up position. On bands 2, 3 and 4 the band change switch automatically cuts off the silent tuning and returns the set to full sensitivity.

FIGURE # 2

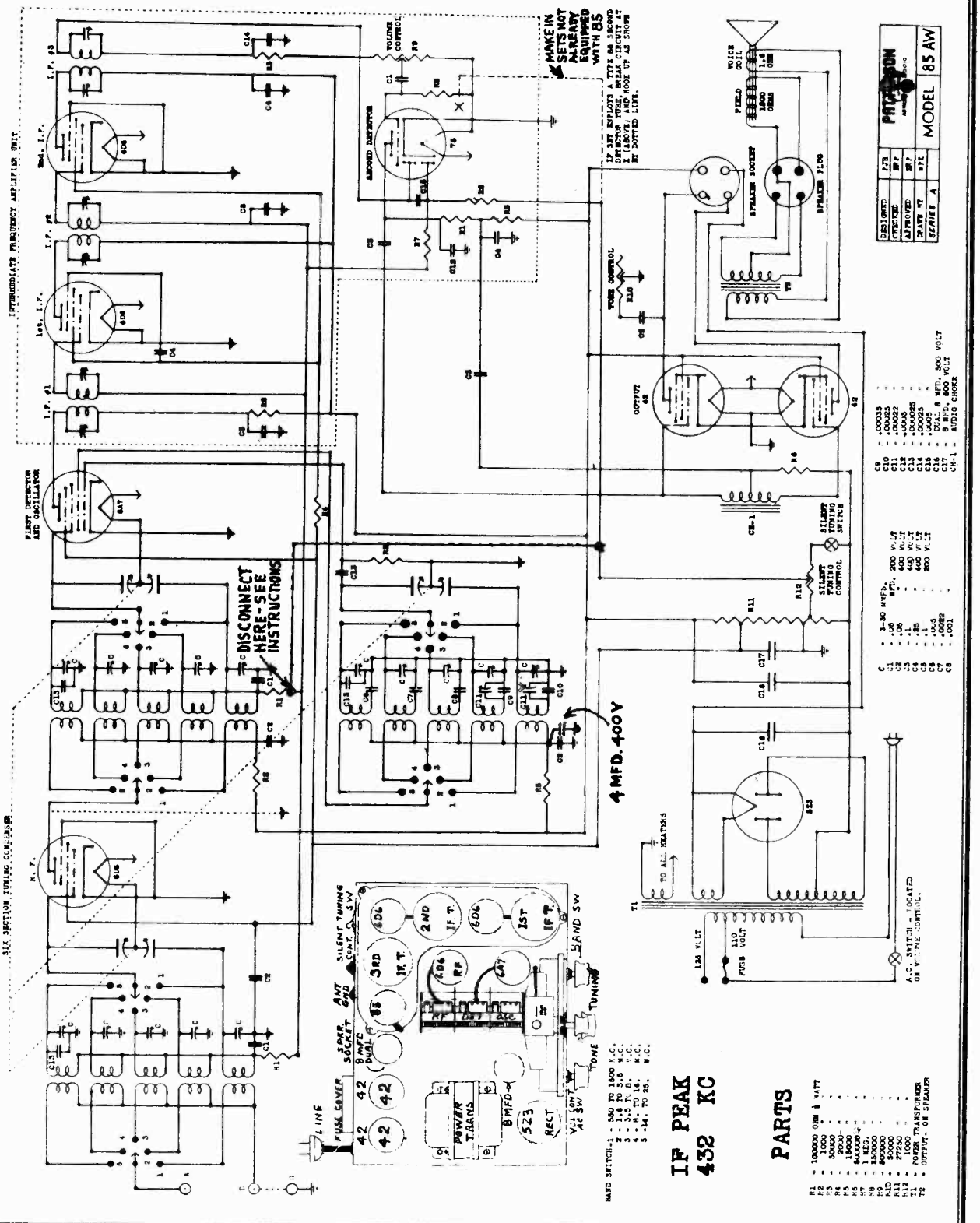
SET LAYOUT—Figure 2 shows the layout of coils and trimmer condensers for the various bands. The coil and condenser layout is identical for both seven and eight-tube models.

It will be noted that the trimmer condenser for each band is located directly on the coil terminals and the trimmer for the broadcast band-pass is located on top of the variable condenser.

Looking at the bottom of the chassis, the section of the band change switch nearest the front of the chassis switches the antenna-detector coils. The rear section switches the oscillator plate and grid coils and in addition "kills" the silent tuning adjustment on all except the broadcast band.

PATTERSON RADIO CO.

MODELS 85AW, 185AW
285AW, 385AW
Schematic, Socket



SET LAY OUT—The accompanying sketch (Fig. 1) shows the component parts of the coil and trimmer condenser assembly. This should be studied in connection with the circuit diagram furnished and in connection with instructions following.

Frequency bands referred to in the following instructions are 1 Band, Broadcast 1500-550 Kcs.

2 Band 1.6-3.5 megacycles
3 Band 3.5-7.5 megacycles
4 Band 8.0- 16 megacycles
5 Band 14- 25 megacycles

RECEIVER INOPERATIVE—Check tubes or replace with ones known to be good.

Measure voltages at sockets and determine if within reasonable limits. If not, correct trouble with reference to circuit diagram.

RECEIVER INOPERATIVE ON CERTAIN BANDS—Check leads to coils and switch. Trouble may be broken coil lead or poor connection in switch. Check switch by pushing on contact with insulated rod. If switch contact is loose tighten by bending. Check continuity of coil with ohm meter. Try another 6A7.

ALIGNMENT OF INTERMEDIATE AMPLIFIER—Connect the grid lead of the vacuum tube voltmeter to the AVC bus (see Fig. 1) and the ground lead of the vacuum tube voltmeter to ground on the chassis. Place oscillator in operation at 432KC. Remove grid clips from 6D6—second I.F. tube, 6D6—first I.F. tube and 6AF Detector-Oscillator tube. Apply output from oscillator to grid of second I.F. tube and adjust trimmers until loudest sound is heard in speaker and the meter on vacuum tube voltmeter swings farthest toward "0." It will be noted that adjustment of the intermediate amplifier trimmers is very critical and extreme care must be exercised in order to obtain exact adjustment. When alignment of third I.F. stage has been completed, replace grid clip and shield on second 6D6 and place oscillator input on first 6D6. Adjust second I.F. trimmers as described above, reducing oscillator output if necessary to obtain a good readable swing on meter. Alignment of second I.F. stage being completed, replace grid cap and shield on first 6D6 and apply oscillator input to grid of 6A7. Adjust trimmers of first I.F. as described for second and third I.F.'s. If these directions have been carefully followed the intermediate frequency amplifier will be properly aligned.

CALIBRATION OF BROADCAST BAND—(See Figure 1 for location of trimmers.) Turn switch to broadcast position. With vacuum tube voltmeter connected to AVC bus as described under Intermediate Amplifier alignment, place service oscillator in operation at 1400 KC. Turn set dial to 1400 KC and adjust oscillator trimmer for resonance as indicated by farthest swing toward "0" of vacuum tube voltmeter. Now adjust service oscillator to 600 KC. Turn set dial to 600 KC and adjust low frequency pad for resonance as indicated by vacuum tube voltmeter. Set service oscillator again at 1400 KC and turn set dial to 1400 KC. Readjust oscillator trimmer for resonance as indicated by vacuum tube voltmeter. Without moving dial setting, adjust detector and R.F. trimmers (see Fig. 1 for location) for maximum swing toward "0."

CALIBRATION OF SECOND BAND (1.6-3.5 megacycles)—Turn switch to second band position. Follow procedure outlined under calibration of broadcast band substituting 3 megacycles for 1400 KC and 2 megacycles for 600 KC.

CALIBRATION OF THIRD BAND (3.5-7.5 megacycles)—Turn switch to third band position. Place service oscillator in operation at 7 megacycles. Open detector and R.F. trimmers about two turns each. Turn oscillator trimmer screw clear in and then turn out until resonance is indicated by vacuum tube voltmeter. Now adjust detector and R.F. trimmers in turn for greatest swing toward "0."

CALIBRATION FOURTH BAND (8.0-16.0 megacycles)—Turn switch to fourth band position. Fourth band has no oscillator trimmer. Proceed as follows. Set dial at 16.3 megacycles. Turn screw on detector trimmer clear in. Now turn screw out slowly. A point will be reached where vacuum tube voltmeter swings almost to zero. This indicates that the detector stage is tuned to exact resonance with the oscillator. We desire, however, that the detector be tuned to a lower frequency than the oscillator; therefore, turn the trimmer screw in again until vacuum tube voltmeter returns to its normal position. Now place service oscillator in operation on 15 megacycles. Do not touch detector trimmer again but turn dial slowly until maximum deflection toward zero is indicated by vacuum tube voltmeter. Adjust R.F. trimmer for further swing towards zero.

CALIBRATION OF FIFTH BAND (14-25 megacycles)—Turn switch to fifth band position. Turn detector trimmer screw clear in. Place service oscillator in operation on 15 megacycles. Turn dial to 15 megacycles and adjust oscillator trimmer until maximum swing toward zero is indicated by vacuum tube voltmeter. Now turn dial to 25 megacycles. Turn detector trimmer screw out slowly until vacuum tube voltmeter swings almost to zero then turn screw in again until vacuum tube voltmeter returns to its normal position. Do not touch this adjustment again. Place service oscillator in operation on 23 megacycles. Turn dial slowly until resonance is indicated by vacuum tube voltmeter. Now adjust R.F. trimmer for further resonance.

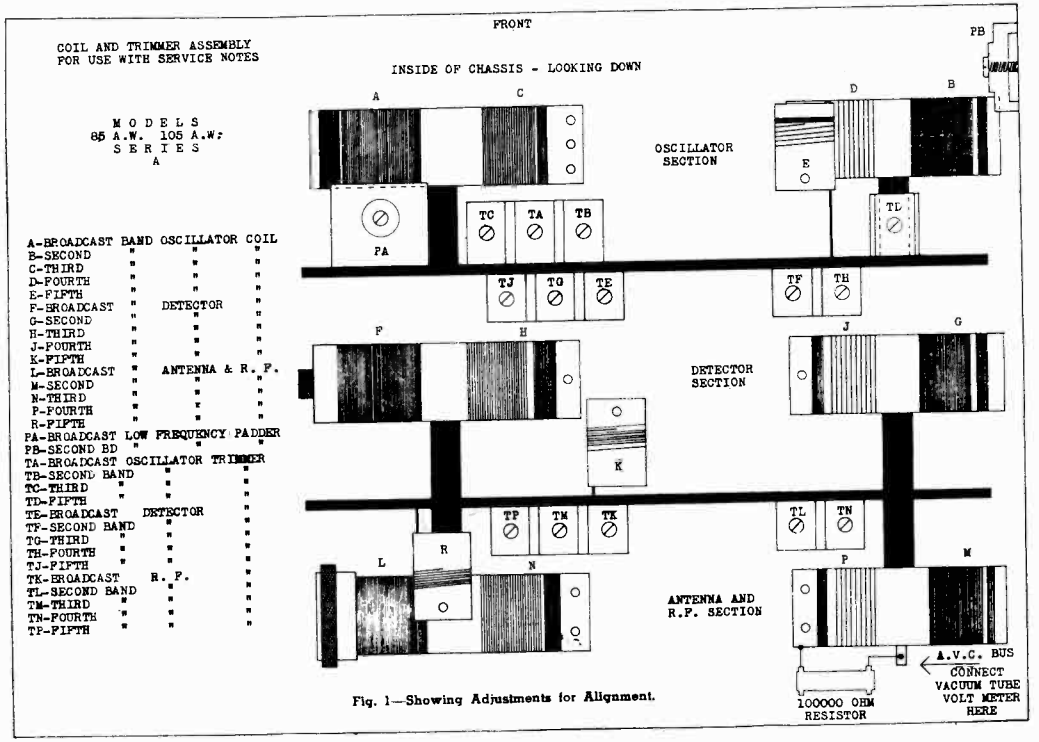


Fig. 1—Showing Adjustments for Alignment.

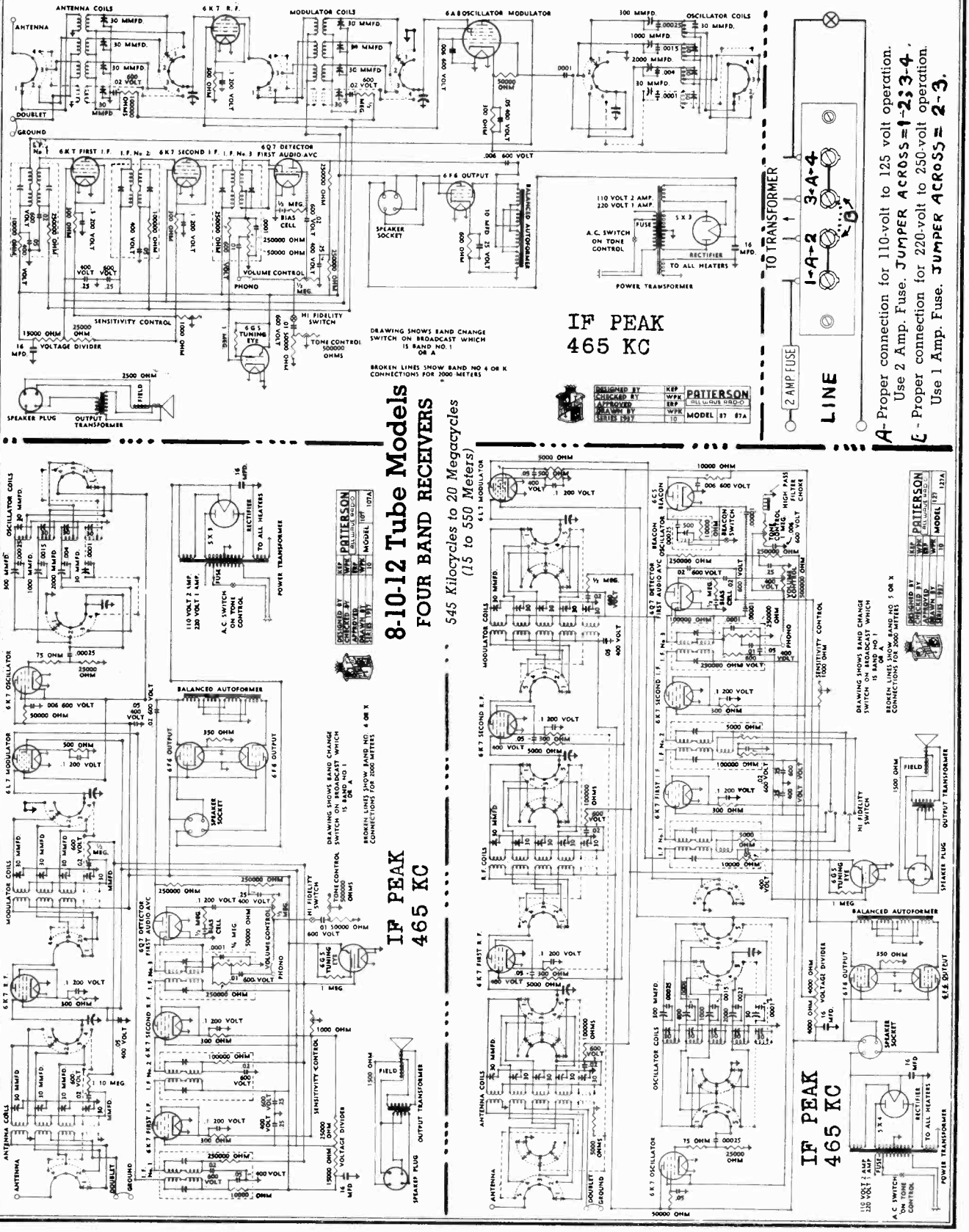
CHANGES TO CORRECT TONAL QUALITY & NOISE.

TONE QUALITY—Considerable improvement may be made in tone quality by replacing 75-second detector with the 85 (in such sets not already equipped) and reconnect the R8, as shown by the dotted line on the circuit diagram. Also, replace 100,000-ohm resistor, R (¼ megohm on some models) with 20,000-ohm ½ watt resistor. Resistor R, is located near the fuse block and voltage divider. Replace the .25 mfd. 400-volt condenser C4 (connected to R) with .25 mfd. 600-volt condenser. On such sets as not so equipped, connect a 4 mfd. 400-volt electrolytic condenser from junction R5 (15,000 ohms most models—20,000 ohms earlier models) and C2 to ground, i.e., in parallel with C2.

SHORT WAVE—Noise, fluttering, shifting from frequency. It is assumed that the 4 mfd. 400-volt electrolytic condenser has been installed as described under "Tone Quality." If excessive detuning and shifting off the station is still experienced when not due to actual fading of the station, considerable improvement in stability may be made by removing the 6A7 tube from the AVC circuit. This overcomes a peculiar condition developed in the AVC and also raises the signal to noise ratio. In order to effect this change, proceed as follows: Referring to the center coil section on 2 and 4-band coil form, there will be seen a 100,000-ohm resistor with a black lead running through the rear coil baffle. Disconnect this black lead from the 100,000-ohm resistor and tape up the bare end of the wire. Solder a piece of wire to the end of the 100,000-ohm resistor, from which black wire was removed, and connect the other end to the center lug of the silent tuning control. Push this wire up against the chassis and well away from the coils.

PATTERSON RADIO CO.

MODELS 87,87A
MODELS 107,107A
MODELS 127,127A
Schematics



MODELS 87,87A
MODELS 107,107A
MODELS 127,127A
Socket,Trimmers
Voltage,Alignment

PATTERSON RADIO CO.

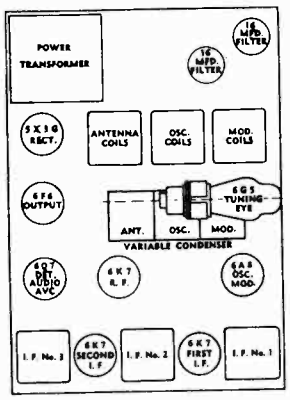


FIG. 9

CHASSIS LAYOUT MODELS 87 & 87A

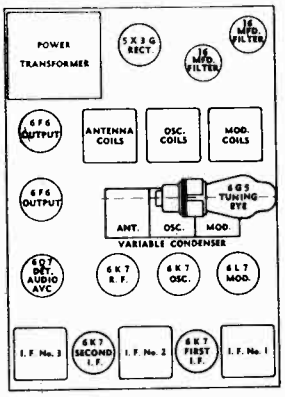


FIG. 10

CHASSIS LAYOUT MODELS 107 & 107A

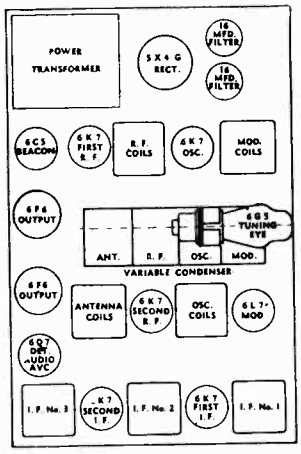


FIG. 11

CHASSIS LAYOUT MODELS 127 & 127A

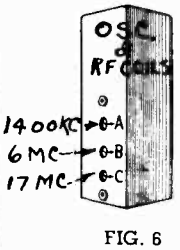


FIG. 6

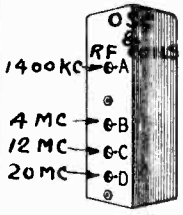


FIG. 8

VOLTAGES

The following tables show characteristic voltages at various points through a normal chassis.

All Voltages Measurable Under The Following Conditions:

Transformer line tap in 110-115 V. position line voltage 115 V. 60 cycles. Band change switch set on Band No. 2. No antenna. No signal being received sensitivity adjustment set at maximum position. All voltages listed measured from point indicated to chassis (ground), all readings taken on standard 1000 ohm per volt. Voltmeter.

8 TUBE CHASSIS

		Plate	Screen	Cathode	Suppressor
RF	6K7	200 V. App.	90 V. App.	2 V. App.	Tied to Cathode
Osc.	6A8	90 V. App.		2.5 V. App.	
Mod.	6A8	200 V. App.	90 V. App.		
1 IF	6K7	200 V. App.	90 V. App.	2 V. App.	Tied to Cathode
2 IF	6K7	200 V. App.	90 V. App.	2 V. App.	Tied to Cathode
Det.	6Q7			0 V. App.	
Audio		*50 V. App.		0 V. App.	
Output	6F6	200 V. App.	200 V. App.	15 V. App.	
EYE	6G5	Target-200 V.		0 V. App.	
Rect.	5x3G	**Plate No. 1—350 V.		AC Plate No. 2—350 V. AC	

**Measurable with AC Voltmeter only.
*Not actual, (measured through 500,000 ohms).

1st filter 360 V. App.
2nd filter 200 V. App.

10 TUBE CHASSIS

		Plate	Screen	Cathode	Suppressor
RF	6K7	235 V. App.	90 V. App.	2.5 V. App.	Tied to Cathode
Osc.	6K7	80 V. App.	235 V. App.	0 V. App.	Tied to Cathode
Mod.	6L7	235 V. App.	90 V. App.	3 V. App.	Tied to Cathode
1 IF	6K7	235 V. App.	90 V. App.	2.5 V. App.	Tied to Cathode
2 IF	6K7	235 V. App.	90 V. App.	2.5 V. App.	Tied to Cathode
Det.	6Q7	55 V. App.		0 V. App.	
Audio	6Q7	55 V. App.			
Output	6F6	235 V. App.	235 V. App.	18 V. App.	
Output	6F6	235 V. App.	235 V. App.	18 V. App.	
EYE	6G5	235 V. App.		0 V. App.	
Rect.	5x3G	Plate No. 1—350 V. AC.		Plate No. 2—350 V. AC.	

*Not actual, (measured through 500,000 ohms).
**Measured only with AC Voltmeter.

1st Filter Cond. 325 V. DC
2nd Filter Cond. 250 V. DC

12 TUBE CHASSIS

		Plate	Screen	Cathode	Suppressor
RF	6K7	250 V. App.	110 V. App.	2.5 V. App.	Tied to Cathode
RF	6K7	250 V. App.	110 V. App.	2.5 V. App.	Tied to Cathode
Osc.	6K7	250 V. App.	110 V. App.	0 V. App.	Tied to Cathode
Mod.	6L7	250 V. App.	110 V. App.	3 V. App.	Tied to Cathode
1 IF	6K7	250 V. App.	110 V. App.	2.5 V. App.	Tied to Cathode
2 IF	6K7	250 V. App.	110 V. App.	2.5 V. App.	Tied to Cathode
Det.	6Q7			0 V. App.	
Audio	6Q7	***90 V. App.		0 V. App.	
Output	6F6	325 V. App.	250 V. App.	20 V. App.	
Output	6F6	325 V. App.	250 V. App.	20 V. App.	
B. Osc.	6C5	*50 V. App.		0 V. App.	
EYE	6G5	Target	250 V. App.	0 V. App.	
Rect.	5x4G	**Plate No. 1—330 V. AC.		Plate No. 2—330 V. AC.	

*Measurable with beat oscillator switch turned on.
**Measurable only with AC Voltmeter
***Not actual, (measured through 500,000 ohms).

1st Filter Cond. 350 V. App.
2nd Filter Cond. 235 V. App.

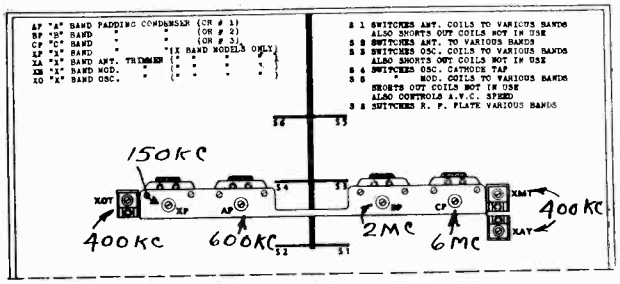


FIG. 5

TRIMMER & PADDER CONDENSERS MODELS 127 & 127A

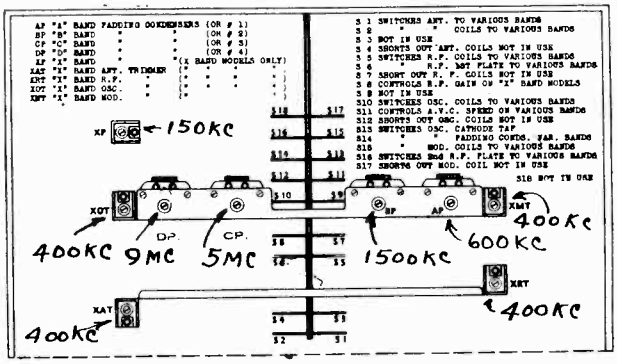
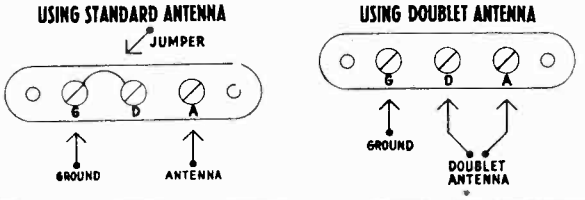


FIG. 7

TRIMMER & PADDER CONDENSERS MODELS 87,87A,107,107A.



MODEL Automatic Tuning

PHILCO RADIO & TELEV. CORP. Notes, Parts

REPLACEMENT PARTS FOR AUTOMATIC DIAL MECHANISMS

Part Nos. 31-1886, 31-1949, 31-1960, 31-1986

View No.	Description	Part No.	List Price
①	Split Gear Assembly (large) }	45-2348	$0.60
②	Split Gear Assembly (large) }		
③	Shaft (Gears)	28-6504	.10
*④	Pinion Gear and Shaft	28-6481	
⑤	Spring (gears)	28-8380	.60
⑥	Switch Cont. Ass'y (audio shorting)	28-4110	.15
⑦	Housing (control screws)	28-7196	1.00
⑧	Switch (magnet tuning)	45-2330	1.20
⑨	Plate (mtg. mechanism, 37-116, 37-675, 37-690)	45-2349	
♦ ⑩	Reflector Ring (early mechanism)	28-4099	.35
	Reflector (37-9)	28-4630	.25
⑪	Mask Assembly (37-116, 37-675, 37-690)	45-2328	.75
	Mask Assembly (37-10, 37-11, code 121)	45-2367	
	Mask Assembly (37-9 and 37-10, 37-11, code 125)	45-2401	
⑫	Dial (37-116, 37-675, 37-690)	27-5207	.80
	Dial (37-10, 37-11, code 121)	27-5271	1.00
	Dial (37-9)	27-5283	.90
	Dial (37-10, 37-11, codes 125)	27-5283	
⑬	Spacing Ring (see note A below)	28-7195	.20
⑭	Station Tab Escutcheon Ass'y	45-2324	.40
⑮	Control Screw	31-1898	.15
⑯	Switch Contact (movable, audio shorting)	28-4097	.10
⑰	Ball Bearing (large)	28-6367	.01
⑱	Vernier Shaft	28-6470	.10
△ ⑲	Compression Spring (early mech.)	28-8416	.02
□	Ball Bearing (early mechanism)	4475	.01
⑳	Retaining Spring (handle hub)	28-8630	.02
㉑	Retaining Spring (control screw housing)	28-8631	.02
㉒	Retaining Pin (vernier drive ass'y.)	28-6477	
㉓	Split Gear Ass'y. (small) }	45-2347	.60
㉔	Split Gear Ass'y. (small) }		
㉕	Pilot Lamp and Mask-Guide Ass'y	28-4118	.25
㉖	Dial Screen Holder Ass'y. (37-116, 37-675, 37-690, 37-9, 37-10, 37-11)	31-1968	.50
㉗	Handle Hub (37-116, 37-675, 37-690, 37-9, 37-10, 37-11)	45-2344	.50
㉘	Screw (handle)	28-6493	.02
㉙	Handle	45-2329	.50
	Collar, fibre (audio switch)	27-8389	.02
	Coupling (tuning condenser)	31-1961	.80
	Cover (handle)	28-4077	.25
	Dial Mechanism (complete assembly, 37-116, 37-675, 37-690)	31-1886	25.00
	Dial Mechanism (complete assembly, 37-10, 37-11, code 121)	31-1949	25.00
	Dial Mechanism (complete assembly, 37-9)	31-1960	25.00
	Dial Mechanism (complete assembly, 37-10, 37-11, codes 125)	31-1986	25.00
○	Lockwasher (vernier drive)	W-1499	1.00/C
	Insulator (No. 8 switch)	27-8368	.01
⊙	Nut (vernier drive)	28-6300	.08
	Shoe (for contact No. 6)	28-4666	
	Screws (magnetic tuning switch)	W-745B	1.25/C
	Screws (station tab. assembly)	W-1665	.30/C
	Screws (handle cover)	W-1669	.40/C
+	Set Screws (gears)	W-1538	1.80/C
	Springs (gears)	28-8380	.01
	Spring (spacing ring No. 13)	28-8629	.04
	Stop (mounting plate)	28-7191	.05
	Vernier Drive Assembly	45-2342	2.40
	Washer, fibre (audio switch, movable section)	27-8351	.02
	Washer, fibre (audio switch, fixed section)	27-8361	.01
	Washer (dial)	27-8398	.01
	Wrench (Allen, screws)	5973	

Later Type Mechanism Parts

			These Parts Must Be Used Together	
⊙	Nut	28-6555	$0.03	
○	Lockwasher	W-1501	1.50/C	• Pinion Gear and Shaft 28-6565
+	Set Screw (Allen wrench), Gears	W-1726	5.50/C	△ Compression Spring 28-8733 .01
♦	Reflector (See Note A)	28-4609	.35	□ Thrust Pin 28-6624 .03

Note A—Early type mechanisms used a spring, part No. 28-8629, inserted in spacing ring ⑬ to hold mask. This spring on later type mechanisms is replaced with springs attached to the Reflector 28-4609.

IN order to continue the Philco policy of training Radio Manufacturers Service Members, Philco issues Service Bulletins for R. M. S. members giving complete information on Philco products.

Complete details of the operating principles and construction of Philco Automatic Tuning and the ease with which it may be serviced, if it should become necessary, are covered in this bulletin.

The tremendous popularity of Philco Automatic tuning means you will be called upon to service Philco sets of this type.

The following instructions have been divided into two sections, i.e., adjustments that can be made without taking the mechanism apart, and those that require the disassembly of the mechanism.

Two views of the mechanism are shown with the parts numbered for reference. Where numbers are mentioned in the text, refer to these drawings.

The replacement or adjustment of parts that do not require the taking apart of the Dial mechanism is as follows:

1. SETTING STATIONS ON AUTOMATIC DIAL.

1. When setting the station, you must select the 6 or 8 most powerful local or those stations most regularly and easily received in the locality.

A. To adjust the Control screws for Automatic tuning of a desired station, proceed as follows:

a. Turn the set "on" and set the tuning range switch in the broadcast position. Set the magnetic tuning control to the "out" position. Set Fidelity-Selectivity control in the selective position.

b. Take off the tuning knobs and then the control handle cover by removing the three screws. Now replace the tuning knobs and turn the dial to the exact frequency of the station desired. Then insert a screw driver in the control screw directly under the tuning knobs (sometimes the control screw will fall slightly to the right or left of the center line). Now press the control screw in and turn it until a click is heard. This indicates that the screw has engaged the locking gates of the magnetic tuning switch number ⑥.

c. Now slightly turn the screw back and forth (this will cause dial to move) until the desired station is tuned perfectly. Then release the pressure on the control screw allowing control screw to return to its original position. It may be necessary to slightly turn the screw to the right or left in order to make it release the locking gates.

d. When screw has been set, insert the station name tab in the window.

The above procedure is followed for the setting of each station selected.

B. Special Adjustments

1. While a certain amount of play (looseness) will be found after the control screws are set up, it should not be greater than 5 K.C. If it is more than 5 K.C., replace the screw or use one of the other screws that fits snugly in the locking gates of switch number ⑥.

It is also advisable to equalize the play in the control screw, so that the same amount is obtained on either side of the frequency being received.

For example: Suppose there is 5 K.C. play. Turn the control screw 2½ K.C. beyond station resonance. This places the station in the exact center of the mechanical play in the control screw. Now check the adjustment by pushing in the control handle and turning the tuning knob, the dial should move 2½ K.C. either side of station resonance.

CAUTION: If the station selected is on a channel in between a powerful and weak station, it is important that you set the control screw on the side toward the weaker adjacent channel station.

For example: Suppose we want a station on 1010 K.C. on the dial. Of course, this will be a powerful local or "best heard" station. At night there are stations on both sides of the station we have selected. Let us assume that the station on 1000 K.C. is strong at night and that the station on 1020 K.C. is weak at night. The control screw for the 1010 K.C. desired local station should be set to lock on the side towards the weaker station. This can be accomplished by turning the control screw one tooth towards the weaker station (1020 K.C.). (See diagram Fig. 1.) Since the mechanism locks on the side of the desired station away from the strong station in the next channel, the set will not jump away from the desired station if its signal fades. Magnetic tuning will compensate for this error in setting.

Always set the control screw away from the stronger signal on either adjacent channel.

2. SECURING STATION TABS

If the station tabs are loose, a tab retaining spring, part number 28-4836 should be inserted around the inside surface of the Dial cover and Station tab Escutcheon ⑭ as follows:

a. Remove the control handle cover.

b. Place retaining ring outside of plungers, locking the ... opposite the red tab.

Note: If the above spring is not available, coat the back of tab with duPont Household Cement, place tab in window of Dial cover and hold until cement dries.

3. CONTROL HANDLE

a. Remove control handle cover.

b. Remove the 2 screws ㉘ holding the handle to the hub.

c. Replace handle and reassemble using caution to have audio switch contact ⑯ aligned in control slot on side of the hub assembly ㉙.

FIG. 1. *Setting Control Screw to Eliminate Interference.*

Prices Subject to Change Without Notice.

4. COUPLING ALIGNMENT

A properly aligned Dial Tuning mechanism should rotate without carrying the tuning condenser, when the (tuning condenser) coupling set screws are loosened. If the tuning condenser moves with the coupling screws loose, the coupling assembly requires a Vertical and Horizontal adjustment of the R. F. unit and Dial Tuning mechanism, as follows:

A. Vertical Adjustment

a. Loosen the tuning condenser coupling set screws.

b. Loosen the rear mounting screw of the R. F. unit.

c. Then raise or lower the R. F. unit until the tuning condenser shaft is centered in the coupling collar. Tighten set screws.

In some cases, where the R. F. unit Vertical Adjustment will not properly align the tuning shaft and coupling, the entire Dial tuning mechanism must be adjusted as follows:

a. Loosen the four front chassis channel screws located on sides of the power and I. F. units.

b. Tilt the dial mechanism towards the front or back of the receiver until the tuning condenser coupling is aligned with the tuning condenser shaft.

c. With mechanism in this position, tighten screws of channel.

B. Horizontal Adjustment

a. Using a pair of pliers or wrench, slightly bend the front mounting flanges for the R. F. unit (located on the I. F. and Power unit) in whichever direction will align the coupling horizontally. Bend both flanges equally to hold original spacing.

The following procedure is for the replacement or adjustment of parts that require the taking apart of the Dial tuning mechanism:

1. DIAL SCALE REPLACEMENT

a. Remove handle cover, then the handle hub assembly ㉗ by releasing retaining spring ㉘. The rotating section ⑮ of the audio switch and gasket can now be changed.

b. Release mask arm from range switch coupling.

c. Remove indicator and lens assembly ㉙.

d. Lift the dial cover and station tab escutcheon ㉔ from the control screw housing by removing the five screws holding the assembly.

e. Take dial and gaskets from unit.

Note: When replacing the dial be sure the index slot of dial is placed over metal ridge on control screw housing ⑦ and that gaskets are replaced.

2. MASK ASSEMBLY AND REFLECTOR RING

a. Remove the parts given under dial procedure above.

b. Then take off spacing ring ⑬.

c. Lift mask ⑪ from housing.

d. At this point the reflector ring ⑩ may be removed. On the ring 3 spring wings will be noted. These wings apply pressure to the mask assembly for preventing vibration.

Note: On the early dial mechanisms a spring inserted in the spacing ring ⑬ was used in place of these wings of the reflector for applying pressure to the mask.

e. Replace the mask on reflector and assemble in the reverse order taking care that index slots are aligned.

3. INCREASING TENSION OF THE VERNIER DRIVE

To increase the tension of the vernier drive requires the removal of the Dial Mechanism parts as follows:

a. Remove the same parts listed under a and b of the Dial Scale Replacement.

b. Take the rotating section ⑯ and gaskets of the audio shorting switch from the vernier shaft.

c. Expand and remove retaining spring ㉑ and lift the complete housing from the vernier drive.

d. Loosen the set screws in the rubber coupling of the tuning condenser.

e. Now loosen and remove lock pin ㉒. To do this, hold a piece of wood (small block) firmly on the side of the vernier drive housing on which the lock pin is located. Tap the end of the wooden block sharply with a hammer until pin is loosened.

Note: The Vernier shaft ⑱ is locked by the ball bearings shown in the drawing as ⑰. Spring ⑲ thrusts the end of shaft ⑱ against the three ball bearings ⑰ of the drive and prevents the removal of the shaft until spring ⑲ is compressed.

The tension of the vernier drive is secured through the strength of the thrust spring ⑲. Lack of tension necessitates the replacement of the spring. To replace the spring continue with the next step.

f. With pin ㉒ removed press the vernier shaft ⑱ in toward the unit. Holding the shaft ⑱ in this position, press pinion gear and shaft ① towards you until the entire shaft assembly moves forward, thus releasing ball bearings. Care should be taken that ball bearings do not drop out.

g. With the vernier shaft assembly removed, the vernier shaft ⑱ slips easily out of the pinion shaft ④ together with the ball bearings ⑰. It may be necessary to tap the pinion shaft to release spring and pin ⑲. Replace spring and pin ⑲, three ball bearings, and reassemble. Apply some light grease to hold bearings in place while replacing the assembly.

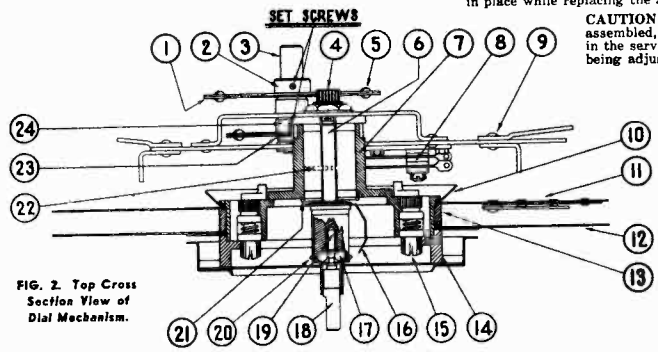


FIG. 2. Top Cross Section View of Dial Mechanism.

CAUTION: After mechanism is reassembled, recalibrate dial as given in the service bulletin of the receiver being adjusted.

Note: It is advisable to replace the entire vernier mechanism to prevent any possibility of the old and new parts not aligning properly. These parts consist of ④, ⑰, ⑱ and ⑲. On the early type mechanisms, the thrust parts ④ consisted of a spring, part No. 28-8416; Ball bearing, part No. 4475, and Pinion Gear and shaft, part No. 28-6481. The later type mechanisms consisted of a spring, part No. 28-8733; Thrust pin, part No. 28-6624, and Pinion Gear and Shaft, part No. 28-6565.

4. BINDING IN CONTROL SCREW HOUSING

a. Remove handle cover, then the handle hub assembly ㉗ by releasing retaining spring ㉘. The rotating section ⑮ of the audio switch and gasket can now be changed.

b. Release mask arm ⑪ from range switch coupling.

c. Remove indicator and lens assembly ㉙.

d. Remove retaining spring ㉑ and pull the entire dial housing from the Vernier Drive.

e. Clean the surfaces of the control screw and vernier drive housings thoroughly. Also, remove any burrs or high spots from the surfaces with a piece of fine emery cloth, particularly at end of slot for the switch lead.

f. Lubricate the vernier drive surface with heavy oil or light grease.

g. Reassemble in the reverse order, being careful to have the insulating gasket of Audio Switch Contact ⑮ in place and that the contact is centered in the handle hub ㉗ contact slot.

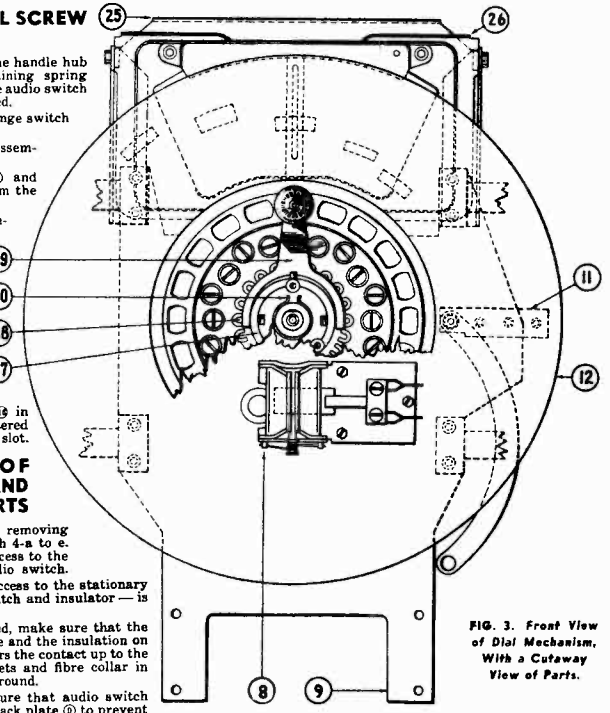


FIG. 3. Front View of Dial Mechanism, With a Cutaway View of Parts.

5. REPLACEMENT OF AUDIO SWITCH AND ELIMINATING SHORTS

a. Use the same procedure for removing parts as given under Paragraph 4-a to e. This procedure will also give access to the movable section ⑯ of the audio switch.

b. With these parts removed, access to the stationary ring contact ⑪ of the audio switch and insulator — is obtained for replacement.

c. When ring contact is replaced, make sure that the protecting metal shoe is in place and the insulation on the contact lead completely covers the contact up to the ring. Also, have the two gaskets and fibre collar in place to eliminate shorting to ground.

d. When reassembling, make sure that audio switch lead (No. 6) is flat against the back plate ⑤ to prevent Housing Gear ⑦ from cutting insulation.

6. MESHING SPLIT GEARS PROPERLY

If for any reason the split gears or control screw housing are removed, the gears must mesh properly to eliminate play or looseness. To do this proceed as follows:

A. Back Gear

a. With set screws loose, slide split gear ② toward the rear of the chassis to disengage pinion gear ④.

b. Then push gear forward until the front half ① of the split gear meshes with the pinion gear ④.

c. With front half of gear meshed, rotate the rear half ② of the gear one tooth, and push gear into mesh with pinion gear ④.

B. Inner Gear

a. To mesh the inner gear properly, release the control screw housing ⑦. This is covered under Binding in Control Screw Housing procedure a to e. The housing, however, should not be entirely removed.

b. Move the housing enough to disengage split gear ㉒ and ㉓.

c. Then push housing until the teeth on the housing re-engages the front half ㉒ of the split gear.

d. Now rotate the rear half ㉓ of the gear one tooth and push the housing in until it engages this section of the split gear.

e. Reassemble mechanism.

7. REPLACING CONTROL SCREWS

A. Removing Screws

a. Remove parts as given in a, b, c and d of Dial Scale Replacement.

b. With these parts removed, insert a screw driver in the control screw slot. Now push in and turn the control screw until the lever on the end of the screw is centered in the small semi-circular slot adjacent to the control screw hole in housing ⑦. Release pressure on screw driver and remove the control screw.

B. Replacing Screws

a. Insert the control screw in the screw hole.

b. Now press screw in and turn it 180 degrees until the stop on the side of the screw is in a position to clear the stopping shoulder in the screw hole in dial cover ㉔.

c. Then reassemble mechanism and set control screw for station desired as given in "Setting Stations on Automatic Dial."

8. POSSIBLE CAUSES OF LOST MOTION

a. Loose coupling or gear set screws — make sure all set screws are tight.

b. Gears not meshed properly. See paragraph 6, "Meshing Split Gears Properly."

c. Loose gates in control screw switch. Replace entire switch assembly ⑥.

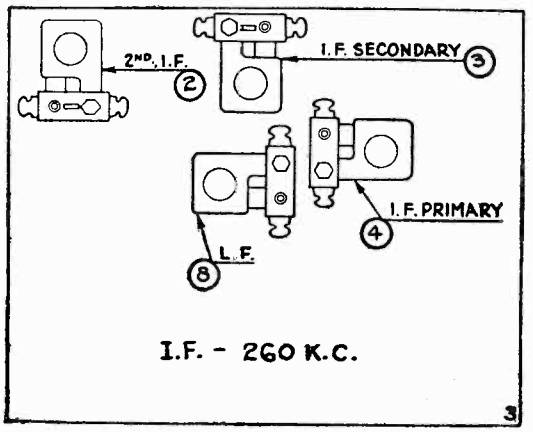
MODELS A-PAD, B-PBD
MODELS C(121,122)NCD,
D(122)NDD, H(121)HHD
MODELS H(122)PHD, H(122)HHD
Alignment, Trimmers

PHILCO RADIO & TELEV. CORP

MODEL B-PBD
MODEL A-PAD

Signal Generator Connection	Signal Generator Frequency	Dial Position	Wave Band Switch Position	Trimmer Number	Output Signal
Remove grid clip from det.-osc. tube					
Control grid of det.-osc.	260 k.c.	...	...	2	Max.
"	"	...	...	4	Max.
"	"	...	...	3	Max.
Connect grid clip to det.-osc. tube					
Ant.[1, 4]	1400 k.c.	140	...	Third [2] section	Max.
"	"	"	...	Second [3] section	Max.
"	"	"	...	First [3] section	Max.
"	700 k.c.	70	...	8	Max.*
"	1400 k.c.	140	...	Third [2] section	Max.

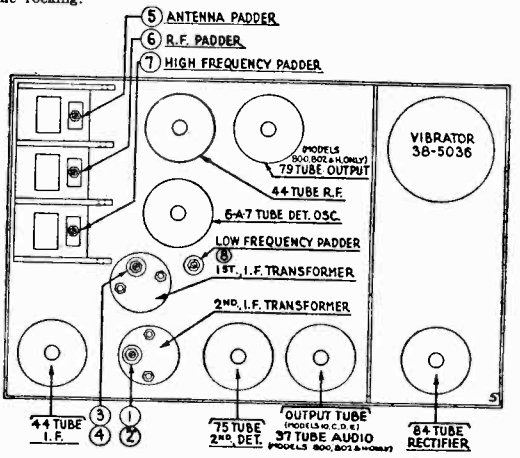
Note 1.—Through a 150 mmfd. condenser.
Note 2.—Located on extreme left of tuning condenser.
Note 3.—Located on tuning condenser.
Note 4.—When the antenna-stage adjustment is made with the receiver installed in the car, the receiver must be connected to the car antenna in the usual manner. Connect the signal-generator output to a wire placed near the car antenna but not connected to it.
* While rocking.



MODELS C(121, 122)NCD; D(122)NDD; H(121)HHD

Signal Generator Connection	Signal Generator Frequency	Dial Position	Wave Band Switch Position	Trimmer Number	Output Signal
Remove grid clip from det.-osc.					
Control grid of det.-osc.	260 k.c.	...	...	1 [1]	...
"	"	...	...	2 [2]	Max.
"	"	...	...	1 [3]	Max.
"	"	...	...	3 [1]	...
"	"	...	...	4 [2]	Max.
"	"	...	...	3 [3]	Max.
Connect grid clip to det.-osc.					
Ant.[4, 6]	1500 k.c.	Note 5	...	7	Max.
"	1400 k.c.	140	...	6	Max.
"	"	"	...	5	Max.
"	600 k.c.	60	...	8	Max.*
"	1400 k.c.	140	...	6	Max.
"	"	"	...	5	Max.

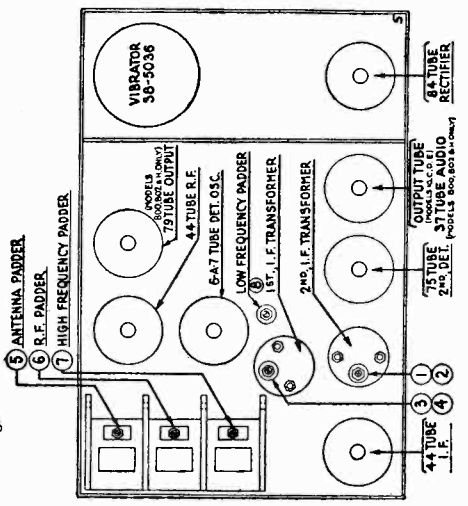
Note 1.—Screw adjustment. Turn all the way in.
Note 2.—Nut adjustment.
Note 3.—This is a critical adjustment. Note the maximum reading, then turn screw in again and slowly bring adjustment to this maximum reading. Do not pass this point. If you do, repeat the adjustment.
Note 4.—Through a 150 mmfd. condenser.
Note 5.—Using a piece of paper approximately .006" thick as a gauge between the heel of the rotor plates and the stator plates, turn the rotor plates until they strike against the paper. This is the correct adjustment for 1500 k.c.—150 on the dial scale.
Note 6.—When the antenna-stage adjustment is made with the receiver installed in the car, the receiver must be connected to the car antenna in the usual manner. Connect the signal-generator output to a wire placed near the car antenna but not connected to it.
* While rocking.



MODEL H(122)PHD
MODEL H(122)HHD

Signal Generator Connection	Signal Generator Frequency	Dial Position	Wave Band Switch Position	Trimmer Number	Output Signal
Remove grid clip from det.-osc. tube					
Control grid of det.-osc. tube	260 k.c.	Note 1	...	1 [2]	Max.
"	"	...	...	2 [3]	Max.
"	"	...	...	3 [2]	Max.
"	"	...	...	4 [3]	Max.
Connect grid clip to det.-osc. tube					
Ant.[4, 6]	1500 k.c.	Note 5	...	7	Max.
"	1400 k.c.	140	...	6	Max.
"	"	"	...	5	Max.
"	600 k.c.	60	...	8	Max.*
"	1400 k.c.	140	...	6	Max.
"	"	"	...	5	Max.

Note 1.—*PHXD only*—Set sensitivity switch to "distance" position and tone control to "brilliant."
Note 2.—This is a screw adjustment.
Note 3.—This is a nut adjustment.
Note 4.—Through a 150 mmfd. condenser.
Note 5.—Using a piece of paper approximately .006" thick as a gauge between the heel of the rotor plates and the stator plates, turn the rotor plates until they strike the paper. This gives the correct adjustment for 1500 k.c.—150 on the dial scale.
Note 6.—When the antenna-stage adjustment is made with the receiver installed in the car, the receiver must be connected to the car antenna in the usual manner. Connect the signal-generator output to a wire placed near the car antenna but not connected to it.
* While rocking.



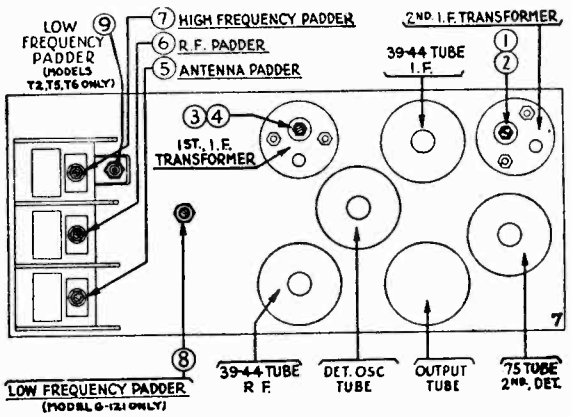
MODELS G(122)CGD,N-FND
MODELS J-NJD,Q-NQD,Q-SQD
MODEL R-HRD
Alignment,Trimmers

PHILCO RADIO & TELEV. CORP.

MODELS G (122)CGD; N-FND

Signal Generator Connection	Signal Generator Frequency	Dial Position	Wave Band Switch Position	Trimmer Number	Output Signal
Remove grid clip from det.-osc. tube					
Control grid of det.-osc. tube	260 k.c.	...	...	1[1]	...
"	"	...	...	2[2]	Max.
"	"	...	...	1[3]	Max.
"	"	...	...	3[1]	...
"	"	...	...	4[2]	Max.
"	"	...	...	3[3]	Max.
Connect grid clip to det.-osc. tube					
Ant.[4, 6]	1580 k.c.	Note 5	...	7	Max.
"	1400 k.c.	140	...	6	Max.
"	"	"	...	5	Max.

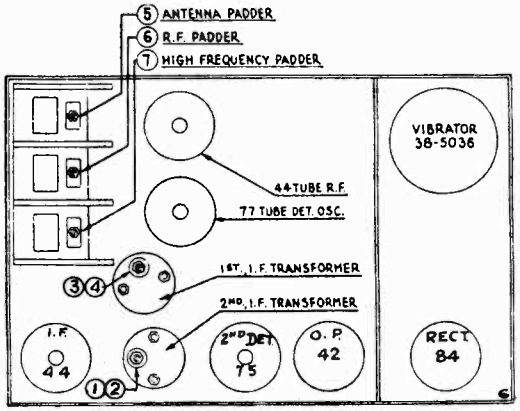
Note 1.—This is screw adjustment. Turn all way in.
Note 2.—This is a nut adjustment.
Note 3.—This adjustment is critical. Note maximum reading obtainable and then turn the screw in again, just bringing it up to the maximum reading. Do not pass this point. If you do, repeat complete operation.
Note 4.—Through a 150 mmfd. condenser.
Note 5.—Using a piece of paper approximately .006" thick as a gauge between the heel of the rotor plates and the stator plates, turn the rotor plates until they strike against the paper. This is the correct adjustment for 1580 k.c.—158 on the dial scale.
Note 6.—When the antenna-stage adjustment is made with the receiver installed in the car, the receiver must be connected to the car antenna in the usual manner. Connect the signal-generator output to a wire placed near the car antenna but not connected to it.



MODELS J-NJD, Q-NQD, Q-SQD

Signal Generator Connection	Signal Generator Frequency	Dial Position	Wave Band Switch Position	Trimmer Number	Output Signal
Remove grid clip from det.-osc. tube					
Control grid of det.-osc. tube	260 k.c.	...	...	1[1]	...
"	"	...	...	2[2]	Max.
"	"	...	...	1[3]	Max.
"	"	...	...	3[1]	...
"	"	...	...	4[2]	Max.
"	"	...	...	3[3]	Max.
Connect grid clip to det.-osc. tube					
Ant.[4, 6]	1580 k.c.	Note 5	...	7	Max.
"	1400 k.c.	140	...	6	Max.
"	"	"	...	5	Max.

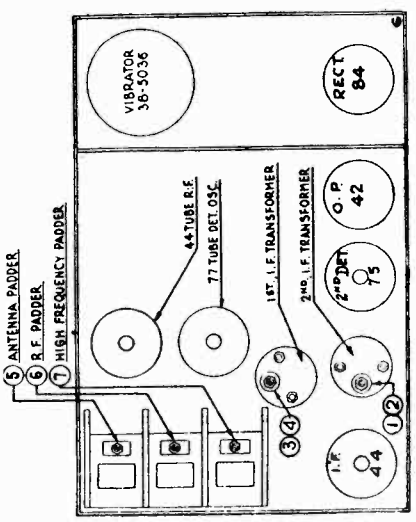
Note 1.—This is a screw adjustment. Turn all way in.
Note 2.—This is a nut adjustment.
Note 3.—This adjustment is critical. Note maximum reading obtainable and then turn the screw in again, just bringing it up to the maximum reading. Do not pass this point. If you do, repeat complete operation.
Note 4.—Through a 150 mmfd. condenser.
Note 5.—Using a piece of paper approximately .006" thick as a gauge between the heel of the rotor plates and the stator plates, turn the rotor plates until they strike against the paper. This is the correct adjustment for 1580 k.c.—158 on the dial scale.
Note 6.—When the antenna-stage adjustment is made with the receiver installed in the car, the receiver must be connected to the car antenna in the usual manner. Connect the signal-generator output to a wire placed near the car antenna but not connected to it.



MODEL R (HRD)

Signal Generator Connection	Signal Generator Frequency	Dial Position	Wave Band Switch Position	Trimmer Number	Output Signal
Remove grid clip from det.-osc. tube					
Control grid of det.-osc. tube	260 k.c.	...	...	1[1]	...
"	"	...	...	2[2]	Max.
"	"	...	...	1[3]	Max.
"	"	...	...	3[1]	...
"	"	...	...	4[2]	Max.
"	"	...	...	3[3]	Max.
Connect grid clip to det.-osc. tube					
Ant.[4, 6]	1580 k.c.	Note 5	...	7	Max.
"	1400 k.c.	140	...	6	Max.
"	"	"	...	5	Max.

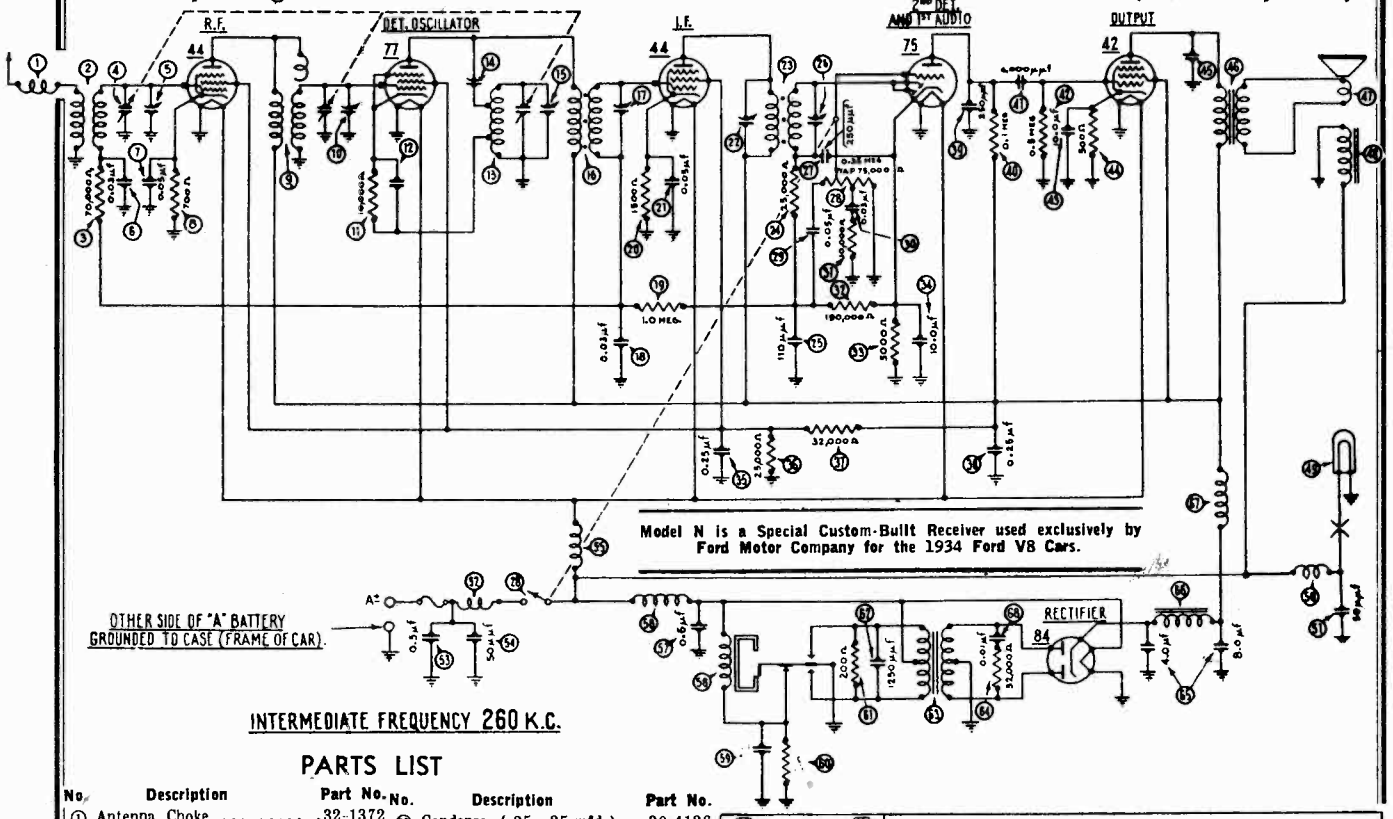
Note 1.—This is a screw adjustment. Turn all way in.
Note 2.—This is a nut adjustment.
Note 3.—This adjustment is critical. Note maximum reading obtainable and then turn the screw in again, just bringing it up to the maximum reading. Do not pass this point. If you do, repeat complete operation.
Note 4.—Through a 150 mmfd. condenser.
Note 5.—Using a piece of paper approximately .006" thick as a gauge between the heel of the rotor plates and the stator plates, turn the rotor plates until they strike against the paper. This is the correct adjustment for 1580 k.c.—158 on the dial scale.
Note 6.—When the antenna-stage adjustment is made with the receiver installed in the car, the receiver must be connected to the car antenna in the usual manner. Connect the signal-generator output to a wire placed near the car antenna but not connected to it.



Schematic, Parts
Chassis, Changes

PHILCO RADIO & TELEV. CORP.

MODEL N-FND
(Ford V8, 1934)



PARTS LIST

No.	Description	Part No.
1	Antenna Choke	32-1372
2	Antenna Transformer	32-1331
3	Resistor (70,000 ohms)	33-1115
4	Tuning Condenser	31-1166
5	First Padder (on Tun. Cond.)	
6	Condenser (.03 mfd.)	30-4025
7	Condenser (.05 mfd.)	30-4020
8	Resistor (700 ohms)	6443
9	R. F. Transformer	32-1332
10	Second Padder (on Tun. Cond.)	
11	Resistor (10,000 ohms)	33-1000
12	Condenser (1,000 mmfd.)	30-1007
13	Oscillator Transformer	32-1333
14	Padder (Pri. 1st I. F. Trans.)	
15	Third Padder (on Tun. Cond.)	
16	First I. F. Transformer	32-1329
17	Padder (Sec. 1st I. F. Trans.)	
18	Condenser (.03 mfd.)	30-4025
19	Resistor (1,000,000 ohms)	33-1096
20	Resistor (1,500 ohms)	33-3047
21	Condenser (.05 mfd.)	30-4020
22	Padder (Pri. 2nd I. F. Trans.)	
23	Second I. F. Transformer	32-1237
24	Resistor (25,000 ohms)	33-1013
25	Condenser (110 mmfd.)	30-1031
26	Padder (Sec. 2nd I. F. Trans.)	
27	Condenser (250 mmfd.)	30-1032
28	Volume Control & Switch Assembly	33-5067
29	Condenser (.05 mfd.)	30-4020
30	Condenser (.03 mfd.)	30-4025
31	Resistor (10,000 ohms)	33-1000
32	Resistor (190,000 ohms)	33-1116
33	Resistor (5,000 ohms)	6096
34	Condenser (10 mfd.)	30-2076
35	Condenser (.25, .25 mfd.)	30-4126
36	Resistor (25,000 ohms)	3656
37	Resistor (32,000 ohms)	3525
38	Condenser (.25, .25 mfd.)	30-4126
39	Condenser (250 mmfd.)	3082
40	Resistor (100,000 ohms)	6099
41	Condenser (6,000 mmfd.)	30-4125
42	Resistor (500,000 ohms)	6097
43	Condenser (10 mfd.)	30-2076
44	Resistor (500 ohms)	6977
45	Condenser (4,000 mmfd.)	30-4185
46	Output Transformer	32-7019
47	Cone & Voice Coil	02861
48	Field Coil Assembly	36-3097
49	Pilot Lamp	34-2038
50	Choke	32-1374
51	Condenser (50 mmfd.)	30-1029
52	"A" Choke	32-1374
53	Condenser (.5 mfd.)	30-4184
54	Condenser (50 mmfd.)	30-1029
55	"A" Choke	32-1367
56	Vibrator Choke	32-1368
57	Condenser (.5 mfd.)	30-4047
58	Vibrator	41-3186
59	Condenser (.02 mfd.)	30-4039
60	Resistor (300 ohms)	33-3010
61	Resistor (200 ohms)	7217
62	Condenser (1,250 mmfd.)	5886
63	Power Transformer	32-7232
64	Resistor (32,000 ohms)	3525
65	Condenser (4-8 mfd.)	30-2030
66	"B" Choke	32-7233
67	R. F. Choke	32-1078
68	Condenser (.01 mfd.)	30-4051
	Knobs	27-4124
	"A" Lead	38-5749
	Tuning Shaft	28-8241
	Volume Shaft	28-8242
	"T" Bolt (Set Mtg.)	28-6161
	Nuts (Set Mtg.)	W518A
	Glass	27-7325

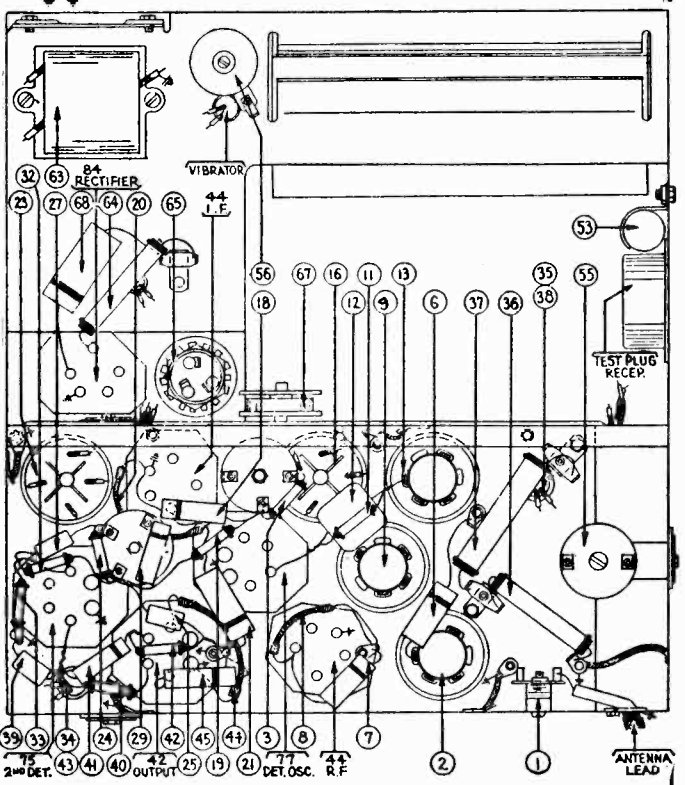


FIGURE 98

CHANGES — "Run Numbers" are stamped on the chassis sub-base for identification. These "Run Numbers" are changed consecutively as major changes are made in the Receiver wiring and parts.

RUN No. 8 — First I. F. Transformer ⑯ replaced with a new type having same part number. Can be identified by the green paint marks on the fibre.

Resistor ⑳ removed (1500 ohms) — Part No. 33-3048 added (2000 ohms).

No major changes were involved in Runs No. 2, 3, 4, 5, 6 and 7.

ADJUSTMENTS — The correct padding procedure for the Model N is given

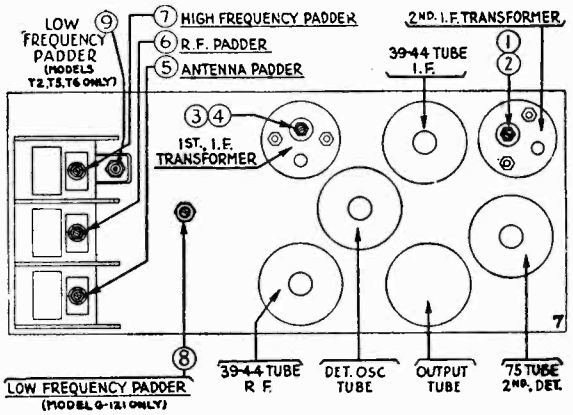
MODELS T2-CT2, T5-CT5
MODELS T3-MT3, RT3, ST3
MODEL 54
Alignment, Trimmers

PHILCO RADIO & TELEV. CORP.

MODEL NOS. T2, T5

Signal Generator Connection	Signal Generator Frequency	Dial Position	Wave Band Switch Position	Trimmer Number	Output Signal
Remove grid clip from det.-osc. tube					
Control grid of det.-osc. tube	260 k.c.	...	...	1 [1]	Max.
"	"			2 [2]	Max.
"	"	...	...	3 [1]	Max.
"	"	...	...	4 [2]	Max.
Connect grid clip to det-osc. tube					
Ant.[3, 5]	1600 k.c.	Note 4	...	7	Max.
"	1400 k.c.	140	...	6	Max.
"	"	"	...	5	Max.
"	600 k.c.	60	...	9	Max.*
"	1400 k.c.	140	...	6	Max.
"	"	"	...	5	Max.

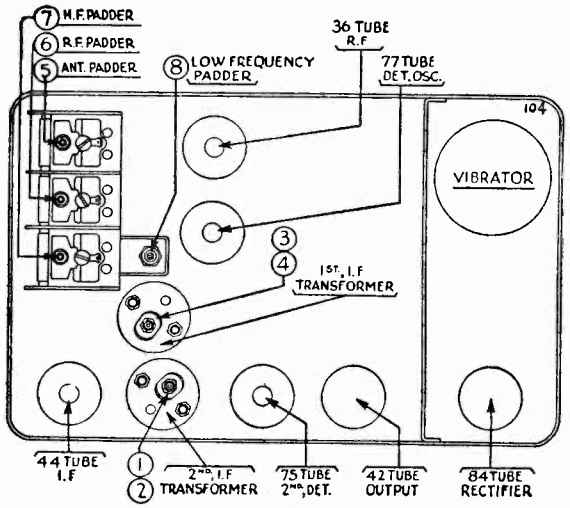
Note 1.—This is a screw adjustment.
Note 2.—This is a nut adjustment.
Note 3.—Through a 150 mmfd. condenser.
Note 4.—Turn the tuning condenser plates wide open. This gives the correct adjustment for 1600 k.c.—160 on the dial scale.
Note 5.—When the antenna-stage adjustment is made with the receiver installed in the car, the receiver must be connected to the car antenna in the usual manner. Connect the signal-generator output to a wire placed near the car antenna but not connected to it.
* While rocking.



MODEL NO. T3

Signal Generator Connection	Signal Generator Frequency	Dial Position	Wave Band Switch Position	Trimmer Number	Output Signal
Remove grid clip from det.-osc. tube					
Control grid of det.-osc. tube	260 k.c.	...	...	1 [1]	Max.
"	"			2 [2]	Max.
"	"	...	...	3 [1]	Max.
"	"	...	...	4 [2]	Max.
Connect grid clip to det-osc. tube					
Ant.[3, 5]	1600 k.c.	Note 4	...	7	Max.
"	1400 k.c.	140	...	6	Max.
"	"	"	...	5	Max.
"	600 k.c.	60	...	8	Max.*
"	1400 k.c.	140	...	6	Max.
"	"	"	...	5	Max.

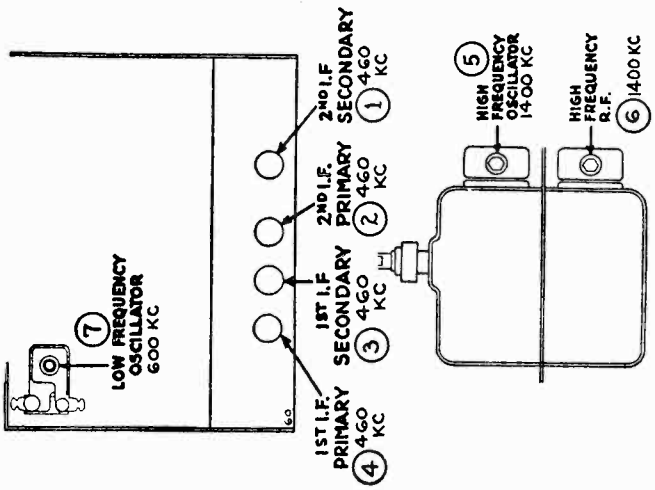
Note 1.—This is a screw adjustment.
Note 2.—This is a nut adjustment.
Note 3.—Through a 150 mmfd. condenser.
Note 4.—Turn the tuning condenser plates wide open. This gives the correct adjustment for 1600 k.c.—160 on the dial scale.
Note 5.—When the antenna-stage adjustment is made with the receiver installed in the car, the receiver must be connected to the car antenna in the usual manner. Connect the signal-generator output to a wire placed near the car antenna but not connected to it.
* While rocking.



MODEL NO. 54

Signal Generator Connection	Signal Generator Frequency	Dial Position	Wave Band Switch Position	Trimmer Number	Output Signal
Remove grid clip from 6A7					
Control grid of 6A7	460 k.c.	55	Broadcast	1	Max.
"	"	"	"	2	Max.
"	"	"	"	3	Max.
"	"	"	"	4	Max.
Connect grid clip to 6A7					
Ant.*	1400 k.c.	140	"	5 [1]	Max.
"	"	"	"	6 [1]	Max.
"	600 k.c.	60	"	7 [2]	Max.**
"	1400 k.c.	140	"	5 [1]	Max.

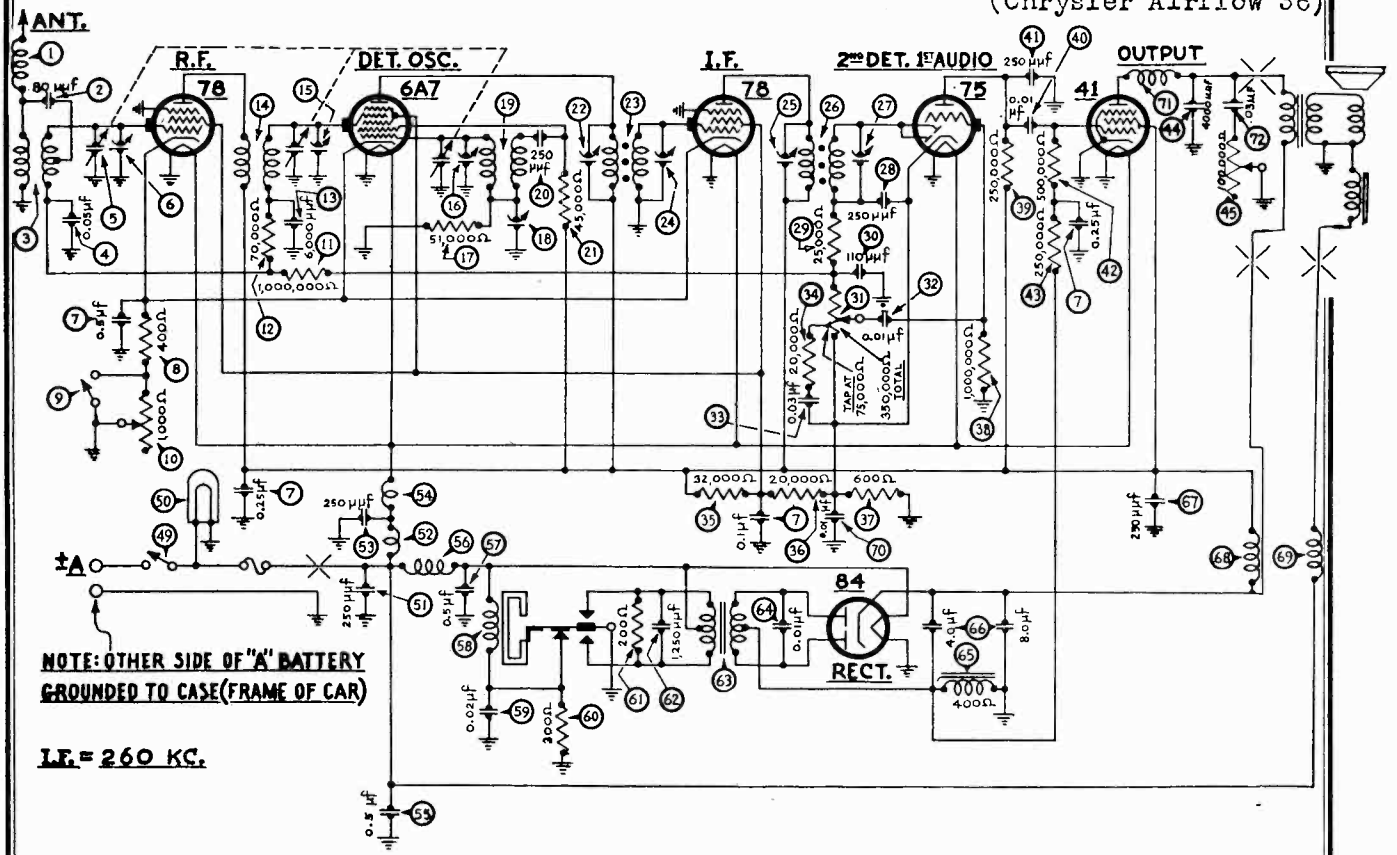
Note 1.—Padders (5) and (6) are accessible through the top grille of cabinet.
Note 2.—Padder (7) is accessible from rear of cabinet.
* Use a 100-mmf. condenser as dummy antenna.
** While rocking.



Schematic, Parts, Chassis

MODELS T10-CT10

PHILCO RADIO & TELEV. CORP. (DeSoto Airflow '36) (Chrysler Airflow '36)



PARTS LIST

No.	Description	Part No.
1	Antenna Choke	38-7210
2	Condenser (80 mmfd.)	30-1066
3	Antenna Transformer	32-1990
4	Condenser (.05 mfd.)	30-4444
5	Tuning Condenser	31-1728
6	First Padder (on Tun. Cond.)	
7	Condenser (.1-.25-.25-.5 mfd.)	30-4374
8	Resistor (400 ohms)	33-1211
9	Sensitivity Control Switch	42-1140
10	Sensitivity Control	33-5129
11	Resistor (1,000,000 ohms)	33-510344
12	Resistor (70,000 ohms)	33-370334
13	Condenser (6,000 mmfd.)	30-4445
14	R. F. Transformer	32-1926
15	Second Padder (on Tun. Cond.)	
16	Third Padder (on Tun. Cond.)	
17	Resistor (51,000 ohms)	33-351344
18	Low Frequency Padder	31-6056
19	Oscillator Transformer	32-1927
20	Condenser (250 mmfd.)	30-1032
21	Resistor (45,000 ohms)	33-345344
22	Padder (Pri. 1st I. F. Trans.)	
23	First I. F. Transformer	32-2160
24	Padder (Sec. 1st I. F. Trans.)	
25	Padder (Pri. 2nd I. F. Trans.)	
26	Second I. F. Transformer	32-2164
27	Padder (Sec. 2nd I. F. Trans.)	
28	Condenser (250 mmfd.)	30-1032
29	Resistor (25,000 ohms)	33-325344
30	Condenser (110 mmfd.)	30-1031
31	Volume Control (350,000 ohms)	33-5121
32	Condenser (.01 mfd.)	30-4124
33	Condenser (.03 mfd.)	30-4449
34	Resistor (20,000 ohms)	33-320334
35	Resistor (32,000 ohms)	33-332433
36	Resistor (20,000 ohms)	33-320334
37	Resistor (600 ohms)	33-1212
38	Resistor (1,000,000 ohms)	33-510344
39	Resistor (250,000 ohms)	33-424344
40	Condenser (.01 mfd.)	30-4145
41	Condenser (250 mmfd.)	30-1032
42	Resistor (500,000 ohms)	33-449344
43	Resistor (250,000 ohms)	33-424344
44	Condenser (4,000 mmfd.)	30-4185
45	Tone Control (100,000 ohms)	33-5141
46	Output Transformer	2598
47	Cone & Voice Coil	36-3159
48	Field Coil Assembly	02795
49	On & Off Switch Assembly	42-5408
50	Pilot Lamp	34-2039
51	Condenser (250 mmfd.)	30-1032
52	"A" Choke	32-1644
53	Condenser (250 mmfd.)	30-1032
54	Filament Choke	32-1930
55	Condenser (.5 mfd.)	30-4047
56	Vibrator Choke	32-1933
57	Condenser (.5 mfd.)	30-4047
58	Vibrator	41-3186
59	Condenser (.02 mfd.)	30-4039
60	Resistor (300 ohms)	33-3130
61	Resistor (200 ohms)	33-1210
62	Condenser (1,250 mmfd.)	5886
63	Power Transformer	32-7488
64	Condenser (.01 mfd.)	30-4381
65	Filter Choke	32-7491
66	Filter Condenser (4-8 mfd.)	38-7693
67	Condenser (250 mmfd.)	30-1032
68	"B" Choke	32-1932
69	"A" Choke	32-1464
70	Condenser (.01 mfd.)	30-4124
71	Choke	32-1382
72	Condenser (.03 mfd.)	30-4447
	Four-prong Socket	27-6044
	Five-prong Socket	27-6035
	Six-prong Socket	27-6036
	Seven-prong Socket	27-6037
	Scale Assembly	42-5437
	Tuning Shaft	28-8491
	Volume Shaft	28-8492
	Tone Shaft	28-8493
	Tuning & Volume Knob (Chrysler)	27-4277
	Tuning & Volume Knob (DeSoto)	27-4275
	Tone Knob (Chrysler)	27-4279
	Tone Knob (DeSoto)	27-4276
	Studs (Speaker Mtg.)	29-6292
	Nuts (Speaker Mtg.)	W55A
	Bracket (Receiver Mtg.)	29-2751
	Fuse	7227
	Fuse Insulator	27-7131
	Spark Plug Resistors	33-1015
	Distributor Resistors	33-1113
	Ground Strap Assembly	41-3194
	Interference Condenser (1 mfd.)	30-4450
	Interference Condenser (.5 mfd.)	30-4007
	Antenna Shielded Loom	38-7295
	Receiver Housing	38-1614

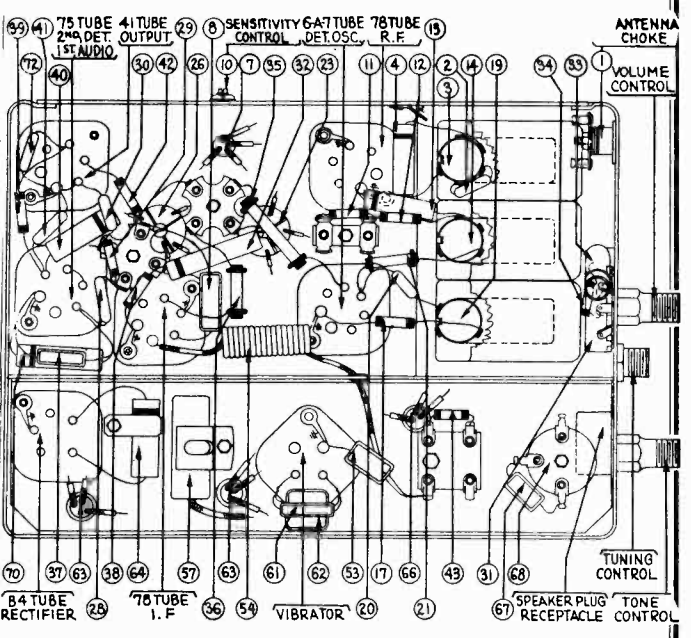


FIGURE 108

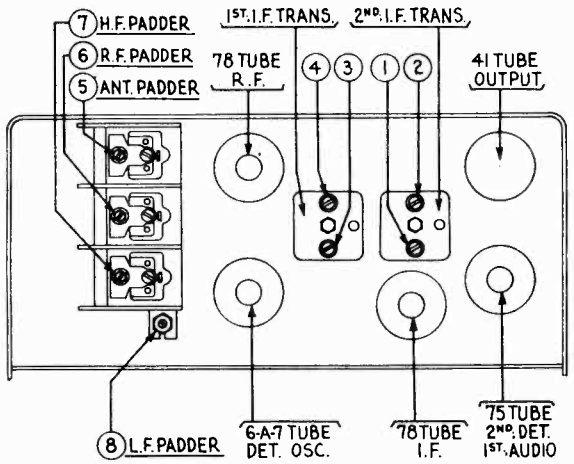
The Model T10 is a Special Custom-Built Receiver used exclusively by the Chrysler Corporation in the 1936 Chrysler Airflow and DeSoto Airflow cars.

MODELS FT9,CT10,CT11,HT11X
NT12X,ST12,NT15,ST15 PHILCO RADIO & TELEV. CORP.
MODELS PT14,RT14X,LT14X3
MT14X4
Alignment,Trimmers

MODELS FT9, CT10, CT11, HT11X, NT12X, ST12, NT15 AND ST15

OPERATION	SIGNAL GENERATOR FREQUENCY	SIGNAL GENERATOR CONNECTION	DUMMY CAPACITY	SPECIAL INSTRUCTIONS	ADJUST PADDER
1	260 K.C	To Grid of 78 Tube—I.F. Stage	.1 Mfd. Condenser in Series with Generator Lead	No Antenna Connection	1 - 2
2	260 K.C	To Grid of 6A7 Tube	.1 Mfd. Condenser in Series with Generator Lead	No Antenna Connection	3 - 4 1 - 2
3	1550 K.C.	To Grid of 78 Tube—R.F. Stage	.1 Mfd. Condenser in Series with Generator Lead	No Antenna Connection Turn Tuning Condenser Plates out of mesh as far as they will go	7 - 6
4	580 K.C.	To Grid of 78 Tube—R.F. Stage	.1 Mfd. Condenser in Series with Generator Lead	No Antenna Connection Set Tuning Condenser at 580 K.C.	8 Note 2
5	1550 K.C.	To Grid of 78 Tube—R.F. Stage	.1 Mfd. Condenser in Series with Generator Lead	No Antenna Connection Turn Tuning Condenser Plates out of mesh as far as they will go	7
6	1400 K.C.	Note 4	Note 4	Set Tuning Condenser at 1400 K.C.	5

Adjust for maximum reading on the output meter.
NOTE 2—Rock the tuning condenser while adjusting the low frequency padder. Tune the condenser to the signal and adjust the padder for maximum output. Rotate the tuning condenser back and forth slightly for maximum output. Then re-adjust the padder for maximum output. Repeat this procedure until no further improvement is noticed.
NOTE 4—Connect the Antenna lead Part No. 41-3191 to the Antenna receptacle on the Receiver in series with the correct dummy capacity. For the FT9 use a 125 mmfd. condenser, for the T10 and T11 (used with metal insert top) use a 1250 mmfd. condenser, for the T11 (used with fabric top) use a 110 mmfd. condenser, for the NT12X, ST12, NT15 and ST15 use a 200 mmfd. condenser.



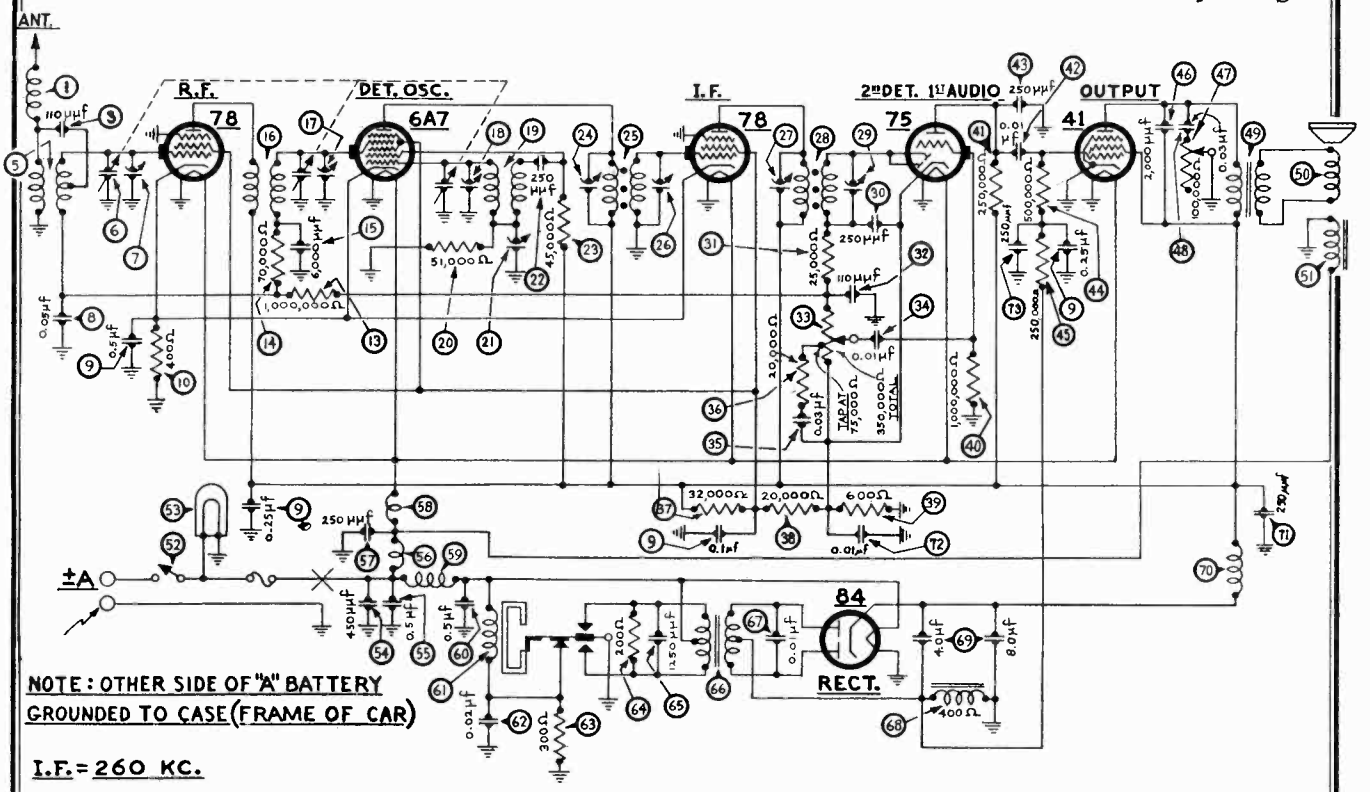
MODELS PT14, RT14X, LT14X3, AND MT14X4

OPERATION	SIGNAL GENERATOR FREQUENCY	SIGNAL GENERATOR CONNECTION	DUMMY CAPACITY	SPECIAL INSTRUCTIONS	ADJUST PADDER
1	260 K.C.	To Grid of 78 Tube—I.F. Stage	.1 Mfd. Condenser in Series with Generator Lead	No Antenna Connection	1 - 2
2	260 K.C.	To Grid of 6A7 Tube	.1 Mfd. Condenser in Series with Generator Lead	No Antenna Connection	3 - 4 1 - 2
3	1600 K.C.	To Grid of 78 Tube—R.F. Stage	.1 Mfd. Condenser in Series with Generator Lead	No Antenna Connection Turn Tuning Condenser Plates out of mesh as far as they will go	7 - 6
4	580 K.C.	To Grid of 78 Tube—R.F. Stage	.1 Mfd. Condenser in Series with Generator Lead	No Antenna Connection Set Tuning Condenser at 580 K.C.	8 Note 2
5	1600 K.C.	To Grid of 78 Tube—R.F. Stage	.1 Mfd. Condenser in Series with Generator Lead	No Antenna Connection Turn Tuning Condenser Plates out of mesh as far as they will go	7
6	1400 K.C.	Note 4	Note 4	Set Tuning Condenser at 1400 K.C.	5

Adjust for maximum reading on the output meter.
NOTE 2—Rock the tuning condenser while adjusting the low frequency padder. Tune the condenser to the signal and adjust the padder for maximum output. Rotate the tuning condenser back and forth slightly for maximum output. Then re-adjust the padder for maximum output. Repeat this procedure until no further improvement is noticed.
NOTE 4—Connect the Antenna lead Part No. 41-3191 to the Antenna receptacle on the Receiver in series with the correct dummy capacity. For the PT14 and MT14X4 use a 230 mmfd. condenser, for the RT14X use a 2340 mmfd. condenser, for the LT14X3 use a 530 mmfd. condenser.

PHILCO RADIO & TELEV. CORP.

MODEL HT11X
Schematic, Parts
Chassis, Changes



The Model T11X is a Special Custom-Built Receiver used exclusively by the Hupp Motor Car Corporation

SEE INDEX FOR ALIGNMENT

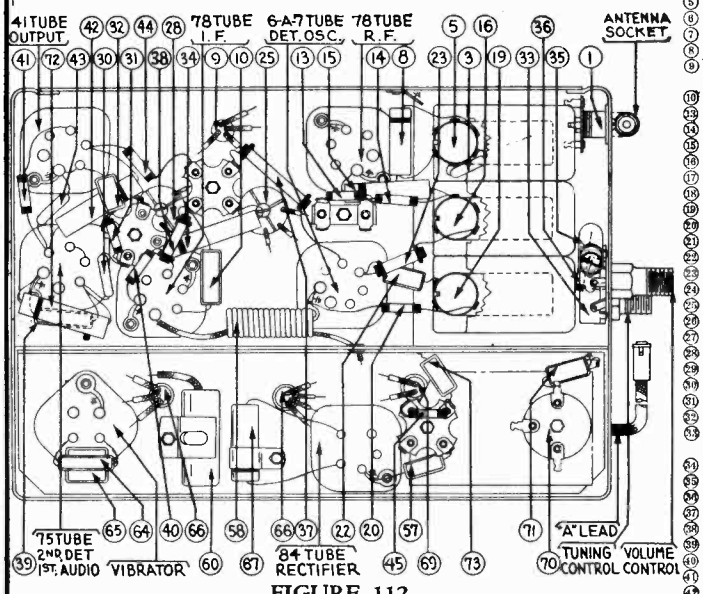


FIGURE 112

PARTS LIST

No.	Description	Part No.
①	Antenna Choke	38-7210
③	Condenser (110 mfd.)	30-1031
⑤	Antenna Transformer	32-1934
⑥	Tuning Condenser	31-1674
⑦	First Padder (on Tun. Cond.)	
⑧	Condenser (.05 mfd.)	30-4020
⑨	Condenser (.1-.25-.25-.5 mfd.)	30-4374
⑩	Resistor (400 ohms)	33-1211
⑬	Resistor (1,000,000 ohms)	33-510344
⑭	Resistor (70,000 ohms)	33-370334
⑮	Condenser (6,000 mmfd.)	30-4125
⑯	R. F. Transformer	32-1926
⑰	Second Padder (on Tun. Cond.)	
⑱	Third Padder (on Tun. Cond.)	
⑲	Oscillator Transformer	32-1927
⑳	Resistor (51,000 ohms)	33-351344
㉑	Low Frequency Padder	31-6056
㉒	Condenser (250 mmfd.)	30-1032
㉓	Resistor (45,000 ohms)	33-345344
㉔	Padder (Pri. 1st I. F. Trans.)	
㉕	First I. F. Transformer	32-1928
㉖	Padder (Sec. 1st I. F. Trans.)	
㉗	Padder (Pri. 2nd I. F. Trans.)	
㉘	Second I. F. Transformer	32-1929
㉙	Padder (Sec. 2nd I. F. Trans.)	
㉚	Condenser (250 mmfd.)	30-1032
㉛	Resistor (25,000 ohms)	33-325344
㉜	Condenser (110 mmfd.)	30-1031
㉝	Volume Control (350,000 ohms)	33-5121
㉞	Condenser (.01 mfd.)	30-4124
㉟	Condenser (.03 mfd.)	30-4025
㊱	Resistor (20,000 ohms)	33-320334
㊲	Resistor (32,000 ohms)	33-332434
㊳	Resistor (20,000 ohms)	33-320334
㊴	Resistor (600 ohms)	33-1212
㊵	Resistor (1,000,000 ohms)	33-510344
㊶	Resistor (250,000 ohms)	33-424344
㊷	Condenser (.01 mfd.)	30-4145
㊸	Condenser (250 mmfd.)	30-1032
㊹	Resistor (500,000 ohms)	33-440344
㊺	Resistor (250,000 ohms)	33-424344
㊻	Condenser (2,000 mmfd.)	30-4177
㊼	Tone Control	33-5101
㊽	Condenser (.03 mfd.)	30-4380
㊾	Output Transformer	2598
㊿	Cone & Voice Coil	36-3159
(51)	Field Coil Assembly	02 95
(52)	On & Off Switch (G Car)	42-5 93
(53)	On & Off Switch (N Car)	42-5469
(54)	Pilot Lamp (G Car)	34-2039
(55)	Pilot Lamp (N Car)	34-2040
(56)	Condenser (450 mmfd.)	31-6065
(57)	Condenser (.5 mfd.)	30-4047
(58)	"A" Choke	32-1644
(59)	Condenser (250 mmfd.)	30-1032
(60)	Choke	32-1930
(61)	Vibrator Choke	32-1933
(62)	Condenser (.5 mfd.)	30-4047
(63)	Vibrator	41-3186
(64)	Condenser (.02 mfd.)	30-4039
(65)	Resistor (300 ohms)	33-3130
(66)	Resistor (200 ohms)	33-1210
(67)	Condenser (1,250 mmfd.)	5886
(68)	Power Transformer	32-7182
(69)	Condenser (.01 mfd.)	30-4381
(70)	Filter Choke	32-7191
(71)	Filter Condenser (4-8 mfd.)	30-2134
(72)	R. F. Choke	32-1932
(73)	Condenser (250 mmfd.)	30-1032
	Condenser (.01 mfd.)	30-4124
	Condenser (250 mmfd.)	30-1032
	Four-prong Socket	27-6044
	Five-prong Socket	27-6035
	Six-prong Socket	27-6036
	Seven-prong Socket	27-6037
	Spark Plug Resistor	33-1015
	Distributor Resistor	4851
	Interference Condenser (.5 mfd.)	30-4007
	Receiver Housing	38-1596
	"T" Bolt (Set Mtg.)	28-6161
	Nut (Set Mtg.)	W518A
	Washer (Set Mtg.)	28-2606
	Clamp (Control Mtg.)	29-3494
	Nut (Clamp Mtg.)	W895
	Fuse	7227
	Fuse Insulator	27-7729
	Pilot Lamp Assem. (N Car)	38-6750
	Pilot Lamp Assem. (G Car)	38-7217
	Tuning Shaft (G Car)	28-8445
	Volume Shaft (G Car)	28-8446
	Tuning Shaft (N Car)	28-8447
	Volume Shaft (N car)	28-8448
	Knob (G Car)	27-4091
	Knob (N Car)	27-4091
	Face Assembly (G Car)	42-5500
	Face Assembly (N Car)	28-3509
	Pointer	28-3598
	Glass	27-7325

CHANGES — "Run Numbers" are stamped on the chassis sub-base for identification. These "Run Numbers" are changed consecutively as major changes are made in the Receiver wiring and parts.

RUN No. 2 — Condenser ⑪ originally was connected to the cathode side of the "B" choke ⑩. The correct connection is shown on the schematic diagram.

MODELS 15,111,112(Above Ser. #174001),211 212,211A,212A
MODELS 22,22L,71,270,370

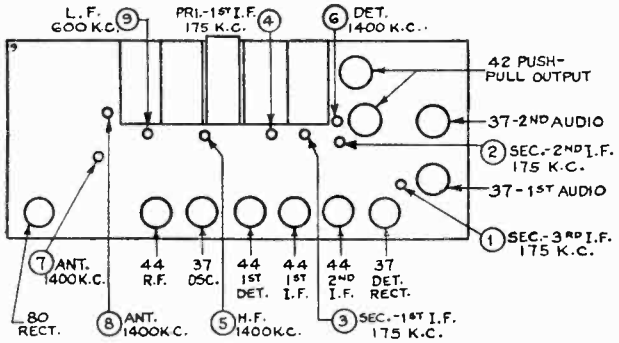
PHILCO RADIO & TELEV. CORP.

MODELS 35,35B,36,37
Alignment,Trimmers

MODEL NOS. 15, 111, 112, 211, 212

Signal Generator Connection	Signal Generator Frequency	Dial Position	Wave Band Switch Position	Trimmer Number	Output Signal
Remove grid clip from 1st det.					
1st det.	175 k.c.	55	...	1	Max.
"	"	"	...	2	Max.
"	"	"	...	3	Max.
"	"	"	...	4	Max.
Connect grid clip to 1st det.					
Ant.**	1400 k.c.	140	...	5	Max.
"	"	"	...	6	Max.
"	"	"	...	7	Max.
"	"	"	...	8	Max.
"	600 k.c.	60	...	9	Max.*
"	1400 k.c.	140	...	5	Max.

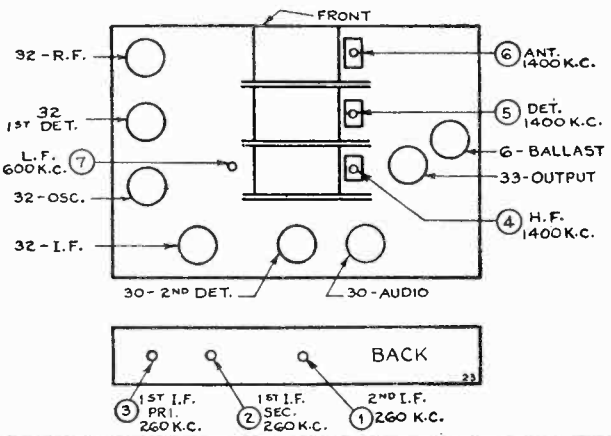
* While rocking.
** Connect 200-mmf. condenser between signal generator and antenna post, at the antenna post.



MODEL NOS. 35, 36

Signal Generator Connection	Signal Generator Frequency	Dial Position	Trimmer Number	Output Signal
Remove grid clip from 1st det.				
Control grid of 1st det.	260 k.c.	55	1 [1]	Max.
"	"	"	2 [1]	Max.
"	"	"	3 [1]	Max.
Connect grid clip to 1st det.				
Ant.*	1400 k.c.	140	4	Max.
"	"	"	5	Max.
"	"	"	6	Max.
"	600 k.c.	60	7 [2]	Max.**
"	1400 k.c.	140	4	Max.

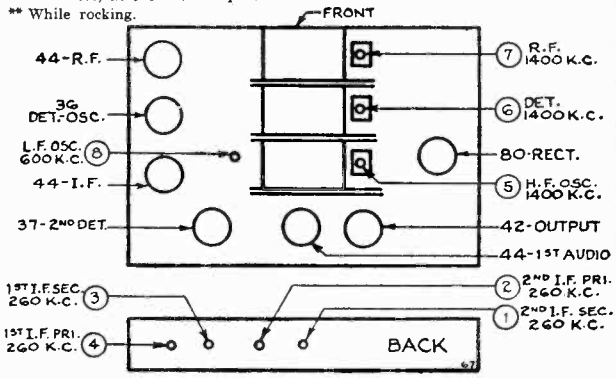
Note 1.—(1), (2), and (3) are accessible at rear of chassis.
Note 2.—(7) is accessible through hole from top of chassis.
* Connect a 200-mmf. condenser between signal generator and antenna post of set, at the antenna post.
** While rocking.



MODEL NOS. 71, 270, 370, 22, 22L

Signal Generator Connection	Signal Generator Frequency	Dial Position	Wave Band Switch Position	Trimmer Number	Output Signal
Remove grid clip from det.-osc.					
Control grid of det.-osc.	260 k.c.	55	...	1	Max.
"	"	"	...	2	Max.
"	"	"	...	3	Max.
"	"	"	...	4	Max.
Connect grid clip to det.-osc.					
Ant.	1400 k.c.	140	...	5	Max.
"	"	"	...	6	Max.
"	"	"	...	7	Max.
"	600 k.c.	60	...	8	Max.**
"	1400 k.c.	140	...	5	Max.

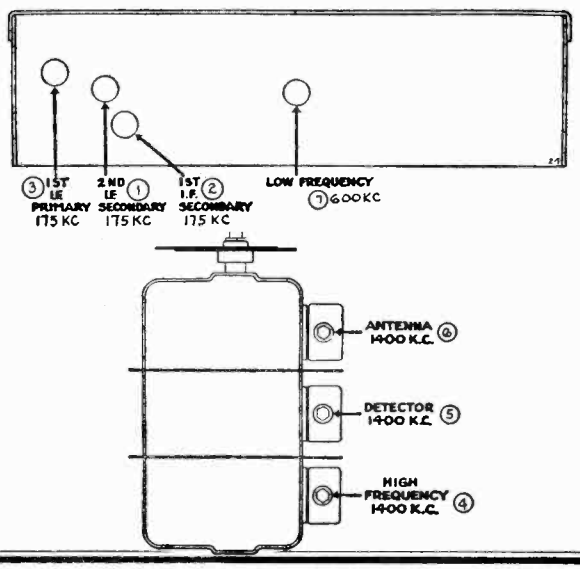
* Connect a 200-mmf. condenser between signal generator and antenna post of set, at the antenna post.
** While rocking.



MODEL NO. 37

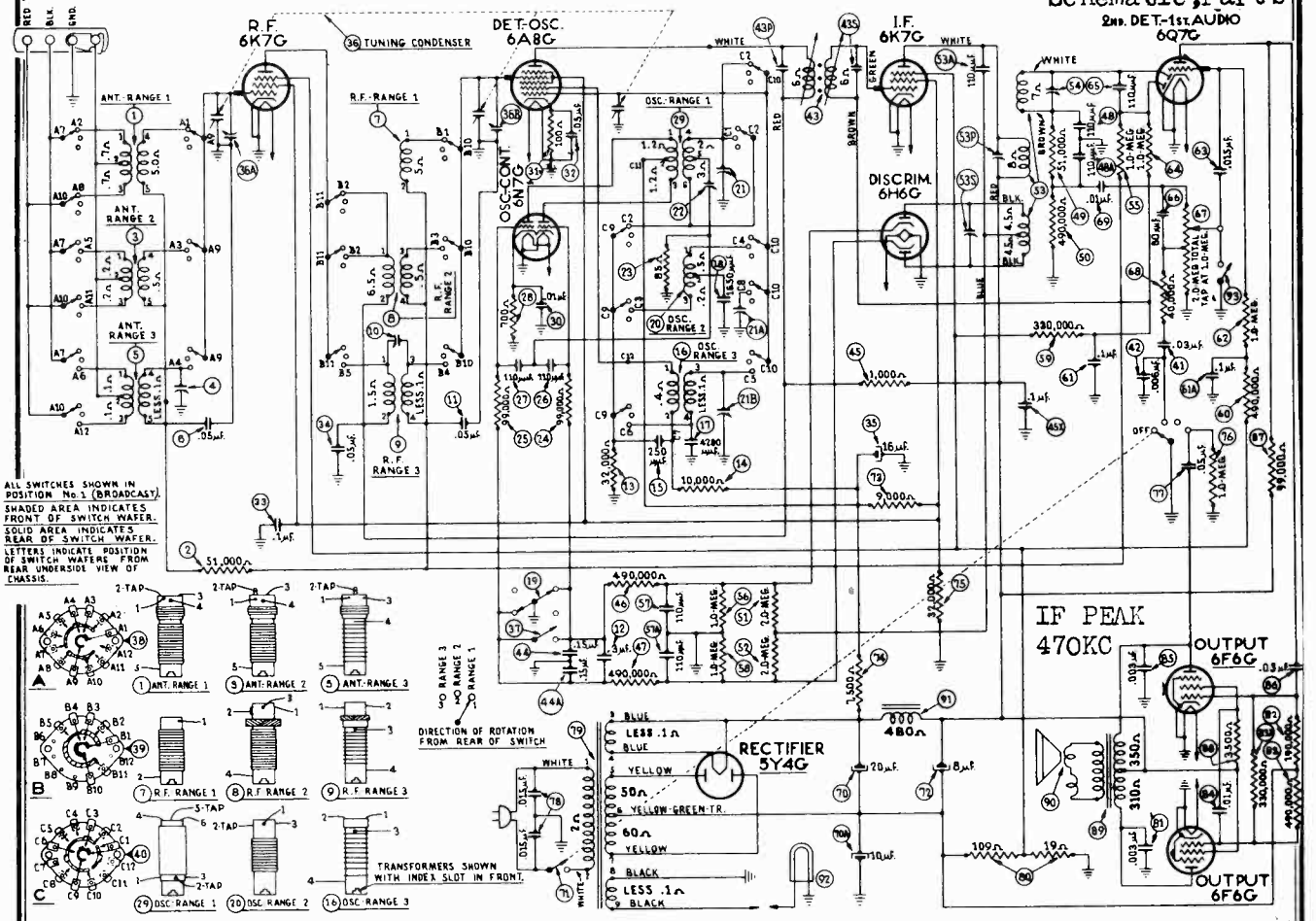
Signal Generator Connection	Signal Generator Frequency	Dial Position	Trimmer Number	Output Signal
Remove grid clip from 1st det.				
Control grid of 1st det.	175 k.c.	55	1	Max.
"	"	"	2	Max.
"	"	"	3	Max.
Connect grid clip to 1st det.				
Ant.*	1400 k.c.	140	4	Max.
"	"	"	5	Max.
"	"	"	6	Max.
"	600 k.c.	60	7	Max.**
"	1400 k.c.	140	4	Max.

* Connect a 200-mmf. condenser between the signal generator and the antenna post of the set, at the antenna post.
** While rocking.



PHILCO RADIO & TELEV. CORP.

MODEL 37-9
Schematic, Parts



Schem. No.	Description	Part No.	List Price
1	Antenna Transformer (Range 1)	32-2378	$1.60
2	Resistor (51,000 ohms, ½ watt)	33-351339	.20
3	Antenna Transformer (Range 2)	32-2381	1.20
4	Compensator (Single)	31-6161	.30
5	Antenna Transformer (Range 3)	32-2384	1.20
6	Condenser (.05 mfd. tubular)	30-4444	.20
7	R. F. Transformer (Range 1)	32-2379	.40
8	R. F. Transformer (Range 2)	32-2382	1.00
9	R. F. Transformer (Range 3)	32-2385	1.20
10	Compensator (Single)	31-6160	.30
11	Condenser (.05 mfd. tubular)	30-4020	.20
12	Condenser (.15 double bakelite both sections used)	6287-DU	.40
13	Resistor (32,000 ohms, ½ watt)	33-332339	.20
14	Resistor (10,000 ohms, ½ watt)	33-310339	.20
15	Condenser (250 mmfd. mica)	30-1032	.25
16	Oscillator Transformer (Range 3)	32-2386	
17	Condenser (3500 mmfd.)	31-6156	.60
18	Condenser (1650 mmfd.)	31-6155	.40
19	Switch (Magnetic Tuning, manual)	42-1281	
20	Oscillator Transformer (Range 2)	32-2383	.70
21	Compensator (Three section)	31-6170	.75
22	Compensator (Osc. series)	31-6151	.40
23	Resistor (85 ohms, ½ watt)	33-085339	.20
24	Resistor (99,000 ohms, ½ watt)	33-399339	.20
25	Resistor (99,000 ohms, ½ watt)	33-399339	.20
26	Condenser (110 mmfd. mica)	30-1031	.20
27	Condenser (110 mmfd. mica)	30-1031	.20
28	Resistor (700 ohms, ½ watt)	33-170339	.20
29	Osc. Transformer (Range 1)	32-2373	1.60
30	Condenser (.01 mfd. tubular)	30-4479	.20
31	Resistor (100 ohms, ½ watt)	33-110339	.20
32	Condenser (.05 mfd. tubular)	30-4020	.20
33	Condenser (.1 mfd. tubular)	30-4455	
34	Condenser (.05 mfd. tubular)	30-4123	.20
35	Electrolytic Condenser (16 mfd.)	30-2118	1.65
36	Tuning Condenser	31-1963	4.00
37	Magnetic Tuning Switch (Automatic Dial)	45-2330	1.20
38	Range Switch (Ant.)	42-1282	.75
39	Range Switch (R. F.)	42-1283	.75
40	Range Switch (Osc.)	42-1284	
41	Condenser (.03 mfd. tubular)	30-4449	.20
42	Condenser (.006 mfd. tubular)	30-4445	.20
43	1st I. F. Transformer	32-2449	2.20
44	Condenser (.15 dual bakelite)	6287-DG	.40
45	Resistor (1000 ohms, ½ watt)	33-210339	.20
46	Resistor (490,000 ohms, ½ watt)	33-449339	.20
47	Resistor (490,000 ohms, ½ watt)	33-449339	.20
48	Condenser (110 mmfd. dual bakelite)	8035-DG	.25
49	Resistor (51,000 ohms, ½ watt)	33-351339	.20
50	Resistor (490,000 ohms, ½ watt)	33-449339	.20
51	Resistor (2 megohm, ½ watt)	33-520339	$0.20
52	Resistor (2 megohm, ½ watt)	33-520339	.20
53	2nd I. F. Transformer (Discrim)	32-2376	3.30
54	Compensator	31-6147	.40
55	Resistor (1 megohm, ½ watt)	33-510339	.20
56	Resistor (1 megohm, ½ watt)	33-510339	.20
57	Condenser (110 mmfd. dual bakelite)	8035-DG	.25
58	Resistor (1 megohm, ½ watt)	33-510339	.20
59	Resistor (330,000 ohms, ½ watt)	33-433339	.20
60	Resistor (490,000 ohms, ½ watt)	33-449339	.20
61	Condenser (.1 mfd. dual bakelite)	4989-DG	.40
62	Resistor (1 megohm, ½ watt)	33-510339	.20
63	Condenser (.015 mfd. tubular)	30-4358	.20
64	Resistor (1 megohm, ½ watt)	33-510339	.20
65	Condenser (110 mmfd. mica)	30-1031	.20
66	Condenser (60 mfd. mica)	30-1040	.20
67	Volume Control	33-5158	1.00
68	Resistor (40,000 ohms, ½ watt)	33-340339	.20
69	Condenser (.01 mfd. tubular)	30-4479	.20
70	Electrolytic Condenser (10, 20 mfd.)	30-2183	2.00
71	Tone Control and A. C. Switch	42-1267	.75
72	Electrolytic Condenser (8 mfd.)	30-2024	1.10
73	Resistor (9,000 ohms, 2 watt)	33-290539	.30
74	Resistor (7,500 ohms, 3 watt)	33-275639	.30
75	Resistor (32,000 ohms, ½ watt)	33-332339	.20
76	Resistor (1 megohm, ½ watt)	33-510339	.20
77	Condenser (.05 mfd. bakelite)	8326-SU	.35
78	Condenser (.015 mfd. dual bakelite)	3793-DG	.40
79	Power Transformer (115 A. C., 50 to 60 cycles)	32-7606	6.25
	(115 A. C., 25 to 40 cycles)	32-7607	9.00
80	Resistor Bias (128 ohms)	33-3280	.30
81	Condenser (.003 mfd. tubular)	30-4469	.20
82	Resistor (190,000 ohms, ½ watt)	33-419339	.20
83X	Resistor (330,000 ohms, ½ watt)	33-433339	.20
83	Resistor (490,000 ohms, ½ watt)	33-449339	.20
84	Condenser (.01 mfd. tubular)	30-4169	.20
85	Condenser (.01 mfd. tubular)	30-4469	.20
86	Condenser (.03 mfd. bakelite)	8318-SU	.35
87	Resistor (99,000 ohms, ½ watt)	33-399339	.20
88	Resistor (3500 ohms, ½ watt)	33-235339	.20
89	Output Transformer (H-30)	32-7754	1.50
90	Cone and Voice Coil (H-30)	36-3801	1.20
91	Field Coil (H-30)	36-3687	4.00
92	Pilot Lamp	34-2039	.07
93	Ring and Arm Insulated (Audio shorting switch)	28-4110	.15
	Ring and Contact (Audio shorting switch)	45-2350	.15
	Washer Flat Fibre	27-8361	.01
	Washer Flat Fibre	27-8351	.01
	Collar Fibre	27-8389	

Description	Part No.	List Price
Automatic Dial (complete)	31-1960	$25.00
Brace	28-4119	.05
Cable (A. C.)	L-2183	.40
Cable (speaker)	41-3258	.50
Coupling (Tuning Condenser)	31-1961	.80
Coupling (Range Switch)	28-7198	.15
Clip (Volume Shaft)	28-4394	.01
Control Screws (Station Index)	31-1898	.15
Dial	27-5283	
Dial Escutcheon Assembly	45-2324	.40
Gear "Front" (Dial Assembly)	45-2347	.60
Gear "Rear" (Dial Assembly)	45-2348	.60
Guide (Mask)	28-4118	.25
Handle (Dial)	45-2389	.50
Hub Assembly (Handle)	45-2344	.50
Housing (Control Screws)	28-7196	1.00
Mask and Link Assembly	45-2401	
Plate (Drive Mtg. Assembly)	45-2349	
Pilot Lamp Assembly	38-7706	.35
Reflector Ring	28-4630	.25
Ring (Retaining Mask Assembly)	28-7195	.20
Rubber (Chassis Mtg.)	27-4116	.08
Rubber Spacer (Chassis Mtg.)	27-4360	.04
Screen Holder Assembly	31-1968	
Shield (Chassis Bottom)	28-4626	.30
Shield (Tube—Square)	28-2726	.10
Shield (Tube—Round)	8005	.10
Shaft (Volume Control)	38-8285	
Shaft and Plate (Range Switch)	42-1287	.50
Spring (Volume Shaft)	28-4117	.40 C
Socket (7 prong)	27-6057	.11
Socket (8 prong)	27-6058	.11
Socket (Rectifier)	27-6052	.11
Spacer (Wood)	27-2116	.06
Terminal Panel (Ant.)	38-7714	.15
Vernier Drive	45-2342	2.40
Washer (Dial Scale)	27-8398	.01

CABINET PARTS

Baffle Speaker	16304	
Bezel Assembly	40-5980	
Bezel Gasket	27-8517	.05
Plate (Fibre)	27-7497	.01
Silk	44-1190	
Speaker H-30	36-1295	
Washer	28-2089	.50 C
Knob (Range Switch)	27-4326	.10
Knob (Tuning)	27-4330	.10
Knob (Tuning Vernier)	27-4331	.10
Knob (Tone and Volume)	27-4332	.10

MODEL 37-9
Alignment, Voltage
Chassis, Trimmers

PHILCO RADIO & TELEV. CORP.

Alignment of Compensators

EQUIPMENT REQUIRED: (1) Signal Generator; **Philco Model 088** (fundamental frequency 110 to 20,000 K. C.) is the correct instrument for this purpose; (2) Output meter; **Philco Model 025** Circuit Tester incorporates a sensitive output meter and is recommended; (3) Fibre handle screw-driver (Philco Part No. 27-7059); (4) Special variable condenser (Philco Part No. 45-2325).

OUTPUT METER: The 025 Output Meter is connected to the plate and cathode terminals of one of the (6F6G) tubes. Adjust the meter to use the (0-30) volt scale.

INTERMEDIATE FREQUENCY CIRCUIT

1. Set controls as follows:
   a. Magnetic Tuning "off" (19)
   b. Bass compensation minimum
   c. Volume control maximum (67)
   d. Receiver Dial 580 K. C.
   e. Signal Generator 470 K. C.
   f. Range switch position 1

2. Adjust the I. F. compensators for maximum with signal generator output lead connected through a .1 mfd. condenser to the grid of the tubes as follows:

Input Point	Compensators in Order
6A8G—1st Det.	(54) (53P) (43S) (43P)

RADIO FREQUENCY CIRCUIT

Tuning Range 530 to 1720 K. C.

1. Connect the signal generator output lead through a .1 mfd. condenser to terminal 1 and the generator ground to terminal 3 on aerial input panel. Terminals 2 and 3 must be connected with the shorting link provided on the aerial panel.

2. Other controls set as given under intermediate frequency circuit, with the exception of those as follows:

Adjust compensators for maximum output as follows:

Range Switch	Signal Generator	Receiver Dial	Compensators in Order
1	1600 K. C.	1600 K. C.	(21) (36B) (36A)
1	580 K. C.	580 K. C.	(22) Roll gang through signal when padding this compensator
1	1600 K. C.	1600 K. C.	(21)
1	1500 K. C.	1500 K. C.	(36A) (36B)

Tuning Range 2.3 to 7.4 M. C.

Adjust compensators for maximum output as follows:

Range Switch	Signal Generator	Receiver Dial	Compensators in Order
2	6 M. C.	6 M. C.	(21A)

Tuning Range 7.35 to 22 M. C.

Adjust compensators for maximum output as follows:

Range Switch	Signal Generator	Receiver Dial	Compensators in Order
3	18 M. C.	18 M. C.	(21B) Check image at 17.06 M. C.
3	18 M. C.	18 M. C.	(10) (4) Use shunt condenser on (21B) or rock gang through signal when padding compensator No. 10
3	18 M. C.	18 M. C.	(21B)

MAGNETIC TUNING ADJUSTMENT—Set the range switch in position one (530 to 1720 K. C.) and the magnetic tuning switch in the "out" position. Now turn the signal generator and receiver dial to any frequency in the Broadcast band. The receiver dial must be adjusted very accurately for maximum output.

Set the magnetic tuning control in the "on" position (clockwise). Compensator (53S) of the magnetic tuning transformer is now adjusted for maximum output.

The above adjustment is now checked for accuracy, by turning the magnetic tuning control "off" and "on." When this is done, there should be no change in the tone of the received signal. If a change of tone or hiss develops, it indicates a shift in frequency and the adjustment must be made again.

Electrical Specifications

Power Supply: Voltage	Frequency Cycles	Consumption
115	50 to 60	110 watts
115	25 to 40	110 watts

Intermediate Frequency: 470 K. C.

Undistorted Output: 5 watts.

Tone Control: 3 positions.

Speaker: H-30.

December, 1936

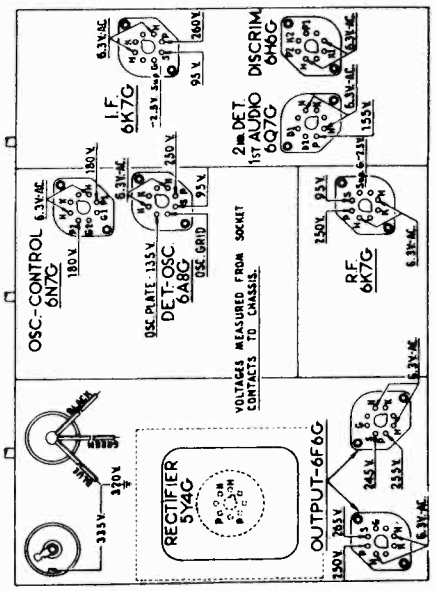


Fig. 1—Receiver Socket Voltages

The voltages indicated by arrows were measured with a Philco 025 Circuit Tester which contains a voltmeter having a resistance of 1000 ohms per volt. Volume Control at minimum, range switch in broadcast position, line voltage 115 A. C.

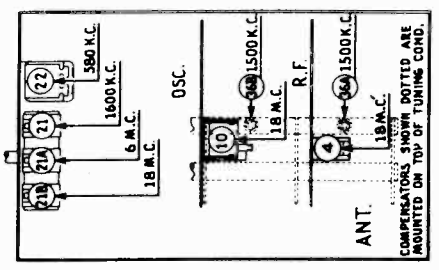


Fig. 3—R. F. Compensators

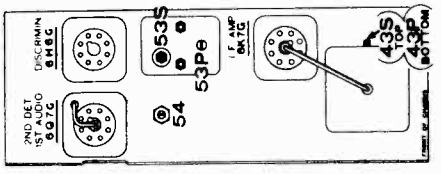


Fig. 2—I. F. Compensators

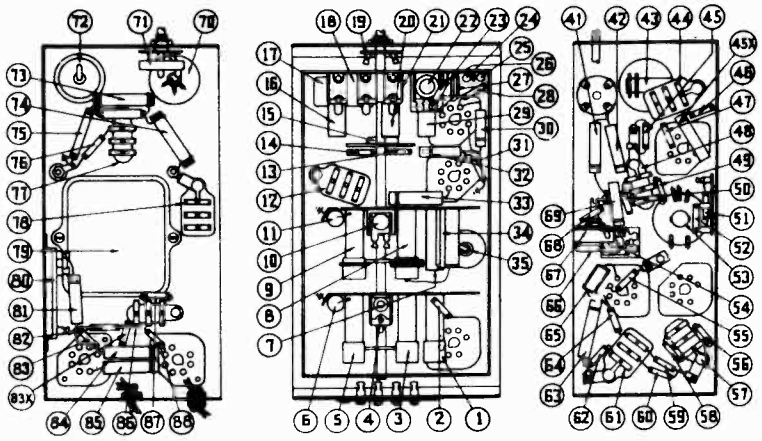


Fig. 4—Part Locations, Underside of Chassis

MODELS 37-10,37-11
Schematic

PHILCO RADIO & TELEV. CORP.

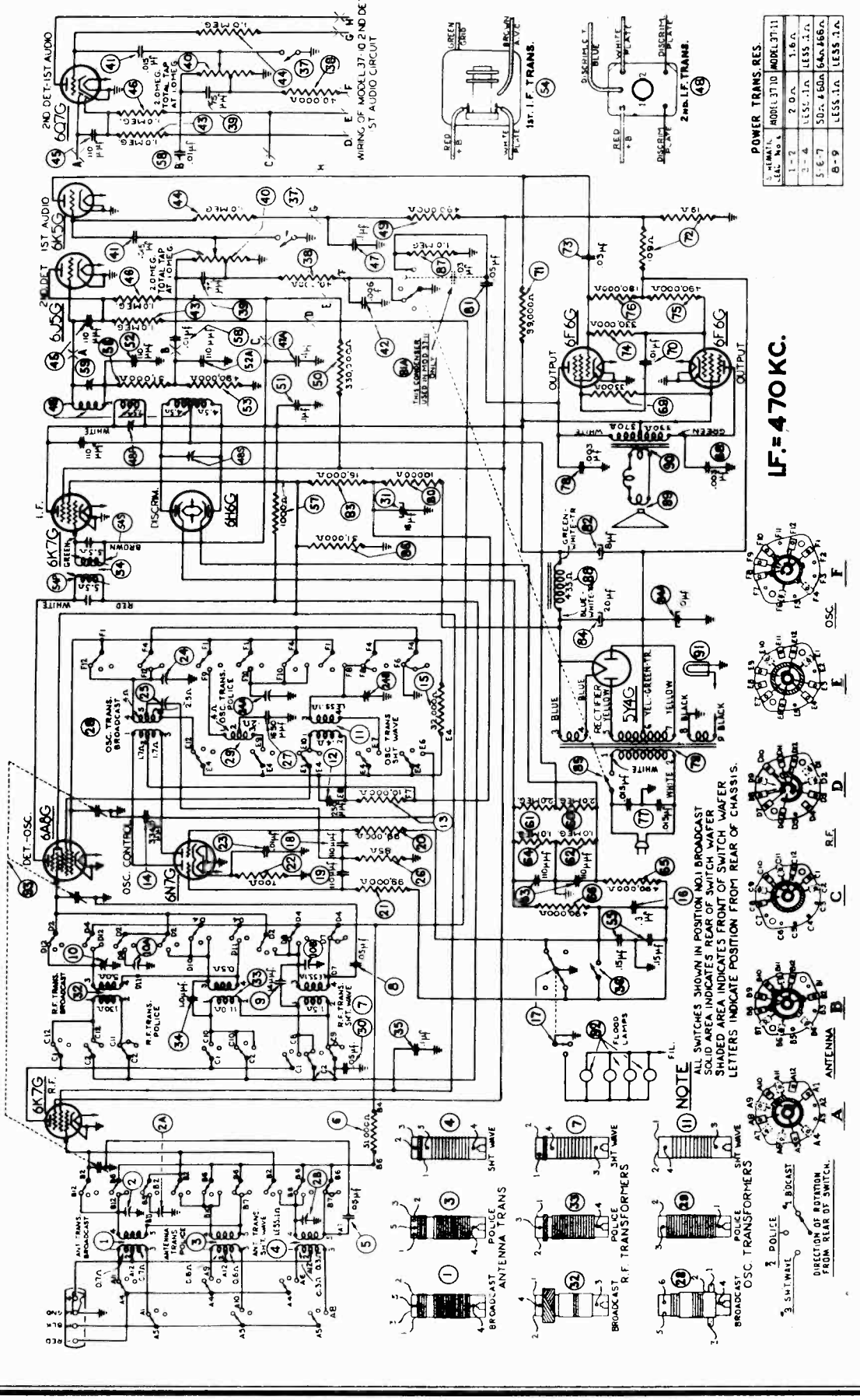


Fig 4. Schematic Diagram

Models 37-10, 37-11

November 1936

Printed in U. S. A

MODELS 37-10, 37-11
Alignment, Trimmers

PHILCO RADIO & TELEV. CORP.

POWER SUPPLY:

Voltage	Frequency Cycles	Consumption 37-10	Consumption 37-11
115	50 to 60	120 watts	125 watts
115	25 to 40	125 watts	130 watts

INTERMEDIATE FREQUENCY: 470 K. C.

UNDISTORTED OUTPUT: 37-10, 5 watts. 37-11, 7 watts.

TUNING RANGES: Three.
Range 1—530 to 1720 K. C.
Range 2—2.3 to 7.4 M. C.
Range 3—7.35 to 22 M. C.

Fig. 7

Fig. 8. R. F. Compensators, Underside of Chassis

Models 37-10 and 37-11

Alignment of Compensators

EQUIPMENT REQUIRED: (1) Signal Generator: Philco Model 088 (fundamental frequency 110 to 20,000 K. C.) is the correct instrument for this purpose; (2) Output meter: Philco Model 025 Circuit Tester incorporates a sensitive output meter and is recommended; (3) Fibre handle screw-driver (Philco Part No. 27-7059); (4) Special variable condenser (Philco Part No. 45-2325).

OUTPUT METER: The 025 Output Meter is connected to the plate and cathode terminals of one of the (6F6G) tubes. Adjust the meter to use the (0-30) volt scale.

INTERMEDIATE FREQUENCY CIRCUIT

1. Set controls as follows:
   - a. Magnetic Tuning "off"
   - b. Bass compensation minimum
   - c. Volume control maximum
   - d. Receiver Dial 580 K. C.
   - e. Signal Generator 470 K. C.
2. Adjust the I. F. compensators for maximum with signal generator output lead connected through a .1 mfd. condenser to the grid of the tubes as follows:

Input Point	Compensators in Order
6K7G—1st I. F.	(59) (48P)
6A8G—1st Det.	(54S) (54P)

RADIO FREQUENCY CIRCUIT

Tuning Range 7.35 to 22 M. C.

1. Connect the signal generator output lead through a .1 mfd. condenser to terminal 1 and the generator ground to terminal 3 on aerial input panel. Terminals 2 and 3 must be connected with the shorting link provided on the aerial panel.
2. Other controls set as given under intermediate frequency circuit, with the exception of those as follow:

Range Switch	Signal Generator	Receiver Dial	Compensators In Order
3	18 M. C.	18 M. C.	(24B) See Note A
3	18 M. C.	18 M. C.	(10B) (2B) Use shunt condenser on (24B) (Note B)
3	18 M. C.	18 M. C.	(24B) (Note A)

Tuning Range 2.3 to 7.4 M. C.

Adjust compensators for maximum as follows:

Range Switch	Signal Generator	Receiver Dial	Compensators In Order
2	7 M. C.	7 M. C.	(24A)
2	6 M. C.	6 M. C.	(10A) (2A)

Tuning Range 530 to 1720 K. C.

Adjust compensators for maximum as follows:

Range Switch	Signal Generator	Receiver Dial	Compensators In Order
1	1600 K. C.	1600 K. C.	(24) (10) (2)
1	580 K. C.	580 K. C.	(25) Roll gang
1	1600 K. C.	1600 K. C.	(24)
1	1500 K. C.	1500 K. C.	(10) (2)

MAGNETIC TUNING ADJUSTMENT

Set the range switch in position one (530 to 1720 K. C.) and the magnetic tuning switch in the "out" position. Now turn the signal generator and receiver dial to any frequency in the Broadcast band. The receiver dial must be adjusted very accurately for maximum output.

Set the magnetic tuning control in the "on" position (clockwise). Compensator (48S) of the magnetic tuning transformer is now adjusted for maximum output.

The above adjustment is now checked for accuracy, by turning the magnetic tuning control "off" and "on". When this is done, there should be no change in the tone of the received signal. If a change of tone or hiss develops, it indicates a slift in frequency and the adjustment must be made again.

NOTE "A"—To accurately adjust the compensator to the fundamental and not the image signal, turn the oscillator compensator to the maximum capacity position clockwise. Then slowly turn the compensators counter-clockwise until a second maximum peak is obtained on the output meter. The first peak is the image signal and the receiver must not be adjusted to it. If the above procedure is correctly performed, the image signal will be found 940 K. C. below the frequency being used.

NOTE "B"—To eliminate the effect of the R. F. compensator detuning the Osc. circuit, a variable tuning condenser, Philco Part No. 45-2325 is connected from the oscillator compensator to ground when designated in the padding instruction above. Tune the added condenser until the second harmonic of the receiver oscillator beats against the signal from the generator, resulting in a maximum indication on the output meter. Then adjust compensators as noted for maximum output.

TONE CONTROL: 37-10—3 Positions. 37-11—4 Positions.

SPEAKER: H-30.

PHILCO TUBES USED: 37-10—Nine. Two 6K7G; one 6A8G; one 6N7G; one 6H6G; one 6Q7G; two 6F6G, and one 5Y4G. **37-11**—Ten. Two 6K7G; one 6A8G; one 6N7G; one 6H6G; one 6K5G; one 6J5G; two 6F6G, and one 5Y4G.

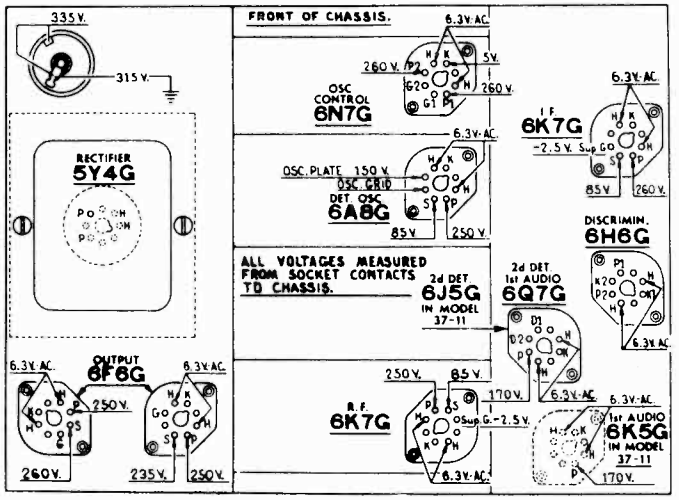


Fig. 1. Socket Voltages 37-10-11
Underside of Chassis View

The voltages indicated by arrows were measured with a **Philco 025 Circuit Tester** which contains a voltmeter having a resistance of 1000 ohms per volt. Volume Control at minimum, range switch in broadcast position, line voltage 115 A. C.

Aerial Connections

To obtain the full advantage of the sensitivity of this receiver, the Philco High Efficiency Aerial supplied with the receiver must be used. The connections for the aerial are as follows:

The red and black leads of the High-Efficiency Aerial "transmission line" are connected to terminals 1 and 2 respectively, of the terminal panel provided on the rear of the chassis. Connect the jumper on the terminal panel across terminals 3 and 4.

If a temporary aerial is used, the jumper should be across terminals 2 and 3. The aerial connects to terminal 1 and the ground lead to terminal 3. A good ground connection is desirable in all installations.

Dial Calibration

In order to adjust this receiver correctly the dial must be aligned to track properly with the tuning condenser. To do this proceed as follows:

1. Loosen the shaft coupling set screws. Then turn the tuning condenser fully closed and the dial to the first index line. Now tighten the shaft coupling set screws, and rotate the dial until the 520 K.C. mark is midway between the index line and the glowing beam indicator.

2. With condenser in this position loosen the set screws of the shaft coupling on the tuning condenser.

3. Then turn the tuning dial until the glowing beam indicator is centered on the index line.

NOTE: Be careful when turning the dial that the position of the tuning condenser is not disturbed.

4. Now tighten the shaft coupling set screws.

NOTE

Models 37-10 and 37-11 are similar in circuit design, with the exception that the 6Q7G tube, 2nd Det. 1st Audio in the 37-10 is replaced with a 6J5G as a diode detector and a 6K5G tube for 1st audio stage in the Model 37-11. The schematic diagram Fig. 3 shows the complete circuit of the 37-11 receiver, also the 6Q7G, 2nd Det. 1st Audio circuit of the 37-10. The parts of these two chasses are the same with the exception of condenser (**81A**) in the tone control circuit and the tone controls. In Model 37-10 the condenser is Part No. 3615-SU .05 mfd., and in the 37-11 it is Part No. 3615-YU .05 mfd., .03 mfd.

Resistor locations in both receiver power units are slightly different as will be noted in Figs. 5 and 7.

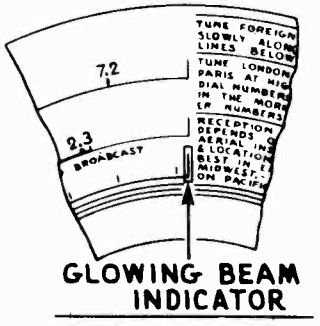


Fig. 2. Dial Calibration

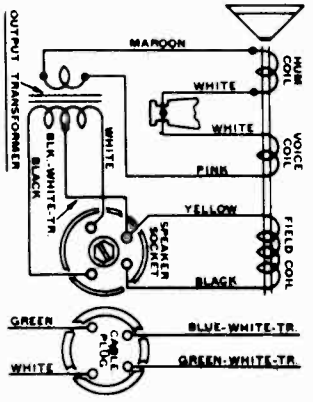


Fig. 3. Speaker

TYPE CIRCUIT: Superheterodyne, with Automatic (Dial) Tuning, and Magnetic Tuning control on the broadcast range.

Both receivers use a push-pull pentode audio output circuit. The 37-11 receiver however, uses a 6J5G, second detector and 6K5G 1st audio tube.

DIAL MECHANISM: Philco Automatic Dial Tuning System.

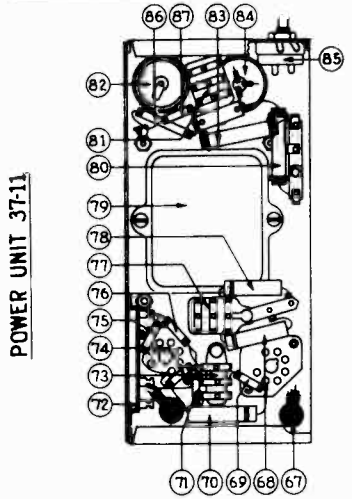


Fig. 5. 37-11 Power Unit Base View

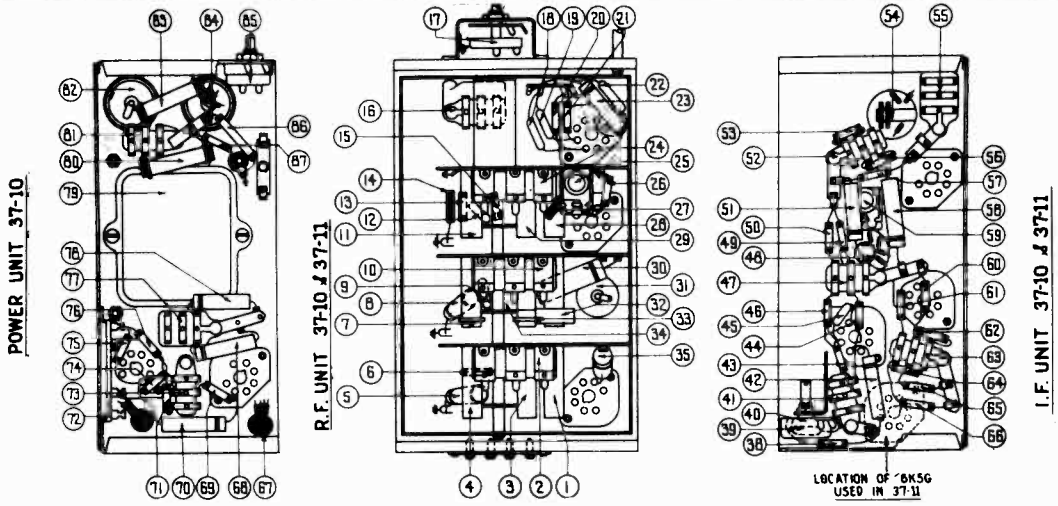


Fig. 6. 37-10-11 R. F., I. F. Base View and 37-10 Power Unit Base View

Replacement Parts—Models 37-10-11

Prices Subject to Change Without Notice

Schem. No.	Description	Part No.	List Price
1	Antenna Transformer (Range 1)	32-2108	$1.60
2	Compensator (Three section)	31-6092	.60
3	Antenna Transformer (Range 2)	32-2119	1.20
4	Antenna Transformer (Range 3)	32-2109	1.20
5	Condenser (.05 mfd. tubular)	30-4020	.20
6	Resistor (51,000 ohms, ½ watt)	33-351339	.20
7	R. F. Transformer (Range 3)	32-2126	.70
8	Condenser (.05 mfd. tubular)	30-4020	.20
9	Condenser (14 mmfd. mica)	30-1073	.20
10	Compensator (Three section)	31-6092	.60
11	Oscillator Transformer (Range 3)	32-2110	.70
12	Condenser (250 mmfd. mica)	30-1032	.25
13	Resistor (10,000 ohms, ½ watt)	33-310339	.20
14	Condenser (3340 mmfd. semi-fixed)	31-6152	.60
15	Resistor (32,000 ohms, ½ watt)	33-332339	.20
16	Condenser (.15 mfd. dual)	6287-DU	.40
17	Magnetic Tuning Switch	42-1269	.75
18	Condenser (.10 mmfd. mica)	30-1031	.20
19	Condenser (110 mmfd. mica)	30-1031	.20
20	Resistor (99,000 ohms, ½ watt)	33-399339	.20
21	Resistor (99,000 ohms, ½ watt)	33-399339	.20
22	Resistor (700 ohms)	33-1220	.20
23	Condenser (.01 mfd. tubular)	30-4169	.20
24	Compensator (Three section)	31-6149	.75
25	Compensator (Broadcast series)	31-6151	.40
26	Resistor (85 ohm, ½ watt)	33-085339	
27	Condenser (1650 mfd. semi-fixed)	31-6096	.40
28	Oscillator Transformer (Range 1)	32-2336	1.60
29	Oscillator Transformer (Range 2)	32-2121	.70
30	Condenser (.05 mfd. tubular)	30-4123	.20
31	Electrolytic Condenser (16 mfd.)	30-2118	1.65
32	R. F. Transformer (Range 1)	32-2105	1.00
33	R. F. Transformer (Range 2)	32-2106	.70
34	Condenser (Lug & Wire Twisted)	38-7878	.04
35	Condenser (.1 mfd. tubular)	30-4455	
36	Magnetic Tuning Switch (Automatic Dial)	45-2330	1.20
37	Audio Shorting Switch (Automatic Dial)	28-4110	.15
		45-2350	.15
	Washer Insulator for above switch	27-8361	.01
38	Resistor (40,000 ohms, ½ watt)	33-340339	.20
39	Condenser (75 mmfd. mica)	30-1053	.20
40	Volume Control	33-5158	1.00
41	Condenser (.015 mfd. bakelite)	3793-SU	.35
42	Condenser (.006 mfd. tubular)	30-4445	$0.20
43	Resistor (1.0 megohm, ½ watt)	33-510339	.20
44	Resistor (1.0 megohm, ½ watt)	33-510339	.20
45	Condenser (110 mmfd. mica)	30-1031	.20
46	Resistor (1.0 megohm, ½ watt)	33-510339	.20
47	Condenser (.1 mfd. dual bakelite)	4989-DG	.40
48	2nd I. F. & Discriminator Transformer	32-2362	3.30
49	Resistor (490,000 ohms, ½ watt)	33-449339	.20
50	Resistor (330,000 ohms, ½ watt)	33-433339	.20
51	Condenser (.1 mfd. tubular)	30-4455	.25
52	Condenser (110 mmfd. dual bakelite)	8035-DG	.25
53	Resistor (490,000 ohms, ½ watt)	33-449339	.20
54	1st I. F. Transformer	32-2333	2.20
55	Condenser (.15 mfd. dual bakelite)	6287-DG	.40
56	Resistor (51,000 ohms, ½ watt)	33-351339	.20
57	Resistor (1000 ohms, ½ watt)	33-210339	.20
58	Condenser (.01 mfd. tubular)	30-4479	
59	Compensator	31-6147	.40
60	Resistor (2 megohms, ½ watt)	33-520339	.20
61	Resistor (2 megohms, ½ watt)	33-520339	.20
62	Resistor (1 megohm, ½ watt)	33-510339	.20
63	Condenser (110 mmfd. dual bakelite)	8035-DG	.25
64	Resistor (1 megohm, ½ watt)	33-510339	.20
65	Resistor (490,000 ohms, ½ watt)	33-449339	.20
66	Resistor (490,000 ohms, ½ watt)	33-449339	.20
67	Speaker Cord	41-3258	
68	Condenser (.003 mfd. tubular)	30-4469	.20
69	Resistor (3500 ohms, ½ watt)	33-235339	.20
70	Condenser (.01 mfd. tubular)	30-4169	.20
71	Resistor (99,000 ohms, ½ watt)	33-399339	.20
72	Resistor (Bias)	33-3280	.30
73	Condenser (.03 mfd. bakelite)	8318-SU	.35
74	Resistor (330,000 ohms, ½ watt)	33-433339	.20
75	Resistor (490,000 ohms, ½ watt)	33-449339	.20
76	Resistor (190,000 ohms, ½ watt)	33-419339	.20
77	Condenser (.015 mfd. dual bakelite)	3793-DG	.40
78	Condenser (.003 mfd. tubular)	30-4469	.20
79	37-10 Power Transformer (115 V., 50 to 60 cycles)	32-7606	6.25
	37-10 Power Transformer (115 V., 25 to 40 cycles)	32-7607	9.00
	37-10 Power Transformer (115-240 V., 50 to 60 cycles)	32-7608	8.00
	37-11 Power Transformer (115 V., 50 to 60 cycles)	32-7640	
	37-11 Power Transformer (115 V., 25 to 40 cycles)	32-7641	
	37-11 Power Transformer (115-240 V., 50 to 60 cycles)	32-7642	
80	37-10 Resistor (10,000 ohms, 2 watt)	33-310639	$0.30
81	Condenser (.05 mfd. bakelite) 37-10	3615-SU	.35
	Condenser (.03, .05 mfd. bakelite) 37-11	3615-YU	
82	Electrolytic Condenser (8 mfd.)	30-2024	1.10
83	Resistor (15,000 ohms, 3 watt)	33-315639	.30
84	Electrolytic Condenser (10, 20 mfd.)	30-2183	2.00
85	Bass Comp. Control & A.C. switch (37-10)	42-1267	
	Bass Comp. Control & A.C. switch (37-11)	42-1268	
86	Resistor (51,000 ohms, 1 watt)	33-351439	.20
87	Resistor (1 megohm, ½ watt)	33-510339	.20
88	Speaker Field Assembly (H30)	36-3687	4.00
89	Cone Voice Coil (H30)	36-3801	
90	Output Transformer (H30)	32-7754	1.50
91	Pilot Lamp	34-2039	.07
92	Floodlight Assembly	38-8210	2.40
93	Tuning Condenser	31-1948	3.75
	Antenna Terminal Panel	38-7714	.15
	Automatic Dial Assembly	31-1949	25.00
	Brace (Drive Mtg.)	28-4119	.05
	Bracket (Drive Mtg. Assembly)	31-1901	1.80
	Cable & Plug (Pilot lamps)	41-3253	
	Cable & Plug (Speaker)	41-3258	
	Cable Power	L-2183	.40
	Coupling Assembly (Tuning Shaft)	31-1961	
	Set Screws Assembly	W-650	.40 C
	Set Screws Assembly	W-644	1.50 C
	Control Screws (Station Index)	31-1898	.15
	Dial	27-5271	1.00
	Dial Guide	27-8580	.03
	Dial Screen Holder	31-1968	
	Dial Escutcheon Assembly	45-2324	.40
	Gear No. 1 Front (Dial Assembly)	45-2347	
	Gear No. 2 Rear (Dial Assembly)	45-2348	.60
	Handle (Dial)	45-2329	
	Handle (Hub Assembly)	45-2344	
	Housing (Control Screw)	28-7196	1.00
	Mask Guide	28-4118	.25
	Mask	27-5272	$0.60
	Mask & Link Assembly	45-2367	
	Pilot Lamp Assembly	38-8407	
	Pilot Lamp Assembly (Auto Dial)	38-8210	2.40
	Ring (Retaining Handle Hub)	28-8630	.02
	Ring (Retaining Mask Assembly)	28-7195	.20
	Reflector Ring	28-4099	.35
	Range Switch Ant.	42-1200	
	Range Switch R. F.	42-1245	
	Range Switch Osc.	42-1274	
	Range Switch Index Plate & Shaft	42-1265	.50
	Range Switch Shaft Coupling	28-7198	.15
	Station Tab Kit	40-6056	
	Set Screw	W-481	2.00 C
	Socket (7 Prong)	27-6057	
	Socket (8 Prong)	27-6058	
	Socket (Rectifier)	27-6052	
	Shield (Tube) (Square)	27-2726	.10
	Shield Base	28-3898	.03
	Shield Tube (Round)	8005	.10
	Shaft (Volume Control)	38-8198	
	Paper Tube (Vol. Shaft)	27-8530	.01
	Retaining Clip (Vol. Shaft)	28-4394	.01
	Spring (Vol. Shaft)	28-4117	.40 C
	Spring (Mask retaining ring)	28-8629	.04
	Speaker (H-30)	36-1295	
	Vernier Drive	45-2342	2.40
	Washer (Dial ring contact)	27-8361	
	Washer (Dial scale)	27-8398	.01

CABINET PARTS

37-10

Baffle (Wood) (Speaker)	23553	
Baffle & Silk Assembly	40-5976	.60

37-11

Baffle & Silk Assembly	40-6015	
Baffle (Wood) (Speaker)	24231	

37-10-11

Bezel Assembly	40-5980	1.00
Cover (Bezel)	28-4077	.25
Gasket (Bezel)	27-8517	.05
Knob (Range Switch)	27-4326	.10
Knob (Tuning)	27-4330	.10
Knob (Tuning Vernier)	27-4331	.10
Knob (Tone & Volume)	27-4332	.10

MODEL 37-34
Schematic
Parts

PHILCO RADIO & TELEV. CORP.

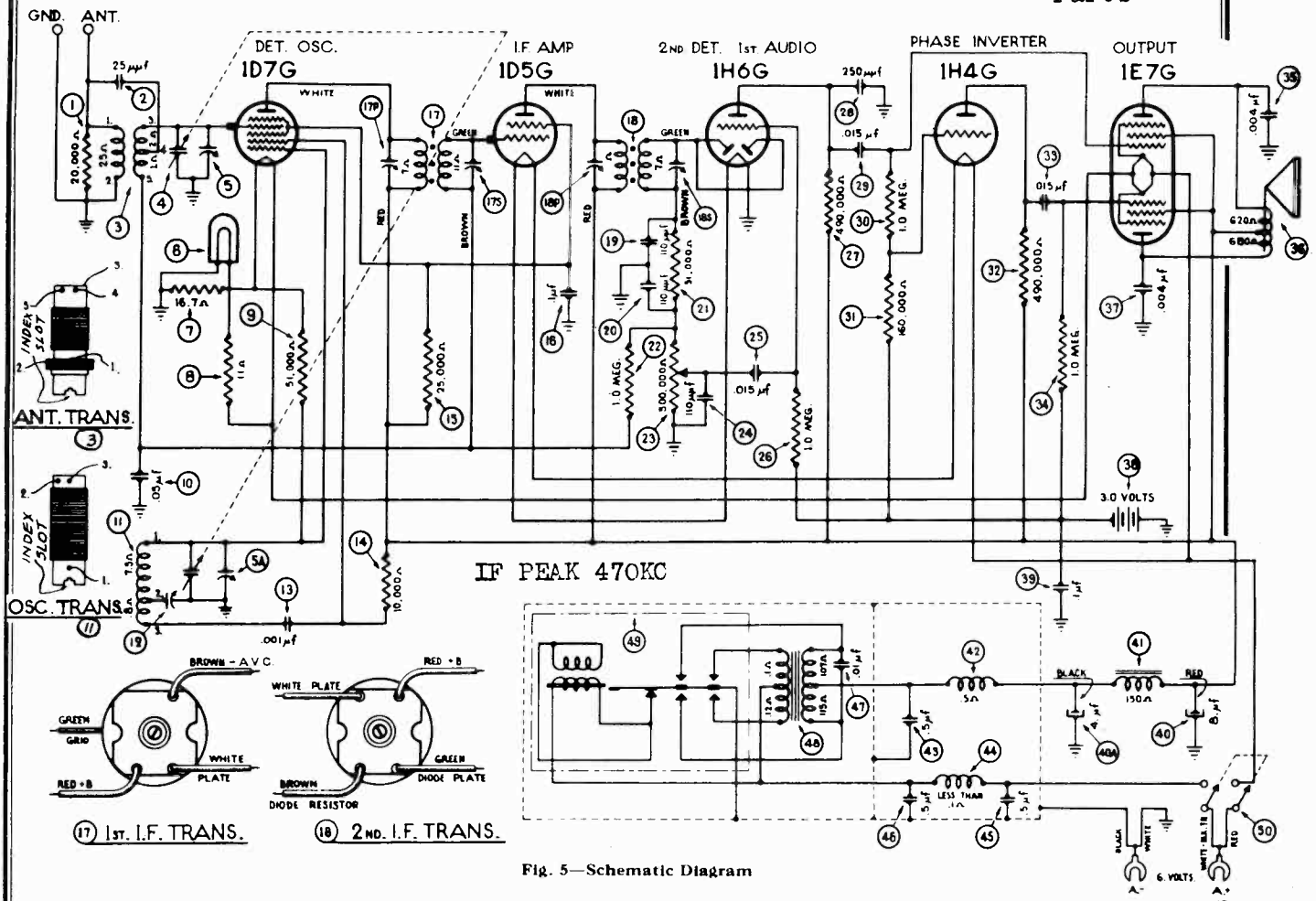


Fig. 5—Schematic Diagram

September 29, 1936

Replacement Parts—Model 37-34

Schem. No.	Description	Part No.	List Price
1	Resistor (20000 ohms ½ watt)	33-320339	$0.20
2	Condenser (25 mmfd. Mica)	30-1067	.20
3	Antenna Transformer	32-2159	1.60
4	Tuning Condenser	31-1828	3.50
5	Compensator (Two section)	31-6145	.50
6	Pilot Lamp	34-2150	.22
7	Resistor (16 ohms flexible)	33-3298	.20
8	Resistor (11 ohms flexible)	33-3297	.20
9	Resistor (51000 ohms, ½ watt)	33-351339	.20
10	Condenser (.05 mfd. tubular)	30-4020	.20
11	Oscillator Transformer	32-2120	1.00
12	Compensator (Osc. 580 K.C.)	04000S	.35
13	Condenser (.001 mfd. tubular)	30-4453	.20
14	Resistor (10000 ohms, ½ watt)	33-310339	.20
15	Resistor (25000 ohms, ½ watt)	33-325339	.20
16	Condenser (.1 mfd. tubular)	30-4122	.20
17	1st I. F. Transformer	32-2100	1.80
18	2nd I. F. Transformer	32-2102	1.80
19	Condenser (110 mmfd. Mica)	30-1031	.20
20	Condenser (110 mmfd. Mica)	30-1031	.20
21	Resistor (51000 ohms ½ watt)	33-351339	.20
22	Resistor (1 megohm ½ watt)	33-510339	.20
23	Volume Control	33-5157	1.00
24	Condenser (110 mmfd. Mica)	30-1031	.20
25	Condenser (.015 mfd. tubular)	30-4358	.20
26	Resistor (1 megohm ½ watt)	33-510339	.20
27	Resistor (490000 ohms ½ watt)	33-449339	.20
28	Condenser (250 mmfd. Mica)	30-1032	.25
29	Condenser (.015 mfd. tubular)	3793SU	.20
30	Resistor (1.0 megohm ½ watt)	33-510339	.20
31	Resistor (160000 ohms ½ watt)	33-416339	.20
32	Resistor (490000 ohms ½ watt)	33-449339	$0.20
33	Condenser (.015 mfd. tubular)	30-4226	.20
34	Resistor (1 megohm ½ watt)	33-510339	.20
35	Condenser (.004 mfd. tubular)	30-4456	.20
36	Cone	45-2315	1.20
37	Condenser (.004 mfd. tubular)	30-4456	.20
38	Bias Cell	41-8009	.30
39	Condenser (.1 mfd. tubular)	30-4122	.20
40	Electrolytic Condenser (4-8 mfd.)	30-2160	2.00
41	Filter Choke	32-7543	1.35
42	B Filter Choke	32-1932	.25
43	Condenser (.5 mfd. metal case)	30-4296	.60
44	"A" Choke	32-1954	.40
45	Condenser (.5 mfd. metal case)	30-4296	.60
46	Condenser (.5 mfd. metal case)	30-4296	.60
47	Condenser (.01 mfd. tubular)	30-4381	.25
48	Power Transformer	32-7682	2.20
49	Vibrator Unit	41-3222	5.25
50	Power Switch	42-1221	.45
	Vernier Drive Assembly	31-1863	
	Pilot Lamp Assembly	38-7875	.45
	Bezel Assembly	40-5987	.30
	Dial	27-5252	.10
	Hub	28-7152	.10
	Clamp	28-2837	.10
	Set Screw	W-1506 C	2.00
	Screen and Bracket Assembly	31-1878	.25
	Knob Dial	27-4321	.10
	Knob (Volume and Power)	27-4332	.10
	Volume Control Shaft	38-8058	.12
	Shaft Retaining Clip	28-4394	.01
	Shaft Spring	28-4117C	$0.40
	Bias Cell Panel	38-7275	.20
	Terminal Panel (R. F. Unit)	38-7963	.05
	Terminal Panel (I. F. Unit)	38-7703	.25
	Terminal Panel (Antenna)	38-7871	.10
	Socket (8 prong)	27-6058	.11
	Socket (7 prong)	27-6057	.11
	Socket (Power Unit)	27-6036	.11
	Shield (Tube)	28-2726	.10
	Shield (I. F. Transformer)	38-7763	.20
	Shield Base	28-3898	.03
	Shield (Vibrator)	38-8022	.25
	Mtg. Grommet (R. F. Unit)	27-4317	.04
	Mtg. Sleeve (R. F. Unit)	28-2257	.01
	Mtg. Washer (R. F. Unit)	W-4436	
	Mtg. Screw (R. F. Unit)	W-729 C	.45
	Mtg. Plate (R. F. Coil)	28-3808	.02
	Mtg. Spacer (R. F. Coil)	27-8228	.01
	Mtg. Screw (R. F. Coil)	W-1635 C	.30
	Mtg. Rubber Chassis	5189	.03
	Mtg. Bushing (Chassis)	27-4359	.02
	Rubber Cushion—Vibrator Unit	27-4287	.05
	Battery Cable	41-3204	1.20
	Speaker Cable	41-3229	.30
	Speaker L2B	36-1256	6.50
	Battery 6 Volt Storage	116-R	
	Baffle and Silk Assembly (B Cabinet)	40-5935	.40
	Baffle and Silk Assembly (F Cabinet)	40-5933	.75

Figures in black type indicate circled figures in Base View.

Prices Subject to Change without Notice

MODEL 37-34
Alignment, Trimmers
Chassis, Voltage

PHILCO RADIO & TELEV. CORP.

Electrical Specifications

Type of Circuit: Superheterodyne, with Push-Pull Pentode Audio Output, using a vibrator unit operated by a 6 volt storage battery for supplying "B" power to the receiver.

Power Supply: 6 volt storage battery Philco Type 116-R.

Current Drain: 1.3 Amps.

Philco Tubes Used: 1D7G, Det.-Osc.; 1D5G, I.F. Amp.; 1H6G, 2nd Det. 1st Audio; 1H4G, Phase Inverter; 1E7G Output.

Frequency Range: 530—1720 K.C.

Intermediate Frequency: 470 K.C.

Speaker: Permanent Magnet Model L2B.

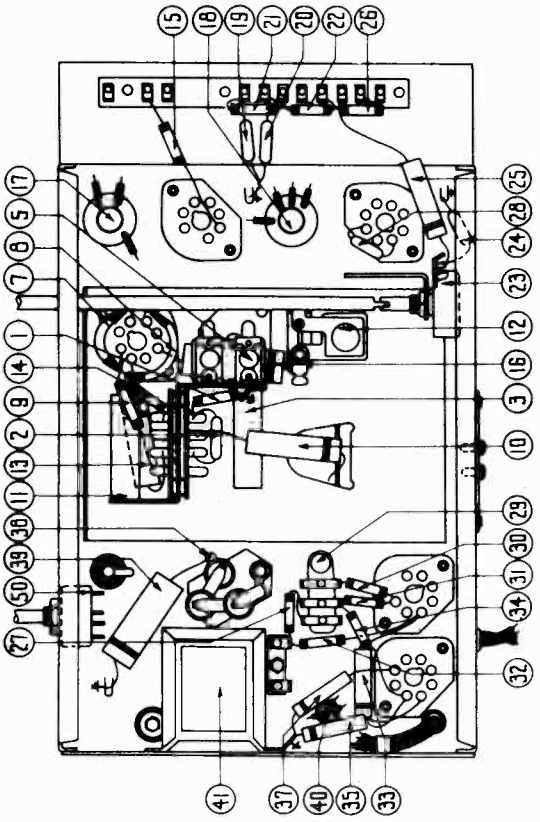


Fig. 4—Parts Locations—underside of chassis

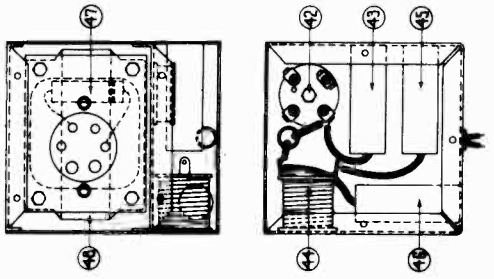


Fig. 3—Power Unit

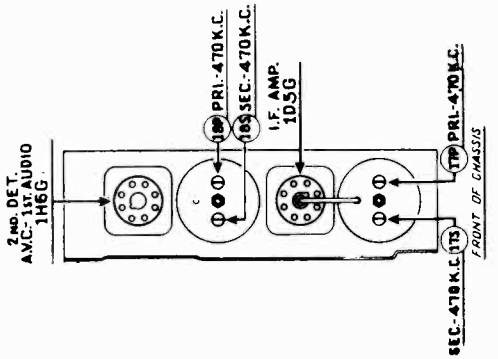


Fig. 2—I. F. Compensators

Aligning Compensators

To accurately adjust this receiver precision test equipment is necessary. A signal generator such as the **Philco Model 088,** covering from 110 to 20,000 K.C. is recommended for adjusting the various compensators at the frequencies specified. A visual indication of the receiver output is also necessary, **Philco Model 025 Circuit Tester** contains a sensitive output meter and is recommended for this purpose.

Philco fibre handle screw-driver **No. 27-7059** and wrench **Part No. 3164** complete the equipment necessary for the following adjustments. The locations of the various compensators are shown in Figs. 1 and 2.

OUTPUT METER—The 025 Output Meter is connected between one of the plate contacts of the 1E7G tube and ground. Adjust the meter to use the (0-30) volt scale.

DIAL ADJUSTMENT—The tuning condenser is set at the maximum capacity position, by turning the knob clockwise. Loosen the set screw of dial hub and set dial, with Glowing Indicator centered between the first and second index lines at the low frequency end of the scale.

INTERMEDIATE FREQUENCY CIRCUIT

1. Connect the 088 Signal Generator output lead through a .1 mfd. condenser to the grid of the 1D7G tube and the generator ground lead to the chassis. Set the generator for 470 K.C. and turn the receiver dial to approximately 580 K.C.

2. Now adjust compensators **18S, 18P, 17S,** and **17P** for maximum output.

RADIO FREQUENCY CIRCUIT

1. Remove the signal generator output lead from the 1D7G tube and connect it through a 200 mmfd condenser to the receiver aerial post.

2. Set the 088 Signal Generator indicator and the receiver dial to 1600 K.C.

3. Now adjust compensators **5A** and **5** for maximum output.

4. The low frequency end of the tuning scale is now adjusted as follows: Set the signal generator at and turn the receiver dial to 580 K.C. Now adjust compensator **12** for maximum output, then vary the tuning condenser of the receiver for maximum output about the 580 K.C. dial mark. Now turn compensator **12** slightly to the right or left and again vary the receiver tuning condenser for maximum output. If the output reading increases, turn compensator **12** in the same direction a trifle more, and vary the tuning condenser again for maximum output. If a decrease in output is noted turn the compensator **12** in the opposite direction. This procedure of first setting the compensator and then varying the tuning condenser is continued until there is no further gain in the output reading.

5. Set the signal generator and receiver dials as given in Paragraph 2 above and adjust compensator **5A** for maximum output.

6. Rotate the signal generator and receiver dials to 1500 K.C. and adjust compensator **5** for maximum output.

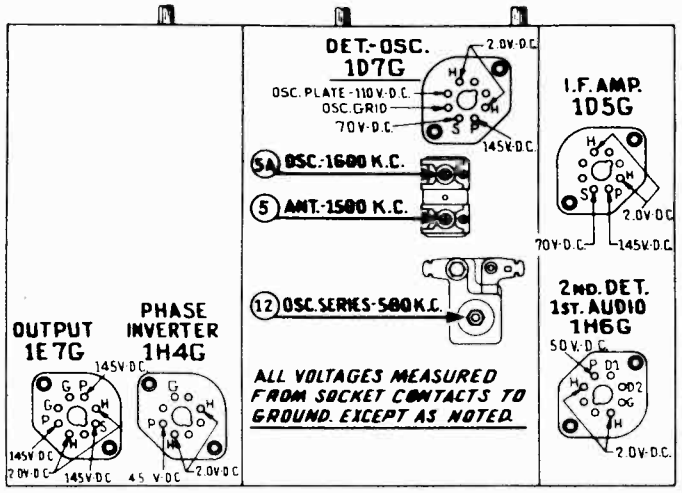


Fig. 1—Socket Voltages and R. F. Compensators

The voltages indicated by arrows were measured with a **Philco 025 Circuit Tester** which contains a voltmeter having a resistance of 1000 ohms per volt. Volume Control at minimum, Storage Battery fully charged.

PHILCO RADIO & TELEV. CORP.

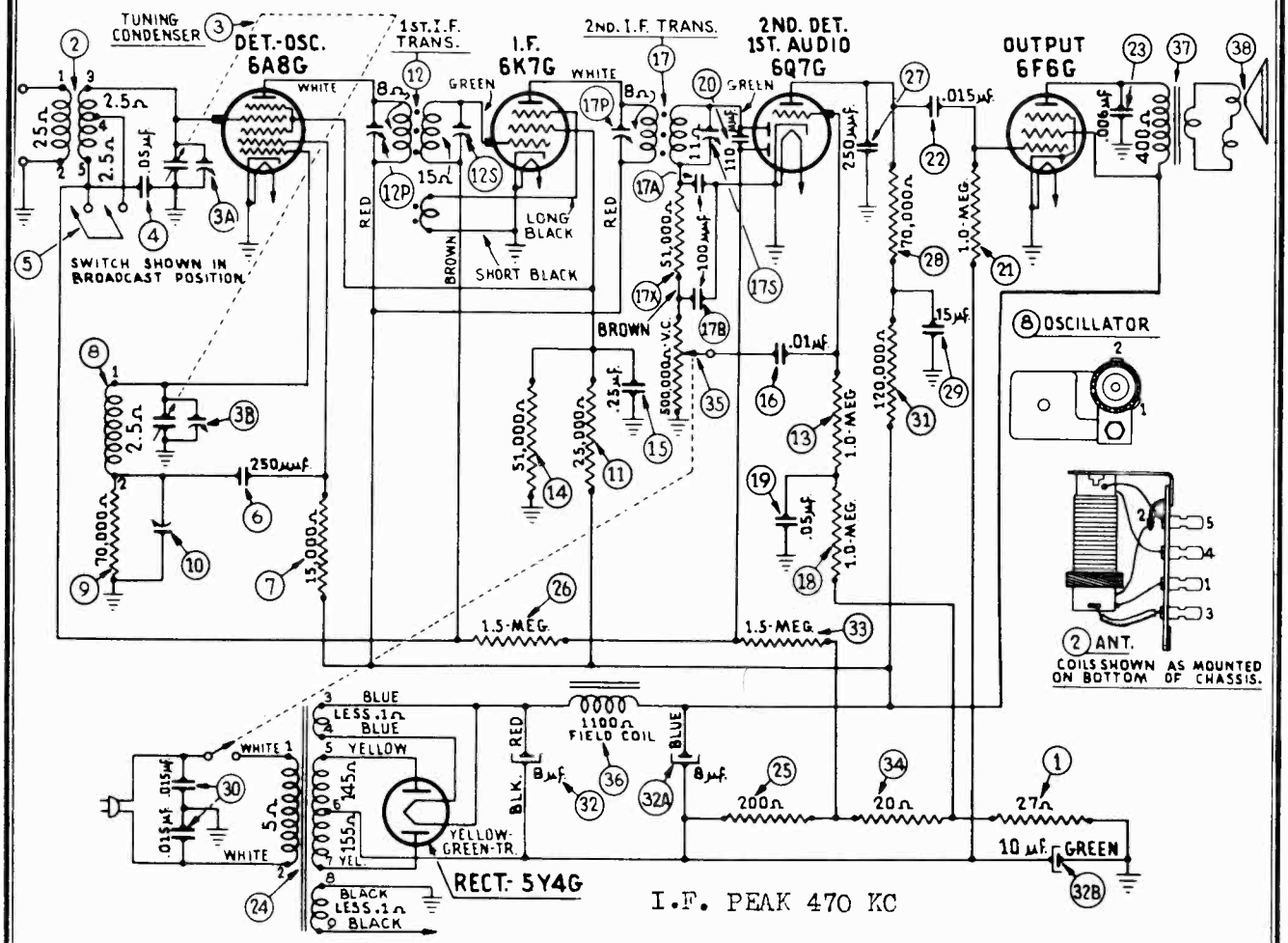


Fig. 4. Schematic Diagram—Model 37-62

Replacement Parts—Model 37-62

January 1937

Schem. No.	Description	Part No.	List Price
1	Resistor (27 ohms ½ watt)	33-027339	$0.20
2	Ant. Transformer	32-2446	
3	Tuning Condenser	31-1989	
4	Condenser (.05 mfd. Tubular)	30-4020	.20
5	Range Switch	42-1299	.60
6	Condenser (250 mmfd. mica)	30-1032	.25
7	Resistor (15000 ohms ½ watt)	33-315339	.20
8	Osc. Transformer	32-2330	
9	Resistor (70000 ohms ½ watt)	33-370339	.20
10	Compensator (Osc. series)	31-6150	
11	Resistor (25000 ohms 1 watt)	33-325439	.20
12	1st I. F. Trans.	32-2311	1.80
13	Resistor (1 megohm ½ watt)	33-510339	.20
14	Resistor (51000 ohms 1 watt)	33-351439	.20
15	Condenser (.25 mfd. tubular)	30-4134	.25
16	Condenser (.01 mfd. Bakelite)	3903SU	.25
17*	2nd I. F. Trans.	32-2460	
17X	Resistor (51000 ohms ½ watt, in I. F. Transformer)	33-351339	.20
18	Resistor (1 megohm ½ watt)	33-510339	.20
19	Condenser (.05 mfd. Tubular)	30-4020	.20
20	Condenser (110 mmfd. mica)	30-1031	.20
21	Resistor (1 megohm ½ watt)	33-510339	.20
22	Condenser (.015 mfd. Bakelite)	3793SU	.35
23	Condenser (.006 mfd. Tubular)	30-4504	
24	Power Transformer (115 volts, 60 cycle)	32-7626	$4.25
	Power Transformer (115 volts, 25 to 40 cycle)	32-7627	5.50
	Power Transformer (110/220 A. C. 50 to 60 cycle)	32-7628	5.25
25	Resistor (200 ohms, ½ watt)	33-1210	.20
26	Resistor (1.5 megohm ½ watt)	33-515339	.20
27	Condenser (250 mmfd. mica)	30-1032	.25
28	Resistor (70000 ohms ½ watt)	33-370339	.20
29	Condenser (.15 mfd. Tubular)	30-4505	
30	Condenser (.015 mfd. Dual Bakelite)	3793DG	.40
31	Resistor (120000 ohms ½ watt)	33-412339	.20
32	Elect. Condenser (8, 8, 10 mfds.)	30-2192	1.80
33	Resistor (1.5 megohms ½ watt)	33-515339	.20
34	Resistor (20 ohms ½ watt)	33-020339	.20
35	Volume Control and A. C. Switch	33-5198	
36	Field Coil Assembly	36-3039	2.75
37	Output Transformer	32-7019	.90
38	Speaker Cone Assembly	36-3157	1.00
	Dial	27-5287	.40
	Hub	28-7152	.10
	Clamp	28-2837	.10
	Dial Screen Assembly	38-8382	.30
	Cable (Speaker)	L-2633	.20
	Cover Speaker Terminals	36-3025	$0.08
	Cord (AC)	L-2183	.40
	Knob	27-4321	.10
	Knob	27-4332	.10
	Mtg. Rubber (Chassis, 4 required)	27-4116	.08
	Mtg. Fibre Plate (Chassis, 4 required)	27-7497	.01
	Mtg. Washer (Chassis, 4 required)	28-2089	1.50 C
	Mtg. Bolt (Chassis, 4 required)	W-1358	2.60 C
	Mtg. Rubber (Chassis, 4 required)	5189	.03
	Panel (Ant. Coil)	38-8533	
	Pilot Lamp Assembly	38-8534	.30
	Shield (Tube)	28-2726	.10
	Socket (8 Prong)	27-6058	.11
	Socket (7 Prong)	27-6057	.11
	Spacer Mtg. Ant. Coil	27-8228	.01
	Screw Mtg. Ant. Coil	W-1635	.30 C
	Speaker	36-1009	5.75
	Vernier Drive Kit	45-2426	
	CABINET PARTS		
	Baffle & Silk	40-6090	.30
	Bezel	28-3899	.25
	Screw (Bezel)	W-1664	.50 C
	Screw (Speaker Mtg.)	W-1664	.50 C

*Two condensers 17A and 17B are part of Padder inside of I. F. Transformer 17.

PRICES SUBJECT TO CHANGE WITHOUT NOTICE

MODEL 37-62
Alignment, Trimmers
Voltage, Chassis

PHILCO RADIO & TELEV. CORP.

Electrical Specifications

Type of Circuit: Superheterodyne, with pentode audio output Circuit.

Power Supply:	Voltage	Frequency	Connection
	115	50 to 60 cycles	60 watts
	115	25 to 40 cycles	60 watts

Intermediate Frequency: 470 K. C.

Undistorted Output: 3 watts.

Speaker: S-7.

Tuning Ranges: Two; Range 1—530 to 1720 K. C. to 2.5 M. C.

Range 2—2.3

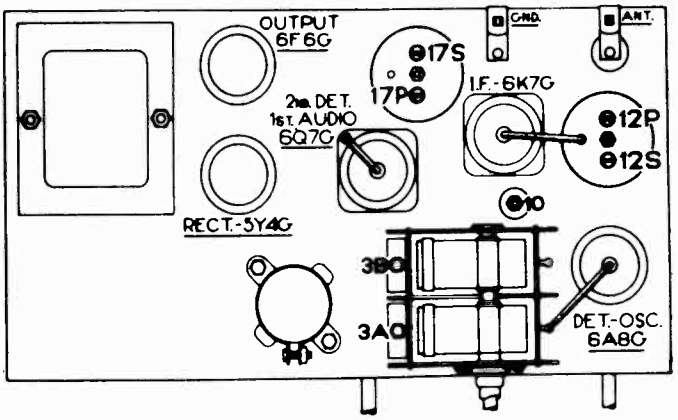


Fig. 2. Locations of R. F. & I. F. Compensators

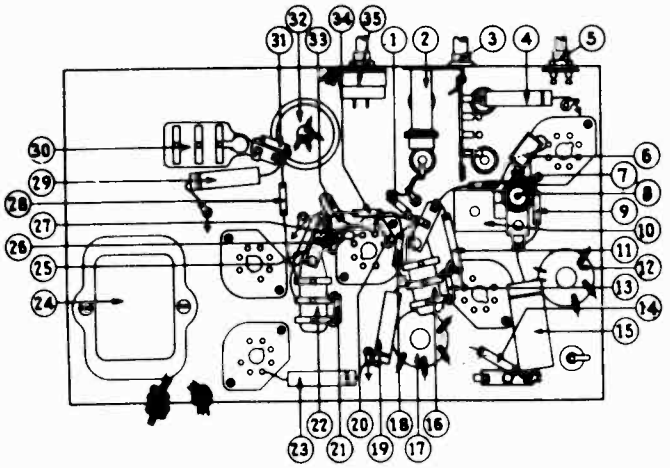


Fig. 3. Parts locations, Underside of chassis view

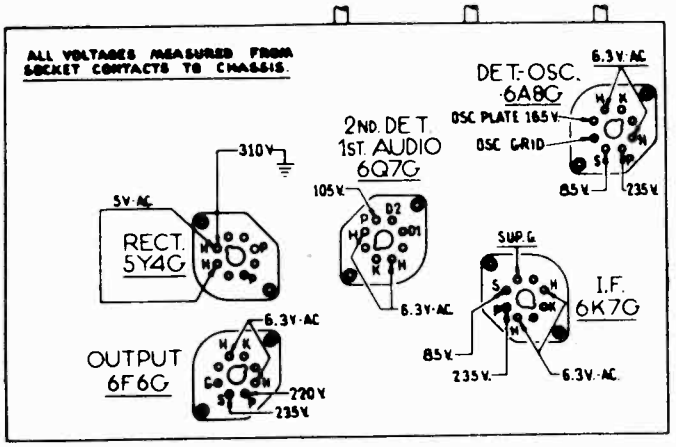


Fig. 1. View of Sockets from Underside Chassis

The voltages indicated by arrows were measured with a **Philco 025 Circuit Tester** which contains a voltmeter having a resistance of 1000 ohms per volt. Volume Control at minimum, range switch in broadcast position, line voltage 115 A. C.

Alignment of Compensators

Equipment Required: (1) Signal Generator; Philco Model 088 (fundamental frequency 110 to 20000 K.C.) is the correct instrument for this purpose; (2) output meter. **Philco Model (025) Circuit Tester** incorporates a Sensitive output meter and is recommended; (3) Fibre handle screwdriver (Philco Part No. 27-7059); (4) Fibre wrench Part No. 3164.

Dial Calibration: Set the tuning condenser at the maximum capacity position. Loosen the set screw of the dial hub and set dial, with the glowing indicator centered between the first and second index lines, at the low frequency end of the broadcast scale. Tighten set screw in this position.

Output Meter: The 025 Output Meter is connected to the plate and cathode terminals of the (6F6G) tube. Adjust the meter to use the (0-30) Volt Scale.

INTERMEDIATE FREQUENCY CIRCUIT

1. Set controls as follows:

a. Volume control maximum
b. Receiver Dial 580 K. C.
c. Signal generator 470 K. C.
d. Range Switch Broadcast position

RADIO FREQUENCY CIRCUIT

Tuning Range: 520 to 1720 K. C.

1. Connect the signal generator output lead through a 200 mmfd. condenser to the ant. terminal of the receiver and the generator ground to the chassis. Set the range switch in the broadcast position.

2. Adjust compensators as follows for maximum output.

Signal generator	Receiver dial	Compensators in order
1600 K. C.	1600 K. C.	(3B), (3A)
580 K. C.	580 K. C.	(10) Note A
1600 K. C.	1600 K. C.	(3B), (3A)

No adjustments are required for Range 2 as Range 1 adjustments compensate for this circuit.

Note A—First tune compensator (10) for maximum output, then vary the tuning condenser of the receiver for maximum output about the 580 K. C. dial mark. Now turn compensator (10) slightly to the right or left and vary the receiver tuning condenser for maximum output. If the out reading increases, turn compensator (10) in the same direction a trifle more, and again vary the tuning condenser for maximum output. If the output decreases, set the compensator in the opposite direction. This procedure of first setting the compensator and then varying the tuning condenser is continued until there is no further gain in output reading.

2. Connect the signal generator output lead through a .1 mfd. condenser to the 6A8G Grid and adjust the Compensators as follows for maximum output (17S), (17P), (12S), and (12P).

PHILCO RADIO & TELEV. CORP.

MODEL 37-93
Schematic
Parts

Type of Circuit: Superheterodyne, with pentode audio output circuit.
Dial Tuning Mechanism: Vernier, 5 to 1 ratio.
Power Supply:

Voltage	Frequency	Consumption
115	50 to 60 cycles	50 watts
115	25 to 60 cycles	50 watts
110/220	50 to 60 cycles	50 watts

Intermediate Frequency: 470 K. C.
Undistorted Output: 3 watts.
Philco Tubes Used: Five; one 6A8G, one 6F6G, one 6K7G, one 5Y4G, one 6R7G.
Tuning Range: 530 to 1720 K. C.
Speaker: SB2.

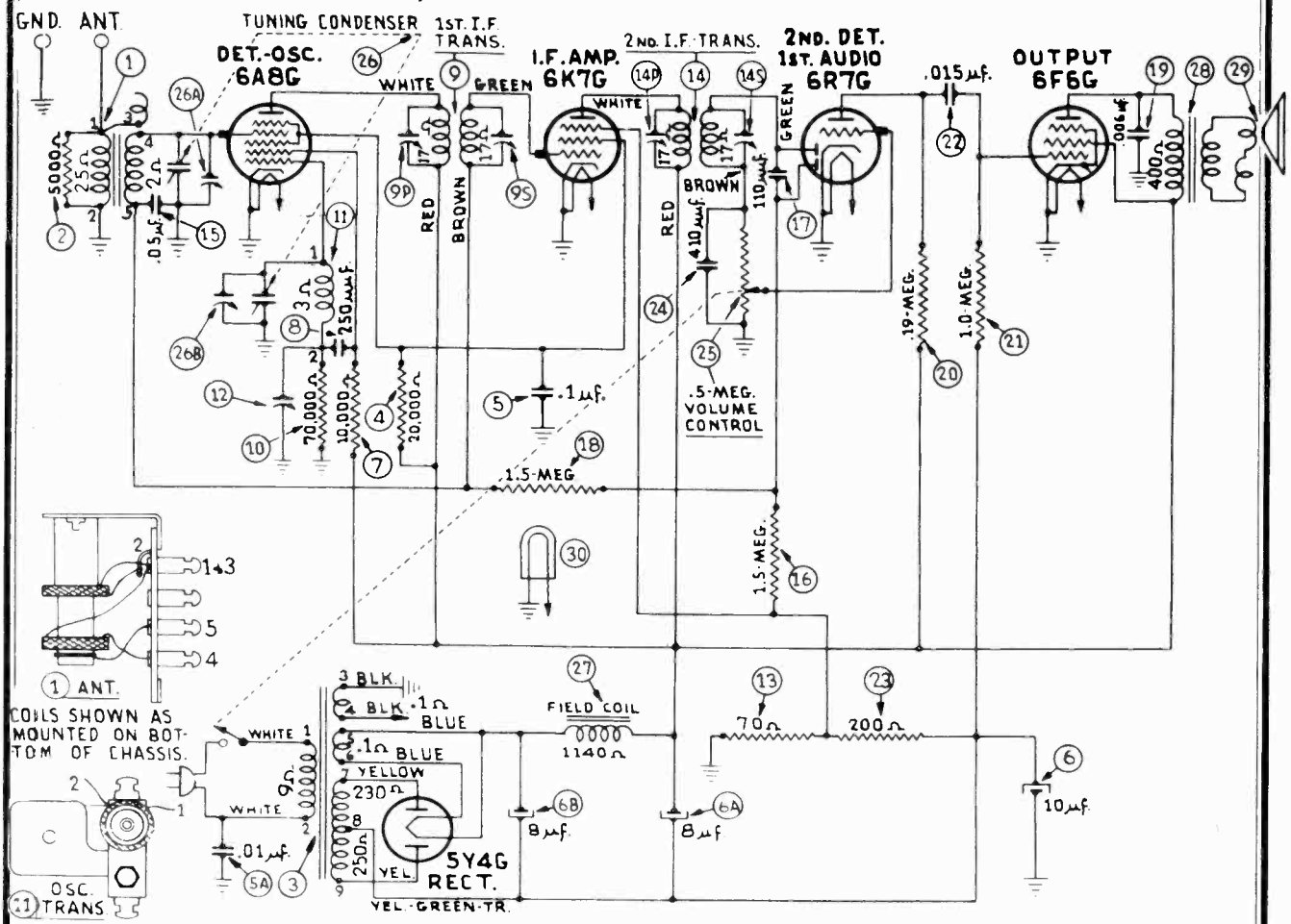


Fig. 4. Schematic Diagram, Model 37-93

I.F. PEAK 470 KC

Replacement Parts — Model 37-93

PRICES SUBJECT TO CHANGE WITHOUT NOTICE

Schem. No.	Description	Part No.	List Price
1	Ant. Transformer	32-2329	$1.00
2	Resistor (5000 ohms)	33-250339	.20
3	Power Transformer 115 volts 50 to 60 cycles	32-7780	3.60
	Power Transformer 110/220 volts 50 to 60 cycles	32-7782	4.00
4	Resistor (20,000 ohms, 1 watt)	33-320439	.20
5	Condenser (.01, .1 mfd. Dual Bakelite)	4989FG	
6	Elect. Cond. (8, 8, 10 mfd.)	30-2073	3.15
7	Resistor (10,000 ohms ½ watt)	33-310339	.20
8	Condenser (250 mmfd. mica)	30-1032	.25
9	1st I. F. Transformer Assembly	32-2457	
10	Resistor (70,000 ohms, ½ watt)	33-370339	.20
11	Oscillator Trans. Assembly	32-2330	.90
12	Compensator (osc. series)	Part of (11)	
13	Resistor (70 ohms ½ watt)	33-070339	.20
14	2nd I. F. Transformer Assembly	32-2459	
15	Condenser (.05 mfd. tubular)	30-4444	.20
16	Resistor (1.5 ohms, ½ watt)	33-515339	.20
17	Condenser (110 mmfd. mica)	33-1031	.20
18	Resistor (1.5 ohms, ½ watt)	33-515339	.20
19	Condenser (.006 mfd. tubular)	30-4445	.20
20	Resistor (190,000 ohms, ½ watt)	33-419339	.20
21	Resistor (1 megohm, ½ watt)	33-510339	.20
22	Condenser (.015 mfd. Bakelite)	3793SU	.35
23	Resistor (200 ohms Bakelite)	33-1210	.20
24	Condenser (410 mmfd. mica)	30-1000	$0.25
25	Volume Control	33-5193	1.45
26	Tuning Condenser	31-1932	2.75
27	Field Coil Assembly	36-3243	2.40
28	Output Trans.	32-7019	.85
29	Cone and Voice Coil Assembly	36-3014	1.00
	Cabinet	10227B	
	Cable A. C.	L-2183	.40
	Cable (Speaker)	L-2610	.20
	Dial Scale	27-5280	.15
	Dial Pointer	27-7933	.01
	Knob (Tuning and Volume)	27-4282	.10
	Mtg. Bolt	40-5790	
	Shield (1st I. F.)	38-7763	.20
	Shield (2nd I. F.)	38-8146	
	Shield (Tube)	28-2726	.10
	Socket (8 prong)	27-6058	.11
	Socket (7 prong)	27-6057	.11
	Speaker SB2	36-1127	5.75
	Terminal Panel, (R. F. Trans.)		
	Vernier Drive Assembly	45-2171	
	Washer Felt	27-7807	.50 C

CABINET PARTS

Baffle & Silk Assembly	40-5988	.30

MODEL 37-93
Alignment, Trimmers
Voltage, Chassis

PHILCO RADIO & TELEV. CORP.

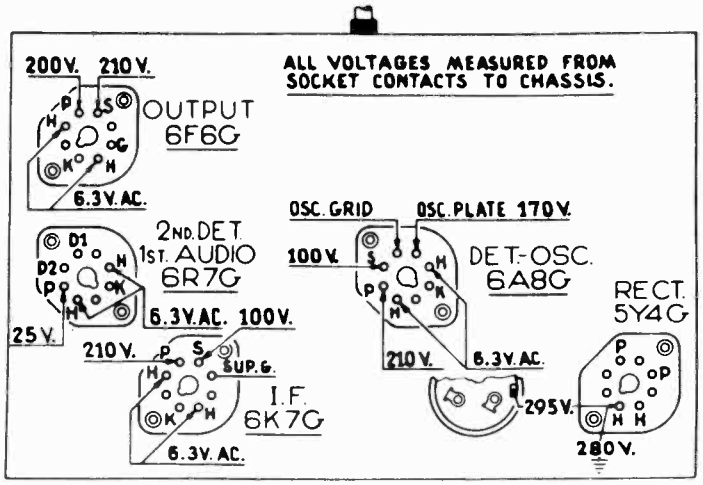


Fig. 1. View of Sockets from Underside Chassis

The voltages indicated by arrows were measured with a Philco 025 Circuit Tester which contains a voltmeter having a resistance of 1000 ohms per volt. Volume Control at minimum, range switch in broadcast position, line voltage 115 A. C.

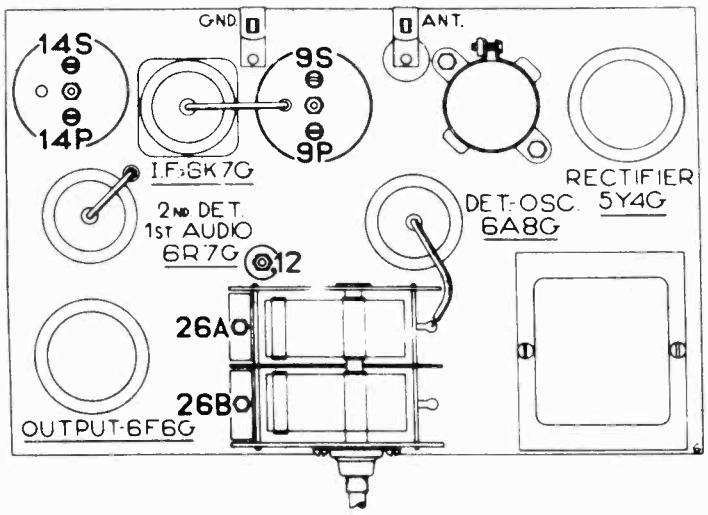


Fig. 2. Locations of R. F. and I. F. Compensators

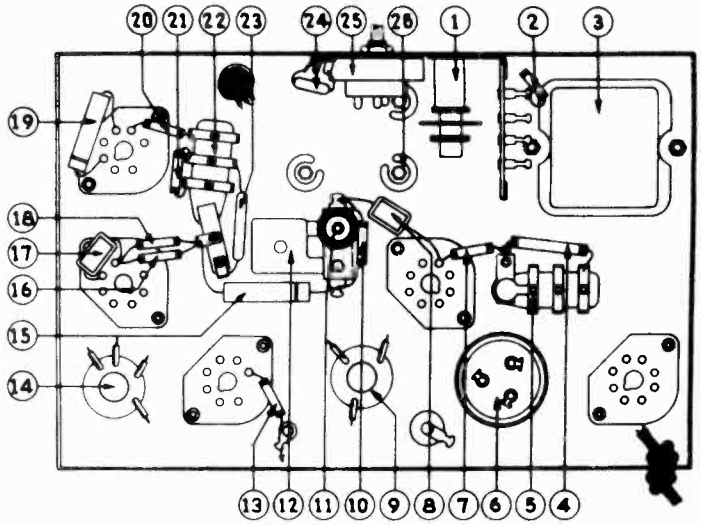


Fig. 3. Part Locations, underside of Chassis

RADIO FREQUENCY CIRCUIT

Tuning Range: 520 to 1720 K. C.

1. Connect the signal generator output lead through a 200 mmfd. condenser to the Ant. terminal of the receiver and the generator ground to the chassis.
2. Adjust compensators as follows for maximum output.

Signal Generator	Set Tuning Condenser	Compensators in Order
1710 K. C.	1710 K. C., Note B	(26B), (26A)
580 K. C.	580 K. C.	(12), Note A
1500 K. C.	1500 K. C.	(26A)

NOTE A—First tune compensator (12) for maximum output, then vary the tuning condenser of the receiver for maximum output, about the 580 K. C. dial mark. Now turn compensator (12) slightly to the right or left and vary the receiver tuning condenser for maximum output. If the output decreases, set the compensator in the opposite direction. This procedure of first setting the compensator and then varying the tuning condenser is continued until there is no further gain in output reading.

NOTE B—Turn the tuning condenser to the minimum capacity position (extreme clockwise). Insert a .006" (six-thousandth inch) gauge between the stator and rotor plates (left side of condenser facing front). Then turn the condenser counter-clockwise until stator and rotor plate touch gauge. Remove gauge without disturbing setting of condenser and adjust compensators (26B), (26A) for maximum output on a 1710 K. C. signal.

SETTING DIAL POINTER

After compensators are adjusted. Set signal generator for 1000 K. C. and tune receiver for maximum output. Place pointer on tuning condenser shaft at the 1000 K. C. dial mark.

Alignment of Compensators

EQUIPMENT REQUIRED: (1) Signal generator; Philco Model 088 (fundamental frequency 110 to 20,000 K. C.) is the correct instrument for this purpose; (2) output meter, PHILCO MODEL (025) CIRCUIT TESTER incorporates a Sensitive output meter and is recommended; (3) Fibre handle screwdriver (Philco Part No. 27-7059); (4) Fibre wrench Part No. 3164.

OUTPUT METER: The 025 Output Meter is connected to the plate and cathode terminals of the (6F6G) tube. Adjust the meter to use the (0-30) Volt Scale.

INTERMEDIATE FREQUENCY CIRCUIT

1. Set controls as follows:
   a. Volume control maximum
   b. Receiver Dial 580 K. C.
   c. Signal generator 470 K. C.
2. Connect the signal generator output lead through a .1 mfd. condenser to the 6A8G Grid and adjust the Compensators as follows for maximum output (14S), (14P), (9S), and (9P).

PHILCO RADIO & TELEV. CORP.

MODEL 37-624
Schematic, Parts

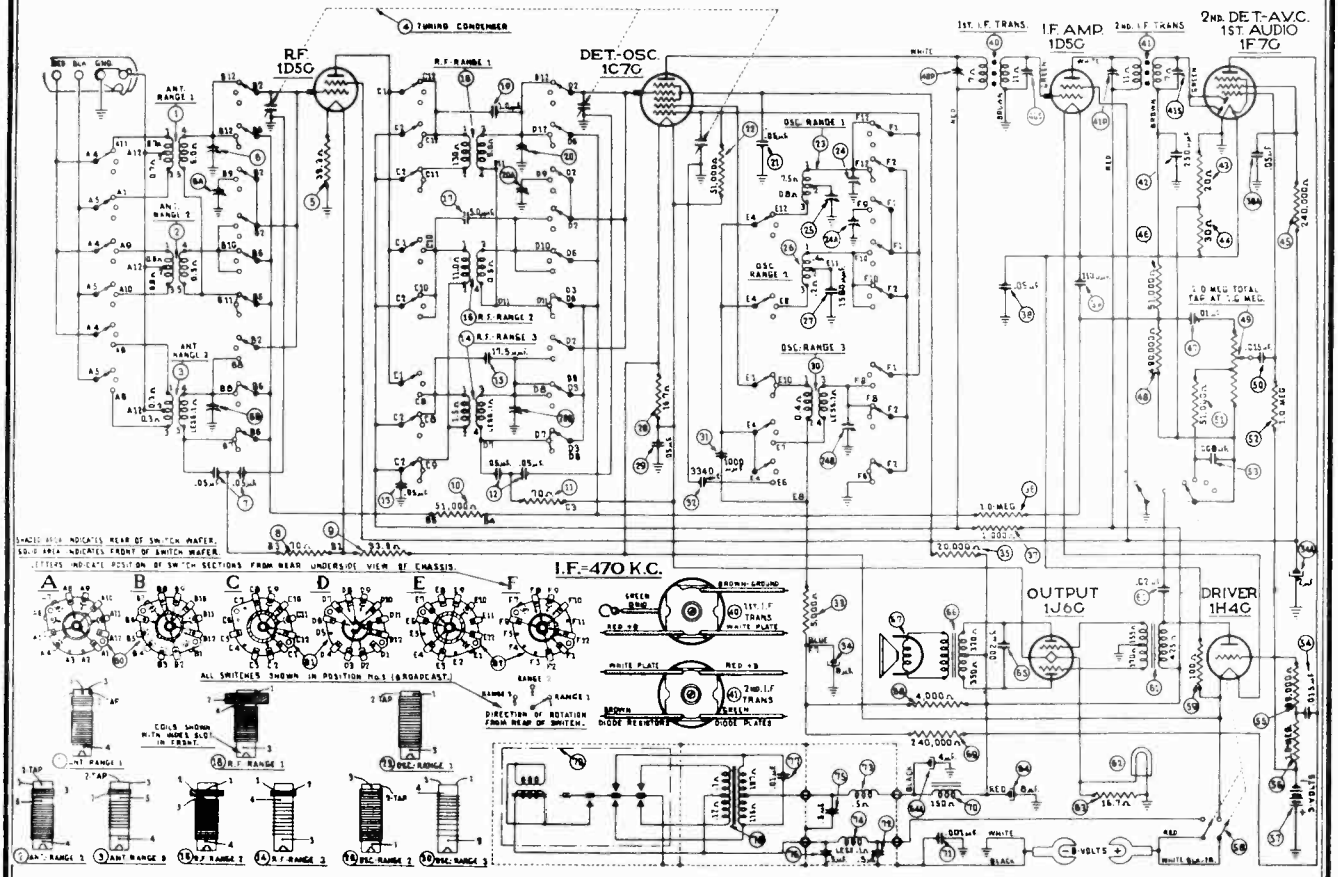


Fig. 5—Schematic Diagram

October 7th, 1936

Replacement Parts — Model 37-624

Schem. No.	Description	Part No.	List Price
1	Antenna Transformer (530-1720 K.C.)	32-2108	$1.60
2	Antenna Transformer (2.3 to 7.4 M.C.)	32-2119	1.20
3	Antenna Transformer (7.35 to 22 M.C.)	32-2109	1.20
4	Tuning Condenser	31-1818	5.00
5	Resistor (33.3 ohm flexible)	33-3233	.20
6	Compensator (three sections)	31-6092	.60
7	Condenser (.05 mfd. dual tubular)	30-4394	.35
8	Resistor (70 ohms, ½ watt)	33-070339	.20
9	Resistor (33.3 flexible)	33-3233	.20
10	Resistor (51000 ohms, ½ watt)	33-351339	.20
11	Resistor (70 ohms ½ watt)	33-070339	.20
12	Condenser (.05 mfd. dual tubular)	30-4394	.35
13	Condenser (.05 mfd. tubular)	30-4123	.20
14	R. F. Transformer (7.35 to 22 M. C.)	32-2126	.70
15	Condenser (17.5 mmfd. mica)	30-1079	.20
16	R. F. Transformer (2.3 to 7.4 M. C.)	32-2106	.70
17	Condenser (5. mmfd. mica)	30-1077	.20
18	R. F. Transformer (530 to 1720 K. C.)	32-2105	1.00
19	Condenser (1. mmfd. wire and lug twisted)	38-7878	
20	Compensator (three sections)	31-6121	.75
21	Condenser (.05 mfd. tubular)	30-4020	.20
22	Resistor (51000 ohms, ½ watt)	33-351339	.20
23	Oscillator Transformer (530 to 1720)	32-2120	1.00
24	Compensator (three sections)	31-6092	.60
25	Compensator (Osc. Broadcast series)	31-6056	.55
26	Oscillator Transformer (2.3 to 7.4 M. C.)	32-2121	.70
27	Condenser (1580 mmfd.)	31-6138	.40
28	Resistor (16.7 ohm flexible)	33-3298	.20
29	Condenser (.05 mfd. tubular)	30-4020	.20
30	Oscillator Transformer (7.35 to 22 M. C.)	32-2110	.70
31	Condenser (1000 mmfd. tubular)	30-4453	.20
32	Condenser (3340 mmfd. semi-fixed)	31-6137	.60
33	Resistor (5000 ohms, ½ watt)	33-250339	.20
34	Electrolytic Condenser (Blue 8 mfd., Plain 2 mfd.)	30-2171	2.00
35	Resistor (20000 ohms, ½ watt)	33-320339	.20
36	Resistor (1.0 megohm, ½ watt)	33-510339	.20
37	Resistor (1000 ohms, ½ watt)	33-210339	.20
38	Condenser (.05 mfd. dual bakelite)	4989-DG	.40
39	Condenser (110 mmfd. mica)	30-1031	.20
40	1st I. F. Transformer	32-2100	
41	2nd I. F. Transformer	32-2102	
42	Condenser (250 mmfd. mica)	30-1032	.25
43	Resistor (20 ohms flexible)	33-3043	$0.25
44	Resistor (30 ohms flexible)	33-3119	.25
45	Resistor (240000 ohms, ½ watt)	33-424339	.20
46	Resistor (51000 ohms, ½ watt)	33-351339	.20
47	Condenser (.01 mfd. tubular)	30-4124	.25
48	Resistor (490000 ohms, ½ watt)	33-490339	.20
49	Volume Control	33-5166	1.00
50	Condenser (.015 mfd. tubular)	30-4358	.20
51	Resistor (51000 ohms, ½ watt)	33-351339	.20
52	Resistor (1.0 megohms, ½ watt)	33-510339	.20
53	Condenser (.008 mfd. tubular)	30-4112	.20
54	Condenser (.015 mfd. single bakelite)	3793-SU	.35
55	Resistor (99000 ohms, ½ watt)	33-399339	.20
56	Resistor (1.0 megohms, ½ watt)	33-510344	.20
57	Bias Cell	41-8009	.30
58	Power Switch and Tone Control	42-1242	1.00
59	Resistor (100 ohms flexible)	33-3187	
60	Condenser (.02 mfd. tubular)	30-4113	.20
61	Audio Transformer	32-7637	2.00
62	Pilot Lamp	34-2150	.22
63	Resistor (16.7 ohms flexible)	33-3298	.20
64	Electrolytic Condenser (4, 8 mfd.)	30-2160	2.00
65	Condenser (.002 mfd. tubular)	30-4177	
66	Output Transformer KR-17, HR-12	32-7639	1.60
67	Cone Voice Coil KR-17	36-3540	.80
	Cone Voice Coil	36-3557	1.20
68	Resistor (4000 ohms, ½ watt)	33-240339	.20
69	Resistor (240000 ohms, ½ watt)	33-424339	.20
70	Filter Choke	32-7543	1.35
71	Condenser (.001 mfd. tubular)	30-4201	.20
72	Condenser (.5 mfd. metal case)	30-4296	.60
73	B Choke	32-1932	.25
74	A Choke	32-1954	.40
75	Condenser (.5 mfd. metal case)	30-4296	.60
76	Condenser (.5 mfd. metal case)	30-4296	.60
77	Condenser (.01 mfd. tubular)	30-4381	.25
78	Power Transformer	32-7682	2.20
79	Vibrator	41-3222	5.25
80	Range Switch (Ant.)	42-1243	1.20
81	Range Switch (R. F.)	42-1244	1.20
82	Range Switch (Osc.)	42-1246	1.20
	Switch Index Plate and Shaft	42-1173	.50
	Pilot Lamp Assembly	38-7875	.45
	Dial	27-5214	.50
	Hub	28-7187	.12
	Clamp	28-2837	.10
	Set Screw	W-1641	$0.02
	Knob Tuning	27-4330	.10
	Knob Tuning Vernier	27-4331	.10
	Vernier Drive Assembly	31-1871	.75
	Knob Range Switch	27-4326	.10
	Knob Tone and Volume	27-4332	.10
	Mask	27-5198	.30
	Mask Arm and Link Assembly	31-1940	.15
	Shaft Coupling and Set Screw	31-1941	
	Felt Washer	27-8399	Per C .30
	Snap Fastener	28-4279	Per C .75
	Mask Guide and Lamp Support	38-7844	.15
	Indicator Bracket Assembly	38-7912	.30
	Volume Control Shaft	38-8059	
	Retaining Clip	28-4394	.01
	Shaft Spring	28-4117	Per C .40
	Socket 7 Prong	27-6057	.11
	Socket 8 Prong	27-6058	.11
	Tube Shield	28-2726	.10
	Base	28-3898	.03
	Bias Cell Panel Assembly	38-7275	.20
	Battery Cable	41-3204	1.20
	Speaker Cable	41-3207	.30
	A Battery	116-R	
	Mtg. Grommet (R. F. Unit)	27-4317	.04
	Mtg. Sleeve (R. F. Unit)	28-2257	.01
	Mtg. Screw (R. F. Unit)	W-729	Per C .45
	Mtg. Washer (R. F. Unit)	27-7807	Per C .50
	Mtg. Rubber (Tuning Cond.)	27-4325	.02
	Mtg. Plate (R. F. Trans.)	28-3808	.02
	Mtg. Spacer (R. F. Trans.)	27-8228	.01
	Mtg. Screw (R. F. Trans.)	W-1635	Per C .30
	Mtg. Bushing (Chassis)	27-4360	.04
	Mtg. Washer Rubber (Chassis)	5189	
	CABINET PARTS		
	Bezel Frame and Plate Assembly	40-5939	.75
	Gasket	27-8311	.01
	Glass	27-8298	.05
	Ring	28-3967	.35
	Screw	W-1644	Per C .50
	Baffle Silk Assembly B Cabinet	40-5970	
	Baffle Silk Assembly J Cabinet	40-5971	.80
	Bottom Shield Plate J Cabinet	28-3895	.25
	Speaker KR-17 B Cabinet	36-1248	10.00
	Speaker HR-12 J Cabinet	36-1250	11.00

Figures in black type indicate circled figures in Base View.

Prices Subject to Change without Notice

MODEL 37-624

Alignment, Trimmers

Voltage, Chassis

PHILCO RADIO & TELEV. CORP.

Type Circuit: Superheterodyne, using a vibrator unit operated by a 6 volt storage battery for supplying "B" power to the receiver, and a Class B audio output circuit.

Power Supply: 6 volt storage battery, Philco Type 116R.

Current Drain: 1.5 Amps.

Philco Tubes Used: 6-1D5G, R. F. Amp.; 1C7G, Det. Osc.; 1D5G I. F. Amp.; 1F7G, 2nd Det.—1st Audio A. V. C.; 1H4G, Audio Driver; 1J6G, Output.

Frequency Ranges: Three. Range 1—530 to 1720 K. C.; Range 2—2.3 to 7.4 M. C.; Range 3—7.35 to 22 M. C.

Intermediate Frequency: 470 K. C.

Speakers: KR-17. "B" Cabinet; HR-12. "J" Cabinet.

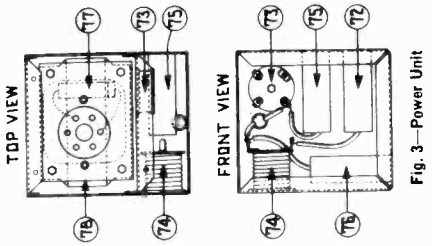


Fig. 3—Power Unit

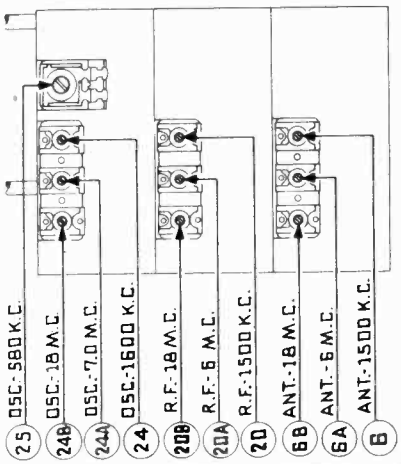


Fig. 3—R. F. Compensators

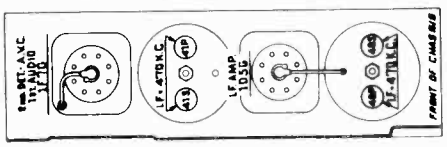


Fig. 2—I. F. Compensators

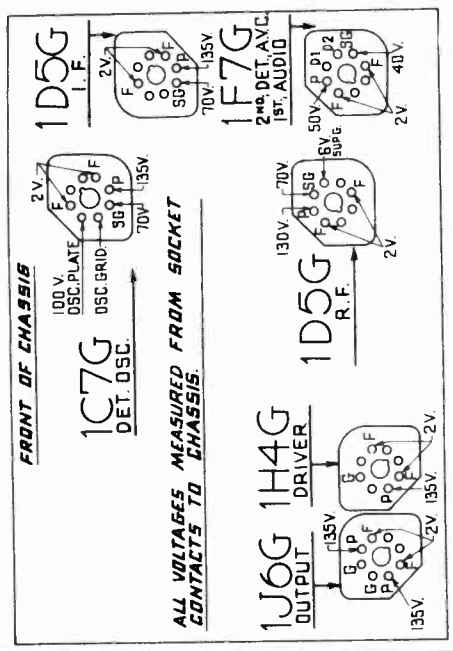


Fig. 1—Socket Voltages and R. F. Compensators

The voltages indicated by arrows were measured with a Philco 025 Circuit Tester which contains a voltmeter having a resistance of 1000 ohms per volt. Volume Control at maximum. Storage Battery fully charged.

Alignment of Compensators

EQUIPMENT REQUIRED: (1) Signal Generator; Philco Model 088 (fundamental frequency 110 to 20000 K. C.) is the correct instrument for this purpose; (2) output meter. **Philco Model 025 Circuit Tester** incorporates an accurate, Sensitive output meter and is recommended; (3) Fibre handle screwdriver (Philco Part No. 27-7059); (4) Special variable condenser (Philco Part No. 45-2325).

DIAL CALIBRATION: Set the tuning condenser at the maximum capacity position. Loosen the set screw of the dial hub and set dial, with the glowing indicator centered between the first and second index lines, at the low frequency end of the broadcast scale. Tighten set screw in this position.

October 7th, 1936

INTERMEDIATE FREQUENCY CIRCUIT

Frequency 470 K. C.

1. Connect the 088 Signal Generator output lead through a .1 mfd. condenser to the control grid of the 1C7G tube, and the ground connection of the Generator to the chassis. Turn the Volume Control to maximum volume position.

2. Set the range switch in position No. 1 (Broadcast), then rotate the tuning condenser of the receiver to approximately 580 K. C. and adjust the signal generator for 470 K. C.

3. Adjust compensators (**41S**) 2nd I. F. Sec., (**41P**) 2nd I. F. Pri., (**40S**) 1st I. F. Sec., and (**40P**) 1st I. F. Pri. for maximum reading on the output meter.

RADIO FREQUENCY CIRCUIT

Tuning Range (7.35) to (22.0) M. C.

1. Remove the signal generator output lead from the grid of the 1C7G tube and connect it through the .1 mfd. condenser to terminal No. 1 on aerial input panel and the generator ground lead to terminal No. 3, rear of chassis. Terminals 2 and 3 must be connected by the shorting link provided on the panel.

2. Set the range switch in position No. 3. Turn the receiver and signal generator dials to 18 M. C. Now adjust compensator (**24B**) by turning the screw (clockwise) to the maximum capacity position, then slowly turning it (counter-clockwise) until a second peak signal is reached on the output meter. The first peak from maximum capacity is the image signal and must not be used. **Note**—In adjusting some receivers only one peak will be observed, therefore, tune the compensator to maximum on this peak. If the above procedure is correctly performed, the image signal will be found at 17.06 M. C. by advancing the signal generator attenuator and turning the receiver dial to this frequency mark on the dial.

3. The antenna and R. F. Compensators (**6B**) and (**20B**) are now adjusted by connecting a variable condenser of approximately 350 mmfd., Philco Part No. 45-2325 across the oscillator section of the gang condenser and ground. Leaving the signal generator and receiver dials at 18 M. C., tune the added condenser from the maximum capacity point until the second harmonic of the receiver oscillator beats against the signal from the generator thereby bringing in the signal. The antenna and R. F. compensators (**6B**) and (**20B**) are then adjusted for maximum output. Now remove the external condenser and readjust compensator (**24B**) for maximum output.

Tuning Range (2.3) to (7.4) M. C.

1. Set range switch in position 2. Rotate signal generator and receiver dials to 7.0 M. C. Now adjust compensator (**24A**) for maximum output.

2. Turn the signal generator and receiver dials to 6.0 M. C. and adjust compensators (**20A**) R. F. and (**6A**) Ant. for maximum output.

Tuning Range (530) to (1720) K. C.

1. Set range switch in position No. 1 (Broadcast). Rotate the signal generator and receiver dials to 1600 K. C. Now adjust compensators (**24**) Osc., (**20**) R. F. and (**6**) Ant. for maximum output.

2. Rotate the signal generator and receiver dials to 580 K. C. Compensator (**25**) Osc. series is now adjusted for maximum output as follows:

First tune compensator (**25**) for maximum output, then vary the tuning condenser of the receiver for maximum output about the 580 K. C. dial mark. Now turn compensator (**25**) slightly to the right or left and vary the receiver tuning condenser for maximum output. If the out reading increases, turn compensator (**25**) in the same direction a trifle more, and again vary the tuning condenser for maximum output. If the output decreases, set the compensator in the opposite direction. This procedure of first setting the compensator and then varying the tuning condenser is continued until there is no further gain in output reading.

3. Readjust compensator (**24**) for maximum output, by turning the signal generator and receiver dials to 1600 K. C.

4. Turn the signal generator and receiver dials to 1500 K. C. and adjust compensators (**20**) R. F. and (**6**) Ant. for maximum output.

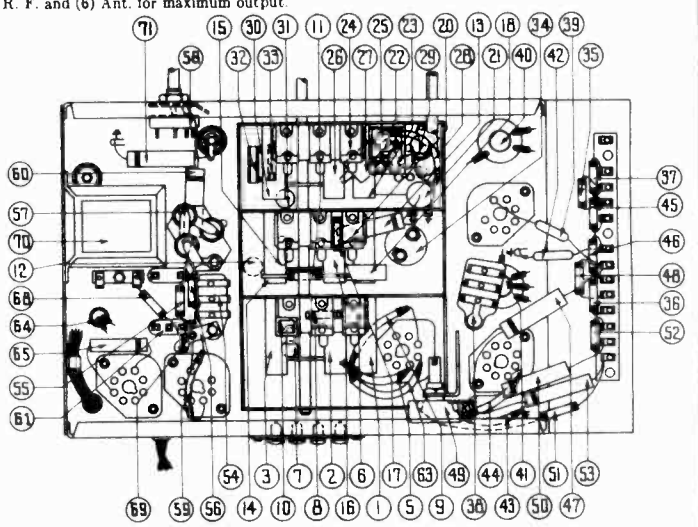
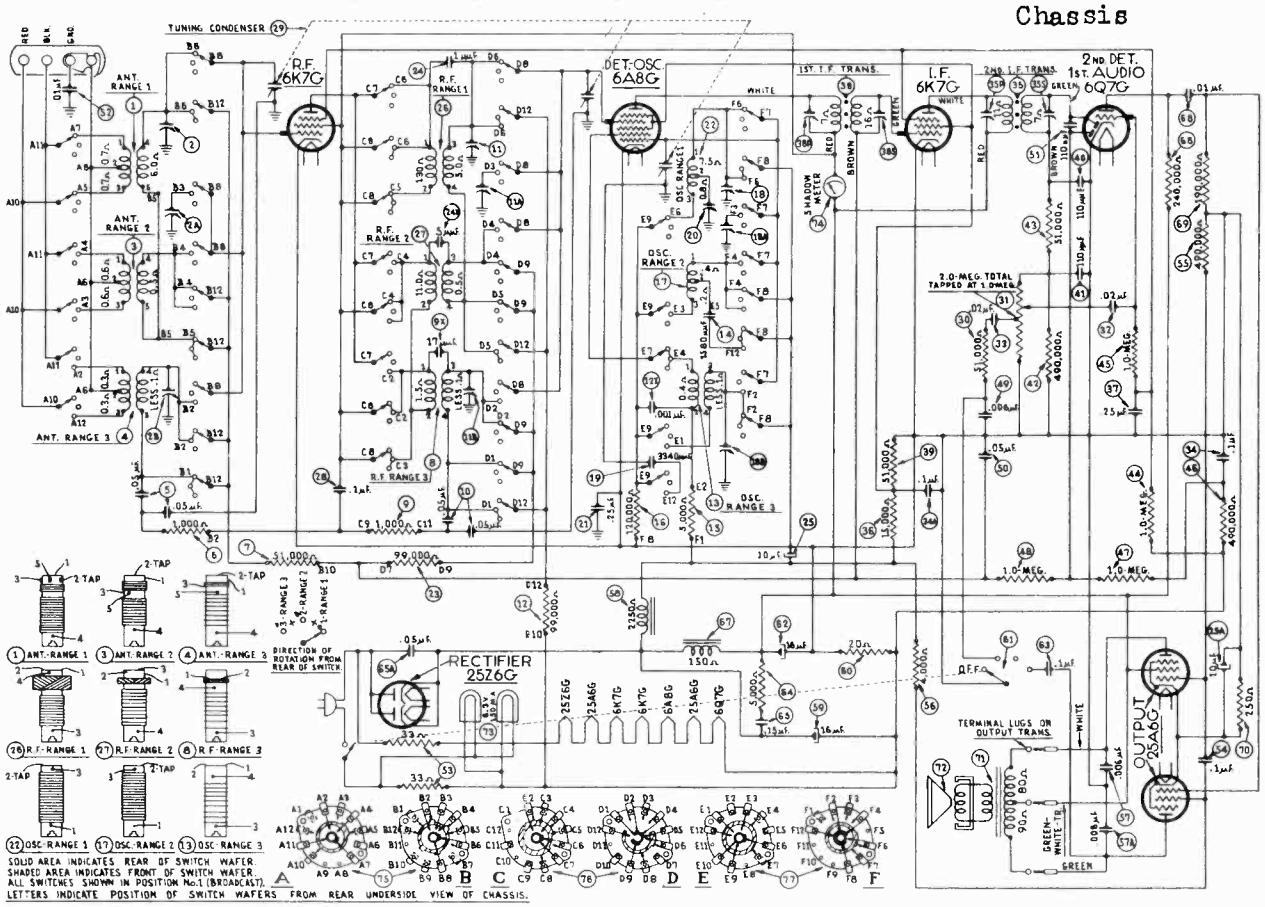


Fig. 4—Parts Locations—Underside of Chassis

PHILCO RADIO & TELEV. CORP.

MODEL 37-641
Schematic, Voltage
Chassis



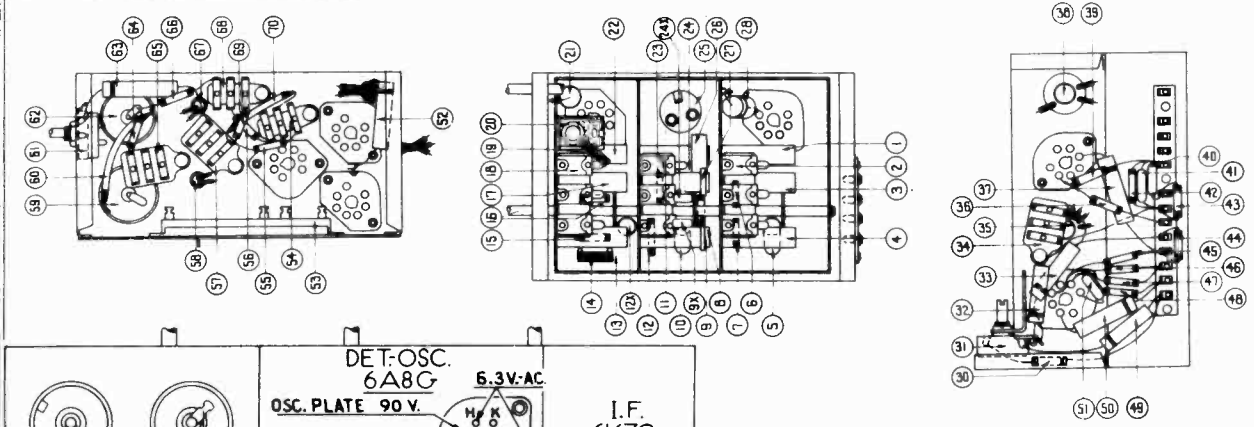


Fig. 4—View of Parts from Underside of Chassis

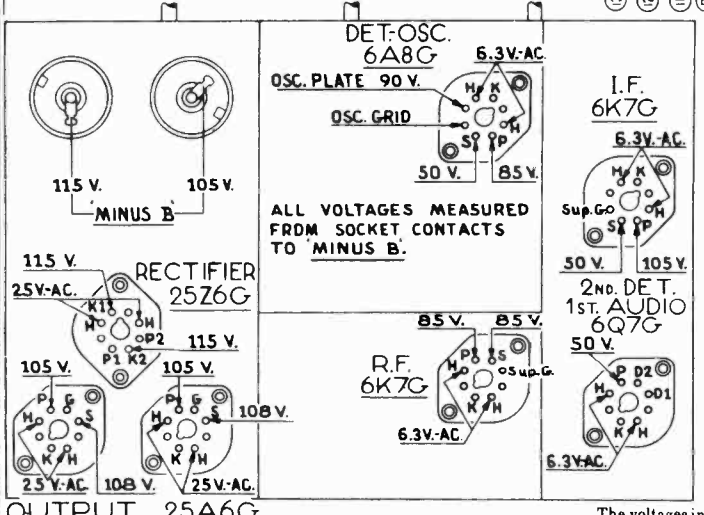


Fig. 1—Socket Voltages—Underside of Chassis View

December, 1936

IF PEAK 470 KC.

Tuning Range 530 to 1720 K. C.

Range Switch	Signal Generator	Receiver Dial	Compensators in Order
1	1600 K. C.	1600 K. C.	(18), (11), (2)
1	580 K. C.	580 K. C.	(20) roll gang
1	1600 K. C.	1600 K. C.	(18)
1	1500 K. C.	1500 K. C.	(11), (2)

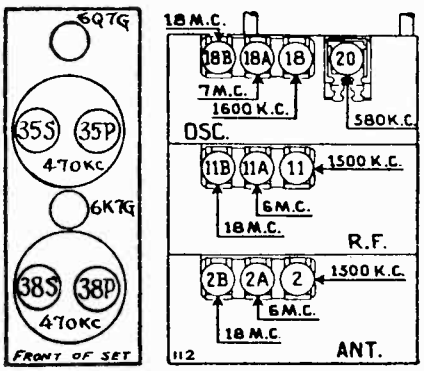
The voltages indicated by arrows were measured with a Philco 025 Circuit Tester which contains a voltmeter having a resistance of 1000 ohms per volt. Volume Control at minimum, range switch in broadcast position, line voltage 115 A. C.

MODEL 37-641
Alignment, Trimmers
Parts

PHILCO RADIO & TELEV. CORP.

Electrical Specifications

Type of Circuit: Superheterodyne, with push-pull pentode audio output.
Power Supply: 115 volts, A. C. or D. C.
Power Consumption: 60 watts.
Power Output: 1.4 watts.
Philco Tubes Used: Seven. One 6A8G; one 6Q7G; one 25Z6G; two 6K7G; two 25A6G.
Tuning Ranges: Three. Range 1—530 to 1720 K. C.; Range 2—2.3 to 7.4 M. C.; Range 3— 7.35 to 22 M. C.
Tone Control: Three Point.
Speaker: "B" Cabinet KR-18. "X" and "MX" Cabinets HR-13.



Replacement Parts

Schem. No.	Description	Part No.	List Price
1	Antenna Transformer (Range 1)	32-2108	$1.60
2	Compensator (three section)	31-6092	.60
3	Antenna Transformer (Range 2)	32-2119	1.20
4	Antenna Transformer (Range 3)	32-2109	1.20
5	Condenser (Dual Tubular .05 mfd.)	30-4489	
6	Resistor (1000 ohms, ½ watt)	33-210339	.20
7	Resistor (51,000 ohms, ½ watt)	33-351339	.20
8	R. F. Transformer (Range 3)	32-2126	.70
9	Resistor (1000 ohms, ½ watt)	33-210339	.20
9X	Condenser (17 mmfd. mica)	30-1079	
10	Condenser (Dual Tubular .05 mfd.)	30-4489	
11	Compensator (three section)	31-6092	.60
12	Resistor (99,000 ohms, ½ watt)	33-399339	.20
12X	Condenser (.001 mfd. tubular)	30-4453	.20
13	Oscillator Transformer (Range 3)	32-2110	.70
14	Condenser (1580 mmfd.)	31-6138	.40
15	Resistor (5000 ohms, ½ watt)	33-250339	.20
16	Resistor (120,000 ohms, ½ watt)	33-412339	.70
17	Oscillator Transformer (Range 2)	32-2121	.70
18	Compensator Oscillator (three sections)	31-6092	.60
19	Condenser (3340 mmfd.)	31-6138	.40
20	Compensator (Range 1 series)	31-6056	.55
21	Condenser (.25 mfd. tubular)	30-4446	.25
22	Oscillator Transformer (Range 1)	32-2120	1.00
23	Resistor (99,000 ohms, ½ watt)	33-399339	.20
24	Condenser (Lug and wire twisted)	38-7878	.04
24X	Condenser (5 mmfd. mica)	30-1077	
25	Electrolytic Condenser (10 mfd., Dual)	30-2125	1.20
26	R. F. Transformer (Range 1)	32-2105	1.00
27	R. F. Transformer (Range 2)	32-2106	.70
28	Condenser (.1 mfd. tubular)	30-4122	.20
29	Tuning Condenser	31-1818	4.50
30	Resistor (51,000 ohms, ½ watt)	33-351339	.20
31	Volume Control	33-5166	1.00
32	Condenser (.02 mfd. tubular)	30-4113	.20
33	Condenser (.02 mfd. tubular)	30-4113	.20
34	Condenser (.1 mfd dual bakelite)	6287-DU	.40
35	2nd I. F. Transformer	32-2102	1.80
36	Resistor (15,000 ohms, ½ watt)	33-351339	.20
37	Condenser (.25 mfd. tubular)	30-4446	.25
38	1st I. F. Transformer	32-2100	1.80
39	Resistor (51,000 ohms, ½ watt)	33-351339	.20
40	Condenser (110 mmfd. mica)	30-1031	.20
41	Condenser (110 mmfd. mica)	30-1031	.20
42	Resistor (490,000 ohms, ½ watt)	33-449339	.20
43	Resistor (51,000 ohms, ½ watt)	33-351339	.20
44	Resistor (1 megohm, ½ watt)	33-510339	.20
45	Resistor (1 megohm, ½ watt)	33-510339	.20
46	Resistor (490,000 ohms, ½ watt)	33-449339	.20
47	Resistor (1 megohm, ½ watt)	33-510339	$0.20
48	Resistor (1 megohm, ½ watt)	33-510339	.20
49	Condenser (.006 mfd. tubular)	30-4125	.20
50	Condenser (.05 mfd. tubular)	30-4020	.20
51	Condenser (110 mmfd. mica)	30-1031	.20
52	Condenser (.01 mfd. tubular)	30-4145	.20
53	Resistor (33 ohms, two section)	33-3294	
54	Condenser (.1 mfd. bakelite)	4989-SU	.35
55	Resistor (490,000 ohms, ½ watt)	33-449339	.20
56	Resistor (4,000 ohms, ½ watt)	33-240339	.20
57	Condenser (.006 mfd. dual)	7625-DU	.30
58	Choke	32-7667	1.60
59	Electrolytic Condenser (16 mfd.)	30-2124	.75
60	Resistor (20 ohms, flexible)	33-3043	.25
61	Tone Control and A. C. Switch	42-1224	.75
62	Electrolytic Condenser (16 mfd.)	30-2124	.75
63	Condenser (.1 mfd. tubular)	30-4455	.25
64	Resistor (5,000 ohms, ½ watt)	33-250339	.20
65	Condenser (.05, .15 mfd. bakelite)	6287-CU	
66	Resistor (240,000 ohms, ½ watt)	33-424339	.20
67	Choke	33-7527	
68	Condenser (.01 mfd. bakelite)	3903-SU	.25
69	Resistor (190,000 ohms, ½ watt)	33-419339	.20
70	Resistor (250 ohms, flexible)	33-3046	
71	Output Transformer HR-13, KR-18	32-7662	
72	Cone and Voice Coil HR-13	36-3797	
	Cone and Voice Coil KR-18	36-3540	.80
73	Pilot and Shadowmeter Lamps	34-2068	.12
74	Shadowmeter	45-2308	
75	Range Switch (Ant.)	42-1243	1.20
76	Range Switch (R. F.)	42-1244	1.20
77	Range Switch (Osc.)	42-1246	1.20
	Bushing Spacer (Mtg. Chassis)	27-4360	.04
	Bracket Indicator and Lens Assembly	38-7912	.30
	Cable (Power)	L-2183	.40
	Cable (Speaker)	41-3246	
	Clip, Volume Control Shaft	28-4394	.01
	Dial	27-5214	.50
	Hub	28-7187	.12
	Clamp	28-2837	.10

PRICES SUBJECT TO CHANGE WITHOUT NOTICE

MODEL NO. 37-641 (121) ALIGNMENT

Signal Generator Connection	Signal Generator Frequency	Dial Position	Wave Band Switch Position	Trimmer Number	Output Signal
Control grid [1] of 6A8G	470 k.c.	580 k.c.	Broadcast	38P	Max.
"	"	"	"	38S	Max
"	"	"	"	35P	Max
"	"	"	"	35S	Max
Ant. term.[2] #1	18 m.c.	18 m.c.	Range 3 7.35-22 m.c.	18B	Max.[3]
"	"	17.06 m.c.	"	Image check	
"	"	18 m.c.[4]	"	11B	Max.
"	"	"	"	2B	Max.
"	18 m.c.[5]	"	"	18B	Max.
"	7 m.c.	7 m.c.	Range 2 2.3-7.4 m.c.	18A	Max.
"	6 m.c.	6 m.c.	"	11A	Max.
"	"	"	"	2A	Max.
"	1600 k.c.	1600 k.c.	Broadcast	18	Max.
"	"	"	"	11	Max.
"	"	"	"	2	Max.
"	580 k.c.	580 k.c.	"	20	Max.*
"	1600 k.c.	1600 k.c.	"	18	Max.
"	1500 k.c.	1500 k.c.	"	11	Max.
"	"	"	"	2	Max.

Note 1.—Through a .1 mfd. condenser.
Note 2.—Through a .1 mfd. condenser. Link terminals 2 and 3 together.
Note 3.—Use lower capacity peak.
Note 4.—Connect an external variable condenser (Philco Part No. 45-2325) from the oscillator compensator (18B) to ground. Tune the added condenser from the minimum capacity position until the second harmonic of the oscillator beats against the signal to produce maximum output.
Note 5.—Remove the external variable condenser.
* While rocking.

Schem. No.	Description	Part No.	List Price			
	Gear (Dial)	28-7185	.10			
	Gear (Drive)	31-1884	.25			
	Guard (Scale)	27-8324	.02			
	Knob (Tuning)	27-4330	.10			
	Knob (Vernier)	27-4331	.10			
	Knob (Tone, Volume)	27-4332	.10			
	Knob (Range Switch)	27-4326	.10			
	Insulator (Electrolytic Cond. Power Unit)	27-7836	.06			
	Insulator (Electrolytic Cond. Power Unit)	27-7194	$0.01			
	Insulator (Electrolytic Cond. Power Unit)	27-8653				
	Mask	27-5198	.30			
	Mask Arm and Link Assembly	31-1959	.30			
	Mask Guide and Pilot Lamp Bracket	38-7844	.15			
	Mask Washer	27-8318	.50 C			
	Mtg. Washer (Rubber, chassis)	5189	.03			
	Mtg. Grommet	27-4317	.07			
	Mtg. Rubber (Tuning Condenser)	27-4325	.02			
	Mtg. Sleeve	28-2257	.01			
	Mtg. Screw	W-729	.45 C			
	Mtg. Washer	28-3927	.01			
	Mtg. Washer	27-7807	.50 C			
	Panel Wiring, I. F. Unit	38-7895				
	Receptical Assembly Shadowmeter	41-3276				
	Socket 7 Prong	27-6057	.11			
	Socket 8 Prong	27-6058	.11			
	Shaft Control Volume	38-8059	.10			
	Spring (Shaft)	28-4117	.40 C			
	Spring (Shadowmeter)	28-8623	.70 C			
	Tube (Paper, Volume Shaft)	27-8530	.01			
	Shaft and Plate (Range Switch)	42-1173	.50			
	Shield (Chassis)	38-8269				
	Shield (Tube)					
	Spring (Thrust, dial gear)	28-8611	.01			
	Washer (Thrust, dial gear)	28-3976	.30 C			
	Washer "C" (dial gear)	28-3904	.01			

"B" CABINET

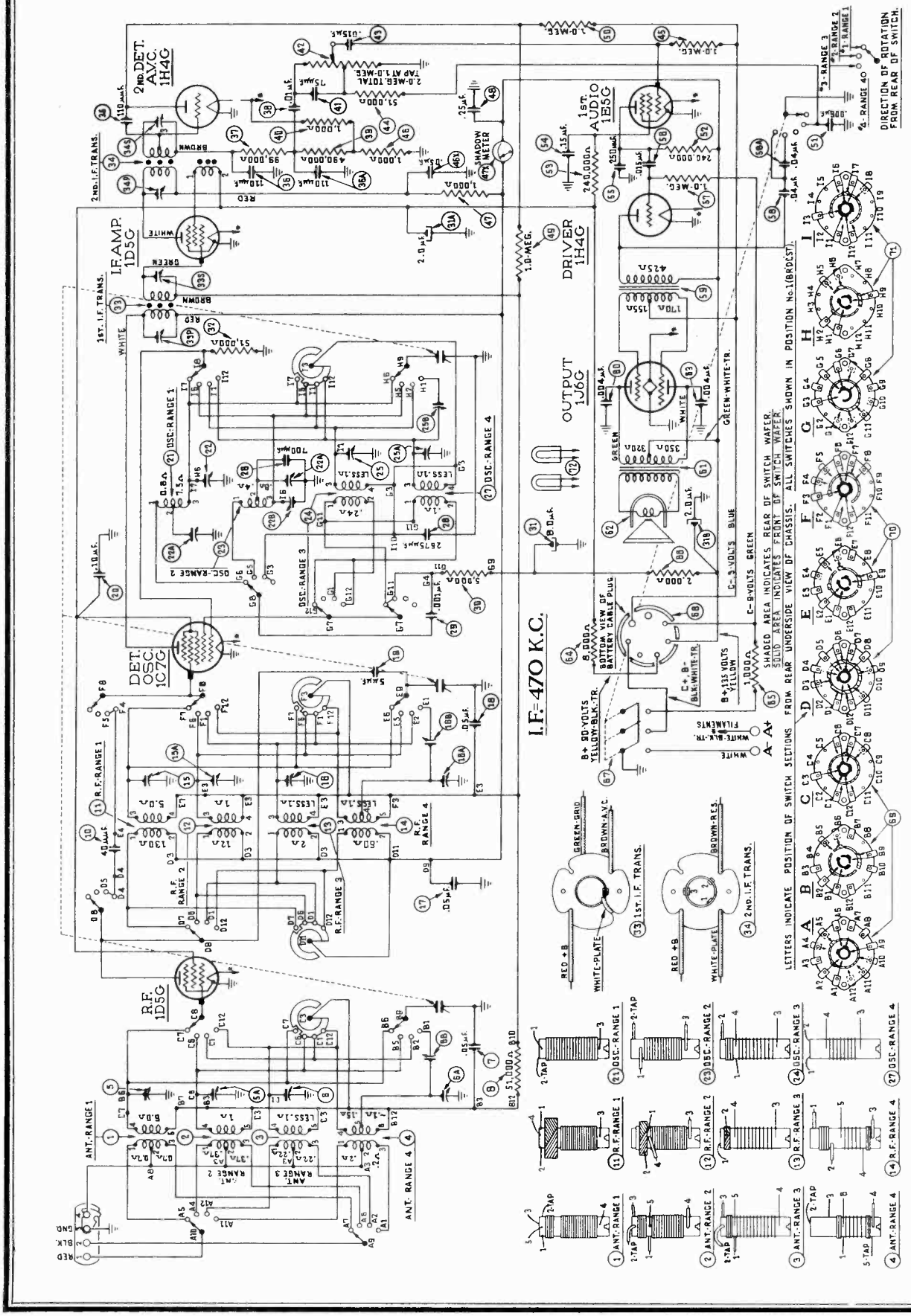
Baffle and Silk Assembly	40-5974	.40
Bezel Frame and Plate Assembly	40-5937	.60
Gasket	27-8311	.01
Glass	27-8298	.05
Bezel Ring	28-3967	.35
Speaker KR-18	36-1249	10.00

"X" AND "MX" CABINET

Baffle Silk Assembly (X)	40-6043	
Baffle Silk Assembly (MX)	40-6023	
Baffle Board (MX)	16277	
Bezel Plate Assembly	40-5945	.70
Gasket	27-8312	.01
Glass	27-8299	.06
Ring	28-3987	.40
Speaker HR-13	36-1251	11.00

PHILCO RADIO & TELEV. CORP.

MODEL 37-643
Schematic



Model 37-643

Fig. 3. Schematic Diagram

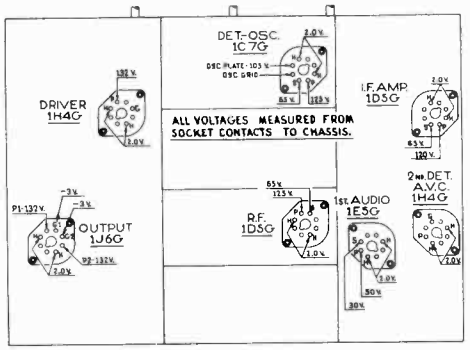


Fig. 1. Socket Voltages and R. F. Compensators

The voltages indicated by arrows were measured with a **Philco 025 Circuit Tester** which contains a voltmeter having a resistance of 1000 ohms per volt. Volume control at minimum; Range Switch in broadcast position; Storage Battery fully charged.

Aerial Connections

The red and black leads of the High Efficiency Aerial "transmission line" are connected to terminals 1 and 2 respectively, of the terminal panel provided on the rear of the chassis. Connect the jumper on the terminal panel across terminals 3 and 4.

If a temporary aerial is used, the jumper should be across terminals 2 and 3. The aerial connects to terminal 1 and the ground lead to terminal 3. A good ground connection is desirable in all installations.

Dial Calibration

In order to adjust this receiver correctly, the dial must be aligned to track properly with the tuning condenser. To do this rotate the tuning control to the extreme counter-clockwise position (maximum capacity). Loosen the set screw of the dial hub, then turn dial until the glowing indicator is centered on second index line of dial scale (see Fig. 2). Now tighten the dial hub set screw in this position.

Shadow Meter Adjustment

With receiver turned ON, remove aerial lead and adjust the shadow meter as follows:

1. Move the shadow meter coil backwards and forwards, until the opposite edges of the shadow are ⅛ of an inch from each end of the shadow screen, measuring along the bottom edge of the screen. Adjustment of the shadow meter light bracket may be necessary for perfect centering.

2. Remove the "B" Battery plug from its socket and rotate coil until shadow reaches minimum width. This width must not exceed ⅛ of an inch.

3. Replace the "B" Battery plug in its socket. The shadow should then widen until it is not more than 1/16 inch or less than 1/16 inch from each side of the screen, measuring along the bottom edge. If these limits are not obtained readjust the shadow meter as given in paragraphs 1 and 2 until they are obtained.

TYPE CIRCUIT: Superheterodyne; battery operated; with Class "B" output circuit; the Philco Automatic Aerial Tuning System, and built-in connection for the Philco High-Efficiency Aerial.

BATTERY REQUIRED: "A" Philco 172-R, storage battery or a dry "A" battery Philco Part No. 41-8011. If a dry "A" battery is used, a ballast lamp Philco type 1Z1 must be inserted in the socket provided in the dry 'A" battery. This lamp acts as a voltage regulator and maintains a constant potential of two volts on the filament of the receiver tubes.

"BC" battery—Philco Part No. 41-8007 is used to supply B and C voltages. This battery contains a socket into which the receiver battery cable plug is inserted.

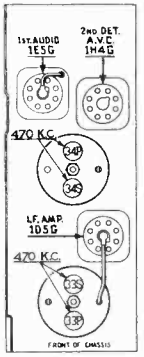


Fig. 5 I. F. Compensators

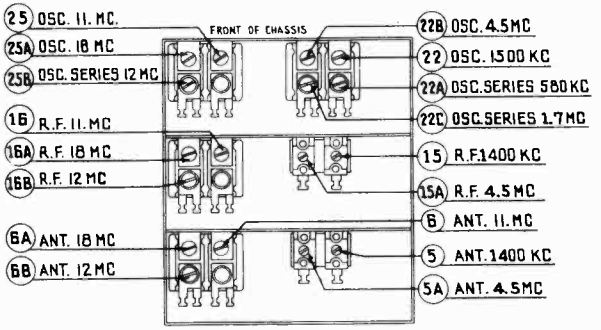


Fig. 6 R. F. Compensators

Alignment of Compensators

EQUIPMENT REQUIRED: (1) Signal Generator; Philco Model 088 (fundamental frequency 110 to 20,000 K. C.) is the correct instrument for this purpose; (2) output meter. Philco Model 025 Circuit Tester incorporates a sensitive output meter and is recommended; (3) Fibre handle screw driver (Philco Part No. 27-7059); (4) Special variable condenser (Philco Part No. 45-2325).

OUTPUT METER: The 025 Output Meter is connected between the plate prong of the 1H4G Driver tube and the chassis. Then adjust the meter to use the (0-30) volt scale.

INTERMEDIATE FREQUENCY CIRCUIT

Set controls as follows:

a. Range switch position one (broadcast)
b. Volume control maximum
c. Connect the 088 Signal Generator output lead through a .1 mfd. condenser to the control grid of the 1C7G tube, and the ground connection of the output lead to the chassis.
d. Receiver dial at 580 K. C.
e. Signal Generator 470 K. C.
f. Adjust compensators (34S), (34P), (33S), and (33P) for maximum output.

RADIO FREQUENCY CIRCUIT

Tuning Range 11.5 to 18.2 M. C.

1. Connect signal generator output lead with the .1 mfd. series condenser to terminal No. 1 and the ground lead to terminal No. 3. Terminals 2 and 3 must be connected with the shorting link provided on the aerial panel.

2. Adjust compensators as follows:

Range Switch	Signal Generator	Receiver Dial	Compensators in Order
4	18.0 M. C.	18.0 M. C.	(25A) check image at 17.06 M. C. on receiver dial (See Note B)
4	18.0 M. C.	18.0 M. C.	(6A), (16A) use shunt condenser on 25A. First lug from left side of R. F. Unit fig. 6. (See Note A)
4	12.0 M. C.	12.0 M. C.	(25B), (16B), (6B)
4	18.0 M. C.	18.0 M. C.	(25A)
4	18.0 M. C.	18.0 M. C.	(6A), (16A) use shunt condenser on (25A). First lug from left side of R. F. Unit fig. 6. See Note (A)

Tuning Range 7.35 to 11.6 M. C.

Range Switch	Signal Generator	Receiver Dial	Compensators in Order
3	11.0 M. C.	11.0 M. C.	(25) check image 10.06 M. C. on receiver
3	11.0 M. C.	11.0 M. C.	(16), (6) use shunt on (25). Third lug from left side of R. F. Unit fig. 6. (See Note A)
3	11.0 M. C.	11.0 M. C.	(25)

Tuning Range 4.7 to 7.4 M. C.

Range Switch	Signal Generator	Receiver Dial	Compensators in Order
2	4.5 M. C.	4.5 M. C.	(22B), (15A), (5A)
2	1.7 M. C.	1.7 M. C.	(22C)
2	4.5 M. C.	4.5 M. C.	(22B), (15A), (5A)

Tuning Range 530 to 1600 K. C.

Range Switch	Signal Generator	Receiver Dial	Compensators in Order
1	1500 K. C.	1500 K. C.	(22), (15), (5)
1	580 K. C.	580 K. C.	(22A) roll tuning condenser
1	1500 K. C.	1500 K. C.	(22)
1	1400 K. C.	1400 K. C.	(15), (5)

NOTE "A"—To eliminate the effect of the Ant. and R. F. compensators detuning the Osc. circuit, a variable tuning condenser, Philco Part No. 45-2325 is connected from the oscillator compensators to ground when designated in the padding instruction above. Tune the added condenser from the minimum capacity position until the second harmonic of the receiver oscillator beats against the signal from the generator, resulting in a maximum indication on the output meter. Then adjust compensators as noted for maximum output.

NOTE "B"—To accurately adjust the compensator to the fundamental and not the image signal, turn the oscillator compensator to the maximum capacity position clockwise. Then slowly turn the compensators counter-clockwise until a second maximum peak is obtained on the output meter. The first peak is the image signal and the receiver must not be adjusted to it. If the above procedure is correctly performed, the image signal will be found 940 K. C. below the frequency being used on any high frequency band.

MODEL 37-643
Chassis, Parts

PHILCO RADIO & TELEV. CORP.

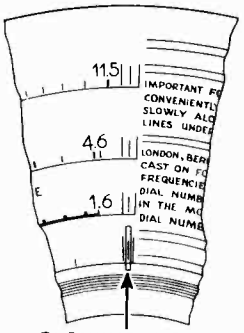


Fig. 2—Dial

SPEAKER:
"B" KR-17
"X" HR-12

CURRENT DRAIN:
"A" battery 0.9 amps
"B" battery 23 M.A.

FREQUENCY RANGES: Four:
Range 1—530 to 1600 K. C.
Range 2—1.58 to 4.8 M. C.
Range 3—4.7 to 11.6 M. C.
Range 4—11.5 to 18.2 M. C.

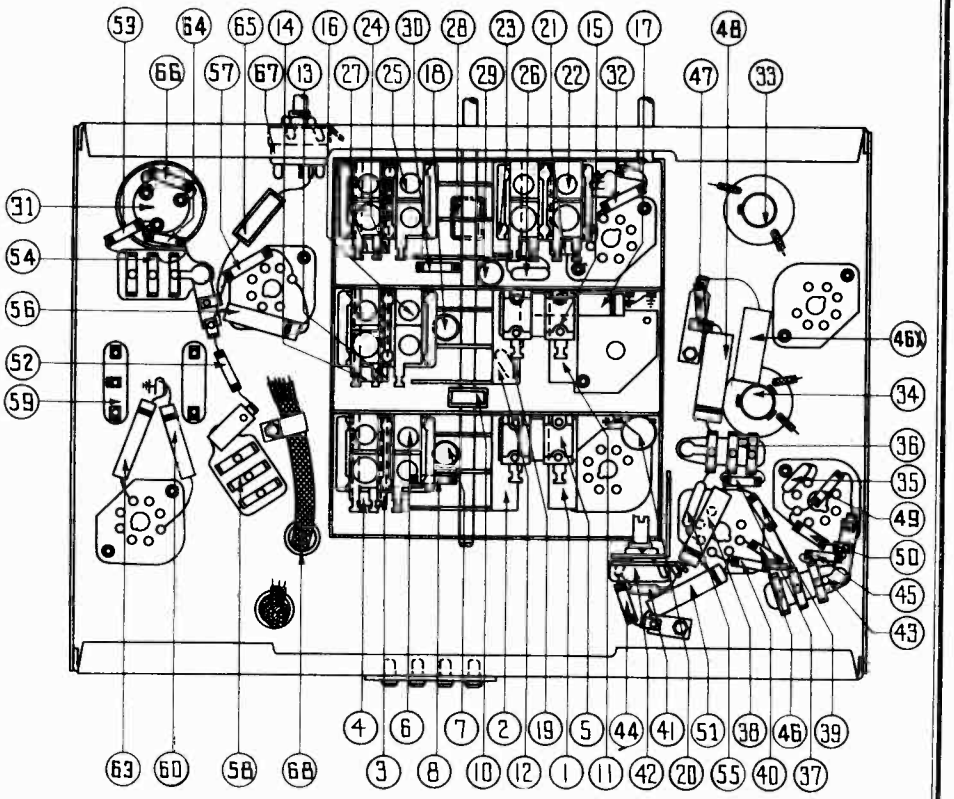


Fig. 4. Base View of Chassis

Replacement Parts—Model 37-643

Schem. No.	Description	Part No.	List Price
1	Antenna Transformer (Range 1)	32-2108	$1.60
2	Antenna Transformer (Range 2)	32-2146	1.20
3	Antenna Transformer (Range 3)	32-2150	1.20
4	Antenna Transformer (Range 4)	32-2175	1.20
5	Compensator (two section)	31-6093	.40
6	Compensator (three section)	31-6128	1.00
7	Condenser (.05 mfd. tubular)	30-4020	.20
8	Resistor (51,000 ohms, ½ watt)	33-351339	.20
9	Tuning Condenser	31-1855	4.50
10	Condenser (40 mmfd. mica)	30-1076	.20
11	R. F. Transformer (Range 1)	32-2105	1.00
12	R. F. Transformer (Range 2)	32-2147	.70
13	R. F. Transformer (Range 3)	32-2151	.70
14	R. F. Transformer (Range 4)	32-2176	1.20
15	Compensator (two section)	31-6120	.50
16	Compensator (three section)	31-6127	1.00
17	Condenser (.05 mfd. tubular)	30-4020	.20
18	Condenser (.05 mfd. tubular)	30-4020	.20
19	Condenser (5 mmfd. mica)	30-1077	.20
20	Condenser (.1 mfd. tubular)	30-4122	.20
21	Oscillator Transformer (Range 1)	32-2120	1.00
22	Compensator (four section)	32-6108	
23	Oscillator Transformer (Range 2)	32-2149	.70
24	Oscillator Transformer (Range 3)	32-2152	.70
25	Compensator (three section)	32-6128	
26	Condenser (650 mmfd. mica)	5863	.25
27	Oscillator Transformer (Range 4)	32-2182	.70
28	Condenser (2675 mmfd.)	30-1085	.40
29	Condenser (.001 mmd. tubular)	30-4453	.20
30	Resistor (5,000 ohms, ½ watt)	33-250339	.20
31	Electrolytic Condenser (8, 2, 2. mfd.)	30-2161	1.60
32	Resistor (51,000 ohms, ½ watt)	33-351339	.20
33	1st I. F. Transformer	32-2253	1.80
34	2nd I. F. Transformer	32-2255	1.80
35	Condenser (110 mmfd. mica) 80 mmf.	30-1031	.20
36	Condenser (110 mmfd. dual)	8035-DG	.25
37	Resistor (99,000 ohms, ½ watt)	33-399339	.20
38	Condenser (.01 mfd. tubular)	30-4124	.20
39	Resistor (490,000 ohms, ½ watt)	33-449339	.20
40	Resistor (1,000 ohms, ½ watt)	33-210339	.20
41	Condenser (75 mmfd. mica)	30-1053	
42	Volume Control	33-5158	1.00
43	Condenser (.015 mfd. bakelite)	3793-SU	.35
44	Resistor (51,000 ohms, ½ watt)	33-351339	.20
45	Resistor (1 megohm, ½ watt)	33-510339	.20
46	Resistor (1000 ohms, ½ watt)	33-210339	.20
46X	Condenser (.05 mfd. tubular)	30-4020	

Schem. No.	Description	Part No.	List Price
47	Resistor (1,000 ohms, ½ watt)	33-210339	$0.20
47X	Shadow Meter	45-2307	
48	Condenser (.25 mfd. tubular)	30-4446	.25
49	Resistor (1 megohm, ½ watt)	33-510339	.20
50	Resistor (1 megohm, ½ watt)	33-510339	.20
51	Condenser (.006 mfd. tubular)	30-4125	.20
52	Resistor (240,000 ohms, ½ watt)	33-424339	.20
53	Resistor (240,000 ohms, ½ watt)	33-424339	.20
54	Condenser (.15 mfd. tubular)	6287-SG	.20
55	Condenser (250 mmfd. mica)	30-1032	.25
56	Condenser (.015 mfd. tubular)	30-4226	.20
57	Resistor (1 megohm, ½ watt)	33-510339	.20
58	Condenser (.04 mfd. dual bakelite)	8327-DU	.40
59	Audio Transformer (Input)	32-7637	2.00
60	Condenser (.004 mfd. tubular)	30-4456	.20
61	Output Transformer KR-17—HR-12	32-7639	1.60
62	Cone and Voice Coil KR-17	36-3540	.80
	Cone and Voice Coil HR-12	36-3557	1.20
63	Condenser (.004 mfd. tubular)	30-4456	.20
64	Resistor (8,000 ohms, ½ watt)	33-280339	.20
65	Resistor (1,000 ohms, ½ watt)	33-1223	.20
66	Resistor (2,000 ohms, ½ watt)	33-220339	.20
67	Switch and Tone Control	42-1241	1.00
68	Battery Cable Assembly	41-3198	1.40
69	Ant. Range Switch	42-1202	
70	R. F. Range Switch	42-1254	
71	Oscillator Range Switch	42-1204	
72	Pilot Lamp (dial) and Shadow Meter	34-2150	.22
	Shadow Meter Receptacle Assem.	41-3225	
	Range Switch Shaft and Index Plate	42-1186	.50
	Pilot Lamp Assembly	38-7875	.45
	Dial	27-5250	.70
	Hub	28-7187	.12
	Clamp	28-2837	.10
	Set Screw	W-1641	.02
	Dial Hole Cover	27-8425	.02
	Gear (Dial)	28-7185	.10
	Gear (Drive)	31-1884	.25
	Thrust Spring	28-8611	.01
	Thrust Washer	28-3976	.30 C
	"C" Washer	28-3904	.01
	Mask	27-5240	.30
	Mask Arm and Link Assembly	31-1959	.30
	Mask Washer	27-8318	.50 C
	Mask Guide and Lamp Bracket	38-7844	.15
	Indicator Bracket and Lens Assembly	31-1900	.30
	Scale Guard	27-8324	.02

Description	Part No.	List Price
Volume Control Shaft	38-8060	$0.12
Retaining Clip	28-4394	.01
Spring	28-4117	.40 C
Tube Shield	28-2726	.10
Tube Shield Base	28-3898	.03
Shield Shadow Meter	28-2917	.02
Socket (7 prong)	27-6057	.11
Socket (8 prong)	27-6058	.11
Grommet Mtg. R. F. Unit	27-4317	.04
Sleeve Mtg. R. F. Unit	28-2257	.01
Washer Mtg. R. F. Unit	27-7807	.50 C
Screw Mtg. R. F. Unit	W-729	.45 C
Mtg. Rubber (Gang Condenser)	27-4325	.02
Mtg. Spring (Shadow Meter)	28-8623	.70 C
Mtg. Plate (R. F. Transformer)	28-3808	.02
Mtg. Spacer (R. F. Transformer)	27-8228	.01
Mtg. Screw (R. F. Transformer)	W-1635	.30 C
Mtg. Busher (Cabinet)	27-4360	.04
Mtg. Rubber (Cabinet)	3558	.03
Speaker Cable	41-3207	.30
Knob (Tuning)	27-4330	.10
Knob (Tuning Vernier)	27-4331	.10
Knob (Tone and Volume)	27-4332	.10
Knob (Range Switch)	27-4326	.10
"A" Battery	172-R	
"B" Battery	41-8007	
"B" CABINET		
Speaker KR-17	36-1248	
Baffle and Silk Assembly	40-5975	.40
Bezel Assembly	40-5946	.75
Gasket	27-8312	.01
Screw	W-1644	.50 C
Glass	27-8299	.06
Ring	28-3987	.40
"X" CABINET		
Baffle Silk Assembly	40-6036	1.20
Speaker HR-12	36-1250	11.00
Bezel and Plate Assembly	40-5948	.80
Glass	27-8300	.06
Ring	28-3988	.45
Gasket	27-8313	.01
Screw	W-1644	.50 C

Prices Subject to Change Without Notice

MODEL 37-665
Voltage, Notes
Spkr. Wiring

PHILCO RADIO & TELEV. CORP.

Electrical Specifications

TYPE CIRCUIT:

Superheterodyne, with a High-Frequency tuning range; covering from 25 to 42 megacycles and a Push-Pull pentode audio output circuit.

POWER SUPPLY:

Voltage	Frequency	Power Consumption
115	50 to 60	130 watts
115	25 to 40	130 watts

Power transformers for the different voltage and frequency ratings are listed in the parts list.

Shadow Meter Adjustment

Remove aerial and allow tubes to warm up. Then adjust shadow meter as follows:

1. Move the shadow meter coil backwards and forwards, until the opposite edges of the shadow are $\frac{1}{8}$ of an inch from end of the shadow screen, measuring along the bottom edge of the screen. Adjustment of the shadow meter light bracket may be necessary for perfect centering.

2. Remove the rectifier tube from its socket, and rotate coil until shadow reaches minimum width. This width must not exceed $\frac{3}{32}$ of an inch.

3. Replace the 5Y4G rectifier tube in its socket. The shadow should then widen to not more than $\frac{3}{16}$ of an inch or less than $\frac{1}{16}$ inch from each side of the screen measuring along the bottom edge. If these limits are not obtained readjust the shadow meter as given in paragraphs 1 and 2 until they are reached.

PHILCO TUBES USED: Nine.

Two 6K7G; two 6F6G; two 6J5G; one 6A8G; one 6K5G and one 5Y4G.

Dial Calibration

In order to adjust this receiver correctly, the dial must be aligned to track properly with the tuning condenser. To do this rotate the tuning control to the extreme counter-clockwise position (maximum capacity). Loosen the set screw of the dial hub, then turn dial until the glowing indicator is centered on the middle index line of dial scale (see Fig. 5). Now tighten the dial hub set screw in this position.

Aerial Connections

To obtain the full advantage of the sensitivity of this receiver the Philco High Efficiency Aerial supplied with the receiver must be used. The connections for the aerial are as follows:

The red and black leads of the High-Efficiency Aerial "transmission line" are connected to terminals 1 and 2 respectively, of the terminal panel provided on the rear of the chassis. Connect the jumper on the terminal panel across terminals 3 and 4.

If a temporary aerial is used, the jumper should be across terminals 2 and 3. The aerial connects to terminal 1 and the ground lead to terminal 3. A good ground connection is desirable in all installations.

Fig. 2—Speaker Wiring, K-35, H-26

Fig. 1—Socket Voltages—Underside of Chassis View

The voltages indicated by arrows were measured with a **Philco 025 Circuit Tester** which contains a voltmeter having a resistance of 1000 ohms per volt. Volume Control at minimum, range switch in broadcast position, line voltage 115 A. C.

SPEAKERS: B Cabinet, K35. Part No. 36-1231.
X Cabinet, H26. Part No. 36-1238.

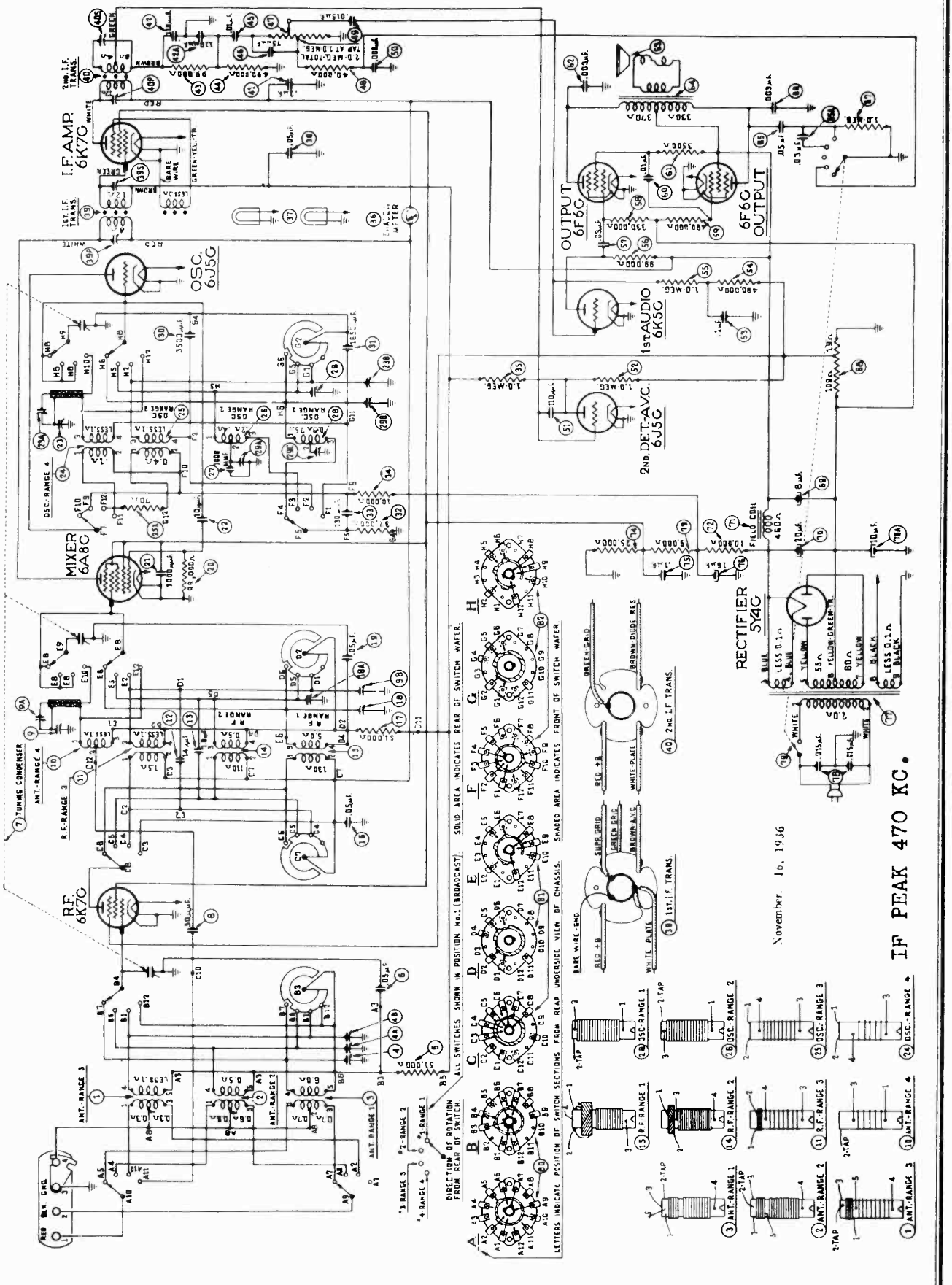
INTERMEDIATE FREQUENCY:
470 K. C.

TUNING RANGES: Four.
Range 1—530 to 1720 K. C.
Range 2—2.3 to 7.4 M. C.
Range 3—7.35 to 22 M. C.
Range 4—25 to 42 M. C.

UNDISTORTED OUTPUT: 7 watts.

MODEL 37-665
Schematic

PHILCO RADIO & TELEV. CORP.



Alignment of Compensators

EQUIPMENT REQUIRED: (1) Signal Generator; Philco **Model 088** (fundamental frequency 110 to 20000 K. C.) is the correct instrument for this purpose; (2) output meter. **Philco Model 025 Circuit Tester** incorporates an accurate, sensitive output meter and is recommended; (3) Fibre handle screw-driver (Philco Part No. 27-7059); (4) Special variable condenser (Philco Part No. 45-2325).

OUTPUT METER: The 025 Output Meter is connected between the plate and cathode prongs of one of the 6F6G tubes. The meter is adjusted to use the (0-30) volt scale.

INTERMEDIATE FREQUENCY CIRCUIT

1. Set controls as follows:
   - **a.** Range switch position one (broadcast)
   - **b.** Receiver dial 580 K. C.
   - **c.** Volume control maximum
   - **d.** Signal generator 470 K. C.
   - **e.** Connect the 088 signal generator output lead through a .1 mfd. condenser to the control grid of the 6A8G tube and the generator ground connection to the chassis.
2. Adjust the following I. F. compensators for maximum output: (39P), (39S), (40P) and (40S).

RADIO FREQUENCY CIRCUIT

Tuning Range (28 to 42 M. C.)

1. Set controls as follows:
   - **a.** Range switch position 4
   - **b.** Connect the signal generator output lead and ground to terminals 1 and 3 respectively on the aerial input panel. Terminals 2 and 3 must be connected with the shorting link provided on the aerial panel.
2. Adjust compensators as follows for maximum output:

Signal Generator	Receiver Dial	Compensators in Order
13 M. C.	39 M. C.	(23) Check image signal at 38.06 on the Receiver Dial. (See Note A)
13 M. C.	39 M. C.	(9) Roll gang
13 M. C.	26 M. C.	(23A)
13 M. C.	26 M. C.	(9A)
13 M. C.	39 M. C.	(23) check image (Note A)
13 M. C.	39 M. C.	(9) Roll gang

Tuning Range 7.35 to 22 M. C.

1. Set controls and adjust compensators for maximum output as follows:
   Range Switch Position 3.

Signal Generator & Receiver Dials	Compensators in Order
18 M. C.	(23B) check image 17.06 M. C.
18 M. C.	(9B), (4B) use shunt condenser on (23B). See Note B

Tuning Range 2.3 to 7.4 M. C.

1. Range Switch Position 2
2. **Signal Generator & Receiver Dials** — **Compensators in Order**

7.0 M. C.	(29), (18A), (4A)
2.35 M. C.	(29A)
7.0 M. C.	(29)
6.0 M. C.	(18A), (4A)

Tuning Range 530 to 1720 K. C.

1. Range Switch Position 1
2. **Signal Generator & Receiver Dials** — **Compensators in Order**

1600 K. C.	(29B), (18), (4)
580 K. C.	(29C) Roll gang
1600 K. C.	(29B)
1500 K. C.	(18), (4)

NOTE "A"—To accurately adjust the compensator to the fundamental and not the image signal, turn the oscillator compensator to the maximum capacity position clockwise. Then slowly turn the compensators counter-clockwise until a second maximum peak is obtained on the output meter. The first peak is the image signal and the receiver must not be adjusted to it. If the above procedure is correctly performed, the image signal will be found 940 K. C. below the frequency being used on any high frequency band.

NOTE "B"—To eliminate the effect of the Ant. and R. F. compensators detuning the Osc. circuit, a variable tuning condenser, Philco Part No. 43-2325 is connected from the oscillator compensators to ground when designated in the padding instruction above. Tune the added condenser from the minimum capacity position until the second harmonic of the receiver oscillator beats against the signal from the generator, resulting in a maximum indication on the output meter. Then adjust compensators as noted for maximum output.

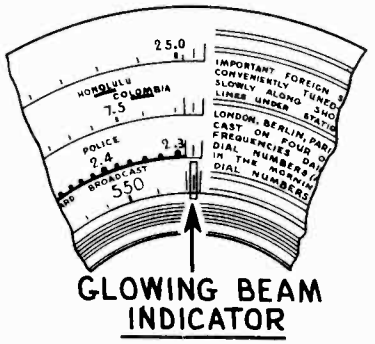


Fig. 5—Dial Calibration

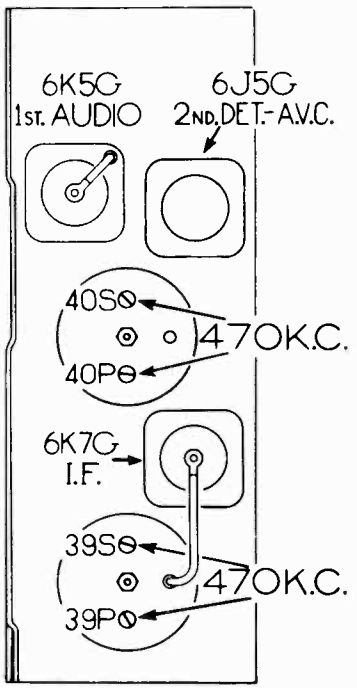


Fig. 6—I. F. Compensators

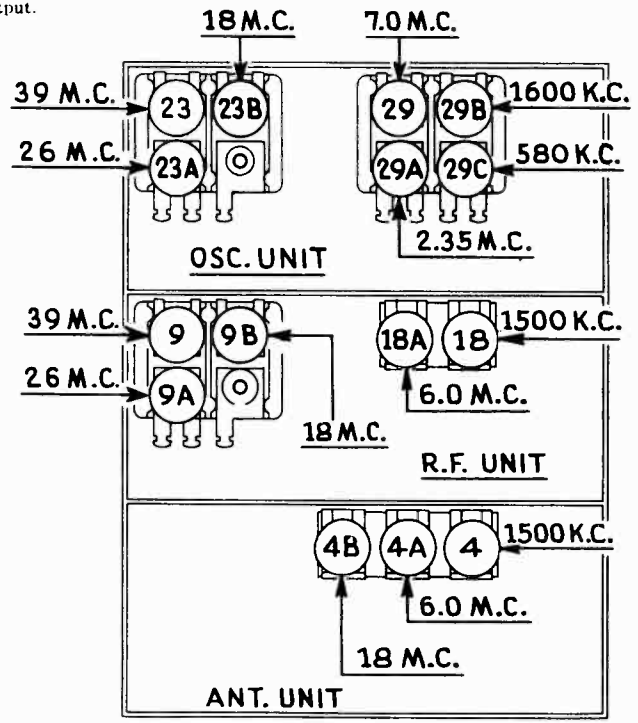


Fig. 7—R. F. Compensators

MODEL 37-665
Chassis, Parts

PHILCO RADIO & TELEV. CORP.

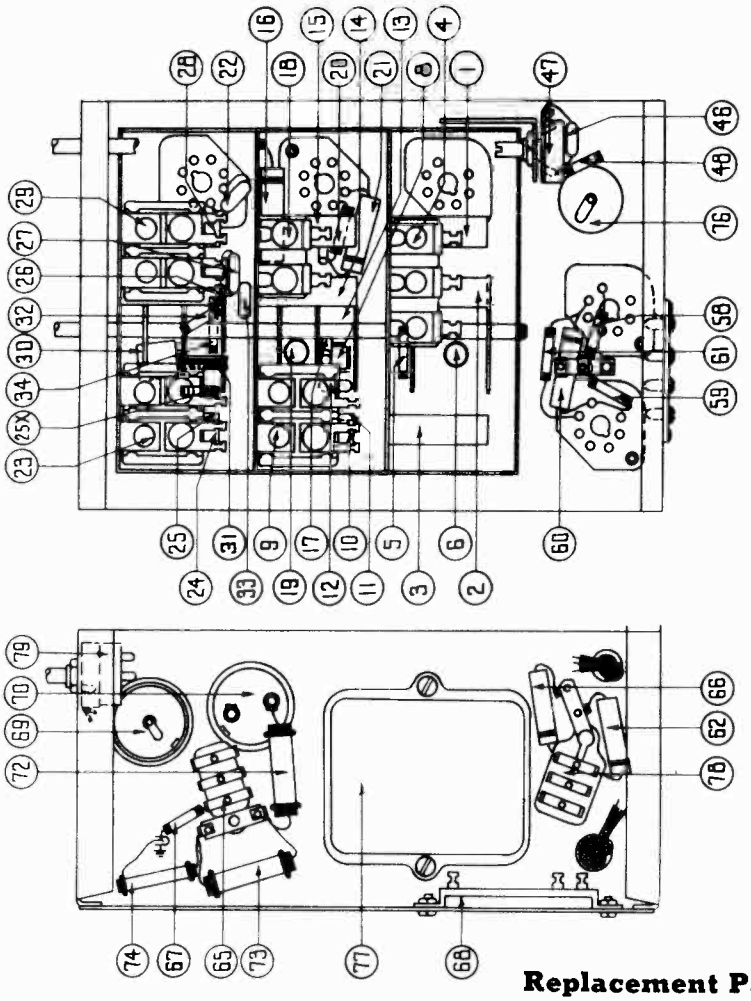
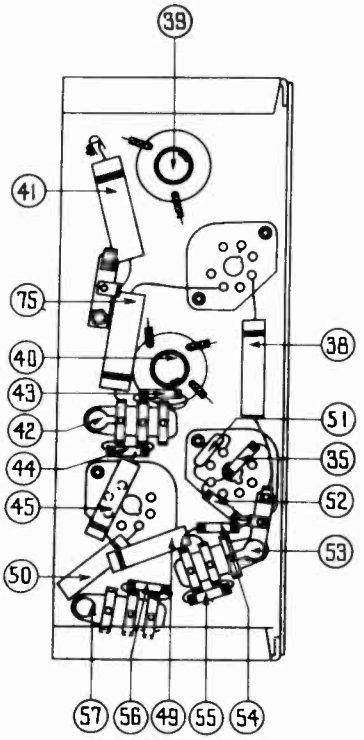


Fig. 4—Base View of Chassis



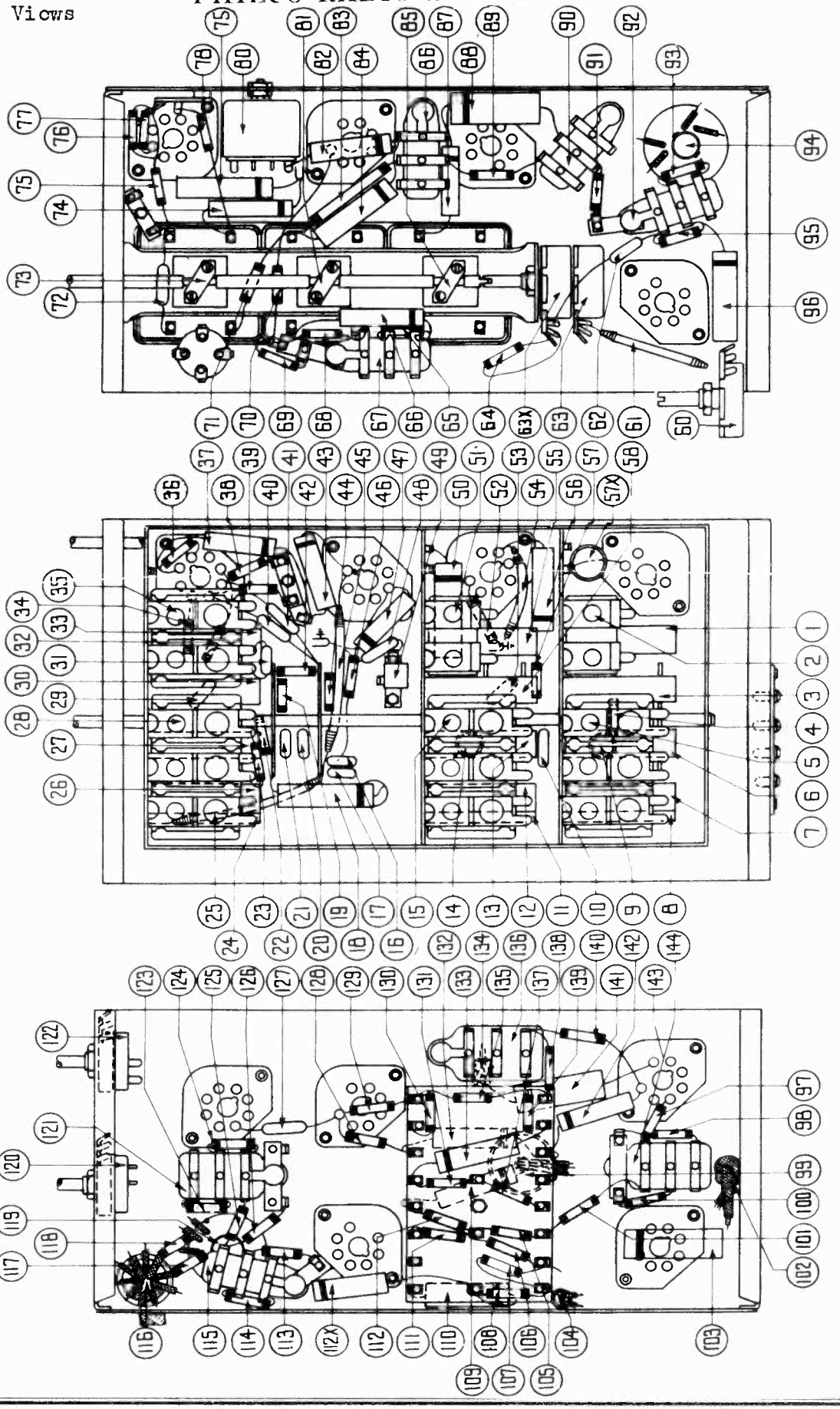
Replacement Parts

Schem. No.	Description	Part No.	List Price
1	Antenna Transformer (Range 3)	32-2109	$1.20
2	Antenna Transformer (Range 2)	32-2119	1.20
3	Antenna Transformer (Range 1)	32-2108	1.60
4	Compensator (three section)	31-6092	.60
5	Resistor (51000 ohms, ½ watt)	33-351339	.20
6	Condenser (.05 mfd. tubular)	30-4444	.20
7	Tuning Condenser	31-1938	4.80
8	Condenser (50 mmfd. mica)	30-1029	.20
9	Compensator (3 section)	31-6225	
10	Ant. Transformer (Range 4)	32-2192	.70
11	R. F. Transformer (Range 3)	2-2126	.70
12	Condenser (14 mmfd.)	30-1073	.20
13	Condenser (1.0 mmfd.) twisted wire and lug	38-7878	.04
14	R. F. Transformer (Range 2)	32-2106	.70
15	R. F. Transformer (Range 1)	32-2105	1.00
16	Condenser (.05 mfd. Tubular)	30-4123	.20
17	Resistor (51000 ohms, ½ watt)	33-351339	.20
18	Compensator (two section)	31-6093	.40
19	Condenser (.05 mfd. Tubular)	30-4444	.20
20	Resistor (99,000 ohms)	33-399339	.20
21	Condenser (1000 mmfd.)	30-4453	.20
22	Condenser (10 mmfd.)	30-1065	.20
23	Compensator (three section)	31-6225	
24	Osc. Transformer (Range 4)	32-2196	1.20
25	Osc. Transformer (Range 3)	32-2110	.70
25X	Resistor (70 ohms, ½ watt)	33-070339	
26	Osc. Transformer (Range 2)	32-2121	.70
27	Condenser (1000 mmfd. mica—Green, White)	30-1007	.30
28	Osc. Transformer (Range 1)	32-2120	1.00
29	Compensator (four section)	31-6108	1.00
30	Condenser (3500 mmfd.)	31-6097	.50
31	Condenser (1650 mmfd.)	31-6096	.40
32	Resistor (32000 ohms, ½ watt)	33-332339	.20
33	Condenser (130 mmfd.)	30-1050	.25
34	Resistor (10000 ohms, ½ watt)	33-310339	.20
35	Resistor (1.0 megohm, ½ watt)	33-510339	.20
36	Shadowmeter	45-2307	2.50
37	Shadowmeter and Pilot Lamp	34-2039	.07
38	Condenser (.05 mfd. tubular)	30-4020	.20
39	1st I. F. Transformer	32-2169	1.80
40	2nd I. F. Transformer	32-2171	1.80
41	Condenser (.1 mfd. tubular)	30-4455	.25
42	Condenser (110 mmfd. Dual Bakelite)	8035-DG	.25
43	Resistor (99,000 ohms, ½ watt)	33-399339	.20
44	Resistor (490,000 ohms, ½ watt)	33-449339	.20
45	Condenser (.01 mfd. tubular)	30-4124	.25
46	Condenser (75 mmfd. mica)	30-1031	.20
47	Volume Control	33-5158	1.00
48	Resistor (40,000 ohms, ½ watt)	33-340339	$0.20
49	Condenser (.015 mfd. tubular)	30-4358	.20
50	Condenser (.006 mfd. tubular)	30-4125	.20
51	Condenser (110 mfd. mica)	30-1031	.20
52	Resistor (1.0 megohm, ½ watt)	33-510339	.20
53	Condenser (.1 mfd. Bakelite)	4989-SG	.20
54	Resistor (490,000 ohms, ½ watt)	33-449339	.20
55	Resistor (1.0 megohm, ½ watt)	33-510339	.20
56	Resistor (99,000 ohms, ½ watt)	33-399339	.20
57	Condenser (.03 mfd. bakelite)	8318-SU	.35
58	Resistor (330,000 ohms, ½ watt)	33-433339	.20
59	Resistor (490,000 ohms, ½ watt)	33-449339	.20
60	Condenser (.01 mfd. tubular)	30-4169	.20
61	Resistor (3500 ohms, ½ watt)	33-235339	.20
62	Condenser (.003 mfd. tubular)	30-4469	.20
63	Cone & Voice Coil K35	36-3174	.80
	Cone & Voice Coil H26	36-3801	
64	Output Transformer K35 and H26	32-7634	1.50
65	Condenser (.05, .03 mfd. dual bakelite)	3615-YU	.40
66	Condenser (.003 mfd. tubular)	30-4469	.20
67	Resistor (1.0 megohm, ½ watt)	33-510339	.20
68	Resistor (128 ohms, wirewound)	33-3280	.30
69	Electrolytic Condenser (8 mfd.)	30-2024	1.10
70	Electrolytic Condenser (10, 20 mfd.)	30-2163	2.40
71	Field Coil Assembly K35 and H26	36-3687	4.00
72	Resistor (10,000 ohms, 3 watts)	33-310639	.30
73	Resistor (9000 ohms, 2 watts)	33-290539	.30
74	Resistor (25,000 ohms, 1 watt)	33-325439	.20
75	Condenser (.1 mfd. tubular)	30-4170	.25
76	Electrolytic Condenser (16 mfd.)	30-2118	1.65
77	Power Transformer 115 V., 50 to 60 cycles	32-7606	6.25
	Power Transformer 115 V., 25 to 40 cycles	32-7607	9.00
	Power Transformer 115/220 V., 50 to 60 cycles	32-7608	8.00
78	Condenser (.015 mfd. dual bakelite)	3793-DG	.40
79	Power & Tone Control Switch	42-1184	.75
80	Range Switch Ant	42-1227	1.25
81	Range Switch R. F.	42-1228	1.60
82	Range Switch Osc.	42-1229	1.60
	Switch Index Plate & Shaft	42-1186	.50
	Pilot Lamp Assembly	38-7706	.35
	Dial	27-5244	.70
	Hub	28-7187	.12
	Clamp	28-2837	.10
	Set Screw	W-1641	.02
	Gear (Dial)	28-7185	.10
	Gear (Drive)	31-1884	.25
	Thrust Spring	28-8611	.01
	Thrust Washer	28-3976	$0.30 C
	"C" Washer	28-3904	.01
	Mask	27-5240	.30
	Mask Washer	27-8318	.50 C
	Mask Arm & Link Assembly	31-1887	.45
	Mask Guide & Bracket	38-7876	.25
	Indicator & Lens Assembly	31-1900	.30
	Volume Control Shaft	38-8060	.12
	Retaining Clip	28-4394	.01
	Shaft Spring	28 4117	.40 C
	Shield (Tube)	28-2726	.10
	Base (Shield)	28-3898	.03
	Socket 7 prong	27-6057	.11
	Socket 8 prong	27-6058	.11
	Socket rectifier	27-6052	.11
	Terminal Panel (Ant.)	38-7714	.15
	Grommet Mtg. R. F. Unit	27-4317	.04
	Sleeve Mtg. R. F. Unit	27-7807	.50 C
	Screw Mtg. R. F. Unit	W-729	.45 C
	Rubber Mtg. (Gang Condenser)	27-4325	.02
	Spring Mtg. Shadowmeter	28-8623	.70 C
	Plate Mtg. R. F. Transformer	28-3808	.02
	Spacer Mtg. R. F. Transformer	27-8228	.01
	Screw Mtg. R. F. Transformer	W-1635	.30 C
	Shield (Receiver Bottom)	38-8316	
	Snap Fasteners	28-4279	.75 C
	Cable Speaker	41-3202	.40
	A. C. Cord	L-2183	.40
	Knob (tuning)	27-4330	.10
	Knob (tuning vernier)	27-4331	.10
	Knob (tone & volume)	27-4332	.10
	Knob Range Switch	27-4326	.10
	Receptacle (Shadowmeter)	41-3225	.40
	"B" CABINET		
	Speaker K35	36-1231	7.25
	Baffle & Silk Assembly	40-5975	.40
	Bezel Assembly	40-5946	.75
	Gasket	27-8312	.01
	Screw	W-1644	.50 C
	Glass	27-8299	.06
	Ring	28-3987	.40
	"X" CABINET		
	Speaker H26	36-1238	8.25
	Bezel Assembly	40-5948	.80
	Gasket	27-8313	.01
	Glass	27-8300	.06
	Ring	38-3988	
	Speaker Baffle	16276	.70
	Silk	44-1165	.40

Prices Subject to Change Without Notice

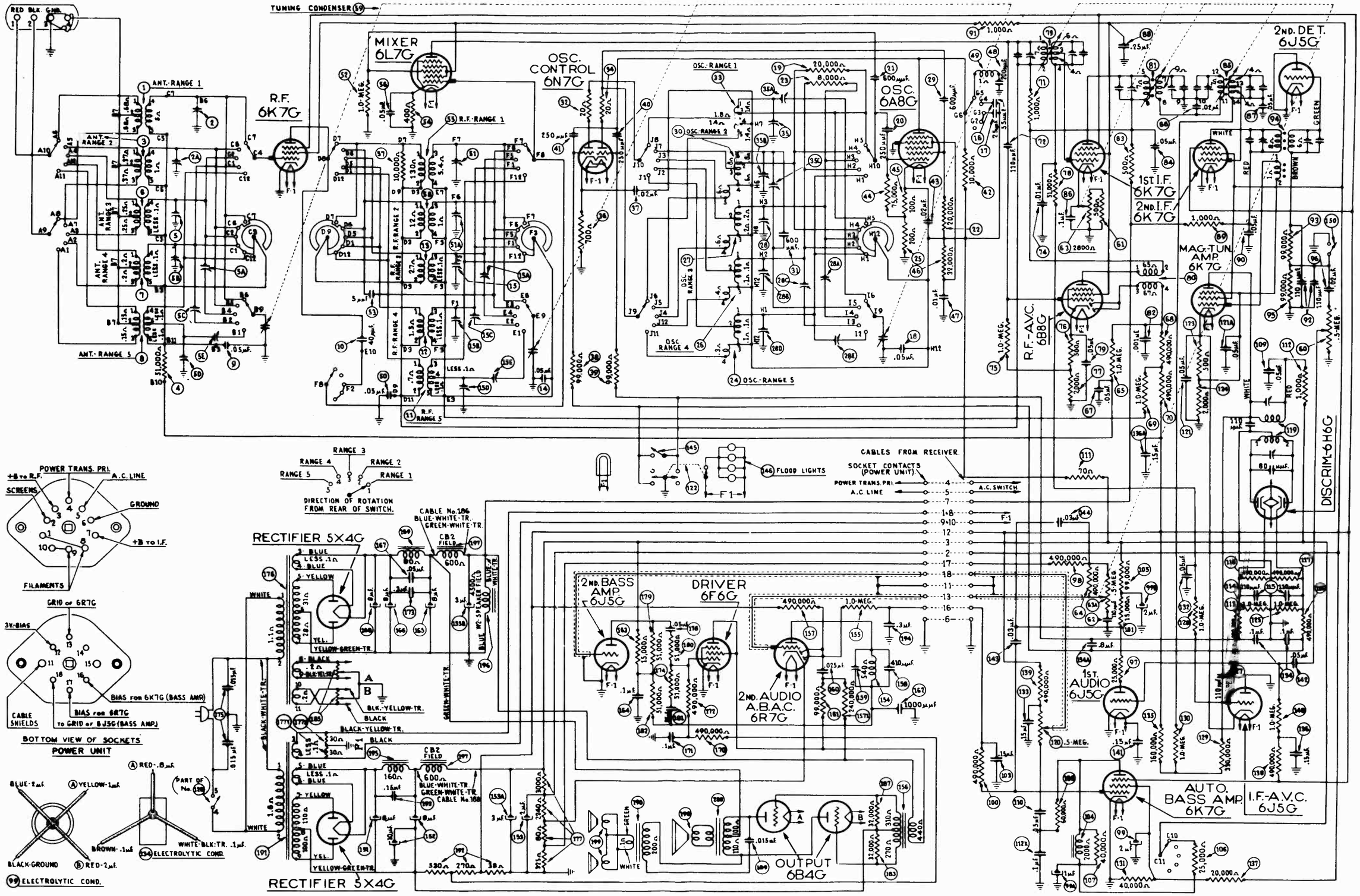
MODEL 37-690
Chassis Views

PHILCO RADIO & TELEV. CORP.



PHILCO RADIO & TELEV. CORP.

MODEL 37-690
Schematic



PHILCO RADIO & TELEV. CORP.

MODEL 37-690
Trimmers
SPU Chassis

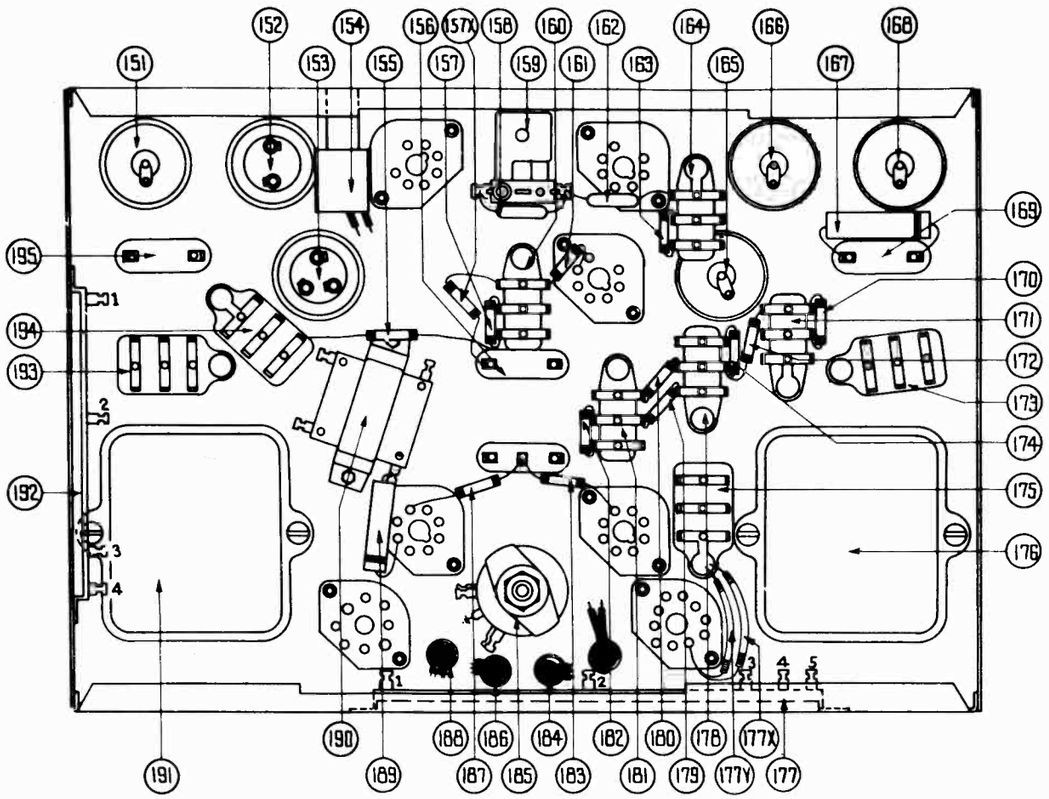


Fig. 6. Underside View of Power Unit

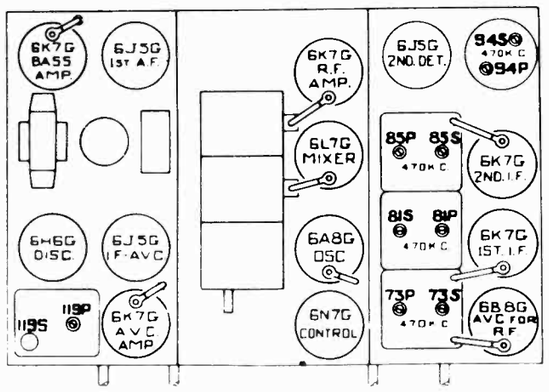


Fig. 7. I. F. Compensators

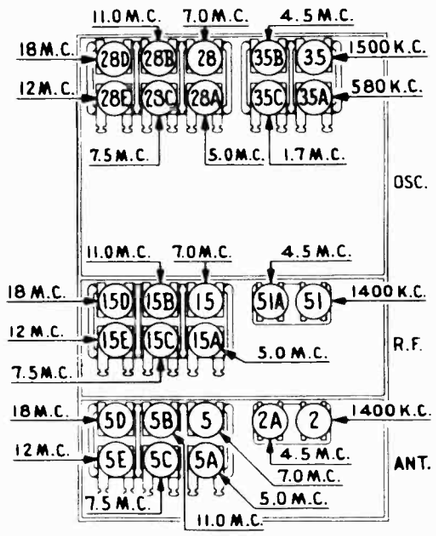


Fig. 8. R. F. Compensators Underside of Chassis View

MODEL 37-690
Alignment

PHILCO RADIO & TELEV. CORP.

ALIGNMENT OF COMPENSATORS

EQUIPMENT REQUIRED: (1) Signal Generator: Philco Model 088 (fundamental frequency 110 to 20000 K. C.) is the correct instrument for this purpose; (2) Output Meter. Philco Model 025 Circuit Tester incorporates a sensitive output meter and is recommended; (3) Fibre handle screw driver (Philco Part No. 27-7059); (4) Special variable condenser (Philco Part No. 45-2325).

OUTPUT METER

The 025 Output Meter is connected to the plate and cathode terminals of the 6F6G driver tube. Adjust the meter to use the (0-30) Volt Scale.

See Dial Calibration Page 1.

INTERMEDIATE FREQUENCY CIRCUIT

1. Adjust the hum control (**185**) for minimum hum with volume control (counter-clockwise).
2. Set controls as follows:
   - **a.** Selectivity-fidelity control (clockwise)
   - **b.** Bass Amplifier at minimum (counter-clockwise)
   - **c.** Volume Control full (clockwise)
   - **d.** Magnetic Tuning "off"
   - **e.** Range Switch position one (broadcast)
   - **f.** Receiver dial at 580 K. C.
   - **g.** Signal Generator at 470 K. C.
3. Adjust the I. F. compensators for maximum with signal generator output lead connected through a .1 mfd. condenser to the grid of tubes as follows:

Input Point	Compensators In Order
6K7G—2nd I. F.	(94S) and (94P)
6K7G—1st I. F.	(85S), (85P), (81S) and (81P)
6L7G—1st Det.	(73S) and (73P)
6L7G—1st Det.	(94S) and (94P). See Note A. Check for two equal peaks. (Fidelity control in expanded position)

4. Turn the fidelity-selectivity control clockwise (selective position) and set the signal generator attenuator for maximum output. Now adjust compensator (**119P**) for minimum output. Retard the receiver volume control, if the output reading goes off scale.

RADIO FREQUENCY CIRCUIT

Tuning Range 11.5 to 18.2 M. C.

1. Set controls as follows:
   - **a.** Connect the signal generator output lead through a .1 mfd. condenser to terminal 1 and generator ground to terminal 3 on aerial input panel. Terminals 2 and 3 must be connected with the shorting link provided on the aerial panel.
   - **b.** Other controls set as given under Intermediate Frequency Circuit (a, b, c, d).

Adjust compensators for maximum as follows:

Range Switch	Signal Generator	Receiver Dial	Compensators in Order
Range 5	18.0 M. C.	18.0 M. C.	(28D) (see Note C below) check image at 17.06 M. C.
Range 5	12.0 M. C.	12.0 M. C.	(28E)
Range 5	18.0 M. C.	18.0 M. C.	(28D)
Range 5	18.0 M. C.	18.0 M. C.	(15D), (5D) (Note B) Use shunt condenser on (28D) first contact from left rear underside view of R. F. Unit
Range 5	12.0 M. C.	12.0 M. C.	(28E), (15E), (5E)
Range 5	18.0 M. C.	18.0 M. C.	(28D) (Note C) check image at 17.06 M. C.
Range 5	18.0 M. C.	18.0 M. C.	(15D), (5D) (Note B)

Tuning Range 7.35 to 11.6 M. C.

Adjust compensators for maximum as follows:

Range Switch	Signal Generator	Receiver Dial	Compensators in Order
Range 4	11.0 M. C.	11.0 M. C.	(28B)
Range 4	11.0 M. C.	11.0 M. C.	(15B) and (5B) Use shunt condenser on (28B) (see Note B) Third contact from left underside view of R. F. Unit
Range 4	7.5 M. C.	7.5 M. C.	(28C), (15C) and (5C)
Range 4	11.0 M. C.	11.0 M. C.	(15B), (5B) Use shunt condenser on (28B) (see Note B)

Tuning Range 4.7 to 7.4 M. C.

Adjust compensators for maximum as follows:

Range Switch	Signal Generator	Receiver Dial	Compensators in Order
Range 3	7.0 M. C.	7.0 M. C.	(28)
Range 3	5.0 M. C.	5.0 M. C.	(28A)
Range 3	7.0 M. C.	7.0 M. C.	(28), (15) and (5)
Range 3	5.0 M. C.	5.0 M. C.	(28A), (15A) and (5A)
Range 3	7.0 M. C.	7.0 M. C.	(28), (15) and (5)

Tuning Range 1.58 to 4.75 M. C.

Adjust compensators for maximum as follows:

Range Switch	Signal Generator	Receiver Dial	Compensators In Order
Range 2	4.5 M. C.	4.5 M. C.	(35B), (51A), (2A)
Range 2	1.7 M. C.	1.7 M. C.	(35C) roll tuning condenser when adjusting this condenser
Range 2	4.5 M. C.	4.5 M. C.	(35B), (51A) and (2A)

Tuning Range 530 to 1600 K. C.

Adjust compensators as follows:

Range Switch	Signal Generator	Receiver Dial	Compensators in Order
Range 1	1500 K. C.	1500 K. C.	(35), (51), (2)
Range 1	580 K. C.	580 K. C.	(35A), Osc. Series—Roll Tuning Condenser
Range 1	1500 K. C.	1500 K. C.	(35)
Range 1	1400 K. C.	1400 K. C.	(51), (2)

10 K. C. AUDIO FILTER

If an audio oscillator is at hand adjust it for 10,000 cycles and connect the output lead to the volume control arm of the receiver. Compensator (**159**) is then adjusted for minimum output.

If, however, an audio oscillator is not available, the 088 Signal Generator may be used with the following procedure:

Tune the dial of the receiver very accurately to a local station on the broadcast band. Then connect the signal generator output lead to the 6L7G Mixer grid and set the indicator for 470 K. C. A heterodyne whistle will be produced when these two signals mix.

Now tune the signal generator dial about the 470 K. C. frequency until a zero beat note is obtained. Then turn the signal generator to 10 K. C. above the point at which zero beat is obtained and adjust compensator (**159**) for minimum output.

MAGNETIC TUNING ADJUSTMENT

Set the range switch in position one (530 to 1600 K. C.). Turn the fidelity-selectivity control clockwise (selective position), and the magnetic tuning switch in the "out" position. Now turn the signal generator and receiver dial to any frequency in the Broadcast band. The receiver dial must be adjusted very accurately for maximum output.

Set the magnetic tuning control in the "on" position (clockwise). Compensator (**119S**) of the magnetic tuning transformer is now adjusted for maximum output.

The above adjustment is now checked for accuracy, by turning the magnetic tuning control "off" and "on". When this is done, there should be no change in the tone of the received signal. If a change of tone or hiss develops, it indicates a shift in frequency and the adjustment must be made again.

NOTE "A"—Slowly shift signal generator indicator between 460 and 480 K. C. As the indicator is turned, two peaks will be noted on the Output Meter; one about 465 K. C. and the other about 475 K. C. These peaks should give the same deflection or reading on the output meter. If they are unequal, compensator (**94P**) primary only, must be slightly readjusted to the right or left until they are equalized. Each time the compensator is set in another position, rotate the signal generator through the 460 or 480 K. C. range and note the reading of each peak. Continue adjusting the compensator until the peaks are equal.

NOTE "B"—To eliminate the effect of the R. F. compensators detuning the Osc. circuit, a variable tuning condenser, 350 mmfd. Philco Part No. 45-2325 is connected from the oscillator compensators to ground when designated in the padding instruction above. Tune the added condenser until the second harmonic of the receiver oscillator beats against the signal from the generator, resulting in a maximum indication on the output meter. Then adjust compensators as noted for maximum output.

NOTE "C"—To accurately adjust the compensator to the fundamental and not the image signal, turn the oscillator compensator to the maximum capacity position clockwise. Then slowly turn the compensators counter-clockwise until a second maximum peak is obtained on the output meter. The first peak is the image signal and the receiver must not be adjusted to it. If the above procedure is correctly performed, the image signal will be found 940 K. C. below the frequency being used on any high frequency band.

MODEL 37-690
Voltage, Notes

PHILCO RADIO & TELEV. CORP.

Electrical Specifications

TYPE CIRCUIT: Superheterodyne, with Magnetic Tuning; Fidelity-selectivity control in the intermediate frequency unit; 10 K. C. audio filter circuit; individual A.V.C. circuits for the R.F. and I.F. amplifiers; Automatic Bass Compensation circuit and Class "A" audio output circuit.

TUNING DIAL: Philco Automatic Dial Tuning Mechanism.

POWER SUPPLY:	**Voltage**	**Frequency**	**Consumption**
	115	50 to 60 cycles	275 watts
	115	25 to 40 cycles	285 watts

PHILCO TUBES USED: Twenty.

Five 6K7G; two 6B4G; four 6J5G; two 5X4G; one 6N7G; one 6B8G; one 6L7G; one 6H6G; one 6A8G; one 6R7G; one 6F6G.

TONE CONTROLS:

A. Treble response adjustable by the Fidelity-selectivity control.
B. Continuously variable Bass Response.

SPEAKERS: One W2—Cathedral High-fidelity Speaker.
Two—CB2 High Frequency Speakers.

INTERMEDIATE FREQUENCY: 470 K. C.

UNDISTORTED OUTPUT: 15 watts.

TUNING RANGES: Five.

Range 1—530 to 1600 K. C.
Range 2—1.58 to 4.75 M. C.
Range 3—4.7 to 7.4 M. C.
Range 4—7.35 to 11.6 M. C.
Range 5—11.5 to 18.2 M. C.

Aerial Connections

To obtain the full advantage of the sensitivity of this receiver the Philco High Efficiency Aerial supplied with the receiver must be used. The connections for the aerial are as follows:

The red and black leads of the High-Efficiency Aerial "transmission line" are connected to terminals 1 and 2 respectively, of the terminal panel provided on the rear of the chassis. Connect the jumper on the terminal panel across terminals 3 and 4.

If a temporary aerial is used, the jumper should be across terminals 2 and 3. The aerial connects to terminal 1 and the ground lead to terminal 3. A good ground connection is desirable in all installations.

Removing Cabinet Top and Adjusting Door Hardware

Remove screws from under side of top frame (on some cabinets it will be necessary to loosen the high frequency speaker baffle to reach screws above them). The top is located by two dowels and will lift off after screws are removed.

To adjust doors after removing top, pull nails from washers, loosen nuts, move hardware in direction to align doors. Tighten nuts and drive nails through holes in washers after turning washers to provide new nail hole locations.

If doors are to be removed, lift loose pin out of hardware in top frame; tip door forward slightly and lift off of pin in bottom frame. For this operation it is also necessary to first remove the top.

CAUTION: The top frame (that section which bears the Philco trademark) should never be removed from the cabinet.

Do not glue top when replacing it on cabinet.

Dial Calibration

In order to adjust this receiver correctly the dial must be aligned to track properly with the tuning condenser. To do this proceed as follows:

1. Loosen the set screws on the shaft coupling of the tuning condenser. Then turn the tuning condenser until the plates are in the maximum capacity position. Now set the glowing beam indicator on the index line at the low frequency end of the broadcast band. With dial and tuning condenser in this position tighten set screws.

2. Turn the tuning condenser control until the indicator is on the first division from the index line.

3. With the dial in this position, loosen the shaft coupling set screws. Then turn the dial until the indicator is again on the index line. Tighten the set screws in this position.

NOTE: Be careful when turning the dial that the position of the tuning condenser is not disturbed.

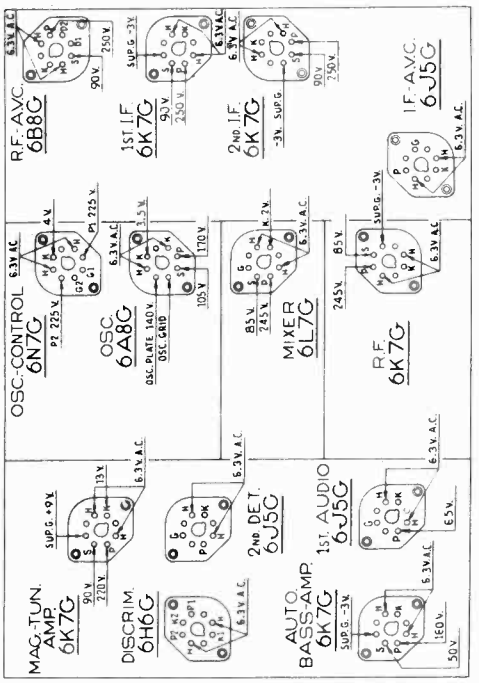


Fig. 1. Receiver Socket Voltage

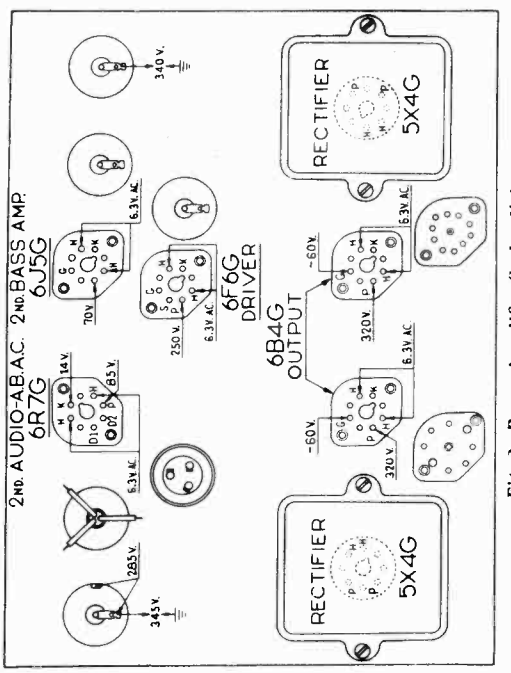


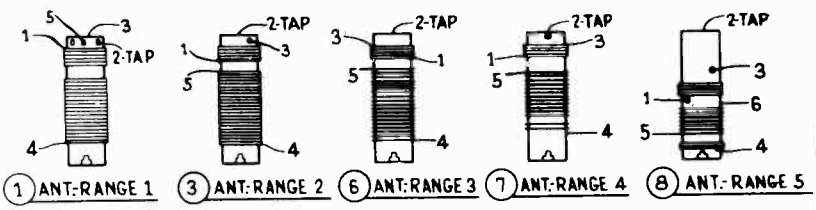
Fig. 2. Power Amplifier Socket Voltage

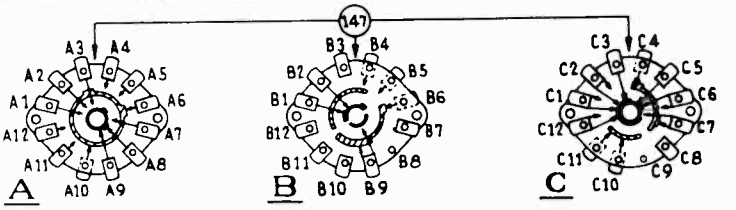
The voltages indicated by arrows were measured with a Philco 025 Circuit Tester which contains a voltmeter having a resistance of 1000 ohms per volt. Volume Control at minimum, range switch in broadcast position, line voltage 115 A. C.

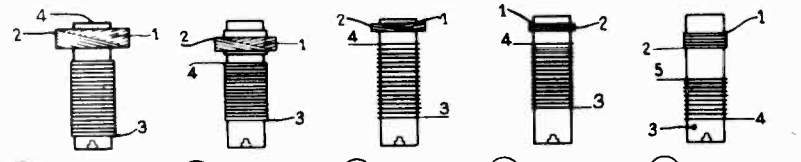
MODEL 37-690
Coil & Switch
Connections
Spkr.Wiring,Notes

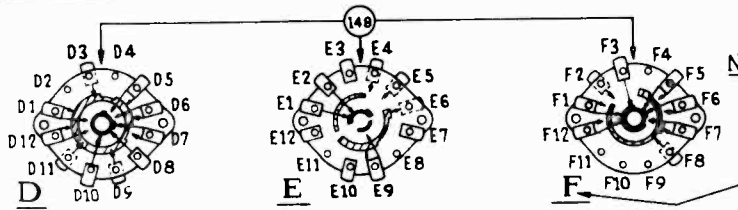
PHILCO RADIO & TELEV. CORP.

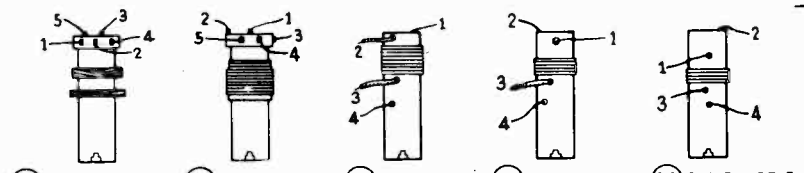
Coil and Range Switch Connections

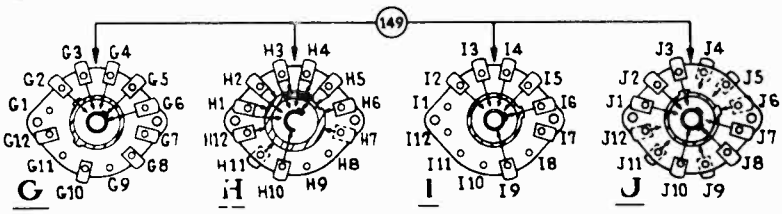


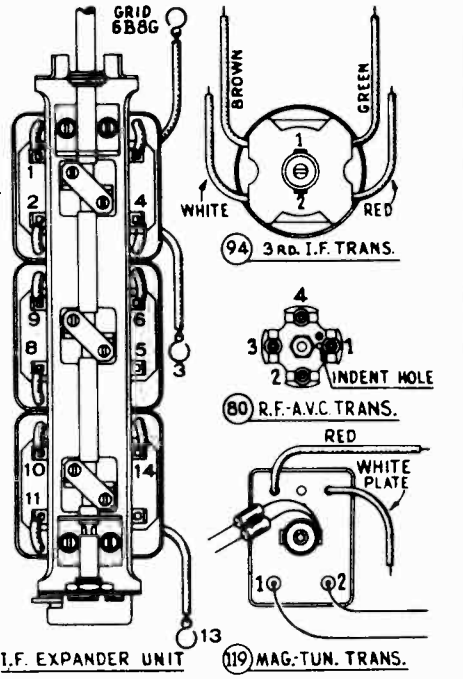












NOTE:- ALL SWITCHES SHOWN IN POSITION No.1- (BROADCAST.)
SOLID AREA INDICATES REAR OF SWITCH WAFER.
SHADED AREA INDICATES FRONT OF SWITCH WAFER.
LETTERS INDICATE POSITION OF SWITCH WAFERS FROM REAR UNDERSIDE VIEW OF CHASSIS.
THE NUMBERS ON THE COILS AND RANGE SWITCH WAFERS, CORRESPOND TO THOSE SHOWN ON THE SCHEMATIC DIAGRAM.

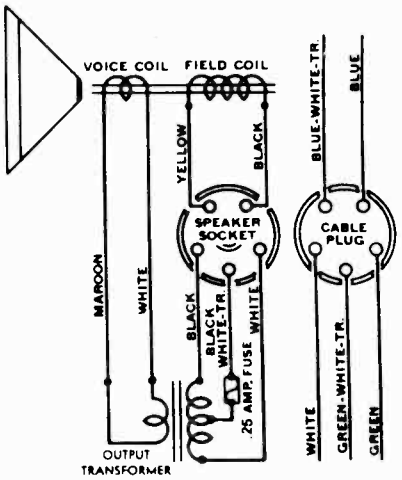


Fig. 3. Speaker Wiring W2

Hum Adjustment and Elimination

Adjust compensator (**185**) for minimum hum with volume control retarded.

If abnormal hum develops with bass compensation control at maximum, change the 6K7G bass amplifier tube. It also may be necessary to interchange the 6B4G output tubes for perfect balance.

MODEL 37-690
Parts

PHILCO RADIO & TELEV. CORP.

PRICES SUBJECT TO CHANGE WITHOUT NOTICE

Replacement Parts—Model 37-690

Schem. No.	Description	Part No.	List Price
1	Antenna Transformer (Range 1)	32-2108	$1.60
2	Compensator (two section)	31-6093	.40
3	Antenna Transformer (Range 2)	32-2146	1.20
4	Resistor (51,000 ohms, ½ watt)	33-351339	.20
5	Compensator (six section)	31-6112	1.40
6	Antenna Transformer (Range 3)	32-2183	1.20
7	Antenna Transformer (Range 4)	32-2185	1.20
8	Antenna Transformer (Range 5)	32-2175	1.20
9	Condenser (.05 mfd. tubular)	30-4020	.20
10	Condenser (40 mmfd. mica)	30-1076	.20
11	R. F. Transformer (Range 5)	32-2176	1.20
12	R. F. Transformer (Range 4)	32-2178	.70
13	R. F. Transformer (Range 3)	32-2177	.70
14	Condenser (.05 mfd. tubular)	30-4020	.20
15	Compensator (six section)	31-6113	1.40
16	Condenser (55 mmfd. mica)	30-1045	.20
17	Condenser (25 mmfd. mica)	30-1067	.20
18	Condenser (.05 mfd. tubular)	30-4123	.20
19	Resistor (20,000 ohms, ½ watt)	33-320339	.20
20	Condenser (250 mmfd. mica)	30-1032	.25
21	Condenser (600 mmfd. mica)	30-1049	.25
22	Resistor (20,000 ohms, ½ watt)	33-320339	.20
23	Resistor (8,000 ohms, ½ watt)	33-280339	.20
24	Oscillator Transformer (Range 5)	32-2199	.70
25	Resistor (200 ohms, wirewound)	7217	.20
26	Oscillator Transformer (Range 4)	32-2198	.70
27	Oscillator Transformer (Range 3)	32-2197	.70
28	Compensator (Osc. six section)	31-6117	1.20
29	Condenser (600 mmfd. mica)	30-1049	.25
30	Oscillator Transformer (Range 2)	32-2194	1.00
31	Condenser (600 mmfd. mica)	30-1049	.25
32	Resistor (20 ohms, ½ watt)	33-020339	.20
33	Oscillator Transformer (Range 1)	32-2191	1.00
34	Resistor (20 ohms, ½ watt)	33-020339	.20
35	Compensator (Four section)	31-6124	1.00
36	Resistor (700 ohms wirewound)	33-170339	.20
37	Condenser (.02 mfd. tubular)	30-4481	.20
38	Resistor (99,000 ohms, ½ watt)	33-399339	.20
39	Resistor (99,000 ohms, ½ watt)	33-399339	.20
40	Condenser (250 mmfd. mica)	30-1032	.25
41	Condenser (250 mmfd. mica)	30-1032	.25
42	Resistor (10,000 ohms, ½ watt)	33-310339	.20
43	Condenser (.02 mfd. tubular)	30-4481	.20
44	Resistor (75,000 ohms, ½ watt)	33-375339	.20
45	Resistor (100 ohms, ½ watt)	33-3023	.25
46	Resistor (32,000 ½ watt)	33-332339	.20
47	Condenser (.01 mfd. tubular)	30-4169	.20
48	Condenser (200 mmfd. mica)	30-1047	.25
49	Plate Coil 6A8G	32-2242	.30
50	Condenser (.05 mfd. tubular)	30-4123	.20
51	Compensator (two section)	31-6093	.40
52	Resistor (1 megohm, ½ watt)	33-510339	.20
53	Condenser (5 mmfd. mica)	30-1077	.20
54	Resistor (400 ohms flexible)	33-3016	.20
55	R. F. Transformer (Range 1)	32-2105	1.00
56	Condenser (.05 mfd. tubular)	30-4444	.20
57	Resistor (10,000 ohms, ½ watt)	33-310339	.20
58	R. F. Transformer (Range 2)	32-2147	.70
59	Tuning Condenser	31-1892	3.60
60	Volume Control	33-5183	1.00
61	Resistor (500 ohms flexible)	33-150439	.20
62	Condenser (110 mmfd. mica)	30-1031	.25
63	Potentiometer (Expander Unit)	33-5178	1.50
64	Resistor (490,000 ohms)	33-449339	.20
65	Resistor (1. megohm, ½ watt)	33-510339	.20
66	Condenser (.02 mfd. tubular)	30-4113	.20
67	Condenser (.05 mfd. bakelite)	3615-SG	.35
68	Resistor (490,000 ohms, ½ watt)	33-449339	.20
69	Resistor (1. megohm, ½ watt)	33-510339	.20
70	Resistor (490,000 ohms, ½ watt)	33-449339	.20
71	Resistor (1000 ohms, ½ watt)	33-210339	.20
72	Condenser (110 mmfd. mica)	30-1031	.20
73	1st I. F. Transformer (Expander)	32-2288	1.80
74	Condenser (.01 mfd. tubular)	30-4169	.20
75	Resistor (1. megohm, ½ watt)	33-510339	.20
76	Resistor (500 ohms, ½ watt)	33-150339	.20
77	Resistor (2000 ohms, ½ watt)	33-220339	.20
78	Resistor (51,000 ohms, ½ watt)	33-351339	.20
79	Condenser (.05 mfd. tubular)	30-4444	.20
80	Transformer (R. F. A.V.C.)	32-2300	1.80
81	2nd I. F. Transformer (Expander)	32-2291	1.80
82	Condenser (.001 mfd. tubular)	30-4201	.20
83	Resistor (500 ohms, ½ watt)	33-150439	.20
84	Condenser (.05 mfd. tubular)	30-4123	.20
85	3rd I. F. Transformer (Expander)	32-2293	1.80
86	Condenser (.1 mfd. bakelite)	4989-SG	.35
87	Condenser (.05 mfd. tubular)	30-4444	.20
88	Condenser (.25 mfd. tubular)	30-4134	.25
89	Resistor (1000 ohms, ½ watt)	33-110339	.20
90	Condenser (.05 mfd. Bakelite)	3615-SG	.35
91	Resistor (1000 ohms, ½ watt)	33-110339	.20
92	Condenser (110 mmfd. dual bakelite)	8035-DG	.25
93	Resistor (99,000 ohms, ½ watt)	33-399339	.20
94	4th I. F. Transformer	32-2302	2.20
95	Resistor (99,000 ohms, ½ watt)	33-399339	.20
96	Condenser (.02 mfd. tubular)	30-4113	$0.20
97	Resistor (25,000 ohms, ½ watt)	33-325339	.20
98	Resistor (490,000 ohms, ½ watt)	33-449339	.20
99	Electrolytic Condenser (2, 2, 1 mfd.)	30-2177	1.40
100	Resistor (490,000 ohms, ½ watt)	33-449339	.20
101	Resistor (15,000 ohms, ½ watt)	33-315339	.20
102	Audio Cable	41-3233	2.00
103	Condenser (.15 mfd. tubular)	30-4191	.25
104	Audio Choke (bass amplifier)	32-7528	1.35
105	Resistor (99,000 ohms, ½ watt)	33-399339	.20
106	Resistor (25,000 ohms, ½ watt)	33-325339	.20
107	Resistor (40,000 ohms, ½ watt)	33-340339	.20
108	Resistor (60,000 ohms, ½ watt)	33-360339	.20
109	Condenser (.05 mfd. tubular)	30-4123	.20
110	Condenser (.05 mfd. tubular)	30-4123	.20
111	Resistor (70 ohms, ½ watt)	33-070339	.20
112	Resistor (1000 ohms, ½ watt)	33-210339	.20
112X	Condenser (.008 mfd. tubular)	30-4455	.20
113	Resistor (490,000 megohms, ½ watt)	33-449339	.20
114	Resistor (1. megohm, ½ watt)	33-510339	.20
115	Condenser (110 mmfd. dual bakelite)	8035-DG	.25
116	Power Cable (Chassis)	41-3232	4.00
117	Resistor (490,000 megohms, ½ watt)	33-449339	.20
118	Resistor (490,000 megohms, ½ watt)	33-449339	.20
119	Magnetic Tuning Transformer	32-2361	4.00
120	Bass Amplifier Control & A.C. Switch	33-5182	.90
121	Condenser (.05 mfd. bakelite)	3615-DG	.40
122	Magnetic Tuning Switch (Manual)	42-1216	.75
123	Resistor (500 ohms, ½ watt)	33-150339	.20
124	Resistor (2000 ohms, ½ watt)	33-220339	.20
125	Resistor (1. megohm, ½ watt)	33-510339	.20
126	Resistor (490,000 ohms, ½ watt)	33-449339	.20
127	Condenser (110 mfd. mica)	30-1031	.20
128	Resistor (1. megohm, ½ watt)	33-510339	.20
129	Resistor (330,000 ohms, ½ watt)	33-433339	.20
130	Resistor (1. megohm, ½ watt)	33-510339	.20
131	Resistor (40,000 ohms, ½ watt)	33-340339	.20
132	Condenser (.05 mfd. tubular)	30-4123	.20
133	Condenser (.15 mfd. tubular)	30-4191	.25
134	Condenser (.1, .1, .8 mfd.)	30-4466	1.40
135	Resistor (160,000 ohms, ½ watt)	33-416339	.20
136	Condenser (.15 mfd. bakelite)	6287-DG	.40
137	Resistor (20,000 ohms, ½ watt)	33-320339	.20
138	Resistor (490,000 ohms, ½ watt)	33-449339	.20
139	Resistor (490,000 ohms, ½ watt)	33-449339	.20
140	Resistor (1. megohm, ½ watt)	33-510339	.20
141	Condenser (.15 mfd. tubular)	30-4191	.25
142	Condenser (.05 mfd. tubular)	30-4444	.20
143	Part of 144 (.03 mfd.)		
144	Condenser (.03 mfd. bakelite)	8318-DU	
145	Magnetic Tuning Switch (Automatic Dial)	45-2330	
146	Flood Lamp Assembly	38-8210	2.40
147	Antenna Range Switch	42-1211	1.60
148	R. F. Range Switch	42-1255	1.60
149	Oscillator Range Switch	42-1217	2.00
150	Switch (audio shorting, auto. dial)	45-2350	
151	Electrolytic Condenser (8 mfd.)	30-2025	1.35
152	Electrolytic Condenser (8, 10 mfd.)	30-2176	1.40
153	Electrolytic Condenser (2, 3, 3 mfd.)	30-2159	1.80
154	Coil (10 K. C. Filter)	32-7764	.80
155	Resistor (1. megohm, ½ watt)	33-510339	.20
156	Audio Transformer (Interstage)	32-7725	3.20
157	Resistor (490,000 ohms, ½ watt)	33-449339	.20
157X	Resistor (240,000 ohms, ½ watt)	33-424339	
158	Condenser (410 mfd. mica)	30-1000	.25
159	Compensator (10 K. C. Filter)	04000-T	.35
160	Condenser (.025 mfd. bakelite)	7653-SU	.35
161	Resistor (99,000 ohms, ½ watt)	33-399339	.20
162	Condenser (1000 mmfd. mica)	30-1007	.30
163	Resistor (15,000 ohms, ½ watt)	33-315339	.20
164	Condenser (.1 mfd. bakelite)	4989-SG	.35
165	Electrolytic Condenser (8 mfd.)	30-2024	1.10
166	Electrolytic Condenser (8 mfd.)	30-2025	1.35
167	Condenser (.05 mfd. tubular)	30-4020	.20
168	Electrolytic Condenser (8 mfd.)	30-2025	1.35
169	Filter Choke	32-7056	2.20
170	Resistor (490,000 ohms, ½ watt)	33-449339	.20
171	Condenser (.1 mfd. bakelite)	4989-SG	.35
172	Resistor (490,000 ohms, ½ watt)	33-449339	.20
173	Condenser (.3 mfd. bakelite)	6287-DU	.40
174	Resistor (51,000 ohms, ½ watt)	33-351339	.20
175	Condenser (.015 mfd. bakelite)	3793-DG	.40
176	Power Transformer	32-7731	7.50
	Power Transformer (25 to 40 cycles)	32-7732	
177	Resistor (wirewound three taps)	33-3302	1.00
177X	Resistor (30 ohm flexible)	33-3119	
177Y	Resistor (30 ohm flexible)	33-3119	
178	Condenser (.05 mfd. bakelite)	3615-SU	.35
179	Resistor (51,000 ohms, ½ watt)	33-351339	.20
180	Resistor (51,000 ohms, ½ watt)	33-351339	.20
181	Condenser (.05 mfd. bakelite)	3615-SU	.35
182	Resistor (51,000 ohms, ½ watt)	33-351339	.20
183	Resistor (32,000 ohms, ½ watt)	33-332339	.20
184	Cable Speaker	41-3242	.90
185	Hum Control	33-5176	$1.60
186	Cable CB2 Speaker	41-3245	
187	Resistor (32,000 ohms, ½ watt)	33-332339	.20
188	Cable CB2 Speaker	41-3245	
189	Condenser (.015 mfd. tubular)	30-4226	.20
190	CB2 Speaker Transformer	32-7663	1.00
191	Power Transformer	32-7728	6.50
	Power Transformer (25 to 40 cycles)	32-7729	
192	Resistor (wirewound two taps)	33-3301	.60
193	Condenser (.15 mfd. bakelite)	6287-SU	.40
194	Condenser (.3 mfd. bakelite)	6287-DG	.40
195	Filter Choke	32-7115	1.80
196	Field W-2 Speaker	36-3782	
197	Field Coil (High Audio Frequency) CB2	36-3739	3.50
198	Cone Voice Coil W-2 Speaker	36-3647	2.25
199	Cone Voice Coil (Speaker, CB2)	36-3654	.80
200	Output Transformer W-2, Speaker	32-7753	1.70

DIAL PARTS

Brace (Drive Mtg.)	28-4119	.05
Bracket Assembly	45-2349	
Coupling Assembly (tuning condenser)	31-1961	
Coupling (range switch)	28-7198	.15
Cover (Handle)	28-4077	.25
Dial	27-5207	.80
Dial Screen Holder Assembly	31-1968	
Dial Guide	27-8580	.03
Dial Escutcheon Assembly	45-2324	.40
Gasket (Dial Scale)	27-8398	.01
Gear No. 1 (front)	45-2347	
Gear No. 2 (rear)	45-2348	
Flood Lamp Assembly (4 unit)	38-8210	2.40
Flood Lamp Assembly (single)	38-7937	.40
Handle (Indexing)	45-2329	
Hub Assembly (Handle)	45-2344	
Mask & Link Assembly	45-2328	
Mask Guide	28-4118	.25

MISCELLANEOUS PARTS

Pilot Lamp	34-2039	
Pilot Lamp Assembly	38-8051	
Pilot Lamp Cable	41-3253	
Ring (Mask Assembly)	28-7195	.20
Spring (Mask Assembly)	28-8629	.04
Set Screw (Handle)	28-6493	.02
Screw (cover)	W-1669	.40 C
Snap Fastener	28-4279	.75 C
Vernier Drive Assembly	45-2342	
Washer Felt (Mask)	27-8399	.30 C
Washer (Mask)	W-495	.30 C
Clarifier (Type K)	36-1155	1.25
Cord (Drive)	27-8495	
Cord (Drive)	27-8496	
Cable (I. F. Unit)	L-2331	.90
Cable (Power Unit)	L-2330	2.00
Cable (A.C. Power)	L-2288	
Clamp (1. F. Cord)	28-4147	.01
Fuse A.C. Cable	45-2046	.05
Fuse (Speaker)	45-2113	.16
Knob (Tuning)	27-4330	.10
Knob (Vernier)	27-4331	.10
Knob (Tone & Volume)	27-4332	.10
Knob (Range Switch)	27-4326	.10
Panel (Ant.)	38-7714	.15
Plug A. C.	27-4117	.40
Shield (6N7G)	8005	.10
Shield Tubes	28-2726	.10
Shield (Expander)	28-4169	1.00
Shaft (Expander)	28-6506	.40
Shaft (Volume Control)	38-8061	.12
Shaft & Index Plate (Range Switch)	42-1208	.50
Socket (8 Prong)	27-6058	.11
Socket (7 Prong)	27-6057	.11
Socket (Power Supply)	27-6067	.15
Socket (Audio)	27-6066	.15
Socket (Rectifier)	27-6052	
Speaker (W-2)	36-1282	22.50
Speaker (High Frequency CB-2)	36-1270	4.50

CABINET PARTS

Bezel Assembly	40-5980	1.00
Baffle Wood (Left & Right Side)	24045	.30
Baffle Wood	16284	3.60
Baffle Card Board	27-8572-A	.35
Gasket (Bezel)	27-8517	.05
Silk (Right & Left Side)	44-1174	.20
Silk (Cardboard Baffle)	44-1175	1.00
Screw (Bezel)	W-480	.55 C
Speaker Felt	27-8498	.15

November 19.46

MODEL 37-2620
Alignment, Trimmers
Voltage, Chassis

PHILCO RADIO & TELEV. CORP.

Electrical Specifications

Type of Circuit: Superheterodyne with Pentode Output.

Power Supply:	Voltage	Frequency	Power Consumption
	115	50 to 60	65 Watts
	115	25 to 40	65 Watts
	220	50 to 60	65 Watts

Power transformers for the different voltages and frequencies are listed on the Parts List.
Intermediate Frequency: 470 K. C.
Tuning Ranges: Three. Range 1—150 to 350 K. C.; Range 2—530 to 1720 K. C.; Range 3—5.7 to 18 M. C.
Philco Tubes Used: *Six. Two 6K7EG; one 6A8EG; one 6Q7EG; one 6F6EG; one 5Y4G.
Speakers: "B" Cabinet—S7; "J" Cabinet—H5; "CS" Cabinet—K38.
***NOTE**—Receivers in the United States use tubes without the "E" designation.

Alignment

MODEL NO. 37-2620

Signal Generator Connection	Signal Generator Frequency	Dial Position	Wave Band Switch Position	Trimmer Number (FIG. 1)	Output Signal
Control grid [1] of 6A8G	470 k.c.	580 k.c.	Broadcast	37A	Max.
"	"	"	"	37	Max.
"	"	"	"	31A	Max.
"	"	"	"	31	Max.
Ant. term.[2] #1	18 m.c.	18 m.c.	Range 3 5.7-18 m.c.	23B	Max.[3]
"	"	17.06 m.c.	"	Image check	
"	18 m.c.[4]	18 m.c.	"	8B	Max.
"	"	"	"	4B	Max.
"	18 m.c.[5]	"	"	23B	Max.
"	1600 k.c.	1600 k.c.	Broadcast	23A	Max.
"	"	"	"	8A	Max.
"	"	"	"	4A	Max.
"	580 k.c.	580 k.c.	"	25	Max.*
"	1600 k.c.	1600 k.c.	"	23A	Max.
"	"	"	"	8A	Max.
"	"	"	"	4A	Max.
"	1500 k.c.	1500 k.c.	"	8A	Max.
"	"	"	"	4A	Max.
Ant. term.[6] #1	300 k.c.	300 k.c.	Range 1 150-350 k.c.	23	Max.
"	"	"	"	8	Max.
"	"	"	"	4	Max.
"	160 k.c.	160 k.c.	"	21	Max.*
"	300 k.c.	300 k.c.	"	23	Max.
"	"	"	"	8	Max.
"	"	"	"	4	Max.
"	160 k.c.	160 k.c.	"	21	Max.*
"	300 k.c.	300 k.c.	"	23	Max.
"	"	"	"	8	Max.
"	"	"	"	4	Max.

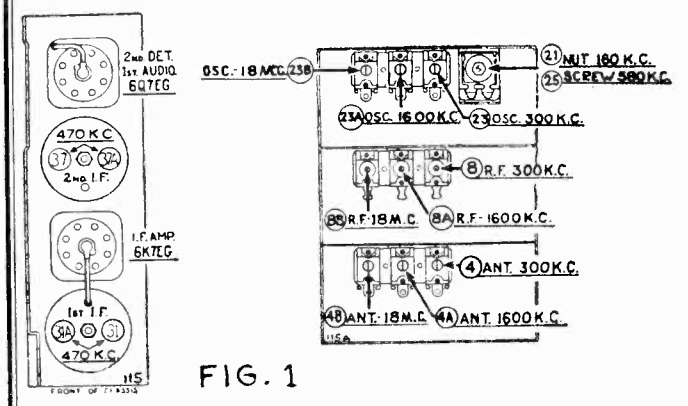
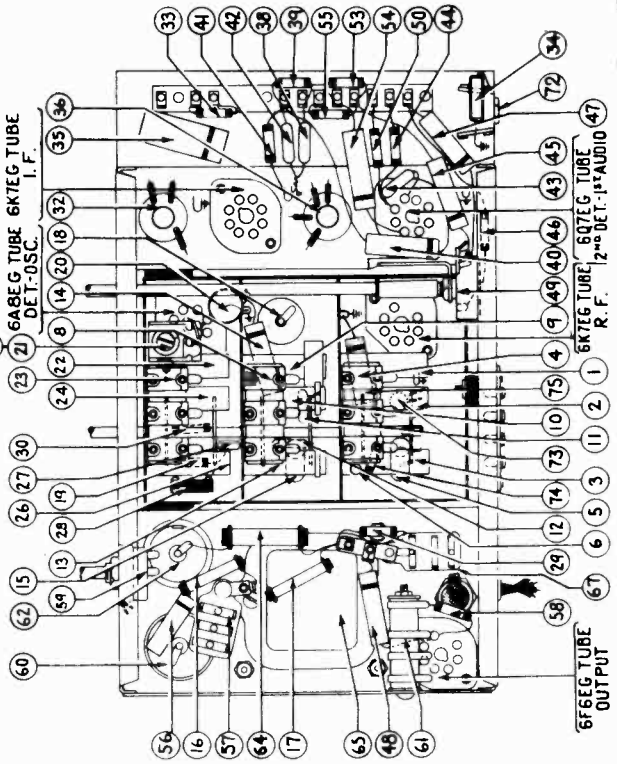
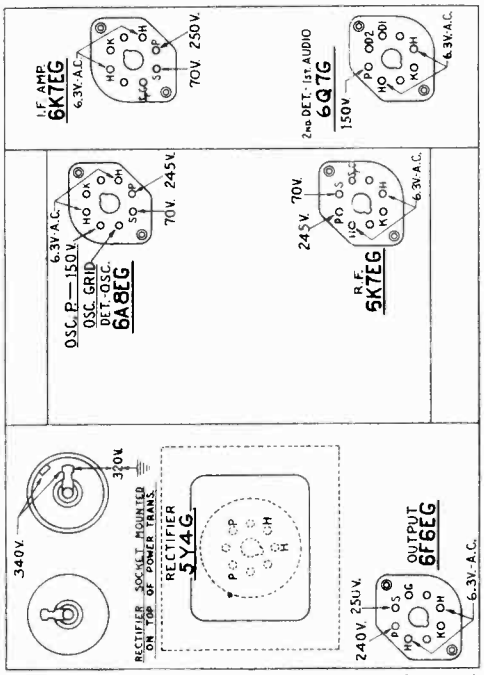


FIG. 1

Note 1.—Through a .1 mfd. condenser.
Note 2.—Link terminals 2 and 3 together.
Note 3.—Use lower capacity peak.
Note 4.—Connect an external variable condenser. (Philco Part No. 45-2325) from the oscillator compensator to ground (First contact from left rear underside view of r.f. unit). Tune the added condenser from the minimum capacity position until the second harmonic of the oscillator beats against the signal to produce maximum output.
Note 5.—Remove the external variable condenser.
Note 6.—Through a 250 mmfd. condenser.
* While rocking.

Fig. 4—Base View of Chassis



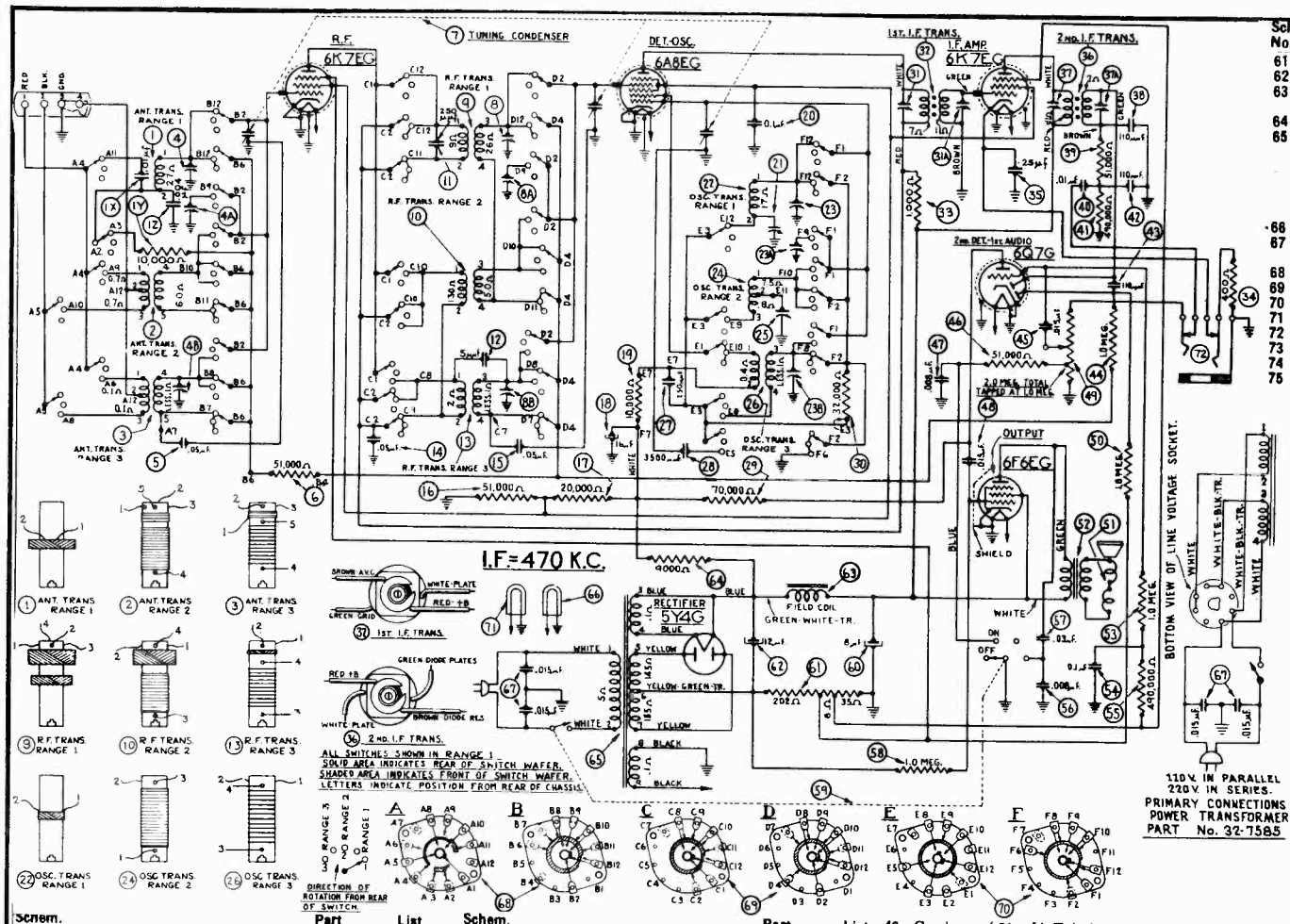


Socket Voltages, Measured from Underside of Chassis

The voltages indicated by arrows were measured with a Philco 025 Circuit Tester which contains a voltmeter having a resistance of 1000 ohms per volt. Volume Control at minimum, range switch in broadcast position, line voltage 115 A. C.

PHILCO RADIO & TELEV. CORP.

MODEL 37-2620. Schematic, Parts



Schem. No.	Description	Part No.	List Price
1	Antenna Transformer (Range 1)	32-2218	$0.80
2	Antenna Transformer (Range 2)	32-2108	.65
3	Antenna Transformer (Range 3)	32-2142	.75
4	Compensator Ant. 1500 K. C.	31-6122	.60
5	Condenser (.05 mfd. tubular)	30-4020	.20
6	Resistor (51000 ohms ½ watt)	33-351339	.20
7	Tuning Condenser	31-1818	4.50
8	Compensator (R. F. 1500 K. C.)	31-6122	.60
9	R. F. Transformer (L. W.)	32-2219	.75
10	R. F. Transformer (Broadcast)	32-2105	.65
11	Condenser (250 mmfd.)	30-1032	
12	Condenser (5 mmfd. Mica)	30-1077	.20
13	R. F. Transformer (S. W.)	32-2222	.55
14	Condenser (.05 mfd. Tubular)	30-4123	.20
15	Condenser (.05 mfd. Tubular)	30-4020	.20
16	Resistor (51000 ohms 1 watt)	33-351439	.20
17	Resistor (20000 ohms 1 watt)	33-320439	.20
18	Electrolytic Condenser (16 mfd.)	30-2118	1.65
19	Resistor (10000 ohms ½ watt)	33-310339	.20
20	Condenser (.1 mfd. Tubular)	30-4170	.25
21	Compensator (Osc. Series Nut 160 K. C.)	31-6060	.55
22	Osc. Transformer (L. W.)	32-2221	.65
23	Compensator (Osc. 1600 K. C.)	31-6223	.60
24	Osc. Transformer (Broadcast)	32-2120	.40
25	Condenser (Screw 580 K. C.)	Part of (21)	
26	Osc. Transformer (S. W.)	32-2143	.75
27	Condenser (250 mmfd. Mica)	30-1032	.25
28	Condenser (3500 mmfd. Semi-fixed)	31-6097	.50
29	Resistor (70000 ohms ½ watt)	33-370339	.20
30	Resistor (32000 ohms ½ watt)	33-332339	.20
31	Compensator (1st I. F. Pri. 470 K. C.)	Part of (39)	
32	1st I. F. Transformer	32-2311	
33	Resistor (1000 ohms ½ watt)	33-210339	.20
34	Resistor (400 ohm bakelite)	33-1211	.20
35	Condenser (.25 mfd. Tubular)	30-4446	.20
36	2nd I. F. Transformer	32-2312	1.50
37	Compensator (2nd I. F. Pri. 470 K. C.)	Part of (42)	
38	Condenser (110 mmfd. Mica)	30-1031	.20
39	Resistor (51000 ohms ½ watt)	33-351339	.20
40	Condenser (.01 mfd. Tubular)	30-4124	.25
41	Resistor (490000 ohms ½ watt)	33-449339	.20
42	Condenser (110 mmfd. Mica)	30-1031	.20
43	Condenser (110 mmfd. Mica)	30-1031	.20
44	Resistor (1 megohm ½ watt)	33-510339	$0.20
45	Condenser (.015 mfd. Tubular)	30-4358	.20
46	Resistor (51000 ohms ½ watt)	33-351339	.20
47	Condenser (.006 mfd. Tubular)	30-4112	.20
48	Condenser (.015 mfd. Tubular)	30-4226	.20
49	Volume Control	33-5158	1.00
50	Resistor (1 megohm ½ watt)	33-510339	.20
51	Voice Coil and Cone, S7 Speaker	36-3014	.80
	Voice Coil and Cone, HS Speaker	36-3796	
52	Output Transformer S7 & HS Speaker	32-7019	.85
53	Resistor (1 megohm ½ watt)	33-510339	.20
54	Condenser (0.1 mfd. Tubular)	30-4122	.20
55	Resistor (490000 ohms ½ watt)	33-449339	.20
56	Condenser (.008 mfd. Tubular)	30-4112	.20
57	Condenser (.03 mfd.)	8318-SU	
58	Resistor (1 megohm ½ watt)	33-510339	.20
59	Tone Control & A. C. Switch	42-1182	.75
60	Electrolytic Condenser (8 mfd.)	30-2024	1.10
61	Bias Resistor	33-3284	
62	Electrolytic Condenser (12 mfd.)	30-2117	1.20
63	Field Coil Assembly, S7 Speaker	36-3039	2.75
	Field Coil Assembly, HS Speaker	36-3690	
64	Resistor (9000 ohms, 2 watt)	33-290539	.30
65	Power Transformer (115 Volt 50-60 cycle)	32-7583	4.50
	Power Transformer (115 Volt 25-40 cycle)	32-7584	
	Power Transformer (110-220 Volt 50-60 cycle)	32-7585	
66	Pilot Lamp	34-2039	.15
67	Condenser (.015-.015 mfd. Double Bakelite)	3793-DG	.40
68	Wave Switch Antenna	42-1170	1.10
69	Wave Switch R. F.	42-1245	1.00
70	Wave Switch Osc.	42-1246	1.10
71	Lamp	34-2039E	
72	Phono Jack	42-1197	
73	Condenser (.01 mfd. Tubular)	30-4169	
74	Resistor (10000 ohms ½ watt)	33-310339	
75	Condenser (.004 mfd. Tubular)	30-4185	
	Wave Switch Indexing Plate & Shaft	42-1173	.50
	Pilot Lamp Assembly	38-7706E	.35
	Dial	27-5245	.50
	Dial Hub	28-7187	.12

Prices Subject to Change Without Notice

Dial Clamp	28-2837	$0.10
Dial Hub Set Screw	W-1641	.02
Dial Gear	28-7185	.10
Dial Guard	27-8324	.02
Thrust Spring	28-8611	.01
Thrust Washer	28-3976	.30 C
"C" Washer	28-3904	.01
Drive Gear	31-1884	.25
Vernier Drive	31-1871	.75
Mask	27-5198	.30
Mask Arm Assembly	31-1940	.35
Mask Guide on Lamp Bracket Support	28-7844	.15
Mask Washer	27-8318	.50 C
Dial Screen Assembly	38-7912	.30
Volume Control Shaft	38-8059	.10
Volume Control Shaft Spring	28-4117	.40 C
Retaining Clips	28-4394	.03
Socket 8 prong	27-6058	.11
Socket 7 prong	27-6057	.11
Tube Shield	28-2726	.10
Tube Shield Base	28-3898	.03
I. F. Shield	38-7763	.20
Terminal Panel I. F. Unit	38-7703	.25
Grommet R. F. Unit	27-4317	.04
Sleeve Mtg. R. F. Unit	28-2257	.01
Spacer Mtg. R. F. Unit	27-8339	.40 C
Screw Mtg. R. F. Unit	W-729	.45 C
Washer Mtg. R. F. Unit	28-3927	.01
Antenna Panel	38-7714	.15
Speaker Cable	L-2181	.25
A. C. Cord	L-2183	.40
Speaker S7—B Cabinet	36-1009	5.75
Speaker HS—J Cabinet	36-1220	6.25
Speaker K-38 (CS 124 Cabinet)	36-1262	
Knobs Tuning	27-4330	.10
Knobs Tuning Vernier	27-4331	.10
Knobs Wave Switch	27-4326	.10
Knobs Tone & Volume	27-4332	.10
Bezel Frame & Plate Assembly	40-5939	.75
Gasket	27-8311	.01
Glass	27-8298	.05
Ring	28-3967	.35
Screw Bezel Mtg.	W-1644	.50 C

December 1936

MODEL 37-2650
Chassis, Parts

PHILCO RADIO & TELEV. CORP.

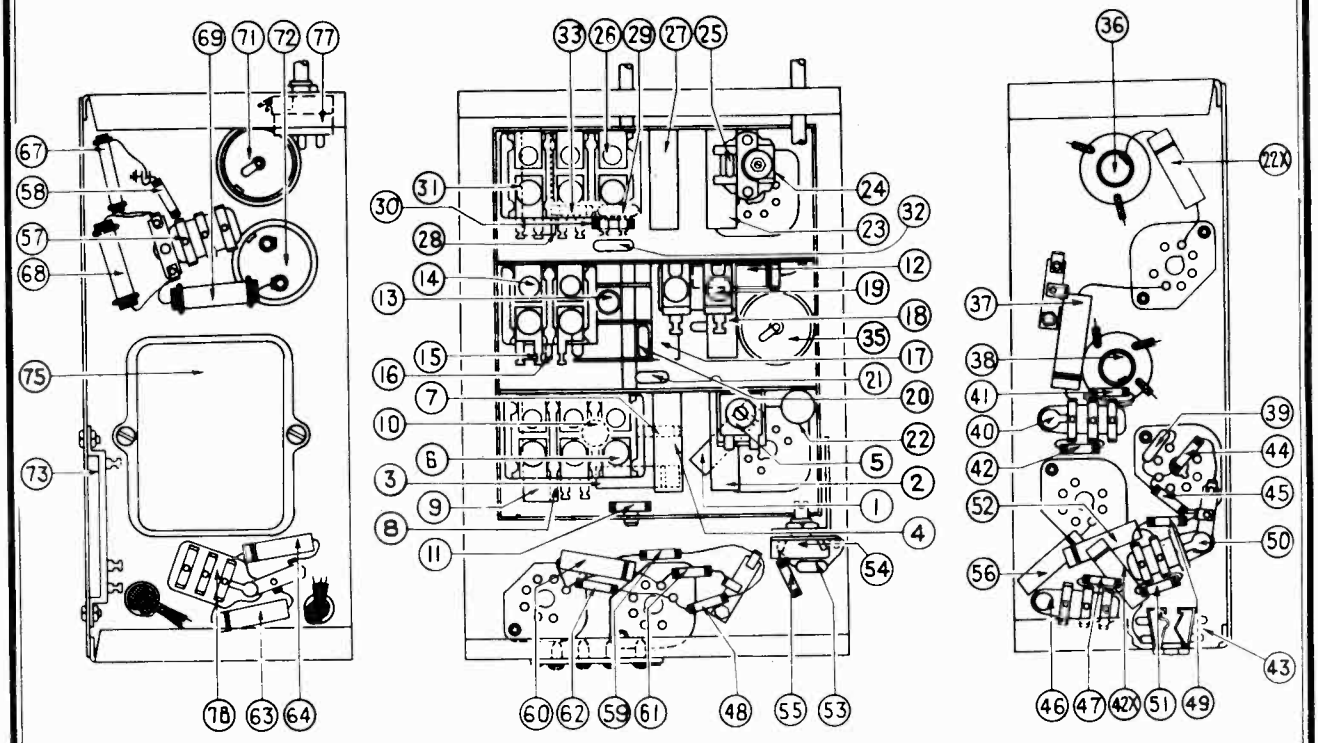


Fig. 4—View of Parts Underside of Chassis

Replacement Parts — Model 37-2650

Schem. No.	Description	Part No.	List Price
1	Condenser .004 mfd. tubular	30-4185	$0.25
2	Ant. Trans. (Range 1)	32-2218	.50
3	Condenser (.01 mfd. tubular)	30-4169	.20
4	Ant. Transformer (Range 2)	32-2108	1.60
5	Compensator, Long Wave	31-6126	.40
6	Compensator (Five sections)	31-6153	1.50
7	Resistor (10,000 ohms, ½ watt)	33-310339	.20
8	Ant. Trans. (Range 3)	32-2150	1.20
9	Ant. Trans. (Range 4)	32-2175	1.20
10	Condenser (.05 mfd. tubular)	30-4444	.20
11	Resistor (51,000 ohms, ½ watt)	33-351339	.20
12	Condenser (.05 mfd. tubular)	30-4123	.20
13	Condenser (.05 mfd. tubular)	30-4444	.20
14	Compensator, R. F. (Four sections)	31-6125	1.00
15	R. F. Trans. (Range 4)	32-2176	1.20
16	R. F. Trans. (Range 3)	32-2151	.70
17	R. F. Trans. (Range 2)	32-2105	1.00
18	R. F. Trans. (Range 1)	32-2219	1.00
19	Compensator R. F. (Two sections)	31-6115	.50
20	Condenser (40 mmfd. mica)	30-1076	.20
21	Condenser (250 mmfd. mica)	30-1032	.25
22	Condenser (.1 mfd. tubular)	30-4455	.25
22X	Condenser (.05 mfd. tubular)	30-4020	.20
23	Osc. Trans. (Range 1)	32-2221	.50
24	Compensator (Osc. two sections)	31-6074	.40
25	Condenser (35 mmfd. mica)	30-1044	.20
26	Compensator (Osc. 6 sections)	31-6111	1.50
27	Osc. Trans. (Range 2)	32-2120	1.00
28	Osc. Trans. (Range 3)	32-2152	.70
29	Condenser (3000 mmfd. mica)	30-1028	.45
30	Resistor (32,000 ohm, ½ watt)	33-332339	.20
31	Osc. Trans. (Range 4)	32-2182	.70
32	Condenser (250 mmfd. mica)	30-1032	.25
33	Resistor (10,000 ohms, ½ watt)	33-310339	.20
34	Tuning Condenser	31-1857	5.00
35	Elect. Cond. (16 mfd.)	30-2118	1.65
36	First I. F. Trans.	32-2170	2.20
37	Condenser (.1 mfd. tubular)	30-4170	.25
38	2nd I. F. Trans.	32-2172	2.20
39	Condenser (110 mmfd. mica)	30-1031	.20
40	Condenser (110 mmfd. dual bakelite)	8035DG	.25
41	Resistor (240,000 ohms, ½ watt)	33-424339	.20
42	Resistor (240,000 ohms, ½ watt)	33-424339	.20
42X	Condenser (.01 mfd. tubular)	30-4479	
43	Phono Jack	42-1197	.60
44	Resistor (1 megohm, ½ watt)	33-510339	.20
45	Resistor (1 megohm, ½ watt)	33-510339	.20
46	Condenser (.03 mfd. Bakelite)	8318-SU	.35
47	Resistor (99,000 ohms, ½ watt)	33-399339	.20
48	Resistor (330,000 ohms, ½ watt)	33-433339	$0.20
49	Resistor (490,000 ohms, ½ watt)	33-449339	.20
50	Condenser (.1 mfd. Bakelite)	4989-SG	.35
51	Resistor (1 megohm, ½ watt)	33-510339	.20
52	Condenser (.015 mfd. tubular)	30-4358	.20
53	Condenser (75 mmfd. mica)	30-1053	.20
54	Volume Control	33-5158	1.00
55	Resistor (51,000 ohms, ½ watt)	33-351339	.20
56	Condenser (.006 mfd. tubular)	30-4024	.25
57	Condenser (.03, .05 mfd. dual bakelite)	3615-YU	.40
58	Resistor (1 megohm, ½ watt)	33-510339	.20
59	Resistor (490,000 ohms, ½ watt)	33-449339	.20
60	Condenser (.01 mfd. tubular)	30-4169	.20
61	Resistor (3500 ohm, ½ watt)	33-235339	.20
62	Resistor (330,000 ohms, ½ watt)	33-433339	.20
63	Condenser (.003 mfd. tubular)	30-4469	.20
64	Condenser (.003 mfd. tubular)	30-4469	.20
65	Output Trans.	32-7634	1.50
66	Cone & Voice Coil. K 35	36-3174	1.00
	H 26	02625	1.40
67	Resistor (25,000 ohms, 1 watt)	33-325439	.20
68	Resistor (9000 ohms, 2 watts)	33-290539	
69	Resistor (10,000 ohms, 3 watts)	33-310639	
70	Field Coil, K 35, H 26 Speakers	36-3687	4.00
71	Elect. Cond. (8 mfd.)	30-2024	1.10
72	Elect. Cond. (20, 10 mfd.)	30-2163	2.40
73	Bias Resistor (128 ohms, 1 tap)	33-3280	.30
74	Pilot & Shadowmeter Lamps	34-2039	.15
75	Power Trans. 115 volt (50 to 60 cycle)	32-7606	6.25
	Power Trans. 115 volt (25 to 40 cycle)	32-7607	9.00
	Power Trans. 110/220 volt (50 to 60 cycle)	32-7608	8.00
76	Socket (line voltage socket)	42-1184	.75
77	Power Switch & Tone Control	3793-DG	.40
78	Condenser (.015 mfd. Dual Bakelite)	42-1202	1.50
79	Range Switch Ant.	42-1254	1.50
80	Range Switch R. F.	42-1204	1.50
81	Range Switch Osc.	45-2307	2.50
82	Shadowmeter	38-7912	.30
	Bracket (Indicator and Lens Ass'y)	28-4394	.01
	Clip (Volume Control)	28-3900	.03
	Clamp	28-3982	.01
	Clamp Locking Plate	31-1941	.12
	Coupling (Range Switch)	27-5269	.60
	Dial	27-8324	.02
	Dial Guard	31-1884	.25
	Gear (Dial Assembly)	28-7185	
	Hub (Dial)	28-7187	.12
	Mask	27-5273	$0.20
	Mask Arm & Link Assembly	31-1940	.15
	Mask Washer	27-8318	.50 C
	Mask Guide & Lamp Support Ass'y	38-7844	.15
	Mtg. Grommet (R. F. unit)	27-4317	.04
	Mtg. Sleeve (R. F. unit)	28-2257	.01
	Mtg. Screw (R. F. unit)	W-729	.45 C
	Mtg. Washer (R. F. unit)	27-3927	
	Mtg. Washer (R. F. unit)	27-7807	.50 C
	Mtg. Bushing, Rubber, (Chassis)	27-4360	04
	Mtg. Washer, Rubber (Chassis)	3558	.03
	Mtg. Washer, Chassis	28-2089	.50 C
	Mtg. Bolt	W-783	2.20 C
	Pilot Lamp Assembly	38-7706E	.35
	Panel (Ant. & Ground)	38-7714	.15
	Set Screw (Dial Drive)	W-1641	.02
	Sleeve Paper (Vol. Draft)	27-8697	
	Socket (rectifier)	27-6052	
	Socket (7 prong)	27-6057	.11
	Socket (8 prong)	27-6058	.11
	Shield (Shadowmeter Light)	28-2917	.02
	Shaft & Plate (range switch)	42-1237	.70
	Shaft (Volume control)	38-8060	.12
	Spring (Shadowmeter)	28-8623	.70 C
	Spring (Volume Shaft)	28-4117	.40 C
	Spring Thrust (Dial Drive)	28-8611	.01
	Washer		
	Washer "C" (Dial Drive)	28-3904	.01
	Washer, Thrust (Dial Drive)	28-3976	.30 C
	Washer, Felt (Range switch coupling)	27-8399	1.25
	X CABINET		
	Baffle & Silk	40-5976	.60
	Baffle (wood)	16271	
	Bezel & Frame Assembly	40-5947	.80
	Bolt (Speaker)	W-1495	1.50 C
	Gasket (Bezel)	27-8313	.01
	Glass (Bezel)	27-8300	.06
	Ring (Bezel)	28-3988	.45
	Speaker H 26	36-1238	8.25
	Shield (Chassis)	38-8276	.45
	B CABINET		
	Baffle & Silk	40-5975	.40
	Bezel Assembly	40-5945	.70
	Gasket (Bezel)	27-8312	.01
	Glass (Bezel)	27-8299	.06
	Ring (Bezel)	28-3987	.40
	Speaker (K 35)	36-1231	7.25

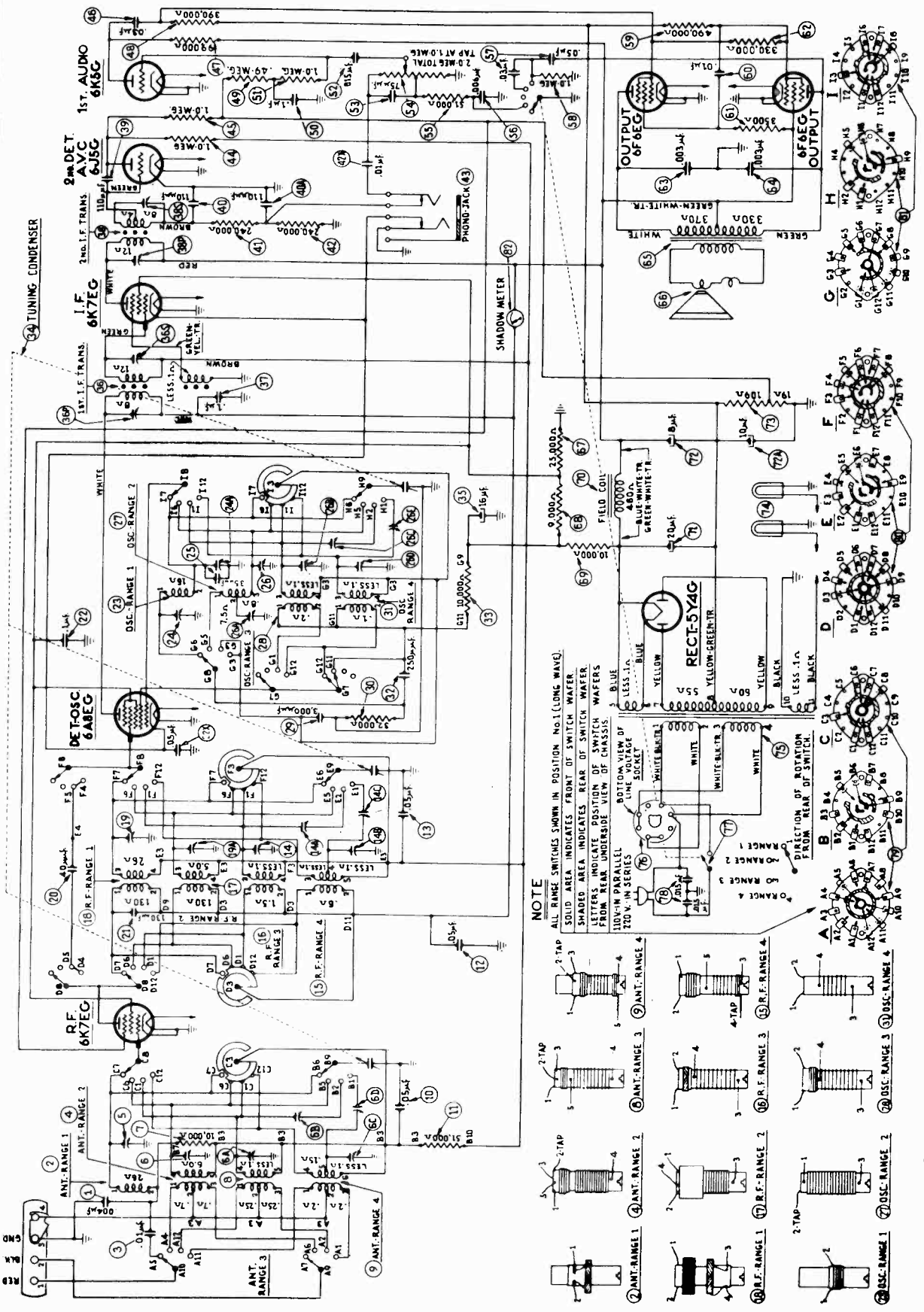
Prices Subject to Change Without Notice

EQUIPMENT REQUIRED: (1) Signal Generator; Philco Model 088 (fundamental frequency 110 to 20,000 K. C.) is the correct instrument for this purpose; (2) Output Meter; Philco Model 025 Circuit Tester incorporates an accurate, sensitive output meter and is recommended; (3) Fibre handle screw-driver (Philco Part No. 27-7059); (4) Philco fibre wrench part No. 3164.

JANUARY 1937

MODEL 37-2650
Schematic

PHILCO RADIO & TELEV. CORP.



IF PEAK 470 KC

Model 37-2650

January, 1937

MODEL 37-2650
Alignment, Trimmers

PHILCO RADIO & TELEV. CORP.

DIAL CALIBRATION: In order to adjust the receiver correctly, the dial must be aligned to track properly with the tuning condenser. To do this, rotate the tuning condenser control to the extreme counter-clockwise position (maximum capacity). Set range switch in the long wave position. Loosen the screw of dial hub, then turn dial until the glowing indicator is centered on the middle index line of dial scale (See Fig. 7.) Now tighten the dial hub set screw in this position.

INTERMEDIATE FREQUENCY CIRCUIT

1. Set controls as follows:
   a. Range switch position 2 (Broadcast).
   b. Receiver Dial at 580 K.C.
   c. Adjust signal generator for 470 K. C.
   d. Connect the 088 signal generator output lead through a .1 mfd. condenser to the control grid of the 6A8EG tube and the ground connection to the chassis.
2. Adjust the following I. F. compensators for maximum output: (36P), (36S), (38P), and (38S).

RADIO FREQUENCY CIRCUIT

Tuning Range 11.5 to 18.2 M. C.

1. Connect the signal generator output lead through .1 mfd. condenser to terminal No. 1 and the generator ground lead to terminal No. 3 on aerial input panel. Terminals 2 and 3 must be connected with the shorting link provided on the panel.

2. Set controls and adjust compensators for maximum output as follows:

Range Switch	Signal Generator and Receiver Dial	Compensators in Order
Position 4	18 M. C.	(26D) Check image at 17.060. See note A
Position 4	18 M. C.	(14B) Use shunt condenser on (26D) (First contact from left side of chassis facing rear underside view.) when adjusting this compensator. See note C. then adjust (6C)
Position 4	18 M. C.	(26D)
Position 4	12 M. C.	(26E), (14C), (16D)
Position 4	18 M. C.	(26D) Check image at 17.060 M. C. See note A
Position 4	18 M. C.	(14B) Use shunt condenser on (26D) when adjusting this compensator. See note C. Then adjust (6C)
Position 4	18 M. C.	(26D) Check image at 17.060 M. C.

Tuning Range 5.7 to 11.6 M. C.

Range Switch	Signal Generator and Receiver Dial	Compensators in Order
Position 3	11 M. C.	(26B)
Position 3	11 M. C.	(14) Use shunt condenser on (26B) (Third contact from left side of chassis facing rear underside view.) when adjusting this compensator (See note C). Then adjust (6A)
Position 3	11 M. C.	(26B)
Position 3	6 M. C.	(26C), (14A), (6B)
Position 3	11 M. C.	(26B)
Position 3	11 M. C.	(14) Use shunt condenser on (26B) when adjusting this compensator. See Note C. Then adjust (6A)

Tuning Range 530 to 1720 K. C.

1. Set controls and adjust compensator for maximum output as follows:

Range Switch	Signal Generator and Receiver Dial	Compensators in Order
Position 2	1600 K. C.	(26), (6), and (19A)
Position 2	580 K. C.	(26A) Roll gang through signal for maximum output. See note B
Position 2	1600 K. C.	(26)
Position 2	1500 K. C.	(6), (19A)

Tuning Range 150 to 350 K. C.

1. Connect the 088 signal generator lead through a 200 mmfd. condenser to terminal No. 1 of the aerial input panel. Set controls and adjust compensators for maximum output as follows:

Range Switch	Signal Generator and Receiver Dial	Compensators in Order
Position 1	300 K. C.	(24), (5), (19)
Position 1	160 K. C.	(24A) Roll gang for maximum output through signal. See note B
Position 1	300 K. C.	(24), (5), (19)
Position 1	160 K. C.	(24A) Roll gang for maximum output through signal. See note B

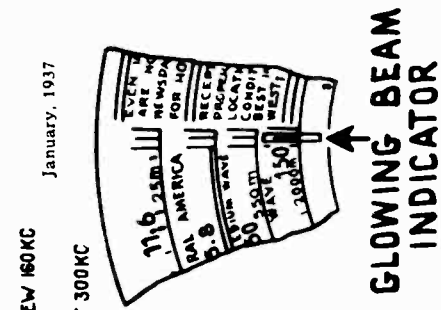


Fig. 7—Dial Scale

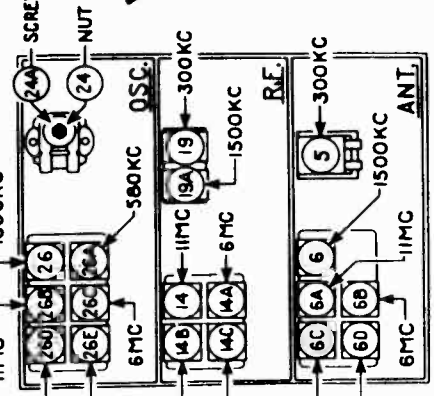


Fig. 5—R. F. Compensators Underside of Chassis

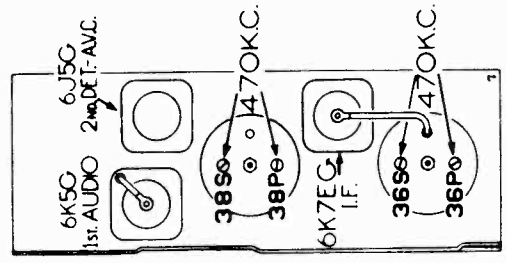


Fig. 6—I. F. Compensators Top of Chassis

OUTPUT METER: The 025 Output Meter is connected to the plate and cathode terminals of one of the (6F6EG) tubes. Adjust the meter to use the (0-30) Volt Scale.

NOTE A—To accurately adjust the compensator to the fundamental and not the image signal, turn the oscillator compensator to the maximum capacity position clockwise. Then slowly turn the compensators counter-clockwise until a second maximum peak is obtained on the output meter. The first peak is the image signal and the receiver must not be adjusted to it. If the above procedure is correctly performed, the image signal will be found 940 K. C. below the frequency being used on any high frequency band.

NOTE B—First tune the compensator for maximum output then vary the tuning condenser of the receiver for maximum output about the frequency mark on the dial. Now turn the compensator slightly to the right or left and again vary the receiver turning condenser for maximum output. If the output decreases, set the compensator in the opposite direction. This procedure of first setting the compensator and then varying the tuning condenser is continued until there is no further gain in output reading.

NOTE C—To eliminate the effect of the R. F. Compensator detuning the oscillator circuit, a variable condenser of approximately 350 mmfd. is connected from the oscillator compensator to ground where designated in the instructions above. Tune the added condenser from the minimum capacity position until the second harmonic of the receiver oscillator beats with the signal from the generator, resulting in a maximum reading on the output meter. Then adjust compensators as noted for maximum output.

MODEL 37-2650
Voltage, Notes
Spkr. Wiring

PHILCO RADIO & TELEV. CORP.

AERIAL CONNECTIONS

The red and black leads of the High-Efficiency Aerial "transmission line" are connected to terminals 1 and 2 respectively, of the terminal panel provided on the rear of the chassis. Connect the jumper on the terminal panel across terminals 3 and 4.

If a temporary aerial is used, the jumper should be across terminals 2 and 3. The aerial connects to terminal 1 and the ground lead to terminal 3. A good ground connection is desirable in all installations.

SHADOWMETER ADJUSTMENT

Apply power to the receiver and allow tubes to warm up. Then adjust shadowmeter as follows:

1. Move the shadow meter coil backwards and forwards, until the opposite edges of the shadow are 1/8 of an inch from each end of the shadow screen, measuring along the bottom edge of the screen. Adjustment of the shadow meter light bracket may be necessary for perfect centering.

2. Remove the rectifier tube from its socket, and rotate coil until shadow reaches minimum width. This width must not exceed 3/32 of an inch.

3. Replace the 5Y4G rectifier tube in its socket. The shadow should then widen to not more than 3/16 inch or less than 1/16 inch from each side of the screen measuring along the bottom edge. If these limits are not obtained readjust the shadow meter as given in paragraphs 1 and 2 again.

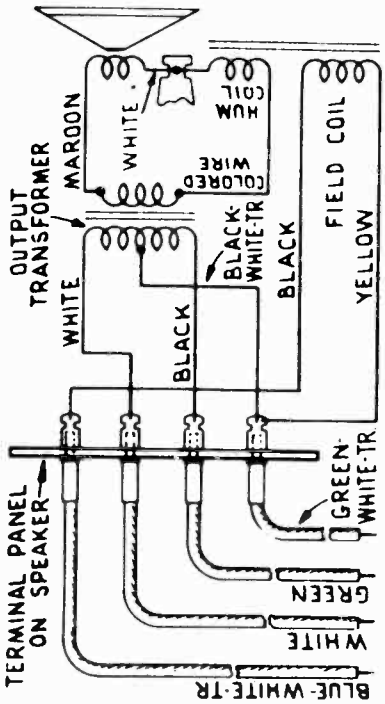


Fig. 2—Speaker Wiring, Types K35, H26

Tone Control:

Four positions, brilliant, bright, mellow, and deep.

***Philco Tubes Used:** Eight—Two 6K7EG; Two 6F6EG; one 6A8EG; one 6K5G; one 6J5G and one 5Y4G.

***Note:** Receivers in the United States use tubes without the "E" designation.

Speaker: K35, B cabinet.
H26, X cabinet.

Type of Circuit:

Superheterodyne, with four tuning ranges; Delayed A. V. C.; Connections for a phonograph; Shadowmeter tuning; Connections for the Philco High Efficiency Aerial, and a push-pull pentode audio output circuit.

Power Supply:

Voltage	Frequency	Consumption
115	50 to 60 cycle	110 watts
115	25 to 40 cycle	110 watts
110/220	50 to 60 cycle	110 watts

The 110/220 volt power transformer Part No. 32-7608 has a voltage selection plug and socket, mounted on top of the power transformer. Place the plug with arrow pointing towards voltage being used.

Tuning Ranges: Four

Range 1—150 to 350 K. C.
Range 2—530 to 1720 K. C.
Range 3—5.7 to 11.6 M. C.
Range 4—11.5 to 18.2 M. C.

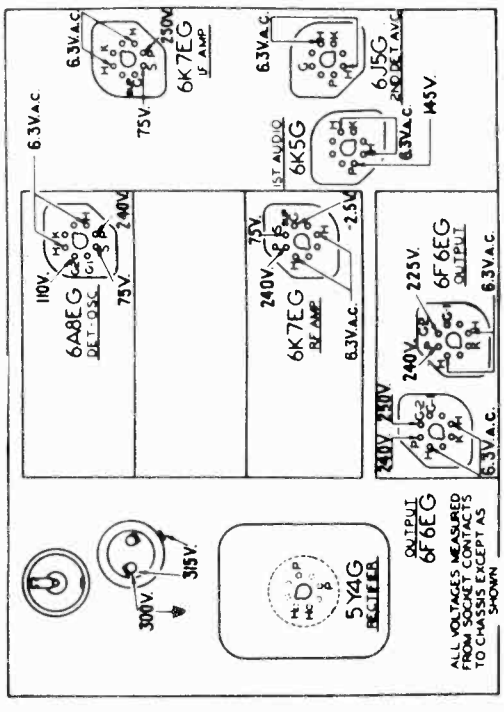


Fig. 1—Socket Voltages—Underside of Chassis View

The voltages indicated by arrows were measured with a Philco 025 Circuit Tester which contains a voltmeter having a resistance of 1000 ohms per volt. Volume Control at minimum, range switch in broadcast position, line voltage 115 A. C.

Intermediate Frequency: 470 K. C.

Undistorted Output: 7 watts.

MODEL 37-2670
Voltage, Notes
Spkr. Wiring

PHILCO RADIO & TELEV. CORP.

Model 37-2670

Electrical Specifications

TYPE OF CIRCUIT: Superheterodyne, with five tuning ranges; push pull class A output; automatic volume control; bass compensation in the volume control circuit; tone control and connections for a phonograph.

POWER SUPPLY:

Voltage	Frequency	Consumption
115	50 to 60 cycle	130 watts
115	25 to 40 cycle	130 watts
110/220	50 to 60 cycle	130 watts

For 110/220 volt operation a transformer part no. 32-7642 is required. These transformers are built into export receivers only. The transformer has a plug and socket, mounted on top of the power transformer, adjacent to the rectifier tube. Place the plug with arrow pointing towards voltage being used.

INTERMEDIATE FREQUENCY: 470 K. C.

TUNING RANGES: Five.
Range 1—150 to 350 K. C.
Range 2—530 to 1600 K. C.
Range 3—1.6 to 4.8 M. C.
Range 4—4.6 to 11.5 M. C.
Range 5—11.5 to 22 M. C.

UNDISTORTED OUTPUT: 10 watts

PHILCO TUBES USED: Two 6K7EG; one 6A8EG; Five 6J5G; Two 6F6EG; and one 5X4G.

NOTE: Receivers in the United States use tubes without the "E" designation.

TONE CONTROL: Four positions.

SPEAKER: "X" cabinet H 28
"B" cabinet K 37

AERIAL CONNECTIONS

The red and black leads of the High-Efficiency Aerial "transmission line" are connected to terminals 1 and 2 respectively, of the terminal panel provided on the rear of the chassis. Connect the jumper on the terminal panel across terminals 3 and 4.

If a temporary aerial is used, the jumper should be across terminals 2 and 3. The aerial connects to terminal 1 and the ground lead to terminal 3. A good ground connection is desirable in all installations.

SHADOW METER ADJUSTMENT

Apply power to the receiver and allow tubes to warm up. Then adjust shadow meter as follows:

1. Move the shadow meter coil backwards and forwards, until the opposite edges of the shadow are $\frac{1}{8}$ of an inch from each end of the shadow screen, measuring along the bottom edge of the screen. Adjustment of the shadow meter light bracket may be necessary for perfect centering.

2. Remove the rectifier tube from its socket, and rotate coil until shadow reaches minimum width. This width must not exceed $\frac{3}{32}$ of an inch.

3. Replace the 5X4G rectifier tube in its socket. The shadow should then widen to not more than $\frac{1}{16}$ inch or less than $\frac{1}{16}$ inch from each side of the screen measuring along the bottom edge. If these limits are not obtained readjust the shadow meter as given in paragraphs 1 and 2 again.

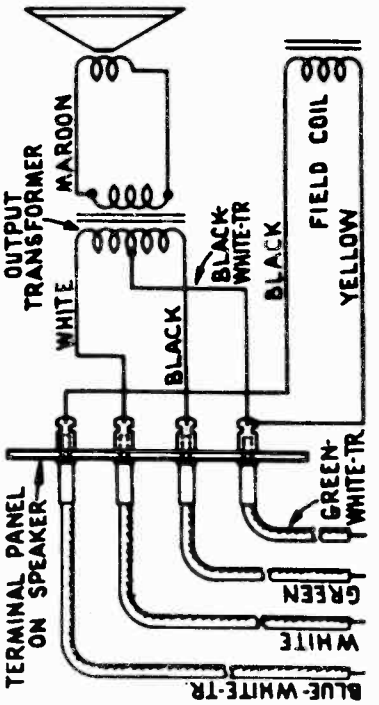


Fig. 2—Speaker Wiring K37, H28

The voltages indicated by arrows were measured with a Philco 025 Circuit Tester which contains a voltmeter having a resistance of 1000 ohms per volt. Volume Control at minimum, range switch in broadcast position, line voltage 115 A. C.

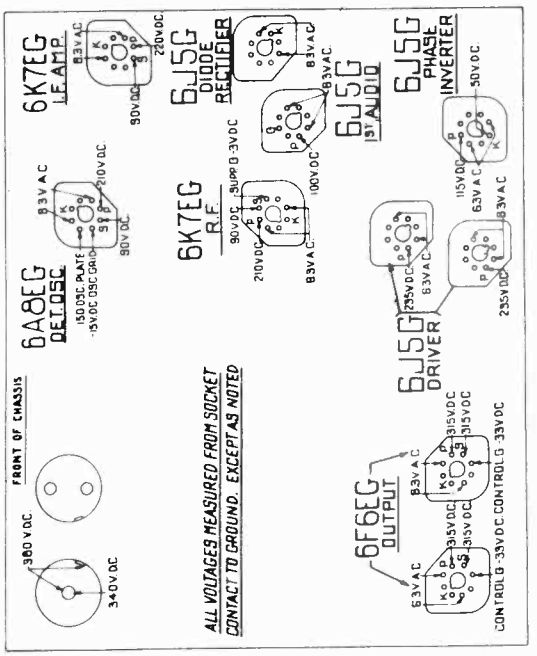
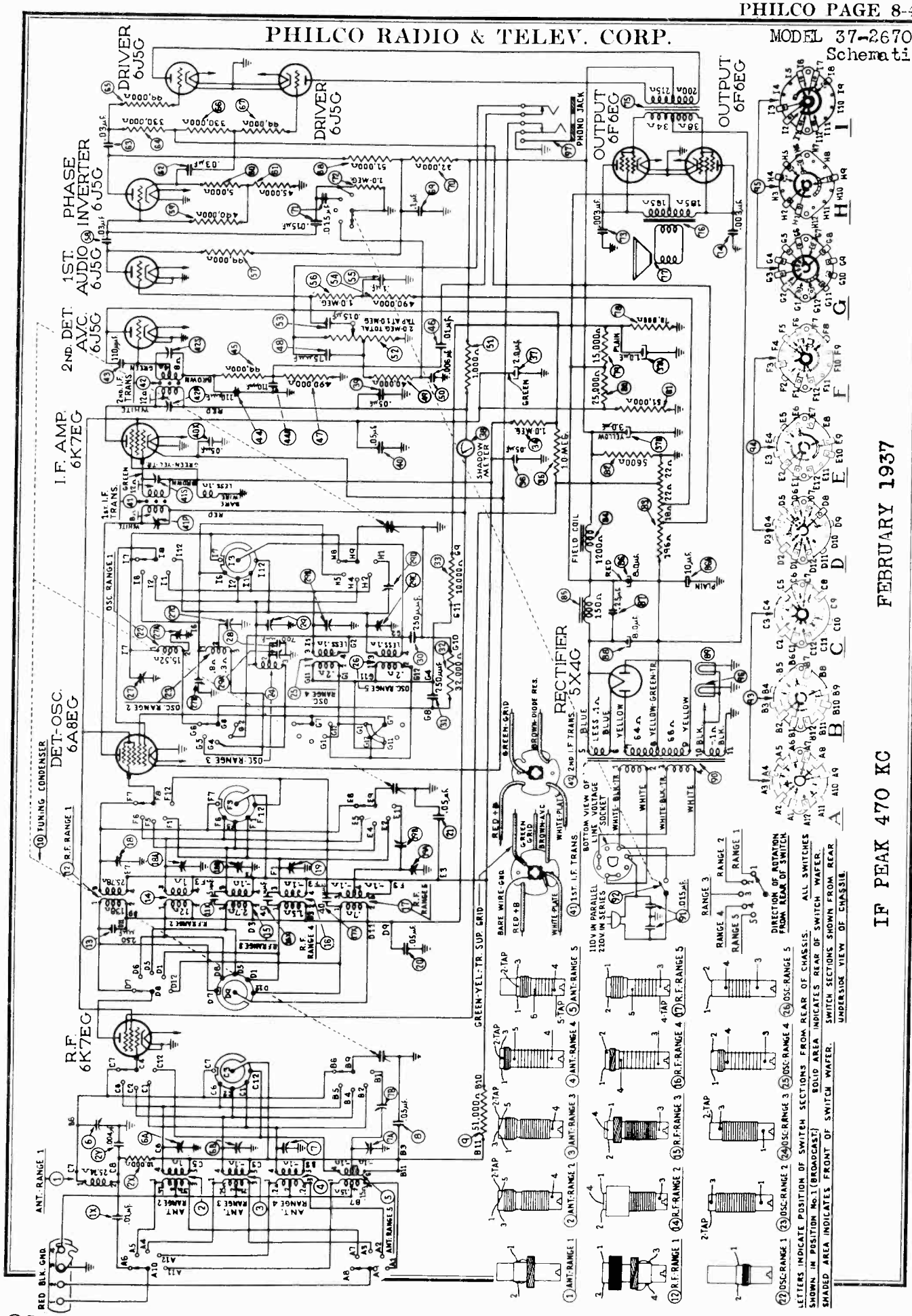


Fig. 1—Socket Voltages—Underside of Chassis View



MODEL 37-2670

Alignment Trimmers

PHILCO RADIO & TELEV. CORP.

DIAL CALIBRATION: In order to adjust the receiver correctly, the dial must be aligned to track properly with the tuning condenser. To do this, rotate the tuning condenser control to the extreme counter-clockwise position (maximum capacity). Set range switch in the long wave position. Loosen the screw of dial hub, then turn dial until the glowing indicator is centered on the middle index line of dial scale (See Fig. 5.) Now tighten the dial hub set screw in this position.

OUTPUT METER: The Output Meter is connected to the plate and cathode terminals of one of the (6F6EG) tubes. Adjust the meter to use the (0-30) Volt Scale.

INTERMEDIATE FREQUENCY CIRCUIT

Frequency 470 K. C.

1. Set controls as follows:
   a. Range switch position 2 (Broadcast).
   b. Receiver dial at 580 K. C.
   c. Adjust signal generator for 470 K. C.
   d. Connect the 088 Signal generator output lead through a .1 mfd. condenser to the control grid of the 6A8EG tube and the ground connection to the chassis.
2. Adjust the following I. F. compensators for maximum output: (42S) (42P) (41S) (41P)

RADIO FREQUENCY CIRCUITS

Tuning Range 11.5—22 M. C.

1. Connect the signal generator output lead through a .1 mfd. condenser to terminal No. 1 and the generator ground lead to terminal no. 3 on aerial input panel. Terminals 2 and 3 must be connected with shorting link provided on the panel.
2. Set controls and adjust compensators for maximum output as follows:

Range Switch Position	Signal Generator and Receiver Dial	Compensators
5	20 M. C	(29C) check image at 19.06 M. C. See Note A
5	20 M. C	(19 A) Use shunt condenser on 29C (first contact from left underside view of chassis) when adjusting this compensator. Then adjust 7A. (See note C)
5	20 M. C	(29C)
5	12 M. C	(29D), (19B), (7B)
5	12 M. C	(29D)

Range Switch Position	Signal Generator and Receiver Dial	Compensator
5	20 M. C.	(29C) check image
5	20 M. C.	(19A) use shunt, then adjust 7A
5	20 M. C.	(29C)

Tuning Range 4.6 to 11.5 M. C.

Range Switch Position	Signal Generator and Receiver Dial	Compensator
4	11 M. C.	(29B)
4	11 M. C.	(19) use shunt condenser on 29B (third contact from left underside view of R. F. unit) when adjusting this compensator. Then adjust 7.

Tuning Range 1.6 to 4.8 M. C.

Range Switch Position	Signal Generator and Receiver Dial	Compensator
3	4.5 M. C.	(29), (18B), (6B)
3	1.7 M. C.	(29A) (Note B).
3	4.5 M. C.	(29), (18B), (6B)

Tuning Range 530 to 1600 K. C.

Range Switch Position	Signal Generator and Receiver Dial	Compensator
2	1500 K. C.	(27B), (18A), (6A)
2	580 K. C.	(27C) See Note B
2	1500 K. C.	(27B)
2	1400 K. C.	(18A), (6A)

Tuning Range 150 to 350 K. C.

1. Connect the 088 signal generator lead through a 200 mmfd. condenser to terminal No. 1 of the aerial input panel. Set controls and adjust compensators for maximum output as follows:

2. Range Switch Position	Signal Generator and Receiver Dial	Compensator
1	300 K. C.	(27), (18), (6)
1	175 K. C.	(27A) (See Note B)
1	300 K. C.	(27), (18), (6)
1	175 K. C.	(27A) Note B
1	300 K. C.	(27), (18), (6)

NOTE A—To accurately adjust the compensator to the fundamental and not the image signal, turn the oscillator compensator to the maximum capacity position clockwise. Then slowly turn the compensators counter-clockwise until a second maximum peak is obtained on the output meter. The first peak is the image signal and the receiver must not be adjusted to it. If the above procedure is correctly performed, the image signal will be found 940 K. C. below the frequency being used on any high frequency band.

NOTE B—First tune the compensator for maximum output then vary the tuning condenser of the receiver for maximum output about the frequency mark on the dial. Now turn the compensator slightly to the right or left and again vary the receiver tuning condenser for maximum output. If the output decreases, set the compensator in the opposite direction. This procedure of first setting the compensator and then varying the tuning condenser is continued until there is no further gain in output reading.

NOTE C—To eliminate the effect of R. F. compensator detuning the oscillator circuit, a variable condenser of approximately 350 mmfd. is connected from the oscillator compensator to ground where designated in the instructions above. Tune the added condenser from the minimum capacity position until the second harmonic of the receiver oscillator beats with the signal from the generator, resulting in a maximum reading on the output meter. Then adjust compensators as noted for maximum output.

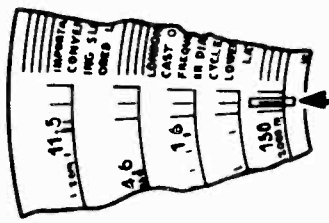


Fig. 5 Dial Calibration

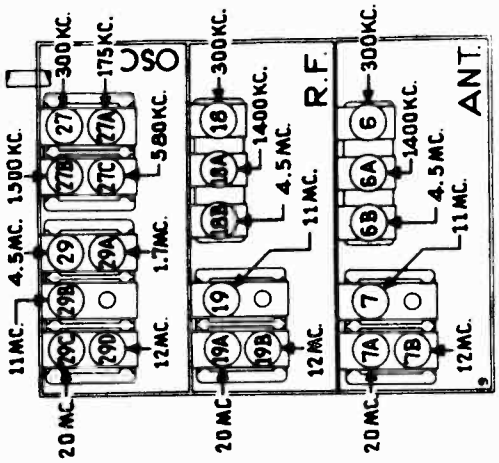


Fig. 7. R. F. Compensators

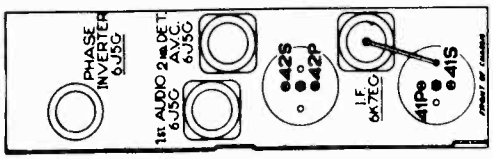


Fig. 6. I. F. Compensators

PHILCO RADIO & TELEV. CORP.

MODEL 37-2670
Chassis, Parts

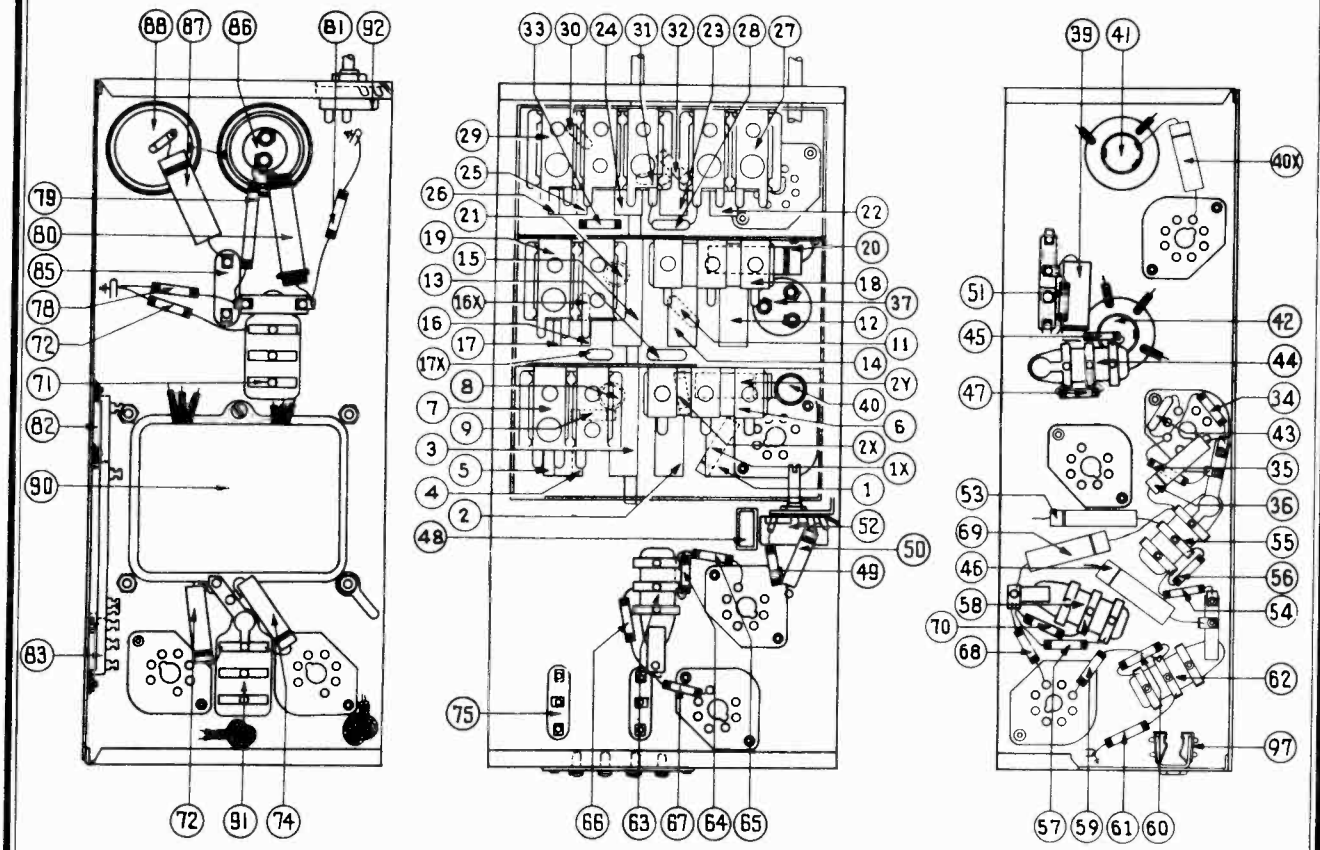


Fig. 4—View of Parts Underside of Chassis

REPLACEMENT PARTS—MODEL 37-2670

Schem. No.	Description	Part No.	List Price
1	Ant. Trans. (Range 1)	32-2218	$0.50
1X	Condenser (.01 mfd.)	30-4479	
2	Ant. Trans. (Range 2)	32-2108	1.60
2X	Resistor (10000 ohms, ½ watt)	33-310339	.20
2Y	Condenser (.004 mfd., Tubular)	30-4185	.25
3	Ant. Trans. (Range 3)	32-2146	1.20
4	Ant. Trans. (Range 4)	32-2150	1.20
5	Ant. Trans. (Range 5)	32-2175	1.20
6	Compensator	31-6131	
7	Compensator	31-6135	
8	Condenser (.05 mfd., Tubular)	30-4444	.20
9	Resistor (51000 ohms, ½ watt)	33-351339	.20
10	Tuning Condenser	31-1857	5.00
11	Condenser (5 mmfd., mica)	30-1080	.20
12	R. F. Trans. (Range 1)	32-2219	1.00
13	Condenser (250 mmfd., mica)	30-1032	.25
14	R. F. Trans. (Range 2)	32-2105	1.00
15	R. F. Trans. (Range 3)	32-2147	.70
16	R. F. Trans. (Range 4)	32-2317	
16X	Condenser (40 mmfd.)	30-1076	.20
17	R. F. Trans. (Range 5)	32-2318	
17X	Condenser (40 mmfd.)	30-1076	
18	Compensator (Three Section)	31-6223	.75
19	Compensator (Three Section)	31-6136	
20	Condenser (.05 mfd., Tubular)	30-4123	.20
21	Condenser (.05 mfd. Tubular)	30-4444	.20
22	Oscillator Trans. (Range 1)	32-2221	.50
23	Osc. Trans. (Range 2)	32-2120	1.00
24	Osc. Trans. (Range 3)	32-2149	.70
25	Osc. Trans. (Range 4)	32-2152	.70
26	Osc. Trans. (Range 5)	32-2182	.70
27	Compensator (4 section, osc.)	31-6134	
28	Condenser (700 mmfd. mica)	5863	.25
29	Compensator (5 section)	31-6133	
30	Condenser (250 mmfd.)	30-1038	
31	Condenser (250 mmfd. mica)	30-1032	.25
32	Resistor (32000 ohm, ½ watt)	33-332339	.20
33	Resistor (10,000 ohms, ½ watt)	33-310339	.20
34	Resistor (1 megohm, ½ watt)	33-510339	.20
35	Resistor (1 megohm, ½ watt)	33-510339	.20
36	Condenser (.05 mfd. Tubular)	30-4444	.20
37	Elect. Cond. (1, 2, 3 mfd.)	30-2122	1.85
38	Shadowmeter	45-2307	2.50
39	Condenser (.05 mfd. Tubular)	30-4123	.25
40	Condenser (.05 mfd. Tubular)	30-4123	
40X	Condenser (.05 mfd. Tubular)	30-4123	.20
41	1st I. F. Trans. Ass'y.	32-2169	1.80
42	2nd I. F. Trans. Ass'y.	32-2171	1.80
43	Condenser (110 mmfd. mica)	30-1031	.20
44	Condenser (110 mmfd. Dual Bakelite)	8035DG	.25
45	Resistor (99000 ohms, ½ watt)	33-399339	.20
46	Condenser (.01 mfd. Tubular)	30-4479	.20
47	Resistor (490000 ohms, ½ watt)	33-449339	.20
48	Condenser (75 mmfd. mica)	30-1053	.20
49	Resistor (40000 ohms)	33-340339	.20
50	Condenser (.006 mfd. tubular)	30-4467	.20
51	Resistor (1000 ohms ½ watt)	33-210339	.20
52	Volume control	33-5158	1.00
53	Condenser (.015 mfd. tubular)	30-4358	.20
54	Resistor (490000 ohms, ½ watt)	33-449339	.20
55	Condenser (.1 mfd. Bakelite)	4989SG	
56	Resistor (1 megohm, ½ watt)	33-510339	.20
57	Resistor (99000 ohms, ½ watt)	33-399339	.20
58	Condenser (.03 mfd. Bakelite)	8318SU	.35
59	Resistor (490000 ohms, ½ watt)	33-449339	.20
60	Resistor (5000 ohms, ½ watt)	33-250339	.20
61	Resistor (45000 ohms, ½ watt)	33-345339	.20
62	Condenser (.03 mfd. Bakelite)	8318SU	.35
63	Condenser (.03 mfd. Bakelite)	8318SU	.35
64	Resistor (330000 ohms, ½ watt)	33-433339	.20
65	Resistor (99000 ohm, ½ watt)	33-399339	.20
66	Resistor (330000 ohms, ½ watt)	33-433339	.20
67	Resistor (99000 ohms, ½ watt)	33-399339	.20
68	Resistor (51000 ohms, ½ watt)	33-351339	.20
69	Condenser (.1 mfd. tubular)	30-4455	.25
70	Resistor (32000 ohms, ½ watt)	33-332339	.20
71	Condenser (.015 Dual Bakelite)	3793DU	.40
72	Resistor (1 megohm, ½ watt)	33-510339	.20
73	Condenser (.003 mfd. tubular)	30-4469	.20
74	Condenser (.003 mfd. tubular)	30-4469	.20
75	Transformer (input audio)	32-7671	2.50
76	Transformer (audio output) K37 H28	32-7638	1.50
77	Cone & Voice Coil Ass'y. K37	36-3020	1.00
	Cone & Voice Coil Ass'y. H28	02625	1.40
78	Resistor (70,000 ohms, 1 watt)	33-370439	.20
79	Resistor (15000 ohms, 1 watt)	33-315339	.20
80	Resistor (25000 ohms, 3 watt)	33-325639	.30
81	Resistor (51000 ohm, ½ watt)	33-351339	.20
82	Resistor (5600 ohm, wire wound)	33-3282	
83	Resistor (Three taps, wire wound)	33-3281	.60
84	Field Coil Ass'y. (K37, H28)	36-3104	2.70
85	Choke (Filter)	32-7115	1.80
86	Elect. Cond. (8,10 mfd.)	30-2045	1.80
87	Condenser (.25 mfd. tubular)	30-4446	.25
88	Elect. Condenser (8 mfd.)	30-2025	1.35
89	Pilot lamp	34-2039	.07
90	Power Trans. 115 volt 50 to 60 cycle	32-7640	6.50
	Power Trans. 115 volt 25 to 40 cycle	32-7641	10.00
	Power Trans. 110/220 50 — 60 cy.	32-7642	8.50
91	Condenser (.015 mfd. Dual bakelite)	3793DG	.40
92	Tone Control & A. C. Switch	42-1184	.75
93	Range Switch (Ant.)	42-1211	1.60
94	Range Switch (R. F.)	42-1255	1.60
95	Range Switch Osc.	42-1253	1.60
96	Shadowmeter lamp	34-2039E	
97	Phono Jack	42-1197	
	Cable (speaker)	41-3210	.45
	Cable (power)	L-2183	.40
	Dial	27-5266	.50
	Dial Hub	28-7187	.12
	Dial Clamp	28-2837	.10
	Dial Set Screw	W-1641	.02
	Mask	27-5206	.30
	Mask Arm Link	31-1887	.45
	Mask Washer	27-8318	.50C
	Mask Guard	38-7876	.25
	Pilot Lamp Ass'y	38-7706E	.35
	Shaft & Plate Range Switch	42-1187	.50
	Screen & Lens Holder Ass'y	31-1967	.50
	Shadowmeter Receptacle Ass'y	41-3225	.40
	ShadowmeterSpring	28-8623	.70C
	Shield (tube)	28-2726	.10
	Shield Base (tube)	28-3898	.03
	Socket 7 prong	27-6057	.11
	Socket 8 prong	27-6058	.11
	Socket Rectifier	27-6052	.11
	Socket E. Z. Switch	27-6053	.11
	Volume Control Shaft Ass'y	38-8060	.12
	Volume Control Clip	28-4394	.01
	Volume Control Spring	28-4117	.40C
	B CABINET		
	Baffle & Silk Ass'y. (10244A, Cabinet)	40-5977	.40
	Baffle & Silk Ass'y. (10273A, Cabinet)	40-6070	
	Bezel Plate Ass'y	40-5948	.80
	Bezel Gasket	27-8313	.01
	Bezel Glass	27-8300	.06
	Bezel Ring	28-3988	.45
	Mtg. Rubbers	3558	.03
	Mtg. Washer	28-2089	.50C
	Mtg. Bolts	W-1495	1.50C
	Mtg. Bushing	27-4360	.04
	Speaker K37	36-1235	7.25
	X CABINET		
	Baffle & Silk	40-6015	.80
	Grille Silk (10275B, Cabinet)	44-1198	
	Speaker H28	36-1242	8.25
	Mtg. Rubber	5189	.03
	Mtg. Bushing	27-4360	.04

Prices subject to change without notice.

Replacement Parts Model 38-1, Code 121

PRICES SUBJECT TO CHANGE WITHOUT NOTICE

Schem. No.	Description	Part No.	List Price
1	Antenna Transformer (Range 1)	32-2575	$0.70
2	Antenna Transformer (Range 2)	32-2576	.70
3	Antenna Transformer (Range 3)	32-2573	.70
4	Compensator, Antenna (Range 3)	31-6160	.30
5	Condenser (.05 μf tubular)	30-4519	.20
6	Condenser (.05 μf—.05 μf Bakelite)	3615DG	.40
7	Resistor (51,000 Ω, ½ watt)	33-351339	.20
8	Tuning Condenser Assembly	30-2075	
9	Resistor (100 Ω, ½ watt)	33-110339	.20
10	Condenser (.05 μf, tubular)	30-4020	.20
11	R. F. Transformer (Range 1)	32-2379	.40
12	R. F. Transformer (Range 2)	32-2382	1.00
13	R. F. Transformer (Range 3)	32-2385	1.20
14	Condenser (5 μμf mica)	30-1097	.20
15	Compensator (R. F. Range 3)	31-6212	
16	Condenser—Part of 6		
17	Condenser (.05 μf tubular)	30-4519	.20
18	Compensator, Osc. (Range 1)	31-6212	
19	Osc. Transformer (Range 1)	32-2373	1.60
20	Osc. Transformer (Range 2)	32-2383	.70
21	Osc. Transformer (Range 3)	32-2386	.70
22	Compensator, Range 1 series	31-6151	.40
23	Condenser (1605 μμf mica)	31-6201	.40
24	Resistor (700 Ω, ½ watt)	33-170339	.20
25	Condenser (.01 μf tubular)	30-4479	.20
26	Condenser (110 μμf mica)	30-1031	.20
27	Condenser (110 μμf mica)	30-1031	.20
28	Resistor (99,000 Ω, ½ watt)	33-399339	.20
29	Resistor (85 Ω, ½ watt)	33-085339	.20
30	Resistor (99,000 Ω, ½ watt)	33-399339	.20
31	Condenser (.3 μf Bakelite)	6287DG	.40
32	Compensator (2 sections)	31-6211	
33	Condenser (250 μμf mica)	30-1032	.25
34	Resistor (32,000 Ω, ½ watt)	33-332339	.20
35	Resistor (10,000 Ω, ½ watt)	33-310339	.20
36	Condenser (4280 μμf mica)	31-6202	.50
37	1st I. F. Transformer	32-2741	3.50
38	2nd I. F. Transformer	32-2742	
39	Condenser (110 μμf—110 μμf Bakelite)	8035DG	.25
40	Resistor (51,000 Ω, ½ watt)	33-351339	.20
41	Resistor (330,000 Ω, ½ watt)	33-433339	.20
42	Condenser (.01 μf tubular)	30-4479	.20
43	Resistor (4.0 meg., ½ watt)	33-540339	.20
44	Resistor (4.6 meg., ½ watt)	33-540339	.20
45	Resistor (1.0 meg., ½ watt)	33-510339	.20
46	Resistor (1.0 meg., ½ watt)	33-510339	.20
47	Resistor (1.0 meg., ½ watt)	33-510339	.20
48	Resistor (1.0 meg., ½ watt)	33-510339	.20
49	Resistor (1,000 Ω, ½ watt)	33-210339	.20
50	Condenser (.1 μf tubular)	30-4455	.25
51	Condenser (110 μμf mica)	30-1031	.20
52	Condenser (110 μμf mica)	30-1031	.20
53	Condenser (.05 μf Bakelite)	3615SG	.35
54	Resistor (490,000 Ω, ½ watt)	33-449339	.20
55	Resistor (490,000 Ω, ½ watt)	33-449339	.20
56	Condenser (.15 μf—.15 μf Bakelite)	6287DG	.40
57	Condenser (.015 μf tubular)	30-4226	.20
58	Resistor (240,000 Ω, ½ watt)	33-424339	.20
59	Condenser (.015 μf tubular)	30-4226	.20
60	Resistor (32,000 Ω, ½ watt)	33-332339	.20
61	Resistor (25,000 Ω, ½ watt)	33-325339	.20
62	Resistor (99,000 Ω, ½ watt)	33-399339	.20
63	Resistor (51,000 Ω, ½ watt)	33-351339	.20
64	Volume Control	33-5233	
65	Resistor (1.0 meg., ½ watt)	33-510339	.20
66	Resistor (20,000 Ω, ½ watt)	33-370339	.20
67	Condenser (.1 μf tubular)	30-4455	.25
68	Condenser (.006 μf tubular)	30-4445	.20
69	Audio Shorting Switch (Part of Auto. Tuner—See parts (6) and (16) Bulletin 273)		
70	Resistor (490,000 Ω, ½ watt)	33-449339	.20
71	Condenser (.1 μf tubular)	30-4499	.20
72	Condenser (.05 μf Bakelite)	3615SU	.35
73	Condenser (.02 μf tubular)	30-4113	.20
74	Resistor (1.0 meg., ½ watt)	33-510339	.20
75	Resistor, wire-wound (7,500 Ω—9,000 Ω)	33-3320	.65
76	Resistor (51,000 Ω, 1 watt)	33-351439	$0.20
77	Electrolytic Condenser (4 μf—3 μf)	30-2243	1.50
78	Condenser (.1 μf tubular)	30-4455	.25
79	Resistor (330,000 Ω, ½ watt)	33-433399	.20
80	Condenser (.1 μf tubular)	30-4455	.25
81	Resistor (70,000 Ω, ½ watt)	33-370339	.20
82	Resistor (32,000 Ω, ½ watt)	33-332339	.20
83	Resistor (32,000 Ω, ½ watt)	33-332339	.20
84	Condenser (.05 μf tubular)	30-4177	.25
85	Resistor (330,000 Ω, ½ watt)	33-433339	.20
86	Condenser (.1 μf tubular)	30-4455	.25
87	Resistor (70,000 Ω, ½ watt)	33-370339	.20
88	Condenser (.1 μf tubular)	30-4455	.25
89	Input Transformer	32-7671	2.50
90	Resistor (51,000 Ω, ½ watt)	33-351339	.20
91	Condenser (.01 μf tubular)	30-4381	.20
92	Output Transformer	32-7914	1.85
93	Cone & Voice Coil Assembly (U28 Speaker)	36-3799	
94	Condenser (.01 μf tubular)	30-4381	.25
95	Resistor (5,600 Ω, wire-wound)	33-3282	.60
96	Field & Pot Assembly (U28 Speaker)	36-3162	11.00
97	Resistor, Three Sections (124 Ω—33 Ω—19 Ω)	33-3319	.50
98	Electrolytic Condenser (18 μf)	30-2200	1.40
99	Choke	32-7115	1.80
100	Resistor (3,000 Ω, ½ watt)	33-230339	.20
101	Electrolytic Two Sections (8 μf—10 μf)	30-2201	
102	Pilot Lamp	34-2064	
103	Power Transformer (115 v. 50 to 60 cycles)	32-7869	
104	Power Transformer (115 v. 25 to 40 cycles)	32-7870	
	Power Transformer (115/230 v. 50 to 60 cycles)	32-7871	
105	Tone Control	42-1268	
106	Condenser (.015 μf—.015 μf Bakelite)	3793DG	
107	A.F.C. Shorting Switch (Part of Auto. Tuner—See part (8) Bulletin 273)	45-2330	
108	A.F.C. Switch Manual	42-1269	
109	Flood Lamp	34-2064	
110	Wave Switch Complete	42-1362	
	MODEL 38-1		
	Automatic Tuning Mechanism Complete	38-9145	
	Brace (Automatic Mechanism)	28-4119	
	Cable (Speaker)	41-3329	
	Cable (Power)	L-2183	
	Clip (Mtg. R. F. Coils)	28-5002	
	Coupling (Tuning Condenser)	31-1961	
	Coupling (Range Switch Shaft & Mask)	38-8693	
	Knob (Range Switch)	27-4326	
	Knob (Tuning)	27-4330	
	Knob (Vernier)	27-4331	
	Knob (Tone, Volume)	27-4332	$0.25
	Mtg. Rubber (Chassis)	27-4564	1.75
	Mtg. Rubber (Rear of R. F. Unit)	27-4197	.09
	Mtg. Rubber (Front of R. F. Unit)	27-4581	
	Pilot Lamp Assembly	38-9100	
	Shield (R. F. Unit)	38-8969	
	Shield Base (Round)	8004	
	Shield Base	28-2725	
	Shield (Tube) (Square)	28-2726	
	Shield (6U7G Tube)	28-5031	.75
	Shield (Round)	8005	.40
	Socket (6 prong)	27-6086	
	Socket (7 prong) (6F6G Tubes)	27-6057	
	Socket (7 prong)	27-6087	1.80
	Speaker (U-28)	36-1361	.09
	Support (Rear of R. F. Unit)	38-8923	3.00
	Terminal Panel (Ant.)	38-8746	
	CABINET PARTS		
	Bezel Assembly	38-8833	
	Cover (Back of Cabinet)	27-8865	
	AUTOMATIC TUNING MECHANISM		
	*Cover (Handle)	28-5092	
	*Dial	27-5358	
	*Dial Screen Holder	31-2053	
	*Escutcheon Assembly (Station tabs)	45-2472	

*These Automatic Tuning Mechanism parts differ from those shown in Service Bulletin 273.

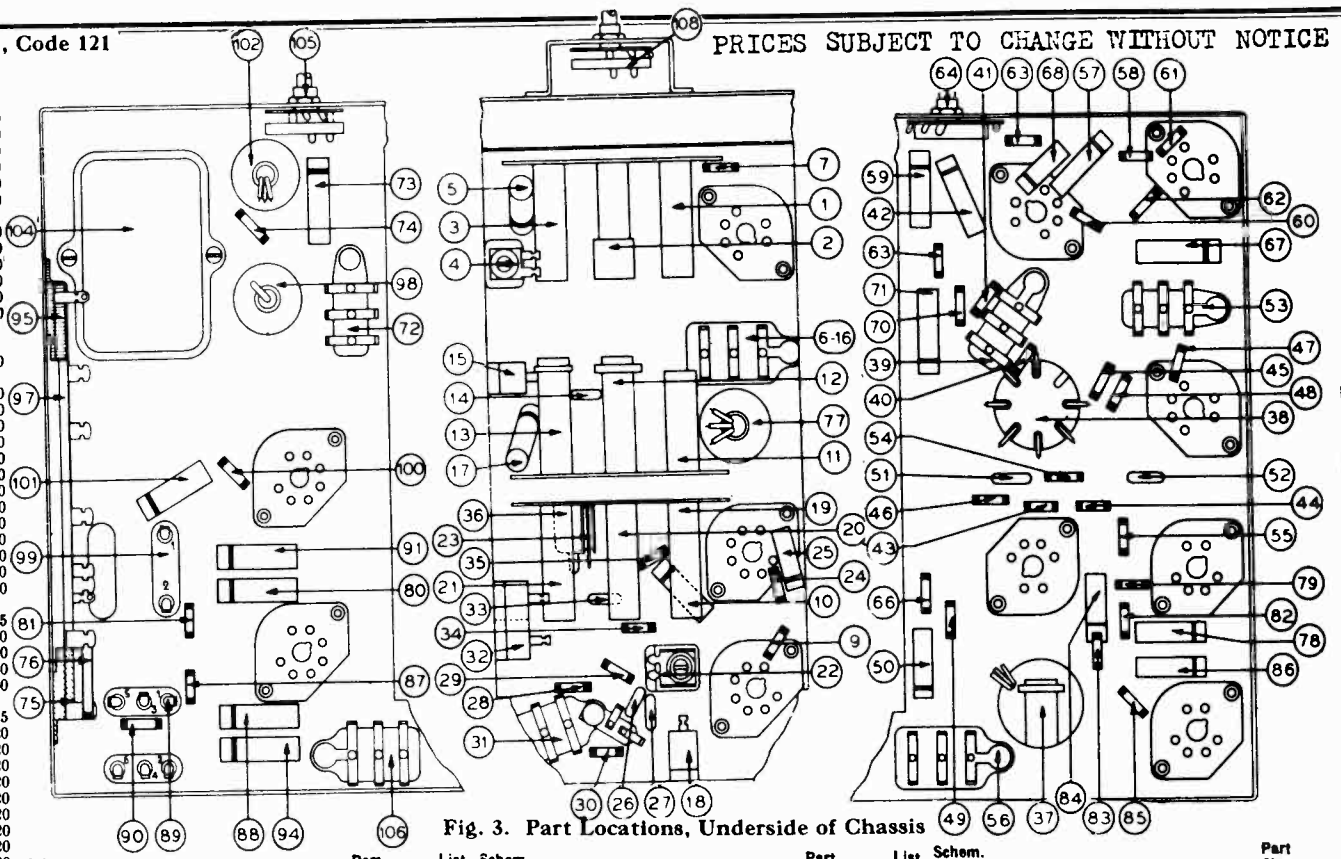
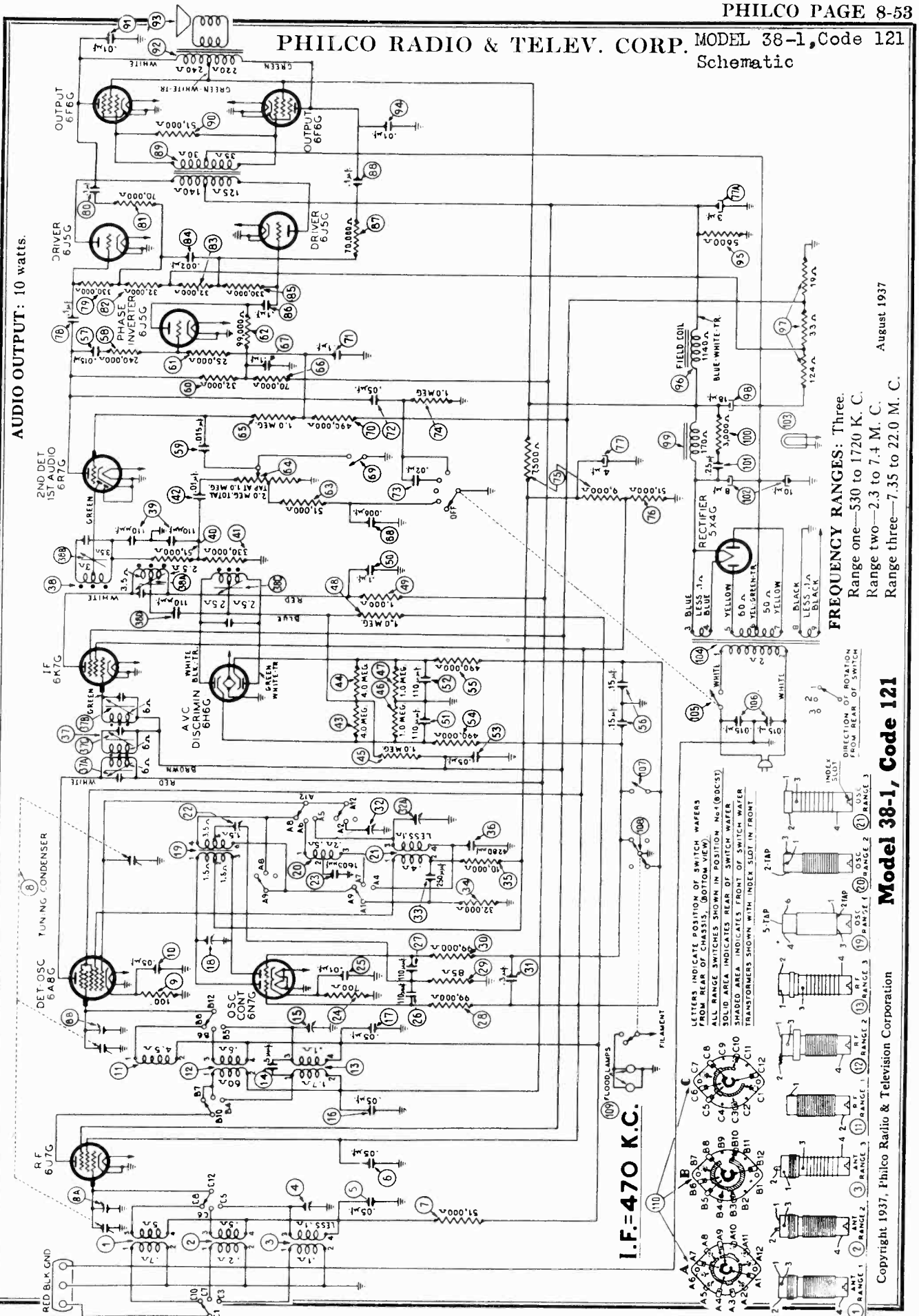


Fig. 3. Part Locations, Underside of Chassis

PHILCO RADIO & TELEV. CORP. MODEL 38-1, Code 121

Schematic



MODEL 38-1, Code 121
Alignment, Trimmers
Voltage

PHILCO RADIO & TELEV. CORP.

Alignment of Compensators

EQUIPMENT REQUIRED: (1) Signal Generator, having a fundamental frequency range covering the intermediate and tuning frequencies of the receiver. Philco Model 077 Signal Generator which has a fundamental frequency range from 115 to 36000 K.C. is the correct instrument for this purpose; (2) Output Meter, Philco Model 026 Circuit Tester incorporates a sensitive output meter and is recommended; (3) Philco Fiber Handle Screw Driver, part number 27-7059 and Fibre Wrench, part number 3164.

OUTPUT METER: The 026 Output Meter is connected to the plate and cathode terminals of one of the 6F6G tubes. Adjust the meter to use the (0-30) volt scale and advance the attenuator control of the generator until a readable indication is noted on the output meter after signal is applied to stage being adjusted.

DIAL CALIBRATION: In order to adjust the compensators of this receiver correctly, the dial must be aligned to track properly with the tuning condenser. To do this proceed as follows:

1. Loosen the set screws on the shaft coupling of the tuning condenser. Then turn the tuning condenser until the plates are in the maximum capacity position. Now turn the dial until the glowing beam indicator is on the INDEX LINE at the low frequency end of Range 2. See Fig. 4. With dial and tuning condenser in this position tighten set screws.
2. Turn the tuning condenser control until the indicator is on the 2.2 M. C. mark.
3. With the dial in this position, loosen the shaft coupling set screws. Then turn the dial until the indicator is again on the INDEX LINE. Tighten the set screws in this position.

NOTE: Be careful when turning the dial that the position of the tuning condenser is not disturbed.

INTERMEDIATE FREQUENCY CIRCUIT

A. Set the receiver and signal generator controls as follows:

1. Range Switch (Broadcast Position)
2. Volume Control (Maximum)
3. Magnetic Tuning Switch "Off"
4. Tone Control First Position
5. Signal Generator Dial 470 K.C.

B. Connect the signal generator output cable through a .1 mfd. condenser to the grid of the 6A8G Det. Osc. tube and connect the cableground to the receiver chassis. Set the generator "attenuator" for maximum output. Adjust the I. F. Compensators as follows:

1. Turn compensator (37C) in until the output meter reading decreases almost to zero.
2. Now adjust the compensators, (37B) and (37A), for maximum output; then readjust (37C) for maximum output.
3. Turn compensator (38C) in about three turns; then adjust compensators (38B) and (38A) for maximum output. The adjustment of compensator 38C is given in the "Magnetic Tuning Circuit Adjustments" below.

RADIO FREQUENCY CIRCUIT

1. Set the controls as given under "Intermediate Frequency Circuit" 1 to 4 and set the range switch, signal generator and receiver dials as given under the adjustments of each tuning range in the following procedure.

Connect the Signal Generator output cable into the "Med" jack of the generator panel and connect the other end through a .1 mfd. condenser to the "Red" terminal of the receiver aerial panel (rear of chassis). The ground connection of the cable should be connected to the "Blk" terminal.

2. Adjust the "R. F." compensators for maximum output as follows:

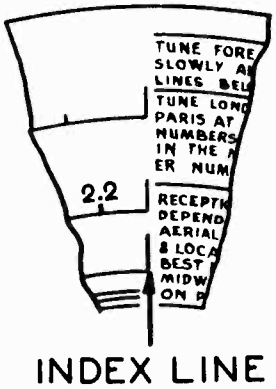


Fig. 4. Dial Calibration

Tuning Range: 530 to 1720 K. C.

Range Switch Position	Signal Generator and Receiver Dial	Compensators in Order
1	1550 K. C.	(18), (8B), and (8A)
1	580 K. C.	(22), Roll Tuning Condenser. See Note B.
1	1550 K. C.	(18), (8B), (8A)

Tuning Range 2.3 to 7.4 M. C.

Range Switch Position	Signal Generator and Receiver Dial	Compensators in Order
2	6.0 M. C.	(32)

Tuning Range: 7.35 to 22.0 M. C.

Range Switch Position	Signal Generator and Receiver Dial	Compensators in Order
3	18.0 M. C.	(32A), (15), (4) Roll tuning condensers when adjusting (15) and (4). See Note B, check image at 17.060. See Note A.
3	18.0 M. C.	(32A)

MAGNETIC TUNING CIRCUIT ADJUSTMENTS

1. Set the Magnetic Tuning switch in the "out" position.
2. Turn the signal generator indicator to 1000 K. C. and adjust the "Attenuator" control for a weak signal.
3. Adjust volume control for a readable indication on the output meter.
4. Now tune the receiver dial for maximum output at 1000 K. C. The dial must be tuned very accurately to the 1000 K. C. signal in order to make the following adjustment correctly.
5. Turn the Magnetic Tuning Switch "In" and adjust compensator (38C) for maximum output.

The above adjustments are now checked for accuracy as follows:

FREQUENCY TEST:

With the 1000 K. C. signal tuned for maximum output turn the Magnetic Tuning control back and forth; that is, from the "out" to "in" position. The reading of the output meter should not change in either position. If the output meter reading changes, the above magnetic tuning circuit adjustments should be repeated.

A further check on the magnetic tuning adjustment is to very carefully tune in a broadcasting station and turn the switch from the "out" to the "in" position. With the switch in either position, the tone of the station being received should not change. If a change of tone or hiss develops repeat the above Magnetic Tuning Adjustments.

SENSITIVITY TEST:

1. To check the magnetic tuning circuit for sensitivity, turn the magnetic tuning switch to the "off" position, and tune in the 1000 K. C. signal. Then adjust the "attenuator" control of the signal generator for a good audible signal. Approximately 20 volts on the output meter.
2. Now detune the signal (first above and then below the 1000 K. C. mark to a point at which the signal is weakly heard. At each point turn the magnetic tuning control "on". When the control is turned on the signal should return to normal output strength. If the magnetic tuning circuit does not pull the signal into resonance, the compensator (38C) should be carefully readjusted.

NOTE "A"—To accurately adjust the high frequency oscillator compensator to the fundamental instead of the image signal, turn the oscillator compensator to the maximum capacity position (clockwise). From this position slowly turn the compensator counter-clockwise until a second maximum peak is obtained on the output meter. Adjust the compensator for maximum output using this second peak. The first peak from maximum capacity position of the compensator is the image signal and must not be used in adjusting the compensator.

If the above procedure is correctly performed, the image signal will be found (much weaker) by turning the receiver dial 940 K. C. below the frequency being used on any high frequency range.

NOTE "B"—When adjusting the low frequency compensator of Range One (Broadcast) or the antenna and R. F. compensators of the high frequency tuning ranges; the receiver Tuning Condenser must be adjusted (rolled) as follows: First tune the compensator for maximum output, then vary the tuning condenser of the receiver for maximum output about the frequency dial mark. Now turn the compensator slightly to the right or left and vary the receiver tuning condenser for maximum output. If the out reading increases, turn the compensator in the same direction a trifle more, and again vary the tuning condenser for maximum output. If the output decreases, set the compensator in the opposite direction. This procedure of first setting the compensator and then varying the tuning condenser is continued until there is no further gain in output reading.

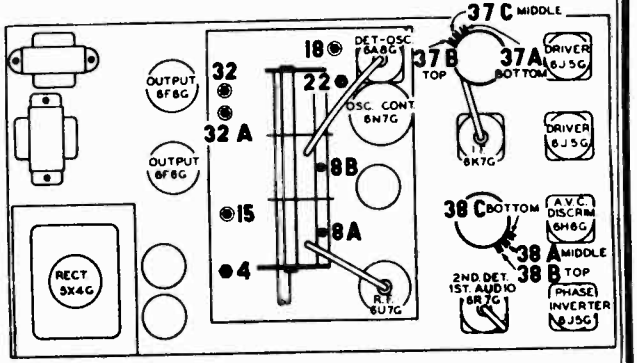


Fig. 5. Compensator Locations

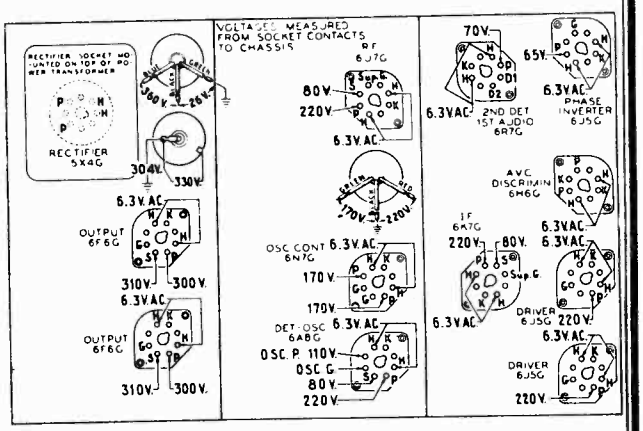


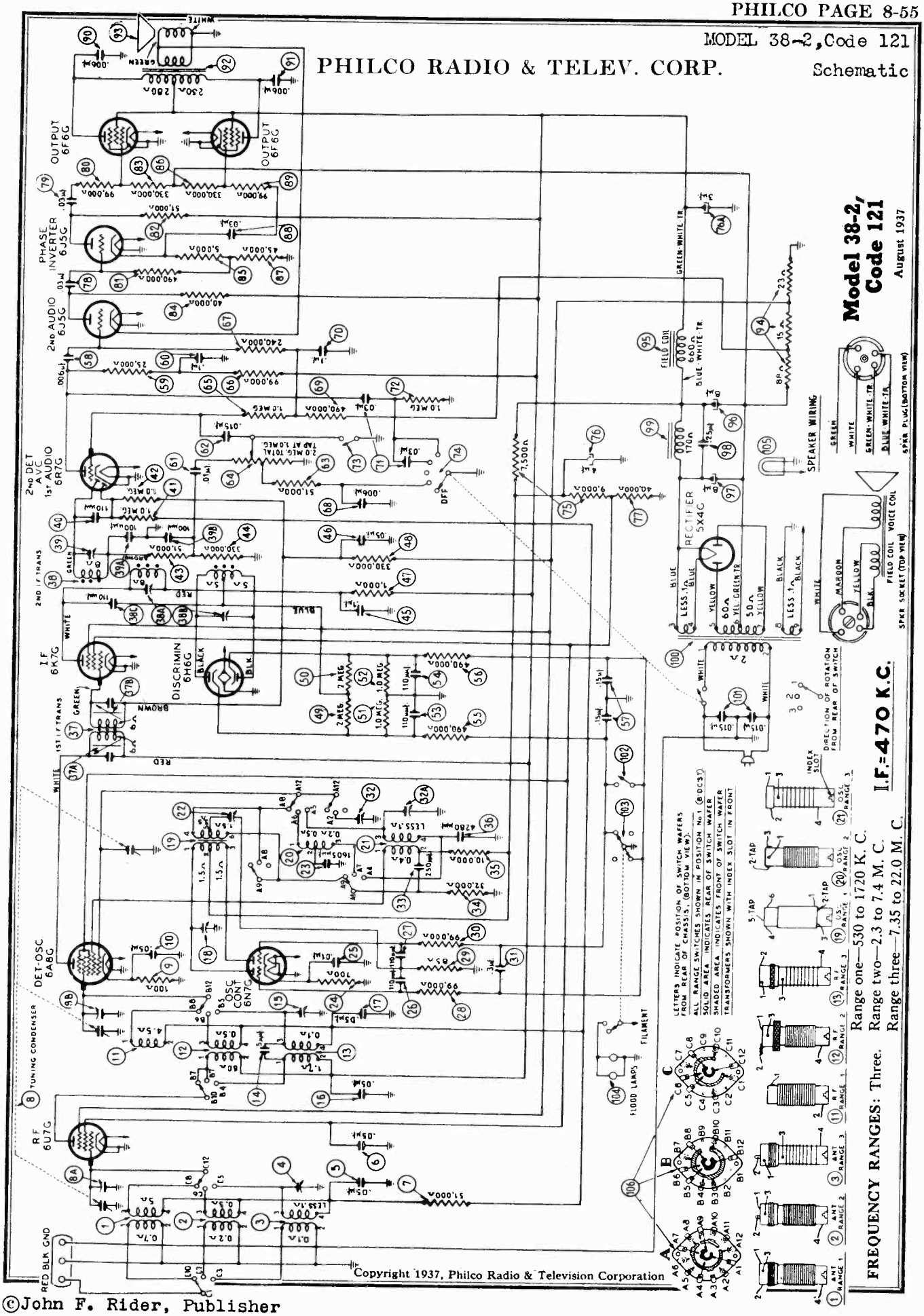
Fig. 1. Underside View of Chassis showing Socket Voltages

The voltages indicated by the arrows were measured with a **Philco 026 Circuit Tester**, which contains a sensitive voltmeter. Line voltage 115 A. C.—Volume control minimum—Dial set at point where no signal is present—Range Switch in broadcast position.

MODEL 38-2, Code 121

PHILCO RADIO & TELEV. CORP.

Schematic



MODEL 38-2, Code 121
Alignment, Trimmers
Voltage

PHILCO RADIO & TELEV. CORP.

Alignment of Compensators

EQUIPMENT REQUIRED: (1) Signal Generator, having a fundamental frequency range covering the intermediate and tuning frequencies of the receiver. Philco Model 077 Signal Generator which has a fundamental frequency range from 115 to 36000 K. C. is the correct instrument for this purpose; (2) Output Meter, Philco Model 026 Circuit Tester incorporates a sensitive output meter and is recommended; (3) Philco Fibre Handle Screw Driver, Part No. 27-7059 and Fibre Wrench, Part No. 3164.

OUTPUT METER: The 026 Output Meter is connected to the plate and cathode terminals of one of the 6F6G tubes. Adjust the meter to use the (0-30) volt scale and advance the attenuator control of the generator until a readable indication is noted on the output meter after signal is applied to stage being adjusted.

DIAL CALIBRATION: In order to adjust the compensators of this receiver correctly, the dial must be aligned to track properly with the tuning condenser. To do this proceed as follows:

1. Loosen the set screws on the shaft coupling of the tuning condenser. Then turn the tuning condenser until the plates are in the maximum capacity position. Now turn the dial until the glowing beam indicator is on the INDEX LINE at the low frequency end of Range 2. See Fig. 4. With dial and tuning condenser in this position, tighten set screws.

2. Turn the tuning condenser control until the indicator is on the 2.2 M. C. Mark.

3. With the dial in this position, loosen the shaft coupling set screws. Then turn the dial until the indicator is again on the INDEX LINE. Tighten the set screws in this position. Be careful when turning the dial that the position of the tuning condenser is not disturbed.

INTERMEDIATE FREQUENCY CIRCUIT

A. Set the receiver and signal generator controls as follows:

1. Range Switch (Broadcast)
2. Volume Control (Maximum)
3. Magnetic Tuning Switch "out"
4. Tone control & A. C. switch first position.
5. Signal generator dial 470 K. C.

B. Connect the signal generator output cable through a .1 mfd. condenser to the grid of the 6A8G Det. Osc. tube and connect the cableground to the receiver chassis. Now adjust the following compensators for maximum output (38A), (39), (37B), and (37A).

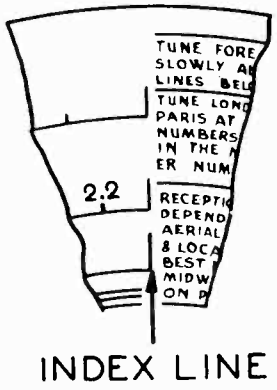


Fig. 4. Dial Calibration

RADIO FREQUENCY CIRCUIT

1. Set the controls as given under "Intermediate Frequency Circuit" 1 to 4 and set the range switch, signal generator and receiver dials as given under the adjustments of each tuning range in the following procedure.

Connect the Signal Generator output cable into the "Med" jack of the generator panel and connect the other end through a .1 mfd. condenser to the "Red" terminal of the receiver aerial panel (rear of chassis). The ground connection of the cable should be connected to the "Blk" terminal.

2. Adjust the "R. F." compensators for maximum output as follows:

Tuning Range: 530 to 1720 K. C.

Range Switch Position	Signal Generator and Receiver Dials	Compensators in Order
1	1550 K. C.	(18), (8B) and (8A)
1	580 K. C.	(22) Roll gang. Note B
1	1550 K. C.	(18), (8B), (8A)

Tuning Range 2.3 to 7.4 M. C.

Range Switch Position	Signal Generator and Receiver Dial	Compensators in Order
2	6.0 M. C.	(32)

Tuning Range 7.35 to 22.0 M. C.

Range Switch Position	Signal Generator and Receiver Dial	Compensators in Order
3	20.0 M. C.	(32A), (15), (4) Roll Tuning condensers when adjusting (15) and (4). See Note B. Check image at 17.060. See Note A.
3	20.0 M. C.	(32A)

MAGNETIC TUNING CIRCUIT ADJUSTMENTS

1. Set the Magnetic Tuning switch in the "out" position.

2. Turn the signal generator indicator to 1000 K. C. and adjust the "Attenuator" control for a weak signal.

3. Adjust volume control for a readable indication on the output meter.

4. Now tune the receiver dial for maximum output at 1000 K. C. The dial must be tuned very accurately to the 1000 K. C. signal in order to make the following adjustment correctly.

5. Turn the Magnetic Tuning switch "in" and adjust compensator (38B) for maximum output.

The above adjustments are now checked for accuracy as follows:

FREQUENCY TEST

With the 1000 K. C. signal tuned for maximum output turn the Magnetic Tuning control back and forth; that is, from the "out" to "in" position. The reading of the output meter should not change in either position. If the output meter reading changes, the above magnetic tuning circuit adjustments should be repeated.

A further check on the Magnetic Tuning adjustment is to very carefully tune in a broadcasting station and turn the switch from the "out" to the "in" position. With the switch in either position, the tone of the station being received should not change. If a change of tone or hiss develops repeat the above Magnetic Tuning Adjustments.

SENSITIVITY TEST

1. To check the magnetic tuning circuit for sensitivity, turn the magnetic tuning switch to the "out" position, and tune in the 1000 K. C. signal. Then adjust the "attenuator" control of the signal generator for a good audible signal. Approximately 20 volts on the output meter.

2. Now detune the signal (first above and then below) the 1000 K. C. mark to a point at which the signal is weakly heard. At each point turn the magnetic tuning control "on" When the control is turned on the signal should return to normal output strength. If the magnetic tuning circuit does not pull the signal into resonance, the compensator should be carefully readjusted.

NOTE "A"—To accurately adjust the high frequency oscillator compensator to the fundamental instead of the image signal, turn the oscillator compensator to the maximum capacity position (clockwise). From this position slowly turn the compensator counter-clockwise until a second maximum peak is obtained on the output meter. Adjust the compensator for maximum output using this second peak. The first peak from maximum capacity position of the compensator is the image signal and must not be used in adjusting the compensator.

If the above procedure is correctly performed, the image signal will be found (much weaker) by turning the receiver dial 940 K. C. below the frequency being used on any high frequency range.

NOTE "B"—When adjusting the low frequency compensator of Range One (Broadcast) or the antenna and R. F. compensators of the high frequency tuning ranges; the receiver Tuning Condenser must be adjusted (rolled) as follows: First tune the compensator for maximum output, then vary the tuning condenser of the receiver for maximum output about the frequency dial mark. Now turn the compensator slightly to the right or left and vary the receiver tuning condenser for maximum output. If the out reading increases, turn the compensator in the same direction a trifle more, and again vary the tuning condenser for maximum output. If the output decreases, set the compensator in the opposite direction. This procedure of first setting the compensator and then varying the tuning condenser is continued until there is no further gain in output reading.

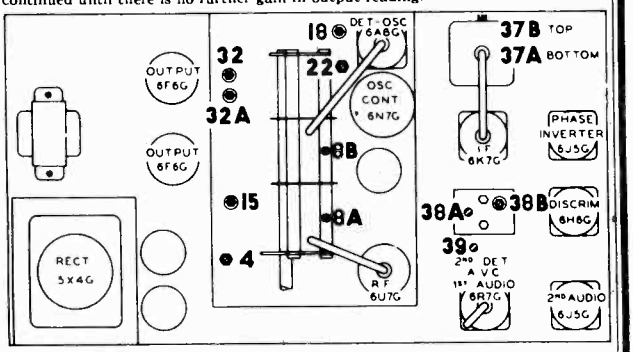


Fig. 5. Compensator Locations

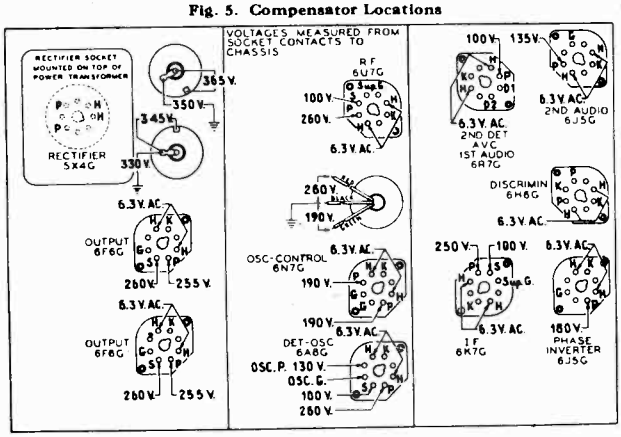


Fig. 1. Underside View of Chassis showing Socket Voltages

The voltages indicated by the arrows were measured with a **Philco 026 Circuit Tester**, which contains a sensitive voltmeter. Line voltage 115 A. C.—Volume control minimum—Dial set at point where no signal is present—Range Switch in broadcast position.

PRICES SUBJECT TO CHANGE WITHOUT NOTICE

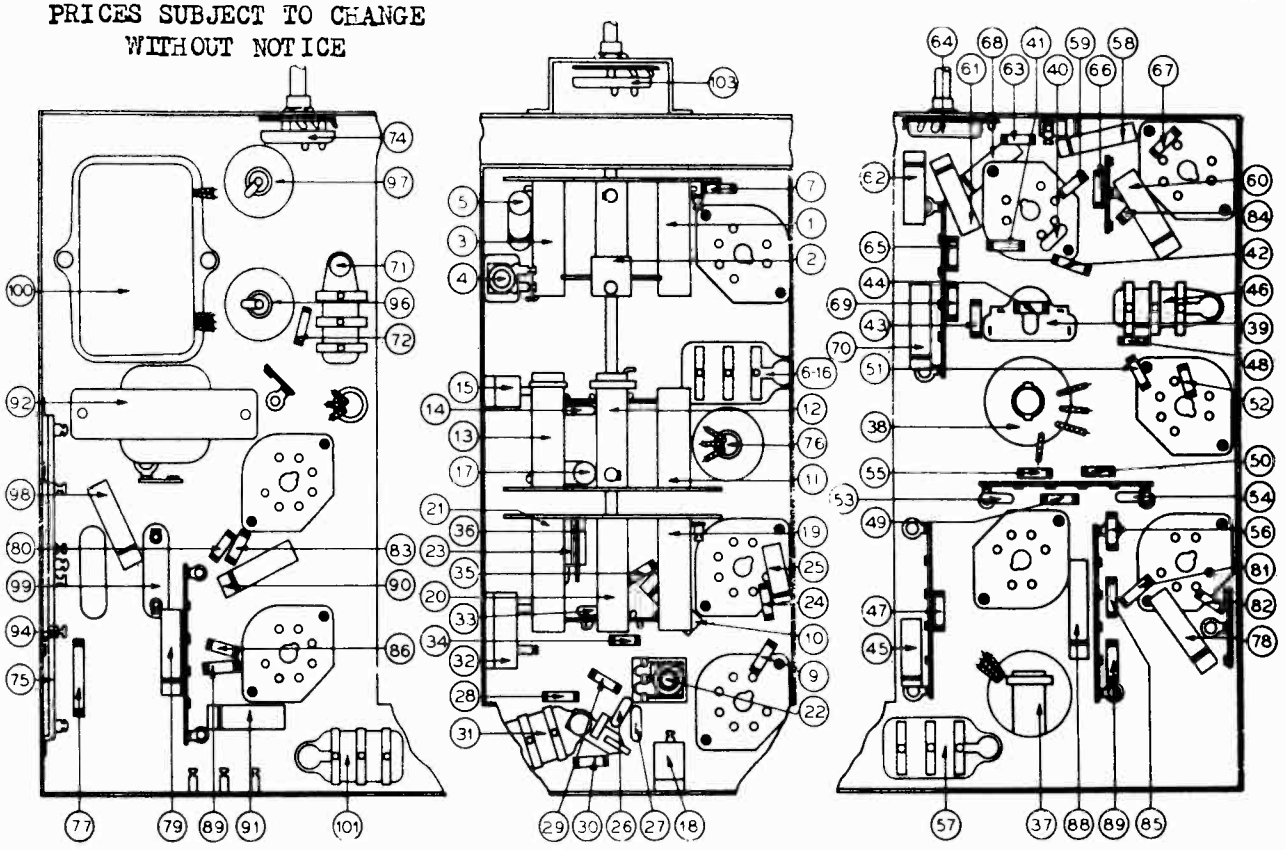


Fig. 3. Part Locations, Underside of Chassis

Schem. No.	Description	Part No.	List Price
1	Antenna Transformer (Range 1)	32-2575	$0.70
2	Antenna Transformer (Range 2)	32-2576	.70
3	Antenna Transformer (Range 3)	32-2573	.70
4	Compensator, Antenna (Range 3)	31-6160	.30
5	Condenser (.05μf tubular)	30-4519	.20
6	Condenser (.05μf—.05μf, Bakelite)	3615DG	.40
7	Resistor (51,000 Ω, ½ Watt)	33-351339	.20
8	Tuning Condenser Assembly	31-2075	
9	Resistor (.100 Ω, ½ Watt)	33-110339	.20
10	Condenser (.05 μf, tubular)	30-4020	.20
11	R. F. Transformer (Range 1)	32-2379	.40
12	R. F. Transformer (Range 2)	32-2382	1.00
13	R. F. Transformer (Range 3)	32-2385	1.20
14	Condenser (5 μμf, Mica)	30-1097	.20
15	Compensator (R. F. Range 3)	31-6212	
16	Condenser—Part of 6		
17	Condenser (.05 μf, Tubular)	30-4519	.20
18	Compensator Osc. (Range 1)	31-6212	
19	Osc. Transformer (Range 1)	32-2373	1.60
20	Osc. Transformer (Range 2)	32-2383	.70
21	Osc. Transformer (Range 3)	32-2386	.70
22	Compensator (Range 1 Series)	31-6151	.40
23	Condenser (1605 μμf, Mica)	31-6201	.40
24	Resistor (200 Ω, ½ Watt)	33-170339	.20
25	Condenser (.01 μf, Tubular)	30-4479	.20
26	Condenser (110 μμf, Mica)	30-1031	.20
27	Condenser (110 μμf, Mica)	30-1031	.20
28	Resistor (99,000 Ω, ½ Watt)	33-399339	.20
29	Resistor (85 Ω, ½ Watt)	33-085339	.20
30	Resistor (99,000 Ω, ½ Watt)	33-399339	.20
31	Condenser (.3 μf, Bakelite)	6287DG	.40
32	Compensator (2 Sections)	31-6211	
33	Condenser (250 μμf, Mica)	30-1032	.25
34	Resistor (32,000 Ω, ½ Watt)	33-332339	.20
35	Resistor (10,000 Ω, ½ Watt)	33-310339	.20
36	Condenser (4280 μμf, Mica)	31-6202	.50
37	1st. I. F. Transformer	32-2604	2.20
38	2nd I. F. Transformer	32-2362	3.30
39	Compensator	31-6203	.30
40	Condenser (110 μμf, Mica)	30-1031	.20
41	Resistor (1.0 Meg., ½ Watt)	33-510339	.20
42	Resistor (1.0 Meg., ½ Watt)	33-510339	.20
43	Resistor (51,000 Ω, ½ Watt)	33-351339	.20
44	Resistor (330,000 Ω, ½ Watt)	33-433339	.20
45	Condenser (.1 μf, Tubular)	30-4455	.25
46	Condenser (.05, Bakelite)	3615SG	.35
47	Resistor (1000 Ω, ½ Watt)	33-210339	.20
48	Resistor (330,000 Ω, ½ Watt)	33-433339	.20
49	Resistor (2.0 Meg., ½ Watt)	33-520339	.20
50	Resistor (2.0 Meg., ½ Watt)	33-520339	.20
51	Resistor (1.0 Meg., ½ Watt)	33-510339	.20
52	Resistor (1.0 Meg., ½ Watt)	33-510339	.20
53	Condenser (110 μμf, Mica)	30-1031	.20
54	Condenser (110 μμf, Mica)	30-1031	.20
55	Resistor (490,000 Ω, ½ Watt)	33-449339	.20
56	Resistor (490,000 Ω, ½ Watt)	33-449339	.20
57	Condenser (.15 μf—.15 μf, Bakelite	6287DG	.40
58	Condenser (.006 μf, Tubular)	30-4445	.20
59	Resistor (25,000 Ω, ½ Watt)	33-325339	.20
60	Condenser (.1 μf, Tubular)	30-4455	.25
61	Condenser (.01 μf, Tubular)	30-4479	.20
62	Condenser (.015 μf, Tubular)	30-4226	.20
63	Resistor (51,000 Ω, ½ Watt)	33-351339	.20
64	Volume Control	33-5233	1.00
65	Resistor (1.0 Meg., ½ Watt)	33-510339	.20
66	Resistor (99,000 Ω, ½ Watt)	33-399339	.20
67	Resistor (240,000 Ω, ½ Watt)	33-424339	.20
68	Condenser (.006 μf, Tubular)	30-4467	.20
69	Resistor (490,000 Ω, ½ Watt)	33-449339	.20
70	Condenser (.1 μf, Tubular)	30-4499	.20
71	Condenser (.03 μf—.03 μf, Bakelite)	8318DU	.40
72	Resistor (1.0 Meg., ½ Watt)	33-510339	.20
73	Audio Shorting Switch (Parts (6) and (16) Bulletin 273)		
74	Tone Control	42-1268	.75
75	Resistor (7,500 Ω — 9,000 Ω Wire Wound)	33-3320	.65
76	Electrolytic Condenser (4 μf—3 μf)	30-2243	1.50
77	Resistor (40,000 Ω, 1 Watt)	33-340439	$0.20
78	Condenser (.03 μf, Tubular)	30-4449	.20
79	Condenser (.03 μf, Tubular)	30-4449	.20
80	Resistor (99,000 Ω, ½ Watt)	33-399339	.20
81	Resistor (490,000 Ω, ½ Watt)	33-449339	.20
82	Resistor (51,000 Ω, ½ Watt)	33-351339	.20
83	Resistor (330,000 Ω, ½ Watt)	33-433339	.20
84	Resistor (40,000 Ω, ½ Watt)	33-340339	.20
85	Resistor (5,000 Ω, ½ Watt)	33-250339	.20
86	Resistor (330,000 Ω, ½ Watt)	33-433339	.20
87	Resistor (45,000 Ω, ½ Watt)	33-345339	.20
88	Condenser (.03 μf, Tubular)	30-4449	.20
89	Resistor (99,000 Ω, ½ Watt)	33-399339	.20
90	Condenser (.006 μf, Tubular)	30-4445	.20
91	Condenser (.006 μf, Tubular)	30-4445	.20
92	Output Transformer	32-7754	1.50
93	Cone & Voice Coil Assembly	36-3801	1.40
94	Resistor (88—15—23 Ω)	33-3321	.40
95	Field & Pot. Assembly	36-3941	
96	Electrolytic Condenser	30-2211	1.00
97	Electrolytic Condenser	30-2211	1.00
98	Condenser (.25 μf, Tubular)	30-4446	.25
99	Choke	32-7115	1.80
100	Power Transformer (115V — 50-60 Cycles)	32-7869	
	PowerTransformer(115V,25-40cycles)	32-7870	
	Power Transformer (115/230V, 50-60 cycles)	32-7871	
101	Condenser (.015 μf—.015 μf, Bakelite)	3793DG	$0.40
102	A. F. C. Shorting Switch	45-2330	1.20
103	A. F. C. Switch	42-1269	
104	Flood Lamp Bulb	34-2064	.09
105	Pilot Lamp	34-2064	.09
106	Wave Switch	42-1362	3.00
	Automatic Tuning Mechanism (complete)	38-9145	
	Cable (Power)	L-2183	.40
	Cable (Speaker)	41-3329	
	Clip (R. F. Coils)	28-5002	.02
	Coupling (Tuning Condenser)	31-1961	.80
	Coupling (Range Switch & Mash)	38-8693	
	Knob (Range Switch)	27-4326	.10
	Knob (Tuning)	27-4330	.10
	Knob (Vernier)	27-4331	.10
	Knob (Tone, Volume)	27-4332	.10
	Mtg. Rubber (Chassis)	27-4564	.10
	Mtg. Rubber (Rear of R. F. Unit)	27-4197	.08
	Mtg. Rubber (Front of R. F. Unit)	27-4581	
	Shield (R. F. Unit)	38-8969	
	Shield (Tube) (Square)	28-2726	$0.10
	Shield (Tube) (Round)	8005	.10
	Shield Base (Square)	28-2725	.03
	Socket Assembly (Pilot Lamp)	38-9100	
	Socket (6 prong)	27-6086	.11
	Socket (7 prong) (6F6G tubes)	27-6057	.11
	Socket (7 prong)	27-6087	.11
	Speaker H-32	36-1299	
	Support (rear of R. F. Unit)	38-8923	
	Terminal Panel (Antenna)	38-8746	.15
	CABINET PARTS		
	Bezel Assembly	38-8833	2.50
	Cover (Back of cabinet)	27-8864	1.00
	AUTOMATIC TUNING MECHANISM PARTS		
	*Cover (handle)	28-5092	.50
	*Dial	27-5358	
	*Dial Screen Holder	31-2053	.75
	*Escutcheon Assembly (Station tabs)	45-2472	

*These Automatic Tuning Mechanism Parts differ from those shown in Service Bulletin 273.

MODEL 38-3
Chassis, Parts

PHILCO RADIO & TELEV. CORP.

Replacement Parts — Model 38-3

PRICES SUBJECT TO CHANGE WITHOUT NOTICE

Schem. No.	Description	Part No.	List Price
1	Antenna transformer (range 1)	32-2575	
2	Antenna transformer (range 2)	32-2576	
3	Antenna transformer (range 3)	32-2573	
4	Compensator antenna, single	31-6161	$0.30
5	Condenser (0.05 mf. tubular)	30-4444	.20
6	Resistor (51,000 ohms, ½ watt)	33-351339	.20
7	Tuning Condenser	31-1963	4.00
8	Remove prior to production		
9	R. F. transformer (range 1)	32-2379	.40
10	R. F. transformer (range 2)	32-2382	1.00
11	Compensator (single) R. F.	31-6160	.30
12	R. F. Transformer (range 3)	32-2385	1.20
13	Condenser (0.05 mf. tubular)	30-4123	.20
14	Condenser (0.05 mf. tubular)	30-4020	.20
15	Condenser (0.05 mf. tubular)	30-4020	.20
16	Resistor (100 ohms, ½ watt)	33-110339	.20
17	Resistor (700 ohms, ½ watt)	33-170339	.20
18	Condenser (0.01 mf. tubular	30-4479	.20
19	Condenser (110 mmf. mica)	30-1031	.20
20	Resistor (99,000 ohms, ½ watt)	33-399339	.20
21	Condenser (110 mmf. mica)	30-1031	.20
22	Resistor (99,000 ohms, ½ watt)	33-399339	.20
23	Resistor (10,000 ohms, ½ wa	33-310339	.20
24	Condenser (250 mmf. mica)	30-1032	.25
25	Resistor (32,000 ohms, ½ watt)	33-[illegible]2739	.20
26	Osc. transformer (range 1)	32-2373	1.60
27	Compensator (osc. series)	31-6151	.40
28	Compensator osc.	31-6170	.75
29	Resistor (85 ohms, ½ watt)	33-085339	.20
30	Osc. transformer (range 2)	32-2383	.70
31	Condenser (1605 mmf. tracking)	31-6155	.40
32	Osc. transformer (range 3)	32-2386	.70
33	Condenser (4280 mmf. tracking)	31-6156	.60
34	Switch (magnetic tuning, manual)	42-1269	.75
35	Switch (magnetic tuning, automatic dial)	45-2330	1.20
36	Condensers (0.15 mf. dual bakelite)	6287 DG	.40
37	Condenser (0.3 mf. double bakelite)	6287 DU	.40
38	Resistor (490,000 ohms, ½ watt)	33-449339	.20
39	Resistor (490,000 ohms, ½ watt)	33-449339	.20
40	Condensers (110 mmf. dual bakelite)	8035 DG	.25
41	Resistor (1.0 meg., ½ watt)	33-510339	.20
42	Resistor (1.0 meg., ½ watt)	33-510339	.20
43	Resistor (2.0 meg., ½ watt)	33-520339	.20
44	Resistor (2.0 meg., ½ watt)	33-520339	.20
45	1st I. F. transformer	32-2604	
46	Resistor (1000 ohms, ½ watt)	33-210339	.20
47	Resistor (9000 ohms, 2 watts)	33-290639	.30
48	Condenser (16 mf. electrolytic)	30-2194	1.60
49	Resistor (7500 ohms, 3 watts)	33-275639	.30
50	Resistor (32,000 ohms, 1 watt)	33-332439	$0.20
51	2nd I. F. transformer (discriminator)	32-2376	3.30
52	Condenser (110 mmf. mica) mounted in 51	30-1031	.20
53	Compensator	31-6147	.40
54	Resistor (51,000 ohms, ½ watt)	33-351339	.20
55	Condenser (110 mmf. dual bakelite)	8035 DG	.25
56	Resistor (490,000 ohms, ½ watt)	33-349339	.20
57	Condenser (0.1 mf. tubular)	30-4455	.25
58	Resistor (330,000 ohms, ½ watt)	33-333339	.20
59	Condenser (110 mmf. mica)	30-1031	.20
60	Resistor (1.0 meg., ½ watt)	33-510339	.20
61	Resistor (1.0 meg., ½ watt)	33-510339	.20
62	Condenser (0.01 mf. tubular)	30-4479	.20
63	Condenser (60 mf. mica)	30-1040	
64	Resistor (40,000 ohms, ½ watt)	33-340339	.20
65	Condenser (0.03 mf. tubular)	30-4449	.20
66	Condenser (0.1 mf. dual bakelite)	4989 DG	.40
67	Condenser (0.006 mf. tubular)	30-4445	.20
68	Volume Control	33-5158	1.00
68	Condenser (0.015 mf. tubular)	30-4358	.20
70	Resistor (1.0 meg., ½ watt)	33-510339	.20
71	Part of 66		
72	Resistor (490,000 ohms, ½ watt)	33-449339	.20
73	Audio shorting switch (stationary insulated section)	28-4110	.15
	Audio shorting switch (movable section)	45-2350	.15
74	Resistor (99,000 ohms, ½ watt)	33-399339	.20
75	Condenser (0.03 mf. bakelite)	8318 SU	.35
76	Resistor (190,000 ohms, ½ watt)	33-319339	.10
77	Resistor (490,000 ohms, ½ watt)	33-349339	.20
78	Resistor (330,000 ohms, ½ watt)	33-433339	.20
79	Condenser (0.01 mf. tubular)	30-4169	.20
80	Condenser (0.05 mf. bakelite)	8326 SU	.25
80A	Condenser (0.03 mf. tubular)	30-4447	.20
81	Resistor (1.0 meg., ½ watt)	33-510339	.20
82	Condenser (0.003 mf. tubular)	30-4469	.20
83	Output transformer	32-2754	1.50
84	Cone and voice coil assembly	36-3801	1.40
85	Resistor (3500 ohms, ½ watt)	33-235339	.20
86	Condenser (0.003 mf. tubular)	30-4469	.20
87	Resistor (bias 128 ohms)	33-3280	.30
88	Condenser (electrolytic 8 mf., 10 mf.)	30-2201	1.75
89	Field Coil Assembly	36-3218	4.25
90	Condenser (electrolytic 18 mf.)	30-2200	1.40
91	Pilot Lamp	34-2039	.07
92	Power transformer (115 volts, 50 to 60 cycles)	32-7606	6.25
	Power transformer (115 volts, 25 cycle)	32-7607	9.00
	32-7608		$8.00
	42-1268		.75
93	Tone Control and A. C. Switch	3793 DG	.40
94	Condensers (0.015 mf. dual bakelite)	42-1324	.75
95	Range Switch (antenna)	42-1314	.75
96	Range Switch (R. F.)	42-1284	.75
97	Range Switch (osc.)	34-2039	.07
98	Flood Lamps	30-4455	.25
99	Condenser (0.1 mf. tubular)		
	38-3 Code 121		
	Brace	28-4119	.05
	Cable A. C.	L-2778	
	Cable Speaker	41-3258	.50
	Coupling (Tuning Condenser)	31-1961	.80
	Coupling (Range Switch)	28-7198	.15
	Clip (volume shaft)	28-4394	.01
	Control Screw (station index)	31-1898	.15
	*Cover (handle)	28-6092	
	Dial	27-5283	.90
	*Dial & Station Tab Escutcheon	45-2472	
	Floodlight Socket Assembly	38-8802	
	Gear, Dial Assembly (small)	45-2348	.60
	Gear, Dial Assembly (large)	45-2347	.60
	Handle (Dial)	45-2329	.75
	Hub Assembly (Handle)	45-2344	.50
	Housing (Control Screws)	28-7196	1.00
	Knob Tuning	27-4330	.10
	Knob Vernier	27-4331	.10
	Knob Tone & Volume	27-4332	.10
	Knob (Range Switch)	27-4326	.10
	Mask Guide	28-4118	.25
	Mask & Link Assembly	45-2401	.70
	Mtg. Feet-Rubber—(Chassis)	27-4564	.10
	Pilot Lamp Assembly	38-7706	.35
	Reflector Ring	28-4609	.35
	Ring Retaining Mask Assembly	28-7195	.20
	Screen Holder Assembly	31-2053	
	Shaft (Vol. Cont.)	38-8285	.12
	Shaft & Plate (Range Switch)	42-1287	.50
	Socket (7 prong)	27-6087	
	Socket (6 prong)	27-6086	
	Speaker H-29	36-1203	
	Vernier Drive Assembly	45-2342	2.40

*A complete list of the automatic tuning mechanism parts is given in Bulletin 273. Those parts shown above marked with an asterisk differ from those shown on Bulletin 273.

MODEL 38-3
Schematic

PHILCO RADIO & TELEV. CORP.

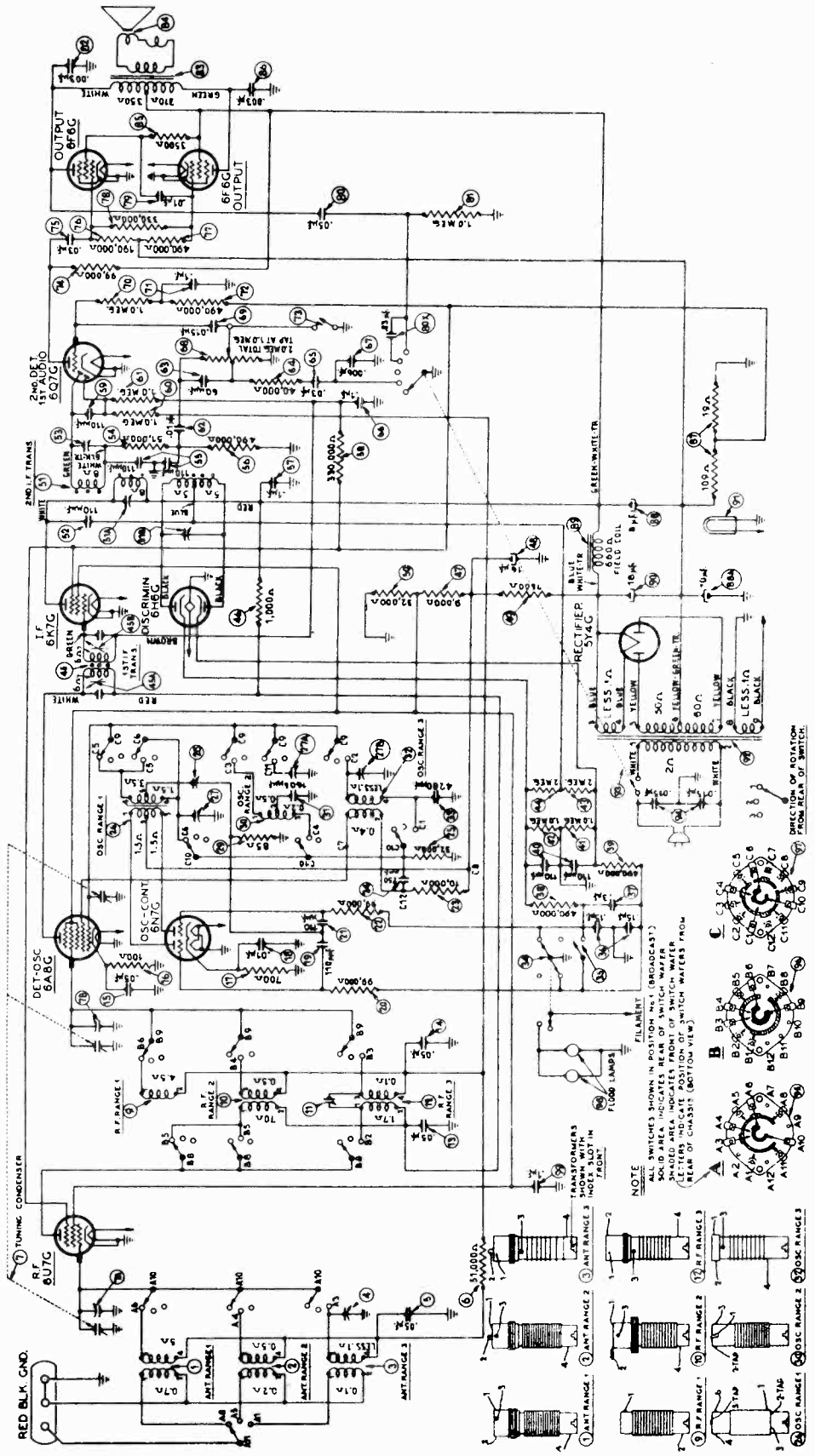


Fig. 4. Schematic Diagram Model 38-3

Electrical Specifications

IF PEAK 470KC

TYPE CIRCUIT: Superheterodyne, with such features as: magnetic tuning control on the broadcast range; automatic volume control; Iron core adjusted first I. F. transformer; push-pull Pentode audio output, using screen phase inversion; Bass compensation in the Volume Control circuit, and the Philco Automatic Tuning Mechanism.

POWER SUPPLY:

Voltage	Frequency	Consumption
115	50 to 60 cycles	110 watts
115	25 to 40 cycles	110 watts

Different Transformers are required for operation on the frequencies list above. These are shown on the parts list.

INTERMEDIATE FREQUENCY: 470 K. C.

UNDISTORTED OUTPUT: 5 watts.

PHILCO TUBES USED: Nine. One 6U7GRF, one 6K7G I. F. amplifier; one 6A8G, Det. Osc.; one 6N7G, osc. control; one 6H6G, discriminator; one 6Q7G, 2nd det. 1st audio; two 6F6G output, and one 5Y4G rectifier.

TUNING RANGE: Three. Range one—530 to 1720 K. C. Range two—2.3 to 7.4 M. C. Range three—7.35 to 22 M. C.

TONE CONTROL: Four positions.

SPEAKER: H29.

April, 1937

MODEL 38-3
Alignment, Voltage
Trimmers

PHILCO RADIO & TELEV. CORP.

Alignment of Compensators

EQUIPMENT REQUIRED: (1) Signal Generator; Philco Model 077 signal generator, using fundamental frequency from 115 to 36000 K. C. is the correct instrument for the purpose; (2) Output meter; Philco model 026 circuit tester incorporates a sensitive output meter and is recommended; (3) Philco fibre handle screw-driver, part No. 27-7059 and fibre wrench part No. 3164.

OUTPUT METER: The 026 output meter is connected to the plate and cathode terminals of one of the 6F6G tubes. Adjust the meter to use the (0-30) volt scale and advance volume control of receiver until a readable indication is noted after signal generator is connected in the following adjustments.

DIAL CALIBRATION: In order to adjust this receiver correctly the dial must be aligned to track properly with the tuning condenser. To do this proceed as follows:

1. Loosen the shaft coupling set screws. Then turn the tuning condenser fully closed and the dial to the first index line. Now tighten the shaft coupling set screws, and rotate the dial until the 520 K. C. mark is midway between the index line and the glowing beam indicator.
2. With condenser in this position loosen the set screws of the shaft coupling on the tuning condenser.
3. Then turn the tuning dial until the glowing beam indicator is entered on the index line.

NOTE: Be careful when turning the dial that the position of the tuning condenser is not disturbed.

4. Now tighten the shaft coupling set screws.

INTERMEDIATE FREQUENCY CIRCUIT

With signal generator output lead connected through a .1 mfd. condenser to the grid of the 6A8G det-osc.tube; and controls set as follows, adjust I. F. compensators for maximum output.

a. Magnetic Tuning Knob (34) off
b. Tone Control (93) normal
c. Volume Control (68) maximum
d. Receiver dial 580 K. C.
e. Signal generator 470 K. C.
f. Range Switch position (Broadcast)
g. Compensators in order (53), (51A), (45A), (45B).

RADIO FREQUENCY CIRCUIT

Tuning Range 530 to 1720 K. C.

1. Connect the signal generator output lead through a .1 mfd. condenser to "RED" terminal of the aerial panel and the generator ground to the chassis of the receiver.
2. Other controls set as given under intermediate frequency circuit, with the exception of those as follows: Adjust compensators for maximum output as follows:

Range Switch	Signal Generator	Receiver Dial	Compensators In Order
1	1600 K. C.	1600 K. C.	(27) (7B) (7A)
1	580 K. C.	580 K. C.	(28) Roll gang through signal when padding this compensator. (See Note B)
1	1600 K. C.	1600 K. C.	(27)
1	1500 K. C.	1500 K. C.	(7B) (7A)

Tuning Range 2.3 to 7.4 M. C. Adjust compensators for maximum output as follows:

Range Switch	Signal Generator	Receiver Dial	Compensators In Order
2	6 M. C.	6 M. C.	(27A)

Tuning Range 7.35 to 22 M. C. Adjust compensators for maximum output as follows:

Range Switch	Signal Generator	Receiver Dial	Compensators In Order
3	18 M. C.	18 M. C.	(27B) check image at 17.06 M. C. (See Note A) (11) (4) Use shunt condenser on (27B) or rock gang through signal when padding compensator No. 11 (See Note C)
3	18 M. C.	18 M. C.	(27B)

MAGNETIC TUNING ADJUSTMENT: Set the range switch in position one (530 to 1720 K. C.) and the magnetic tuning switch in the "out" position. Now turn the signal generator and receiver dial to any frequency in the Broadcast band. The receiver dial must be adjusted very accurately for maximum output.

Set the magnetic tuning control in the "on" position (clockwise). Compensator (51B) of the magnetic tuning transformer is now adjusted for maximum output.

The above adjustment is now checked for accuracy, by turning the magnetic tuning control "off" and "on." In either position, there should be no change in the tone of the signal. If a change of tone or hiss develops, it indicates a shift in frequency and the adjustment must be repeated.

NOTE A—To accurately adjust the high frequency oscillator compensator to the fundamental instead of the image signal, turn the oscillator compensator to the maximum capacity position (clockwise). Then slowly turn compensator counter-clockwise until a second maximum peak is obtained on the output meter. This second peak is the fundamental signal, and the compensator must be adjusted for maximum output with it. The first peak from maximum capacity position of the compensator is the image signal and must not be used in adjusting this compensator.

If the above procedure is correctly performed, the image signal will be found (much weaker) 940 K. C. below the frequency being used on any high frequency range.

NOTE B—First tune compensator (28) for maximum output, then vary the tuning condenser of the receiver for maximum output about the 580 K. C. dial mark. Now turn compensator (28) slightly to the right or left and vary the receiver tuning condenser for maximum output. If the output reading increases, turn compensator (28) in the same direction a trifle more, and again vary the tuning condenser for maximum output. If the output decreases, set the compensator in the opposite direction. This procedure of first setting the compensator and then varying the tuning condenser is continued until there is no further gain in output reading.

NOTE C—To eliminate the effect of the R. F. compensator detuning the Osc. circuit, a variable tuning condenser of approximately 350 mmfd. is connected from the oscillator compensator to ground when designated in the padding instruction above. Tune the added condenser until the second harmonic of the receiver oscillator beats against the signal from the generator, resulting in a maximum indication on the output meter. Then adjust compensators as noted for maximum output.

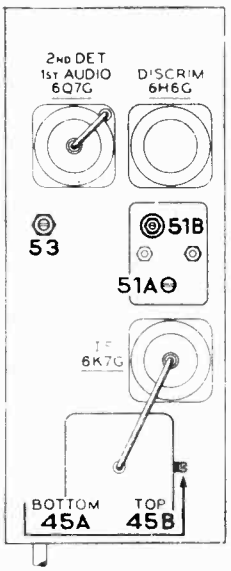


Fig. 2. I. F. Compensators Top of Chassis

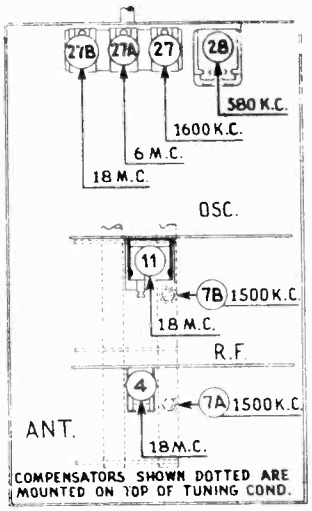


Fig. 3. R. F. Compensators Underside of Chassis

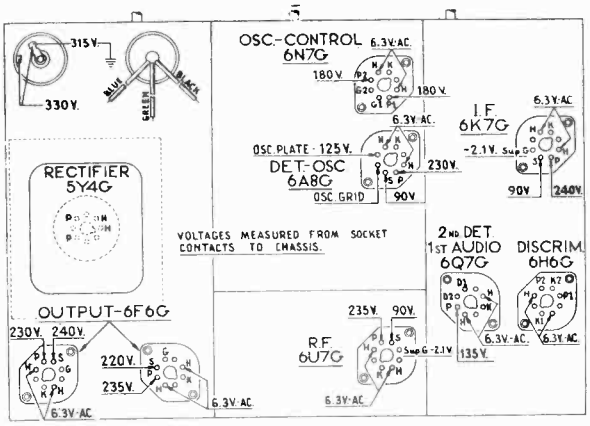
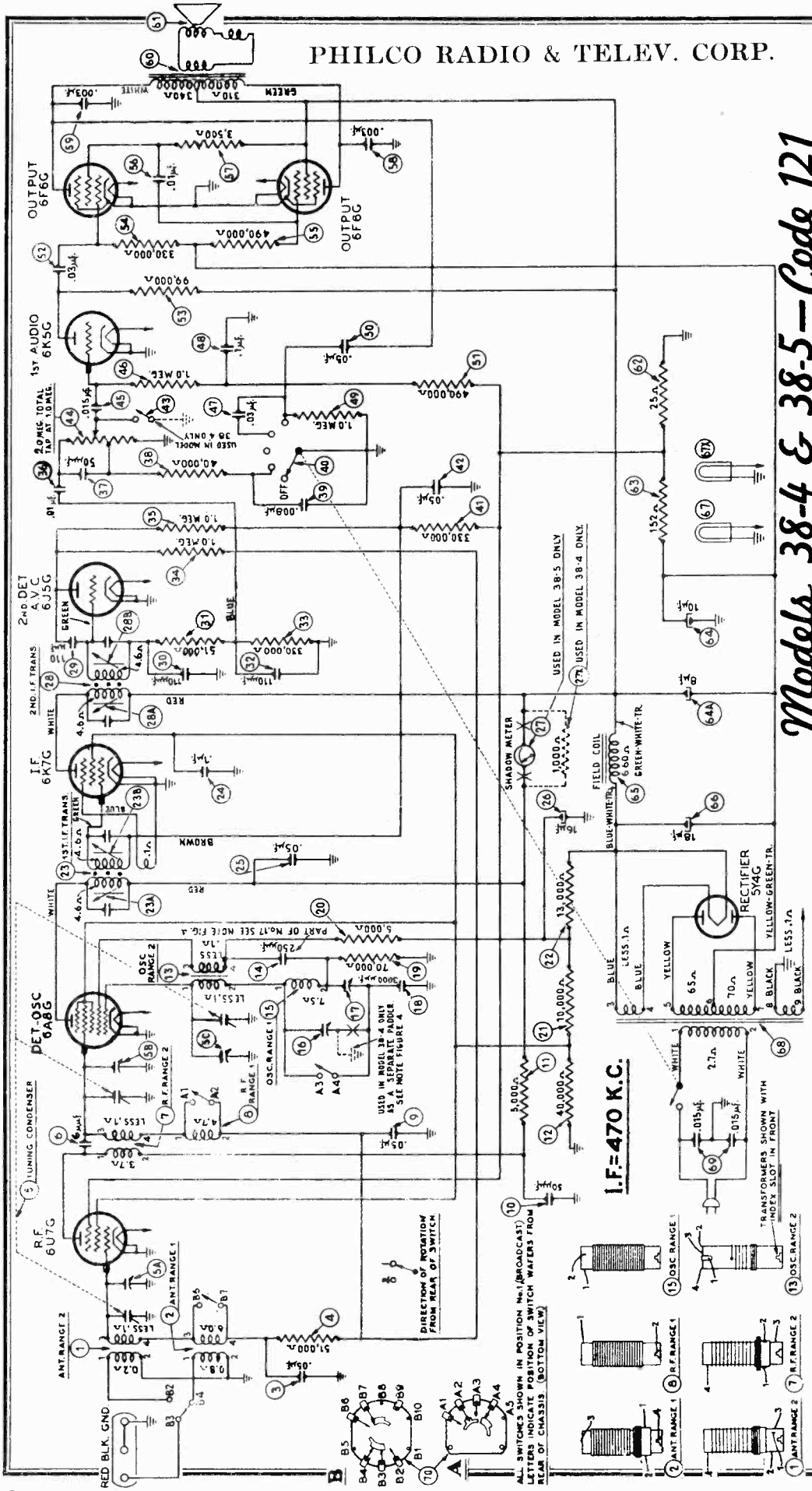


Fig. 1. Socket Voltages, Underside of Chassis—The voltages indicated by arrows were measured with a **Philco 026 Circuit Tester** which contains an accurate voltmeter. Volume Control at minimum, range switch in broadcast position, line voltage 115 A. C.

PHILCO RADIO & TELEV. CORP.

MODELS 38-4, 38-5
Schematic, Notes
Code 121



TUNING RANGES: Two Range 1—540 to 1720 K. C.
Range 2—5.7 to 18.2 M. C.

INTERMEDIATE FREQUENCY: 470 K. C.

POWER SUPPLY: Voltage	Frequency	Consumption
110	60 cycle	95 watts
110	25 to 40 cycle	95 watts
115/230	50 to 60 cycle	95 watts

UNDISTORTED OUTPUT: 5 watts.

TONE CONTROL: Four positions.

SPEAKERS:	38-4	38-5
B cabinet	—	K39
X cabinet	—	H29
XX cabinet	H29	—

Different transformers are required for operation on the frequencies listed above. The part numbers of these transformers are listed on page 3.

May, 1937

Model 38-4 employs the **Philco Cone-Centric Automatic Tuning System**; Type "H29" dynamic speaker unit and is assembled in a console cabinet type "XX".

Model 38-5 differs from the 38-4 in the tuning mechanism. The tuning mechanism of this receiver is of the manually operated type with vernier control and incorporates a shadowmeter for visual tuning. The receiver is designed for a table model cabinet type "B" and a console cabinet type "X". The B cabinet utilizes a dynamic speaker type "K39" and the "X" cabinet a dynamic speaker type "H29".

MODELS 38-4,38-5 Code 121
Alignment,Parts

PHILCO RADIO & TELEV. CORP.

Electrical Specifications

TYPE CIRCUIT: An eight tube A.C. operated super-heterodyne circuit is incorporated in these receivers with features, such as Philco foreign tuning system; a high gain R.F. amplifier; two tuning ranges; iron core adjusted I.F. transformers; automatic volume control; bass compensation, and a pentode push-pull audio output circuit.

The same circuit is used in both models. The features, however, such as tuning mechanism; speaker, and cabinets differ in each model.

PHILCO TUBES USED: Eight—6U7G, R. F. amp.; 6A8G, Det. Osc.; 6K7G, I. F. amp.; 6J5G, 2nd Det., A.V.C.; 6K5G, 1st audio; two 6F6G, audio output; and one 5Y4G rectifier.

Alignment of Compensators

EQUIPMENT REQUIRED: (1) Signal Generator, having a fundamental frequency range covering the tuning and intermediate frequencies of the receiver. Philco Model 077 Signal Generator which has a fundamental frequency range from 115 to 36000 K. C. is the correct instrument for this purpose; (2) Output meter, Philco Model 026 circuit tester incorporates a sensitive output meter and is recommended; (3) Philco Fibre Handle Screw Driver, part No. 27-7059 and Fibre Wrench, part No. 3164.

OUTPUT METER: The 026 output meter is connected to the plate and cathode terminals of one of the 6F6G tubes. Adjust the meter to use the (0-30) volt scale and advance the attenuator control of the generator until a readable indication is noted on the output meter after signal is applied.

DIAL CALIBRATION: In order to adjust the receiver correctly the dial must be aligned to track properly with the tuning condenser. To adjust the dial of each model proceed as follows:

Model 38-4

1. Loosen the tuning condenser shaft coupling set screws (use wrench Part No. 45-2481), and turn the tuning condenser to the maximum capacity position (Plates fully meshed). Turn the selector knob until the dial pointer is on the small black dot at the low frequency end of the Range One scale. With condenser and pointer set in this position tighten set screws.
2. Now turn the selector knob clockwise until the dial pointer moves 1/16 of an inch to the left of the small dot and the first straight line on the scale (See Fig. 6). Hold pointer and condenser in this position, and carefully loosen shaft coupling set screws.
3. After set screws are loose, turn the selector knob until dial pointer is again on the small black dot at the low frequency end of Range One scale.

Be careful when turning the selector knob that the positron of the tuning condenser is not disturbed.

Tighten shaft coupling set screws with condenser and dial pointer in this position.

Model 38-5

1. Turn the tuning condenser to maximum capacity position (plate fully meshed).
2. Holding the tuning condenser in this position, loosen the dial clamp; then turn the dial until the indicator is centered on the middle index line (See Fig. 7). Tighten clamp in this position.

Before any of the following adjustments are made, the receiver should be turned "on" for at least 5 minutes.

INTERMEDIATE FREQUENCY CIRCUIT

Insert the signal generator shielded output lead into the "Med" jack on the panel of the generator. Connect the other end of the output lead through a .1 mfd. condenser to the grid of the 6A8G, det. osc. tube and the ground connection of the signal generator to the chassis. Set the signal generator and receiver controls, and adjust the I. F. compensators as follows:

1. Set Signal Generator at 470 K. C. Turn "Multiplier" Control to 1000 and the "Attenuator" for maximum output.
2. Turn the receiver dial to 580 K. C.
3. Receiver Volume Control maximum.
4. Range Switch Broadcast Position.
5. Adjust compensators (28B), (28A), (23B), and (23A) for maximum output. If the output meter goes off scale when adjusting the compensators retard signal generator attenuator.

RADIO FREQUENCY CIRCUIT

Tuning Range: 5.7 to 18.2 M. C.

1. With one end of the shielded lead of the signal generator output lead in the "Med" jack, connect the other end through the .1 mfd. condenser to the "Red" terminal of the aerial panel of the receiver. The output lead ground must be connected to the black terminal or to the chassis.
2. Set the controls and adjust the R. F. compensators as follows:

Volume Control	Range Switch	Signal Generator and Receiver Dial	Compensators in Order
Max.	2	18 M. C.	(5C) See Note A

Tuning Range: 530 to 1720 K. C.

Range Switch	Signal Generator and Receiver Dial	Compensators in Order
1	1500 K. C.	(16), (5B), (5A)
1	580 K. C.	(17)
1	1500 K. C.	(16), (5B), (5A)

NOTE A—To accurately adjust the high frequency oscillator compensator to the fundamental instead of the image signal, turn the oscillator compensator to the maximum capacity position (clockwise). From this position slowly turn the compensator counterclockwise until a second maximum peak is obtained on the output meter. Adjust the compensator for maximum output using this second peak. The first peak from maximum capacity position of the compensator is the image signal and must not be used in adjusting the compensator.

If the above procedure is correctly performed, the image signal will be found (much weaker) by turning the receiver dial 940 K. C. below the frequency being used on the high frequency range.

Service Data

FOR CONE-CENTRIC TUNING MECHANISM—MODEL 4

Complete information for setting the stations on the Cone-Centric Tuning mechanism of Model 38-4 will be found in the instruction sheet (Form No. 39-5533) which is supplied with each set.

The locations of a few assemblies of the Cone-Centric Automatic Tuning mechanism is illustrated in Fig. 2. The part numbers and prices of these assemblies are listed on page 3. A complete list of prices of these assemblies are listed on page 3. A complete list of replacement parts and detailed service data for the mechanism will be found in bulletin 282.

Aerial Connections

To obtain the full advantage of the sensitivity of these receivers, the Philco High Efficiency Aerial Part No. 40-6112 must be used.

For attaching the aerial to the receiver a terminal panel is provided at the rear of the chassis. This panel contains three screw terminals marked "Red", "Blk" and "Gnd". Connect the red and black wires of the Philco High Efficiency Aerial transmission line to the "Red" and "Blk" terminals respectively.

If you use a temporary aerial, connect it to the "Red" terminal.

A good ground connection is necessary for best reception. The terminal mark "Gnd" should be connected to a water pipe or any other good ground source.

REPLACEMENT PARTS—Models 38-4, 38-5

Schem. No.	Description	Part No.	List Price
1	Antenna transformer (range 2)	32-2538	
2	Antenna transformer (range 1)	32-2629	
3	Condenser (.05 mfd. tubular	30-4444	$0.20
4	Resistor (51000 ohms, ½ watt)	33-351339	.20
5	Tuning Condenser assembly (Model 4)	31-2038	
	Tuning Condenser (Model 5)	31-2052	
6	Condenser (strip of copper foil, 6 mmd.)		
7	R. F. transformer (range 2)	32-2632	
8	R. F. transformer (range 1)	32-2630	
9	Condenser (.05 mfd., tubular)	30-4444	.20
10	Condenser (50 mmfd., mica)	30-1029	.20
11	Resistor (5000 ohms, ½ watt)	33-250339	.20
12	Resistor (40000 ohms, 1 watt)	33-340439	.20
13	Osc. transformer (range 2)	32-2633	1.25
14	Condenser (250 mmfd.) on compensator section. See Note 6g. 4		
15	Osc. transformer (range 1)	32-2631	
16	Compensators (dual, 1500 and 580 K.C. Model 5)	31-6194	
	Compensators (air type, 1500 K.C. Model 4)	31-6196	
17	Compensator (580 K.C., Model 5; Part of 16)		
	Compensator (580 K.C. Model 4, condenser 14 is part of this unit	31-6199	
18	Condenser (3000 mmfd., mica)	30-1028	.45
19	Resistor (70,000 ohms, ½ watt)	33-370339	.20
20	Resistor (5000 ohms, ½ watt)	33-250339	.20
21	Resistor (10000 ohms, 1 watt)	33-310439	.20
22	Resistor (13000 ohms, 2 watt)	33-313539	.30
23	First I. F. transformer	32-2643	
24	Condenser (0.1 mfd., tubular)	30-4455	.55
25	Condenser (0.05 mfd., tubular)	30-4123	.20
26	Condenser (electrolytic, 16 mfd.)	30-2212	1.05
27	Shadowmeter (Model 38-5)	45-2307	2.50
27X	Resistor (1000 ohms, ½ watt)	33-210339	.20
28	Second I. F. transformer	32-2645	
29	Condenser (110 mmfd., mica)	30-1031	.20
30	Condenser (110 mmfd., mica)	30-1031	.20
31	Resistor (51000 ohms, ½ watt)	33-351339	.20
32	Condenser (110 mmfd., mica)	30-1031	.20
33	Resistor (330000 ohms, ½ watt)	33-433339	.20
34	Resistor (1.0 megohm, ½ watt)	33-510339	.20
35	Resistor (1.0 megohm, ½ watt)	33-510339	.20
36	Condenser (0.01 mfd., tubular)	30-4124	.25
37	Condenser (50 mmfd., mica)	30-1029	.20
38	Resistor (40000 ohms, ½ watt)	33-340339	.20
39	Condenser (0.008 mfd., tubular)	30-4112	.20
40	Tone Control Switch and off-on switch	42-1341	
41	Resistor (330000 ohms, ½ watt)	33-433339	.20
42	Condenser (0.05 mfd., tubular)	30-4519	$0.20
43	(Used on Model 38-4 only) Audio shorting switch, section of 45-2476 Selector arm		
44	Volume Control (Model 5)	33-5224	
	Volume Control (Model 4)	33-5225	
45	Condenser (0.015 mfd., tubular)	30-4338	.20
46	Resistor (1.0 megohms, ½ watt)	33-510339	
47	Condenser (.03 mfd., tubular)	30-4447	
48	Condenser (0.1 mfd. bakelite)	4989SG	.35
49	Resistor (1.0 megohms, ½ watt)	33-510339	.20
50	Condenser (.05 mfd., bakelite)	8326SU	.25
51	Resistor (490000 ohms, ½ watt)	33-449339	.20
52	Condenser (0.03 mfd., bakelite)	8318SU	.35
53	Resistor (99000 ohms, ½ watt)	33-399339	.20
54	Resistor (330000 ohms, ½ watt)	33-433339	.20
55	Resistor (490000 ohms, ½ watt)	33-449339	.20
56	Condenser (0.01 mfd., tubular)	30-4169	.20
57	Resistor (3500 ohms, ½ watt)	33-235339	.20
58	Condenser (0.003 mfd., tubular)	30-4460	.20
59	Condenser (0.003 mfd., tubular)	30-4469	.20
60	Out put transformer (H29, K39)	32-7754	1.50
61	Voice Coil and Cone Assembly (K39)	36-3174	1.00
	Voice Coil and Cone Assembly (H29)	36-3801	1.40
62	Bias resistors (25 ohms and 152 ohms)	33-3317	
63	Part of 62, 152 ohm Section		
64	Dual Electrolytic Condenser (8 & 10 mfd.)	30-2201	1.75
65	Field Coil and Pot Assembly (H29)	36-3218	4.25
	Field Coil and Pot Assembly (K39)	36-3239	4.25
66	Electrolytic Condenser (18 mfd.)	30-2200	1.40
67	Pilot Lamp	34-2064	.07
67X	Lamp (Shadowmeter Model 5)	34-2064	
68	Power Transformer, 115V, 50/60 cycles	32-7837	
	" " 115V, 25/40 cycles	32-7598	8.00
	" " 115/230V, 50-60 cycles	32-7839	
69	Condensers (0.015 mfd., dual bakelite)	3793DG	.40
70	Range Switch (Model 5)	42-1335	
	Range Switch (Model 4)	42-1340	
	Brace (38-4, Tuning Unit)	28-5119	
	Cable (Speaker) (38-5 & 38-4)	41-3324	
	Cable Power	L-2778	.40
	Cable (Shadowmeter, Model 5)	41-3225	.40
	Clip (R. F. Transformer)	28-5002	.02
	Dial (38-4, Supplied by Distributor, in each district)	27-5337	
	Dial Pointer Assembly	38-8925	
	Dial 38-5	27-5330	
	Dial Washer 38-5	27-4568	
	Dial Clamp 38-5	28-5089	.03

Prices subject to change without notice.

Schem. No.	Description	Part No.	List Price
	Gear (Small) Cone-Centric	45-2490	
	Gear (Large) Cone-Centric	45-2491	
	Knob Ass'y Vernier (Large) 38-4	45-2477	
	Knob Ass'y Selector (Small) 38-4	27-4572	
	Knob (Tuning) (Model 5)	27-4330	$0.10
	Knob (Tuning, Vernier) (Model 5)	27-4331	.10
	Knob (Tone & Volume)	27-4332	.10
	Mtg. Plate Ass'y, Cone-Centric Tuning Mechanism	45-2479	
	Mtg. Washer, Rubber, (Chassis)	27-4571	
	Mtg. Cushion (Tuning Condenser)	27-4599	
	Mtg. Corners (Chassis)	27-4564	.10
	Pilot Lamp Socket Assembly (38-5)	38-8954	
	Reflector Assembly Cone-Centric Mechanism	45-2478	
	Selector Arm Assembly (Cone-Centric)	45-2476	
	Shield (R. F. Unit) 38-5	38-8814	
	Screen Brkt. Assembly (38-5)	31-2050	
	Socket (7 prong)	27-6087	.11
	Socket (6 prong)	27-6086	.11
	Socket (6 Prong) Power Tubes	27-6057	.11
	Terminal Panel (Ant.)	38-8746	
	Tube Shield (Square)	28-2726	.10
	Tube Shield (Round)	28-5031	.12
	Tube Shield Base (Square)	28-2725	.03
	Tube Shield Base (Round)	28-5030	
	Vernier Drive (Model 5)	31-2089	
	Wrench (Station, Setting) Model 4	45-2475	.45
	Wrench (Set Screws)	45-2481	.40
	38-4XX CABINET		
	Bezel Ring (Cabinet)	28-5128	
	Bezel Gasket	27-8893	
	Speaker H29	36-1293	8.25
	38-5 X CABINET		
	Bezel Frame Assembly	40-6129	1.10
	Bezel Gasket	27-8313	.01
	Bezel Glass	27-8300	.06
	Bezel Ring	28-5080	.70
	38-5 B CABINET		
	Bezel (Frame Assembly)	40-6127	
	Bezel Gasket	27-8312	.01
	Bezel Glass	27-8299	.06
	Bezel Ring	28-5079	.60
	Speaker K39	36-1285	

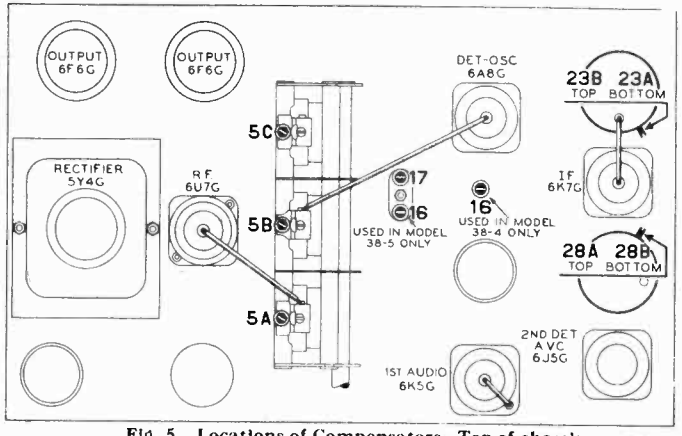


Fig. 5. Locations of Compensators Top of chassis

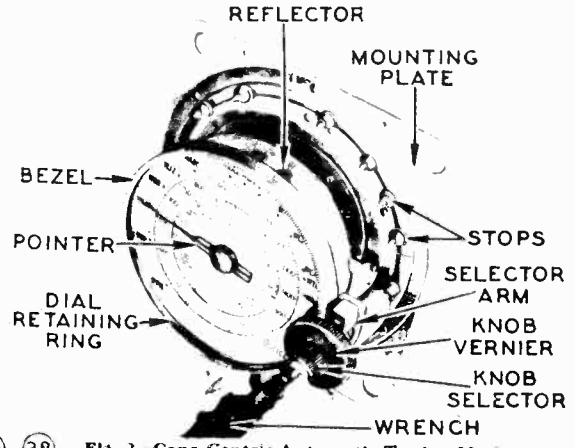


Fig. 2—Cone-Centric Automatic Tuning Mechanism, Model 4

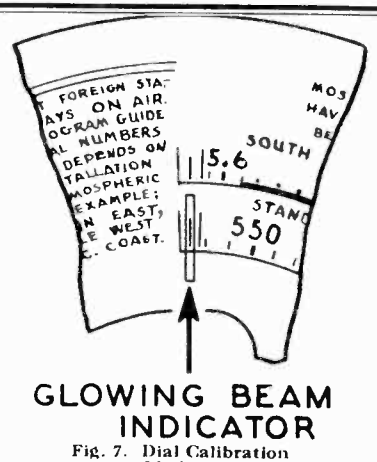
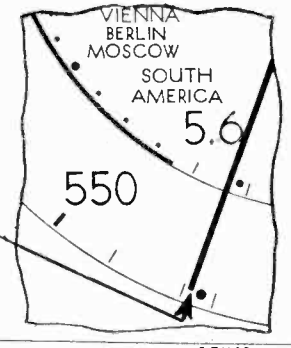


Fig. 7. Dial Calibration Model 5

Models 38-4, 38-5
Code 121

MOVE POINTER 1/16" TO LEFT OF DOT.

Fig. 6. Dial Calibration Model 4



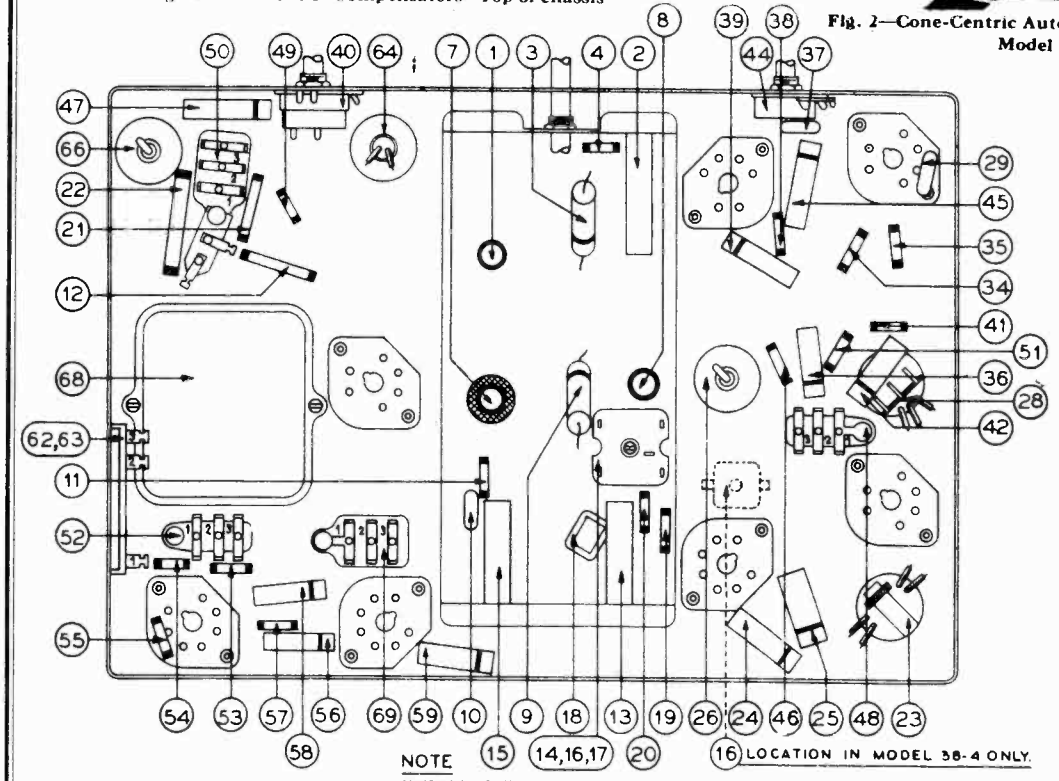


Fig. 4—Locations of Parts, Underside of Chassis

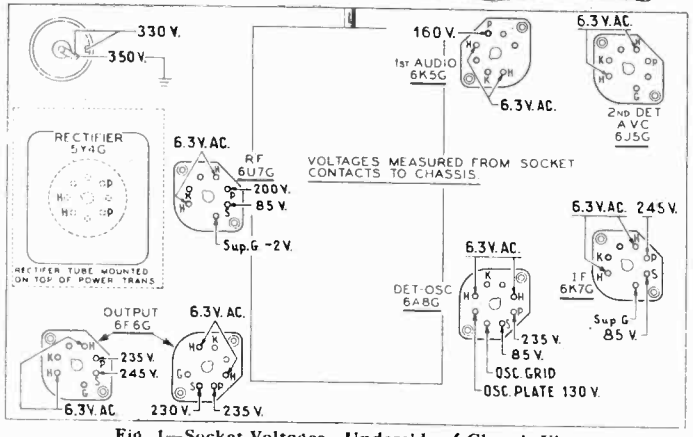


Fig. 1—Socket Voltages—Underside of Chassis View

The Voltages indicated by arrows were measured with a **Philco 026 Circuit Tester** which contains a sensitive voltmeter. Volume Control at minimum, range switch in broadcast position, line voltage 115 A. C.

MODELS 38-7(121,124)
38-8(121),38-9(121) PHILCO RADIO & TELEV. CORP.
Voltage,Trimmers,Chassis

PHILCO TUBES USED: Six—one 6A8G, det. osc.; one 6K7G, I. F. amp.; one 6J5G, 2nd Det. A. V. C.; one 6K5G 1st audio; one 6F6G, output; one 5Y4G rectifier.

CABINETS AND SPEAKERS:

	Cabinet	Speaker
38-7 Code 121	XX	H31
38-7 Code 121	T	K41
38-7 Code 124	CS	K41
38-8 Code 121	X	HS
38-9 Code 121	K	HS
38-9 Code 121	T	S7
38-9 Code 121	X	HS

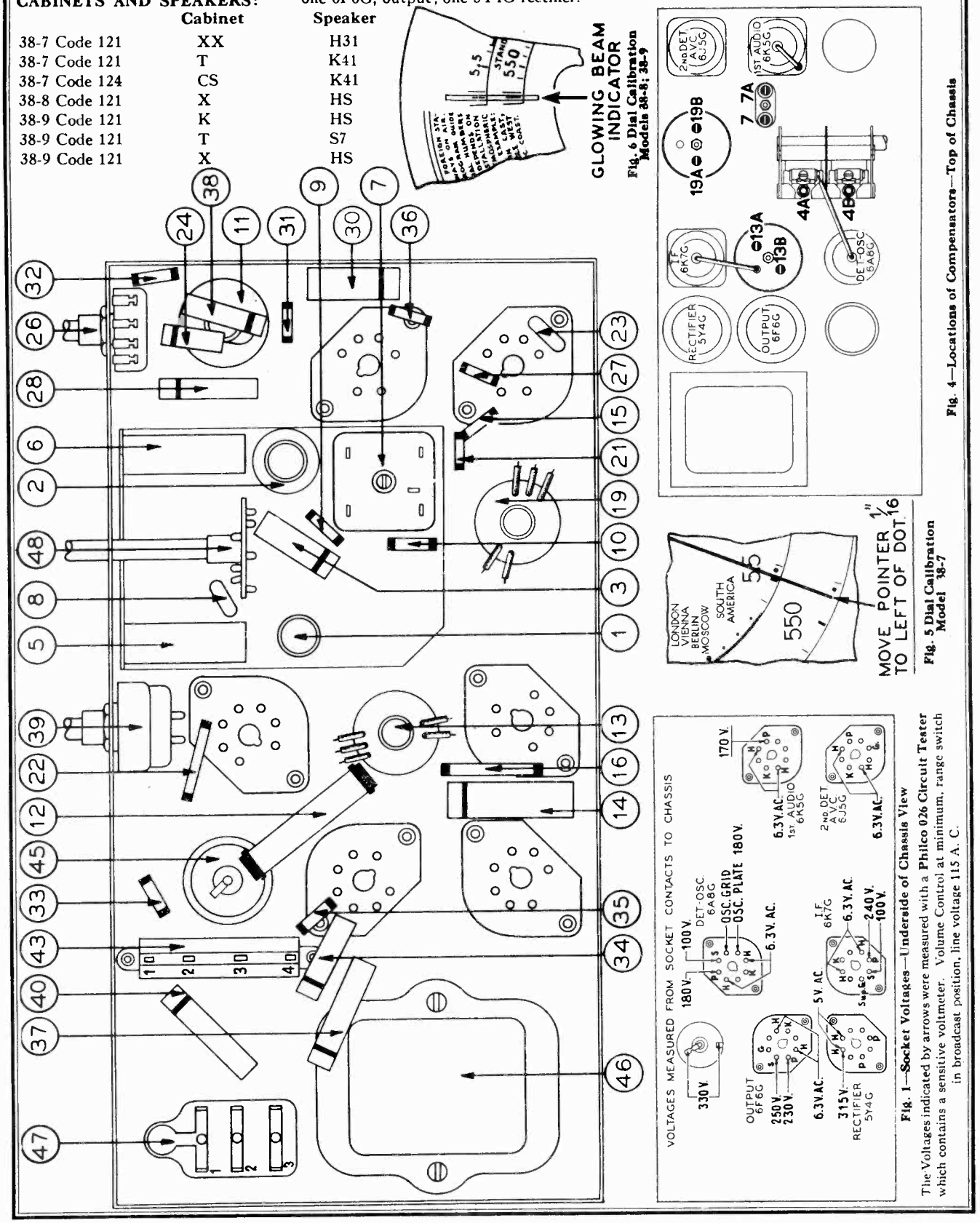


Fig. 1—Socket Voltages—Underside of Chassis View

The Voltages indicated by arrows were measured with a Philco 026 Circuit Tester which contains a sensitive voltmeter. Volume Control at minimum, range switch in broadcast position, line voltage 115 A. C.

Fig. 4—Locations of Compensators—Top of Chassis

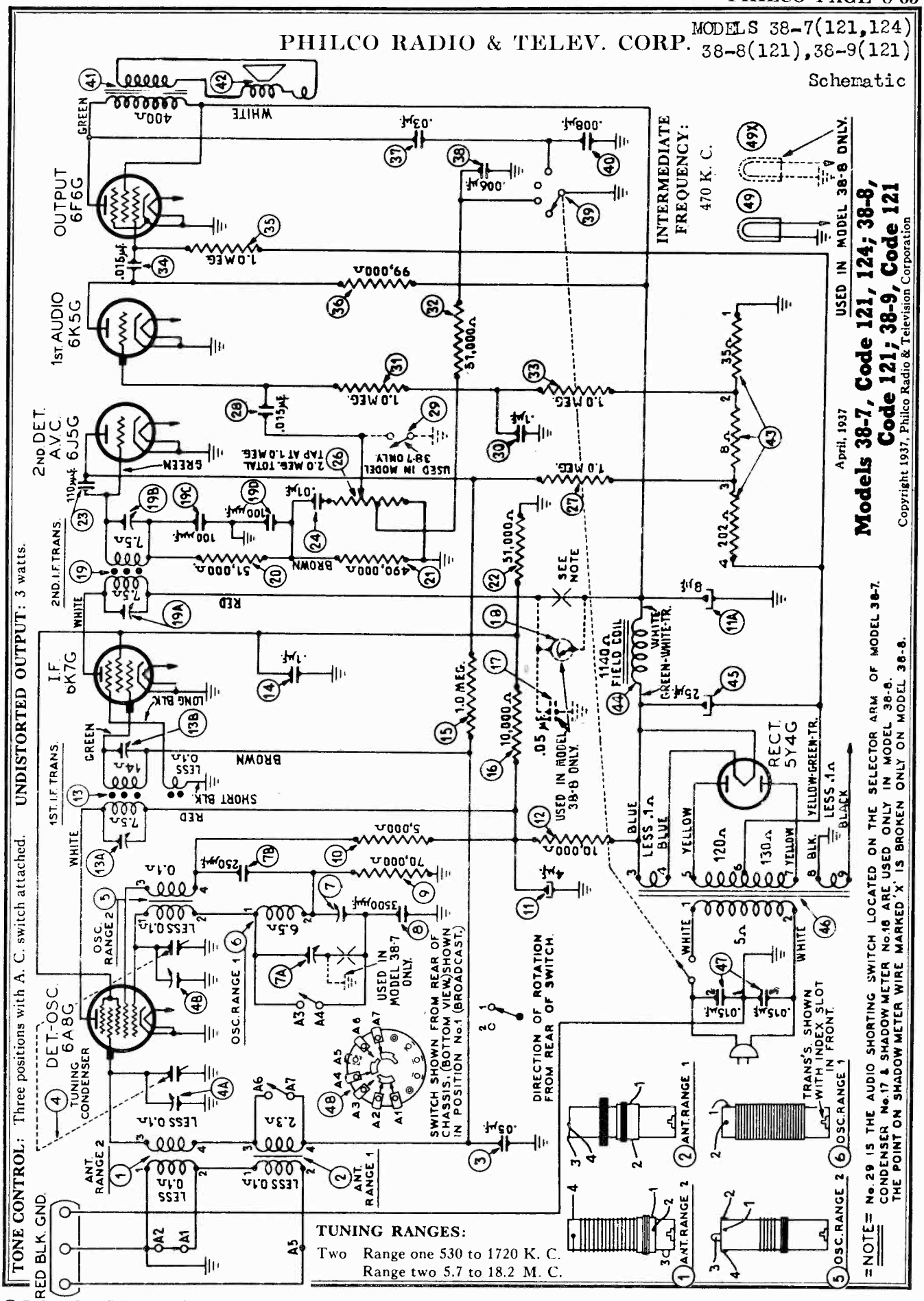
Fig. 5 Dial Calibration Model 38-7

Fig. 6 Dial Calibration Models 38-8; 38-9

PHILCO RADIO & TELEV. CORP.

MODELS 38-7(121,124)
38-8(121),38-9(121)

Schematic



MODELS 38-7(121,124)
38-8(121),38-9(121)
Alignment,Parts

PHILCO RADIO & TELEV. CORP.

Electrical Specifications

Models 38-7, 38-8 and 38-9 receivers employ a six tube A. C. operated superheterodyne circuit with such features as: Two tuning ranges covering standard and short wave broadcasts; Philco foreign tuning system; automatic volume control; bass compensation; tone control, and pentode audio output circuit.

The same circuit is used for each receiver. The features, however such as, tuning mechanism, speakers and cabinets differ in each model.

Model 38-7 in addition to the features given above employs the Philco automatic tuning mechanism with cone-centric tuning. The chassis of this model is built into a console cabinet type XX, Table Cabinet Type "T" and is designated code 121. The same chassis built into a type "CS" cabinet is identified as code 124.

Model 38-8 differs from the 38-7 in that a manually operated tuning mechanism with shadowmeter tuning is used. This receiver is built into a type "X" cabinet with a type "HS" dynamic speaker.

Model 38-9 is identically the same as model 38-8 with the exception that the shadowmeter is not used, and that the speaker and cabinet types differ. This model is assembled in a type "T" cabinet with dynamic speaker type "S7" and a "K" type cabinet using a dynamic speaker type "HS".

POWER SUPPLY:

Voltage	Frequency	Consumption
115	50 to 60 cycles	70 Watts
115	25 to 40 cycles	70 Watts
115/220V	50 to 60 cycles	70 Watts

Different transformers are required for operation on the frequencies listed above. These are shown on the Parts List.

SERVICE DATA FOR AUTOMATIC TUNING MECHANISM—MODEL 7

Complete information for setting the stations on the cone-centric tuning mechanism of Model 38-7 is covered in the instruction form no. (39-5533) which is supplied with each set.

A few major assemblies of the automatic cone-centric tuning mechanism are listed on page 3 of this bulletin. A complete list of replacement parts, however, and detailed service data for the automatic mechanism, will be found in bulletin 282.

SHADOW METER ADJUSTMENT
Model 38-8

Apply power to the receiver and allow tubes to warm up. Then adjust shadow meter as follows:

1. Move the shadow meter coil backwards and forwards, until the opposite edges of the shadow are 1/8 of an inch from each end of the shadow screen, measuring along the bottom edge of the screen. Adjustment of the shadow meter light bracket may be necessary for perfect centering.

2. Remove the rectifier tube from its socket, and rotate the shadowmeter coil until shadow reaches minimum width. This width should not exceed 3/32 of an inch.

3. Replace the 5Y4G rectifier tube in its socket. The shadow should then widen to not more than 3/16 inch or less than 1/16 inch from each side of the screen measuring along the bottom edge. If these limits are not obtained readjust the shadow meter as given in paragraphs 1 and 2 again.

Alignment of Compensator

EQUIPMENT REQUIRED: (1) Signal Generator, using a fundamental frequency covering the intermediate and tuning ranges of the receivers. Philco Model 077 Signal Generator which has a fundamental frequency range from 115 to 36000 K. C. is the correct instrument for this purpose; (2) Output meter, Philco Model 026 circuit tester incorporates a sensitive output meter and is recommended; (3) Philco Fibre Handle Screw Driver, part No. 27-7059 and Fibre Wrench No. 3164.

OUTPUT METER: The 026 output meter is connected to the plate and cathode terminals of the 6F6G tube. Adjust the meter to use the (0-30) volt scale and advance the attenuator control of the generator until a readable indication is noted on the output meter.

DIAL CALIBRATION: In order to adjust the receiver correctly the dial must be aligned to track properly with the tuning condenser. To adjust the dial of each model proceed as follows:

Model 38-7: 1. Loosen the shaft coupling set screws, using wrench Part No. 45-2481; then turn the tuning condenser to the maximum capacity position (plate fully meshed). Now turn the selector knob until the dial pointer is on the small black circle at the low frequency end of the Range One scale. With condenser and pointer set in this position tighten set screws. 2. Now turn the selector knob (clockwise) until the dial pointer moves 1/16 of an inch from the small circle (clockwise), see Fig. 5. Leave pointer in this position and loosen coupling set screws. 3. After loosening set screws, turn the selector knob until pointer is again on the small black dot at low frequency end of Range One scale. Be careful when turning the selector knob that the position of tuning condenser is not disturbed. Tighten coupling set screws with condenser and dial pointer in this position.

Models 8 and 9: 1. Turn the tuning condenser to maximum capacity position (plates fully meshed). 2. Loosen the clamp of dial, then turn the dial—being careful that position of tuning condenser is not disturbed—until the glowing indicator is centered on the middle index line at the low frequency end of Range One scale. Tighten the dial clamp in this position.

Note—Before the following adjustments are performed, the receiver must be turned on and allowed to heat for 15 minutes.

INTERMEDIATE FREQUENCY CIRCUIT

Insert the signal generator output lead into the "Med" Jack on the panel of the generator. Connect the other end of the output lead through a .1 mfd. condenser to the grid of the 6A8G, det. osc. tube and the ground connection of the signal generator to the chassis. Set the signal generator and receiver controls, and adjust the I. F. compensator as follows:

1. Set Signal Generator at 470 K. C. Turn "Multiplier" Control to 1000 and the "Attenuator" for maximum output.
2. Turn the receiver dial to 580 K. C.
3. Receiver Volume Control maximum.
4. Range Switch Broadcast Position.
5. Adjust compensators (19B), (19A), (13B), and (13A) for maximum output. If the output meter goes off scale when adjusting the compensators retard signal generator attenuator.

RADIO FREQUENCY CIRCUIT

Tuning Range: 5.7 to 18 M. C.

1. Insert the Signal Generator output lead in the "Med." jack on the panel, and connect the other end through the .1 mfd. condenser to the "Red" terminal of the aerial panel of the receiver. The output lead ground must be connected to the "Blk" terminal or to the chassis.

2. Leave the receiver volume control at maximum. Then set the controls and adjust the R. F. compensators as follows:

Range Switch	Signal Generator and Receiver Dial	Compensators in Order
2	18 MC.	4B See Note A

Tuning Range: 530 to 1720 K. C.

Range Switch	Signal Generator and Receiver Dial	Compensators in Order
1	1500 KC.	(7A), (4A)
1	580 KC.	7
1	1500 KC.	7A

NOTE A—To accurately adjust the high frequency oscillator compensator to the fundamental instead of the image signal, turn the oscillator compensator to the maximum capacity position (clockwise). Now, slowly turn compensator counter-clockwise until a second maximum peak is obtained on the output meter. The second peak is the fundamental signal, and must be used in adjusting the receiver for maximum output. The first peak from maximum capacity position of the compensator is the image signal and must not be used in adjusting this compensator.

If the above procedure is correctly performed, the image signal will be found (much weaker) by turning the receiver dial 940 KC. below the frequency being used on any high frequency range.

REPLACEMENT PARTS

Schem. No.	Description	Part No.	List Price
1	Antenna Transformer—Short Wave	32-2558	
2	Antenna Transformer—Broadcast	32-2557	$1.25
3	Condenser .05 mf.	30-4519	.20
4	Tuning Condenser, Models 8 and 9	31-2026	
	Tuning Condenser, Model 7	31-2040	
5	Osc. Transformer—Short Wave	32-2560	1.25
6	Osc. Transformer—Broadcast	32-2559	
7	Compensator, Dual, Models 8 and 9	31-6188	
	Compensator, 580 KC. (Model 7)	31-6195	
7A	Compensator, Model 7 (1500 KC.)	31-6196	
8	Condenser 3500 mmf. mica	30-1094	.40
9	Resistor 70,000 ohms (½ watt)	33-370339	.20
10	Resistor 5000 ohms (½ watt)	33-250339	.20
11	Condenser, Electrolytic Dual (4 and 8 mfd.)	30-2217	
12	Resistor 10,000 ohms (3 watt)	33-310639	.30
13	1st I. F. Transformer	32-2580	
14	Condenser .1 mf.	30-4455	.25
15	Resistor 1.0 meg. (½ watt)	33-510339	.20
16	Resistor 10,000 mmf. (1 watt)	33-310439	.20
17	Condenser .05 mf. (38-8 only)	30-4454	
18	Shadowmeter (38-8 only)	45-2307	2.50
19	2nd I. F. Transformer	32-2582	
20	Resistor 51,000 mmf. (mounted in 19)	33-351339	.20
21	Resistor 490,000 ohms (½ watt)	33-449339	.20
22	Resistor 51,000 ohms (1 watt)	33-351439	.20
23	Condenser, mica, 110 mmf.	30-1031	.20
24	Condenser .01 mf.	30-4479	.20
25	Removed Prior to Production		
26	Volume Control	33-5216	
27	Resistor 1 meg. (½ watt)	33-510339	.20
28	Condenser .015 mf.	30-4358	.20
28	Audio Shorting Switch (38-7 only) Part of Selector Crank		
30	Condenser .1 mf.	30-4409	.20
31	Resistor 1.0 meg. (½ watt)	33-510339	.20
32	Resistor 51,000 mf. (½ watt)	33-351339	.20
33	Resistor 1.0 meg. (½ watt)	33-510339	.20
34	Condenser .015 mf.	30-4515	.20
35	Resistor 1.0 meg. (½ watt)	33-510339	.20
36	Resistor 99,000 mf. (½ watt)	33-399339	.20
37	Condenser .03 mf.	30-4447	.20
38	Condenser .06 mf.	30-4467	.20
39	Tone Control	42-1327	
40	Condenser .008 mf.	30-4112	$0.20
41	Output Transformer (Model 7)	32-7862	
	Output Transformer (Models 8 and 9)	32-7019	.85
42	Cone and Voice Coil Assembly (H31)	36-3801	1.40
	Cone and Voice Coil Assembly (K41)	36-3174	1.00
	Cone and Voice Coil Assembly (HS)	36-3796	1.20
	Cone and Voice Coil Assembly (S7)	36-3157	1.00
43	Bias Resistor	33-3316	
44	Field Coil Assembly (H31)	36-3665	4.25
	Field Coil Assembly (K41)	36-3931	
	Field Coil Assembly (HS)	36-3690	3.50
	Field Coil Assembly (S7)	36-3039	3.50
45	Electrolytic Condenser	30-2219	
46	Power Transformer, 115V, 50/60 cycle	32-7833	
	Power Transformer, 110V, 25 to 40 cycle	32-7627	
	Power Transformer, 115/230V, 50/60 cycle	32-7833	
47	Condenser .015—.015 mf., 25 mf.	3793DG	.40
48	Wave Switch	42-1325	
49	Pilot Lamp, Models 8 and 9	34-2064	

MODELS 38-7, & 9 PARTS

Pilot Lamp, Model 7	34-2184	
Cable (Power)	L-2778	.40
Cable (Speaker)	L-2840	
Cable (Shadowmeter, Model 8)	41-3225	.40
Dial, Models 8 and 9	27-5327	
Dial Clamp	27-5089	
Dial Washer	27-4598	
Knob	27-4330	.10
Knob	27-4331	.10
Knob	27-4332	.10
Mtg. Corner, Rubber (Chassis)	27-4564	.10
Mtg. Rubber (Tuning Condenser)	27-4599	
Screen Brkt. Assembly (Models 8 and 9)	31-2047	
Socket (7 prong)	27-6087	
Socket (6 prong)	27-6086	
Socket Ass'y (Pilot lamp) Models 8 & 9	38-8844	
Vernier Drive Ass'y, Models 8 and 9	31-2022	

MODEL 37-8 PARTS

Bracket Assembly	45-2479	
Brace (Mtg. Unit)	28-5118	
Bearing (Main Shaft)	28-7242	
Bezel Assembly (Scale)	40-6136	
Coupling Assembly	31-2056	
Dial Model 7, supld. by your distributor	27-5338	
Dial Retaining Ring	28-5107	
Dial Mechanism, Cone-centric complete	31-2092	
Escutcheon Ring	28-5128	
Felt (Stop Cover)	27-8822	
Gear, Tuning Condenser (small)	45-2490	
Gear, Tuning Condenser (large)	45-2491	
Knob (Selector)	27-4572	
Knob (Vernier)	45-2477	
Knob Spring	28-8761	
Knob Retaining Screw	28-6672	
Reflector Assembly	45-2478	
Selector Crank Assembly	45-2476	
Shaft (Coupling)	28-6675	
Stop Assembly	31-2055	
Stop Cover (Mounted on Selector Crank)	28-5088	
Shaft (Tuning Condenser Gear)	28-6675	
Pointer Assembly	38-8925	
Wrench (Setting Stops)	45-2475	

CABINET PARTS MODEL 8

Baffle and Silk Assembly (X)	40-6448	
Bezel Plate Assembly (X)	40-6129	
Bezel Gasket	27-8313	$0.01
Bezel Glass	27-8300	.06
Bezel Ring	28-5080	

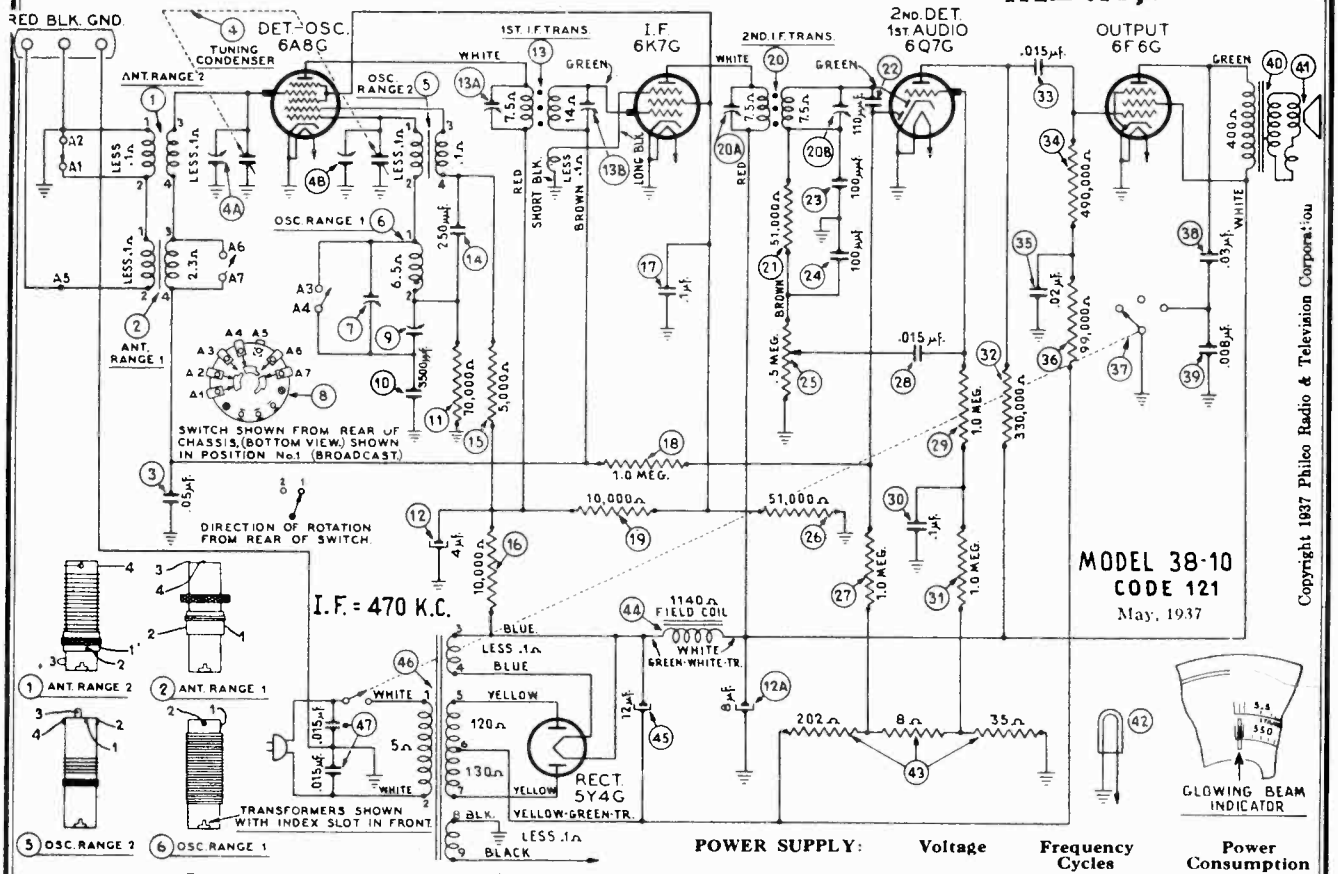
CABINET PARTS MODEL 9

Baffle and Silk Assembly (X cabinet)	40-6448	
Baffle and Silk Assembly (K cabinet)	40-6139	
Baffle and Silk Assembly (T cabinet)	40-6140	
Bezel Plate Assembly (K, X)	40-6128	
Bezel Plate Assembly (T)	40-6124	.90
Bezel Gasket (X, K)	27-8313	.01
Bezel Gasket (T)	27-8311	.01
Bezel Glass (K, X)	27-8300	.06
Bezel Glass (T)	27-8298	.05
Bezel Ring (K, X)	28-5080	
Bezel Ring (T)	28-5078	.55

Prices to subject to change without notice.

PHILCO RADIO & TELEV. CORP.

MODEL 38-10, Code 121
Schematic, Voltage
Trimmers, Chassis



Electrical Specifications

TYPE OF CIRCUIT: Five tube, A.C. operated superheterodyne circuit with features, such as two tuning ranges covering the frequencies shown under "Tuning Ranges"; Automatic Volume Control; and a Pentode Audio Output Stage.

PHILCO TUBES USED: Five—one 6A8G, Det. osc.; one 6K7G, I. F.; one 6Q7G, 2nd Det. 1st audio; one 6F6G, output, and one 5Y4G, Rectifier.

TONE CONTROL: Two position with A.C. switch attached.

SPEAKERS: Type S7 in T Cabinet, HS in F Cabinet.

POWER SUPPLY:

Voltage	Frequency Cycles	Power Consumption
115	50 to 60	60 watts
115	25 to 40	60 watts
115/230	50 to 60	60 watts

The part number of these transformers are shown on the Parts List Page

INTERMEDIATE FREQUENCY: 470 K. C.

TUNING RANGES: Two—Range 1, 540 to 1720 K. C.
Range 2, 5.7 to 18 M. C.

UNDISTORTED OUTPUT: 3 watts.

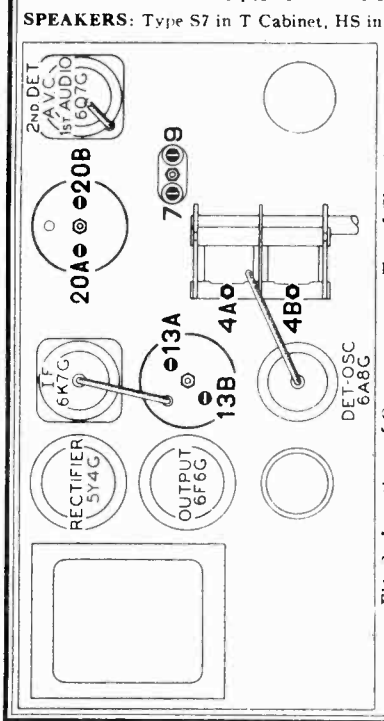


Fig. 2. Locations of Compensators—Top of Chassis

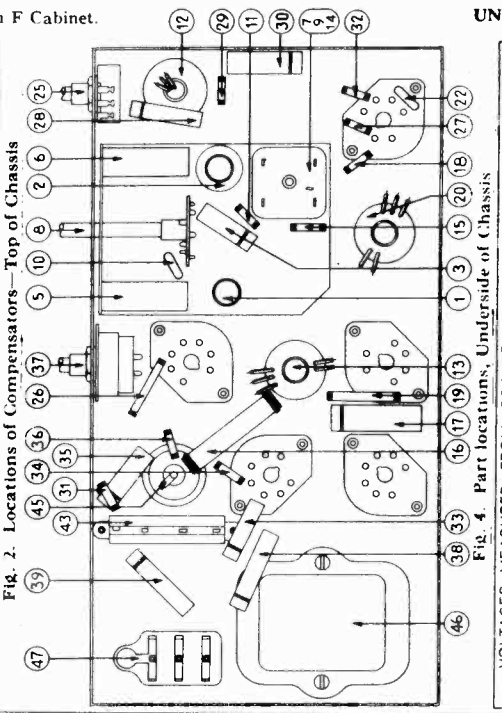


Fig. 4. Part locations, Underside of Chassis

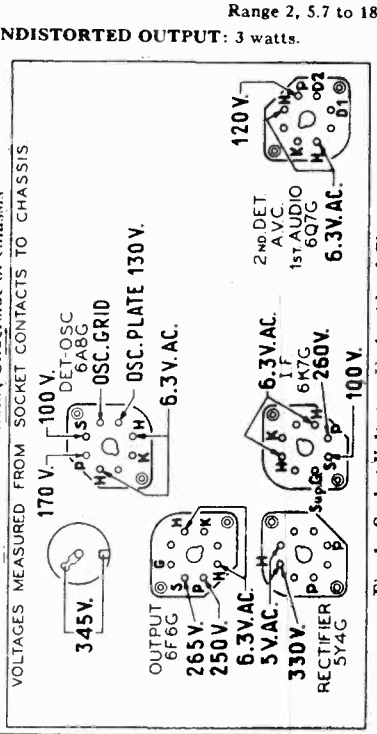


Fig. 1. Socket Voltages, Underside of Chassis

The voltages indicated by arrows were measured with a **Philco 026 Circuit Tester** which contains an accurate voltmeter. Volume Control at minimum, range switch in broadcast position, line voltage 115 A. C.

Alignment of Compensators

EQUIPMENT REQUIRED: (1) Signal Generator, using a fundamental frequency range covering the tuning and intermediate frequencies of the receiver. Philco Model 077 Signal Generator which has a fundamental frequency range from 115 to 36,000 K. C. is the correct instrument for this purpose; (2) Output Meter, Philco Model 026 Circuit Tester incorporates a sensitive output meter and is recommended; (3) Philco Fibre Handle Screw Driver, part No. 27-7059 and Fibre Wrench, part No. 3164.

OUTPUT METER: The 026 Output Meter is connected to the plate and cathode terminals of the 6F6G tubes. Adjust the meter to use the (0-30) volt scale and advance the attenuator control of the generator until a readable indication is noted on the output meter after signal is applied.

DIAL CALIBRATION: In order to adjust the receiver correctly the dial must be aligned to track properly with the tuning condenser. To adjust the dial proceed as follows:

1. Turn the tuning condenser to maximum capacity position (plate fully meshed).

2. Holding the tuning condenser in this position, loosen the clamp and turn the dial until the indicator is centered on the middle index line (See Fig. 3). Tighten clamp with dial in this position.

INTERMEDIATE FREQUENCY CIRCUIT

Insert the signal generator shielded output lead into the "Med" jack on the panel of the generator. Connect the other end of the output lead through a .1 mfd. condenser to the grid of the 6A8G, det. osc. tube and the ground connection of the signal generator to the chassis. Set the Signal Generator and receiver controls, and adjust the I. F. compensators as follows:

1. Set Signal Generator at 470 K. C. Turn "Multiplier" Control to 1000 and the "Attenuator" for maximum output.

2. Turn the receiver dial to 580 K. C.

3. Receiver volume control maximum.

4. Range Switch Broadcast Position.

5. Adjust compensators (20B), (20A), (13B), (13A) for maximum output.

If the output meter goes off scale when adjusting the compensators retard signal generator attenuator.

RADIO FREQUENCY CIRCUIT

Tuning Range: 5.7 to 18 M. C.

1. With one end of the shielded lead of the signal generator output lead in the "Med" jack, connect the other end through the .1 mfd. condenser to the "Red" terminal of the aerial panel of the receiver. The output lead ground must be connected to the black terminal or to the chassis.

2. Set the controls and adjust the R. F. compensators as follows:

Volume Control	Range Switch	Signal Generator and Receiver Dial	Compensators in Order
Max.	2	18 M. C.	4B

Tuning Range: 530 to 1720 K. C.

Range Switch	Signal Generator and Receiver Dial	Compensators in Order
1	1500 K. C.	7, 4A
1	580 K. C.	(9)
1	1500 K. C.	7, 4A

NOTE A—To accurately adjust the high frequency oscillator compensator to the fundamental instead of the image signal, turn the oscillator compensator to the maximum capacity position (clockwise). From this position slowly turn the compensator counterclockwise until a second maximum peak is obtained on the output meter. Adjust the compensator for maximum output using this second peak. The first peak from maximum capacity position of the compensator is the image signal, and must not be used in adjusting this compensator.

If the above procedure is correctly performed, the image signal will be found (much weaker) by turning the receiver dial 940 K. C. below the frequency being used on the high frequency range.

Replacement Parts

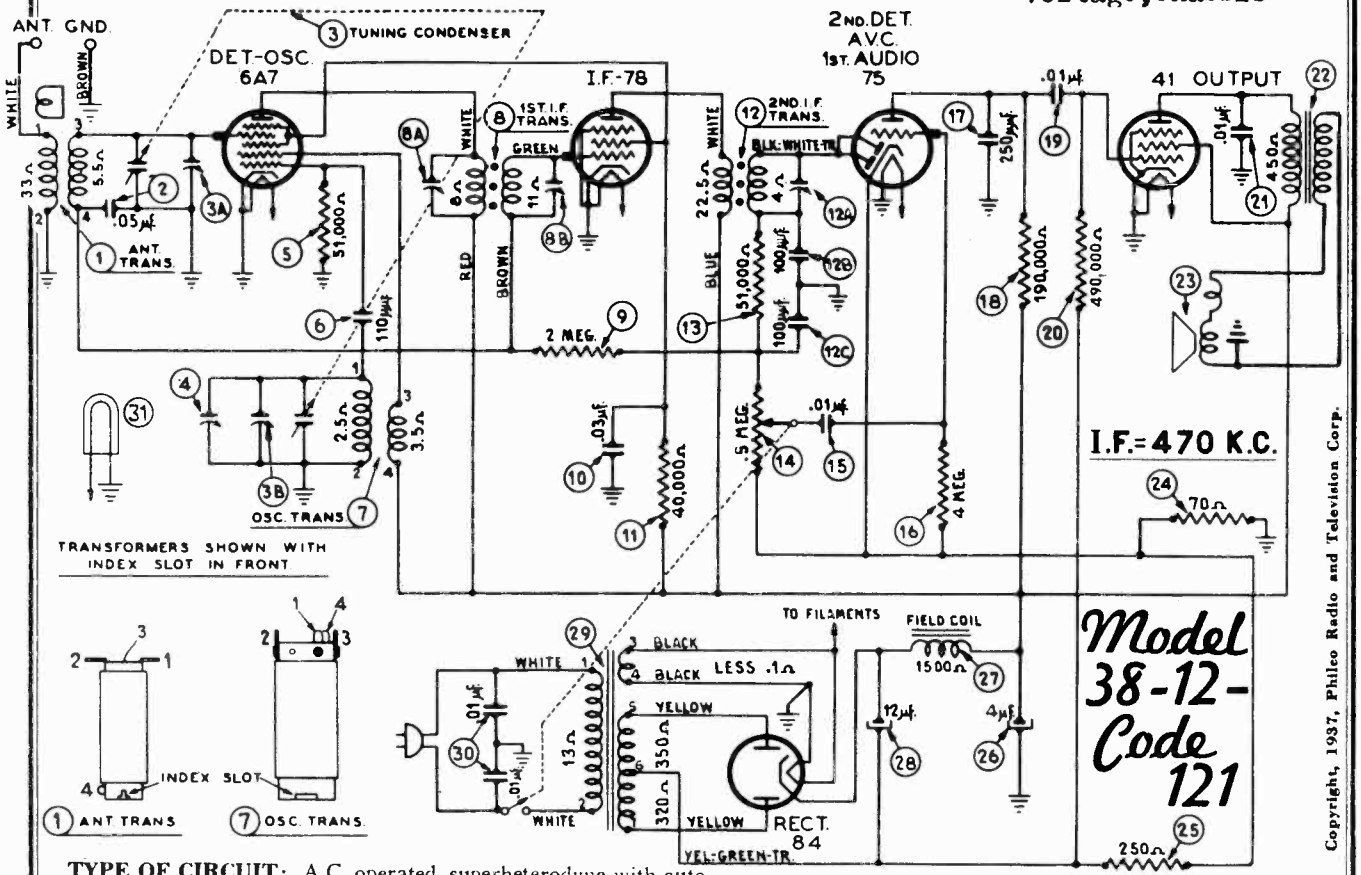
Prices to subject to change without notice.

Schem. No.	Description	Part No.	List Price
1	Antenna Transformer (range 2)	32-2558	$0.70
2	Antenna Transformer (range 1)	32-2557	1.25
3	Condenser (0.05 mfd. tubular)	30-4519	.20
4	Tuning Condenser Assembly	31-2026	5.00
5	Osc. Transformer (range 2)	32-2560	
6	Osc. Transformer (range 1)	32-2559	.50
7	Compensators (dual, 1500 K. C.)	31-6188	.50
8	Range Switch	42-1325	.75
9	Compensator (Part of 7, 580 K. C.)		
10	Condenser (3500 mmfd., mica)	30-1094	.40
11	Resistor (70,000 ohms, 1/2 watt)	33-370339	.20
12	Condenser (dual electrolytic 4 and 8 mfd.)	30-2217	
13	1st I. F. Transformer	32-2580	
14	Condenser (250 mmfd.) Part of 7		
15	Resistor (5,000 ohms, 1/2 watt)	33-250339	.20
16	Resistor (10,000 ohms, 3 watts)	33-310639	.30
17	Condenser (0.1 mfd., tubular)	30-4455	.25
18	Resistor (1.0 megohm, 1/2 watt)	33-510339	.20
19	Resistor (10,000 ohms, 1 watt)	33-310439	.20
20	2nd I. F. Transformer	32-2582	
21	Resistor (51,000 ohms, 1/2 watt)	33-351339	.20
22	Condenser (110 mmfd., mica)	30-1031	.20
23	Condenser (100 mmfd.) part of No. (20)		
24	Condenser (100 mmfd.) part of No. (20)		
25	Volume Control	33-5215	
26	Resistor (51,000 ohms, 1 watt)	33-351439	.20
27	Resistor (1.0 megohm, 1/2 watt)	33-510339	.20
28	Condenser (0.015 mfd. tubular)	30-4358	.20
29	Resistor (1.0 megohm, 1/2 watt)	33-510339	.20
30	Condenser (0.1 mfd. tubular)	30-4499	.20
31	Resistor (1.0 megohm, 1/2 watt)	33-510339	.20
32	Resistor (330,000 ohms, 1/2 watt)	33-433339	.20
33	Condenser (0.015 mfd. tubular)	30-4515	.20
34	Resistor (490,000 ohms, 1/2 watt)	33-449339	.20
35	Condenser (0.02 mfd., tubular)	30-4215	.20
36	Resistor (99,000 ohms, 1/2 watt)	33-399339	.20
37	Tone Control off-on switch	42-1326	
38	Condenser (0.03 mfd., tubular)	30-4447	.20
39	Condenser (0.008 mfd. tubular)	30-4112	.20
40	Output Transformer	32-7019	.85
41	Cone and Voice Coil Assembly (S-7)	36-3157	1.00
	Cone and Voice Coil Assembly (HS)	36-3796	1.20
42	Pilot Lamp	34-2064	.09
43	Bias Resistor	33-3316	.35
44	Field Coil Assembly (S7)	36-3039	3.50
	Field Coil Assembly (HS)	36-3690	3.50
45	Condenser (electrolytic, 12 mfd.)	30-2210	1.20
46	Power Transformer		
	110 volt, 50 to 60 cycle	32-7833	4.00
	110 volt, 25 to 40 cycle	32-7627	5.50
	Power Trans. 115/230, 50 to 60 cycles	32-7835	
47	Condenser (0.015 mfd., dual bakelite)	3793DG	.40
	Cable (Power)	L-2778	.40
	Cable (Speaker)	L-2840	
	Dial	27-5327	
	Dial Washer	27-4598	
	Dial Clamp	28-5089	.03
	Knob (Tuning)	27-4330	.10
	Knob (Vernier)	27-4331	.10
	Knob (Tone & Volume)	27-4332	.10
	Mtg. Cushions (Tuning Condenser)	27-4599	.20
	Mtg. Rubber (Chassis)	27-4564	.10
	Pilot Lamp Assembly	38-8844	
	Screen Bracket Assembly	31-2047	
	Socket (6 prong)	27-6086	.11
	Socket (7 prong)	27-6087	.11
	Socket (7 prong)	27-6053	.11
	Socket (7 prong)	27-6057	.11
	Terminal Panel (Ant.)	38-8746	
	Vernier Drive	31-2072	
	38-10 F CABINET		
	Speaker (HS)	36-1220	$6.25
	Bezel Plate & Frame	40-6126	
	Bezel Gasket	27-8312	.01
	Bezel Glass	27-8299	.06
	Bezel Ring	28-5079	.60
	38-10 T CABINET		
	Speaker S7	36-1009	5.75
	Bezel Plate & Frame	40-6124	.90
	Bezel Gasket	27-8311	.01
	Bezel Glass	27-8298	.05
	Bezel Ring	28-5078	.55

MODEL 38-12, Code 121

PHILCO RADIO & TELEV. CORP.

Schematic, Trimmers
Voltage, Chassis



TYPE OF CIRCUIT: A.C. operated, superheterodyne with automatic volume control, Pentode audio output, and covers the standard broadcast and state police frequencies.

POWER SUPPLY:	Voltage	Frequency Cycles	Power Consumption
	115	50 to 60	40 watts

PHILCO TUBES USED: Five: One 6A7, Det. Osc.; One 78, I.F.; One 75, 2nd Det., 1st Audio; One 41, Output, and One 84, Rectifier.

INTERMEDIATE FREQUENCY: 470 K.C.

R.F. TUNING RANGE: 540 to 1720 K.C.

June, 1937

AUDIO OUTPUT: 2 watts.

TUNING MECHANISM: 8 to 1 Ratio using Pulley and Cord.

CABINET: Type "T" and "C."

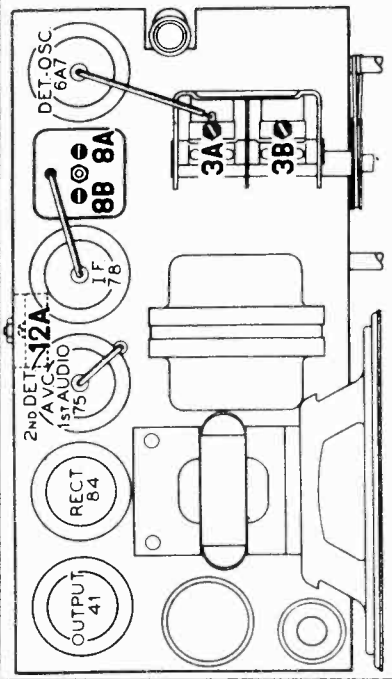


FIG. 2.—Locations of Compensators.

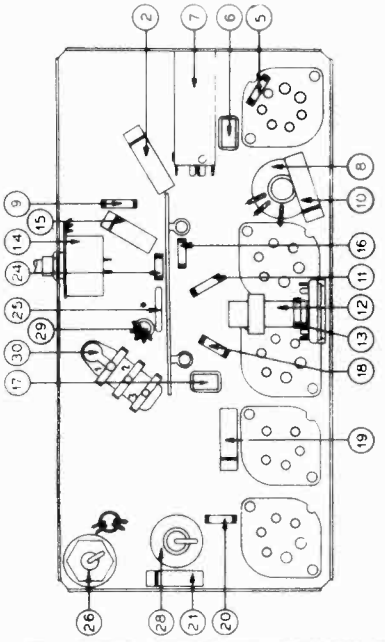


FIG. 5.—Part Locations Underside of Chassis.

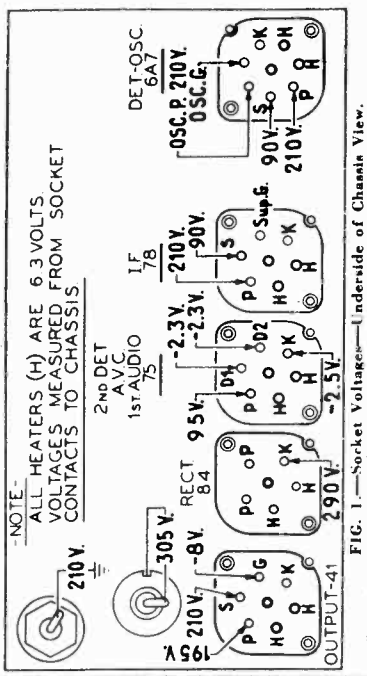


FIG. 1.—Socket Voltages—Underside of Chassis View.
The Voltages indicated by arrows were measured with a Philco 026 Circuit Tester which contains a sensitive voltmeter. Volume Control at minimum —Tuning condenser set for no signal—line voltage 115 A.C.

MODEL 38-12,Code 121
Alignment,Parts

PHILCO RADIO & TELEV. CORP.

Alignment of Compensators

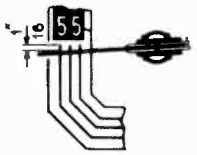
EQUIPMENT REQUIRED: (1) Signal Generator, using a fundamental frequency range covering the tuning and intermediate frequencies of the receiver. Philco Model 077 Signal Generator which has a fundamental frequency range from 115 to 36,000 K.C. is the correct instrument for this purpose; (2) Output Meter, Philco Model 026 Circuit Tester incorporates a sensitive output meter and is recommended; (3) Philco Fibre Handle Screw Driver, Part No. 27-7059 and Fibre Wrench, Part No. 3164.

OUTPUT METER: The 026 Output Meter is connected to the plate and cathode terminals of the 41 tube. Adjust the meter to use the (0-30) volt scale and advance the attenuator control of the generator until a readable indication is noted on the output meter after signal is applied.

DIAL CALIBRATION: In order to adjust the receiver correctly the dial must be aligned to track properly with the tuning condenser. To adjust the dial, proceed as follows:

1 Turn the tuning condenser to maximum capacity position (plates fully meshed).

2 Holding the tuning condenser in this position, turn the pointer until it is 1/16 of an inch below the three lines of the scale at the 550 K.C. end. (See Fig. 3.) This is the correct position of pointer at maximum capacity of tuning condenser.



POINTER SETTING TUNING CONDENSER CLOSED

FIG. 3.—Dial Pointer Calibration.

Intermediate Frequency Circuit

Insert the signal generator shielded output lead into the "Med." jack on the panel of the generator. Connect the other end of the output lead through a .1 mfd. condenser to the grid of the 6A7 Det. Osc. tube, and the ground connection of the signal generator to the chassis. Set the Signal Generator and receiver controls, and adjust the I.F. compensators as follows:

1 Set Signal Generator at 470 K.C. Turn "Multiplier" Control to 1000 and the "Attenuator" for maximum output.

2 Turn the receiver dial to 580 K.C.

3 Receiver volume control maximum.

4 Adjust compensators, (12A), (8B), (8A), for maximum output. If the output meter goes off scale when adjusting the compensators, retard the signal generator attenuator.

Radio Frequency Circuit

TUNING RANGE: 540 to 1720 K.C.

1 With one end of the shielded lead of the signal generator output lead in the "Med." jack, connect the other end through a 100 mmfd. condenser to the white aerial wire (rear of chassis). Connect the signal generator ground to the brown lead or to the chassis of the receiver.

2 Set the controls and adjust the R.F. compensators as follows:

Volume Control	Signal Generator and Receiver Dial	R.F. Compensators in Order	
Max.	1500 K.C.	(3B)	(3A)

Replacement Parts Model 38-12

Schematic No.	Description	Part No.	List Price
1	Antenna Transformer	32-2583	
2	Condenser (0.05 mfd. tubular)	30-4444	$0.20
3	Tuning Condenser Assembly)	31-2068	
4	Compensator (Part of tuning condenser 3)		
5	Resistor (51,000 ohms, ½ watt)	33-351339	.20
6	110 mmfd. mica	30-1031	.20
7	Oscillator Transformer	32-2586	
8	First I.F. Transformer	32-2672	
9	Resistor (2 megohms)	33-520339	.20
10	Condenser (0.03 mfd. tubular)	30-4449	.20
11	Resistor (40,000 ohms, ½ watt)	33-340339	.20
12	Second I.F. Transformer	32-2674	
13	Resistor (51,000 ohms, ½ watt)	33-351339	.20
14	Volume Control	33-5230	1.45
15	Condenser (0.01 mfd. tubular)	30-4479	.20
16	Resistor (4 megohms, ½ watt)	33-540339	.20
17	Condenser (250 mmfd. mica)	30-1032	.25
18	Resistor (190,000 ohms, ½ watt)	33-419339	.20
19	Condenser (0.01 mfd. tubular)	30-4169	.20
20	Resistor (490,000 ohms, ½ watt)	33-449339	.20
21	Condenser (0.01 mfd. tubular)	30-4169	.20
22	Output Transformer	32-7861	
23	Cone and Voice Coil Assembly	36-3981	
24	Resistor (70 ohms, ½ watt)	33-070339	.20
25	Resistor (250 ohms, ½ watt)	33-1259	
26	Condenser (Electrolytic 4 mfd.)	30-2236	.90
*27	Field coil assembly (not supplied; see Note)		
28	Condenser (Electrolytic 12 mfd.)	30-2235	1.20
29	Power Transformer (115V, 50 to 60 cycle)	32-7826	3.00
30	Condenser (0.01 mfd., .01 mfd.)	3903-DG	.30
31	Pilot Lamp	34-2068	.12
	Bezel and Glass Assembly	40-6158	
	Bezel Clamp	28-5153	.01
	Bracket (Tuning Condenser)	28-5060	
	Cable (Power)	L-2778	.40
	Clip (R.F. Trans. small)	28-5002	.02
	Clip (R.F. Trans. large)	28-5003	.03
	Clip (Tuning Shaft)	28-8610	.03
	Dial Assembly	31-2097	
	Dial Pointer	28-5185	.15
	Dial Drive Cord Assembly	31-2082	.10
	Dial Drive Drum	28-6662	
	Dial Drive Spring	28-8751	
	Knob (Tuning and Volume)	27-4604	
	Shaft Assembly (Tuning)	38-9102	
	Shield (Tube)	28-5059	
	Socket (6 prong)	27-6036	.11
	Socket (7 prong)	27-6037	.11
	Socket (5 prong)	27-6035	.11
	Stop—Rubber	27-4540	
	Speaker Model BO-1	36-1366	
	Pilot Lamp Assembly	38-9041	

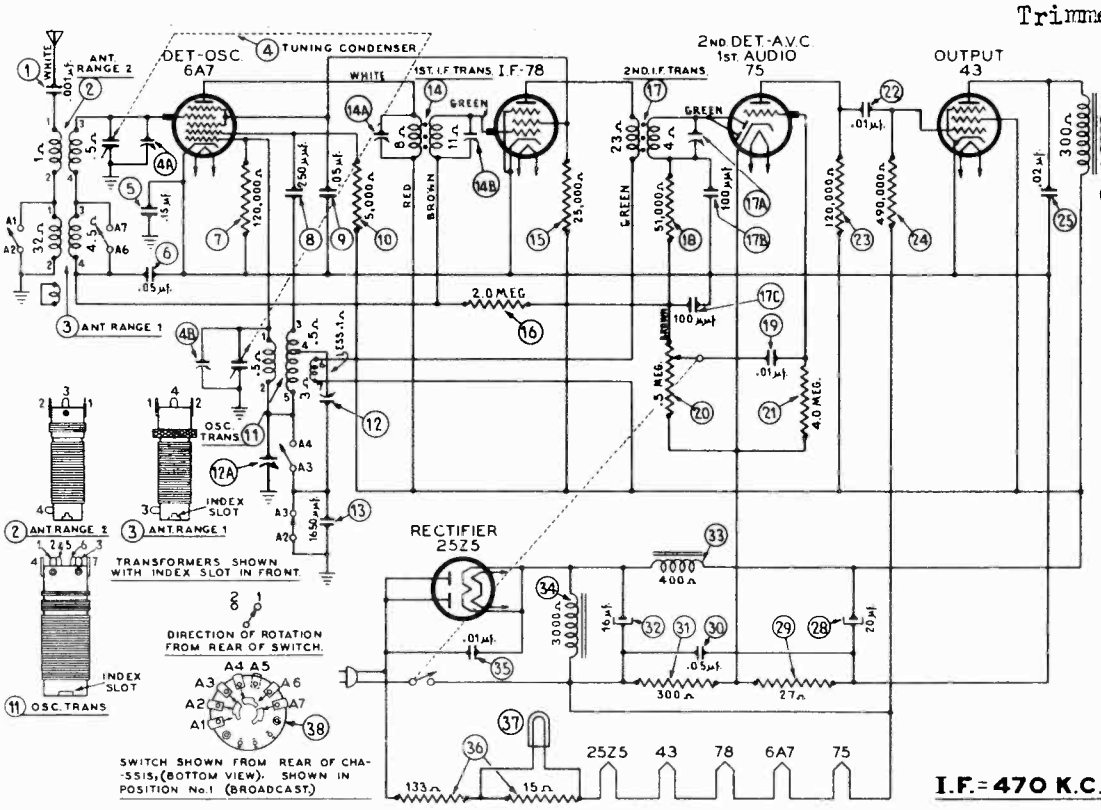
* Entire Speaker must be replaced when field coil is open or damaged.

Prices Subject to Change without Notice

MODEL 38-14, Codes 121, 124

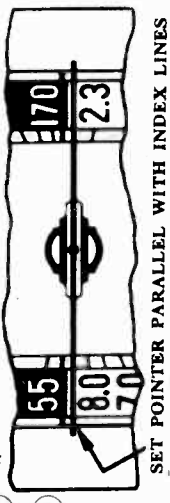
PHILCO RADIO & TELEV. CORP.

Schematic, Voltage
Trimmers, Chassis



July, 1937

Model 38-14 Code 121 – 124



SET POINTER PARALLEL WITH INDEX LINES

Fig. 3. Dial Pointer Calibration

POWER SUPPLY: Voltage 115 — Power Consumption 55 watts

INTERMEDIATE FREQUENCY: 470 K. C.

R. F. TUNING RANGES: 540 to 1720 K. C.
2.3 to 7.4 M. C.

AUDIO OUTPUT: 1 watt

PHILCO TUBES USED: Five: one 6A7, Det. osc.; one 78, I. F.; one 75, 2nd Det., 1st Audio; one 43, Output, and one 25Z5 Rectifier.

TUNING MECHANISM: 12 to 1 Ratio using Pulley and Cord.

CABINET: Type "T," Code 121
Type "CS," Code 124

Electrical Specifications

TYPE OF CIRCUIT: A. C. or D. C. operated superheterodyne with automatic volume control, pentode audio output, and covers the standard broadcast, municipal and state police frequencies, first class amateur (night) and many night foreign and American short-wave stations.

Code 121 & 124 chasses of this Model are identical with the exception of electrolytic condensers, speaker and cabinets. These differences are listed on the part list.

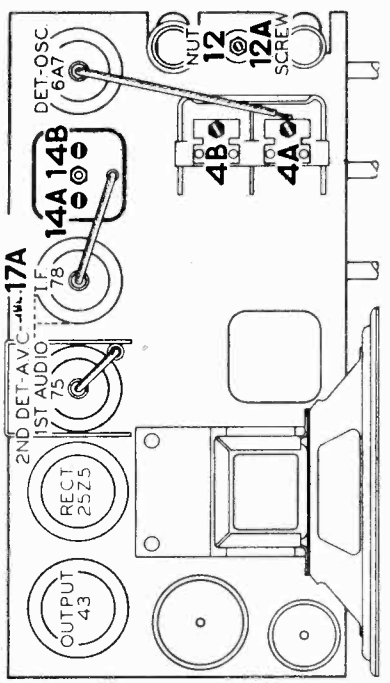


Fig. 2. Locations of Compensators—Top of Chassis

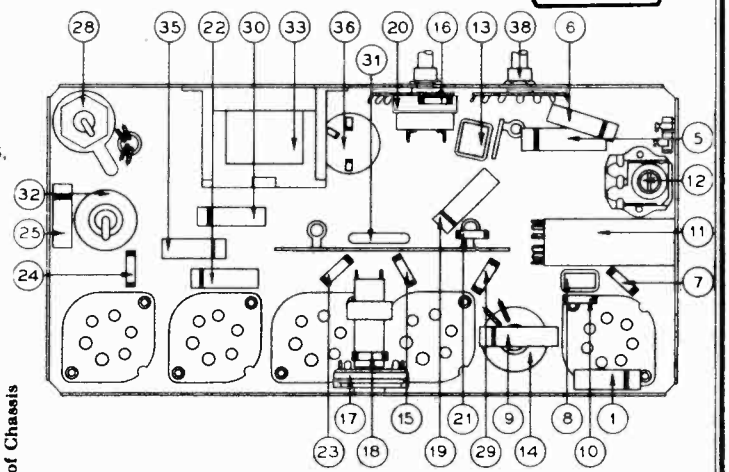


Fig. 5. Part locations, Underside of Chassis

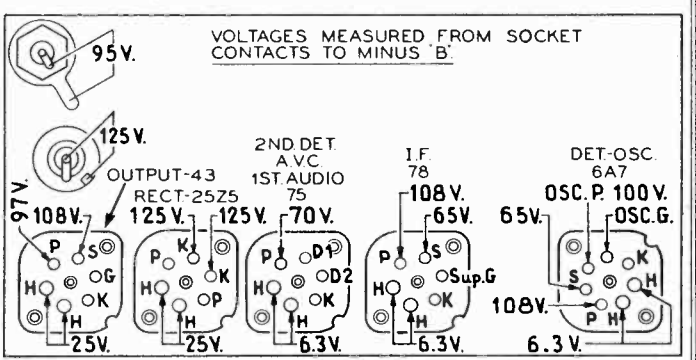


Fig. 1. Socket Voltage—Underside of Chassis View

The voltages indicated by arrows were measured with a **Philco 026 Circuit Tester**, which contains a sensitive voltmeter. Volume Control at minimum—Tuning Condenser set for no signal—line voltage 115 A. C.

MODEL 38-14, Codes 121, 124
Alignment, Parts

PHILCO RADIO & TELEV. CORP.

Replacement Parts

Schem. No.	Description	Part No.	List Price
1	Cond. (tubular .001 mf.)	30-4453	$0.20
2	Ant. Trans. (Range 2)	32-2720	
3	Ant. Trans. (Range 1)	32-2718	
4	Tuning Cond. Assembly	31-2094	
5	Cond. (tubular .15 mf.)	30-4191	.25
6	Cond. (tubular .05 mf.)	30-4519	.20
7	Resistor (120,000 ohm ½ watt)	33-412399	.20
8	Cond. (mica 250 mmf.)	30-1032	.25
9	Cond. (tubular .05 mf.)	30-4444	.20
10	Resistor (5000 ohm ½ watt)	33-250339	.20
11	Osc. Trans.	32-2719	
12	Compensator	31-6209	
13	Cond. (mica 1650 mmf.)	5877	.35
14	I. F. Trans. (1st)	32-2672	2.20
15	Resistor (25,000 ohm ½ watt)	33-325339	.20
16	Resistor (2 meg. ½ watt)	33-520339	.20
17	I. F. Trans. (2nd)	32-2674	1.50
18	Resistor (51,000 ohm ½ watt)	33-351339	.20
19	Cond. (tubular .01 mf.)	30-4479	.20
20	Volume Control	33-5236	
21	Resistor (4.0 meg. ½ watt)	33-540339	.20
23	Resistor (120,000 ohm ½ watt)	33-412339	.20
24	Resistor (490,000 ohm ½ watt)	33-449339	.20
25	Cond. (tubular .02 mf.)	30-4215	.20
26	Output Trans. (B 0-2)	32-7874	
	Output Trans. (S-18)	32-7395	1.10
27	Cone and Voice Coil Assembly (S-18)	36-3014	
	Cone and Voice Coil Assembly (B-0-2)	36-3981	
28	Electrolytic Cond. (20 mf. Code 121)	30-2245	.95
	Electrolytic Cond. (Code 124)	30-2275	
29	Resistor (27 ohm ½ watt)	33-027339	.20
30	Cond. (tubular) .05 mf.	30-4444	.20
31	Resistor (300 ohm, 2 watt)	33-1258	
32	Electrolytic Cond. (16 mf. Code 121)	30-2246	.90
	Electrolytic Cond. (Code 124)	30-2277	

Schem. No.	Description	Part No.	List Price
33	Choke	32-7868	
34	Field Coil and Pot. Assembly (S-18)	36-3985	
	*Field Coil and Pot. Assembly (B 0-2)	(See Speaker Note below).	
35	Condenser (tubular .01 mf.)	30-4169	.20
36	Filament Resistor (133 ohm—15 ohm)	33-3322	.65
37	Pilot Lamp	34-2068	.12
38	Range Switch	42-1366	.70
	Cable Speaker (Code 124)	L-2984	
	Cable (Power)	L-2778	.40
	Clip, Small (Mtg. R. F. Coil)	28-5002	.02
	Clip, Large (Mtg. R. F. Coil)	28-5003	.03
	Dial Ass'y	31-2098	
	Dial Pointer	28-5201	.20
	Dial Drive Cord	31-2096	.10
	Dial Drive Shaft	38-9001	
	Insulator Washer (Electrolytic)	27-8882	
	Insulator Washer (Electrolytic)	27-8883	
	Insulator Cover 1¼ (Elec. Cond. 32)	27-8800	
	Insulator Cover, 2¼ (Elec. Cond. 32)	27-8905	
	Mtg. Rubber Dial	27-4150	$0.01
	Mtg. Rubber (Tuning Condenser)	27-4596	
	Pilot Lamp Ass'y	38-9127	
	Pilot Lamp	34-2068	.12
	Pully (Tuning Condenser)	31-1283	.30
	Speaker (B 0-2, Code 121)	36-1367	
	Speaker (S-18, Code 124)		
	Socket (6 prong)	27-6036	.11
	Socket (7 prong)	27-6037	.11
	Washer "C" (Tuning Shaft)	28-3904	.01
	Bezel and Glass (Code 121)	40-6158	
	Bezel and Glass (Code 124)	40-6264	
	Bezel Clamp	28-5153	.02

*Entire Speaker must be replaced when field coil is open or damaged.

PRICES SUBJECT TO CHANGE WITHOUT NOTICE

Alignment of Compensators

EQUIPMENT REQUIRED: (1) Signal Generator, using a fundamental frequency range covering the tuning and intermediate frequencies of the receiver. Philco Model 077 Signal Generator which has a fundamental frequency range from 115 to 36,000 K. C. is the correct instrument for this purpose; (2) Output meter, Philco Model 026 circuit tester incorporates a sensitive output meter and is recommended; (3) Philco Fibre Handle Screw Driver, Part No. 27-7059 and Fibre Wrench, Part No. 3164.

OUTPUT METER: The 026 Output Meter is connected to the plate and cathode terminals of the 43 tube. Adjust the meter to use the (0-30) volt scale and advance the attenuator control of the generator until a readable indication is noted on the output meter after signal is applied.

DIAL CALIBRATION: In order to adjust the receiver correctly the dial must be aligned to track properly with the tuning condenser. To adjust the dial, proceed as follows:

1. Turn the tuning condenser to maximum capacity position (plates fully meshed).
2. Holding the tuning condenser in this position, turn the pointer until it is parallel with the index lines (see Fig. 3). This is the correct position of pointer at maximum capacity of tuning condenser.

INTERMEDIATE FREQUENCY CIRCUIT

When adjusting the following compensators, a Philco Set Transformer Part No. 32-2763 must be connected in the signal generator output circuit as follows: Insert the signal generator output lead into the "Med" jack and the ground lead into the "Gnd" jack of the signal generator.

Connect the other end of the output lead to terminal No. 1 on the Set Transformer and the cable ground to Terminal No. 2. No. 3 and 4 terminals of Set Transformer are then connected to the chassis and 6A7 grid respectively of the receiver with short pieces of wire. Insert a 0.1 mfd. in series with the No. 4 lead which connects to the grid.

Set the signal generator and receiver controls and adjust the I. F. compensators as follows:

1. Set Signal Generator at 470 K. C. Turn "Multiplier" Control to 1000 and the "Attenuator" for maximum output.
2. Turn the receiver dial to 580 K. C.
3. Range Switch Broadcast position.
4. Receiver volume control maximum.
5. Adjust compensators, (17A), (14B), (14A), for maximum output. If the output meter goes off scale when adjusting the compensators, retard the signal generator attenuator.

RADIO FREQUENCY CIRCUIT

Tuning Range: 2.3 to 7.4 M. C.

1. Remove terminal No. 4 lead of set transformer from the 6A7 grid and connect to the aerial wire of the receiver through a 400 ohm resistor. Remove the .1 mfd. condenser when using the 400 ohm resistor.
2. Set the controls and adjust the R. F. compensators as follows:

Range Switch	Volume Control	Signal Generator and Receiver Dial	R. F. Compensators (4B)
Shortwave	Max.	6 M. C.	

Tuning Range: 530 to 1720 K. C.

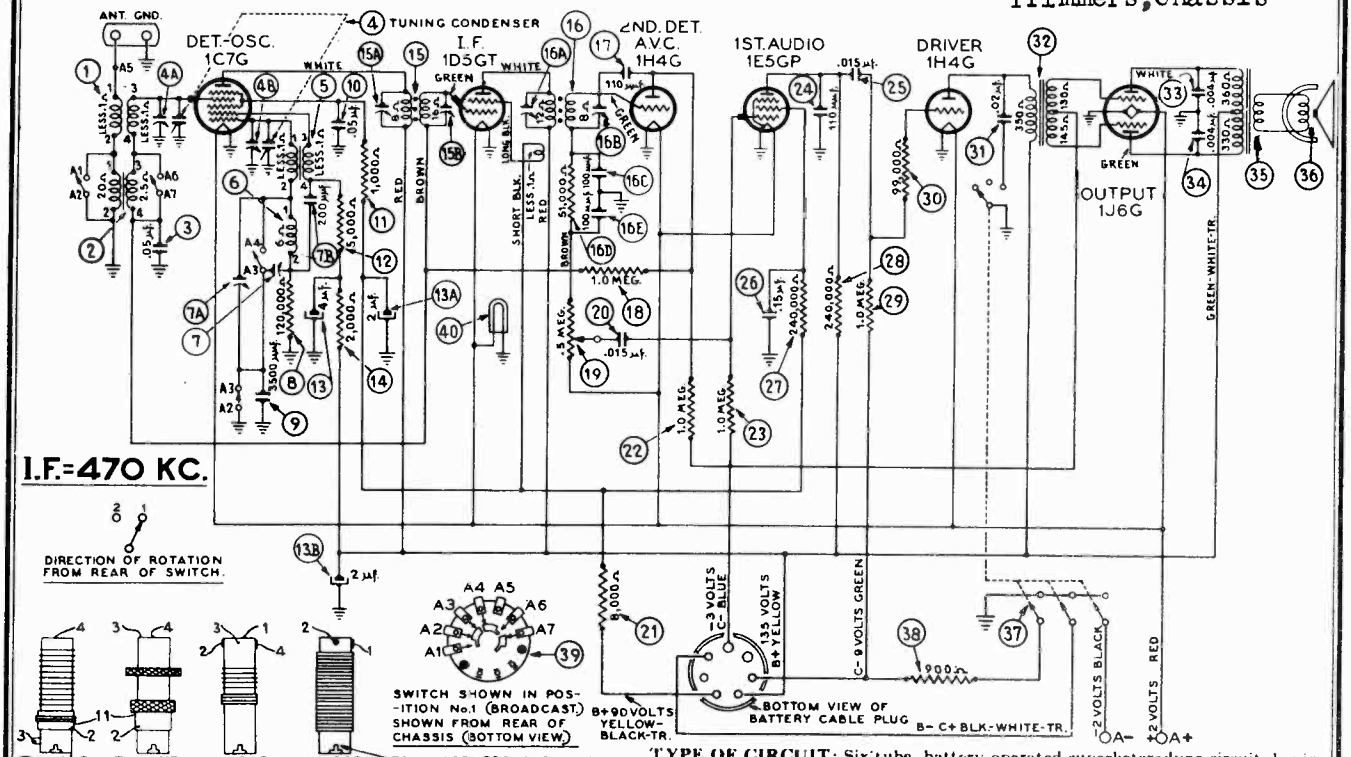
1. Remove the 400 ohm resistor from the No. 4 lead and replace with a 100 mmfd. condenser and reconnect to the aerial wire.

Set the controls and adjust the R. F. compensators as follows:

Range Switch	Volume Control	Signal Generator and Receiver Dial	R. F. Compensators in Order
Broadcast	Max.	1550 K. C.	(12A), (4A)
	Max.	580 K. C.	(12) Roll Tuning Condenser
	Max.	1550 K. C.	(12A), (4A)

MODEL 38-38, Code 121

PHILCO RADIO & TELEV. CORP. Schematic, Voltage Trimmers, Chassis



TYPE OF CIRCUIT: Six-tube, battery operated superheterodyne circuit, having two tuning ranges covering broadcast and short-wave frequencies; Automatic Volume Control; Tone Control, and a class "B" output stage.

INTERMEDIATE FREQUENCY: 470 K. C.

TUNING RANGES: Two—Range 1, 530 to 1720 K. C.
Range 2, 5.7 to 18.0 M. C.

POWER OUTPUT: 1 watt.

TYPE AERIAL: "L" type, Philco Part No. 45-2428.

CABINETS AND SPEAKERS USED:

Cabinet Type	Speaker Used
T	KR26
K	HR20
X	HR20

July, 1937

Model 38-38, Code 121

BATTERIES REQUIRED:

"A" Battery: Two volt storage battery Philco type 172R or Dry "A" battery Philco Part No. 41-8011.

If a dry A Battery is used, a ballast lamp "type 1F1" **MUST** be inserted in the socket provided in the (41-8011) battery. This lamp acts as a voltage regulator and maintains a constant potential of two volts on the filament of the tubes.

"BC" Battery: Philco battery Part No. 41-8007 is used to supply "B" and "C" voltages. This battery contains a socket into which the receiver battery cable plug is inserted.

PHILCO TUBES USED: One 1C7G, 1st Det. & Osc.; one 1D5GT, I. F. amplifier; One 1H4G, 2nd Det. (A.V.C.); one 1E5GP, 1st Audio; one 1H4G, Audio Driver, and one 1J6G, output.

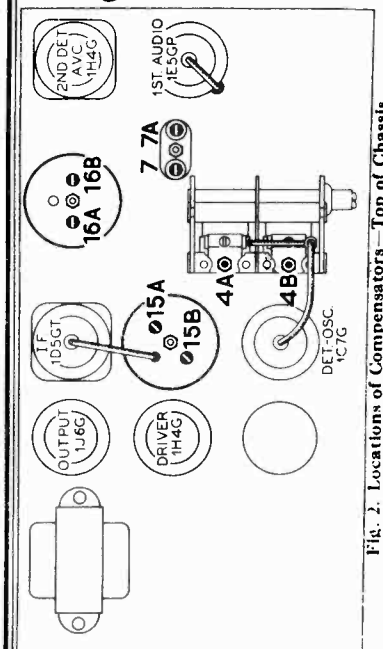


Fig. 2. Locations of Compensators—Top of Chassis

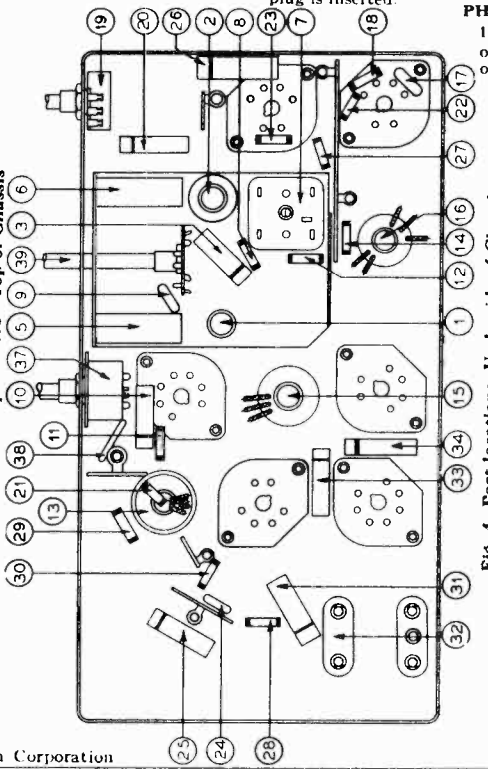


Fig. 4. Part locations, Underside of Chassis

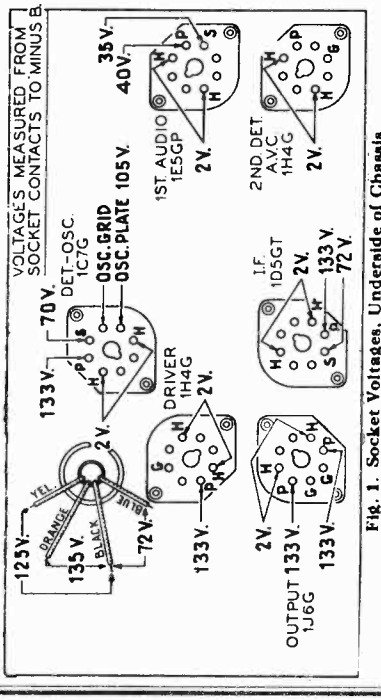


Fig. 1. Socket Voltages, Underside of Chassis
The voltages indicated by arrows were measured with a **Philco 026 Circuit Tester** which contains a sensitive voltmeter. Volume Control at minimum, range switch in broadcast position.

MODEL 38-38, Code 121
Alignment, Parts

PHILCO RADIO & TELEV. CORP.

Replacement Parts

Schem. No.	Description	Part No.	List Price
1	Antenna Transformer Range (2)	32-2558	$0.70
2	Antenna Transformer Range (1)	32-2667	1.60
3	Condenser (0.5 μf, tubular)	30-4519	.20
4	Tuning Condenser	31-2025	5.00
5	Oscillator Coil Range (2)	32-2668	1.25
6	Oscillator Coil Range (1)	32-2559	.50
7	Padding Condenser	31-6188	
8	Resistor (120,000 Ω, ½ W.)	33-412339	.20
9	Condenser (3500 μμf, Mica)	30-1094	.40
10	Condenser (.05 μf, tubular)	30-4444	.20
11	Resistor (1000 Ω ½ W.)	33-210339	.20
12	Resistor (5000 Ω, ½ W.)	33-250339	.20
13	Electrolytic Condenser (4—2—2 μf)	30-2241	1.50
14	Resistor (2000 Ω, ½ W.)	33-220339	.20
15	First I. F. Transformer	32-2664	2.20
16	Second I. F. Transformer	32-2666	2.20
17	Condenser (110 μμf, Mica)	30-1031	.20
18	Resistor (1 megohm, ½ W.)	33-510339	.20
19	Volume Control	33-5234	1.00
20	Condenser (.015 μf tubular)	30-4388	.20
21	Resistor (8000 Ω, ½ W.)	33-280339	.20
22	Resistor (1 megohm, ½ W.)	33-510339	.20
23	Resistor (1 megohm, ½ W.)	33-510339	.20
24	Condenser (110 μμf, Mica)	30-1031	.20
25	Condenser (.015 μf, tubular)	30-4515	.20
26	Condenser (.15 μf, tubular)	30-4191	.25
27	Resistor (240,000 Ω, ½ W.)	33-424339	.20
28	Resistor (240,000 Ω, ½ W.)	33-424339	.20
29	Resistor (1 megohm, ½ W.)	33-510339	.20
30	Resistor (99,000 Ω, ½ W.)	33-399339	.20
31	Condenser (.02 μf, tubular)	30-4215	.20
32	Input Transformer	32-7637	2.00
33	Condenser (.004 μf, tubular)	30-4456	.20
34	Condenser (.004 μf, tubular)	30-4456	.20
35	Output Transformer	32-7758	1.50
36	Cone and Voice Coil Assembly	36-3540	1.00
37	Power and Tone Switch	42-1351	
38	Resistor (900 Ω, 1 W.)	33-1223	.20
39	Range Switch	42-1358	.75
40	Pilot Light	34-2150	.22
	Cable (Battery)	41-3198	1.40
	Cable (Speaker)	41-3326	.40
	Clip (Mtg. R. F. Trans.)	28-5002	
	Dial	27-5333	.60
	Dial Washer	27-4598	.03
	Dial Clamp	27-5089	
	Knob (Tuning)	27-4330	
	Knob (Vernier)	27-4331	
	Knob (Tone, Volume)	27-4332	
	Mtg. Rubber (Chassis)	27-4564	
	Mtg. Rubber (Tuning Condenser)	27-4599	
	Mtg. Rubber (Screen Bracket)	27-4570	
	Screen	27-5320	
	Shield (Tube)	28-2725	
	Socket Assembly (Pilot Lamp)	38-9002	
	Socket (6 prong)	27-6086	.11
	Socket (7 prong)	27-6087	.11
	Terminal Panel (Ant.)	38-8849	.10
	Vernier Drive Assembly	31-2072	1.00

MODEL 38-38T

Bezel Frame Assembly	40-6124	$0.90
Bezel Gasket	27-8311	.01
Bezel Glass	27-8298	.05
Bezel Ring	28-5078	.55
Speaker KR-26	36-1353	10.00

MODEL 38-38 K, X

Bezel Frame Assembly	40-6128	1.05
Bezel Gasket	27-8313	.01
Bezel Glass	27-8300	.06
Bezel Ring	28-5080	.70
Speaker (HR-20)	36-1351	
Battery (A)	172R	
Battery (B)	41-8007	

PRICES SUBJECT TO CHANGE WITHOUT NOTICE

Alignment of Compensators

EQUIPMENT REQUIRED: (1) Signal Generator, having a fundamental frequency range covering the tuning and intermediate frequencies of the receiver. Philco Model 077 A. C. operated Signal Generator or Model 088, battery operated Signal Generator which have the required frequency range are the correct instruments for this purpose; (2) Output meter, Philco Model 026 circuit tester incorporates a sensitive output meter and is recommended; (3) Philco Fibre Handle Screw Driver, Part No. 27-7059 and Fibre Wrench, Part No. 3164.

OUTPUT METER: The 026 Output Meter is connected to the plate terminals of the 1J6G tube. Adjust the meter to use the (0-30) volt scale and advance the attenuator control of the generator until a readable indication is noted on the output meter after signal is applied.

DIAL CALIBRATION: In order to adjust the receiver correctly the dial must be aligned to track properly with the tuning condenser. To adjust the dial proceed as follows:

1. Turn the tuning condenser to maximum capacity position (plates fully meshed).

2. Holding the tuning condenser in this position, loosen the dial clamp; then turn the dial until the indicator is centered on the middle index line. Tighten clamp in this position. See Fig. 3

INTERMEDIATE FREQUENCY CIRCUIT

Insert the signal generator shielded output lead into the "Med" jack on the panel of the generator. Connect the other end of the output lead through a .1 mfd. condenser to the grid of the 1C7G Det. Osc. tube and the ground connection of the signal generator to the chassis. Set the signal generator and receiver controls and adjust the I. F. compensators as follows:

1. Set Signal Generator at 470 K. C. Turn "Multiplier" Control to 1000 and adjust the attenuator for a readable indication on the output meter.

2. Turn the receiver dial to 580 K. C.

3. Receiver Volume Control maximum.

4. Range Switch Broadcast Position.

5. Adjust compensators (16B), (16A), (15B) and (15A) for maximum output.

If the output meter goes off scale when adjusting the compensators retard signal generator "attenuator."

RADIO FREQUENCY CIRCUIT

Tuning Range: 5.7 to 18 M. C.

1. With one end of the shielded lead of the signal generator output cable in the "Med" jack, connect the other end through a 400 ohm carbon resistor to the "Ant." terminal of the aerial panel of the receiver. The output lead ground must be connected to the "Gnd" terminal or to the chassis.

2. Set the controls and adjust the R. F. compensators as follows:

Volume Control	Range Switch	Signal Generator and Receiver Dial	Compensators in Order
Max.	2	18 M. C.	(4B) See Note A

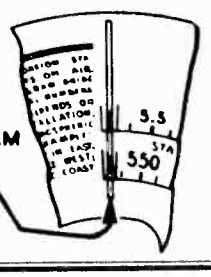
Tuning Range: 530 to 1720 K. C.

Remove the 400 ohm resistor from the generator output cable and replace with a 200 mmfd. condenser. Then set the controls and adjust the compensators as follows:

Volume Control	Range Switch	Signal Generator and Receiver Dial	Compensators in Order
Max.	1	1500 K. C.	(7A), (4A)
Max.	1	580 K. C.	(7)
Max.	1	1500 K. C.	(7A), (4A)

NOTE A—To accurately adjust the high frequency oscillator compensator to the fundamental instead of the image signal, turn the oscillator compensator to the maximum capacity position (clockwise). From this position slowly turn the compensator counter-clockwise until a second maximum peak is obtained on the output meter. Adjust the compensator for maximum output using this second peak. The first peak from maximum capacity position of the compensator is the image signal and must not be used in adjusting the compensator.

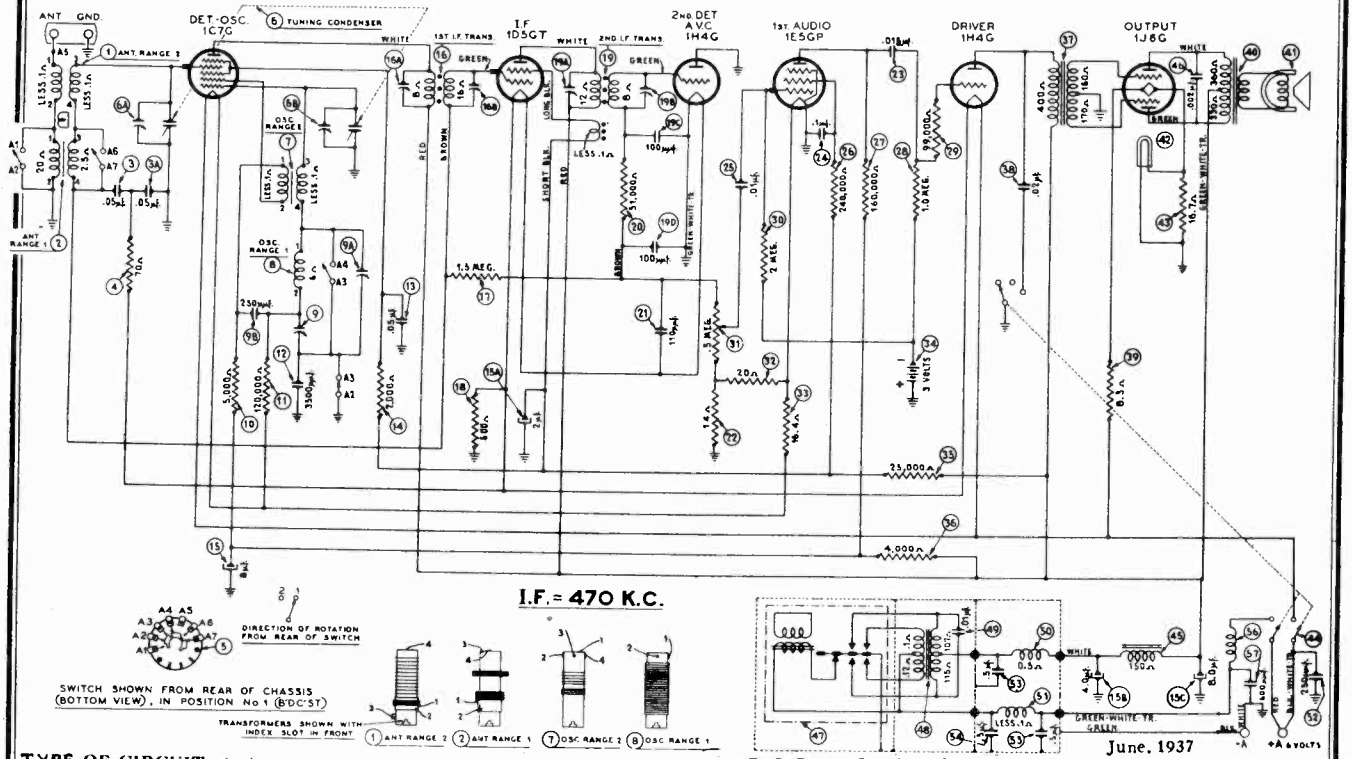
If the above procedure is correctly performed, the image signal will be found (much weaker) by turning the receiver dial 940 K. C. below the frequency being used on the high frequency range.



MODEL 38-39, Code 121

PHILCO RADIO & TELEV. CORP.

Schematic, Voltage Trimmers, Chassis



June, 1937

Model 38-39, Code 121

TYPE OF CIRCUIT: A six tube superheterodyne circuit is used in this model having two tuning ranges covering standard and short wave broadcasts. The receiver is operated by a 6 volt storage battery and uses a synchronous vibrator for supplying "B" voltage. The vibrator unit is mounted in the cabinet and connected to the receiver chassis through a cable and plug.

Additional design features included in this model are: Automatic Volume Control: two point tone control: Class "B" audio output circuit.

The receiver is designed to operate from a standard "I" type aerial, Philco Part No. 45-2428. This aerial system should be used to obtain the maximum performance from the receiver. Instructions for installing the aerial are provided in each kit.

POWER SUPPLY: 6 volt storage battery Philco Type 116K
Current Drain 1.4 Amps.

INTERMEDIATE FREQUENCY: 470 K. C.

FREQUENCY RANGES: Range one 530 to 1720 K. C.
Range two 5.7 to 18.0 M. C.

OUTPUT: 1.5 watts.

SPEAKERS USED: Philco Type KR26 in "T" Cabinet.
Philco Type HR20 in "K" Cabinet.
Philco Type HR20 in "X" Cabinet.

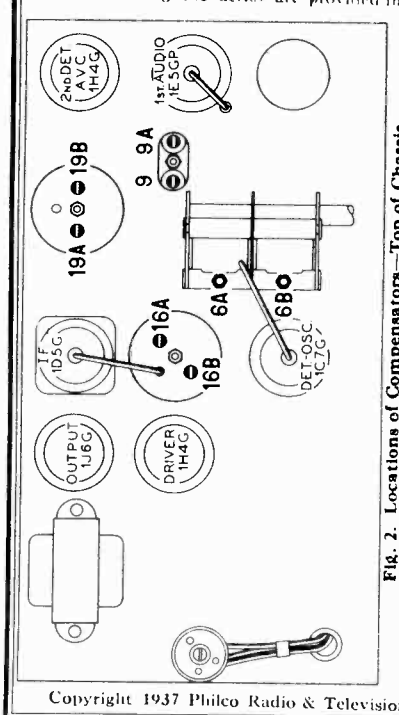


Fig. 2. Locations of Compensators—Top of Chassis

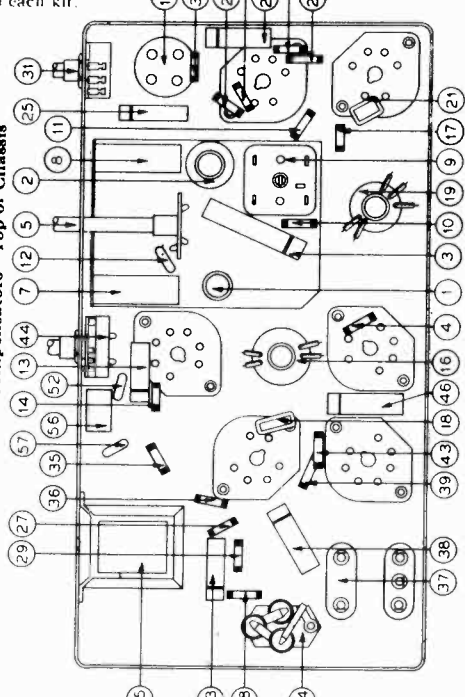


Fig. 5. Part locations, Underside of Chassis

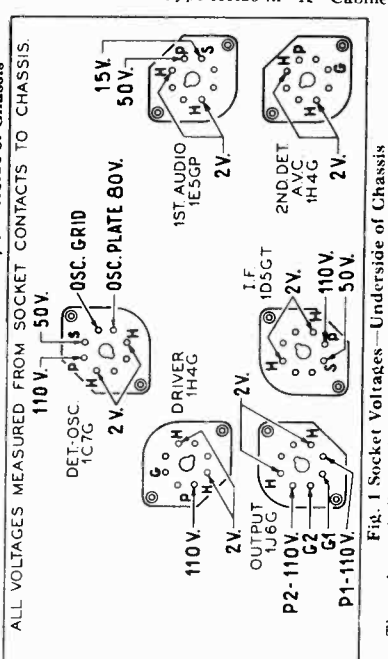


Fig. 1 Socket Voltages—Underside of Chassis

The voltages indicated by arrows were measured with a Philco 026 Circuit Tester which contains a sensitive voltmeter. Volume Control minimum—Range Switch in broadcast position—Storage Battery fully charged.

MODEL 38-39, Code 121
Alignment, Parts

PHILCO RADIO & TELEV. CORP.

Alignment of Compensators

EQUIPMENT REQUIRED: (1) Signal Generator, having a fundamental frequency range covering the tuning and intermediate frequencies of the receiver. Philco Model, 077 A. C. operated, Signal Generator or Model 088 Battery operated, Signal Generator, which have the required frequency range are the correct instruments for this purpose; (2) Output meter, Philco Model 026 circuit tester incorporates a sensitive output meter and is recommended; (3) Philco Fibre Handle Screw Driver, part no. 27-7059 and Fibre Wrench, part no. 3164.

OUTPUT METER: The 026 output meter is connected to the plate terminals of the 1J6G tube. Adjust the meter to use the (0-30) volt scale and advance the attenuator control of the generator until a readable indication is noted on the output meter after signal is applied.

DIAL CALIBRATION: In order to adjust the receiver correctly the dial must be aligned to track properly with the tuning condenser. To adjust the dial proceed as follows:

1. Turn the tuning condenser to maximum capacity position (plate fully meshed).

2. Holding the tuning condenser in this position, loosen the dial clamp; then turn the dial until the indicator is centered on the middle index line (See Fig. 2). Tighten clamp in this position.

INTERMEDIATE FREQUENCY CIRCUIT

Insert the signal generator shielded output lead into the "Med" jack on the panel of the generator. Connect the other end of the output lead through a .1 mfd. condenser to the grid of the 1C7G Det. Osc. tube and the ground connection of the signal generator to the chassis. Set the signal generator and receiver controls and adjust the I. F. compensators as follows:

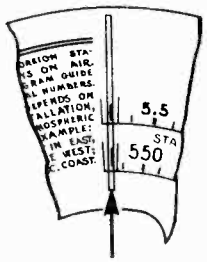
1. Set Signal Generator at 470 K. C. Turn "Multiplier" Control to 1000 and adjust the attenuator for a readable indication on the output meter.

2. Turn the receiver dial to 580 K. C.

3. Receiver Volume Control maximum.

4. Range Switch Broadcast Position.

5. Adjust compensators **(19B)**, **(19A)**, **(16B)** and **(16A)** for maximum output. If the output meter goes off scale when adjusting the compensators retard signal generator "attenuator."



GLOWING BEAM INDICATOR

Fig. 2. Dial Calibration

RADIO FREQUENCY CIRCUIT

Tuning Range: 5.7 to 18 M. C.

1. With one end of the shielded lead of the signal generator output cable in the "Med" jack, connect the other end through a 400 ohm carbon resistor to the "Ant." terminal of the aerial panel of the receiver. The output lead ground must be connected to the "Gnd." terminal or to the chassis.

2. Set the controls and adjust the R. F. compensators as follows:

Volume Control	Range Switch	Signal Generator and Receiver Dial	Compensators in Order
Max.	2	18 M. C.	**(6B)** See Note A

Tuning Range: 530 to 1720 K. C.

Remove the 400 ohm resistor from the generator output cable and replace with a 200 mmfd. condenser. Then set the controls and adjust the compensators as follows:

Volume Control	Range Switch	Signal Generator and Receiver Dial	Compensators in Order
Max.	1	1500 K. C.	**(9A)**, **(6A)**
Max.	1	580 K. C.	**(9)**
Max.	1	1500 K. C.	**(9A)**, **(6A)**

NOTE A—To accurately adjust the high frequency oscillator compensator to the fundamental instead of the image signal, turn the oscillator compensator to the maximum capacity position (clockwise). From this position slowly turn the compensator counter-clockwise until a second maximum peak is obtained on the output meter. Adjust the compensator for maximum output using this second peak. The first peak from maximum capacity position of the compensator is the image signal and must not be used in adjusting the compensator.

If the above procedure is correctly followed, the image signal will be found (much weaker) by turning the receiver dial 940 K. C. below the frequency being used on the high frequency range.

MODEL 38-39T CABINET

Bezel Frame Assembly	40-6124	.90
Bezel Gasket	27-8311	.01
Bezel Glass	27-8298	.05
Bezel Ring	28-5078	.55
Speaker KR-26	36-1353	10.00

Replacement Parts

Schem. No.	Description	Part No.	List Price
1	Transformer, Antenna Short Wave	32-2558	$0.70
2	Transformer, Antenna Broadcast	32-2667	1.60
3	Condenser (.05 μf—.05 μf)	30-4489	.35
4	Resistor (70 Ω, ½ Watt)	33-070339	.20
5	Wave Switch	42-1358	.75
6	Tuning Condenser Assembly	31-2065	
7	Transformer, Oscillator Short Wave	32-2668	1.25
8	Transformer, Oscillator Broadcast	32-2559	.50
9	Padder	31-6188	.50
10	Resistor (5000 Ω, ½ Watt)	33-250339	.20
11	Resistor (120,000 Ω, ½ Watt)	33-412339	.20
12	Condenser, Mica (3500 μμf)	30-1094	.40
13	Condenser, (.05 μf)	30-4444	.20
14	Resistor (2000 Ω, ½ Watt)	33-220339	.20
15	Electrolytic Condenser	30-2226	
16	I. F. Transformer, First	32-2664	2.20
17	Resistor (1.5 megohms, ½ Watt)	33-515339	.20
18	Resistor (600 Ω, ½ Watt)	33-1235	.20
19	I. F. Transformer, Second	32-2666	2.20
20	Resistor (51,000 Ω, ½ Watt)	33-351339	.20
21	Condenser, Mica (110 μμf)	30-1031	.20
22	Resistor (11.7 Ω, ½ Watt)	33-1264	.20
23	Condenser (.015 μf)	30-4515	.20
24	Condenser (.1 μf)	30-4122	.20
25	Condenser (.01 μf)	30-4479	.20
26	Resistor (240,000 Ω, ½ Watt)	33-424339	.20
27	Resistor (240,000 Ω, ½ Watt)	33-424339	.20
28	Resistor (1 megohm, ½ Watt)	33-510339	.20
29	Resistor (99,000 Ω, ½ Watt)	33-399339	.20
30	Resistor (2.0 megohms, ½ Watt)	33-520339	.20
31	Volume Control (.5 megohm)	33-5234	1.00
32	Resistor (20 Ω, ½ Watt)	33-1265	.20
33	Resistor (16.4 Ω, ½ Watt)	33-1266	.20
34	Bias Cell Assembly	38-7275	.20
35	Resistor (25,000 Ω, ½ Watt)	33-325339	.20
36	Resistor (4,000 Ω, ½ Watt)	33-240239	.20
37	Transformer—Push-pull Input	32-7637	2.00
38	Condenser (.02 μf)	30-4215	.20
39	Resistor (8.3 Ω, ½ Watt)	33-1268	.20
40	Transformer—Output	32-7758	
41	Cone & Voice Coil Assembly (KR26)	36-3540	1.00
	Cone & Voice Coil Assembly (HR20)	36-3797	
42	Dial Lamp	34-2150	.22
43	Resistor (16.7 Ω, ½ Watt)	33-1267	.20
44	Power Switch Tone Control	42-1363	1.00
45	Choke	32-7543	1.35
46	Condenser, (0.002 μf tubular)	30-4177	.25
47	Vibrator	41-3222	5.25
48	Power Transformer	32-7682	2.20
49	Condenser (.01 μf)	30-4381	.25
50	Choke ("B")	32-1932	.25
51	Choke ("A")	32-1954	.40
52	Condenser, Mica .250 μμf	5858	.25
53	Condenser, (.5 μf)	30-4296	.60
54	Condenser, (.5 μf)	30-4296	.60
55	Condenser, (.5 μf)	30-4296	.60
56	Choke	32-2247	
57	Condenser, (600 μμf) mica	30-1049	.25

MODEL 38-39 (Code 121)

Cable (Vibrator Unit)	41-3328	
Cable (Battery)	41-3204	
Cable (Speaker)	41-3326	.40
Clip (R. F. Coils)	28-5002	.02
Dial	27-5333	
Dial Washer	27-4598	.03
Dial Clamp	28-5089	.03
Knob (Tuning)	27-4330	.10
Knob (Tuning Vernier)	27-4331	.10
Knob (Tone & Volume)	27-4332	
Mtg. Panel (Bias Cell)	38-9104	
Mtg. Corner (Chassis)	27-4564	.10
Mtg. Rubber (Vibrator) (Small)	27-4307	
Mtg. Rubber (Vibrator, Assem.) (large)	27-4585	
Mtg. Rubber (Vibrator) (Square)	27-4287	
Mtg. Sleeve (Vibrator)	28-6521	
Mtg. Screw (Vibrator)	W-614	
Shield (Vibrator)	38-8022	
Shield (Tube)	28-2726	$0.10
Screen	27-5320	.75
Socket (Pilot Lamp)	38-9006	
Socket (6 prong)	27-6086	.11
Socket (7 prong)	27-6087	.11
Socket (Vibrator)	27-6036	
Terminal Panel (Ant.)	38-8849	.10
Vernier Drive	31-2072	1.90
Vibrator Socket Assembly	41-3327	

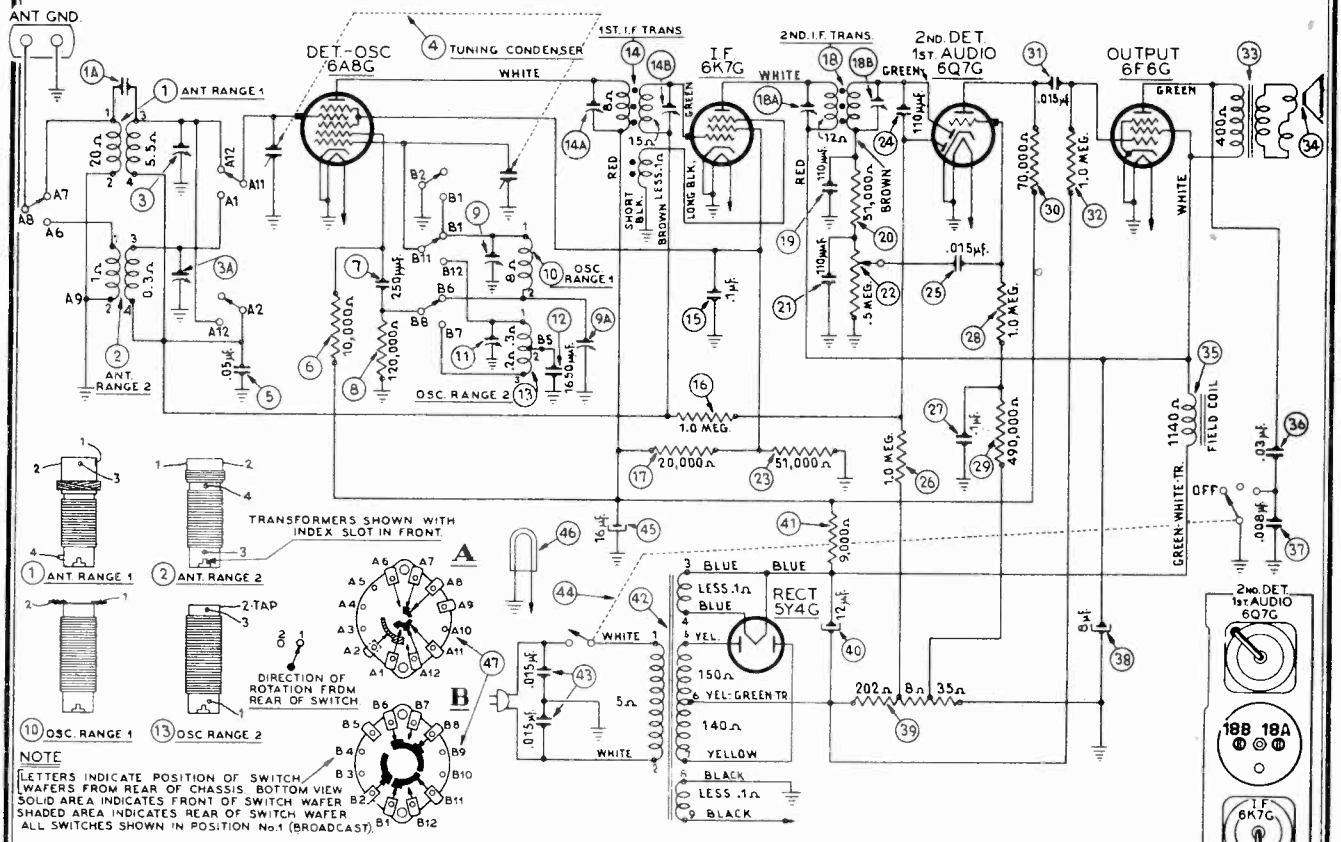
MODEL 38-39X and K CABINETS

Speaker H. R. 20	36-1351	
Bezel Frame Assembly	40-6128	1.05
Bezel Basket	27-8313	.01
Bezel Glass	27-8300	.06
Bezel Ring	28-5080	.70
Battery	116R	

PRICES SUBJECT TO CHANGE WITHOUT NOTICE

MODEL 38-60, Code 125

PHILCO RADIO & TELEV. CORP. Schematic, Voltage Trimmers, Chassis



Model 38-60—Code 125

April, 1937

INTERMEDIATE FREQUENCY: 470 K. C.

TUNING RANGE: Two—Range one 530 to 1720 K. C.
Range two 2.3 to 7.4 M. C.

UNDISTORTED OUTPUT: 3 watts.

TONE CONTROL: Two position.

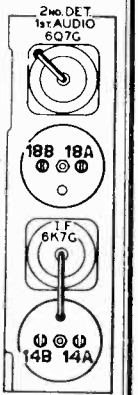


Fig. 2. I. F. Compensators top of chassis

Electrical Specifications

TYPE CIRCUIT: Superheterodyne, with Automatic Volume Control and a pentode audio output circuit.

POWER SUPPLY: Voltage	Frequency	Consumption
115	50 to 60	60 watts
115	25 to 40	60 watts
115/220	50 to 60	60 watts

PHILCO TUBES USED: One 6A8G, Det. Osc.; one 6K7G, I. F.; one 6Q7G, 2nd Det. audio; one 6F6G, audio output; and one 5Y4G, Rectifier.

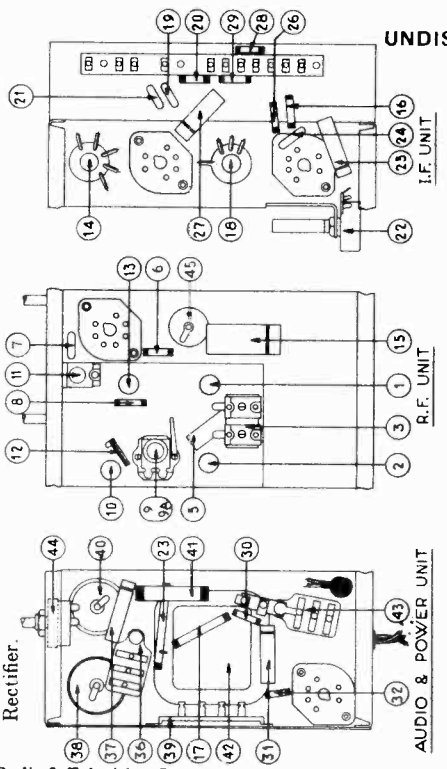


Fig. 4. Part Locations, underside of chassis

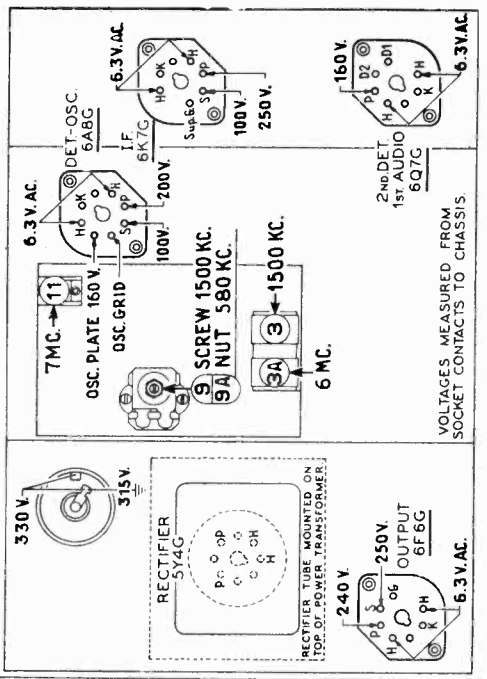


Fig. 1. R. F. Compensators and Voltage Readings, underside of chassis. The voltages indicated by arrows were measured with a Philco 026 Circuit Tester which contains a sensitive voltmeter. Volume control at minimum, range switch in broadcast position, line voltage 115 A. C.

MODEL 38-60,Code 125
Alignment,Parts

PHILCO RADIO & TELEV. CORP.

Alignment of Compensators

EQUIPMENT REQUIRED: (1) Signal Generator using a fundamental frequency range covering the intermediate and tuning ranges of the receiver. Philco Model 077 Signal Generator which has a fundamental frequency range from 115 to 36,000 K. C., is the correct instrument for this purpose; (2) output meter, Philco Model 026 circuit tester incorporates a sensitive output meter, and is recommended; (3) Philco Fibre Handle Screw Driver, part No. 27-7059 and Fibre Wrench part No. 3164.

OUTPUT METER: The 026 output meter is connected to the plate and cathode terminals of the 6F6G tube. Adjust the meter to use the (0-30) volt scale and advance attenuator control of the generator until a readable indication is noted or the output meter after a signal is applied to the receiver in the following adjustments.

DIAL CALIBRATION: In order to adjust this receiver correctly the dial must be aligned to track properly with the tuning condenser. To do this proceed as follows:

1. Turn the tuning condenser to the maximum capacity position, then loosen dial hub, set screws and rotate the dial (condenser at maximum capacity) until the glowing beam indicator is centered between the first and second index lines at the low frequency end of the broadcast scale.

2. With dial in this position, tighten dial hub set screws.

INTERMEDIATE FREQUENCY CIRCUIT

Connect the 077 signal generator output lead through a .1 mfd. condenser to the control grid of the 6A8G tube and the ground connection of the output lead to the chassis. Then set the controls of the signal generator and receiver as follows:

a. Signal Generator 470 K. C.

b. Receiver dial at 580 K. C.

c. Range switch of receiver at Range One.

d. Volume Control maximum.

e. Adjust I. F. Compensator (18B), (18A), (14B), (14A) for maximum output.

RADIO FREQUENCY CIRCUIT

Tuning Range 530 to 1720 K. C.

1. Connect the signal generator output lead through a 200 mmfd. condenser from the "med" post of the generator to the aerial terminal; and the output lead ground connection to the chassis.

2. The R. F. Compensators are adjusted as follows for maximum output:

Range Switch Position	Signal Generator and Receiver Dial	Compensators In Order
1	1500 K. C.	(9) (3)
1	580 K. C.	(9A) Note A
1	1500 K. C.	(9) (3)

Tuning Range 2.3 to 7.4 M. C.

Remove the 200 mmfd. from the output lead and replace with a 400 ohm carbon resistor and reconnect to the antenna terminal.

Range Switch Position	Signal Generator and Receiver Dial	Compensators In Order
2	7.0 M. C.	(11)
2	6.0 M. C.	(3A)

NOTE A—First tune compensator (9A) for maximum output, then vary the tuning condenser of the receiver for maximum output about the 580 K. C. dial mark. Now turn compensator (9A) slightly to the right or left and vary the receiver tuning condenser for maximum output. If the output reading increases, turn compensator (9A) in the same direction a trifle more, and again vary the tuning condenser for maximum output. If the output decreases, set the compensator in the opposite direction. This procedure of first setting the compensator and then varying the tuning condenser is continued until there is no further gain in output reading.

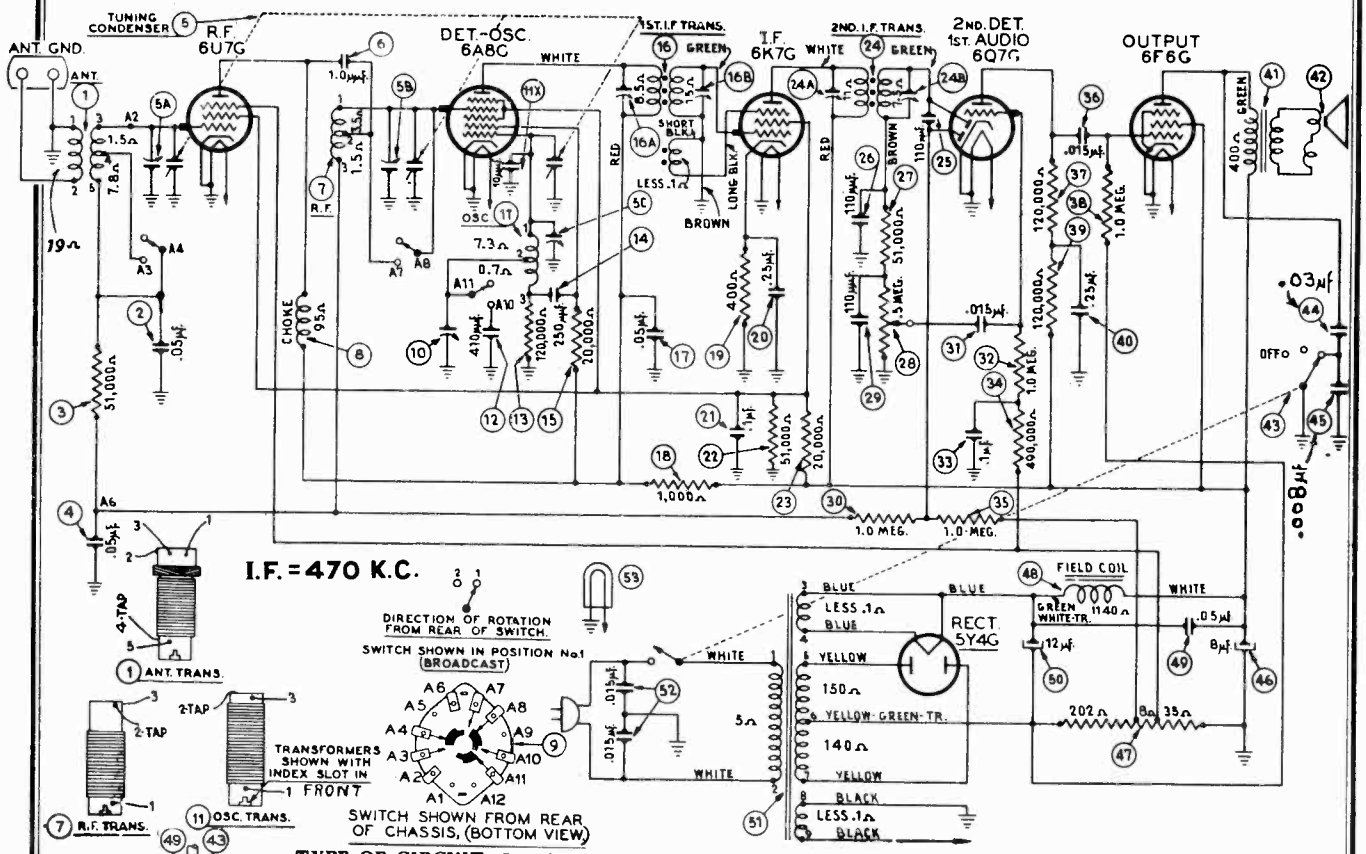
Replacement Parts

Schem. No.	Description	Part No.	List. Price
1	Antenna transformer (range 1)	32-2588	$1.00
2	Antenna transformer (range 2)	32-2246	.70
3	Compensator (2 section)	31-6093	.40
4	Tuning condenser	31-1826	3.00
5	Condenser (.05 mf. tubular)	30-4444	.20
6	Resistor (10,000 ohms, ½ watt)	33-310339	.20
7	Condenser (250 mmf. mica)	30-1032	.25
8	Resistor (120,000 ohms, ½ watt)	33-412339	.20
9	Compensator (2 section)	31-6100	.40
10	Oscillator transformer (range 1)	32-2380	.50
11	Compensator	31-6101	.20
12	Condenser (1650 mmf.)	31-6096	.40
13	Oscillator transformer (range 2)	32-2121	.70
14	I. F. Transformer (first)	32-2580	2.20
15	Condenser (.1 mf. tubular)	30-4455	.25
16	Resistor (1 meg., ½ watt)	33-510339	.20
17	Resistor (20,000 ohms, 1 watt)	33-320439	.20
18	Second I. F. transformer	32-2582	2.20
19	Condenser (110 mmf.) Part of 18		
20	Resistor (51,000 ohms)	33-351339	.20
21	Condenser (110 mmf.) Part of 18		
22	Volume control	33-5157	1.00
23	Resistor (51,000 ohms, 1 watt)	33-351439	.20
24	Condenser (110 mmf. mica)	30-1031	.20
25	Condenser (.015 mf. tubular)	30-4358	.20
26	Resistor (1 meg., ½ watt)	33-510339	.20
27	Condenser (.1 mf. tubular)	30-4122	.20
28	Resistor (1 meg., ½ watt)	33-510339	.20
29	Resistor (490,000 ohms, ½ watt)	33-449339	.20
30	Resistor (70,000 ohms, ½ watt)	33-370339	.20
31	Condenser (.015 mf. tubular)	30-4226	.20
32	Resistor (1 meg., ½ watt)	30-510339	.20
33	Output transformer (S7)	32-7019	.85
34	Cone and voice coil assembly	36-3157	1.00
35	Field coil assembly (S7)	36-3039	3.50
36	Condenser (.03 mf. bakelite)	8328-SU	.35
37	Condenser (.008 mf. tubular)	30-4317	.20
38	Condenser (8 mf. electrolytic)	30-2211	
39	Bias resistor (wire wound)	33-3316	
40	Condenser (12 mf. electrolytic)	30-2210	
41	Resistor (9000 ohms, 2 watts)	33-290539	.30
42	Power transformer		
	115 volts, 50-60 cycle	32-7583	4.50
	115 volts, 25-40 cycle	32-7584	6.50
	115/230 volts, 50-60 cycle	32-7585	6.50
43	Condenser (.015 mf.-.015 mf. dual bakelite)	3793-DG	.40
44	Tone control and off-on switch	42-1180	.75
45	Condenser (16 mf. electrolytic)	30-2212	
46	Pilot lamp	34-2039	.07
47	Range switch	42-1333	
	Cable Speaker	L-2181	.25
	Cable A. C.	L-2778	
	Dial	27-5196	.45
	Dial Hub	28-7152	.10
	Dial Clamp	28-2837	.10
	Dial Set Screw	W-1506	2.00 C
	Knob (Tuning)	27-4321	.10
	Knob (Tone & Volume)	27-4332	.10
	Pilot Lamp Socket Assembly	38-7706	.35
	Screen Bracket Assembly	31-1878	.25
	Speaker S7	36-1009	5.75
	Shaft (Vol. Cont.)	38-8058	.12
	Shaft Spring	28-4117	.40 C
	Shaft Clip	28-4394	.01
	Socket (6 prong)	27-6086	
	Socket (7 prong)	27-6087	
	Vernier Drive Assembly	31-1863	
	F CABINET		
	Baffle & Silk	40-6142	
	Bezel Assembly	40-6130	$1.00
	Bezel Gasket	27-8312	.01
	Bezel Glass	27-8299	.06
	Bezel Ring	28-5079	.60
	B CABINET		
	Baffle & Silk	40-6093	
	Bezel Plate & Frame	40-6117	.90
	Bezel Gasket	27-8311	.01
	Bezel Glass	27-8298	.05
	Bezel Ring	27-5078	.55

PRICES SUBJECT TO CHANGE WITHOUT NOTICE

MODEL 38-89, Code 125

PHILCO RADIO & TELEV. CORP. Schematic, Voltage Chassis



TYPE OF CIRCUIT: Superheterodyne with automatic volume control and a pentode audio output circuit.

POWER SUPPLY:

Voltage	Frequency	Consumption
115	50 to 60 cycles	65 watts
115	25 to 40 cycles	65 watts
115/220	50 to 60 cycles	

Different transformers are required for operation on the frequencies listed above. They are shown on the parts list.

TUNING RANGES) Two—Range one 530 to 1650 K. C.
Range two 1500 to 3700 K. C.

INTERMEDIATE FREQUENCY: 470 K. C.

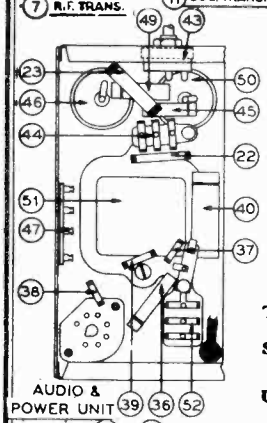
TONE CONTROL: Two positions.

SPEAKERS: Type S in B cabinet.
Type HS in K cabinet.

UNDISTORTED OUTPUT: 3 watts.

Model 38-89
Code 125

April, 1937



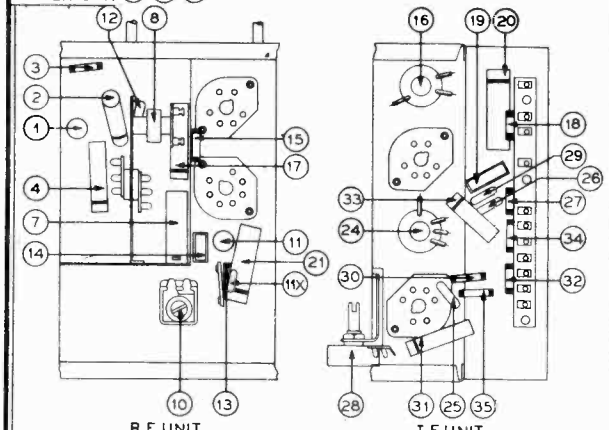


Fig. 4. Part Locations, underside of chassis.

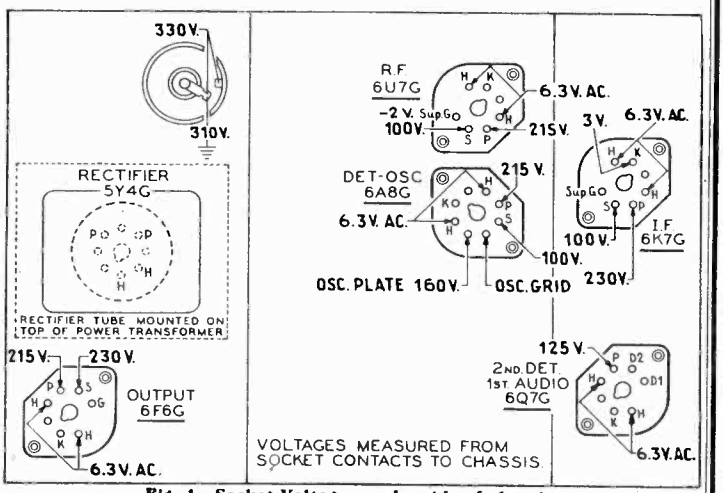


Fig. 1. Socket Voltages under side of chassis

The voltages indicated by arrows were measured with a **Philco 026 Circuit Tester** which contains an accurate voltmeter. Volume control at minimum, range switch in broadcast position, line voltage 115 A. C.

MODEL 38-89, Code 125
Alignment, Trimmers
Parts.

PHILCO RADIO & TELEV. CORP.

Replacement Parts

Schem. No.	Description	Part No.	List Price
1	Antenna transformer	32-2592	
2	Condenser (0.05 mf. tubular)	30-4519	$0.20
3	Resistor (51,000 ohms, ½ watt)	33-351339	.20
4	Condenser (0.05 mf. tubular)	30-4519	.20
5	Tuning Condenser assembly	31-2033	
6	Condenser (1.0 mmf. twisted wire)		
7	R. F. transformer	32-2128	.70
8	R. F. choke coil	32-2139	.35
9	Wave Switch	42-1334	
10	Compensator	31-6056	.55
11X	Condenser (10 mmf. mica)	30-1065	.20
11	Oscillator transformer	32-2120	1.00
12	Condenser (410 mmf. mica)	30-1000	.25
13	Resistor (120,000 ohms, ½ watt)	33-412339	.20
14	Condenser (250 mmf. mica)	30-1032	.25
15	Resistor (20,000 ohms, ½ watt)	33-320339	.20
16	1st I. F. transformer	32-2580	2.20
17	Condenser (0.05 mf. tubular)	30-4123	.20
18	Resistor (1,000 ohms, ½ watt)	33-210339	.20
19	Resistor (400 ohms, 1 watt, wire wound)	33-1211	.20
20	Condenser (0.25 mf. tubular)	30-4446	.25
21	Condenser (0.1 mf. tubular)	30-4455	.25
22	Resistor (51,000 ohms, ½ watt)	33-351, 339	.20
23	Resistor (20,000 ohms, ½ watt)	33-320, 339	.20
24	2nd I. F. transformer	32-2582	2.20
25	Condenser (110 mmf. mica)	30-1031	.20
26	Condenser (110 mmf. mica)	30-1031	.20
27	Resistor (51,000 ohms, ½ watt)	33-351,339	.20
28	Volume Control	33-5157	1.00
29	Condenser (110 mmf. mica)	30-1031	.20
30	Resistor (1.0 meg., ½ watt)	33-510, 339	
31	Condenser (0.015 mf. tubular)	30-4358	.20
32	Resistor (1.0 meg., ½ watt)	33-510, 339	.20
33	Condenser (0.1 mf. tubular)	30-4122	.20
34	Resistor (490,000 ohms, ½ watt)	33-449, 339	.20
35	Resistor (1.0 meg., ½ watt)	33-510, 339	.20
36	Condenser (0.015 mf. tubular)	30-4226	.20
37	Resistor (120,000 ohms, ½ watt)	33-412, 339	.20
38	Resistor (1.0 meg., ½ watt)	33-510, 339	.20
39	Resistor (120,000 ohms, ½ watt)	33-412, 339	.20
40	Condenser (0.25 mf. tubular)	30-4449	.20
41	Output transformer	32-7019	.85
42	Cone and voice coil assembly (S16)	36-3014	1.00
	Cone and voice coil assembly (HS3)	36-3796	
43	Tone control and power switch	42-1180	
44	Condenser (0.03 mf. bakelite)	8328-SU	.35
45	Condenser (0.008 mf. tubular)	30-4317	.20
46	Condenser (electrolytic, 8 mf.)	30-2211	
47	Bias resistor	33-3284	.30
48	Field coil assembly (S16)	36-3664	
	Field coil assembly (HS3)	36-3928	
49	Condenser (0.05 mf. tubular)	30-4020	.20
50	Condenser (electrolytic, 12 mf.)	30-2210	
51	Power transformer (115 v., 50-60 cycles)	32-7583	4.50
	(115 v., 25-40 cycles)	32-7584	6.50
	(115/230 v., 50-60 cycles)	32-7585	6.50
52	Condensers (0.015 mf. dual bakelite)	3793-DG	.40
53	Pilot Lamp	34-2064	.07
	Cable (Power)	L-2778	
	Cable (Speaker)	L-2181	.25
	Dial	27-5204	.35
	Dial Hub	28-7152	.10
	Dial Clamp	28-2837	.10
	Dial Set Screws	W-1506	2.00c
	Knob (Tuning)	27-4321	.10
	Knob (Vol., Range, Tone)	27-4332	.10
	Mtg. Spacer Bushing	27-4359	.02
	Mtg. Rubber Chassis	5189	.03
	Pilot Lamp Assembly	38-7706	.35
	Screen Bracket assembly	31-1878	
	Shield Tube, Round	28-5031	
	Shield Tube, Square	28-2726	$0.10
	Shield Base (Tube)	27-5030	.35
	Shaft (Volume Control)	38-8058	.12
	Socket 7 prong	27-6087	
	Socket 6 prong	27-6086	
	"K" CABINET		
	Baffle & Silk	40-6139	
	Bezel Frame & Plate	40-6130	1.00
	Bezel Gasket	27-8312	.01
	Bezel Glass	27-8299	.06
	Bezel Ring	28-5079	
	Speaker (HS3)	36-1350	
	"B" CABINET		
	Baffle & Silk Assembly	40-6093	
	Bezel Frame & Plate Assembly	40-6117	.90
	Bezel Gasket	27-8311	.01
	Bezel Glass	27-8298	.05
	Bezel Ring	28-5078	
	Speaker (S16)	36-1225	5.75

PRICES SUBJECT TO CHANGE WITHOUT NOTICE

Alignment of Compensators

EQUIPMENT REQUIRED: (1) Signal Generator—Philco Model 077 Signal Generator—using fundamental frequency from 115 to 36000 K. C. is the correct instrument for the purpose; (2) Output Meter, Philco Model 026 circuit tester incorporates a sensitive output meter and is recommended; (3) Philco Fibre Handle Screw Driver, part No. 27-7059 and Fibre Wrench part No. 3164.

OUTPUT METER: The 026 output meter is connected to the plate and cathode terminals of the 6F6G tube. Adjust the meter to use the (0-30) volt scale and advance attenuator control of the generator until a readable indication is noted.

DIAL CALIBRATION: In order to adjust this receiver correctly the dial must be aligned to track properly with the tuning condenser. To do this proceed as follows:

1. Turn the tuning condenser to the maximum capacity position. Then loosen dial hub, set screws and rotate the dial (condenser at maximum capacity) until the glowing beam indicator is center on second index line at the low frequency end of the broadcast scale.

2. With dial in this position, tighten dial hub set screws.

INTERMEDIATE FREQUENCY CIRCUIT

Insert the signal generator output lead in the med. jack, and connect the other end through a .1 mfd. condenser to the grid of the 6A8G det. osc. tube. The ground connection of the signal generator is connected to the chassis. Set the signal generator controls and adjust the I. F. compensators as follows:

a. Set 077 Signal Generator indicator at 470 K. C. Turn the multiplier control to 1000, and set the gain control for maximum output.

b. Receiver Dial 580 K. C.

c. Receiver volume control full "on".

d. Adjust compensator (24B), (24A), (16B) and (16A) for maximum output. If the output meter goes off scale when adjusting the compensators retard signal generator attentuator.

RADIO FREQUENCY CIRCUIT

Tuning Range 530 to 1650 K. C.

1. Insert the signal generator output lead in the "medium jack" on the panel, and connect the other end through the .1 mfd. condenser to the antenna terminal of the receiver. The output lead ground must be connected to the chassis.

2. Leave the receiver volume control full on. Then set the controls and adjust the R. F. compensators as follows:

Range Switch Position	Signal Generator and Receiver Dial	Compensators In Order
1	1500 K. C.	(5C), (5B), (5A)
1	580 K. C.	(10) (See Note A)
1	1500 K. C.	(5C), (5B), (5A)

Tuning Range 1500 to 3700 K. C.

The alignment of this tuning range is taken care of by the Range 1 adjustments.

NOTE A—First tune compensator (10) for maximum output, then vary the tuning condenser of the receiver for maximum output about the 580 K. C. dial mark. Now turn compensator (10) slightly to the right or left and vary the receiver tuning condenser for maximum output. If the out reading increases, turn compensator (10) in the same direction a trifle more, and again vary the tuning condenser for maximum output. If the output decreases, set the compensator in the opposite direction. This procedure of first setting the compensator and then varying the tuning condenser is continued until there is no further gain in output reading.

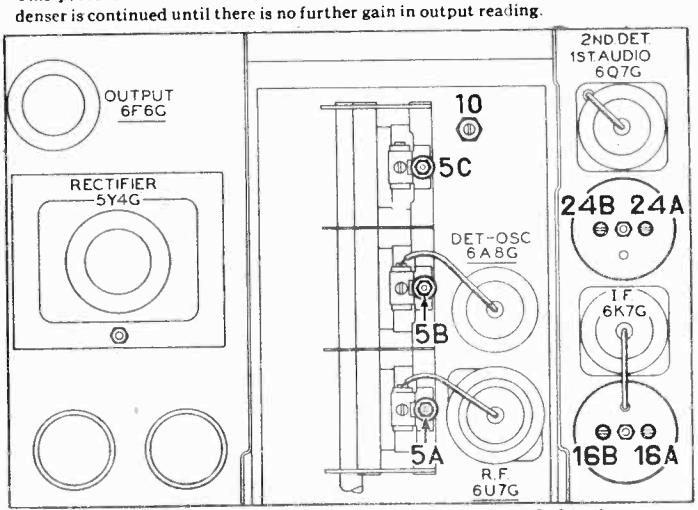
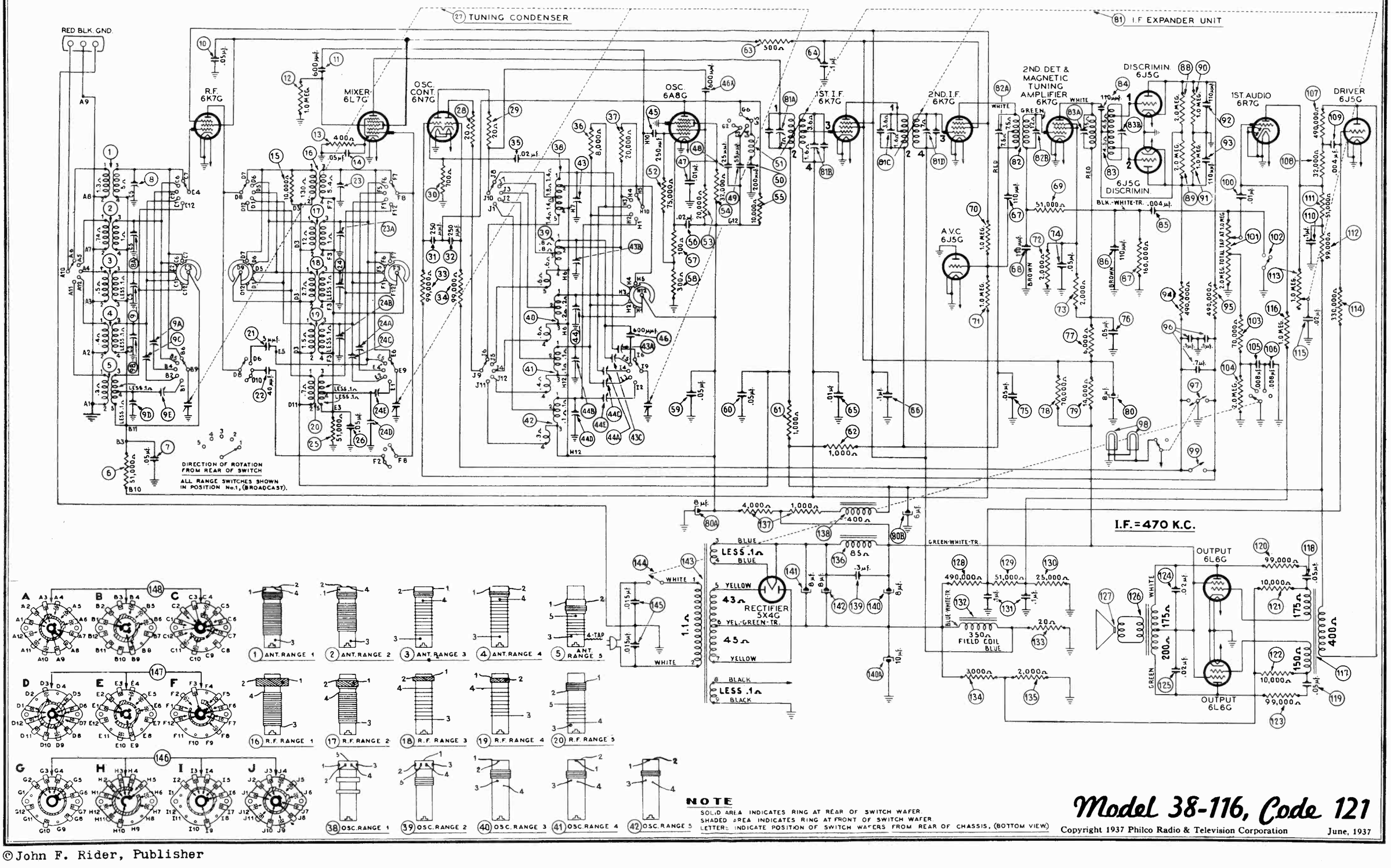


Fig. 2. Locations of Compensators. Top of chassis.

PHILCO RADIO & TELEV. CORP.



NOTE
SOLID AREA INDICATES RING AT REAR OF SWITCH WAFER.
SHADED AREA INDICATES RING AT FRONT OF SWITCH WAFER.
LETTERS INDICATE POSITION OF SWITCH WAFERS FROM REAR OF CHASSIS, (BOTTOM VIEW).

Model 38-116, Code 121

June, 1937

Alignment of Compensators

EQUIPMENT REQUIRED: (1) Signal Generator, having a fundamental frequency range covering the tuning and intermediate frequencies of the receiver. **Philco Model 077 Signal Generator** which has a fundamental frequency range from 115 to 36000 K. C. is the correct instrument for this purpose; (2) Output Meter, **Philco Model 026 Circuit Tester** incorporates a sensitive output meter and is recommended; (3) Philco Fibre Handle Screw Driver, Part No. 27-7059 and Fibre Wrench, Part No. 3164.

OUTPUT METER: The 026 Output Meter is connected to the plate and cathode terminals of one of the 6L6G tubes. Adjust the meter to use the (0-30) volt scale and advance the attenuator control of the generator until a readable indication is noted on the output meter after signal is applied to stage being adjusted.

DIAL CALIBRATION: In order to adjust the compensators of this receiver correctly the dial must be aligned to track properly with the tuning condenser. To do this proceed as follows:

1. Loosen the set screws on the shaft coupling of the tuning condenser. Then turn the tuning condenser until the plates are in the maximum capacity position. Now turn the dial until the glowing beam indicator is on the **Index Line** at the low frequency end of the broadcast band. See Fig. 0. With dial and tuning condenser in this position tighten set screws.
2. Turn the tuning condenser control until the indicator is on the 520 K.C. mark. See Fig. 6.
3. With the dial in this position, loosen the shaft coupling set screws. Then turn the dial until the indicator is again on the **Index Line.** Tighten the set screws in this position.

NOTE: Be careful when turning the dial that the position of the tuning condenser is not disturbed.

INTERMEDIATE FREQUENCY CIRCUIT

1. Viewing each instrument from the front, set the receiver and Signal Generator controls as follows:

a. Selectivity-fidelity control (clockwise)
b. Volume Control at maximum (clockwise)
c. Magnetic Tuning switch (off)
d. Bass Compensation switch first position from "off"
e. Range Switch position one (broadcast)
f. Receiver dial 580 K. C.
g. Signal Generator indicator set at 470 K. C. and the "Attenuator" control for maximum output.

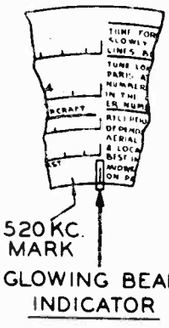


Fig. 6. Dial Calibration

2. Connect the Signal Generator output cable through a **.1** mfd. condenser to the grid of the second 6K7G I. F. tube. Then adjust the I. F. compensators as follows:

a. Close compensator (**82B**) by turning to the extreme clockwise position, then pad compensator (**82A**) for maximum output. Now readjust compensator (**82B**) for maximum output.

b. Connect the Signal Generator output lead through the **.1** mfd. condenser to the grid of the 6L7G tube, and adjust the following compensators for maximum output: (**81D**), (**81C**), (**81A**), (**81B**).

c. Repad (**82A**)—See **Note A.** Check for two equal peaks. Fidelity control in expanded position (counter-clockwise).

RADIO FREQUENCY CIRCUIT

1. Set the controls as given under "Intermediate Frequency Circuit" (**a-b-c-d**) and set the Range Switch, Signal Generator and Receiver Dials as given under the adjustments of each tuning range in the following procedure.

Connect the Signal Generator output cable to the "Red" and "Blk" terminals on the aerial panel (rear of chassis). The ground connection of the cable should be connected to the "Blk" terminal.

2. Set the controls and adjust the compensators for maximum output as follows:

Tuning Ranges 530 to 1600 K. C.

Range Switch	Signal Generator and Receiver Dial	Compensators in Order
Position 1	1500 K. C.	(**43**), (**8**), (**23**)
Position 1	580 K. C.	(**43A**) **Roll Tuning Condenser.**
Position 1	1500 K. C.	(**43**), (**8**), (**23**) **See Note B**
Position 1	1400 K. C.	(**8**), (**23**)

Tuning Range 4.7 to 7.4 M. C.

Range Switch	Signal Generator and Receiver Dial	Compensators in Order
Position 3	7.0 M. C.	(**44**)
Position 3	5.0 M. C.	(**44A**)
Position 3	7.0 M. C.	(**44**), (**9**), (**24**)
Position 3	5.0 M. C.	(**44A**), (**9A**), (**24A**)
Position 3	7.0 M. C.	(**44**), (**9**), (**24**)

Tuning Range 7.35 to 11.6 M. C.

Range Switch	Signal Generator and Receiver Dial	Compensators in Order
Position 4	11.0 M. C.	(**44B**)
Position 4	7.5 M. C.	(**44C**)
Position 4	11.0 M. C.	(**44B**), (**9B**), (**24B**) **Roll Tuning Condenser. See Note B**
Position 4	7.5 M. C.	(**44C**), (**9C**), (**24C**)
Position 4	11.0 M. C.	(**44B**), (**9B**), (**24B**) **Roll Tuning Condenser. See Note B**

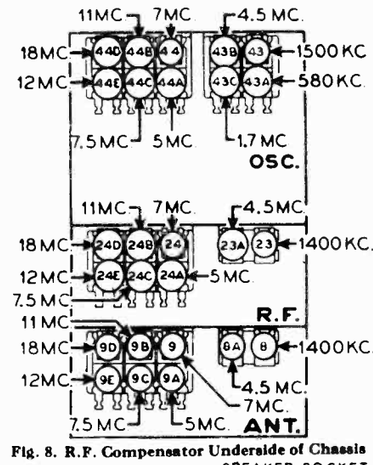
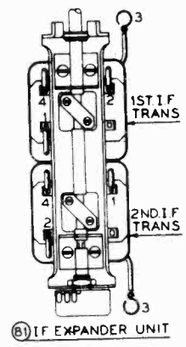


Fig. 8. R.F. Compensator Underside of Chassis



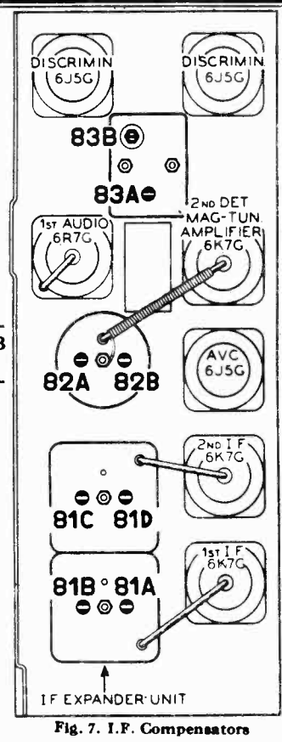


Fig. 7. I.F. Compensators

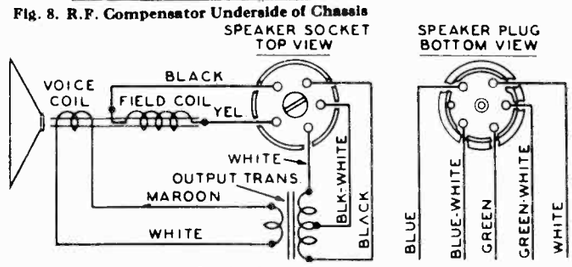
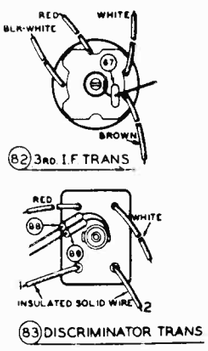


Fig. 3. Speaker Wiring



Tuning Range 1.58 to 4.75 M. C.

Range Switch	Signal Generator and Receiver Dial	Compensators in Order
Position 2	4.5 M. C.	(**43B**), (**8A**), (**23A**)
Position 2	1.7 M. C.	(**43C**)
Position 2	4.5 M. C.	(**43B**), (**8A**), (**23A**)

Tuning Range 11.5 to 18.2 M. C.

Range Switch	Signal Generator and Receiver Dial	Compensators in Order
Position 5	18.0 M. C.	(**44D**)
Position 5	12.0 M. C.	(**44E**)
Position 5	18.0 M. C.	(**44D**), (**9D**), (**24D**) **Roll Tuning Condenser. See Note B and C. Check image at 17.060 M. C.**
Position 5	12.0 M. C.	(**44E**), (**9E**), (**24E**) **Roll Tuning Condenser. See Note B**
Position 5	18.0 M. C.	(**44D**), (**9D**), (**24D**), **Roll Tuning Condenser. See Note B and C. Check image at 17.060 M. C.**

NOTE "A"—Slowly shift signal generator indicator between 460 and 480 K. C. As the indicator is turned, two peaks will be noted on the Output Meter; one about 465 K. C. and the other about 475 K. C. These peaks should give the same deflection or reading on the output meter. If the peaks are unequal Compensator (82A) must be slightly readjusted to the right or left (not more than ⅛ of a turn) until the peaks are equalized. This adjustment is used to compensate for slight differences between peaks. If the compensator must be turned more than ⅛ of a turn in either direction to equalize the peaks, all padders should be carefully readjusted as given under "Intermediate Frequency Circuit" adjustment procedure. Each time the compensator is set in another position, rotate the signal generator through the 460 or 480 K. C. range and note the reading of each peak.

NOTE "B"—When adjusting the low frequency compensator of Range One (Broadcast) or the antenna and R. F. compensators of the high frequency tuning ranges; the receiver Tuning Condenser must be adjusted (rolled) as follows: First tune the compensator for maximum output, then vary the tuning condenser of the receiver for maximum output about the frequency dial mark. Now turn the compensator slightly to the right or left and vary the receiver tuning condenser for maximum output. If the out reading increases, turn the compensator in the same direction a trifle more, and again vary the tuning condenser for maximum output. If the output decreases, set the compensator in the opposite direction. This procedure of first setting the compensator and then varying the tuning condenser is continued until there is no further gain in output reading.

NOTE "C"—To accurately adjust the high frequency oscillator compensator to the fundamental instead of the image signal, turn the oscillator compensator to the maximum capacity position (clockwise). From this position slowly turn the compensator counter-clockwise until a second maximum peak is obtained on the output meter. Adjust the compensator for maximum output using this second peak. The first peak from maximum capacity position of the compensator is the image signal and must not be used in adjusting the compensator.

If the above procedure is correctly performed, the image signal will be found (much weaker) by turning the receiver dial 940 K. C. below the frequency being used on any high frequency range.

MAGNETIC TUNING CIRCUIT ADJUSTMENT

a. Set the Magnetic Tuning switch in the "out" position (counter-clockwise).

b. Volume control maximum (extreme clockwise).

c. Turn Treble-Selectivity control to the expanded position (extreme clockwise).

d. Now, adjust the "Attenuator" control of the signal generator for a weak signal, and turn the indicator to 1000 K. C. Then adjust the receiver dial for **maximum** output at this frequency.

NOTE: The receiver dial **MUST** be tuned very accurately to the 1000 K. C. signal in order to make the following adjustments correctly.

e. After adjusting the receiver dial, turn the Magnetic Tuning switch "on."

f. Now, turn compensator (**83B**) slightly to the right or left (about ¼ turn) and proceed with adjustment "g."

g. Adjust compensator (**83A**) primary of the discriminator transformer for **minimum** output; then readjust compensator (**83B**) secondary of discriminator transformer for **maximum** output.

The above adjustments are now checked for accuracy as follows:

Frequency Test:

With the 1000 K. C. signal tuned for maximum output turn the Magnetic Tuning control back and forth; that is, from the "out" to "in" position. The reading of the output meter should not change in either position. If the output meter reading changes, the above magnetic tuning circuit adjustments should be repeated.

Sensitivity Test:

1. To check the magnetic tuning circuit for sensitivity, turn the magnetic tuning switch to the "off" position, and tune in the 1000 K. C. signal. Then adjust the "attenuator" control of the signal generator for a good audible signal. Approximately 20 volts on the output meter.

2. Now detune the signal (first above and then below the 1500 K. C. mark) to a point at which the signal is weakly heard. At each point turn the magnetic tuning control "on." When the control is turned on the signal should return to normal output strength. If the magnetic tuning circuit does not pull the signal into resonance, the primary compensator (**83A**) should be carefully readjusted.

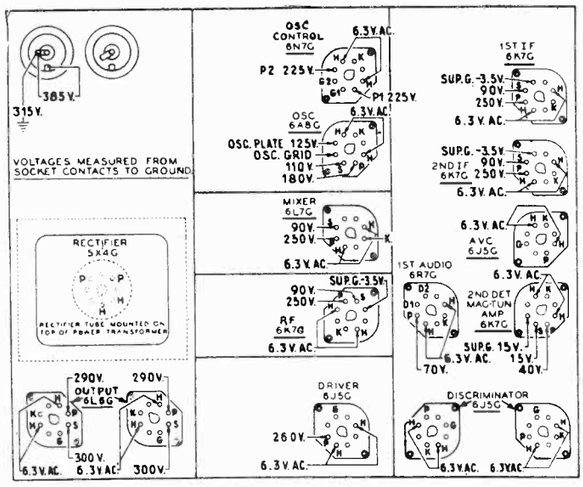


Fig. 1. Underside View of Chassis showing Socket Voltages

The voltages indicated by the arrows were measured with a **Philco 026 Circuit Tester,** which contains a sensitive voltmeter. Line voltage 115 A. C.—Volume control minimum—Dial set at point where no signal is present—Range Switch in broadcast position.

Aerial Connections

To obtain the full advantage of the sensitivity of this receiver the the "Red" and "Blk" terminals respectively. Connect the **Philco High Efficiency Aerial** supplied with the instrument must "Gnd" terminal to a good ground source. If a temporary be used. Connect the aerial as follows:

The aerial terminal panel located on the rear of the chassis, contains three terminals marked "Red," "Blk" and "Gnd". Connect the red and black wires of the aerial lead in (Transmission Line) to aerial is used, connect it to the "Red" terminal.

MODEL 38-116, Code 121 Chassis, Notes

PHILCO RADIO & TELEV. CORP.

PHILCO TUBES USED: 6K7G R.F.; 6L7G Mixer; 6A8G Oscillator; 6N7G Oscillator control; two 6K7G I. F.; 6K7G 2nd Detector Magnetic tuning amplifier; two 6J5G discriminator; 6J5G A. V. C.; 6R7G 1st audio; 6J5G audio driver; two 6L6G audio output, and one 5X4G rectifier.

Fig. 2. Underside View of Chassis

TYPE OF CIRCUIT: Model 38-116, code 121 employs a fifteen tube A.C. operated superheterodyne circuit with a spread-band dial having five tuning ranges covering a frequency range from 530 K.C. to 18.2 M.C.

Incorporated in this model are design features such as: magnetic tuning control on each tuning range; automatic volume control; treble-selectivity expander unit in the intermediate frequency circuit; audio bass compensation; acoustic clarifiers to eliminate cabinet resonance; special push-pull audio output circuit using 6L6G beam tubes, and the **Philco** automatic tuning mechanism.

POWER SUPPLY:	**Voltage**	**Frequency Cycles**	**Power Consumption**
	115	50 to 60	165 watts
	115	25 to 40	165 watts

Different transformers are required for operation on the voltages and frequencies listed above. The part numbers for these transformers are listed on page 5. A special transformer for operation on either 115 or 230 volt—50 to 60 cycle A.C. power circuit can be obtained. This transformer is provided with a plug and socket for selection of either voltage rating. Place the plug with arrow pointing toward voltage being used.

TONE CONTROLS: Two—1. High audio-frequency tone varied by Treble-Selectivity control.

2. Low audio-frequency tone varied by "Bass Tone Control," in the volume control circuit.

PHILCO SPEAKERS USED: One type "W4" with three acoustic clarifiers.

FREQUENCY RANGES:

Range One	530 to 1600 K.C.
Two	1.58 to 4.75 M.C.
Three	4.7 to 7.4 M.C.
Four	7.35 to 11.6 M.C.
Five	11.5 to 18.2 M.C.

UNDISTORTED OUTPUT: 15 watts.

CABINET: Type XX.

MODEL 38-116, Code 121

Parts

PHILCO RADIO & TELEV. CORP.

REPLACEMENT PARTS—Models 38-116, Code 121

PRICES SUBJECT TO CHANGE WITHOUT NOTICE

Schem. No.	Description	Part No.	List Price
1	Ant. Trans. (Range 1)	32-3208	
2	Ant. Trans. (Range 2)	32-2146	$1.20
3	Ant. Trans. (Range 3)	32-2183	1.20
4	Ant. Trans. (Range 4)	32-2185	1.20
5	Ant. Trans. (Range 5)	32-2175	1.20
6	Resistor (51,000—½ watt)	33-351339	.20
7	Condenser (0.5 mf. tubular)	30-4444	.40
8	Compensator (Range 1 & 2 Ant.)	31-6063	.40
9	Compensator (3, 4 & 5 Ant.)	31-6112	1.40
10	Condenser (.05 mf. tubular)	30-4122	.20
11	Condenser (600 mmf. mica)	30-1049	.25
12	Resistor (1 meg. ½ watt)	33-510339	.20
13	Resistor (400 ohms 1 watt wire wound)	33-1211	.20
14	Condenser (.05 mf. tubular)	30-4444	.40
15	Resistor (10,000 ohms ½ watt)	33 310339	.20
16	R. F. Trans. (Range 1)	32-2105	1.00
17	R. F. Trans. (Range 2)	32-2147	.70
18	R. F. Trans. (Range 3)	32-2177	.70
19	R. F. Trans. (Range 4)	32-2178	.70
20	R. F. Trans. (Range 5)	32-2176	1.20
21	Condenser (5 mmf. mica)	30-1077	.20
22	Condenser (40 mmf. mica)	30-1076	.20
23	Compensator (R. F. Range 1 & 2 R. F.)	31-6093	.40
24	Compensator (R. F. Range 3, 4, 5)	31-6113	1.40
25	Resistor (51,000 ½ watt)	33-351339	.20
26	Condenser (.05 mf. tubular)	30-4619	.20
27	Tuning Condenser	31-1892	3.75
28	Resistor (20 ohms, ½ watt)	33-020339	.20
29	Resistor (20 ohms, ½ watt)	33-020339	.20
30	Resistor (700 ohms, ½ watt)	33-170339	.25
31	Condenser (250 mmf. mica)	30-1032	.25
32	Condenser (250 mmf. mica)	30-1032	.25
33	Resistor (99,000 ohms, ½ watt)	33-399339	.20
34	Resistor (99,000 ohms, ½ watt)	33-399339	.20
35	Condenser (.02 mf. tubular)	30-4481	.20
36	Resistor (8,000 ohms, ½ watt)	33-280339	.20
37	Resistor (20,000, ½ watt)	33-320339	.20
38	Osc. Trans. (Range 1)	32-2191	1.00
39	Osc. Trans. (Range 2)	32-2194	1.00
40	Osc. Trans. (Range 3)	32-2197	.70
41	Osc. Trans. (Range 4)	32-2198	.70
42	Osc. Trans. (Range 5)	32-2199	.70
43	Compensator (Range 1 & 2 Osc.)	31-6124	1.00
44	Compensator (Range 3, 4 & 5 Osc.)	31-6117	1.20
45	Condenser (250 mmf. mica)	30-1032	.25
46	Condenser (600 mmf. mica)	30-1049	.25
46X	Condenser (600 mmf. mica)	30-1049	.25
47	Condenser (.01 mf. tubular)	30-4169	.20
48	Condenser (25 mmf. mica)	30-1067	.20
49	Condenser (55 mmf. mica)	30-1045	.20
50	Condenser (200 mmf. mica)	30-1078	.25
51	Choke (R. F.)	32-2242	.30
52	Resistor (75,000 ½ watt)	33-375339	.20
53	Resistor (20,000 ½ watt)	33-320339	.20
54	Resistor (32,000 ½ watt)	33-332339	.20
55	Resistor (10,000 ½ watt)	33-510339	$0.20
56	Condenser (.02 mf. tubular)	30-4481	.20
57	Resistor (10 ohms wire wound)	33-1219	.20
58	Resistor (300 ohms, wire wound)	33-3121	.25
59	Condenser (.05 mf. tubular)	30-4123	.20
60	Condenser (.05 mf. tubular)	30-4123	.20
61	Resistor (1000 ohms, ½ watt)	33-210339	.20
62	Resistor (1000 ohms, ½ watt)	33-210339	.20
63	Resistor (500 ohms, ½ watt)	33-150339	.20
64	Condenser (.1 mf. Bakelite)	4989SG	.35
65	Condenser (.01 mf. tubular)	30-4514	.20
66	Condenser (.01 mf. tubular)	30-4499	.20
67	Condenser (110 mmf. mica)	30-1031	.20
68	Condenser (110 mmf., Part of 82)	30-1031	
69	Resistor (51,000 ohms, ½ watt, Part of 82)	33-351339	.20
70	Resistor (1 meg., ½ watt)	33-510339	.20
71	Resistor (1 meg., ½ watt)	33-510339	.20
72	Resistor (2000 ohms, ½ watt)	33-220339	.20
73	Resistor (2000 ohms, ½ watt)	33-220339	.20
74	Condenser (.05 mf. tubular)	30-4444	.20
75	Condenser (.05 mf. tubular)	30-4518	.20
76	Condenser (.05 mf. tubular)	30-4444	.20
77	Resistor (6,000 1 watt)	33-260439	.20
78	Resistor (70,000 1 watt)	33-370439	.20
79	Resistor (14,000 wire wound)	33-3291	.40
80	Condenser (Elec. 8—8—6 mf.)	30-2232	2.50
‡81	1. F. Expander Unit (For 1st and 2nd I. F. Trans. See Note)	38-8912	10.00
82	1. F. Transformer (3rd)	32-2660	
83	Discriminator Trans.	32-2661	
84	110 mf. Condenser (Part of 83)	30-1031	.20
85	Condenser (.004 mf.)	30-4456	.20
86	Condenser (Part of 82)		
87	Resistor (160,000 ohm, ½ watt)	33-416339	.20
88	Resistor (2 meg., ½ watt)	33-520339	.20
89	Resistor (2 meg., ½ watt)	33-520339	.20
90	Resistor (1 meg., ½ watt)	33-510339	.20
91	Resistor (1 meg., ½ watt)	33-510339	.20
92	Condenser (110 mmf. mica)	30-1031	.20
93	Condenser (110 mmf. mica)	30-1031	.20
94	Resistor (490,000 ohms, ½ watt)	33-449339	.20
95	Resistor (490,000 ohms, ½ watt)	33-449339	.20
96	Condenser (.1—.1—.7 mf.)	30-4466	1.40
97	A.F.C. Shorting Switch	42-1216	.75
98	Flood Lights	34-2064	.09
99	A.F.C. Shorting Switch (Part of Mech. Tuner)	45-2330	1.20
100	Condenser (.01 mf. tubular)	30-4169	.20
101	Volume Control	33-5158	1.00
102	Audio Shorting Switch (Part of Mech. Tuner—See parts (6) and (16) Bulletin 273)		
103	Resistor (70,000 ohms, ½ watt)	33-370339	.20
104	Resistor (2 meg., ½ watt)	33-520339	.20
105	Condenser (.008 mf. tubular)	30-4112	.20
106	Condenser (.008 mf. tubular)	30-4112	.20
107	Resistor (490,000 ohms, ½ watt)	33-449339	.20
108	Resistor (32,000 ohms, ½ watt)	33-332339	.20
109	Condenser (.004 mf. tubular)	30-4456	.25
110	Condenser (.01 mf. tubular)	30-4455	.20
111	Resistor (51,000 ohms, ½ watt)	33-351339	.20
112	Resistor (99,000 ½ watt)	33-399339	.20
113	Potentiometer	33-5235	
114	Resistor (330,000 ohms, ½ watt)	33-433339	.20
115	Condenser (.02 mf. tubular)	30-4481	.20
116	Resistor (1 meg., ½ watt)	33-510339	.20
117	Input Trans.	32-7865	
118	Condenser (.05 mf. tubular)	30-4518	.20
119	Condenser (.05 mf. tubular)	30-4518	.20
120	Resistor (99,000 ½ watt)	33-399339	.20
121	Resistor (10,000 ½ watt)	33-310339	.20
122	Resistor (10,000 ½ watt)	33-310339	.20
123	Resistor (99,000 ½ watt)	33-399339	.20
124	Condenser (.02 mf. tubular)	30-4481	.20
125	Condenser (.02 mf. tubular)	30-4189	.35
126	Output Trans.	32-7751	2.00
127	Cone and Voice Coil Assembly	36-3647	2.50
128	Resistor (490,000 ½ watt)	33 449339	.20
129	Resistor (51,000 ½ watt)	33 351339	.20
130	Resistor (25,000 ½ watt)	33 325339	.20
131	Condenser (.1—.1 mf. Bakelite)	4899DG	.40
132	Field Coil Assembly	36-3788	15.00
133	Resistor (20 ohms, ½ watt)	33-020039	.20
134	Resistor (3,000 ohms, ½ watt)	33-230339	.20
135	Resistor (2,000 ohms, ½ watt)	33-220339	.20
136	Choke (85 ohm)	32-7056	2.20
137	Resistor (4,000 — 1,000 ohms, wire wound)	33-3289	.50
138	Choke (400 ohm)	32-7722	1.20
139	Condenser (.3 mf. tubular)	30-4465	.25
140	Condenser Elec. (8—10 mf.)	30-2201	1.75
141	Elec. Cond. (8 mf.)	30-2026	1.05
142	Elec. Cond. (8 mf.)	30-2026	1.05
143	Power Transformer (115 V., 50 to 60 cycle)	32-7699	7.50
	Power Transformer (115 V., 25 to 40 cycle)	32-7700	
	Power Transformer (115/220 V., 50 to 60 cycle)	32-7701	
144	Power and Tone Switch	42-1196	$0.75
145	Condenser (.015—.015 Bakelite)	3793DG	.40
146	Range Switch (Osc.)	42-1217	2.00
147	Range Switch (R. F.)	42-1255	1.60
148	Range Switch (Ant.)	42-1211	1.60
149	Pilot Lamp	34-2064	
	Acoustic Clarifier	36-1155	1.25
	Automatic Tuning Mech. Complete	31-2063	
	Bezel Assembly (Cabinet)	38-8833	
	Bezel Gasket	27-8828	.08
	Brace (Dial Mechanism)	28-4119	.05
†Cable and Plug (Floodlights)		41-3253	.25
	Cable (Power)	L-2183	.40
	Cable and Plug (Speaker)	41-3338	
	Clamp (R. F. Unit Rear Mtg.)	28-3900	.03
	Clamp Locking Plate (R. F. unit)	28-3982	.01
	Clamp (I. F. Cord)	28-4147	.01
	Cord (I. F. Expander Drive)	27-8411	.04
	Coupling (Range Switch and Mask)	38-8693	
	Coupling (Tuning Condenser and Dial Mechanism)	31-1961	
•Cover (Handle of Automatic Mech.)		28-5092	
•Dial		27-5340	.80
•Dial Screen Holder		31-2053	
•Escutcheon Assembly (Station Tabs)		45-2472	
†Floodlight Socket Assembly, 4 Sockets		38-8210	
	Knob (Range Switch)	27-4326	.10
	Knob (Tuning)	27-4330	.10
	Knob (Vernier)	27-4331	.10
	Knob (Bass, Volume, Expander Magnetic)	27-4332	.10
	Mask Guide (Tuning Mechanism)	28-4118	.25
†Pilot Lamp Socket Assembly		38-8051	
	Shaft and Index Plate (Range Switch)	42-1208	.50
	Shaft (I. F. Expander)	28-6496	.30
	Shaft (Volume Control)	38-8061	.12
	Shield (Tube, Square)	28-2726	.10
	Shield (Round 6N7G)	8005	.10
	Shield 3rd (I. F.)	38-1962	
	Shield (I. F. Expander)	38-9025	
	Shield Base (Square)	28-2725	.20
	Shield Base (Round 6N7G)	8004	.03
	Speaker (W4)	36-1284	
	Socket (7 prong, Power tubes)	27-8057	.11
	Socket (7 prong)	27-8087	.11
	Socket (6 prong)	27-8086	.11
	Socket (Power Transformer)	27-8052	.11
	Terminal Panel (Ant.)	38-8746	

MISCELLANEOUS MOUNTING PARTS

Bolt (Mtg. Speaker)	W-862	
Bushing (Mtg. R. F. Unit)	28-2257	.01
Clip (Volume Shaft Front Section)	28-4394	.01
Cover (Back of Cabinet)	27-8866	
Felt (Mtg. Speaker)	27-8498	.15
Rubber Grommet (Mtg. R. F. Unit)	27-4317	.04
Rubber Bushing (Mtg. Chassis)	27-4202	.08
Rubber Bushing (Mtg. Chassis)	27-4360	
Rubber Cushion (Mtg. Chassis)	3558	
Pin (I. F. Shaft)	3014	
Screw (Mtg. R. F. Unit Rear Section)	W-729	
Screw (I. F. Cord Clamp)	W-1324	
Screws (Back Cover, Cabinet)	W-1803	
SnapFastener(RangeSwitchCoupling)	28-4279	
Spacer (Mtg. R. F. Unit)	27-7807	
Spring (Retaining I. F. Shaft Front Section)	28-8610	
Spring Clip (I. F. Shaft, Rear Section)	28-4117	per C .40
Washer—Flat—(I. F. Shaft)	W-174	
Washer (Mtg. R. F. Unit)	28-3927	.01
Washer—Spring—(Mtg. I. F. Shaft)	28-4186	per C .75

•These Automatic Tuning Mechanism Parts differ from those shown in Service Bulletin 273.

‡1st I. F. Transformer Section 32-2727

2nd I. F. Transformer Section 32-2728

†Pilot and Floodlight Socket Assembly. 3 Sockets. Used on later type receivers 38-8487

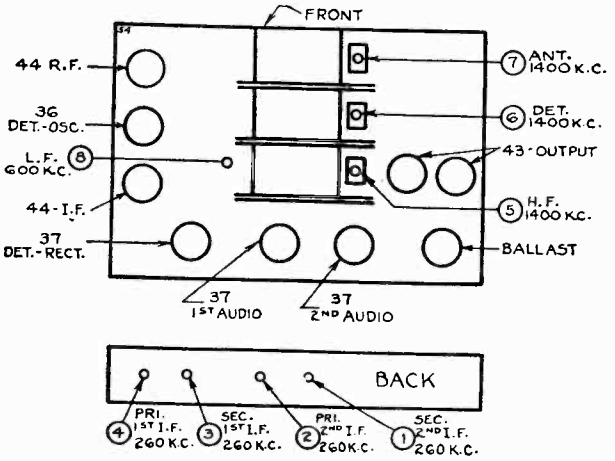
MODEL 47
MODEL 48
MODELS 90,90A(with 1-47)
Alignment,Trimmers

PHILCO RADIO & TELEV. CORP.

MODEL NO. 47

Signal Generator Connection	Signal Generator Frequency	Dial Position	Wave Band Switch Position	Trimmer Number	Output Signal
Remove grid clip from det.-osc.					
Control grid of det.-osc.	260 k.c.	60	...	1 [1]	Max.
"	"	"	...	2 [1]	Max.
"	"	"	...	3 [1]	Max.
"	"	"	...	4 [1]	Max.
Connect grid clip to det.-osc.					
Ant.*	1400 k.c.	140	...	5	Max.
"	"	"	...	6	Max.
"	"	"	...	7	Max.
"	600 k.c.	60	...	8 [2]	Max.**
"	1400 k.c.	140	...	5	Max.

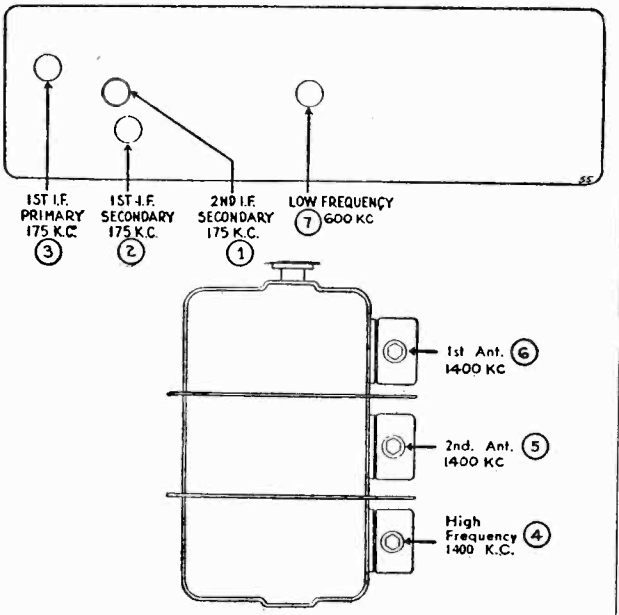
Note 1.—Accessible through holes in rear of chassis.
Note 2.—Accessible through hole from top of chassis.
* Connect a 200-mmf. condenser between signal generator and antenna post of set, at the antenna post.
** Adjust while rocking.



MODEL NO. 48

Signal Generator Connection	Signal Generator Frequency	Dial Position	Trimmer Number	Output Signal
Remove grid clip from det.-osc.				
Control grid of det.-osc.	175 k.c.	60	1	Max.
"	"	"	2	Max.
"	"	"	3	Max.
Connect grid clip to det.-osc.				
Ant.*	1400 k.c.	140	4	Max.
"	"	"	5	Max.
"	"	"	6	Max.
"	600 k.c.	60	7	Max.
"	1400 k.c.	140	4	Max.

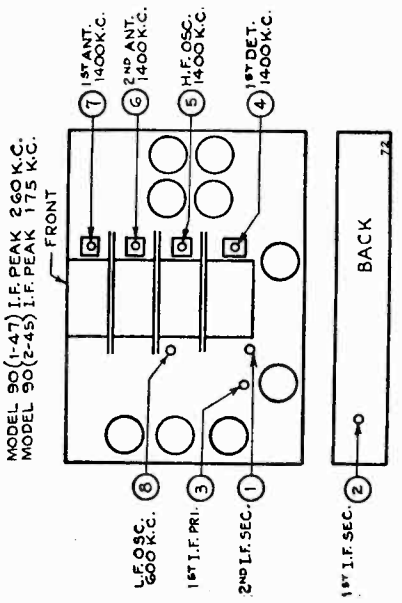
* Connect a 200-mmf. condenser between signal generator and antenna post of set, at the antenna post.



MODEL NOS. 90, 90A, (with 1-47)

Signal Generator Connection	Signal Generator Frequency	Dial Position	Wave Band Switch Position	Trimmer Number	Output Signal
Remove grid clip from 1st det.					
Control grid of 1st det.	Note 1	55	...	1	Max.
"	"	"	...	2	Max.
"	"	"	...	3	Max.
Connect grid clip to 1st det.					
Ant.*	1400 k.c.	140	...	5	Max.
"	"	"	...	4	Max.
"	"	"	...	6	Max.
"	"	"	...	7	Max.
"	600 k.c.	60	...	8	Max.**
"	1400 k.c.	140	...	5	Max.

* Connect a 200-mmf. condenser between signal generator and antenna post of set, at the antenna post.
** While rocking.
Note 1.—175 k.c. for models with two 45s and 260 k.c. for models with one 47.



MODEL 70(Below Ser.#B22,000)
270
MODEL 80
MODEL 81
Alignment,Trimmers

PHILCO RADIO & TELEV. CORP.

MODEL NOS. 70 (below ser. ‡B22,000), 270

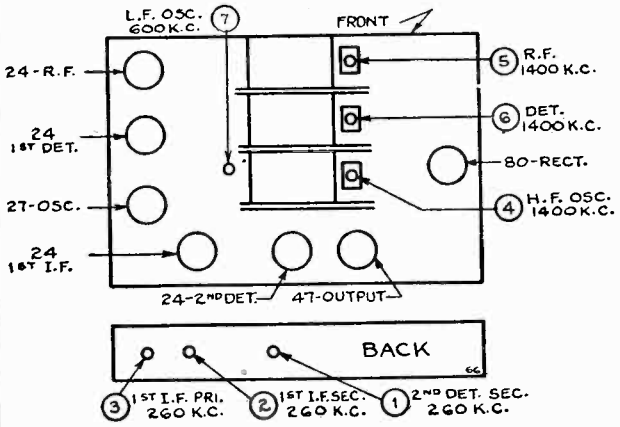
Signal Generator Connection	Signal Generator Frequency	Dial Position	Wave Band Switch Position	Trimmer Number	Output Signal
Remove grid clip from 1st det.					
Control grid of 1st det.	260 k.c.	55	...	1	Max.
"	"	"	...	2	Max.
"	"	"	...	3	Max.
Connect grid clip to 1st det.					
Ant.*	1400 k.c.	140	...	4	Max.
"	"	"	...	5	Max.
"	"	"	...	6	Max.
"	600 k.c.	60	...	7	Max.**
"	1400 k.c.	140	...	4	Max.

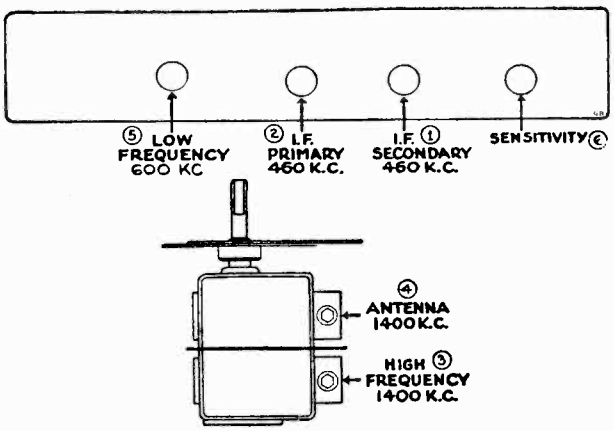
* Connect a 200-mmf. condenser between signal generator and antenna post of set, at the antenna post.
** While rocking.

MODEL NO. 80

Signal Generator Connection	Signal Generator Frequency	Dial Position	Wave Band Switch Position	Trimmer Number	Output Signal
Remove grid clip from det.-osc.					
Control grid of det.-osc.	460 k.c.	55	...	1	Max.
"	"	"	...	2	Max.
Connect grid clip to det.-osc.					
Ant.*	1400 k.c.	140	...	3	Max.
"	"	"	...	4	Max.
"	600 k.c.	60	...	5	Max.**
"	1400 k.c.	140	...	3	Max.
Note 1	Note 1	Note 1	...	6	Note 1

* Use a 100-mmf. condenser as dummy antenna.
** While rocking.
Note 1.—Connect antenna to receiver. Tune in station, first at about 130 and adjust (6) to a point just before squealing starts. Tune in stations along other points on dial. If squealing is present at any point readjust (6) slightly until there is none at any point along dial. This adjustment may have to be changed if set is moved to different location or if antenna length or 2nd det. tube is changed.

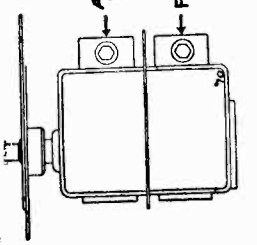


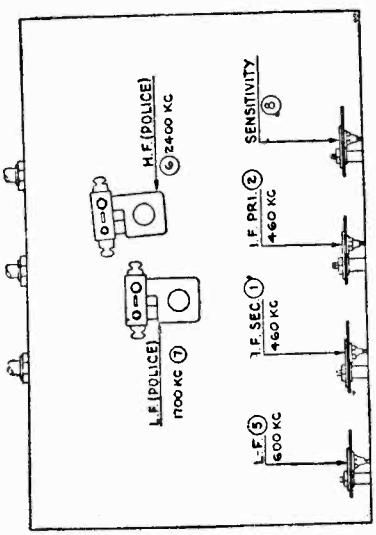


MODEL NO. 81

Signal Generator Connection	Signal Generator Frequency	Dial Position	Wave Band Switch Position	Trimmer Number	Output Signal
Remove grid clip from det.-osc.					
Control grid of det.-osc.	460 k.c.	55	Broadcast	1	Max.
"	"	"	"	2	Max.
Connect grid clip to det.-osc.					
Ant.*	1400 k.c.	140	"	3	Max.
"	"	"	"	4	Max.
"	600 k.c.	60	"	5	Max.**
"	1400 k.c.	140	"	3	Max.
"	2400 k.c.	2400 k.c.	Police	6	Max.
"	1700 k.c.	1700 k.c.	"	7	Max.
Note 1	Note 1	Note 1	Broadcast	8	Note 1

* Use a 100-mmf. condenser as dummy antenna.
** While rocking.
Note 1.—Connect antenna to receiver. Tune in station, first at about 130 and adjust (8) to a point just before squealing starts. Tune in stations along other points on dial. If squealing is still present, back off (8) slightly until there is none at any point along dial. This adjustment may have to be changed if antenna length or 2nd det. tube are changed.





Alignment, Trimmers

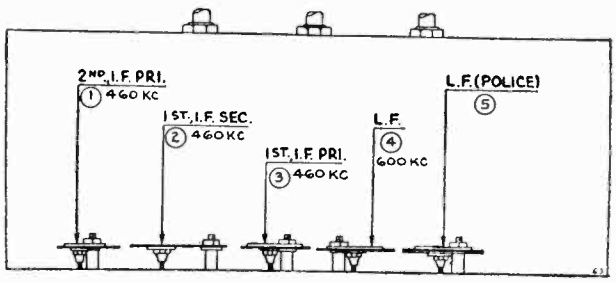
PHILCO RADIO & TELEV. CORP.

MODELS 95, 96, 296
MODEL 503
MODEL 504
MODEL 505

MODEL NO. 505

Signal Generator Connection	Signal Generator Frequency	Dial Position	Wave Band Switch Position	Trimmer Number	Output Signal
Remove grid clip from 6A7					
Control grid of 6A7	460 k.c.	55	Broadcast	1	Max.
"	"	"	"	2	Max.
"	"	"	"	3	Max.
Connect grid clip to 6A7					
Ant.*	"	"	"	Wave Trap [1]	*Min.*
"	1400 k.c.	140	"	H.F. Osc. [2]	Max.
"	"	"	"	Ant. [2]	Max.
"	600 k.c.	60	"	4	Max.**
"	1400 k.c.	140	"	H.F. Osc.	Max.
"	Note 3	Low-freq. end	Police	5	Max.

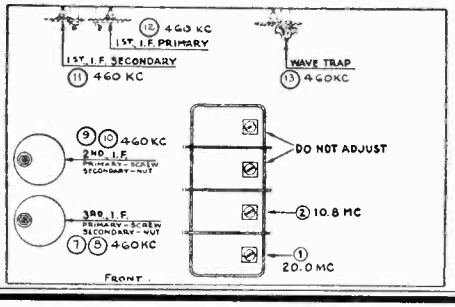
Note 1.—Wave trap in series with antenna was not used on early production.
Note 2.—H.F. osc. and ant. trimmers are located on tuning-condenser frame—the ant. trimmer is nearest front of chassis.
Note 3.—Set signal generator frequency to same as point on dial chosen near low frequency end. Adjustment of (5) will correct the dial calibration.
* Connect a 200-mmf. condenser between signal generator and antenna post of set, at the antenna post.
** While rocking.



MODEL NO. 504

Signal Generator Connection	Signal Generator Frequency	Dial Position	Wave Band Switch Position	Trimmer Number	Output Signal
Remove grid clip from 6A7					
Control grid of 6A7	460 k.c.	520 k.c.	Range 1	7 [1]	Max.
"	"	"	"	8 [2]	Max.
"	"	"	"	9 [1]	Max.
"	"	"	"	10 [2]	Max.
"	"	"	"	11	Max.
"	"	"	"	12	Max.
Connect grid clip to 6A7					
Ant.*	"	"	"	13	*Min.*
"	20 m.c.	20 m.c.	Range 4	1	Max.
"	10.8 m.c.	10.8 m.c.	Range 3	2	Max.
"	3.6 m.c.	3.6 m.c.	Range 2	3	Max.
"	1500 k.c.	1.5 m.c.	"	4	Max.
"	1400 k.c.	1400 k.c.	Range 1	5	Max.
"	520 k.c.	520 k.c.	"	6	Max.

* Use a 200-mmf. condenser as dummy antenna on broadcast band and a 400-ohm carbon resistor on shortwave band.
Note 1.—Nut adjustment.
Note 2.—Screw adjustment.
Caution: The two trimmers on the rear sections of the tuning condenser gang are correctly adjusted and sealed at the factory. *Do not change this adjustment.*



MODEL NOS. 95, 96, 296

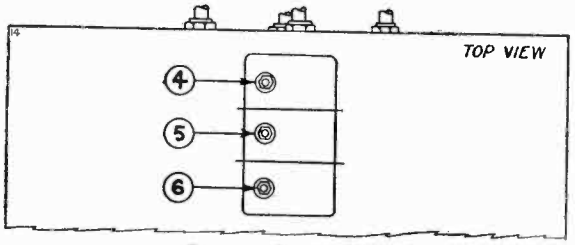
Signal Generator Connection	Signal Generator Frequency	Dial Position	Trimmer Number	Output Signal
Ant.*	1300 k.c.	130	Det. [1]	Max.
"	"	"	3rd [1] R.F.	Max.
"	"	"	2nd [1] R.F.	Max.
"	"	"	Ant. [1]	Max.

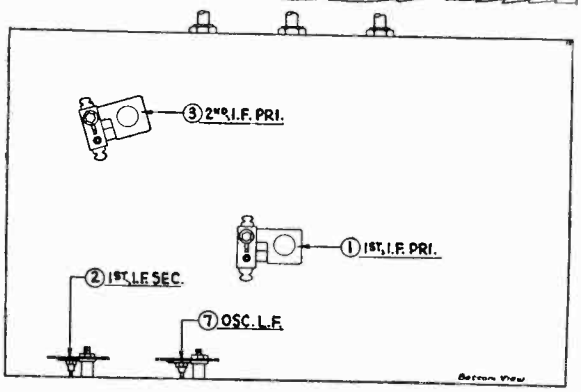
Note 1.—Located on top of chassis, behind gang condenser and between r.f. coil shields.
* Connect a 200-mmf. condenser between the signal generator and the antenna post of the set, at the antenna post.

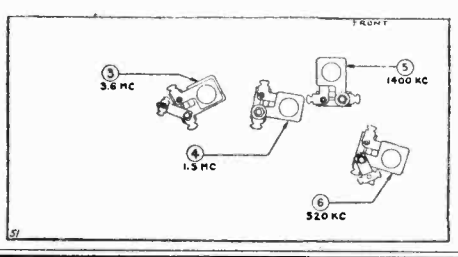
MODEL NO. 503

Signal Generator Connection	Signal Generator Frequency	Dial Position	Wave Band Switch Position	Trimmer Number	Output Signal
Remove grid clip from 6A7					
Control grid of 6A7	260 k.c.	55	...	3	Max.
"	"	"	...	2	Max.
"	"	"	...	1	Max.
Connect grid clip to 6A7					
Ant.**	1500 k.c.	150	...	6	Max.
"	1400 k.c.	140	...	5	Max.
"	1400 k.c.	"	...	4	Max.
"	600 k.c.	60	...	7	Max.*
"	1500 k.c.	150	...	6	Max.

* While rocking.
** Connect a 200-mmf. condenser between signal generator and antenna post of set, at antenna post.







MODEL 98
Chassis, Parts

PHILCO RADIO & TELEV. CORP.

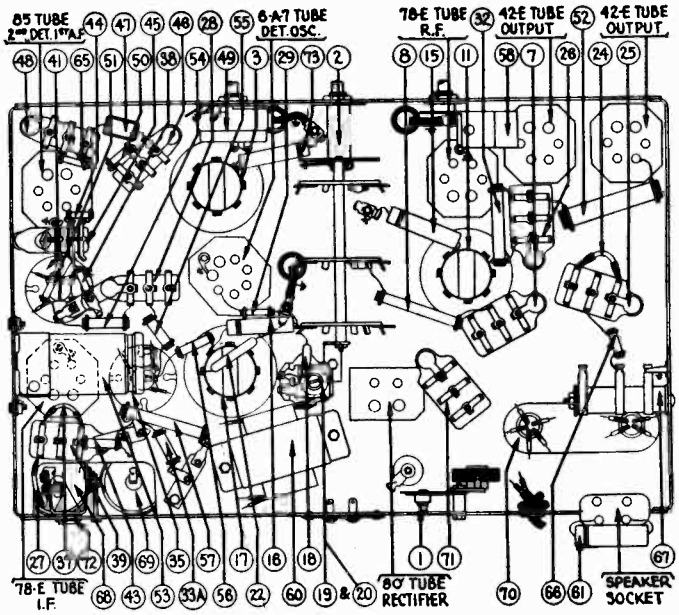


Fig. 3. Bottom View of Chassis

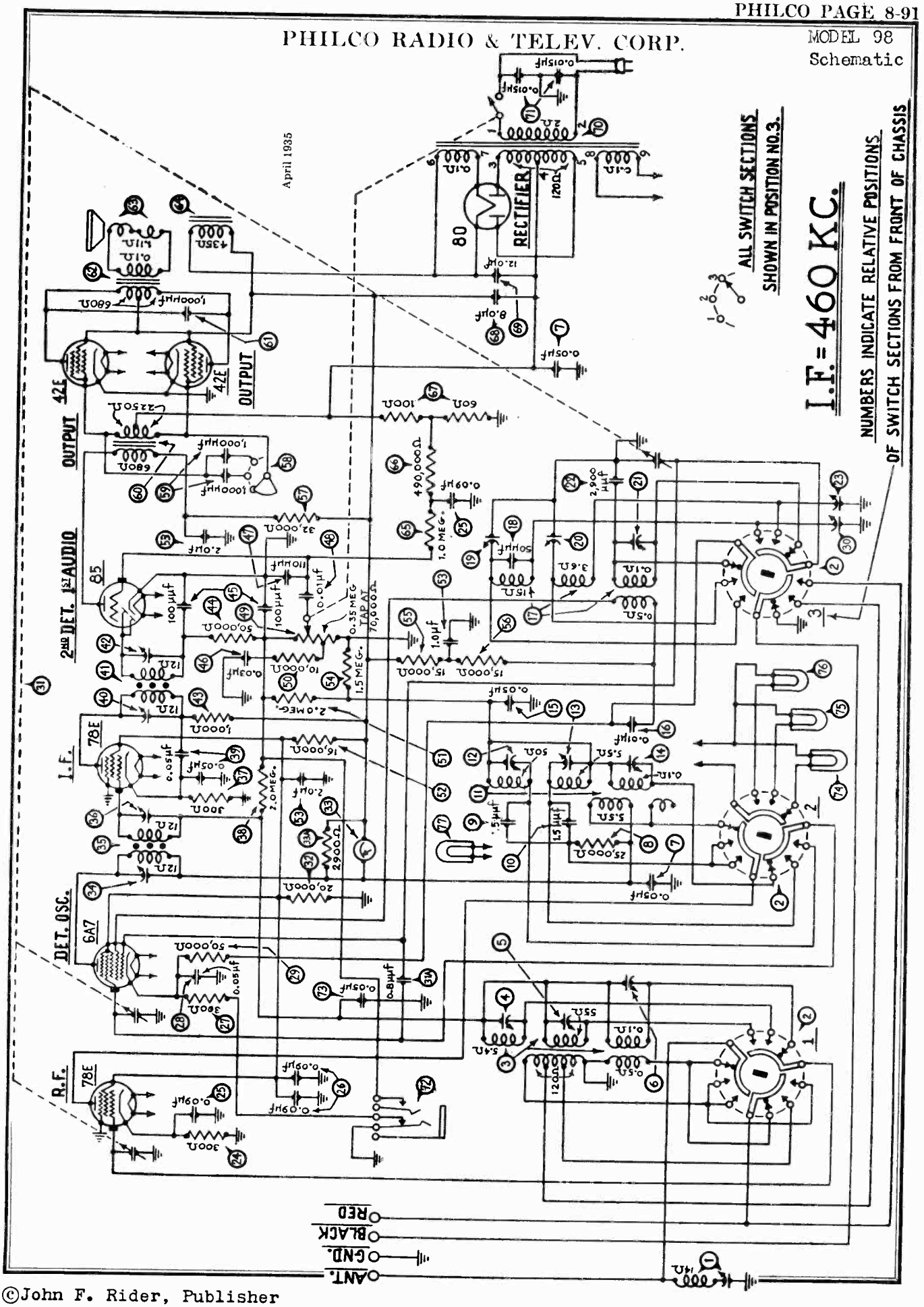
	Description	Part No.
①	Wavetrap	38-6718
②	Waveband Switch	42-1106
③	Ant. Transformer	32-1664
④	Compensating Condenser (Ant., Medium Wave)	Part of ③
⑤	Compensating Condenser (Ant., Long Wave)	Part of ③
⑥	Compensating Condenser (Ant., Short Wave)	Part of ③
⑦	Condenser (.05 Mfd. Twin Bakelite Block)	3615-DG
⑧	Resistor (25000 ohms) (Red, Green, Orange)	3656
⑨	Condenser (.0000015 Mfd.)	Part of ⑪
⑩	Condenser (.0000015 Mfd.)	Part of ⑪
⑪	R.F. Transformer	32-1666
⑫	Compensating Condenser (R.F. Long Wave)	Part of ⑪
⑬	Compensating Condenser (R.F. Medium Wave)	Part of ⑪
⑭	Compensating Condenser (R.F. Short Wave)	Part of ⑪
⑮	Condenser (.05 Mfd. Tubular)	30-4020
⑯	Condenser (.01 Mfd. Tubular)	30-4169
⑰	Oscillator Transformer	32-1665
⑱	Condenser (.00005 Mfd. Mica)	30-1029
⑲	Compensating Condenser (Osc., Long Wave Series)	31-6044
⑳	Compensating Condenser (Osc., Medium Series)	
㉑	Compensating Condenser (Osc., Short Wave)	Part of ⑰
㉒	Condenser (.0029 Mfd. Mica)	30-1054
㉓	Compensating Condenser (Osc., Medium H.F. End)	Part of ⑰
㉔	Resistor (300 ohms Flexible) (Orange, Black, Brown)	33-3010
㉕	Condenser (.09 Mfd. Twin Bakelite Block)	4989-DG
㉖	Condenser (.09 Mfd. Twin Bakelite Block)	4989-DG
㉗	Resistor (300 ohms Flex.) (Orange, Black, Brown)	33-3010
㉘	Condenser (.05 Mfd. Bakelite Block)	3615-SG
㉙	Resistor (50000 ohms) (Green, Brown, Orange)	6098

	Description	Part No.
㉚	Compensating Condenser (Osc., Long Wave, H.F. End)	Part of ⑰
㉛	Tuning Condenser Assembly	31-1362
㉛A	Condenser (.8 Mmfd.)	Part of ㉛
㉜	Resistor (20000 ohms) (Red, Black, Orange)	6649
㉝	Shadow Tuning Meter	45-2028
㉝A	Resistor (2900 ohms) (Red, White, Red)	5309
㉞	Compensating Condenser (1st I.F. Pri.)	Part of ㉟
㉟	First I.F. Transformer	32-1631
㊱	Compensating Condenser (1st I.F. Sec.)	Part of ㉟
㊲	Resistor (300 ohms Flex.) (Orange, Black, Brown)	33-3010
㊳	Resistor (2 Megs.) (Red, Black, Green)	33-1172
㊴	Condenser (.05 Mfd. Twin Bakelite Block)	3615-DG
㊵	Compensating Condenser (2nd I.F. Pri.)	Part of ㊶
㊶	2nd I.F. Transformer	32-1632
㊷	Compensating Condenser (2nd I.F. Sec.)	Part of ㊶
㊸	Resistor (1000 ohms) (Brown, Black, Red)	5837
㊹	Resistor (50000 ohms) (Green, Brown, Orange)	6098
㊺	Condenser (.00011 Mfd. Twin Bakelite Block)	8035-DG
㊻	Condenser (.03 Mfd. Bakelite Block)	6287-P
㊼	Condenser (.00011 Mfd. Mica)	30-1031
㊽	Condenser (.01 Mfd. Bakelite Block)	3903-SU
㊾	Volume Control & On-Off Switch	33-5102
㊿	Resistor (10000 ohms) (Brown, Black, Orange)	33-1000
(51)	Resistor (2 Megs.) (Red, Black, Green)	33-1172
(52)	Resistor (16000 ohms) (Brown, Blue, Orange)	7500
(53)	Condenser (Electrolytic, 1 Mfd., 2 Mfd., 2 Mfd.)	30-2114
(54)	Resistor (1.5 Meg.) (Brown, Green, Green)	7009
(55)	Resistor (15000 ohms) (Brown, Green, Orange)	6208
(56)	Resistor (15000 ohms) (Brown, Green, Orange)	6208
(57)	Resistor (32000 ohms) (Orange, Red, Orange)	3525
(58)	Tone Control	30-4311
(59)	Condensers (in Tone Control)	Part of (58)
(60)	Input (Audio) Transformer	32-7372
(61)	Condenser (.001 Mfd. Tubular)	30-4201
(62)	Output Transformer (on Speaker)	2585
(63)	Voice Coil & Cone Assembly: K-31	36-3174
	Voice Coil & Cone Assembly: H-21	02625
(64)	Field Coil & Pot Assembly: K-31	36-3463
	Field Coil & Pot Assembly: H-21	36-3461
(65)	Resistor (1 Meg.) (Brown, Black, Green)	33-1171
(66)	Resistor (490000 ohms) (Yellow, White, Yellow)	33-1169
(67)	Resistor (Wirewound Porcelain Base, 60 ohms, 100 ohms)	33-3208
(68)	Condenser (Electrolytic, 8 Mfd.)	30-2025
(69)	Condenser (Electrolytic, 12 Mfd.)	30-2117
(70)	Power Transformer: 115 volts 60 cycles	32-7369
	Power Transformer: 115 volts 25 cycles	32-7370
	Power Transformer: 230 volts 50 cycles	32-7371
(71)	Condenser (.015 Mfd. Twin Bakelite Block)	3793-DG
(72)	Headphone Jack	6585
(73)	Condenser (.05 Mfd. Tubular)	30-4020
(74)	Dial Lamp (Long Wave Band)	34-2031
(75)	Dial Lamp (Medium Wave Band)	34-2031
(76)	Dial Lamp (Short Wave Band)	34-2031
(77)	Pilot Lamp for Shadow Tuning Meter	Part of (33)
	Tube Socket 4 Prong	27-6019
	Tube Socket 6 Prong	27-6020
	Tube Socket 7 Prong	27-6012
	Socket (Speaker)	27-6018
	Tube Shield Body	28-1107
	Tube Shield Base	28-1110
	Dial Assembly	31-1514
	Electric Cord & Plug	L-943A

PHILCO RADIO & TELEV. CORP.

MODEL 98
Schematic

April 1935



MODEL 98
Alignment, Voltage
Trimmers

PHILCO RADIO & TELEV. CORP.

Adjusting Compensating Condensers

The adjustment of the compensating condensers in Model 98 requires a signal generator covering the broadcast and police band, and also one capable of producing a signal on several frequencies in the short wave band. We recommend the Philco model 024 or 048A instrument for the broadcast frequencies, and the Model 091 crystal controlled short wave signal generator for the "short wave" frequencies. The location of all compensating condensers is shown in Fig. 4.

Adjustment of I. F.

1. Remove the antenna connection from the receiver, disconnect the grid clip from the first detector (type 6A7 tube), and connect the "ANT" output terminal of the Model 048A or 024 signal generator to the grid cap of this tube; connect the "GND" terminal of the signal generator to the "GND" terminal of the receiver.

2. Connect the 0 to 20 volt range of the output meter in the Model 048A or 025 tester to the plate prongs of the two output (42E) tubes or to the two bottom prongs of the speaker plug.

3. Adjust the signal generator to a frequency of 460 K.C. Place the receiver in operation with the dial turned to the low frequency end of the scale, wave band switch to center position, and with the volume control adjusted near its maximum setting. Adjust the signal generator attenuator for approximately half-scale reading of the output meter.

4. The I.F. compensating condensers are located at the tops of the I.F. coil shields (smaller square top cans) and adjusted thru hole in top. The primary is adjusted by the screw, and the secondary by the nut. Adjust condensers ㊵ and ㊷ (2d I.F.) for maximum reading in the output meter, and then condensers ㉞ and ㊱ (1st I.F.).

Adjustment of Wave-Trap

Connect the signal generator leads to the antenna and ground terminals of the receiver. Replace the grid clip on the 6A7 grid cap.

With the signal generator still in operation at 460 K.C., adjust the wave-trap ① condenser until a MINIMUM reading is obtained on the output meter. The Philco fibre wrench, part No. 3164, is used for this adjustment.

Adjustment of High and Low Frequency Compensators

1. Leaving the output meter connected to the receiver connect the Philco Model 091 signal generator to the antenna and ground terminals of the chassis and place the signal generator in operation

2. Turn the wave-band switch to the extreme right (short-wave) and adjust the station selector to 18.0 megacycles, at which point the fifth harmonic of the 3600 K.C. signal will be heard. By means of the Philco wrench, part No. 3164, adjust the oscillator S.W., R.F.S.W. and antenna S.W. compensators for maximum reading in the output meter. These are numbered ㉑, ⑭ and ⑥, respectively in figure No. 2.

3. It will now be necessary to again use the broadcast type signal generator Models 024, 048 or equivalent. Connect the output of this signal generator to the antenna and ground terminals of the chassis. Turn the waveband switch to center position and set the station selector dial at 1700 K.C. Adjust the signal generator to the same frequency. Adjust the three compensators for the H.F. end of the broadcast (medium) scale. These are ㉘, ⑬ and ④.

4. Turn the dial to 60 and set the signal generator at 600 K.C. Adjust compensator ⑳ (nut) for maximum output.

5. Turn the waveband switch to the extreme left (long-wave) and set the dial at 30 and the signal generator at 300. Adjust condensers ㉚, ⑫ and ⑤ (oscillator, R.F. and antenna) for maximum output.

6. Turn the dial to 17 and set signal generator at 170. Adjust condenser ⑲ (screw) (long-wave series) for maximum output.

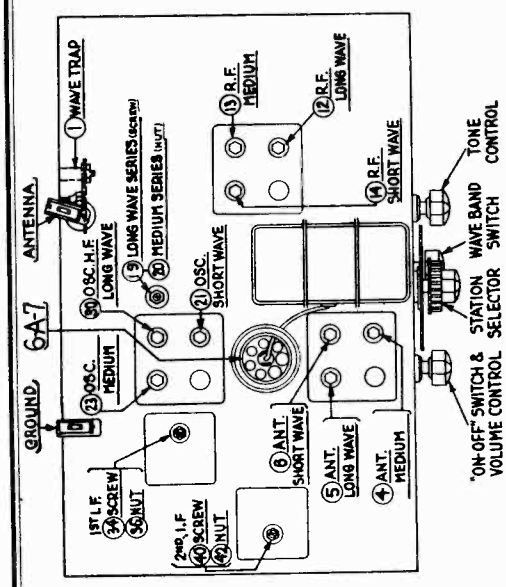


Fig. 4. Locations of Compensating Condensers

Power Transformer Data
(110 Volt 60 Cycle)

Terminals	A.C. Volts	Current	Circuit	Color
1–2	120	.....	Primary	White
3–5	710	118 M.A.	Secondary	Yellow
6–7	5.0	2.0 A.	Fil. Rect.	Blue
8–9	6.3	3.5 A.	Filaments	Black
4	...	.....	Center Tap of 3–5	Yellow, Green Tracer

Tube Socket Voltages
Measured to Ground

Tube	78E R.F.	6A7 Det. Osc.	78E I.F.	85 2d Det.	42E Output
Plate Long & Medium Wave	98	246	250	100	246
Short Wave	250	"	"	"	"
Screen Grid	92	92	92	...	257
Cathode	2.3	2.5	2.3	0	0

6A7: G 3 & 5 = 165.

Above voltages were obtained by using a PHILCO type 025 Circuit Tester (or 048A All-purpose Tester), using test prods applied to underside of chassis. Volume control at maximum; dial at low frequency end.

MODELS 233G, 233AG
Schematic, Chassis
Parts

PHILCO RADIO & TELEV. CORP.

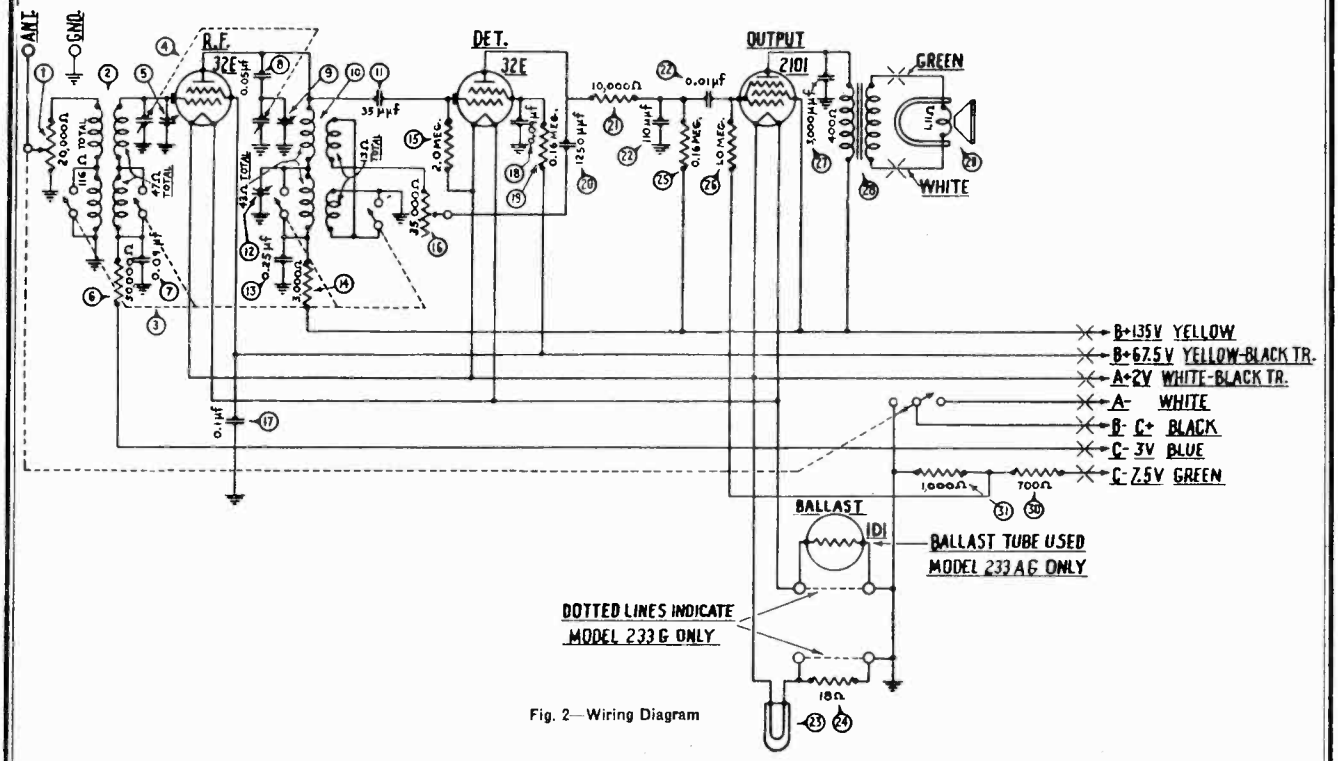


Fig. 2—Wiring Diagram

Replacement Parts for Model 233

Nos. on Diagram	Description	Part No.
(1)	Volume Control (20,000 ohms) & On-Off Switch	33-5075
(2)	Antenna Transformer	32-1451
(3)	Wave-Band Switch	42-1081
(4)	Tuning Condenser Assembly	31-1361
(5)	Compensating Condenser (R. F.)	Part of (4)
(6)	Resistor (50,000 ohms) (Green-Brown-Orange)	6098
(7)	Condenser (.09 Mfd.) (Bakelite Block Type)	4989F
(8)	Condenser (.05 Mfd.) (Tubular)	30-4020
(9)	Compensating Condenser (Det.)	Part of (4)
(10)	Detector Transformer	32-1452
(11)	Condenser (35 Mfd. Mica)	30-1055
(12)	Compensating Condenser (Low Frequency)	04000E
(13)	Condenser (.25 Mfd. Tubular)	30-4146
(14)	Resistor (3,000 ohms) (Red-White-Red)	5309
(15)	Resistor (2 Meg.) (Red-Black-Green)	33-1025
(16)	Regeneration Control	33-5076
(17)	Condenser (.1 Mfd. Tubular)	30-4122
(18)	Condenser (.09 Mfd. Bakelite Block)	4989F
(19)	Resistor (160,000 ohms) (Brown-Blue-Yellow)	5331
(20)	Condenser (.00125 Mfd. Mica)	5886
(21)	Resistor (10,000 ohms) (Brown-Black-Orange)	33-1000
(22)	Condenser (.00011 Mfd. & .015 Mfd.)	8035D
(23)	Pilot Lamp	5316
(24)	Pilot Lamp Resistor*	33-3185
(25)	Resistor (160,000 ohms) (Brown-Blue-Yellow)	5331
(26)	Resistor (1 Meg.) (Brown-Black-Green)	33-1096
(27)	Condenser (.003 Mfd. Tubular)	30-4042
(28)	Output Transformer	32-7287
(29)	Voice Coil and Cone Assembly (KR-8 Speaker)	36-3159
(30)	Resistor (700 ohms)	6443
(31)	Resistor (1,000 ohms)	33-3017
	Four Prong Socket	7545
	Five Prong Socket	27-6013

Nos. on Diagram	Description	Part No.
	Shorting Jumper Wire	38-6138
	Speaker Cable	L-1729
	Battery Cable (233G)	41-3110
	Battery Cable (233AG)	41-3111
	Pilot Lamp Bracket Assembly	38-6052
	Tube Shield	8C05

*Shorted by Jumper wire on 233G. Jumper removed on 233AG.

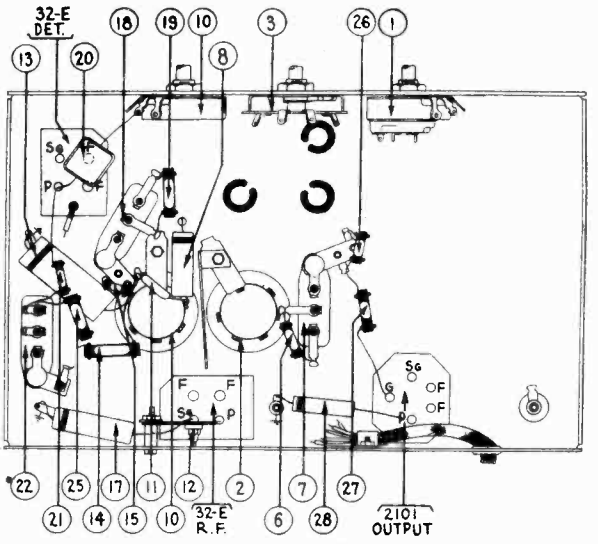


Fig. 3—Bottom of Chassis.

October, 1934

Models 233G and 233AG

Models 233G and 233AG are battery operated radio receivers covering a frequency range of 535 to 1510 kilocycles (standard wave) and 145 to 310 kilocycles (long wave). A two-position switch changes from one range to the other. The upper scale on the dial covers standard frequencies; the lower scale, low frequencies or long waves.

Model 233G is to be operated from a 2-volt storage (wet) cell for the filament voltage; model 233AG uses a dry battery for the filament supply. The 233AG requires the use of a ballast tube (in the socket provided on the chassis); in model 233G the ballast tube is not needed, and the jumper clip should be left across the two contacts of the ballast tube socket.

These sets use two type 32-E tubes,—one as radio frequency amplifier and one as detector—and one pentode output tube, type 2101.

Models 233G and 233AG utilize the regeneration or "reaction" circuit. This feature is controlled by the reaction control knob (see Fig. 1).

The filament current drain is 0.42 Ampere and the "B" or plate battery drain varies from 12 M. A. to 14 M. A.

Adjusting Compensating Condensers

There are three compensating condensers in these sets. Two are located on the top of the sections of the tuning condenser gang; and one underneath chassis and reached from the rear (thru hole in sub-base).

Connect the set up to the batteries and the antenna lead from signal generator to antenna post of set. Set signal generator at 1500 K.C. Turn wave-band switch to right and set dial at 150. (If set is removed from cabinet, obtain a piece of flat steel, 006" thick, about ½" wide and four or five inches long; open condenser gang and bring heel of detector section down on this steel strip; then remove the strip without disturbing setting of condenser gang).

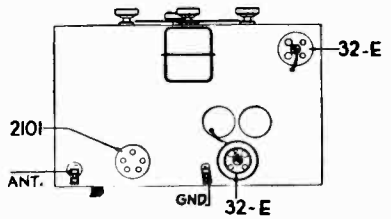


Fig. 1—Tube Locations

Turn volume control full on and reaction control about ¾ of the way to full on; then with a suitable hex wrench (such as Philco No. 3164) adjust condensers ⑧ and ⑨ (located on tuning condenser gang) to obtain maximum reading in the output meter, which should be connected to primary terminals of the output transformer.

While making the adjustment, advance the reaction control as far as possible without causing oscillation, working for maximum output on both condensers.

Now throw wave-band switch to left and turn dial to 300 K.C. (30 on lower scale of dial). In this position the condenser gang is approximately open. Now adjust condenser ⑲ (reached from rear) for maximum output, keeping the reaction control advanced as explained above, to just below point of oscillation.

Models 264 and 265

Philco Models 264 and 265 are five-tube superheterodyne radio receivers designed for operation on alternating current. The voltage and frequency for which each type of these models is intended is indicated on the chassis nameplate.

These receivers cover two bands or ranges of receivable frequencies: (1) Long waves or low frequency from 140 to 320 kilocycles (2140 to 935 meters), and (2) medium wave or standard (American) frequencies, from 540 to 1500 kilocycles (555 to 200 meters). A switch on the panel permits quick change from one to the other range.

The tubes used are: 1 type 6A7 detector-oscillator; 1 type 78-E intermediate frequency; 1 type 75 2d detector-1st A. F.; 1 type 42-E output, and 1 type 80 rectifier. The intermediate frequency is 125 kilocycles (K. C.) and the power consumption is 65 watts. The chief difference between Models 264 and 265 is that the latter is equipped with a shadow tuning meter and a phonograph jack.

Tube Socket Voltages*

	6A7 Det.-Osc.	78-E I. F.	75 2d Det. A. F.	42-E Output
P to Gnd.	255	255	180	250
SG. to Gnd.	45	100	...	267
K to Gnd.	2.2	3.4	0	—.25

6A7, G2 to Gnd.: 265. 80, Fil. to chassis: 345.
*Tests made with high resistance voltmeter. Refer to Fig. 1.

Power Transformer Data
(230 VOLT TYPE RECEIVER)

Terminals	A. C. Volts	Circuit	Color
1-2	230	Primary	White
3-6	6.3	Filaments	Black
6-7	5.0	Fil. of Rect.	Blue
8-10	680	Sec. High Volt.	Yellow
4	...	Center Tap of 3-5	Black—Yellow Tr.
9	...	Cen. Tap of 8-10	Yel.—Green Tr.

Adjusting Compensating Condensers

Adjustment of compensating condensers in Models 264 and 265 requires the use of an accurate signal generator (such as the Philco Model 024), an output meter (Philco Model 012 or 025 is recommended) and a special adjusting wrench (Philco No. 3164). The I. F. or intermediate frequency of the set is 125 K. C. Adjustments are made in the following order:

I. F.—Set signal generator at 125 K. C. Remove grid clip from cap of 6A7 tube and connect antenna lead from signal generator to cap of tube, connect ground lead to ground post of set. Set dial of receiver at 55 (upper scale) and wave-band switch at right. See that set is connected to proper current and volume control full "On." Connect output meter to plate and cathode of output tube (42-E). Adjust the three I. F. compensating condensers ⑯, ⑱ and ⑳ to give maximum response in the output meter. These adjustments are all made from the rear of the chassis (see Fig. 3), through holes in sub-base.

ANT.-DET. and OSC.-H. F. (standard wave)—These are condensers ⑥, ⑪ and ⑬ located on top of the tuning condenser assembly and adjusted from above. ⑥ is the one nearest the front of chassis.

Set signal generator at 1500. Replace grid clip on cap of 6A7 tube and connect antenna and ground leads from signal generator direct to antenna and ground posts of set. Turn dial of set to 150 and adjust condensers ⑥, ⑪ and ⑬ for maximum reading in output meter.

OSC.-L. F. (standard wave)—Set signal generator at 600 and turn dial of set to 60. Adjust condenser ⑭, reached from rear of chassis, to give maximum reading in output meter.

H. F. and L. F. (long-wave band)—Turn wave-band switch to the left. Set signal generator at 300 and dial at 30 (lower scale). Adjust condenser ⑫ to give maximum response in output meter. This condenser is reached from underneath chassis.

Now turn dial to 15 and set signal generator at 150. Adjust condenser ⑰ for maximum response. Condenser ⑰ is reached from the rear.

NOTE—If reading on output meter is too great during adjustments, turn down "attenuator" on signal generator.

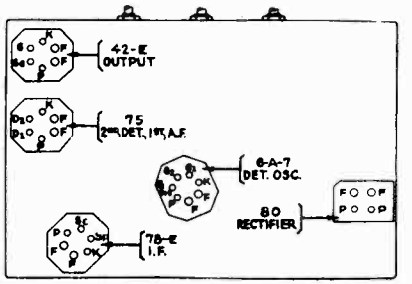


Fig. 1.—Tube Sockets as Seen From Bottom of Chassis.

PHILCO RADIO & TELEV. CORP.

MODEL 245
Schematic, Parts
Chassis

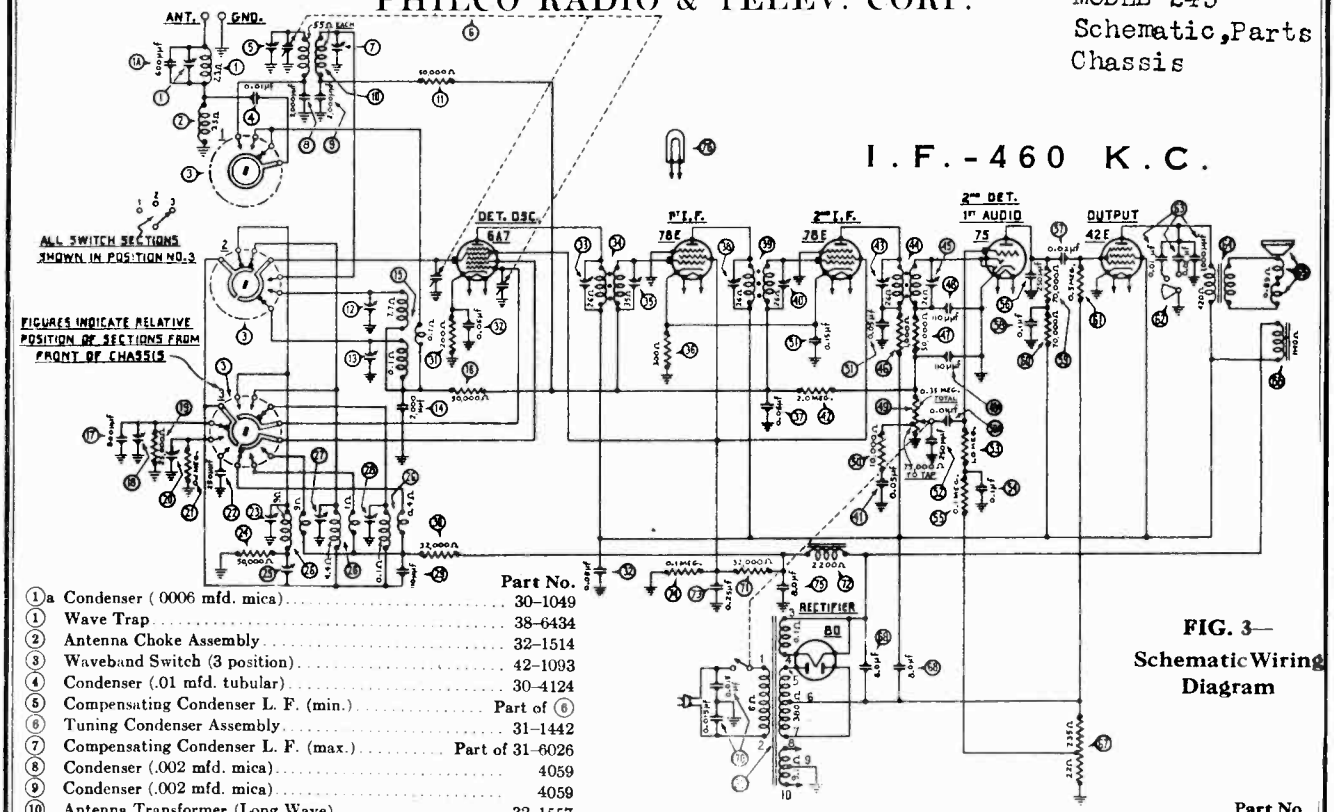


FIG. 3— Schematic Wiring Diagram

		Part No.
(1)a	Condenser (.0006 mfd. mica)	30–1049
(1)	Wave Trap	38–6434
(2)	Antenna Choke Assembly	32–1514
(3)	Waveband Switch (3 position)	42–1093
(4)	Condenser (.01 mfd. tubular)	30–4124
(5)	Compensating Condenser L. F. (min.)	Part of (6)
(6)	Tuning Condenser Assembly	31–1442
(7)	Compensating Condenser L. F. (max.)	Part of 31–6026
(8)	Condenser (.002 mfd. mica)	4059
(9)	Condenser (.002 mfd. mica)	4059
(10)	Antenna Transformer (Long Wave)	32–1557
(11)	Resistor (50,000 ohms) (Green-Brown-Orange)	6098
(12)	Compensating Condenser ANT (Med.)	Part of 31–6026
(13)	Compensating Condenser ANT (S. W.)	Part of 31–6026
(14)	Condenser (.002 mfd. mica)	4059
(15)	Antenna Transformer (Standard and Short-wave)	32–1556
(16)	Resistor (50,000 ohms) (Green-Brown-Orange)	6098
(17)	Condenser (.0008 mfd. mica)	5878
(18)	Compensating Condenser (S. W. Ser.)	04000–S
(19)	Resistor (25,000 ohms) (Red-Green-Orange)	33–1013
(20)	Compensating Condenser (Med. Ser.)	Part of 31–6033
(21)	Resistor (100,000 ohms) (White-White-Orange)	6099
(22)	Condenser (.00025 mfd. mica)	5858
(23)	Compensating Condenser (Osc. Long Wave)	Part of 31–6032
(24)	Resistor (50,000 ohms) (Green-Brown-Orange)	6098
(25)	Compensating Condenser (Long Wave Ser.)	Part of 31–6033
(26)	Oscillator Transformer	32–1558
(27)	Compensating Condenser OSC (Med.)	Part of 31–6032
(28)	Compensating Condenser OSC (S. W.)	Part of 31–6026
(29)	Condenser (.00011 mfd. mica)	30–1031
(30)	Resistor (32,000 ohms) (Orange-Red-Orange)	5279
(31)	Resistor (200 ohms flexible)	7217
(32)	Condenser (.05 mfd. twin bakelite block)	3615-AJ
(33)	Compensating Condenser (1st I. F. pri.)	Part of (34)
(34)	1st I. F. Transformer	32–1369
(35)	Compensating Condenser (1st I. F. sec.)	Part of (34)
(35)	Resistor (300 ohms flexible)	33–3010
(37)	Condenser (.05 mfd. bakelite block)	3615-BW
(38)	Compensating Condenser (2nd I. F. pri.)	Part of (39)
(39)	2nd I. F. Transformer	32–1410
(40)	Compensating Condenser (2nd I. F. sec.)	Part of (39)
(41)	Condenser (.05 mfd. tubular)	30–4020
(42)	Resistor (2,000,000 ohms) (Red-Black-Green)	5872
(43)	Compensating Condenser (3rd I. F. pri.)	Part of (44)
(44)	3rd I. F. Transformer	32–1411
(45)	Compensating Condenser (3rd I. F. sec.)	Part of (44)
(46)	Resistor (1,000 ohms) (Brown-Black-Red)	5837
(47)	Resistor (50,000 ohms) (Green-Brown-Orange)	6098
(48)	Condenser (.00011 mfd. mica)	30–1031
(48)a	Condenser (.00011 mfd. mica)	30–1031
(49)	Volume Control (350,000 ohms tapped at 75,000)	33–5066
(50)	Resistor (10,000 ohms) (Brown-Black-Orange)	33–1000
(50)a	Condenser (.01 mfd. tubular)	30–4124
(51)	Condenser (.15 & .05 mfd. bakelite block)	6287-M
(52)	Condenser (.00025 mfd. mica)	5858
(53)	Resistor (1,000,000 ohms) (Brown-Black-Green)	4409
(54)	Condenser (.1 mfd. tubular)	30–4122
(58)	Resistor (100,000 ohms) (White-White-Orange)	4411
(66)	Condenser (.00025 mfd. mica)	5858

		Part No.
	A. C. Cord and Plug Assembly	L-943-A
	Speaker Socket (code 122 only)	4957
	Dial Assembly	31–1451
	Tube Shield	28–1107
(57)	Condenser (.02 mfd. tubular)	30–4113
(58)	Condenser (.1 mfd. bakelite block)	3615-BM
(59)	Resistor (70,000 ohms) (Violet-Black-Orange)	5385
(60)	Resistor (70,000 ohms) (Violet-Black-Orange)	5385
(61)	Resistor (500,000 ohms) (Yellow-White-Yellow)	4517
(62)	Tone Control (3 point)	30–4178
(63)	Condensers in Tone Control	Part of (62)
(64)	Output Transformer (code 121, using P-19 speaker)	32–7041
(65)	Cone and Voice Coil Assembly (P-19 speaker)	02861
(66)	Field Coil & Pot Assembly (P-19 speaker)	36–3298
(67)	B. C. Resistor (wire wound, 22 ohms, 235 ohms)	33–3037
(68)	Electrolytic Condenser (8 & 8 mfd.)	30–2079
(69)	Power Transformer—115 volts, 60 cycles	32–7226
(69)	Power Transformer—115 volts, 25 cycles	32–7227
(69)	Power Transformer—230 volts, 50 cycles	32–7228
(70)	Condenser (.015 twin bakelite block)	3793-E
(71)	Resistor (32,000 ohms) (Orange-Red-Orange)	33–1026
(72)	Filter Choke	32–7018
(73)	Condenser (.25 mfd. tubular)	30–4146
(74)	Resistor (100,000 ohms) (White-White-Orange)	4411
(75)	Electrolytic Condenser (8 mfd.)	30–2108
(76)	Pilot Lamp (6.3 volt)	6608

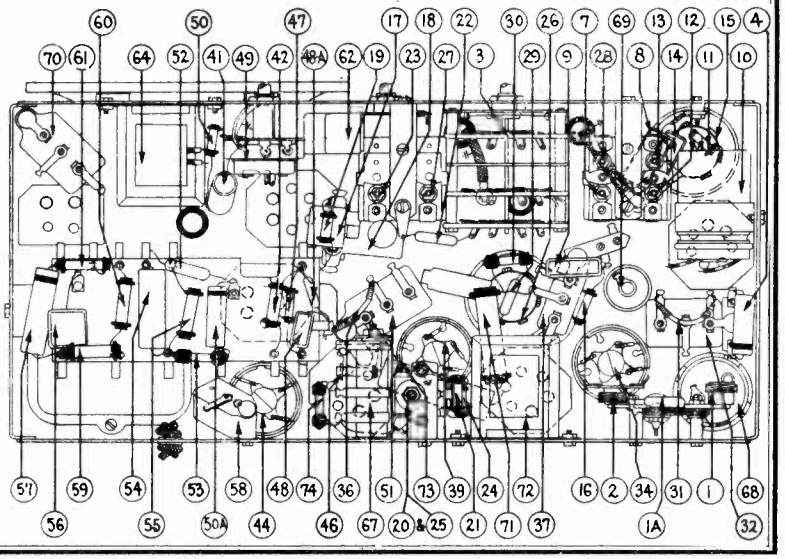


Fig. 4. Bottom View of Chassis

MODEL 245 — Voltage, Alignment
Trimmers, Socket — Transformer Data

PHILCO RADIO & TELEV. CORP.

PHILCO Model 245 is a six-tube superheterodyne receiver designed to receive three different ranges or bands of radio frequencies, viz: (1) Low frequency, 125 to 340 kilocycles (K. C.); (2) Medium or standard American broadcast frequencies, 540 to 1500 kilocycles; and (3) Short-wave, or high frequencies, from 5.5 to 16.0 megacycles (5500 to 16000 K. C.). A three-position waveband switch changes the reception from one band to the next, starting with low frequency, at the left-hand or counter-clockwise position.

This model has three-point tone control with fixed bass compensation, automatic volume control and pentode output. The tubes used are: Type 6A7 detector oscillator, two type 78-E intermediate frequency, type 75 second detector—1st audio frequency, and type 42-E pentode output tube. A type 80 is used as rectifier.

The intermediate frequency of the set is 460 K. C. and the power consumption is 65 watts.

This receiver is designed for alternating current (AC) only, of the voltage and cycles indicated on the chassis nameplate.

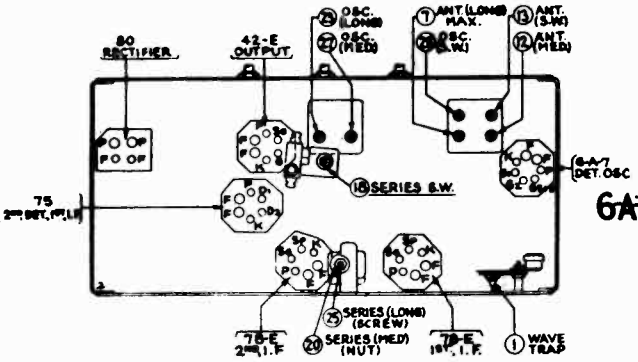


FIG. 1—View of Tube Sockets and Compensating Condensers underneath Chassis.

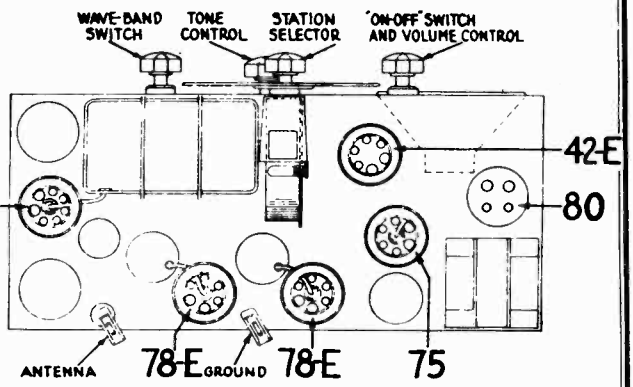


FIG. 2—Tube Sockets and Controls as seen from top of Chassis.

Tube Socket Voltages

(At Line Voltage 115V)

Tube	6A7	78-E	78-E	75	42-E
P to Chassis	272	272	265	170	253
S G to Chassis	95	95	95	..	272
K to Chassis	3	3.9	3.9	0	0

6A7. G_2 to Chassis: 180V; G_1 = −27V.

Above voltages obtained with PHILCO Model 025 or Model 048 Set Tester, from socket terminals of Set, underneath chassis. See Fig. 1. Volume control at minimum. Dial at 60.

Power Transformer Data

(115 Volt 60 Cycle Type)

Terminal	A. C. Volts	Circuit	Color of Leads
1–2	115	Primary	White
3–4	5.0	Fil. of 80	Blue
5–7	680	Plates of 80	Yellow
8–10	6.3	Filaments	Black
6	..	Center Tap 5-7	Yellow, Green Tr.
9	.....	Center Tap 8-10	Black-Yellow Tr.

Adjusting Compensating Condensers

(Intermediate Frequency 460 K. C.)

The adjustment of compensating condensers in Model 245 requires the use of signal generators capable of producing a signal on both standard and long-wave broadcast frequencies, as well as short-waves or high frequencies. For the former two we suggest Philco Model 024 Signal Generator, and for the Short-Wave, Model 091 Crystal Controlled Oscillator. The Model 024 covers frequencies from 105 to 2000 K. C. and the other has a fundamental frequency of 3600 K. C. (3.6 M. C.) any harmonic of which may be used.

Other equipment needed includes some form of output meter, and a suitable insulated-handle wrench and screwdriver for adjusting the condensers. Philco equipment available includes Model 025 or 012 output meter and Part 3164 wrench and 27-7059 screwdriver.

First connect the output meter to the plate and cathode prongs of the 42-E output tube.

Adjustments are then made in the following order; positions of all compensators are shown in Fig. 1.

ADJUSTMENT OF THE INTERMEDIATE FREQUENCY

Remove the grid clip from the type 6A7 tube and connect the "ANT" output terminal of the signal generator to the grid cap of the tube. Connect the "GND" terminal of the signal generator to the "GND" terminal of the receiver chassis.

Set the signal generator at 460 K. C. (the intermediate frequency of Model 245) and with the receiver and signal generator turned on, the wave band switch at center and dial at 600 K. C., adjust each of the I. F. compensating condensers in turn, to give maximum response in the output of the receiver. The three pairs of I. F. compensating condensers are located one pair at the top of each of the three I. F. transformer shields. These are the three metal "cans" near the rear of the chassis. Each of the transformers has a dual compensating condenser mounted at its top, and accessible through a hole in the top of the coil shield. In the dual compensators the Primary circuit is adjusted by turning the screw; the Secondary circuit is adjusted by turning the hex-head nut. The condenser numbers, referring to Fig. 2, are ⑱, ⑲, ⑳, ㉑, ㉒ and ㉓.

ADJUSTMENT OF THE WAVE TRAP

Replace the grid clip upon the Detector-Oscillator tube (Type 6A7). Connect the output leads from the signal generator directly to the antenna and ground terminals of the receiver. Set the Wave-Band Switch of the receiver to the standard broadcast band (center position) and the Station Selector at the low frequency (540 K. C.) end. Adjust the Wave Trap condenser to give a MINIMUM response to a 460 K. C. signal from the signal generator. The Wave Trap ① is located at rear and underneath the chassis, and is shown in Fig. 1. It is reached from the rear of the chassis, by inserting the fibre wrench through the hole near rear corner of chassis.

ADJUSTMENT OF SHORT-WAVE COMPENSATORS

H. F. end: The crystal controlled signal generator is used for these adjustments. Turn the wave band switch to the right and the signal generator "on." Turn the dial of the set to about half way between 14 and 15 megacycles (right hand scale) and you should there pick up the 4th harmonic of the 3.6 M. C. signal. Adjust the ant. S. W. compensator ⑰ and the oscillator S. W. compensator ⑱ (see Fig. 1) to give maximum response in the output meter.

L. F. end: Turn dial of set to a little more than 7 megacycles at which point the second harmonic of the signal generator (7.2 M. C.) should be heard. Adjust condenser ⑯ (S. W. series) for maximum response. This condenser is also reached from underneath the chassis.

ADJUSTMENT OF MEDIUM OR STANDARD WAVES

The standard broadcast signal generator is now used again.

H. F. end: Turn waveband switch to center position. Set signal generator at 1500 K. C. and dial at 150 (center scale). Now adjust condensers ⑭ (Antenna Medium) and ⑮ (oscillator medium) to get maximum response.

L. F. end: Turn dial to 60 and set signal generator at 600. Adjust condenser ⑬ (nut) (Series Medium) for maximum output.

ADJUSTMENT OF LONG-WAVE COMPENSATORS

Turn wave-band switch to left-hand position (long wave). Set signal generator at 300 K. C. and dial at 300 (left-hand scale). Connect antenna lead from signal generator to grid cap of 6A7 tube instead of to antenna post of set. Adjust condenser ⑫ (oscillator, long-wave) to get maximum response.

Transfer antenna lead of signal generator to antenna post, and adjust condenser ⑦ (long-wave, maximum) to get maximum response.

Turn dial so that condenser gang is open (dial just beyond end of scale) and adjust condenser ⑥ (antenna long wave minimum) so that there is no oscillation, and noise is reduced to a minimum. This adjustment is located on top of one section of the tuning condenser and is reached from above. Turn the dial to the other end of scale and be sure no oscillation occurs. Finally set signal generator at 175 and dial at set at approximately 175. Adjust condenser ⑩ (screw) (long-wave series) to get maximum reading.

PHILCO RADIO & TELEV CORP.

MODEL 261
Schematic
Parts

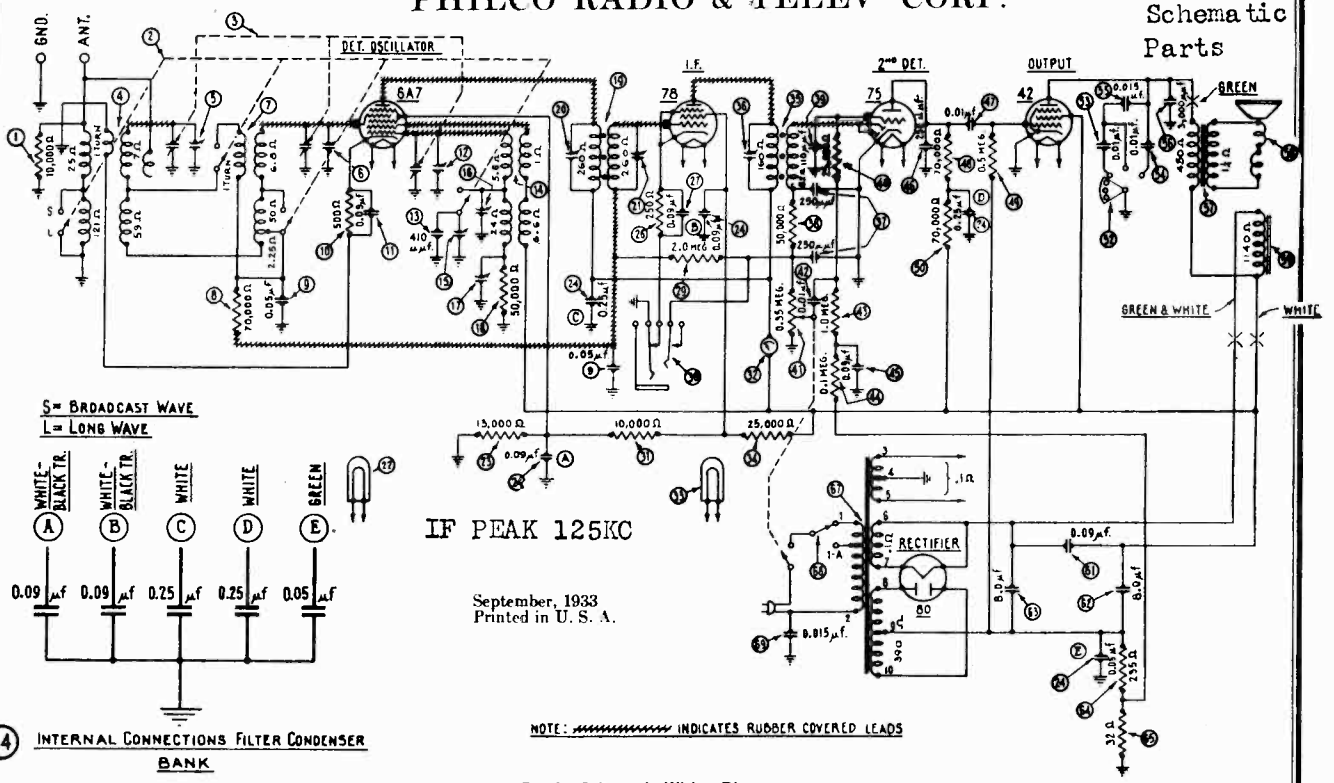


Fig. 3—Schematic Wiring Diagram

COMPONENT PARTS FOR MODEL 261

No. on Figs.	Description	Part No.
①	Resistor (10,000) (Brown-Black-Orange) (½ watt)	4412
②	Wave-band Switch	42-1001
③	Tuning Condenser Assembly	31-1037
④	Antenna (H. F.) Transformer	32-1157
⑤	Compensating Condenser (Ant.; Part of ③)	
⑥	Compensating Condenser (Det.; Part of ③)	
⑦	Detector Transformer	32-1158
⑧	Resistor (70,000) (Violet-Black-Orange) (½ watt)	5385
⑨	Condenser (.05) (Double)	3615-AJ
⑩	Resistor (500) (Flexible Wire-Wound) (Green-Black-Brown)	6977
⑪	Condenser (.09)	4989-AB
⑫	Compensating Condenser (Osc.; Part of ③)	
⑬	Condenser (410 MMf)	5120
⑭	Oscillator Transformer	32-1159
⑮	Compensating Condenser (Osc.; Series Broadcast Wave)	04000-S
⑯	Compensating Condenser (Osc.; Long Wave)	04000-D
⑰	Compensating Condenser (L. F. Series Oscillator)	04000-S
⑱	Resistor (50,000) (Green-Brown-Orange) (½ watt)	4518
⑲	1st I. F. Transformer	32-1160
⑳	Compensating Condenser (1st I. F. Primary)	04000-A
㉑	Compensating Condenser (1st I. F. Sec.)	04000-A
㉒	Pilot Lamp (Station Selector)	6608
㉓	Resistor (13,000) (Brown-Orange-Orange) (1 watt)	3766
㉔	Filter Condenser Bank	30-4044
㉖	Resistor (250) (Flexible Wire-Wound) (Red-Black-Brown)	7217
㉗	Condenser (.09)	4989-D
㉙	Resistor (2. meg.) (Red-Black-Green) (½ watt)	5872
㉚	Gramophone Jack	6585
㉛	Resistor (10,000) (Brown-Black-Orange) (½ watt)	4412
㉜	Shadow Tuning Meter	6497
㉝	Pilot Lamp (Shadow Tuning Meter; Part of ㉜)	
㉞	Resistor (25,000) (Red-Green-Orange) (1 watt)	3656
㉟	2nd I. F. Transformer	32-1223
㊱	Compensating Condenser (2nd I. F. Primary)	04000-W
㊲	Condenser (250MMf) (Double)	8317-B

No. on Figs.	Description	Part No.
㊳	Resistor (50,000) (Green-Brown-Orange) (½ watt)	4518
㊴	Condenser (110 MMf) (Blue-Yellow)	4519
㊵	Resistor (25,000) (Red-Green-Orange) (½ watt)	4516
㊶	Volume Control and "On-Off" Switch	33-5006
㊷	Condenser (.01)	3903-AM
㊸	Resistor (1. meg.) (Brown-Black-Green) (½ watt)	4409
㊹	Resistor (.1 meg.) (White-White-Orange) (½ watt)	4411
㊺	Condenser (.09)	4989-D
㊻	Condenser (250 MMf) (Yellow)	3082
㊼	Condenser (.01)	3903-W
㊽	Resistor (70,000) (Violet-Black-Orange) (½ watt)	5385
㊾	Resistor (.5 meg.) (Yellow-White-Yellow) (½ watt)	4517
㊿	Resistor (70,000) (Violet-Black-Orange) (½ watt)	5385
(52)	Tone Control	30-4043
(53)	Condenser (Internal to (52)). (.01)	
(54)	Condenser (Internal to (52)). (.01)	
(55)	Condenser (Internal to (52)). (.015)	
(56)	Condenser (3,000 MMf)	30-4042
(57)	Output Transformer (Mounted on Speaker)	2580
(58)	Voice Coil and Cone Assembly { K-7 (Code 121) / H-9 (Code 122) }	36-3020 / 02625
(59)	Speaker Field assembled with Pot { K-7 (Code 121) / H-9 (Code 122) }	02741 / 02807
(61)	Condenser (.09)	4989-AB
(62)	Electrolytic Condenser (8. Mf)	7557
(63)	Electrolytic Condenser (8. Mf)	7558
(64)	Resistor (Wire-Wound) (235 ohms section)	7998
(65)	Resistor (Wire-Wound) (32. ohms section)	7998
(67)	Mains Transformer (200-260 V., A. C.; 40-60 ~) with Tapped Primary	32-7074
(68)	Tap Switch; Part of (67) (in schematic)	3116
(69)	Condenser (.015)	3793-Z
	Valve Shield	28-1107
	Four-Prong valve holder	7544
	Six-Prong valve holder	7547
	Seven-Prong valve holder	27-6005

MODEL 261 — Trimmers, Chassis Voltage, Socket Alignment

PHILCO RADIO & TELEV. CORP.

THE MODEL 261 is a five-valve superheterodyne receiver, designed for dual wave reception, of 525–1510 kilocycles (570–200 meters), and 140–320 kilocycles which completely covers the 1000–2000 meter band. This Model contains a Type 6A7E valve as combination first detector and oscillator, a Type 78E valve for the intermediate frequency, a Type 75 valve as second detector and first low frequency stage, a Type 42E as low frequency power output, and a Type 80 rectifier valve. The intermediate frequency is 125 K. C. The power consumption is 63 watts.

Table 1—Valve Holder Data—A. C. Mains Voltage, 240 Volts*

Circuit	Det. Osc.	I. F.	2nd Det. and L. F.	L. F. Power Output	Rectifier
Valve Type	6A7E	78E	75	42E	80
Low Tension — F to F (Volts)	6.3	6.3	6.3	6.3	5.0
High Tension—P to K (Volts)	250	250	190	240	360
Screen Grid Volts—SG to K (6A7E; G3/5 to K)	50	100	25	260	
Control Grid Volts—CG to K (6A7E; G4 to K)	0	4	25	5	
Cathode Volts—K to F	2.2	2.7	0	0	

Additional Type 6A7E Values: G1 to K = .4 volt; G2 to K = 260 volts.

* All of the above values were obtained from the under side of chassis, using test prods and leads with a suitable A. C. voltmeter for L. T. voltages, and a high-resistance, multi-range D. C. voltmeter for all other values. Volume control at maximum and station selector at 525 K. C. Mains Transformer Primary tap on 230–260. Readings taken with a plug-in adapter will NOT be satisfactory.

Table 2—Mains Transformer Data

Terminal	A. C. Volts	Circuit	Color
1	230-260	Primary (Full Primary Winding)	White—20% Black Tr.
1A	200-230	Primary (Tapped Primary Winding)	Green
2	200-260 with ① or ①A	Primary (Common)	White
3-5	6.3	Low Tension	Black
6-7	5.0	L. T. of "80" Valve	Blue
8-10	680	H. T. (Anodes) of "80"	Yellow
4		Center Tap of 3-5	Black-Yellow Tracer
9		Center Tap of 8-10	Yellow-Green Tracer

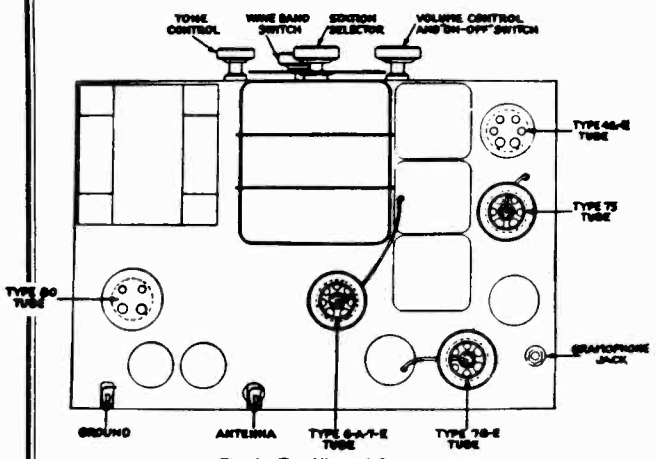


Fig. 1—Top View of Chassis

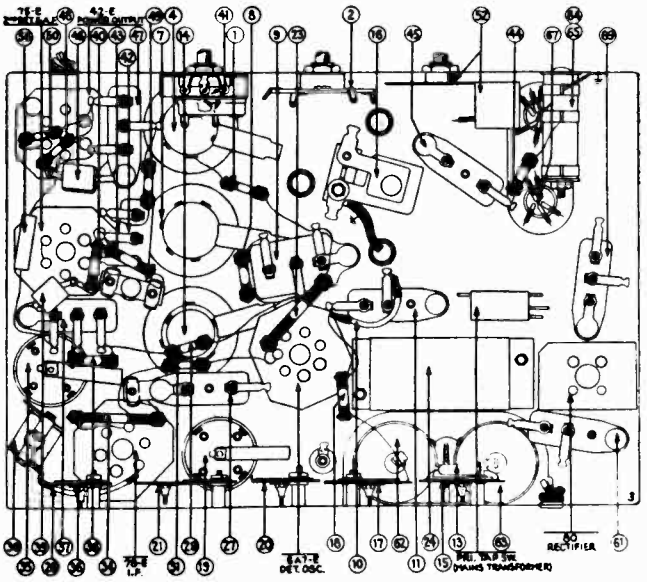


Fig. 2 Bottom View of Chassis, Showing Parts

ADJUSTMENT OF MODEL 261

The receivers are accurately adjusted prior to shipment from the factory. Adjustments of the compensating condensers should *only* be undertaken with proper instructions and equipment available. An accurately calibrated signal generator is necessary. One will be found in the **Philco 048 All-Purpose Set Tester.**

The adjustment of the compensating condensers is similar to the procedure outlined in Service Bulletin No. 120-C.

Location of the several compensating condensers can be ascertained by reference to Fig. 3 for their electrical location in the receiver, and to Fig. 2 for the physical location of the compensating condensers at the rear and upon the underside of the receiver chassis.

The intermediate frequency compensating condensers first should be adjusted. The intermediate frequency is 125 kilocycles. These condensers are ⑳, ㉑, and ㊱, accessible from the rear of the chassis.

The Antenna ⑤, Detector ⑥, and High Frequency (1400 K. C.) Oscillator ⑫ compensating condensers next should be adjusted. These are mounted upon the tuning condenser ③. ⑤ is nearest the front of chassis. The low frequency compensating condensers are adjusted last. These are ⑮, ⑯, and ⑰. ⑬ is the 600 K. C. compensating condenser; ⑯ the 300 K. C. compensating condenser; and ⑰ the 150 K. C. compensating condenser. The sequence of adjustment should be: ⑮, ⑯, ⑰. ⑮ and ⑰ are accessible from rear of chassis; ⑯ is mounted upon the underside of the chassis.

The I. F. compensating condensers should be given a final retrimming after these adjustments are completed

Terminal Arrangement of Valve Holders, Viewed From Under Side of Chassis

PHILCO RADIO & TELEV. CORP.

MODEL 263-E
Schematic, Chassis
Parts, Trimmers

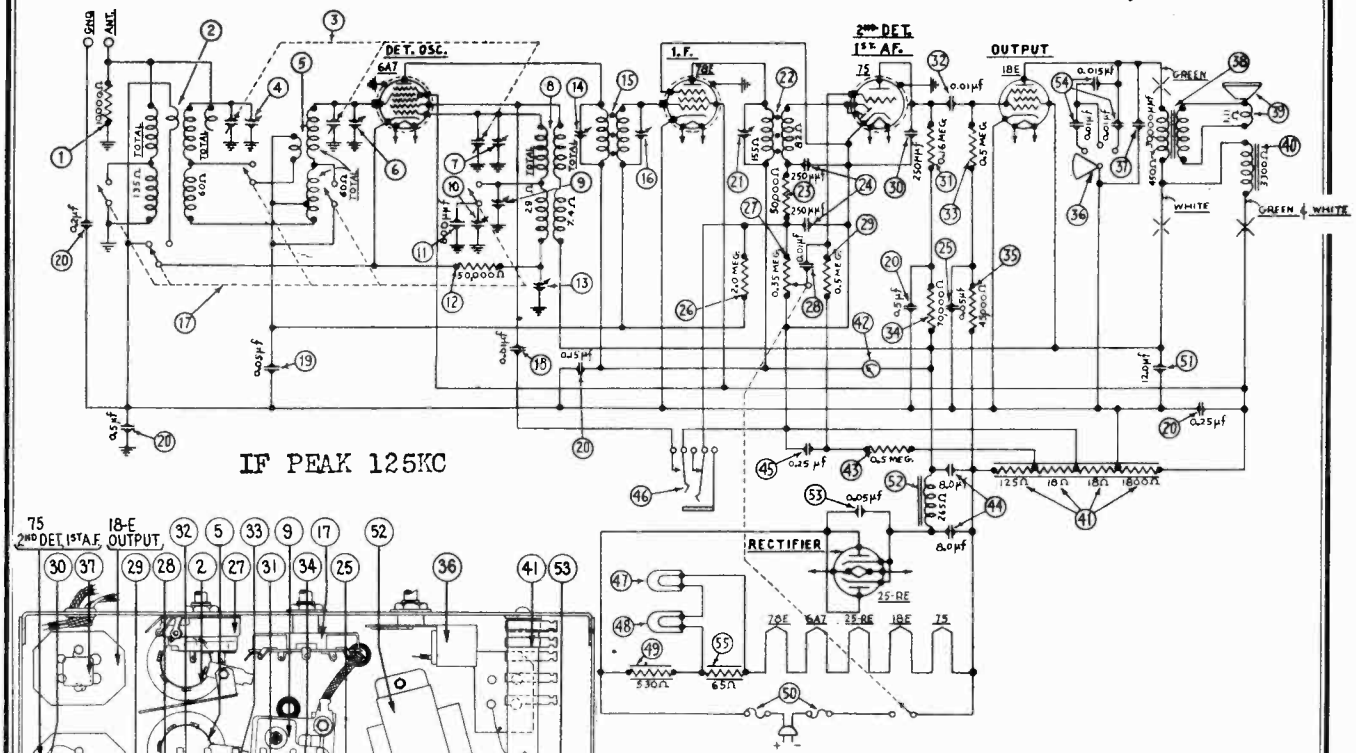


Fig. 4—Wiring Diagram

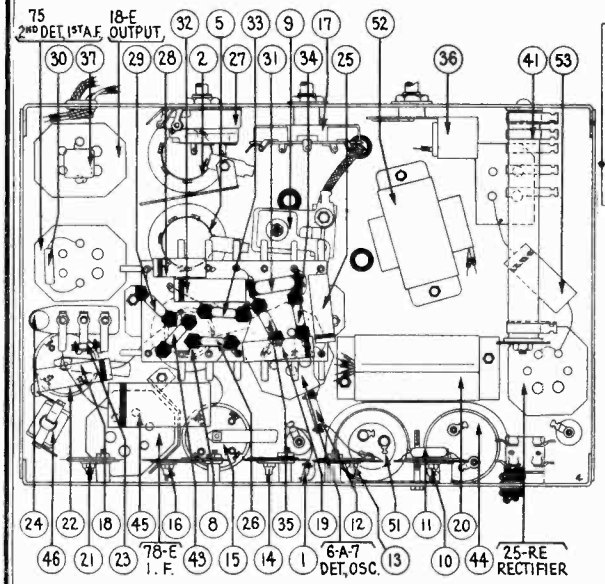


Fig. 3—Bottom of Chassis, showing components

MODEL 263-E COMPONENTS

(1)	Resistor (10,000 ohms) (Brown-Black-Orange)	33–1000
(2)	Antenna Transformer	32–1351
(3)	Tuning Condenser Assembly	31–1171
(4)	Compensating Condenser (Ant.)	Part of (3)
(5)	Detector Transformer	32–1159
(6)	Compensating Condenser (Det.)	Part of (3)
(7)	Compensating Condenser (Osc. H. F. Standard)	Part of (3)
(8)	Oscillator Transformer	32–1158
(9)	Compensating Condenser (Osc. Long-wave)	04000-D
(10)	Compensating Condenser (Osc. Series Standard)	04000-S
(11)	Condenser (.0008 mfd.) (Mica)	5120
(12)	Resistor (50,000 ohms) (Green-Brown-Orange)	4518
(13)	Compensating Condenser (Long-wave Series Osc.)	04000-S
(14)	Compensating Condenser (1st I. F. Pri.)	04000-A
(15)	First I. F. Transformer	32–1160
(16)	Compensating Condenser (1st I. F. Sec.)	04000-A
(17)	Wave-band Switch	42–1057
(18)	Condenser (.01 mfd.) (Tubular)	30–4145
(19)	Condenser (.05 mfd.) (Tubular)	30–4020
(20)	Condenser Block (.5—.25—.2—.15—.5)	30–4157
(21)	Compensating Condenser (2nd I. F. Pri.)	04000–M
(22)	Second I. F. Transformer	32–1223
(23)	Resistor (50,000 ohms) (Green-Brown-Orange)	6098
(24)	Condenser (.00025 mfd. Twin) (Block Type)	8317-C
(25)	Condenser (.05 mfd.) (Tubular)	30–4020
(26)	Resistor (2 megs.) (Red-Black-Green)	5872
(27)	Volume Control and On-Off Switch	33–5065
(28)	Condenser (.01 mfd.) (Tubular)	30–4124
(29)	Resistor (.5 meg.) (Yellow-White-Yellow)	4517
(30)	Condenser (.00025 mfd.) (Mica)	5858
(31)	Resistor (160,000 ohms) (Brown-Blue-Yellow)	5331
(32)	Condenser (.01 mfd.) (Tubular)	30–4145
(33)	Resistor (.5 meg.) (Yellow-White-Yellow)	4517
(34)	Resistor (70,000 ohms) (Violet-Black-Orange)	5385
(35)	Resistor (45,000 ohms) (Yellow-Green-Orange)	5256
(36)	Tone Control	30–4043
(37)	Condenser (.002 mfd.) (Mica)	6853
(38)	Output Transformer	2580
(39)	Voice Coil and Cone Assembly:	
	H-18	02625
	K-25	36–3174
(40)	Speaker Field Coil	02803
(41)	B. C. Resistor (125, 18, 18, 1800 ohms)	33–3136
(42)	Shadowmeter	45–2028
(43)	Resistor (.5 meg.) (Yellow-White-Yellow)	4517
(44)	Condenser (Electrolytic—8 mfd.—8 mfd.)	30–2028
(45)	Condenser (.25 mfd.) (Tubular)	30–4134
(46)	Phonograph Jack	6585
(47)	Pilot Lamp	6608
(48)	Pilot Lamp (Shadowmeter)	Part of (42)
(49)	Line Resistor (530 ohms)	33–3134
(50)	Line Fuses (2)	7227
(51)	Condenser: Electrolytic—12 mfd.—(8 mfd.+4 mfd.)	30–2030
(52)	Filter Choke	4819
(53)	Condenser (.05 mfd.)	30–4123
(54)	Condensers (Inside (36))	Part of (36)
(55)	Resistor (65 ohms) (Pilot Lamps)	33–3135

October, 1934.
Printed in U. S. A.

MODEL 263-E
Socket, Voltage
Alignment

PHILCO RADIO & TELEV. CORP.

Model 263-E

Philco model 263-E is a five-valve superheterodyne receiver designed for reception of two bands of frequencies; either 530 to 1500 kilocycles (K.C.) or 140 to 320 kilocycles. It may be operated on either 230 volts (50-60 cycles) alternating current (A.C.), or 230 volts direct current (D.C.) It employs the following valves: One type 6A7 detector oscillator; one type 78-E intermediate frequency; one type 75, second detector and first low frequency; one type 18-E low frequency power output; and one type 25RE as rectifier.

The intermediate frequency of the set is 125 kilocycles and the power consumption is 90 watts.

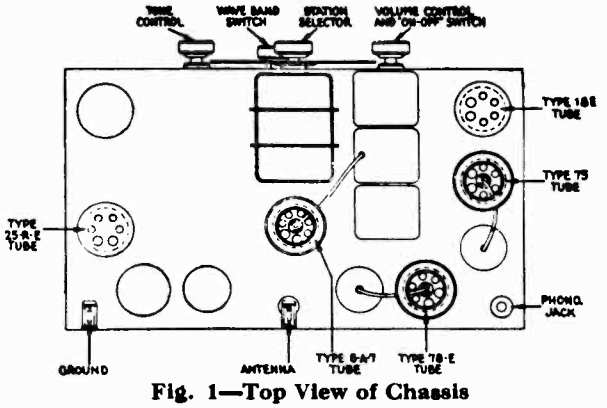


Fig. 1—Top View of Chassis

Valve-holder Voltages

(Mains Voltage 230 A.C.)

Valve	6A7	78-E	75	18-E	25RE
Circuit P to K	190	190	100	185	235
Sg to K	70	70	....	220	....

6A7: G_1 to K = .2 volt
6A7: G_2 to K = 200 volts

Above readings made with high resistance D.C. voltmeter using test prods on valve-holders under chassis (see Fig. 1).

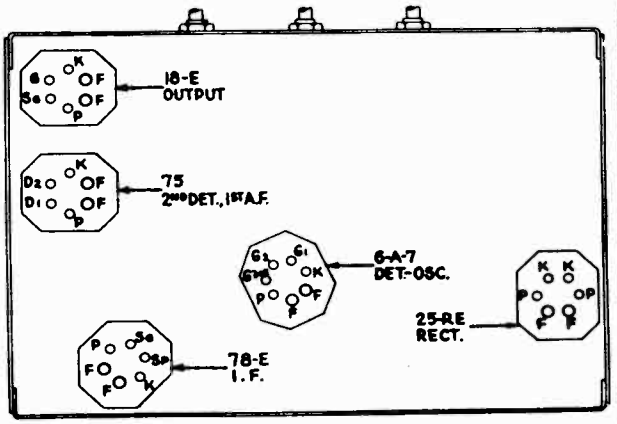


Fig. 2—Valve-holder Terminals (Viewed from underneath—for tests)

ADJUSTING COMPENSATING CONDENSERS

The Intermediate Frequency of Model 263-E is 125 kilocycles.

With the exception of the three compensating condensers located on the three sections of the tuning condenser, all are located underneath chassis, and are reached either through the rear holes in sub-base, or from underneath. Fig. 3 shows all condensers which are located under the chassis.

For proper adjustment, an accurate signal generator having a range from 100 to at least 1600 K.C. is required; also an output meter and a suitable adjusting wrench. Philco Model 024 signal generator, model 012 output meter and No. 3164 fibre hex wrench, are recommended.

Connect the output meter to the plate and cathode prongs of the output valve (type 18E). Turn on the set and signal generator. Turn wave band switch of set to right.

I. F. Compensating Condensers

Remove grid clip from cap of 6A7 valve and connect shielded antenna lead from signal generator to cap of valve. Connect ground terminal of signal generator to ground post of set. Set signal generator at 125 K.C., dial of set at 55 (wave band switch to right). Adjust each of the I. F. condensers (14), (16) and (21) in Figs. 3 and 4) in turn, to give maximum reading in the output meter. These condensers are all reached from the rear of the chassis.

Antenna, Detector and Osc. HF. (Standard Wave)

Remove antenna lead of signal generator from grid cap of 6A7 valve and replace grid clip. Connect signal generator antenna lead to antenna post on set. Set signal generator at 1500 and turn dial of set to 150. Adjust condensers (4), (6) and (7) (located on sections of tuning condenser assembly), so as to get maximum reading in output meter. (4) is located nearest front of chassis and (7) nearest rear.

Osc. Long Wave and Long Wave Series; Standard Wave Series

These are condensers (9), (13) and (10) in the order named. (9) is reached from underneath the chassis; (10) and (13) from the rear.

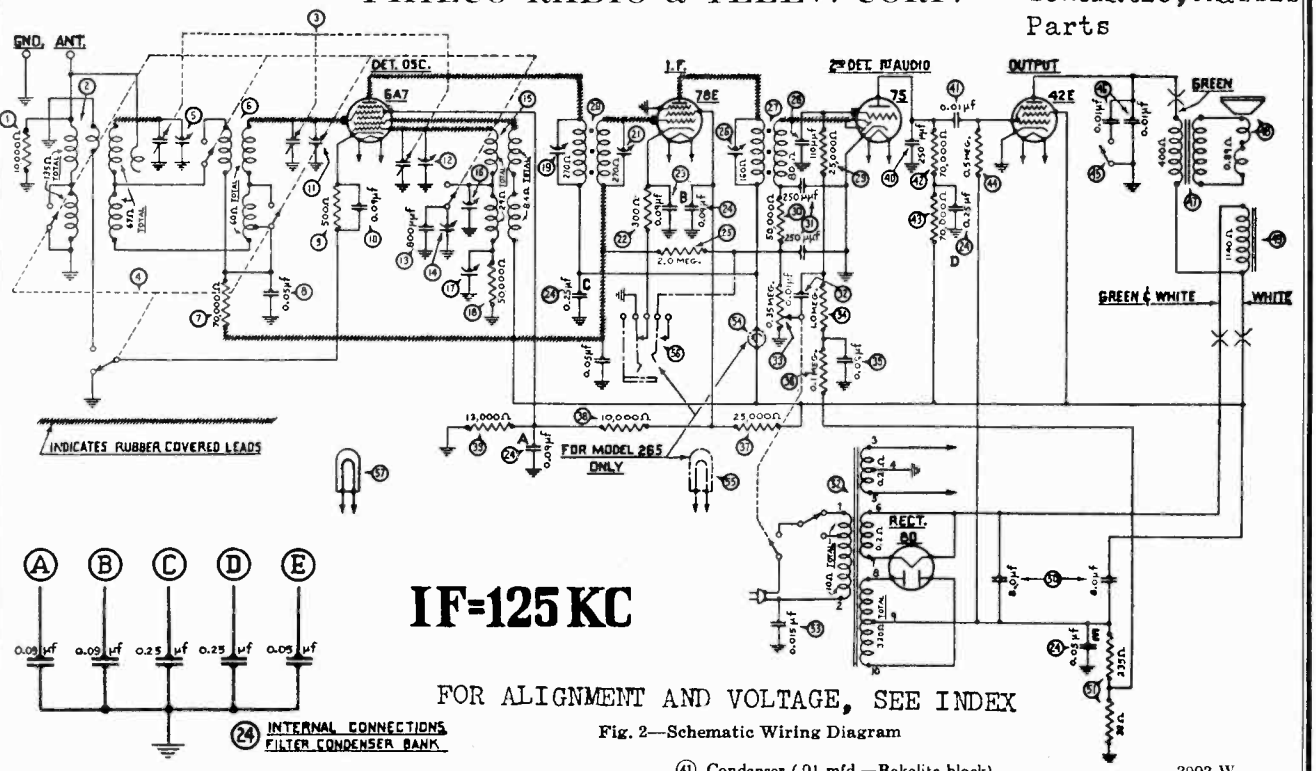
First adjust (10) (series or L. F. standard wave) with signal generator set at 600 and dial at 60, for maximum output.

Then turn waveband switch to left. Set signal generator at 300 and dial at 30 (lower scale) and adjust (9) for maximum signal; then turn dial to 15 and set signal generator at 150 and adjust (13) for maximum signal.

OCTOBER 1934

PHILCO RADIO & TELEV. CORP.

MODELS 264, 265
Schematic, Chassis
Parts



FOR ALIGNMENT AND VOLTAGE, SEE INDEX

Fig. 2—Schematic Wiring Diagram

No. on Figs.	Description	Part No.
1	Resistor (10,000 ohms) (Brown-Black-Orange)	33-1000
2	Antenna Transformer	32-1157
3	Tuning Condenser Assembly (Model 264)	31-1091
	(Model 265)	31-1037
4	Wave-Band Switch	42-1057
5	Compensating Condenser (Antenna)	Part of 3
6	Detector Transformer	32-1158
7	Resistor (70,000 ohms) (Violet-Black-Orange)	5385
8	Condenser (Bakelite block type, .05 mfd. twin)	3615-AJ
9	Resistor (500 ohms—Flexible wirewound)	6977
10	Condenser (.09 mfd.—Blakelite block type)	4989-AB
11	Compensating Condenser (Det.)	Part of 3
12	Compensating Condenser (Osc. H. F.)	Part of 3
13	Condenser (.0008 mfd.—Mica)	5878
14	Compensating Condenser (H. F. Series)	04000-S
15	Oscillator Transformer	32-1159
16	Compensating Condenser (Osc. Long Wave)	04000-D
17	Compensating Condenser (L. F. Series)	04000-S
18	Resistor (50,000 ohms) (Green-Brown-Orange)	6098
19	Compensating Condenser (1st I. F. Pri.)	04000-A
20	First I. F. Transformer	32-1160
21	Compensating Condenser (1st I. F. Sec.)	04000-A
22	Resistor (300 ohms—Flexible wirewound)	33-3010
23	Condenser (.09 mfd.—Bakelite block)	4989-D
24	Condenser (Metal Case; .25—.09—.09—.25—.05)	30-4044
25	Resistor (2 megohms) (Red-Black-Green)	5972
26	Compensating Condenser (2d I. F. Pri.)	04000-M
27	2d I. F. Transformer	32-1223
28	Condenser (.00011 mfd.—Mica)	30-1031
29	Resistor (25,000 ohms) (Red-Green-Orange)	33-1013
30	Resistor (50,000 ohms) (Green-Brown-Orange)	6098
31	Condenser (.00025 mfd. twin—Bakelite Black)	8317-B
32	Condenser (.01 mfd.—Bakelite block)	3903-AM
33	"On-Off" Switch and Volume Control	33-5006
34	Resistor (1 megohm) (Brown-Black-Green)	33-1096
35	Condenser (.09 mfd.—Bakelite block)	4989-D
36	Resistor (.1 meg.) (White-White-Orange)	4411
37	Resistor (25,000 ohms) (Red-Green-Orange)	3656
38	Resistor (10,000 ohms) (Brown-Black-Orange)	4412
39	Resistor (13,000 ohms) (Brown-Orange-Orange)	3766
40	Condenser (.00025 mfd.—Mica)	3082
41	Condenser (.01 mfd.—Bakelite block)	3903 W
42	Resistor (70,000 ohms) (Violet-Black-Orange)	5385
43	Resistor (70,000 ohms) (Violet-Black-Orange)	5385
44	Resistor (.5 meg.) (Yellow-White-Yellow)	4517
45	Tone Control (Two-position)	30-4046
46	Condensers in Tone Control	Part of 45
47	Output Transformer (S-7 Speaker)	32-7019
48	Voice Coil and Cone Assembly (S-7)	36-3157
49	Field Coil and Pot Assembly	36-3039
50	Condenser (Electrolytic) (8 mfd.—8 mfd.)	30-2028
51	Resistor (Wirewound, 235, 32 ohms)	7998
52	Power Transformer: 115 Volt, 50-60 Cycles	8046*
	Power Transformer: 230 Volt, 50-60 Cycles	8048
	Power Transformer: 230 Volt, 25-40 Cycles	32-7074
53	Condenser (.015 mfd.—Bakelite block)	3793-Z
54	Shadow Tuner (Model 265 only)	6497
55	Pilot Lamp for Shadow Tuner (Model 265 only)	Part of 54
56	Phonograph Jack (Model 265 only)	6585

*Model 265 only.

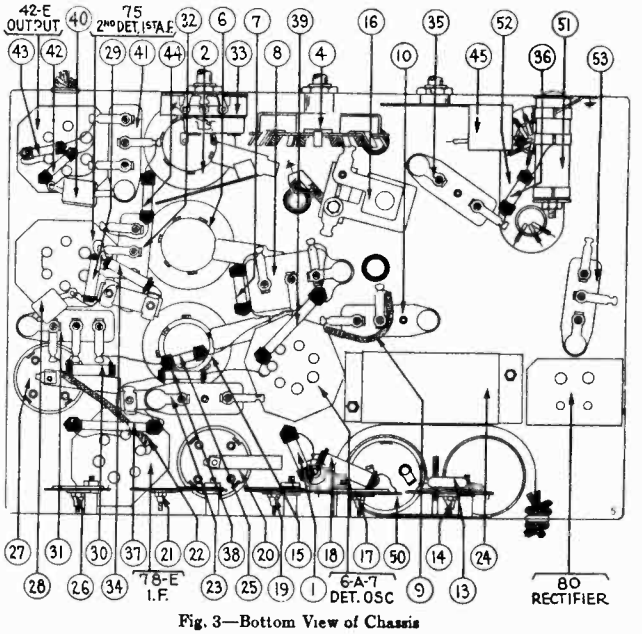
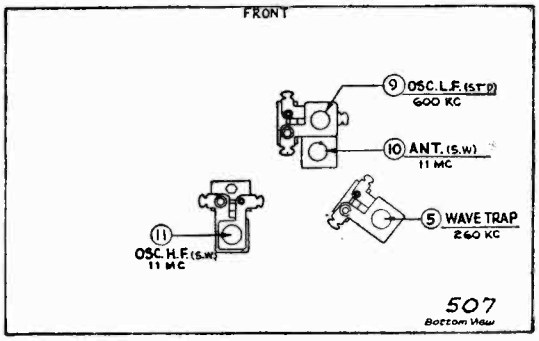


Fig. 3—Bottom View of Chassis

MODEL 507
MODEL 509
Alignment
Trimmers

PHILCO RADIO & TELEV. CORP.

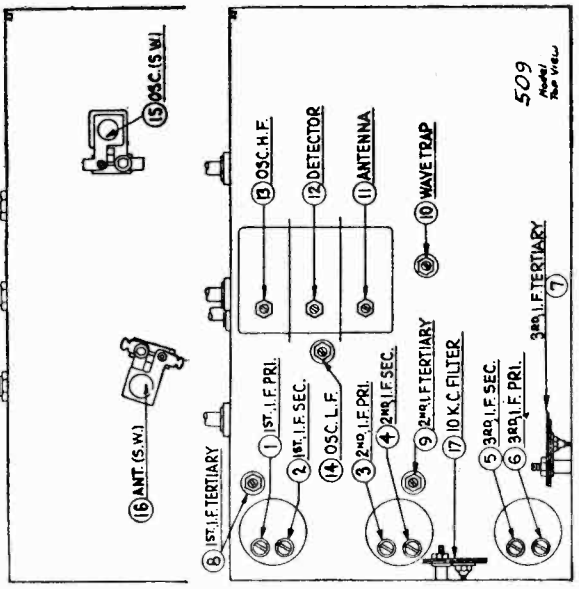


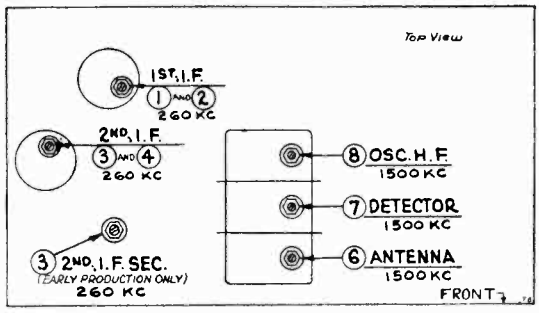
MODEL NO. 507

Signal Generator Connection	Signal Generator Frequency	Dial Position	Wave Band Switch Position	Trimmer Number	Output Signal
Remove grid clip from 6A7					
Control grid of 6A7	260 k.c.	55	Broadcast (left)	4 [1]	Max.
"	"	"	"	3 [2]	Max.
"	"	"	"	2 [1]	Max.
"	"	"	"	1 [2]	Max.
Connect grid clip to 6A7					
Ant.*	"	"	"	5	*Min.*
"	1500 k.c.	150	"	6	Max.
"	"	"	"	7	Max.
"	"	"	"	8	Max.
"	600 k.c.	60	"	9	Max.
"	11 m.c.	11 m.c.	Short Wave (right)	10	Max.
"	"	"	"	11	Max.

* Use a 200-mmf. condenser dummy antenna on broadcast band and a 400-ohm carbon resistor on shortwave band.
Note 1.—Nut adjustment.
Note 2.—Screw adjustment.

MODEL 509





MODEL NO. 509

Signal Generator Connection	Signal Generator Frequency	Dial Position	Wave Band Switch Position	Trimmer Number	Output Signal
Remove grid clip from 6A7					
Control grid of 6A7	260 k.c.[1]	550 k.c.	Broadcast [2] (left)	1	Min.[3]
"	"	"	"	2	Min.
"	"	"	"	3	Min.
"	"	"	"	4	Min.
"	"	"	"	5 [4]	Min.
"	"	"	"	6 [5]	Min.
"	260 k.c.[6]	"	"	7	Note 7
"	260 k.c.[8, 9]	"	"	8	*Max.*
"	"	"	"	9	*Max.*
"	Note 10		"	8	Note 10
Connect grid clip to 6A7					
Ant.	260 k.c.[11]	"	"	10	*Max.*
Ant.[12]	1500 k.c.	1500 k.c.	"	11	Min.
"	"	"	"	12	Min.
"	"	"	"	13	Min.
"	600 k.c.	600 k.c.	"	14	Min.*
Ant.[13]	11.0 m.c.	11.0 m.c.	Short Wave (right)	15 [14]	*Max.*[15]
"	"	10.48 m.c.	"	Image check	
"	"	11.0 m.c.	"	16	*Max.*
Note 16	10 k.c.	...	...	17	Min.

Note 1.—Adjust signal generator to give an unmodulated output, which should be regulated to give a reading of about two volts on the voltmeter scale (see note 3) during the first four i-f. adjustments.
Note 2.—Turn fidelity-selectivity control all the way to the left.
Note 3.—The usual output meter cannot be used with an unmodulated signal. Use indirect indication through a.v.c. system (for all adjustments unless otherwise noted) by connecting a high-resistance d.c. voltmeter (scale 0-5 or 0-10 volts) across the r.f. cathode resistor. This method will give *minimum scale reading* for maximum receiver output, and vice-versa. The voltmeter will indicate about 3.5 volts bias when no signal is applied to the antenna and will decrease upon application of signal.
Note 4.—Connect 500 mmfd. condenser from plate of second i-f. tube to ground.
Note 5.—Remove 500 mmfd. condenser (note 4) from plate of second i-f. tube and connect across the third i-f. secondary. Remove this condenser after adjustment is completed.
Note 6.—Set signal-generator for maximum output.
Note 7.—Adjust (7) to give *minimum width* on shadow-tuning meter of receiver.
Note 8.—Set signal-generator output to give reading of 2 volts on voltmeter.
Note 9.—Turn fidelity-selectivity control all the way to the right.
Note 10.—When varying signal-generator frequency through 253 k.c. and 267 k.c., a definite peak on the voltmeter should be noted for each. If these two readings are not the same, they can be equalized by slight readjustment of (8).
Note 11.—Turn fidelity-selectivity control all the way to the left.
Note 12.—Through 250 mmfd. condenser.
Note 13.—Through 400 ohm resistance.
Note 14.—Remove voltmeter from r.f. cathode resistor and connect regular output meter to plates of output tubes in the usual manner for adjustment of (15), (16), and (17).
Note 15.—Use "lower capacity peak" for adjustment of (15) to maximum indication on output meter. Neglect "higher-capacity peak."
Note 16.—The accurate adjustment of the 10 k.c. audio filter (17) requires a calibrated audio oscillator. Connect the low side of the audio oscillator to ground and the high side to the variable tap on the receiver volume control.
* While rocking.

PHILCO RADIO & TELEV. CORP.

MODEL 267-E
Schematic, Chassis
Parts Trimmers

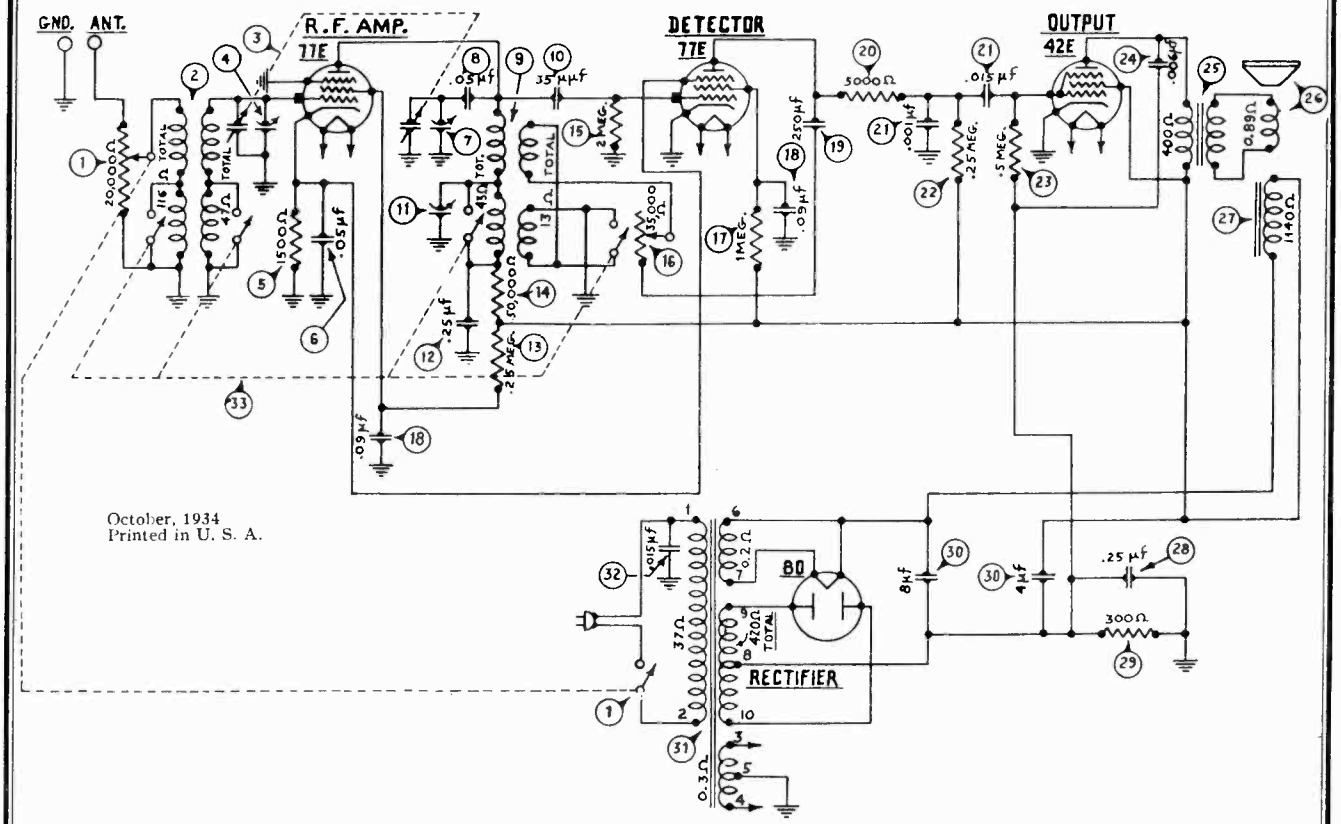


Fig. 2—Schematic Wiring Diagram

NOTE: In current production a 2500 ohm resistor Part No. 33-1100, is connected across the two contacts of the wave band switch nearest (in diagram) to the volume control (16).

REPLACEMENT PARTS—MODEL 267-E

No. on Figs.	Description	Part Number
(1)	Volume Control (20,000 ohms) and On-off Switch	33-5055
(2)	Antenna Transformer	32-1451
(3)	Tuning Condenser Assembly	31-1361
(4)	Compensating Condenser (Antenna)	Part of (3)
(5)	Resistor (1500 ohms) (Brown-Green-Red)	7951
(6)	Condenser (.05 Mfd. Bakelite Block)	3615-AA
(7)	Compensating Condenser (Detector)	Part of (3)
(8) *	Condenser (.05 Mfd. Tubular)	30-4012
(9)	Detector Transformer	32-1452
(10)	Condenser (.000035 Mfd. Mica)	30-1048
(11)	Compensating Condenser (Low Frequency)	04000E
(12)	Condenser (.25 Mfd. Tubular)	30-4146
(13)	Resistor (.25 Meg.) (Red-Yellow-Yellow)	33-1097
(14)	Resistor (50,000 ohms) (Green-Brown-Orange)	6098
(15)	Resistor (2 Meg.) (Red-Black-Green)	33-1025
(16)	Regeneration Control (35,000 ohms)	33-5076
(17)	Resistor (1 Meg.) (Brown-Black-Green)	33-1096
(18)	Condenser (.09 Mfd. Twin Bakelite Block)	4989-AK
(19)	Condenser (.00025 Mfd. Mica)	30-1032
(20)	Resistor (5,000 ohms) (Green-Black-Red)	5310
(21)	Condenser (.0001 and .015 Bakelite Block)	7762-B
(22)	Resistor (.25 Meg.) (Red-Yellow-Yellow)	33-1097
(23)	Resistor (.5 Meg.) (Yellow-White-Yellow)	6097
(24)	Condenser (.006 Mfd., Tubular)	30-4024
(25)	Output transformer (On Speaker)	32-7019
(26)	Voice Coil and Cone Assembly (SB Speaker)	36-3157
(27)	Speaker Field Coil and Pot. Assembly	36-3243
(28)	Condenser (.25 Mfd. Tubular)	30-4146
(29)	Resistor (Wirewound, 390 ohms)	7465
(30)	Condenser (Electrolytic 4 and 8 Mfd.)	30-2013
(31)	Power Transformer (50-60 Cycles)	7423
(32)	Condenser (.015 Mfd. Bakelite Block)	3793-AJ
(33)	Wave-Band Switch	42-1081

* Production after 10-23-34 uses Part No. 30-4123.

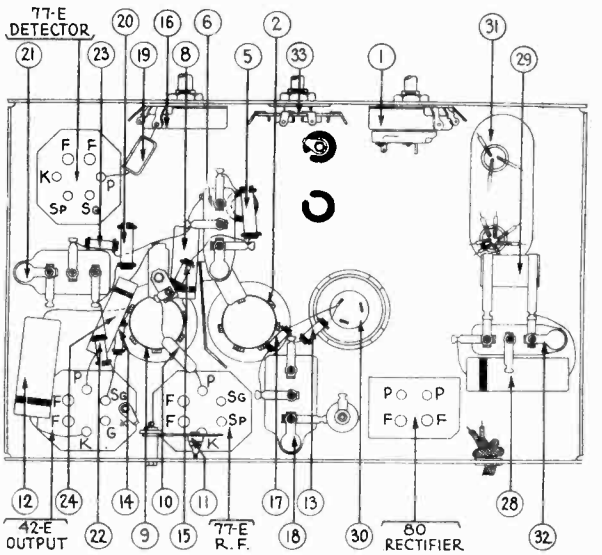


Fig. 3—Bottom View of Chassis Showing Parts, and Location of Tube Sockets for Voltage Tests

MODEL 267-E
Socket, Voltage
Alignment
Transformer Data

PHILCO RADIO & TELEV. CORP.

MODEL 267-E

Philco Model 267-E is a four tube receiver designed for operation on 230 volts 50-60 cycles alternating current (A. C.). It receives over two frequency ranges, viz: 535 to 1510 kilocycles (standard wave) and 145 to 310 K.C. (long wave). The circuit used is the regenerative or "reaction" circuit. Model 267-E employs the following tubes: Type 77-E R. F., type 77-E detector, type 42-E pentode output and type 80 as rectifier. The power consumption is 46 watts.

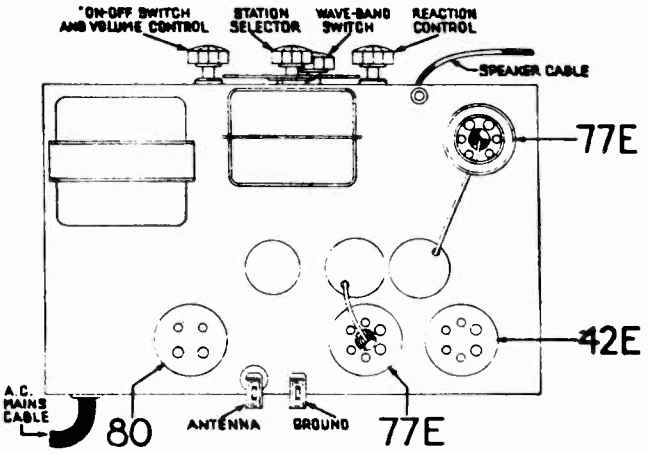


Fig. 1—Top View

Power Transformer Data
(Line Voltage 240)

Terminals (See Fig. 2)	A. C. Voltage	Current	Circuit	Color
1-2	240	....	Primary	White
3-4	6.3	1.5 A	Filaments	Black
6-7	5.0	2.0 A	Filaments of 80	Blue
9-10	630	55 MA	Plates of 80	Yellow
5	....	....	Center tap of 3-4	Black-Yellow tracer
8	....	....	Center tap of 9-10	Yellow-Green tracer

Tube Socket Voltage
(Line Voltage 230)

	R. F. 77-E	Det 77-E	Output 42-E
P-K	42	137	245
SG-K	35	87	255
K to Gnd	0	3.8	0

Above values were obtained by a high resistance D.C. voltmeter and test prods applied to underside of chassis. See Fig. 3.

ADJUSTING COMPENSATING CONDENSERS

There are three compensating condensers in these sets. Two are located on the top of the sections of the tuning condenser gang; and one underneath chassis and reached from the rear (thru hole in sub-base).

Connect the set up to the A. C. line and the antenna lead from signal generator to antenna post of set. Set signal generator at 1500 K.C. Turn wave-band switch to right and set dial at 150. (If set is removed from cabinet, obtain a piece of flat steel, .006" thick, about ½" wide and four or five inches long; open condenser gang and bring heel of detector section down on this steel strip; then remove the strip without disturbing setting of condenser gang).

Turn volume control full on and reaction control about ¾ of the way to full on; then with a suitable hex wrench (such as Philco No. 3164) adjust condensers ⑩ and ⑦ (located on tuning condenser gang) to obtain maximum reading in the output meter, which should be connected to primary terminals of the output transformer.

While making the adjustment, advance the reaction control as far as possible without causing oscillation, working for maximum output on both condensers.

Now throw wave-band switch to left and turn dial to 300 K.C. (30 on lower scale of dial). In this position the condenser gang is approximately open. Now adjust condenser ⑪ (reached from rear) for maximum output, keeping the reaction control advanced as explained above, to just below point of oscillation.

MODEL 506
Schematic

PHILCO RADIO & TELEV. CORP.

September, 1934
Printed in U. S. A.

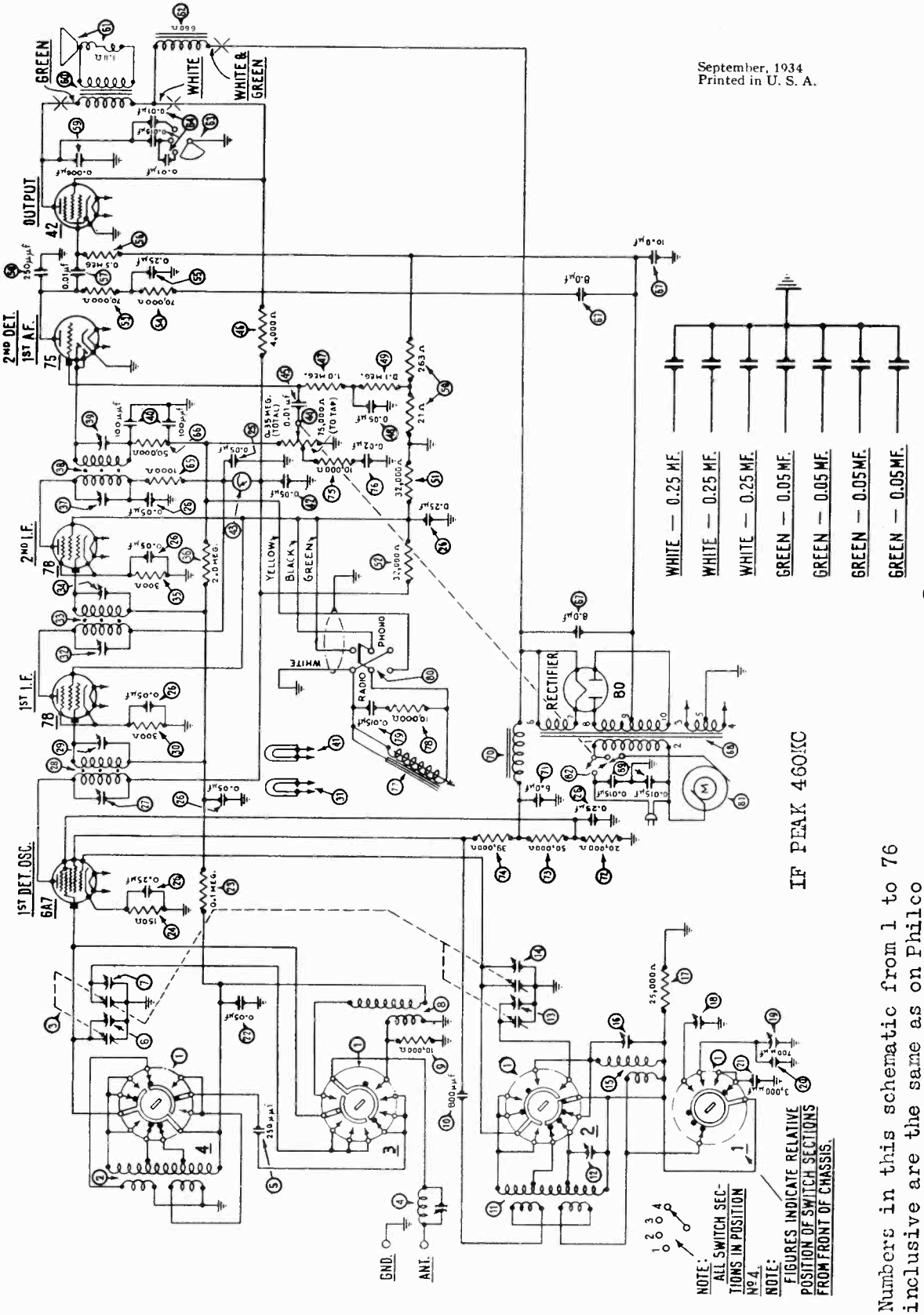


Fig. 1—Schematic Wiring Diagram

Numbers in this schematic from 1 to 76 inclusive are the same as on Philco page 5—41. For other service data, see that pertaining to Model 144 on pages 5—42 and 5—43 of Rider's Volume V.

MODEL 506
Notes, Parts

PHILCO RADIO & TELEV. CORP.

Radio-Phonograph Model 506

PHILCO MODEL 506 has the same superheterodyne broadcast and short-wave receiver chassis as Model 144, and must be operated upon the exact frequency (cycles) of alternating current given upon the name-label of the radio receiver chassis,—for correct speed of the phonograph motor.

Service Bulletin No. 193 on Model 144 gives the data necessary to test and adjust the radio receiver of Model 506, and includes a full description of the adjustment of its compensating condensers.

The radio circuits are the same as those of Model 144,—with the additional phonograph reproducing circuits. Complete schematic wiring diagram of Model 506 is given in Figure 1 of this Bulletin. The audio frequency system of the radio chassis amplifies the impulses generated in the pick-up.

Replacement Parts for the radio chassis and speaker are given in Service Bulletin No. 193 (Model 144); the additional *phonograph* parts are:

No. on Fig. 1	Description	Part No.	List Price
(77)	Pick-up and Tone Arm Assembly	35-2002	
(78)	Resistor (10,000 ohm) (Brown-Black-Orange)	33-1000	$0.20
(79)	Condenser (.015 Mfd.)	3793-S	.35
(80)	Phonograph-Radio Switch	42-1067	.65
(81)	Phonograph Motor (115 volt, 60 cycle)	35-1002	23.00
	Phonograph Motor (115 volt, 25 cycle)	35-1008	35.00
(82)	Automatic-Stop Switch (Motor)	6345	3.15
	Phonograph-Radio Switch Indicator	4277	.02
	Phonograph-Radio Switch Plate	28-2250	.10
	Radio-Phono Cord Assembly	35-3002	1.35
	Turntable	35-3001	12.50
	Speed-Change Lever	28-1648	.25
	Speed-Change Lever Spacer	28-6103	.03
	Speed-Change Lever Spring	28-1649	.05
	Motor Board	28271	$3.00
	Motor Board Mounting Screw	W-461B	.01
	Motor Board Mounting Washer (Finishing)	W-464B	1.50 per C.
	Mounting Board *Rubber* Washer	4074	.06
	Motor Mounting Screw	W-247A	.30 per C.
	Motor Mounting Washer	W-151A	.20 per C.
	Motor Mounting Nut	W-139A	.35 per C.
	Pick-up Mounting Screw	W-230B	.30 per C.
	Pick-up Mounting Washer	W-151A	.20 per C.
	Pick-up Mounting Nut	W-139A	.35 per C.
	Pick-up Needle Screw	4108	.18
	Cord-Connector Plug	4091	.30
	Needle Cup	28-2222	.05
	Needle Cup Cover	28-2223	.05

NOTE: Part (71) electrolytic condenser is 30-2014 in Model 506 instead of a 30-2020 as used in early Model 144 (30-2026 in current 144).

The electric pick-up is of the high-impedance type. Its impedance, at 1000 cycles, is 10,000 ohms. Its D. C. resistance is 700 ohms A description of the adjustment of the pick-up is given in Service Bulletin No. 89, "Adjusting the Electric Pick-up".

The electric motor depends upon the frequency (cycles) of the power supply for its correct speed. The power line frequency must be the same as that given in the name-label upon the radio chassis and upon the motor frame. Only a motor of the correct frequency will give the proper turntable speed.

The motor is of the self-starting, synchronous type. The motor should be lubricated at least once every six months. To do this, lift off the turntable and place a few drops of a good grade of light machine oil in the oil-hole in the top-plate of the motor.

If the electric motor should develop a fault, it should be replaced. Do not attempt to repair it; get in touch with your Distributor regarding the faulty motor.

The tone arm must be free to rotate upon its axis at all times. Damage to records will result if it is not.

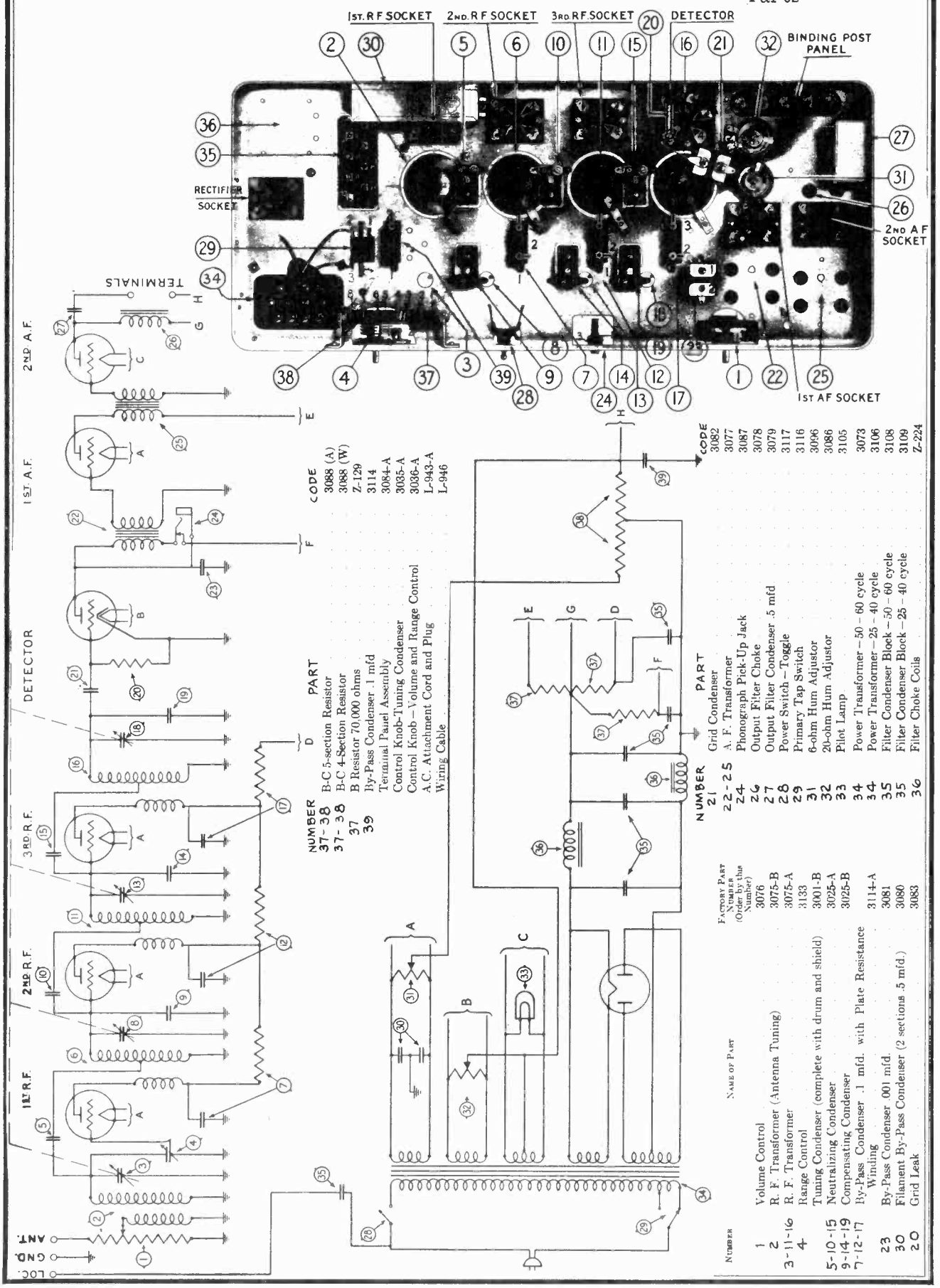
The speaker unit of Model 506 is Type H-16.

The power consumption of Model 506,—with motor running,— is 100 watts.

PRICES SUBJECT TO CHANGE WITHOUT NOTICE

PHILCO RADIO & TELEV. CORP.

MODEL 511
Schematic, Chassis Parts



NUMBER	PART	CODE
37-38	B-C 5-section Resistor	3088 (A)
37-38	B-C 4-Section Resistor	3088 (W)
37	B Resistor 70,000 ohms	Z-129
39	By-Pass Condenser .1 mfd	3114
	Terminal Panel Assembly	3084-A
	Control Knob-Tuning Condenser	3035-A
	Control Knob – Volume and Range Control	3036-A
	A.C. Attachment Cord and Plug	L-943-A
	Wiring Cable	L-946

NUMBER	PART	CODE
21	Grid Condenser	3082
22-25	A. F. Transformer	3077
24	Phonograph Pick-Up Jack	3087
26	Output Filter Choke	3078
27	Output Filter Condenser .5 mfd	3079
28	Power Switch – Toggle	3117
29	Primary Tap Switch	3116
31	6-ohm Hum Adjustor	3096
32	20-ohm Hum Adjustor	3086
33	Pilot Lamp	3105
34	Power Transformer – 50 – 60 cycle	3073
34	Power Transformer – 25 – 40 cycle	3106
35	Filter Condenser Block – 50 – 60 cycle	3108
35	Filter Condenser Block – 25 – 40 cycle	3109
36	Filter Choke Coils	Z-224

NUMBER	NAME OF PART	FACTORY PART NUMBER (Order by this Number)
1	Volume Control	3076
2	R. F. Transformer (Antenna Tuning)	3075-B
3-11-16	R. F. Transformer	3075-A
4	Range Control	3133
	Tuning Condenser (complete with drum and shield)	3001-B
5-10-15	Neutralizing Condenser	3025-A
9-14-19	Compensating Condenser	3025-B
7-12-17	By-Pass Condenser .1 mfd. with Plate Resistance Winding	3114-A
23	By-Pass Condenser .001 mfd.	3081
30	Filament By-Pass Condenser (2 sections .5 mfd.)	3080
20	Grid Leak	3083

MODEL 642
Chassis Parts

PHILCO RADIO & TELEV. CORP.

Replacement Parts for Model 642

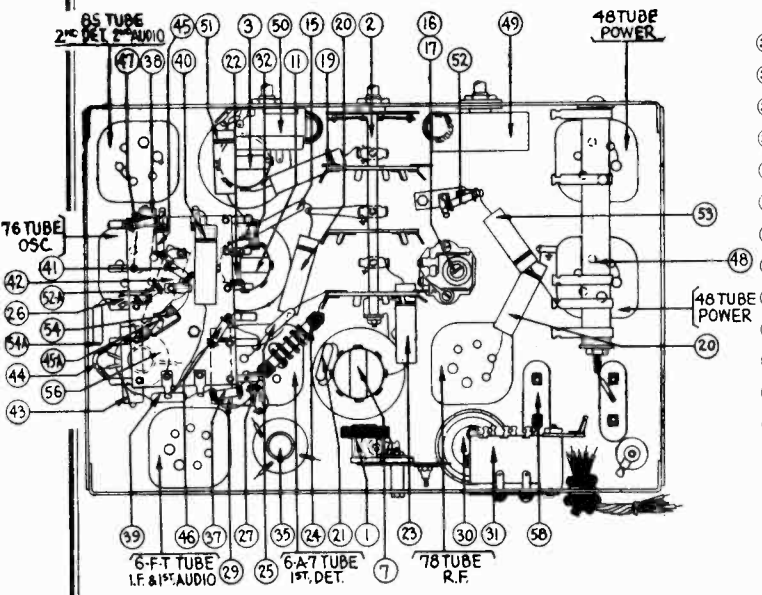


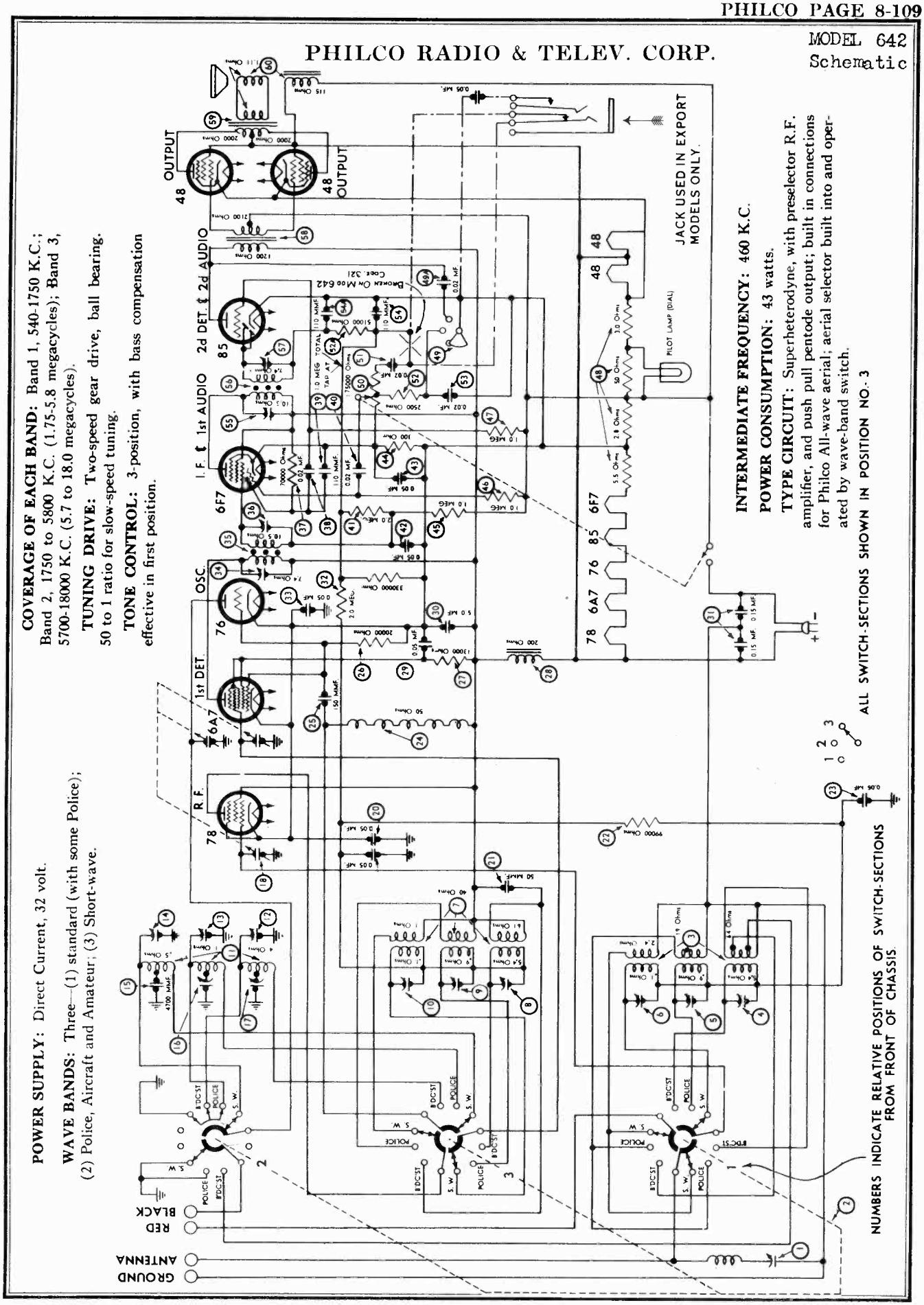
Fig. 4. Bottom View of Chassis

PRICES SUBJECT TO CHANGE WITHOUT NOTICE

	Description	Part No.	List Price
(1)	Wavetrap	38-6972	$0.75
(2)	Waveband Switch	42-1107	1.75
(3)	Antenna Transformer	32-1867	3.00
(4)	Compensating Condenser (Std.)	Part of (3)	....
(5)	Compensating Condenser (Police)	Part of (3)	....
(6)	Compensating Condenser (S. W.)	Part of (3)	....
(7)	R. F. Transformer	32-1868	3.00
(8)	Compensating Condenser (Std.)	Part of (7)	....
(9)	Compensating Condenser (Police)	Part of (7)	....
(10)	Compensating Condenser (S. W.)	Part of (7)	....
(11)	Oscillator Transformer	32-1869	2.50
(12)	Compensating Condenser (Std.)	Part of (11)	....
(13)	Compensating Condenser (Police)	Part of (11)	....
(14)	Compensating Condenser	Part of (11)	....
(15)	Condenser (.0047 mf.)	30-1052	.55
(16)	Compensating Condenser (L. F. Police)	31-6027	.70
(17)	Compensating Condenser (L. F. Std.)	Part of (16)	....
(18)	Tuning Condenser	31-1526	2.75
(19)	Condenser (0.05 mf.)	30-4020	.20
(20)	Condenser (0.05 mf.)	30-4020	.20
(21)	Condenser (.000050 mf.)	30-1029	.20
(22)	Resistor (99,000 ohms)	6099	.20
(23)	Condenser (0.05 mf.)	30-4020	.20
(24)	Choke (R.F.)	32-1842	.50
(25)	Condenser (.00015 mf.)	30-1033	.25
(26)	Resistor (20,000 ohms)	33-1178	.20
(27)	Resistor (13,000 ohms)	8267	.20
(28)	Choke (Filter)	32-7215	.90
(29)	Condenser (0.05 mf.)	30-4020	.20
(30)	Condenser (5.0 mf.)	30-2132	$0.70
(31)	Condenser (0.15-0.15 mf.)	6287-DU	.40
(32)	Resistor (2.0 meg.)	33-1025	.20
(33)	Condenser (0.05 mf.)	30-4020	.20
(34)	Compensating Condenser (1st I. F. Pri.)	Part of (35)	....
(35)	I. F. Transformer (1st)	32-1843	1.50
(36)	Compensating Condenser (1st I. F. Sec.)	Part of (35)	....
(37)	Resistor (170,000 ohms)	33-1191	.20
(38)	Condenser (0.02 mf.)	30-4215	.20
(39)	Condenser (.00011 mf.)	30-1031	.20
(40)	Condenser (0.02 mf.)	30-4124	.25
(41)	Resistor (2 meg.)	33-1025	.20
(42)	Condenser (0.05 mf.)	30-4020	.20
(43)	Condenser (0.05 mf.)	30-4020	.20
(44)	Resistor (300 ohms)	33-3010	.20
(45)	Resistor (1.0 meg.)	33-1096	.20
(46)	Resistor (1.0 meg.)	33-1096	.20
(47)	Resistor (1.0 meg.)	33-1096	.20
(48)	B. C. Resistor	38-7026	.30
(49)	Tone Control	30-4332	.75
(50)	Volume Control	33-5120	1.45
(51)	Condenser (0.02 mf.)	30-4215	.20
(52)	Resistor (25,000 ohms)	33-1013	.20
(53)	Condenser (0.02 mf.)	30-4215	.20
(54)	Condenser (.00011 mf.)	30-1031	.20
(54)A	Condenser (.00011 mf.)	30-1031	.20
(55)	Compensating Condenser (2nd I. F. Pri.)	Part of (56)	....
(56)	2nd I. F. Transformer	32-1844	1.50
(57)	Compensating Condenser (2nd I. F. Sec.)	Part of (56)	....
(58)	Input Transformer	3242	2.50
(59)	Output Transformer	32-7309	1.30
(60)	Speaker Cone Assembly (K-29)	36-3159	.80
	Field Coil Assembly	36-3407	3.25
	5 Prong Socket	27-6035	.11
	6 Prong Socket	27-6036	.11
	7 Prong Socket	27-6037	.11
	R. F. Shield Assembly	38-6938	.35
	Tube Shield Body	28-2726	.10
	Tube Shield Base	28-2725	.03
	Pilot Lamp	34-2068	.16
	Dial	27-5098	.25
	Hub and Set Screw Assembly	31-1550	.15
	Spring Clamp	28-2837	.10
	Speaker Cable	L-1885	.25
	Bezel	28-3163	.50
	Bezel Glass	27-8006	.55
	Bezel Gasket	27-7980	.01
	Bezel Frame Gasket	27-7971	.02
	Knob (Station Selector)	27-4206	.12
	Knob (Fine Tuning)	27-4207	.10
	Knob (Volume Control, Tone Control)	27-4208	.10
	Knob (Wave Band Switch)	27-4225	.10

PHILCO RADIO & TELEV. CORP.

MODEL 642
Schematic



COVERAGE OF EACH BAND: Band 1, 540-1750 K.C.; Band 2, 1750 to 5800 K.C. (1.75-5.8 megacycles); Band 3, 5700-18000 K.C. (5.7 to 18.0 megacycles).

TUNING DRIVE: Two-speed gear drive, ball bearing. 50 to 1 ratio for slow-speed tuning.

TONE CONTROL: 3-position, with bass compensation effective in first position.

POWER SUPPLY: Direct Current, 32 volt.

WAVE BANDS: Three—(1) standard (with some Police); (2) Police, Aircraft and Amateur; (3) Short-wave.

INTERMEDIATE FREQUENCY: 460 K.C.

POWER CONSUMPTION: 43 watts.

TYPE CIRCUIT: Superheterodyne, with preselector R.F. amplifier, and push pull pentode output; built in connections for Philco All-wave aerial; aerial selector built into and operated by wave-band switch.

MODEL 642
Voltage, Socket
Trimmers, Alignment

PHILCO RADIO & TELEV. CORP.

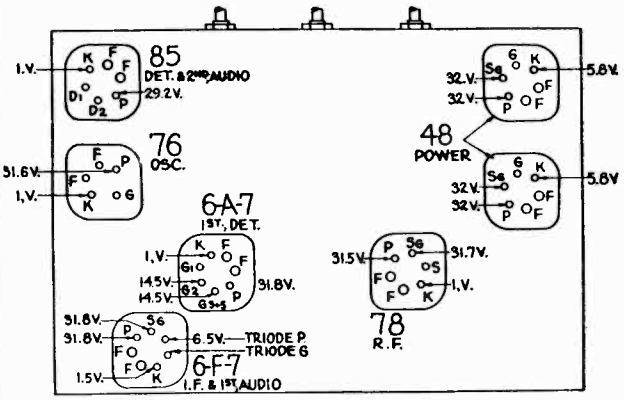


Fig. 1. Tube Sockets as viewed from bottom and Voltage Measurements

Above voltages were obtained by using a PHILCO type 025 Circuit Tester (or 048A All-purpose Tester), using test prods applied to underside of chassis. Volume control at minimum; dial at 55; waveband switch counter-clockwise (band 1). Use Fig. 1 for test points. Line voltage 32 volts.

Adjusting Compensating Condensers

The adjustment of the compensating condensers in Model 642 requires a signal generator covering the broadcast and police band, and also one capable of producing a signal at certain frequencies in the short wave band. Philco Model 088 All-wave signal generator is ideal for these requirements. The location of all compensating condensers is shown in Fig. 5. An output meter is also needed, such as the Philco Model 025.

Adjustment of I. F.

I. F. ADJUSTMENTS: Set the signal generator at 460 K.C. with attenuator set at minimum, and attach its antenna lead to the grid of the 6F7 I. F. amplifier tube (removing grid cap). Connect ground lead to ground terminal on set. Set the dial at 55 and turn the waveband switch to position 1 (standard). Adjust the volume control of set to almost maximum (just before oscillator hiss becomes noticeable), and the signal generator attenuator so that about one-fourth (¼) scale reading is had on the output meter. With a fibre screw driver adjust condensers ⑤⑤ and ⑤⑦ (2nd I. F.) for maximum reading on output meter. Turn attenuator of signal generator to minimum and remove its antenna lead from the grid of the 6F7 I. F. tube, replacing grid cap. Then place the antenna lead on the grid of the 6A7. Adjust attenuator as before, then proceed to adjust condensers ③④ and ③⑧ (1st I. F.) for maximum reading. Care should be taken to keep the output meter reading during adjustments at about one-fourth scale reading. This should be done by using the signal generator attenuator control.

Adjustment of Wave-Trap

1. Connect the signal generator leads to the antenna and ground terminals of the receiver.

2. With the wave-band switch of the receiver still in the extreme left (standard band), (540-1750 K.C.), turn the station selector to 55.

3. With the signal generator in operation at 460 K.C., adjust the wave-trap ① condenser until a MINIMUM reading is obtained on the output meter. The Philco fibre wrench, part No. 3164, is used for this adjustment. The wave-trap compensator is reached from rear of chassis.

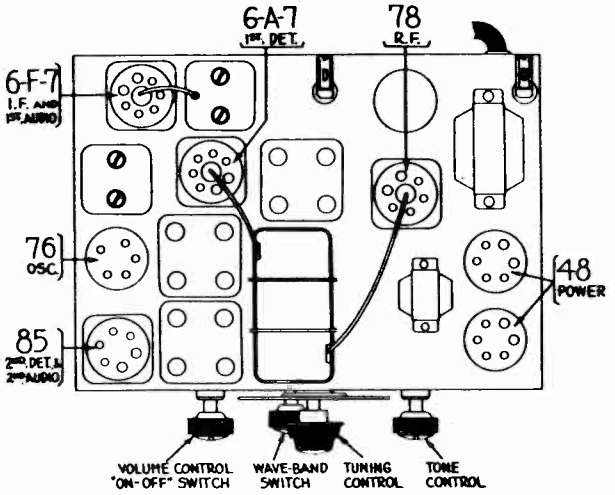


Fig. 2. Location of Tubes (Top View)

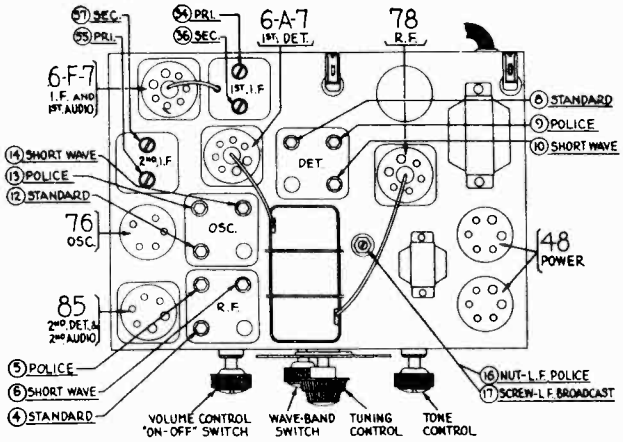


Fig. 5. Location of Compensating Condensers

Adjustment of R. F., Oscillator and Detector Stages

1. **SHORT WAVE:** Connect the antenna lead of the signal generator to the grid of the 78 R.F. tube (removing grid clip), and the ground lead to the ground terminal of the set. Set the signal generator dial at 18.0 MC. Turn waveband switch to position 3. Turn the set dial to 18.0 MC. Turn condenser ⑩ one-half turn from tight. Adjust condenser ⑭ for maximum output. Turn the set dial and signal generator dial to 6.0 MC and adjust condenser ⑩ for maximum reading.

Remove the signal generator antenna lead from the 78 grid (replacing grid clip) and connect to the antenna post of the set.

Tune the set and signal generator back to 18.0 MC and adjust condenser ⑧ for maximum output. Check image frequency at approximately 17.1 MC.

2. **POLICE:** Turn the waveband switch to position 2 and tune the set and signal generator to 5.5 MC. Adjust condensers ⑤, ⑨ and ⑬ for maximum output. Next tune the set and signal generator to 1800 K.C. and adjust condenser ⑯ (Nut) for maximum output. Tune the set and signal generator again to 5.5 MC and re-adjust condenser ⑬ for maximum output.

3. **STANDARD:** Throw waveband switch to position 1. Tune the set and signal generator to 1500 K.C. Adjust condensers ④, ⑧ and ⑫ for maximum output. Next tune the set and signal generator to 580 K.C. and adjust condenser ⑰ (Screw) for maximum output. Readjust the set at 1500 K.C. by tuning condenser ⑫ for maximum output.

PHILCO RADIO & TELEV. CORP.

MODEL 821P
Schematic, Chassis
Parts

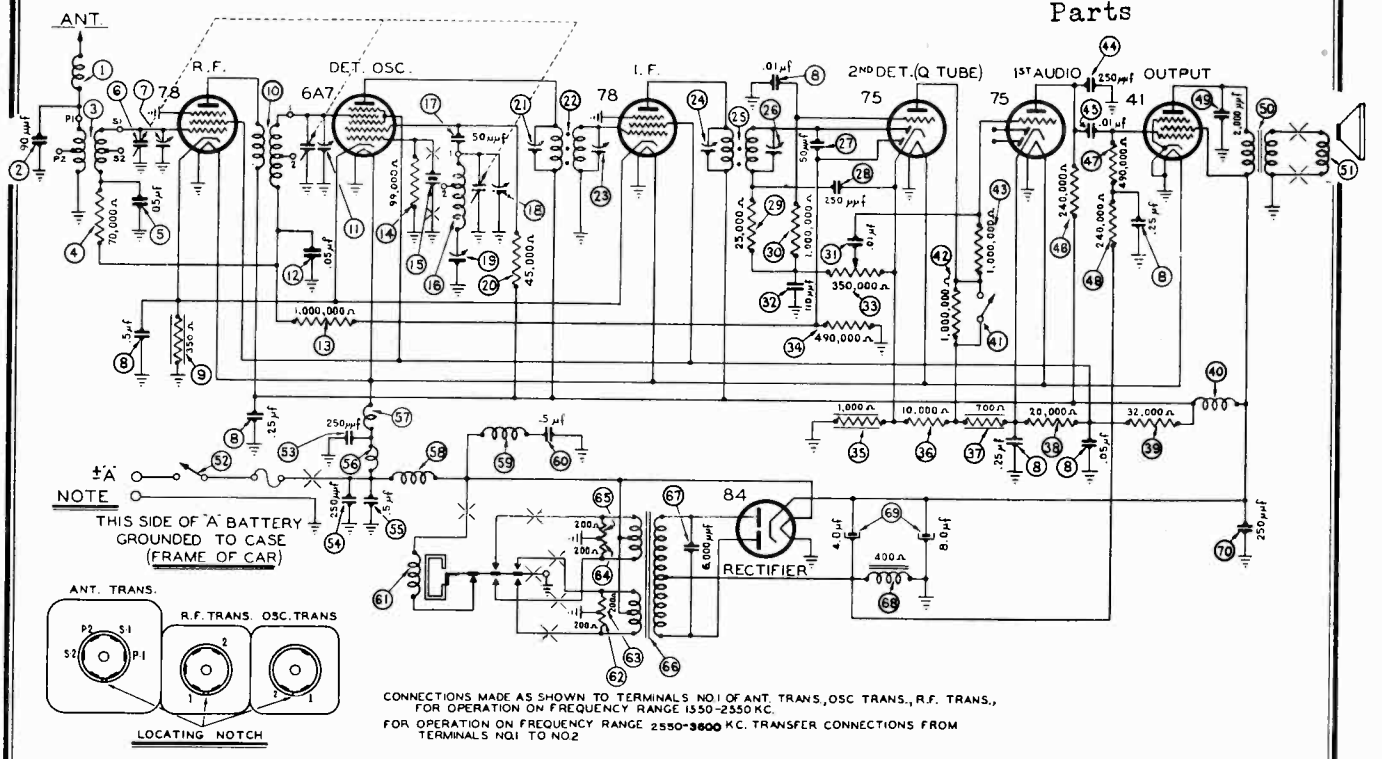


Figure 3

PARTS LIST — MODEL 821P

No.	Description	Part No.
(1)	Antenna Choke	38-8697
(2)	Condenser (90 mmfd.)	30-1046
(3)	Antenna Transformer	32-2605
(4)	Resistor (70,000 ohms)	33-370344
(5)	Condenser (.05 mfd.)	30-4444
(6)	Tuning Condenser	31-2046
(7)	First Padder (on Tun. Cond.)	
(8)	Condenser (.01-.05-.25-.25-.5 mfd.)	30-4526
(9)	Resistor (350 ohms)	33-1241
(10)	R. F. Transformer	32-2596
(11)	Second Padder (on Tun. Cond.)	
(12)	Condenser (.05 mfd.)	3615-0SU
(13)	Resistor (1,000,000 ohms)	33-510344
(14)	Resistor (99,000 ohms)	33-399344
(15)	Crystal (821P)	
	1875 K. C.	45-2101
	Frequencies 1596-1610-1626 K.C.	
	1908 K. C.	45-2194
	Frequencies 1630-1634-1642-1650 1658-1666 K.C.	
	1953 K. C. Crystal	45-2195
	Frequencies 1674-1683-1690 1698-1706-1712 K. C.	
	2578 K. C.	45-2251
	Frequencies 2310-2318-2326 2334 K. C.	
	2618 K. C. Crystal	45-2231
	Frequencies 2342-2350-2358 23-66-2374 K. C.	
	2658 K.C. Crystal	45-2196
	Frequencies 2382-2390-2398 2406-2414 K.C.	
	2696 K.C. Crystal	45-2197
	Frequencies 2422-2430-2442 2450 K.C.	
	2734 K.C. Crystal	45-2198
	Frequencies 2458-2466-2474 2482-2490 K.C.	
	3000 K. C. Crystal	45-2230
	Frequencies 2726 K. C.	
	3360 K. C. Crystal	45-2496
	Frequencies 3105 K. C.	
(16)	Oscillator Transformer	32-2597
(17)	Condenser (50 mmfd.)	30-1029
(18)	Third Padder (on Tun. Cond.)	
(19)	Low Frequency Padder	31-6079
(20)	Resistor (45,000 ohms)	33-345344
(21)	Padder (Pri. 1st I.F. Trans.)	
(22)	First I. F. Transformer	32-2026
(23)	Padder (Sec. 1st I.F. Trans.)	
(24)	Padder (Pri. 2nd I.F. Trans.)	
(25)	Second I. F. Transformer	32-2027
(26)	Padder (Sec. 2nd I.F. Trans.)	
(27)	Condenser (50 mmfd.)	30-1029
(28)	Condenser (250 mmfd.)	30-1032
(29)	Resistor (25,000 ohms)	33-325344
(30)	Resistor (1,000,000 ohms)	33-510344
(31)	Condenser (.01 mfd.)	3903-0SU
(32)	Condenser (110 mmfd.)	30-1031
(33)	Volume Control (350,000 ohms)	33-5148
(34)	Resistor (490,000 ohms)	33-449344
(35)	Resistor (1,000 ohms)	33-210344
(36)	Resistor (10,000 ohms)	33-310344
(37)	Resistor (700 ohms)	33-1220
(38)	Resistor (20,000 ohms)	33-320344
(39)	Resistor (32,000 ohms)	33-332434
(40)	"B" Choke	32-1281
(41)	Sensitivity Switch	42-1140
(42)	Resistor (1,000,000 ohms)	33-510344
(43)	Resistor (1,000,000 ohms)	33-510344
(44)	Condenser (250 mmfd.)	30-1032
(45)	Condenser (.01 mfd.)	3903-0SU
(46)	Resistor (240,000 ohms)	33-424344
(47)	Resistor (490,000 ohms)	33-449344
(48)	Resistor (240,000 ohms)	33-424344
(49)	Condenser (2,000 mmfd.)	30-4177
(50)	Output Transformer	32-7831
(51)	Complete Speaker (DR-4)	36-1342
(52)	On & Off Switch	42-1188
(53)	Condenser (250 mmfd.)	30-1032
(54)	Condenser (250 mmfd.)	30-1032
(55)	Condenser (.5 mfd.)	30-4015
(56)	"A" Choke	32-1604
(57)	Filament Choke	32-2535
(58)	Vibrator Choke	32-2039
(59)	Choke	32-1374
(60)	Condenser (.5 mfd.)	30-4015
(61)	Vibrator	41-3315-3
(62)	Resistor (200 ohms)	33-120344
(63)	Resistor (200 ohms)	33-120344
(64)	Resistor (200 ohms)	33-120344
(65)	Resistor (200 ohms)	33-120344
(66)	Power Transformer	32-7820
(67)	Condenser (6,000 mmfd.)	30-4512
(68)	Filter Choke	32-7545
(69)	Filter Condenser (4-8 mfd.)	30-2150
(70)	Condenser (250 mmfd.)	30-1032
	Control Assembly	42-5591

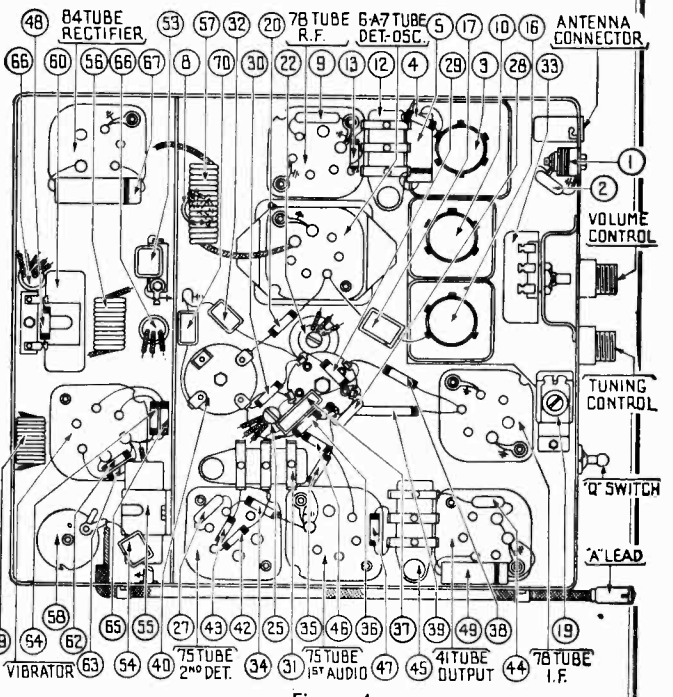


Figure 4

No.	Description	Part No.	Description	Part No.
	Volume Shaft	28-8620	Speaker Clamp	28-3131
	Volume Knob	27-4208	Clamp Nut	W-124
	Antenna Lead	41-3191	Fuse	7227
	Four Prong Socket	27-6044	Fuse Insulator	27-7729
	Five Prong Socket	27-6035	Receiver Mtg. Plate	28-4650
	Six Prong Socket	27-6036	Receiver Housing	38-8777
	Seven Prong Socket	27-6037		

MODEL 821P
Alignment
Trimmers

PHILCO RADIO & TELEV. CORP.

The Model 821P, in addition to utilizing all the precautions requisite for circuit stability, uses a sealed, precision QUARTZ CRYSTAL to control the oscillator circuit and hold it on the required frequency. This feature is indispensable in any fixed frequency Receiver used for emergency service

The Receivers, when used with the proper crystals, can be adjusted for any specified frequency between 1550 K. C. and 3600 K. C. Different crystals are used to obtain these frequencies. The crystal frequency, however, is no indication of the Receiver frequency adjustment.

FREQ. OF CRYSTAL	RECEIVER FREQ.		PART No. CRYSTAL
1875 K. C.	1596-1610-1626	K. C.	45-2101
1908 K. C.	1630-1634-1642		
	1650-1658-1666	K. C.	45-2194
1953 K. C.	1674-1683-1690		
	1698-1706-1712	K. C.	45-2195
2578 K. C.	2310-2318-2326-2334	K. C.	45-2251
2618 K. C.	2342-2350-2358-2366-2374	K. C.	45-2231
2658 K. C.	2382-2390-2398		
	2406-2414	K. C.	45-2196
2696 K. C.	2422-2430-2442		
	2450	K. C.	45-2197
2734 K. C.	2458-2466-2474		
	2482-2490	K. C.	45-2198
3000 K. C.	2726	K. C.	45-2230
3360 K. C.	3105	K. C.	45-2496

The I. F. stages can be tuned to any frequency between 242 K. C. and 278 K. C.

The I. F. frequency used in each Receiver is the difference between the frequency of the crystal in the Receiver and the frequency of the transmitter, i.e., the transmitter frequency is 2422 K. C., the crystal used is 2696 K. C., the difference is 274 K. C., which is the frequency to which the I. F. amplifier must be tuned.

The Receiver must be padded while warm and repadded after it has been operated for several hours.

The Receiver "Q" switch must be in the off position, cutting out the carrier relay circuit.

I. F. STAGES — The signal generator must be set exactly to the predetermined frequency and the generator lead connected to the grid cap of the 6A7 detector oscillator tube in series with a .1 mfd. condenser. Adjust padders (21), (23), (24) and (26) on the first and second I. F. transformers for maximum reading on the output meter.

R. F. STAGE — Tune the signal generator to the frequency of the transmitter and connect the output of the signal generator to the grid cap of the R. F. tube in series with a .1 mfd. condenser. Turn the tuning condenser to the input frequency and adjust padders (18) and (11) for maximum reading on the output meter. Notice the position of the padders. They should be out as far as possible, yet with sufficient tension to keep them firmly in place. If the padders are too tight, turn the tuning condenser plates in mesh slightly and repad (18) and (11). If the padders are too loose, turn the tuning condenser plates out of mesh slightly and repad (18) and (11). Repeat these adjustments until the correct padding settings are obtained.

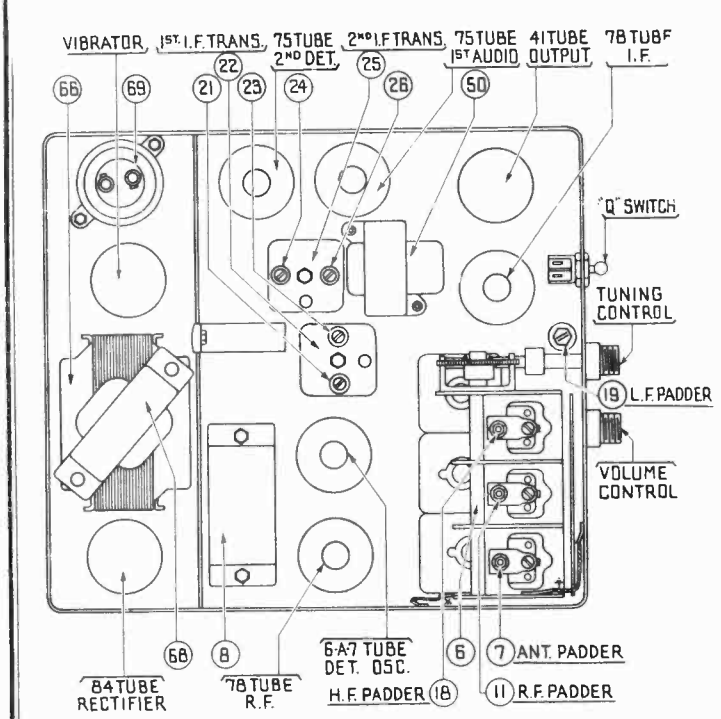
The low frequency padder (19) must be adjusted to a position where padders (11) and (18) are not too tight or too loose, i.e., if padder (18) is too tight and padder (11) too loose, turn the tuning condenser plates out of mesh slightly and screw in a little on padder (19). If padder (18) is too loose and padder (11) too tight, turn the tuning condenser plates in mesh slightly and loosen the padder (19) somewhat.

For any given frequency padder (19) should be screwed in almost tight (approximately a ½ to ¾ of a turn from tight) for best results and at the same time obtain the correct tuning condenser setting and adjustments of padders (11) and (18).

Special attention must be given to the adjustment of the oscillator padder (18), which should be backed off the peak slightly to obtain stable crystal operation.

ANTENNA STAGE — Connect the antenna lead, Part No. 41-3191, to the antenna receptacle on the Receiver in series with a 55 mmfd. condenser and set the signal generator to the frequency of the transmitter. Adjust padders (7), (21), (23), (24) and (26) for maximum reading on the output meter.

DO NOT OPEN THE CRYSTAL HOLDER. If for any reason whatever it has been opened, the crystal plates should be very carefully cleaned with carbon tetrachloride. After cleaning, the crystal must not be touched by the fingers. Use a clean cloth for handling.



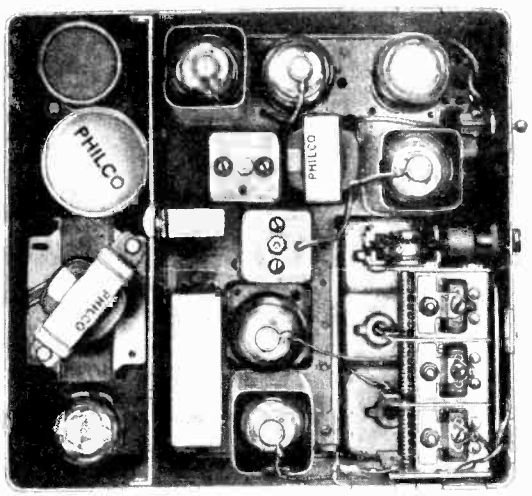
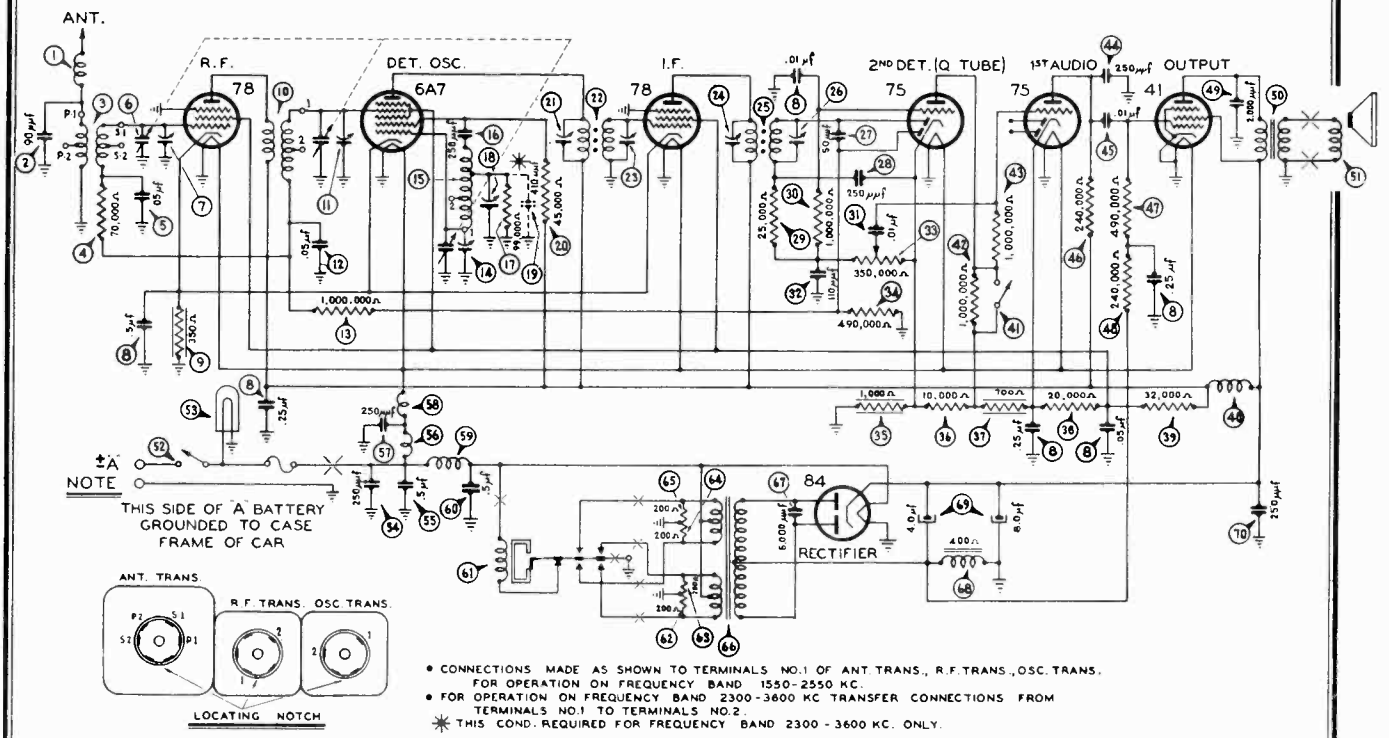


Figure 5 — Model 821P Top View

JULY, 1937

MODEL 821PV
Schematic, Chassis
Parts

PHILCO RADIO & TELEV. CORP.

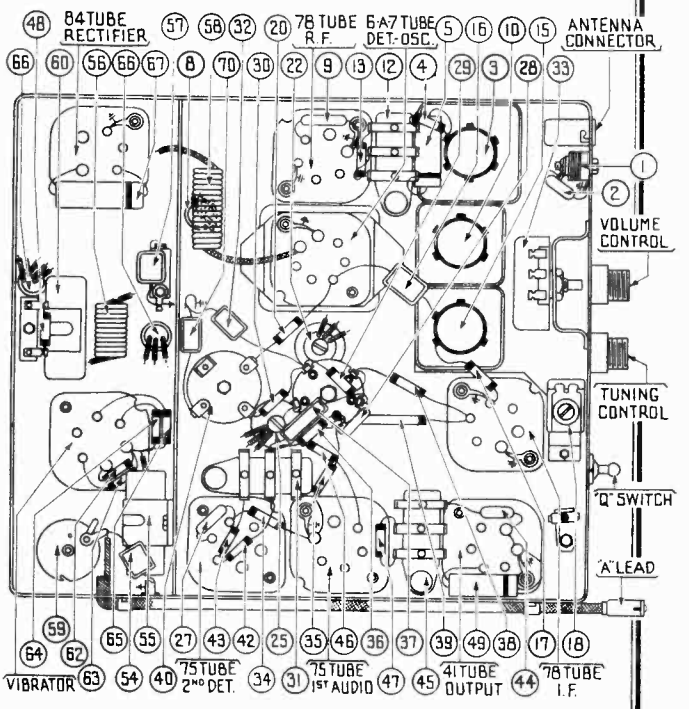


I.F.=260 KC

PARTS LIST — MODEL 821PV

No.	Description	Part No.
①	Antenna Choke	38-8697
②	Condenser (90 mmfd.)	30-1046
③	Antenna Transformer	32-2605
④	Resistor (70,000 ohms)	33-370344
⑤	Condenser (.05 mfd.)	30-4444
⑥	Tuning Condenser	31-2031
⑦	First Padder (on Tun. Cond.)	
⑧	Condenser (.01-.05-.25-.25-.5 mfd.)	30-4526
⑨	Resistor (350 ohms)	33-1241
⑩	R. F. Transformer	32-2596
⑪	Second Padder (on Tun. Cond.)	
⑫	Condenser (.05 mfd.)	3615-0SU
⑬	Resistor (1,000,000 ohms)	33-510344
⑭	Third Padder (on Tun. Cond.)	
⑮	Oscillator Transformer	32-2598
⑯	Condenser (250 mmfd.)	30-1032
⑰	Resistor (99,000 ohms)	33-399344
⑱	Low Frequency Padder	31-6079
⑲	Condenser (410 mmfd.)	30-1093
⑳	Resistor (45,000 ohms)	33-345344
㉑	Padder (Pri. 1st I.F. Trans.)	
㉒	First I. F. Transformer	32-2026
㉓	Padder (Sec. 1st I.F. Trans.)	
㉔	Padder (Pri. 2nd I.F. Trans.)	
㉕	Second I. F. Transformer	32-2027
㉖	Padder (Sec. 2nd I.F. Trans.)	
㉗	Condenser (50 mmfd.)	30-1029
㉘	Condenser (250 mmfd.)	30-1032
㉙	Resistor (25,000 ohms)	33-325344
㉚	Resistor (1,000,000 ohms)	33-510344
㉛	Condenser (.01 mfd.)	3903-0SU
㉜	Condenser (110 mmfd.)	30-1031
㉝	Volume Control (350,000 ohms)	33-5148
㉞	Resistor (490,000 ohms)	33-449344
㉟	Resistor (1,000 ohms)	33-210344
㊱	Resistor (10,000 ohms)	33-310344
㊲	Resistor (700 ohms)	33-1220
㊳	Resistor (20,000 ohms)	33-320344
㊴	Resistor (32,000 ohms)	33-332434
㊵	"B" Choke	32-1281
㊶	Sensitivity Switch	42-1140
㊷	Resistor (1,000,000 ohms)	33-510344
㊸	Resistor (1,000,000 ohms)	33-510344

No.	Description	Part No.
㊹	Condenser (250 mmfd.)	30-1032
㊺	Condenser (.01 mfd.)	3903-0SU
㊻	Resistor (240,000 ohms)	33-424344
㊼	Resistor (490,000 ohms)	33-449344
㊽	Resistor (240,000 ohms)	33-424344
㊾	Condenser (2,000 mmfd.)	30-4177
㊿	Output Transformer	32-7831
(51)	Complete Speaker (DR-4)	36-1342
(52)	On & Off Switch	42-1318
(53)	Pilot Lamp	34-2040
(54)	Condenser (250 mmfd.)	30-1032
(55)	Condenser (.5 mfd.)	30-4015
(56)	"A" Choke	32-1604
(57)	Condenser (250 mmfd.)	30-1032
(58)	Filament Choke	32-2535
(59)	Vibrator Choke	32-2039
(60)	Condenser (.5 mfd.)	30-4015
(61)	Vibrator	41-3315-3
(62)	Resistor (200 ohms)	33-120344
(63)	Resistor (200 ohms)	33-120344
(64)	Resistor (200 ohms)	33-120344
(65)	Resistor (200 ohms)	33-120344
(66)	Power Transformer	32-7820
(67)	Condenser (6,000 mmfd.)	30-4512
(68)	Filter Choke	32-7545
(69)	Filter Condenser (4-8 mfd.)	30-2150
(70)	Condenser (250 mmfd.)	30-1032
	Four Prong Socket	27-6044
	Five Prong Socket	27-6035
	Six Prong Socket	27-6036
	Seven Prong Socket	27-6037
	Speaker Clamp	28-3131
	Clamp Nut	W-124
	Control Assembly	42-5739
	Scale Assembly	42-5736
	Tuning & Volume Shaft	28-8740
	Pilot Lamp Assembly	38-7734
	Tuning & Volume Knob	27-4521
	Switch Lever Knob	27-4525
	Antenna Lead	41-3191
	Fuse	7227
	Fuse Insulator	27-7729
	Receiver Mtg. Plate	28-4650
	Receiver Housing	38-8777



MODEL 821PV
Alignment, Trimmers
Notes
MODEL 821P Notes

PHILCO RADIO & TELEV. CORP.

MODELS 821PV

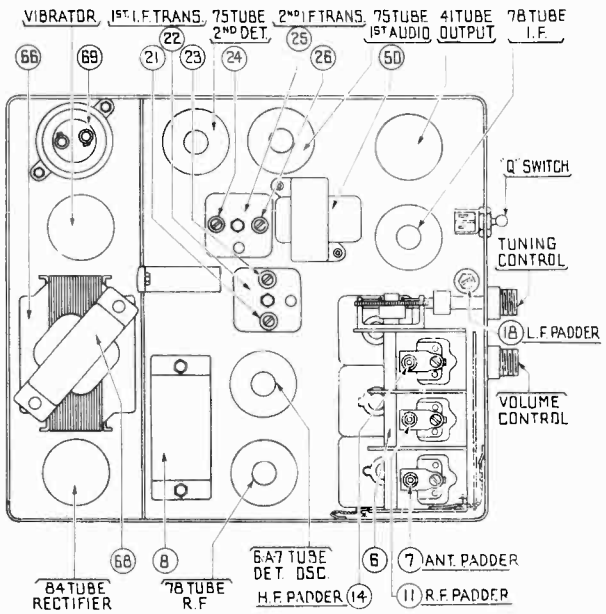
OPERATION	SIGNAL GENERATOR FREQUENCY	SIGNAL GENERATOR CONNECTION	DUMMY CAPACITY	SPECIAL INSTRUCTIONS	ADJUST PADDER
1	*260 K. C.	To Grid of 78 Tube—I.F. Stage	.1 Mfd. Condenser in Series with Generator Lead	No Antenna Connection Turn Tuning Condenser Plates out of mesh as far as they will go	24 - 26
2	*260 K. C.	To Grid of 6A7 Tube	.1 Mfd. Condenser in Series with Generator Lead	No Antenna Connection Turn Tuning Condenser Plates out of mesh as far as they will go	21 - 23 24 - 26
		FOR FREQUENCIES BETWEEN 1550 K. C. AND 2550 K. C.			
3	*2550 K. C.	To Grid of 78 Tube—R.F. Stage	.1 Mfd. Condenser in Series with Generator Lead	No Antenna Connection Turn Tuning Condenser Plates out of mesh as far as they will go	14 - 11
4	*1650 K. C.	To Grid of 78 Tube—R.F. Stage	.1 Mfd. Condenser in Series with Generator Lead	No Antenna Connection Turn Tuning Condenser to 1650 K. C.	18 Note 1
5	*2550 K. C.	To Grid of 78 Tube—R.F. Stage	.1 Mfd. Condenser in Series with Generator Lead	No Antenna Connection Turn Tuning Condenser Plates out of mesh as far as they will go	14
6	*2400 K. C.	Note 2	55 Mmfd. Condenser Note 2	Turn Tuning Condenser to 2400 K. C.	7 - 11
		FOR FREQUENCIES BETWEEN 2550 K. C. AND 3600 K. C.			
7	*3600 K. C.	To Grid of 78 Tube—R.F. Stage	.1 Mfd. Condenser in Series with Generator Lead	No Antenna Connection Turn Tuning Condenser Plates out of mesh as far as they will go	14 - 11
8	*2400 K. C.	To Grid of 78 Tube—R.F. Stage	.1 Mfd. Condenser in Series with Generator Lead	No Antenna Connection Set Tuning Condenser at 2400 K. C.	18 Note 1
9	*3600 K. C.	To Grid of 78 Tube—R.F. Stage	.1 Mfd. Condenser in Series with Generator Lead	No Antenna Connection Turn Tuning Condenser Plates out of mesh as far as they will go	14
10	*3400 K. C.	Note 2	55 Mmfd. Condenser Note 2	Set Tuning Condenser at 3400 K. C.	7 - 11

Adjust for maximum reading on the output meter.

NOTE 1—Rock the tuning condenser while adjusting the low frequency padder. Tune the condenser to the signal and adjust the padder for maximum output. Rotate the tuning condenser back and forth slightly for maximum output. Then re-adjust the padder for maximum output. Repeat this procedure until no further improvement is noticed.

NOTE 2—Connect the antenna lead, Part No. 41-3191, to the antenna receptacle on the Receiver in series with a 55 mmfd. condenser.

* The Receiver "Q" switch must be in the off position, cutting out the carrier relay circuit.



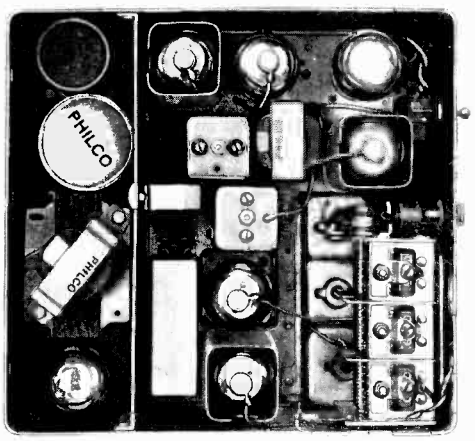


Figure 8 — Model 821PV Top View

JULY 1937

RECEIVER FREQUENCY RANGE

The Model 821P is a fixed frequency, crystal controlled Receiver designed for the medium high frequencies. These are the frequencies used by the Municipal Police, State Police, Marine Fire, Geophysical and Temporary Service and the Forestry, Forest Fire Control, Flood Control, National Park Service, Coast Guard Service, etc. (1550 K. C. to 3600 K. C.).

The Model 821PV is a variable frequency Receiver, designed for use in these same services when it is necessary to receive signals from transmitters operating on different frequencies within these bands. The Model 821PV normally covers the frequency band of 1550 K.C. to 2550 K.C. It can be obtained for use on the higher frequencies, 2300 K.C. to 3600 K.C., on special order at a slight increase in cost.

Schematic, Chassis Parts, Notes

PHILCO RADIO & TELEV. CORP.

MODELS 826, S-1416 (Studebaker)

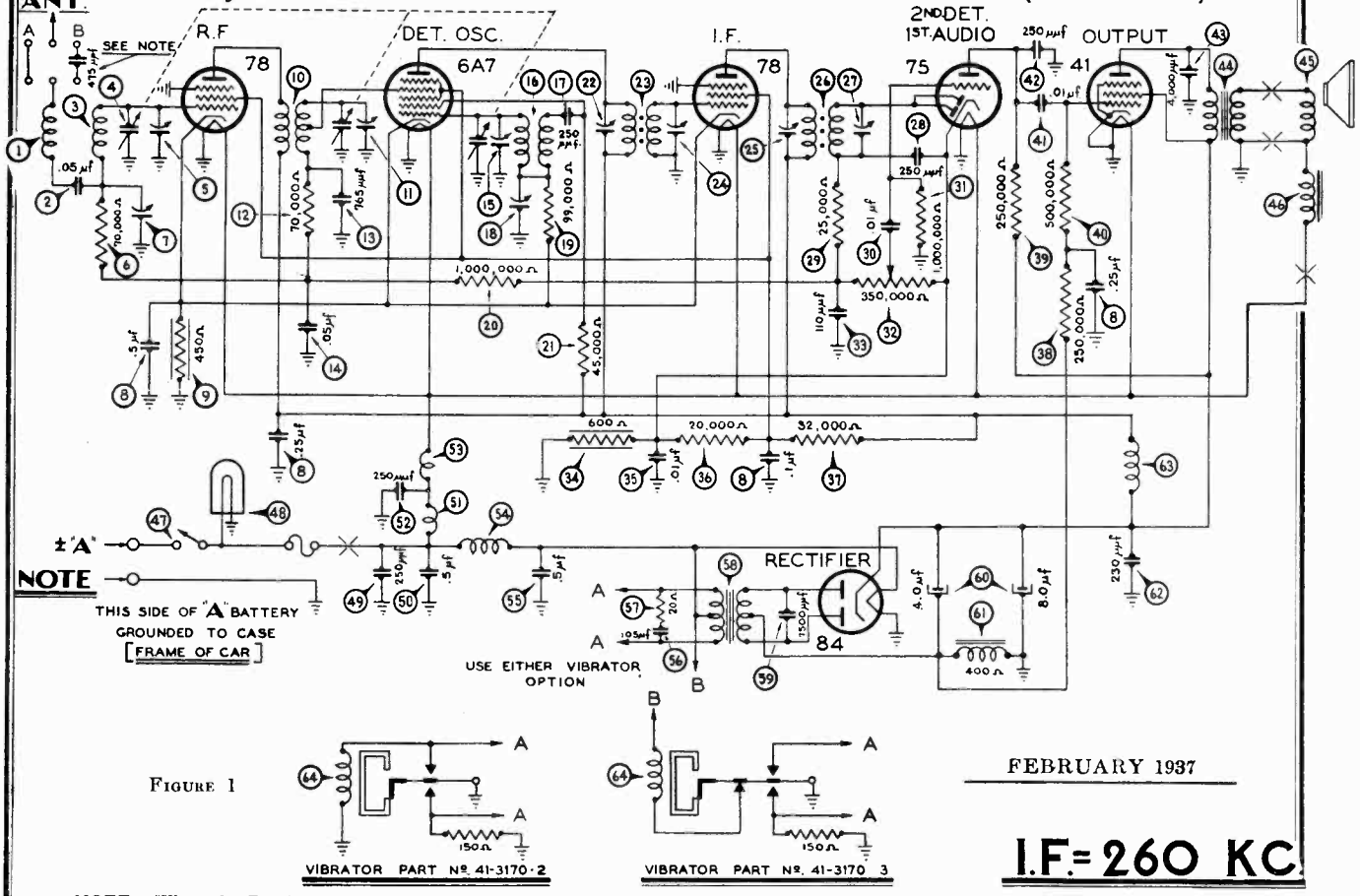


FIGURE 1

FEBRUARY 1937

I.F.= 260 KC

NOTE: When the Receiver is installed in a car having a top antenna, under-car antenna, spare wheel antenna or antenna having a similarly low relative capacitance (50 mmf. to 450 mmf.) use connector plug in "A".

When the Receiver is installed in a car having a metal insert top antenna, insulated door antenna, insulated trunk cover antenna or antenna having similarly high relative capacitance (450 mmf. to 2500 mmf.) use condenser plug in "B".

MODEL 826 PARTS LIST

No.	Description	Part No.
①	Antenna Choke	38-8532
②	Condenser (.05 mfd.)	30-4444
③	Antenna Transformer	32-2516
④	Tuning Condenser	31-1030
⑤	First Padder (on Tun. Cond.)	
⑥	Resistor (70,000 ohms)	33-370344
⑦	Antenna Compensator Condenser	31-6082
⑧	Condenser (.1-.25-.25-.5 mfd.)	30-4415
⑨	Resistor (450 ohms)	33-1218
⑩	R. F. Transformer	32-2307
⑪	Second Padder (on Tun. Cond.)	
⑫	Resistor (70,000 ohms)	33-370344
⑬	Condenser (765 mmfd.)	30-1069
⑭	Condenser (.05 mfd.)	3615-0SG
⑮	Third Padder (on Tun. Cond.)	
⑯	Oscillator Transformer	32-2308
⑰	Condenser (250 mmfd.)	30-1032
⑱	Low Frequency Padder	31-6102
⑲	Resistor (99,000 ohms)	33-399344
⑳	Resistor (1,000,000 ohms)	33-510344
㉑	Resistor (45,000 ohms)	33-345344
㉒	Padder (Pri. 1st I. F. Trans.)	
㉓	First I. F. Transformer	32-2026
㉔	Padder (Sec. 1st I. F. Trans.)	
㉕	Padder (Pri. 2nd I. F. Trans.)	
㉖	Second I. F. Transformer	32-2027
㉗	Padder (Second 2nd I. F. Trans.)	
㉘	Condenser (250 mmfd.)	30-1032
㉙	Resistor (25,000 ohms)	33-325344
㉚	Condenser (.01 mfd.)	3903-0SU
㉛	Resistor (1,000,000 ohms)	33-510344
㉜	Volume Control (350,000 ohms)	33-5148
㉝	Condenser (110 mmfd.)	30-1031
㉞	Resistor (600 ohms)	33-1212
㉟	Condenser (.01 mfd.)	3903-0SG
㊱	Resistor (20,000 ohms)	33-320344
㊲	Resistor (32,000 ohms)	33-332434
㊳	Resistor (250,000 ohms)	33-424344
㊴	Resistor (250,000 ohms)	33-424344
㊵	Resistor (500,000 ohms)	33-449344
㊶	Condenser (.01 mfd.)	3903-0SU

No.	Description	Part No.
㊷	Condenser (250 mmfd.)	30-1032
㊸	Condenser (4000 mmfd.)	30-4185
㊹	Output Transformer	32-7495
㊺	Cone & Voice Coil	36-3526
㊻	Field Coil Assembly	32-9236
㊼	On & Off Switch	42-1318
	Complete Speaker	36-1279
㊽	Pilot Lamp	34-2040
㊾	Condenser (250 mmfd.)	30-1032
㊿	Condenser (.5 mfd.)	30-4015
(51)	"A" Choke	32-1604
(52)	Condenser (250 mmfd.)	30-1032
(53)	Filament Choke	32-2535
(54)	Vibrator Choke	32-2039
(55)	Condenser (.5 mfd.)	30-4015
(56)	Condenser (.05 mfd.)	30-4444
(57)	Resistor (20 ohms)	33-020344
(58)	Power Transformer	32-7550
(59)	Condenser (7500 mmfd.)	30-4420
(60)	Filter Condenser (4-8 mfd.)	30-2150
(61)	Filter Choke	32-7545
(62)	Condenser (250 mmfd.)	30-1032
(63)	"B" Choke	32-1281
(64)	Vibrator (Optional)	41-3170-2
		41-3170-3
	Four Prong Socket	27-6044
	Five Prong Socket	27-6035
	Six Prong Socket	27-6036
	Seven Prong Socket	27-6037
	Tuning & Volume Knob	27-4521
	On & Off Knob	27-4525
	Pilot Lamp Assembly	38-7734
	Scale Assembly	42-5714
	Tuning & Volume Shaft	28-8740
	Control Assembly	42-5713
	Distributor Resistor	33-1196
	Interference Condenser	30-4007
	Antenna Condenser	30-4412
	Antenna Connector	28-6423
	Insulator	27-8199
	Fuse	7227
	Fuse Insulator	27-7729
	Tee Bolt	28-6161
	Nut	W518
	Receiver Housing	38-8562

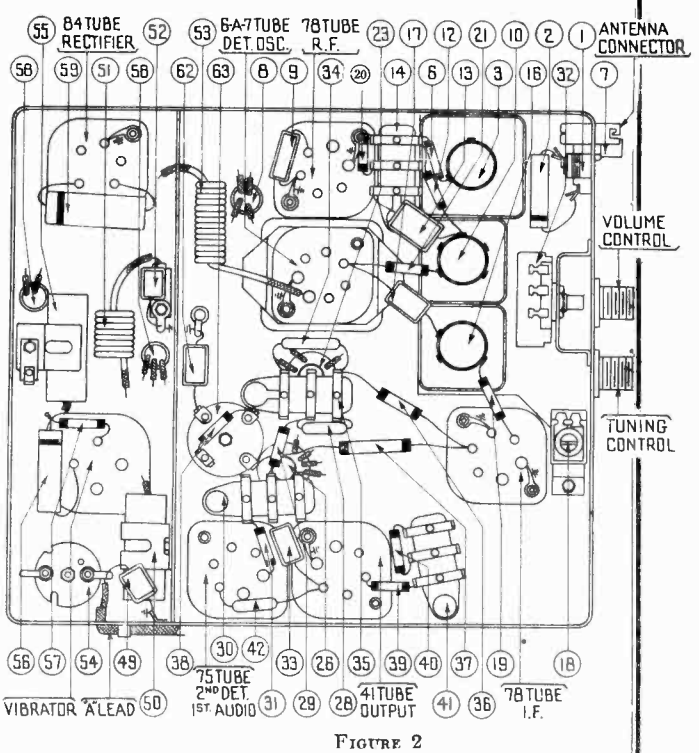


FIGURE 2

The circuit of the Model S-1416 is similar to the Model 826 with the following exception: The Model S-1416 does not use a condenser plug or connector plug in the Antenna connector on the Receiver. The Antenna connector is changed so that this is not necessary.

MODELS 826,827,S1416
Socket,Trimmers
Alignment

PHILCO RADIO & TELEV CORP.

I. F. TRANSFORMERS AND PADDERS

The I. F. Transformers are assembled complete with padding condensers.

Both the primary and the secondary padders are placed side by side in the top of the transformer shield can. The adjusting screws are accessible thru the holes in the top of the shield. (See Figure 4).

The coil windings terminate in leads instead of terminals or lugs. The color scheme of the leads is given in Figure 3.

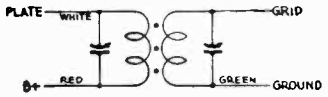


FIGURE 3

If replacements are ever necessary, replace the entire coil assembly, 32-2026 for the first I. F. stage and 32-2027 for the second I. F. stage. Neither the coil nor the padders will be furnished separately. Order only by the above numbers.

ADJUSTMENTS

All padding adjustments are carefully made at the factory and ordinarily no readjustments are necessary. However, when readjustments are required, the procedure given below must be followed in detail.

Equipment

Fully charged heavy duty storage battery or 6-volt power pack, 048A or 099 Philco Set Tester, 3164 Padding wrench, 27-7159 Padding screw driver.

General

OUTPUT METER — The output meter must be connected by means of an adapter to the plate of the type 41 output tube and to the Receiver chassis.

SIGNAL GENERATOR — With the Receiver and signal generator set up for operation at the prescribed frequency, turn the Receiver volume control on full and set the signal generator attenuator so that a half scale reading is obtained on the output meter. The signal in the speaker should be audible but not loud.

The shielding on the signal generator output lead must be connected to the Receiver housing.

Procedure

I. F. — Set the signal generator at exactly 260 K. C. Connect the generator lead to the grid cap of the 78 I. F. tube in series with a .1 mfd. condenser (without removing the grid cap).

Adjust the secondary screw padder (27) on the second I. F. transformer for maximum reading on the output meter. Then adjust the primary screw padder (25) for maximum reading. (See Figure 4 for location of padders).

Remove the generator lead from the 78 tube.

Connect the generator lead to the grid cap of the 6A7 tube in series with a .1 mfd. condenser (without removing the grid cap). Adjust the secondary screw padder (24) on the first I. F. transformer for maximum reading on the output meter. Then adjust the primary screw padder (22) for maximum reading. Readjust padders (25) and (27) with the generator lead connected to the type 6A7 tube. (See Figure 4 for location of padders).

HIGH FREQUENCY AND R. F. — After padding the first I. F. stage remove the generator lead from the 6A7 tube.

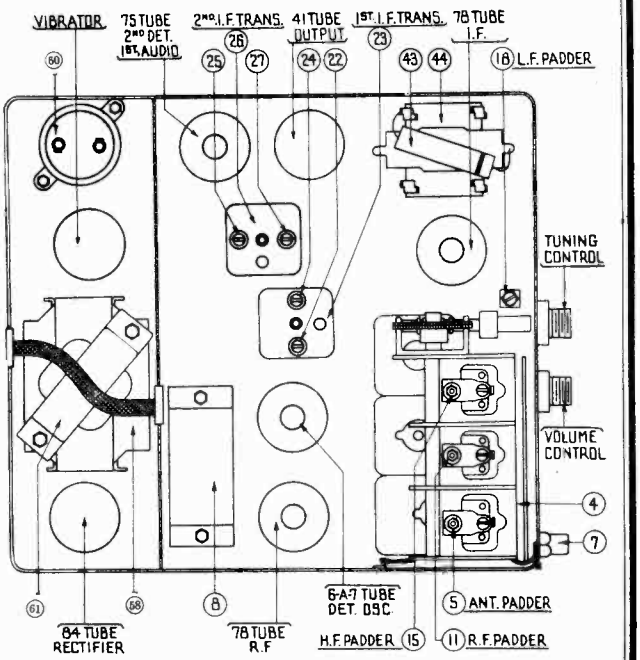
Set the signal generator at 1550 K. C. and then connect the generator lead to the grid cap of the 78 R. F. tube in series with a .1 mfd. condenser (without removing the grid cap).

Turn the tuning condenser plates out of mesh as far as they will go.

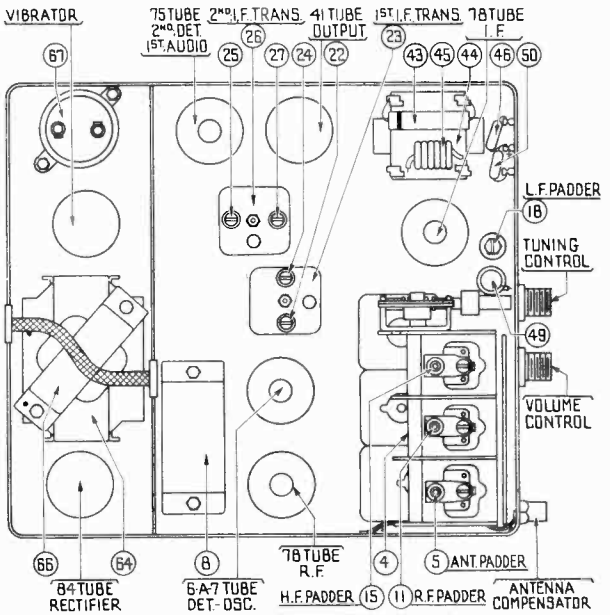
With the tuning condenser in this position, adjust the high frequency padder (15) and the R. F. padder (11) until the maximum reading is obtained on the output meter. This is the true setting for 1550 K. C., 155 on the dial scale.

LOW FREQUENCY—Turn the tuning condenser plates in mesh to approximately 580 K. C., 58 on the dial scale and set the signal generator at 580 K. C. Roll the tuning condenser and adjust the low frequency padder screw (18) for maximum reading on the output meter.

HIGH FREQUENCY READJUSTMENT—Turn the tuning condenser plates out of mesh to 1550 K. C. and set the signal generator at 1550 K. C. Then adjust the high frequency padder (15) again for maximum reading on the output meter.



MODEL 826 — S-1416 FIGURE 4



MODEL 827 FIGURE 4

Remove the generator lead from the 78 R. F. tube.

ANTENNA—WHEN PADDING THE ANTENNA STAGE IT IS EXTREMELY IMPORTANT THAT THE PROPER DUMMY ANTENNA BE CONSTRUCTED AND USED.

Connect the signal generator lead to the antenna cable assembly (made up of Part No. 41-3191 cable and a 200 mmfd. condenser Part No. 30-1013) in series between the Receiver antenna receptacle and the signal generator. Plug the cable into the antenna receptacle on the end of the Receiver.

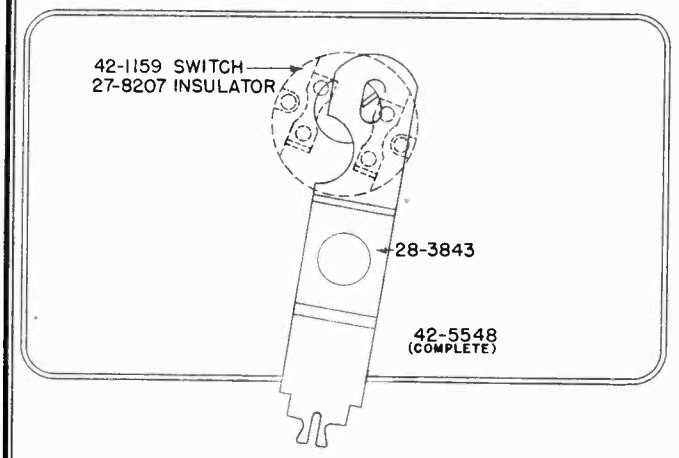
Turn the tuning condenser to 1400 K. C. and set the generator at 1400 K. C. Adjust the padders (11) and (5) for the maximum reading on the output meter.

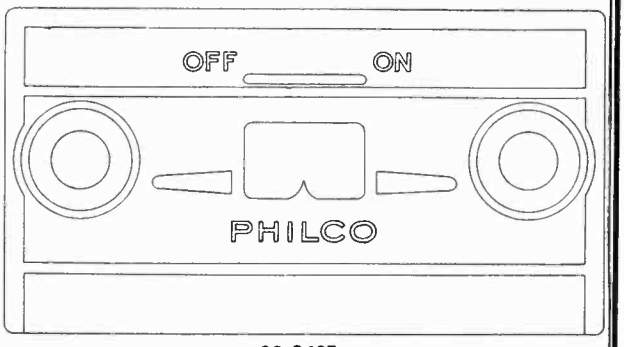
When the antenna stage adjustment is made with the Receiver installed in the car, the Receiver antenna lead must be connected to the car antenna in the usual manner. Connect the signal generator output lead to a wire placed near the car antenna but not connected to it.

MODELS 826,827,827K
828,828K
Chevrolet Control

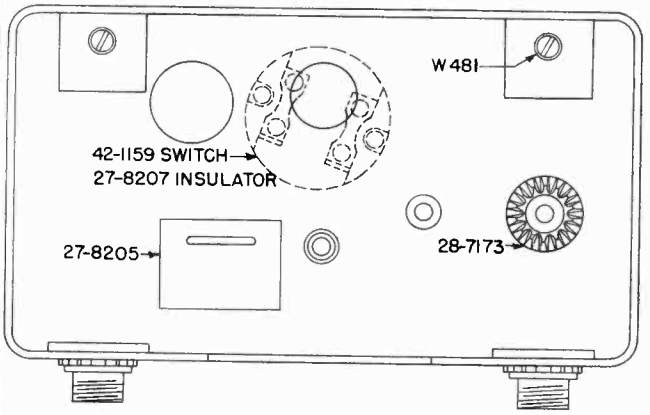
PHILCO RADIO & TELEV. CORP.

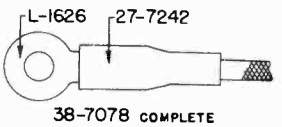
CHEVROLET CONTROL MODELS 826 - 827 - 827K - 828 - 828K Parts



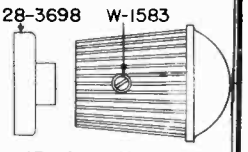


28-8493

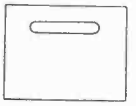




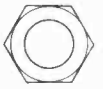
38-7078 COMPLETE



27-4288 COMPLETE

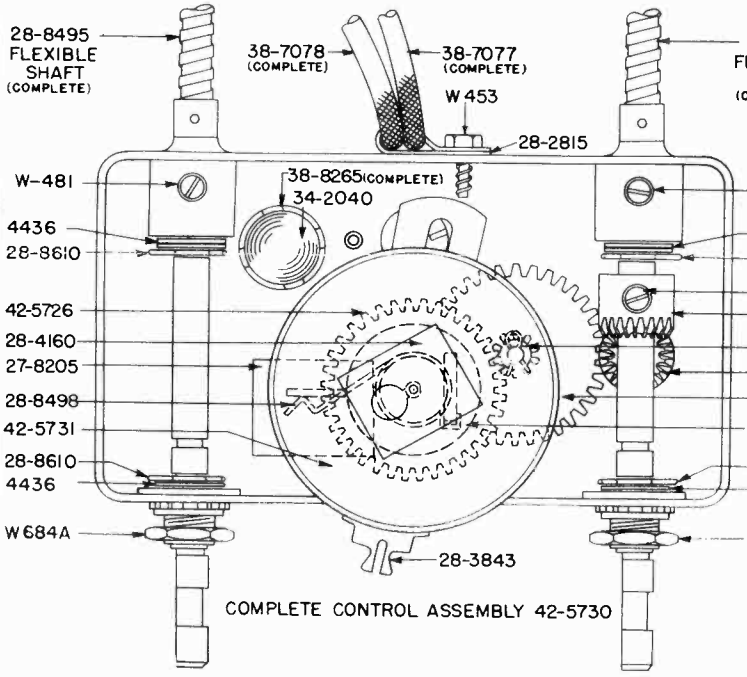


27-8205



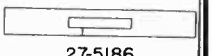
W-684 A

28-2650



COMPLETE CONTROL ASSEMBLY 42-5730

4436



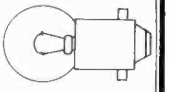
27-5186

27-4314

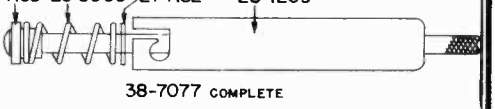
28-8658

W-1433

28-8610



34-2040

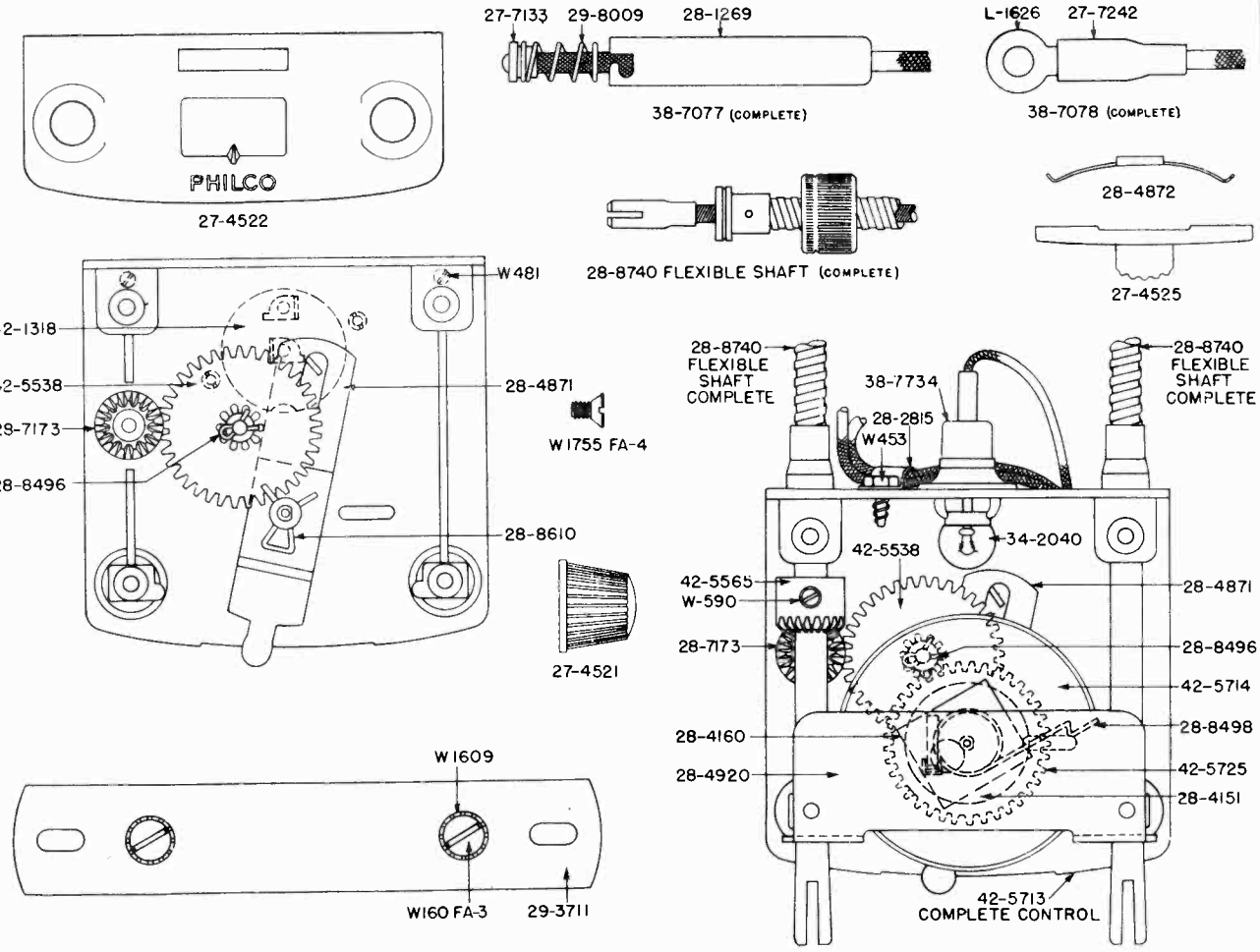


38-7077 COMPLETE

MODELS 826,827,827K
828,828K
Standard Control
Parts

PHILCO RADIO & TELEV. CORP.

STANDARD CONTROL MODELS 826 - 827 - 827K - 828 - 828K



AUGUST 1937

PARTS LIST AND PRICES

(Prices Subject to Change Without Notice)

PART NUMBER	DESCRIPTION		LIST PRICE
L-1626	Lug		$ .01
W-160FA3	Screw (Brkt. mtg.)	per 100	.30
W-453	Screw	per 100	1.80
W-481	Screw	per 100	2.00
W-590	Screw	per 100	2.00
W-684FA3	Nut	per 100	1.25
W-1433	Washer	per 100	.50
W-1609	Lockwasher	per 100	.50
W-1755FA4	Screw (Cover mtg.)	per 100	.30
4436	Washer	per 100	1.50
27-4288	Knob		.15
27-4314	Knob		.04
27-4521	Knob		.10
27-4522	Cover		.75
27-4525	Switch Lever Knob		.10
27-5186	Light Shield		.01
27-7133	Ferrule		.01
27-7242	Insulator	per 100	.40
27-8205	Shield	per 100	.50
28-1269	Fuse Housing		.01
28-2650	Washer	per 100	.45
28-2815	Clamp		.01
28-3698	Knob Base		.04
28-4151	Friction Washer		.02
28-4160	Friction Spring		.01
28-4871	Switch Lever		*
28-4872	Switch Knob Retaining Spring		.02

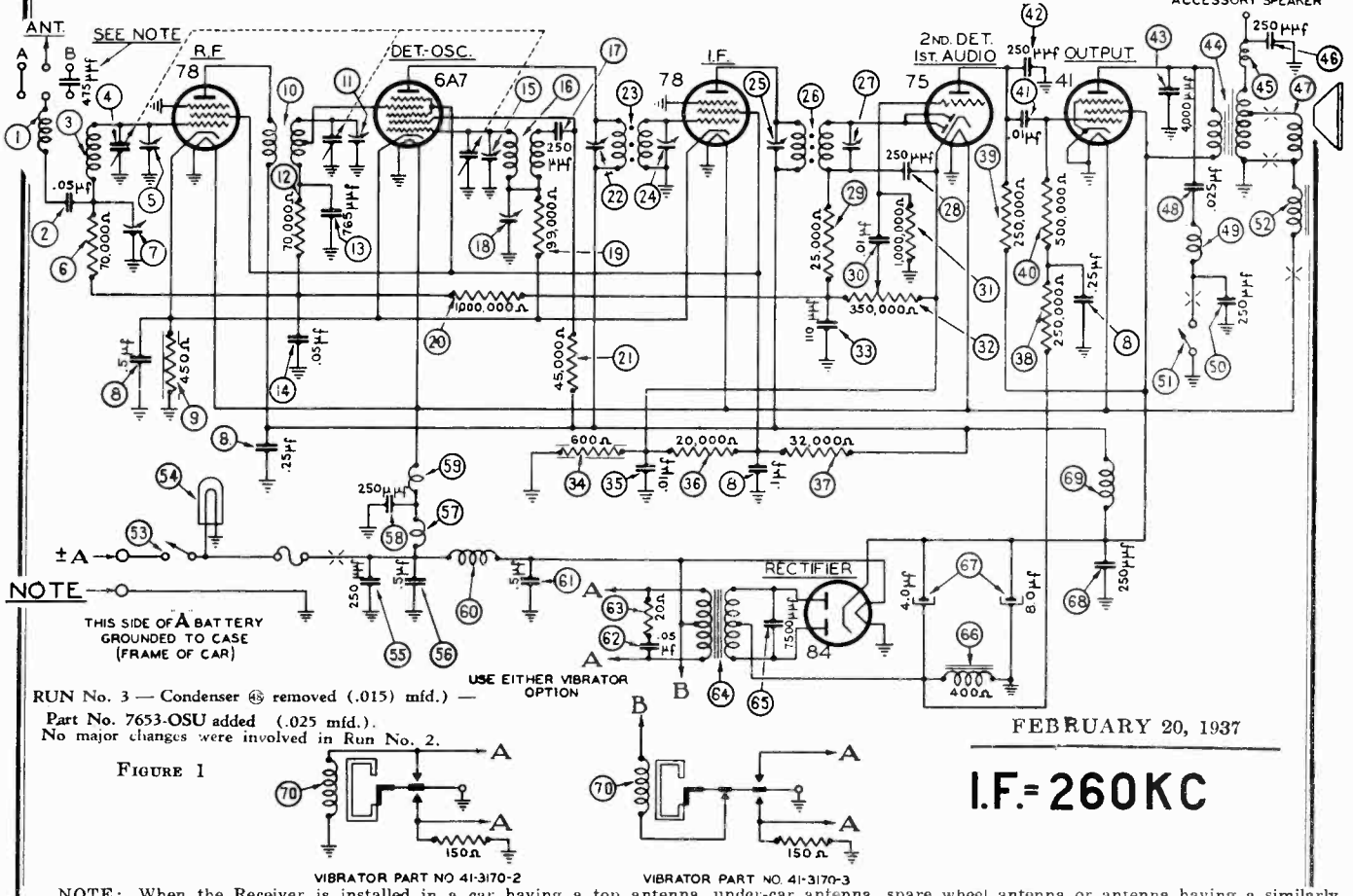
PART NUMBER	DESCRIPTION	LIST PRICE
28-4893	Bezel Plate	.10
28-4920	Shaft Bearing Plate	*
28-7173	Miter Gear	.10
28-8495	Flexible Shaft	1.15
28-8496	Spring	.05
28-8498	Anti-back Lash Spring	.10
28-8610	Spring	.03
28-8653	Spring	.03
28-8740	Flexible Shaft	1.00
29-3711	Bracket	.03
29-8009	Spring per 100	.50
34-2040	Pilot Lamp	.07
38-7077	Fuse Lead Assembly	.15
38-7078	Ammeter Lead Assembly	.15
38-7734	Pilot Lamp Assembly	.35
38-8265	Pilot Lamp Assembly	.30
42-1318	On & Off Switch	.40
42-5538	Intermediate Gear Assembly	.15
42-5548	Cover Assembly	.65
42-5565	Miter Gear Assembly	.15
42-5713	Standard Control	6.75
42-5714	Scale Assembly	.35
42-5725	Drum Drive Gear Assembly	*
42-5726	Drum Gear and Shaft Assembly	*
42-5730	Chevrolet Control	6.00
42-5731	Scale Assembly	.30

*Prices not available at this time.

Parts

PHILCO RADIO & TELEV. CORP.

MODEL 827
Schematic, Chassis



RUN No. 3 — Condenser (45) removed (.015) mfd.) — Part No. 7653-OSU added (.025 mfd.). No major changes were involved in Run No. 2.

FEBRUARY 20, 1937

I.F.= 260KC

FIGURE 1

NOTE: When the Receiver is installed in a car having a top antenna, under-car antenna, spare wheel antenna or antenna having a similarly low relative capacitance (50 mmf. to 450 mmf.) use connector plug in "A".

When the Receiver is installed in a car having a metal insert top antenna, insulated door antenna, insulated trunk cover antenna or antenna having similarly high relative capacitance (450 mmf. to 2500 mmf.) use condenser plug in "B".

MODEL 827 PARTS LIST

No.	Description	Part No.
(1)	Antenna Choke	38-8651
(2)	Condenser (.05 mfd.)	30-4444
(3)	Antenna Transformer	32-2516
(4)	Tuning Condenser	31-1930
(5)	First Padder (on tun. cond.)	
(6)	Resistor (70,000 ohms)	33-370344
(7)	Antenna Compensating Condenser	31-6082
(8)	Condenser (.1-.25-.25-.5 mfd.)	30-4415
(9)	Resistor (450 ohms)	33-1218
(10)	R. F. Transformer	32-2307
(11)	Second Padder (on tun. cond.)	
(12)	Resistor (70,000 ohms)	33-370344
(13)	Condenser (765 mmfd.)	30-1069
(14)	Condenser (.05 mfd.)	3615-0SG
(15)	Third Padder (on tun. cond.)	
(16)	Oscillator Transformer	32-2308
(17)	Condenser (250 mmfd.)	30-1032
(18)	Low Frequency Padder	31-6102
(19)	Resistor (99,000 ohms)	33-399344
(20)	Resistor (1,000,000 ohms)	33-510344
(21)	Resistor (45,000 ohms)	33-345344
(22)	Padder (Pri. 1st I.F. Trans.)	
(23)	First I. F. Transformer	32-2026
(24)	Padder (Sec. 1st I. F. Trans.)	
(25)	Padder (Pri. 2nd I.F. Trans.)	
(26)	Second I. F. Transformer	32-2027
(27)	Padder (Sec. 2nd I.F. Trans.)	
(28)	Condenser (250 mmfd.)	30-1032
(29)	Resistor (25,000 ohms)	33-325344
(30)	Condenser (.01 mfd.)	3903-0SU
(31)	Resistor (1,000,000 ohms)	33-510344
(32)	Volume Control (350,000 ohms)	33-5148
(33)	Condenser (110 mmfd.)	30-1031
(34)	Resistor (600 ohms)	33-1212
(35)	Condenser (.01 mfd.)	3903-0SG
(36)	Resistor (20,000 ohms)	33-320344
(37)	Resistor (32,000 ohms)	33-332434
(38)	Resistor (250,000 ohms)	33-424344
(39)	Resistor (250,000 ohms)	33-424344
(40)	Resistor (500,000 ohms)	33-449344
(41)	Condenser (.01 mfd.)	3903-0SU
(42)	Condenser (250 mmfd.)	30-1032
(43)	Condenser (4000 mmfd.)	30-4185
(44)	Output Transformer	32-7815
(45)	Choke	32-1374
(46)	Condenser (250 mmfd.)	30-1032
(47)	Cone & Voice Coil	36-3586
(48)	Condenser (.025 mfd.)	7653-0SU
(49)	Choke	32-1464
(50)	Condenser (250 mmfd.)	30-1032
(51)	Tone Control Switch	42-1225
(52)	Field Coil Assembly	36-3597
	Complete Speaker (CD)	36-1267
(53)	On & Off Switch	42-1318
(54)	Pilot Lamp	34-2040
(55)	Condenser (250 mmfd.)	30-1032
(56)	Condenser (.5 mfd.)	30-4015
(57)	"A" Choke	32-1604
(58)	Condenser (250 mmfd.)	30-1032
(59)	Filament Choke	32-2535
(60)	Vibrator Choke	32-2039
(61)	Condenser (.5 mfd.)	30-4015
(62)	Condenser (.05 mfd.)	30-4444
(63)	Resistor (20 ohms)	33-020344
(64)	Power Transformer	32-7550
(65)	Condenser (7,500 mmfd.)	30-4420
(66)	Filter Choke	32-7545
(67)	Filter Condenser (4-8 mfd.)	30-2150
(68)	Condenser (250 mmfd.)	30-1032
(69)	"B" Choke	32-1281
(70)	Vibrator (OPTIONAL)	41-3170-2
		41-3170-3
	Four Prong Socket	27-6044
	Five Prong Socket	27-6035
	Six Prong Socket	27-6036
	Seven Prong Socket	27-6037
	Tuning & Volume Knob	27-4521
	On & Off Knob	27-4525
	Pilot Lamp Assembly	38-7734
	Scale Assembly	42-5714
	Tuning & Volume Shaft	28-8740
	Tone Control Shaft	L-2767
	Control Assembly	42-5713
	Distributor Resistor	33-1196
	Interference Condenser	30-4007
	Antenna Condenser	30-4412
	Antenna Connector	28-6423
	Insulator	27-8199
	Fuse	7227

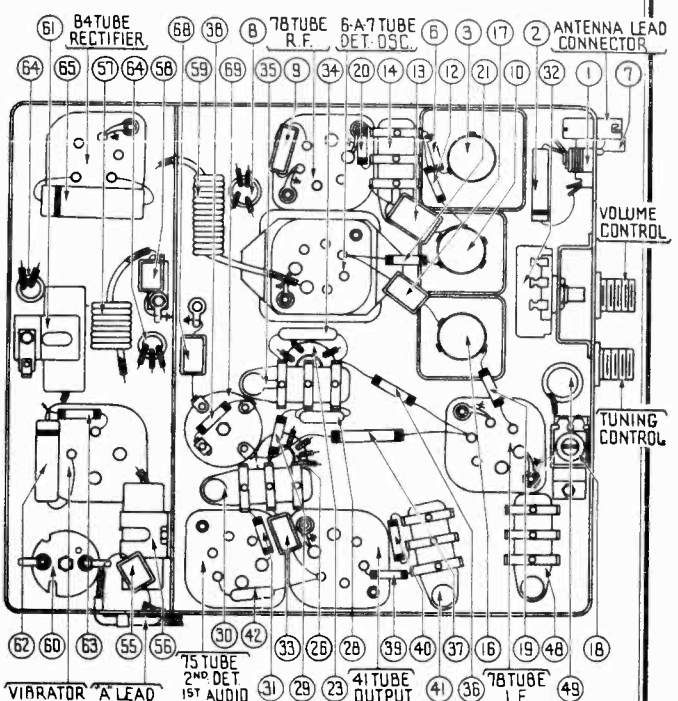


FIGURE 2

No.	Description	Part No.	No.	Description	Part No.
	Fuse Insulator	27-7729		Nut	W-518
	Tee Bolt	28-6161		Receiver Housing	38-8571

MODEL 828
Schematic, Chassis

PHILCO RADIO & TELEV. CORP.

ANT. Parts

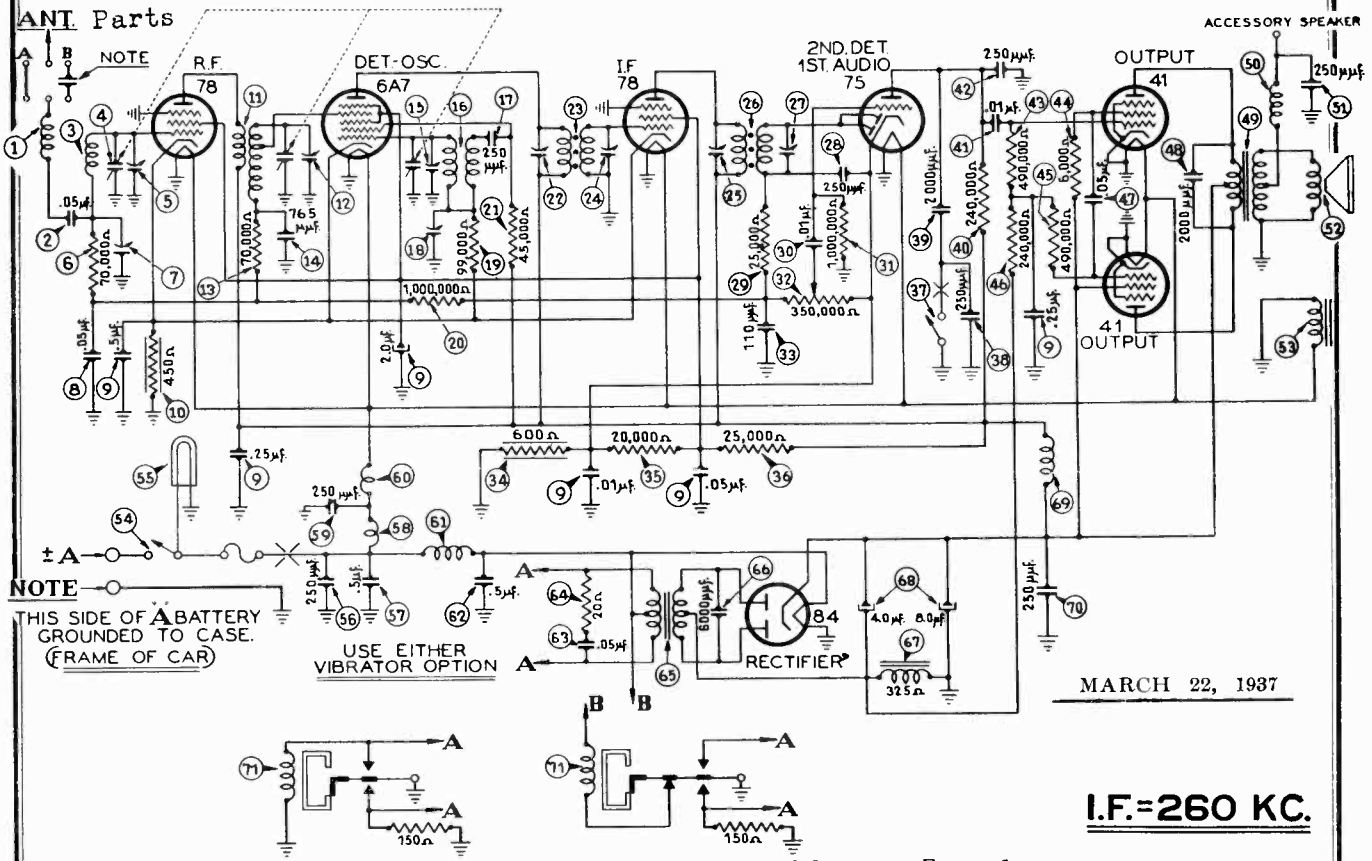


FIGURE 1

NOTE: When the Receiver is installed in a car having a top antenna, under-car antenna, spare wheel antenna or antenna having a similarly low relative capacitance (50 mmf. to 450 mmf.) use connector plug in "A"

When the Receiver is installed in a car having a metal insert top antenna, insulated door antenna, insulated trunk cover antenna or antenna having similarly high relative capacitance (450 mmf. to 2500 mmf.) use condenser plug in "B"

MODEL 828 PARTS LIST

No.	Description	Part No.
①	Antenna Choke	38-8651
②	Condenser (.05 mfd.)	30-4444
③	Antenna Transformer	32-2516
④	Tuning Condenser	31-1930
⑤	First Padder (on Tun. Cond.)	
⑥	Resistor (70,000 ohms) .33-	370344
⑦	Antenna Compensating Condenser	31-6082
⑧	Condenser (.05 mfd.)	3615-08G
⑨	Condenser (.01-.05-.25-.25-.5-2 mfd.)	30-4510
⑩	Resistor (450 ohms)	33-1218
⑪	R. F. Transformer	32-2307
⑫	Second Padder (on Tun. Cond.)	
⑬	Resistor (70,000 ohms) .33-	370344
⑭	Condenser (765 mmfd.)	30-1069
⑮	Third Padder (on Tun. Cond.)	
⑯	Oscillator Transformer	32-2308
⑰	Condenser (250 mmfd.)	30-1032
⑱	Low Frequency Padder	31-6102
⑲	Resistor (99,000 ohms)	33-399344
⑳	Resistor (1,000,000 ohms)	33-510344
㉑	Resistor (45,000 ohms) .33-	345344
㉒	Padder (Pri. 1st I. F. Trans.)	
㉓	First I. F. Transformer	32-2026
㉔	Padder (Sec. 1st I.F. Trans.)	
㉕	Padder (Pri. 2nd I.F. Trans.)	
㉖	Second I. F. Transformer	32-2027
㉗	Padder (Sec. 2nd I.F. Trans.)	
㉘	Condenser (250 mmfd.)	30-1032
㉙	Resistor (25,000 ohms) .33-	325344
㉚	Condenser (.01 mfd.)	3903-0SU
㉛	Resistor (1,000,000 ohms)	33-510344
㉜	Volume Control (350,000 ohms)	33-5148
㉝	Condenser (110 mmfd.)	30-1031
㉞	Resistor (600 ohms)	33-1212
㉟	Resistor (20,000 ohms) .33-	320344
㊱	Resistor (25,000 ohms) .33-	325344
㊲	Tone Control Switch	42-1225
㊳	Condenser (250 mmfd.)	30-1032
㊴	Condenser (2000 mmfd.)	30-4177
㊵	Resistor (240,000 ohms)	33-424344
㊶	Condenser (.01 mfd.)	3903-0SU
㊷	Condenser (250 mmfd.)	30-1032
㊸	Resistor (490,000 ohms)	33-449344
㊹	Resistor (6,000 ohms) .33-	260344
㊺	Resistor (490,000 ohms)	33-449344
㊻	Resistor (240,000 ohms)	33-424344
㊼	Condenser (.05 mfd.)	30-4454
㊽	Condenser (2000 mmfd.)	30-4177
㊾	Output Transformer	32-7818
㊿	Choke	32-1464
(51)	Condenser (250 mmfd.)	30-1032
(52)	Cone & Voice Coil	36-3586
(53)	Field Coil Assembly	36-3597
	Complete Speaker (CB)	36-1203
(54)	On & Off Switch	42-1318
(55)	Pilot Lamp	34-2040
(56)	Condenser (250 mmfd.)	30-1032
(57)	Condenser (.5 mfd.)	30-4015
(58)	"A" Choke	32-1604
(59)	Condenser (250 mmfd.)	30-1032
(60)	Filament Choke	32-2535
(61)	Vibrator Choke	32-2039
(62)	Condenser (.5 mfd.)	30-4015
(63)	Condenser (.05 mfd.)	30-4444
(64)	Resistor (20 ohms) .33-	020344
(65)	Power Transformer	32-7821
(66)	Condenser (6000 mmfd.)	30-4512
(67)	Filter Choke	32-7822
(68)	Filter Condenser (4-8 mfd.)	30-2150
(69)	"B" Choke	32-1281
(70)	Condenser (250 mmfd.)	30-1032
(71)	Vibrator (OPTIONAL)	41-3170-2
		41-3170-3
	Four Prong Socket	27-6044
	Five Prong Socket	27-6035
	Six Prong Socket	27-6036
	Seven Prong Socket	27-6037
	Tuning & Volume Knob	27-4521
	On & Off Knob	27-4525
	Pilot Lamp Assembly	38-7734
	Scale Assembly	42-5714
	Tuning & Volume Shaft	28-8740
	Tone Control Cable	L-2767
	Control Assembly	42-5713
	Distributor Resistor	33-1196
	Interference Condenser	30-4007
	Antenna Condenser	30-4412
	Antenna Connector	28-6423
	Insulator	27-8199
	Fuse	7227
	Fuse Insulator	27-7729
	Tee Bolt	28-6161
	Nut	W518
	Receiver Housing	38-8571

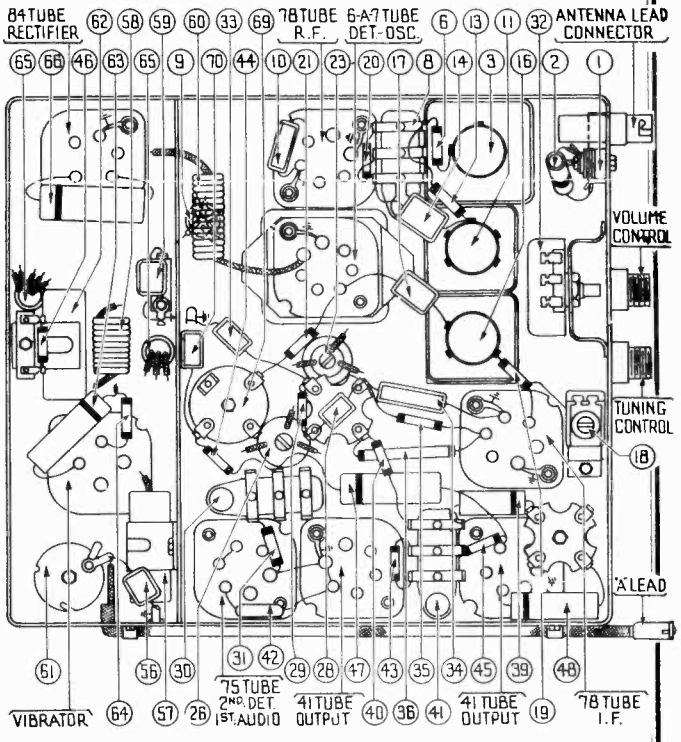


FIGURE 2

PHILCO RADIO & TELEV. CORP.

MODEL 827K
Schematic, Chassis
Parts

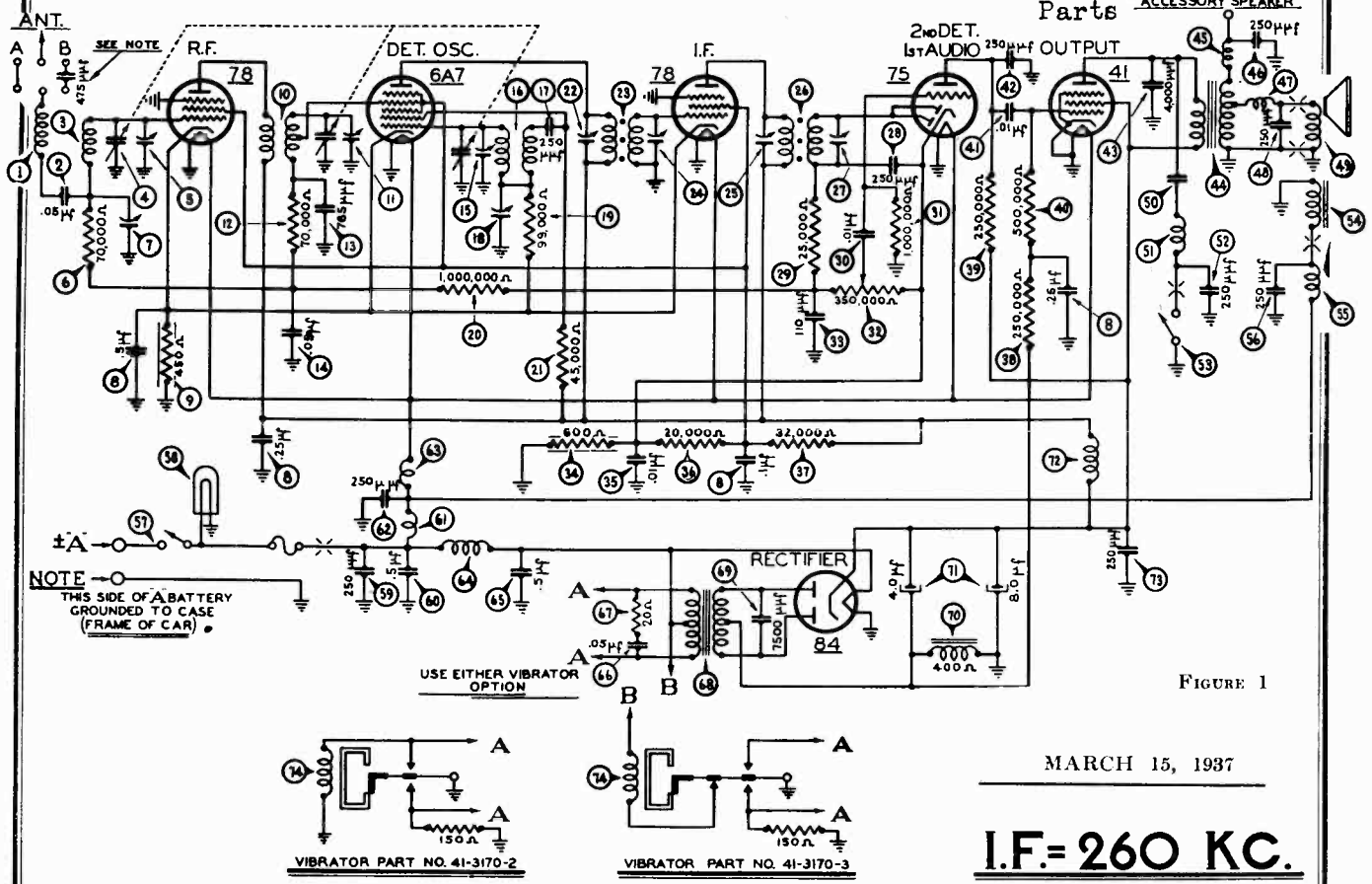


FIGURE 1

MARCH 15, 1937

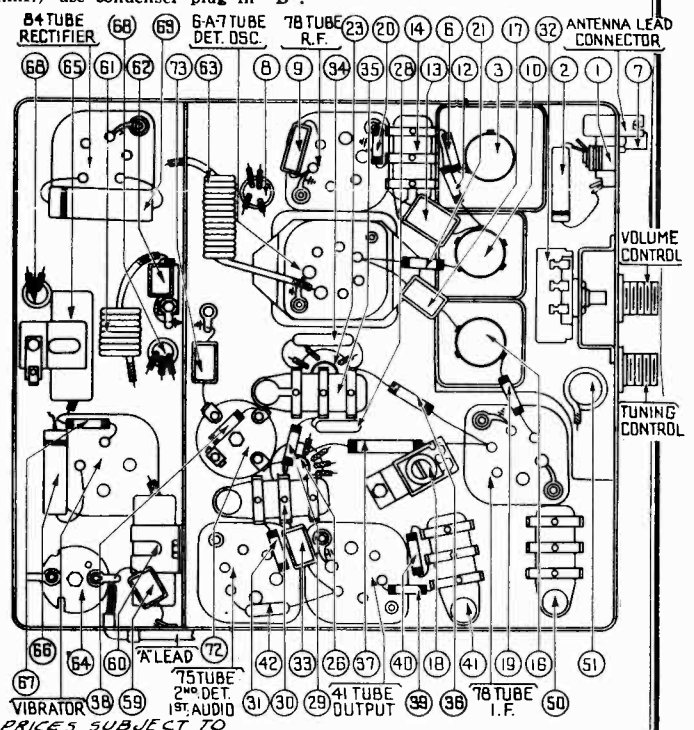
I.F.= 260 KC.

NOTE: When the Receiver is installed in a car having a top antenna, under-car antenna, spare wheel antenna or antenna having a similarly low relative capacitance (50 mmf. to 450 mmf.) use connector plug in "A".

When the Receiver is installed in a car having a metal insert top antenna, insulated trunk cover antenna or antenna having similarly high relative capacitance (450 mmf. to 2500 mmf.) use condenser plug in "B".

MODEL 827K PARTS LIST

No.	Description	Part No.
①	Antenna Choke	38-8651
②	Condenser (.05 mfd.)	30-4444
③	Antenna Transformer	32-2516
④	Tuning Condenser	31-1930
⑤	First Padder (on Tun. Cond.)	
⑥	Resistor (70,000 ohms)	33-370344
⑦	Antenna Compensating Condenser	31-6082
⑧	Condenser (.1-.25-.25-.5 mfd.)	36-4115
⑨	Resistor (450 ohms)	33-1218
⑩	R. F. Transformer	32-2307
⑪	Second Padder (on Tun. Cond.)	
⑫	Resistor (70,000 ohms)	33-370344
⑬	Condenser (765 mmfd.)	30-1069
⑭	Condenser (.05 mfd.)	3615-0SG
⑮	Third Padder (on Tun. Cond.)	
⑯	Oscillator Transformer	32-2308
⑰	Condenser (250 mmfd.)	30-1032
⑱	Low Frequency Padder	31-6102
⑲	Resistor (99,000 ohms)	33-399344
⑳	Resistor (1,000,000 ohms)	33-510344
㉑	Resistor (45,000 ohms)	33-345344
㉒	Padder (Pri. 1st I.F. Trans.)	
㉓	First I. F. Transformer	32-2026
㉔	Padder (Sec. 1st I.F. Trans.)	
㉕	Padder (Pri. 2nd I.F. Trans.)	
㉖	Second I. F. Transformer	32-2027
㉗	Padder (Sec. 2nd I.F. Trans.)	
㉘	Condenser (250 mmfd.)	30-1032
㉙	Resistor (25,000 ohms)	33-325344
㉚	Condenser (.01 mfd.)	3903-0SU
㉛	Resistor (1,000,000 ohms)	33-510344
㉜	Volume Control (350,000 ohms)	33-5148
㉝	Condenser (110 mmfd.)	30-1031
㉞	Resistor (600 ohms)	33-1212
㉟	Condenser (.01 mfd.)	3903-0SG
㊱	Resistor (20,000 ohms)	33-320344
㊲	Resistor (32,000 ohms)	33-332434
㊳	Resistor (250,000 ohms)	33-424344
㊴	Resistor (250,000 ohms)	33-424344
㊵	Resistor (500,000 ohms)	33-449344
㊶	Condenser (.01 mfd.)	3903-0SU
㊷	Condenser (250 mmfd.)	30-1032
㊸	Condenser (4000 mmfd.)	30-4185
㊹	Output Transformer	32-7816
㊺	Choke	32-1374
㊻	Condenser (250 mmfd.)	30-1032
㊼	Choke	32-2535
㊽	Condenser (250 mmfd.)	30-1032
㊾	Cone & Voice Coil	36-3159
㊿	Condenser (.025 mfd.)	7653-0SU
(51)	Choke	32-1464
(52)	Condenser (250 mmfd.)	30-1032
(53)	Tone Control Switch	42-1225
(54)	Field Coil Assembly	36-3513
	Complete Speaker (A47)	36-1331
(55)	Choke	32-1930
(56)	Condenser (250 mmfd.)	30-1032
(57)	On & Off Switch	42-1318
(58)	Pilot Lamp	34-2040
(59)	Condenser (250 mmfd.)	30-1032
(60)	Condenser (.5 mfd.)	30-4015
(61)	"A" Choke	32-1604
(62)	Condenser (250 mmfd.)	30-1032
(63)	Filament Choke	32-2535
(64)	Vibrator Choke	32-2039
(65)	Condenser (.5 mfd.)	30-4015
(66)	Condenser (.05 mfd.)	30-4444
(67)	Resistor (20 ohms)	33-020344
(68)	Power Transformer	32-7550
(69)	Condenser (7500 mmfd.)	30-4420
(70)	Filter Choke	32-7545
(71)	Filter Condenser (4-8 mfd.)	30-2150
(72)	"B" Choke	32-1281
(73)	Condenser (250 mmfd.)	30-1032
(74)	Vibrator (OPTIONAL)	41-3170-2
		41-3170-3
	Four Prong Socket	27-6044
	Five Prong Socket	27-6035
	Six Prong Socket	27-6036
	Seven Prong Socket	27-6037
	Tuning & Volume Knob	27-4521
	On & Off Knob	27-4525
	Pilot Lamp Assembly	38-7734
	Scale Assembly	42-5714
	Tuning & Volume Shaft	28-8740
	Tone Control Shaft	L-2767
	Distributor Resistor	33-1196
	Interference Condenser	30-4007
	Antenna Condenser	30-4412
	Antenna Connector	28-6423
	Insulator	27-8199
	Fuse	7227



PRICES SUBJECT TO CHANGE WITHOUT NOTICE

FIGURE 2

No.	Description	Part No.
	Fuse Insulator	27-7729
	Tee Bolt (Rec. Mtg.)	28-6161
	Nut (Rec. Mtg.)	W518
	Receiver Housing	38-8573
	Stud (Speaker Mtg.)	6122
	Nut (Speaker Mtg.)	W55

MODEL 827K
Socket, Trimmers
Alignment

PHILCO RADIO & TELEV. CORP.

I. F. TRANSFORMERS AND PADDERS

The I. F. Transformers are assembled complete with padding condensers.

Both the primary and the secondary padders are placed side by side in the top of the transformer shield can. The adjusting screws are accessible thru the holes in the top of the shield. (See Figure 4).

The coil windings terminate in leads instead of terminals or lugs. The color scheme of the leads is given in Figure 3.

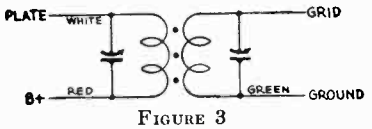


FIGURE 3

If replacements are ever necessary, replace the entire coil assembly, 32-2026 for the first I. F. stage and 32-2027 for the second I. F. stage. Neither the coil nor the padders will be furnished separately. Order only by the above numbers.

MODEL 827-K ADJUSTMENTS

All padding adjustments are carefully made at the factory and ordinarily no readjustments are necessary. However, when readjustments are required, the procedure given below must be followed in detail.

Equipment

Fully charged heavy duty storage battery or 6-volt power pack, 048A or 099 Philco Set Tester, 3164 Padding wrench, 27-7159 Padding screw driver.

General

OUTPUT METER — The output meter must be connected by means of an adapter to the plate of the type 41 output tube and to the Receiver chassis.

SIGNAL GENERATOR — With the Receiver and signal generator set up for operation at the prescribed frequency, turn the Receiver volume control on full and set the signal generator attenuator so that a half scale reading is obtained on the output meter. The signal in the speaker should be audible but not loud.

The shielding on the signal generator output lead must be connected to the Receiver housing.

Procedure

I. F. — Set the signal generator at exactly 260 K. C. Connect the generator lead to the grid cap of the 78 I. F. tube in series with a .1 mfd. condenser (without removing the grid cap).

Adjust the secondary screw padder (27) on the second I. F. transformer for maximum reading on the output meter. Then adjust the primary screw padder (25) for maximum reading. (See Figure 4 for location of padders).

Remove the generator lead from the 78 tube.

Connect the generator lead to the grid cap of the 6A7 tube in series with a .1 mfd. condenser (without removing the grid cap). Adjust the secondary screw padder (24) on the first I. F. transformer for maximum reading on the output meter. Then adjust the primary screw padder (22) for maximum reading. Readjust padders (25) and (27) with the generator lead connected to the type 6A7 tube. (See Figure 4 for location of padders).

HIGH FREQUENCY AND R. F. — After padding the first I. F. stage remove the generator lead from the 6A7 tube.

Set the signal generator at 1550 K. C. and then connect the generator lead to the grip cap of the 78 R. F. tube in series with a .1 mfd. condenser (without removing the grid cap).

Turn the tuning condenser plates out of mesh as far as they will go.

With the tuning condenser in this position, adjust the high frequency padder (15) and the R. F. padder (11) until the maximum reading is obtained on the output meter. This is the true setting for 1550 K. C., 155 on the dial scale.

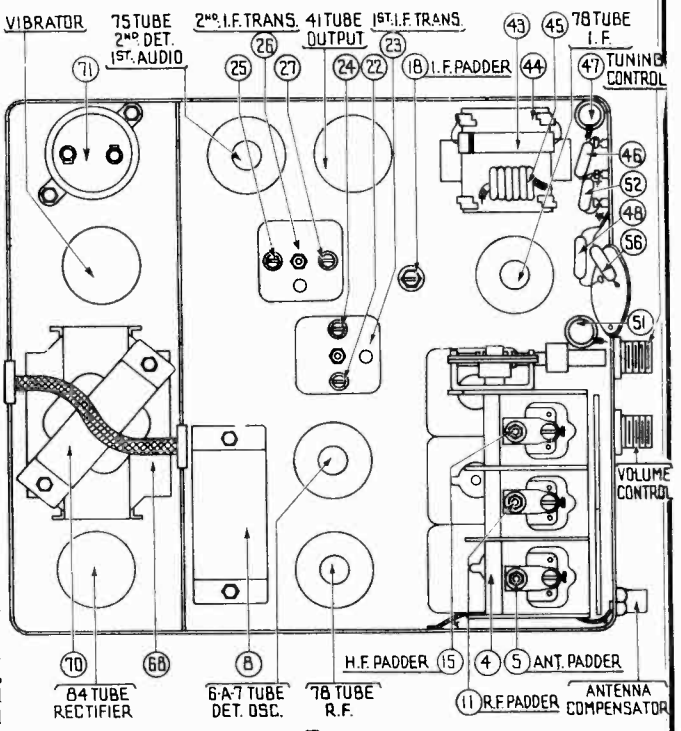


FIGURE 4

LOW FREQUENCY — Turn the tuning condenser plates in mesh to approximately 580 K. C., 58 on the dial scale and set the signal generator at 580 K. C. Roll the tuning condenser and adjust the low frequency padder screw (18) for maximum reading on the output meter.

HIGH FREQUENCY READJUSTMENT — Turn the tuning condenser plates out of mesh to 1550 K. C. and set the signal generator at 1550 K. C. Then adjust the high frequency padder (15) again for maximum reading on the output meter.

Remove the generator lead from the 78 R. F. tube.

ANTENNA — WHEN PADDING THE ANTENNA STAGE IT IS EXTREMELY IMPORTANT THAT THE PROPER DUMMY ANTENNA BE CONSTRUCTED AND USED.

Connect the signal generator lead to the antenna lead assembly (made up of Part No. 41-3191 lead and a 200 mmfd condenser, Part No. 30-1013), in series between the lead and the signal generator. Plug the lead into the antenna lead connector on the end of the Receiver.

Turn the tuning condenser to 1400 K. C. and set the generator at 1400 K. C. Adjust the padders (11) and (5) for the maximum reading on the output meter.

When the antenna stage adjustment is made with the Receiver installed in the car, the Receiver antenna lead must be connected to the car antenna in the usual manner. Connect the signal generator output lead to a wire placed near the car antenna but not connected to it.

PHILCO RADIO & TELEV. CORP.

MODEL 828K
Schematic, Chassis
Parts

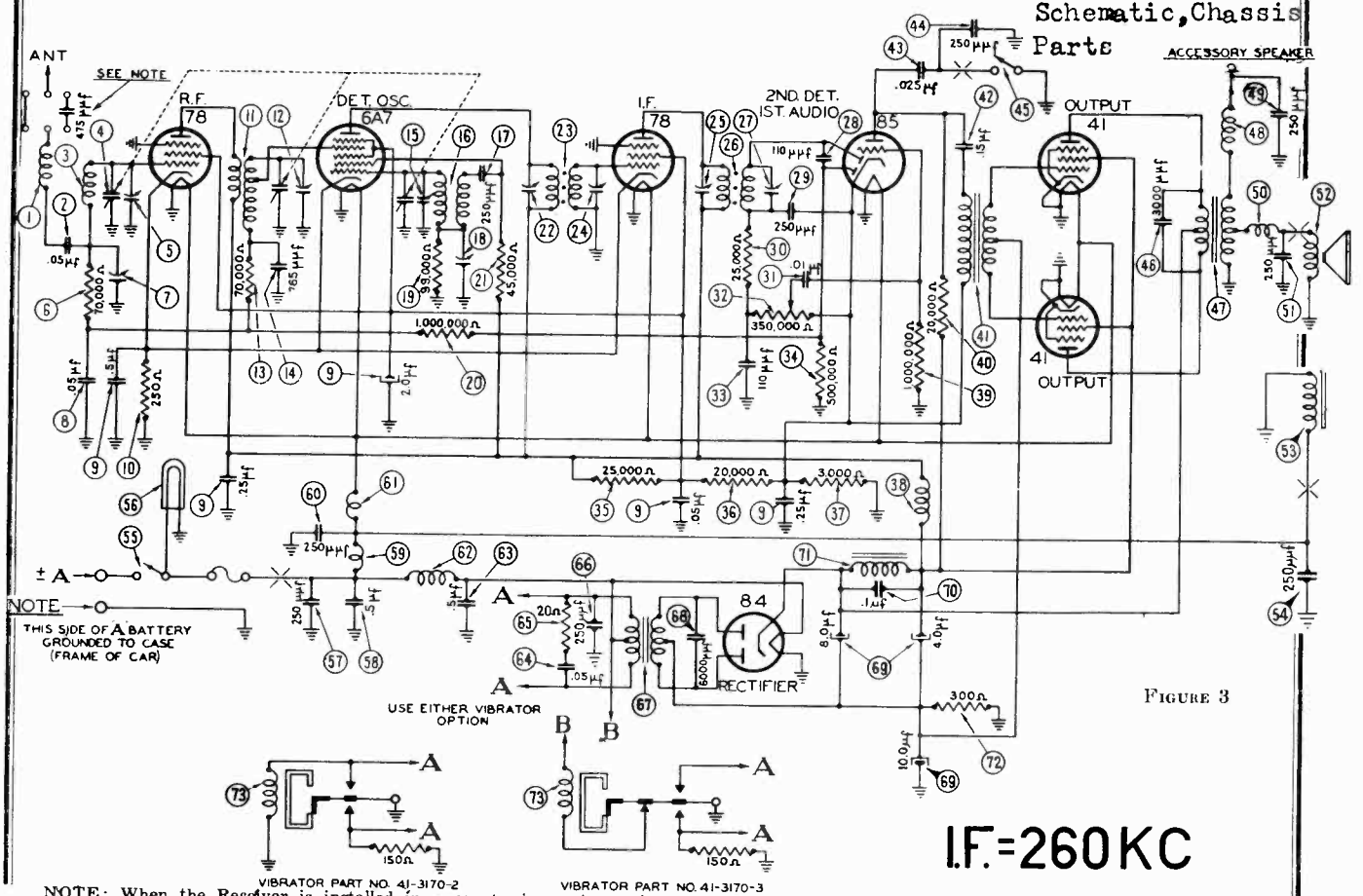


FIGURE 3

NOTE: When the Receiver is installed in a car having a top antenna, under-car antenna, spare wheel antenna or antenna having a similarly low relative capacitance (50 mmf. to 450 mmf.) use connector plug in "A"
When the Receiver is installed in a car having a metal insert top antenna, insulated door antenna, insulated trunk cover antenna or antenna having similarly high relative capacitance (450 mmf. to 2500 mmf.) use condenser plug in "B".

MODEL 828K PARTS LIST

No.	Description	Part No.
①	Antenna Choke	38-8532
②	Condenser (.05 mfd.)	30-4444
③	Antenna Transformer	32-2516
④	Tuning Condenser	31-1770
⑤	First Padder (on tun. cond.)	
⑥	Resistor (70,000 ohms)	33-370344
⑦	Antenna Compensating Condenser	31-6082
⑧	Condenser (.05 mfd.)	3615-0SG
⑨	Condenser (.05-.25-.25-.5-2 mfd.)	30-4513
⑩	Resistor (250 ohms)	33-1259
⑪	R. F. Transformer	32-2307
⑫	Second Padder (on tun. cond.)	
⑬	Resistor (70,000 ohms)	33-370344
⑭	Condenser (765 mmfd.)	30-1069
⑮	Third Padder (on tun. cond.)	
⑯	Oscillator Transformer	32-2308
⑰	Condenser (250 mmfd.)	30-1032
⑱	Low Frequency Padder	31-6102
⑲	Resistor (99,000 ohms)	33-399344
⑳	Resistor (1,000,000 ohms)	33-510344
㉑	Resistor (45,000 ohms)	33-345344
㉒	Padder (Pri. 1st I.F. Trans.)	
㉓	First I. F. Transformer	32-2026
㉔	Padder (Sec. 1st I.F. Trans.)	
㉕	Padder (Pri. 2nd I.F. Trans.)	
㉖	Second I. F. Transformer	30-2034
㉗	Padder (Sec. 2nd I.F. Trans.)	
㉘	Condenser (110 mmfd.)	30-1031
㉙	Condenser (250 mmfd.)	30-1032
㉚	Resistor (25,000 ohms)	33-325344
㉛	Condenser (.01 mfd.)	3903-0SU
㉜	Volume Control (350,000 ohms)	33-5148
㉝	Condenser (110 mmfd.)	30-1031
㉞	Resistor (500,000 ohms)	33-449344
㉟	Resistor (25,000 ohms)	33-325444
㊱	Resistor (20,000 ohms)	33-320344
㊲	Resistor (3,000 ohms)	33-230344
㊳	"B" Choke	32-1281
㊴	Resistor (1,000,000 ohms)	33-510344
㊵	Resistor (20,000 ohms)	33-320344
㊶	Input Transformer	32-7828
㊷	Condenser (.15 mfd.)	30-4505
㊸	Condenser (.025 mfd.)	7653-0SU
㊹	Condenser (250 mmfd.)	30-1032
㊺	Tone Control Switch	42-1225
㊻	Condenser (3000 mmfd.)	30-4469
㊼	Output Transformer	32-7829
㊽	Choke	32-1464
㊾	Condenser (250 mmfd.)	30-1032
㊿	Choke	32-2269
(51)	Condenser (250 mmfd.)	30-1032
(52)	Cone & Voice Coil	36-3159
(53)	Field Coil Assembly	36-3513
	Complete Speaker (A48)	36-1332
(54)	Condenser (250 mmfd.)	30-1032
(55)	On & Off Switch	42-1318
(56)	Pilot Lamp	34-2040
(57)	Condenser (250 mmfd.)	30-1032
(58)	Condenser (.5 mfd.)	30-4015
(59)	"A" Choke	32-1604
(60)	Condenser (250 mmfd.)	30-1032
(61)	Filament Choke	32-2535
(62)	Vibrator Choke	32-2039
(63)	Condenser (.5 mfd.)	30-4015
(64)	Condenser (.05 mfd.)	30-4444
(65)	Resistor (20 ohms)	33-020344
(66)	Condenser (250 mmfd.)	30-1032
(67)	Power Transformer	32-7821
(68)	Condenser (6000 mmfd.)	30-4512
(69)	Filter Condenser (4-8-10 mfd.)	30-2213
(70)	Condenser (.1 mfd.)	30-4455
(71)	Filter Choke	32-7827
(72)	Resistor (300 ohms)	33-1258
(73)	Vibrator (OPTIONAL)	41-3170-2 / 41-3170-3
	Four Prong Socket	27-6044
	Five Prong Socket	27-6035
	Six Prong Socket	27-6036
	Seven Prong Socket	27-6037
	Tuning & Volume Knob	27-4521
	On & Off Knob	27-4525
	Pilot Lamp Assembly	38-7734
	Scale Assembly	42-5714
	Tuning & Volume Shaft	28-8740
	Tone Control Cable	L-2767
	Control Assembly	42-5713
	Distributor Resistor	33-1196
	Interference Condenser	30-4007
	Antenna Condenser	30-4412
	Antenna Connector	28-6423
	Insulator	27-8199
	Fuse	7227

PRICES SUBJECT TO CHANGE WITHOUT NOTICE

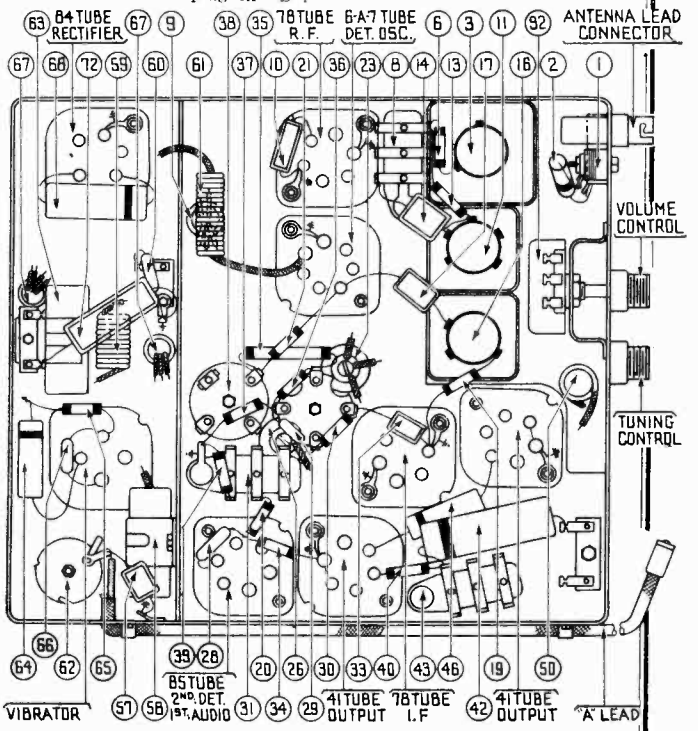


FIGURE 4

No.	Description	Part No.	No.	Description	Part No.
	Fuse Insulator	27-7729		Nut	W518
	Tee Bolt	28-6161		Receiver Housing	38-8710

MODELS 828, 828K
Socket, Trimmers
Alignment

PHILCO RADIO & TELEV. CORP.

I. F. TRANSFORMERS AND PADDERS

The I. F. Transformers are assembled complete with padding condensers.

Both the primary and the secondary padders are placed side by side in the top of the transformer shield can. The adjusting screws are accessible thru the holes in the top of the shield. (See Figure).

The coil windings terminate in the leads instead of terminals or lugs. The color scheme of the leads is given in Figure 5

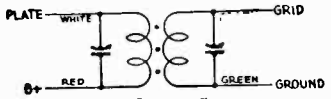


FIGURE 5

If replacements are ever necessary, replace the entire coil assembly, 32-2026 for the first I. F. stage and 32-2034 for the second I. F. stage. Neither the coil nor the padders will be furnished separately. Order only by the above numbers.

ADJUSTMENTS

OUTPUT METER — The output meter must be connected by means of an adapter to the plate of the type 41 output tube and to the Receiver chassis.

SIGNAL GENERATOR — With the Receiver and signal generator set up for operation at the prescribed frequency, turn the Receiver volume control on full and set the signal generator attenuator so that a half scale reading is obtained on the output meter. The signal in the speaker should be audible but not loud.

The shielding on the signal generator output lead must be connected to the Receiver housing.

Procedure

I. F. — Set the signal generator at exactly 260 K. C. Connect the generator lead to the grid cap of the 78 I. F. tube in series with a .1 mfd. condenser (without removing the grid cap).

Adjust the secondary screw padder (27) on the second I. F. transformer for maximum reading on the output meter. Then adjust the primary screw padder (25) for maximum reading. (See Figure 6 for location of padders).

Remove the generator lead from the 78 tube.

Connect the generator lead to the grid cap of the 6A7 tube in series with a .1 mfd. condenser (without removing the grid cap). Adjust the secondary screw padder (24) on the first I. F. transformer for maximum reading on the output meter. Then adjust the primary screw padder (22) for maximum reading. Readjust padders (25) and (27) with the generator lead connected to the type 6A7 tube. (See Figure for location of padders).

HIGH FREQUENCY AND R. F. — After padding the first I. F. stage remove the generator lead from the 6A7 tube.

Set the signal generator at 1550 K. C. and then connect the generator lead to the grid cap of the 78 R. F. tube in series with a .1 mfd. condenser (without removing the grid cap).

Turn the tuning condenser plates out of mesh as far as they will go.

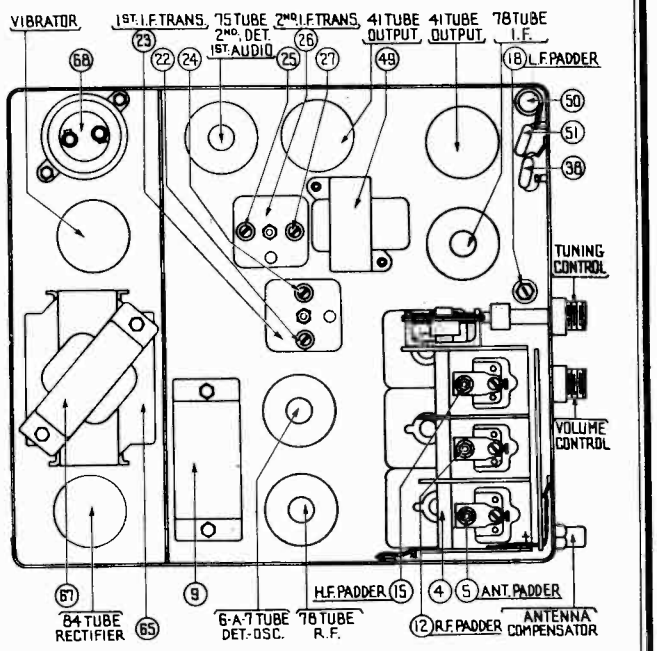
With the tuning condenser in this position, adjust the high frequency padder (15) and the R. F. padder (12) until the maximum reading is obtained on the output meter. This is the true setting for 1550 K. C., 155 on the dial scale.

LOW FREQUENCY — Turn the tuning condenser plates in mesh to approximately 580 K. C., 58 on the dial scale and set the signal generator at 580 K. C. Roll the tuning condenser and adjust the low frequency padder screw (18) for maximum reading on the output meter.

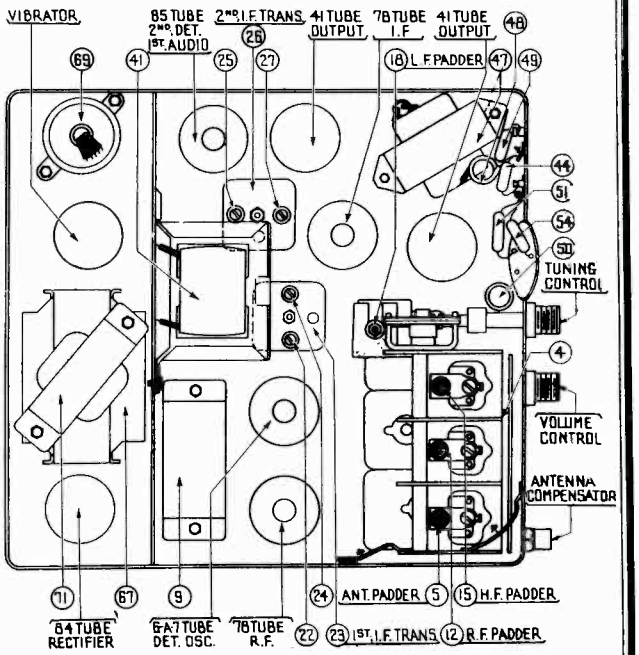
HIGH FREQUENCY READJUSTMENT — Turn the tuning condenser plates out of mesh to 1550 K. C. and set the signal generator at 1550 K. C. Then adjust the high frequency padder (15) again for maximum reading on the output meter.

Remove the generator lead from the 78 R. F. tube.

MODEL 828



MODEL 828-K



ANTENNA — WHEN PADDING THE ANTENNA STAGE IT IS EXTREMELY IMPORTANT THAT THE PROPER DUMMY ANTENNA BE CONSTRUCTED AND USED.

Connect the signal generator lead to the antenna lead assembly (made up of Part No. 41-3191 lead and a 200 mmfd. condenser, Part No. 30-1013), in series between the lead and the signal generator. Plug the lead into the antenna lead connector on the end of the Receiver.

Turn the tuning condenser to 1400 K. C. and set the generator at 1400 K. C. Adjust the padders (12) and (5) for the maximum reading on the output meter.

When the antenna stage adjustment is made with the Receiver installed in the car, the Receiver antenna lead must be connected to the car antenna in the usual manner. Connect the signal generator output lead to a wire placed near the car antenna but not connected to it.

PHILCO RADIO & TELEV. CORP.

MODELS R-1415 Reo
W-1419 Willys-Overland
Schematic, Chassis, Parts

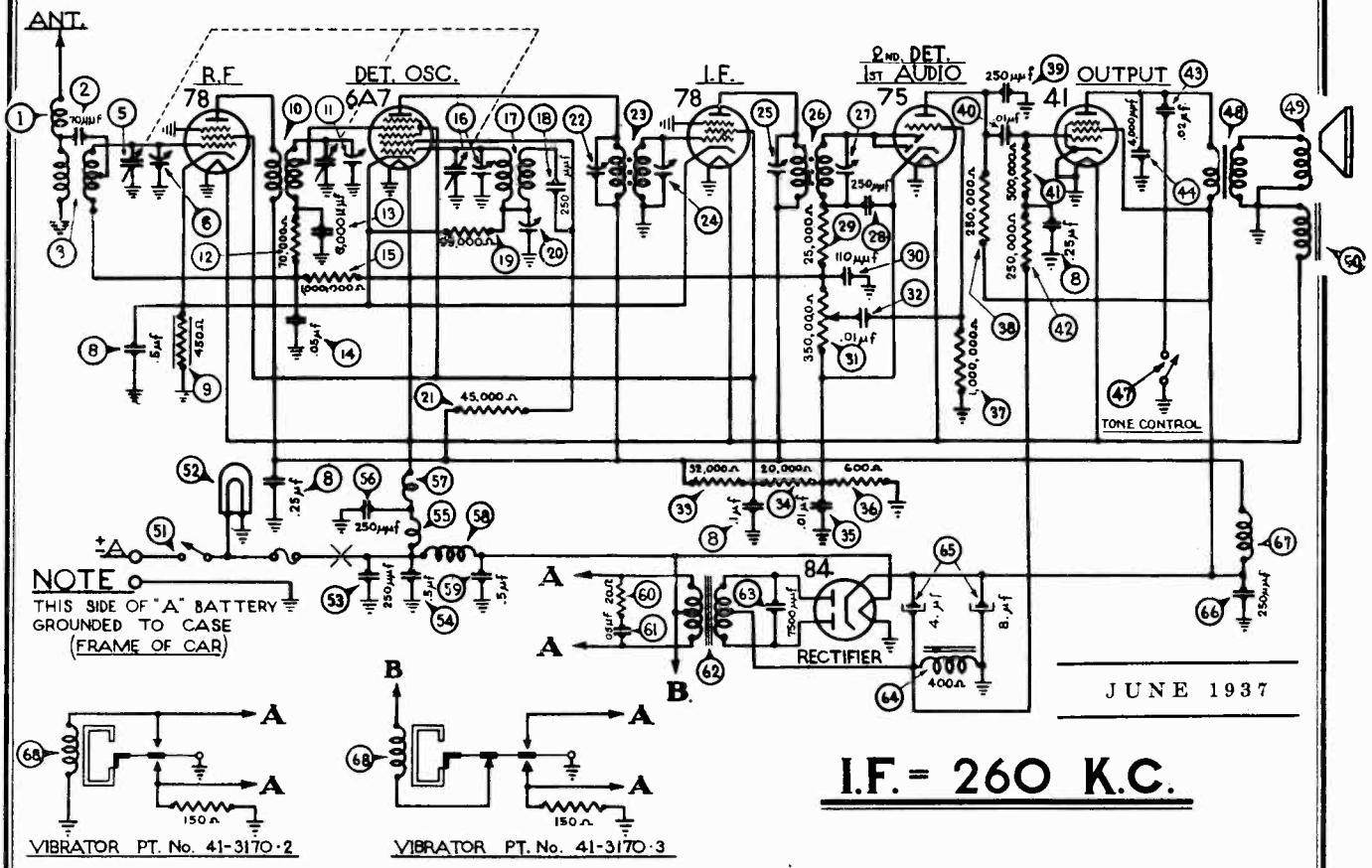


FIGURE 1

PARTS LIST

No.	Description	Part No.
①	Antenna Choke	38-8623
②	Condenser (70 mmfd.)	30-1068
③	Antenna Transformer	32-2494
④	Tuning Condenser	31-2004
⑤	First Padder (on Tun. Cond.)	
⑥	Condenser (.1-.25-.25-.5 mfd.)	30-4415
⑦	Resistor (450 ohms)	33-1218
⑧	R. F. Transformer	32-2495
⑨	Second Padder (on Tun. Cond.)	
⑩	Resistor (70,000 ohms)	33-370344
⑪	Condenser (6,000 mmfd.)	30-4467
⑫	Condenser (.05 mfd.)	3615-0SG
⑬	Resistor (1,000,000 ohms)	33-510344
⑭	Third Padder (on Tun. Cond.)	
⑮	Oscillator Transformer	32-2496
⑯	Condenser (250 mmfd.)	30-1032
⑰	Resistor (99,000 ohms)	33-399344
⑱	Low Frequency Padder	31-6056
⑲	Resistor (45,000 ohms)	33-345344
⑳	Padder (Pri. 1st I. F. Trans.)	
㉑	First I. F. Transformer	32-2026
㉒	Padder (Sec. 1st I. F. Trans.)	
㉓	Padder (Pri. 2nd I. F. Trans.)	
㉔	Second I. F. Transformer	32-2027
㉕	Padder (Sec. 2nd I. F. Trans.)	
㉖	Condenser (250 mmfd.)	30-1032
㉗	Resistor (25,000 ohms)	33-325344
㉘	Condenser (110 mmfd.)	30-1031
㉙	Volume Control (350,000 ohms)	33-5139
㉚	Condenser (.01 mfd.)	3903-0SU
㉛	Resistor (32,000 ohms)	33-332434
㉜	Resistor (20,000 ohms)	33-320344
㉝	Condenser (.01 mfd.)	3903-0SG
㉞	On & Off Switch (R-1415)	42-5493
㉟	On & Off Switch (W-1419)	42-5617
㊱	Pilot Lamp (R-1415)	34-2039
㊲	Pilot Lamp (W-1419)	34-2040
㊳	Resistor (600 ohms)	33-1212
㊴	Resistor (1,000,000 ohms)	33-510344
㊵	Resistor (250,000 ohms)	33-424344
㊶	Condenser (250 mmfd.)	30-1032
㊷	Condenser (.01 mfd.)	3903-0SU
㊸	Resistor (500,000 ohms)	33-449344
㊹	Resistor (250,000 ohms)	33-424344
㊺	Condenser (.02 mfd.)	30-4419
㊻	Condenser (4,000 mmfd.)	30-4185
㊼	Tone Control Switch	42-1140
㊽	Output Transformer	32-7495
㊾	Cone & Voice Coil	36-3586
㊿	Field Coil Assembly	36-3597
(51)	On & Off Switch	42-5617
(52)	Pilot Lamp	34-2040
(53)	Condenser (.5 mfd.)	30-4015
(54)	"A" Choke	32-1604
(55)	Condenser (250 mmfd.)	30-1032
(56)	Filament Choke	32-2535
(57)	Vibrator Choke	32-2039
(58)	Condenser (.5 mfd.)	30-4015
(59)	Resistor (20 ohms)	33-020344
(60)	Condenser (.05 mfd.)	30-4444
(61)	Power Transformer	32-7550
(62)	Condenser (7,500 mmfd.)	30-4420
(63)	Filter Choke	32-7545
(64)	Filter Condenser (4-8 mfd.)	30-2150
(65)	Condenser (250 mmfd.)	30-1032
(66)	"B" Choke	32-1281
(67)	Vibrator (OPTIONAL)	41-3170-2
(68)	Inductive Suppressor	41-3170-3
	Interference Condenser	33-2250
	Glass (R-1415)	30-4007
	Knob (R-1415)	27-7325
	Scale Assembly (W-1419)	27-4161
	Tun. & Vol. Knob (W-1419)	42-5698
		27-4524

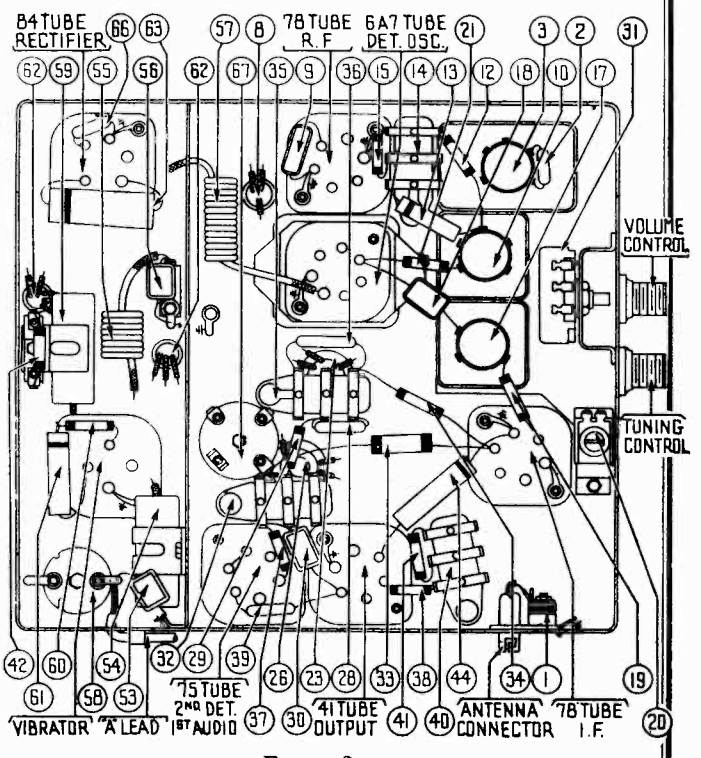


FIGURE 2

MODELS R-1415 Reo
Socket, Trimmers
Alignment

W-1419 Willys-Overland

PHILCO RADIO & TELEV. CORP.

I. F. TRANSFORMERS AND PADDERS

The I. F. transformers are assembled complete with padding condensers.

Both the primary and the secondary padders are placed side by side in the top of the transformer shield can. The adjusting screws are accessible thru the holes in the top of the shield. (See Figure 4).

The coil windings terminate in leads instead of terminals or lugs. The color scheme of the leads is given in Figure 3.

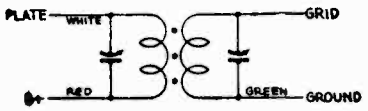


FIGURE 3

If replacements are ever necessary, replace the entire coil assembly, 32-2026 for the first I. F. stage and 32-2027 for the second I. F. stage. Neither the coil nor the padders will be furnished separately. Order only by the above numbers.

ADJUSTMENTS

All padding adjustments are carefully made at the factory and ordinarily no readjustments are necessary. However, when readjustments are required the procedure given below must be followed in detail.

Equipment

Fully charged heavy duty storage battery or 6-volt power pack, 048A or 099A Philco Set Tester, 3164 Padding wrench, 27-7159 Padding screw driver.

General

OUTPUT METER — The output meter must be connected by means of an adapter to the plate of the type 41 output tube and to the Receiver chassis.

SIGNAL GENERATOR — With the Receiver and signal generator set up for operation at the prescribed frequency, turn the Receiver volume control on full and set the signal generator attenuator so that a half scale reading is obtained on the output meter. The signal in the speaker should be audible but not loud.

The shielding on the signal generator output lead must be connected to the Receiver housing.

Procedure

I. F. — Set the signal generator at exactly 260 K. C. Connect the generator lead to the grid cap of the 78 I. F. tube in series with a .1 mfd. condenser (without removing the grid cap).

Adjust the secondary screw padder (27) on the second I. F. transformer for maximum reading on the output meter. Then adjust the primary screw padder (25) for maximum reading. (See Figure 4 for location of padders).

Remove the generator lead from the 78 tube.

Connect the generator lead to the grid cap of the 6A7 tube in series with a .1 mfd. condenser (without removing the grid cap). Adjust the secondary screw padder (24) on the first I. F. transformer for maximum reading on the output meter. Then adjust the primary screw padder (22) for maximum reading. Readjust padders (25) and (27) with the generator lead connected to the type 6A7 tube. (See Figure 4 for location of padders).

HIGH FREQUENCY AND R. F. — After padding the first I. F. stage remove the generator lead from the 6A7 tube.

Set the signal generator at 1550 K. C. and then connect the generator lead to the grid cap of the 78 R. F. tube in series with a .1 mfd. condenser (without removing the grid cap).

Turn the tuning condenser plates out of mesh as far as they will go. With the tuning condenser in this position, adjust the high frequency padder (16) and the R. F. padder (11) until the maximum reading is obtained on the output meter. This is the true setting for 1550 K. C., 155 on the dial scale.

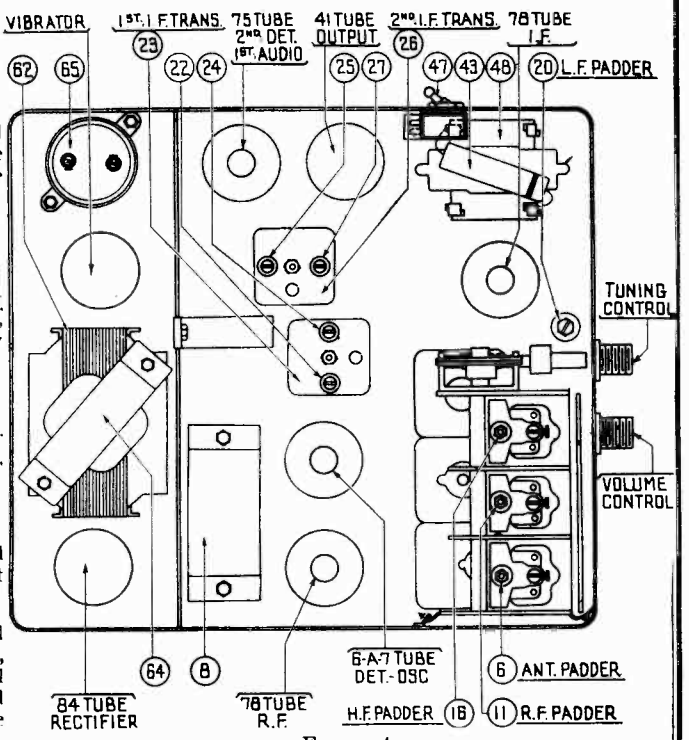


FIGURE 4

LOW FREQUENCY — Turn the tuning condenser plates in mesh to approximately 600 K. C., 60 on the dial scale and set the signal generator at 600 K. C. Rock the tuning condenser and adjust the low frequency padder screw (20) for maximum reading on the output meter.

HIGH FREQUENCY READJUSTMENT — Turn the tuning condenser plates out of mesh as far as they will go and set the signal generator at 1550 K. C. Then adjust the high frequency padder (16) again for maximum reading on the output meter.

Remove the generator lead from the 78 R. F. tube.

Connect the signal generator lead to the antenna lead, Part No. 41-3191.

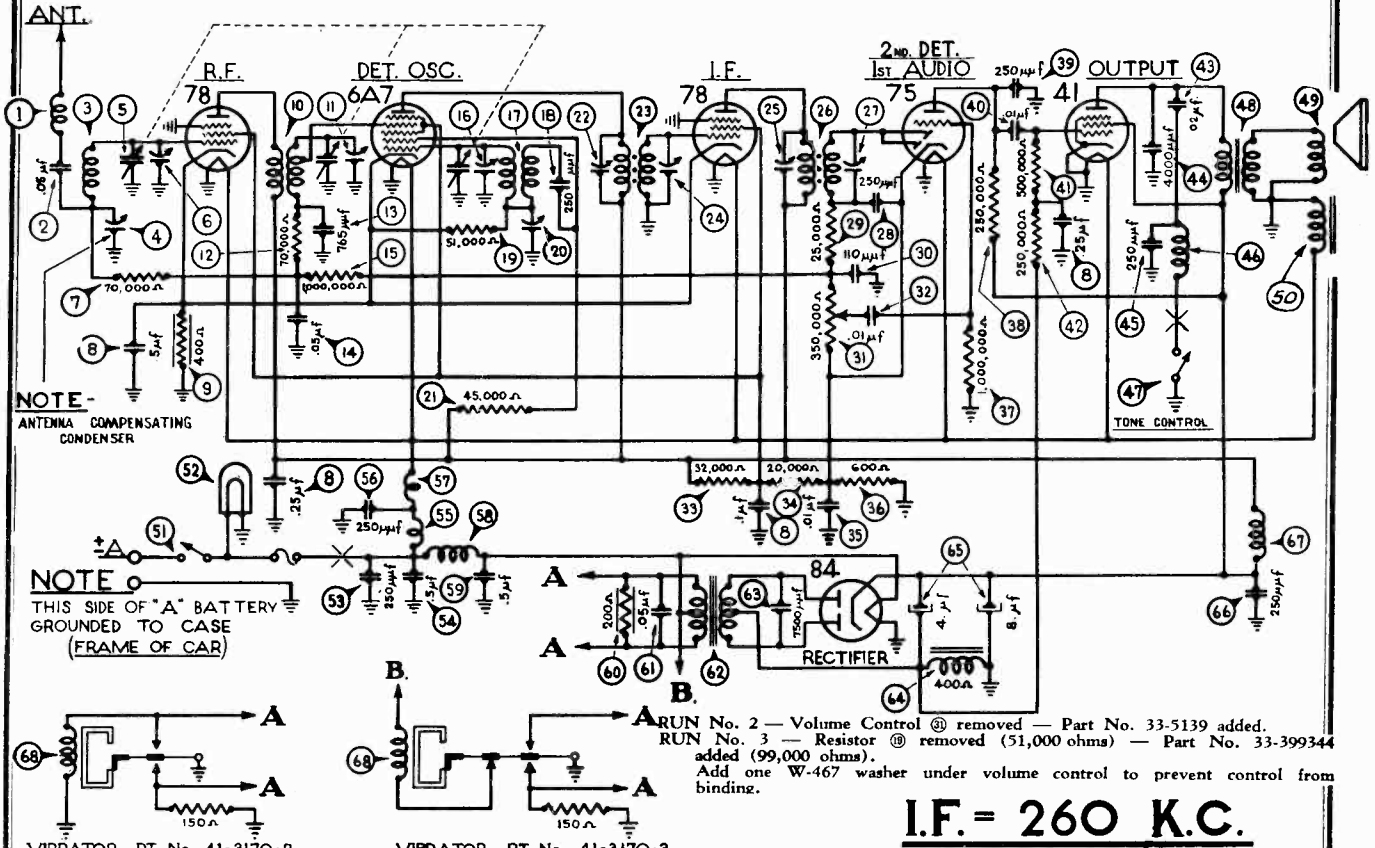
Turn the tuning condenser to 1400 K. C. and set the generator at 1400 K. C. Adjust the padders (11) and (6) for the maximum reading on the output meter.

When the antenna stage adjustment is made with the Receiver installed in the car, the Receiver antenna lead must be connected to the car antenna in the usual manner. Connect the signal generator output lead to a wire placed near the car antenna but not connected to it.

The Model R-1415 is a Special Custom Receiver used exclusively by the Reo Motor Car Company.
The Model W-1419 is a Special Custom-Built Receiver used exclusively by the Willys-Overland Motors Inc.

PHILCO RADIO & TELEV. CORP.

MODEL P-1417 Packard
Schematic, Chassis
Parts



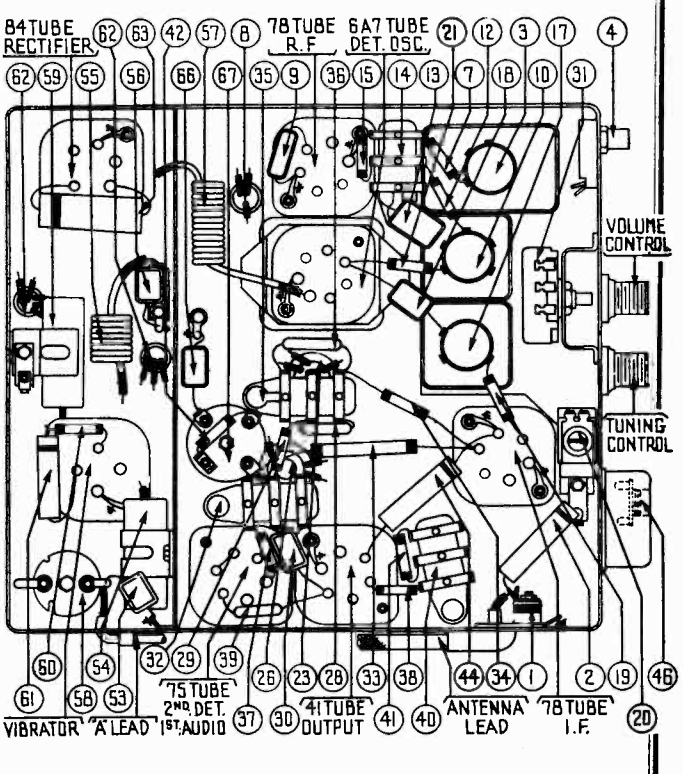
RUN No. 2 — Volume Control (31) removed — Part No. 33-5139 added.
RUN No. 3 — Resistor (19) removed (51,000 ohms) — Part No. 33-399344 added (99,000 ohms).
Add one W-467 washer under volume control to prevent control from binding.

I.F. = 260 K.C.

OCTOBER 1, 1936

MODEL — P-1417 PARTS LIST

No.	Description	Part No.
(1)	Antenna choke	32-2344
(2)	Condenser (.05 mfd.)	30-4444
(3)	Antenna transformer	32-2306
*(4)	Antenna coupling condenser	31-6082
*(5)	Tuning condenser	31-1769
(6)	First padder (On tun. cond.)	
(7)	Resistor (70,000 ohms)	33-370334
(8)	Condenser (.1-.25-.25-.5 mfd)	30-4415
(9)	Resistor (400 ohms)	33-1211
(10)	R. F. transformer	32-2307
(11)	Second padder (On tun. cond.)	
(12)	Resistor (70,000 ohms)	33-370334
(13)	Condenser (765 mmfd.)	30-1069
(14)	Condenser (.05 mfd.)	3615-OSG
(15)	Resistor (1,000,000 ohms)	33-510344
(16)	Third padder (On tun. cond.)	
(17)	Oscillator transformer	32-2308
(18)	Condenser (250 mmfd.)	30-1032
(19)	Resistor (51,000 ohms)	33-351344
*(20)	Low frequency padder	31-6102
(21)	Resistor (45,000 ohms)	33-345344
(22)	Padder (Pri. 1st I. F. trans.)	
(23)	First I.F. transformer	32-2026
(24)	Padder (Sec. 1st I.F. trans.)	
(25)	Padder (Pri. 2nd I.F. trans.)	
(26)	Second I.F. transformer	32-2027
(27)	Padder (Sec. 2nd I.F. trans.)	
(28)	Condenser (250 mmfd.)	30-1032
(29)	Resistor (25,000 ohms)	33-325344
(30)	Condenser (110 mmfd.)	30-1031
(31)	Volume control (350,000 ohms)	33-5139
(32)	Condenser (.01 mfd.)	3903-OSU
(33)	Resistor (32,000 ohms)	33-332344
(34)	Resistor (20,000 ohms)	33-320334
(35)	Condenser (.01 mfd.)	3903-OSG
(36)	Resistor (600 ohms)	33-1212
(37)	Resistor (1,000,000 ohms)	33-510344
(38)	Resistor (250,000 ohms)	33-424344
(39)	Condenser (250 mmfd.)	30-1032
(40)	Condenser (.01 mfd.)	3903-OSU
(41)	Resistor (500,000 ohms)	33-449344
(42)	Resistor (240,000 ohms)	33-424344
(43)	Condenser (.02 mfd.)	30-4419
(44)	Condenser (4000 mmfd.)	30-4185
(45)	Condenser (250 mmfd.)	30-1032
(46)	Choke	32-2063
*(47)	Tone control switch	42-5603
*(48)	Output transformer	32-7495
(49)	Cone & voice coil	36-3586
*(50)	Field coil assembly	36-3597
(51)	On & Off switch assembly	42-5606
(52)	Pilot lamp	34-2040
(53)	Condenser (250 mmfd.)	30-1032
(54)	Condenser (.05 mfd.)	30-4015
(55)	"A" choke	32-1432
(56)	Condenser (250 mmfd.)	30-1032
(57)	Filament choke	32-2038
(58)	Vibrator choke	32-2039
(59)	Condenser (.5 mfd.)	30-4015
(60)	Resistor (200 ohms)	33-1210
(61)	Condenser (.05 mfd.)	30-4444
(62)	Power transformer	32-7550
(63)	Condenser (7500 mmfd.)	30-4420
(64)	Filter choke	32-7545
(65)	Filter condenser (4-8 mfd.)	30-2150
(66)	Condenser (250 mmfd.)	30-1032
(67)	"B" choke	32-1281
(68)	Vibrator (Optional)	41-3170-2 / 41-3170-3
	Four prong socket	27-6044
	Five prong socket	27-6035
	Six prong socket	27-6036
	Seven prong socket	27-6037
	Ground clamp	41-3194
	Antenna loom	38-8030
	Interference condenser	4522S
	Interference condenser	30-4007
	Distributor resistor	4851
	Fuse	7227
	Fuse insulator	27-7729
	Tuning & volume control knob	27-4313
	Tone control lever	28-7203
	Knob base	28-4184
	Tee bolt	28-6268
	Nut (Rec. mtg.)	W518A
	Tuning & volume shaft	28-8662
	Dial assembly	42-5635
	Antenna lead (on Receiver)	L-2308



NOTE: The items marked with an asterisk are rarely required for service and in many cases will not be carried in stock by the local service station. In such cases it will be necessary to order these parts from Philco Transitone, Philadelphia or Chicago.

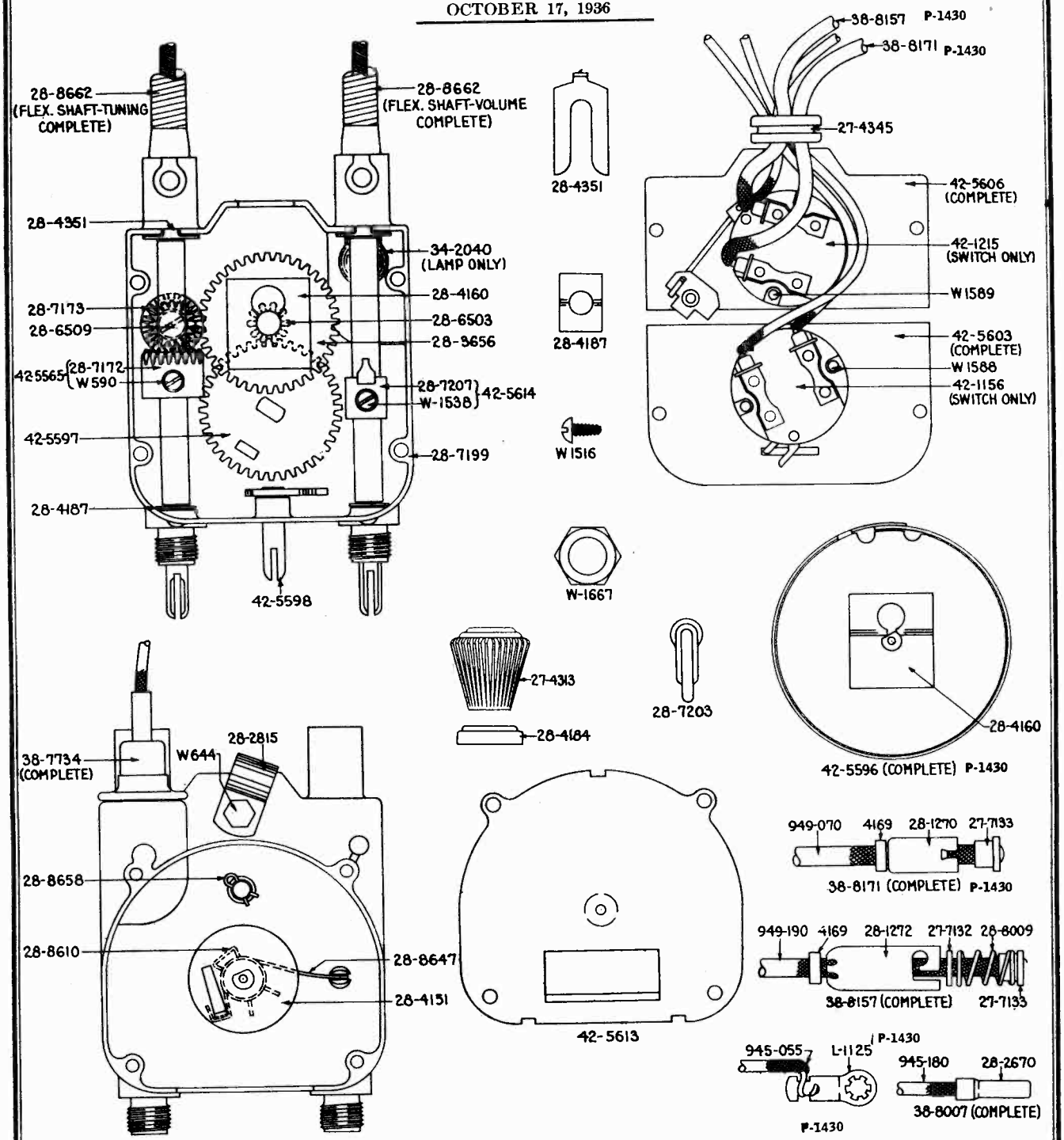
MODELS P-1417, P-1430

Packard

Control Parts

PHILCO RADIO & TELEV. CORP.

OCTOBER 17, 1936



PARTS LIST

Part No.	Description
L-1125	Lug (P-1430)
L-1833	Lug (P-1417)
W-590	Set Screw
W-644	P.K. Screw
W-1516	Screw
W-1538	Set Screw
W-1588	Rivet
W-1589	Rivet
W-1667	Nut
945-055	Wire
949-070	Wire
949-180	Wire
949-190	Wire
4169	Rubber Washer
27-4313	Tuning & Volume Knob

Part No.	Description
27-4345	Grommet
27-7132	Washer
27-7133	Ferrule
28-1270	Housing
28-1272	Housing
28-2670	Prong
28-2815	Clamp
28-3656	Intermediate Gear (large)
28-4151	Drum Washer
28-4160	Drum Spring
28-4184	Knob Base
28-4187	Spring Washer
28-4351	Shaft Retainer
28-6503	Intermediate Gear (small)
28-6509	Miter Idler Screw

Part No.	Description
28-7172	Miter Gear
28-7173	Miter Idler Gear
28-7199	Control Housing
28-7203	Knob
28-7207	Switch Arm
28-8009	Spring
28-8610	Gear Retaining Spring
28-8647	Back Lash Spring
28-8658	Retaining Spring
28-8662	Tuning & Volume Shaft
34-2040	Pilot Lamp
38-7062	"A" Lead (P-1417)
38-7621	"A" Lead (P-1417)
38-7734	Pilot Lamp Assembly
38-8007	Sensitivity Lead Assembly

Part No.	Description
38-8157	"A" Lead (P-1430)
38-8171	"A" Lead (P-1430)
42-1156	Sensitivity Switch Only
42-1215	On & Off Switch Only
42-5565	Miter Gear Assembly
42-5596	Scale Assembly (P-1430)
42-5597	Shaft & Gear Assembly
42-5598	Sensitivity Switch Shaft Assembly
42-5603	Sensitivity Switch Assembly
42-5606	On & Off Switch Assembly
42-5613	Top Cover
42-5614	Switch Arm Assembly
42-5635	Scale Assembly (P-1417)

MODEL N-1418 Nash
Socket, Trimmers
Alignment

PHILCO RADIO & TELEV. CORP.

MODEL P-1417 Packard
MODEL G-1418 Graham

I. F. TRANSFORMERS AND PADDERS

The I. F. transformers are assembled complete with padding condensers.

Both the primary and the secondary padders are placed side by side in the top of the transformer shield can. The adjusting screws are accessible thru the holes in the top of the shield.

The coil windings terminate in leads instead of terminals or lugs. The color scheme of the leads is given in Figure 7.

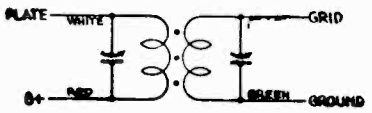


FIGURE 7

If replacements are ever necessary, replace the entire coil assembly, 32-2026 for the first I. F. stage and 32-2027 for the second I. F. stage. Neither the coil nor the padders will be furnished separately. Order only by the above numbers.

General

OUTPUT METER—The output meter must be connected by means of an adapter to the plate of the type 41 output tube and to the Receiver chassis.

SIGNAL GENERATOR—With the Receiver and signal generator set up for operation at the prescribed frequency, turn the Receiver volume control on full and set the signal generator attenuator so that a half scale reading is obtained on the output meter. The signal in the speaker should be audible but not loud.

The shielding on the signal generator output lead must be connected to the Receiver housing.

Procedure

I. F.—Set the signal generator at exactly 260 K. C. Connect the generator lead to the grid cap of the 78 I. F. tube in series with a .1 mfd. condenser (without removing the grid cap).

Adjust the secondary screw padder (27) on the second I. F. transformer for maximum reading on the output meter. Then adjust the primary screw padder (25) for maximum reading. (See Figure 8 for location of padders).

Remove the generator lead from the 78 tube.

Connect the generator lead to the grid cap of the 6A7 tube in series with a .1 mfd. condenser (without removing the grid cap). Adjust the secondary screw padder (24) on the first I. F. transformer for maximum reading on the output meter. Then adjust the primary screw padder (22) for maximum reading. Readjust padders (25) and (27) with the generator lead connected to the type 6A7 tube. (See Figure 8 for location of padders).

HIGH FREQUENCY AND R. F.—After padding the first I. F. stage remove the generator lead from the 6A7 tube.

Set the signal generator at 1550 K. C. and then connect the generator lead to the grid cap of the 78 R. F. tube in series with a .1 mfd. condenser (without removing the grid cap).

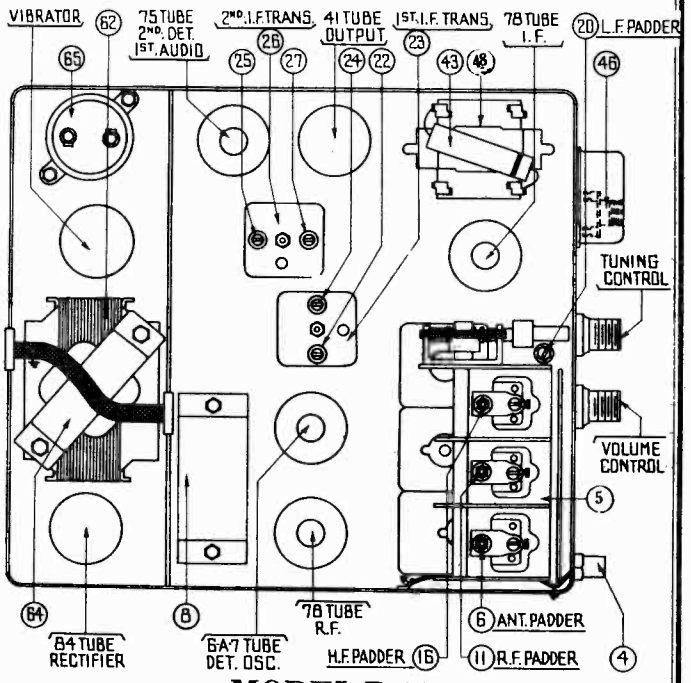
Turn the tuning condenser plates out of mesh as far as they will go.

With the tuning condenser in this position, adjust the high frequency padder (16) and the R. F. padder (11) until the maximum reading is obtained on the output meter. This is the true setting for 1550 K. C., 155 on the dial scale.

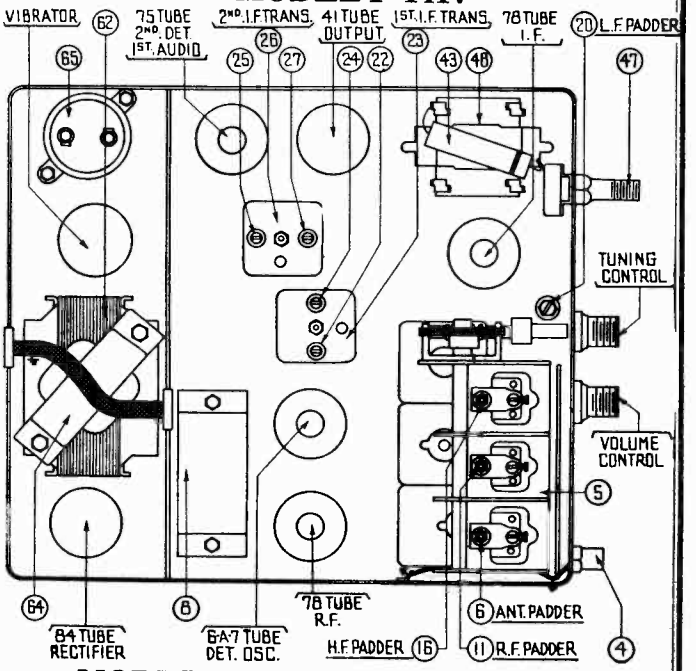
LOW FREQUENCY—Turn the tuning condenser plates in mesh to approximately 600 K. C., 60 on the dial scale and set the signal generator at 600 K. C. Roll the tuning condenser and adjust the low frequency padder screw (20) for maximum reading on the output meter.

HIGH FREQUENCY READJUSTMENT—Turn the tuning condenser plates out of mesh to 1550 K. C. and set the signal generator at 1550 K. C. Then adjust the high frequency padder (16) again for maximum reading on the output meter.

Remove the generator lead from the 78 R. F. tube.



MODEL P-1417



MODEL G-1418 MODEL N-1418

ANTENNA—WHEN PADDING THE ANTENNA STAGE IT IS EXTREMELY IMPORTANT THAT THE PROPER DUMMY ANTENNA BE CONSTRUCTED AND USED.

Connect the signal generator lead to the antenna cable assembly (made up of Part No. 38-7295 cable and a 155 mmfd. condenser in series between the lead and the signal generator. Plug the cable into the antenna receptacle on the top of the Receiver.

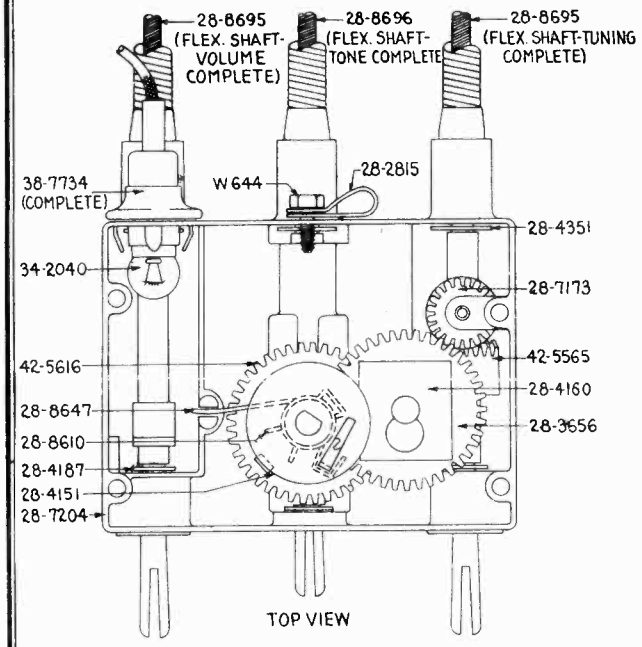
Turn the tuning condenser to 1400 K. C. and set the generator at 1400 K. C. Adjust the padders (11) and (6) for the maximum reading on the output meter.

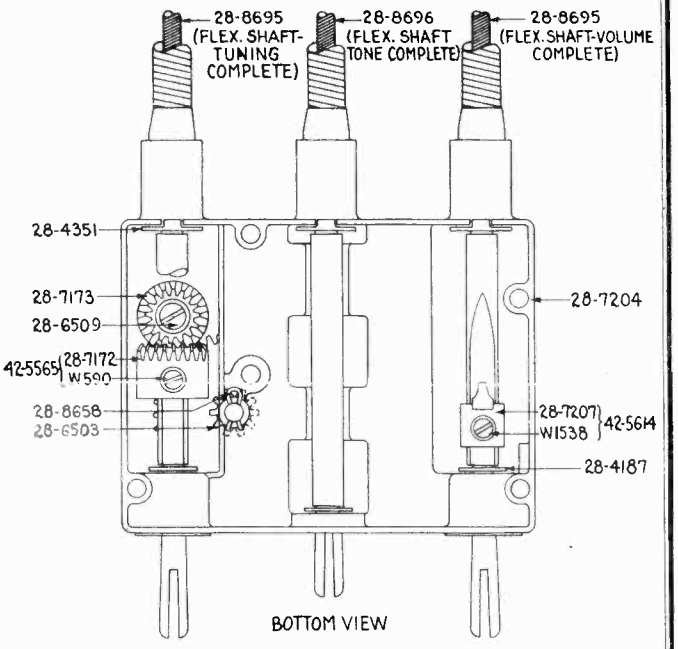
When the antenna stage adjustment is made with the Receiver installed in the car, the Receiver antenna lead must be connected to the car antenna in the usual manner. Connect the signal generator output lead to a wire placed near the car antenna but not connected to it.

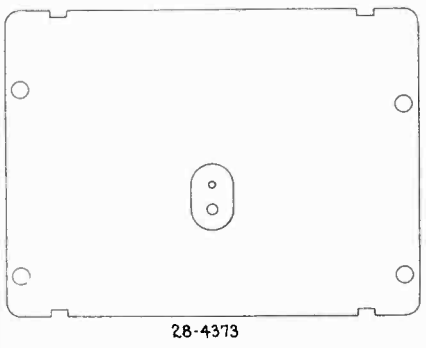
MODELS N-1418, N-1433
Nash

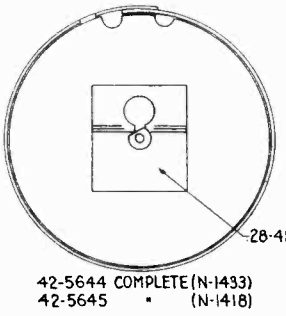
PHILCO RADIO & TELEV. CORP.

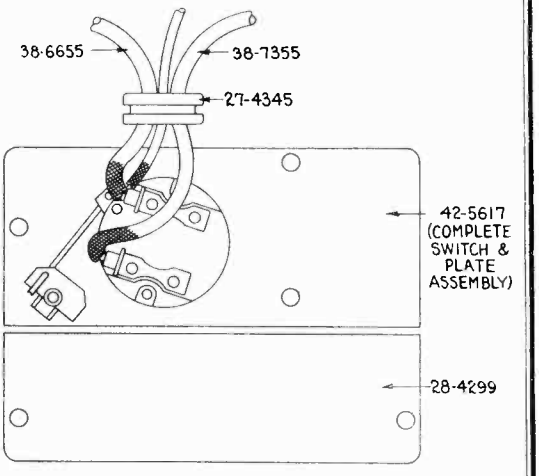
Control Parts

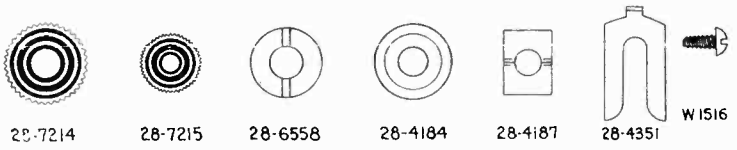


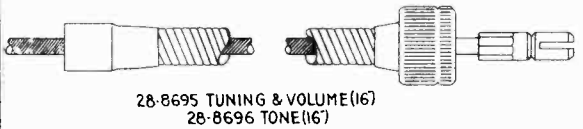


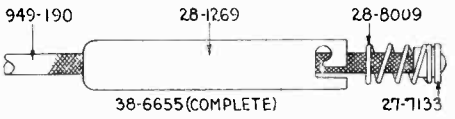


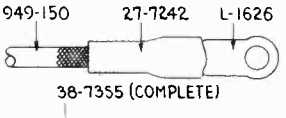












PARTS LIST

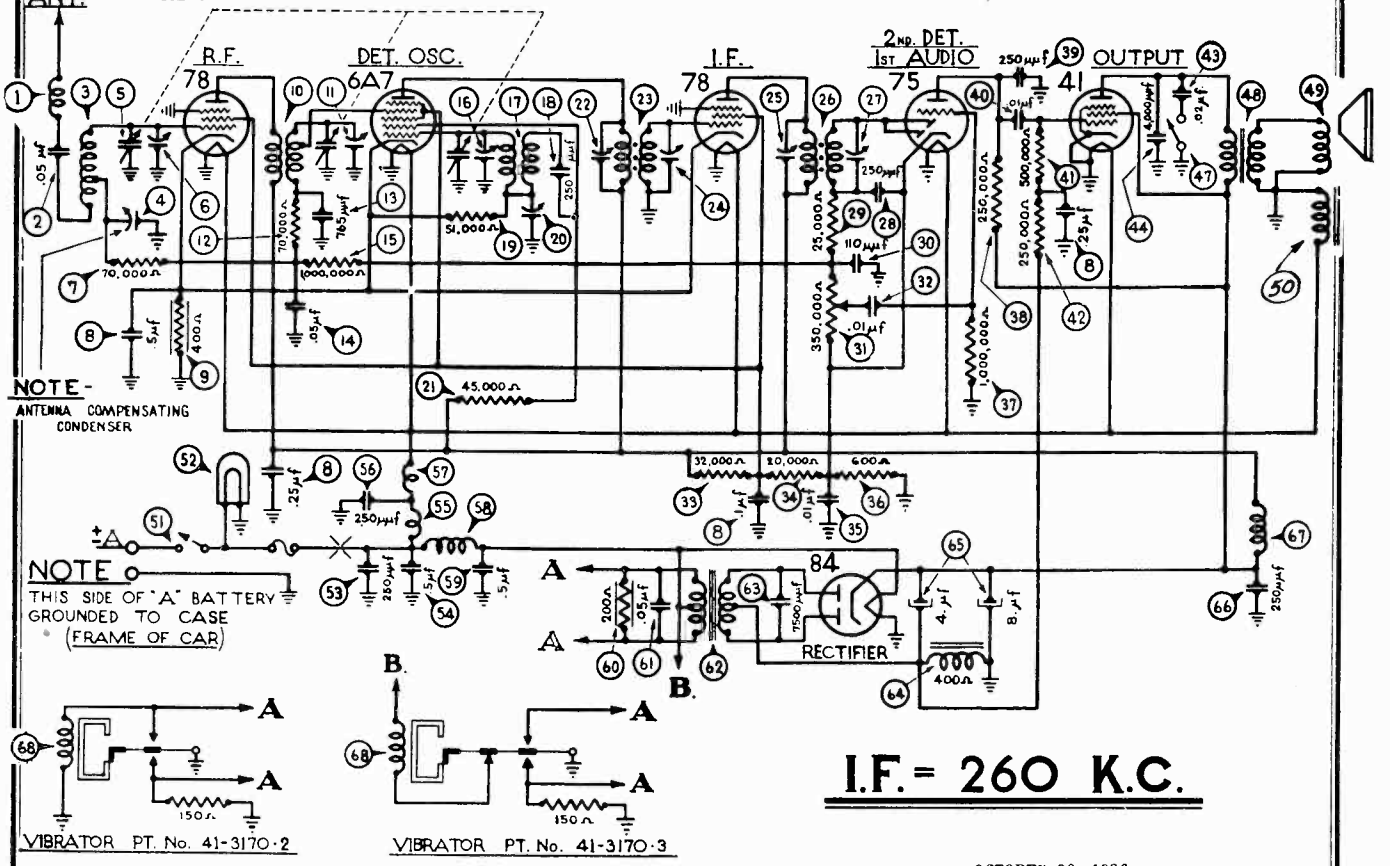
Part No.	Description
L-1626	Lug
W-590	Set Screw
W-644	Screw (clamp mtg.)
W-1516	Screw
W-1538	Set Screw
949-150	Wire
949-190	Wire
27-4345	Grommet
27-7133	Ferrule
27-7242	Sleeve
28-1269	Fuse Housing
28-2815	Clamp
28-3656	Intermediate Gear (large)
28-4151	Drum Friction Washer
28-4160	Drum Spring
28-4184	Knob Base
28-4187	Spring Washer
28-4299	Cover
28-4351	Shaft Retainer
28-4373	Cover
28-6503	Intermediate Gear (small)
28-6509	Miter Idler Screw
28-6558	Gland Nut
28-7172	Miter Gear
28-7173	Miter Idler Gear
28-7204	Control Housing
28-7207	Switch Arm
28-7214	Tuning and Volume Knob
28-7215	Tone Control Knob
28-8009	Spring
28-8610	Gear Retaining Spring
28-8647	Back Lash Spring
28-8658	Retaining Spring
28-8695	Tuning and Volume Control Shaft
28-8696	Tone Control Shaft
34-2040	Pilot Lamp
38-7734	Pilot Lamp Assembly
38-6655	"A" Lead
38-7355	"A" Lead
42-5614	Switch Arm Assembly
42-5616	Drum Shaft and Gear Assembly
42-5617	On and Off Switch Assembly
42-5644	Scale Assembly (N-1433)
42-5645	Scale Assembly (N-1418)
42-5565	Miter Gear Assembly

NOVEMBER 15, 1936

Schematic, Chassis Parts

PHILCO RADIO & TELEV. CORP.

MODELS N-1418 Nash
G-1418 Graham

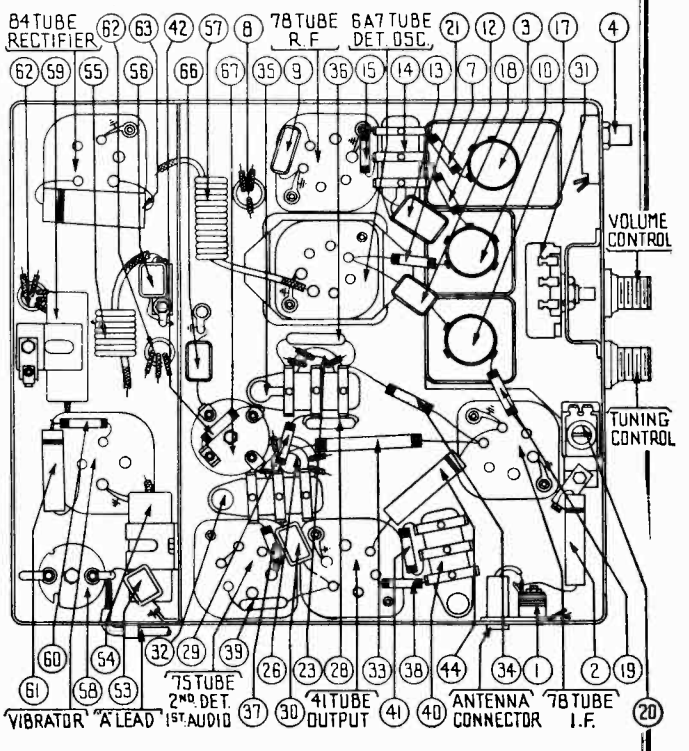


I.F. = 260 K.C.

OCTOBER 20, 1936

MODEL G-1418 PARTS LIST

No.	Description	Part No.
①	Antenna Choke	38-8244
②	Condenser (.05 mfd.)	30-4444
③	Antenna Transformer	32-2326
*④	Antenna Coupling Condenser	31-6082
*⑤	Tuning Condenser	31-1769
⑥	First Padder (on tun. cond.)	
⑦	Resistor (70,000 ohms)	33-370334
⑧	Condenser (.1-.25-.25-.5 mfd.)	30-4415
⑨	Resistor (400 ohms)	33-1211
⑩	R. F. Transformer	32-2307
⑪	Second Padder (on tun. cond.)	
⑫	Resistor (70,000 ohms)	33-370334
⑬	Condenser (765 mmfd.)	30-1069
⑭	Condenser (.05 mfd.)	3615-0SG
⑮	Resistor (1,000,000 ohms)	33-510344
⑯	Third Padder (on tun. cond.)	
⑰	Oscillator Transformer	32-2308
⑱	Condenser (250 mmfd.)	30-1032
⑲	Resistor (51,000 ohms)	33-351344
*⑳	Low Frequency Padder	31-6102
㉑	Resistor (45,000 ohms)	33-345344
㉒	Padder (Pri. 1st I. F. Trans.)	
㉓	First I F. Transformer	32-2026
㉔	Padder (Sec. 1st I. F. Trans.)	
㉕	Padder (Pri. 2nd I. F. Trans.)	
㉖	Second I. F. Transformer	32-2027
㉗	Padder (Sec. 2nd I. F. Trans.)	
㉘	Condenser (250 mmfd.)	30-1032
㉙	Resistor (25,000 ohms)	33-325344
㉚	Condenser (110 mmfd.)	30-1031
㉛	Volume Control (350,000 ohms)	33-5139
㉜	Condenser (.01 mfd.)	3903-0SU
㉝	Resistor (32,000 ohms)	33-332434
㉞	Resistor (20,000 ohms)	33-320334
㉟	Condenser (.01 mfd.)	3903-0SG
㊱	Resistor (600 ohms)	33-1212
㊲	Resistor (1,000,000 ohms)	33-510344
㊳	Resistor (250,000 ohms)	33-424344
㊴	Condenser (250 mmfd.)	30-1032
㊵	Condenser (.01 mfd.)	3903-0SU
㊶	Resistor (500,000 ohms)	33-449344
㊷	Resistor (240,000 ohms)	33-424344
㊸	Condenser (.02 mfd.)	30-4419
㊹	Condenser (4000 mmfd.)	30-4185
㊺	Condenser (250 mfd.)	30-1032
㊻	Choke	32-2063
*㊼	Tone Control Switch	42-5646
*㊽	Output Transformer	32-7495
㊾	Cone & Voice Coil	36-3586
*㊿	Field Coil Assembly	36-3597
(51)	On & Off Switch Assembly	42-5617
(52)	Pilot Lamp	34-2040
(53)	Condenser (250 mmfd.)	30-1032
(54)	Condenser (.05 mfd.)	30-4015
(55)	"A" Choke	32-1432
(56)	Condenser (250 mmfd.)	30-1032
(57)	Filament Choke	32-2038
(58)	Vibrator Choke	32-2039
(59)	Condenser (.5 mfd.)	30-4015
(60)	Resistor (200 ohms)	33-1210
(61)	Condenser (.05 mfd.)	30-4444
(62)	Power Transformer	32-7550
(63)	Condenser (7500 mmfd.)	30-4420
(64)	Filter Choke	32-7545
(65)	Filter Condenser (4-8 mfd.)	30-2150
(66)	Condenser (250 mmfd.)	30-1032
(67)	"B" Choke	32-1281
(68)	Vibrator (Optional)	41-3170-2 41-3170-3
	Four-prong Socket	27-6044
	Five-prong Socket	27-6035
	Six-prong Socket	27-6036
	Seven-prong Socket	27-6037
	Interference Condenser	30-4007
	Distributor Resistor	33-1196
	Fuse	7227
	Fuse Insulator	27-7729
	Tuning & Volume Control Knob	27-4428
	Tone Control Knob	27-4430
	Knob Base	28-4184
	Control Wrench	28-4380
	Tee Bolt (Rec. mtg.)	28-6161
	Nut (Rec. mtg.)	W-518A
	Tuning & Volume Shaft	28-8684
	Tone Control Shaft	28-8686
	Dial Assembly	42-5652
	Pilot Lamp Assembly	38-7734

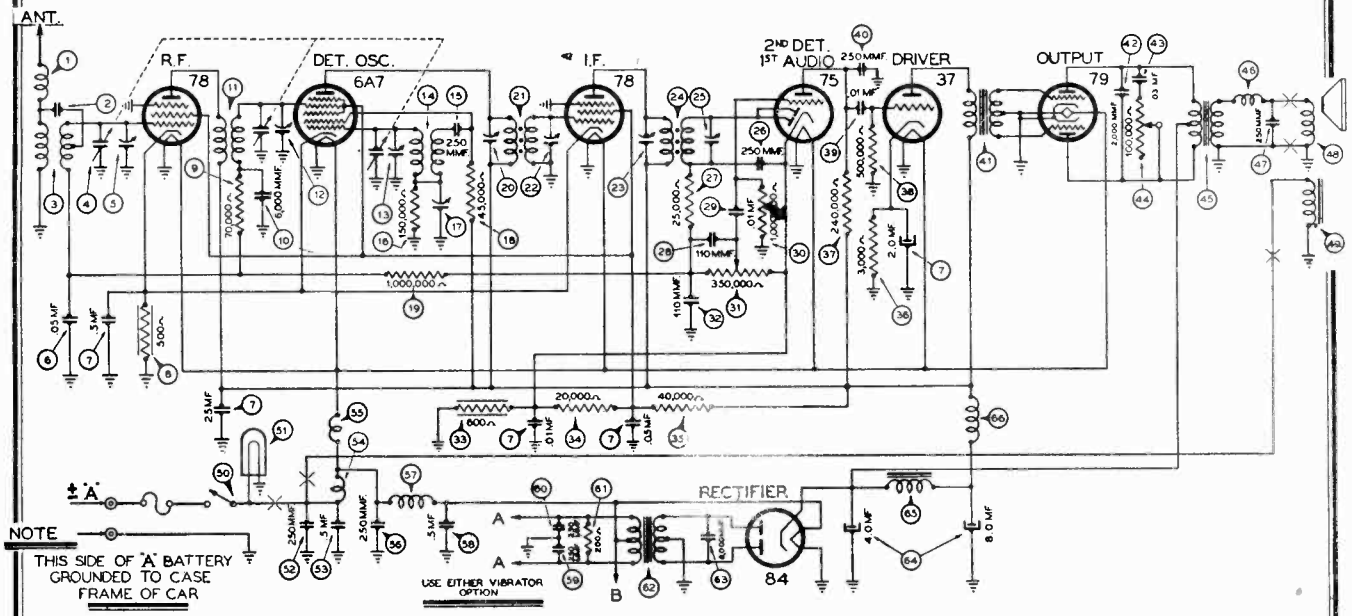


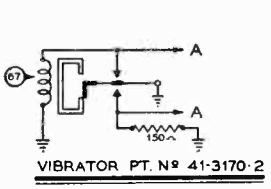
NOTE: The items marked with an asterisk are rarely required for service and in many cases will not be carried in stock by the local service station. In such cases it will be necessary to order these parts from Philco Transitone, Philadelphia or Chicago.

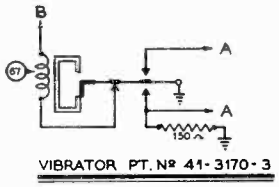
MODELS L-1420, L-1424
L-1425, Lincoln

PHILCO RADIO & TELEV. CORP.

Schematic, Chassis Parts







FOR ALIGNMENT
SEE INDEX

I.F.= 260 KC

MODEL L-1424 — PARTS LIST

No.	Description	Part No.
①	Antenna Choke	38-8210
②	Condenser (90 mmfd.)	30-1046
③	Antenna Transformer	32-2365
④	Tuning Condenser	31-1954
⑤	First Padder (on tun. cond.)	
⑥	Condenser (.05 mfd.)	30-4444
⑦	Condenser (.01, .05, .25, .5, 2 mfd.)	30-4493
⑧	Resistor (500 ohms)	33-1213
⑨	Resistor (70,000 ohms)	33-370344
⑩	Condenser (6000 mmfd.)	30-4445
⑪	R. F. Transformer	32-2231
⑫	Second Padder (on tun. cond.)	
⑬	Third Padder (on tun. cond.)	
⑭	Oscillator Transformer	32-2232
⑮	Condenser (250 mmfd.)	30-1032
⑯	Resistor (150,000 ohms)	33-415344
⑰	Low Frequency Padder	31-6056
⑱	Resistor (45,000 ohms)	33-345344
⑲	Resistor (1,000,000 ohms)	33-510344
⑳	Padder (Pri. 1st I.F. trans.)	
㉑	First I.F. Transformer	32-2286
㉒	Padder (Sec. 1st I.F. trans.)	
㉓	Padder (Pri. 2nd I.F. trans.)	
㉔	Second I.F. Transformer	32-2167
㉕	Padder (Sec. 2nd I.F. trans.)	
㉖	Condenser (250 mmfd.)	30-1032
㉗	Resistor (25,000 ohms)	33-325344
㉘	Condenser (110 mmfd.)	30-1031
㉙	Condenser (.01 mfd.)	30-4479
㉚	Resistor (1,000,000 ohms)	33-510344
㉛	Volume Control (350,000 ohms)	33-5202
㉜	Condenser (110 mmfd.)	30-1031
㉝	Resistor (600 ohms)	33-1212
㉞	Resistor (20,000 ohms)	33-320344
㉟	Resistor (40,000 ohms)	33-340444
㊱	Resistor (3000 ohms)	33-230344
㊲	Resistor (240,000 ohms)	33-424344
㊳	Resistor (500,000 ohms)	33-449344
㊴	Condenser (.01 mfd.)	30-4145
㊵	Condenser (250 mmfd.)	30-1032
㊶	Input Transformer	32-7779
㊷	Condenser (2000 mmfd.)	30-4177
㊸	Condenser (.03 mfd.)	30-4447
㊹	Tone Control (100,000 ohms)	33-5141
㊺	Tone Control (L-1425)	33-5101
㊻	Output Transformer	32-7778
㊼	Output Transformer (L-1425)	32-7788
㊽	Choke	32-2269
㊾	Condenser (250 mmfd.)	30-1032
㊿	Cone & Voice Coil	36-3159
(51)	Field Coil Assembly	36-3513
(52)	On & Off Switch	42-5617
(53)	Pilot Lamp	34-2040
(54)	Condenser (250 mmfd.)	30-1032
(55)	Condenser (.5 mfd.)	30-4474
(56)	"A" Choke	32-1374
(57)	Filament Choke	32-1561
(58)	Condenser (250 mmfd.)	30-1032
(59)	Vibrator Choke	32-2249
(60)	Condenser (.5 mfd.)	30-4474
(61)	Condenser (250 mmfd.)	30-1032
(62)	Resistor (200 ohms)	33-120344
(63)	Power Transformer	32-7720
(64)	Condenser (8000 mmfd.)	30-4420
(65)	Filter Condenser (4-8 mfd.)	30-2167
(66)	Filter Choke	32-7722
(67)	"B" Choke	32-1281
		41-3170-2
	Vibrator (OPTIONAL)	41-3170-3
	Four Prong Socket	27-6044
	Five Prong Socket	27-6035
	Six Prong Socket	26-6036
	Seven Prong Socket	27-6037
	Fuse	7227
	Fuse Insulator	27-7729
	Water Gauge Condenser	30-4007
	Generator Condenser	30-4181
	Oil Gauge Condenser	30-4307
	Gas Gauge Condenser	30-4663
	Distributor Condenser	30-4404
	Antenna Shield Loom	L-2569
	Plate (Rec. mtg.)	29-3734
	Screw (Rec. mtg.)	W-1614
	Speaker Cable	41-3260
	Adapter Plate	28-4560
	Wrench	28-4380
	Tuning Shaft	28-8704
	Volume Shaft	28-8700
	Tone Control Shaft	28-8701
	Scale Assembly	42-5666
	Pilot Lamp Assembly	38-7734
	Tuning & Volume Knob	27-4426
	Tone Knob	27-4427
	Receiver Housing	38-1756

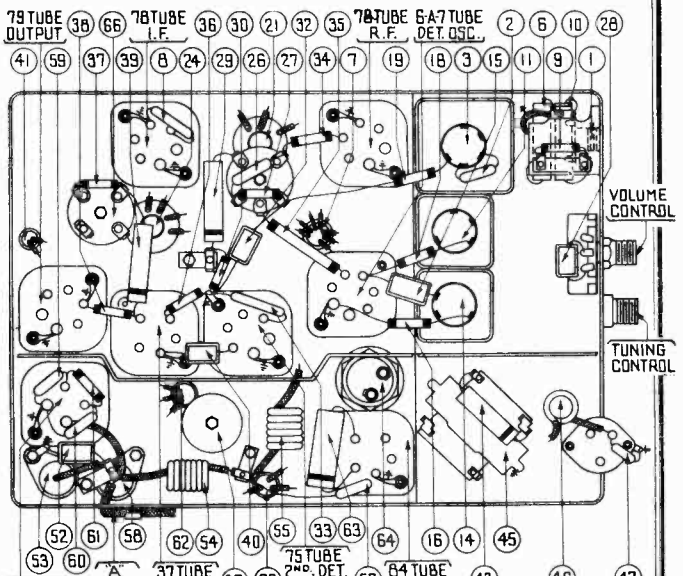


FIGURE 136

CHANGES — "Run Numbers" are stamped on the chassis sub-base for identification. These "Run Numbers" are changed consecutively as major changes are made in the Receiver wiring and parts.

RUN No. 2 — Volume Control ㉛ removed — Part No. 33-5202 added.

SEE INDEX FOR ALIGNMENT

The Circuit of the Model L-1420 and L-1425 is identical to the Model L-1424 with the following exception:—

The Field for the L-1425 is supplied from the center tap of chokes ㊿ and (51).

The Models L-1420, L-1424 and L-1425 are Special Custom-Built Receivers used exclusively by the Lincoln Motor Company in their 1937 cars.

Socket, Trimmers
Alignment

PHILCO RADIO & TELEV. CORP.

MODELS L1420, P1421, P1422
L1424, L1425, P1426
P1439, L1460
MODELS F1440, F1442

MODELS L1420, P1421, P1422, L1424, L1425, P1426 AND P1439, L-1460

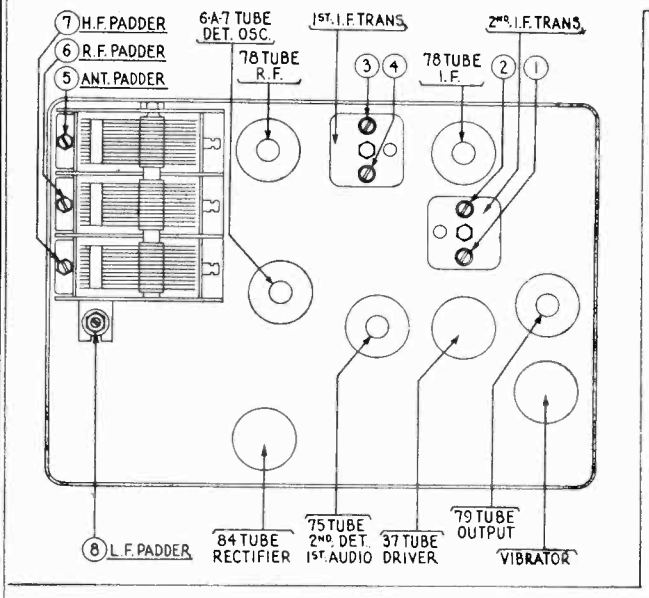
OPERATION	SIGNAL GENERATOR		DUMMY CAPACITY	SPECIAL INSTRUCTIONS	ADJUST PADDER
	FREQUENCY	CONNECTION			
1	260 K. C.	To Grid of 78 Tube—I.F. Stage	.1 Mfd. Condenser in Series with Generator Lead	No Antenna Connection	1 - 2
2	260 K. C.	To Grid of 6A7 Tube	.1 Mfd. Condenser in Series with Generator Lead	No Antenna Connection	3 - 4 1 - 2
3	1500 K. C.	To Grid of 78 Tube—R.F. Stage	.1 Mfd. Condenser in Series with Generator Lead	No Antenna Connection Note 1	7 - 6
4	580 K. C.	To Grid of 78 Tube—R.F. Stage	.1 Mfd. Condenser in Series with Generator Lead	No Antenna Connection Set Tuning Condensers at 580 K. C.	8 Note 2
5	1550 K. C.	To Grid of 78 Tube—R.F. Stage	.1 Mfd. Condenser in Series with Generator Lead	No Antenna Connection Set Tuning Condensers at 1550 K. C.	7
6	1400 K. C.	Note 4	Note 4	Set Tuning Condensers at 1400 K. C.	6 - 5

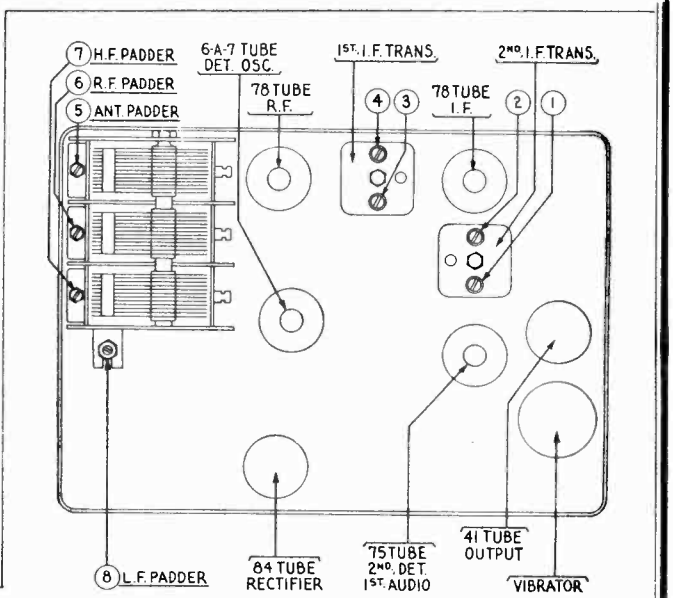
Adjust for maximum reading on the output meter.

NOTE 1—Turn the condenser rotor plates completely out of mesh. Use a piece of bond letterhead paper as a gauge between the heel of the rotor plates and the stator plates and turn the condenser plates in mesh until they strike against the paper.

NOTE 2—Rock the tuning condenser while adjusting the low frequency padder. Tune the condenser to the signal and adjust the padder for maximum output. Rotate the tuning condenser back and forth slightly for maximum output. Then re-adjust the padder for maximum output. Repeat this procedure until no further improvement is noticed.

NOTE 4—Connect the Antenna lead Part No. 41-3191 to the Antenna receptacle on the Receiver in series with the correct dummy capacity. For the L1420, L1424 and L1425 use a 565 mmfd. condenser, for the P1421, P1426 and P1439 use a 230 mmfd. condenser.





MODELS F1440 AND F1442

OPERATION	SIGNAL GENERATOR		DUMMY CAPACITY	SPECIAL INSTRUCTIONS	ADJUST PADDER
	FREQUENCY	CONNECTION			
1	260 K. C.	To Grid of 78 Tube—I.F. Stage	.1 Mfd. Condenser in Series with Generator Lead	No Antenna Connection	1 - 2
2	260 K. C.	To Grid of 6A7 Tube	.1 Mfd. Condenser in Series with Generator Lead	No Antenna Connection	3 - 4 1 - 2
3	1500 K. C.	To Grid of 78 Tube—R.F. Stage	.1 Mfd. Condenser in Series with Generator Lead	No Antenna Connection Note 1	7 - 6
4	580 K. C.	To Grid of 78 Tube—R.F. Stage	.1 Mfd. Condenser in Series with Generator Lead	No Antenna Connection Set Tuning Condensers at 580 K. C.	8 Note 2
5	1550 K. C.	To Grid of 78 Tube—R.F. Stage	.1 Mfd. Condenser in Series with Generator Lead	No Antenna Connection Set Tuning Condensers at 1550 K. C.	7
6	1400 K. C.	Note 4	Note 4	Set Tuning Condensers at 1400 K. C.	6 - 5

Adjust for maximum reading on the output meter.

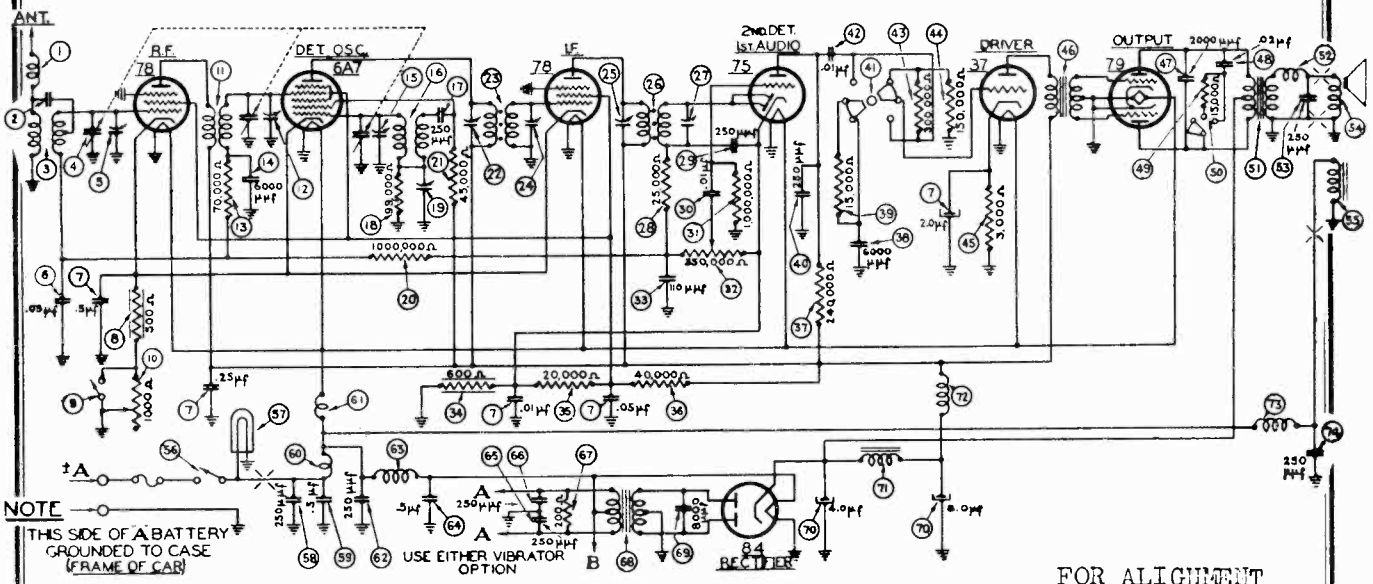
NOTE 1—Turn the condenser rotor plates completely out of mesh. Use a piece of bond letterhead paper as a gauge between the heel of the rotor plates and the stator plates and turn the condenser plates in mesh until they strike against the paper.

NOTE 2—Rock the tuning condenser while adjusting the low frequency padder. Tune the condenser to the signal and adjust the padder for maximum output. Rotate the tuning condenser back and forth slightly for maximum output. Then re-adjust the padder for maximum output. Repeat this procedure until no further improvement is noticed.

NOTE 4—For the F1440 use the Ford Antenna transformer and lead assembly, connected in series to the signal generator with a 15 mmfd. condenser. For the F1442 use the standard antenna lead Part No. 41-3191 connected directly to the Antenna terminal of the signal generator.

MODEL P-1426 Packard
Schematic, Chassis
Changes, Parts

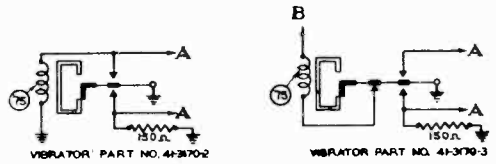
PHILCO RADIO & TELEV. CORP.



FOR ALIGNMENT SEE INDEX

I.F. = 260 KC.

FOR ALIGNMENT SEE INDEX



PARTS LIST

No.	Description	Part No.
(1)	Antenna Choke	38-8074
(2)	Condenser (80 mmfd.)	30-1066
(3)	Antenna Transformer	32-2230
(4)	Tuning Condenser	31-1913
(5)	First Padder (on Tun. Cond.)	
(6)	Condenser (.05 mfd.)	30-4444
(7)	Condenser (.01-.05-.25-.5-2 mfd.)	30-4493
(8)	Resistor (500 ohms)	33-1218
(9)	Sensitivity Control Switch	42-1225
(10)	Sensitivity Control	33-5129
(11)	R. F. Transformer	32-2231
(12)	Second Padder (on Tun. Cond.)	
(13)	Resistor (70,000 ohms)	33-370344
(14)	Condenser (6000 mmfd.)	30-4445
(15)	Third Padder (on Tun. Cond.)	
(16)	Oscillator Transformer	32-2232
(17)	Condenser (250 mmfd.)	30-1032
(18)	Resistor (99,000 ohms)	33-399344
(19)	Low Frequency Padder	31-6056
(20)	Resistor (1,000,000 ohms)	33-510344
(21)	Resistor (45,000 ohms)	33-345344
(22)	Padder (Pri. 1st I.F. Trans.)	
(23)	First I. F. Transformer	32-2286
(24)	Padder (Sec. 1st I.F. Trans.)	
(25)	Padder (Pri. 2nd I.F. Trans.)	
(26)	Second I. F. Transformer	32-2167
(27)	Padder (Sec. 2nd I.F. Trans.)	
(28)	Resistor (25,000 ohms)	33-325344
(29)	Condenser (250 mmfd.)	30-1032
(30)	Condenser (.01 mfd.)	30-4479
(31)	Resistor (1,000,000 ohms)	33-510344
(32)	Volume Control (350,000 ohms)	38-8596
(33)	Condenser (110 mmfd.)	30-1031
(34)	Resistor (600 ohms)	33-1212
(35)	Resistor (20,000 ohms)	33-320344
(36)	Resistor (40,000 ohms)	33-340344
(37)	Resistor (240,000 ohms)	33-424344
(38)	Condenser (6000 mmfd.)	30-4445
(39)	Resistor (15,000 ohms)	33-315344
(40)	Condenser (250 mmfd.)	30-1032
(41)	Bass Compensation Switch	42-1316
(42)	Condenser (.01 mfd.)	30-4145
(43)	Resistor (300,000 ohms)	33-430344
(44)	Resistor (150,000 ohms)	33-415344
(45)	Resistor (3000 ohms)	33-230344
(46)	Input Transformer	32-7779
(47)	Condenser (2000 mmfd.)	30-4177
(48)	Condenser (.02 mfd.)	30-4419
(49)	Resistor (15,000 ohms)	33-315344
(50)	Tone Control Switch	42-1315
(51)	Output Transformer	32-7778
(52)	Choke	32-2269
(53)	Condenser (250 mmfd.)	30-1032
(54)	Cone & Voice Coil	36-3159
(55)	Field Coil Assembly	36-3513
	Speaker Assembly (A-41)	36-1260
(56)	On & Off Switch	42-5615
(57)	Pilot Lamp	34-2040
(58)	Condenser (250 mmfd.)	30-1032
(59)	Condenser (.5 mfd.)	30-4474
(60)	"A" Choke	32-1374
(61)	Filament Choke	32-1561
(62)	Condenser (250 mmfd.)	30-1032
(63)	Vibrator Choke	32-2249
(64)	Condenser (.5 mfd.)	30-4474
(65)	Condenser (250 mmfd.)	30-1032
(66)	Condenser (250 mmfd.)	30-1032
(67)	Resistor (200 ohms)	33-120344
(68)	Power Transformer	32-7720
(69)	Condenser (8000 mmfd.)	30-4420
(70)	Filter Condenser (4-8 mfd.)	30-2167
(71)	Filter Choke	32-7811
(72)	"B" Choke	32-1281
(73)	Choke	32-2268
(74)	Condenser (250 mmfd.)	30-1032
(75)	Vibrator (OPTIONAL)	41-3170-2
		41-3170-3
	Four Prong Socket	27-6044
	Five Prong Socket	27-6035
	Six Prong Socket	27-6036
	Seven Prong Socket	27-6037
	Speaker Socket	27-6030
	Receiver Housing	38-1830
	Inductive Suppressor	32-2250
	Interference Condenser (gen)	30-4475
	Interference Condenser (Dome Light)	30-4476
	Interference Condenser	30-4477
	Fuse	7227
	Fuse Insulator	27-7729
	Stud	28-6231
	Nut	W 55
	Washer	4486
	Washer	6691
	Dial	27-5247
	Tuning Shaft	28-8656
	Volume Shaft	28-8657
	Pilot Lamp Assembly	38-6750
	Switch & Lead Assembly	41-3217

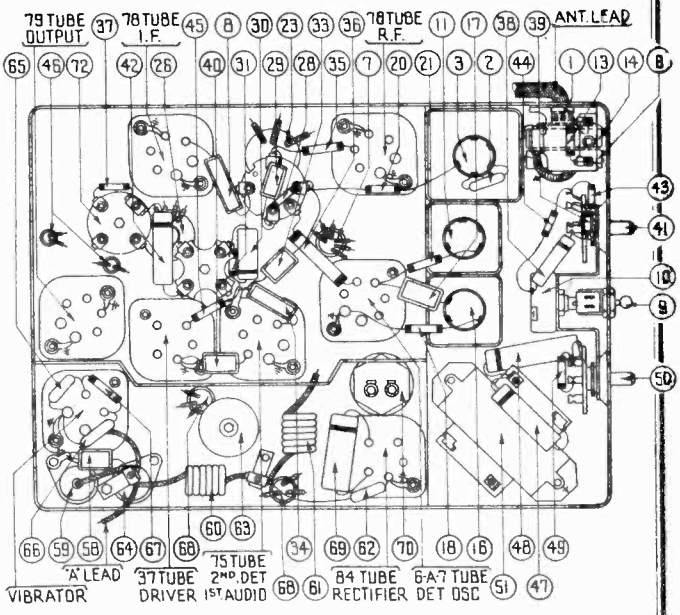


FIGURE 138

CHANGES — "Run Numbers" are stamped on the chassis sub-base for identification. These "Run Numbers" are changed consecutively as major changes are made in the Receiver wiring and parts.

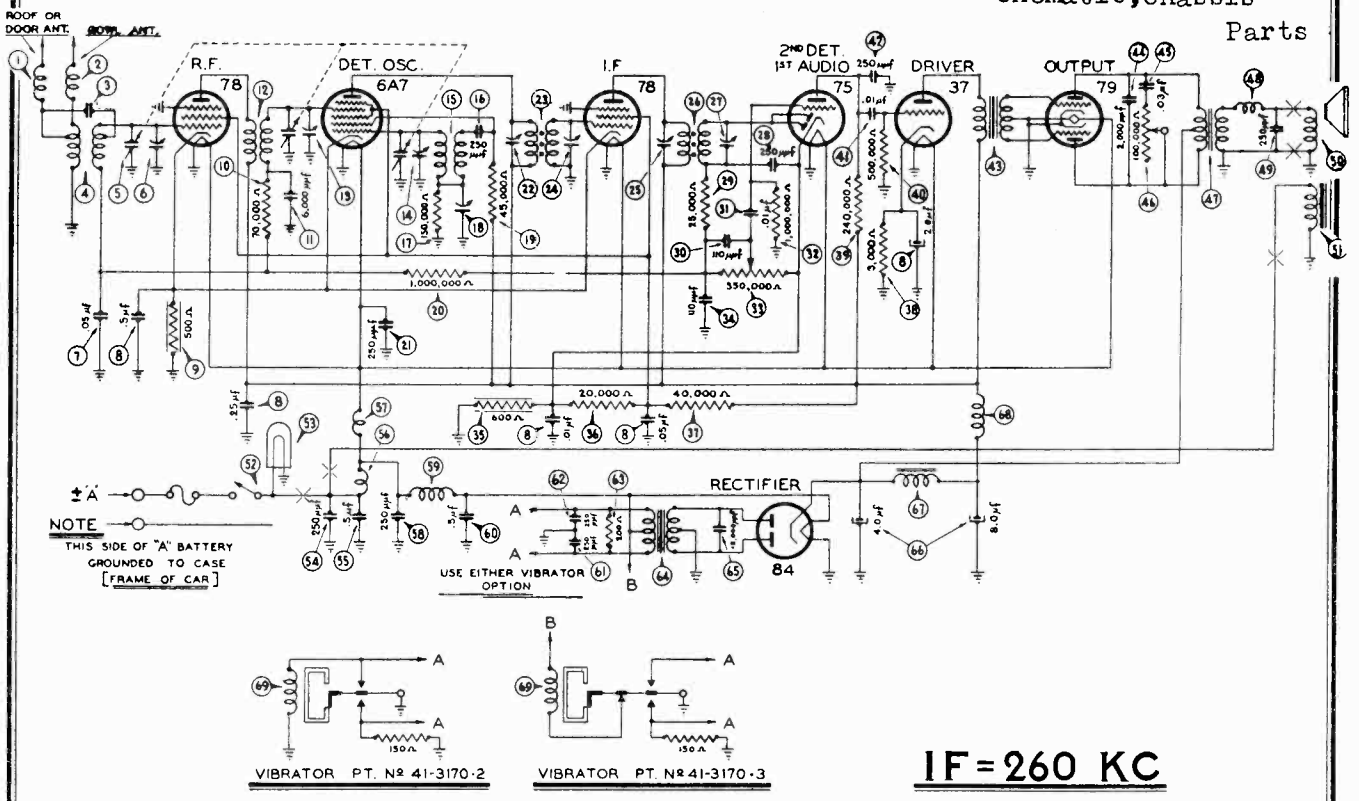
RUN No 2 — Condenser (2) removed (110 mmfd.) — Part No. 30-1066 added (80 mmfd.)

The Model P-1426 is a Special Custom-Built Receiver used exclusively by the Packard Motor Company in the 1937 Packard cars.

MODELS L-1427, L-1429
L-1460 Lincoln

PHILCO RADIO & TELEV. CORP.

Schematic, Chassis Parts



IF = 260 KC

PARTS LIST

No.	Description	Part No.
(1)	Antenna Choke	38-8106
(2)	Antenna Choke	38-8106
(3)	Condenser (50 mmfd.)	30-1029
(4)	Antenna Transformer	32-2517
(5)	Tuning Condenser	31-1984
(6)	First Padder (on Tun. Cond.)	
(7)	Condenser (.05 mfd.) (.01-.05-.25-.5-2 mfd.)	30-4444
(8)	Condenser (.01-.05-.25-.5-2 mfd.)	30-4493
(9)	Resistor (500 ohms)	33-1213
(10)	Resistor (70,000 ohms)	33-370344
(11)	Condenser (6000 mmfd.)	30-4445
(12)	R. F. Transformer	32-2231
(13)	Second Padder (on Tun. Cond.)	
(14)	Third Padder (on Tun. Cond.)	
(15)	Oscillator Transformer	32-2232
(16)	Condenser (250 mmfd.)	30-1032
(17)	Resistor (150,000 ohms)	33-415344
(18)	Low Frequency Padder	31-6056
(19)	Resistor (45,000 ohms)	33-345344
(20)	Resistor (1,000,000 ohms)	33-510344
(21)	Condenser (250 mmfd.)	30-1032
(22)	Padder (Pri. 1st I.F. Trans.)	
(23)	First I. F. Transformer	32-2286
(24)	Padder (Sec. 1st I.F. Trans.)	
(25)	Padder (Pri. 2nd I.F. Trans.)	
(26)	Second I. F. Transformer	32-2167
(27)	Padder (Sec. 2nd I.F. Trans.)	
(28)	Condenser (250 mmfd.)	30-1032
(29)	Resistor (25,000 ohms)	33-325344
(30)	Condenser (110 mmfd.)	30-1031
(31)	Condenser (.01 mfd.)	30-4479
(32)	Resistor (1,000,000 ohms)	33-510344
(33)	Volume Control (350,000 ohms)	33-5202
(34)	Condenser (110 mmfd.)	30-1031
(35)	Resistor (600 ohms)	33-1212
(36)	Resistor (20,000 ohms)	33-320344
(37)	Resistor (40,000 ohms)	33-340444
(38)	Resistor (3000 ohms)	33-230344
(39)	Resistor (240,000 ohms)	33-424344
(40)	Resistor (500,000 ohms)	33-449344
(41)	Condenser (.01 mfd.)	30-4145
(42)	Condenser (250 mmfd.)	30-1032
(43)	Input Transformer	32-7779
(44)	Condenser (2000 mmfd.)	30-4177
(45)	Condenser (.03 mfd.)	30-4447
(46)	Tone Control (100,000 ohms)	33-5141
(47)	Output Transformer (L-1427)	32-7778
(47)	Output Transformer (L-1429)	32-7788
(48)	Choke	32-1432
(49)	Condenser (250 mmfd.)	30-1032
(50)	Cone & Voice Coil	36-3159
(51)	Field Coil Assembly	36-3513
	Speaker Assembly (A-44)	36-1326
(52)	On & Off Switch	42-5617
(53)	Pilot Lamp	34-2040
(54)	Condenser (250 mmfd.)	30-1032
(55)	Condenser (.5 mfd.)	30-4474
(56)	"A" Choke	32-1374
(57)	Filament Choke	32-1604
(58)	Condenser (250 mmfd.)	30-1032
(59)	Vibrator Choke	32-2537
(60)	Condenser (.5 mfd.)	30-4474
(61)	Condenser (250 mmfd.)	30-1032
(62)	Condenser (250 mmfd.)	30-1032
(63)	Resistor (200 ohms)	33-120344
(64)	Power Transformer	32-7720
(65)	Condenser (8000 mmfd.)	30-4420
(66)	Filter Condenser (4-8 mfd.)	30-2167
(67)	Filter Choke	32-7722
(68)	"B" Choke	32-1281
(69)	Vibrator (OPTIONAL)	41-3170-2 41-3170-3
	Four Prong Socket	27-6044
	Five Prong Socket	27-6035
	Six Prong Socket	27-6036
	Seven Prong Socket	27-6037
	Fuse	7227
	Fuse Insulator	27-7729
	Water Gauge Condenser	30-4007
	Generator Condenser	30-4181
	Oil Gauge Condenser	30-4307
	Gas Gauge Condenser	30-4663
	Distributor Condenser	30-4404
	Plate (Rec. Mtg.)	28-3734
	Screw (Rec. Mtg.)	W-1614
	Speaker Cable	41-3260
	Adapter Plate	42-5691
	Wrench	28-4380
	Tuning Shaft	28-8704
	Volume Shaft	28-8700
	Tone Control Shaft	28-8701
	Scale Assembly	42-5666
	Pilot Lamp Assembly	38-7734
	Tuning & Volume Knob	27-4426
	Tone Control Knob	27-4427
	Receiver Housing	38-8565

FOR ALIGNMENT
SEE INDEX

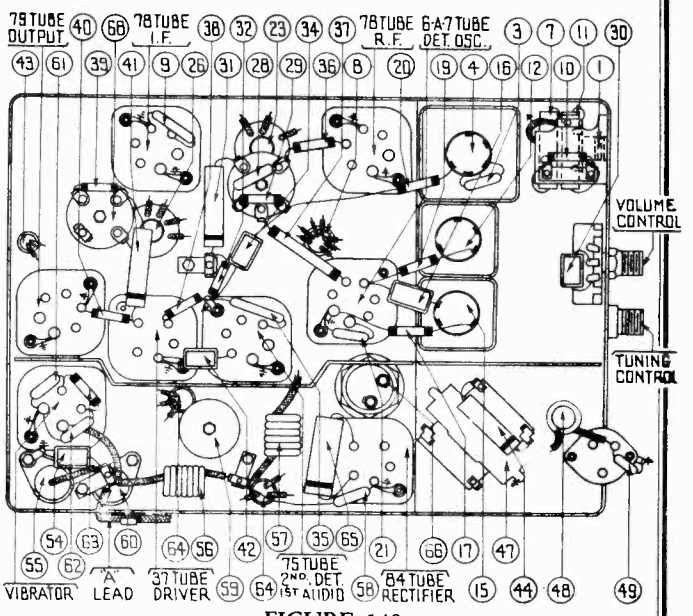


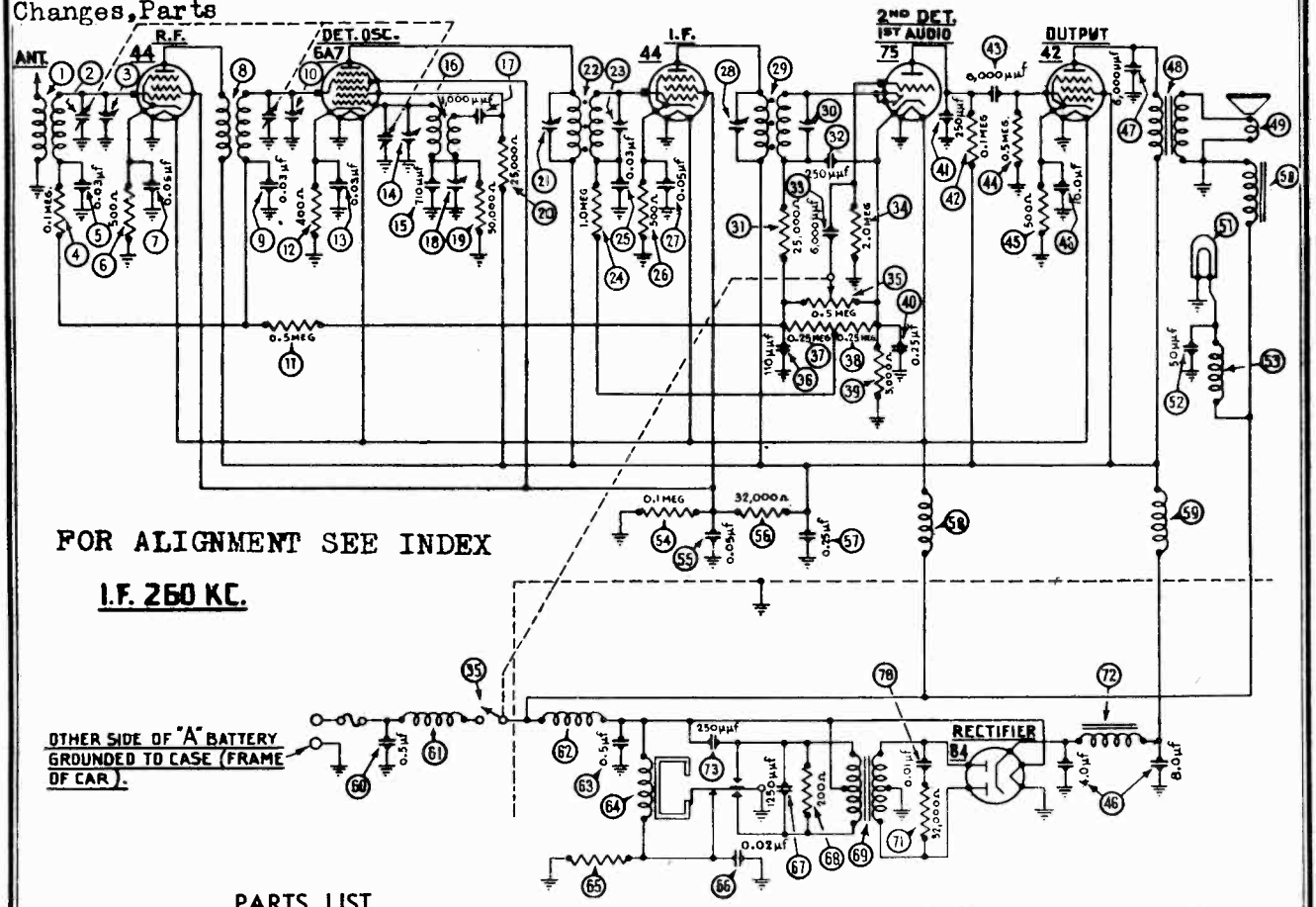
FIGURE 140

The circuit for the Model L-1429 is the same as for the L-1427.

The Models L-1427 and L-1429 are Special Custom-Built Receivers used exclusively by the Lincoln Motor Company in their 1937 cars.

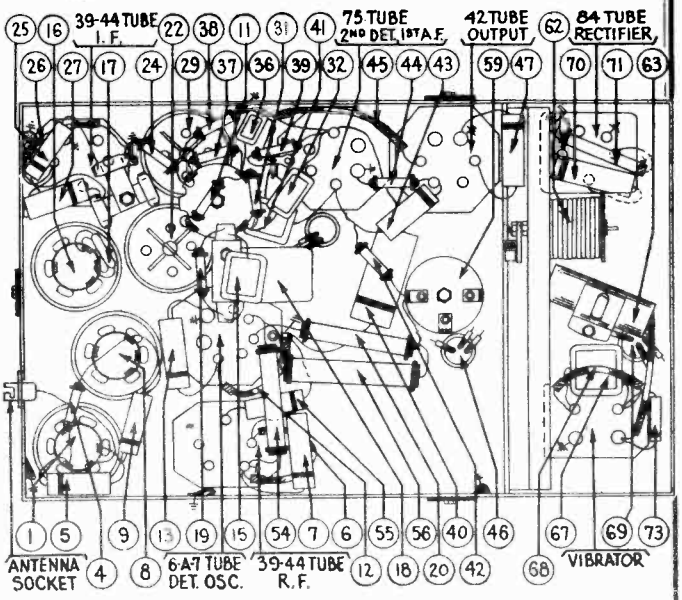
MODELS DP, DPV Police
Schematic, Chassis
Changes, Parts

PHILCO RADIO & TELEV. CORP.



PARTS LIST

No.	Description	Part No.	No.	Description	Part No.
①	Antenna Transformer	32-1445	㊵	Condenser (.25 mfd.)	30-4146
②	Tuning Condenser	31-1321	㊶	Condenser (250 mmfd.)	5858
③	First Padder (on Tun. Cond.)		㊷	Resistor (100,000 ohms)	6099
④	Resistor (100,000 ohms)	6099	㊸	Condenser (6,000 mmfd.)	30-4125
⑤	Condenser (.03 mfd.)	30-4025	㊹	Resistor (500,000 ohms)	6097
⑥	Resistor (500 ohms)	33-3031	㊺	Resistor (500 ohms)	33-3031
⑦	Condenser (.05 mfd.)	30-4020	㊻	Condenser (4-8-10 mfd.)	30-2072
⑧	R. F. Transformer	32-1446	㊼	Condenser (6,000 mmfd.)	30-4024
⑨	Condenser (.03 mfd.)	30-4025	㊽	Output Transformer	32-7214
⑩	Second Padder (on Tun. Cond.)		㊾	Cone & Voice Coil	02861
⑪	Resistor (500,000 ohms)	6097	㊿	Field Coil Assembly	36-3097
⑫	Resistor (400 ohms)	33-3016	(51)	Pilot Lamp	34-2031
⑬	Condenser (.03 mfd.)	30-4025	(52)	Condenser (50 mmfd.)	30-1029
⑭	Third Padder (on Tun. Cond.)		(53)	Choke	32-1438
⑮	Condenser (710 mmfd.)	5863	(54)	Resistor (100,000 ohms)	4411
⑯	Oscillator Transformer	32-1447	(55)	Condenser (.05 mfd.)	30-4020
⑰	Condenser (1,000 mmfd.)	30-1007	(56)	Resistor (32,000 ohms)	33-1026
⑱	Padder	04000R	(57)	Condenser (.25 mfd.)	04360
⑲	Resistor (50,000 ohms)	6098	(58)	Choke	32-1402
⑳	Resistor (25,000 ohms)	3656	(59)	R. F. Choke	32-1281
(21)	Padder (Pri. 1st. I. F. Trans.)		(60)	Condenser (.5 mfd.)	30-4147
(22)	First I. F. Transformer	32-1448	(61)	"A" Choke	32-1374
(23)	Padder (Sec. 1st I. F. Trans.)		(62)	Vibrator Choke	32-1282
(24)	Resistor (1,000,000 ohms)	33-1096	(63)	Condenser (.5 mfd.)	30-4015
(25)	Condenser (.03 mfd.)	30-4025	(64)	Vibrator	41-3186
(26)	Resistor (500 ohms)	33-3031	(65)	Resistor (300 ohms)	33-3010
(27)	Condenser (.05 mfd.)	30-4020	(66)	Condenser (.02 mfd.)	30-4039
(28)	Padder (Pri. 2nd I. F. Trans.)		(67)	Condenser (1,250 mmfd.)	5886
(29)	Second I. F. Transformer	32-1449	(68)	Resistor (200 ohms)	7217
(30)	Padder (Sec. 2nd I. F. Trans.)		(69)	Power Transformer	32-7216
(31)	Resistor (25,000 ohms)	33-1013	(70)	Condenser (.01 mfd.)	30-4051
(32)	Condenser (250 mmfd.)	5858	(71)	Resistor (32,000 ohms)	7836
(33)	Condenser (6,000 mmfd.)	30-4125	(72)	"B" Filter Choke	32-7215
(34)	Resistor (2,000,000 ohms)	33-1025	(73)	Condenser (250 mmfd.)	5858
(35)	Vol. Con. & Switch Assm.	38-5534		Glass (variable frequency)	27-7325
(36)	Condenser (110 mmfd.)	30-1031		Flexible Shafts	28-8206
(37)	Resistor (250,000 ohms)	33-1097		Knobs	27-4058
(38)	Resistor (250,000 ohms)	33-1097		Glass (red) fixed frequency	27-7710
(39)	Resistor (5,000 ohms)	6096		Pointer	28-1957



CHANGES — "Run numbers" are stamped on the chassis sub-base for identification. These "Run numbers" are changed consecutively as major changes are made in the Receiver wiring and parts.

RUN No. 2 — Condenser ㊼ removed (6000 mmfd.) — Part No. 30-4145 added (.01 mfd.)
Condenser ㊵ removed (.5 mfd.) — Part No. 30-4306 added (.5 mfd.)

ADJUSTMENT — The correct padding procedure for the Models DP and DPV is given

PHILCO RADIO & TELEV. CORP.

MODELS DP, DPV
MODELS P1430, S1431, P1432
N1433, N1434, G1436
S1437
Socket, Trimmers, Alignment

MODELS DP and DPV POLICE RADIO

OPERATION	SIGNAL GENERATOR FREQUENCY	SIGNAL GENERATOR CONNECTION	DUMMY CAPACITY	SPECIAL INSTRUCTIONS	ADJUST PADDER
1	260 K. C.	To Grid of Detector Oscillator Tube	.1 Mfd. Condenser in Series with Generator Lead	Note 3	1 - 2 3 - 4
2	3500 K. C.	Note 4	150 Mmfd. Condenser Note 4	Note 1	7 - 6 - 5
3	1600 K. C.	Note 4	150 Mmfd. Condenser Note 4	Set Tuning Condenser at 1.6 K. C.	8 Note 2

Adjust for maximum reading on the output meter.

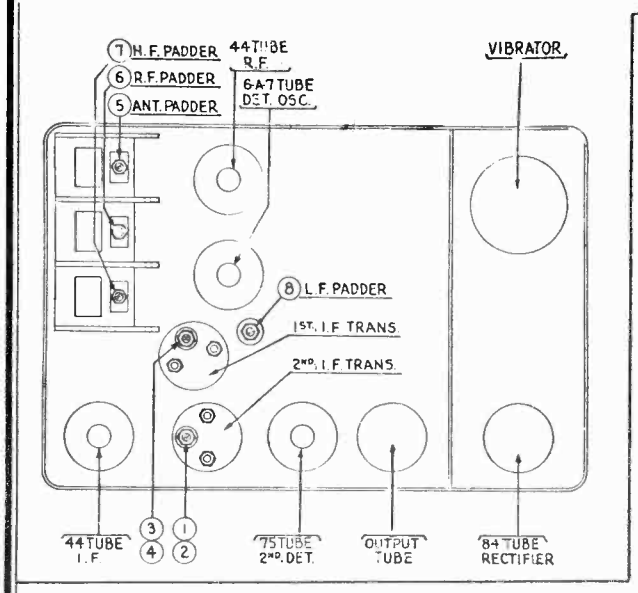
NOTE—When using the Model DPV as a fixed frequency Receiver, use the procedure given above first and then lock the tuning condenser at the desired frequency. If possible, the R.F. and Antenna padders should be adjusted while using the signal from the police transmitter.

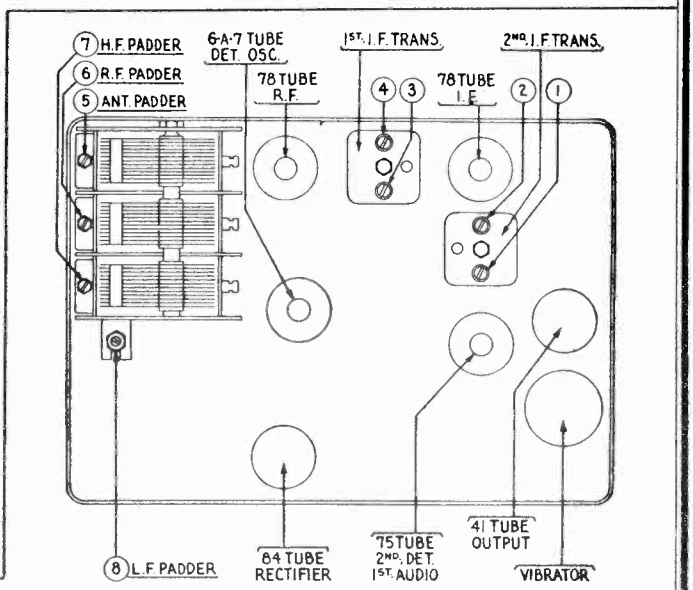
NOTE 1—Turn the condenser rotor plates completely out of mesh. Use a piece of bond letterhead paper as a gauge between the heel of the rotor plates and the stator plates and turn the condenser plates in mesh until they strike against the paper.

NOTE 2—Rock the tuning condenser while adjusting the low frequency padder. Tune the condenser to the signal and adjust the padder for maximum output. Rotate the tuning condenser back and forth slightly for maximum output. Then re-adjust the padder for maximum output. Repeat this procedure until no further improvement is noticed.

NOTE 3—Turn the adjusting screw all the way in, then adjust the nut for maximum reading on the output meter. Next adjust the screw for maximum reading on the output meter. This adjustment is critical. Note the maximum reading obtained, turn the screw in again, and readjust, bringing the adjustment up to the maximum reading. Do not pass it and back off.

NOTE 4—Connect the antenna lead, Part No. 41-3191, to the antenna receptacle on the Receiver in series with a 150 mmfd. condenser





MODELS P1430, S1431, P1432, N1433, N1434, G1436, AND S1437

OPERATION	SIGNAL GENERATOR FREQUENCY	SIGNAL GENERATOR CONNECTION	DUMMY CAPACITY	SPECIAL INSTRUCTIONS	ADJUST PADDER
1	260 K. C.	To Grid of 78 Tube—I.F. Stage	.1 Mfd. Condenser in Series with Generator Lead	No Antenna Connection	1 - 2
2	260 K. C.	To Grid of 6A7 Tube	.1 Mfd. Condenser in Series with Generator Lead	No Antenna Connection	3 - 4 1 - 2
3	1500 K. C.	To Grid of 78 Tube—R.F. Stage	.1 Mfd. Condenser in Series with Generator Lead	No Antenna Connection Note 1	7 - 6
4	580 K. C.	To Grid of 78 Tube—R.F. Stage	.1 Mfd. Condenser in Series with Generator Lead	No Antenna Connection Set Tuning Condensers at 580 K. C.	8 Note 2
5	1550 K. C.	To Grid of 78 Tube—R.F. Stage	.1 Mfd. Condenser in Series with Generator Lead	No Antenna Connection Set Tuning Condensers at 1550 K. C.	7
6	1400 K. C.	Note 4	Note 4	Set Tuning Condensers at 1400 K. C.	6 - 5

Adjust for maximum reading on the output meter.

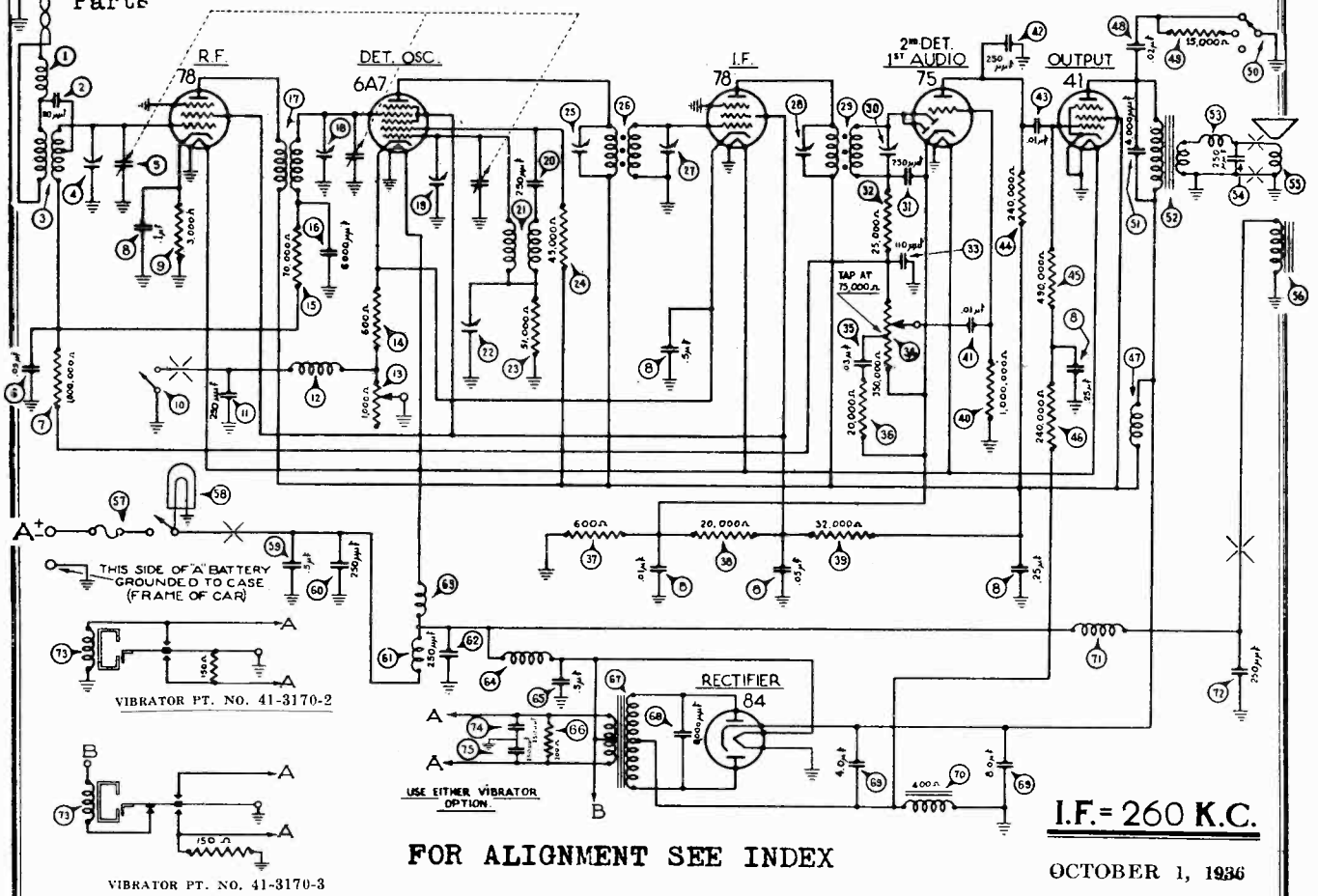
NOTE 1—Turn the condenser rotor plates completely out of mesh. Use a piece of bond letterhead paper as a gauge between the heel of the rotor plates and the stator plates and turn the condenser plates in mesh until they strike against the paper.

NOTE 2—Rock the tuning condenser while adjusting the low frequency padder. Tune the condenser to the signal and adjust the padder for maximum output. Rotate the tuning condenser back and forth slightly for maximum output. Then re-adjust the padder for maximum output. Repeat this procedure until no further improvement is noticed.

NOTE 4—Connect the Antenna lead Part No. 41-3191 to the Antenna receptacle on the Receiver in series with the correct dummy capacity. For the P1430 and P1432 use a 230 mmfd. condenser, for the S1431 use a 25 mmfd. condenser (connect lead to the Roof Antenna connector), for the N1433 use a 50 mmfd. condenser (connect lead to the Roof Antenna connector), for the N1434 and S1437 use the standard antenna lead connected directly to the output terminal on the signal generator, for the G1436 use a 1690 mmfd. condenser.

MODEL P-1430 Packard
Schematic, Chassis Parts

PHILCO RADIO & TELEV. CORP.



FOR ALIGNMENT SEE INDEX

OCTOBER 1, 1936

MODEL P-1430 PARTS LIST

No.	Description	Part No.
1	Antenna Choke	32-1372
2	Condenser (110 mmfd.)	30-1031
3	Antenna Transformer	32-2230
4	First Padder (on tun. cond.)	
*5	Tuning Condenser	31-1912
6	Condenser (.05 mfd.)	30-4444
7	Resistor (1,000,000 ohms)	33-510344
8	Condenser (.01-.05-.1-.25-.25-.5 mfd.)	30-4478
9	Resistor (3,000 ohms)	33-230344
10	Sensitivity Switch	42-5603
11	Condenser (250 mmfd.)	30-1032
12	Choke	32-2063
13	Sensitivity Control	33-5129
14	Resistor (600 ohms)	33-1212
15	Resistor (70,000 ohms)	33-370344
16	Condenser (6,000 mmfd.)	30-4445
17	R. F. Transformer	32-2231
18	Second Padder (on tun. cond.)	
19	Third Padder (on tun. cond.)	
20	Condenser (250 mmfd.)	30-1032
21	Oscillator Transformer	32-2232
*22	Low Frequency Padder	31-6056
23	Resistor (51,000 ohms)	33-351344
24	Resistor (45,000 ohms)	33-345344
25	Padder (Pri. 1st I. F. Trans.)	
26	First I. F. Transformer	32-2286
27	Padder (Sec. 1st I. F. Trans.)	
28	Padder (Pri. 2nd I. F. Trans.)	
29	Second I. F. Transformer	32-2167
30	Padder (Sec. 2nd I. F. Trans.)	
31	Condenser (250 mmfd.)	30-1032
32	Resistor (25,000 ohms)	33-325344
33	Condenser (110 mmfd.)	30-1031
34	Volume Control (350,000 ohms)	33-5121
35	Condenser (.03 mfd.)	30-4449
36	Resistor (20,000 ohms)	33-320344
37	Resistor (600 ohms)	33-1212
38	Resistor (20,000 ohms)	33-320344
39	Resistor (32,000 ohms)	33-332444
40	Resistor (1,000,000 ohms)	33-510344
41	Condenser (.01 mfd.)	30-4479
42	Condenser (250 mmfd.)	30-1032
43	Condenser (.01 mfd.)	30-4145
44	Resistor (240,000 ohms)	33-424344
45	Resistor (490,000 ohms)	33-449344
46	Resistor (240,000 ohms)	33-424344
47	"B" Choke	32-1281
48	Condenser (.02 mfd.)	30-4419
49	Resistor (15,000 ohms)	33-315344
*50	Tone Control Switch	42-1139
51	Condenser (4000 mmfd.)	30-4185
52	Output Transformer	32-7721
53	Choke	32-1374
54	Condenser (250 mmfd.)	30-1032
55	Cone & Voice Coil	36-3159
56	Field Coil Assembly	36-3513
*57	On & Off Switch	42-5606
58	Pilot Lamp	34-2039
59	Condenser (.5 mfd.)	30-4474
60	Condenser (250 mmfd.)	30-1032
61	"A" Choke	32-1374
62	Condenser (250 mmfd.)	30-1032
63	Filament Choke	32-1561
64	Vibrator Choke	32-2249
65	Condenser (.5 mfd.)	30-4474
66	Resistor (200 ohms)	33-120344
67	Power Transformer	32-7720
68	Condenser (8000 mmfd.)	30-4420
69	Filter Condenser (4-8 mfd.)	30-2168
70	Filter Choke	32-7722
71	Choke	32-2269
72	Condenser (250 mmfd.)	30-1032
		41-3170-2
73	Vibrator (Optional)	41-3170-3
74	Condenser (250 mmfd.)	30-1032
75	Condenser (250 mmfd.)	30-1032
	Four Prong Socket	27-6044
	Five Prong Socket	27-6035
	Six Prong Socket	27-6036
	Seven Prong Socket	27-6037
	Tuning & Volume Shaft	28-8662
	Sensitivity Shaft	28-6502
	Scale Assembly	42-5596
	Sensitivity Switch Knob	28-7203
	Tuning & Volume Knob	27-4313
	Knob Base	28-4184

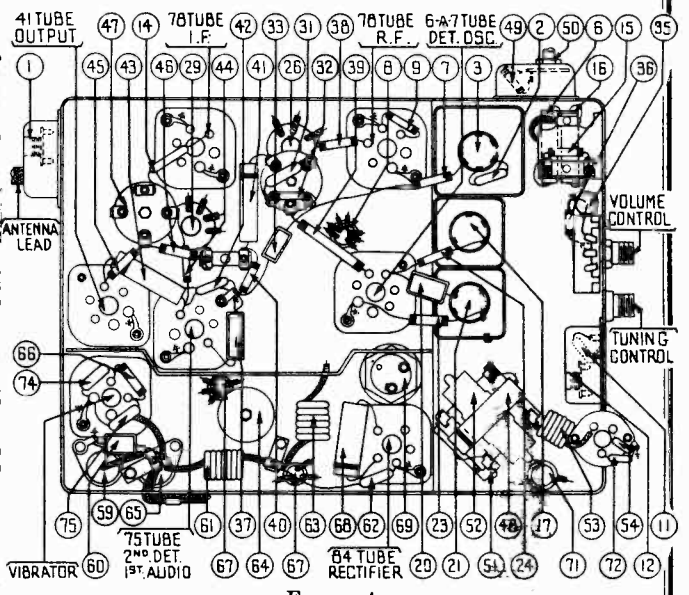


FIGURE 4

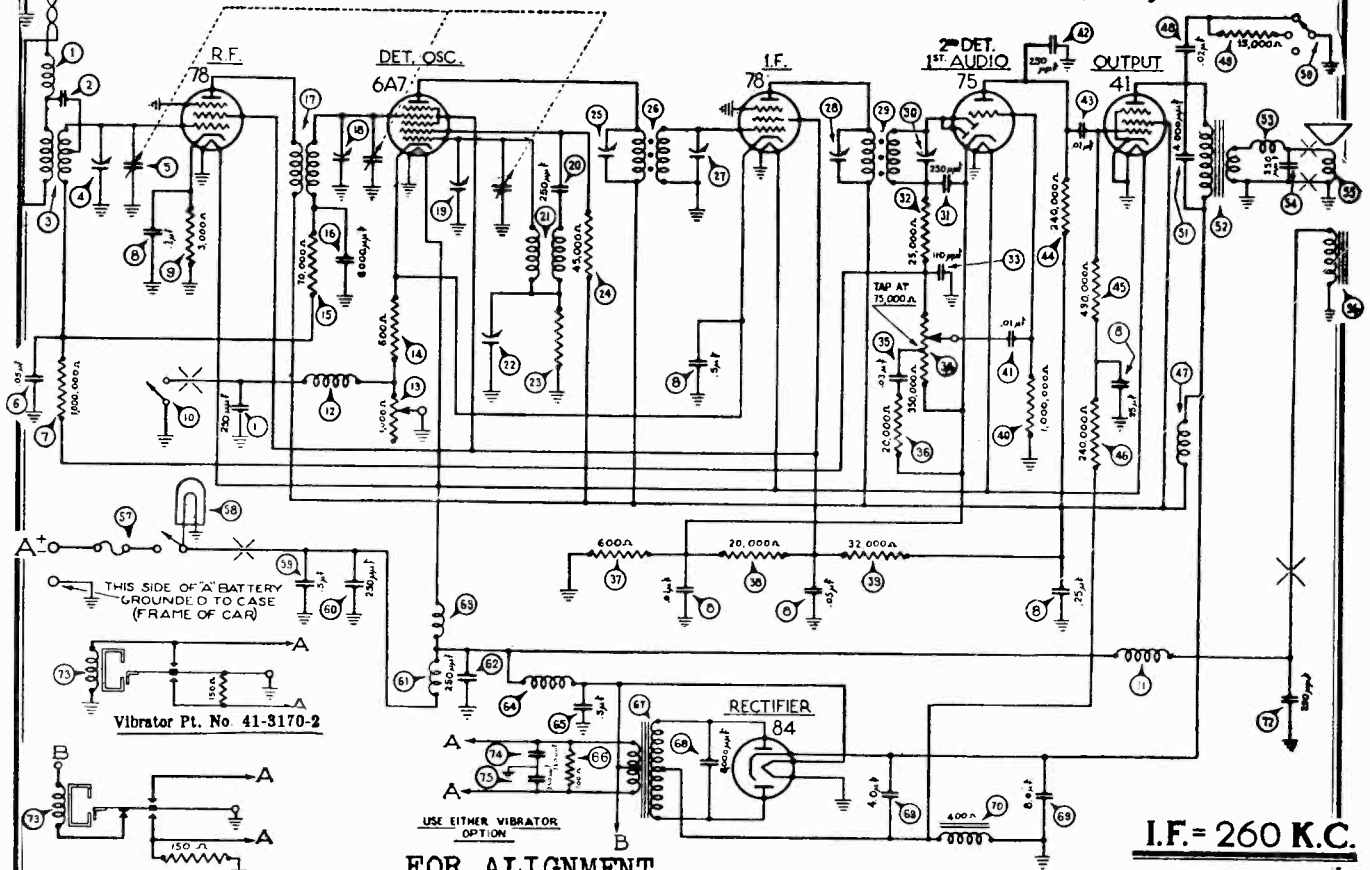
Description	Part No.
Distributor Resistor	4851
Interference Condenser	4522
Interference Condenser	30-4007
Fuse	7227
Fuse Insulator	27-7729
Tee Bolt (Rec. mtg.)	28-6268
Nut (Rec. mtg.)	W-518A
Stud (Speaker mtg.)	28-6088
Nut (Speaker mtg.)	W-55A
Ground Strap	38-6606
Antenna Loom	38-8030
Ground Clamp	41-3194
Receiver Housing	38-1707

The items marked with an asterisk are rarely required for service and in many cases will not be carried in stock by the local service station. In such cases it will be necessary to order these parts from Philco Transitone, Philadelphia or Chicago.

ANT. Changes, Parts

MODEL P-1432H Packard

PHILCO RADIO & TELEV. CORP. Schematic, Chassis



FOR ALIGNMENT SEE INDEX

PARTS LIST

No.	Description	Part No.
①	Antenna Choke	32-2063
②	Condenser (80 mmfd.)	30-1066
③	Antenna Transformer	32-2236
④	First Padder (on tun. cond.)	
⑤	Tuning Condenser	31-1912
⑥	Condenser (.05 mfd.)	30-4444
⑦	Resistor (1,000,000 ohms)	33-510344
⑧	Condenser (.01 05-.1-.25-.25-.5 mfd.)	30-4478
⑨	Resistor (3,000 ohms)	33-230344
⑩	Sensitivity Switch	42-5603
⑪	Condenser (250 mmfd.)	30-1032
⑫	Choke	32-2063
⑬	Sensitivity Control	33-5129
⑭	Resistor (600 ohms)	33-1212
⑮	Resistor (70,000 ohms)	33-370344
⑯	Condenser (6,000 mmfd.)	30-4445
⑰	R. F. Transformer	32-2231
⑱	Second Padder (on tun. cond.)	
⑲	Third Padder (on tun. cond.)	
⑳	Condenser (250 mmfd.)	30-1032
㉑	Oscillator Transformer	32-2232
㉒	Low Frequency Padder	31-6056
㉓	Resistor (99,000 ohms)	33-399344
㉔	Resistor (45,000 ohms)	33-345344
㉕	Padder (Pri. 1st I.F. Trans.)	
㉖	First I. F. Transformer	32-2286
㉗	Padder (Sec. 1st I. F. Trans.)	
㉘	Padder (Pri. 2nd I. F. Trans.)	
㉙	Second I. F. Transformer	32-2167
㉚	Padder (Sec. 2nd I. F. Trans.)	
㉛	Condenser (250 mmfd.)	30-1032
㉜	Resistor (25,000 ohms)	33-325344
㉝	Condenser (110 mmfd.)	30-1031
㉞	Volume Control (3,0,000 ohms)	33-5121
㉟	Condenser (.03 mfd.)	30-4449
㊱	Resistor (20,000 ohms)	33-320344
㊲	Resistor (600 ohms)	33-1212
㊳	Resistor (20,000 ohms)	33-320334
㊴	Resistor (32,000 ohms)	33-332444
㊵	Resistor (1,000,000 ohms)	33-510344
㊶	Condenser (.01 mfd.)	30-4479
㊷	Condenser (250 mmfd.)	30-1032
㊸	Condenser (.01 mfd.)	30-4145
㊹	Resistor (240,000 ohms)	33-424344
㊺	Resistor (490,000 ohms)	33 449344
㊻	Resistor (240,000 ohms)	33,424344
㊼	"B" Choke	32,1281
㊽	Condenser (.02 mfd.)	30-4495
㊾	Resistor (15,000 ohms)	33-315344
㊿	Tone Control Switch	42-1139
(51)	Condenser (4000 mmfd.)	30-4185
(52)	Output Transformer	32-7495
(53)	Choke	32-1374
(54)	Condenser (250 mmfd.)	30-1032
(55)	Cone and Voice Coil	36-3526
(56)	Field coil assembly	32-9236
(57)	On & Off Switch	42-5606
(58)	Pilot Lamp	34-2039
(59)	Condenser (.5 mfd.)	30-4474
(60)	Condenser (250 mmfd.)	30-1032
(61)	"A" Choke	32-1374
(62)	Condenser (250 mmfd.)	30-1032
(63)	Filament Choke	32-1438
(64)	Vibrator Choke	32-2537
(65)	Condenser (.5 mfd.)	30-4474
(66)	Resistor (200 ohms)	33-120344
(67)	Power Transformer	32-7720
(68)	Condenser (8000 mmfd.)	30-4420
(69)	Filter Condenser (4-8 mfd.)	30-2179
(70)	Filter Choke	32-7722
(71)	Choke	32-2269
(72)	Condenser (250 mmfd.)	30-1032
(73)	Vibrator (Optional)	41-3170-2
(74)	Condenser (250 mmfd)	30-1032
(75)	Condenser (250 mmfd.)	30-1032
	Tuning & Volume Shaft	28-8662
	Sensitivity Shaft	28-6502
	Scale Assembly	42-5596
	Sensitivity Switch Knob	28-7203
	Tuning & Volume Knob	27-4313
	Knob Base	28-4184
	Antenna Loom Assembly	38-8030
	Tee Bolt (Rec. mtg.)	28-6268
	Switch and Lead Assembly	41-3217
	Speaker Cable	41-3235

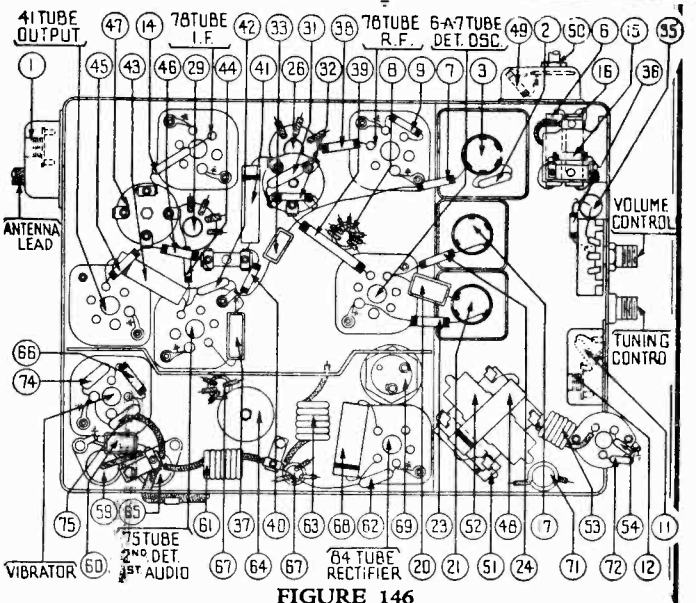


FIGURE 146

CHANGES — "Run Numbers" are stamped on the chassis sub-base for identification. These "Run Numbers" are changed consecutively as major changes are made in the Receiver wiring and parts.

RUN No. 2 — Condenser ㊶ removed (.01 mfd.) — Part No. 30-4479 added (.01 mfd.).

RUN No. 3 — Remove Choke (63). Add Choke 32-1438. One side is connected to the filament of the type 41 Tube Socket. The other side connected to Choke (61).

Connect a 250 mmfd. condenser Part No. 30-1032 across the filament of the type 6A7 Tube Socket.

Connect one side of a 250 mmfd. condenser Part No. 30-1032 between the 8 mfd. section of Condenser (68) and the "B" Choke (67) and the other side to ground.

RUN No. 5 — Resistor ㉓ removed (51,000 ohms) Part No. 33-399344 added (99,000 ohms).

RUN No. 6 — A 10,000 ohms resistor Part No. 33-310344 has been added to the Receiver. This is connected in series between the B+ side of Choke (67) and the 8 mfd. section of Condenser (68).

RUN No. 7 — Condnser ② removed (110 mmfd.) Part No. 30-1066 added (80 mmfd.).

No major change was involved in Run No. 4.

ADJUSTMENTS — The correct padding procedure for the Model P-1432H given

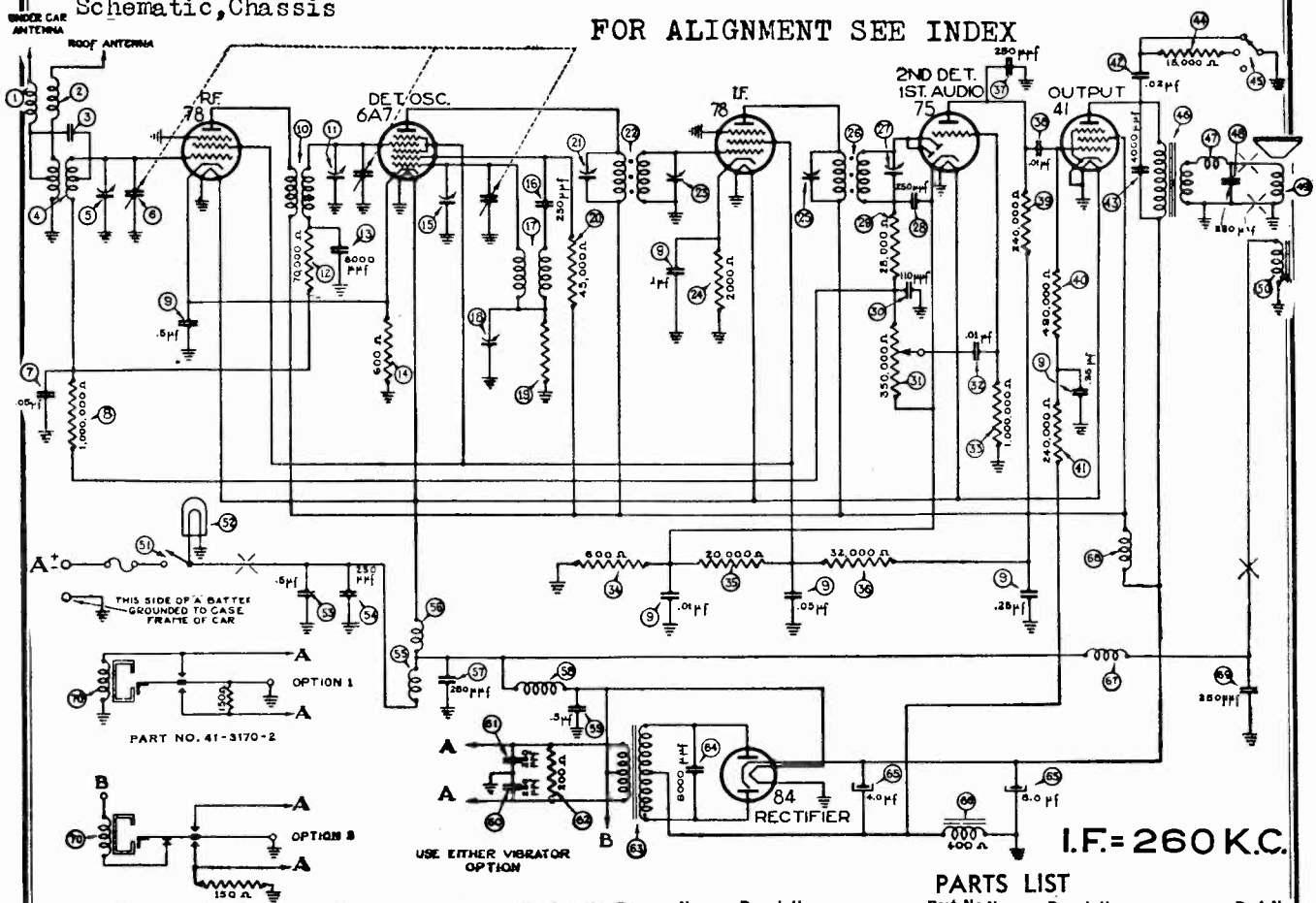
The Model P-1432H is a Special Custom-Built Receiver used exclusively by Packard Motor Car Company in 1937 Packard cars.

MODEL N-1433H Nash Schematic, Chassis

PHILCO RADIO & TELEV. CORP.

Changes, Parts

FOR ALIGNMENT SEE INDEX



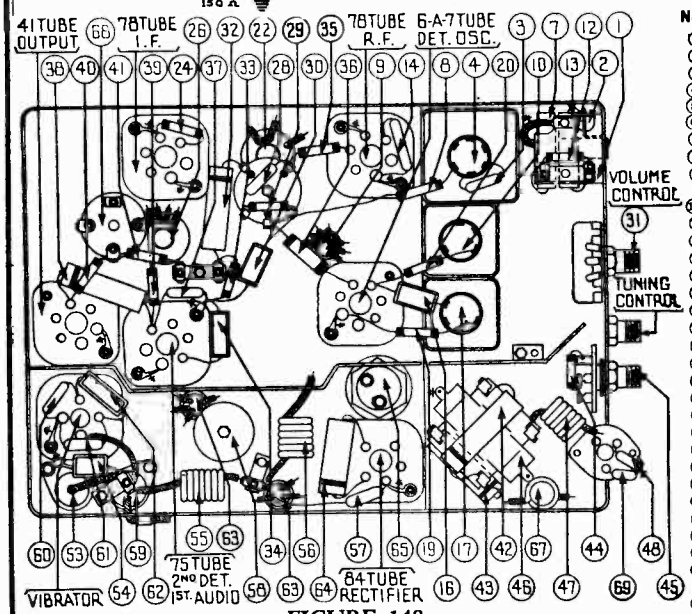


FIGURE 148

CHANGES — "Run Numbers" are stamped on the chassis sub-base for identification. These "Run Numbers" are changed consecutively as major changes are made in the Receiver wiring and parts.

RUN No. 2 — Remove Tone Control Switch (45). Add Part No. 42-1273.
RUN No. 3 — Remove Tone Control Switch (45). Add Part No. 42-1273.
RUN No. 4 — Choke (56) removed, Part No. 32-1438 added. One side is connected to the filament of the type 41 Tube, and the other side is connected to Choke (63).
Connect a 250 mmfd. condenser Part No. 30-1032 across the filament of the type 6A7 Tube Socket.
Connect one side of a 250 mmfd. Condenser Part No. 30-1032 between the 8 mfd. section of Condenser (63) and the "B" Choke (68) and the other side to ground.
RUN No. 5 — The Antenna Transformer (4) is replaced with a new type having the same part number. It can be identified by the orange paint mark on the fibre.
RUN No. 6 — Resistor (19) removed (51,000 ohms) Part No. 33-399344 added (99,000 ohms).

PARTS LIST

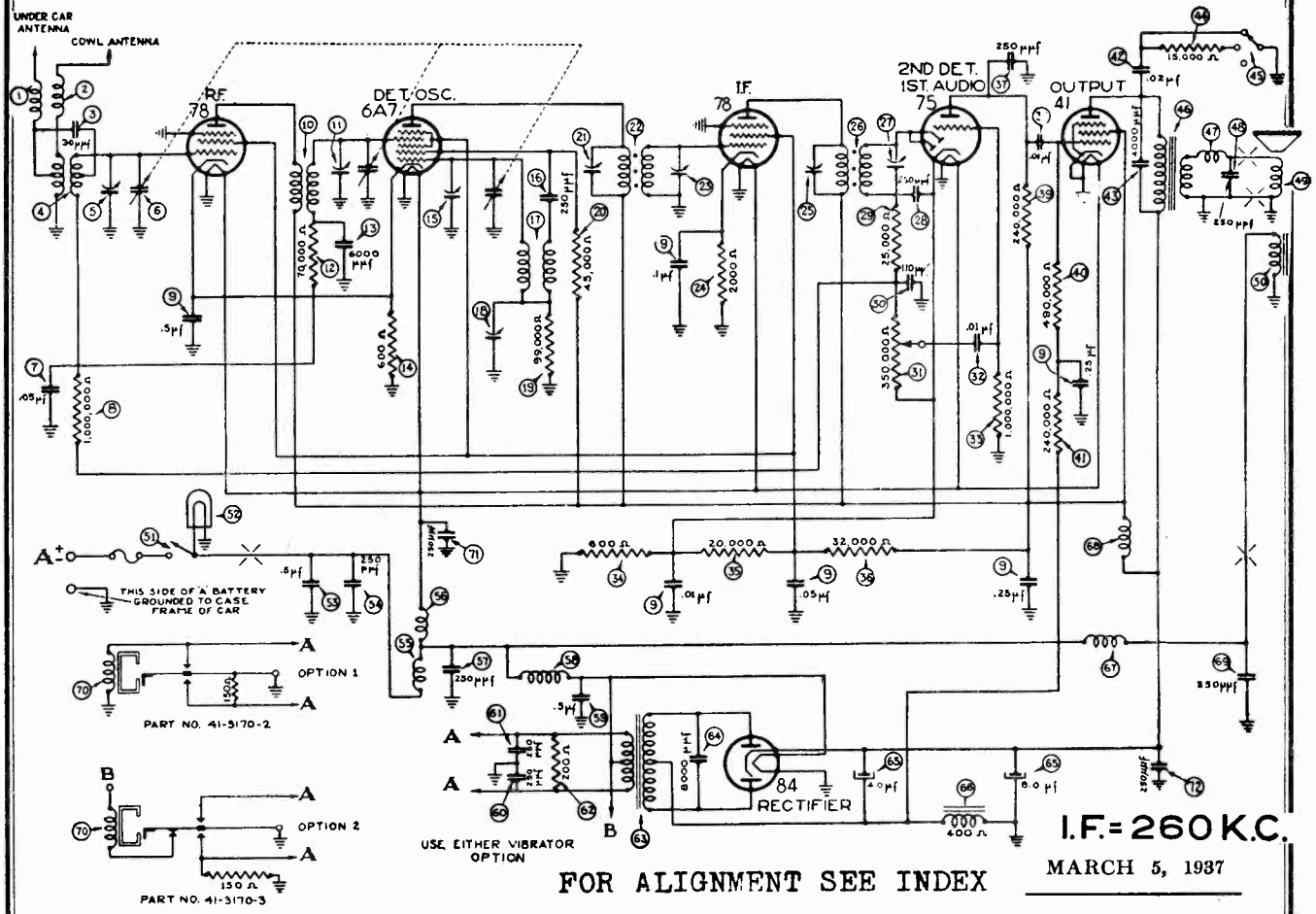
No.	Description	Part No.
1	Antenna choke	38-8106
2	Antenna Choke	38-8106
3	Condenser (70 mmfd.)	30-1068
4	Antenna Transformer	32-2281
5	First Padder (on tun. cond.)	
6	Tuning Condenser	31-1912
7	Condenser (.05 mfd.)	30-4444
8	Resistor (1,000,000 ohms)	33-510344
9	Condenser (.01-.05-.1-.25-.25-.5 mfd.)	30-4478
10	R. F. Transformer	32-2231
11	Second padder (on tun. cond.)	
12	Resistor (70,000 ohms)	33-370344
13	Condenser (6,000 mmfd.)	30-4445
14	Resistor (600 ohms)	33-1212
15	Third Padder (on tun. cond.)	
16	Condenser (250 mmfd.)	30-1032
17	Oscillator Transformer	32-2232
18	Low Frequency Padder	31-6056
19	Resistor (51,000 ohms)	33-351344
20	Resistor (45,000 ohms)	33-345344
21	Padder (Pri. 1st I. F. Trans.)	
22	First I. F. Transformer	32-2286
23	Padder (Sec. 1st I. F. Trans.)	
24	Resistor (2,000 ohms)	32-220334
25	Padder (Pri. 2nd I. F. Trans.)	
26	Second I. F. Transformer	32-2167
27	Padder (Sec. 2nd I. F. Trans.)	
28	Condenser (250 mmfd.)	30-1032
29	Resistor (25,000 ohms)	33-325344
30	Condenser (110 mmfd.)	30-1031
31	Volume Control (350,000 ohms)	33-5139
32	Condenser (.01 mfd.)	30-4124
33	Resistor (1,000,000 ohms)	33-510344
34	Resistor (600 ohms)	33-1212
35	Resistor (20,000 ohms)	33-320334
36	Resistor (32,000 ohms)	33-332444
37	Condenser (250 mmfd.)	30-1032
38	Condenser (.01 mfd.)	30-4145
39	Resistor (240,000 ohms)	33-424344
40	Resistor (490,000 ohms)	33-449344
41	Resistor (240,000 ohms)	33-424344
42	Condenser (.02 mfd.)	30-4419
43	Condenser (4,000 mmfd.)	30-4185
44	Resistor (15,000 ohms)	33-315344
45	Tone Control Switch	42-1273
46	Output Transformer	32-7495
47	Choke	32-1374
48	Condenser (250 mmfd.)	30-1032
49	Cone and Voice Coil	36-3526
50	Field Coil Assembly	32-9236
51	On and Off Switch Assembly	42-5617
52	Pilot Lamp	34-2039
53	Condenser (.5 mfd.)	30-4474
54	Condenser (250 mmfd.)	30-1032
55	"A" Choke	32-1374
56	Filament Choke	32-1561
57	Condenser (250 mmfd.)	30-1032
58	Vibrator Choke	32-2249
59	Condenser (.5 mfd.)	30-4474
60	Condenser (250 mmfd.)	30-1032
61	Condenser (250 mmfd.)	30-1032
62	Resistor (200 ohms)	33-120344
63	Power Transformer	32-7720
64	Condenser (8,000 mmfd.)	30-4420
65	Filter Condenser (4-8 mfd.)	30-2168
66	Filter Choke	32-7722
67	Choke	32-2269
68	"B" Choke	32-1281
69	Condenser (250 mmfd.)	30-1032
70	Vibrator (Optional)	41-3170-2
	Inductive Suppressor	41-3170-3
	Tee Bolt (Rec. mtg.)	32-2250
	Nut (Rec. mtg.)	28-6161
	Speaker Cable	W518A
	Tuning and Volume Knob	41-3247
	Tone Control Knob	28-7214
	Knob Base	28-7215
	Tuning & Volume Shaft	28-4184
	Tone Control Shaft	28-8695
	Scale Assembly	28-8696
	Receiver Housing	42-5644
		38-1727

Model N-1433H is a Special Custom-Built Receiver used exclusively by Nash Motor Company in 1937 Nash cars.

Schematic, Chassis Parts

PHILCO RADIO & TELEV. CORP.

MODEL N-1434H
Two-Unit Receiver



FOR ALIGNMENT SEE INDEX

MARCH 5, 1937

MODEL N-1434-H PARTS LIST

No.	Description	Part No.
①	Antenna Choke	38-8106
②	Antenna Choke	38-8106
③	Condenser (30 mmfd.)	30-1059
④	Antenna Transformer	32-2461
⑤	First Padder (on tun. cond.)	
*⑥	Tuning Condenser	31-1912
⑦	Condenser (.05 mfd.)	30-4444
⑧	Resistor (1,000,000 ohms)	33-510344
⑨	Condenser (.01-.05-.1-.25-.25-.5 mfd)	30-4478
⑩	R. F. Transformer	32-2231
⑪	Second Padder (on tun. cond.)	
⑫	Resistor (70,000 ohms)	33-370344
⑬	Condenser (6,000 mmfd.)	30-4445
⑭	Resistor (600 ohms)	33-1212
⑮	Third Padder (on tun. cond.)	
⑯	Condenser (250 mmfd.)	30-1032
⑰	Oscillator Transformer	32-2232
*⑱	Low Frequency Padder	31-6056
⑲	Resistor (99,000 ohms)	33-399344
⑳	Resistor (45,000 ohms)	33-345344
㉑	Padder (Pri. 1st I.F. Trans.)	
㉒	First I. F. Transformer	32-2286
㉓	Padder (Sec. 1st I.F. Trans.)	
㉔	Resistor (2,000 ohms)	32-220334
㉕	Padder (Pri. 2nd I.F. Trans.)	
㉖	Second I. F. Transformer	32-2167
㉗	Padder (Sec. 2nd I.F. Trans.)	
㉘	Condenser (250 mmfd.)	30-1032
㉙	Resistor (25,000 ohms)	33-325344
㉚	Condenser (110 mmfd.)	30-1031
㉛	Volume Control (350,000 ohms)	33-5139
㉜	Condenser (.01 mfd.)	30-4479
㉝	Resistor (1,000,000 ohms)	33-510344
㉞	Resistor (600 ohms)	33-1212
㉟	Resistor (20,000 ohms)	33-320334
㊱	Resistor (32,000 ohms)	33-332444
㊲	Condenser (250 mmfd.)	30-1032
㊳	Condenser (.01 mfd.)	30-4145
㊴	Resistor (240,000 ohms)	33-424344
㊵	Resistor (490,000 ohms)	33-449344
㊶	Resistor (240,000 ohms)	33-424344
㊷	Condenser (.02 mfd.)	30-4495
㊸	Condenser (4,000 mmfd.)	30-4185
㊹	Resistor (15,000 ohms)	33-315344
*㊺	Tone Control Switch	42-1273
*㊻	Output Transformer	32-7495
㊼	Choke	32-1374
㊽	Condenser (250 mmfd.)	30-1032
㊾	Cone & Voice Coil	36-3526
*㊿	Field Coil Assembly	32-9236
*(51)	On & Off Switch Assembly	42-5617
(52)	Pilot Lamp	34-2039
(53)	Condenser (.5 mfd.)	30-4474
(54)	Condenser (250 mmfd.)	30-1032
(55)	"A" Choke	32-1374
(56)	Filament Choke	32-1438
(57)	Condenser (250 mmfd.)	30-1032
(58)	Vibrator Choke	32-2537
(59)	Condenser (.5 mfd.)	30-4474
(60)	Condenser (250 mmfd.)	30-1032
(61)	Condenser (250 mmfd.)	30-1032
(62)	Resistor (200 ohms)	33-120344
(63)	Power Transformer	32-7720
(64)	Condenser (8,000 mmfd.)	30-4420
(65)	Filter Condenser (4-8 mfd.)	30-2179
(66)	Filter Choke	32-7722
(67)	Choke	32-2269
(68)	"B" Choke	32-1281
(69)	Condenser (250 mmfd.)	30-1032
(70)	Vibrator (OPTIONAL)	41-3170-2
(71)	Condenser (250 mmfd.)	41-3170-3
(72)	Condenser (250 mmfd.)	30-1032
	Four-prong Socket	27-6044
	Five-prong Socket	27-6035
	Six-prong Socket	27-6036
	Seven-prong Socket	27-6037
	Inductive Suppressor	32-2250
	Interference Condenser	30-4007
	Fuse	7227
	Fuse Insulator	27-7729
	Tee Bolt (Rec. mtg.)	28-6161

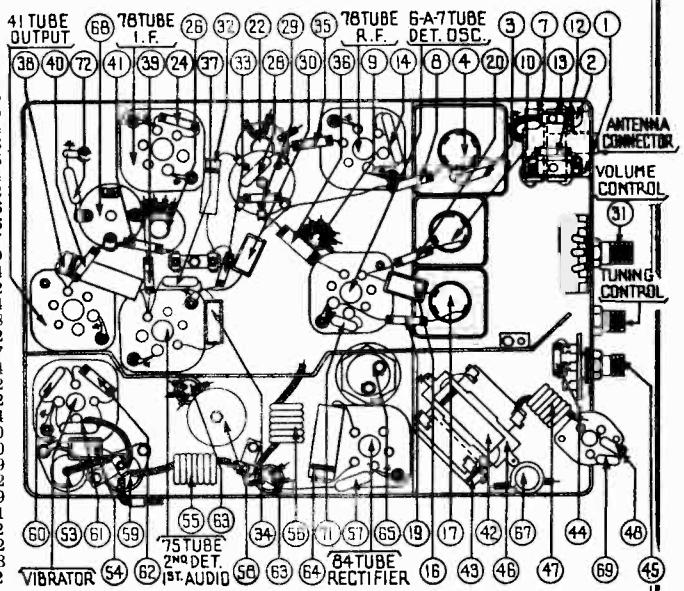


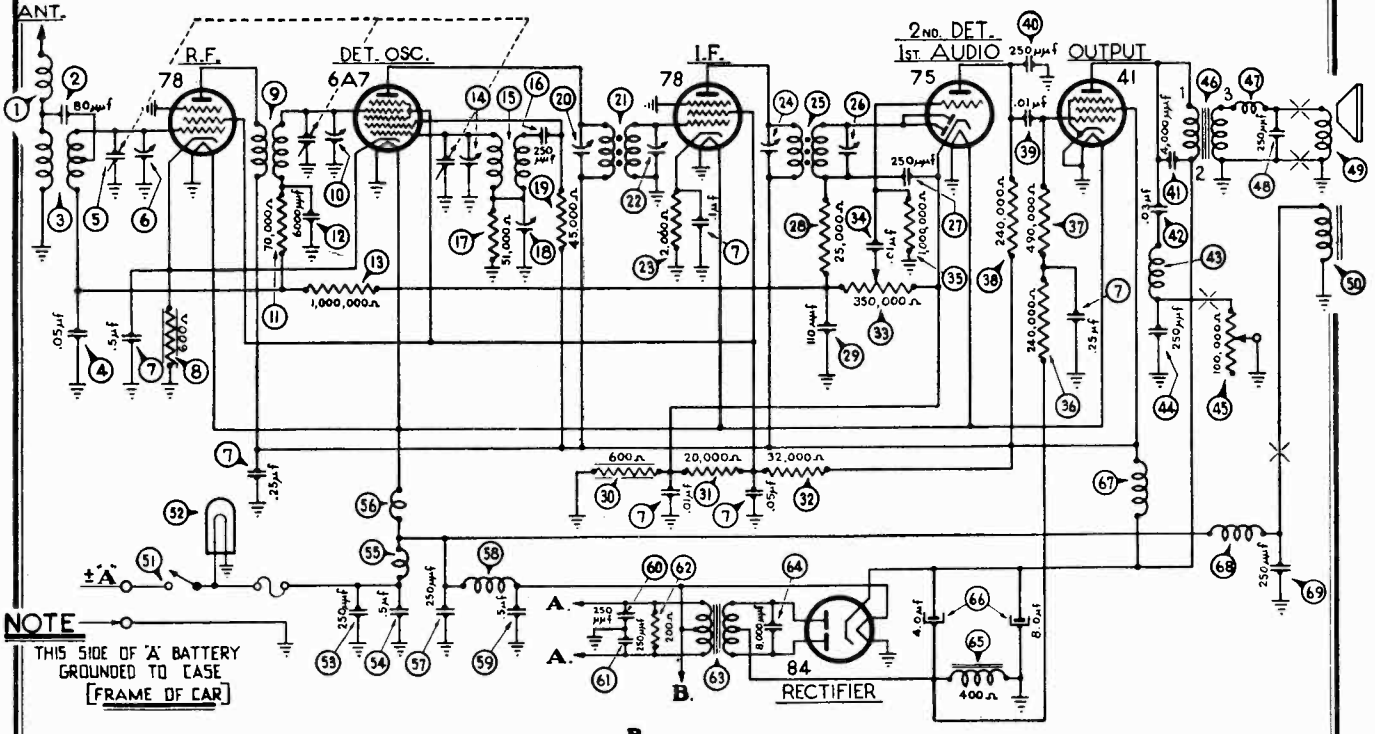
FIGURE 2

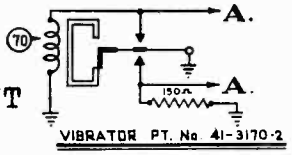
No.	Description	Part No.
	Nut (Rec. mtg.)	W518A
	Speaker Cable	41-3247
	Tuning & Volume Knob	28-7214
	Tone Control Knob	28-7215
	Knob Base	28-4184
	Tuning & Volume Shaft	28-8695
	Tone Control Shaft	28-8696
	Scale Assembly	42-5644
	Control Mtg. Wrench	28-4380
	Receiver Housing	38-1727
	Tow Strap	36-3403

NOTE: The items marked with an asterisk are rarely required for service and in many cases will not be carried in stock by the local service station. In such cases it will be necessary to order these parts from Philco Transitone, Philadelphia or Chicago.

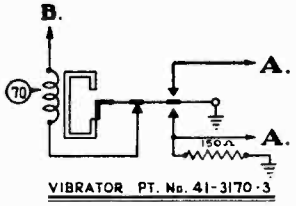
MODEL G-1436
Schematic, Chassis Parts

PHILCO RADIO & TELEV. CORP.





VIBRATOR PT. No. 41-3170-2



VIBRATOR PT. No. 41-3170-3

FOR ALIGNMENT SEE INDEX

I.F. = 260 K.C.

OCTOBER 15, 1936

FIGURE 3

MODEL G-1436 PARTS LIST

No.	Description	Part No.
①	Antenna Choke	32-1956
②	Condenser (80 mmfd.)	30-1066
③	Antenna Transformer	32-2331
④	Condenser (.05 mfd.)	30-4444
*⑤	Tuning Condenser	31-1912
⑥	First Padder (on tun. cond.)	
⑦	Condenser (.01-.05-.1-.25-.25-.5 mfd.)	30-4478
⑧	Resistor (600 ohms)	33-1212
⑨	R. F. Transformer	32-2231
⑩	Second Padder (on tun. cond.)	
⑪	Resistor (20,000 ohms)	33-370344
⑫	Condenser (6000 mmfd.)	30-4445
⑬	Resistor (1,000,000 ohms)	33-510344
⑭	Third Padder (on tun. cond.)	
⑮	Oscillator Transformer	32-2232
⑯	Condenser (250 mmfd.)	30-1032
⑰	Resistor (51,000 ohms)	33-351344
*⑱	Low Frequency Padder	31-6056
⑲	Resistor (45,000 ohms)	33-345344
⑳	Padder (Pri. 1st I. F. Trans.)	
㉑	First I. F. Transformer	32-2286
㉒	Padder (Sec. 1st I. F. Trans.)	
㉓	Resistor (2000 ohms)	33-220344
㉔	Padder (Pri. 2nd I. F. Trans.)	
㉕	Second I. F. Transformer	32-2167
㉖	Padder (Sec. 2nd I. F. Trans.)	
㉗	Condenser (250 mmfd.)	30-1032
㉘	Resistor (25,000 ohms)	33-325344
㉙	Condenser (110 mmfd.)	30-1031
㉚	Resistor (600 ohms)	33-1212
㉛	Resistor (20,000 ohms)	33-320344
㉜	Resistor (32,000 ohms)	33-332444
㉝	Volume Control (350,000 ohms)	33-5139
㉞	Condenser (.01 mfd.)	30-4479
㉟	Resistor (1,000,000 ohms)	33-510344
㊱	Resistor (240,000 ohms)	33-424344
㊲	Resistor (490,000 ohms)	33-449344
㊳	Resistor (240,000 ohms)	33-424344
㊴	Condenser (.01 mfd.)	30 4145
㊵	Condenser (250 mmfd.)	30-1032
㊶	Condenser (4000 mmfd.)	30-4185
㊷	Condenser (.03 mfd.)	30-4380
㊸	Choke	32-1374
㊹	Condenser (250 mmfd.)	30-1032
*㊺	Tone Control (100,000 ohms)	33-5192
*㊻	Output Transformer	32-7495
㊼	Choke	32-1374
㊽	Condenser (250 mmfd.)	30-1032
*㊾	Cone & Voice Coil	36-3822
*㊿	Field Coil Assembly	36-3823
(51)	On & Off Switch Assembly	
(52)	Pilot Lamp	34-2040
(53)	Condenser (250 mmfd.)	30-1032
(54)	Condenser (.5 mfd.)	30-4474
(55)	"A" Choke	32-1374
(56)	Filament Choke	32-1561
(57)	Condenser (250 mmfd.)	30-1032
(58)	Vibrator Choke	32-2249
(59)	Condenser (.5 mfd.)	30-4474
(60)	Condenser (250 mmfd.)	30-1032
(61)	Condenser (250 mmfd.)	30-1032
(62)	Resistor (200 ohms)	33-120344
(63)	Power Transformer	32-7720
(64)	Condenser (8000 mmfd.)	30-4420
(65)	Filter Choke	32-7722
(66)	Filter Condenser (4-8 mfd.)	30-2168
(67)	"B" Choke	32-1981
(68)	Choke	32-2239
(69)	Condenser (250 mmfd.)	30-1032
(70)	Vibrator (Optional)	41-3170-2
		41-3170-3
	Four-prong Socket	27-6044
	Five-prong Socket	27-6035
	Six-prong Socket	27-6036
	Seven-prong Socket	27-6037
	Distributor Resistor	33-1196

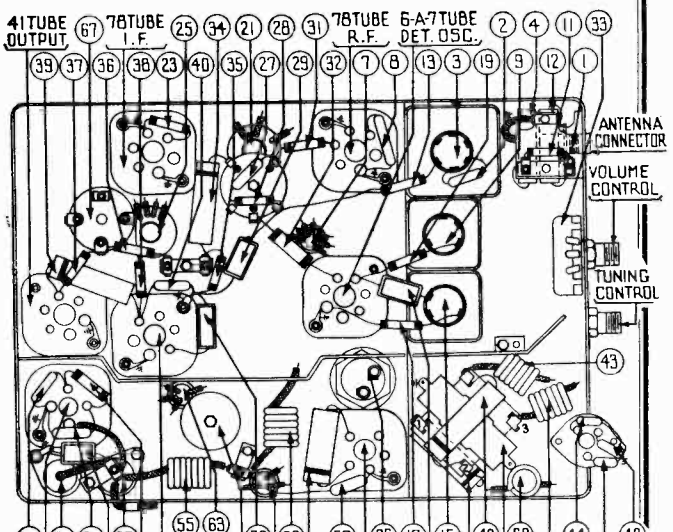


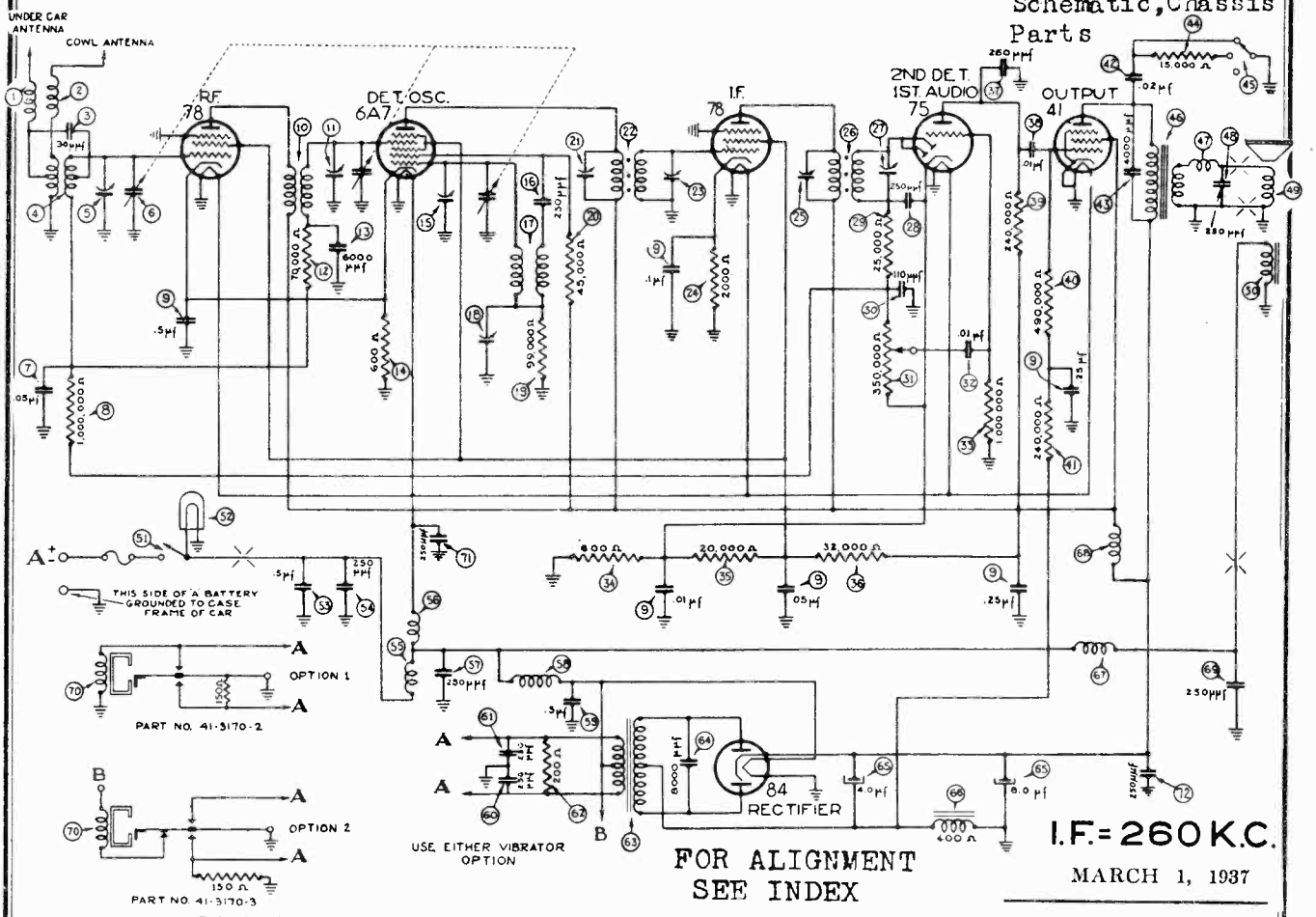
FIGURE 4

No.	Description	Part No.
	Interference Condenser	30-4007
	Interference Condenser	30-4486
	Fuse	7927
	Fuse Insulator	27 7729
	Tee Bolt (Rec. mtg.)	28-6161
	Nut (Rec. mtg.)	W158A
	*Speaker Cable Assembly	41-3255
	*Shielded Loom Assembly	38-8230

NOTE: The items marked with an asterisk are rarely required for service and in many cases will not be carried in stock by the local service station. In such cases it will be necessary to order these parts from Philco Transitone, Philadelphia or Chicago.

PHILCO RADIO & TELEV. CORP.

MODEL S-1437 Studebaker
Two Unit Receiver
Schematic, Chassis
Parts



MODEL S-1437 PARTS LIST

No.	Description	Part No.
①	Antenna Choke	38-8106
②	Antenna Choke	38-8106
③	Condenser (30 mmfd.)	30-1059
④	Antenna Transformer	32-2461
⑤	First Padder (on tun. cond.)	
*⑥	Tuning Condenser	31-1912
⑦	Condenser (.05 mfd.)	30-4444
⑧	Resistor (1,000,000 ohms)	33-510341
⑨	Condenser (.01-.05-.1-.25-.25-.5 mfd)	30-4478
⑩	R. F. Transformer	32-2231
⑪	Second Padder (on tun. cond.)	
⑫	Resistor (70,000 ohms)	33-370344
⑬	Condenser (6,000 mmfd.)	30-4445
⑭	Resistor (600 ohms)	33-1212
⑮	Third Padder (on tun. cond.)	
⑯	Condenser (250 mmfd.)	30-1032
⑰	Oscillator Transformer	32-2232
*⑱	Low Frequency Padder	31-6056
⑲	Resistor (99,000 ohms)	33-399344
⑳	Resistor (45,000 ohms)	33-345344
㉑	Padder (Pri. 1st I.F. Trans.)	
㉒	First I. F. Transformer	32-2286
㉓	Padder (Sec. 1st I.F. Trans.)	
㉔	Resistor (2,000 ohms)	33-220334
㉕	Padder (Pri. 2nd I.F. Trans.)	
㉖	Second I. F. Transformer	32-2167
㉗	Padder (Sec. 2nd I.F. Trans.)	
㉘	Condenser (250 mmfd.)	30-1032
㉙	Resistor (25,000 ohms)	33-325344
㉚	Condenser (110 mmfd.)	30-1031
㉛	Volume Control (350,000 ohms)	33-5139
㉜	Condenser (.01 mfd.)	30-4479
㉝	Resistor (1,000,000 ohms)	33-510344
㉞	Resistor (600 ohms)	33-1212
㉟	Resistor (20,000 ohms)	33-320334
㊱	Resistor (32,000 ohms)	33-332444
㊲	Condenser (250 mmfd.)	30-1032
㊳	Condenser (.01 mfd.)	30-4145
㊴	Resistor (240,000 ohms)	33-424344
㊵	Resistor (490,000 ohms)	33-449344
㊶	Resistor (240,000 ohms)	33-424344
㊷	Condenser (.02 mfd.)	30-4495
㊸	Condenser (4,000 mmfd.)	30-4185
㊹	Resistor (15,000 ohms)	33-315344
*㊺	Tone Control Switch	42-1273
*㊻	Output Transformer	32-7495
㊼	Choke	32-1374
㊽	Condenser (250 mmfd.)	30-1032
㊾	Cone and Voice Coil	36-3526
*㊿	Field Coil Assembly	32-9236
*(51)	On & Off Switch Assembly	42-5617
(52)	Pilot Lamp	34-2039
(53)	Condenser (.5 mfd.)	30-4474
(54)	Condenser (250 mmfd.)	30-1032
(55)	"A" Choke	32-1374
(56)	Filament Choke	32-1438
(57)	Condenser (250 mmfd.)	30-1032
(58)	Vibrator Choke	32-2537
(59)	Condenser (.5 mfd.)	30-4474
(60)	Condenser (250 mmfd.)	30-1032
(61)	Condenser (250 mmfd.)	30-1032
(62)	Resistor (200 ohms)	33-120344
(63)	Power Transformer	32-7720
(64)	Condenser (8,000 mmfd.)	30-4420
(65)	Filter Condenser (4-8 mfd.)	30-2179
(66)	Filter Choke	32-7722
(67)	Choke	32-2269
(68)	"B" Choke	32-1281
(69)	Condenser (250 mmfd.)	30-1032
(70)	Vibrator (OPTIONAL)	41-3170-2
(71)	Condenser (250 mmfd.)	41-3170-3
(72)	Condenser (250 mmfd.)	30-1032
	Four-prong Socket	27-6044
	Five-prong Socket	27-6035
	Six-prong Socket	27-6036
	Seven-prong Socket	27-6037
	Inductive Suppressor	32-2250
	Interference Condenser	30-4007
	Distributor Condenser	30-1087
	Fuse	7227
	Fuse Insulator	27-7729
	Static Collector (Pres.)	28-3584
	Static Collector (Dict.)	38-7405

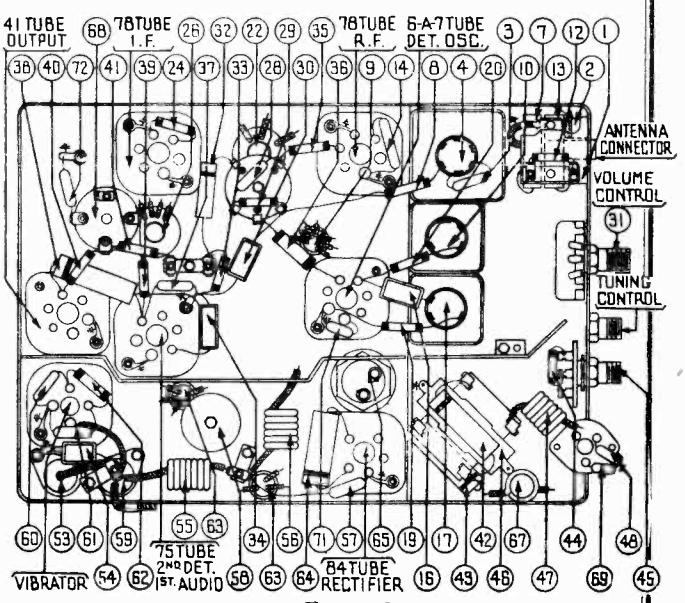


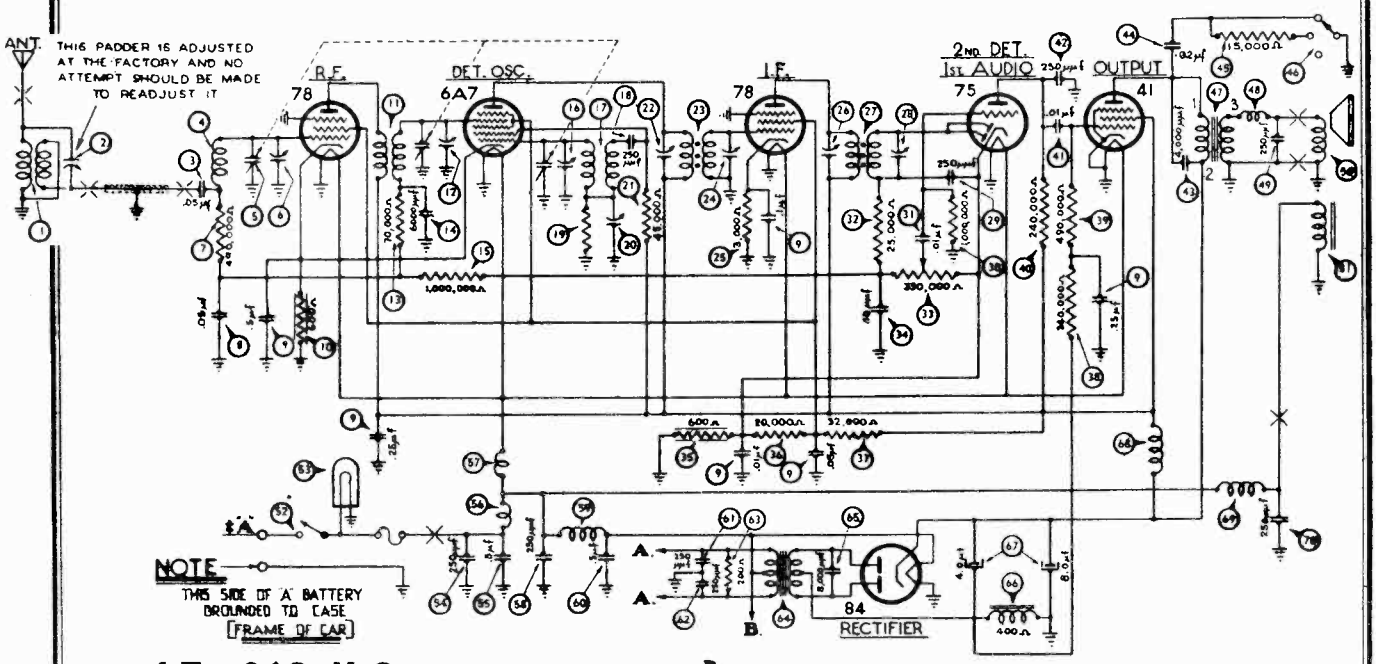
FIGURE 2

No.	Description	Part No.
	Tee Bolt (Rec. Mtg.)	28-6161
	Nut (Rec. Mtg.)	W-518A
	Speaker Cable	41-3231
	Ground Strap	38-7425
	Tuning & Volume Knob	28-7211
	Tone Control Knob	28-7212
	Tuning Shaft	28-8666
	Volume Shaft	28-8667
	Tone Control Shaft	28-8668
	Scale Assembly	42-5630
	Receiver Housing	38-1727

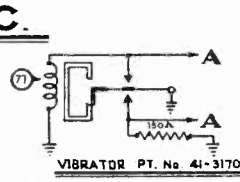
NOTE: The items marked with an asterisk are rarely required for service and in many cases will not be carried in stock by the local service station. In such cases it will be necessary to order these parts from Philco Transitone, Philadelphia or Chicago.

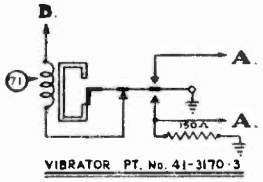
MODEL F-1440 Ford
Schematic, Chassis Changes, Parts

PHILCO RADIO & TELEV. CORP.



I.F. = 260 K.C.





FOR ALIGNMENT SEE INDEX

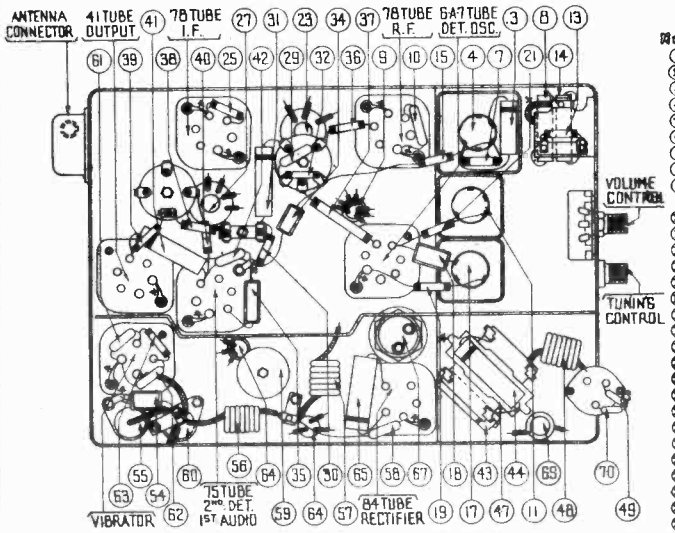


FIGURE 156

CHANGES — "Run Numbers" are stamped on the chassis sub-base for identification. These "Run Numbers" are changed consecutively as major changes are made in the Receiver wiring and parts.

RUN No. 2 — Tuning Condenser ⑧ removed Part No. 31-1985 added.

RUN No. 4 — Choke ㊾ removed Part No. 32-1438 added. One side is connected to the filament of the type 41 Tube and the other side is connected to Choke ㊽.

A 250 mmfd. Condenser Part No. 30-1032 has been added across the filament of the type 6A7 Tube Socket.

A 250 mmfd. Condenser Part No. 30-1032 has been added to the Receiver. One side is connected between the 8 mfd. section of Condenser ㊶ and the "B" Choke ㊽ and the other side grounded.

RUN No. 5 — Resistor ⑲ removed (51,000 ohms) Part No. 33-399344 added (99,000 ohms).

RUN No. 6 — Antenna Choke Part No. 32-2063 added to the Receiver. One side is connected to Condenser ③ and the other side connected to the Antenna Connector on the Receiver.

RUN No. 7 — The grid wire from the type 41 Tube was removed from its original location on the "B" Choke ㊽ and wired to the other side of "B" Choke ㊽.

No maior change was involved in Run No. 3.

PARTS LIST

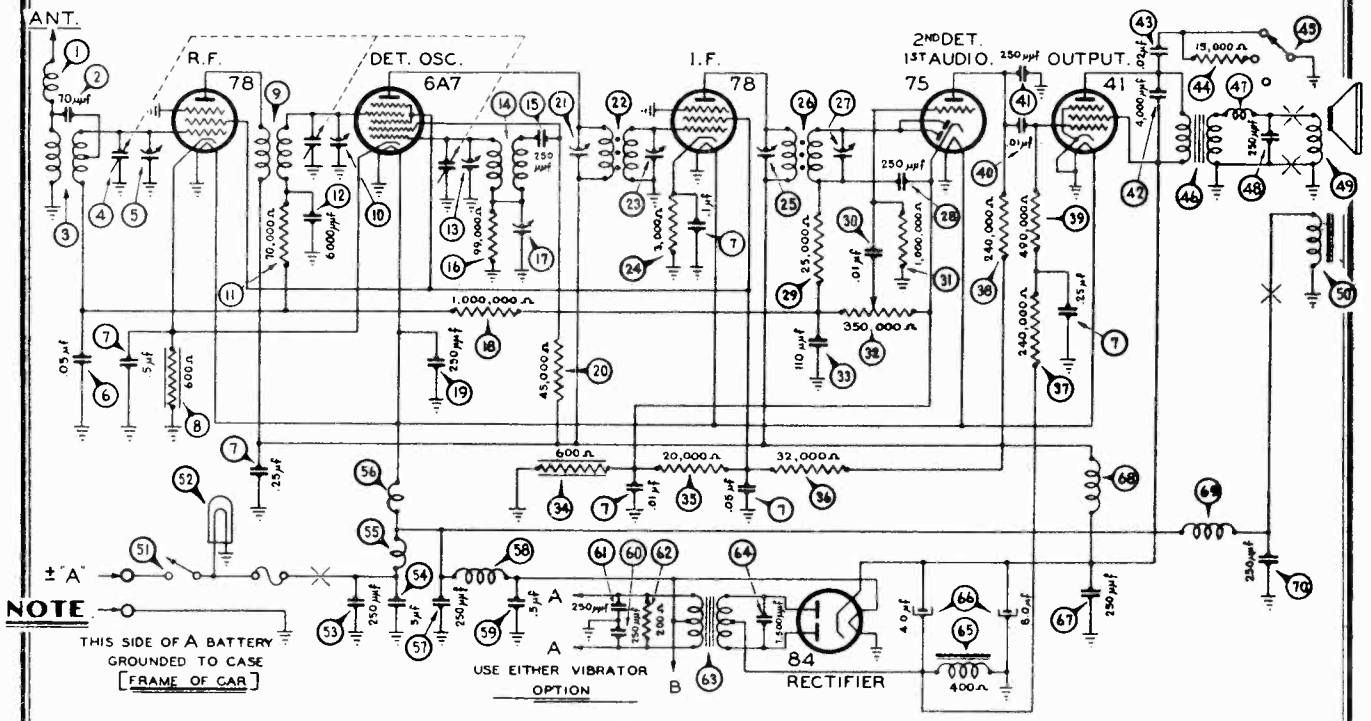
No.	Description	Part No.
①	Roof Antenna Transformer	32-2418
②	Padder	31-6165
③	Condenser (.05 mfd.)	30-4444
④	Receiver Antenna Transformer	32-2422
⑤	Tuning Condenser	31-1954
⑥	First Padder (on Tun. Cond.)	
⑦	Resistor (490,000 ohms)	33-449344
⑧	Condenser (.05 mfd.)	30-4444
⑨	Condenser (.01-.05-.1 .25-.25-.5 mfd.)	30-4478
⑩	Resistor (600 ohms)	33-1212
⑪	R. F. Transformer	32-2231
⑫	Second Padder (on Tun. Cond.)	
⑬	Resistor (70,000 ohms)	33-370344
⑭	Condenser (6,000 mmfd.)	30-4445
⑮	Resistor (1,000,000 ohms)	33-510344
⑯	Third Padder (on Tun. Cond.)	
⑰	Oscillator Transformer	32-2232
⑱	Condenser (250 mmfd.)	30-1032
⑲	Resistor (99,000 ohms)	33-399344
⑳	Low Frequency Padder	31-6056
㉑	Resistor (45,000 ohms)	33-345344
㉒	Padder (Pri. 1st I. F. Trans.)	
㉓	First I. F. Transformer	32-2286
㉔	Padder (Sec. 1st I. F. Trans.)	
㉕	Resistor (3,000 ohms)	33-230344
㉖	Padder (Pri. 2nd I. F. Trans.)	
㉗	Second I. F. Transformer	32-2167
㉘	Padder (Sec. 2nd I. F. Trans.)	
㉙	Condenser (250 mmfd.)	30-1032
㉚	Resistor (1,000,000 ohms)	33-510344
㉛	Condenser (.01 mfd.)	30-4124
㉜	Resistor (25,000 ohms)	33-325344
㉝	Volume Control (350,000 ohms)	33-5139
㉞	Condenser (110 mmfd.)	30-1031
㉟	Resistor (600 ohms)	33-1212
㊱	Resistor (20,000 ohms)	33-320344
㊲	Resistor (32,000 ohms)	33-332444
㊳	Resistor (240,000 ohms)	33-424344
㊴	Resistor (490,000 ohms)	33-449344
㊵	Resistor (240,000 ohms)	33-424344
㊶	Condenser (.01 mfd.)	30-4145
㊷	Condenser (250 mmfd.)	30-1032
㊸	Condenser (4,000 mmfd.)	30-4185
㊹	Condenser (.02 mfd.)	30-4419
㊺	Resistor (15,000 ohms)	33-315344
㊻	Tone Control Switch	42-1139
㊼	Output Transformer	32-7495
㊽	Choke	32-1374
㊾	Condenser (250 mmfd.)	30-1032
㊿	Cone & Voice Coil	36-3586
(51)	Field Coil Assembly	32-9236
(52)	On & Off Switch	42-1277
(53)	Pilot Lamp	34-2040
(54)	Condenser (250 mmfd.)	30-1032
(55)	Condenser (.5 mfd.)	30-4474
(56)	"A" Choke	32-1374
(57)	Filament Choke	32-1561
(58)	Condenser (250 mmfd.)	30-1032
(59)	Vibrator Choke	32-2249
(60)	Condenser (.5 mfd.)	30-4474
(61)	Condenser (250 mmfd.)	30-1032
(62)	Condenser (250 mmfd.)	30-1032
(63)	Resistor (200 ohms)	33-120344
(64)	Power Transformer	32-7720
(65)	Condenser (8,000 mmfd.)	30-4420
(66)	Filter Choke	32-7722
(67)	Filter Condenser	30-2168
(68)	"B" Choke	32-1281
(69)	Choke	32-2269
(70)	Condenser (250 mmfd.)	30-1032
(71)	Vibrator (OPTIONAL)	41-3170-2 41-3170-3
	Four-prong Socket	27-6044
	Five-prong Socket	27-6035
	Six-prong Socket	27-6036
	Seven-prong Socket	27-6037
	Tuning Shaft	28-8699
	Volume Shaft	28-8714
	Knob	27-4437
	Pilot Lamp Assembly	38-8265
	Dial	27-4456
	Glass	27-8656
	Pointer	27-4457
	Fuse	7227
	Fuse Insulator	27-7729
	Speaker Cable	41-3250
	"U" Clamp (Cont. Mtg.)	28-4680
	Transformer Lead (Shield)	L-2651
	Transformer Assembly	32-2424

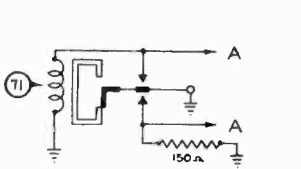
The Model F-1440 Concealed Header Bar Speaker with Ear Level Reception is a Special Custom-Built Receiver used exclusively by the Ford Motor Company for the 1937 Ford V-8 cars.

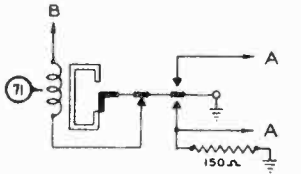
Changes, Parts

PHILCO RADIO & TELEV. CORP.

MODEL F-1442 Ford
Schematic, Chassis







FOR ALIGNMENT SEE INDEX

I.F.= 260 KC.

PARTS LIST

No.	Description	Part No.
1	Antenna Choke	32-2063
2	Condenser (70 mmfd.)	30-1068
3	Antenna Transformer	32-2524
4	Tuning Condenser	31-1984
5	First Padder (on Tun. Cond.)	
6	Condenser (.05 mfd.)	30-4444
7	Condenser (.01-.05-.1-.25-.25-.5 mfd.)	30-4478
8	Resistor (600 ohms)	33-1212
9	R. F. Transformer	32-2231
10	Second Padder (on Tun. Cond.)	
11	Resistor (70,000 ohms)	33-370344
12	Condenser (6,000 mmfd.)	30-4445
13	Third Padder (on Tun. Cond.)	
14	Oscillator Transformer	32-2232
15	Condenser (250 mmfd.)	30-1032
16	Resistor (99,000 ohms)	33-399344
17	Low Frequency Padder	31-6056
18	Resistor (1,000,000 ohms)	33-510344
19	Condenser (250 mmfd.)	30-1032
20	Resistor (45,000 ohms)	33-345344
21	Padder (Pri. 1st I. F. Trans.)	
22	First I. F. Transformer	32-2286
23	Padder (Sec. 1st I. F. Trans.)	
24	Resistor (3,000 ohms)	33-230344
25	Padder (Pri. 2nd I. F. Trans.)	
26	Second I. F. Transformer	32-2167
27	Padder (Sec. 2nd I. F. Trans.)	
28	Condenser (250 mmfd.)	30-1032
29	Resistor (25,000 ohms)	33-325344
30	Condenser (.01 mfd.)	30-4124
31	Resistor (1,000,000 ohms)	33-510344
32	Volume Control (350,000 ohms)	33-5139
33	Condenser (110 mmfd.)	30-1031
34	Resistor (600 ohms)	33-1212
35	Resistor (20,000 ohms)	33-320344
36	Resistor (32,000 ohms)	33-332444
37	Resistor (240,000 ohms)	33-424344
38	Resistor (240,000 ohms)	33-424344
39	Resistor (490,000 ohms)	33-449344
40	Condenser (.01 mfd.)	30-4145
41	Condenser (250 mmfd.)	30-1032
42	Condenser (4,000 mmfd.)	30-4185
43	Condenser (.02 mfd.)	30-4495
44	Resistor (15,000 ohms)	33-315344
45	Tone Control Switch	42-1139
46	Output Transformer	32-7495
47	Choke	32-1374
48	Condenser (250 mmfd.)	30-1032
49	Cone & Voice Coil	36-3586
50	Field Coil Assembly	32-9236
51	On & Off Switch	42-1277
52	Pilot Lamp	34-2040
53	Condenser (250 mmfd.)	30-1032
54	Condenser (.5 mfd.)	30-4474
55	"A" Choke	32-1374
56	Filament Choke	32-1438
57	Condenser (250 mmfd.)	30-1032
58	Vibrator Choke	32-2537
59	Condenser (.5 mfd.)	30-4474
60	Condenser (250 mmfd.)	30-1032
61	Condenser (250 mmfd.)	30-1032
62	Resistor (200 ohms)	33-120344
63	Power Transformer	32-7720
64	Condenser (7,500 mmfd.)	30-4420
65	Filter Choke	32-7722
66	Filter Condenser (4-8 mfd.)	30-2168
67	Condenser (250 mmfd.)	30-1032
68	"B" Choke	32-1281
69	Choke	32-2269
70	Condenser (250 mmfd.)	30-1032
71	Vibrator (OPTIONAL)	41-3170-2
		41-3170-3
	Four-prong Socket	27-6044
	Five-prong Socket	27-6035
	Six-prong Socket	27-6036
	Seven-prong Socket	27-6037
	Tuning Shaft	28-8699
	Volume Shaft	28-8714
	Knob	27-4437
	Pilot Lamp Assembly	38-8265
	Dial	27-4456
	Glass	27-8656
	Pointer	27-4457
	Fuse	7227
	Fuse Insulator	27-7729
	Speaker Cable	41-3250
	Antenna Lead	L-2804
	"U" Clamp (Control Mtg.)	28-4680
	Gas Gauge Condenser	30-4663
	Oil Gauge Condenser	30-4307
	Interference Condenser	30-4500

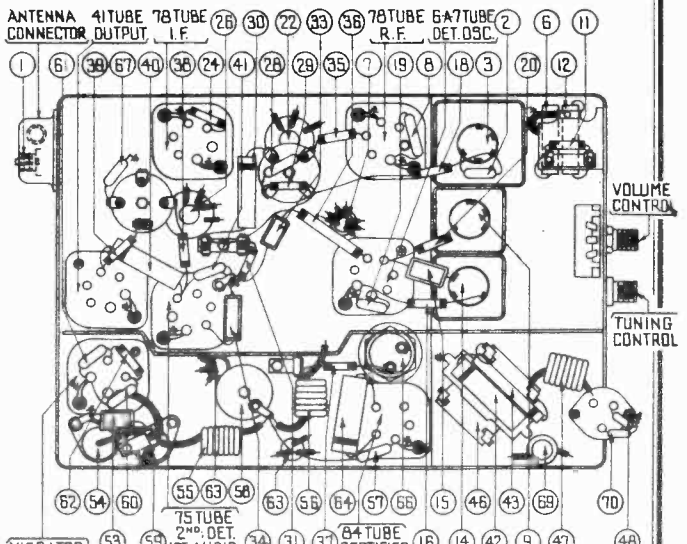


FIGURE 158

CHANGES — "Run Numbers" are stamped on the chassis sub-base for identification. These "Run Numbers" are changed consecutively as major changes are made in the Receiver wiring and parts.

RUN No. 2 — Resistor (24) removed (300 ohms) Part No. 33-220344 added (2000 ohms).

RUN No. 3 — Resistor (23) removed (2000 ohms) Part No. 33-225344 added (2500 ohms).

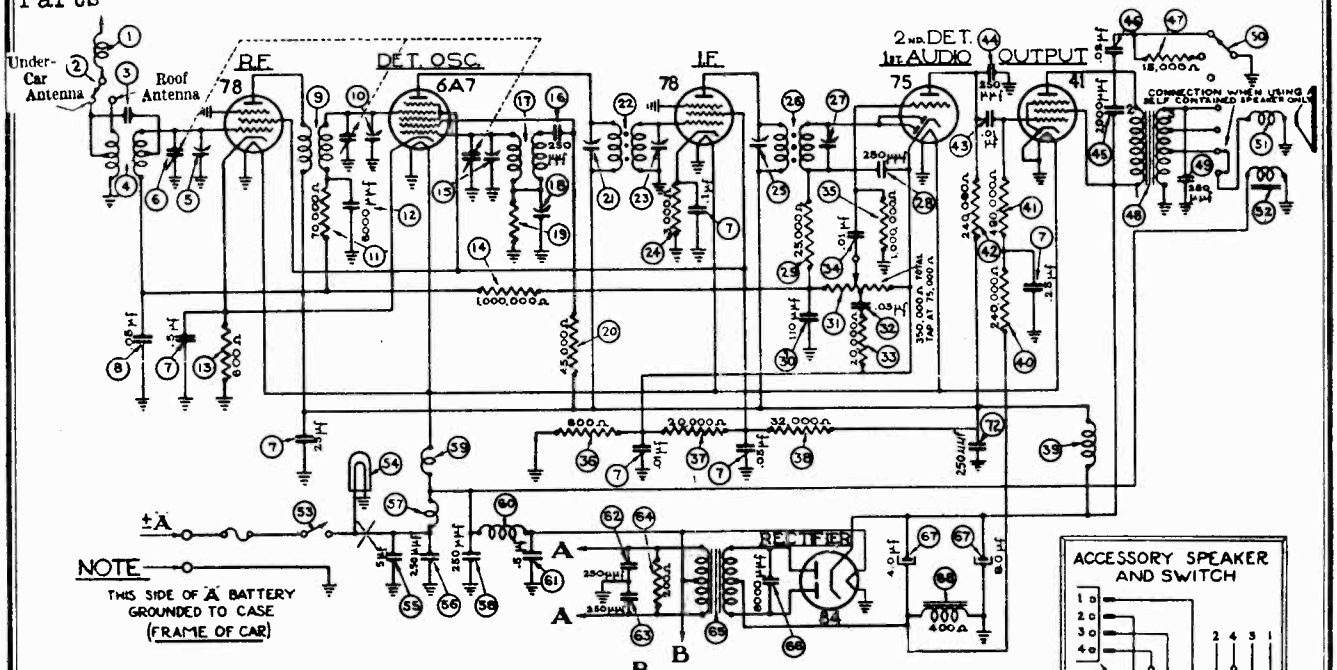
RUN No. 4 — Reverse all lug connections on "B" Choke (68).

ADJUSTMENTS — The correct padding procedure for the Model F-1442 is given on Page 107.

The Model F-1442 Concealed Header Bar Speaker with Ear Level Reception is a Special Custom-Built Receiver used exclusively by the Ford Motor Company for the 1937 Ford V-8 cars.

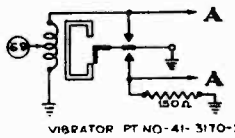
MODEL C-1540 Chrysler
Schematic, Chassis Parts

PHILCO RADIO & TELEV. CORP.

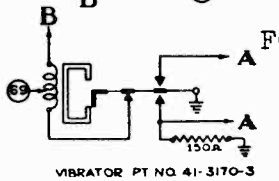


NOV. 20, 1936

I.F.=260KC.



VIBRATOR PT NO-41-3170-2

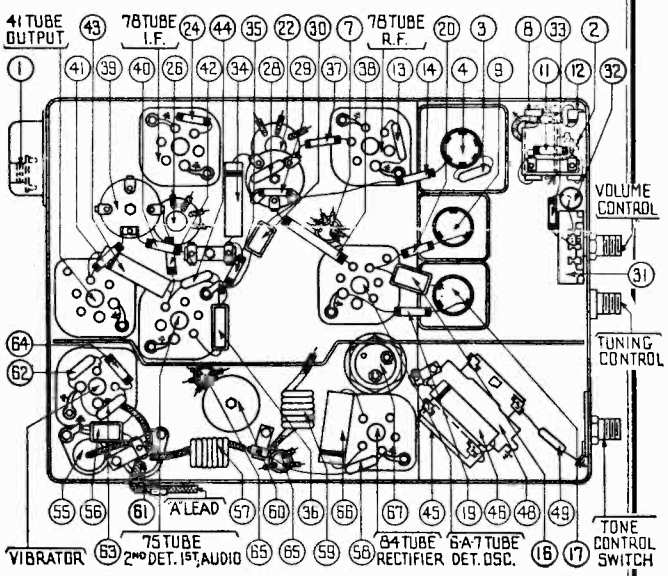


VIBRATOR PT NO. 41-3170-3

FOR ALIGNMENT SEE INDEX

MODEL C-1450 PARTS LIST

No.	Description	Part No.
(1)	Antenna Choke	32-2063
*(2)	Antenna Switch	42-1259
(3)	Condenser (70 mmfd.)	30-1068
(4)	Antenna Transformer	32-2350
(5)	First Padder (on Tun. Cond.)	
*(6)	Tuning Condenser	31-1984
(7)	Condenser — (.01-.05-.1-.25-.25-.5 mfd.)	30-4478
(8)	Condenser (.05 mfd.)	30-4444
(9)	R. F. Transformer	32-2231
(10)	Second Padder (on Tun. Cond.)	
(11)	Resistor (70,000 ohms)	33-370344
(12)	Condenser (6,000 mmfd.)	30-4445
(13)	Resistor (600 ohms)	33-1212
(14)	Resistor (1,000,000 ohms)	33-510344
(15)	Third Padder (on Tun. Cond.)	
(16)	Condenser (250 mmfd.)	30-1032
(17)	Oscillator Transformer	32-2232
*(18)	Low Frequency Padder	31-6056
(19)	Resistor (99,000 ohms)	33-399344
(20)	Resistor (45,000 ohms)	33-345344
(21)	Padder (Pri. 1st I. F. Trans.)	
(22)	First I. F. Transformer	32-2286
(23)	Padder (Sec. 1st I. F. Trans.)	
(24)	Resistor (3,000 ohms)	33-230344
(25)	Padder (Pri. 2nd I. F. Trans.)	
(26)	Second I. F. Transformer	32-2167
(27)	Padder (Sec. 2nd I. F. Trans.)	
(28)	Condenser (250 mmfd.)	30-1032
(29)	Resistor (25,000 ohms)	33-325344
(30)	Condenser (110 mmfd.)	30-1031
(31)	Volume Control (350,000 ohms)	33-5121
(32)	Condenser (.03 mfd.)	30-4449
(33)	Resistor (20,000 ohms)	33-320344
(34)	Condenser (.01 mfd.)	30-4124
(35)	Resistor (1,000,000 ohms)	33-510344
(36)	Resistor (600 ohms)	33-1212
(37)	Resistor (20,000 ohms)	33-320344
(38)	Resistor (32,000 ohms)	33-332444
(39)	"B" Choke	32-1281
(40)	Resistor (240,000 ohms)	33-424344
(41)	Resistor (490,000 ohms)	33-449344
(42)	Resistor (240,000 ohms)	33-424344
(43)	Condenser (.01 mfd.)	30-4145
(44)	Condenser (250 mmfd.)	30-1032
(45)	Condenser (2,000 mmfd.)	30-4177
(46)	Condenser (.02 mfd.)	30-4495
(47)	Resistor (15,000 ohms)	33-315344
*(48)	Output Transformer	32-7765
(49)	Condenser (250 mmfd.)	30-1032
*(50)	Tone Control Switch	42-1273
(51)	Cone and Voice Coil	36-3159
*(52)	Field Coil Assembly	36-3513
(53)	On & Off Switch	42-5317
(54)	Pilot Lamp	34-2040
(55)	Condensers (.5 mfd.)	30-4474
(56)	Condenser (250 mmfd.)	30-1032
(57)	"A" Choke	32-1374
(58)	Condenser (250 mmfd.)	30-1032
(59)	Filament Choke	32-1438
(60)	Vibrator Choke	32-2249
(61)	Condenser (.5 mfd.)	30-4474
(62)	Condenser (250 mmfd.)	30-1032
(63)	Condenser (250 mmfd.)	30-1032
(64)	Resistor (200 ohms)	33-120344
(65)	Power Transformer	32-7720
(66)	Condenser (8,000 mmfd.)	30-4420
(67)	Filter Condenser (4-8 mfd.)	30-2179
(68)	Filter Choke	32-7722
		41-3170-2
(69)	Vibrator (Optional)	41-3170-3
(70)	Accessory Speaker Switch	42-1257
(71)	Accessory Speaker Cone	36-3526
(72)	Condenser (250 mmfd.)	30-1032
(73)	Condenser (250 mmfd.)	30-1032
	*Accessory Speaker Cable	41-3237
	*Accessory Speaker Knob	03334
	*Complete Cable and Adapter	41-3234
	Four-prong Socket	27-6044
	Five-prong Socket	27-6035
	Six-prong Socket	27-6036
	Seven-prong Socket	27-6037
	*Accessory Speaker Socket	27-6025
	*Receiver Housing	38-1736
	Distributor Resistor	33-1113
	Generator Condenser	30-4490
	Interference Condenser	30-4007
	Fuse	7227
	Fuse Insulator	27-7729
	Rec. Mtg. Plate (Plymouth)	28-3086
	Rec. Mtg. Plate (Chrysler-Dodge-DeSoto)	28-4650
	Tun. & Vol. Knob (Plymouth)	27-4363
	Tun. & Vol. Knob (Dodge)	27-4365



Description	Part No.
Tun. & Vol. Knob (DeSoto)	27-4367
Tun. & Vol. Knob (Chrysler)	27-4377
Tun. & Vol. Knob (Motor Parts)	27-4401
Tone Control Knob (Plymouth)	27-4371
Tone Control Knob (Dodge)	27-4373
Tone Control Knob (DeSoto)	27-4375
Tone Control Knob (Chrysler)	27-4379

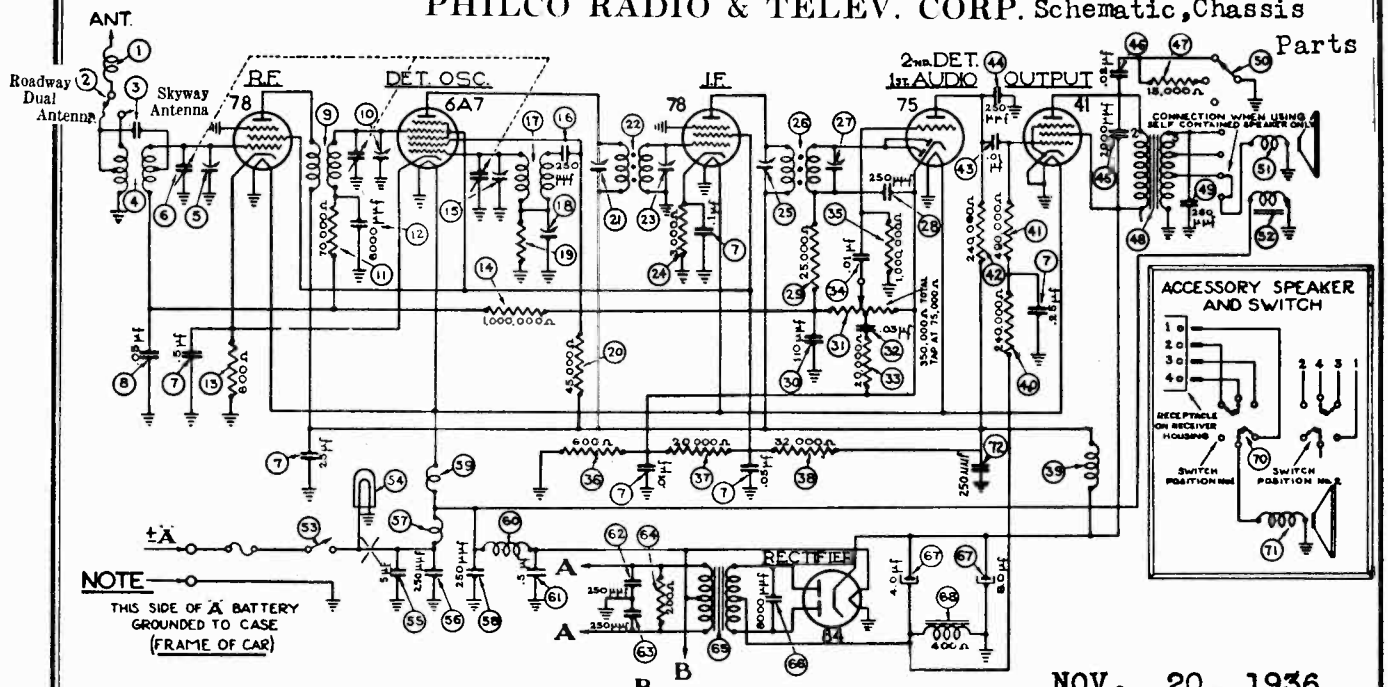
No.	Description	Part No.
	Tone Control Knob (Motor Parts)	27-4400
	Tuning Control Shaft	28-8674
	Volume Control Shaft	28-8675
	Tone Control Shaft	28-8676
	Bolt (Rec. Mtg.)	W825A
	Scale Assembly	42-5637
	Anti Back Lash Spring	28-8647
	Pilot Lamp Assembly	38-7734
	Wrench	28-4380

A Condenser (73) has been added to the Receiver. One side is connected to the filament of the type 6A7 tube and the other side to the ground.

NOTE: The items marked with an asterisk are rarely required for service and in many cases will not be carried in stock by the local service station. In such cases it will be necessary to order these parts from Philco Transitone, Philadelphia or Chicago.

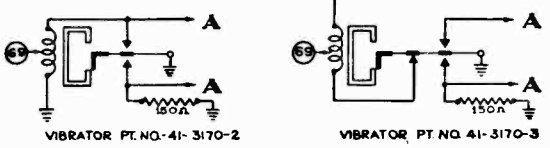
MODEL C-1452 Chrysler

PHILCO RADIO & TELEV. CORP. Schematic, Chassis Parts



NOV. 20, 1936

FIGURE 3



I.F. = 260 K.C.

MODEL C-1452 PARTS LIST

No.	Description	Part No.
①	Antenna Choke	32-2063
*②	Antenna Switch	42-1259
③	Condenser (30 mmfd.)	30-1059
④	Antenna Transformer	32-2433
⑤	First Padder (on Tun. Cond.)	
*⑥	Tuning Condenser	31-1984
⑦	Condenser — (.01-.05-.1-.25-.25-.5 mfd.)	30-4478
⑧	Condenser (.05 mfd.)	30-4444
⑨	R. F. Transformer	32-2231
⑩	Second Padder (on Tun. Cond.)	
⑪	Resistor (70,000 ohms)	33-370344
⑫	Condenser (6,000 mmfd.)	30-4445
⑬	Resistor (600 ohms)	33-1212
⑭	Resistor (1,000,000 ohms)	33-510344
⑮	Third Padder (on tun. Cond.)	
⑯	Condenser (250 mmfd.)	30-1032
⑰	Oscillator Transformer	32-2232
*⑱	Low Frequency Padder	31-6056
⑲	Resistor (99,000 ohms)	33-399344
⑳	Resistor (45,000 ohms)	33-345344
㉑	Padder (Pri. 1st I. F. Trans.)	
㉒	First I. F. Transformer	32-2286
㉓	Padder (Sec. 1st I. F. Trans.)	
㉔	Resistor (3,000 ohms)	33-230344
㉕	Padder (Pri. 2nd I. F. Trans.)	
㉖	Second I. F. Transformer	32-2167
㉗	Padder (Sec. 2nd I. F. Trans.)	
㉘	Condenser (250 mmfd.)	30-1032
㉙	Resistor (25,000 ohms)	33-325344
㉚	Condenser (110 mmfd.)	30-1031
㉛	Volume Control (350,000 ohms)	33-5121
㉜	Condenser (.03 mfd.)	30-4449
㉝	Resistor (20,000 ohms)	33-320344
㉞	Condenser (.01 mfd.)	30-4124
㉟	Resistor (1,000,000 ohms)	33-510344
㊱	Resistor (600 ohms)	33-1212
㊲	Resistor (20,000 ohms)	33-320344
㊳	Resistor (32,000 ohms)	33-332444
㊴	"B" Choke	32-1281
㊵	Resistor (240,000 ohms)	33-424344
㊶	Resistor (490,000 ohms)	33-449344
㊷	Resistor (240,000 ohms)	33-524344
㊸	Condenser (.01 mfd.)	30-4145
㊹	Condenser (250 mmfd.)	30-1032
㊺	Condenser (2,000 mmfd.)	30-4177
㊻	Condenser (.02 mfd.)	30-4495
㊼	Resistor (15,000 ohms)	33-315344
*㊽	Output Transformer	32-7765
㊾	Condenser (250 mmfd.)	30-1032
*㊿	Tone Control Switch	42-1273
(51)	Cone and Voice Coil	36-3159
*(52)	Field Coil Assembly	36-3513
(53)	On & Off Switch	42-5317
(54)	Pilot Lamp	34-2040
(55)	Condensers (.5 mfd.)	30-4474
(56)	Condenser (250 mmfd.)	30-1032
(57)	"A" Choke	32-1374
(58)	Condenser (250 mmfd.)	30-1032
(59)	Filament Choke	32-1438
(60)	Vibrator Choke	32-2249
(61)	Condenser (.5 mfd.)	30-4474
(62)	Condenser (250 mmfd.)	30-1032
(63)	Condenser (250 mmfd.)	30-1032
(64)	Resistor (200 ohms)	33-120344
(65)	Power Transformer	32-7720
(66)	Condenser (8,000 mmfd.)	30-4420
(67)	Filter Condenser (4-8 mfd.)	30-2179
(68)	Filter Choke	32-7722
(69)	Vibrator (Optional)	41-3170-2 41-3170-3
(70)	Accessory Speaker Switch	42-1257
(71)	Accessory Speaker Cone	36-3526
(72)	Condenser (250 mmfd.)	30-1032
(73)	Condenser (250 mmfd.)	30-1032
	*Accessory Speaker Cable	41-3237
	*Accessory Speaker Knob	03334
	*Complete Cable and Adapter	41-3234
	Four-prong Socket	27-6044
	Five-prong Socket	27-6035
	Six-prong Socket	27-6036
	Seven-prong Socket	27-6037
	*Accessory Speaker Socket	27-6025
	*Receiver Housing	38-1736
	Distributor Resistor	33-1113
	Generator Condenser	30-4490
	Interference Condenser	30-4007
	Fuse	7227
	Fuse Insulator	27-7729
	Rec. Mtg. Plate (Plymouth)	28-3086
	Rec. Mtg. Plate (Chrysler-Dodge-DeSoto)	28-4650
	Tun. & Vol. Knob (Plymouth)	27-4363

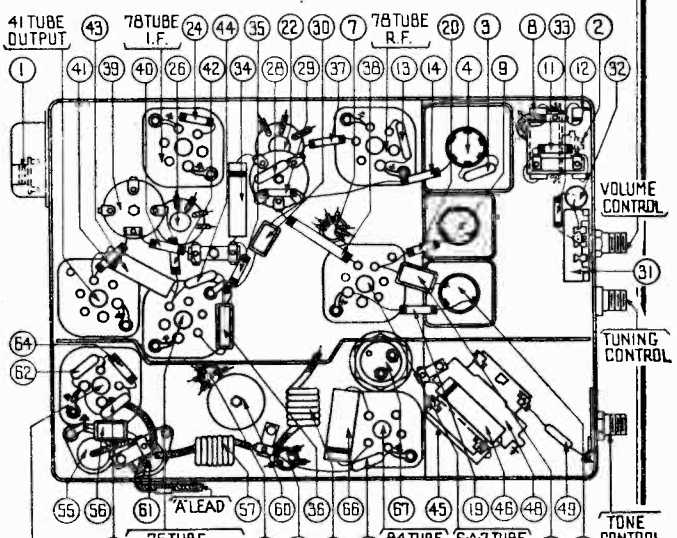


FIGURE 4

Description	Part No.
Tun. & Vol. Knob (Dodge)	27-4365
Tun. & Vol. Knob (DeSoto)	27-4367
Tun. & Vol. Knob (Chrysler)	27-4377
Tun. & Vol. Knob (Motor Parts)	27-4401
Tone Control Knob (Plymouth)	27-4371
Tone Control Knob (Dodge)	27-4373
Tone Control Knob (DeSoto)	27-4375
Tone Control Knob (Chrysler)	27-4379

No.	Description	Part No.
	Tone Control Knob (Motor Parts)	27-4400
	Tuning Control Shaft	28-8674
	Volume Control Shaft	28-8675
	Tone Control Shaft	28-8676
	Bolt (Rec. Mtg.)	W825A
	Scale Assembly	42-5637
	Anti Back Lash Spring	28-8647
	Pilot Lamp Assembly	38-7734
	Wrench	28-4380

A Condenser (73) has been added to the Receiver. One side is connected to the filament of the type 6A7 tube and the other side to the ground.

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PHILCO RADIO & TELEV. CORP.

I. F. TRANSFORMERS AND PADDERS

The I. F. transformers are assembled complete with padding condensers.

Both the primary and secondary padders are placed side by side in the top of the transformer shield can. The adjusting screws are accessible thru the holes in the top of the shield. (See Figure 6).

The coil windings terminate in leads instead of terminals or lugs. The color scheme of the leads is given in Figure 5.

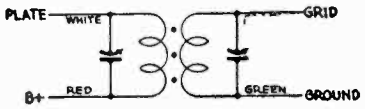


FIGURE 5

If replacements are ever necessary, replace the entire coil assembly, 32-2286 for the first I. F. stage and 32-2167 for the second I. F. stage. Neither the coil nor the padders will be furnished separately. Order only by the above numbers.

ADJUSTMENTS

All padding adjustments are carefully made at the factory and ordinarily no readjustments are necessary. However, when readjustments are required, the procedure given below must be followed in detail.

Equipment

Fully charged heavy duty storage battery or 6-volt power pack, 048 Philco Set Tester, 3164 Padding wrench, 27-7159 Padding screw driver.

General

OUTPUT METER — The output meter must be connected by means of an adapter to the plate of the type 41 output tube and to the Receiver chassis.

SIGNAL GENERATOR — With the Receiver and signal generator set up for operation at the prescribed frequency, turn the Receiver volume control on full and set the signal generator attenuator so that a half scale reading is obtained on the output meter. The signal in the speaker should be audible but not loud.

The shielding on the signal generator output lead must be connected to the Receiver housing.

Procedure

I. F. — Set the signal generator at exactly 260 K. C. Connect the generator lead to the grid cap of the 78 I. F. tube in series with a .1 mfd. condenser (without removing the grid cap).

Adjust the secondary screw padder ㉗ on the second I. F. transformer for maximum reading on the output meter. Then adjust the primary screw padder ㉕ for maximum reading. (See Figure 6 for location of padders).

Remove the generator lead from the 78 tube.

Connect the generator lead to the grid cap of the 6A7 tube in series with a .1 mfd. condenser (without removing the grid cap). Adjust the secondary screw padder ㉓ on the first I. F. transformer for maximum reading on the output meter. Then adjust the primary screw padder ㉑ for maximum reading. Readjust padders ㉓ and ㉗ with the generator lead connected to the type 6A7 tube. (See Figure 6 for location of padders).

HIGH FREQUENCY AND R. F. — After padding the first I. F. stage remove the generator lead from the 6A7 tube.

Set the signal generator at 1550 K. C. and then connect the generator lead to the grid cap of the 78 R. F. tube in series with a .1 mfd. condenser (without removing the grid cap).

Using a piece of paper approximately .006" thick as a gauge between the heel of the rotor plates and the stator plates, turn the rotor plates in mesh until they strike against the paper.

With the tuning condenser in this position, adjust the high frequency padder ⑮ and the R. F. padder ⑩ until the maximum reading is obtained on the output meter. This is the true setting for 1550 K. C., 155 on the dial scale.

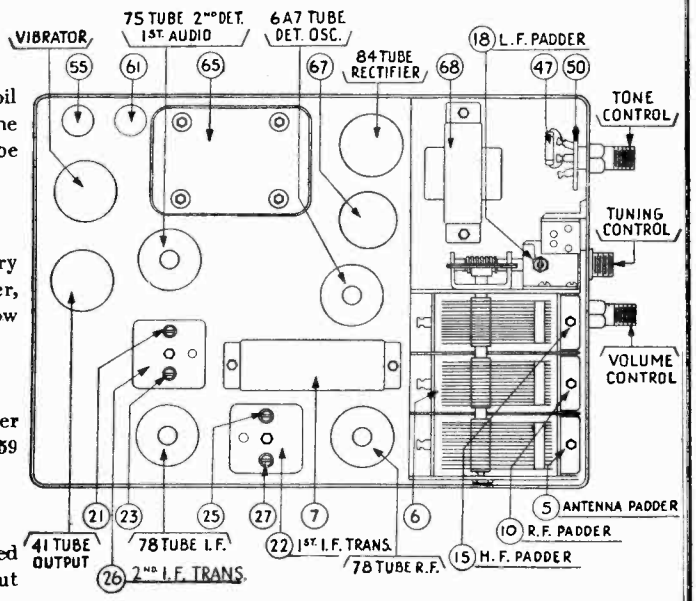


FIGURE 6

LOW FREQUENCY — Turn the tuning condenser plates in mesh to approximately 600 K. C., 60 on the dial scale and set the signal generator at 600 K. C. Roll the tuning condenser and adjust the low frequency padder screw ⑱ for maximum reading on the output meter.

HIGH FREQUENCY READJUSTMENT — Turn the tuning condenser plates out of mesh to 1550 K. C. and set the signal generator at 1550 K. C. Then adjust the high frequency padder ⑮ again for maximum reading on the output meter.

Remove the generator lead from the 78 R. F. tube.

ANTENNA — WHEN PADDING THE ANTENNA STAGE, IT IS EXTREMELY IMPORTANT THAT THE PROPER DUMMY ANTENNA BE CONSTRUCTED AND USED.

Connect the signal generator to the Antenna Cable Assembly (made up of the "Skyway Antenna" lead, Part No. L-2665 lead and a 22 mmfd. condenser in series between the lead and the signal generator). Plug the cable into the antenna connector on the end of the Receiver.

Remove the snap button cover over the antenna selector and advance the selector switch to the Skyway antenna position.

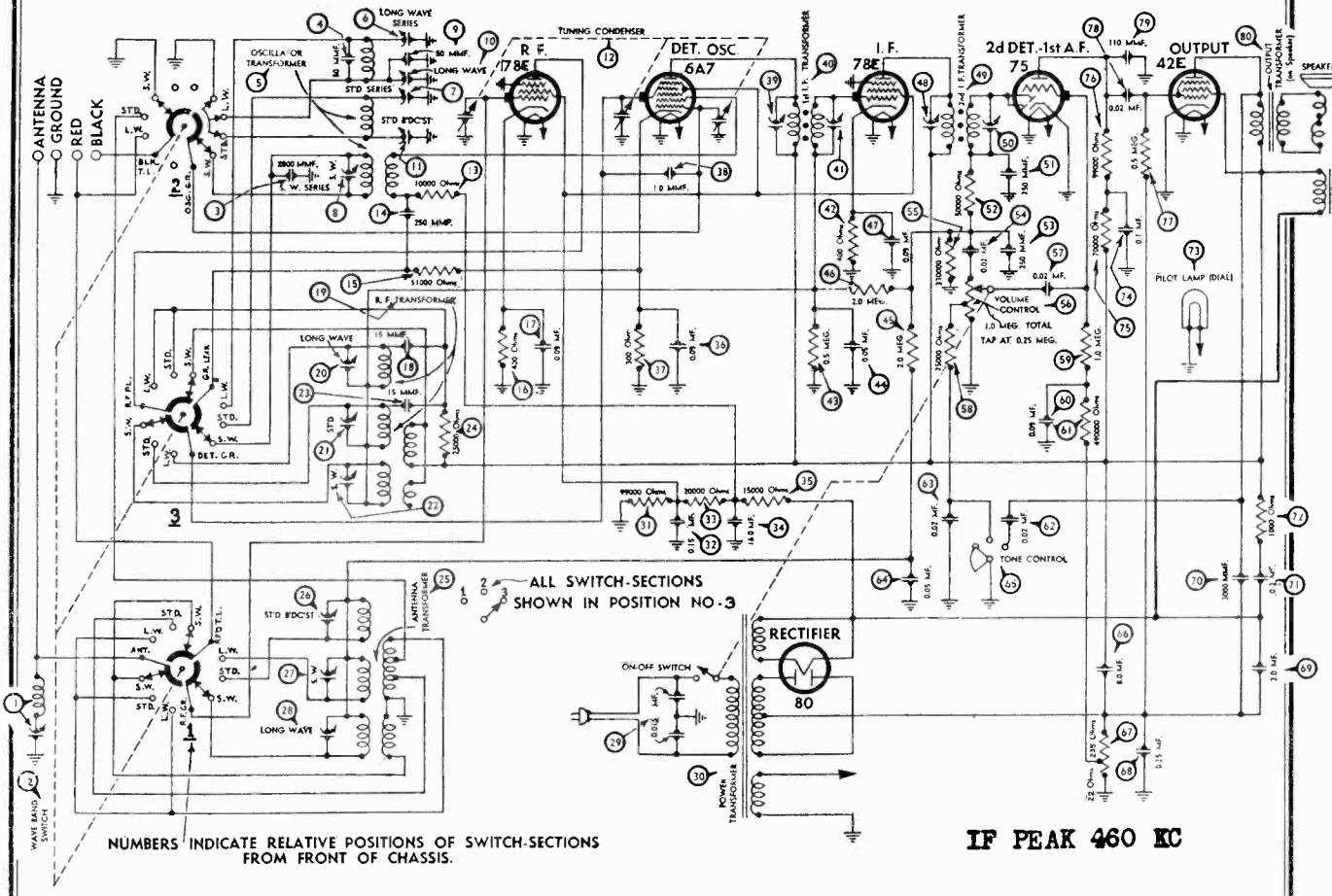
Follow this padding procedure regardless of whether the Receiver is used with the Roadway or with the Skyway antenna.

Turn the tuning condenser to 1400 K. C. and set the generator at 1400 K. C. Adjust the padders ⑩ and ⑤ for the maximum reading on the output meter.

When the antenna stage adjustment is made with the Receiver installed in the car, the antenna lead must be connected to the Receiver in the usual manner. Connect the signal generator output lead to a wire placed near the car antenna but not connected to it.

MODEL 2620
Schematic, Parts

PHILCO RADIO & TELEV. CORP.



Schematic Number	Description	Part Number	List Price
(1)	Wave Trap	38-6850	
(2)	Waveband Switch	42-1107	
(3)	Condenser (2900 mmf.)	30-1054	
(4)	Condenser (50 mmf.)	30-1029	
(5)	Oscillator Coil	32-1665	
(6)	Padder (LONGWAVE LF.)	31-6044	
(7)	Padder (STANDARD LF.)	Part of (6)	
(8)	Padder	Part of (5)	
(9)	Condenser (50 mmf.)	30-1029	
(10)	Padder	Part of (5)	
(11)	Padder	Part of (5)	
(12)	Tuning Condenser Assembly	31-1526	
(13)	Resistor (10,000 ohms)	4412	
(14)	Condenser (250 mmf.)	30-1032	
(15)	Resistor (51,000 ohms)	6098	
(16)	Condenser (0.09 mf.)	4989-DG	
(17)	Resistor (400 ohms)	33-3016	
(18)	Condenser (1.5 mmf.)		
(19)	R. F. Transformer	32-1666	
(20)	Padder	Part of (19)	
(21)	Padder	Part of (19)	
(22)	Padder	Part of (19)	
(23)	Condenser (1.5 mmf.)		
(24)	Resistor (25,000 ohms)	33-1013	
(25)	Antenna Transformer	32-1664	
(26)	Padder	Part of (25)	
(27)	Padder	Part of (25)	
(28)	Padder	Part of (25)	
(29)	Condenser (0.015-0.015 mf.)	3793-DG	
(30)	Power Transformer (110 V., AC)	32-7381	
(31)	Resistor (99,000 ohms)	4411	
(32)	Condenser (0.15 mf.)	30-4191	
(33)	Resistor (20,000 ohms)	6649	
(34)	Condenser (Electrolytic 16.0 mf.)	30-2118	
(35)	Resistor (15,000 ohms)	5718	
(36)	Condenser (0.09 mf.)	30-4122	
(37)	Resistor (300 ohms)	30-3010	
(38)	Condenser (1.0 mmf.)		
(39)	Padder	Part of (40)	
(40)	1st I. F. Transformer	32-1646	
(41)	Padder	Part of (40)	
(42)	Resistor (400 ohms)	33-3016	
(43)	Resistor (0.5 meg.)	6097	
(44)	Condenser (0.05 mf.)	30-4020	
(45)	Resistor (2.0 meg.)	33-1025	
(46)	Resistor (2.0 meg.)	33-1025	
(47)	Condenser (0.09 mf.)	30-4122-S	

Schematic Number	Description	Part Number
(48)	Padder	Part of (49)
(49)	2nd I. F. Transformer	32-1647
(50)	Padder	Part of (49)
(51)	Condenser (250 mmf.)	30-1032
(52)	Resistor (50,000 ohms)	6098
(53)	Condenser (250 mmf.)	30-1032
(54)	Condenser (0.02 mf.)	30-4215
(55)	Resistor (330,000 ohms)	33-1200
(56)	Volume Control and Switch	33-5105-F
(57)	Condenser (0.02 mf.)	30-4215
(58)	Resistor (25,000 ohms)	33-1013
(59)	Resistor (1.0 meg.)	33-1096
(60)	Condenser (0.09 mf.)	Part of (16)
(61)	Resistor (490,000 ohms)	6097
(62)	Condenser (0.02 mf.)	Part of (65)
(63)	Condenser (0.02 mf.)	30-4215
(64)	Condenser (0.05 mf.)	30-4020
(65)	Tone Control	30-4332
(66)	Condenser (Electrolytic 8.0 mf.)	Part of (69)
(67)	B.C. Resistor (257 ohms)	38-5418
(68)	Condenser (0.25 mf.)	30-4146
(69)	Condenser (Electrolytic 8.0-8.0 mf.)	30-2079
(70)	Condenser (3.000 mmf.)	30-4042
(71)	Condenser (0.3 mf.)	6287-DU
(72)	Resistor (1,000 ohms)	5837
(73)	Pilot Lamp	34-2064
(74)	Condenser (0.1 mf.)	30-4122
(75)	Resistor (70,000 ohms)	5385
(76)	Resistor (99,000 ohms)	4411
(77)	Resistor (0.5 meg.)	6097
(78)	Condenser (0.02 mf.)	30-4113
(79)	Condenser (110 mmf.)	30-1031
(80)	Output Transformer	32-7019
(81)	Replacement Speaker Cone	36-3157
(82)	Field Coil Assembly	36-3579
	Dial	27-5128
	Spring and Clamp	28-2837
	Hub and Set Screw Assembly	31-1515
	Knob (Station Selector)	27-4206
	Knob (Fine Tuning)	27-4207
	Knob (Volume and Tone)	27-4208
	Knob (Waveband)	27-4219
	Bezel	28-3163
	Bezel Gasket	27-7980
	Bezel Frame Gasket	27-7971
	Bezel Glass	27-8006

MODEL 2620
Socket, Trimmers
Chassis, Alignment

PHILCO RADIO & TELEV. CORP.

TYPE CIRCUIT: Superheterodyne, with preselector R. F. amplifier and pentode output (3 watts); built in connections for ***Philco All-Wave Aerial,*** aerial selector built into and operated by waveband switch.

POWER SUPPLY: Alternating current, voltage and frequency as specified on nameplate of chassis.

TUBES USED: 1 type 78E, R. F.; 1 type 6A7, 1st detector and oscillator; 1 type 78E, I. F.; 1 type 75, detector, AVC, and 1st audio; 1 type 42E, output; 1 type 80, rectifier.

WAVE BANDS: Three (1) long wave (weather); (2) standard, (with some police); (3) short wave.

COVERAGE OF EACH BAND: Band 1, 145 to 350 K.C. Band 2, 540 to 1720 K.C.; Band 3, 5.7 to 18.0 MC.

TUNING DRIVE: Two-speed gear drive, ball bearing, 50 to 1 ratio for slow tuning.

TONE CONTROLS: 3 position, with bass compensation effective in first position.

INTERMEDIATE FREQUENCY: 460 K.C.

POWER CONSUMPTION: 60 watts.

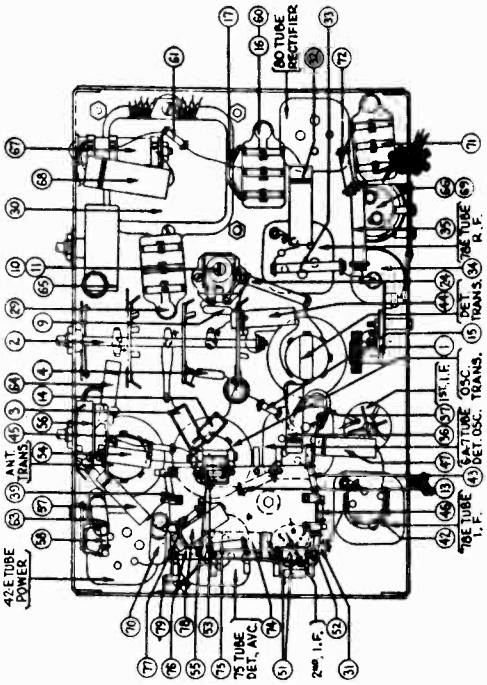


FIGURE 2

ADJUSTING COMPENSATING CONDENSERS

Adjustment of compensating condensers in Model 2620 requires an accurate signal generator covering long-wave, standard wave, police, and short-wave frequencies. The PHILCO Model 088 All-Wave Signal Generator, having a continuous range of from 100 to 20,000 K.C., is ideal for this purpose.

An output meter is also needed. PHILCO Model 025 Circuit Tester includes a high grade output meter.

Philco No. 3164 fibre wrench and No. 27-7059 fibre-handled screwdriver complete the equipment needed for making these adjustments. The location of the various compensating condensers is shown in Fig. 1. Connect the output meter to the plate and cathode contacts of the 42E output tube (using the adapters provided with the "025") and set it at the 0-30 volt range.

1. F. — Connect the antenna lead from the 088 Signal Generator to the grid cap of the 78E, I. F. amplifier (having removed the grid clip from the tube), and the ground lead to the ground post on the chassis. Set the Signal Generator (088) at 460 K.C., volume control of set full on, tone control counter-clockwise, wave band switch in No. 2 position, and condenser gang all the way in. Adjust the signal generator attenuator for approximately ¼ scale reading on the output meter, now adjust condensers ⑭ and ⑮ for maximum reading of the output meter. Remove the signal generator antenna lead from the grid cap (replacing grid clip) and connect to the 6A7 grid cap. Repeat procedure, this time tuning condensers No. ⑨ and ⑪ for maximum output reading. Care should be taken to keep the signal input from the signal generator low at all times to insure proper peaking of the transformers.

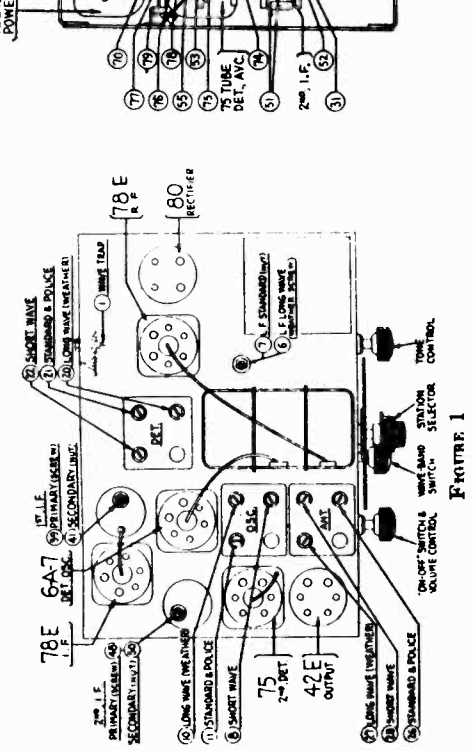


FIGURE 1

WAVE TRAP—Connect the Signal Generator antenna and ground leads to the antenna and ground posts of the set. Replace the grid clip on the 6A7 tube cap. With the signal generator operating at 460 K.C. and the set controls adjusted as for I. F., adjust wavetrap (1) until a minimum reading is obtained in the output meter.

SHORT-WAVE: Turn wave band switch to extreme right (position 3) and set dial at 18.0 meg. Set Signal Generator at 18.0 meg. Connect a shunt condenser across the oscillator section of the gang and tune the shunt for maximum output. Adjust condensers ㉒ and ㉓ for maximum output. Remove shunt condenser and adjust condenser ⑧ for correct calibration. Check the alignment by tuning the set dial at approximately 7.1 meg. for the image frequency.

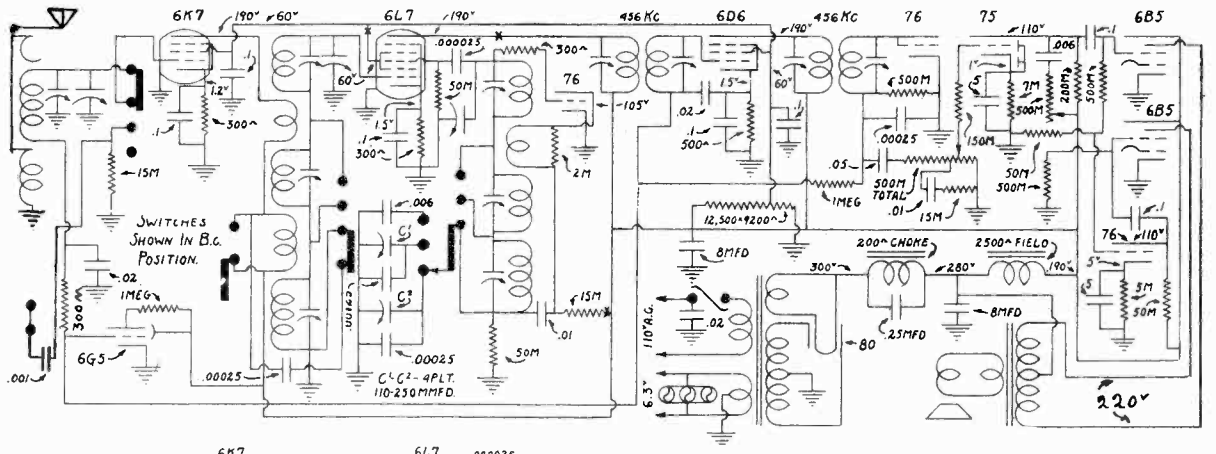
STANDARD: Turn wave switch to Standard (position 2) and set dial at 1500 K.C. Set Signal Generator at 1500 K.C., adjust condensers ⑪, ⑫ and ㉑ for maximum. Turn dial of set and signal generator to 580 K.C. and adjust condenser ⑦ for maximum output, retune ⑪ at 1500 K.C.

LONG WAVE: (Weather) — Turn waveband switch to position 1 (left) (longwave). Set dial at 185 and signal generator at 350 K.C. Adjust condensers ⑩, ㉑ and ㉗ (oscillator, R. F., and Antenna Longwave) for maximum reading.

Turn dial to 17, signal generator to 170 and adjust condenser ⑥ (longwave series) for maximum reading.

PILGRIM ELECTRIC CORP.

MODELS NT, NTE
MODELS NTH, NTHE
Schematics, Voltage

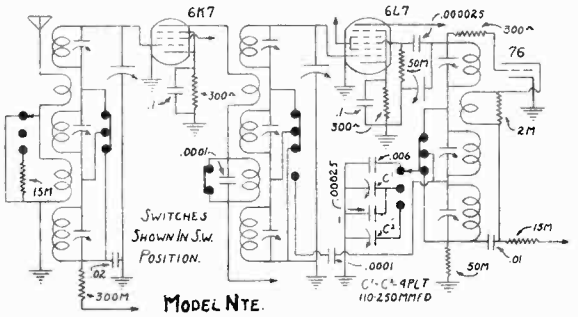


IF PEAK 456 KC

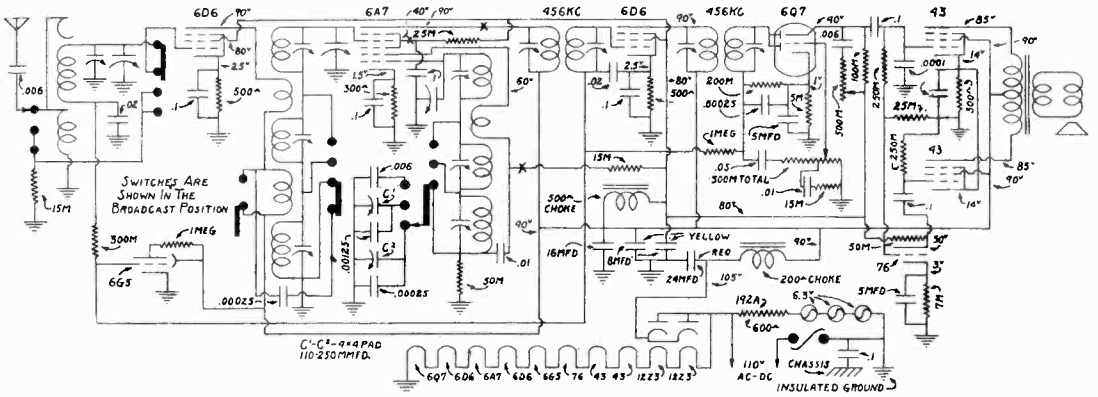
MODEL NT

902,001 AND UP.

ALL VOLTAGES MEASURED WITH 1000Ω PER VOLT METER. ALL OTHER CONSTANTS ON MODEL NTE SAME AS MODEL NT.



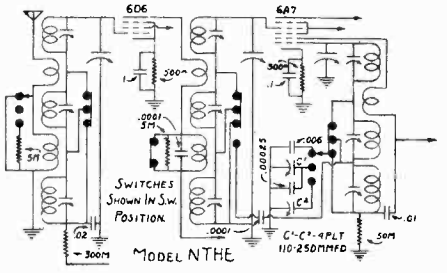
MODEL NTE.



IF PEAK 456 KC

MODEL NTH

200,001 AND UP.



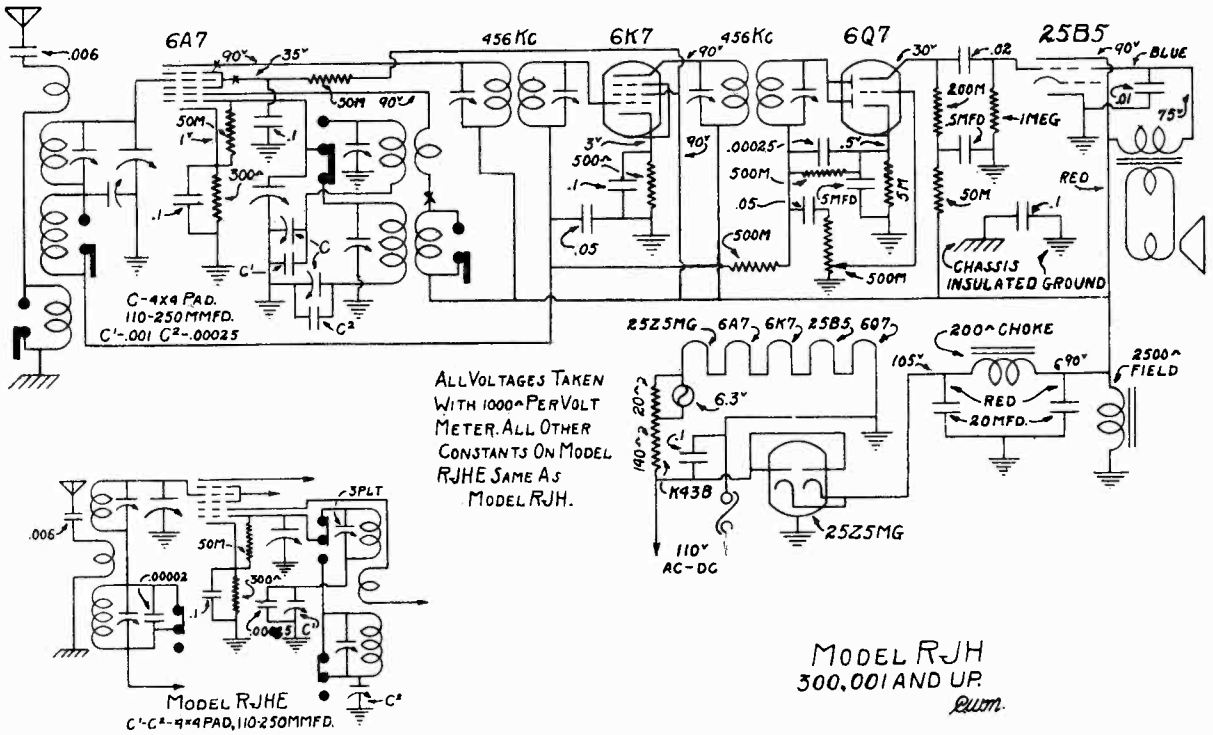
MODEL NTHE

MODEL NTHE-ADDITIONAL PARTS-.00002 MICA, 6Q7 GRID TO GROUND. .0005 MICA, 6Q7 PLATE TO GROUND. 150M, ½ WATT CHASSIS RESISTOR, IN SERIES WITH 6Q7 GRID LEAD. .25 MFD-150V INS. GND TO

MODEL NTHE

MODELS RJ, RJE
MODELS RJH, RJHE
Schematics, Voltage

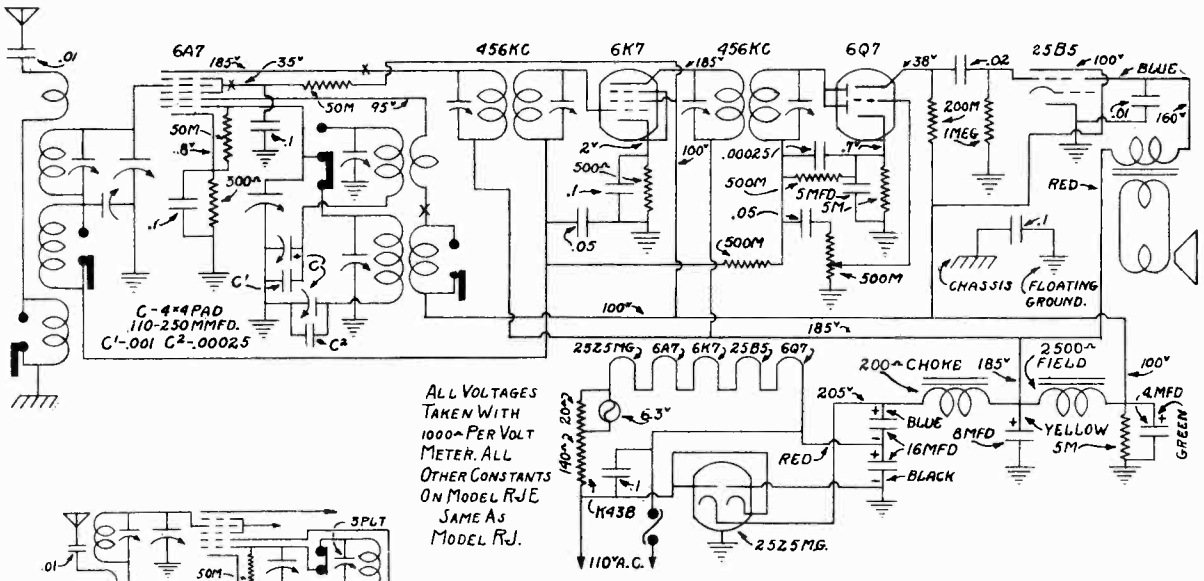
PILGRIM ELECTRIC CORP.



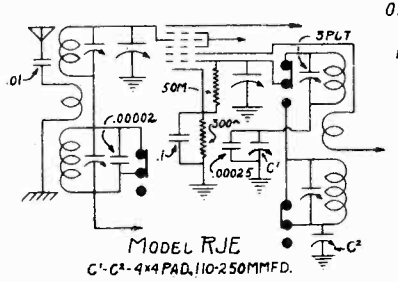
ALL VOLTAGES TAKEN WITH 1000Ω PER VOLT METER. ALL OTHER CONSTANTS ON MODEL RJHE SAME AS MODEL RJH.

MODEL RJHE
C1-C2-4x4 PAD, 110-250MMFD.

MODEL RJH
300,001 AND UP.



ALL VOLTAGES TAKEN WITH 1000Ω PER VOLT METER. ALL OTHER CONSTANTS ON MODEL RJE SAME AS MODEL RJ.

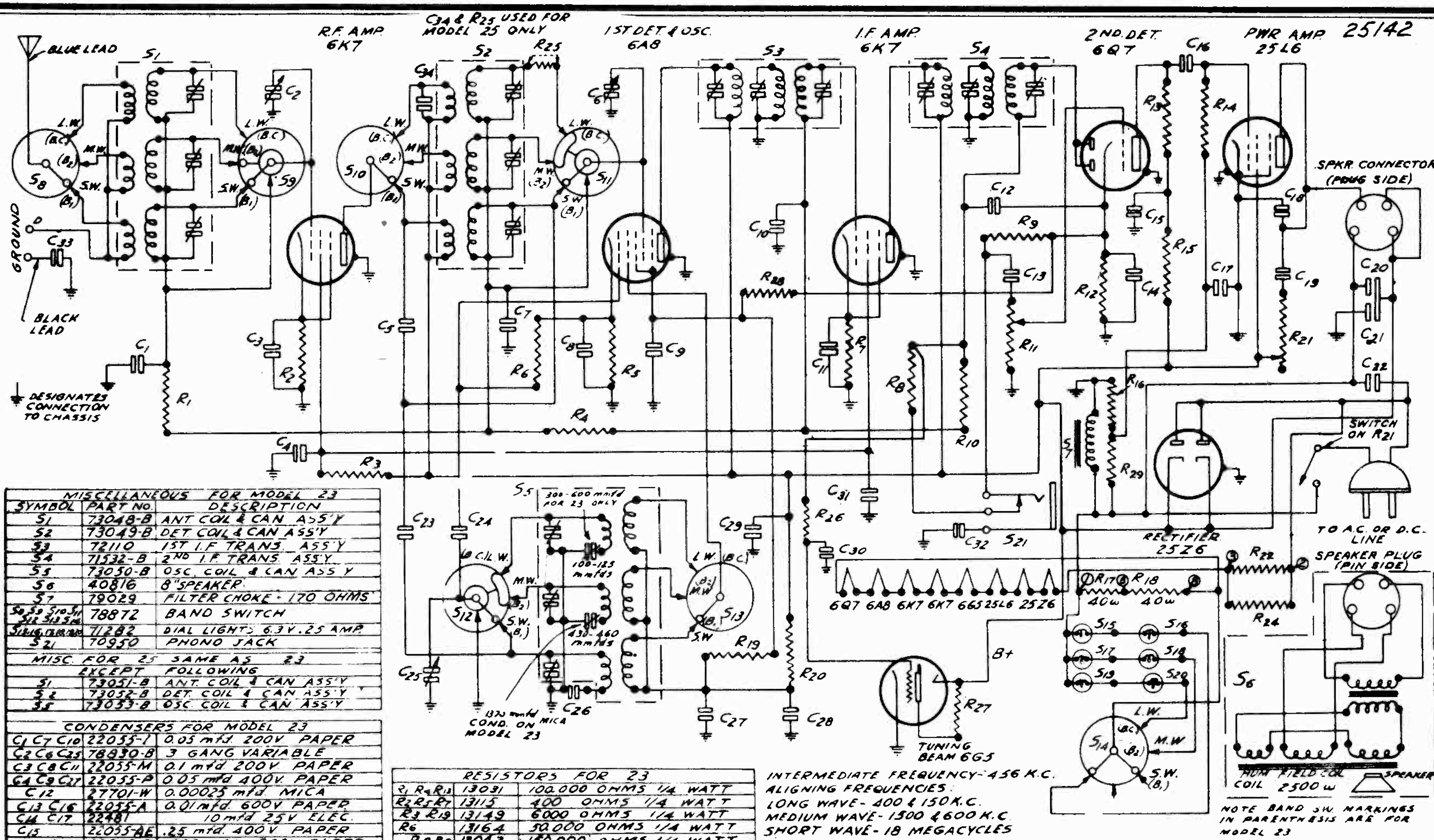


MODEL RJE
C1-C2-4x4 PAD, 110-250MMFD.

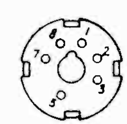
MODEL RJ
300,001 AND UP.

MODELS 23,P23,25,P25
Schematic,Parts

PILOT RADIO CORP.



FOR ALIGNMENT, SEE INDEX



PART No 81963 (BOTTOM)
NOTE: FIGURES IN CIRCLES REFER TO PIN No.

MISCELLANEOUS FOR MODEL 23		
SYMBOL	PART NO.	DESCRIPTION
S1	73048-B	ANT. COIL & CAN ASS'Y
S2	73049-B	DET. COIL & CAN ASS'Y
S3	72110	1ST I.F. TRANS. ASS'Y
S4	71532-B	2ND I.F. TRANS. ASS'Y
S5	73050-B	OSC. COIL & CAN ASS'Y
S6	40816	8" SPEAKER
S7	79029	FILTER CHOKE - 170 OHMS
S8 S9 S10 S11 S12 S13 S14	78872	BAND SWITCH
S15 S16 S17 S18 S19 S20	71282	DIAL LIGHTS 6.3 V. .25 AMP.
S21	70950	PHONO JACK
MISC. FOR 25 SAME AS 23 EXCEPT FOLLOWING		
S1	73051-B	ANT. COIL & CAN ASS'Y
S2	73052-B	DET. COIL & CAN ASS'Y
S5	73053-B	OSC. COIL & CAN ASS'Y

CONDENSERS FOR MODEL 23		
C1 C7 C10	22055-I	0.05 mfd. 200V PAPER
C2 C6 C25	78830-B	3 GANG VARIABLE
C3 C8 C11	22055-M	0.1 mfd. 200V PAPER
C4 C9 C27	22055-P	0.05 mfd. 400V. PAPER
C12	27701-W	0.00025 mfd. MICA
C13 C16	22055-A	0.01 mfd. 600V PAPER
C14 C17	22481	10 mfd. 25V ELEC.
C15	22055-AE	.25 mfd. 400V PAPER
C33	22055-R	.005 mfd. 1000V PAPER
C19	22055-AB	.1 mfd. 600V. PAPER
C20	85007	40 mfd. 150V. (BLACK) ELECTRO.
C21	85007	40 mfd. 150V. (PLAIN) ELECTRO.
C28 C31	85008	8-8 mfd. 150V ELECTROLYTIC
C22 C18	22055-U	0.01 mfd. 1000V. PAPER
C24	27723-D	.00005 mfd. MICA
C26	27742-W	.0023 mfd. MICA
C23	71525-A	NEUTRALIZING
C5	27737-D	.00001 mfd. MICA
C32	22055-S	0.5 mfd. 200V. PAPER
C30	22055-H	.02 mfd. 200 V. PAPER
C29	22065-L	.1 mfd. 400V. PAPER
CONDENSERS FOR MODEL 25 SAME AS FOR 23 EXCEPT FOLLOWING		
C34	27701-W	.00025 mfd. MICA
C26	27745-W	.0025 mfd. MICA

RESISTORS FOR 23		
R1 R4 R13	13031	100,000 OHMS 1/4 WATT
R2 R5 R7	13115	400 OHMS 1/4 WATT
R3 R19	13149	6000 OHMS 1/4 WATT
R6	13164	50,000 OHMS 1/4 WATT
R8 R9	13043	150,000 OHMS 1/4 WATT
R10 R26	13001	1,000,000 OHMS 1/4 WATT
R11	78714	750,000 OHMS VOL. CONTROL
R12	13003	300 OHMS 1/4 WATT
R27	13024	500,000 OHMS 1/4 WATT
R16	13194	400,000 OHMS 1/4 WATT
R17 R18	81963	40 OHMS
R22	81963	100 OHMS
R20	13073	3000 OHMS 1/2 WATT
R21	78821	10,000 OHMS TONE CONT. & SW.
R24	83012	400 OHMS WIRE WOUND 2 WATT
R14 R29	13171	250,000 OHMS 1/4 WATT
R15	13031	100,000 OHMS 1/4 WATT
R28	13116	12,000 OHMS 1/4 WATT
RESISTORS FOR 25 SAME AS 23 EXCEPT FOLLOWING		
R25	13029	250 OHMS 1/4 WATT

CLASSIFICATION: 20 SERIES

THIS PRINT SUPERSEDES ALL OTHERS PRIOR TO [redacted]

DO NOT SCALE THIS PRINT

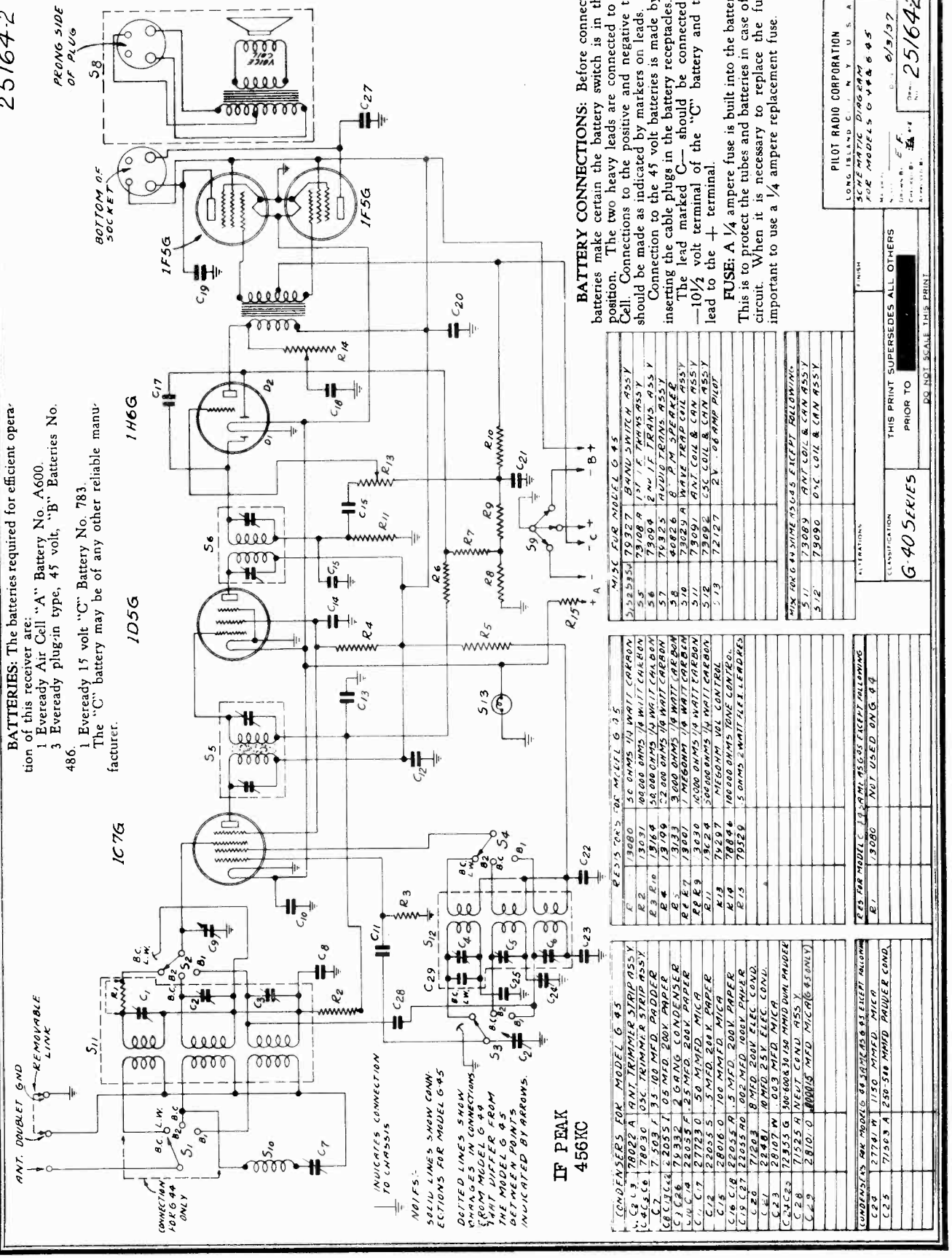
FINISH

PILOT RADIO CORPORATION
LONG ISLAND CITY, N. Y. U. S. A.
SCHEMATIC CIRCUIT DIAGRAM FOR MODELS 23-25 (610)
MATERIAL
SCALE
DATE 12/2/36
DRAWN BY
CHECKED BY
APPROVED BY
DWG. No. 25142

MODELS G-44, G-45
Schematic, Parts
Batt. Connections

PILOT RADIO CORP.

25164.2



Range, Model 23 and P-23
16 - 555 m. (18,800 - 540 kc.)

Range, Model 25 and P-25
16 - 51 m. (18,800 - 5,880 kc.)
181 - 555 m. (1,650 - 540 kc.)
731 - 2140 m. (410 - 140 kc.)

SERVICE INFORMATION FOR PILOT MODELS 23, 25, P-23, and P-25

REMOVAL OF CHASSIS FROM CABINET:

To remove the chassis from the cabinet proceed as follows:

Be certain that the line cord is removed from the power outlet socket.

Remove the "slip-on" knobs and felt washers from the controls and loosen the set screw on the tuning knob.

Remove the speaker plug from the socket at the rear of the chassis. Models P-23 and 25 have the socket mounted on the speaker.

Remove the four mounting screws, located underneath the cabinet.

Remove the tuning beam plug from the socket at the front of the chassis.

When removing Models P-23 and P-25 from the cabinet remove the phono-radio switch from the motor board, and disconnect wires going to matching transformer. Also disconnect line and ground leads to phono motor.

REALIGNMENT: Should the receiver require realignment, the procedure outlined below should be followed. For best results an external modulated oscillator with adequate frequency range, and a visual output meter, should be used.

Before connecting the chassis to the power line, reconnect the speaker cable in its socket at the rear of the chassis.

The R. F. alignment trimmer condensers are mounted on the side of the coil shields.

I. F. ALIGNMENT: When aligning the Intermediate Frequency Amplifier, the external oscillator must be set at 456 kc. The Band Selector Switch should be in the position marked "Broadcast", and the tuning condenser should be set at maximum capacity. Connect the "antenna" lead of the external oscillator to the control grid of the type 6K7 tube in the I. F. Amplifier stage through a .1 mfd. fixed condenser. Connect the "ground" lead of the external oscillator to the receiver ground lead. The I. F. alignment capacitors are located at the side of the shielded I. F. Transformers. Rotate the adjusting screw of each capacitor on I. F. Unit No. 2 slowly until maximum output is noted. On completion of this operation, remove the external oscillator lead from the type 6K7 I. F. amplifier tube and connect it in the same manner to the control grid at the top of the type 6A8 tube.

Now rotate each adjustment screw on I. F. Unit No. 1 for maximum output. During these operations, use the least possible input to prevent broadening of the resonance peaks.

In order to obtain the most accurate realignment of the I. F. amplifier, it is essential to repeat the alignment process in both I. F. Units.

BROADCAST ALIGNMENT: After the I. F. amplifier is completely realigned, connect the external oscillator leads to the receiver antenna and ground leads. Insert a 200 mmf. condenser in series with the antenna lead. Set the Band Selector Switch in the "Broadcast" position and place the tuning control pointer at the 1500 kc. mark. Adjust the broadcast band oscillator trimmer.

Next adjust the interstage alignment trimmer for maximum response. Finally adjust the antenna section trimmer in the same manner.

Next adjust the 600 kc. padder condenser, located on the top of the oscillator coil. Set the external oscillator at 600 kc. Rotate the receiver tuning control until resonance is indicated. Then rock the tuning control back and forth about this resonance position, and at the same time adjust the padder condenser for the highest resonance peak.

Now repeat the 1500 kc. trimmer adjustment, following in every detail the procedure previously described.

ALIGNMENT OF THE SHORT WAVE-BANDS:— The procedure in aligning the short wave-bands is identical with that for the broadcast with the exception of the adjustment of the padder condenser. Insert a 400 ohm non-inductive resistor in series with the antenna lead. The alignment frequencies are as follows:

Band 2: 50 Meters—(6,000 kc.)
Band 1: 16.6 Meters—(18,000 kc.)

When aligning Band 2, set the Band Selector Switch in the position marked "Band 2". Set the tuning control pointer at 50 meters. Adjust the oscillator alignment capacitor on Band 2 for maximum output. Next adjust the interstage and antenna section alignment capacitors for maximum output.

To align Band 1, set the Band Selector Switch in the position marked "Band 1". Set the tuning control pointer at the 16.6 meter mark. Set the external oscillator at 16.6 meters. Adjust the oscillator section alignment capacitor on Band 1 for maximum output.

Proceed next to align the interstage section of Band 1. In doing this, it is essential to rock the tuning control back and forth about the resonance position and at the same time to adjust the trimmer for the highest resonance peak. Next align the antenna section for maximum sensitivity.

LONG WAVE MODEL 25

The above alignment positions refer to the Model 23 only, which is calibrated in frequency. The alignment points for the Model 25, which is calibrated in meters only, is as follows:

Long Wave	Align at 750 meters.
	Pad at 2,000 meters.
Broadcast	Align at 200 meters.
	Pad at 500 meters.
Band 1	Align at 17 meters.

The Long Wave alignment procedure is similar to that for the Broadcast. A 200 mmf. condenser should be used in series with the antenna lead in aligning this band.

CAUTION: When making repairs on the receiver, use only ROSIN CORE SOLDER. NEVER USE SOLDERING PASTE OR ACID FLUXES OF ANY TYPE.

Model G-44
16.4 - 51 m. (18,300 - 5,900 kc.)
48 - 146 m. (6,250 - 2,050 kc.)
187 - 555 m. (1,600 - 540 kc.)

REMOVAL OF CHASSIS FROM CABINET:

To remove the chassis from the cabinet proceed as follows:

Be certain that the battery cable is removed from the batteries.

Remove the "slip-on" knobs and felt washers from the controls and loosen the set screw on the tuning knob.

Remove the speaker plug from the socket at the rear of the speaker.

Remove the four mounting screws, located underneath the cabinet.

REALIGNMENT: Should the receiver require realignment, the procedure outlined below should be followed. In the schematic wiring diagram, the location and function of the various alignment capacitors are clearly illustrated. For best results an external modulated oscillator with adequate frequency range, and a visual output meter, should be used.

Before connecting the chassis to the batteries, reconnect the speaker cable in its socket at the rear of the chassis.

I. F. ALIGNMENT: When aligning the Intermediate Frequency Amplifier, the external oscillator must be set at 456 kc. The Band Switch should be in the position marked "Broadcast," and the tuning condenser should be set at maximum capacity. Connect the "antenna" lead of the external oscillator to the control grid of the type 1D5G tube in the I. F. Amplifier stage through a .1 mfd. fixed condenser. Connect the "ground" lead of the external oscillator to the receiver ground lead. The I. F. alignment capacitors are located at the top of the shielded I. F. Transformers. Rotate the adjusting screw of each capacitor on I. F. Unit No. 2 slowly until maximum output is noted. On completion of this operation, remove the external oscillator leads from the type 1D5G I. F. Amplifier tube and connect it in the same manner to the control grid at the top of the type 1C7G tube.

Now rotate each adjustment screw on I. F. Unit No. 1 for maximum output. During these operations, use the least possible input to prevent broadening of the resonance peaks.

In order to obtain the most accurate realignment of the I. F. Amplifier, it is essential to repeat the alignment process in both I. F. units with the external oscillator leads connected across the control grid of the 1C7G tube.

WAVE TRAP ADJUSTMENT: With the oscillator still set at 456 kc., connect the oscillator to the antenna through a 200 mmfd. condenser. Then adjust the wave trap condenser for minimum deflection on the output meter.

The wave trap condenser is located underneath the gang condenser.

LOCATION OF TRIMMERS: The trimmers are mounted on the rear of the antenna and oscillator coil shields.

The antenna coil and trimmer assembly is mounted on the rear right corner of the chassis. The oscillator assembly is to the left of the antenna assembly.

In Model G-44 the Broadcast trimmers (oscillator and antenna) are the top trimmers.

The middle trimmers are for B2 and the bottom trimmers for B1.

The top trimmers in Model G-45 are for the long wave band. The middle trimmers are for the medium wave band and the bottom trimmers for the short wave band.

The padding condenser adjusting screw for 600 kc. is accessible through the hole at the rear of the chassis of the G-44 Model. On the G-45 Model this screw is the padding adjustment for the long wave band and the hexagon head through which this screw passes is the padding adjustment for medium wave band.

Model G-45
16.4 - 51 m. (18,800 - 5,900 kc.)
187 - 555 m. (1,600 - 540 kc.)
740 - 2,220 m. (405 - 135 kc.)
(MODEL G-45 IS SOLD OUTSIDE THE U. S. A. ONLY)

BROADCAST ALIGNMENT: After the I. F. Amplifier is completely realigned, connect the external oscillator leads to the receiver antenna and ground leads, through a .0002 mfd. condenser. Set the Band Switch in the "Broadcast" position and place the tuning control pointer at the 1500 kc. mark. Adjust the broadcast band oscillator trimmer to maximum response. Adjust the signal section trimmer in the same manner.

Next adjust the 600 kc. padder condenser. Set the external oscillator at 600 kc. Rotate the receiver tuning control until resonance is indicated. Then rock the tuning control back and forth about this resonance position, and at the same time adjust the padder condenser for the highest resonance peak.

Now repeat the 1500 kc. trimmer adjustment, following in every detail the procedure previously described.

ALIGNMENT OF THE SHORT-WAVE BANDS: The procedure in aligning the short-wave bands is identical with that for the broadcast with the exception of the adjustment of the padder condenser which is of fixed value and requires no adjustment. The alignment frequency is 16.6 Meters—(18,000 kc.)

Turn the Band Switch to the right. Tune the external oscillator to 16.6 meters. Tune the receiver so that the dial pointer is in a position coincidental with the 16.6 meter indication on the dial scale. Adjust the short wave oscillator trimmer for maximum response. Next adjust the signal circuit trimmer for maximum resonance. Repeat all adjustments to assure correct alignment, rocking the gang condenser to right or left for maximum gain.

Model G-44 is aligned in the same manner at 6,000 kc. with the switch in Band 2 position.

LONG WAVE ALIGNMENT: Procedure in the Model G-45 is similar to the Broadcast section of that receiver. Align at 375 kc. Adjust the padder at 150 kc.

Should it be necessary to remove the band switch assembly, it is advisable to realign the receiver after reinstalling.

LONG-WAVE BAND: Model G-45 (sold only outside the U. S. A.) has a third band covering 740 to 2,220 meters. Broadcast stations operating on long waves have a limited range, and are located chiefly in Europe. Hence, Model G-45 is not sold in the U. S. A. To tune the long-wave stations, simply turn the Band Switch to the third position.

CAUTION: When making repairs on the receiver, use only ROSIN CORE SOLDER. NEVER USE SOLDER-IN PASTE OR ACID FLUXES OF ANY TYPE.

ANTENNA: While this set will give you amazing results with a few feet of wire for an antenna, you will be well repaid for the slight expense of a good antenna by the improvement in broadcast quality, the increase of distance on foreign short waves, and the reduction of interference noises.

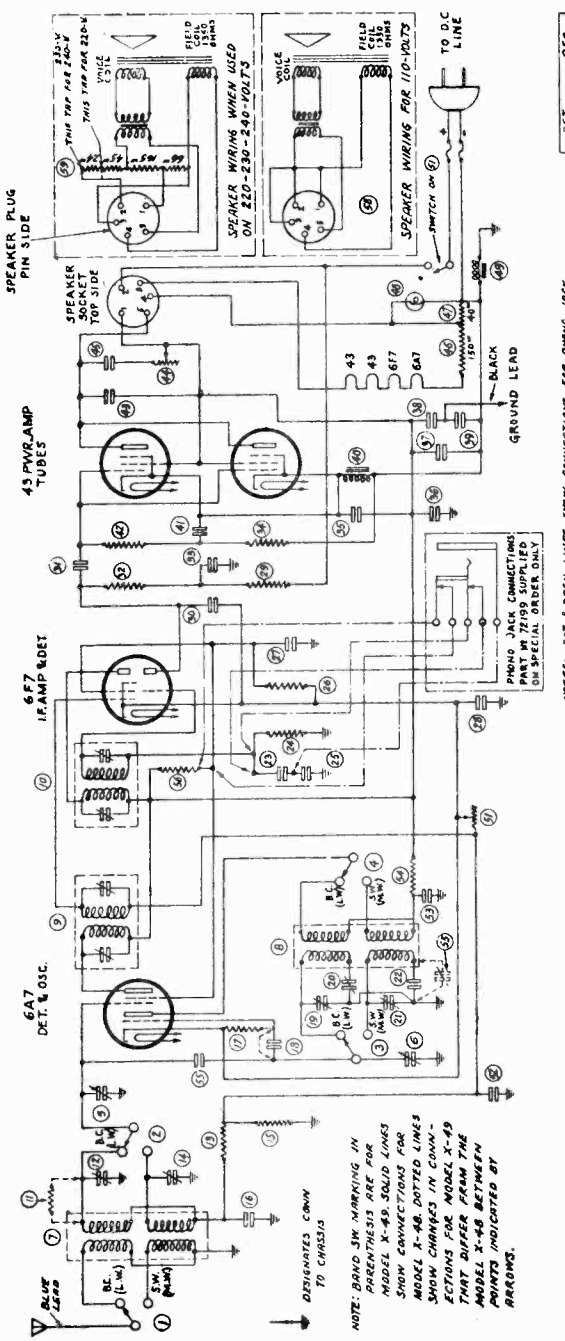
Pilot engineers recommend the doublet antenna. When using a doublet, connect one lead-in wire to terminal "A" at the rear of the set, and the other one to terminal "D".

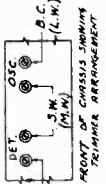
If you use an ordinary single-wire antenna, connect the antenna to the "A" terminal on the set. Then short the "D" and "G" terminals and connect to a good ground.

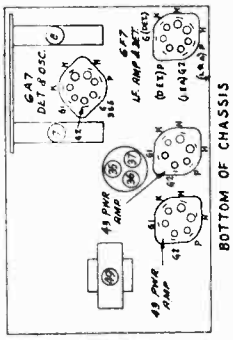
If you are in doubt about the best antenna for your location, consult your Pilot dealer. He is best able to assist you. Do not depend upon self-styled "experts".

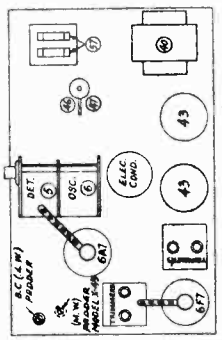
MODELS X-48, X-49
Schematic, Socket
Trimmers, Parts

PILOT RADIO CORP.









NOTES: DOT & DASH LINES SHOW CONNECTIONS FOR PHONO JACK BETWEEN POINTS INDICATED BY ARROWS
ALIGNING FREQUENCIES: MODEL X-48 BC 600 & 1400 KC SW 18 MC
MODEL X-49 LW 160 & 375 KC MW 600 & 1400 KC

IF PEAK 456 KC

MODEL X48 SUPERHETERODYNE
Range: 16-52 Meters (18,800-5,700 kc.)
178-550 Meters (1,680-545 kc.)

MODEL X49 SUPERHETERODYNE
Range: 178-550 Meters (1,680-545 kc.)
789-2,142 Meters (380-140 kc.)
(Sold in the European area only)

A good antenna is most essential for the reception of signals from stations located thousands of miles from the receiver. The flat top portion of the antenna should be placed as high above the ground and grounded objects as possible. Both lead-in wire and antenna should be located as far from sources of man-made static as possible. Automobile ignition systems, telephone communication lines, electric oil burner installations, motor and trolley power lines are some of the more common offenders of this nature. The installation of a good antenna requires a small amount of additional labor, but the extra effort is always rewarded with improved reception with a minimum of static interference. A properly installed antenna is almost as good as an extra stage of tuned radio frequency amplification.

It is advisable to place the radio receiver close to the incoming lead-in, as frequently an extension about the interior of the house picks up a considerable amount of static along with the desired signal. The illustration shows how to install a lightning arrester if one is desired.

The kit contains two 75 ft. lengths of No. 14 wire. The illustration suggests the use of at least 25 ft. per section. Use as much of the wire up to 75 ft. per section as your location will permit. The letters at the right form a reference to the parts as arranged in the illustration.

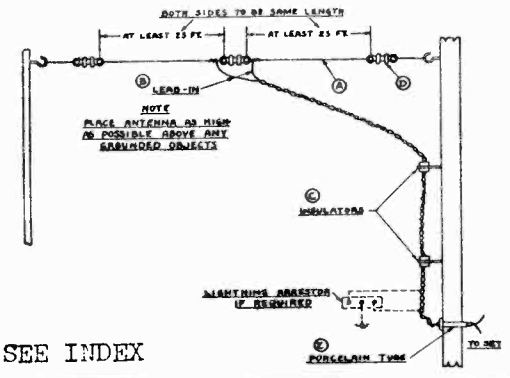
Method No. 1: Join the ends of both leads together and connect to antenna terminal of set.

Method No. 2: Connect one wire to antenna lead of set; connect the other wire to the ground lead. Use the method on your set which gives the best performance.

CONTENTS OF PILOT KIT

2—75 ft. lengths of No. 14 enameled, copper wire.....A
100 ft. twisted pair lead-in wire .....B
2—Insulated stand-off insulators C
6—Porcelain insulators .....D
2—Porcelain tubes .....D
6—Insulated staples

ALL-WAVE ANTENNA SYSTEM

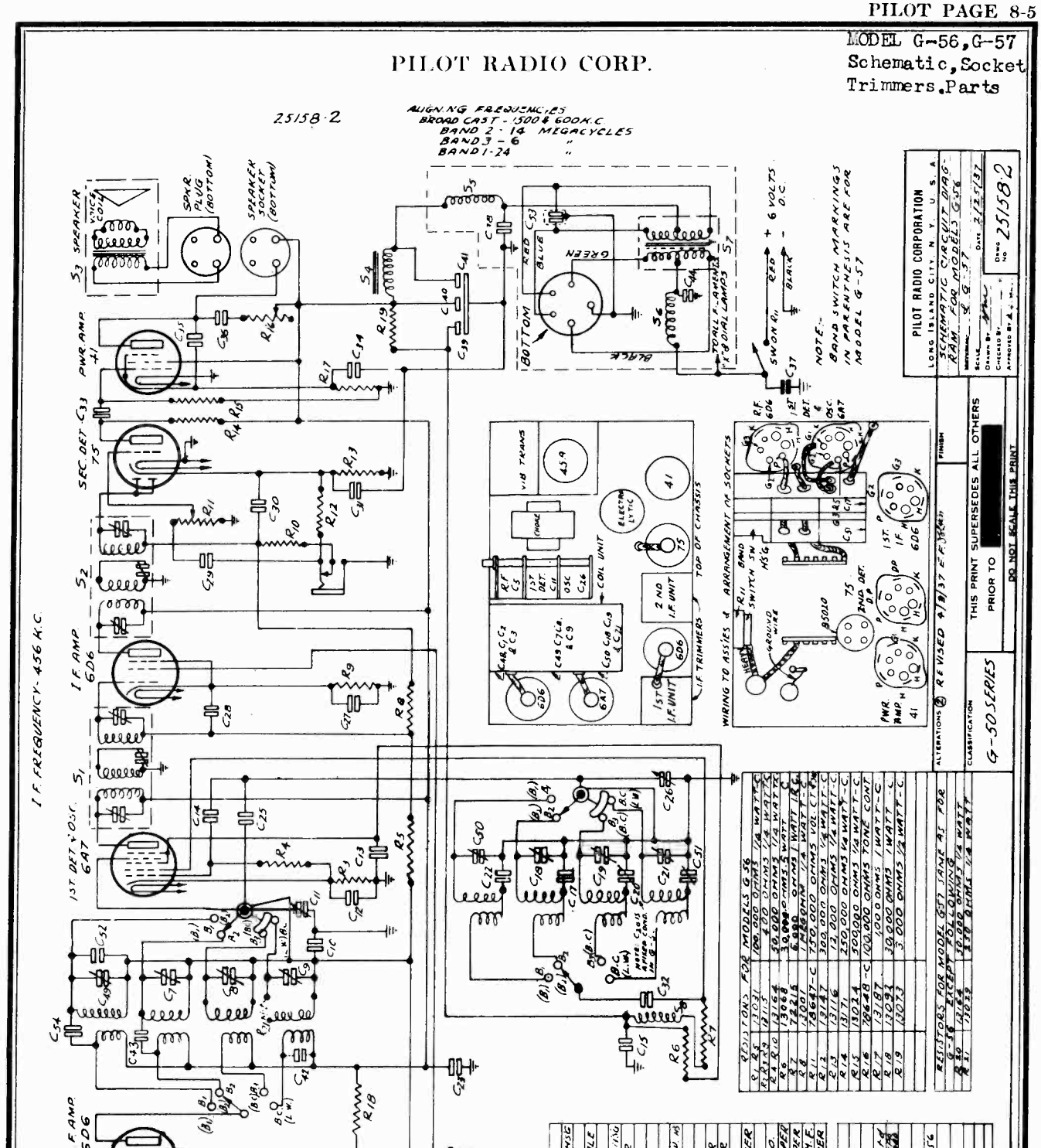


MODEL X-48 CONDENSERS		
DIAGRAM NO.	PART NO.	DESCRIPTION
42, 44, 45, 51	71529	TRIMMER & PANEL ASS'Y.
4, 6	71646	400 MMFDS. 2 GANG VARIABLE
46, 53, 54, 58	22055-M	.1 MFD. 200-V. PAPER
34, 53	22055-C	.05 MFD. 600-V. PAPER
45	22055-V	.03 MFD. 1000-V. PAPER
36, 38	22055-L	.1 MFD. 400-V PAPER
28, 41	22055-J	.25 MFD. 200-V. PAPER
33	22055-N	.1 MFD. 600-V PAPER
43	22055-U	.01 MFD. 1000-V. PAPER
30	22726-W	.0002 MFDS. MICA
22	27734-W	.006 MFDS. MICA
10	28016-W	.0001 MFDS. MICA
55	71525-B	NEUTRALIZING ASS'Y. (AS REQ'D)
20	71593-A	SINGLE PADDER 250-600 MMFDS.
35, 36, 37	71600	4-4-4 MFDS. 150-V. ELECT.
		MODEL X-48 RESISTORS
56	13124	25,000 OHMS ½ WATT
32	13171	250,000 OHMS ¼ WATT
13, 24	13031	100,000 OHMS ¼ WATT
17, 23, 26	13164	50,000 OHMS ½ WATT
14	13079	20,000 OHMS ½ WATT
15	13028	1,000 OHMS ½ WATT
42	13084	500,000 OHMS ½ WATT
29	13001	1 MEG. OHM ½ WATT
46, 47	70553	(150 OHMS) TAPPED AT 60™ 20 WATTS
51	72262	VOLUME CONTROL & SWITCH 5000™ (250™ OHMS)
44	71557	TONE CONTROL 10,000 OHMS

MODEL X-48 MISCELLANEOUS		
DIAGRAM NO.	PART NO.	DESCRIPTION
1, 2, 3, 4	71172-B	BAND SWITCH
3	71169	ANTENNA COIL ASSEMBLY
8	71170	OSCILLATOR COIL ASSEMBLY
9	70934	1ST I.F. COIL ASSEMBLY
10	70937	2ND I.F. COIL ASSEMBLY
38	40801	SPEAKER & RESISTOR ASSEM.
39	78566	SPEAKER & RESISTOR ASSEM.
48	71582	DIAL LAMP 6.3 V. .25 AMP
57	70853-D	FUSE .75 AMP
40	71635	POWER CHOKE 312™ 10 HENRIES
49	42007-B	FILTER CHOKE 450™
MODEL X-48 SAME AS X-48 EXCEPT AS FOLLOWS		
DIAGRAM NO.	PART NO.	DESCRIPTION
55	71577-F	DUAL PADDER (450-520 MMFDS. 15-70 MMFDS.
7	71173	ANTENNA COIL ASSEMBLY
8	71174	OSCILLATOR COIL ASSEMBLY
11	13480	50 OHM ½ WATT RESISTOR
55	71526-B	NOT USED
18	28016-W	NOT USED
20	71593-A	NOT USED
22	27734-W	NOT USED

FOR ALIGNMENT, SEE INDEX

MODEL G-56, G-57
Schematic, Socket
Trimmers, Parts



1. Examine the label on the rear of the chassis to make sure that the voltage is correct for the power supply in your home.
2. Connect the blue wire at the rear of the chassis to your antenna. For best results use an antenna of the type described in the PILOT antenna instruction sheet. If you are not experienced in erecting antennas, we strongly advise having this done by your radio service man. Good results can be obtained from a single wire about fifty feet long, and as high above surrounding objects as possible.
3. Connect the black lead at the rear of the chassis to the ground. This lead should be as short as possible, connected to the nearest water pipe.
4. When the connections have been made, switch on the set by turning the upper left-hand knob clockwise. This is the volume control knob as well as the line switch. On the right is the tuning knob for the compass dial, and at the lower right, the Band Switch.
5. When tuning in a station, be very careful to adjust the dial to the center of the response with the volume control set at the lowest position that will give sufficient volume. Unless that is done, the tone will be distorted.
6. If signals from local stations are loud enough to overload the speaker, reducing the volume slightly will clear up the tone.
7. The tone control is at the lower left. Turning the knob to the left emphasizes the bass. Full musical response is obtained when this knob is turned all the way to the right.
8. If there is no sound in the speaker after the set has been turned on and the tubes have had time to become warm, reverse the position of the plug in the line socket.

NOTE: This PILOT set, in design, the quality of the materials, and the workmanship, is a fine musical instrument. It deserves careful treatment. Protect it from excessive dampness and from dry heat. Have it inspected and have the tubes checked twice a year by your radio dealer, to assure the maintenance of its fine musical quality.

SERVICE INFORMATION

REMOVAL OF CHASSIS FROM CABINET:

To remove the chassis from the cabinet proceed as follows:

Be certain that the line cord is removed from the power outlet socket.

Remove the slip-on knobs and felt washers from the controls on the front panel.

Remove the speaker plug from the socket at the rear of the chassis.

Remove the four mounting screws, located underneath the cabinet.

REALIGNMENT: Should the receiver require realignment, the procedure outlined below should be followed. For best results an external modulated oscillator with adequate frequency range, and a visual output meter, should be used.

Before connecting the chassis to the power line, reconnect the speaker cable in its socket at the rear of the chassis.

I. F. ALIGNMENT: When aligning the intermediate Frequency Amplifier, the external oscillator must be set at 456 kc. The tuning condenser should be set at maximum capacity. Connect the antenna lead of the external oscillator to the control grid of the type 6F7 tube in the I. F. Amplifier stage through a 0.1 mfd. fixed condenser. Connect the ground lead of the external oscillator to the receiver ground clip. The I. F. alignment capacitors are located at the top of the shielded I. F. Transformers. Rotate the adjusting screw of each capacitor on I. F. Unit No. 2 slowly until maximum output is noted. On completion of this operation, remove the external oscillator leads from the type 6F7 I. F. Amplifier tube and connect it in the same manner to the control grid at the top of the type 6A7 tube.

Now rotate each adjustment screw on I. F. Unit No. 1 for maximum output. During these operations, use the least possible input to prevent broadening of the resonance peaks.

In order to obtain the most accurate realignment of the I. F. Amplifier, it is essential to repeat the alignment process in both I. F. units with the external oscillator leads connected across the control grid of the 6A7 tube.

BROADCAST ALIGNMENT: After the I. F. Amplifier is completely realigned, connect the external oscillator leads to the receiver antenna and ground leads, this time with a .0002 mfd. condenser in the antenna lead. Adjust the tuning control pointer at the 1400 kc. mark. Adjust the broadcast band oscillator trimmer to maximum response. Adjust the signal section trimmer in the same manner.

Next adjust the 600 kc. padder condenser. Set the external oscillator at 600 kc. Rotate the receiver tuning control until resonance is indicated. Then rock the tuning control back and forth about this resonance position, and at the same time adjust the padder condenser for the highest resonance peak.

Now repeat the 1400 kc. trimmer adjustment, following in every detail the procedure previously described.

SHORT-WAVE ALIGNMENT: The procedure in aligning the short-wave bands is identical with that for the broadcast with the exception of the adjustment of the padder condenser. A 400 ohm resistor should be inserted in the antenna lead. The alignment frequency is 16.8 Meters—(17,800 kc.).

Turn the Band Switch to the right. Tune the external oscillator to 16.8 meters. Tune the receiver so that the dial pointer is in a position coincidental with the 16.8 meter indication on the dial scale. Adjust the short wave oscillator trimmer for maximum response. Next adjust the signal circuit trimmer for maximum resonance. Repeat all adjustments to assure correct alignment, rocking the gang condenser to right or left for maximum gain.

HIGH BAND ALIGNMENT: Procedure in the Model 49 is similar to the Broadcast section of this receiver. Align at 375 kc. Adjust the padder at 160 kc.

CAUTION: When making repairs on the receiver, use only ROSIN CORE SOLDER. NEVER USE SOLDERING PASTE OR ACID FLUXES OF ANY TYPE.

VOLTAGES MEASURED AT TUBE SOCKETS

	6A7 Det., Osc.	6F7 Amp., Det.	43 Output	43 Output
Plate	125 (110)	125 (110)	175 (95)	175 (95)
Screen	45 (45)	45 (45)	135 (110)	135 (110)
Cathode	10 (8)	10 (8)	21* (16)*	21* (16)*
Filament	6.3 (6.3)	6.3 (6.3)	25 (25)	25 (25)

Speaker field volts—105 (105) volts.

Anode grid of 6A7—110 (80) volts.

Triode plate of 6F7—95 (70) volts.

Note: Values are given for 220-volt line. For 110-volt line use values in parentheses.

* Measured across choke No. 40

Note: All measurements made with volt meter of at least 1,000 ohms per volt.

Note: All measured to chassis frame.

Model G-56
Four Tuning Bands Cover 12.4-566 m. (24,200-530 kc.)
Model G-57
Four Tuning Bands: 12.4-32.5 meters (24,200-9,200 kc.)—20.5-61 meters (14,600-4,900 kc.) 182-566 meters (1,650-530 kc.) — 755-2,300 meters (397-130 kc.)

REMOVAL OF CHASSIS FROM CABINET:

To remove the chassis from the cabinet proceed as follows:

Disconnect the battery from the receiver.

Remove the "slip-on" knobs and felt washers from the controls and loosen the set screw on the tuning knob.

Remove the speaker plug from the socket at the rear of the chassis.

Remove the four mounting screws, located underneath the cabinet.

REALIGNMENT: Should the receiver require realignment, the procedure outlined below should be followed. For best results an external modulated oscillator with adequate frequency range, and a visual output meter, should be used.

Before connecting the chassis to the battery, reconnect the speaker cable in its socket at the rear of the chassis.

The location of the R. F. alignment trimmer condensers is on the side of the band switch. The trimmers in the lowest row are those for aligning Band 1. Those in the second row from bottom are for Band 2. Those in the third row up are for Band 3. The trimmers in the top row are for the Broadcast band. The Broadcast and Long Wave trimmers for Model G-57, are located in the third and fourth rows respectively from the bottom.

The padder condenser is located under the rear section of the band switch. Access to the padder condenser is made through a hole provided in the rear of the chassis frame. Model G-57 has a Long Wave and a Broadcast padding condenser.

I. F. ALIGNMENT: When aligning the Intermediate Frequency Amplifier, the external oscillator must be set at 456 kc. The Band Selector Switch should be in the position marked "Broadcast", and the tuning condenser should be set at maximum capacity. Connect the "antenna" lead of the external oscillator to the control grid of the type 6K7 tube in the I. F. Amplifier stage through a .1 mfd. fixed condenser. Connect the "ground" lead of the external oscillator to the receiver ground lead. The I. F. alignment capacitors are located at the side of the shielded I. F. Transformers. Rotate the adjusting screw of each capacitor on I. F. Unit No. 2 slowly until maximum output is noted. On completion of this operation, remove the external oscillator lead from the type 6K7 I. F. amplifier tube and connect it in the same manner to the control grid at the top of the type 6A8 tube.

Now rotate each adjustment screw on I. F. Unit No. 1 for maximum output. During these operations, use the least possible input to prevent broadening of the resonance peaks.

In order to obtain the most accurate realignment of the I. F. amplifier, it is essential to repeat the alignment process in both I. F. Units.

BROADCAST ALIGNMENT: After the I. F. amplifier is completely realigned, connect the external oscillator leads to the receiver antenna and ground leads. Insert a 200 mmf. condenser in series with the antenna lead. Set the Band Selector Switch in the "Broadcast" position and place the tuning control pointer at the 1500 kc. mark. Adjust the broadcast band oscillator trimmer.

Next adjust the 600 kc. padder condenser, located in the lower rear partition of the band switch, under the chassis. Set the external oscillator at 600 kc. Rotate the receiver tuning control to the resonance position, and at the same time adjust the padder condenser for the highest peak.

Now repeat the 1500 kc. trimmer adjustment, following in every detail the procedure previously described.

The alignment frequencies are as follows:

Model G-56

Band 4—500 and 200 meters—600 and 1,500 kc.
Band 3—50 meters— 6,000 kc.
Band 2—21.4 meters—14,000 kc.
Band 1—12.5 meters—24,000 kc.

Model G-57

Band 4—1,875 and 800 meters—160 and 375 kc.
Band 3— 500 and 200 meters—600 and 1,500 kc.
Band 2—21.4 meters—14,000 kc.
Band 1—12.5 meters—24,000 kc.

The .0002 mfd. condenser should be replaced with a 400 ohm resistor when aligning Band 3 (Model G-56). Rotate the tuning condenser to the 6,000 kc. indication on the dial scale. Set the external oscillator at 6,000 kc. Adjust the Band 3 oscillator trimmer for maximum sensitivity. Next adjust the interstage and antenna trimmer condensers for maximum sensitivity. Check the overall sensitivity of the band at several points along the dial scale.

Align Band 2 in a similar manner. The alignment frequency is 14,000 kc. (21.4 meters).

The alignment of Band 1 requires greater care due to the higher frequencies covered by this band. The alignment frequency is 24,000 kc. or 12.5 meters. Set the external oscillator at 24,000 kc. Rotate the tuning condenser of the receiver until the dial pointer is co-incidental with the 24,000 kc. indication on the dial scale. Adjust the oscillator trimmer condenser for maximum sensitivity. Proceed next to align the interstage section. In doing this it is essential to rock the tuning control back and forth about the resonance position and at the same time to adjust the trimmer for the highest resonant peak. Next align the antenna section for minimum sensitivity.

The Long Wave alignment procedure for Model G-57 is similar to that for Broadcast.

REMOVAL OF BAND SELECTOR SWITCH ASSEMBLY: Should it be necessary to remove the switch assembly, this is easily done by removing the supporting screws. Before doing this, however, it is essential to unsolder the leads between the switch and the chassis.

It is advisable to realign the receiver after reinstalling the switch assembly.

PHONOGRAPH PICK-UP: A jack is provided at the rear of the chassis for plugging in an electric phonograph pick-up, in order that records can be reproduced by the loudspeaker, through the high-quality amplifier with which this set is equipped. The pick-up should be of the high-impedance type.

SHORT WAVE BAND 3: Amateurs and police transmitters are included in Band 3. (Model G-56 only.)

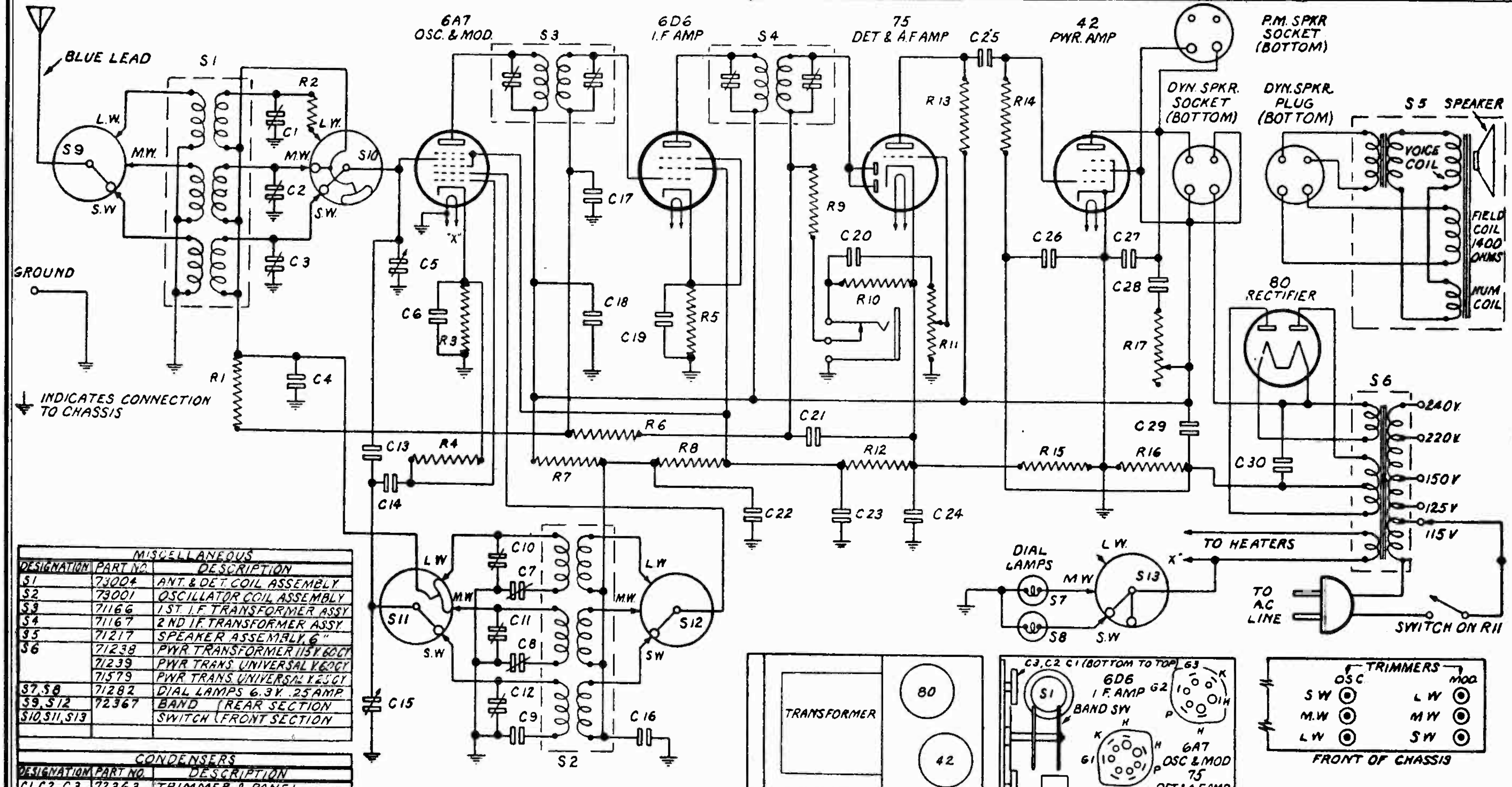
LONG WAVE BAND: Stations operating on wavelengths between 755 and 2,300 meters will be received when the band switch is in the fourth position. (Model G-57 only.)

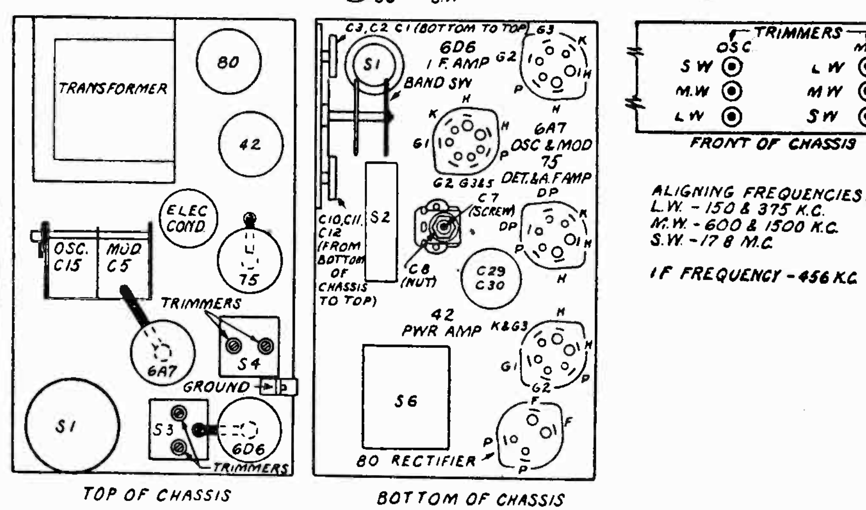
CAUTION: When making repairs on the receiver, use only ROSIN CORE SOLDER. NEVER USE SOLDERING PASTE OR ACID FLUXES OF ANY TYPE.

PILOT RADIO CORP.

PILOT RADIO CORP.

MODEL X-105
Schematic, Socket Trimmers, Parts





MISCELLANEOUS		
DESIGNATION	PART NO.	DESCRIPTION
S1	73004	ANT. & DET. COIL ASSEMBLY
S2	73001	OSCILLATOR COIL ASSEMBLY
S3	71166	1ST. I.F. TRANSFORMER ASSY
S4	71167	2ND I.F. TRANSFORMER ASSY.
S5	71217	SPEAKER ASSEMBLY, 6"
S6	71238	PWR. TRANSFORMER 115V. 60CY
	71239	PWR. TRANS. UNIVERSAL V. 60CY
	71579	PWR. TRANS. UNIVERSAL V. 25CY
S7, S8	71282	DIAL LAMPS 6.3V. .25 AMP.
S9, S12	72367	BAND SWITCH { REAR SECTION
S10, S11, S13		{ FRONT SECTION

CONDENSERS		
DESIGNATION	PART NO.	DESCRIPTION
C1, C2, C3. C10, C11, C12	72363	TRIMMER & PANEL ASSEMBLY
C4, C17	22055-I	.05 MFD. 200 V. PAPER
C5, C15	72371	405 MMFDS 2 GANG VAR.
C6, C19	22055-M	.1 MFD. 200 V PAPER
C7	72355-G	DUAL PADDER { 30-150 MMFDS
C8		{ 300-600 "
C9	27734-W	6000 MMFDS. MICA
C13	71525-B	NEUTRALIZING ASSY.
C14	27723-W	50 MMFDS. MICA
C16	22055-C	.05 MFD. 600 V. PAPER
C18	22055-AB	.1 MFD. 600 V PAPER
C20, C25	22055-A	.01 MFD. 600 V. PAPER
C21	27701-W	250 MMFDS. MICA
C22	72353	4 MFDS. 475 V. ELECTRO.
C23	22055-P	.05 MFD. 400 V. PAPER
C24	22055-F	.25 MFD. 200 V PAPER
C26	22055-S	.5 MFD. 200 V. PAPER
C27	22055-R	.005 MFD 1000 V PAPER
C28	22055-AF	.05 MFD 1000 V. PAPER
C29, C30	71045	DUAL 8 MFDS. 475 V ELEC

RESISTORS		
DESIGNATION	PART NO.	DESCRIPTION
R1	13031	100,000 OHMS 1/4 WATT
R2	13080	50 OHMS 1/4 WATT
R3, R5	13115	400 OHMS 1/4 WATT
R4, R9	13164	50,000 OHMS 1/4 WATT
R6	13001	1 MEGOHM 1/4 WATT
R7	13073	3,000 OHMS 1/2 WATT
R8	13129	15,000 OHMS 1 WATT
R10	13147	300,000 OHMS 1/4 WATT
R11	71211	750,000 OHMS VOLUME CONTROL & SWITCH
R12	13148	30,000 OHMS 1/4 WATT
R13	13171	250,000 OHMS 1/4 WATT
R14	13024	500,000 OHMS 1/4 WATT
R15	13130	420 OHMS 1/4 WATT
R16	13059	250 OHMS 1 WATT
R17	71615	100,000 OHMS TONE CONTROL

MODEL X-105
Voltage,Alignment
MODEL 223
Alignment

PILOT RADIO CORP.

MODEL 223

A good antenna is most essential for the reception of signals from stations located thousands of miles from the receiver. The flat top portion of the antenna should be placed as high above the ground and grounded objects as possible. Both lead-in wire and antenna should be located as far from sources of man-made static as possible. Automobile ignition systems, telephone communication lines, electric oil burner installations, motor and trolley power lines are some of the more common offenders of this nature. The installation of a good antenna requires a small amount of additional labor, but the extra effort is always rewarded with improved reception with a minimum of static interference. A properly installed antenna is almost as good as an extra stage of tuned radio frequency amplification.

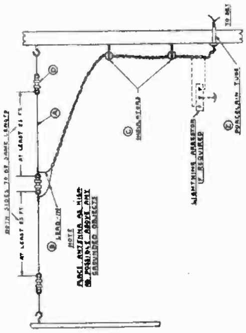
It is advisable to place the radio receiver close to the incoming lead-in, as frequently an extension about the interior of the house picks up a considerable amount of static along with the desired signal. The illustration shows how to install a lightning arrester if one is desired.

The kit contains two 75 ft. lengths of No. 14 wire. The illustration suggests the use of at least 25 ft. per section. Use as much of the wire up to 75 ft. per section as your location will permit. The letters at the right form a reference to the parts as arranged in the illustration.

Method No. 1: Join the ends of both leads together and connect to antenna terminal of set.

Method No. 2: Connect one lead to antenna of set; connect the other lead to the ground. Use the method on your set which gives the best performance.

ALL-WAVE ANTENNA SYSTEM



CONTENTS OF PILOT KIT

2—75 ft. lengths of No. 14 enameled, copper wire	A
100 ft. twisted pair lead-in wire	B
2—Insulated stand-off insulators	C
6—Porcelain insulators	D
2—Porcelain tubes	D
6—Insulated staples	

SERVICE INFORMATION

REMOVAL OF CHASSIS FROM CABINET:

To remove the chassis from the cabinet proceed as follows:

Be certain that the line cord is removed from the power outlet socket.

Remove the "slip-on" knobs and felt washers from the controls on the front panel.

Remove the speaker plug from the socket at the top of the chassis.

Remove the four mounting screws located underneath the cabinet.

REALIGNMENT: Should the receiver require realignment, the outlined procedure below should be followed. In the schematic wiring diagram the location and function of the various alignment capacitors are clearly illustrated. For best results an external modulated oscillator with adequate frequency range, and a visual output meter should be used.

Before connecting the chassis to the power line, reconnect the speaker cable in its socket at the top of the chassis.

I. F. ALIGNMENT: When aligning the Intermediate Frequency Amplifier, the external oscillator must be set at 456 kc. The Band Selector Switch should be in the position marked "Broadcast", and the tuning condenser should be set at maximum capacity. Connect the "antenna" lead of the external oscillator to the control grid of the type 6D6 tube in the I. F. Amplifier stage through a .1 mfd. fixed condenser. Connect the "ground" lead of the external oscillator to the receiver chassis. The I. F. alignment capacitors are located at the side of the shielded I. F. Transformers. Rotate the adjusting screw of each capacitor on I. F. Unit No. 2 slowly until maximum output is noted. On completion of this operation, remove the external oscillator lead from the type 6D6 I. F. amplifier tube and connect it in the same manner to the control grid at the top of the type 6A7 tube.

Now rotate each adjustment screw on I. F. Unit No. 1 for maximum output. During these operations, use the least possible input to prevent broadening of the resonance peaks.

In order to obtain the most accurate realignment of the I. F. Amplifier, it is essential to repeat the alignment process in both I. F. Units, with the external oscillator connected to the 6A7 tube.

BROADCAST ALIGNMENT: After the I. F. Amplifier is completely realigned, connect the external oscillator leads to the receiver antenna and chassis, this time with a 200 mmf. condenser in the antenna lead. Set the Band Selector Switch in the "Broadcast" position and place the tuning control pointer at the 1500 kc. mark. Adjust the broadcast band oscillator trimmer to maximum response.

Next adjust the interstage alignment trimmer for maximum response. Finally adjust the antenna section trimmer in the same manner.

Next adjust the 600 kc. padder condenser, located on the top of the oscillator coil. Set the external oscillator at 600 kc. Rotate the receiver tuning control until resonance is indicated. Then rock the tuning control back and forth about this resonance position, and at the same time adjust the padder condenser for the highest response.

Now repeat the 1500 kc. trimmer adjustment, following in every detail the procedure previously described.

ALIGNMENT OF THE SHORT WAVE BANDS: The procedure in aligning the short wave bands is identical with that for the broadcast with the exception of the adjustment of the padder condenser. A 400-ohm resistor should be connected in the antenna lead. The alignment frequency of Band 1 is 16.8 Meters—(17,800 kc.) and of Band 2, 6000 kc.

Turn the Band Switch to Band 1. Tune the external oscillator to 16.8 meters. Tune the receiver so that the dial pointer is in a position coincidental with the 16.8 meter indication on the dial scale. Adjust Band 1 oscillator trimmer for maximum response. Next adjust the signal circuit trimmer for maximum resonance. Repeat all adjustments to assure correct alignment, rocking the gang condenser to right or left for maximum gain. Then align Band 2 in the same manner at 6000 kc.

NOTE: Should it be necessary to remove any part of the band switch assembly, it is advisable to realign the receiver after reinstalling.

CAUTION: When making repairs on the receiver, use only ROSIN CORE SOLDER. NEVER USE SOLDERING PASTE OR ACID FLUXES OF ANY TYPE.

MODEL X105 SUPERHETERODYNE SERVICE INFORMATION Range: 16-52 Meters (18,800-5,700 kc.)

REMOVAL OF CHASSIS FROM CABINET:

To remove the chassis from the cabinet proceed as follows:

Be certain that the line cord is removed from the power outlet socket.

Use a small screw driver to loosen the set screw on the tuning knob.

Remove the "slip-on" knobs and felt washers from the controls on the front panel.

Remove the speaker plug from the socket at the rear of the chassis.

Remove the four mounting screws, located underneath the cabinet.

REALIGNMENT: Should the receiver require re-alignment, the outlined procedure below should be followed. In the schematic wiring diagram, the location and function of the various alignment capacitors are clearly illustrated. For best results an external modulated oscillator with adequate frequency range, and a visual output meter, should be used.

Before connecting the chassis to the power line, reconnect the speaker cable in its socket at the rear of the chassis.

I. F. ALIGNMENT: When aligning the Intermediate Frequency Amplifier, the external oscillator must be set at 456 kc. The Band Switch should be in the position marked "Broadcast," and the tuning condenser should be set at maximum capacity. Connect the "antenna" lead of the external oscillator to the control grid of the type 6D6 tube in the I. F. Amplifier stage through a .1 mfd. fixed condenser. Connect the "ground" lead of the external oscillator to the receiver ground lead. The I. F. alignment capacitors are located at the top of the shielded I. F. Transformers. Rotate the adjusting screw of each capacitor on I. F. Unit No. 2 slowly until maximum output is noted. On completion of this operation, remove the external oscillator leads from the type 6D6 I. F. Amplifier tube and connect it in the same manner to the control grid at the top of the type 6A7 tube.

Now rotate each adjustment screw on I. F. Unit No. 1 for maximum output. During these operations, use the least possible input to prevent broadening of the resonance peaks.

In order to obtain the most accurate realignment of the I. F. Amplifier, it is essential to repeat the alignment process in both I. F. units with the external oscillator leads connected across the control grid of the 6A7 tube.

BROADCAST ALIGNMENT: After the I. F. amplifier is completely realigned, connect the external oscillator leads to the receiver antenna and ground leads, through a .0002 mfd. condenser. Set the Band Switch in the "Broadcast" position and place the tuning control pointer at the 1500 kc. mark. Adjust the broadcast band oscillator trimmer to maximum response. Adjust the signal section trimmer in the same manner.

Next adjust the 600 kc. padder condenser. Set the external oscillator at 600 kc. Rotate the receiver tuning control until resonance is indicated. Then rock the tuning control back and forth about this resonance position, and at the same time adjust the padder condenser for the highest resonance peak.

Now repeat the 1500 kc. trimmer adjustment, following in every detail the procedure previously described.

ALIGNMENT OF THE SHORT-WAVE BANDS: The procedure in aligning the short wave-bands is identical with that for the broadcast with the exception of the adjustment of the padder condenser which is of fixed value and requires no adjustment. The alignment frequency is 16.6 Meters—(18,000 kc.)

Turn the Band Switch to the right. Tune the external oscillator to 16.6 meters. Tune the receiver so that the dial pointer is in a position coincidental with the 16.6 meter indication on the dial scale. Adjust the short wave oscillator trimmer for maximum response. Next adjust the signal circuit trimmer for maximum resonance. Repeat all adjustments to assure correct alignment, rocking the gang condenser to right or left for maximum gain.

LONG WAVE ALIGNMENT: Procedure in the Model X105 is similar to the Broadcast section of that receiver. Align at 375 k.c. Adjust the padder at 160 k.c.

Should it be necessary to remove the band switch assembly, it is advisable to realign the receiver after reinstalling.

CAUTION: When making repairs on the receiver, use only ROSIN CORE SOLDER. NEVER USE SOLDERING PASTE OR ACID FLUXES OF ANY TYPE.

RECEIVER DESCRIPTION

Operating Voltages—115, 125, 150, 220, 240 volts, Alternating Current.
Frequency Rating —50 to 60 cycles.
Power Consumption—50 Watts.
Tubes —1 type 6A7, 1 type 6D6, 1 type 75, 1 type 42, 1 type 80.
Wavelength Range—16 meters to 52.6 meters—178.5 meters to 550 meters—789 to 2142 meters.
Undistorted power output—3 watts.
Intermediate Frequency—456 kc.
Tube Functions —Type 6A7: Electron emission control oscillator-detector.
Type 6D6: I. F. Amplifier.
Type 75: Duo-diode detector amplifier.
Type 42: Class "A" power pentode.
Type 80: Full-wave rectifier for power supply.

VOLTAGES

The D. C. Voltages measured at the tube sockets of the set should be read with a high resistance voltmeter of at least 1000 ohms per volt.

	OSC. DET. Type 6A7	I. F. Type 6D6	DIODE DET. Type 75	POWER PENTODE Type 42	RECTIFIER Type 80
Plate	230	230	105*	205	***
Cathode	4.	3.8	1.4	**	
Screen	85	85		230	
Filament	6.3	6.3	6.3	6.3	

*Voltages measured through 250,000 ohm plate resistor.

Speaker field voltage 90 volts. All plate voltages measured to cathode.

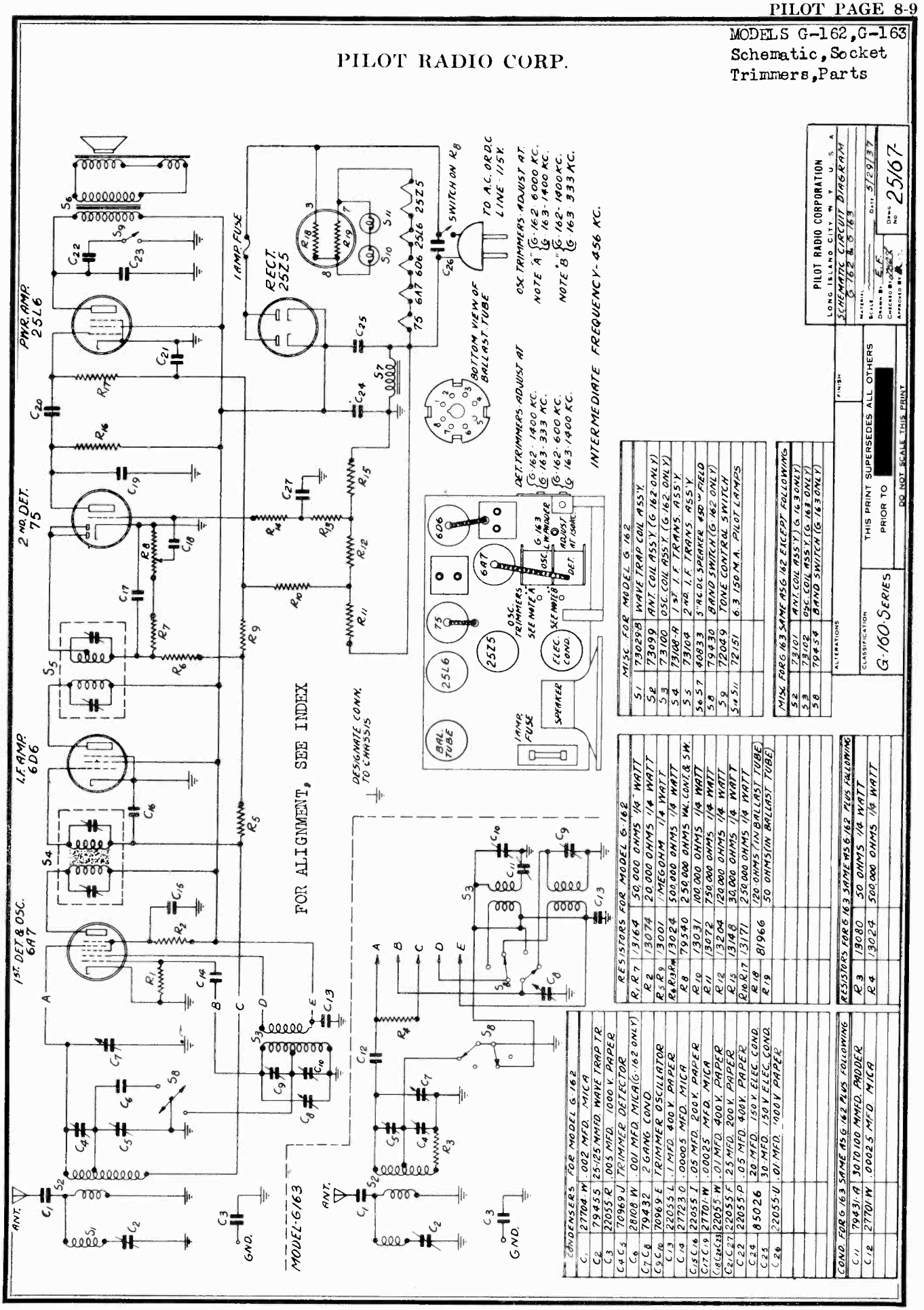
All screen voltages measured to cathode. All cathode voltages measured to chassis frame.

**Grid bias voltage for No. 42 tube obtained across R-16 (250 ohms resistor).

***Filament to chassis ground 315 volts D. C.

Anode grid of 6A7 to cathode—175 volts.

MODELS G-162, G-163
Schematic, Socket
Trimmers, Parts



CONDENSERS FOR MODEL G-162		
C1	27704 W	.002 MFD. MICA
C2	79455	25-125 MMFD. WAVE TRAP TR
C3	22055 R	.005 MFD. 1000 V. PAPER
C4 C5	70969 J	TRIMMER DETECTOR
C6	28108 W	.001 MFD. MICA (G-162 ONLY)
C7 C8	79432	2 GANG COND.
C9 C10	70969 E	TRIMMER OSCILLATOR
C13	22055 L	.1 MFD. 400 V. PAPER
C14	27723 O	.00005 MFD. MICA
C15 C16	22055 I	.05 MFD. 200 V. PAPER
C17 C19	27701 W	.00025 MFD. MICA
C18 C23 C26	22055 W	.01 MFD. 400 V. PAPER
C21 C27	22055 F	.25 MFD. 200 V. PAPER
C22	22055 P	.05 MFD. 400 V. PAPER
C24	85026	20 MFD. 150 V. ELEC. COND.
C25		30 MFD. 150 V. ELEC. COND.
C26	22055 U	.01 MFD. 400 V. PAPER

COND. FOR G-163 SAME AS G-162 PLUS FOLLOWING		
C11	79431 A	30 TO 100 MMFD. PADDER
C12	27701 W	.00025 MFD. MICA

RESISTORS FOR MODEL G-162		
R1 R7	13164	50,000 OHMS 1/4 WATT
R2	13074	20,000 OHMS 1/4 WATT
R3 R9	13001	1 MEGOHM 1/4 WATT
R6 R13 R14	13024	500,000 OHMS 1/4 WATT
R8	79540	250,000 OHMS VAL. CONT. & SW.
R10	13031	100,000 OHMS 1/4 WATT
R11	13072	750,000 OHMS 1/4 WATT
R12	13204	120,000 OHMS 1/4 WATT
R15	13148	30,000 OHMS 1/4 WATT
R16 R17	13171	250,000 OHMS 1/4 WATT
R18	81966	120 OHMS (IN BALLAST TUBE)
R19		50 OHMS (IN BALLAST TUBE)

RESISTORS FOR G-163 SAME AS G-162 PLUS FOLLOWING		
R3	13080	50 OHMS 1/4 WATT
R4	13024	500,000 OHMS 1/4 WATT

MISC. FOR MODEL G-162		
S1	73029B	WAVE TRAP COIL ASS'Y.
S2	73099	ANT. COIL ASS'Y (G-162 ONLY)
S3	73100	OSC. COIL ASS'Y (G-162 ONLY)
S4	73108-B	1ST I.F. TRANS. ASS'Y.
S5	73104	2ND. I.F. TRANS. ASS'Y.
S6 S7	40833	5" A.C.-D.C. SPEAKER 450 Ω FIELD
S8	79430	BAND SWITCH (G-162 ONLY)
S9	72049	TONE CONTROL SWITCH
S10 S11	72151	6.3 150 M.A. PILOT LAMPS

MISC. FOR G-163 SAME AS G-162 EXCEPT FOLLOWING		
S2	73101	ANT. COIL ASS'Y (G-163 ONLY)
S3	73102	OSC. COIL ASS'Y (G-163 ONLY)
S8	79454	BAND SWITCH (G-163 ONLY)

ALTERATIONS

CLASSIFICATION: G-160 SERIES

THIS PRINT SUPERSEDES ALL OTHERS PRIOR TO [redacted]

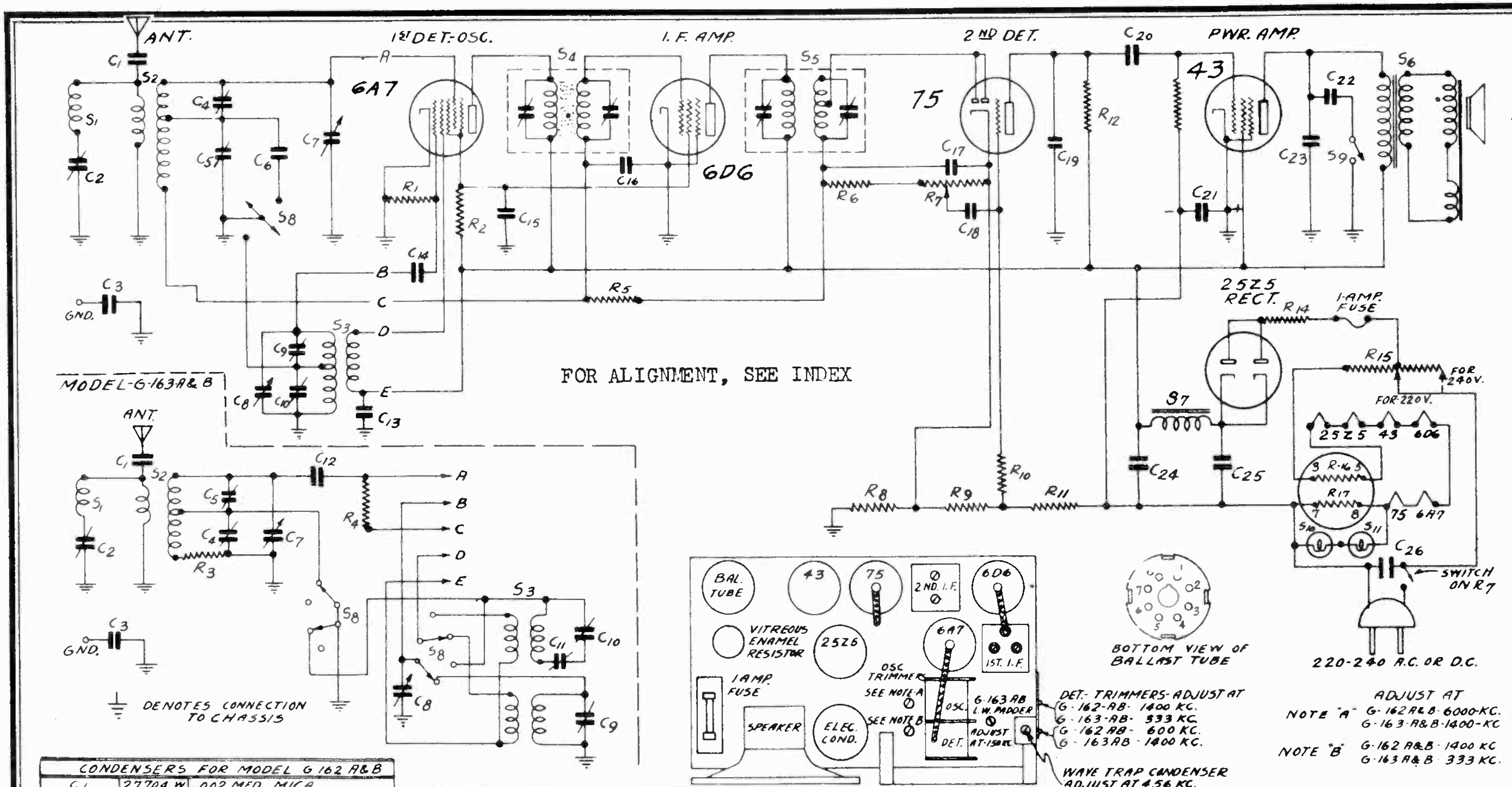
DO NOT SCALE THIS PRINT

FINISH

PILOT RADIO CORPORATION
LONG ISLAND CITY N.Y. U.S.A.
SCHEMATIC CIRCUIT DIAGRAM
G-162 & G-163
MATERIAL
SCALE
DRAWN BY: E.F.
CHECKED BY: [redacted]
APPROVED BY:
DATE 5/29/37
DRWG NO. 25167

MODELS G-162A, G-162B
G-163A, G-163B
Schematic, Socket
Trimmers, Parts

PILOT RADIO CORP.



CONDENSERS FOR MODEL G 162 A&B		
C1	27704 W	.002 MFD. MICA
C2	79455	25-125 MMFD. WAVE TRAP TR.
C3	22055-R	.005 MFD. 1000V. PAPER
C4 C5	70969-J	TRIMMER MIXER
C6	28108 W	.001 MFD. MICA
C7 C8	79432	2 GANG CONDENSER
C9 C10	70969-E	TRIMMER OSC.
C13	22055-L	.1 MFD. 400V. PAPER
C14	27723-0	.00005 MFD. MICA
C15 C16	22055 I	.05 MFD. 200V. PAPER
C17 C19	27701-W	.00025 MFD. MICA
C18 C20	22055-W	.01 MFD. 400V. PAPER
C21	22481	10 MFD. 25V. ELEC.
C22	22055-AJ	.03 MFD. 600V. PAPER
C23 C26	22055-U	.01 MFD. 1000V. PAPER
C24	85027	12 MFD. 250V. ELEC.
C25		16 MFD. 250V. ELEC

COND. FOR G-163 A&B SAME AS G-162 A&B PLUS FOLLOWING		
C11	79431-A	30 TO 100 MMFD. PADDER
C12	27701 W	.00025 MFD. MICA.

RESISTORS FOR MODEL G-162 A&B		
R1, R6	13164	50,000 OHMS 1/4 WATT CARBON
R2	13075	15,000 OHMS 1/2 WATT CARBON
R5 R10	13007	2 MEGOHMS 1/4 WATT CARBON
R7	79540	250,000 OHMS VOL. CONTROL & SW.
R8	13080	50 OHMS 1/4 WATT CARBON
R9	13206	16 OHMS 1/4 WATT CARBON
R11	13036	200 OHMS 1 WATT CARBON
R12	13171	250,000 OHMS 1/4 WATT CARBON
R13	13024	500,000 OHMS 1/4 WATT CARBON
R14	13207	100 OHMS 1 WATT CARBON
R15	83029	VITREOUS ENAM. WIRE W RES. 310 OHMS TAPPED AT 240 OHMS
R16	81967	210 OHMS (IN BALLAST TUBE)
R17		80 OHMS (IN BALLAST TUBE)

RES. FOR G-163 A&B SAME AS G-162 A&B PLUS FOLLOWING		
R3	13080	50 OHMS 1/4 WATT CARBON
R4	13024	500,000 OHMS 1/4 WATT CARBON

MISC. FOR MODEL G-162 A&B		
S1	73029-B	WAVE TRAP COIL ASS'Y.
S2	73099	ANT. COIL ASS'Y (G-162 A&B ONLY)
S3	73100	OSC. COIL ASS'Y (G-162 A&B ONLY)
S4	73108-A	1ST. I.F. TRANS. ASS'Y.
S5	73104	2ND. I.F. TRANS. ASS'Y.
S6 S7	40835	5" A.C.-D.C. SPKR. 1100-OHM FIELD
S8	79430	BAND SWITCH (G-162 A&B ONLY)
S9	72049	TONE CONTROL SWITCH
S10 S11	72151	6.3 V. 150 MA. PILOT LAMPS

MISC. FOR 162 A&B SAME AS 162 A&B EXCEPT THE FOLLOWING		
S2	73101	ANT. COIL. ASS'Y (G-163 A&B ONLY)
S3	73102	OSC. COIL ASS'Y (G-163 A&B ONLY)
S9	79454	BAND SW. (G-163 A&B ONLY)

INT. FREQ. 456 KC.

ALTERATIONS ② 73101 WAS 73001 E.F. 5/25/36
③ FIL. STRING WRONG E.F. 6/8/37

FINISH

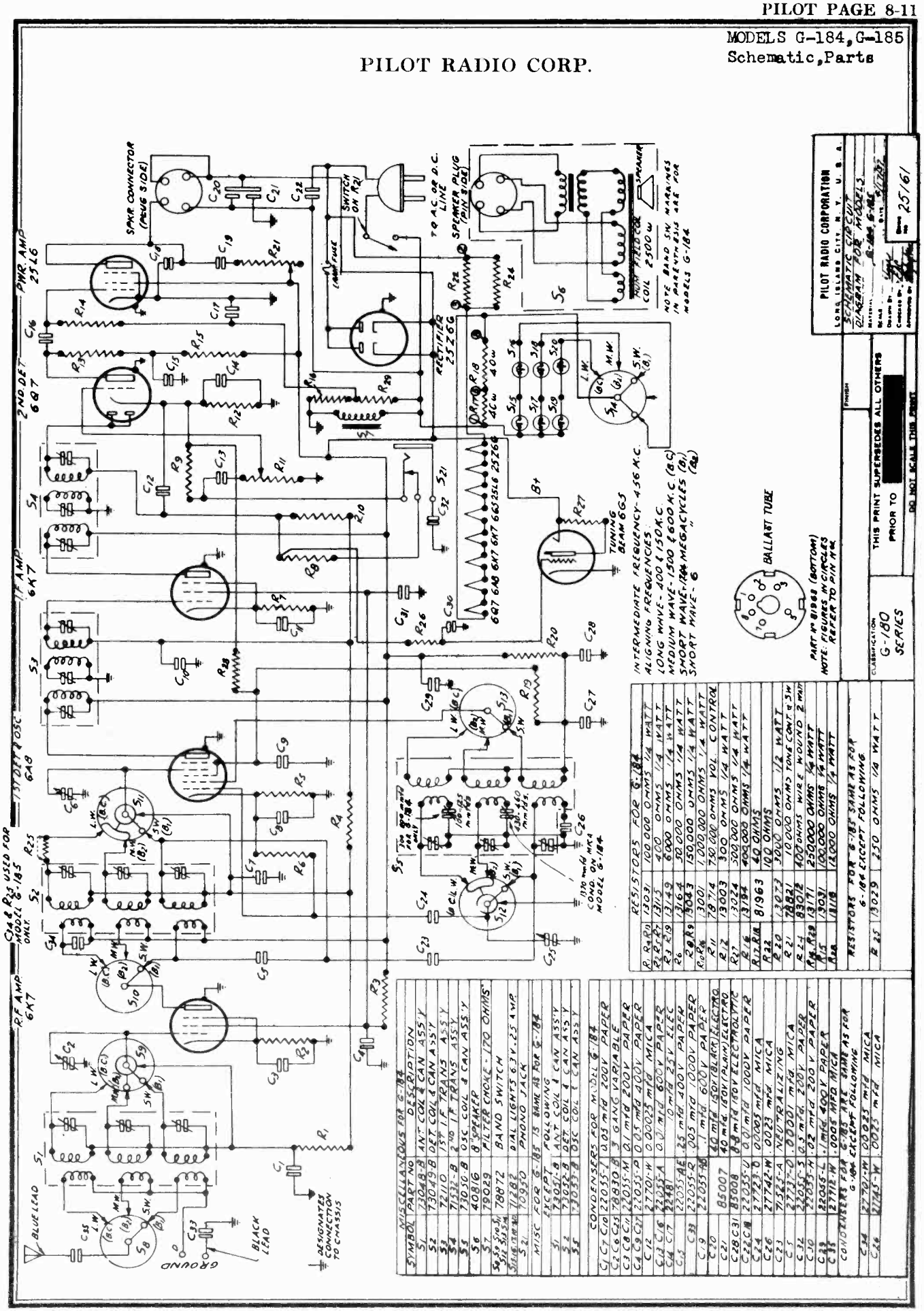
CLASSIFICATION
G-162 A&B
G-163 A&B

THIS PRINT SUPERSEDES ALL OTHERS
PRIOR TO [redacted]
DO NOT SCALE THIS PRINT

PILOT RADIO CORPORATION
LONG ISLAND CITY, N. Y. U. S. A.
SCHEMATIC CIRCUIT DIAGRAM
FOR MODELS G-162 A&B G-163 A&B
MATERIAL
SCALE
DATE 5/18/37
DRAWN BY E.F.
CHECKED BY
APPROVED BY
DWG. NO. 25166-3

MODELS G-184, G-185
Schematic, Parts

PILOT RADIO CORP.



RESISTORS FOR G-184		
R1 R4 R11	1308	100 000 OHMS 1/4 WATT
R2 R5 R7	1315	400 OHMS 1/4 WATT
R3 R19	1349	6000 OHMS 1/4 WATT
R6	1364	50 000 OHMS 1/4 WATT
R8 R9	3043	150 000 OHMS 1/4 WATT
R10 R12	3001	1 000 000 OHMS 1/4 WATT
R13	7874	750 000 OHMS VOL CONTROL
R14	13003	300 000 OHMS 1/4 WATT
R17	13024	500 000 OHMS 1/4 WATT
R16 R18	8/1963	400 000 OHMS 1/4 WATT
R22		100 OHMS
R20	13022	3000 OHMS 1/2 WATT
R21	7881	10 000 OHMS TONE CONT & SW
R24	8308	400 OHMS WIRE WOUND 2 WATT
R23 R28	13111	250 000 OHMS 1/4 WATT
R15	3031	100 000 OHMS 1/4 WATT
R26	1118	13 000 OHMS 1/4 WATT

RESISTORS FOR G-185 SAME AS FOR G-184 EXCEPT FOLLOWING		
R 25	13029	250 OHMS 1/2 WATT

MISCELLANEOUS FOR G-184		
SYMBOL	PART NO	DESCRIPTION
S1	73048-B	ANT. COIL & CAN ASS'Y
S2	73049-B	OSC COIL & CAN ASS'Y
S3	72110	1ST I.F. TRANS ASS'Y
S4	71132-B	2ND I.F. TRANS ASS'Y
S5	73030-B	OSC COIL & CAN ASS'Y
S6	40816	8" SPEAKER
S7	79029	FILTER CHOKE - 120 OHMS
S8, S9, S10, S11, S12, S13	78872	BAND SWITCH
SIG. LIGHTS	71282	DIAL LIGHTS 6.3 V. .25 AMP
J1	10930	PHONO JACK

MISC. FOR G-185 IS SAME AS FOR G-184 EXCEPT FOLLOWING		
S1	73051-B	ANT COIL & CAN ASSY
S2	73052-B	OSC COIL & CAN ASSY
S3	73053-B	OSC COIL & CAN ASSY

CONDENSERS FOR MODEL G-184		
C1 C7 C10	22035-T	0.03 mfd 200V PAPER
C2 C6 C25	78830-B	3 GANG VARIABLE
C3 C8 C14	22035-M	0.1 mfd 200V PAPER
C4 C9 C19	22035-P	0.05 mfd 400V PAPER
C12	27701-W	0.00025 mfd MICA
C13 C16	22035-A	0.1 mfd 600V PAPER
C15 C17	22481	10 mfd 25V ELEC
C5	22035-AE	.25 mfd 400V PAPER
C18	22035-Q	.005 mfd 1000V PAPER
C20	22035-AG	1 mfd 600V PAPER
C21	85007	40 mfd 150V BLACK ELECTRO
C28 C31	85008	40 mfd 150V ALUMINUM ELECTRO
C22 C29	22035-U	0.01 mfd 1000V PAPER
C24	27723-D	0.0005 mfd MICA
C26	27742-W	0.0023 mfd MICA
C11	27555-A	NEUTRALIZING
C27	27701-D	0.0001 mfd MICA
C32	22035-S	0.3 mfd 200V PAPER
C30	22035-L	0.02 mfd 200 V PAPER
C23	22035-L	.1 mfd 400V PAPER
C31	27712-W	.0005 MFD MICA

CONDENSERS FOR G-185 ARE SAME AS FOR G-184 EXCEPT FOLLOWING		
C24	27701-W	0.00025 mfd MICA
C26	27743-W	0.0025 mfd MICA

MODEL G-162 & G-163 (G-163 sold outside of U.S.)

Model G-162A 220 Volt - AC DC 50-60 cycles Model G-163A
Model G-162B 240 Volt - AC DC 50-60 cycles Model G-163B

44.5-126 m. (6,750-2380 kc.)
187-566 m. (1,600-530 kc.)

187-566 m. (1,600-530 kc.)
800-2170 m. (375-138 kc.)

REMOVAL OF CHASSIS FROM CABINET:

To remove the chassis from the cabinet proceed as follows:

Be certain that the line cord is removed from the power outlet socket.

Remove the knobs and felt washers from the controls on the front panel.

Remove the four mounting screws, located underneath the cabinet and pull chassis out.

REALIGNMENT: If the receiver requires alignment, the procedure outlined below should be followed. In the schematic diagram sheet, the location and function of the various alignment capacitors are clearly illustrated. For best results, an external modulated oscillator with adequate frequency range and a visual output meter, should be used.

I. F. ALIGNMENT: When aligning the Intermediate Frequency Amplifier, the external oscillator must be set at 456 kc. The Band Switch should be in the position marked "Broadcast", and the tuning condenser should be set at maximum capacity. When aligning the receiver on all positions, the volume control should be turned to the maximum clockwise position. Connect the antenna lead of the external oscillator to the control grid of the 6D6 tube in the I. F. Amplifier through a .1 mfd. fixed condenser. Connect the ground lead of the external oscillator to the chassis. The I. F. alignment trimmers are located at the top of the shielded I. F. Transformers. Rotate the adjusting screw of each capacitor on I. F. Unit No. 2 slowly until maximum output is noted. Following this, connect the external oscillator leads to the control grid of the 6A7 tube. Adjust each trimmer on I. F. Unit No. 1 for maximum gain.

During these operations, use the least possible input to prevent broadening of the resonance peaks.

In order to obtain the most accurate realignment of the I. F. amplifier, it is essential to repeat the alignment process in all I. F. Units, with the external oscillator leads connected to the control grid of the 6A7 tube.

WAVE TRAP ADJUSTMENT: With the oscillator still set at 456 kc., connect the oscillator to the antenna through a 200 mmfd. condenser. Then adjust the wave trap condenser for minimum deflection on the output meter.

BROADCAST ALIGNMENT: After the I. F. amplifier is completely realigned, connect the external oscillator leads to the receiver antenna and ground through a .0002 mfd. condenser. Leave the Band Switch in the "Broadcast" position and place the tuning control pointer at the 1400 kc. mark. Tune the external oscillator to 1400 kc. Adjust the broadcast band oscillator trimmer to maximum response.

Next adjust the antenna section trimmer for maximum output.

The alignment frequencies are as follows:

Longwave Band — 900 meters (333 kc.)
—2,000 meters (150 kc.)

Broadcast Band — 214 meters (1,400 kc.)
Band 1— 50 meters (6,000 kc.)

BAND 1: Align the Short-wave band in a similar manner using a 400-ohm non-inductive resistor in place of the .0002 mfd. condenser. The alignment frequency is 6,000 kc. (50 meters).

THE LONG WAVE ALIGNMENT procedure in the Models G-163A and B is as follows: Turn the Band Switch to the Long Wave position. The alignment frequency is 333 kc. Adjust the padder condenser at 150 kc. and at the same time rock the gang until at some setting of both padder and gang condenser maximum output is obtained. Use a .0002 mfd. condenser in the antenna lead from the external oscillator.

CAUTION: When making repairs on the receiver, use only ROSIN CORE SOLDER. NEVER USE SOLDERING PASTE OR ACID FLUXES OF ANY TYPE.

TONE CONTROL SWITCH: The tone control is at the rear of the chassis. In one position the treble response is increased and in the other position the bass frequencies are emphasized. When tuning in short waves the latter position will probably be found preferable.

BAND SWITCH: The center knob controls the band switch. You will see that positions are indicated on the escutcheon, corresponding to the positions to which the dot on the knob can be set. These tuning bands are for the different types of stations

ANTENNA: Due to the high sensitivity of this receiver, it is recommended that an aerial not over fifty feet long be used.

If you use an ordinary single-wire antenna, connect the antenna to the blue lead on the set. Then connect the clip on the chassis to the ground.

LONG WAVE BAND: Models G-163A and B (sold only outside the U. S. A.) have a tuning band covering 800 to 2170 meters. Broadcast stations operating on long waves have a limited range, and are located chiefly in Europe. Hence, Models G-163A and B are not sold in the U. S. A.

Tranex AC-DC Model G-184—110-125 V. (50-60 Cycles)—Tranex AC-DC Model G-185

16 - 555 m. (18,800 - 540 kc.)
16 - 555 m. (18,800 - 540 kc.)
731 - 2140 m. (410 - 140 kc.)

MODEL G-174

(MODELS G-175 and G-185 ARE SOLD OUTSIDE THE U. S. A. ONLY)

REMOVAL OF CHASSIS FROM CABINET:

To remove the chassis from the cabinet proceed as follows:

Be certain that the line cord is removed from the power outlet socket.

Remove the "slip-on" knobs and felt washers from the controls and loosen the set screw on the tuning knob.

Remove the speaker plug from the socket at the rear of the chassis.

Remove the four mounting screws, located underneath the cabinet.

Remove the tuning beam plug from the socket at the front of the chassis.

REALIGNMENT: Should the receiver require realignment, the procedure outlined below should be followed. For best results an external modulated oscillator with adequate frequency range, and a visual output meter, should be used.

Before connecting the chassis to the power line, reconnect the speaker cable in its socket at the rear of the chassis.

The R. F. alignment trimmer condensers are mounted on the side of the coil shields.

I. F. ALIGNMENT: When aligning the Intermediate Frequency Amplifier, the external oscillator must be set at 456 kc. The Band Selector Switch should be in the position marked "Broadcast", and the tuning condenser should be set at maximum capacity. Connect the "antenna" lead of the external oscillator to the control grid of the type 6K7 tube in the I. F. Amplifier stage through a .1 mfd. fixed condenser. Connect the "ground" lead of the external oscillator to the receiver ground lead. The I. F. alignment capacitors are located at the side of the shielded I. F. Transformers. Rotate the adjusting screw of each capacitor on I. F. Unit No. 2 slowly until maximum output is noted. On completion of this operation, remove the external oscillator lead from the type 6K7 I. F. amplifier tube and connect it in the same manner to the control grid at the top of the type 6A8 tube.

Now rotate each adjustment screw on I. F. Unit No. 1 for maximum output. During these operations, use the least possible input to prevent broadening of the resonance peaks.

In order to obtain the most accurate realignment of the I. F. amplifier, it is essential to repeat the alignment process in both I. F. Units.

BROADCAST ALIGNMENT: After the I. F. amplifier is completely realigned, connect the external oscillator leads to the receiver antenna and ground leads. Insert a 200 mmf. condenser in series with the antenna lead. Set the Band Selector Switch in the "Broadcast" position and place the tuning control pointer at the 1500 kc. mark. Adjust the broadcast band oscillator trimmer.

Next adjust the interstage alignment trimmer for maximum response. Finally adjust the antenna section trimmer in the same manner.

Next adjust the 600 kc. padder condenser, located on the top of the oscillator coil. Set the external oscillator at 600 kc. Rotate the receiver tuning control until resonance is indicated. Then rock the tuning control back and forth about this resonance position, and at the same time adjust the padder condenser for the highest resonance peak.

Now repeat the 1500 kc. trimmer adjustment, following in every detail the procedure previously described.

ALIGNMENT OF THE SHORT WAVE-BANDS:— The procedure in aligning the short wave-bands is identical with that for the broadcast with the exception of the adjustment of the padder condenser. Insert a 400 ohm non-inductive resistor in series with the antenna lead. The alignment frequencies are as follows:

Band 2: 50 Meters—(6,000 kc.)
Band 1: 16.6 Meters—(18,000 kc.)

When aligning Band 2, set the Band Selector Switch in the position marked "Band 2". Set the tuning control pointer at 50 meters. Adjust the oscillator alignment capacitor on Band 2 for maximum output. Next adjust the interstage and antenna section alignment capacitors for maximum output.

To align Band 1, set the Band Selector Switch in the position marked "Band 1". Set the tuning control pointer at the 16.6 meter mark. Set the external oscillator at 16.6 meters. Adjust the oscillator section alignment capacitor on Band 1 for maximum output.

Proceed next to align the interstage section of Band 1. In doing this, it is essential to rock the tuning control back and forth about the resonance position and at the same time to adjust the trimmer for the highest resonance peak. Next align the antenna section for maximum sensitivity.

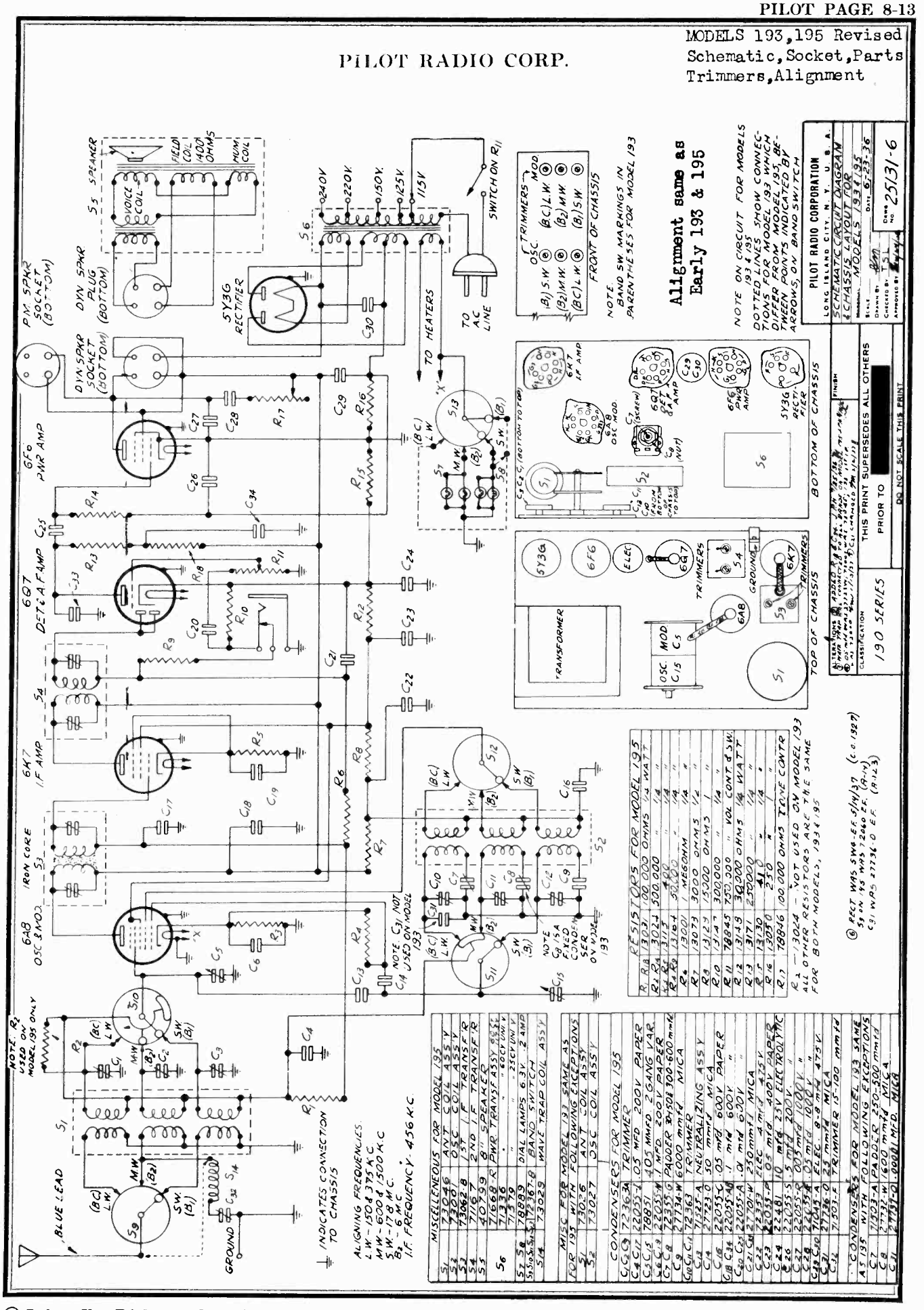
LONG WAVE MODELS G-175 and G-185

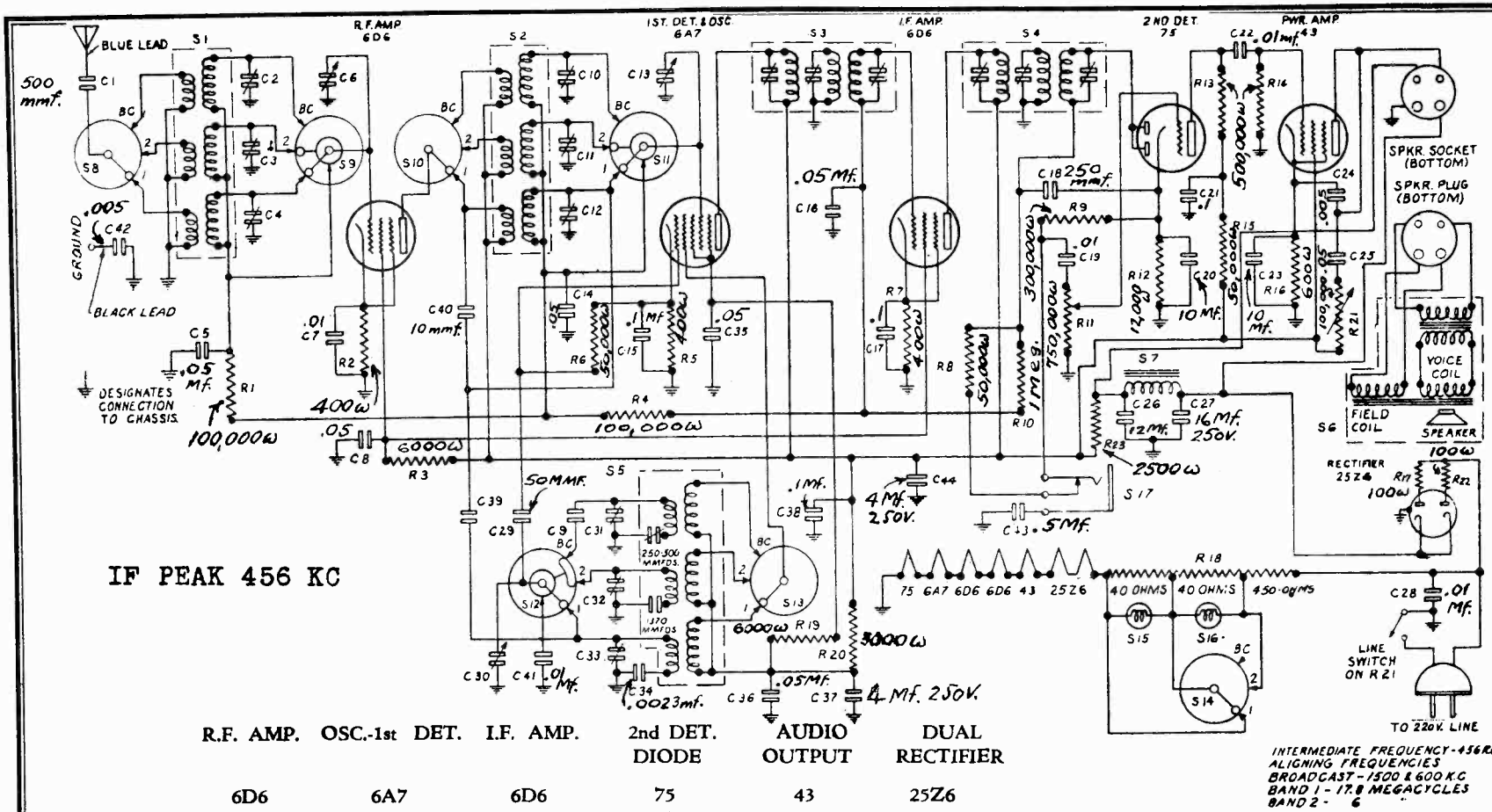
The above alignment positions refer to the Models G-174 and G-184 only, which are calibrated in frequency. The alignment points for the Models G-175 and G-185, which are calibrated in meters only, are as follows.

Long Wave	Align at 750 meters.
	Pad at 2,000 meters.
Broadcast	Align at 200 meters.
	Pad at 500 meters.
Band 1	Align at 17 meters.

The Long Wave alignment procedure is similar to that for the Broadcast. A 200 mmf. condenser should be used in series with the antenna lead in aligning this band.

CAUTION: When making repairs on the receiver, use only ROSIN CORE SOLDER. NEVER USE SOLDERING PASTE OR ACID FLUXES OF ANY TYPE.





IF PEAK 456 KC

	R.F. AMP.	OSC.-1st DET.	I.F. AMP.	2nd DET. DIODE	AUDIO OUTPUT	DUAL RECTIFIER
	6D6	6A7	6D6	75	43	25Z6
PLATE	115	115	115	50*	175	——
SCREEN	90	75	90	——	120	——
CATHODE	2.6	2.25	2.6	.5	15	215**
FILAMENT	6.3	6.3	6.3	6.3	25	25

NOTE: The D.C. voltages measured at the tube sockets of the set should be read with a high resistance voltmeter of at least 1,000 ohms per volt.

All voltages measured to chassis.
Speaker field voltage 215 volts.
Anode Grid of 6A7 100 volts.
* Measured through Plate Resistor.
** Cathode to chassis.

NOTE: These measurements should be made with the volume control turned to the right, and with the tuning adjusted at "No signal" position on dial.

Power Consumption ..... 100 Watts

Line Volts ..... 220 volts A.C.-D.C.

I. F. Frequency ..... 456 Kc.

Power Output ..... 2.3 Watts

REVERSING D.C. PLUG: When the Model 223 is operated on D.C., if the set seems dead, reverse the line plug in the socket. The set will work with the plug in one position, but not in the other.

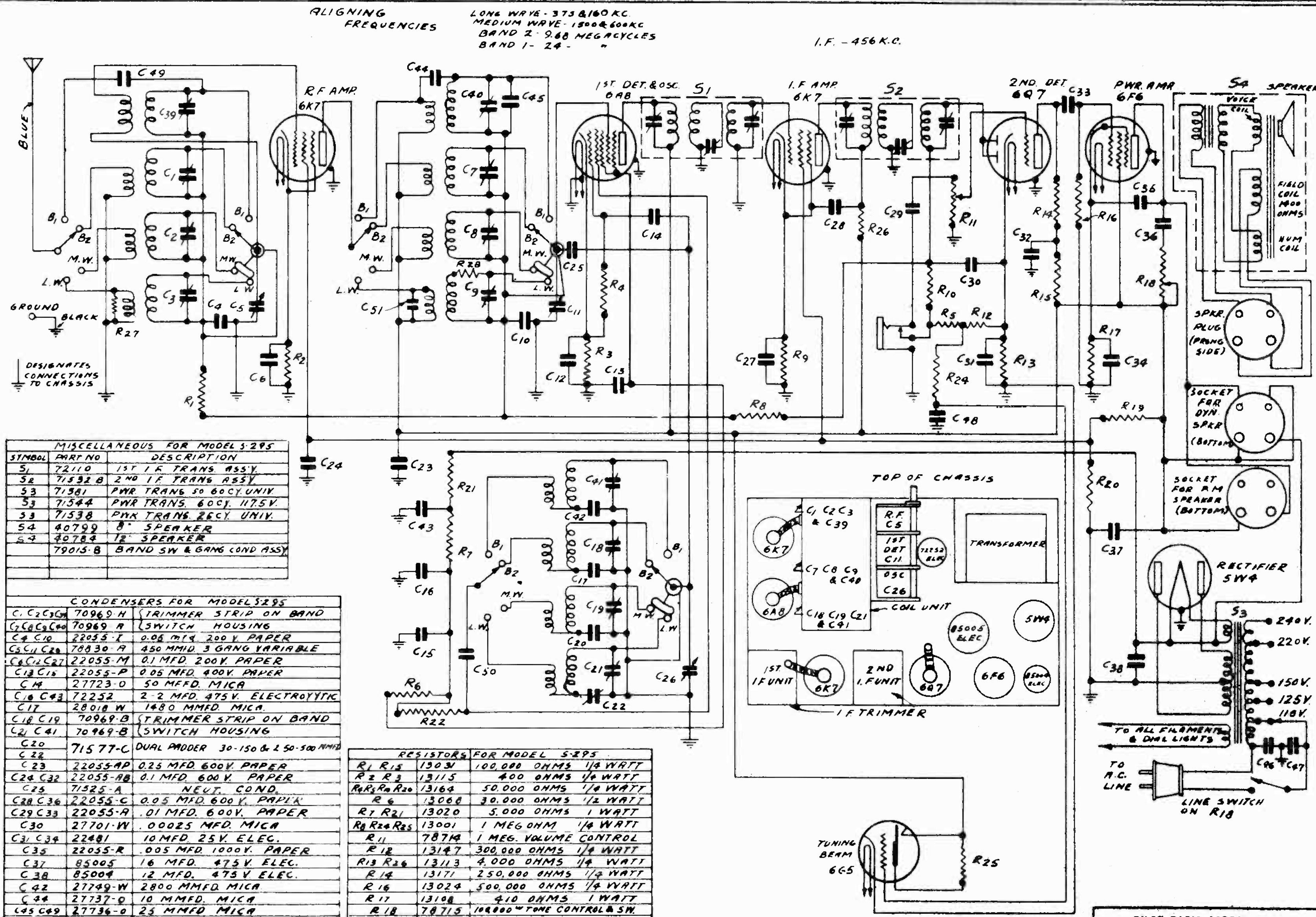
Range: 16-555 Meters (18,800-545 kc.)

For Operation on 220 Volts—AC-DC

FOR ALIGNMENT, SEE INDEX

MODEL S-295
Schematic, Socket
Trimmers, Parts

PILOT RADIO CORP.



MISCELLANEOUS FOR MODEL S-295		
SYMBOL	PART NO	DESCRIPTION
S1	72110	1ST I.F. TRANS. ASS'Y.
S2	71532 B	2ND I.F. TRANS ASS'Y.
S3	71581	PWR. TRANS 50 60 CY. UNIV.
S3	71544	PWR TRANS. 60 CY. 117.5 V.
S3	71538	PWR TRANS. 25 CY. UNIV.
S4	40799	8" SPEAKER
S4	40784	12" SPEAKER
	79015-B	BAND SW & GANG COND ASS'Y.

CONDENSERS FOR MODEL S-295		
C1 C2 C3 C39	70969-H	TRIMMER STRIP ON BAND
C7 C8 C9 C40	70969 A	SWITCH HOUSING
C4 C10	22055-Z	0.05 MFD. 200 V. PAPER
C5 C11 C26	78830-A	450 MMFD. 3 GANG VARIABLE
C6 C12 C27	22055-M	0.1 MFD. 200 V. PAPER
C13 C15	22055-P	0.05 MFD. 400 V. PAPER
C14	27723-0	50 MFD. MICA
C16 C43	72252	2-2 MFD. 475 V. ELECTROLYTIC
C17	28018 W	1480 MMFD. MICA.
C18 C19	70969-B	TRIMMER STRIP ON BAND
C21 C41	70969-B	SWITCH HOUSING
C20 C22	71577-C	DUAL PADDER 30-150 & 250-500 MMFD
C23	22055-AP	0.25 MFD. 600 V. PAPER
C24 C32	22055-AB	0.1 MFD. 600 V. PAPER
C25	71525-A	NEUT. COND.
C28 C36	22055-C	0.05 MFD. 600 V. PAPER
C29 C33	22055-A	.01 MFD. 600 V. PAPER
C30	27701-W	.00025 MFD. MICA
C31 C34	22481	10 MFD. 25 V. ELEC.
C35	22055-R	.005 MFD. 1000 V. PAPER
C37	85005	16 MFD. 475 V. ELEC.
C38	85004	12 MFD. 475 V. ELEC.
C42	27749-W	2800 MMFD. MICA
C44	27737-0	10 MMFD. MICA
C45 C49	27736-0	25 MMFD. MICA
C46 C47	78503	.01 MFD. 1000 V. PAPER DUAL
C48	22056-H	.02 MFD. 200 V. PAPER
C50	22055-A	.01 MFD. 600 V. PAPER
C51	27701-0	250 MMFD. MICA

FOR ALIGNMENT, SEE INDEX

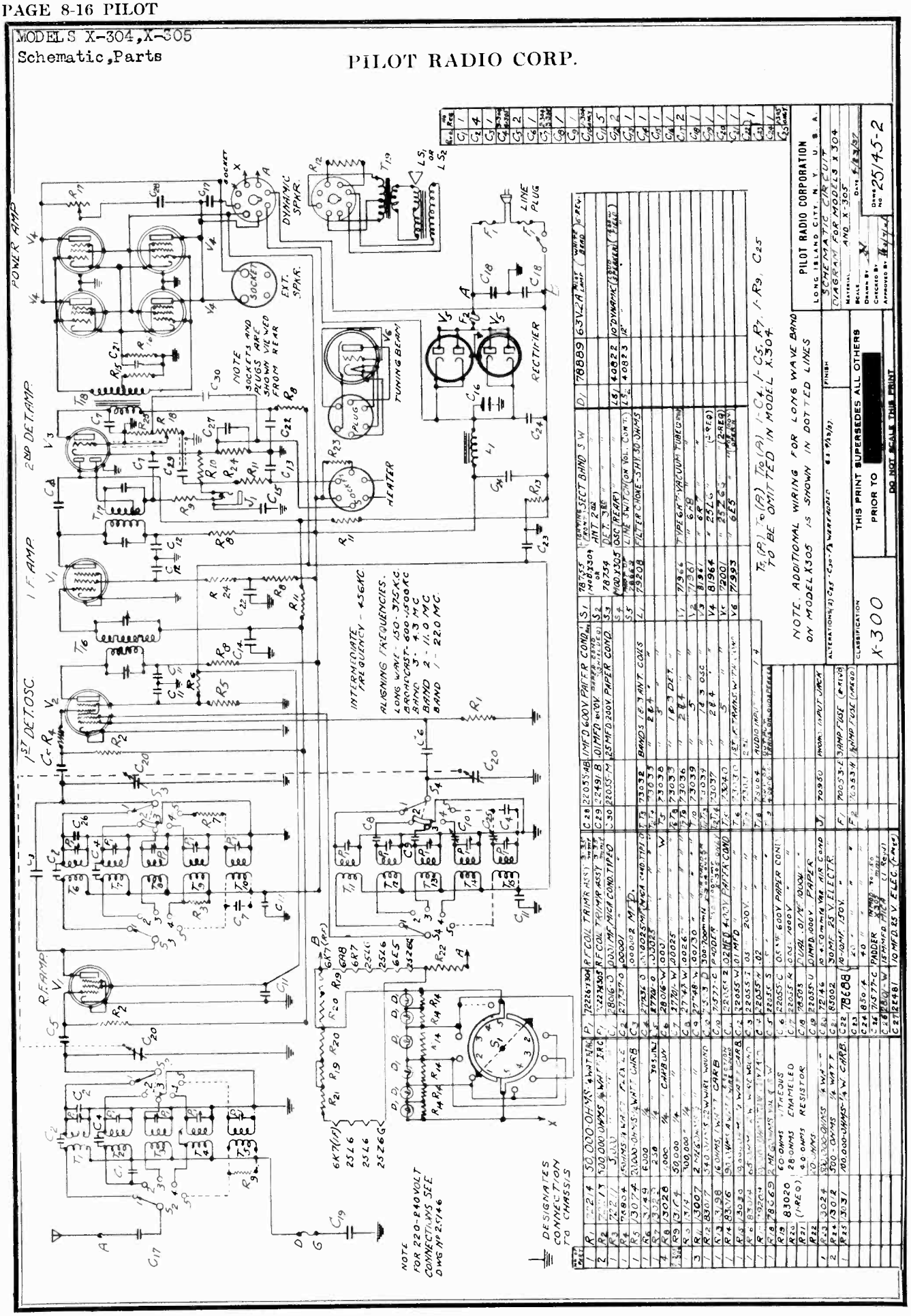
RESISTORS	FOR MODEL S-295	
R1 R15	13031	100,000 OHMS 1/4 WATT
R2 R3	13115	400 OHMS 1/4 WATT
R4 R5 R10 R20	13164	50,000 OHMS 1/4 WATT
R6	13068	30,000 OHMS 1/2 WATT
R7 R21	13020	5,000 OHMS 1 WATT
R8 R24 R25	13001	1 MEG OHM 1/4 WATT
R11	78714	1 MEG. VOLUME CONTROL
R12	13147	300,000 OHMS 1/4 WATT
R13 R26	13113	4,000 OHMS 1/4 WATT
R14	13171	250,000 OHMS 1/4 WATT
R16	13024	500,000 OHMS 1/4 WATT
R17	13108	410 OHMS 1 WATT
R18	78715	100,000 Ω TONE CONTROL & SW.
R19	13092	30,000 OHMS 1 WATT
R9	13181	600 OHMS 1/4 WATT
R22	13179	18,000 OHMS 2 WATT
R27	13164	50,000 OHMS 1/4 WATT
R28	13029	250 OHMS 1/4 WATT

PILOT RADIO CORPORATION
LONG ISLAND CITY, N. Y. U. S. A.
SCHEMATIC CIRCUIT DIAGRAM & CHASSIS LAYOUT FOR MODEL S-295
DATE 10/22/36
DRAWN BY E.F.
No. 25139

ALTERATIONS
FINISH
CLASSIFICATION S-295
THIS PRINT SUPERSEDES ALL OTHERS PRIOR TO [redacted]
DO NOT SCALE THIS PRINT

MODELS X-304, X-305
Schematic, Parts

PILOT RADIO CORP.



MODEL S-295, FOR ALTERNATING CURRENT

Four Tuning Bands: 12.4-32.8 meters (24,100-9,150 kc.) — 29.7-79 meters (10,100-3,800 kc.) 182-560 meters (1,650-537 kc.) — 755-2,300 meters (397-130 kc.)

REMOVAL OF CHASSIS FROM CABINET:

To remove the chassis from the cabinet proceed as follows:

Be certain that the line cord is removed from the power outlet socket.

Remove the "slip-on" knobs and felt washers from the controls and loosen the set screw on the tuning knob.

Remove the speaker plug from the socket at the rear of the chassis.

Remove the four mounting screws, located underneath the cabinet.

Remove the tuning beam plug from the socket at the front of the chassis.

REALIGNMENT: Should the receiver require realignment, the procedure outlined below should be followed. For best results an external modulated oscillator with adequate frequency range, and a visual output meter, should be used.

Before connecting the chassis to the power line, reconnect the speaker cable in its socket at the rear of the chassis.

The location of the R.F. alignment trimmer condensers is on the side of the band switch. The trimmers in the lowest row are those for aligning Band 1. Those in the second row from the bottom are for Band 2. Those in the third row up are for the Broadcast band. The trimmers in the top row are for the Long Wave band.

The padder condensers for Long Wave and Broadcast bands are located under the rear section of the band switch. Access to the padder condenser is made through a hole provided in the rear of the chassis frame. The adjusting screw on the right is the Long Wave Padder.

I. F. ALIGNMENT: When aligning the Intermediate Frequency Amplifier, the external oscillator must be set at 456 kc. The Band Selector Switch should be in the postion marked "Broadcast", and the tuning condenser should be set at maximum capacity. Connect the "antenna" lead of the external oscillator to the control grid of the type 6K7 tube in the I. F. Amplifier stage through a .1 mfd. fixed condenser. Connect the "ground" lead of the external oscillator to the receiver ground lead. The I. F. alignment capacitors are located at the side of the shielded I. F. transformers. Rotate the adjusting screw of each capacitor on I. F. Unit No. 2 slowly until maximum output is noted. On completion of this operation, remove the external oscillator lead from the type 6K7 I. F. amplifier tube and connect it in the same manner to the control grid at the top of the type 6A8 tube.

Now rotate each adjustment screw on I. F. Unit No. 1 for maximum output. During these operations, use the least possible input to prevent broadening of the resonance peaks.

In order to obtain the most accurate realignment of the I. F. amplifier, it is essential to repeat the alignment process in both I. F. units.

LONG WAVE ALIGNMENT: After the I. F. amplifier is completely realigned, connect the external oscillator leads to the receiver antenna and ground leads. Insert a 200 mmf. condenser in series with the antenna lead. Set the Band Selector Switch in the Long Wave position and place the tuning control pointer at the 800 meter mark. The external oscillator should be tuned to 800 meters. Adjust the Long Wave band oscillator trimmer.

Next adjust the interstage alignment trimmer for maximum response. Finally adjust the antenna section trimmer in the same manner.

Next adjust the 1875 meter padder condenser, located in the lower rear partition of the band switch, under the chassis. Set the external oscillator at 1875 meters. Rotate the receiver tuning control to the resonance position, and at the same time adjust the padder condenser for the highest peak.

Now repeat the 800 meter trimmer adjustment, following in every detail the procedure previously described.

BROADCAST ALIGNMENT: The Broadcast alignment procedure is similar to that for Long Wave. A 200 mmf. condenser should be connected in series with the antenna when aligning this band.

The alignment frequencies are as follows:

Band 4—800 and 1875 meters.
Band 3—200 and 500 meters.
Band 2— 31 meters.
Band 1— 12.5 meters.

When aligning Band 2, set the Band Switch in the position marked Band 2. Replace the .0002 mfd. condenser with a 400 ohm non-inductive resistor. Rotate the tuning condenser to the 31 meter indication on the dial scale. Set the external oscillator at 31 meters. Adjust the Band 2 oscillator trimmer for maximum sensitivity. Next adjust the interstage and antenna trimmer condensers for maximum sensitivity. Check the overall sensitivity of the band at several points along the dial scale.

The alignment of Band 1 requires greater care due to the higher frequencies covered by this band. The alignment frequency is 12.5 meters. Set the external oscillator at 12.5 meters. Rotate the tuning condenser of the receiver until the dial pointer is co-incidental with the 12.5 meter indication on the dial scale. Adjust the oscillator trimmer condenser for maximum sensitivity. Proceed next to align the interstage section. In doing this it is essential to rock the tuning control back and forth about the resonance position and at the same time to adjust the trimmer for the highest resonant peak. Next align the antenna section for maximum sensitivity.

REMOVAL OF BAND SELECTOR SWITCH ASSEMBLY: Should it be necessary to remove the switch assembly, this is easily done by removing the supporting screws. Before doing this, however, it is essential to unsolder the leads between the switch and the chassis.

It is advisable to realign the receiver after reinstalling the switch assembly.

CAUTION: When making repairs on the receiver, use only ROSIN CORE SOLDER. NEVER USE SOLDERING PASTE OR ACID FLUXES OF ANY TYPE.

PHONOGRAPH PICK-UP: A jack is provided at the rear of the chassis for plugging in an electric phonograph pick-up, in order that records can be reproduced by the loudspeaker, through the high-quality amplifier with which this set is equipped. The pick-up should be of the high-impedance type.

EXTRA SPEAKER: At the rear of the chassis there is a socket for plugging in an extra speaker, which can be located in the kitchen, in one of your up-stairs rooms, or down cellar in the game room. This will give you the equivalent of an extra radio, at the small expense of the extra speaker. We recommend a permanent magnet dynamic speaker of 10,000 ohms. These speakers operate without any field exciting current.

Model X-304
12.7 - 570 m. (23,600 - 525 kc.)

Model X-305
12.7 - 570 m. (23,600 - 525 kc.)
740 - 2150 m. (405 - 136 kc.)

(MODEL X-305 IS SOLD OUTSIDE THE U. S. A. ONLY)

REMOVAL OF CHASSIS FROM CABINET:

To remove the chassis from the cabinet proceed as follows:

Be certain that the line cord is removed from the power outlet socket.

Remove the knobs and felt washers from the controls on the front panel.

Remove the back from the cabinet.

Remove the speaker plug from the socket at the rear of the chassis.

Remove the four mounting screws, located underneath the cabinet and pull chassis out.

Remove the tuning beam connector cable from the socket at the front of the chassis.

REALIGNMENT: If the receiver requires alignment, the procedure outlined below should be followed. In the service information sheet, the location and function of the various alignment capacitors are clearly illustrated. For best results, an external modulated oscillator with adequate frequency range and a visual output meter, should be used.

Before connecting the chassis to the power line, reconnect the speaker cable in its socket at the rear of the chassis, and reinsert the tuning beam cable plug in the socket at the front of the chassis.

I. F. ALIGNMENT: When aligning the Intermediate Frequency Amplifier, the external oscillator must be set at 456 kc. The Band Switch should be in the position marked "Broadcast", and the tuning condenser should be set at maximum capacity. When aligning the receiver on all positions, the volume control and the tone control should be turned to the maximum clockwise position. Connect the antenna lead of the external oscillator to the control grid of the 6K7 tube in the I. F. Amplifier through a .1 mfd. fixed condenser. Connect the ground lead of the external oscillator to the chassis. The I. F. alignment trimmers are located at the top of the shielded I. F. Transformers. Rotate the adjusting screw of each capacitor on I. F. Unit No. 2 slowly until maximum output is noted. Following this, connect the external oscillator leads to the control grid of the 6A8 tube. Adjust each trimmer on I. F. Unit No. 1 for maximum gain.

During these operations, use the least possible input to prevent broadening of the resonance peaks.

In order to obtain the most accurate realignment of the I. F. amplifier, it is essential to repeat the alignment process in all I. F. Units, with the external oscillator leads connected to the control grid of the 6A8 tube.

BROADCAST ALIGNMENT: After the I. F. amplifier is completely realigned, connect the external oscillator leads to the receiver antenna and ground leads through a .0002 mfd. condenser. Leave the Band Switch in the "Broadcast" position and place the tuning control pointer at the 1500 kc mark. Tune the external oscillator to 1500 kc. Adjust the broadcast band oscillator trimmer to maximum response.

Next adjust the interstage alignment trimmer for maximum response. Finally adjust the antenna section trimmer in the same manner.

Next adjust the 600 kc. padder condenser, located in the lower rear partition of the band switch, under the chassis. Set the external oscillator at 600 kc. Rotate the receiver tuning control to the resonance position, and at the same time adjust the padder condenser for the highest peak.

Now repeat the 1500 kc. trimmer adjustment, following in every detail the procedure previously described.

The alignment frequencies are as follows:

Band 5—150 and 375 kc.—2000 and 800 m.
Band 4—600 and 1500 kc.—500 and 200 m.
Band 3—69.7 meters— 4,300 kc.
Band 2—27.2 meters—11,000 kc.
Band 1—13.6 meters—22,000 kc.

When aligning Band 3, set the Band Switch in the position marked Band 3. Rotate the tuning condenser to the 4300 kc. indication on the dial scale. Set the external oscillator at 4300 kc. Adjust the Band 3 oscillator trimmer for maximum sensitivity. Next adjust the interstage and antenna trimmer condensers for maximum sensitivity. Check the overall sensitivity of the band at several points along the dial scale.

Align Band 2 in a similar manner using a 400-ohm non-inductive resistor in place of the .0002 mfd. condenser. The alignment frequency is 11,000 kc. (27.2 meters).

The alignment of Band 1 requires greater care due to the higher frequencies covered by this band. The tracking characteristic of Band 1 of this receiver differs from that of the other bands, in that the 1st detector and T.R.F. circuits resonate on the high frequency side of the oscillator. This condition applies only to Band 1. The alignment frequency is 22,000 kc. or 13.6 meters. Set the external oscillator at 22,000 kc. Rotate the tuning condenser of the receiver until the dial pointer is co-incidental with the 22,000 kc. indication on the dial scale. Adjust the oscillator trimmer condenser for maximum sensitivity. Proceed next to align the interstage section. In doing this it is essential to rock the tuning control back and forth about the resonance position and at the same time to adjust the trimmer for the highest resonant peak. Next align the antenna section for maximum sensitivity.

THE LONG WAVE ALIGNMENT procedure in the Model X-305 is similar to that of the broadcast. Turn the Band Switch to the Long Wave position. The alignment frequency is 375 kc. Adjust the padder condenser at 150 kc. Use a .0002 mfd. condenser in the antenna lead from the external oscillator.

REMOVAL OF BAND SELECTOR SWITCH ASSEMBLY: Should it be necessary to remove the switch assembly, it is advisable to realign the receiver after reinstalling it.

CAUTION: When making repairs on the receiver, use only ROSIN CORE SOLDER. NEVER USE SOLDERING PASTE OR ACID FLUXES OF ANY TYPE.

RECEIVER DESCRIPTION

Maximum power output—6 watts.
I. F.—456 kc.

Type of Circuit — All wave Superheterodyne with TRF stage on all bands. A. V. C., Class "A" push pull parallel power output stage.

VOLTAGES

The D. C. Voltages listed below were measured at the tube sockets of the set with a high resistance voltmeter of 1,000 ohms per volt, and on a 115 volt A.C. fine.

	R.F. 6K7	Osc. & 1st Det. 6A8		I.F. 6K7	2nd Det. & Amp. 6R7	Pwr. Pent. 25L6	Pwr. Pent. 25L6	Pwr. Pent. 25L6	Pwr. Pent. 25L6	Rect. 25Z6	Rect. 25Z6	T.B. 6E5
Plate	95	78	94	90	69	93	93	93	93	.....	.....	*6
Screen	78	.....	49	78	.....	96	96	96	96	.....	.....	.....
Cathode	0	0	0	0	0	8	8	8	—	104	104	—
Filament	6.3	6.5	.....	6.3	6.3	26	26	26	26	26	26	6.3

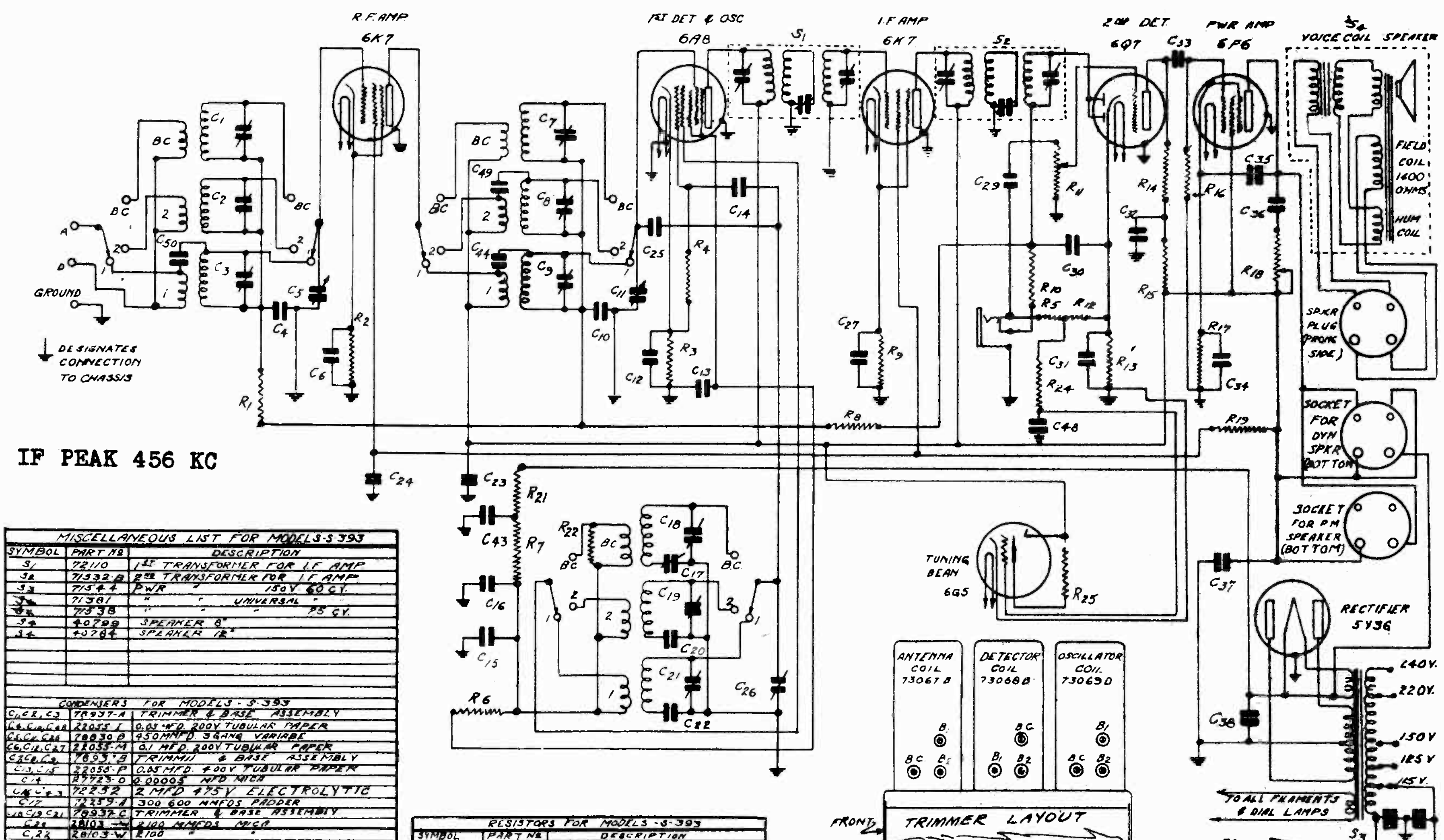
Speaker field—106 Volts. Tuning Beam—Target 96 volts to ground.

A 6E5 tuning beam should be plugged into the tuning beam socket on the chassis, whenever the receiver is operated outside the cabinet.

* Measured through 1 megohm.

MODEL S-393
Schematic, Trimmers
Alignment, Parts

PILOT RADIO CORP.



IF PEAK 456 KC

MISCELLANEOUS LIST FOR MODELS-S-393		
SYMBOL	PART No.	DESCRIPTION
S1	72110	1ST TRANSFORMER FOR I.F. AMP
S2	71532-B	2ND TRANSFORMER FOR I.F. AMP
S3	71544	PWR " 150V 60 CY.
S3	71381	" " UNIVERSAL " "
S3	71538	" " " 25 CY.
S4	40799	SPEAKER 8"
S4	40784	SPEAKER 12"

CONDENSERS FOR MODELS-S-393		
C1, C2, C3	78937-A	TRIMMER & BASE ASSEMBLY
C4, C10, C28	22055-I	0.05 MFD. 200V. TUBULAR PAPER
C5, C11, C26	78830-B	450 MMFD. 3 GANG VARIABLE
C6, C12, C27	22055-M	0.1 MFD. 200V TUBULAR PAPER
C7, C8, C9	78937-B	TRIMMER & BASE ASSEMBLY
C13, C15	22055-P	0.05 MFD. 400V TUBULAR PAPER
C14	27723-O	0.00005 MFD MICA
C16, C43	72252	2 MFD 475V ELECTROLYTIC
C17	72259-A	300 600 MMFDS PADDER
C18, C19, C21	78937-C	TRIMMER & BASE ASSEMBLY
C20	28103-W	2100 MMFDS MICA
C22	28103-W	2100 " "
C23	22055-AP	0.25 MFD 600V TUBULAR PAPER
C24, C32	22055-AB	0.1 " " " "
C25	71525-A	NEUTRALIZING CONDENSER
C29, C33	22055-A	0.01 MFD 600V TUBULAR PAPER
C30	27701-W	0.00025 MFD. MICA
C31, C34	22481	10 MFDS. 25V. ELECTROLYTIC
C37, C38	71045	8 " 475V. "
C35	22055-AR	0.003 MFD. 1000V. TUBULAR PAPER
C36	22055-C	0.05 " 600V. " "
C44, C49, C50	27737-O	10 MMFD. MICA
C46, C47	78503	DUAL .01 MFD. 1000V PAPER

RESISTORS FOR MODELS-S-393		
SYMBOL	PART No.	DESCRIPTION
R1, R5, R15	13031	100,000-OHMS 1/4 WATT CARB
R2, R3	13115	400- " " " "
R4	13186	25,000-OHMS 1/4 WATT CARB
R6	13068	30,000-OHMS 1/2 " "
R7, R21	13053	10,000- " 1 " "
R8, R24, R25	13001	1 MEGOHM 1/4 " "
R10	13164	50,000-OHMS 1/4 " "
R11	78 [illegible]	1 MEGOHM VOLUME CONTROL
R12	13147	300,000-OHMS 1/4 WATT CARB
R13	13113	4,000 " " " "
R14	13171	250,000 " " " "
R16	13024	500,000 " " " "
R17	13108	410 " 1 " "
R18	78715	100,000 " TONE CONTROL & S.W.
R19	13092	30,000 " 1 WATT CARBON
R9	13131	600 " 1/2 " "
R22	13133	3000 " 1/4 " "

ALIGNMENT FREQUENCIES:-
Broadcast - 1500 & 600 KC
Band #2 - 9000 KC
Band #1 - 24000 KC
(Otherwise similar to Model 393 alignment)

ALTERATIONS ⓐ 5Y3G WAS 5W4, R4, 13186 WAS 13169 C20 - 28103-W WAS 27743-W

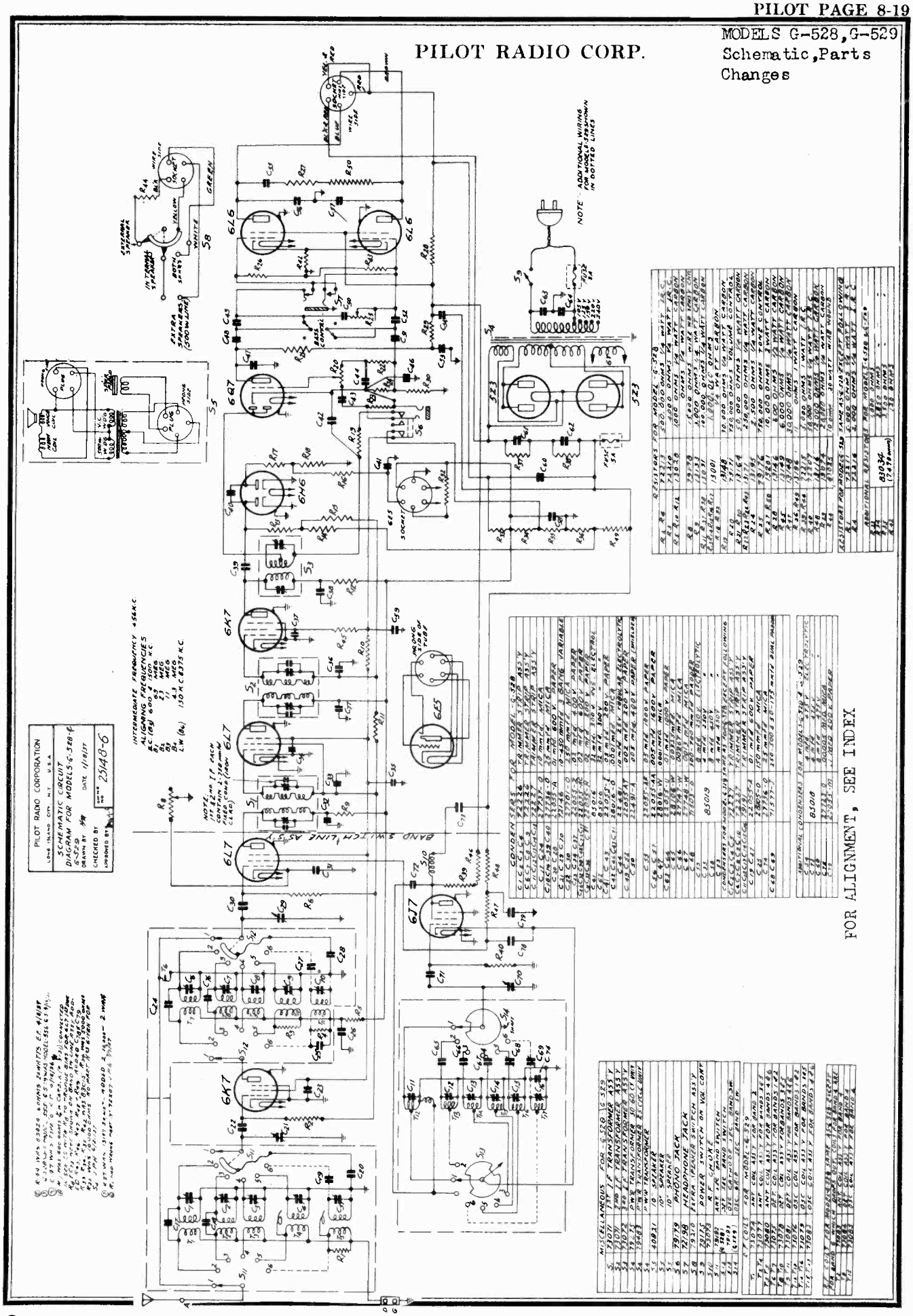
FINISH

CLASSIFICATION MODEL S-393

THIS PRINT SUPERSEDES ALL OTHERS PRIOR TO [redacted]

DO NOT SCALE THIS PRINT

PILOT RADIO CORPORATION
LONG ISLAND CITY, N.Y. U.S.A.
SCHEMATIC CIRCUIT DIAGRAM FOR MODEL-S-393
MATERIAL
SCALE
DATE 9/30/37
DRAWN BY
CHECKED BY
APPROVED BY
DRAWING No. 25152-2



MODELS G-528, G-529
Socket, Trimmers
Phono. Data

PILOT RADIO CORP.

MODELS TG-528, TG-529
Speaker Connections

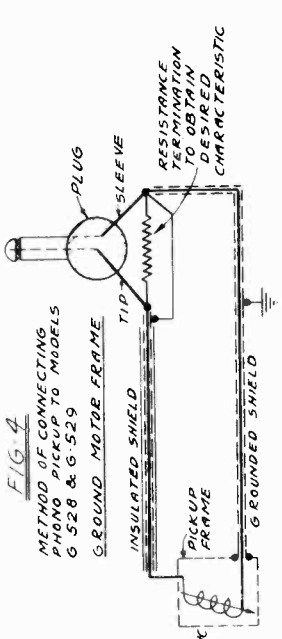


FIG. 4
METHOD OF CONNECTING PHONO PICKUP TO MODELS G-528 & G-529
GROUND MOTOR FRAME

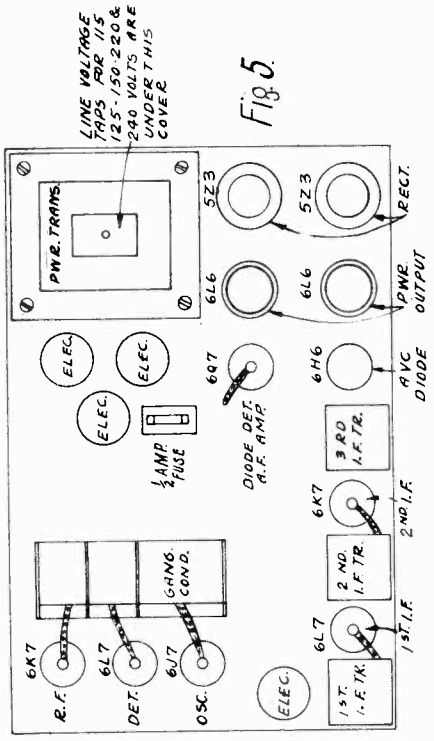
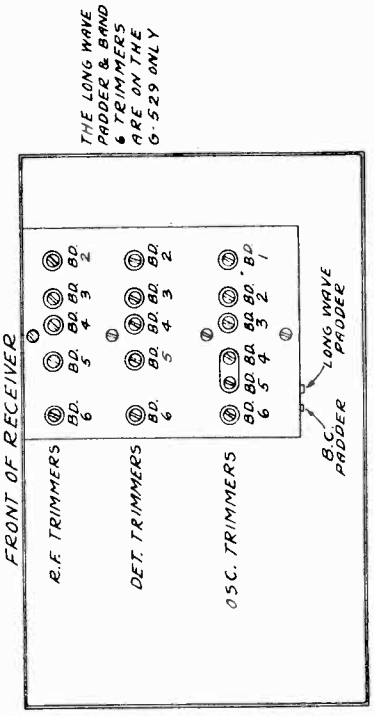


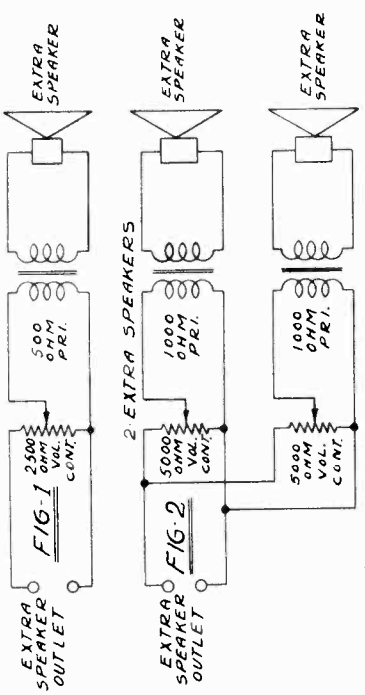
Fig. 5



Schematic Wiring Diagram

and special circuits for the Models TG-528 and TG-529

EXTRA SPEAKER CONNECTIONS FOR MODELS G-528 & G-529



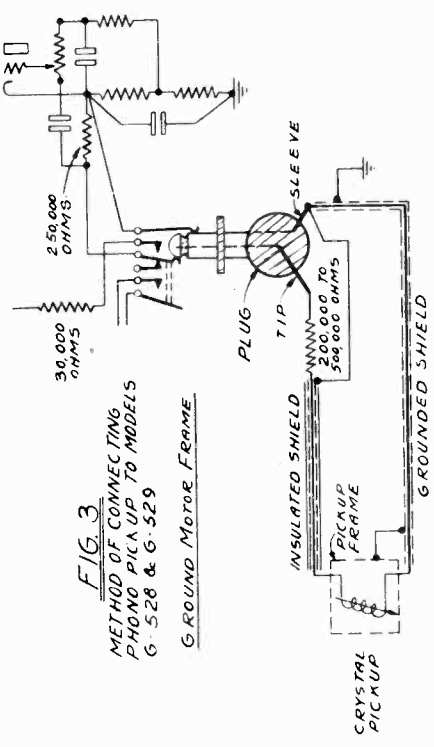
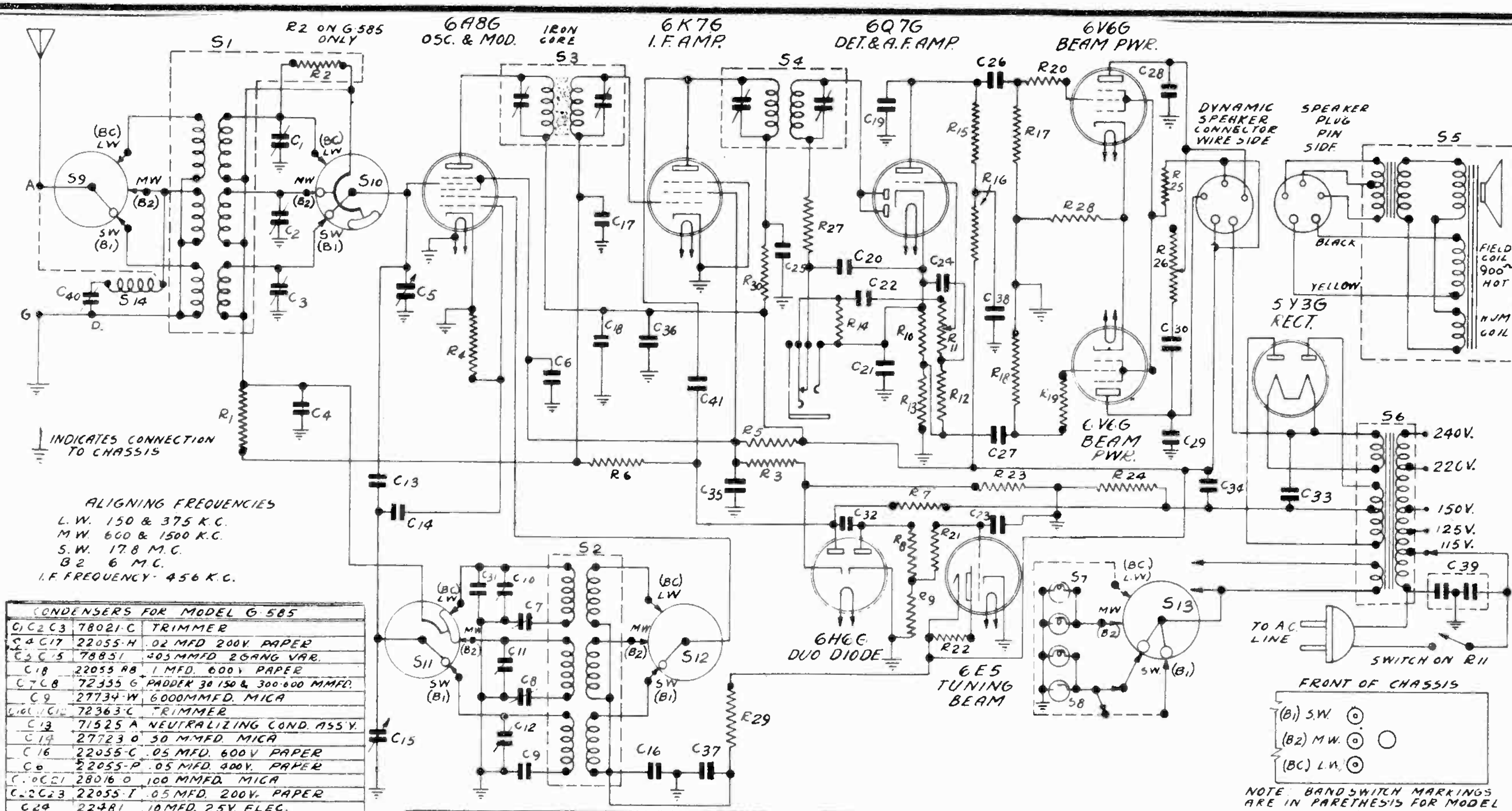
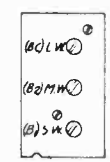


FIG. 3
METHOD OF CONNECTING PHONO PICKUP TO MODELS G-528 & G-529
GROUND MOTOR FRAME

MODEL G-584, G-585
Schematic, Trimmers
Parts

PILOT RADIO CORP.





NOTE ON CIRCUIT FOR MODELS G-584 & G-585 DOTTED LINES SHOW CONNECTIONS FOR MODEL G-584 WHICH DIFFER FROM MODEL G-585 BETWEEN POINTS INDICATED BY ARROWS ON BAND SWITCH

CONDENSERS FOR MODEL G-585		
C1 C2 C3	78021-C	TRIMMER
C4 C17	22055-H	.02 MFD 200V. PAPER
C5 C15	78851	405 MMFD 2 GANG VAR.
C18	22055 AB	.1 MFD. 600V PAPER
C7 C8	72335 G	PADDER 30 150 & 300-600 MMFD.
C9	27734-W	6000 MMFD. MICA
C10 C11 C12	72363-C	TRIMMER
C13	71525 A	NEUTRALIZING COND. ASS'Y.
C14	27723 0	30 MMFD. MICA
C16	22055-C	.05 MFD. 600V PAPER
C6	22055-P	.05 MFD. 400V. PAPER
C20 C21	28016 0	100 MMFD. MICA
C22 C23	22055-T	.05 MFD. 200V. PAPER
C24	22481	10 MFD. 25V. ELEC.
C25 C26	22055 AC	.02 MFD 600V PAPER
C27	22055-Z	.02 MFD 400V PAPER
C28 C29	22055 AL	.002 MFD. 1000V PAPER
C30	22055 AC	.02 MFD 600V PAPER
C33	85024	10 MFD 450V ELEC.
C34		8 MFD 450V ELEC.
C19 C32 C31	27736-0	25 MMFD. MICA
C35	85025	8-MFD 450V ELEC.
C36		8-MFD. 250V ELEC.
C37 C38		4-4 MFD. 250V. ELEC.
C39	78503	.01-.01 MFD. SHIELDED PAPER 1000V
C40	71503-F	35 100 MMFD PAPPER
C19	28016 W	100-MMFD MICA

CONDENSERS FOR MODEL G-584 SAME AS G-585 EXCEPT FOLLOWING		
C7	71503-A	250-500 MMFD. PADDER
C8	27732-W	1600 MMFD. MICA
C31	27736 0	NOT USED ON G-584

RESISTORS FOR MODELS G-584 & G-585		
R1 R13 R15	13031	100,000 OHMS 1/4 WATT CARBON
R2	13029	502,000 OHMS 1/4 WATT CARBON (G-585 ONLY)
R17 R18	13024	500,000 OHMS 1/4 WATT CARBON
R19 R20	13115	400 OHMS 1/4 WATT CARBON
R16	13074	20,000 OHMS 1/4 WATT CARBON
R10	13195	2,500 OHMS 1/4 WATT CARBON
R12 R14	13171	250,000 OHMS 1/4 WATT CARBON
R6 R7	13007	2 MEGOHM 1/4 WATT CARBON
R8 R9 R21	13001	1 MEGOHM 1/4 WATT CARBON
R22	13001	1 MEGOHM 1/4 WATT CARBON
R11	79492	750,000-OHM VOL. CONT. & SWITCH
R3	13129	15,000 OHMS 1 WATT CARBON
R4	13164	50,000 OHMS 1/4 WATT CARBON
R5	13201	10,000 OHMS 2-WATT CARBON
R23	13029	250 OHMS 1/4 WATT CARBON
R24	13188	23 OHMS 1 WATT CARBON
R25	13028	1,000 OHMS 1/4 WATT CARBON
R26	79493	30,000 OHMS TONE CONTROL
R27	13148	30,000 OHMS 1/4 WATT CARBON
R28	83026	150 OHMS 3 WATT WIRE WOUND
R29	13052	6,000 OHMS 1/2 WATT CARBON
R30	13149	6,000 OHMS 1/4 WATT CARBON

MISC. FOR MODEL G585		
S1	73110	ANT. COIL ASS'Y.
S2	73112	OSC. COIL ASS'Y.
S3	73108 B	1ST. I.F. TRANS ASS'Y
S4	73103	2ND I.F. TRANS ASS'Y
S5	40891	8" H.C. SPEAKER
		PWR. TRANS. ASS'Y. 60~ 117.5V.
S6	79491	" " 60~ UNIV.
S7 S8	78889	DIAL LAMPS 6.3 V. .2 AMP.
S9 S10 S11 S12 S13	72367-C	BAND SWITCH
S14		WAVE TRAP COIL ASS'Y.

MISC. FOR MODEL G-584 SAME AS G-585 EXCEPT THE FOLLOWING		
S1	73109	ANT. COIL ASS'Y.
S2	73111	OSC. COIL ASS'Y.

ALTERATIONS
FINISH
CLASSIFICATION: G-580 SERIES
THIS PRINT SUPERSEDES ALL OTHERS PRIOR TO [redacted]
DO NOT SCALE THIS PRINT

PILOT RADIO CORPORATION
LONG ISLAND CITY N. Y. U. S. A.
SCHEMATIC CIRCUIT DIAGRAM MODELS G-584 & G-585
DRAWN BY: E.F.
DATE: 6/22/37
APPROVED BY: A.W.H.
DWG. NO. 25169-

MODELS G-528 & G-529

RECEIVER ALIGNMENT

EQUIPMENT REQUIRED:

Signal Generator, having accurate frequency calibration.
Output Meter
Dummy Antenna; 900 ohm non-inductive resistor
.1 mfd. condenser
.0002 mfd. condenser

CONNECTIONS: The posts marked D and G on the rear of the chassis should be connected to ground side of the signal generator. The hot side of the signal generator is connected to the grid of the 6L7 mixer tube thru a .1 mfd. condenser when aligning the intermediate frequency amplifier. The hot lead is transferred to the post marked A in series with a .0002 mfd. condenser when aligning Bands 4, 5, and 6. The .0002 mfd. condenser is replaced with a 400-ohm resistor when aligning Bands 1, 2 and 3.

The output meter may be connected to the extra speaker terminals.

SIGNAL GENERATOR OUTPUT: The signal generator output control should permit attenuation of the signal to zero output. If this is not possible on the higher frequencies a harmonic of a lower frequency may be used. Apparent broad tuning of the trimmers will be noticed if the aligning signal is too strong.

The broadness is due to the automatic volume control action. It is for this reason that the signal generator output must be kept low for accurate alignment.

ALIGNMENT PROCEDURE: All the control knobs should be turned to the extreme clockwise positions. The positions of the various trimmers are clearly shown in Figure 5. Connect the signal generator and output meter for aligning the intermediate-frequency amplifier as described under "connections". Turn the loud-speaker switch to the external speaker position. Set the signal generator at 456 kc. and increase its output until a reading is obtained on the output meter. Adjust the trimmers mounted on the side of the intermediate frequency transformers in the order listed below under IF alignment. Decrease the signal generator output so that a very small deflection is read on the output meter and repeat the adjustment of the IF trimmers.

Next connect the signal-generator for aligning Band 5. Set the signal generator and receiver dial at 1500 kc. Adjust the B5 oscillator trimmer for maximum output. The detector and R.F. trimmers should next be adjusted for maximum output.

Band 5 should now be adjusted at the low frequency end of the dial. For this adjustment set the signal generator to 600 kc. and follow instructions under "rocking the gang". Repeat the 1500 kc. adjustment after aligning at 600 kc.

Model 529 has a long wave band (Band 6) which is adjusted in a manner similar to that for Band 5.

Bands 1, 2, 3 and 4 have no adjustment at the low frequency end of the band.

IMAGE FREQUENCY: All bands except Band 1 are aligned with the oscillator frequency adjuster higher than the signal frequency. Band 1 has the oscillator adjusted to a frequency below the signal frequency. The possibility of aligning the receiver to the image frequency on Bands 2, 3 and 4 can be eliminated by adjusting the signal generator to the alignment frequency with sufficient output to receive two signals separated by twice the intermediate frequency. The signal which is received at a higher frequency on the receiver dial is the correct signal for alignment. The reverse is true on Band 1.

INTERMEDIATE FREQUENCY ALIGNMENT

Set Signal Generator at	Set Receiver Dial at	Adjust in Order Listed Below
456 kc.	530 kc.	I.F.T.1
		I.F.T.2
		I.F.T.3

RADIO FREQUENCY ALIGNMENT

Set Signal Generator and Receiver Dial at		Adjust in Order Listed Below
Band 6	375 kc.	Osc. 6, Det. 6, RF6.
Band 6	150 kc.	Long wave padder, rock gang*
		Repeat 375 kc. adjustment
Band 5	1,500 kc.	Osc. 5, Det. 5, RF5.
Band 5	600 kc.	Broadcast padder, rock gang*
		Repeat 1,500 kc. adjustment
Band 4	4,300 kc.	Osc. 4, Det. 4, RF4
Band 3	11,000 kc.	Osc. 3, Det. 3, RF3
Band 2	23,000 kc.	Osc. 2, Det. 2, RF2
Band 1	60,000 kc.	Osc. 1

*Rocking the gang is necessary to obtain correct alignment of the RF circuits. The signal generator should be set to the padding frequency and the gang rotated until the output meter reads maximum output.

The padding condenser for the band to be adjusted is turned a slight amount and the gang condenser turned to the new peak. If the output reading is greater at this setting of the padder, continue adjusting the padder and the gang condenser in the same direction until a point is reached where the output decreases when the padder and gang are rotated further in either direction. The padder should be turned in the opposite direction where decreased output follows an adjustment of the padder.

ALIGNMENT OF BANDS 2 and 3: Greater care is required when aligning Bands 2 and 3 due to the higher frequencies covered. The signal generator and receiver dial indicator are set at the alignment frequency and the oscillator trimmer is adjusted for maximum output, care being taken to avoid adjustment to the image frequency. The interstage trimmer is now adjusted and the gang condenser rocked at the same time around the resonance position, until at some position of both trimmer and gang condenser, maximum output is obtained. The R.F. trimmer is adjusted in the same manner.

BAND 1 ALIGNMENT: The 60,000 kc. signal necessary for alignment may not be obtainable with most signal generators. The third harmonic of 20,000 kc. can be used satisfactorily. Two signals will be heard near 60,000 kc. on the dial. The oscillator trimmer should be adjusted to bring the lower frequency signal to the 60,000 kc. calibration on the dial.

SOCKET VOLTAGES

	6K7 RF Amp.	6L7 Mixer	6J7 Osc.	6L7 IF Amp.	6K7 IF Amp.	6H6 AVC	6Q7 Det, AF, Amp.	6L6 (2) Power Amp.	5Z3 (2) Rect.	6E5 Tun. Beacon
Cathode	0	3*	0	0	0	0	.40†	20	—	—
Screen grid	93	95	185	95	90	—	—	305	—	0
Plate	230	228	185	242	230	—	130†	310	—	†
Filament	6.3	6.3	6.3	6.3	6.3	6.3	6.3	6.3	5	6.3
									Target	242

Grid bias voltage applied to I. F. and R. F. tubes—2.6 volts (Measure across R36)
The above voltages were measured to chassis with a 1000 ohm per volt voltmeter and a 115 volt AC line.
*Sensitivity control in maximum position. Cathode voltage measured with sensitivity control in minimum position, 9 volts.
†Measured through high resistance.
Operating Voltages 115-125-150-220-240 volts Alternating current
Line frequency 50-60 cycles

Power consumption 200 watts
Undistorted power output—20 watts

Model G-584	Model G-585
16 - 51 m. (18,800 - 5,880 kc.)	16 - 51 m. (18,800 - 5,880 kc.)
48 - 146 m. (6,250 - 2,050 kc.)	190 - 571 m. (1,580 - 525 kc.)
190 - 571 m. (1,580 - 525 kc.)	780 - 2,190 m. (385 - 140 kc.)

(MODEL G-585 IS SOLD OUTSIDE THE U.S.A. ONLY)

REMOVAL OF CHASSIS FROM CABINET:

To remove the chassis from the cabinet proceed as follows:

Be certain that the line cord is removed from the power outlet socket.

Remove the "slip-on" knobs and felt washers from the controls and loosen the set screw on the tuning knob.

Remove the speaker plug from the socket at the rear of the speaker.

Remove the four mounting screws, located underneath the cabinet.

REALIGNMENT: Should the receiver require realignment, the procedure outlined below should be followed. In the schematic wiring diagram, the location and function of the various alignment capacitors are clearly illustrated. For best results an external modulated oscillator with adequate frequency range, and a visual output meter, should be used.

Before connecting the chassis to the power line, reconnect the speaker cable.

I. F. ALIGNMENT: When aligning the Intermediate Frequency Amplifier, the external oscillator must be set at 456 kc. The Band Switch should be in the position marked "Broadcast," and the tuning condenser should be set at maximum capacity. Connect the "antenna" lead of the external oscillator to the control grid of the type 6K7-G tube in the I. F. Amplifier stage through a .1 mfd. fixed condenser. Connect the "ground" lead of the external oscillator to the receiver ground lead. The I. F. alignment capacitors are located at the top of the shielded I. F. Transformers. Rotate the adjusting screw of each capacitor on I. F. Unit No. 2 slowly until maximum output is noted. On completion of this operation, remove the external oscillator leads from the type 6K7-G I. F. Amplifier tube and connect it in the same manner to the control grid at the top of the type 6A8-G tube.

Now rotate each adjustment screw on I. F. Unit No. 1 for maximum output. During these operations, use the least possible input to prevent broadening of the resonance peaks.

In order to obtain the most accurate realignment of the I. F. Amplifier, it is essential to repeat the alignment process in both I. F. units with the external oscillator leads connected across the control grid of the 6A8-G tube.

WAVE TRAP ADJUSTMENT: With the oscillator still set at 456 kc., connect the oscillator to the antenna through a .0002 mfd. condenser. Then adjust the wave trap condenser for minimum deflection on the output meter.

BROADCAST ALIGNMENT: After the I. F. Amplifier is completely realigned, connect the external oscillator leads to the receiver antenna and ground leads, through a .0002 mfd. condenser. Set the Band Switch in the "Broadcast" position and place the tuning control pointer at the 1500 kc. mark. Adjust the broadcast band oscillator trimmer to maximum response. Adjust the signal section trimmer in the same manner.

Next adjust the 600 kc. padder condenser. Set the external oscillator at 600 kc. Rotate the receiver tuning control until resonance is indicated. Then rock the tuning control back and forth about this resonance position, and at the same time adjust the padder condenser for the highest resonance peak.

Now repeat the 1500 kc. trimmer adjustment, following in every detail the procedure previously described.

ALIGNMENT OF THE SHORT-WAVE BANDS: The procedure in aligning the short-wave bands is identical with that for the broadcast with the exception of the adjustment of the padder condenser which is of fixed value and requires no adjustment. The alignment frequency is 17 Meters—(17,600 kc.)

Turn the Band Switch to the right. Tune the external oscillator to 17 meters. Tune the receiver so that the dial pointer is in a position coincidental with the 17 meter indication on the dial scale. Adjust the short wave oscillator trimmer for maximum response. Next adjust the signal circuit trimmer for maximum resonance. Repeat all adjustments to assure correct alignment, rocking the gang condenser to right or left for maximum gain.

Model G-584 is aligned in the same manner at 6,000 kc. with the switch in Band 2 position.

LONG WAVE ALIGNMENT: Procedure in the Model G-585 is similar to the Broadcast section of that receiver. Align at 375 kc. Adjust the padder at 150 kc.

Should it be necessary to remove the band switch assembly, it is advisable to realign the receiver after reinstalling.

CAUTION: When making repairs on the receiver, use only ROSIN CORE SOLDER. NEVER USE SOLDERING PASTE OR ACID FLUXES OF ANY TYPE.

RECEIVER DESCRIPTION

Frequency Rating —50 to 60 cycles.

Power Consumption—90 Watts.

Tubes —1 type 6A8-G, 1 type 6K7-G, 1 type 6Q7-G, 2 type 6V6-G, 1 type 5Y3-G, 1 type 6E5, type 6H6G

Undistorted power output—6 watts.

Intermediate Frequency—456 kc.

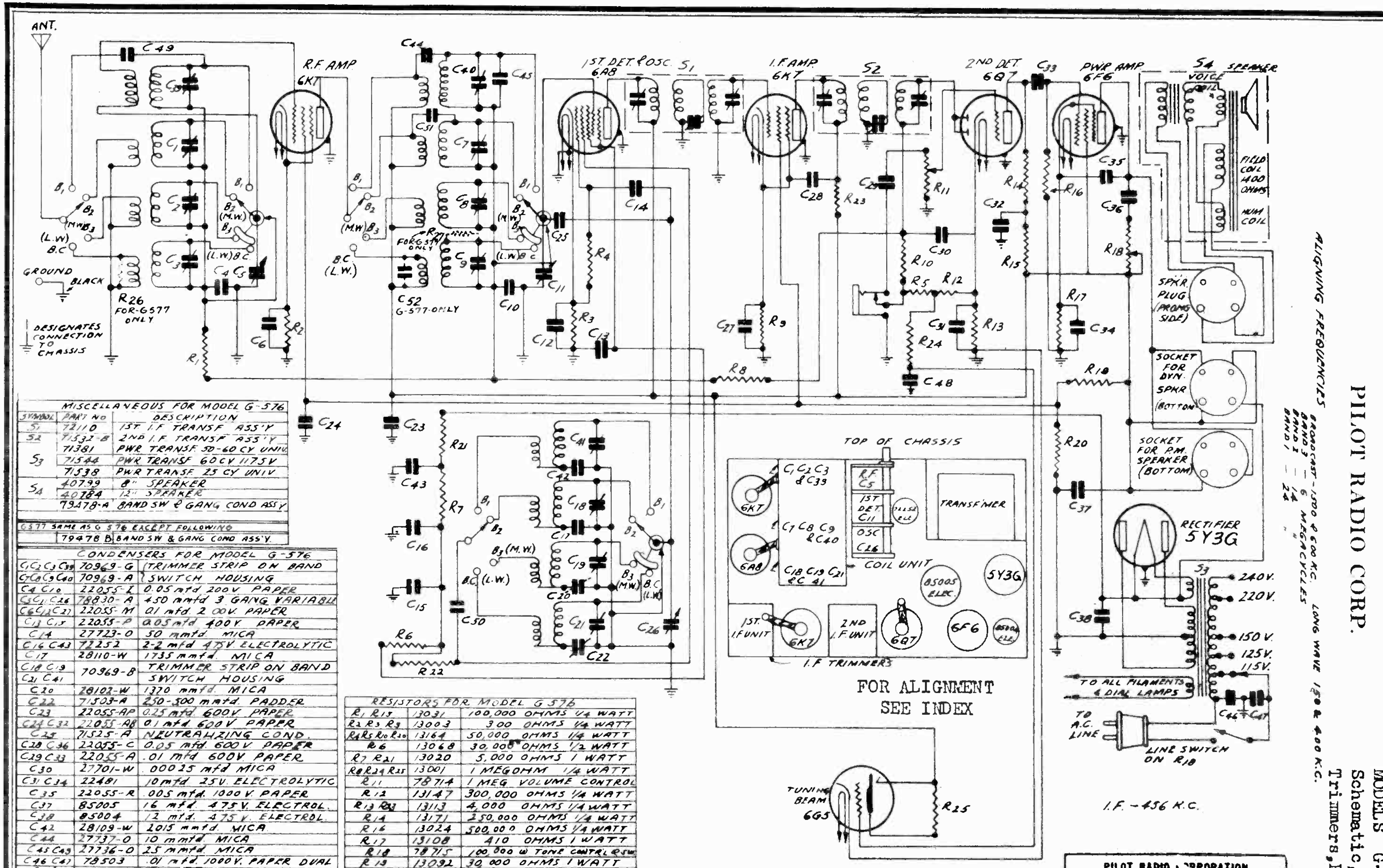
Tube Functions —Type 6A8-G Electron emission control oscillator-detector.
Type 6K7-G I. F. amplifier.
Type 6Q7-G Duo-diode det. amplifier.
Type 6V6-G (2) Class "A" power pentode.
Type 5Y3-G Full-wave rectifier for power supply.
Type 6E5 Tuning Beacon
Type 6H6G. AVC diode

PILOT RADIO CORP.

MODELS G-576, G-577
Schematic, Socket
Trimmers, Parts

PILOT RADIO CORP.

ALIGNING FREQUENCIES BROADCAST - 1500 & 600 K.C. LONG WAVE 150 & 400 K.C.
BAND 3 - 6 MEGACYCLES
BAND 2 - 14 "
BAND 1 - 24 "



FOR ALIGNMENT SEE INDEX

MISCELLANEOUS FOR MODEL G-576		
SYMBOL	PART NO	DESCRIPTION
S1	72110	1ST. I.F TRANSF ASS'Y
S2	71532-B	2ND I.F TRANSF ASS'Y
S3	71381	PWR TRANSF 50-60 CY UNIV.
	71544	PWR TRANSF 60 CY 117.5 V
	71538	PWR TRANSF 25 CY UNIV
S4	40799	8" SPEAKER
	40784	12" SPEAKER
	79478-A	BAND SW & GANG COND ASS'Y
G577 SAME AS G 576 EXCEPT FOLLOWING		
	79478 B	BAND SW & GANG COND ASS'Y.

CONDENSERS FOR MODEL G-576		
$C_1 C_2 C_3 C_{39}$	70969-G	TRIMMER STRIP ON BAND
$C_7 C_8 C_9 C_{40}$	70969-A	SWITCH HOUSING
$C_4 C_{10}$	22055-I	0.05 mfd 200V PAPER
$C_5 C_{11} C_{26}$	78830-A	450 mmfd 3 GANG VARIABLE
$C_6 C_{12} C_{27}$	22055-M	.01 mfd 200V. PAPER
$C_{13} C_{15}$	22055-P	0.05 mfd 400V. PAPER
C_{14}	27723-0	50 mmfd. MICA
$C_{16} C_{43}$	72252	2-2 mfd 475V. ELECTROLYTIC
C_{17}	28110-W	1735 mmfd. MICA
$C_{18} C_{19}$	70969-B	TRIMMER STRIP ON BAND
$C_{21} C_{41}$		SWITCH HOUSING
C_{20}	28102-W	1370 mmfd. MICA
C_{22}	71503-A	250-500 mmfd. PADDER
C_{23}	22055-AP	0.25 mfd. 600V. PAPER
$C_{24} C_{32}$	22055-AB	0.1 mfd. 600V PAPER
C_{25}	71525-A	NEUTRALIZING COND.
$C_{28} C_{36}$	22055-C	0.05 mfd. 600V PAPER
$C_{29} C_{33}$	22055-A	.01 mfd 600V. PAPER
C_{30}	27701-W	.00025 mfd MICA
$C_{31} C_{34}$	22481	10 mfd 25V. ELECTROLYTIC
C_{35}	22055-R	.005 mfd. 1000V. PAPER
C_{37}	85005	16 mfd. 475V. ELECTROL.
C_{38}	85004	12 mfd. 475V. ELECTROL.
C_{42}	28109-W	2015 mmfd. MICA
C_{44}	27737-0	10 mmfd. MICA
$C_{45} C_{49}$	27736-0	25 mmfd. MICA
$C_{46} C_{47}$	78503	.01 mfd. 1000V. PAPER DUAL
C_{48}	22055-H	.02 mfd. 200V. PAPER
C_{50}	22055-A	.01 mfd. 600V. PAPER
C_{51}	27737-0	10 mmfd. MICA
G-577 SAME AS G-576 EXCEPT FOLLOWING		
$C_{20} C_{22}$	71577-J	250-500 & 50-175 MMFD (DUAL PADDER)
C_{52}	27701-0	250 MMFD. MICA

RESISTORS FOR MODEL G 576		
$R_1 R_{15}$	13031	100,000 OHMS 1/4 WATT
$R_2 R_3 R_9$	13003	300 OHMS 1/4 WATT
$R_4 R_5 R_{10} R_{20}$	13164	50,000 OHMS 1/4 WATT
R_6	13068	30,000 OHMS 1/2 WATT
$R_7 R_{21}$	13020	5,000 OHMS 1 WATT
$R_8 R_{24} R_{25}$	13001	1 MEGOHM 1/4 WATT
R_{11}	78714	1 MEG VOLUME CONTROL
R_{12}	13147	300,000 OHMS 1/4 WATT
$R_{13} R_{23}$	13113	4,000 OHMS 1/4 WATT
R_{14}	13171	250,000 OHMS 1/4 WATT
R_{16}	13024	500,000 OHMS 1/4 WATT
R_{17}	13108	410 OHMS 1 WATT
R_{18}	78715	100,000 W TONE CONTRL & SW
R_{19}	13092	30,000 OHMS 1 WATT
R_{22}	13179	12,000 OHMS 2 WATTS
G-577 SAME AS G-576 PLUS FOLLOWING.		
R26	13164	50,000 OHMS 1/4 WATT CARBON
R27	13029	250 OHMS 1/4 WATT CARBON

ALTERATIONS ② RECT. WAS 5W4 E.F. 5/19/37 (1327)
79478-A WAS 49478-A
ADDED-L.W. G-577

FINISH

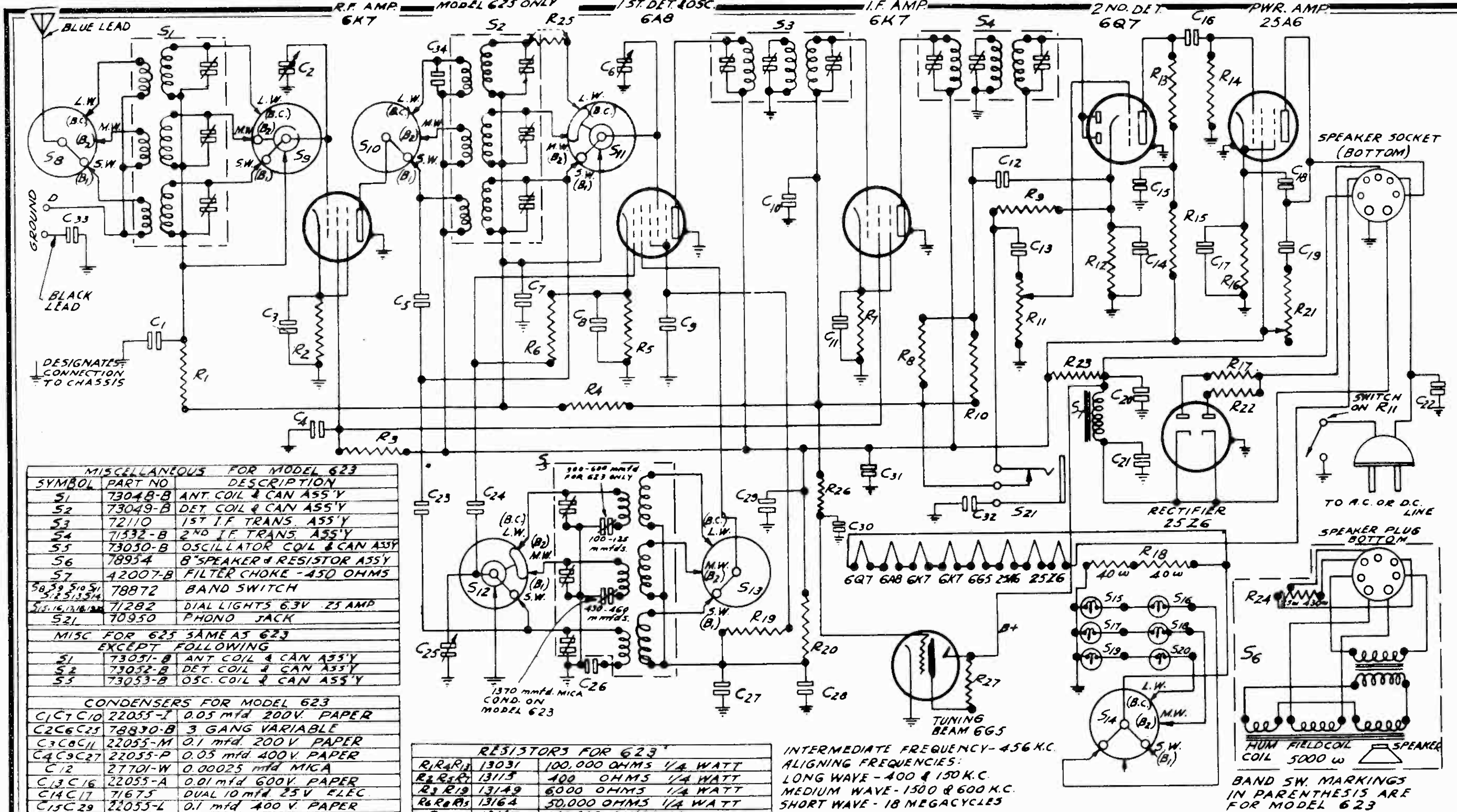
CLASSIFICATION G-570

THIS PRINT SUPERSEDES ALL OTHERS
PRIOR TO [redacted]
DO NOT SCALE THIS PRINT

PILOT RADIO CORPORATION
LONG ISLAND CITY, N. Y. U. S. A.
SCHEMATIC CIRCUIT DIAGRAM & CHASSIS LAYOUT FOR MODELS G576 & G577
MATERIAL
SCALE
DATE 3/23/37
DRAWN BY
CHECKED BY
APPROVED BY
DWG. No. 25157-2

MODELS 623, 625
Schematic, Parts

PILOT RADIO CORP.



MISCELLANEOUS FOR MODEL 623		
SYMBOL	PART NO	DESCRIPTION
S1	73048-B	ANT. COIL & CAN ASS'Y
S2	73049-B	DET. COIL & CAN ASS'Y
S3	72110	1ST I.F. TRANS. ASS'Y
S4	71532-B	2ND I.F. TRANS. ASS'Y
S5	73050-B	OSCILLATOR COIL & CAN ASS'Y
S6	78954	8" SPEAKER & RESISTOR ASS'Y
S7	42007-B	FILTER CHOKE - 450 OHMS
S8 S9 S10 S11 S12 S13 S14	78872	BAND SWITCH
S15, 16, 17, 18, 19, 20	71282	DIAL LIGHTS 6.3V .25 AMP
S21	70950	PHONO JACK
MISC FOR 625 SAME AS 623 EXCEPT FOLLOWING		
S1	73051-B	ANT COIL & CAN ASS'Y
S2	73052-B	DET COIL & CAN ASS'Y
S5	73053-B	OSC. COIL & CAN ASS'Y

CONDENSERS FOR MODEL 623		
C1 C7 C10	22055-I	0.05 mfd 200V. PAPER
C2 C6 C25	78830-B	3 GANG VARIABLE
C3 C8 C11	22055-M	0.1 mfd. 200V PAPER
C4 C9 C27	22055-P	0.05 mfd. 400V. PAPER
C12	27701-W	0.00025 mfd MICA
C13 C16	22055-A	0.01 mfd 600V. PAPER
C14 C17	71675	DUAL 10 mfd. 25V ELEC
C15 C29	22055-L	0.1 mfd 400 V. PAPER
C18 C33	22055-R	.005 mfd. 1000V. PAPER
C19	22055-C	.05 mfd. 600V. PAPER
C20	78594	12 mfd. 250 ELECTROLYTIC
C21		16 mfd. 250 "
C28		4 mfd. 250 "
C22	22055-U	0.01 mfd. 1000V. PAPER
C24	27723-W	.00005 mfd. MICA
C26	27745-W	.0025 mfd. MICA
C23	71525-A	NEUTRALIZING
C5	27737-O	.00001 mfd. MICA
C32	22055-S	0.5 mfd. 200V. PAPER
C31	78595	4 mfd. 250V. ELEC.
C30	22055-H	.02 mfd 200V. PAPER
CONDENSERS FOR MODEL 625 SAME AS FOR 623 EXCEPT FOLLOWING		
C34	27701-W	.00025 mfd. MICA

RESISTORS FOR 623		
R1 R4 R13	13031	100,000 OHMS 1/4 WATT
R2 R5 R7	13115	400 OHMS 1/4 WATT
R3 R19	13149	6000 OHMS 1/4 WATT
R6 R8 R15	13164	50,000 OHMS 1/4 WATT
R9	13147	300,000 OHMS 1/4 WATT
R10 R26 R27	13001	1,000,000 OHMS 1/4 WATT
R11	78714	750,000 ω VOL. CONTROL
R12	13149	6000 OHMS 1/4 WATT
R14	13024	500,000 OHMS 1/4 WATT
R16	13192	440 OHMS 1 WATT
R17 R22	13077	100 OHMS 1/2 WATT
R18	83002	80 OHMS TAPPED AT 40 ω
R20	13073	3000 OHMS 1/2 WATT
R21	78715	100,000 OHMS TONE CONT. & SW.
R23	78610	2500 OHMS 3 WATTS WIRE W'D
R24	83010	455 ω TAPPED AT 25 ω " "
RESISTORS FOR 625 SAME AS 623 EXCEPT FOLLOWING		
R25	13029	250 OHMS 1/4 WATT

FOR ALIGNMENT, SEE INDEX

ALTERATIONS ② BAND SW. MARKINGS & CONDENSER VALUES IN S5 - FOR MODEL 623 - ADDED 8/20/36. R13 WAS # 13024, R13 WAS # 13113.

FINISH

CLASSIFICATION: 620 SERIES

THIS PRINT SUPERSEDES ALL OTHERS PRIOR TO [redacted]

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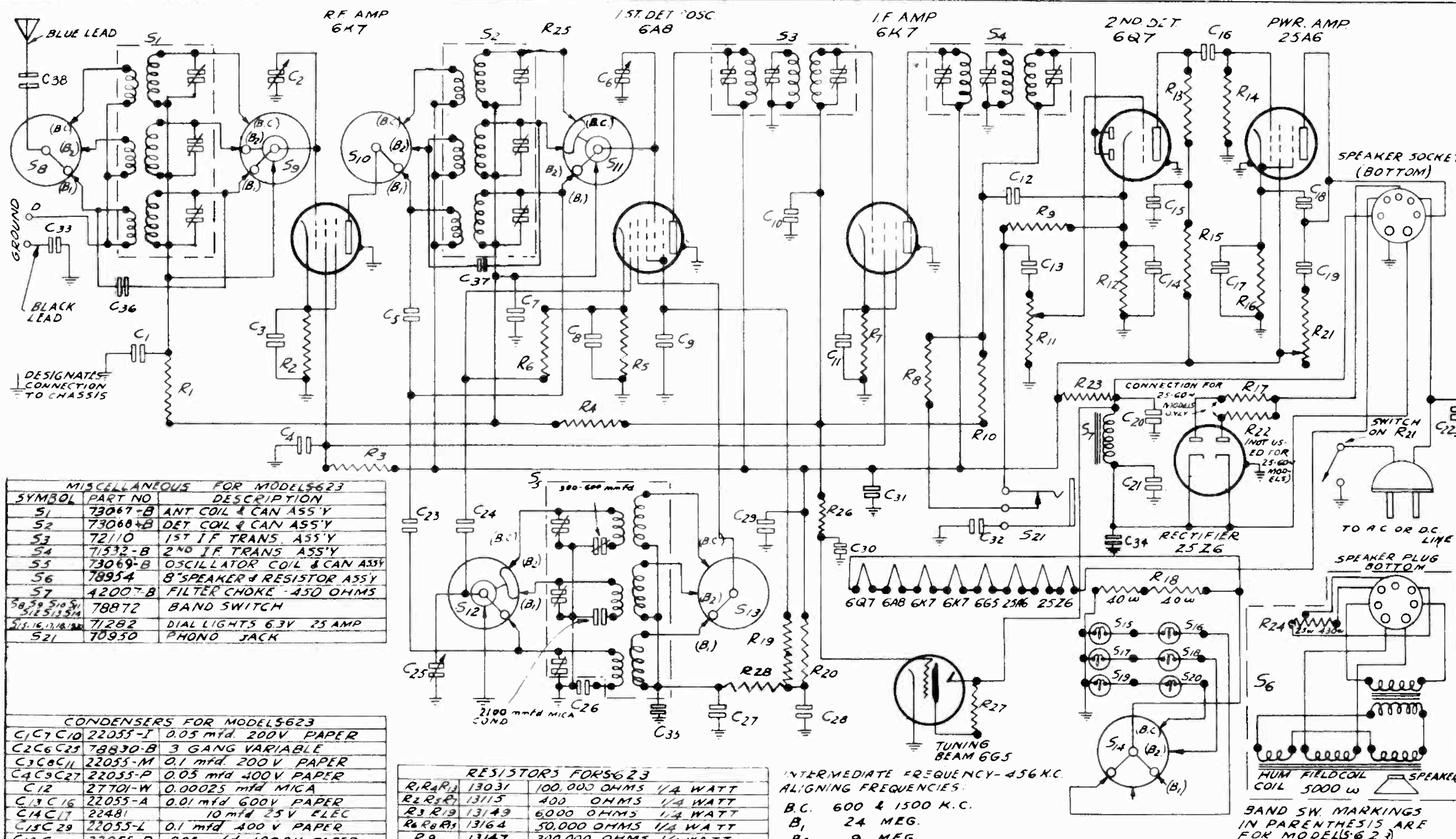
PILOT RADIO CORPORATION
LONG ISLAND CITY, N. Y. U. S. A.

SCHEMATIC CIRCUIT DIAGRAM FOR MODELS 623 & 625

MATERIAL
SCALE
DATE 8/7/36
DRAWN BY
CHECKED BY FAC
APPROVED BY
DRWG. NO. 25134-2

MODELS S-623, S-623J
Schematic, Parts

PILOT RADIO CORP.



MISCELLANEOUS FOR MODEL S623		
SYMBOL	PART NO	DESCRIPTION
S1	73067-B	ANT. COIL & CAN ASS'Y
S2	73068-B	DET. COIL & CAN ASS'Y
S3	72110	1ST I.F. TRANS. ASS'Y
S4	71532-B	2ND I.F. TRANS. ASS'Y
S5	73069-B	OSCILLATOR COIL & CAN ASS'Y
S6	78954	8" SPEAKER & RESISTOR ASS'Y
S7	42007-B	FILTER CHOKE - 450 OHMS
S8 S9 S10 S11 S12 S13 S14	78872	BAND SWITCH
S15, 16, 17, 18, 19, 20	71282	DIAL LIGHTS 6.3V .25 AMP
S21	70950	PHONO JACK

CONDENSERS FOR MODEL S623		
C1 C7 C10	22055-I	0.05 mfd. 200V PAPER
C2 C6 C25	78830-B	3 GANG VARIABLE
C3 C8 C11	22055-M	0.1 mfd. 200V PAPER
C4 C9 C27	22055-P	0.05 mfd 400V PAPER
C12	27701-W	0.00025 mfd MICA
C13 C16	22055-A	0.01 mfd 600V PAPER
C14 C17	22481	10 mfd 25V ELEC
C15 C29	22055-L	0.1 mfd 400V PAPER
C18 C33	22055-R	.005 mfd 1000V. PAPER
C19	22055-C	.05 mfd 600V PAPER
C20	78594	12 mfd. 250 ELECTROLYTIC
C21		16 mfd 250 "
C28		4 mfd 250 "
C22	22055-U	0.01 mfd. 1000V PAPER
C24	27723-0	.00005 mfd MICA
C26	28103-W	.0021 MFD. MICA
C23	71525-A	NEUTRALIZING
C5	27737-0	.00001 mfd. MICA
C32	22055-S	0.5 mfd. 200V. PAPER
C35	85013	4 mfd. 250V. ELEC.
C30	22055-H	.02 mfd 200V. PAPER
C-31	85013	12 MFD. 250 V. ELEC.
C36 C37	27737-0	10 MMFD. MICA
C34	22055-C	.05 MFD. 600V. PAPER
C38	22055-R	.005 MFD. 1000V. PAPER

RESISTORS FOR S623		
R1 R4 R13	13031	100,000 OHMS 1/4 WATT
R2 R5 R7	13115	400 OHMS 1/4 WATT
R3 R19	13149	6000 OHMS 1/4 WATT
R6 R8 R15	13164	50,000 OHMS 1/4 WATT
R9	13147	300,000 OHMS 1/4 WATT
R10 R26 R27	13001	1,000,000 OHMS 1/4 WATT
R11	78714	750,000 ω VOL. CONTROL
R12	13149	6000 OHMS 1/4 WATT
R14	13024	500,000 OHMS 1/4 WATT
R16	13192	440 OHMS 1 WATT
R17 R22	13077	100 OHMS 1/2 WATT
R18	83002	80 OHMS TAPPED AT 40 ω
R20	13086	2000 OHMS 1/2 WATT
R21	78715	100 000 OHMS TONE CONT. & SW
R23	78610	2500 OHMS 3 WATTS WIRE W'D
R24	83010	455 ω TAPPED AT 25 ω " "
R28	13028	1000 OHMS 1/4 WATT

FOR ALIGNMENT, SEE INDEX

INTERMEDIATE FREQUENCY - 456 K.C.
ALIGNING FREQUENCIES:

B.C. 600 & 1500 K.C.
B_1 24 MEG.
B_2 9 MEG.

CONDENSERS FOR MODELS S623J (25-60~)		
SAME AS FOR MODEL S623 EXCEPT FOLLOWING:		
C20	85012	12 MFD 250V. ELECTRO
C35		4 250V "
C31		12 250V "
C21	85010	34 MFD 250V ELECTRO
C28		4 250V. "

RESISTORS FOR MODELS S623J (25-60~)		
SAME AS FOR MODEL S623 EXCEPT FOLLOWING		
R17	83013	100 OHMS 2 WATTS WIRE W'ND
R22		NOT USED

ALTERATIONS

CLASSIFICATION
S623
S623J (25-60~)

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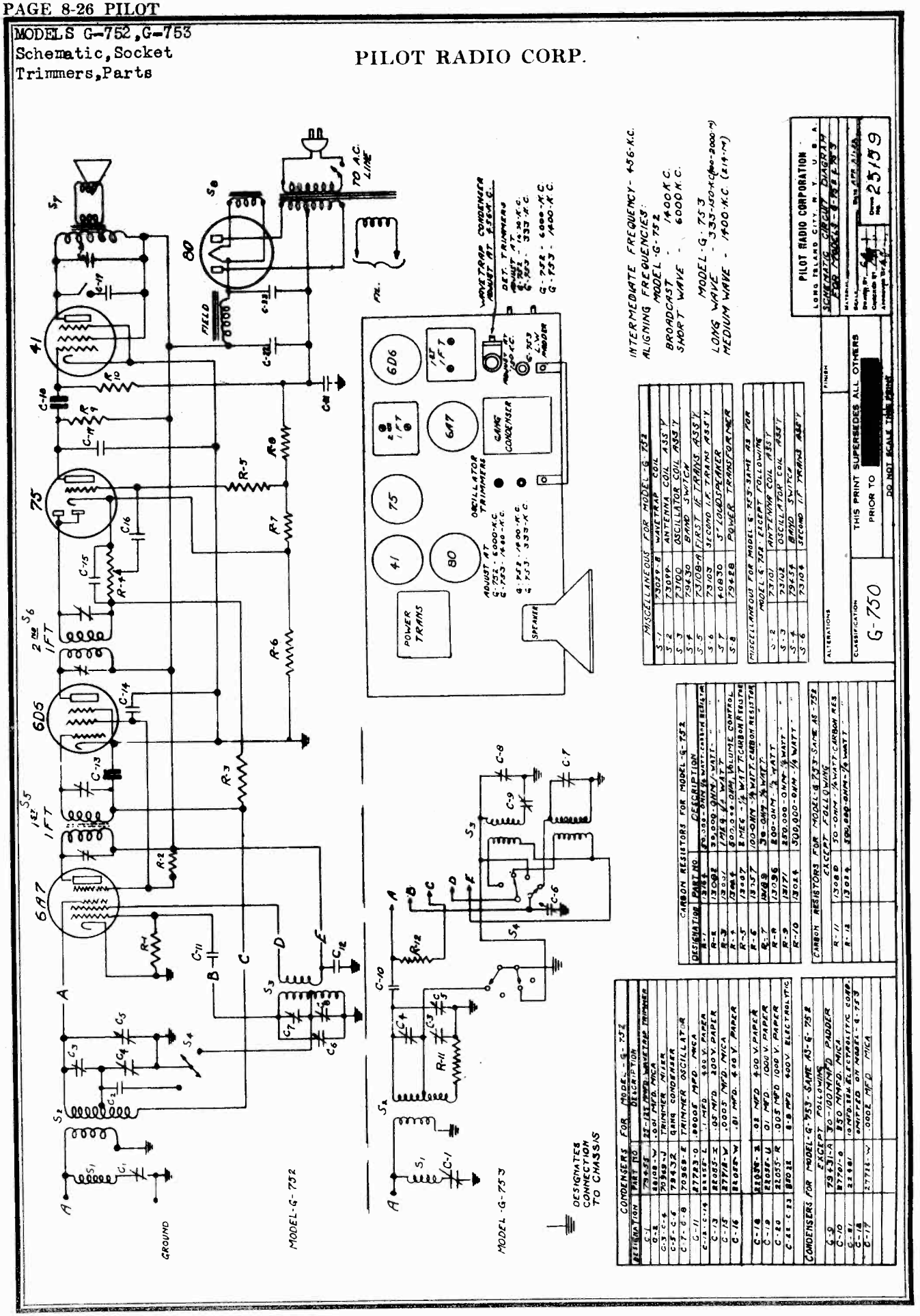
PILOT RADIO CORPORATION
LONG ISLAND CITY, N. Y. U. S. A.
SCHEMATIC CIRCUIT DIAGRAM FOR MODELS S623, S623J (25-60~)
SCALE
DATE 8/7/36
DRAWN BY HM
CHECKED BY EAP
APPROVED BY WHC 8/11/36
DRWG NO 25144

MODELS G-752, G-753
Schematic, Socket
Trimmers, Parts

PILOT RADIO CORP.



MISCELLANEOUS FOR MODEL-G-752

S-1	73089-B	WAVETRAP COIL ASS'Y
S-2	73099	ANTENNA COIL ASS'Y
S-3	73100	OSCILLATOR COIL ASS'Y
S-4	73430	BAND SWITCH
S-5	73308-A	FIRST I.F. TRANS ASS'Y
S-6	73103	SECOND I.F. TRANS ASS'Y
S-7	40830	5" LOUDSPEAKER
S-8	73428	POWER TRANSFORMER

MISCELLANEOUS FOR MODEL-G-753-SAME AS FOR MODEL-G-752 EXCEPT FOLLOWING

S-2	73101	ANTENNA COIL ASS'Y
S-3	73102	OSCILLATOR COIL ASS'Y
S-4	73434	BAND SWITCH ASS'Y
S-6	73104	SECOND I.F. TRANS ASS'Y

CARBON RESISTORS FOR MODEL-G-752

DESIGNATION	PART NO.	DESCRIPTION
R-1	13134	25,000-OHM ½ WATT CONTROL RESISTOR
R-2	13098	30,000-OHM ½ WATT
R-3	13091	1 MEG-½ WATT
R-4	13114	600,000-OHM VOLUME CONTROL
R-5	13092	2 MEG-½ WATT CARBON RESISTOR
R-6	13137	100-OHM-½ WATT CARBON RESISTOR
R-7	1148 9	30,000-½ WATT
R-8	13096	200-OHM-½ WATT
R-9	13171	250,000-OHM ½ WATT
R-10	13014	500,000-OHM ½ WATT

CARBON RESISTORS FOR MODEL-G-753-SAME AS-G-752 EXCEPT FOLLOWING

R-11	13088	50-OHM ½ WATT CARBON RES
R-12	13014	500,000 OHM-½ WATT

CONDENSERS FOR MODEL-G-752

DESIGNATION	PART NO.	DESCRIPTION
C-1	73068	.05 MFD. MICA TRIMMER
C-2, C-4	70569-J	.01 MFD. MICA
C-3, C-5	70569-J	TRIMMER, MICA
C-6, C-7	73432	GANG CONDENSER
C-8, C-9	70569-E	TRIMMER OSCILLATOR
C-10	27723-0	.00005 MFD. MICA
C-11, C-14	21155-L	.1 MFD. 400 V. PAPER
C-13	22085-X	.05 MFD. 200 V. PAPER
C-15	27714-V	.0005 MFD. MICA
C-16	21055-W	.01 MFD. 400 V. PAPER
C-17	21055-X	.01 MFD. 400 V. PAPER
C-18	21055-U	.01 MFD. 1000 V. PAPER
C-19	22055-R	.005 MFD. 1000 V. PAPER
C-20, C-21, C-22	18018	8 MFD. 450 V. ELECTROLYTIC

CONDENSERS FOR MODEL-G-753-SAME AS-G-752 EXCEPT FOLLOWING PADDER

C-9	73431-A	30-100 MMFD. PADDER
C-10	27770-0	850 MMFD. MICA
C-21	22181	10 MFD. 25 V. ELECTROLYTIC COMB.
C-18		OMITTED ON MODEL-G-753
C-19	27711-W	.0002 MFD. MICA

PILOT RADIO CORP.

MODELS 623, 625
MODELS S-623, S-623J
MODELS G-752, G-753
Alignment

Range, Model 623
16 - 555 m. (18,800 540 kc.)

Range, Model 625
16 - 555 m. (18,800 - 540 kc.)
731 - 2140 m. (410 - 140 kc.)

220-240 V. AC-DC

(MODEL 625 IS SOLD OUTSIDE THE U. S. A. ONLY)

AC-DC Model S-623, for 220-240 V. (50-60 Cycles)
AC-DC Model S-623-J, for 220-240 V. (25-60 Cycles)

Three tuning bands covering 12-94 m. (25,000-3,200 kc.) and 187-560 m. (1,600-535 kc.)

I. F. ALIGNMENT: When aligning the Intermediate Frequency Amplifier, the external oscillator must be set at 456 kc. The Band Selector Switch should be in the position marked "Broadcast", and the tuning condenser should be set at maximum capacity. Connect the "antenna" lead of the external oscillator to the control grid of the type 6K7 tube in the I. F. Amplifier stage through a .1 mfd. fixed condenser. Connect the "ground" lead of the external oscillator to the receiver ground lead. The I. F. alignment capacitors are located at the side of the shielded I. F. Transformers. Rotate the adjusting screw of each capacitor on I. F. Unit No. 2 slowly until maximum output is noted. On completion of this operation, remove the external oscillator lead from the type 6K7 I. F. amplifier tube and connect it in the same manner to the control grid at the top of the type 6A8 tube.

Now rotate each adjustment screw on I. F. Unit No. 1 for maximum output. During these operations, use the least possible input to prevent broadening of the resonance peaks

In order to obtain the most accurate realignment of the I. F. amplifier, it is essential to repeat the alignment process in both I. F. Units.

BROADCAST ALIGNMENT: After the I. F. amplifier is completely realigned, connect the external oscillator leads to the receiver antenna and ground leads. Insert a 200 mmf. condenser in series with the antenna lead. Set the Band Selector Switch in the "Broadcast" position and place the tuning control pointer at the 1500 kc. mark. Adjust the broadcast band oscillator trimmer.

Next adjust the interstage alignment trimmer for maximum response. Finally adjust the antenna section trimmer in the same manner.

Next adjust the 600 kc. padder condenser, located on the top of the oscillator coil. Set the external oscillator at 600 kc. Rotate the receiver tuning control until resonance is indicated. Then rock the tuning control back and forth about this resonance position, and at the same time adjust the padder condenser for the highest resonance peak.

Now repeat the 1500 kc. trimmer adjustment, following in every detail the procedure previously described.

ALIGNMENT FOR SHORT WAVE BANDS (ALL EXCEPT S-623 & S-623J)

The procedure in aligning the short wave-bands is identical with that for the broadcast with the exception of the adjustment of the padder condenser. Insert a 400 ohm non-inductive resistor in series with the antenna lead. The alignment frequencies are as follows:

Band 2: 50 Meters—(6,000 kc.)
Band 1: 16.6 Meters—(18,000 kc.)

When aligning Band 2, set the Band Selector Switch in the position marked "Band 2". Set the tuning control pointer at 50 meters. Adjust the oscillator alignment capacitor on Band 2 for maximum output. Next adjust the interstage and antenna section alignment capacitors for maximum output.

To align Band 1, set the Band Selector Switch in the position marked "Band 1". Set the tuning control pointer at the 16.6 meter mark. Set the external oscillator at 16.6 meters. Adjust the oscillator section alignment capacitor on Band 1 for maximum output.

Proceed next to align the interstage section of Band 1. In doing this, it is essential to rock the tuning control back and forth about the resonance position and at the same time to adjust the trimmer for the highest resonance peak. Next align the antenna section for maximum sensitivity.

ALIGNMENT FOR SHORT WAVE BANDS (S-623 & S623J ONLY)

The procedure in aligning the short wave-bands is identical with that for the broadcast with the exception of the adjustment of the padder condenser. Insert a 400 ohm non-inductive resistor in series with the antenna lead. The alignment frequencies are as follows:

Band 2: 33.4 Meters—(9,000 kc.)
Band 1: 12.5 Meters—(24,000 kc.)

When aligning Band 2, set the Band Selector Switch in the position marked "Band 2". Set the tuning control pointer at 33.4 meters. Adjust the oscillator alignment capacitor on Band 2 for maximum output. Next adjust the interstage and antenna section alignment capacitors for maximum output.

To align Band 1, set the Band Selector Switch in the position marked "Band 1". Set the tuning control pointer at the 12.5 meter mark. Set the external oscillator at 12.5 meters. Adjust the oscillator section alignment capacitor on Band 1 for maximum output.

Proceed next to align the interstage section of Band 1. In doing this, it is essential to rock the tuning control back and forth about the resonance position and at the same time to adjust the trimmer for the highest resonance peak. Next align the antenna section for maximum sensitivity.

LONG WAVE MODEL 625 ONLY

The above alignment positions refer to the Model 623 only, which is calibrated in frequency. The alignment points for the Model 625, which is calibrated in meters only, is as follows:

Long Wave	Align at 750 meters.
	Pad at 2,000 meters.
Broadcast	Align at 200 meters.
	Pad at 500 meters.
Band 1	Align at 17 meters.

The Long Wave alignment procedure is similar to that for the Broadcast. A 200 mmf. condenser should be used in series with the antenna lead in aligning this band.

Model G-752
44.5-126 m. (6,750-2380 kc.)
187-566 m. (1,600-530 kc.)

Model G-753
187-566 m. (1,600-530 kc.)
800-2170 m. (375-138 kc.)

(MODEL G-753 IS SOLD OUTSIDE THE U. S. A. ONLY)

REMOVAL OF CHASSIS FROM CABINET:

To remove the chassis from the cabinet proceed as follows:

Be certain that the line cord is removed from the power outlet socket.

Remove the knobs and felt washers from the controls on the front panel.

Remove the four mounting screws, located underneath the cabinet and pull chassis out.

REALIGNMENT: If the receiver requires alignment, the procedure outlined below should be followed. In the schematic diagram sheet, the location and function of the various alignment capacitors are clearly illustrated. For best results, an external modulated oscillator with adequate frequency range and a visual output meter, should be used.

I. F. ALIGNMENT: When aligning the Intermediate Frequency Amplifier, the external oscillator must be set at 456 kc. The Band Switch should be in the position marked "Broadcast", and the tuning condenser should be set at maximum capacity. When aligning the receiver on all positions, the volume control should be turned to the maximum clockwise position. Connect the antenna lead of the external oscillator to the control grid of the 6D6 tube in the I. F. Amplifier through a .1 mfd. fixed condenser. Connect the ground lead of the external oscillator to the chassis. The I. F. alignment trimmers are located at the top of the shielded I. F. Transformers. Rotate the adjusting screw of each capacitor on I. F. Unit No. 2 slowly until maximum output is noted. Following this, connect the external oscillator leads to the control grid of the 6A7 tube. Adjust each trimmer on I. F. Unit No. 1 for maximum gain.

During these operations, use the least possible input to prevent broadening of the resonance peaks.

In order to obtain the most accurate realignment of the I. F. amplifier, it is essential to repeat the alignment process in all I. F. Units, with the external oscillator leads connected to the control grid of the 6A7 tube.

WAVE TRAP ADJUSTMENT: With the oscillator still set at 456 kc., connect the oscillator to the antenna through a 200 mmfd. condenser. Then adjust the wave trap condenser to minimum deflection on the output meter.

BROADCAST ALIGNMENT: After the I. F. amplifier is completely realigned, connect the external oscillator leads to the receiver antenna and ground through a .0002 mfd. condenser. Leave the Band Switch in the "Broadcast" position and place the tuning control pointer at the 1400 kc. mark. Tune the external oscillator to 1400 kc. Adjust the broadcast band oscillator trimmer to maximum response.

Next adjust the antenna section trimmer for maximum output.

The alignment frequencies are as follows:

Longwave Band — 900 meters (333 kc.)
Broadcast Band — 214 meters (1,400 kc.)
Band 1— 50 meters (6,000 kc.)

BAND 1: Align the Short-wave band in a similar manner using a 400-ohm non-inductive resistor in place of the .0002 mfd. condenser. The alignment frequency is 6,000 kc. (50 meters).

THE LONG WAVE ALIGNMENT procedure in the Model G-753 is as follows: Turn the Band Switch to the Long Wave position. The alignment frequency is 333 kc. Adjust the padder condenser at 150 kc. and at the same time rock the gang until at some setting of both padder and gang condenser maximum output is obtained. Use a .0002 mfd. condenser in the antenna lead from the external oscillator.

LONG WAVE BAND: Model G-753 (sold only outside the U. S. A.) has a tuning band covering 800 to 2170 meters. Broadcast stations operating on long waves have a limited range, and are located chiefly in Europe. Hence, Model G-753 is not sold in the U. S. A.

SHORT-WAVE BAND: This band covers 44.5 to 126 meters, and is calibrated in both meters and megacycles because some program time-tables show the dial settings in meters, while others use megacycles.

The receiving range on the 49-meter band is about 300 miles during the daytime, and 1,500 miles or more at night.

ANTENNA: Due to the high sensitivity of this receiver, it is recommended that an aerial not over fifty feet long be used.

If you use an ordinary single-wire antenna, connect the antenna to the blue lead on the set. Then connect the clip on the chassis to the ground.

TONE CONTROL SWITCH: The tone control is at the rear of the chassis. In one position the treble response is increased and in the other position the bass frequencies are emphasized. When tuning in short waves the latter position will probably be found preferable.

BAND SWITCH: The center knob controls the band switch. When this knob is in the counterclockwise position the band switch is in the broadcast position on Model G-752 and in the long-wave position on Model G-753. Turning the switch to the right or clockwise on Model G-752 permits reception of shortwave signals and medium wave signals on Model G-753.

CAUTION: When making repairs on the receiver, use only ROSIN CORE SOLDER. NEVER USE SOLDERING PASTE OR ACID FLUXES OF ANY TYPE.

MODELS M-2203, M-2205
Schematic, Socket, Trimmers
Alignment, Parts, Voltage

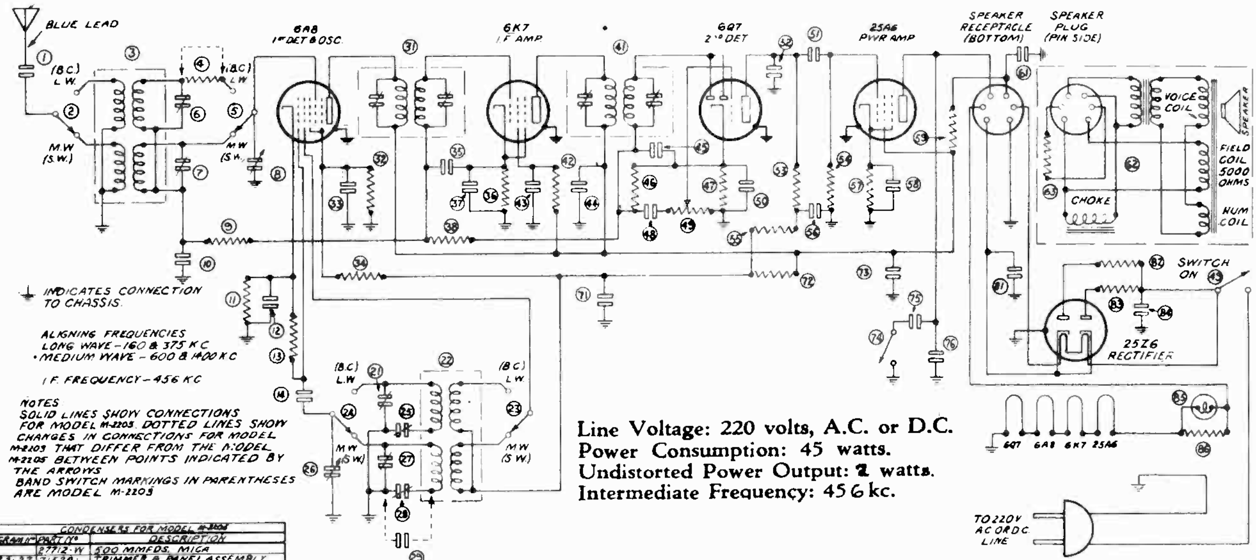
PILOT RADIO CORP.

MODEL M-2203 SUPERHETERODYNE

Range: 16-52 Meters (18,800-5,700 kc.)
178-550 Meters (1,680-545 kc

MODEL M-2205 SUPERHETERODYNE

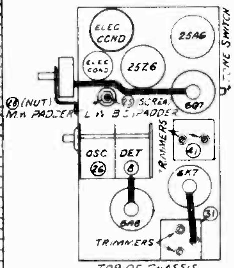
Range: 178-550 Meters (1,680-545 kc.)
789-2,142 Meters (380-140 kc.)
(Not available for sale in North and South America)

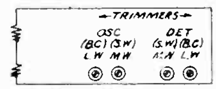


Line Voltage: 220 volts, A.C. or D.C.
Power Consumption: 45 watts.
Undistorted Power Output: 2 watts.
Intermediate Frequency: 456 kc.

CONDENSERS FOR MODEL M-2205		
DIAGRAM No.	PART No.	DESCRIPTION
1	27712-W	500 MMFDS. MICA
6,7,21,27	71520	TRIMMER & PANEL ASSEMBLY
8,26	71181-C	405 MMFDS. 2 GANG VARIABLE
10,35	22055-H	.02 MFD 200 V. PAPER
12	22055-I	.05 MFD 200 V. PAPER
14	27723-O	50 MMFDS. MICA
25 28	72355-M	DUAL PADDER 20-80 MMFDS. 300-600 MMFDS
33,43	22055-P	.05 MFD 400 V. PAPER
36	22055-L	.1 MFD 400 V PAPER
44	22055-AE	.25 MFD 400 V PAPER
45,52	27701-W	250 MMFDS. MICA
48,51	22055-A	.01 MFD 600 V PAPER
50,58	22481	10 MFDS 25 V ELECTROLYTIC
61 73 81	78594	12 MFDS 4 MFDS. ELECTROLYTIC 250 V 16 MFDS
71	78535	4 MFDS 250 V ELECTROLYTIC
75	22055-V	.05 MFD 1000 V. PAPER
76,84	22055-U	.01 MFD 1000 V. PAPER
87	22055-M	.1 MFD 200 V. PAPER
CONDENSERS FOR MODEL M-2203		
SAME AS FOR MODEL 2205 WITH FOLLOWING CHANGES:		
25	71503-E	SINGLE PADDER 300-600 MMFDS
29	27734-W	6000 MMFDS. MICA (REPLACES 28)
MISCELLANEOUS LIST FOR MODEL M-2203		
SAME AS FOR MODEL 2205 WITH FOLLOWING CHANGES		
3	71169	ANTENNA COIL ASSEMBLY
22	71170	OSCILLATOR COIL ASSEMBLY

MISCELLANEOUS LIST FOR MODEL M-2205		
DIAGRAM No.	PART No.	DESCRIPTION
2,5,23,24	72392	BAND SWITCH
3	71173	ANTENNA COIL ASSEMBLY
22	71174	OSCILLATOR COIL ASSEMBLY
31	73062-A	1ST I.F. TRANSFORMER
41	73010	2ND I.F. TRANSFORMER ASSY
62	78699	8" SPKR CHOKE & RESISTOR ASSY
74	72049	TONE CONTROL SWITCH
85	72151	DIAL LAMP 6.3 V .15 AMP
RESISTORS FOR MODEL M-2205		
DIAGRAM No.	PART No.	DESCRIPTION
4	13080	50 OHMS 1/4 WATT
9	3031	100,000 OHMS 1/4 WATT
11,36	13115	400 OHMS 1/4 WATT
13,55	13164	50,000 OHMS 1/4 WATT
32	13075	15,000 OHMS 1/2 WATT
34	13149	6,000 OHMS 1/4 WATT
38	13001	1 MEGOHM 1/4 W.
42	13116	12,000 OHMS 1/4 WATT
46	13147	300,000 OHMS 1/4 WATT
49	71211	250,000 OHMS VOL. CONTROL & SW
54	13024	500,000 OHMS 1/4 WATT
57	13192	440 OHMS 1 WATT
59	78610	2500 OHMS 3 WATTS WIRE
63	78708	485 OHMS 55 WATTS WIRE
72	13133	3000 OHMS 1/4 WATT
82,83	13077	100 OHMS 1/2 WATT
86	13184	40 OHMS 1 WATT WIRE
47	13193	4500 OHMS 1/4 WATT
53	13043	150,000 OHMS 1/4 WATT
RESISTORS FOR MODEL M-2203		
SAME AS FOR MODEL M-2205 EXCEPT 4 IS NOT USED		





FRONT OF CHASSIS SHOWING TRIMMER ARRANGEMENT

PILOT RADIO CORPORATION LONG ISLAND CITY N.Y. U.S.A.	
ALTERATIONS	FINISH
CLASSIFICATION: MODELS M-2205 & M-2203	THIS PRINT SUPERSEDES ALL OTHERS PRIOR TO [redacted]
SCHEMATIC CIRCUIT DIAGRAM & CHASSIS LAYOUT FOR MODELS M-2205 & M-2203	DWG. 25140
DRAWN BY J.P.P. CHECKED BY E.A.C.	DATE MAR 24 1936

DO NOT SCALE THIS PRINT

Voltages: Read tube socket voltages with meter having resistance of at least 1,000 ohms per volt. All voltages measured to chassis.

	Osc.-Det.	I.F.	Det. Amp.	Aud. Output	Recti-fier
Tube	6A8	6K7	6Q7	25A6	25Z6
Plate	130	130	50*	180	—
Cathode	2.5	3.5	1	17.	210.
Screen	60	100	—	130	—
Filament	6.3	6.3	6.3	25.	25.

*Voltage measured through plate resistor.
Speaker field voltage, 210 volts.
Anode grid of 6A8, 100 volts.

REALIGNMENT: Should the receiver require realignment, the outlined procedure below should be followed. In the service information sheet, the location and function of the various alignment capacitors are clearly illustrated. For best results an external modulated oscillator with adequate frequency range, and a visual output meter, should be used.

Before connecting the chassis to the power line, reconnect the speaker cable in its socket at the rear of the speaker.

I. F. ALIGNMENT: When aligning the Intermediate Frequency Amplifier, the external oscillator must be set at 456 kc. The Band Switch should be in the position marked "Broadcast", and the tuning condenser should be set at maximum capacity. Connect the "antenna" lead of the external oscillator to the control grid of the type 6K7 tube in the I.F. Amplifier stage through a .1 mfd. fixed condenser. Connect the "ground" lead of the external oscillator to the receiver ground lead. The I.F. alignment capacitors are located at the top of the shielded I.F. Transformers. Rotate the adjusting screw of each capacitor on I.F. Unit No. 2 slowly until maximum output is noted. On completion of this operation, remove the external oscillator leads from the type 6K7 I.F. Amplifier tube and connect it in the same manner to the control grid at the top of the type 6A8 tube.

Now rotate each adjustment screw on I.F. Unit No. 1 for maximum output. During these operations, use the least possible input to prevent broadening of the resonance peaks.

In order to obtain the most accurate realignment of the I.F. Amplifier, it is essential to repeat the alignment process in both I.F. units with the external oscillator leads connected across the control grid of the 6A8 tube.

BROADCAST ALIGNMENT: After the I.F. amplifier is completely realigned, connect the external oscillator leads to the receiver antenna and ground leads with a .0002 mfd. condenser in the antenna lead. Set the Band Switch in the "Broadcast" position and place the tuning control pointer at the 1400 kc. mark. Adjust the broadcast band oscillator trimmer to maximum response. Adjust the signal section trimmer in the same manner.

Next adjust the 600 kc. padder condenser. Set the external oscillator at 600 kc. Rotate the receiver tuning control until resonance is indicated. Then rock the tuning control back and forth about this resonance position, and at the same time adjust the padder condenser for the highest resonance peak.

Now repeat the 1400 kc. trimmer adjustment, following in every detail the procedure previously described.

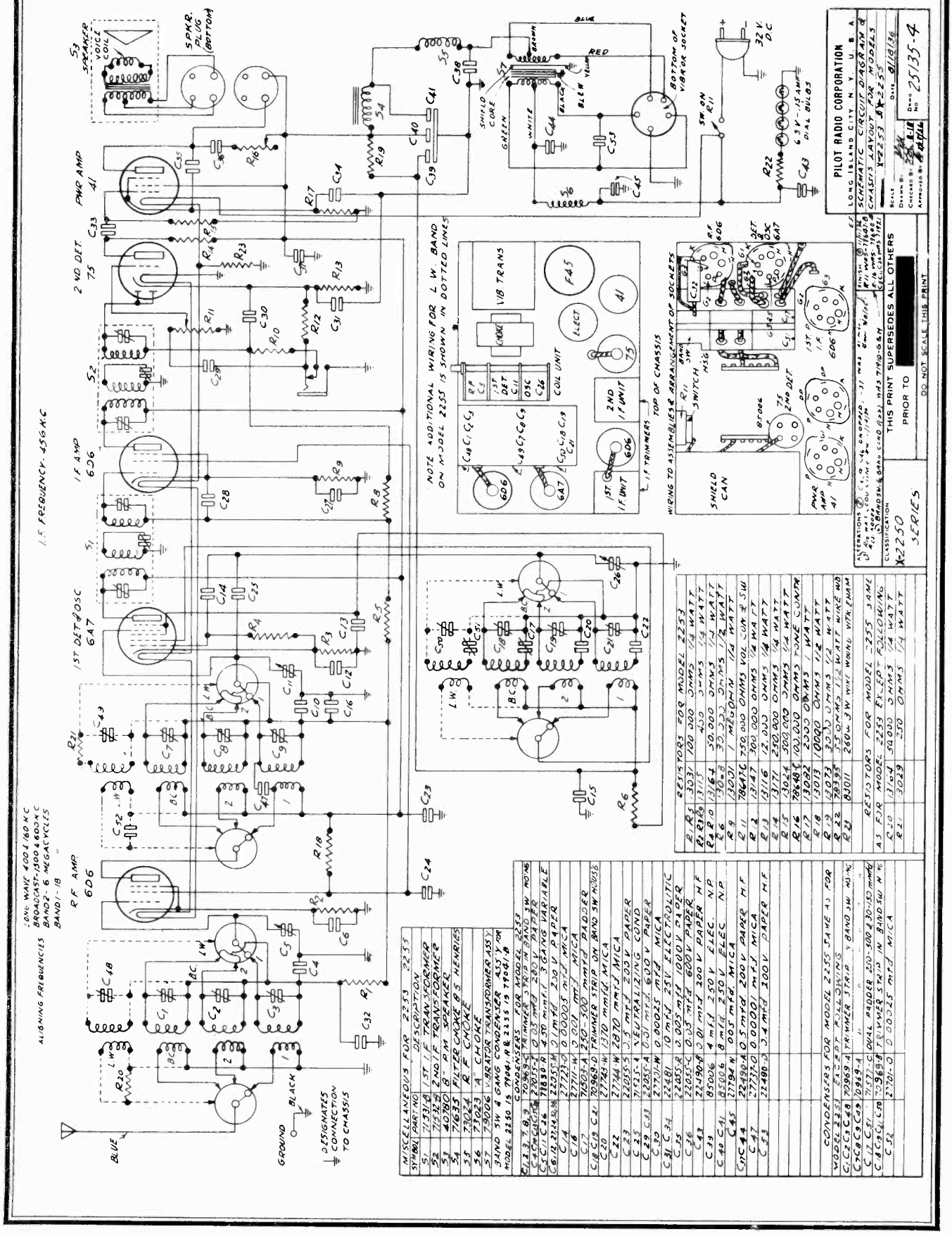
SHORT-WAVE ALIGNMENT: The procedure in aligning the short-wave bands is identical with that for the broadcast with the exception of the adjustment of the padder condenser. The alignment frequency is 16.8 Meters—(17,800 kc.) Turn the Band Switch to the right. Tune the external oscillator to 16.8 meters. Tune the receiver so that the dial pointer is in a position coincidental with the 16.8 meter indication on the dial scale. Adjust the short wave oscillator trimmer for maximum response. Next adjust the signal circuit trimmer for maximum resonance. Repeat all adjustments to assure correct alignment, rocking the gang condenser to right or left for maximum gain.

THE LONG WAVE ALIGNMENT: Procedure in the Model 2205 is similar to the Broadcast section of that receiver. Align at 375 kc. Adjust the padder at 160 kc.

Should it be necessary to remove the band switch assembly, it is advisable to realign the receiver after reinstalling.

MODELS X-2253, X-2255
Schematic, Socket
Trimmers, Parts

PILOT RADIO CORP.



Model 2253
16 - 550 m. (18,800 - 545 kc.)

Model 2255
16 - 550 m. (18,800 - 545 kc.)
750 - 2000 m. (400 - 150 kc.)

FOR 32-VOLT BATTERY OPERATION

(MODEL 2253 IS SOLD OUTSIDE THE U. S. A. ONLY)

REMOVAL OF CHASSIS FROM CABINET:

To remove the chassis from the cabinet proceed as follows:

Be certain that the line cord is removed from the power outlet socket.

Remove the "slip-on" knobs and felt washers from the controls and loosen the set screw on the tuning knob.

Remove the speaker plug from the socket at the rear of the chassis.

Remove the four mounting screws, located underneath the cabinet.

REALIGNMENT: Should the receiver require realignment, the procedure outlined below should be followed. For best results an external modulated oscillator with adequate frequency range, and a visual output meter, should be used.

Before connecting the chassis to the power line, reconnect the speaker cable in its socket at the rear of the chassis.

The location of the R. F. alignment trimmer condensers is on the side of the band switch. The trimmers in the lowest row are those for aligning Band 1. Those in the second row from the bottom are for Band 2. Those in the third row up are for the Broadcast. In the Model 2255 there is an additional row of trimmers located immediately above those for the Broadcast.

The padder condenser is located under the rear section of the band switch. In the Model 2255 an additional padder for the long wave range is located at the right of the Broadcast padder. Access to the padder condenser is made through a hole provided in the rear of the chassis frame.

I. F. ALIGNMENT: When aligning the Intermediate Frequency Amplifier, the external oscillator must be set at 456 kc. The Band Selector Switch should be in the position marked "Broadcast" and the tuning condenser should be set at maximum capacity. Connect the "antenna" lead of the external oscillator to the control grid of the type 6D6 tube in the I. F. Amplifier stage through a .1 mfd. fixed condenser. Connect the "ground" lead of the external oscillator to the receiver ground lead. The I. F. alignment capacitors are located at the side of the shielded I. F. Transformers. Rotate the adjusting screw of each capacitor on I. F. Unit No. 2 slowly until maximum output is noted. On completion of this operation, remove the external oscillator lead from the type 6D6 I. F. amplifier tube and connect it in the same manner to the control grid at the top of the type 6A7 tube.

Now rotate each adjustment screw on I. F. Unit No. 1 for maximum output. During these operations, use the least possible input to prevent broadening of the resonance peaks.

In order to obtain the most accurate realignment of the I. F. amplifier, it is essential to repeat the alignment process in both I. F. Units.

BROADCAST ALIGNMENT: After the I. F. amplifier is completely realigned, connect the external oscillator leads to the receiver antenna and ground leads. Insert a 200 mmf. condenser in series with the antenna lead. Set the Band Selector Switch in the "Broadcast" position and place the tuning control pointer at the 1500 kc. mark. Adjust the broadcast band oscillator trimmer.

Next adjust the interstage alignment trimmer for maximum response. Finally adjust the antenna section trimmer in the same manner.

Next adjust the 600 kc. padder condenser, located in the lower rear section of the band switch, under the chassis. Set the external oscillator at 600 kc. Rotate the receiver tuning control until resonance is indicated. Then rock the tuning control back and forth about this resonance position, and at the same time adjust the padder condenser for the highest resonance peak.

Now repeat the 1500 kc. trimmer adjustment, following in every detail the procedure previously described.

ALIGNMENT OF THE SHORT-WAVE BANDS:— The procedure in aligning the short-wave bands is identical with that for the broadcast with the exception of the adjustment of the padder condenser. Insert a 400 ohm non-inductive resistor in series with the antenna lead. The alignment frequencies are as follows:

Band 2: 50 Meters—(6,000 kc.)
Band 1: 16.6 Meters—(18,000 kc.)

When aligning Band 2, set the Band Selector Switch in the position marked "Band 2". Set the tuning control pointer at 50 meters. Adjust the oscillator alignment capacitor on Band 2 for maximum output. Next adjust the interstage and antenna section alignment capacitors for maximum output.

To align Band 1, set the Band Selector Switch in the position marked "Band 1". Set the tuning control pointer at the 16.6 meter mark. Set the external oscillator at 16.6 meters. Adjust the oscillator section alignment capacitor on Band 1 for maximum output.

Proceed next to align the interstage section of Band 1. In doing this, it is essential to rock the tuning control back and forth about the resonance position and at the same time to adjust the trimmer for the highest resonance peak. Next align the antenna section for maximum sensitivity.

LONG WAVE MODEL 2255

The above alignment positions refer to the Model 2253 only, which is calibrated in frequency. The alignment points for the Model 2255, which is calibrated in meters only, is as follows:

Long Wave	Align at 750 meters.
	Pad at 2,000 meters.
Broadcast	Align at 200 meters.
	Pad at 500 meters.
Band 2	Ahgn at 49 meters.
Band 1	Align at 17 meters.

The Long Wave alignment procedure is similar to that for the Broadcast. A 200 mmf. condenser should be used in series with the antenna lead in aligning this band.

REMOVAL OF BAND SELECTOR SWITCH ASSEMBLY: Should it be necessary to remove the switch assembly, this is easily done by removing the supporting screws. Before doing this, however, it is essential to unsolder the leads between the switch and the chassis.

It is advisable to realign the receiver after reinstalling the switch assembly.

CAUTION: When making repairs on the receiver, use only ROSIN CORE SOLDER. NEVER USE SOLDERING PASTE OR ACID FLUXES OF ANY TYPE.

Model G-576 G-577
Four Tuning Bands Cover 12.3-566 m. (24,200-530 kc.)

REMOVAL OF CHASSIS FROM CABINET:

To remove the chassis from the cabinet proceed as follows:

Be certain that the line cord is removed from the power outlet socket.

Remove the "slip-on" knobs and felt washers from the controls and loosen the set screw on the tuning knob.

Remove the speaker plug from the socket at the rear of the chassis.

Remove the four mounting screws, located underneath the cabinet.

Remove the tuning beam plug from the socket at the front of the chassis.

REALIGNMENT: Should the receiver require realignment, the procedure outlined below should be followed. For best results an external modulated oscillator with adequate frequency range, and a visual output meter, should be used.

Before connecting the chassis to the power line, reconnect the speaker cable in its socket at the rear of the chassis.

The location of the R. F. alignment trimmer condensers is on the side of the band switch. The trimmers in the lowest row are those for aligning Band 1. Those in the second row from the bottom are for Band 2. Those in the third row up are for Band 3. The trimmers in the top row are for the Broadcast band.

The padder condenser is located under the rear section of the band switch. Access to the padder condenser is made through a hole provided in the rear of the chassis frame.

I. F. ALIGNMENT: When aligning the Intermediate Frequency Amplifier, the external oscillator must be set at 456 kc. The Band Selector Switch should be in the position marked "Broadcast", and the tuning condenser should be set at maximum capacity. Connect the "antenna" lead of the external oscillator to the control grid of the type 6K7 tube in the I. F. Amplifier stage through a .1 mfd. fixed condenser. Connect the "ground" lead of the external oscillator to the receiver ground lead. The I. F. alignment capacitors are located at the side of the shielded I. F. Transformers. Rotate the adjusting screw of each capacitor on I. F. Unit No. 2 slowly until maximum output is noted. On completion of this operation, remove the external oscillator lead from the type 6K7 I. F. amplifier tube and connect it in the same manner to the control grid at the top of the type 6A8 tube.

Now rotate each adjustment screw on I. F. Unit No. 1 for maximum output. During these operations, use the least possible input to prevent broadening of the resonance peaks.

In order to obtain the most accurate realignment of the I. F. amplifier, it is essential to repeat the alignment process in both I. F. Units.

BROADCAST ALIGNMENT: After the I. F. amplifier is completely realigned, connect the external oscillator leads to the receiver antenna and ground leads. Insert a 200 mmf. condenser in series with the antenna lead. Set the Band Selector Switch in the "Broadcast" position and place the tuning control pointer at the 1500 kc. mark. Adjust the broadcast band oscillator trimmer.

Next adjust the 600 kc. padder condenser, located in the lower rear partition of the band switch, under the chassis. Set the external oscillator at 600 kc. Rotate the receiver tuning control to the resonance position, and at the same time adjust the padder condenser for the highest peak.

Now repeat the 1500 kc. trimmer adjustment, following in every detail the procedure previously described.

The alignment frequencies are as follows:

Band 4—600 and 1500 kc.—500 and 200 m.
Band 3—50 meters— 6,000 kc.
Band 2—21.4 meters—14,000 kc.
Band 1—12.5 meters—24,000 kc.

When aligning Band 3, set the Band Switch in the position marked Band 3. Replace the 200 mmf. condenser with a 400 ohm resistor. Rotate the tuning condenser to the 6,000 kc. indication on the dial scale. Set the external oscillator at 6,000 kc. Adjust the Band 3 oscillator trimmer for maximum sensitivity. Next adjust the interstage and antenna trimmer condensers for maximum sensitivity. Check the overall sensitivity of the band at several points along the dial scale.

The alignment of Bands 1 and 2 requires greater care due to the higher frequencies covered. Set the external oscillator to the alignment frequency of the band to be adjusted. Rotate the tuning condenser of the receiver until the dial pointer is co-incidental with the alignment frequency indication on the dial scale. Adjust the oscillator trimmer condenser for maximum sensitivity. Proceed next to align the interstage section. In doing this it is essential to rock the tuning control back and forth about the resonance position and at the same time to adjust the trimmer for the highest resonant peak. Next align the antenna section for minimum sensitivity.

REMOVAL OF BAND SELECTOR SWITCH ASSEMBLY: Should it be necassary to remove the switch assembly, this is easily done by removing the supporting screws. Before doing this, however, it is essential to unsolder the leads between the switch and the chassis.

It is advisable to realign the receiver after reinstalling the switch assembly.

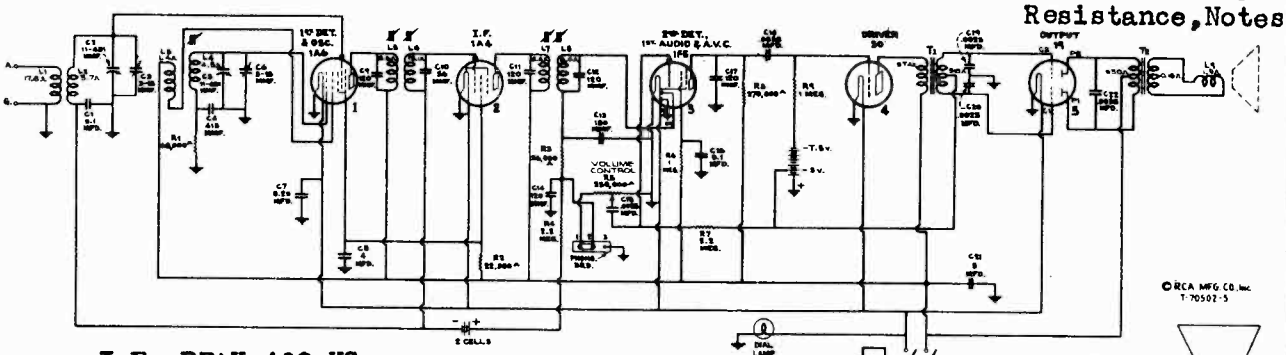
CAUTION: When making repairs on the receiver, use only ROSIN CORE SOLDER. NEVER USE SOLDERING PASTE OR ACID FLUXES OF ANY TYPE.

PHONOGRAPH PICK-UP: A jack is provided at the rear of the chassis for plugging in an electric phonograph pick-up, in order that records can be reproduced by the loudspeaker, through the high-quality amplifier with which this set is equipped. The pick-up should be of the high-impedance type.

EXTRA SPEAKER: At the rear of the chassis there is a socket for plugging in an extra speaker, which can be located in the kitchen, in one of your up-stairs rooms, or down cellar in the game room. This will give you the equivalent of an extra radio, at the small expense of the extra speaker. We recommend a permanent magnet dynamic speaker of 10,000 ohms. These speakers operate without any field exciting current.

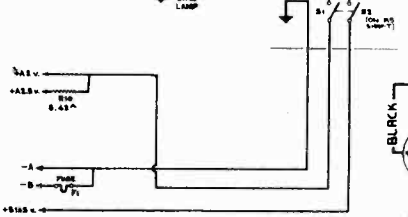
RCA MFG. CO., INC.

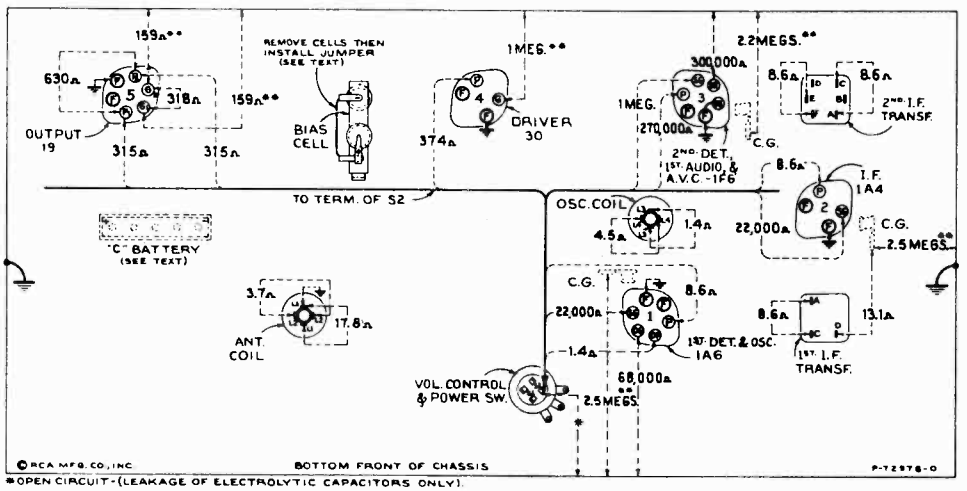
MODEL 5BT
Schematic, Socket
Chassis Wiring
Resistance, Notes



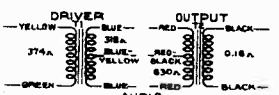
I.F. PEAK 460 KC.

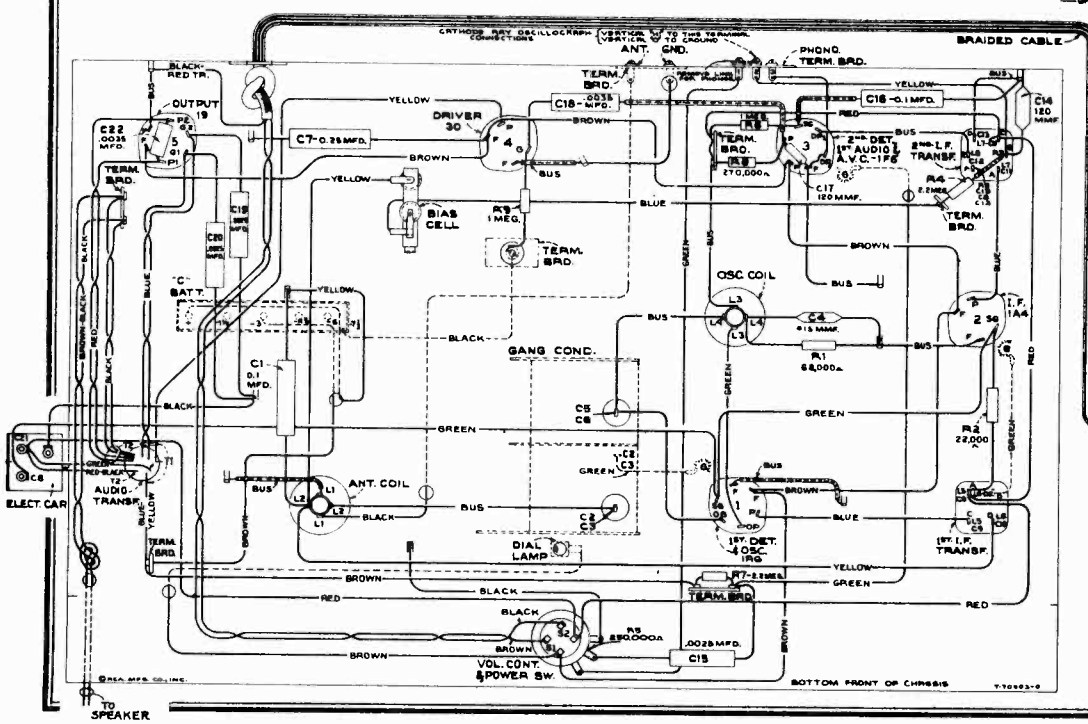
***Before making any resistance measurements, remove the two bias cells and connect jumpers on bias-cell board as shown. Also, remove the "C" battery and connect the two leads (—7½ v. and —3 v.) to chassis ground. After measurements are completed, remove jumpers from bias-cell board and then carefully insert bias cells. Next, insert "C" battery and restore leads to their respective positions.*





Resistance Diagram
Battery cable disconnected -- Tubes removed -- Tuning condenser in full mesh -- Bias cells and C battery removed -- Volume setting optional.





MODEL 5BT
Trimmers, Voltage Alignment

RCA MFG. CO., INC.

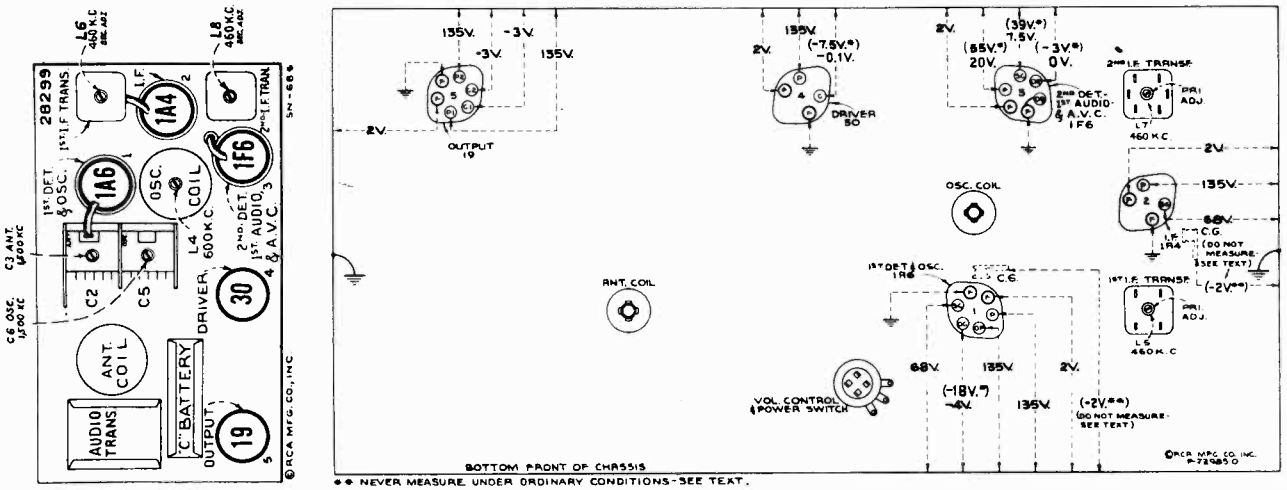


Figure 6—Radiotron Socket Voltages, Coil, and Trimmer Locations

Measured with all batteries at normal voltage—Tuned to approximately 1,000 kc—No signal being received—Volume control optional

Radiotron Socket Voltages

***CAUTION:** Do not attempt to measure voltages on control grids of RCA-1A6 or RCA-1A4, with any conventional voltmeter, due to presence of bias cells. See "Caution" under "Service data" for method of measuring these cells.*

***Note:** Two voltage values are shown for some readings. The higher value shown in parenthesis with asterisk (*) indicates operating conditions without voltmeter loading. The lower value is the actual measured voltage and differs from the higher value because of the additional loading of the voltmeter through the high series circuit resistance.*

Radiotron Plate Current Readings

Measured with Milliammeter Connected at Tube Socket Plate Terminals under Conditions Similar to Those of Voltage Measurements

(1)	RCA-1A6—1st. Det.	2.26	ma.
	—Osc.	1.86	ma.
(2)	RCA-1A4—I.F.	3.6	ma.
(3)	RCA-1F6—2nd Det.—A.F.—A.V.C.	0.3	ma.
(4)	RCA-30—Driver	3.8	ma.
(5)	RCA-49—Output	2.8	ma.**

(** Total plate current.)

I-F Adjustments

The four adjustment screws (attached to molded magnetite cores) of the two i-f transformers (one on top and one on bottom of each i-f transformer) are located as shown by figures 3 and 6. Each circuit must be aligned to a basic frequency of **460 kc.**

Connect the "Ant." output of the test-oscillator to the control grid of the RCA-1A6 through a **.001 mfd.** capacitor. Connect the test oscillator "Gnd." terminal to the ground terminal of the receiver chassis. Tune the test oscillator to **460 kc.** Adjust the receiver tuning control to a point, within its range, where no interference is encountered either from broadcast stations or short stator of oscillator tuning condenser C5 to ground, eliminating local (hetrodyne) oscillator signals.

Adjust the two magnetite core screws **L8** and **L7** of the second i-f transformer to produce maximum (peak) indicated receiver output. Then, adjust the two magnetite core screws **L6** and **L5** of the first i-f transformer for maximum (peak) receiver output as shown by the indicating device. It is advisable to repeat the adjustment of all i-f magnetite core screws to assure that the interaction between them has not disturbed the original adjustments. Remove temporary jumper, stator C5 to ground, if used.

R-F Adjustments

Calibrate the tuning dial by adjusting the dial pointer to the extreme low-frequency end calibration mark **(530 kc)** on dial scale while the gang tuning condenser plates are in their full-mesh position. Reduce output of test oscillator to minimum. Set receiver dial pointer to **600 kc.** Tune the test oscillator to **600 kc** and increase its output until an indication is obtained on the output indicator.

Adjust oscillator magnetite core screw **L4** (top of oscillator coil) so that maximum (peak) indication is shown by the output indicator.

Set receiver dial pointer to **1,500 kc.** Tune test oscillator to **1,500 kc.** Adjust the oscillator and antenna trimmers **C6** and **C3** for maximum (peak) indicated output.

Tune test oscillator to **600 kc** and adjust receiver to pick up this signal **near 600 kc.** Readjust the oscillator magnetite core screw **L4** for maximum (peak) indicated output while rocking the receiver gang tuning condenser back and forth through this signal.

Repeat adjustments of **C6** and **C3** as above to correct for any changes in the oscillator tuning caused by the adjustment of **L4.**

RCA MFG. CO., INC.

TYPICAL CONNECTIONS FOR LOW IMPEDANCE PICKUP

TYPICAL CONNECTIONS FOR MODELS R-93, R93-2 & R-93-5

Caution: The two bias cells are used only for the purpose of supplying bias potential and should never be measured with an ordinary voltmeter or other device which draws any current. A simple check on these cells may be made by connecting a milliammeter in the plate circuit of the RCA-1A4 tube and noting the plate current reading. Then remove the two bias cells, being careful that the spring contact clips do not short-circuit them during removal. Connnect a 2-volt battery between the + and — 2v. (— battery to grid side) terminals of the bias cell board, and again note the plate current reading. If the first reading obtained (with bias cells) is more than 40% from the latter reading (with 2-volt battery), the bias cells should be replaced. This 40% difference is equivalent to a change of approximately 25% battery voltage.

PRICES SUBJECT TO CHANGE
WITHOUT NOTICE

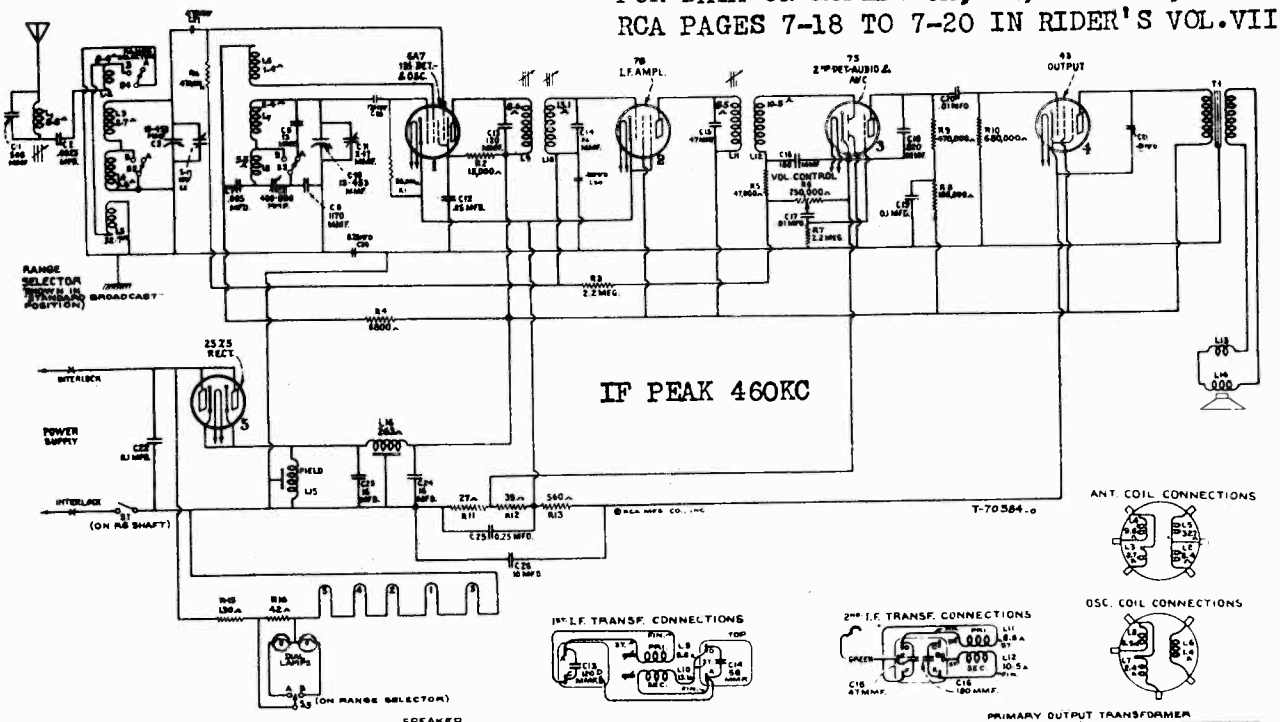
Stock No.	DESCRIPTION	List Price
	RECEIVER ASSEMBLIES	
13216	Board—Antenna and ground terminal board	$0.25
12717	Board—Phonograph terminal board	.22
4289	Body—Female section of fuse holder—Package of 10	.35
4286	Bushing—Bushing and ferrule assembly for fuse holder—Package of 10	.38
13217	Cable—Battery cable complete with four 2-contact male connectors, fuse holder and fuse	3.05
4288	Cap—Male section of fuse holder—Package of 10	.36
12629	Capacitor—56 Mmfd. (C10)	.20
12404	Capacitor—120 Mmfd. (C9, C11, C12)	.26
12724	Capacitor—120 Mmfd. (C14, C17)	.28
12406	Capacitor—180 Mmfd. (C13)	.26
13297	Capacitor—415 Mmfd. (C4)	.25
5107	Capacitor—.0025 Mfd. (C15, C19, C20)	.16
5005	Capacitor—.0035 Mfd. (C18, C22)	.16
4841	Capacitor—0.1 Mfd. (C1, C16)	.22
4840	Capacitor—0.25 Mfd. (C7)	.30
13295	Capacitor Pack—Comprising one 4 mfd. and one 8 mfd. sections (C8, C21)	1.70
13293	Coil—Antenna coil with shield (L1, L2)	1.00
13294	Coil—Oscillator coil with shield (L3, L4)	1.00
13212	Condenser—2-gang variable tuning condenser (C2, C3, C5, C6)	3.40
12828	Connector—2-contact male connector for cable, Stock No. 13217	.20
12827	Connector—2-contact and guide pin male connector for cable Stock No. 13217	.30
5119	Connector—3-contact female connector for speaker cable	.25
12006	Core—Adjustable core and stud assembly for Stock Nos. 12801 and 12802	.22
12681	Cell—Bias cell	.30
13391	Dial—Station selector dial scale	.45
3748	Fuse—½ ampere—Package of 5 (F1)	.40
13215	Holder—Bias cell holder	.25
13213	Indicator—Station selector indicator pointer	.15
4290	Insulator—Insulator for female section of fuse holders—Package of 10	.35
4348	Lamp—Dial lamp	.38
13298	Resistor—Flexible type, 0.43 ohm—Package of 5 (R10)	.90
11305	Resistor—22,000 ohms, carbon type, ¼ watt—Package of 5 (R2)	1.00
11282	Resistor—56,000 ohms, carbon type, 1/10 watt—Package of 5 (R3)	.75
12009	Resistor—68,000 ohms, carbon type, ¼ watt—Package of 5 (R1)	$1.00
11323	Resistor—270,000 ohms, carbon type, ¼ watt—Package of 5 (R8)	1.00
12200	Resistor—1 meg., insulated, ¼ watt—Package of 5 (R6, R9)	1.00
11626	Resistor—2.2 meg., carbon type, ¼ watt—Package of 5 (R4, R7)	1.00
13296	Shield—Coil shield for coil Stock Nos. 13293 and 13294	.30
12008	Shield—First or second I. F. transformer shield	.28
12607	Shield—First I. F. transformer shield top	.30
12581	Shield—Second I. F. transformer shield top	.36
3682	Shield—1A4, 1A6, or 1F6 Radiotron shield	.22
8098	Socket—Dial lamp socket	.10
4794	Socket—4-contact 1A4 or 30 Radiotron socket	.15
4786	Socket—6-contact 1A6, 1F6 or 19 Radiotron socket	.15
12007	Spring—Retaining spring for core, Stock No. 12006—Package of 10	.36
4284	Spring—Spring for female section fuse holder—Package of 10	.30
12803	Transformer—Audio transformer pack (T1, T2)	3.55
12801	Transformer—First I. F. transformer (L5, L6, C9, C10)	1.70
12802	Transformer—Second I. F. transformer (L7, L8, C11, C12, C13, R3)	1.85
13214	Volume control and power switch (R5, S1, S2)	1.50
4285	Washer—Insulating washer for female section of fuse holder—Package of 10	.22
	REPRODUCER ASSEMBLIES	
12642	Cone—Reproducer cone and dust cap	.94
5118	Plug—3-contact male connector for reproducer	.25
9712	Reproducer—Complete	6.60
	MISCELLANEOUS ASSEMBLIES	
12638	Knob—Station selector control knob—Package of 5	.58

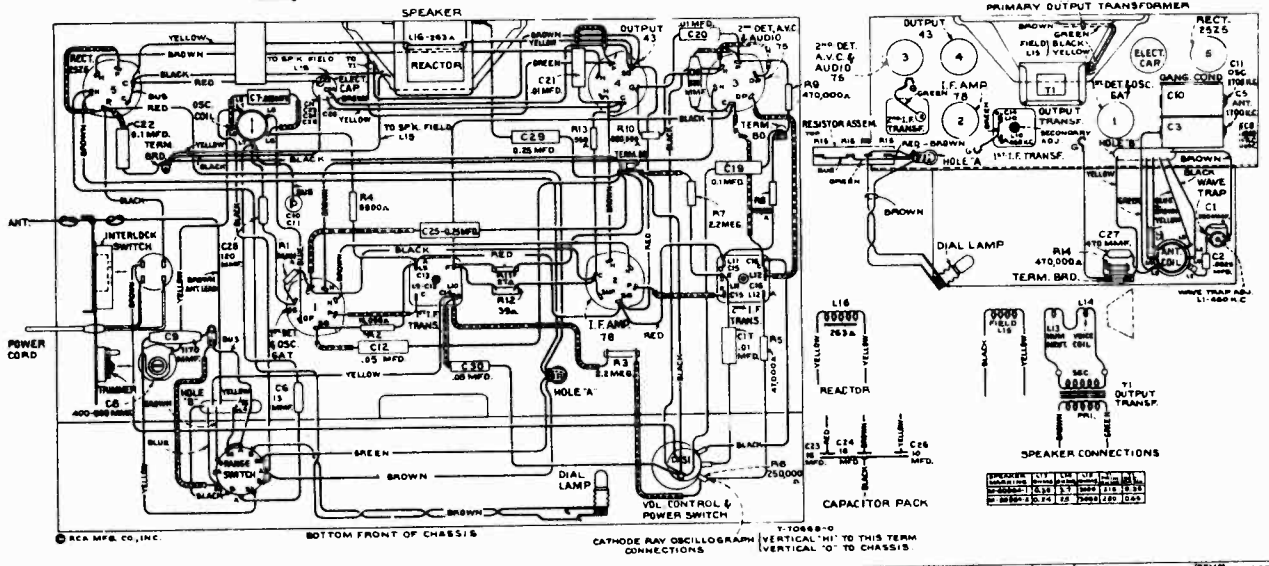
MODELS 5XA, 5XA3, 5XA4
Schematic, Socket, Voltage
Chassis Wiring, Resistance

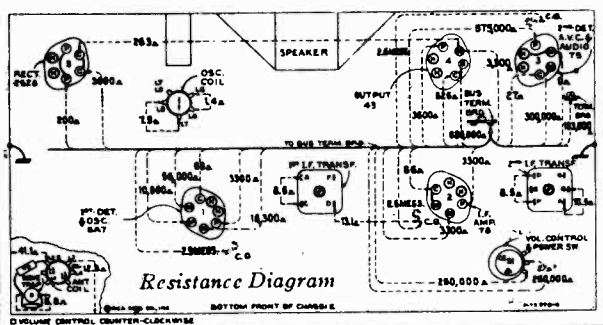
RCA MFG. CO., INC.

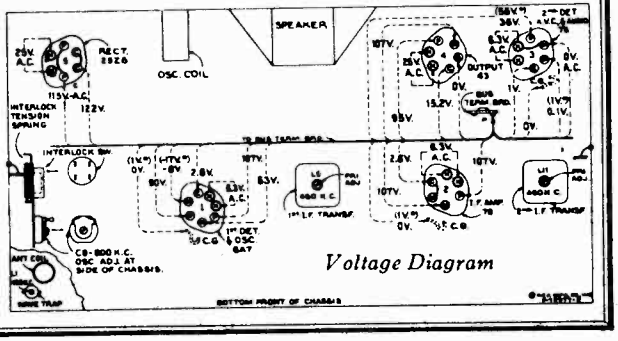
RCA Victor Models 5XA, 5XA3, and 5XA4 are similar to RCA Victor Models 5X, 5X3, and 5X4 respectively. Technical Information and Service Data for Models 5X, 5X3, and 5X4 is directly applicable except as contained herein.

FOR DATA ON MODELS 5X, 5X3, AND 5X4, SEE RCA PAGES 7-18 TO 7-20 IN RIDER'S VOL. VII



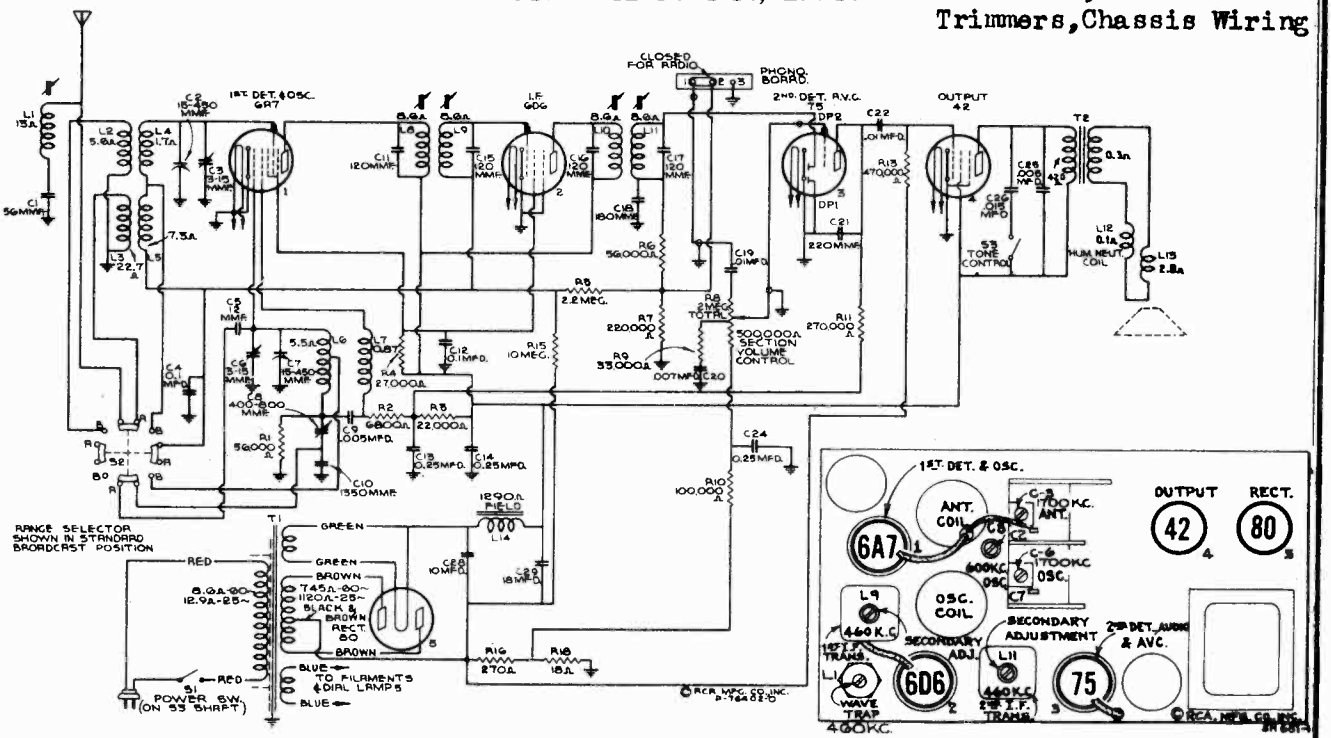






RCA MFG. CO., INC.

MODEL 5T1
Schematic, Socket
Trimmers, Chassis Wiring



IF PEAK 460 KC

Figure 2—Schematic Circuit Diagram

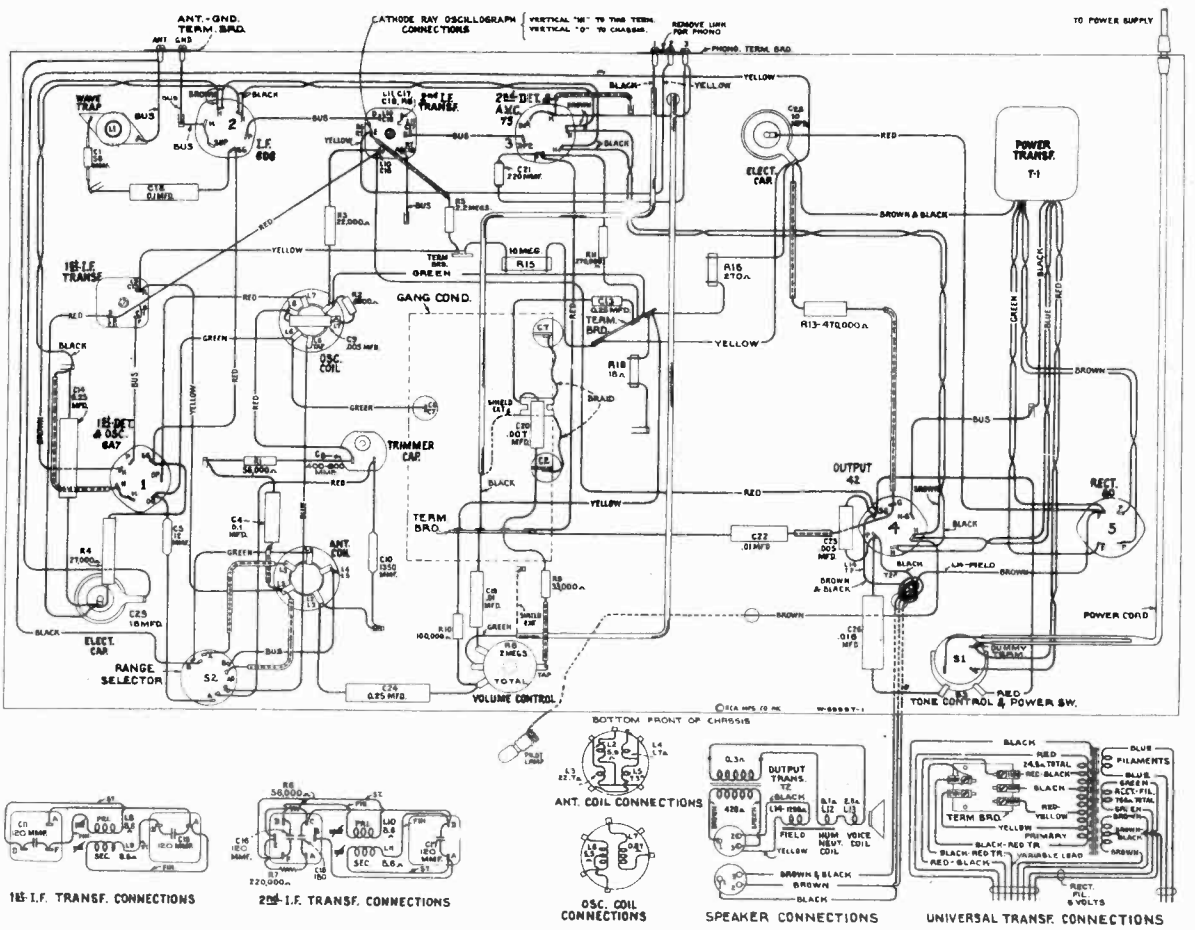


Figure 3—Chassis Wiring Diagram

MODEL 5T1
Voltage,Alignment

RCA MFG. CO., INC.

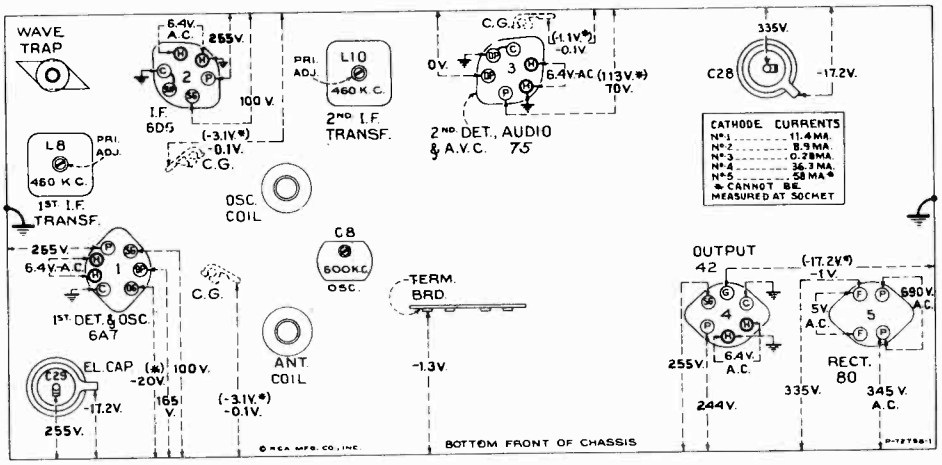


Figure 4—Radiotron Socket Voltages, Coil, and Trimmer Locations
Measured at 115 volts, 60-cycle supply—Tuned to approximately 1,000 kc ("Standard Broadcast")—No signal being received—Volume control minimum

Note: Two voltage values are shown for some readings. The value shown in parentheses with asterisk (*) indicates operating conditions without voltmeter loading. The other value (generally lower) is the actual measured voltage and differs from the value shown in parentheses because of the additional loading of the voltmeter through the high series circuit resistance.

Voltage values as specified should hold within ±20% when the receiver is normally operative at its rated line voltage. To duplicate the conditions under which the voltages were measured requires a 1,000-ohm-per-volt d-c meter, having ranges of 10, 50, 250, and 500 volts. Use the nearest range above the specified measured voltage. A-c voltages were measured with a corresponding a-c meter.

Alignment Procedure

Calibrate the tuning dial by adjusting dial pointer to the extreme low-frequency end calibration mark on the "Standard broadcast" dial scale with the two-gang tuning condenser in full-mesh position.

Perform alignment in proper order tabulated below, starting with No. 1 and following all operations across, then No. 2, etc.

Cathode-ray alignment is preferable; the connections to the chassis are shown on figure 3. If an output indicator is used, connect it across the loudspeaker voice-coil and advance the receiver volume control to full-volume position.

Connect the "low" output terminal of the test oscillator to the receiver chassis for all alignment operations. Regulate the output of the test oscillator so that minimum signal is applied to the receiver to obtain an observable output indication. This will avoid a-v-c action.

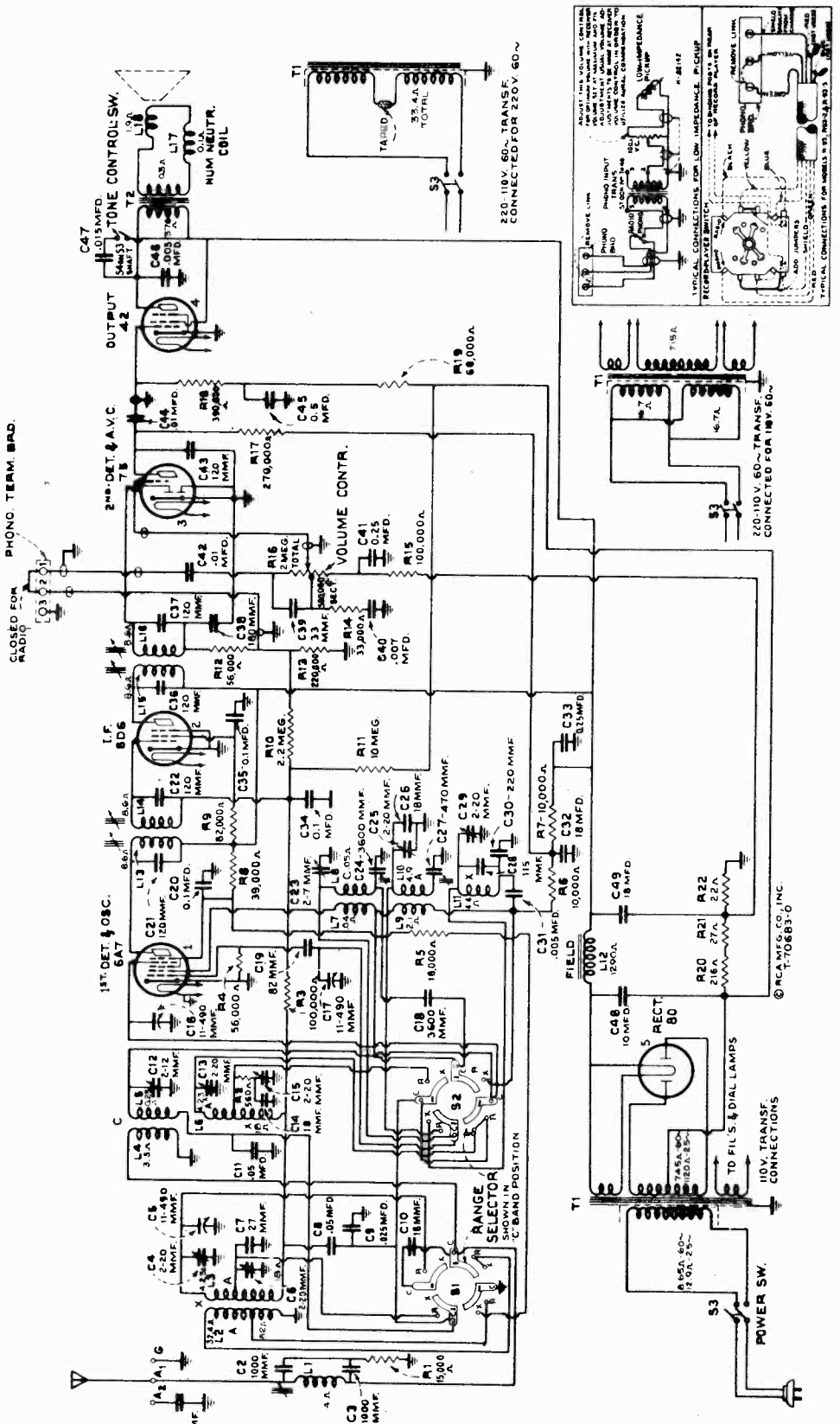
The term "Dummy antenna" means the device which must be connected between the "high" test-oscillator output and the point of connection to the receiver in order to obtain ideal alignment. "No signal, 550-750 kc" means that the receiver should be tuned to a point between 550 and 750 kc where no signal is received from a station or the local (heterodyne) oscillator.

For further details on alignment, refer to booklet "RCA Victor Receiver Alignment."

Order of Alignment	Test Oscillator			Receiver Dial Setting	Circuit to Adjust	Adjustment Symbols	Adjust to Obtain
	Connection to Receiver	Dummy Antenna	Frequency Setting				
1	6D6 i-f Grid Cap	.001 Mfd.	460 kc	No signal 550-750 kc	2nd i-f Trans.	L10 and L11	Max. (peak)
2	6A7 Det. Grid Cap	.001 Mfd.	460 kc	No signal 550-750 kc	1st i-f Trans.	L8 and L9	Max. (peak)
3	Ant. Post	200 Mmfd.	460 kc	No signal S. W. Band	Wave Trap	L1	Minimum Output
4	Ant. Post	200 Mmfd.	600 kc	600 kc	L-F Osc.	C8	Max. (peak)
5	Ant. Post	200 Mmfd.	1,700 kc	1,700 kc	H-F Osc.	C6	Max. (peak)
6	Ant. Post	200 Mmfd.	600 kc	Rock thru 600 kc	L-F Osc.	C8	Max. (peak)
7	Ant. Post	200 Mmfd.	1,700 kc	1,700 kc	H-F Osc.	C6	Max. (peak)
8	Ant. Post	200 Mmfd.	1,700 kc	1,700 kc	Ant.	C3	Max. (peak)

RCA MFG. CO., INC.

MODEL 5T4
Schematic
Phono.Data



Frequency or Wave-length Ranges

Band "X" .... 145-350 kc (approx. 2,068-857 meters)
Band "A" .. 525-1,550 kc (approx. 571-193 meters)
Band "C" ..... 5.8-22 megacycles

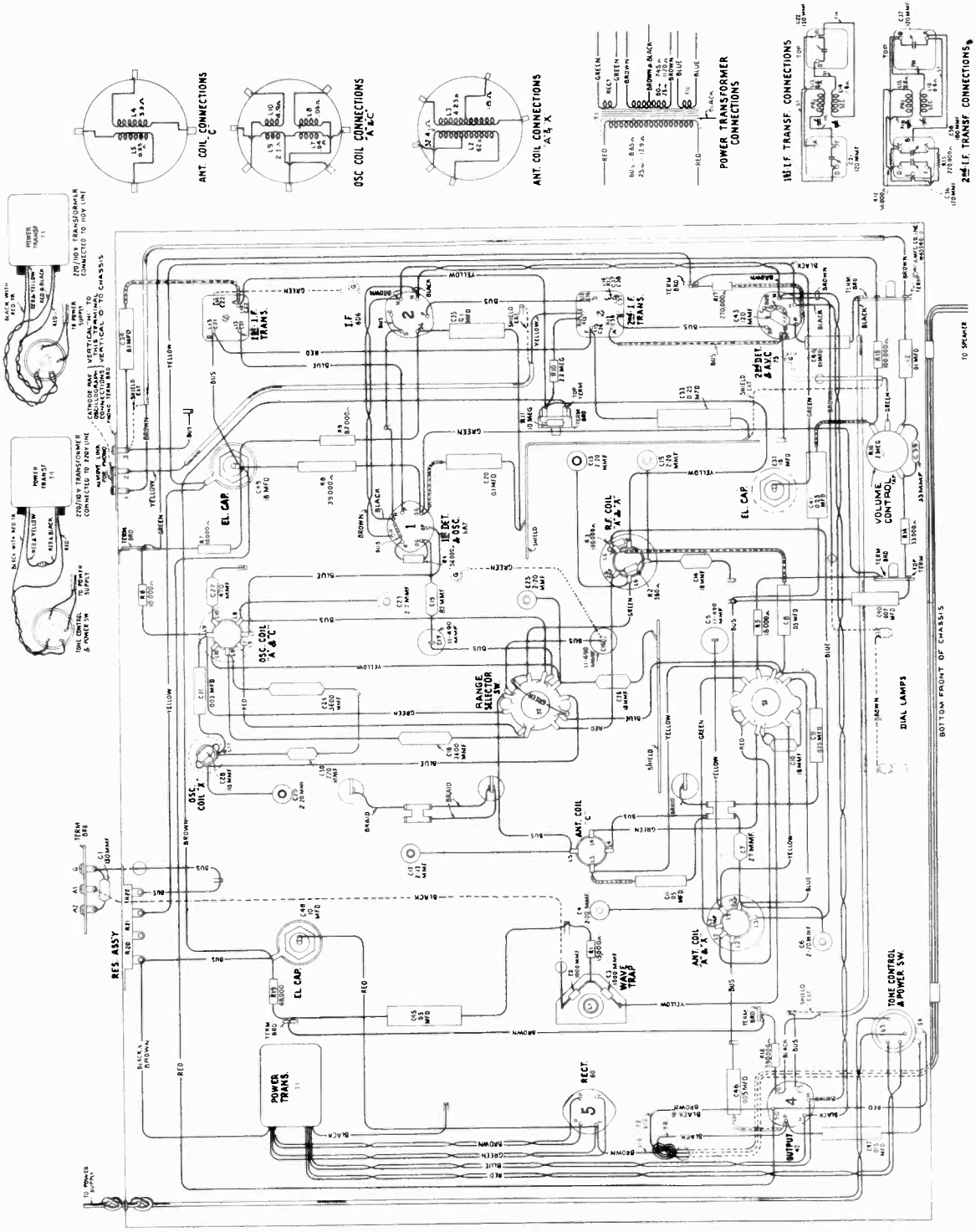
Intermediate Frequency ..... 460 kc

Alignment Frequencies

Band "X" .... 175 kc (osc.), 350 kc (osc., det., ant.)
Band "A" .. 600 kc (osc.), 1,500 kc (osc., det., ant.)
Band "C" ..... 20,000 kc (osc., ant.)

MODEL 5T4
Chassis Wiring

RCA MFG. CO., INC.



Pilot Lamps (2) ..... Mazda No. 46, 6.3 volts, 0.25 ampere

POWER SUPPLY RATINGS

Rating A ..... 105-125 volts, 50-60 cycles, 75 watts
Rating B ..... 105-125 volts, 25-50 cycles, 75 watts
Rating C ..... 100-125/200-250 volts, 50-60 cycles, 75 watts

POWER OUTPUT RATING

Undistorted ..... 2.0 watts
Maximum ..... 4.5 watts

LOUDSPEAKER

Type ..... Electrodynamic
Voice Coil Impedance ..... 2.2 ohms at 400 cycles

RCA MFG. CO., INC.

MODEL 5T4
Socket, Trimmers
Voltage, Resistance
Loud Spkr. Wiring

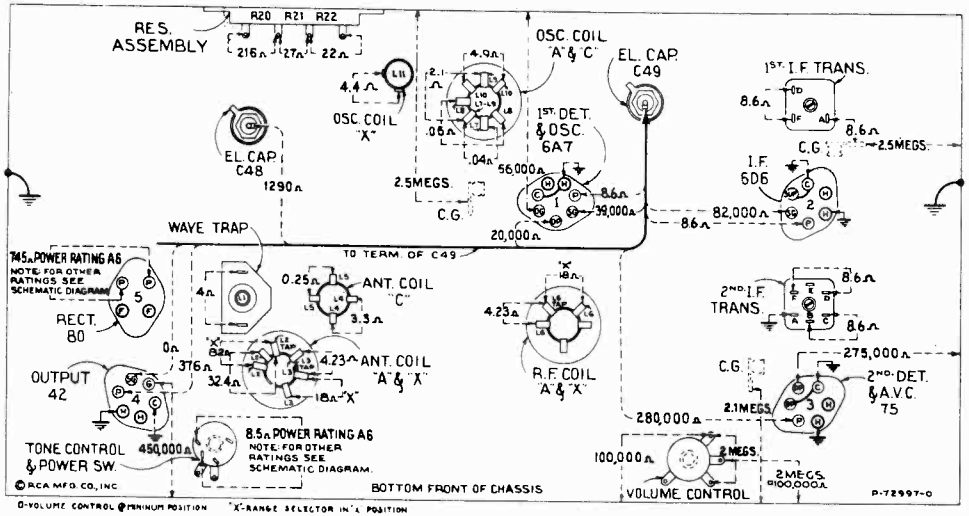
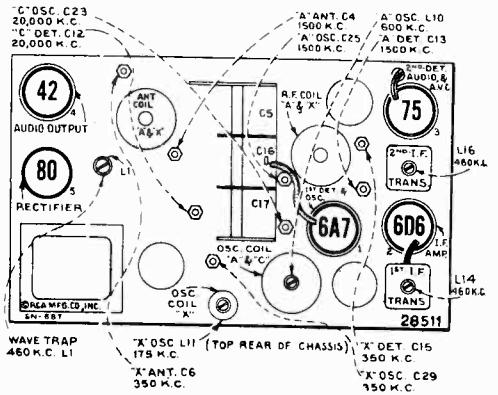


Figure 4—Resistance Diagram

Power supply disconnected—Radiotrons in sockets—Tuning condenser in full mesh—Volume control maximum—Range selector in "A" position



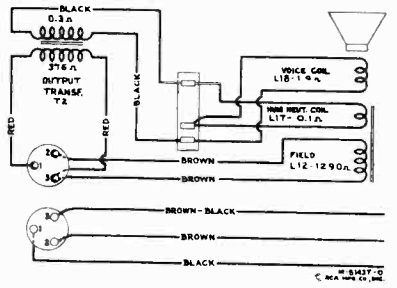


Figure 5—Loudspeaker Wiring

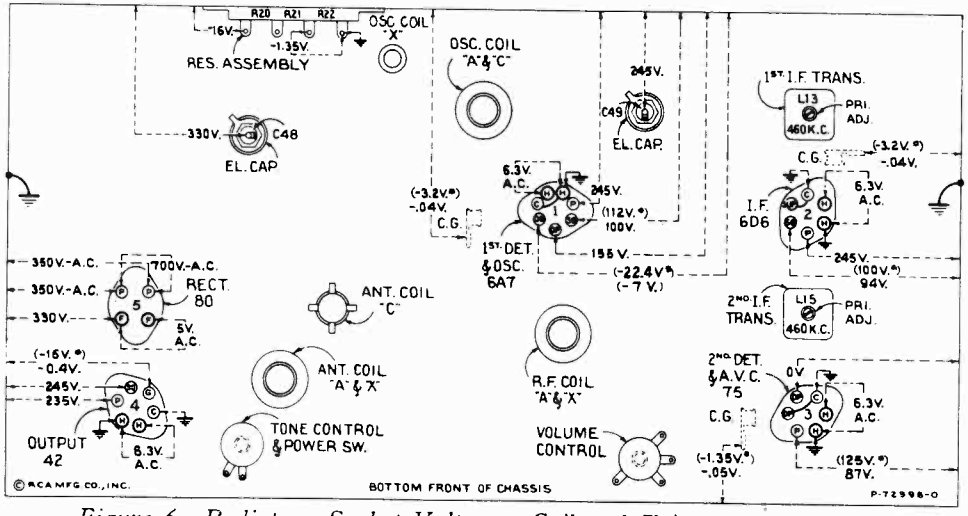


Figure 6—Radiotron Socket Voltages, Coil and Trimmer Locations

Measured at 115 volts, 60-cycle supply—Tuned to approximately 1,000 kc or 300 meters "A" band—No signal being received—Volume control minimum

Radiotron Cathode Current Readings

Measured with Milliammeter Connected at Tube Socket Cathode Terminal under Conditions Similar to Those of Voltage Measurements

(1)	RCA-6A7—1st Det.—Osc.	12.4	ma.
(2)	RCA-6D6—I. F. Amp.	10.2	ma.
(3)	RCA-75—2nd Det., A.V.C. and A. F.	0.23	ma.
(4)	RCA-42—Power Amp.	39	ma.
(5)	RCA-80—Rectifier	64	ma.*

(*Cannot be measured at socket)

Note: Two voltage values are shown for some readings. The value shown in parentheses with asterisk (*) indicates operating conditions without voltmeter loading. The other value (generally lower) is the actual measured voltage and differs from the value shown in parentheses because of the additional loading of the voltmeter through the high series circuit resistance.

There are ten alignment trimmers provided in the antenna transformer, detector, and oscillator coil tuned circuits. The i-f transformer, low-frequency oscillator, and wave-trap adjustments are made by means of screws attached to molded magnetite cores. All of these circuits have been accurately adjusted during manufacture and should remain properly aligned unless affected by abnormal conditions or altered during servicing. Loss of sensitivity, improper tone quality, and poor selectivity are the usual indications of improper alignment.

The correct performance of this receiver can only be obtained when the aligning has been done with adequate and reliable apparatus. The manufacturer of this receiver has available for sale, through its distributors and dealers, a complete assortment of such service equipment as may be needed for the alignment operation.

A test oscillator, such as the **RCA Stock No. 9595**, is required as a source of the specified alignment frequencies. Visual indication of receiver output during the adjustment is necessary and should be accomplished by the use of an indicator such as the **RCA Stock No. 4317 Neon Output Indicator.**

The procedure outlined below should be followed in adjusting the various trimmer capacitors and molded cores:

I-F Adjustments

The four adjustment screws (attached to molded magnetite cores) of the two i-f transformers (one on top and one on bottom of each i-f transformer) are located as shown by figures 3 and 6. Each circuit must be aligned to a basic frequency of **460 kc.** To do this, attach the output indicator across the loudspeaker voice coil.

Connect the "Ant" output of the test oscillator to the control grid of the RCA-6A7 through a **.001 mfd.** capacitor. Connect the test oscillator **"Gnd"** terminal to the ground terminal of the receiver chassis. Tune the oscillator to **460 kc.** Advance the receiver volume control to its full-on position and adjust the receiver tuning control to a point, within its range, where no interference is encountered from local broadcast stations or from the local (heterodyne) oscillator. To eliminate signals from the local oscillator short stator of C17 to chassis-ground. Increase the output of the test oscillator until a slight indication is present on the output indicator. Adjust the two magnetite core screws of the second i-f transformer **L16** and **L15** to produce maximum (peak) indicated receiver output. Then adjust the two magnetite core screws **L14** and **L13** of the first i-f transformer for maximum (peak) receiver output as shown by the indicating device. During these adjustments, regulate the test oscillator output so that the indication is always as low as possible. By doing so, broadness of tuning due to a.v.c. action will be avoided. It is advisable to repeat the adjustment of all i-f magnetite core screws to assure that the interaction between them has not disturbed the original adjustment. Remove temporary jumper, stator C17 to chassis-ground if used.

R-F Adjustments

Calibrate the tuning dial by adjusting the scale pointer to the extreme right-hand end calibration mark, on any scale, while the three-gang tuning condenser plates are in full mesh.

Wave-Trap Adjustment

Attach the "Ant" output of the test oscillator to the receiver "A1" terminal through a **200 mmfd. (important)** capacitor. The ground connections remain connected together. Leave the test oscillator adjusted to **460 kc.** Adjust range selector to band "A" position. Then adjust the wave-trap screw to the point which causes maximum suppression (minimum output) of the 460 kc signal.

"C" Band

(a) Attach the "Ant" output of the test oscillator to the receiver "A1" terminal through a **300-ohm** resistor, leaving the "Gnd" of the oscillator connected to the receiver chassis.
Adjust range selector to band "C" position. Set receiver dial pointer to **20,000 kc** (20 on scale).

(b) Tune test oscillator to **20,000 kc.** Set oscillator trimmer **C23** to minimum capacity (plunger full out), and detector trimmer **C12** to maximum capacity (plunger full in). Slowly push in oscillator trimmer **C23** until maximum (peak) output is reached. Two peaks may be found. Adjust **C23** to the peak with minimum capacity (plunger near out) for maximum indication. Tighten lock nut. Slowly pull out plunger of detector trimmer **C12** until maximum (peak) indicated output is reached while slightly rocking the gang tuning condenser back and forth through the signal. Two peaks may be found with this circuit. The peak with maximum capacity (plunger near in) should be used. Tighten lock nut.

"A" Band

(c) Attach the "Ant" output of the test oscillator to the receiver "A1" terminal through a **200 mmfd.** capacitor, leaving the "Gnd" of the oscillator connected to the receiver chassis. Adjust range selector to band "A" position. Reduce output of test oscillator to a minimum. Tune the test oscillator to **600 kc** and set receiver dial pointer to **600 kc (500 meters).** Adjust output of test oscillator until a slight indication of output is visible.

(d) Adjust the oscillator magnetite core screw **L10** (top of oscillator coil) so that maximum (peak) indicated output results.

(e) Set receiver dial pointer to **1,500 kc (200 meters).** Tune the test oscillator to **1,500 kc.** Carefully adjust the oscillator, detector, and antenna trimmers **C25, C13** and **C4** respectively so that each brings about maximum (peak) indicated output.

(f) Tune the test oscillator to **600 kc.** Adjust the receiver to pick up this signal disregarding the dial reading at which it is best received. Adjust oscillator magnetite core screw **L10** (top of oscillator coil), simultaneously rocking the tuning control of the receiver backward and forward through the signal, until maximum (peak) output results from the combined operations. After completing this adjustment, the trimmers **C25, C13** and **C4** should be re-adjusted as in (e) to correct for any change in the oscillator high-frequency tuning which has been caused by the preceding adjustment.

"X" Band

(g) Adjust receiver range selector to band "X" position and set receiver tuning control to a dial reading of **350 kc** or **857.14 meters** (19.75 on "C" scale). Tune test oscillator to **350 kc** and adjust oscillator, detector, and antenna trimmers **C29, C15** and **C6,** respectively, for maximum indicated receiver output.

(h) Set receiver to **175 kc** or **1,714.28 meters** (7.4 on "C" scale) and tune test oscillator to **175 kc.** Adjust screw **L11** for maximum indicated output, simultaneously rocking tuning control of the receiver backward and forward through the signal.

(i) The adjustment of **C29, C15** and **C6** should now be repeated at **350 kc** as described in (g) to compensate for any changes caused by the low-frequency adjustment **L11.**

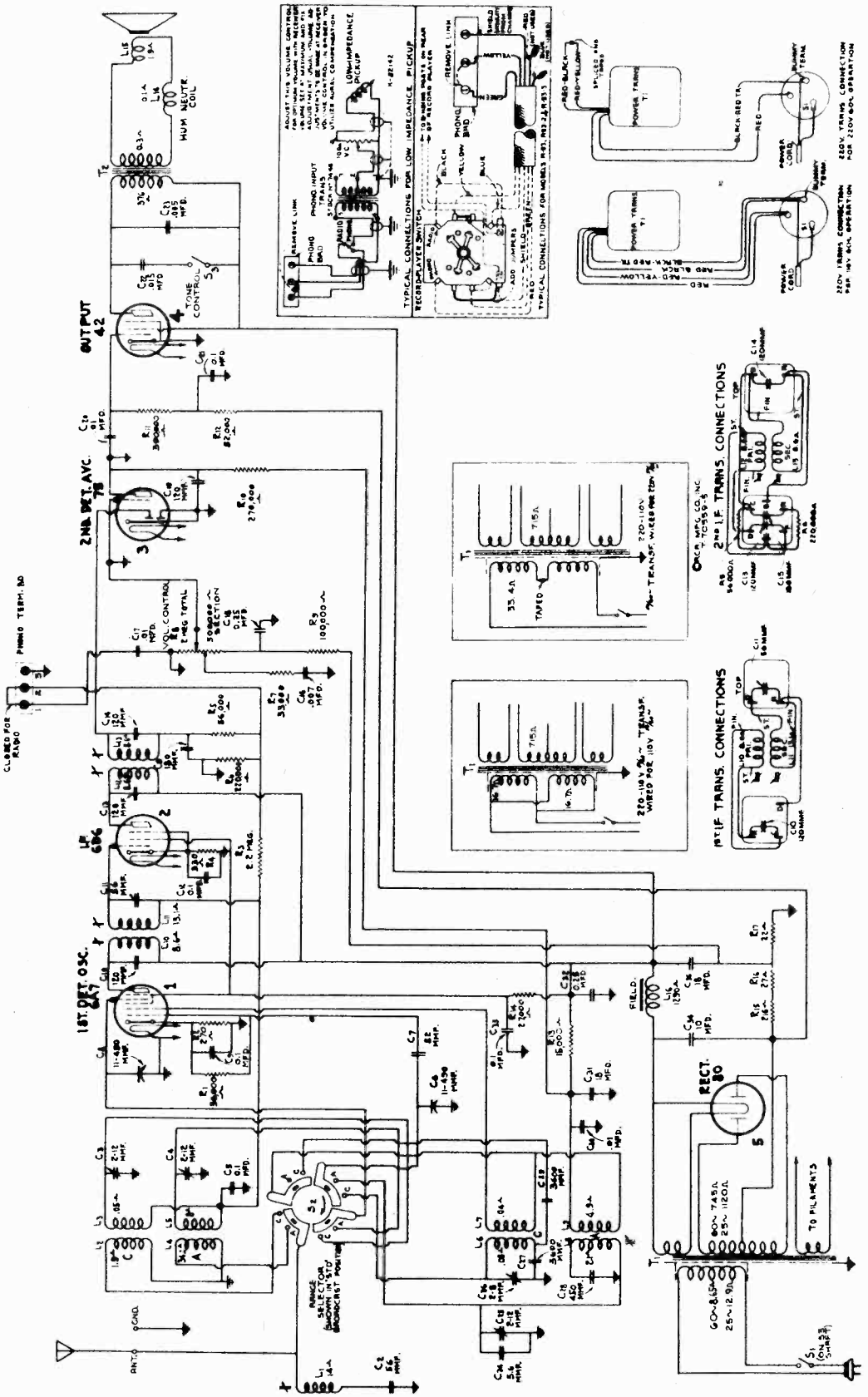
Loudspeaker

Centering of the loudspeaker voice coil is made in the usual manner with three narrow paper feelers after first removing the front paper dust cover. This may be removed by softening its cement with a very light application of acetone, using care not to allow the acetone to flow down into the air gap. The dust cover may be cemented back in place with ambroid upon completion of adjustment.

Alignment Procedure

RCA MFG. CO., INC.

MODEL 5T5
Schematic
Phono.Data



Alignment Frequencies

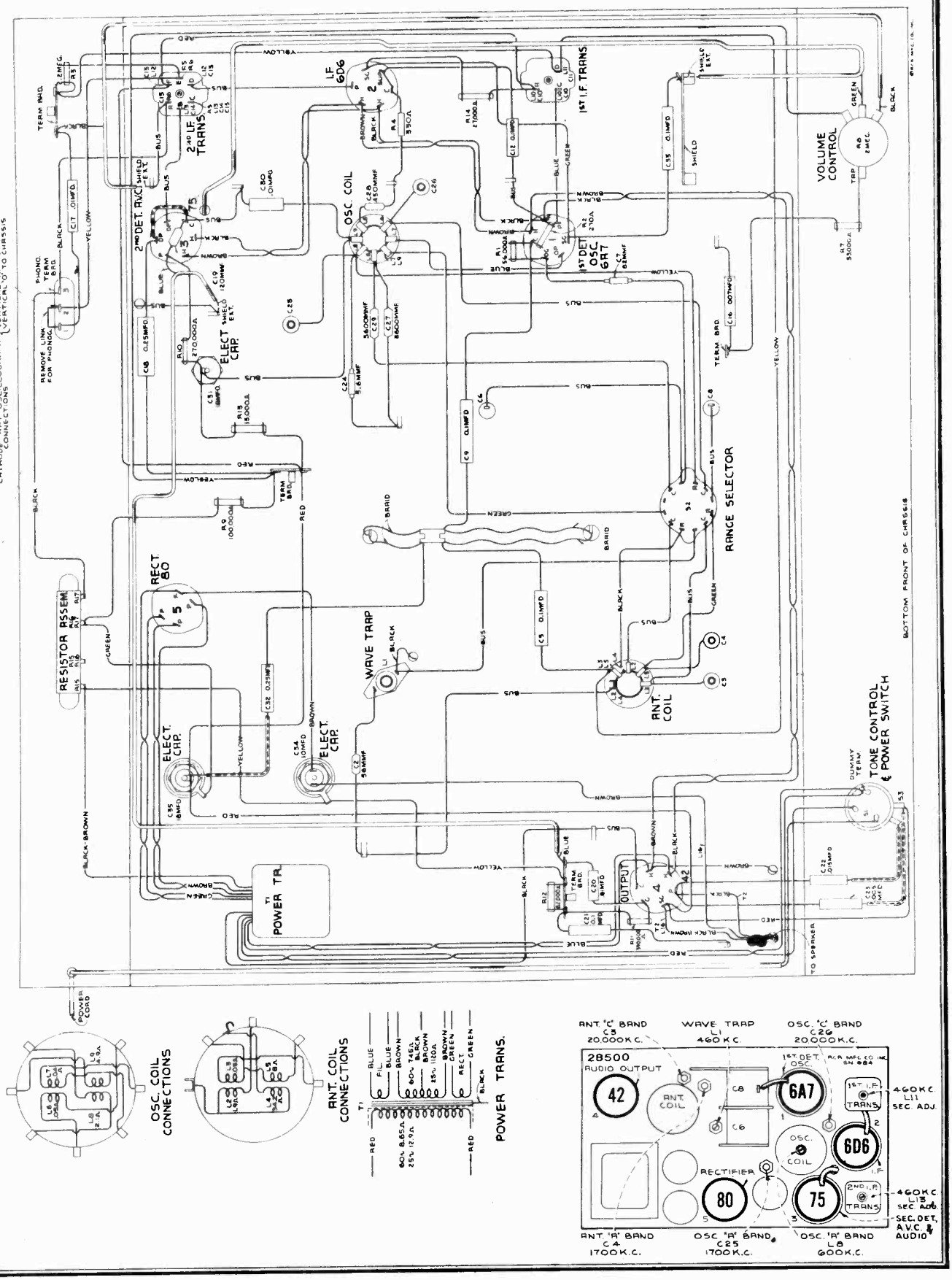
"Standard broadcast" (A)	1,500 kc
"Standard broadcast" (A)	600 kc (osc.), 1,700 kc (osc., ant.)
"Short wave" (C)	5,800-21,600 kc
"Short wave" (C)	20,000 kc
Intermediate Frequency	460 kc

Frequency Ranges

"Standard broadcast" (A)	530-1,900 kc
"Short wave" (C)	5,800-21,600 kc
Intermediate Frequency	460 kc

MODEL 5T5
Chassis Wiring
Trimmers, Socket

RCA MFG. CO., INC.



RCA MFG. CO., INC.

MODEL 5T5
Voltage, Resistance
Spkr. Wiring

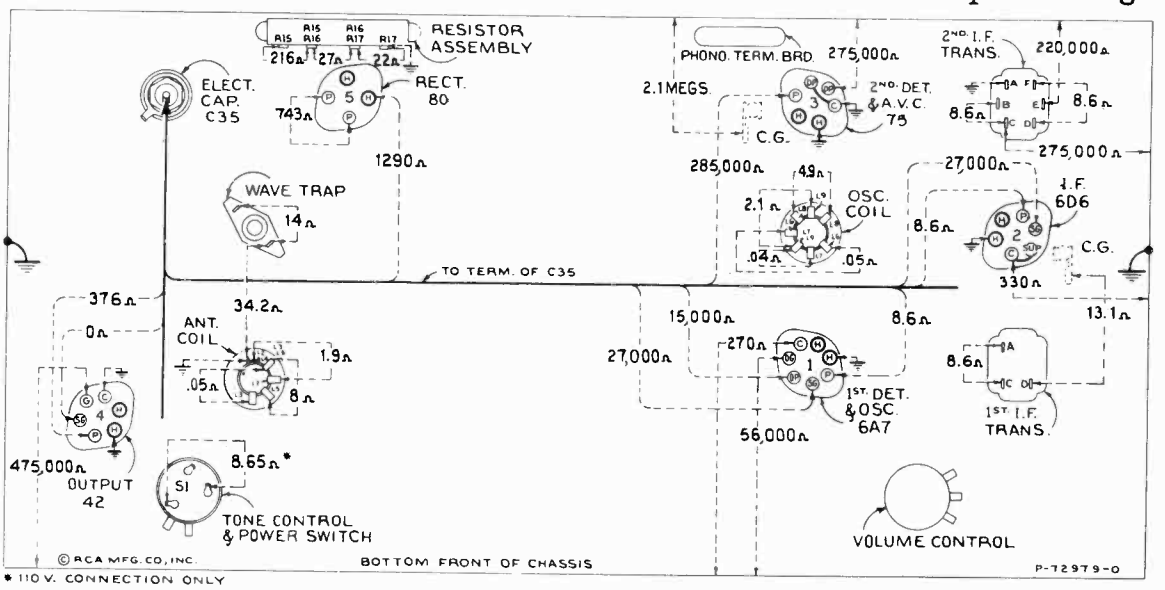


Figure 4—Resistance Diagram

Power supply disconnected—Radiotrons in sockets—Tuning condenser in full mesh—Volume control maximum

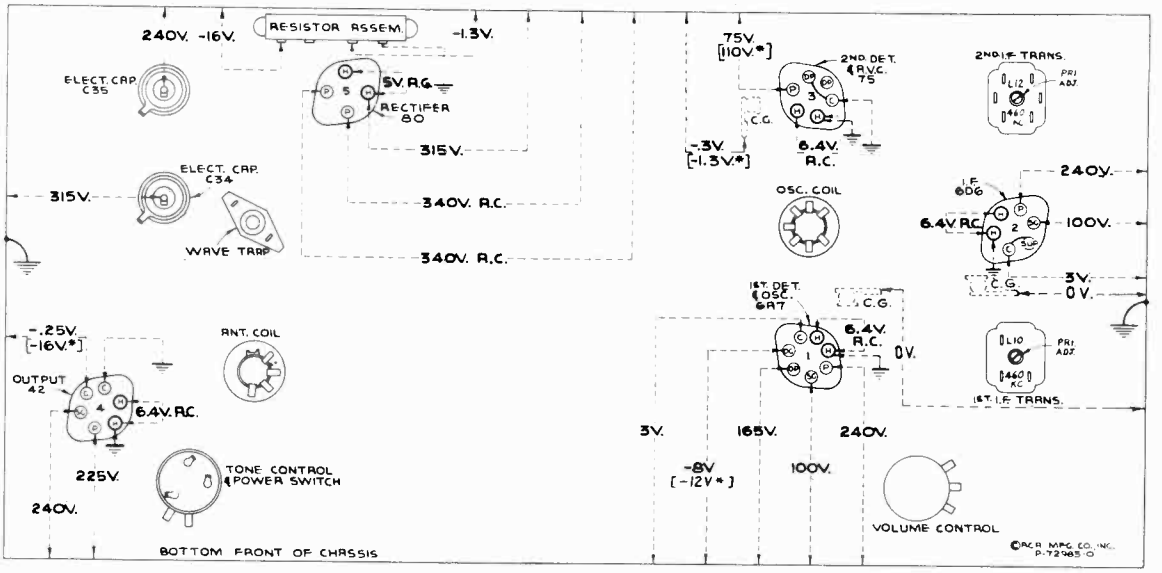


Figure 6—Radiotron Socket Voltages, Coil and Trimmer Locations.

Measured at 115 volts, 60-cycle supply—Tuned to approximately 1,000 kc ("Standard broadcast")—No signal being received—Volume control minimum

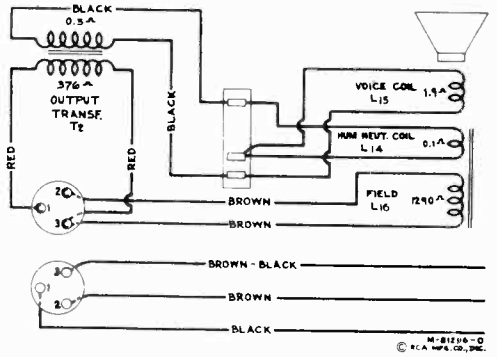


Figure 5—Loudspeaker Wiring

***Note:** Two voltage values are shown for some readings. The value shown in parentheses with asterisk (*) indicates operating conditions without voltmeter loading. The other value (generally lower) is the actual measured voltage and differs from the value shown in parentheses because of the additional loading of the voltmeter through the high series circuit resistance.*

Radiotron Plate Current Readings

Measured with Milliammeter Connected at Tube Socket Plate Terminals Under Conditions Similar to Those of Voltage Measurements

(1)	RCA-6A7—1st Det.—Osc.	11.0 ma.
(2)	RCA-6D6—I. F. Amp.	10.0 ma.
(3)	RCA-75—2nd Det., A.V.C. and A. F.	0.22 ma.
(4)	RCA-42—Power Amp.	42.0 ma.
(5)	RCA-80—Rectifier	—

Alignment Procedure

There are five alignment trimmers provided in the antenna transformer and oscillator coil tuned circuits. The i-f transformer and wave-trap adjustments are made by means of screws attached to molded magnetite cores. All of these circuits have been accurately adjusted during manufacture and should remain properly aligned unless affected by abnormal conditions or altered during servicing. Loss of sensitivity, improper tone quality, and poor selectivity are the usual indications of improper alignment.

The correct performance of this receiver can only be obtained when the aligning has been done with adequate and reliable apparatus. The manufacturer of this receiver has available for sale, through its distributors and dealers, a complete assortment of such service equipment as may be needed for the alignment operation.

A test oscillator, such as the **RCA Stock No. 9595**, is required as a source of the specified alignment frequencies. Visual indication of receiver output during the adjustment is necessary and should be accomplished by the use of an indicator such as the **RCA Stock No. 4317 Neon Output Indicator.**

The procedure outlined below should be followed in adjusting the various trimmer capacitors and molded cores:

I-F Adjustments

The four adjustment screws (attached to molded magnetite cores) of the two i-f transformers (one on top and one on bottom of each i-f transformer) are located as shown by figures 3 and 6. Each circuit must be aligned to a basic frequency of **460 kc.** To do this, attach the output indicator across the loudspeaker voice coil.

Connect the output of the test oscillator to the control grid of the RCA-6A7 through a **.001 mfd.** capacitor. Connect the test oscillator **"Gnd"** terminal to the ground terminal of the receiver chassis. Tune the oscillator to **460 kc.** Advance the receiver volume control to its full-on position and adjust the receiver tuning control to a point, within its range, where no interference is encountered from local broadcast stations or from the local (heterodyne) oscillator. To eliminate signals from the local oscillator short stator of C6 to chassis-ground. Increase the output of the test oscillator until a slight indication is present on the output indicator. Adjust the two magnetite core screws of the second i-f transformer **L13** and **L12** to produce maximum (peak) indicated receiver output. Then adjust the two magnetite core screws **L11** and **L10** of the first i-f transformer for maximum (peak) receiver output as shown by the indicating device. During these adjustments, regulate the test oscillator output so that the indication is always as low as possible. By doing so, broadness of tuning due to a.v.c. action will be avoided. It is advisable to repeat the adjustment of all i-f magnetite core screws to assure that the interaction between them has not disturbed the original adjustment.

R-F Adjustments

Calibrate the tuning dial by adjusting the scale pointer to the extreme end calibration mark (beyond 55 on dial) while the two-gang tuning condenser plates are in full mesh.

Wave-Trap Adjustment

Attach the output of the test oscillator to the receiver "Antenna" terminal through a **200 mmfd.** (important) capacitor. The ground connections remain connected together. Leave the test oscillator tuned to **460 kc.** Adjust range selector to "Short wave" (C) position. Then adjust the wave-trap screw to the point which causes maximum suppression (minimum received) of the 460 kc signal.

"Standard Broadcast" Band

(a) Adjust range selector to "Standard broadcast" (A) position. Reduce output of test oscillator to a minimum. Tune the test oscillator to **600 kc** and set receiver dial pointer to 600 kc. Adjust output of test oscillator until a slight indication of output is visible.

(b) Adjust the oscillator magnetite core screw **L8** (top of oscillator coil) so that maximum (peak) indicated output results.

(c) Set receiver dial pointer to **1,700 kc.** Tune the test oscillator to 1,700 kc. Carefully adjust the oscillator and antenna trimmers C25 and C4 respectively so that each brings about maximum (peak) indicated output.

(d) Tune the test oscillator to **600 kc.** Adjust the receiver to pick up this signal disregarding the dial reading at which it is best received. Adjust oscillator magnetite core screw **L8** (top of oscillator coil) for maximum (peak) output while rocking gang tuning condenser. After completing this adjustment, the trimmers C25 and C4 should be re-adjusted as in (c) to correct for any change in the oscillator high-frequency tuning which has been caused by the preceding adjustment.

"Short-Wave" Band

(e) Connect the "Ant." output of the test oscillator to the "Antenna" terminal through a 300-ohm resistor, leaving the "Gnd." of the oscillator connected to the receiver chassis.

(f) Adjust range selector to its "Short wave" (C) position. Set receiver dial pointer to **20,000 kc.** Tune test oscillator to **20,000 kc.** Set oscillator trimmer C26 to minimum capacity (plunger full out), and antenna trimmer C3 to maximum capacity (plunger full in). Slowly push in oscillator trimmer C26 until maximum (peak) output is reached. Two peaks may be found. Adjust **C26** to the peak with minimum capacity (plunger near out) for maximum indication. Tighten lock nut. Slowly pull out plunger of antenna trimmer C3 until maximum (peak) indicated output is reached while slightly rocking the gang tuning condenser back and forth through the signal. Two peaks may be found with this circuit. The peak with maximum capacity (plunger near in) should be used. Tighten lock nut.

Loudspeaker

Centering of the loudspeaker voice coil is made in the usual manner with three narrow paper feelers after first removing the front paper dust cover. This may be removed by softening its cement with a very light application of acetone, using care not to allow the acetone to flow down into the air gap. The dust cover may be cemented back in place with ambroid upon completion of adjustment.

REPLACEMENT PARTS

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

Stock No.	DESCRIPTION	List Price
	RECEIVER ASSEMBLIES	
13216	Board—Antenna and ground terminal board	$0.25
12717	Board—Phonograph terminal board	.22
5237	Bushing—Variable condenser mounting bushing assembly—Package of 3	.43
12118	Cap—Grid contact cap—Package of 5	.15
12714	Capacitor—Adjustable trimmer (C3, C4, C25)	.38
12807	Capacitor—Adjustable trimmer (C26)	.35
12973	Capacitor—5.6 Mmfd. (C24)	.20
12723	Capacitor—56 Mmfd. (C2)	.20
12629	Capacitor—56 Mmfd. (C11)	.20
13394	Capacitor—82 Mmfd. (C7)	.20
12724	Capacitor—120 Mmfd. (C19)	.28
12404	Capacitor—120 Mmfd. (C10, C13, C14)	.26
12406	Capacitor—180 Mmfd. (C15)	.26
12812	Capacitor—450 Mmfd. (C28)	.25
12811	Capacitor—3,600 Mmfd. (C27, C29)	.35
4868	Capacitor—.005 Mfd. (C23)	.20
5148	Capacitor—.007 Mfd. (C16)	.20
11315	Capacitor—.015 Mfd. (C22)	.20
4858	Capacitor—.01 Mfd. (C17, C20, C30)	.25
4840	Capacitor—0.25 Mfd. (C18)	.30
5170	Capacitor—0.25 Mfd. (C32)	.25
4841	Capacitor—0.1 Mfd. (C5, C9, C12, C21, C33)	.22
11240	Capacitor—10 Mfd. (C34)	1.08
5212	Capacitor—18 Mfd. (C31, C35)	1.16
12797	Coil—Antenna coil and shield (L2, L3, L4, L5)	1.30
12798	Coil—Oscillator coil and shield (L6, L7, L8, L9)	1.65
12701	Condenser—2-gang variable tuning condenser (C6, C8)	4.00
5119	Connector—3-contact female connector for speaker cable	.25
12006	Core—Adjustable core and stud for Stock Nos. 12653 and 12801	.22
12664	Core—Adjustable core and stud for Stock No. 12654	.22
13313	Dial—Station selector dial	.45
12702	Drive—Vernier drive for variable condenser	.68
13314	Indicator—Station selector indicator pointer	.15
5226	Lamp—Dial lamp, 6.3 volts—Package of 5	.70
13310	Resistor—Voltage divider comprising one 216-ohm, one 27-ohm and one 22-ohm sections (R15, R16, R17)	.55
6135	Resistor—270 ohms, carbon type, ¼ watt watt—Package of 5 (R2)	1.00
11296	Resistor—330 ohms, carbon type, ¼ watt —Package of 5 (R4)	1.00
12759	Resistor—15,000 ohms, carbon type, ½ watt—Package of 5 (R13)	1.00
12011	Resistor—27,000 ohms, carbon type, 1 watt—Package of 5 (R14)	1.10
11364	Resistor—33,000 ohms, carbon type, ¼ watt—Package of 5 (R7)	1.00
5029	Resistor—56,000 ohms, carbon type, ¼ watt—Package of 5 (R1)	1.00
11282	Resistor—56,000 ohms, carbon type, 1/10 watt—Package of 5 (R5)	.75
11365	Resistor—82,000 ohms, carbon type, ¼ watt—Package of 5 (R12)	1.00
5145	Resistor—100,000 ohms, carbon type, ¼ watt—Package of 5 (R9)	1.00
11398	Resistor—220,000 ohms, carbon type, 1/10 watt—Package of 5 (R6)	.75
11323	Resistor—270,000 ohms, carbon type, ¼ watt—Package of 5 (R10)	$1.00
11847	Resistor—390,000 ohms, carbon type, ¼ watt—Package of 5 (R11)	1.00
11626	Resistor—2.2 meg., carbon type, ¼ watt —Package of 5 (R3)	1.00
12651	Shield—Antenna coil shield	.22
13311	Shield—Chassis end shield and rubber mounting foot assembly—Package of 2	.80
12607	Shield—First I. F. transformer shield top	.30
12008	Shield—I. F. transformer shield	.28
12799	Shield—Oscillator coil shield	.15
12581	Shield—Second I. F. transformer shield top	.36
3682	Shield—6A7 or 75 Radiotron shield	.22
3950	Shield—6D6 Radiotron shield	.26
4794	Socket—4-contact 80 Radiotron socket	.15
4786	Socket—6-contact 6D6, 42 or 75 Radiotron socket	.15
4787	Socket—7-contact 6A7 Radiotron socket	.15
11199	Socket—Dial lamp socket	.14
12007	Spring—Retaining spring for Stock Nos. 12006 and 12664—Package of 10	.36
12796	Switch—Range switch (S2)	1.00
13309	Switch—Tone control and power switch (S1, S3)	.55
12801	Transformer—First I. F. transformer complete (L10, L11, C10, C11)	1.70
12653	Transformer—Second I. F. transformer complete (L12, L13, C13, C14, C15, R5, R6)	2.06
13392	Transformer—Power transformer, 105-125 volts, 50-60 cycles (T1)	4.95
13566	Transformer—Power transformer, 105-125 volts, 25-60 cycles (T1)	4.80
13393	Transformer—Power transformer, 110 and 220 volts, 50-60 cycles (T1)	4.95
12654	Trap—Wave-trap complete (L1)	.75
13144	Volume control (R8)	1.00
	REPRODUCER ASSEMBLIES	
12641	Board—3-contact reproducer terminal board	.15
12640	Bracket—Output transformer mounting bracket	.18
12012	Coil—Field coil (L16)	1.85
11469	Coil—Neutralizing coil (L14)	.20
12642	Cone—Reproducer cone and dust cap (L15)	.94
5118	Connector—3-contact male speaker cable connector	.25
9699	Reproducer—Complete	6.38
11253	Transformer—Output transformer (T2)	1.56
11886	Washer—Spring washer to hold field coil securely—Package of 5	.20
	MISCELLANEOUS ASSEMBLIES	
12785	Crystal—Station selector escutcheon and crystal	1.00
12699	Knob—Large station selector knob—Package of 5	.68
12700	Knob—Small (vernier) station selector knob—Package of 5	.58
11347	Knob—Volume control, tone control or range switch knob—Package of 5	.75
11377	Screw—Chassis mounting screw and washer assembly—Package of 4	.12
4982	Spring—Retaining spring for knob, Stock No. 12699—Package of 10	.50
11349	Spring—Retaining spring for knob, Stock Nos. 11347 and 12700—Package of 5	.25

Prices quoted above are subject to change without notice.

RCA MFG. CO., INC.

MODELS 5T6, 5T7, 5T8
Schematic, Socket
Trimmers, Trans. Data

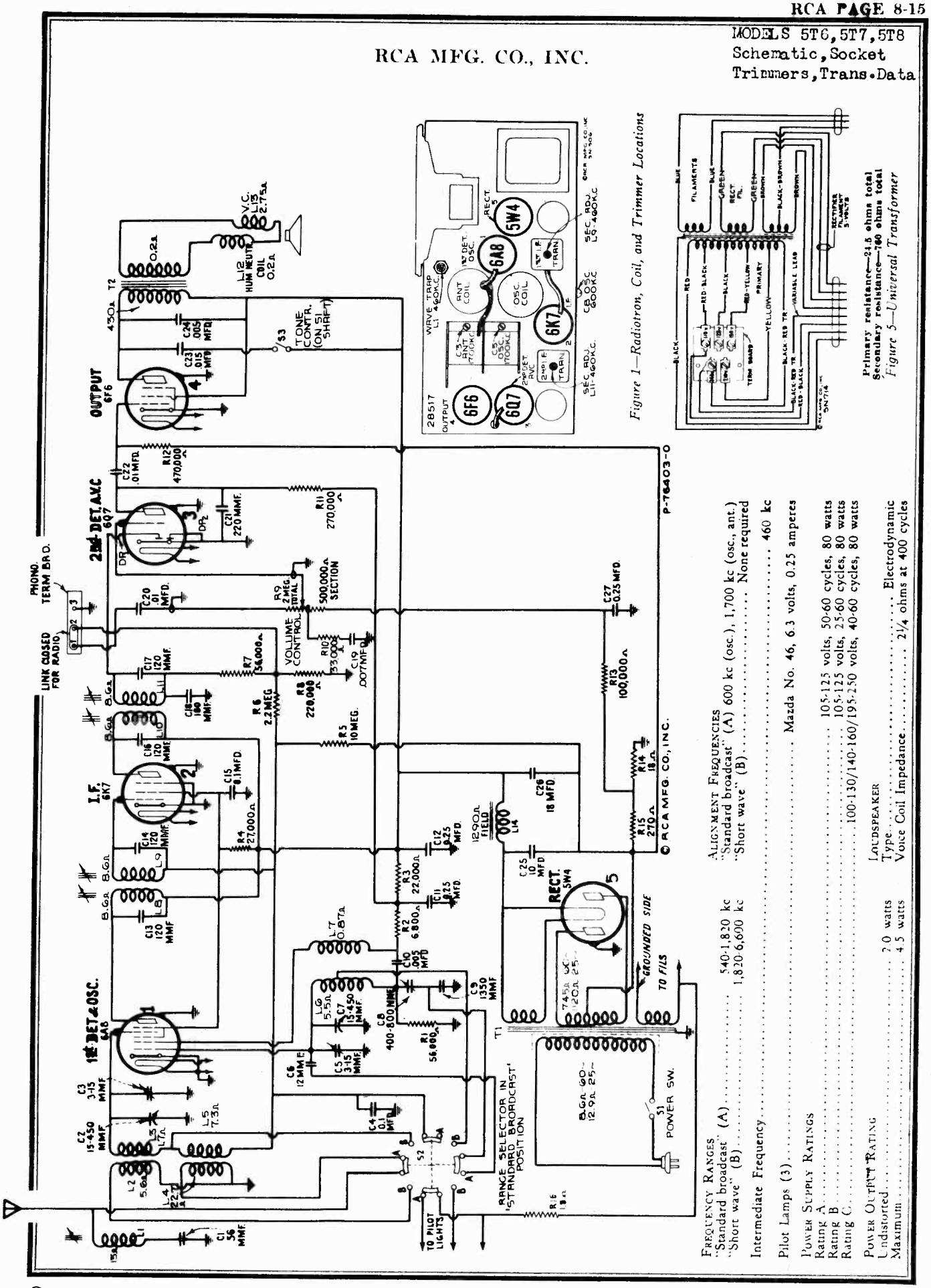


Figure 1—Radiotron, Coil, and Trimmer Locations

Primary resistance—21.5 ohms total
Secondary resistance—760 ohms total

Figure 5—Universal Transformer

FREQUENCY RANGES
"Standard broadcast" (A) ..... 540-1,820 kc
"Short wave" (B) ..... 1,820-6,600 kc

INTERMEDIATE FREQUENCY ..... 460 kc

PILOT LAMPS (3) ..... Mazda No. 46, 6.3 volts, 0.25 amperes

POWER SUPPLY RATINGS
Rating A ..... 105-125 volts, 50-60 cycles, 80 watts
Rating B ..... 105-125 volts, 25-60 cycles, 80 watts
Rating C ..... 100-130/140-160/195-250 volts, 40-60 cycles, 80 watts

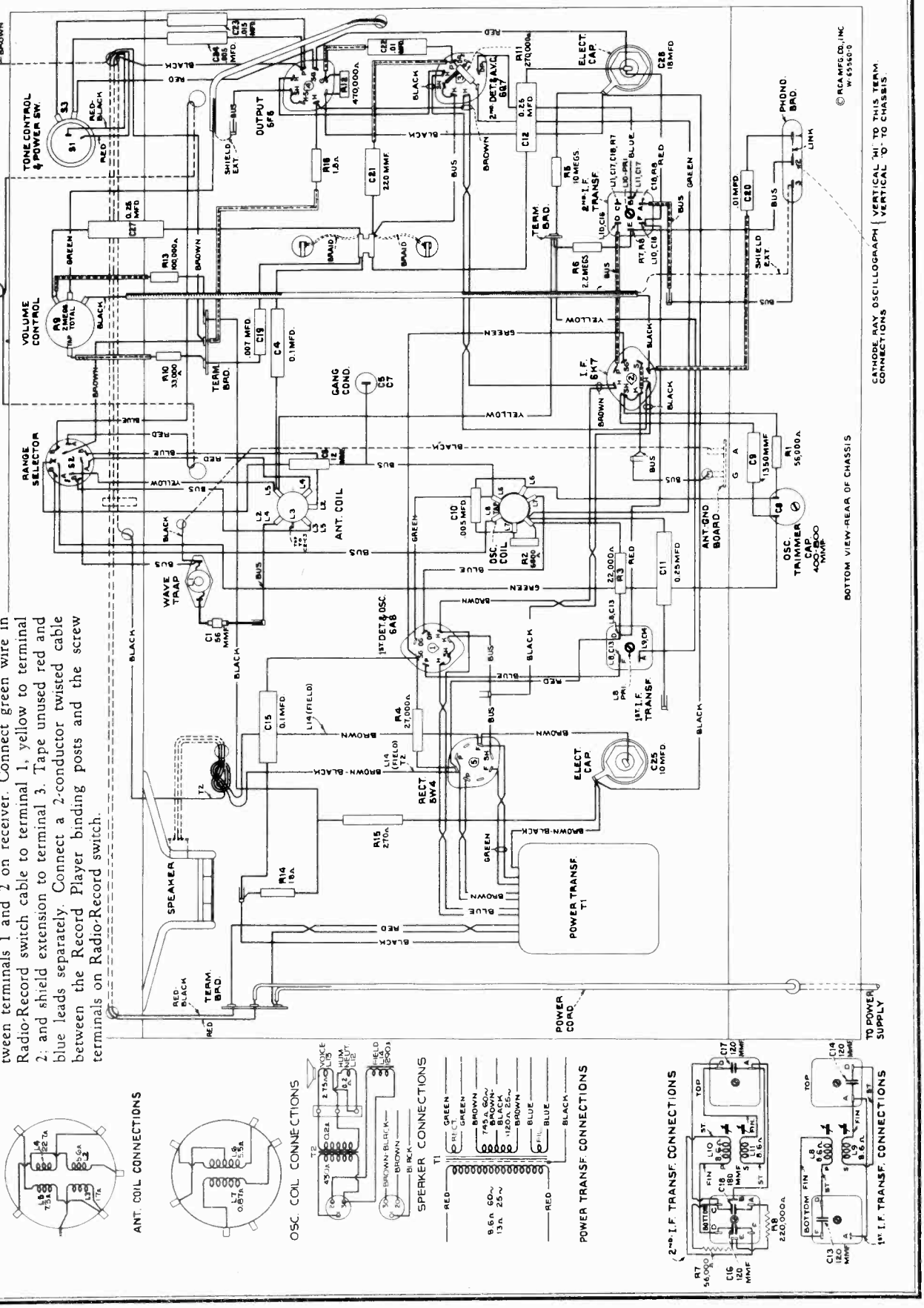
POWER OUTPUT RATING
Undistorted ..... 2.0 watts
Maximum ..... 4.5 watts

ALIGNMENT FREQUENCIES
"Standard broadcast" (A) 600 kc (osc.), 1,700 kc (osc., ant.)
"Short wave" (B) ..... None required

LOUDSPEAKER
Type ..... Electrodynamic
Voice Coil Impedance ..... 2¼ ohms at 400 cycles

MODELS 5T6, 5T7, 5T8
Chassis Wiring
Phono. Data

RCA MFG. CO., INC.



Phonograph Attachment.—A terminal board is provided for connecting a phonograph into the audio-amplifying circuit. RCA Victor Models R-93, R-93-2, or R-93-S Record Players should be connected as follows: Remove link between terminals 1 and 2 on receiver. Connect green wire in Radio-Record switch cable to terminal 1, yellow to terminal 2, and shield extension to terminal 3. Tape unused red and blue leads separately. Connect a 2-conductor twisted cable between the Record Player binding posts and the screw terminals on Radio-Record switch.

Alignment Procedure

Calibrate the tuning dial by adjusting dial pointer to the horizontal center line (between the two dial scales) with the two-gang tuning condenser in full-mesh position. Two screws are provided on the dial hub for this adjustment.

Perform alignment in proper order tabulated below, starting with No. 1 and following all operations across, then No. 2, etc.

Cathode-ray alignment is preferable; the connections to the chassis are shown on figure 3. If an output indicator is used, connect it across the loudspeaker voice-coil and advance the receiver volume control to full-volume position.

Connect the "low" output terminal of the test oscillator to the receiver chassis for all alignment operations. Regulate the output of the test oscillator so that minimum signal is applied to the receiver to obtain an observable output indication. This will avoid a-v-c action.

The term "Dummy antenna" means the device which must be connected between the "high" test-oscillator output and the point of connection to the receiver in order to obtain ideal alignment. "No signal, 550-750 kc" means that the receiver should be tuned to a point between 550 and 750 kc where no signal is received from a station or the local (heterodyne) oscillator.

For further details on alignment, refer to booklet "RCA Victor Receiver Alignment."

Order of Alignment	Test Oscillator			Receiver Dial Setting	Circuit to Adjust	Adjustment Symbols	Adjust to Obtain	Adjustment Location
	Connection to Receiver	Dummy Antenna	Frequency Setting					
1	6K7 i-f Grid Cap	.001 Mfd.	460 kc	No signal 550-750 kc	2nd i-f Trans.	L11 and L10	Max. (peak)	Figs. 1-4
2	6A8 Det. Grid Cap	.001 Mfd.	460 kc	No signal 550-750 kc	1st i-f Trans.	L9 and L8	Max. (peak)	Figs. 1-4
3	Ant. Post	200 Mmfd.	460 kc	No signal S. W. Band	Wave Trap	L1	Minimum Output	Fig. 1
4	Ant. Post	200 Mmfd.	600 kc	600 kc	L-F Osc.	C8	Max. (peak)	Fig. 1
5	Ant. Post	200 Mmfd.	1,700 kc	1,700 kc	H-F Osc.	C5	Max. (peak)	Fig. 1
6	Ant. Post	200 Mmfd.	1,700 kc	1,700 kc	Ant.	C3	Max. (peak)	Fig. 1
7	Ant. Post	200 Mmfd.	600 kc	Rock thru 600 kc	L-F Osc.	C8	Max. (peak)	Fig. 1
8	Ant. Post	200 Mmfd.	1,700 kc	1,700 kc	H-F Osc.	C5	Max. (peak)	Fig. 1
9	Ant. Post	200 Mmfd.	1,700 kc	1,700 kc	Ant.	C3	Max. (peak)	Fig. 1

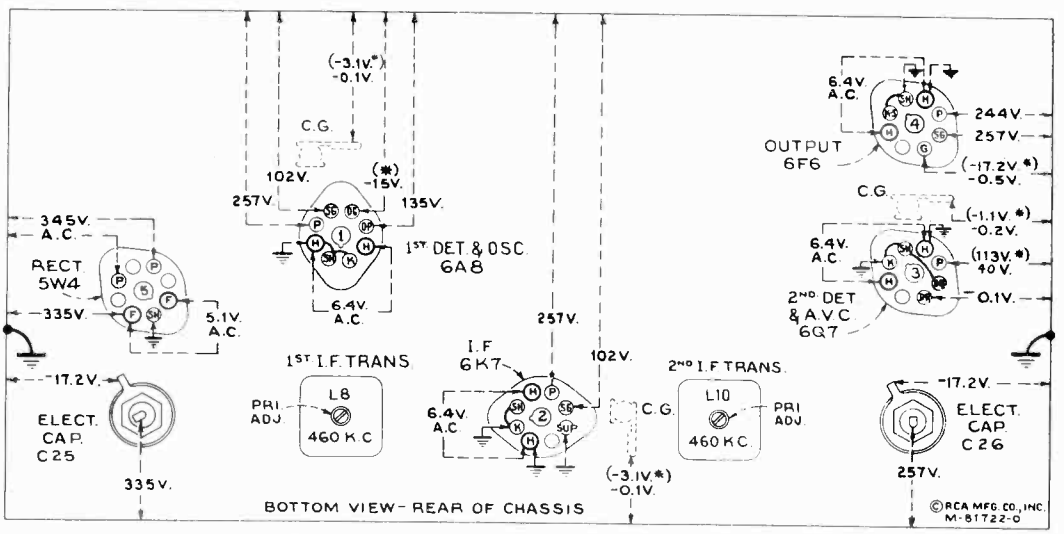


Figure 4—Radiotron Socket Voltages, Coil, and Trimmer Locations

Measured at 115 volts, 60-cycle supply—Tuned to approximately 1,000 kc ("Standard broadcast")—No signal being received—Volume control minimum

Radiotron Socket Voltages

Note: Two voltage values are shown for some readings. The value shown in parentheses with asterisk (*) indicates operating conditions without voltmeter loading. The other value (generally lower) is the actual measured voltage and differs from the value shown in parentheses because of the additional loading of the voltmeter through the high series circuit resistance.

Radiotron Cathode Current Readings

Measured with Milliammeter Connected at Tube Socket Cathode Terminals Under Conditions Similar to Those of Voltage Measurements

(1) RCA-6A8—1st Det.—Osc. ..... 11.7 ma.
(2) RCA-6K7—I. F Amp. ..... 9.4 ma.
(3) RCA-6Q7—2nd Det., A.V.C and A. F. ... 0.3 ma.
(4) RCA-6F6—Power Amp. ..... 39.6 ma.
(5) RCA-5W4—Rectifier. ..... 61.0 ma.*

* Cannot be measured at socket.

MODELS 5T6, 5T7, 5T8
MODEL 6T5

RCA MFG. CO., INC.

Parts Lists

REPLACEMENT PARTS FOR MODEL 5T6, 5T7, 5T8

STOCK No.	DESCRIPTION
13098	Board—Antenna and ground terminal board
12717	Board—Phonograph terminal board
5237	Bushing—Variable condenser mounting bushing assembly
12611	Cap—Grid contact cap
11465	Capacitor—Adjustable capacitor (C8)
12659	Capacitor—12 Mmfd. (C6)
12661	Capacitor—56 Mmfd. (C1)
12404	Capacitor—120 Mmfd. (C13, C14, C16, C17)
12406	Capacitor—180 Mmfd. (C18)
13818	Capacitor—220 Mmfd. (C21)
12660	Capacitor—1,350 Mmfd. (C9)
4868	Capacitor—.005 Mfd. (C10, C24)
5148	Capacitor—.007 Mfd. (C19)
13138	Capacitor—.01 Mfd. (C20)
4858	Capacitor—.01 Mfd. (C22)
11315	Capacitor—.015 Mfd. (C23)
4841	Capacitor—0.1 Mfd. (C4, C15)
4840	Capacitor—0.25 Mfd. (C11, C27)
5170	Capacitor—0.25 Mfd. (C12)
11240	Capacitor—10 Mfd. (C25)
5212	Capacitor—18 Mfd. (C26)
12648	Coil—Antenna coil—less shield (L2, L3, L4, L5)
12649	Coil—Oscillator coil—less shield (L6, L7)
13811	Condenser—2-gang variable tuning condenser (C2, C3, C5, C7)
5119	Connector—3-contact female speaker cable connector
12006	Core—Adjustable core and stud assembly for I.F. transformer, Stock Nos. 12652 and 12653)
12664	Core—Adjustable core and stud assembly for wave trap, Stock No. 12654
13814	Dial—Station selector dial
13816	Disc—Station selector drive disc and lamp socket assembly
13815	Drive—Variable condenser drive shaft, spool and bearing
14301	Fuse—½ amp. resistor-fuse, 1.8 ohms (R16)
13817	Indicator—Station selector indicator
5226	Lamp—Dial lamp
13812	Range Switch (S2)
13674	Resistor—18 ohm, carbon type, ½ watt (R14)
13819	Resistor—270 ohm, wire wound, 1.1 watt (R15)
8070	Resistor—22,000 ohm, carbon type, ½ watt (R3)
12011	Resistor—27,000 ohm, carbon type, 1 watt (R4)
11364	Resistor—33,000 ohm, carbon type, ½ watt (R10)
11282	Resistor—56,000 ohm, carbon type, 1/10 watt (R7)
5029	Resistor—56,000 ohm, carbon type, ½ watt (R1)
11454	Resistor—6,800 ohm, carbon type, ½ watt (R2)
5145	Resistor—100,000 ohm, carbon type, ½ watt (R13)
11398	Resistor—220,000 ohm, carbon type, 1/10 watt (R8)
11323	Resistor—270,000 ohm, carbon type, ½ watt (R11)
11172	Resistor—470,000 ohm, carbon type, ½ watt (R12)
11626	Resistor—2.2 megohm, carbon type, ½ watt (R6)
13673	Resistor—10 megohm, carbon type, ½ watt (R5)
4869	Screw—No. 8-32x5/32 set screw for drive disc, Stock No. 13816
12650	Shield—Antenna coil shield
12735	Shield—Dial lamp shield
12607	Shield—First I.F. transformer shield top
12008	Shield—First or second I.F. transformer shield
12651	Shield—Oscillator coil shield
12581	Shield—Second I.F. transformer shield top
11195	Socket—5-contact 5W4 Radiotron socket
11196	Socket—8-contact 6A8, 6F6, 6K7 or 6Q7 Radiotron socket
11199	Socket—Dial lamp socket
12007	Spring—Retaining spring for core, Stock Nos. 12006 and 12664
13813	Tone Control and Power Switch (S1, S3)
13106	Transformer—First I.F. transformer, complete (L8, L9, C13, C14)
13107	Transformer—Second I.F. transformer, complete (L10, L11, C16, C17, C18, R7, R8)
12644	Transformer—Power transformer, 115 volt, 60 cycle (T1)
12645	Transformer—Power transformer, 115 volt, 25 cycle (T1)
12646	Transformer—Power transformer, 240-210, 150-125-110 volts, 60 cycle (T1)
12654	Trap—Wave trap (L1)
13144	Volume Control (R9)
	REPRODUCER ASSEMBLIES
13822	Coil—Field coil (L14)
13821	Cone—Reproducer cone and dust cap (L13)
5118	Connector—3-contact male speaker cable connector
9776	Reproducer, complete
13823	Transformer—Output transformer (T2)
	MISCELLANEOUS ASSEMBLIES
13824	Escutcheon—Station selector escutcheon
12673	Knob—Station selector or volume control knob
13825	Knob—Tone control or range switch knob
11586	Screw—Chassis mounting screw No. 14x1 in.
13885	Screw—No. 8-32x¼ in. headless set screw for knob, Stock No. 13825
4119	Screw—No. 8-32x¼ in. headless set screw for knob, Stock No. 12673

REPLACEMENT PARTS FOR MODEL 6T5

STOCK No.	DESCRIPTION
	RECEIVER ASSEMBLIES
13216	Board—Antenna and ground terminal board
12717	Board—Phonograph terminal board
5237	Bushing—Variable condenser mounting bushing assembly
13870	Cable—Tuning tube cable and socket
12118	Cap—Grid contact cap
12714	Capacitor—Adjustable trimmer (C8)
12807	Capacitor—Adjustable trimmer (C5)
12723	Capacitor—56 Mmfd. (C1)
12629	Capacitor—56 Mmfd. (C16)
13394	Capacitor—82 Mmfd. (C7)
12724	Capacitor—120 Mmfd. (C24)
12404	Capacitor—120 Mmfd. (C15, C17, C18)
12406	Capacitor—180 Mmfd. (C9)
12812	Capacitor—450 Mmfd. (C11)
12811	Capacitor—3,600 Mmfd. (C9)
4868	Capacitor—.005 Mfd. (C28)
5148	Capacitor—.007 Mfd. (C21)
11315	Capacitor—.015 Mfd. (C27)
4858	Capacitor—.01 Mfd. (C10, C22, C25)
4841	Capacitor—0.1 Mfd. (C2, C14, C26)
4840	Capacitor—0.25 Mfd. (C23)
5170	Capacitor—0.25 Mfd. (C13)
11240	Capacitor—10 Mfd. (C29)
5212	Capacitor—18 Mfd. (C12, C30)
12797	Coil—Antenna coil and shield (L2, L3, L4, L5)
12798	Coil—Oscillator coil and shield (L6, L7, L8, L9)
13679	Condenser—2-gang variable tuning condenser (C3, C4, C6)
5119	Connector—3-contact female connector for speaker cable
12006	Core—Adjustable core and stud for Stock Nos. 12653 and 12801
12664	Core—Adjustable core and stud for Stock No. 12654
13868	Dial—Station selector dial
13680	Drive—Vernier drive for variable condenser
13314	Indicator—Station selector indicator pointer
5226	Lamp—Dial lamp, 6.3 volts
13674	Resistor—18 ohms, carbon type, ¼ watt (R17)
13819	Resistor—270 ohms, wire wound, 1.1 watts (R16)
12759	Resistor—15,000 ohms, carbon type, ½ watt (R2)
12011	Resistor—27,000 ohms, carbon type, 1 watt (R3)
11364	Resistor—33,000 ohms, carbon type, ¼ watt (R9)
5029	Resistor—56,000 ohms, carbon type, ¼ watt (R1)
11282	Resistor—56,000 ohms, carbon type, 1/10 watt (R8)
11365	Resistor—82,000 ohms, carbon type, ¼ watt (R13)
5145	Resistor—100,000 ohms, carbon type, ¼ watt (R10)
11398	Resistor—220,000 ohms, carbon type, 1/10 watt (R6)
11323	Resistor—270,000 ohms, carbon type, ¼ watt (R12)
11847	Resistor—390,000 ohms, carbon type, ¼ watt (R14)
12013	Resistor—1 meg., carbon type, 1/10 watt (R15)
11626	Resistor—2.2 meg., carbon type, ¼ watt (R5, R7)
13732	Resistor—10 meg., carbon type, ¼ watt (R4)
12651	Shield—Antenna coil shield
13311	Shield—Chassis end shield and rubber mounting foot assembly
12607	Shield—First I. F. transformer shield top
12008	Shield—I. F. transformer shield
12799	Shield—Oscillator coil shield
12581	Shield—Second I. F. transformer shield top
3682	Shield—6A7 or 75 Radiotron shield
3950	Shield—6D6 Radiotron shield
13871	Socket—Tuning tube socket and cover
4794	Socket—4-contact 80 Radiotron socket
4786	Socket—6-contact 6D6, 42 or 75 Radiotron socket
4787	Socket—7-contact 6A7 Radiotron socket
11199	Socket—Dial lamp socket
12007	Spring—Retaining spring for Stock Nos. 12006 and 12664
12796	Switch—Range switch (S2)
13309	Switch—Tone control and power switch (S1, S3)
12801	Transformer—First I. F. transformer complete (L10, L11, C15, C16)
12653	Transformer—Second I. F. transformer complete (L12, L13, C17, C18, C19, R6, R8)
12644	Transformer—Power transformer, 105-125 volts, 50-60 cycles (T1)
12645	Transformer—Power transformer, 105-125 volts, 25-60 cycles (T1)
13869	Transformer—Power transformer, 110 and 220 volts, 50-60 cycles (T1)
12654	Trap—Wave-trap complete (L1)
13144	Volume control (R11)
	REPRODUCER ASSEMBLIES
12641	Board—3-contact reproducer terminal board
12640	Bracket—Output transformer mounting bracket
12012	Coil—Field coil (L16)
11469	Coil—Neutralizing coil (L14)
12642	Cone—Reproducer cone and dust cap (L15)
5118	Connector—3-contact male speaker cable connector
9699	Reproducer—Complete
11253	Transformer—Output transformer (T2)
11886	Washer—Spring washer to hold field coil securely
	MISCELLANEOUS ASSEMBLIES
12038	Band—Rubber band for tuning tube
13615	Bracket—Tuning tube mounting bracket and clamp
12785	Crystal—Station selector escutcheon and crystal
12742	Escutcheon—Tuning tube escutcheon
12699	Knob—Large station selector knob
12700	Knob—Small (vernier) station selector knob
11347	Knob—Volume control, tone control or range switch knob
11377	Screw—Chassis mounting screw and washer assembly
4982	Spring—Retaining spring for knob, Stock No. 12699
11349	Spring—Retaining spring for knob, Stock Nos. 11347 and 12700

Prices quoted above are subject to change without notice.

RCA MFG. CO., INC.

MODEL 6K2(2nd Prod.)
Schematic
Chassis Wiring

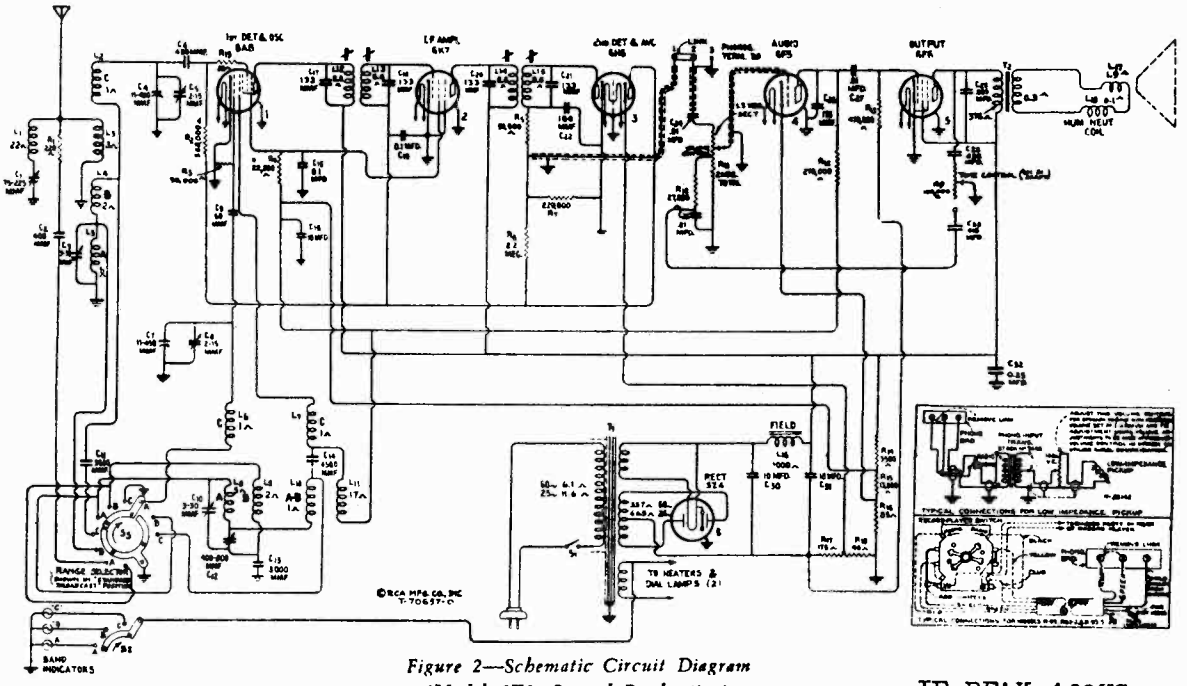


Figure 2—Schematic Circuit Diagram
(Model 6K2, Second Production)

IF PEAK 460KC

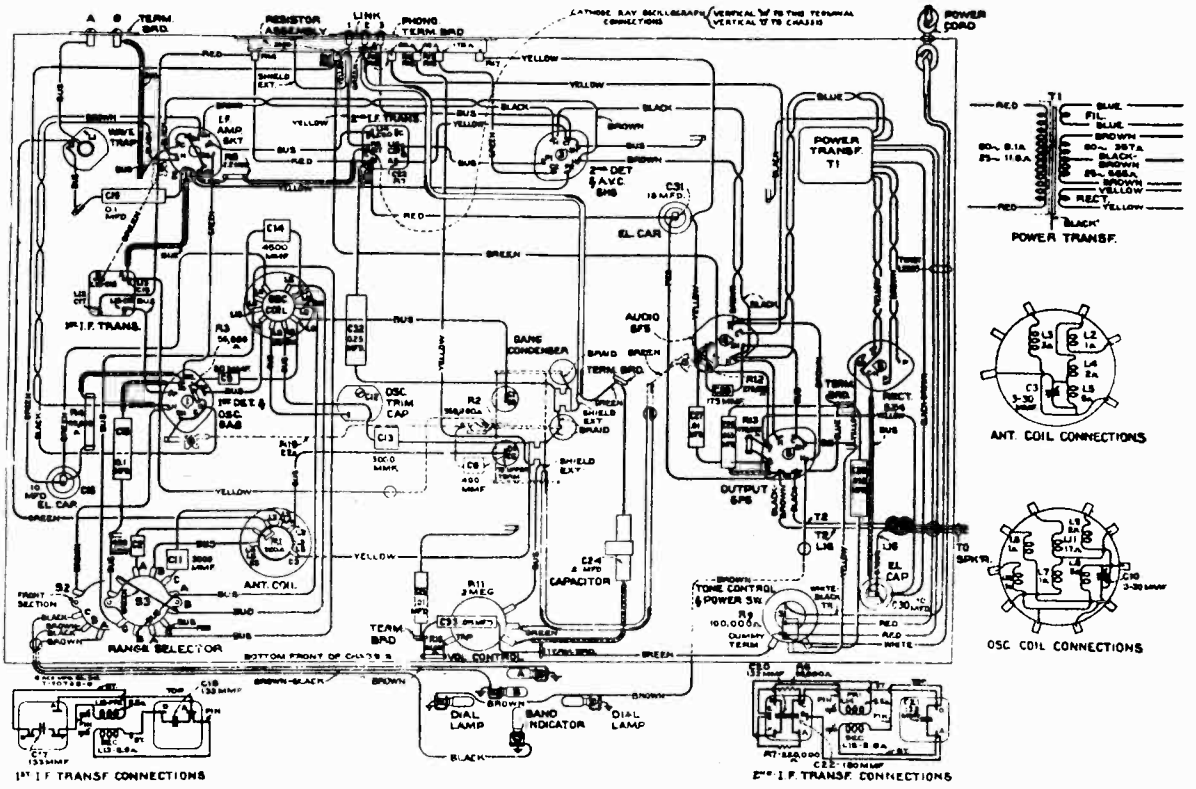


Figure 3—Chassis Wiring Diagram
(Model 6K2, Second Production)

MODEL 6K2(2nd Prod.)
Socket,Trimmers
Parts

RCA MFG. CO., INC.

RCA VICTOR MODEL 6K2 (Second Production)

WITH MAGNETITE CORE I-F TRANSFORMERS

FOR DATA ON MODEL 6K2 (1st Prod.), SEE PAGES 7-41 TO 7-43 IN RIDER'S VOL. VII

These receivers are similar to Model 6K2 (first production) except for the i-f transformers, loudspeaker, and a few component parts. Visual inspection of the i-f transformers will readily identify these receivers. Service Data for Model 6K2 are directly applicable to these receivers except the information contained herein. The primary adjustments for the i-f transformers are located on the bottom of the transformers while the secondary adjustments are located on top.

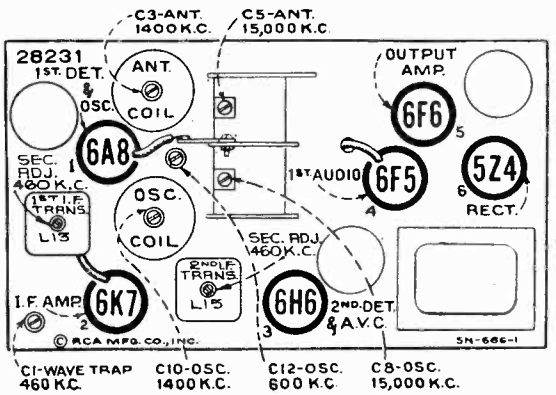


Figure 1—Radiotron, Coil, and Trimmer Locations (Model 6K2, Second Production)

REPLACEMENT PARTS

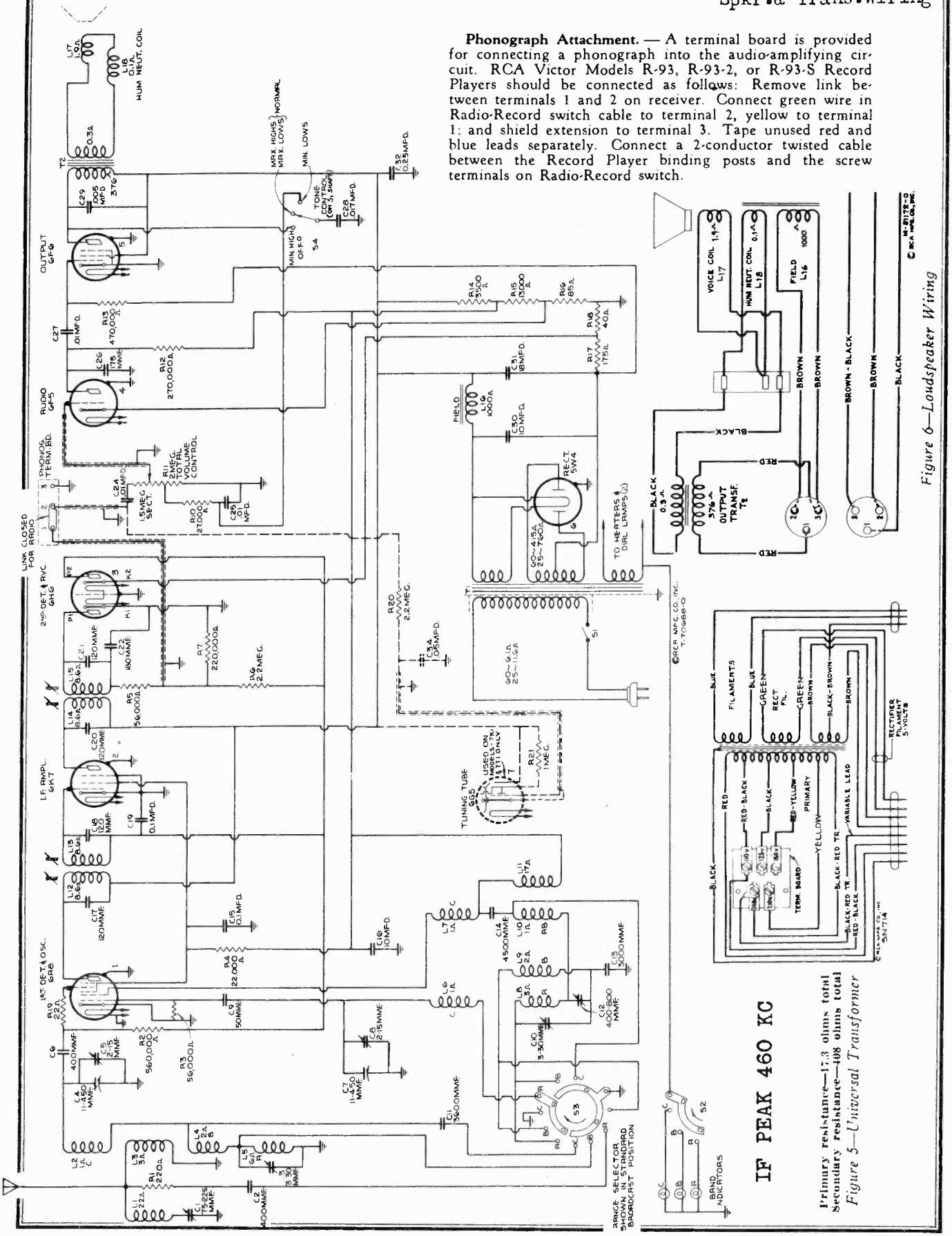
Insist on genuine factory tested parts, which are readily identified and may be purchased from authorized dealers

Stock No.	DESCRIPTION
	RECEIVER ASSEMBLIES
12930	Board—Antenna and ground terminal board.
12717	Board—Phonograph terminal board.
12772	Bracket—Top dial lamp socket bracket.
5237	Bushing—Variable tuning condenser mounting bushing assembly.
11350	Cap—Grid contact cap used on resistor—Stock No. 11624.
12511	Cap—Grid contact cap.
11256	Capacitor—Adjustable trimmer—(C1).
11465	Capacitor—Adjustable trimmer—(C12).
11289	Capacitor—50 Mmfd.—(C9).
12946	Capacitor—133 Mmfd.—(C17, C18, C20, C21).
11623	Capacitor—175 Mmfd.—(C26).
12406	Capacitor—180 Mmfd.—(C22).
11290	Capacitor—400 Mmfd.—(C2, C6).
11622	Capacitor—3000 Mmfd.—(C13).
11621	Capacitor—3600 Mmfd.—(C11).
11287	Capacitor—4500 Mmfd.—(C14).
4868	Capacitor—.005 Mfd.—(C29).
11395	Capacitor—.01 Mfd.—(C24).
4858	Capacitor—.01 Mfd.—(C25, C27).
11315	Capacitor—.015 Mfd.—(C33).
12670	Capacitor—.035 Mfd.—(C28).
4841	Capacitor—0.1 Mfd.—(C19).
11414	Capacitor—0.1 Mfd.—(C15).
5170	Capacitor—0.25 Mfd.—(C32).
11387	Capacitor—10 Mfd.—(C16).
11240	Capacitor—10 Mfd.—(C30).
5212	Capacitor—18 Mfd.—(C31).
11617	Coil—Antenna coil less shield—(L2, L3, L4, L5, C3, R1).
11618	Coil—Oscillator coil less shield—(L6, L7, L8, L9, L10, L11, C10).
13597	Condenser—2-gang variable tuning condenser—(C4, C5, C7, C8).
5119	Connector—3-contact female connector for speaker cable.
12006	Core—Adjustable core and stud for Stock No. 13106 and 13107.
12792	Dial—Station selector dial.
13598	Drive—Variable tuning condenser vernier drive.
13599	Foot—Chassis mounting foot and bracket.
12770	Holder—Dial scale holder and lamp bracket assembly less bracket for top dial lamp socket.
12712	Indicator—Station selector indicator pointer.
5226	Lamp—Dial lamp—6.3 volt.
12718	Mask—Dial light diffuser complete with red, orange and green-colored screen.
11466	Resistor—Voltage divider resistor—comprising one 3,500-ohm, one 13,000-ohm, one 85-ohm, one 40-ohm and one 175-ohm sections—(R14, R15, R16, R17, R18).
11624	Resistor—22 ohms—Flexible type complete with grid contact cap—(R19).
11620	Resistor—220 ohms—Carbon type—1/10 watt—(R1).
8070	Resistor—22,000 ohms—Carbon type—1/2 watt—(R4).
11400	Resistor—27,000 ohms—Carbon type—1/4 watt—(R10).
11282	Resistor—56,000 ohms—Carbon type—1/10 watt—(R5).
12286	Resistor—56,000 ohms—Insulated—1/4 watt—(R3).
11398	Resistor—220,000 ohms—Carbon type—1/10 watt—(R7).
11453	Resistor—270,000 ohms—Carbon type—1/10 watt—(R12).
11452	Resistor—470,000 ohms—Carbon type—1/10 watt—(R13).
11597	Resistor—560,000 ohms—Carbon type—1/10 watt—(R2).
11626	Resistor—2.2 megohms—Carbon type—1/4 watt—(R6).
12008	Shield—I. F. transformer shield for Stock Nos. 13106 and 13107.
12607	Shield—First I. F. transformer shield top.
12581	Shield—Second I. F. transformer shield top.
11603	Shield—Coil shield for Stock Nos. 11617 and 11618.
12735	Shield—Dial lamp shield.
12771	Socket—Dial lamp socket—Located at top of dial scale.
11199	Socket—Dial lamp socket.
11195	Socket—5-contact 5Z4 Radiotron socket.
11198	Socket—7-contact 6F5, 6H6 Radiotron socket.
11196	Socket—8-contact 6A8, 6F6 or 6K7 Radiotron socket.
12007	Spring—Retaining spring for core Stock No. 12006.
12769	Switch—Range switch—(S2, S3).
12668	Tone Control—Control and power switch—(R9, S1).
13106	Transformer—First I. F. transformer—(L12, L13, C17, C18).
13107	Transformer—Second I. F. transformer—(L14, L15, C20, C21, C22, R5, R7).
11848	Transformer—Power transformer—105-125-volt, 50-60-cycle—(T1).
11849	Transformer—Power transformer—105-125-volt, 25-40-cycle—(T1).
11850	Transformer—Power transformer—105-250-volt, 40-60-cycle—(T1).
11391	Trap—Wave trap—(L1, C1).
13144	Volume control—(R11).
	REPRODUCER ASSEMBLIES
12641	Board—Reproducer terminal board.
12640	Bracket—Output transformer mounting bracket and clamp.
13600	Coil—Field coil—(L16).
11469	Coil—Neutralizing coil—(L18).
12667	Cone—Reproducer cone complete—(L17).
5118	Connector—3-contact male connector for speaker cable.
9766	Reproducer complete.
11253	Transformer—Output transformer—(T2).
11886	Washer—Spring washer to hold field coil securely.
	MISCELLANEOUS ASSEMBLIES
12666	Cover—Reproducer cover assembly.
12698	Crystal—Station selector crystal and escutcheon.
11582	Knob—Range switch knob.
12699	Knob—Large station selector knob.
12700	Knob—Small (vernier) station selector knob.
11347	Knob—Tone control or volume control knob.
11210	Screw—Chassis mounting screw assembly.
11349	Spring—Retaining spring for knob—Stock No. 11347, No. 11582 and No. 12700.
4982	Spring—Retaining spring for knob—Stock No. 12699.

RCA MFG. CO., INC.

MODELS 6K3, 7T1, 7K1
Schematic, Phono. Data
Spkr. & Trans. Wiring

Phonograph Attachment. — A terminal board is provided for connecting a phonograph into the audio-amplifying circuit. RCA Victor Models R-93, R-93-2, or R-93-S Record Players should be connected as follows: Remove link between terminals 1 and 2 on receiver. Connect green wire in Radio-Record switch cable to terminal 2, yellow to terminal 1; and shield extension to terminal 3. Tape unused red and blue leads separately. Connect a 2-conductor twisted cable between the Record Player binding posts and the screw terminals on Radio-Record switch.



MODELS 6K3, 7T1, 7K1
Chassis Wiring

RCA MFG. CO., INC.

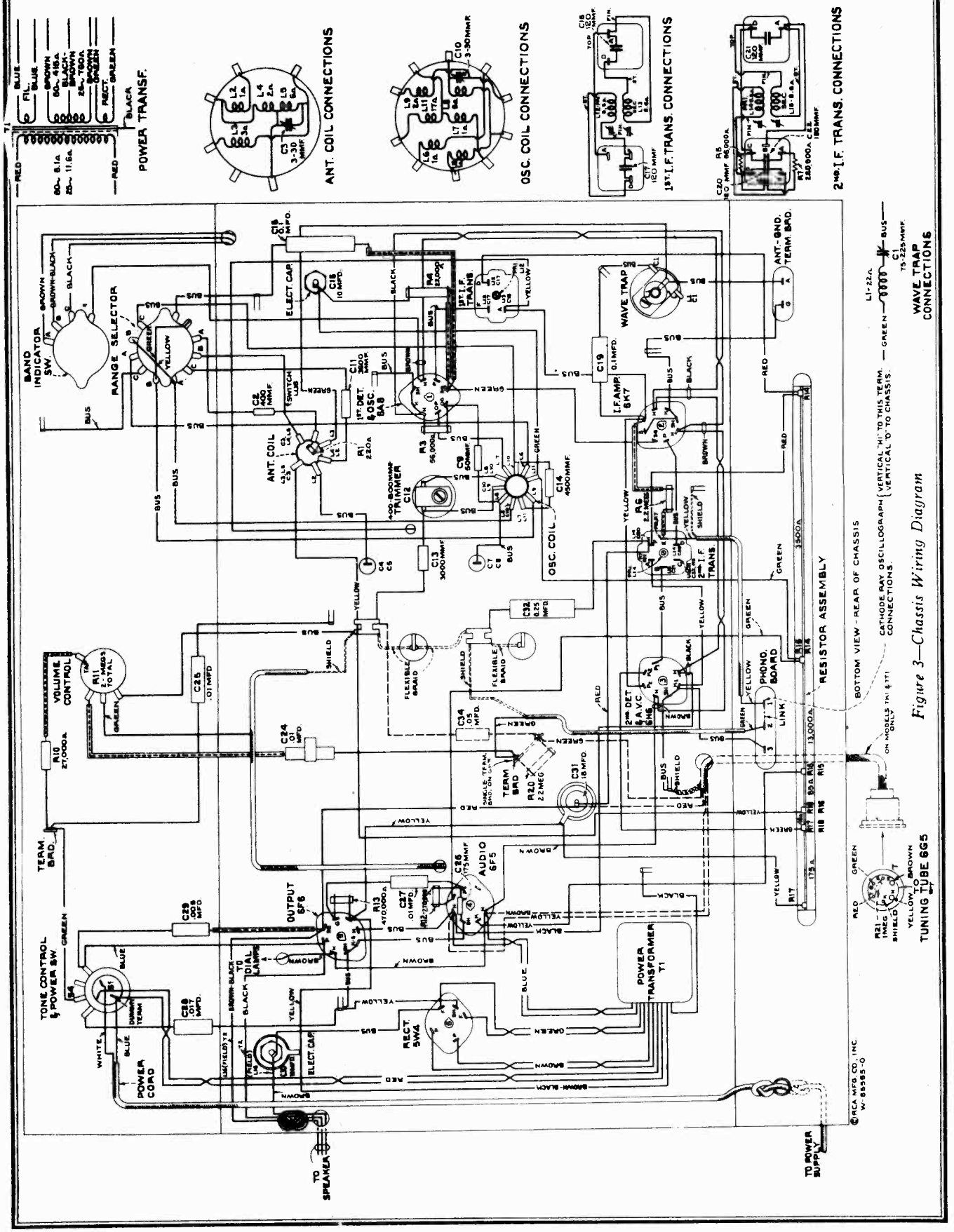


Figure 3—Chassis Wiring Diagram

RCA MFG. CO., INC.

MODELS 6K3, 7T1, 7K1
Socket, Trimmers Voltage, Alignment

Alignment Procedure

Calibrate the tuning dial by adjusting dial pointer to the low-frequency (end) calibration mark on "Standard broadcast" scale with the gang tuning-condenser plates in full-mesh position. This is a friction adjustment.

Perform alignment in proper order tabulated below, starting with No. 1 and following all operations across, then No. 2, etc. Adjustment locations are shown by figures 1 and 4.

Cathode-ray alignment is preferable; the connections to the chassis are shown on figure 3. If an output indicator is used, connect it across the loudspeaker voice-coil and advance the receiver volume control to full-volume position.

Connect the "low" output terminal of the test oscillator to the receiver chassis for all alignment operations. Regulate the output of the test oscillator so that minimum signal is applied to the receiver to obtain an observable output indication. This will avoid a-v-c action.

The term "Dummy antenna" means the device which must be connected between the "high" test-oscillator output and the point of connection to the receiver in order to obtain ideal alignment. "No signal, 550-750 kc" means that the receiver should be tuned to a point between 550 and 750 kc where no signal or interference is received from a station or local (heterodyne) oscillator.

For further details on alignment, refer to booklet "RCA Victor Receiver Alignment."

Order of Alignment	Test Oscillator: Connection to Receiver	Test Oscillator: Dummy Antenna	Test Oscillator: Frequency Setting	Receiver Dial Setting	Circuit to Adjust	Adjustment Symbols	Adjust to Obtain
1	6K7 i-f Grid Cap	.001 Mfd.	460 kc	No signal 550-750 kc	2nd i-f Trans.	L14 and L15	Max. (peak)
2	6A8 Det. Grid Cap	.001 Mfd.	460 kc	No signal 550-750 kc	1st i-f Trans.	L12 and L13	Max. (peak)
3	Ant. Post	200 Mmfd.	460 kc	No signal 550-750 kc	Wave Trap	C1	Minimum Output
4	Ant. Post	300 Ohms	15,000 kc	15,000 kc	"C" Osc.	C8	Max (peak)*
5	Ant. Post	300 Ohms	15,000 kc	Rock thru 15,000 kc	"C" Ant.	C5	Max. (peak)
6	Ant. Post	200 Mmfd.	600 kc	600 kc	L-F Osc.	C12	Max. (peak)
7	Ant. Post	200 Mmfd.	1,400 kc	1,400 kc	H-F Osc.	C10	Max. (peak)
8	Ant. Post	200 Mmfd.	1,400 kc	1,400 kc	"A" Ant.	C3	Max. (peak)
9	Ant. Post	200 Mmfd.	600 kc	Rock thru 600 kc	L-F Osc.	C12	Max. (peak)
10	Ant. Post	200 Mmfd.	1,400 kc	1,400 kc	H-F Osc.	C10	Max. (peak)
11	Ant. Post	200 Mmfd.	1,400 kc	1,400 kc	"A" Ant.	C3	Max. (peak)

* Use maximum capacity peak if two peaks can be obtained.

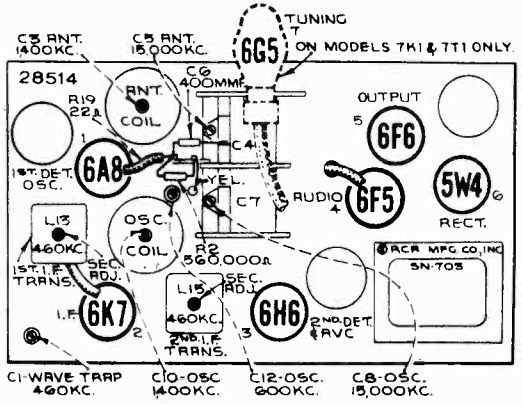


Figure 1—Radiotron, Coil, and Trimmer Locations

Radiotron Cathode Current Readings

Measured with Milliammeter Connected at Tube Socket Cathode Terminals Under Conditions Similar to Those of Voltage Measurements

(1)	RCA-6A8—1st Det.—Osc.	12.3 ma.
(2)	RCA-6K7—I-F Amp.	9.8 ma.
(3)	RCA-6H6—2nd Det. and A.V.C.	.....
(4)	RCA-6F5—Audio Driver	0.2 ma.
(5)	RCA-6F6—Power Amplifier	34.0 ma.
(6)	RCA-5W4—Rectifier	76.0 ma.*
(7)	RCA-6G5—Tuning Tube	2.0 ma.

*Cannot be measured at socket.

Note: Two voltage values are shown for some readings. The value shown in parentheses with asterisk (*) indicates operating conditions without voltmeter loading. The other value (generally lower) is the actual measured voltage and differs from the value shown in parentheses because of the additional loading of the voltmeter through the high series circuit resistance.

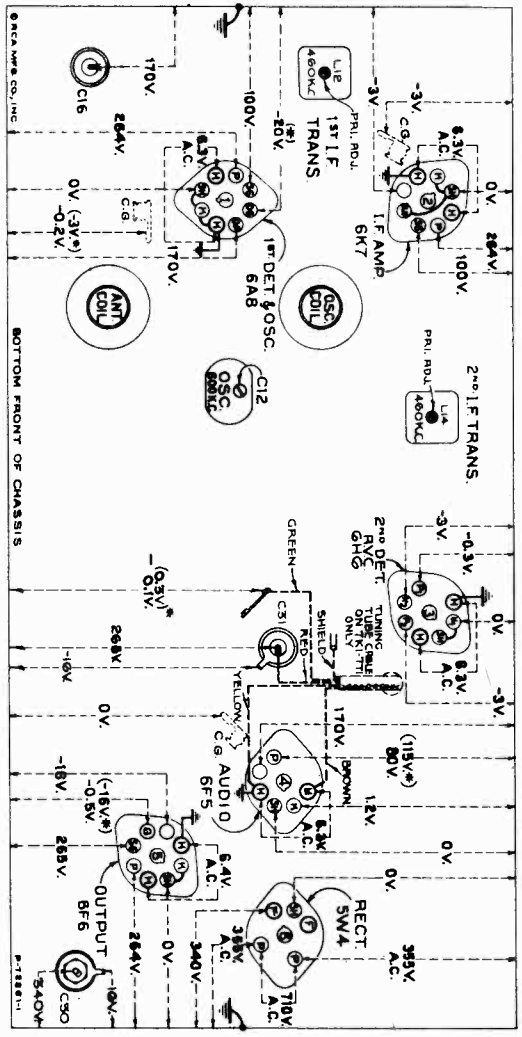


Figure 4—Radiotron Socket Voltages, Coil, and Trimmer Locations
Measured at 115 volts, 60-cycle supply—Tuned to approximately 1,000 kc ("Standard broadcast")—No signal being received—Volume control minimum

Loudspeaker. — Centering of the loudspeaker is made in the usual manner with three narrow paper feelers after first removing the front dust cover. This may be removed by softening its cement with a light application of acetone, using care not to allow the acetone to flow into the air gap. The dust cover should be cemented back in place with ambroid upon completion of adjustment.

MODELS 6K3, 7T1, 7K1
Data, Parts

RCA MFG. CO., INC.

These receivers are of the superheterodyne type and have many distinctive features. Model 6K3 is a six-tube console model employing a 12-inch loudspeaker. Models 7T1 and 7K1 are table and console models respectively having similar chassis to Model 6K3 except for the addition of a tuning tube "Magic Eye": the former has an 8-inch loudspeaker while the latter has a 12-inch loudspeaker.

FREQUENCY RANGES

"Standard Broadcast" (A)..... 540— 1,625 kc
"Medium Wave" (B)..... 1,625— 5,700 kc
"Short Wave" (C)..... 5,700—18,000 kc

ALIGNMENT FREQUENCIES

"Standard Broadcast" (A)..... 600 kc (osc.), 1,400 kc (osc. and ant.)
"Medium Wave" (B)..... None required
"Short Wave" (C)..... 15,000 kc (osc. and ant.)

Intermediate Frequency..... 460 kc

RADIOTRON COMPLEMENT

(1) RCA-6A8..... First Detector—Oscillator
(2) RCA-6K7..... Intermediate Amplifier
(3) RCA-6H6..... Second Detector—A.V.C.
(4) RCA-6F5..... Audio Voltage Amplifier
(5) RCA-6F6..... Audio Power Amplifier
(6) RCA-5W4..... Full-Wave Rectifier
(7) RCA-6G5—(Models 7T1 and 7K1 only) Tuning Tube

Pilot Lamps (5)..... 7T1 and 7K1, Mazda No. 40, 6.3 volts, 0.15 amp, 6K3, Mazda No. 46, 6.3 volts, 0.25 amp.

POWER SUPPLY RATINGS

Rating A..... 105-125 volts, 50-60 cycles, 90 watts
Rating B..... 105-125 volts, 25-60 cycles, 90 watts
Rating C..... 100-130/140-160/195-250 volts, 40-60 cycles, 90 watts

POWER OUTPUT

Undistorted..... 2.0 watts
Maximum..... 4.5 watts

LOUDSPEAKER

Type..... Electrodynamic
Impedance (v.c.)..... 2.2 ohms at 400 cycles

STOCK No.	DESCRIPTION
	RECEIVER ASSEMBLIES
12930	Board—Antenna and ground terminal board
12717	Board—Phonograph terminal board
12772	Bracket—Top dial lamp socket bracket
5237	Bushing—Variable tuning condenser mounting bushing assembly
11888	Cable—Tuning tube cable and socket—Models 7T1 and 7K1 only
12511	Cap—Grid contact cap
11350	Cap—Grid contact cap used on resistor—Stock No. 11624
11465	Capacitor—Adjustable capacitor (C12)
11256	Capacitor—Adjustable trimmer (C1)
12404	Capacitor—120 Mmfd. (C17, C18, C20, C21)
11289	Capacitor—50 Mmfd. (C9)
11623	Capacitor—175 Mmfd. (C26)
12406	Capacitor—180 Mmfd. (C22)
11290	Capacitor—400 Mmfd. (C2, C6)
11622	Capacitor—3000 Mmfd. (C13)
11621	Capacitor—3600 Mmfd. (C11)
11287	Capacitor—4500 Mmfd. (C14)
4868	Capacitor—.005 Mfd. (C29)
11395	Capacitor—.01 Mfd. (C24)
4858	Capacitor—.01 Mfd. (C25, C27)
11315	Capacitor—.015 Mfd. (C33)
11451	Capacitor—.017 Mfd. (C28)
4836	Capacitor—.05 Mfd. (C34)—Models 7T1 and 7K1 only
4841	Capacitor—0.1 Mfd. (C19)
11414	Capacitor—0.1 Mfd. (C15)
5170	Capacitor—0.25 Mfd. (C32)
11387	Capacitor—10 Mfd. (C16)
11240	Capacitor—10 Mfd. (C30)
5212	Capacitor—18 Mfd. (C31)
11617	Coil—Antenna coil less shield (L2, L3, L4, L5, C3, R1)
11618	Coil—Oscillator coil less shield (L6, L7, L8, L9, L10, L11, C10)
13597	Condenser—2-gang variable tuning condenser (C4, C5, C7, C8)
5119	Connector—3-contact female connector for speaker cable
12006	Core—Adjustable core and stud for Stock Nos. 13106 and 13107
13682	Dial—Station selector dial
13598	Drive—Variable tuning condenser vernier drive
13599	Foot—Chassis mounting foot and bracket
12770	Holder—Dial scale holder and lamp bracket assembly less bracket for top dial lamp socket
12712	Indicator—Station selector indicator pointer
4340	Lamp—Dial lamp—Models 7T1 and 7K1 only
5226	Lamp—Dial lamp—Model 6K3 only
13683	Mask—Dial light diffuser complete with colored screen
11466	Resistor—Voltage divider resistor—comprising one 3,500-ohm, one 13,000-ohm, one 85-ohm, one 40-ohm and one 175-ohm sections (R14, R15, R16, R17, R18)
11624	Resistor—22 ohms—Flexible type complete with grid contact cap (R19)
11620	Resistor—220 ohms—Carbon type—1/10 watt (R1)
8070	Resistor—22,000 ohms—Carbon type—½ watt (R4)
11400	Resistor—27,000 ohms—Carbon type—½ watt (R10)
12286	Resistor—56,000 ohms—Insulated—½ watt (R3)
11282	Resistor—56,000 ohms—Carbon type—1/10 watt (R5)
11398	Resistor—220,000 ohms—Carbon type—1/10 watt (R7)
11453	Resistor—270,000 ohms—Carbon type—1/10 watt (R12)
11452	Resistor—470,000 ohms—Carbon type—1/10 watt (R13)
11397	Resistor—560,000 ohms—Carbon type—1/10 watt (R2)
12013	Resistor—1 megohm—Carbon type—1/10 watt (R21)—Models 7T1 and 7K1 only
11626	Resistor—2.2 megohms — Carbon type — ½ watt (R6, R20)
12008	Shield—I. F. transformer shield for Stock Nos. 13106 and 13107
12607	Shield—First I. F. transformer shield top
12581	Shield—Second I. F. transformer shield top
11603	Shield—Coil shield for Stock Nos. 11617 and 11618
12735	Shield—Dial lamp shield
12771	Socket—Dial lamp socket—Located at top of dial scale
11199	Socket—Dial lamp socket
11195	Socket—5-contact 5W4 Radiotron socket
11198	Socket—7-contact 6F5, 6H6 Radiotron socket
11196	Socket—8-contact 6A8, 6F6 or 6K7 Radiotron socket
11381	Socket—Tuning tube socket and cover—Models 7T1 and 7K1 only
12007	Spring—Retaining spring for core, Stock No. 12006
12769	Switch—Range switch (S2, S3)
13681	Tone Control—Tone and power switch (S1, S4)
13106	Transformer—First I. F. transformer (L12, L13, C17, C18)
13107	Transformer—Second I. F. transformer (L14, L15, C20, C21, C22, R5, R7)
11458	Transformer—Power transformer — 105-125-volt, 50-60-cycle (T1)
11585	Transformer—Power transformer — 105-125-volt, 25-40-cycle (T1)
11584	Transformer—Power transformer — 105-250-volt, 40-60-cycle (T1)
11391	Trap—Wave trap (L1, C1)
13144	Volume Control (R11)
	REPRODUCER ASSEMBLIES
12641	Board—Reproducer terminal board
12640	Bracket—Output transformer mounting bracket and clamp
13600	Coil—Field coil (L16)
11469	Coil—Neutralizing coil (L18)
12642	Cone—Reproducer cone complete (L17)—Model 7T1
12667	Cone—Reproducer cone complete (L17)—Models 6K3 and 7K1
5118	Connector—3-contact male connector for speaker cable
9771	Reproducer complete—Model 7T1
9766	Reproducer complete—Models 6K3 and 7K1
11253	Transformer—Output transformer (T2)
11886	Washer—Spring washer to hold field coil securely
	MISCELLANEOUS ASSEMBLIES
12038	Band—Rubber band for tuning tube
13615	Bracket—Tuning tube mounting bracket and clamp
12698	Crystal—Station selector crystal and escutcheon
12742	Escutcheon—Tuning tube escutcheon
12699	Knob—Large station selector knob
12700	Knob—Small (vernier) station selector knob
11347	Knob—Tone control, range switch or volume control knob
11377	Screw—Chassis mounting screw assembly—Used on Model 7T1
11210	Screw — Chassis mounting screw assembly — Used on Models 6K3 and 7K1
11349	Spring—Retaining spring for knob—Stock Nos. 11347 and 12700
4982	Spring—Retaining spring for knob—Stock No. 12699

First Edition

RCA MFG. CO., INC.

MODEL 6T5
Schematic, Socket
Trimmers, Spkr. Wiring

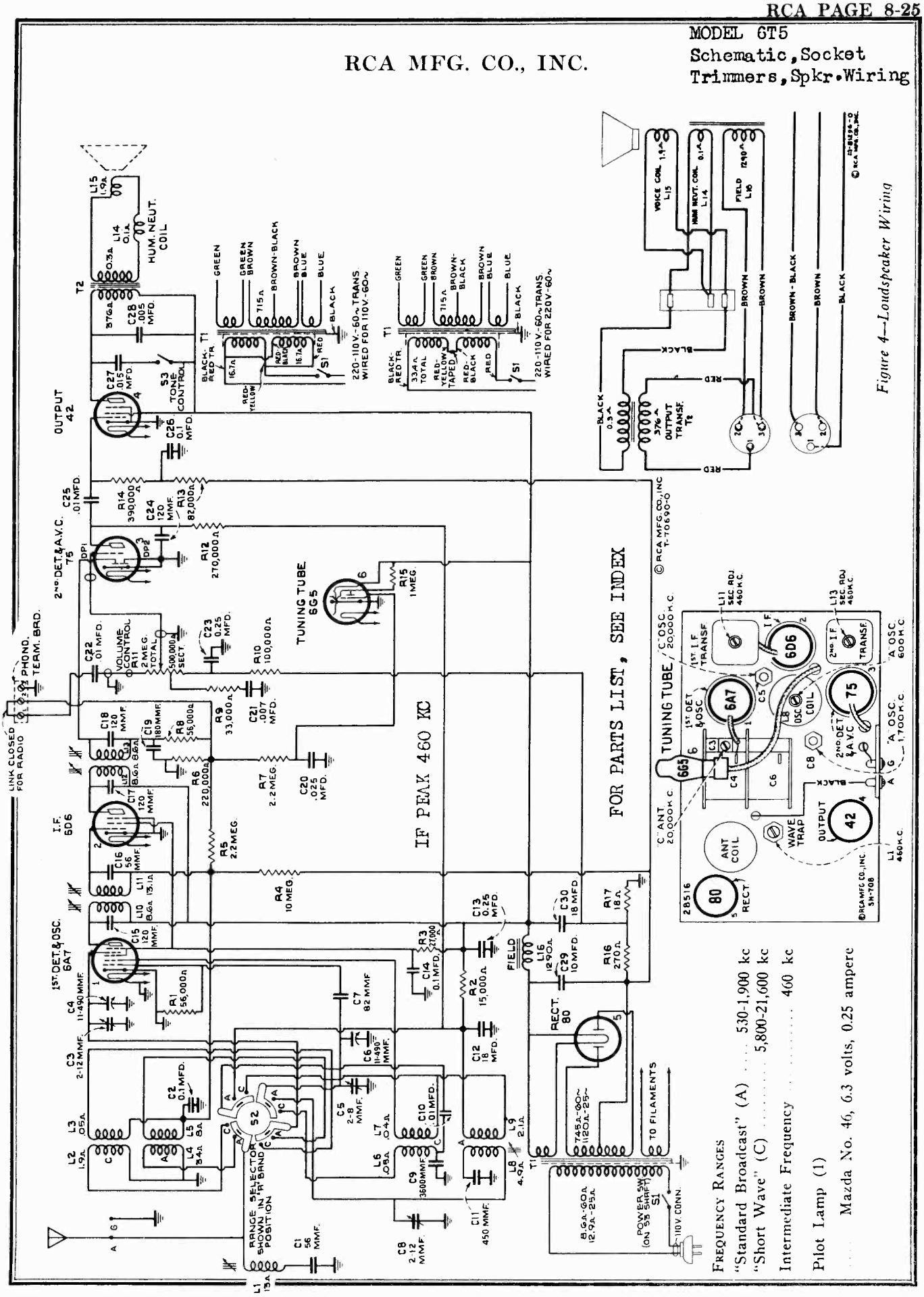


Figure 4—Loudspeaker Wiring

FREQUENCY RANGES

"Standard Broadcast" (A) ..... 530-1,900 kc
"Short Wave" (C) ..... 5,800-21,600 kc
Intermediate Frequency ..... 460 kc

Pilot Lamp (1)

Mazda No. 46, 6.3 volts, 0.25 ampere

MODEL 6T5
Chassis Wiring

RCA MFG. CO., INC.

POWER SUPPLY RATINGS

Rating A ..... 105-125 volts, 50-60 cycles, 75 watts
Rating B ..... 105-125 volts, 25-60 cycles, 75 watts
Rating C ..... 100-125/200-250 volts, 50-60 cycles, 75 watts

ALIGNMENT FREQUENCIES

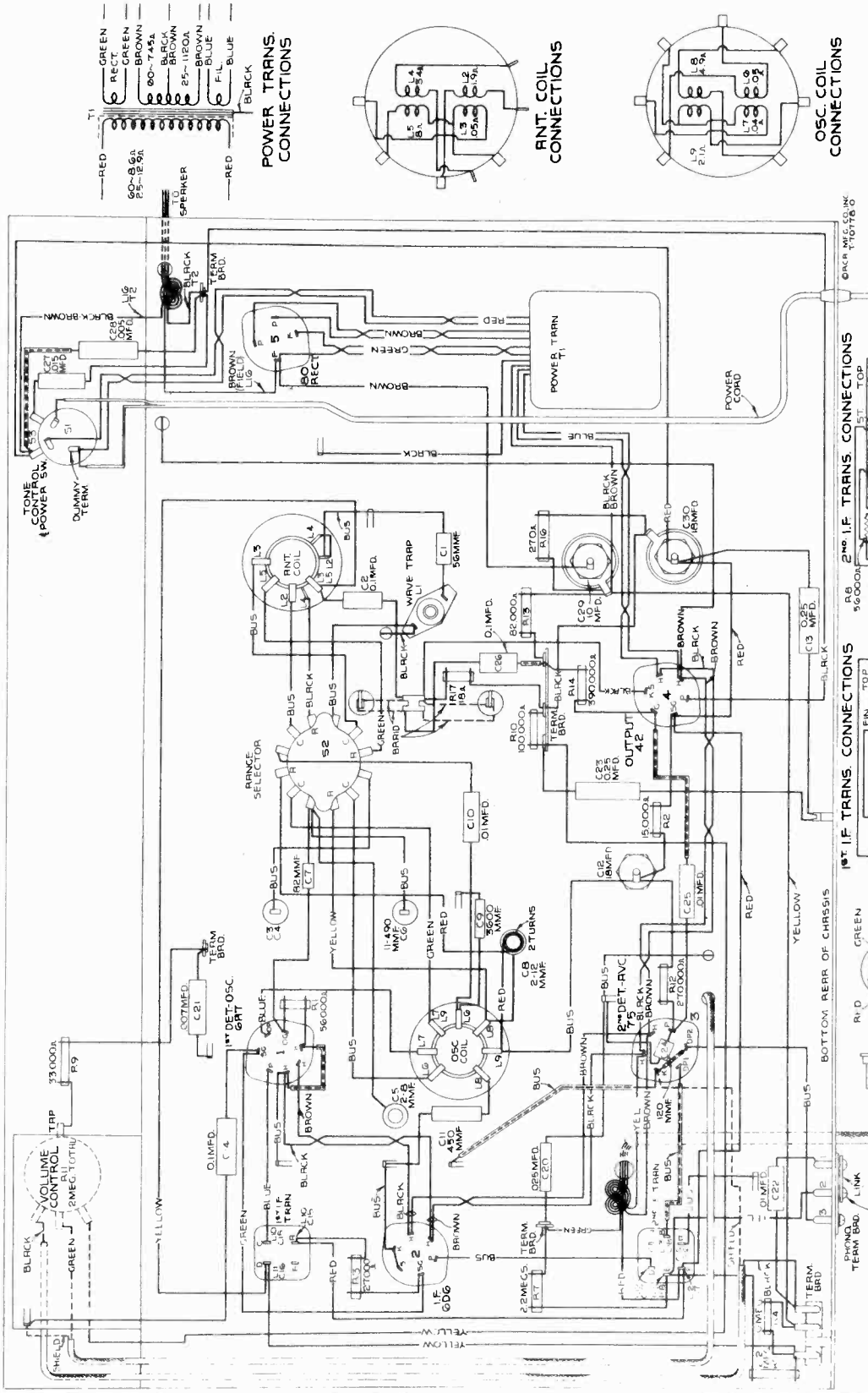
"Standard Broadcast" (A) 600 kc (osc.), 1,700 kc (osc.)
"Short Wave" (C) ..... 20,000 kc (osc., ant.)

POWER OUTPUT RATING

Undistorted ..... 2.0 watts
Maximum ..... 4.5 watts

LOUDSPEAKER

Type ..... Electrodynamic
Voice Coil Impedance ..... 2¼ ohms at 400 cycles



Phonograph Attachment.—A terminal board is provided for connecting a phonograph into the audio-amplifying circuit. RCA Victor Models R-93, R-93-2, or R-93-S Record Players should be connected as follows: Remove link between terminals 1 and 2 on receiver. Connect green wire in Radio-Record switch cable to terminal 1, yellow to terminal 2, and shield extension to terminal 3. Tape unused red and blue leads separately. Connect a 2-conductor twisted cable between the Record Player binding posts and the screw terminals on Radio-Record switch.

Radiotron Cathode Current Readings

Measured with Milliammeter Connected at Tube Socket Cathode Terminals Under Conditions Similar to Those of Voltage Measurements

(1)	RCA-6A7—1st Det.—Osc.	11.0 ma.
(2)	RCA-6D6—I-F Amp.	10.0 ma.
(3)	RCA-75—2nd Det., A.V.C. and A. F.	0.22 ma.
(4)	RCA-42—Power Amplifier	42.0 ma.
(5)	RCA-80—Rectifier	66.0 ma.*
(6)	RCA-6G5—Tuning Tube	2.0 ma.

(*Cannot be measured at socket.)

Alignment Procedure

Calibrate the tuning dial by adjusting dial pointer to the low-frequency (end) calibration mark on "Standard broadcast" scale with the gang tuning-condenser plates in full-mesh position. This is a friction adjustment.

Perform alignment in proper order, tabulated below, starting with No. 1 and following all operations across, then No. 2, etc. Adjustment locations are shown on Figures 1 and 5.

Cathode-ray alignment is preferable; the connections to the chassis are shown on Figure 3. If an output indicator is used, connect it across the loudspeaker voice-coil and advance the receiver volume control to full-volume position.

Connect the "low" output terminal of the test oscillator to the receiver chassis for all alignment operations. Regulate the output of the test oscillator so that minimum signal is applied to the receiver to obtain an observable output indication. This will avoid a-v-c action.

The term "Dummy antenna" means the device which must be connected between the "high" test-oscillator output and the point of connection to the receiver in order to obtain ideal alignment. "No signal, 550-750 kc" means that the receiver should be tuned to a point between 550 and 750 kc where no signal or interference is received from a station or local (heterodyne) oscillator.

For further details on alignment, refer to booklet "RCA Victor Receiver Alignment."

Order of Alignment	Test Oscillator			Receiver Dial Setting	Circuit to Adjust	Adjustment Symbols	Adjust to Obtain
	Connection to Receiver	Dummy Antenna	Frequency Setting				
1	6D6 I-F Grid Cap	.001 Mfd.	460 kc	No Signal 550-750 kc	2nd I-F Trans.	L12 and L13	Max. (peak)
2	6A7 Det. Grid Cap	.001 Mfd.	460 kc	No Signal 550-750 kc	1st I-F Trans.	L10 and L11	Max. (peak)
3	Ant. Post	200 Mmfd.	460 kc	No Signal S-W Band	Wave Trap	L1	Minimum Output
4	Ant. Post	300 Ohms	20,000 kc	20,000 kc	"C" Osc.	C5	Max. (peak)*
5	Ant. Post	300 Ohms	20,000 kc	Rock Thru 20,000 kc	"C" Ant.	C3	Max. (peak)†
6	Ant. Post	200 Mmfd.	600 kc	600 kc	"A" L-F Osc.	L8	Max. (peak)
7	Ant. Post	200 Mmfd.	1,700 kc	1,700 kc	"A" H-F Osc.	C8	Max. (peak)
8	Ant. Post	200 Mmfd.	600 kc	Rock Thru 600 kc	"A" L-F Osc.	L8	Max. (peak)
9	Ant. Post	200 Mmfd.	1,700 kc	1,700 kc	"A" H-F Osc.	C8	Max. (peak)

* Use minimum capacity peak.
† Use maximum capacity peak.

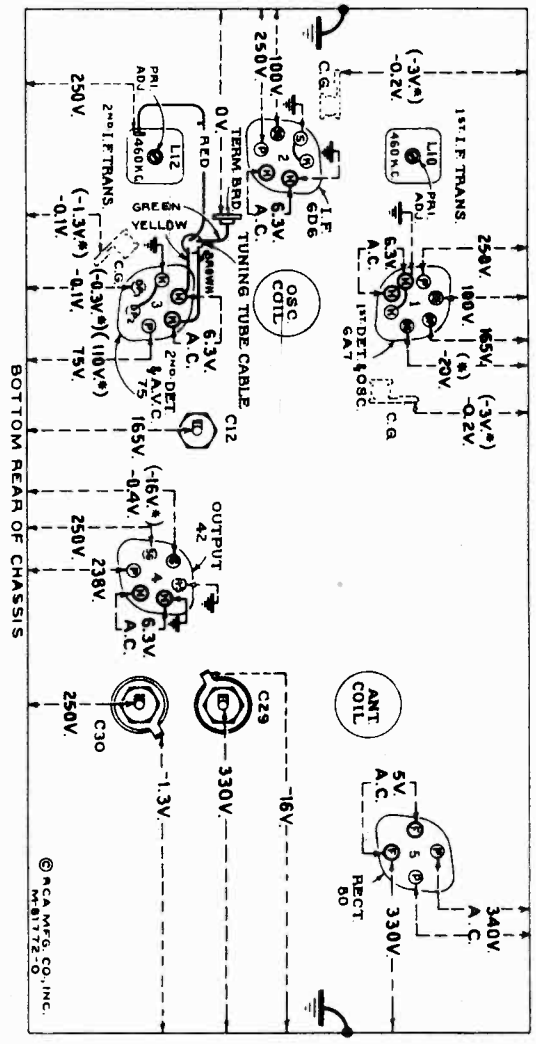


Figure 5—Radiotron Socket Voltages, Coil, and Trimmer Locations

Measured at 115 volts, 60-cycle supply—Tuned to approximately 1,000 kc ("Standard broadcast")—No signal being received—Volume control minimum

***Note:** Two voltage values are shown for some readings. The value shown in parentheses with asterisk (*) indicates operating conditions without voltmeter loading. The other value (generally lower) is the actual measured voltage and differs from the value shown in parentheses because of the additional loading of the voltmeter through the high series circuit resistance.*

MODEL 7U2
Phono.Data
Notes

RCA MFG. CO., INC.

Pilot Lamps (5) ..... Mazda No. 46, 6.3 volts, 0.25 amperes

Power Supply Ratings		Radio	Total Radio and Phonograph
Rating A-6	105-125 volts, 60 cycles	95 watts	120 watts
Rating A-5	105-125 volts, 50 cycles	95 watts	120 watts
Rating B-2	105-125 volts, 25 cycles	95 watts	120 watts
Rating C-6	105-130/140-160/200-250 volts, 60 cycles	95 watts	120 watts
Rating C-5	105-130/140-160/200-250 volts, 50 cycles	95 watts	120 watts

Alignment

The r-f and i-f adjustments on this instrument should be performed as outlined under "Alignment" in "Technical Information and Service Data" for Model 7U, substituting the magnetite-core symbols L15, L14, L13 and L12 for the trimming capacitor symbols C21, C20, C18 and C17 respectively in "I-F Adjustments." FOR DATA ON MODEL 7U, SEE RCA PAGES 7-61 TO 7-66 IN RIDER'S VOLUME VII.

Phonograph

The phonograph motor is of the governor induction type and is designed to be simple and foolproof. Occasionally, however, certain adjustments may be required. These adjustments are illustrated and explained in Figures 4 and 5. Application of oil to the felt pad which rubs against the governor disc will insure smooth operation.

Pickup adjustments are the same as outlined for Model 7U.

Resistance and Voltage Measurements

Voltage and resistance measurements for this receiver are the same as for Model 7U (Figures 4 and 7), with the following exception:

The resistance value shown on Figure 4, between the plate and capacitor C31 terminals of the RCA-6A8 first-detector and oscillator, and the RCA-6K7 i-f amplifier, should be 8.6 ohms instead of 13 ohms.

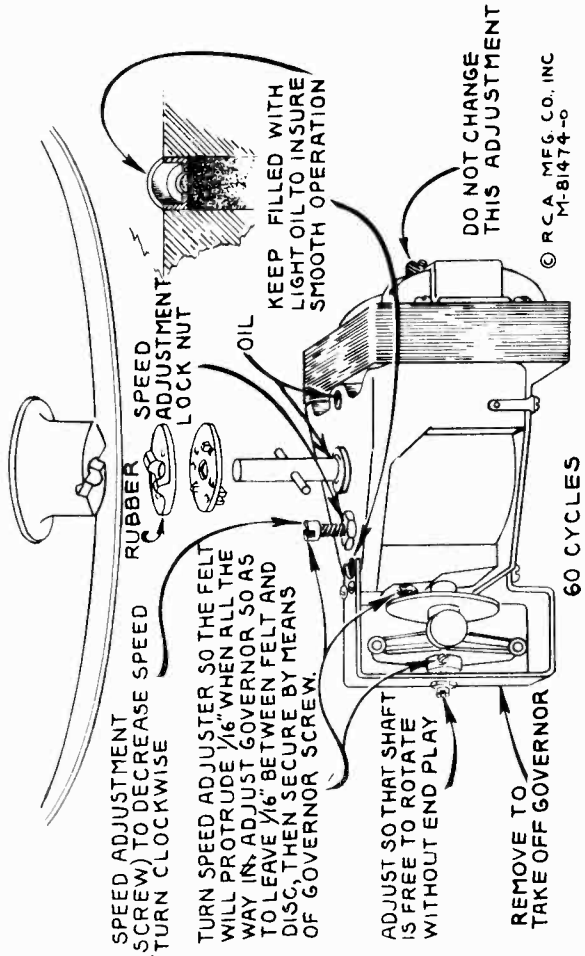


Figure 4—Details of 60-Cycle Motor

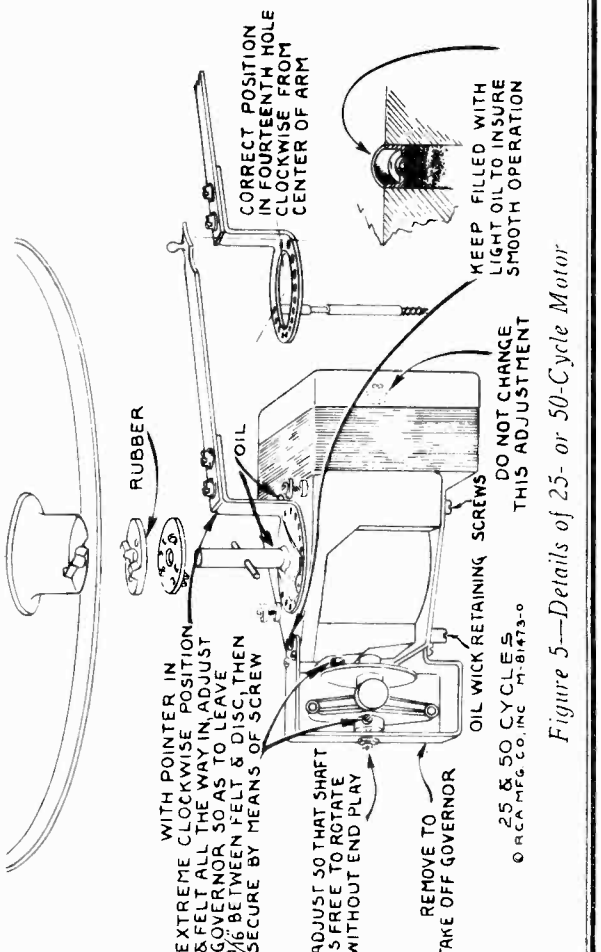
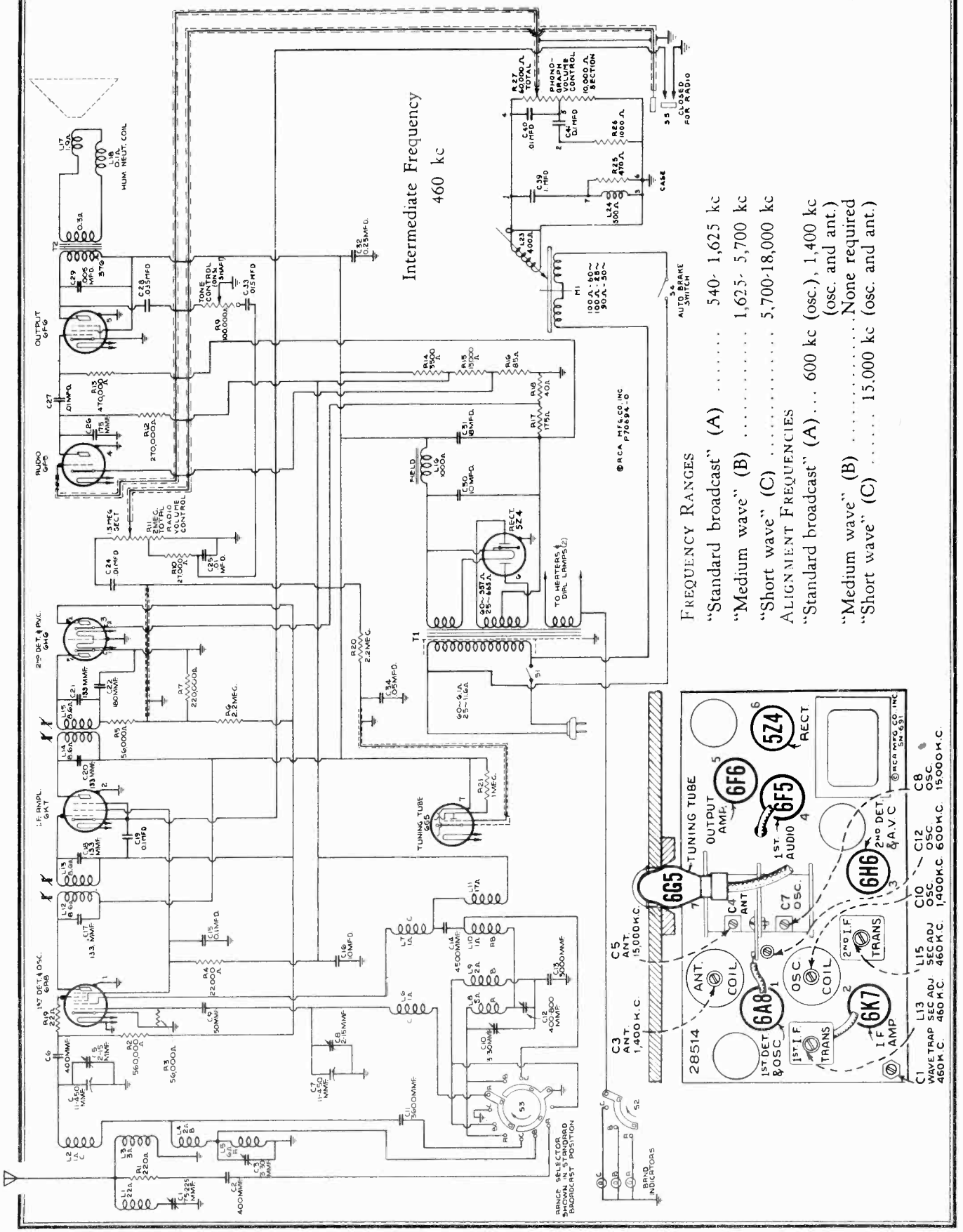


Figure 5—Details of 25- or 50-Cycle Motor

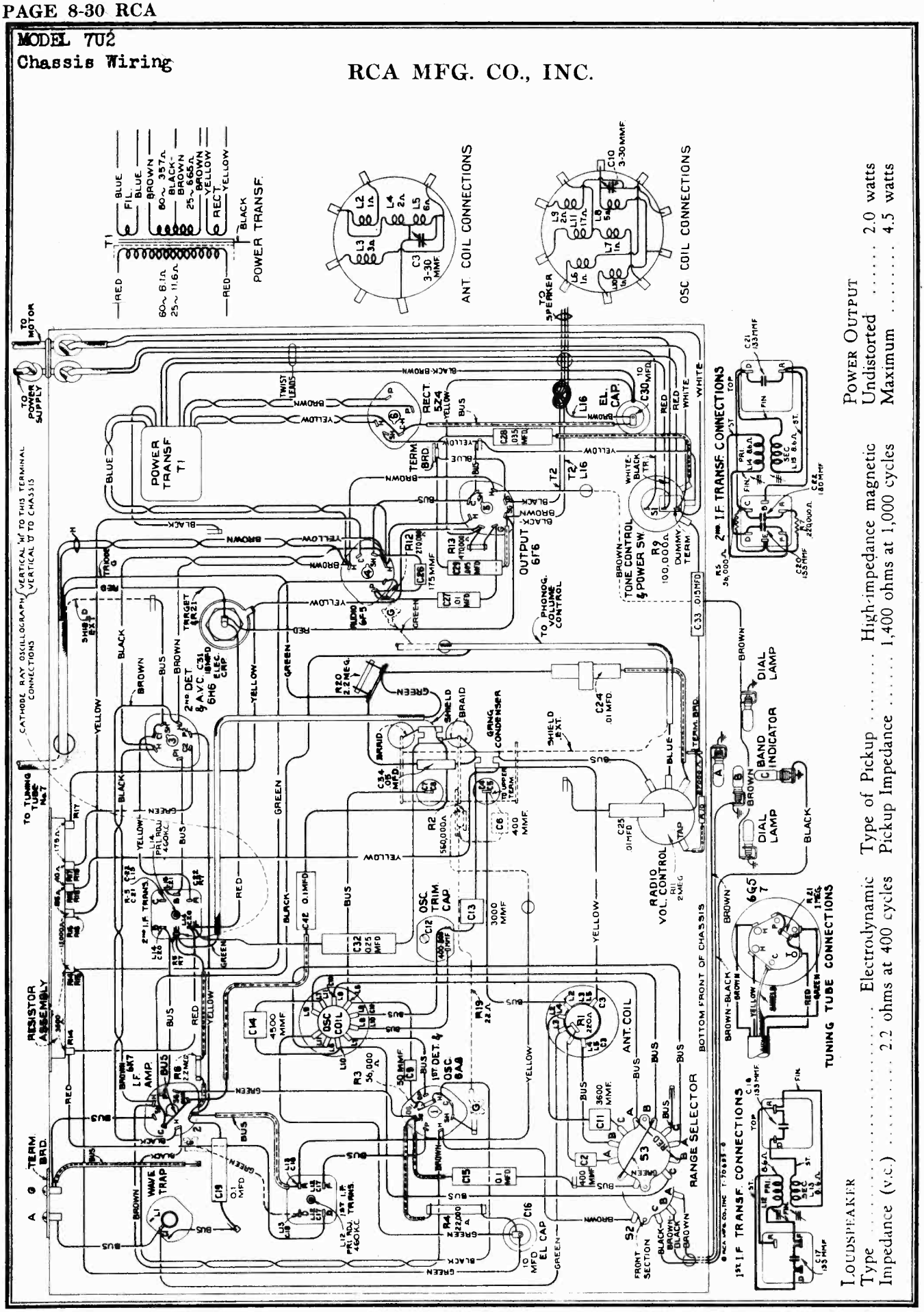
MODEL 7U2
Schematic
Socket
Trimmers

RCA MFG. CO., INC.



MODEL 7U2
Chassis Wiring

RCA MFG. CO., INC.



LOUDSPEAKER

Type	Electrodynamic
Impedance (v.c.)	2.2 ohms at 400 cycles

Power Output	
Type of Pickup	High-impedance magnetic
Pickup Impedance	1,400 ohms at 1,000 cycles
Undistorted	2.0 watts
Maximum	4.5 watts

Stock No.	DESCRIPTION	List Price
	RECEIVER ASSEMBLIES	
12930	Board—Antenna and ground terminal board	$0.20
5237	Bushing—Variable condenser mounting bushing assembly—Package of 3	.43
11888	Cable—Tuning lamp cable and socket	1.06
12032	Cable—3-conductor, shielded, volume control cable, approx. 8 inches long, complete with 4-contact male connector and grid contact cap	.90
11350	Cap—Grid contact cap—Package of 5	.20
12511	Cap—Grid contact cap—Package of 5	.15
11289	Capacitor—50 Mmfd. (C9)	.26
12946	Capacitor—133 Mmfd. (C17, C18, C20, C21)	.20
11623	Capacitor—175 Mmfd. (C26)	.18
12406	Capacitor—180 Mmfd. (C22)	.26
11290	Capacitor—400 Mmfd. (C2, C6)	.25
11622	Capacitor—3,000 Mmfd. (C13)	.36
11621	Capacitor—3,600 Mmfd. (C11)	.38
11287	Capacitor—4,500 Mmfd. (C14)	.30
4868	Capacitor—.005 Mfd. (C29)	.20
11315	Capacitor—0.15 Mfd. (C33)	.20
12670	Capacitor—.035 Mfd. (C28)	.20
11395	Capacitor—.01 Mfd. (C24)	.18
4858	Capacitor—.01 Mfd. (C25, C27)	.25
4836	Capacitor—.05 Mfd. (C34)	.30
11414	Capacitor—0.1 Mfd. (C15, C42)	.20
4841	Capacitor—0.1 Mfd. (C19)	.22
5170	Capacitor—.25 Mfd. (C32)	.25
11240	Capacitor—10 Mfd. (C30)	1.08
11387	Capacitor—10 Mfd. (C16)	.86
5212	Capacitor—18 Mfd. (C31)	1.16
11465	Capacitor—Adjustable trimmer (C12)	.48
11256	Capacitor—Adjustable trimmer for wave-trap, Stock No. 11391 (C1)	.48
11617	Coil—Antenna coil less shield (L2, L3, L4, L5, C3, R1)	1.68
11618	Coil—Oscillator coil less shield (L6, L7, L8, L9, L10, L11, C10)	2.22
13597	Condenser—2-gang variable tuning condenser (C4, C5, C7, C8)	4.55
4573	Connector—2-contact female connector for motor cable, receiver section	$0.30
5119	Connector—3-contact female connector for chassis reproducer cable	.25
6123	Connector—4-contact male connector for cable, Stock No. 12032	.30
12006	Core—Adjustable core and stud for Stock No. 13106 and No. 13107	.22
13598	Drive—Variable tuning condenser vernier drive	.80
13599	Foot—Chassis mounting foot and bracket assembly—Package of 2	.55
12770	Holder—Dial scale holder and lamp bracket assembly	.55
12712	Indicator—Station selector indicator pointer	.22
4340	Lamp—Dial lamp—Package of 5	.60
12718	Mask—Dial light diffuser complete with red, orange and green-colored screen	.40
11466	Resistor—Voltage divider, comprising one 3,500-ohm, one 13,000-ohm, one 85-ohm, one 40-ohm and one 175-ohm sections (R14, R15, R16, R17, R18)	.95
11624	Resistor—22 ohms, flexible type complete with grid contact cap (R19)	.22
11620	Resistor—220 ohms, carbon type, 1/10 watt—Package of 5 (R1)	.75
8070	Resistor—22,000 ohms, carbon type, ½ watt—Package of 5 (R4)	1.00
11400	Resistor—27,000 ohms, carbon type, ¼ watt—Package of 5 (R10)	1.00
11282	Resistor—56,000 ohms, carbon type, 1/10 watt—Package of 5 (R5)	.75
12286	Resistor—56,000 ohms, insulated, ¼ watt—Package of 5 (R3)	1.00
11398	Resistor—220,000 ohms, carbon type, 1/10 watt—Package of 5 (R7)	.75
11453	Resistor—270,000 ohms, carbon type, 1/10 watt—Package of 5 (R12)	.75
11452	Resistor—470,000 ohms, carbon type, 1/10 watt—Package of 5 (R13)	.75
11397	Resistor—560,000 ohms, carbon type, 1/10 watt—Package of 5 (R2)	.75
12013	Resistor—1 megohm, carbon type, 1/10 watt—Package of 5 (R21)	.75
11626	Resistor—2.2 megohms, carbon type, ¼ watt—Package of 5 (R6, R20)	$1.00
12607	Shield—First I. F. transformer shield top	.30
12581	Shield—Second I. F. transformer shield top	.36
11603	Shield—Coil shield for Stock Nos. 11617 and 11618	.26
12735	Shield—Dial lamp shield—Package of 5	.25
12008	Shield—I. F. transformer shield for Stock Nos. 13106 and 13107	.28
11199	Socket—Dial lamp socket	.14
12771	Socket—Dial lamp socket, located at top of dial scale	.25
11381	Socket—Tuning lamp socket and cover	.45
11195	Socket—5-contact 5Z4 Radiotron socket	.15
11198	Socket—7-contact 6F5 or 6H6 Radiotron socket	.15
11196	Socket—8-contact 6A8, 6F6 or 6K7 Radiotron socket	.15
12007	Spring—Retaining spring for core, Stock No. 12006—Package of 10	.36
12769	Switch—Range switch (S2, S3)	1.25
12668	Tone control and power switch (R9, S1)	1.22
11391	Trap—Wave-trap (L1, C1)	1.22
13106	Transformer—First I. F. transformer (L12, L13, C17, C18)	1.60
13107	Transformer—Second I. F. transformer (L14, L15, C20, C21, C22, R5, R7)	2.06
11848	Transformer—Power transformer, 100-125 volts, 50-60 cycles (T1)	4.40
11849	Transformer—Power transformer, 100-125 volts, 25-40 cycles (T1)	5.70
11850	Transformer—Power transformer, 105-250 volts, 40-60 cycles (T1)	8.00
13144	Volume control (R11)	1.00
	MOTOR BOARD ASSEMBLIES	
4577	Connector—2-contact male connector for motor leads	.30
13575	Escutcheon—Motor speed regulator escutcheon for 25- or 50-cycle motors only	.25
13065	Lever—Brake mechanism actuating lever, fastens to pivot shaft under base	.20
3261	Rest—Pickup rubber rest—Package of 5	.40
13573	Screw—Motor mounting screw assembly, for 60-cycle motor only—Package of 3	.85
13574	Screw—Motor mounting screw assembly, for 25- or 50-cycle motors only—Package of 3	.85
11750	Screw—No. 4-40 x 9/32, cone pointed, headless set screw for lever, Stock No. 13065—Package of 10	.22
	AUTOMATIC BRAKE AND SWITCH ASSEMBLIES	
13582	Brake—Automatic brake and switch complete	2.65
4577	Connector—2-contact male connector for brake switch power supply leads	.30
3994	Cover—Switch cover and screw	.26
10174	Springs—Complete set of springs for automatic brake—Package of 2 sets	.50
3322	Switch—Automatic brake switch (S4)	.75
	PICKUP AND ARM ASSEMBLIES	
11731	Armature—Pickup armature	.64
11732	Coil—Pickup coil (L23)	.60
4543	Damper—Pickup damper block complete with damper plate	.10
13579	Pickup and arm complete	7.85
11951	Screw—Needle holding screw—Package of 10	.46
12641	Board—Terminal board assembly	$0.15
12640	Bracket—Output transformer mounting bracket	.18
13600	Coil—Field coil (L16)	1.75
11469	Neutralizing coil (L18)	.20
12667	Cone—Reproducer cone (L17)	1.00
5118	Connector—3-contact male connector for reproducer	.25
5119	Connector—3-contact female connector for reproducer cable	.25
9766	Reproducer complete	7.25
11253	Transformer—Output transformer (T2)	1.56
11886	Washer—Spring washer used to hold field coil securely—Package of 5	.20
13576	Motor—105-125 volts, 60-cycle motor complete (M1)	18.90
13577	Motor—105-125 volts, 50-cycle motor complete	25.20
13578	Motor—105-125 volts, 25-cycle motor complete	25.20
13583	Regulator—Motor speed regulator pointer, used on 25- and 50-cycle motors only	.25
11762	Box—Used needle box	.25
11996	Bracket—Tuning lamp mounting bracket and clamp	.22
12030	Cable—2-conductor shielded cable, approx. 18 inches long, connects phonograph volume control to compensator pack	.52
12031	Cable—3-conductor shielded cable, approx. 19 inches long, complete with 4-contact female connector, connects phonograph volume to receiver	1.04
11272	Clamp—Cable clamp for phonograph volume control cable, Stock Nos. 12030 and 12031—Package of 5	.10
11760	Compensator—Phonograph compensator pack, comprising one 470-ohm and one 1,000-ohm resistors, one .01 Mfd., one .1 Mfd. and one 1 Mfd. capacitors and one .25 Henry reactor, L24, C39, C40, C41, R25, R26)	3.85
4153	Connector—4-contact female connector for cable, Stock No. 12031	.48
12666	Cover—Reproducer cover	.65
12698	Escutcheon—Station selector escutcheon and crystal	1.02
12742	Escutcheon—Tuning tube escutcheon	.22
11347	Knob—Phonograph volume control, receiver volume control, or range switch knob—Package of 5	.75
12699	Knob—Large station selector knob—Package of 5	.68
11210	Screw—Chassis mounting screw assembly, comprising one screw, one washer, and one lockwasher—Package of 4	.28
4982	Spring—Retaining spring for large knob in Stock No. 12699—Package of 10	.50
11349	Spring—Retaining spring for small knob in Stock Nos. 12699, 11347 anl 11582—Package of 5	.25
11696	Turntable—Complete	2.48
11695	Volume control—Phonograph volume control and switch (R27, S5)	1.60

The prices quoted above are subject to change without notice.

RCA MFG. CO., INC.

Alignment Procedure

The low-frequency oscillator tracking (600 kc.), wave-trap, and i-f transformer adjustments are made by means of six screws attached to molded magnetite cores. The remaining adjustments in the antenna and oscillator circuits are made with six plunger-type air-dielectric trimming capacitors and require the use of an **RCA Stock No. 12636 Adjusting Tool.** Before adjusting the plunger-type trimmers, they must be unlocked by loosening their hexagon lock nuts. The lock nuts should be tightened upon completion of adjustments. For location of these adjustments refer to figures 3 and 5.

A standard test oscillator, such as the **RCA Stock No. 9595,** will be required as a source of signal at the specified alignment frequencies. Means for indication of the receiver output during alignment is also necessary to show when the correct point of adjustment is reached. The **RCA Stock No. 4317 Neon Glow Indicator** is designed for this purpose.

Attach the output indicator across the loudspeaker voice coil. Advance the receiver volume control to its maximum position, letting it remain in such position for all adjustments. For each adjusting operation, regulate the test-oscillator output control so that the signal level is as low as possible and still be observable at the receiver output. Use of such small signal will obviate broadness of tuning which would otherwise result from a.v.c. action on a strong signal.

I-F Adjustments

Connect the "Ant." output of the test-oscillator to the grid cap of the RCA-6L7 through a **.001 mfd.** capacitor. Connect the test oscillator "Gnd." terminal to the ground terminal of the receiver chassis. Place the receiver range selector in its "Standard broadcast" (A) position and set receiver dial pointer to a position of no extraneous signals **near 600 kc.** Ground stator of local oscillator tuning condenser C23 to eliminate local oscillator signals. Adjust the test oscillator to **460 kc.**

Adjust the two magnetite core screws **L16** and **L15** of the second i-f transformer to produce maximum (peak) indicated receiver output. Then adjust the two magnetite core screws **L14** and **L13** of the first i-f transformer for maximum (peak) receiver output as shown by the indicating device. It is advisable to repeat the adjustment of all i-f magnetite core screws to assure that the interaction between them has not disturbed the original adjustments. Remove temporary chassis ground from oscillator stator C23.

R-F Adjustments

Calibrate the tuning dial by adjusting the scale pointer to the extreme low-frequency end calibration mark **(530 kc.)** on "Standard broadcast" scale while the gang tuning condenser plates are in their full-mesh position. Alignment should be made in sequence of "Wave-trap," "Short wave," "Medium wave," and "Standard broadcast."

Wave-Trap Adjustment

Attach the "Ant." output of the test oscillator to the receiver antenna terminal "A1" through a **200-mmfd. (important)** capacitor. The ground connections remain connected together. Leave the test oscillator adjusted to **460 kc.** and range selector in "Standard broadcast" position as before. Then adjust the wave-trap screw **L1** to the point which causes maximum suppression (minimum indicated output) of the **460 kc.** signal.

"Short Wave" Band

Connect the "Ant." output of the test oscillator to the receiver antenna terminal "A1" through a **300-ohm** resistor, leaving the ground connections as before. Place the receiver range selector to its "Short wave" **(C)** position and set the dial pointer to **20,000 kc.** Adjust test oscillator to **20,000 kc.** Adjust the oscillator trimmer **C14** to produce maximum (peak) output. Two positions of this trimmer may be found which produce maximum output. The position of minimum capacitance (plunger near out) should be used. Tighten lock nut. Adjust the antenna trimmer **C7** to produce maximum (peak) output while slightly rocking the gang tuning condenser back and forth through the signal. Two positions may be found on this trimmer which produce maximum output. The position of maximum capacitance (plunger near in) should be used. Tighten lock nut. Check for image signal by changing the receiver dial setting to **19,080 kc.** If the oscillator trimmer **C14** has been correctly adjusted, the image signal will be received at this position. No adjustments should be made while checking for the image signal.

"Medium Wave" Band

Connections for test oscillator remain the same as for "Short Wave" (C) Band. Adjust the test oscillator to **6,000 kc.** Place receiver range selector to "Medium Wave" (B) position and set receiver dial pointer to **6,000 kc.** Then adjust the two trimmers **C16** and **C8** of the oscillator and antenna coils so that each produces maximum (peak) indicated receiver output. Tighten trimmer lock nuts.

"Standard Broadcast" Band

Change test oscillator connections by substituting **200 mmfd.** condenser for the 300-ohm resistor. Adjust test oscillator and set receiver dial pointer to **1,500 kc.** Place receiver range selector to "Standard broadcast" (A) position.

Then adjust the two trimmers, **C17** and **C9,** of the oscillator and antenna coils so that each produces maximum (peak) receiver output. Shift the test oscillator frequency to **600 kc.** Tune the receiver to pick up this signal **near 600 kc.,** disregarding the dial reading at which it is best received. Then adjust the oscillator magnetite core screw **L11** simultaneously rocking the receiver tuning control backward and forward through the signal until maximum receiver output results from these combined operations. The adjustments at **1,500 kc.** should then be repeated to correct for any change which may have been caused by the **600 kc.** oscillator adjustment. Tighten lock nuts on **C17** and **C9.**

Loudspeaker.—Centering of the loudspeaker voice coil is made in the usual manner with three narrow paper feelers after first removing the front paper dust cover. This may be removed by softening its cement with a very light application of acetone, using care not to allow the acetone to flow down into the air gap. The dust cover may be cemented back in place with ambroid upon completion of adjustment.

REPLACEMENT PARTS

Stock No.	DESCRIPTION	List Price
	RECEIVER ASSEMBLIES	
12716	Board—Antenna and ground terminal board	$0.20
12717	Board—Phonograph terminal board	.22
5237	Bushing—Tuning condenser mounting bushing assembly—Package of 3	.43
12511	Cap—Grid contact cap—Package of 5	.15
12714	Capacitor—Adjustable trimmer (C7, C9, C16, C17)	.38
12807	Capacitor—Adjustable trimmer (C8, C14)	.35
13001	Capacitor—8.2 Mmfd. (C22)	.20
13002	Capacitor—12 Mmfd. (C18)	.20
12948	Capacitor—33 Mmfd. (C24)	.20
12723	Capacitor—56 Mmfd. (C3)	.20
12629	Capacitor—56 Mmfd. (C26)	.20
12404	Capacitor—120 Mmfd. (C25, C27, C28)	.26
12724	Capacitor—120 Mmfd. (C36)	.28
12725	Capacitor—150 Mmfd. (C1)	.28
12406	Capacitor—180 Mmfd. (C29)	.26
13003	Capacitor—180 Mmfd. (C13)	.20
12488	Capacitor—270 Mmfd. (C19)	.20
12537	Capacitor—560 Mmfd. (C11, C21)	.20
12727	Capacitor—555 Mmfd. (C20)	.20
12947	Capacitor—1,800 Mmfd. (C15)	.40
5005	Capacitor—.0035 Mfd. (C37)	.16
11315	Capacitor—.015 Mfd. (C34)	.20
4886	Capacitor—.05 Mfd. (C5, C6, C39)	.20
4841	Capacitor—0.1 Mfd. (C12, C30, C35)	.22
4858	Capacitor—.01 Mfd. (C2, C4, C31, C33, C38, C45)	.25
5170	Capacitor—0.25 Mfd. (C32)	.25
4840	Capacitor—0.25 Mfd. (C40)	.30
5212	Capacitor—18 Mfd. (C43)	1.16
12998	Capacitor—Pack comprising one 24 Mfd., one 16 Mfd. and on 10 Mfd. sections (C41, C42, C44)	3.70
12708	Coil—Antenna coil and shield (L2, L3, L4, L5)	2.04
12943	Coil—Oscillator coil and shield (L6, L7, L8, L9, L10, L11, L12)	2.30
12701	Condenser—2-gang variable tuning condenser (C10, C23)	4.00
11979	Connector—2-contact male connector for power leads	.30
5119	Connector—3-contact female connector for speaker leads	.25
12800	Core—Adjustable core and stud for Stock No. 12709	.20
12006	Core—Adjustable core and stud for Stock No. 12801 and No. 12653	.22
12664	Core—Adjustable core and stud for Stock No. 12654	.22
12996	Dial—Station selector dial scale	.80
12702	Drive—Vernier drive for tuning condenser	.68
12712	Indicator—Station selector indicator pointer	.22
4340	Lamp—Dial lamp—Package of 5	.60
12718	Mask—Dial light diffuser complete with colored screen	.40
12997	Range switch—(S1, S2)	2.05
12999	Reactor—Filter reactor (L18)	1.60
11955	Resistor—27 ohms, carbon type, ¼ watt—Package of 5 (R21)	1.00
12453	Resistor—27 ohms, insulated, ¼ watt—Package of 5 (R20)	1.00
13004	Resistor—2,200 ohms, carbon type, ½ watt—Package of 5 (R22)	1.00
11647	Resistor—5,600 ohms, carbon type, ¼ watt—Package of 5 (R3)	1.00
11400	Resistor—27,000 ohms, carbon type, ¼ watt—Package of 5 (R3)	1.00
11282	Resistor—56,000 ohms, carbon type, 1/10 watt—Package of 5 (R6)	.75
11281	Resistor—100,000 ohms, carbon type, 1/10 watt—Package of 5 (R4)	.75
5145	Resistor—100,000 ohms, carbon type, ¼ watt—Package of 5 (R2, R19)	1.00
11398	Resistor—220,000 ohms, carbon type, 1/10 watt—Package of 5 (R7)	$0.75
11453	Resistor—270,000 ohms, carbon type, 1/10 watt—Package of 5 (R12)	.75
13005	Resistor—390,000 ohms, carbon type, 1/10 watt—Package of 5 (R13)	.75
11452	Resistor—470,000 ohms, carbon type, 1/10 watt—Package of 5 (R1)	.75
11811	Resistor—680,000 ohms, carbon type, ¼ watt—Package of 5 (R10)	1.00
4241	Resistor—1.5 meg., carbon type, ¼ watt—Package of 5 (R11)	1.00
12651	Shield—Coil shield for Stock No. 12708	.22
12710	Shield—Coil shield for Stock No. 12709	.28
12607	Shield—1st I. F. transformer shield cap	.30
12008	Shield—I. F. transformer shield for Stock Nos. 12801, 12653	.28
12581	Shield—2nd I. F. transformer shield cap	.36
12110	Shield—Top cap shield for 6J7 Radiotron	.14
12704	Shutter—Dial scale holder and shutter assembly	.88
11198	Socket—7-contact 6J7, 6K7 or 6L7 Radiotron socket	.15
11196	Socket—8-contact 25A6, 25Z6, 6H6 or 6J7 Radiotron socket	.15
3529	Socket—Dial lamp socket	.32
12007	Spring—Retaining spring for Stock Nos. 12800, 12006 and 12664—Package of 10	.36
12849	Spring—Tension spring for band indicator shutter link—Package of 5	.18
12668	Tone control and power switch (R14, S3)	1.22
12801	Transformer—First I. F. transformer complete (L13, L14, C25, C26)	1.70
12653	Transformer—Second I. F. transformer complete (L15, L16, C27, C28, C29, R6, R7)	2.06
12654	Trap—Wave trap complete (L1)	.75
13144	Volume control (R9)	1.00
	REPRODUCER ASSEMBLIES	
12914	Board—2-contact reproducer terminal board	.25
12640	Bracket—Output transformer mounting bracket	.18
12642	Cone—Reproducer cone and dust cap (L17)	.94
5118	Connector—3-contact male connector for speaker leads	.25
9717	Reproducer complete	16.20
11828	Transformer—Output transformer (T1)	1.46
	MISCELLANEOUS ASSEMBLIES	
11824	Connector—2-contact female connector for power cord, Stock No. 11823	.34
11823	Cord—Power cord complete	.65
12698	Crystal—Station selector escutcheon and crystal	1.02
12699	Knob—Large station selector knob—Package of 5	.68
12992	Knob—Small vernier station selector knob—Package of 5	.45
12995	Knob—Tone and power switch knob—Package of 5	.45
12994	Knob—Volume control or range switch knob—Package of 5	.45
11377	Screw—Chassis mounting screw assembly—Package of 4	.12
12993	Screw—8-32 x ⅜ headless set screw for knob, Stock Nos. 12992, 12993, 12994 and 12995—Package of 10	.20
4982	Spring—Retaining spring for knob, Stock No. 12699—Package of 10	.50
12679	Resistor—2.2 meg., insulated, ¼ watt—Package of 5 (R5)	1.00
13000	Resistor—Ballast resistor, comprising one 50-ohm and three 40-ohm sections (R15, R16, R17, R18)	1.40
4669	Screw—8-32 set screw for Stock No. 12704—Package of 10	.25

Prices quoted above are subject to change without notice.

RCA MFG. CO., INC.

MODEL 7X
Schematic, Voltage
Socket, Trimmers
Alignment, Resistance

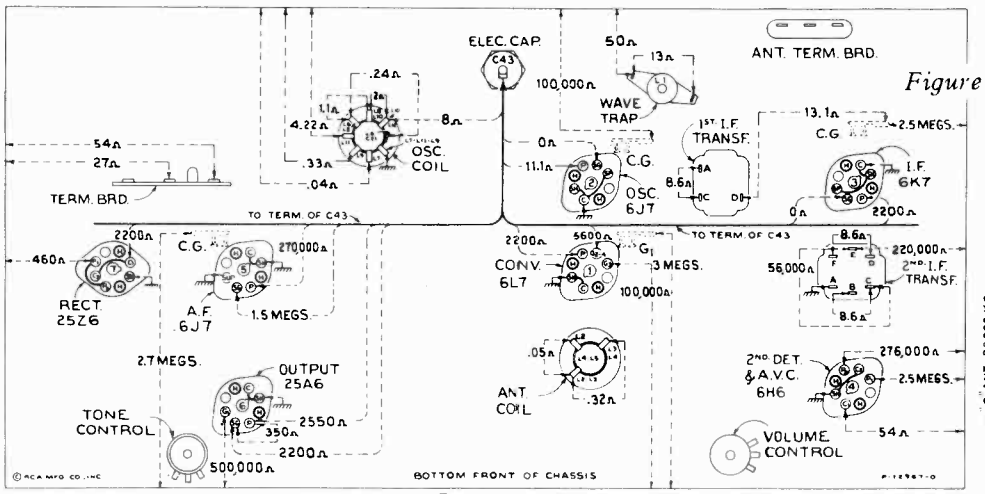


Figure 4—Resistance Diagram

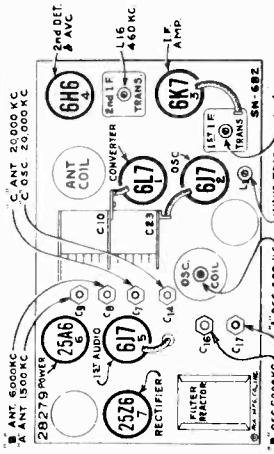


Figure 3—Radiotron, Coil, and Trimmer Locations

Radiotron Cathode Current Readings

(1) RCA-6L7—Converter	7.5	ma.
(2) RCA-6J7—Osc.	3.5	ma.
(3) RCA-6K7—I. F. Amp.	8.5	ma.
(4) RCA-6H6—2nd Det.-A.V.C.	—	
(5) RCA-6J7—Audio	0.22	ma.
(6) RCA-25A6—Power	27.0	ma.
(7) RCA-25Z6—Rectifier	48.0	ma.

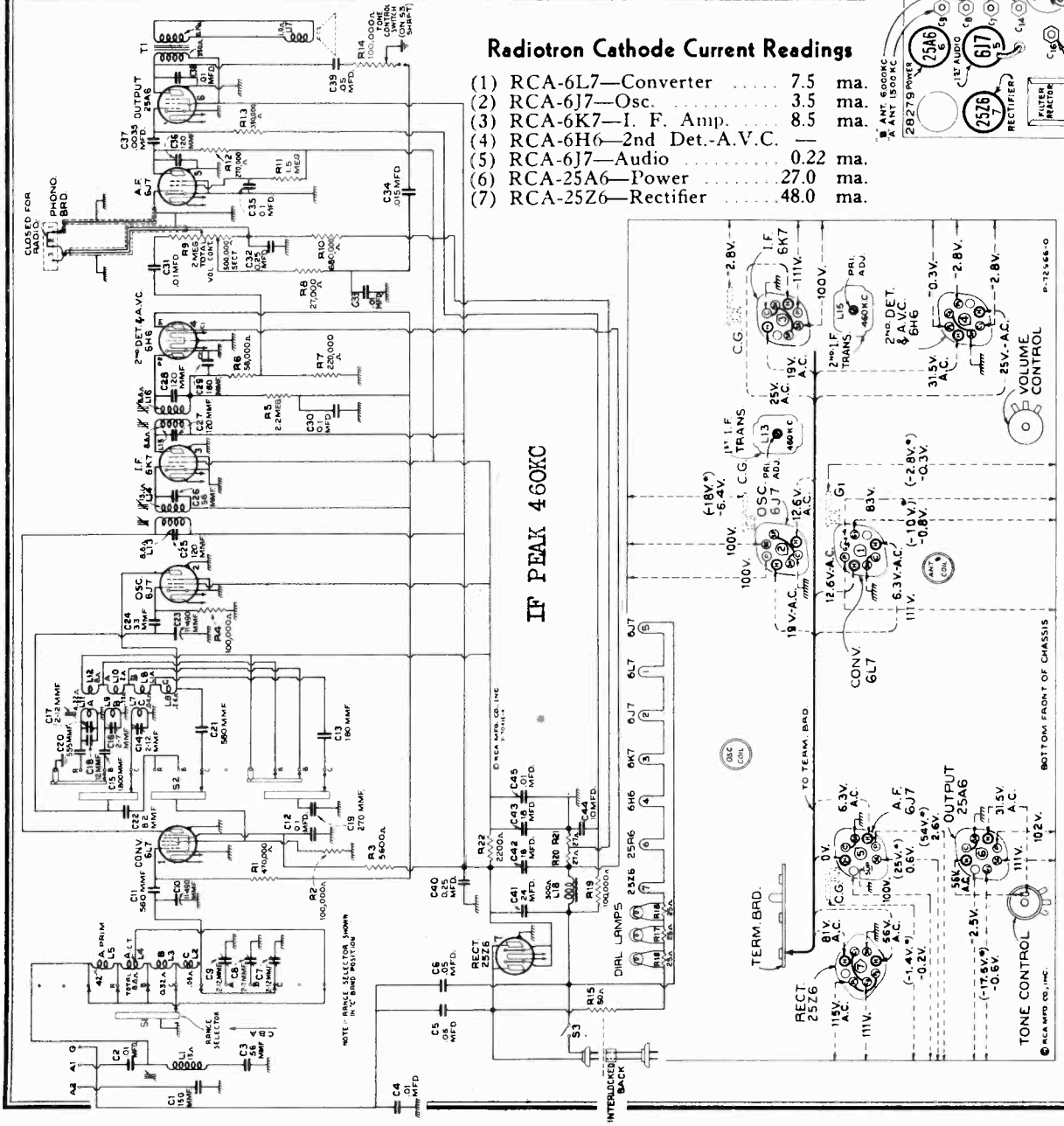


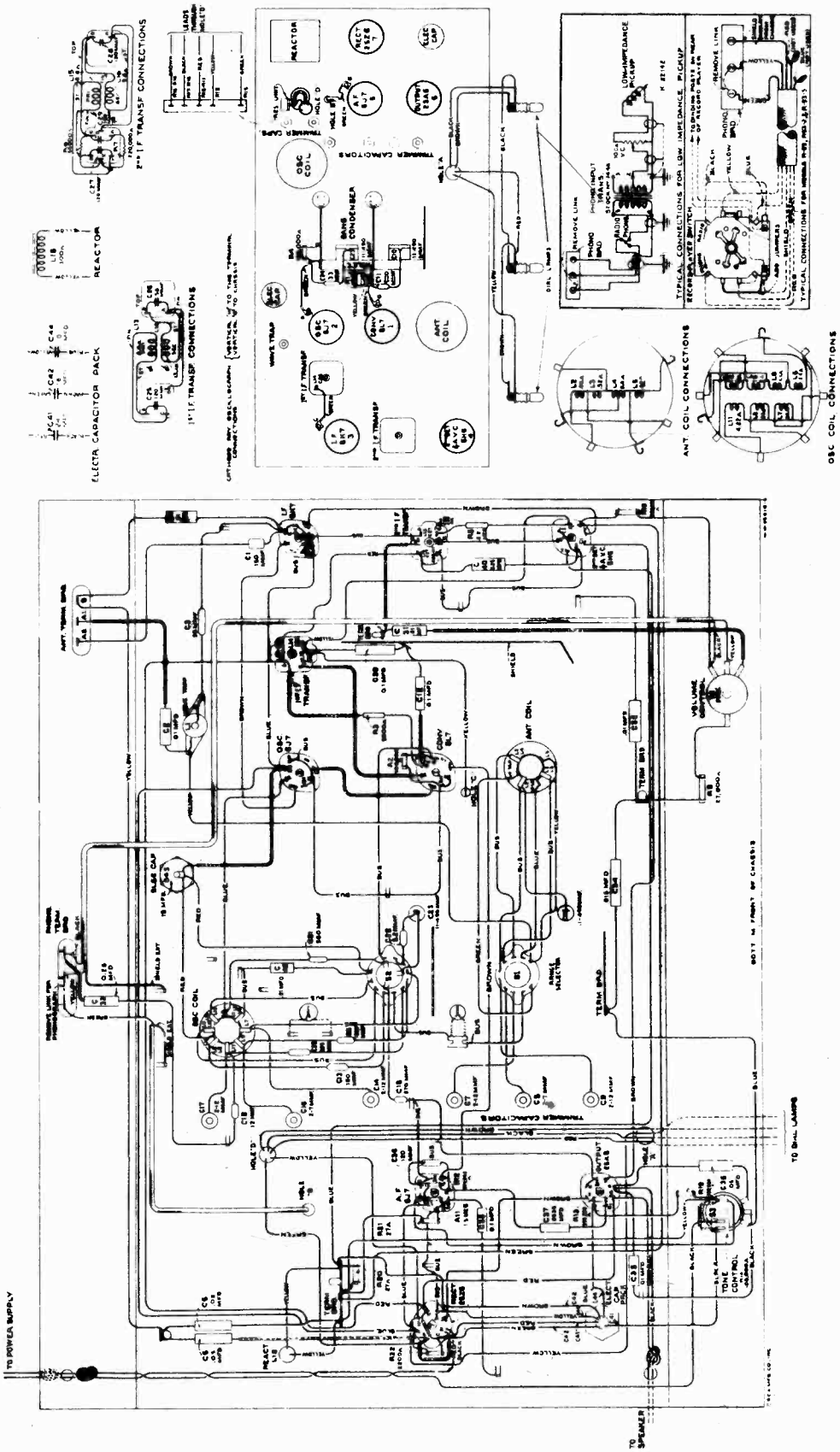
Figure 5—Radiotron Socket Voltages and Trimmer Locations

Measured at 115 volts, 60-cycle supply—For 115-volt d-c supply approximately 10% lower—Tuned to approximately 1,000 kc—No signal being received—Tone control optional—Volume control maximum

MODEL 7X

Chassis Wiring

RCA MFG. CO., INC.



Frequency Ranges

"Standard Broadcast" (A)	530-1,780 kc.
"Medium Wave" (B)	1,780-6,300 kc.
"Short Wave" (C)	6,300-22,000 kc.
Intermediate Frequency	460 kc.

Alignment Frequencies

"Standard Broadcast (A)	600 kc. (osc.), 1,500 kc. (osc., ant.)
"Medium Wave" (B)	6,000 kc. (osc., ant.)
"Short Wave" (C)	20,000 kc. (osc., ant.)

RCA MFG. CO., INC.

MODELS 8BT,8BK,8BT6,8BK6
Schematic,Socket,Trimmers
Phono.Data,Spkr.Wiring

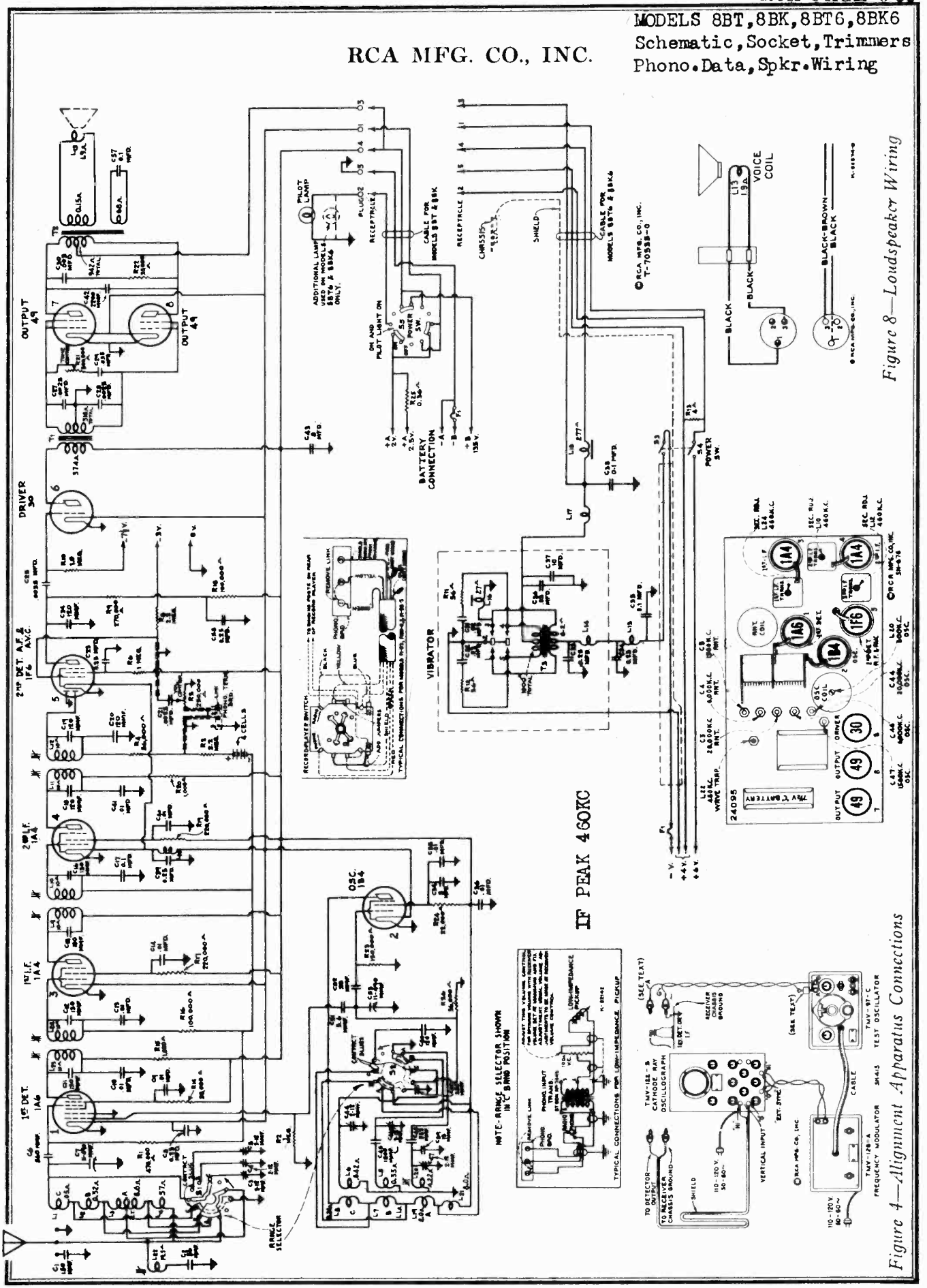


Figure 8—Loudspeaker Wiring

Figure 4—Alignment Apparatus Connections

MODELS 8BT6,8BK6
Power Unit Wiring
Chassis Wiring

RCA MFG. CO., INC.

MODELS 8BT,8BK
Batt.Cable,Chassis Wiring

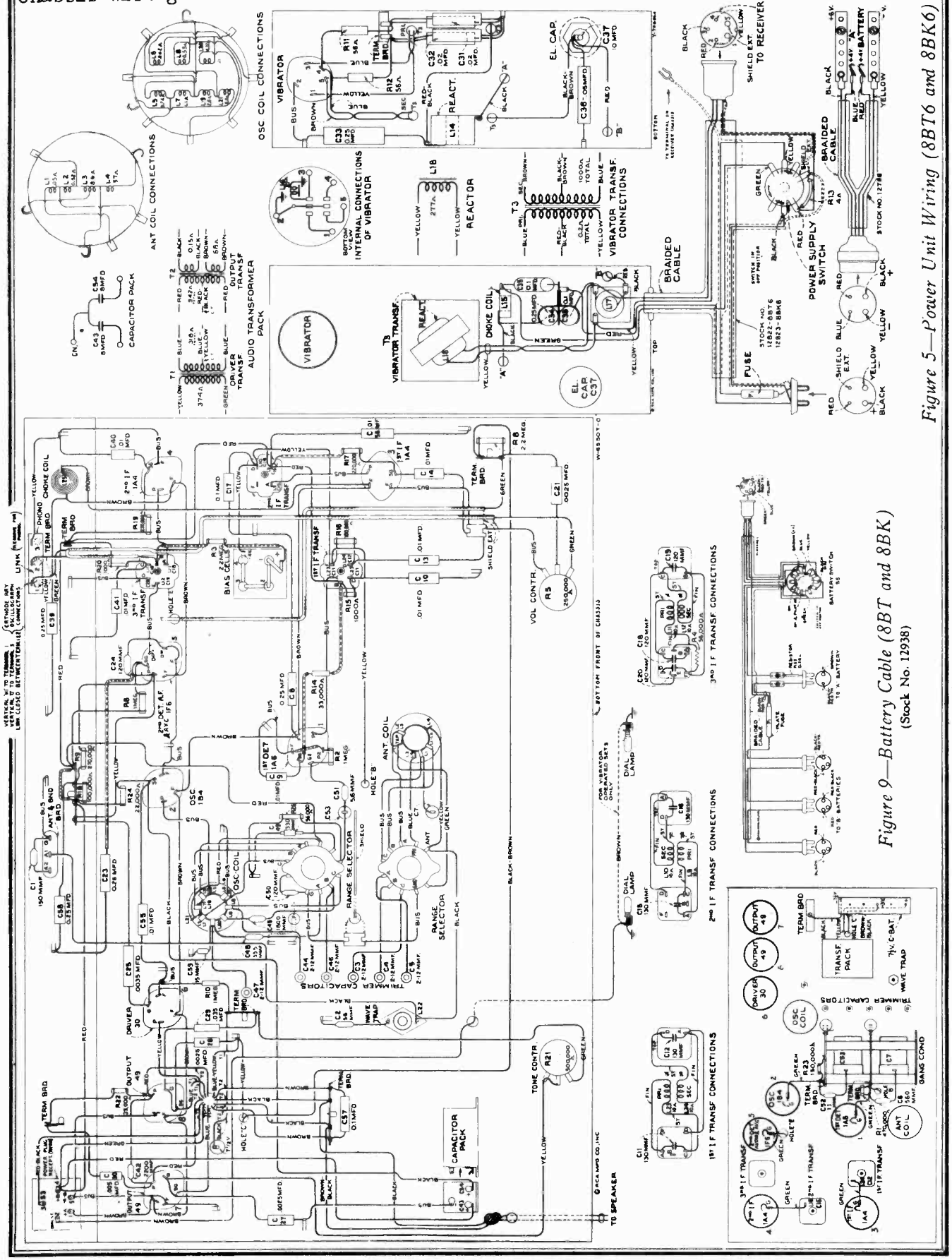


Figure 5—Power Unit Wiring (8BT6 and 8BK6)

Figure 9—Battery Cable (8BT and 8BK)
(Stock No. 12938)

RCA MFG. CO., INC.

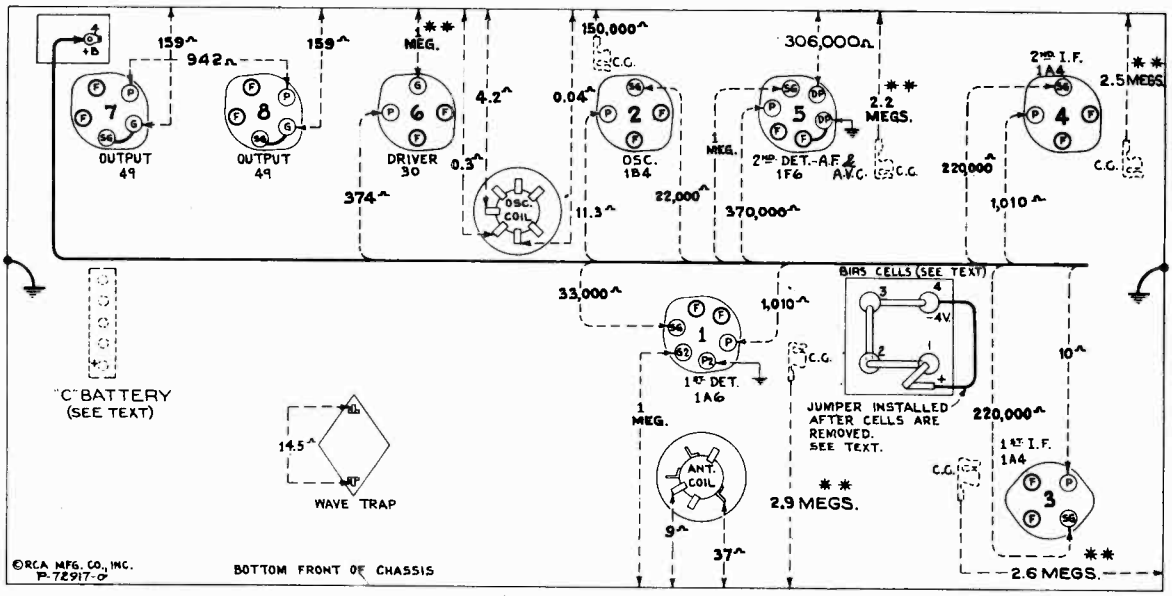


Figure 6—Resistance Diagram

Power-supply cable disconnected—Radiotrons in sockets—Tuning condenser in full-mesh—Bias cells and "C" battery removed—Volume setting optional

Resistance Measurements

***Before making any resistance measurements, remove the four bias cells and connect jumpers on bias-cell board as shown. Also, remove the "C" battery and connect the two leads (—7½ v. and —3 v.) to chassis ground. After measurements are completed, remove jumpers from bias-cell board and then carefully insert bias cells. Next, insert "C" battery and restore leads to their respective positions.*

Radiotron Plate Current Readings

Measured with Milliammeter Connected at Tube Socket Plate Terminals under Conditions Similar to Those of Voltage Measurements

(1)	RCA-1A6	—1st Det.	1.2 ma.
(2)	RCA-1B4	—Osc.	3.8 ma.
(3)	RCA-1A4	—1st I.F.	0.9 ma.
(4)	RCA-1A4	—2nd I.F.	0.9 ma.
(5)	RCA-1F6	—2nd Det.—A.F.—A.V.C..	0.25 ma.
(6)	RCA-30	—Driver	3.2 ma.
(7)	RCA-49	—Output	1.5 ma.
(8)	RCA-49	—Output	1.5 ma.

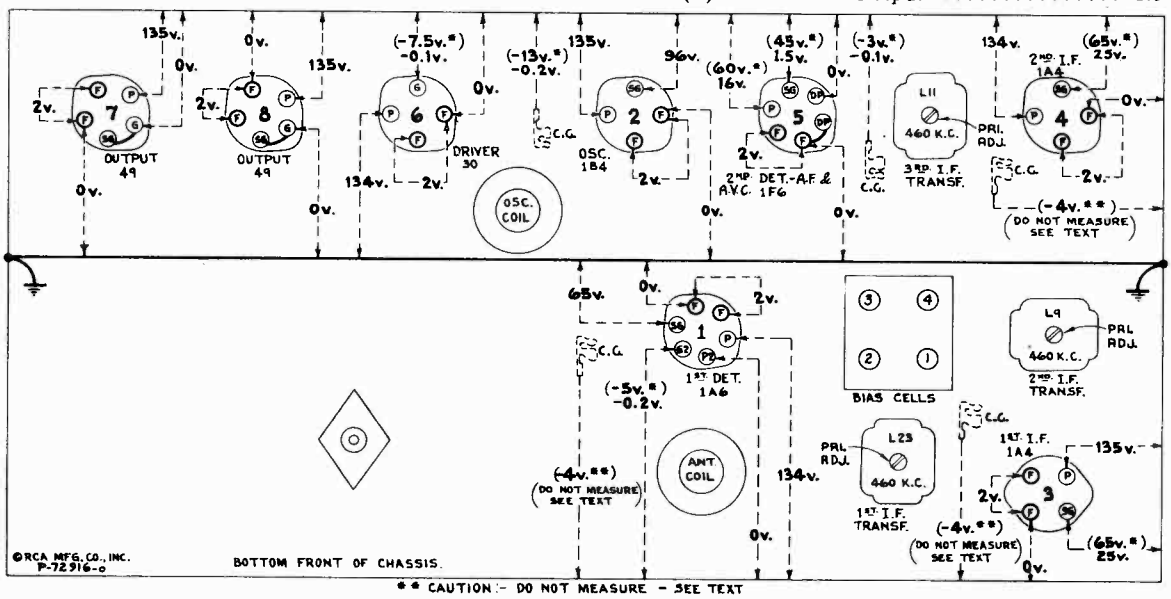


Figure 7—Radiotron Socket Voltages, Coil, and Trimmer Locations

Measured with all batteries at normal voltage—Tuned to approximately 1,000 kc ("Standard broadcast")—No signal being received—Volume control optional

The signal entering the antenna circuit is coupled to control grid No. 1 of the RCA-1A6 through a tuned r-f transformer. This transformer is tapped to provide correct inductance for the band being used, and at the same time selecting the proper winding which serves as the primary and shorts out the unused coils to prevent any interaction which might otherwise occur. The locally generated oscillator signal is fed to control grid No. 2 of the RCA-1A6 through capacitor C51. Separate windings are employed in the oscillator stage for each band. The unused portions of the oscillator coil are shorted out when not in use. The output of the first-detector stage is fed through a two-stage i-f amplifier, consisting of two RCA-1A4's and three i-f transformers, to the diode portion of the RCA-1F6. Such an i-f amplifier arrangement provides excellent selectivity and gain, while its design gives increased fidelity due to its flat-top characteristic. The audio frequency secured by the detection process develops a voltage across resistors R4 and R5. The voltage developed across R5 is applied as a.v.c. bias to the first detector and i-f tubes. The arm of the volume control R5 selects a portion of the audio voltage which is applied to the control grid of the RCA-1F6 for voltage amplification. The output of this stage is resistance-capacitance coupled to the RCA-30 driver tube. The output of the driver stage is transformer coupled to the class "B" push-pull output stage using RCA-49's. The output of this push-pull stage is transformer coupled to the permanent magnet dynamic loudspeaker. A tertiary winding on the output transformer shunted by C57 provides sharp cutoff of the high audio frequencies. A continuously variable high-frequency tone control R21 in series with C29 provides manual high-frequency tone control.

Models 8BT6 and 8BK6 obtain their plate supply from a vibrator-type power unit. The vibrator together with the power transformer T3 combine the functions of generating alternating current and rectification. Filter chokes and capacitors are built into this unit to eliminate interference (noise) which would otherwise be introduced into the receiver circuits.

Caution: The four bias cells are used only for the purpose of supplying bias potential and should never be measured with an ordinary voltmeter or other device which draws any current. A simple check on these cells may be made by connecting a milliammeter in the plate circuit of either RCA-1A4 tube and noting the plate current reading. Then remove the two bias cells (3 and 4), being careful that the spring contact clips do not short-circuit them during removal. Connect a 4-volt battery between the + and — 4v. terminals of the bias cell board, and again note the plate current reading. If the first reading obtained (with bias cells) is more than 40% from the latter reading (with 4-volt battery), all bias cells should be replaced. This 40% difference is equivalent to a change of approximately 25% battery voltage.

Alignment Procedure

There are seven alignment adjustments provided in the antenna and oscillator coil tuned circuits. Six of these adjustments are plunger type air trimmers and require use of an **RCA Stock No. 12636 Adjusting Tool.** The i-f transformer adjustments are made by means of screws attached to molded magnetite cores.

The cathode-ray method of alignment is preferred due to the flat-top i-f characteristics of these receivers. This type of alignment is possible through use of apparatus such as the **RCA Stock No. 9558 Frequency Modulator** and the **RCA Stock No. 9545 Cathode-Ray Oscillograph.** If this equipment is not available, an approximate alignment may be performed by the output-indicator method with an instrument such as the **RCA Stock No. 4317 Neon Glow Indicator** attached across the loudspeaker voice coil. Alignment by this method is similar to the cathode-ray method outlined below except that the receiver volume control should be at maximum, and the test oscillator sweeping operations omitted. The i-f adjustments should be made so that the test-oscillator frequency can be shifted 2 kc above and below the 460 kc alignment frequency with little change in output. The r-f adjustments should be peaked.

Cathode-Ray Alignment

Make alignment apparatus connections shown on figure 4. Remove the plug of the frequency modulator cable from the test oscillator jack. Connect the receiver chassis to a good external ground. Connect oscillograph "Vertical" input terminals as indicated on figure 2. Set oscillograph power switch to "On" and adjust "Intensity" and "Focus" controls to give a clearly defined spot, or line, on the screen. Set oscillograph "Ampl. A" switch to "On," "Vertical gain" control full-clockwise, "Ampl. B" switch to "Timing," "Range" switch to No. 2 position, and "Timing" switch to "Int." Place the "Sync." control, "Freq." control, and "Horizontal gain" control to about their mid-positions. For each of the following adjustments, the test oscillator output must be regulated so that the image obtained on the oscillograph screen will be of the minimum size for accurate observation. The receiver volume control setting is optional.

I-F Adjustments

(a) Connect the "Ant." output of the test oscillator to the grid cap of RCA-1A4 second i-f tube (with grid lead in place) through a **.05-mfd.** capacitor, with "Gnd." to receiver chassis. Tune the test oscillator to **460 kc,** place its modulation switch to "On" and its output switch to "Hi."

(b) Turn on the receiver and test oscillator. Increase the output of the test oscillator until a deflection is noticeable on the oscillograph screen. The figures obtained represent several waves of the detected signal, the amplitude of which may be observed as an indication of output. Cause the wave image formed (400-cycle waves) to be spread completely across the screen by adjusting the "Horizontal gain" control. The image should be synchronized and made to remain motionless by adjusting the "Sync." and "Freq." controls.

(c) Adjust the two magnetite core screws L12 and L11 (see figures 3 and 7) of the third i-f transformer (one on top and one on bottom) to produce maximum vertical deflection of the oscillographic image. This adjustment places the transformer in exact resonance with the 460-kc signal.

(d) The sweeping operation should follow using the frequency modulator. Shift the oscillograph "Timing" switch to "Ext." Insert plug of frequency-modulator cable in test-oscillator jack. Turn the test-oscillator modulation switch to "Off." Turn on the frequency modulator and place its sweep-range switch to "Hi."

(e) Increase the frequency of the test oscillator by slowly turning its tuning control until two separate, distinct, and similar waves appear on the screen. If only one wave appears, increase the "Freq." control on the oscillograph to obtain two waves. These waves will be identical in shape, totally disconnected, and appear in reversed positions. They will have a common base line, which is discontinuous. Adjust the "Freq." and "Sync." controls of the oscillograph to make them remain motionless on the screen. Continue increasing the test oscillator frequency until these forward and reverse curves move together and overlap, with their highest points exactly coincident. This condition will be obtained at a test oscillator setting of **approximately 575 kc.**

(f) With the images established as in (e), re-adjust the two magnetite core screws on the third i-f transformer so that they cause the curves on the oscillograph screen to become exactly coincident throughout their lengths and have maximum amplitude.

(g) Without altering the adjustments of the apparatus, shift the "Ant." output of the test oscillator along with the **.05-mfd.** capacitor to the grid cap of the RCA-1A4 first i-f tube (with grid lead in place). Adjust the two second i-f transformer magnetite core screws L10 and L9 so that they cause the forward and reverse curves to become coincident throughout their lengths and have maximum amplitude.

(h) Shift the "Ant." output of the test oscillator along with the **.05-mfd.** capacitor to the grid cap of the RCA-1A6 first detector tube. Adjust the two magnetite core screws L24 and L23 of the first i-f transformer so that they cause the forward and reverse curves to become coincident and have maximum amplitude. The composite wave obtained in this manner represents the resonance characteristic of the total i-f system. Lack of symmetry or irregularity of the resultant image will indicate the presence of a defect in the i-f system.

R-F Adjustments

Calibrate the pointer of the tuning dial by adjusting it to the extreme low-frequency end of dial scale **(530 kc)** with the plates of the gang tuning condenser in full mesh. Alignment must be made in the sequence of "Short wave" band, "Medium wave" band, "Wave-trap," and "Standard broadcast" band.

"Short Wave" Band

(i) Connect the "Ant." output of the test oscillator to the antenna terminal "A1" through a **300-ohm** resistor. Remove the plug of the frequency-modulator cable from test-oscillator jack. Turn test-oscillator modulation switch to "On." Shift the oscillograph "Timing" switch to "Int."

(j) Set receiver range selector to its "Short wave" position and dial pointer to 20,000 kc. Adjust the test oscillator to **20,000 kc.** Adjust oscillator air trimmer **C44** until maximum (peak) amplitude of output is reached. Two peaks may be found. The peak with minimum capacity (plunger near out) should be used. Tighten lock nut. Adjust antenna air trimmer C3 until maximum (peak) amplitude of output is reached while slightly rocking the gang tuning condenser back and forth through the signal. Two peaks may be found with this circuit. The peak with maximum capacity (plunger near in) should be used. Tighten lock nut. Check the image frequency by changing the receiver dial setting to **19,080 kc.** The test oscillator signal should be faintly received at this position indicating that the adjustment of **C44 has** been correctly made. No adjustments should be made while checking for this image signal.

"Medium Wave" Band

(k) Place receiver range selector to its "Medium wave" position with the receiver dial pointer set to 6,000 kc. Tune the test oscillator to **6,000 kc** Adjust the oscillator air trimmer C46 for maximum (peak) amplitude of output as shown by the waves on the oscillograph screen. Two peaks may be found. The peak obtained with minimum capacity (plunger near out) should be used. Tighten lock nut. Adjust antenna air trimmer C4 for maximum (peak) output. Tighten lock nut.

"Wave-Trap" Adjustment

(l) Connect the output of the test oscillator to the antenna terminal "A1" through a **200-mmfd. (important)** capacitor. Place receiver range selector in "Standard broadcast" position. Set the receiver dial to a position of no extraneous signals **near 600 kc.** Tune the test oscillator to **460 kc.** Adjust the wave-trap magnetite core screw to the point which causes minimum amplitude of output (maximum suppression of signal) as shown by the waves on the oscillograph.

"Standard Broadcast" Band

(m) Reduce output of test oscillator to minimum. Set receiver dial pointer to **600 kc.** Tune the test oscillator to **600 kc** and increase its output until a deflection is noticeable on the oscillograph screen.

(n) Adjust oscillator magnetite core screw L20 (top of oscillator coil) so that maximum (peak) amplitude of output is shown on the oscillograph screen.

(o) Set receiver dial pointer to **1,500 kc.** Tune test oscillator to **1,500 kc.** Adjust the oscillator and antenna air trimmers C47 and C5 for maximum (peak) output.

(p) Set test oscillator to **600 kc** and tune receiver to pick up this signal **near 600 kc.** Re-adjust the oscillator magnetite core screw L20 for maximum (peak) output while rocking the receiver gang tuning condenser back and forth through this signal.

(q) Repeat adjustments in (o) above to correct for any changes in the oscillator tuning caused by the adjustment of L20. Tighten lock nuts on **C47** and **C5** after each is adjusted.

Antenna and Ground Terminals

These receivers are equipped with an antenna-ground terminal board having three terminals. These terminals are marked "A2," "A1," and "G," the latter being the ground terminal.

nected to a good external ground. The transmission line leads of the RCA RK-40A antenna system should be connected to terminals "A2" and "A1." The receiver coupling units of the RCA RK-40 and the RCA Spider-Web antenna systems should be connected to terminals "A1" and "G." Connect a single-wire antenna to terminal "A1."

Phonograph Attachment

A terminal board is provided for connecting a phonograph into the audio amplifying circuit. Typical methods of connecting a low-impedance pickup, or the RCA Victor Models R-93, R-93-2, and R-93-S Record Players are shown on the schematic diagram (figure 1).

Loudspeaker

Centering of the loudspeaker voice coil is made in the usual manner with three narrow paper feelers after first removing the front paper dust cover. This may be removed by softening its cement with a very light application of acetone using care not to allow the acetone to flow down into the air gap. The dust cover should be cemented back in place with ambroid upon completion of adjustment.

Power Supply (Models 8BT and 8BK)

Filament voltage for these receivers is obtained from either a 2½-volt Air-cell or a 2-volt storage battery. When the Air-cell is used, the 0.36 ohm resistor **R25** must be connected in series with the A- battery lead as shown on figure 9. When operating on a 2-volt storage battery, this resistor **R25** should be removed. Plugs are provided on the battery cable (see figure 9) for plugging in the Air-cell and B batteries. The A-battery plug should be removed when operating on a 2-volt storage battery. The 7½-volt C battery is located on the top-side of the chassis and securely held in place by a metal cover (see figure 3). The four bias cells are located underneath the chassis (see figures 2 and 6).

Power Supply (Models 8BT6 and 8BK6)

The vibrator power unit supplies the necessary plate, grid, and cathode voltages for proper operation of these receivers. It contains a plug-in type vibrator, step-up transformer, and an efficient filter system. Rectification of the high voltage is accomplished by means of the synchronous vibrator. The complete unit is acoustically shielded to prevent noise. The vibrator-power-unit chassis should be insulated from the receiver chassis, when removed for service, to avoid vibrator buzz. The vibrator unit has been carefully adjusted by means of special equipment to insure quiet operation over an extensive period of life. No adjustments should be attempted on a vibrator suspected of being in a defective condition, but a renewal installed. The plug-in arrangement affords easy removal or replacement.

A 6-volt storage battery supplies power for the vibrator and for the tube filaments. Four connections are required to the 6-volt battery. The + 6-volt (black) lead and the + 4-volt (blue) lead supply filament voltage to the receiver, while the + 4-volt (red) lead and — volt (yellow) lead supply voltage to the vibrator power unit. The two 4-volt leads (blue and red) should make separate connections to the same battery strap to avoid against vibrator buzz which might otherwise result if these two leads are joined together or touch each other. The 7½-volt C battery is located on the top-side of the receiver chassis and securely held in place by a metal cover (see figure 3). The four bias cells are located underneath the receiver chassis (see figures 2 and 6).

Stock No.	Description	List Price
	RECEIVER ASSEMBLIES	
12806	Board—3-contact antenna and ground terminal board and bracket assembly	.25
12717	Board—3-contact phonograph terminal board	.22
5237	Bushing—Variable condenser mounting bushing assembly—Package of 3	.43
12118	Cap—Grid contact cap—Package of 5	.15
12714	Capacitor—Adjustable trimmer (C3, C4, C5, C44, C46, C47)	.38
12814	Capacitor—5.6 Mmfd. (C51)	.20
12896	Capacitor—15 Mmfd. (C59)	.20
12948	Capacitor—33 Mmfd. (C52)	.20
12723	Capacitor—56 Mmfd. (C2)	.20
12950	Capacitor—120 Mmfd. (C50)	.25
12404	Capacitor—120 Mmfd. (C18, C19, C20)	.26
12724	Capacitor—120 Mmfd. (C24)	.28
12946	Capacitor—130 Mmfd. (C11, C12, C15, C16)	.20
12725	Capacitor—150 Mmfd. (C1)	.28
12952	Capacitor—330 Mmfd. (C49)	.25
12727	Capacitor—555 Mmfd. (C48)	.20
12537	Capacitor—560 Mmfd. (C6)	.20
12947	Capacitor—1,800 Mmfd. (C45)	.40
12951	Capacitor—2,200 Mmfd. (C42)	.40
5107	Capacitor—.0025 Mfd. (C21, C27, C28)	.16
5005	Capacitor—.0035 Mfd. (C25)	.16
4868	Capacitor—.005 Mfd. (C30)	.20
4858	Capacitor—.01 Mfd. (C9, C10, C13, C14, C40, C41, C55, C56)	.25
5196	Capacitor—.035 Mfd. (C29)	.18
4841	Capacitor—0.1 Mfd. (C17, C57)	.22
4840	Capacitor—0.25 Mfd. (C8, C23, C39, C58)	.30
12804	Capacitor—Pack, comprising 2 sections 8 Mfd. each (C43, C54)	1.70
12179	Coil—Choke coil (L25)	.45
12708	Coil—Antenna coil and shield complete (L1, L2, L3, L4)	2.04
12943	Coil—Oscillator coil and shield complete (L5, L6, L7, L8, L19, L20, L21)	2.30
12701	Condenser—2-gang variable tuning condenser (C7, C53)	4.00
5119	Connector—3-contact female connector for speaker cable	.25
12805	Connector — 5-contact male receptacle located on rear of receiver chassis for power cable	.20
12800	Core—Adjustable core and stud for Stock No. 12943	.20
12006	Core—Adjustable core and stud for Stock No. 12945 and 12949	.22
12664	Core—Adjustable core and stud for Stock No. 12654	.22
12681	Cell—Bias cell	.30
12940	Dial—Station selector dial	.85
12702	Drive—Vernier drive complete for variable tuning condenser	.68
12808	Holder—Bias cell holder	.35
12712	Indicator—Station selector indicator pointer	.22
4348	Lamp—Dial lamp, 2-volt	.38
12941	Mask—Dial light diffuser	.15
5112	Resistor—1,000 ohm—carbon type—¼ watt—Package of 5 (R15, R20)	1.00
11305	Resistor—22,000 ohm—carbon type—¼ watt—Package of 5 (R24)	1.00
11364	Resistor—33,000 ohm—carbon type—¼ watt—Package of 5 (R22)	1.00
12454	Resistor—33,000 ohm—insulated type—¼ watt—Package of 5 (R14)	1.00
11282	Resistor—56,000 ohm—carbon type—1/10 watt—Package of 5 (R4)	.75
5029	Resistor—56,000 ohm—carbon type—¼ watt—Package of 5 (R26)	1.00
5145	Resistor—100,000 ohm—carbon type—¼ watt—Package of 5 (R16, R18)	1.00
12478	Resistor—150,000 ohm—carbon type—1/10 watt—Package of 5 (R23)	.75
5158	Resistor—220,000 ohm—carbon type—¼ watt—Package of 5 (R17, R19)	1.00
11323	Resistor—270,000 ohm—carbon type—¼ watt—Package of 5 (R9)	1.00
11452	Resistor—470,000 ohm—carbon type—1/10 watt—Package of 5 (R1)	.75
3033	Resistor—1 meg.—carbon type—¼ watt—Package of 5 (R2, R6)	1.00
12200	Resistor—1 meg.—insulated type—¼ watt—Package of 5 (R10)	1.00
11626	Resistor—2.2 meg.—carbon type—¼ watt—Package of 5 (R3, R8)	1.00
12651	Shield—Coil shield for Stock No. 12708	.22
12710	Shield—Coil shield for Stock No. 12943	.28
12008	Shield—I.F. transformer shield for Stock No. 12945 and 12949	.28
12581	Shield—I.F. transformer shield top for Stock No. 12949	.36
12607	Shield—I.F. transformer shield top for Stock No. 12945	.30
4236	Shield—Front 1A4 Radiotron shield	.22
3682	Shield—1A4, 1B4, 1A6 or 1F6 Radiotron shield	.22
4794	Socket—4-contact 1A4, 1B4 or 30 Radiotron socket	.15
4814	Socket—5-contact 49 Radiotron socket	.15
4786	Socket—6-contact 1A6 or 1F6 Radiotron socket	.15
11199	Socket—Dial lamp socket	.14
12007	Spring—Retaining spring for core Stock Nos. 12800, 12006 and 12664—Package of 10	.36
12942	Switch—Range switch (S1, S2)	1.60
11219	Tone Control—(R21)	1.00
12944	Transformer—Audio transformer pack (T1, T2)	5.20
12945	Transformer—First I.F. transformer complete (L23, L24, C11, C12)	1.85
12945	Transformer — Second I.F. transformer complete (L9, L10, C15, C16)	1.85
12949	Transformer—Third I.F. transformer complete (L11, L12, C18, C19, C20, R4)	2.10
12654	Trap—Wave trap (L22)	.75
11589	Volume Control—(R5)	.85
	REPRODUCER ASSEMBLIES Console Model 8BK—8BK6	
12667	Cone—Reproducer cone and dust cap (L13)	1.00
5118	Plug—3-contact male connector for reproducer	.25
9713	Reproducer—Complete	14.85
	REPRODUCER ASSEMBLIES Table Model 8BT—8BT6	
12642	Cone—Reproducer cone and dust cap (L13)	.94
5118	Plug—3-contact male connector for reproducer	.25
9712	Reproducer—Complete	6.60
	VIBRATOR ASSEMBLIES 8BT6—8BK6	
4289	Body—Fuse connector female body—Package of 10	.35
12822	Cable—Power cable (set end) approximately 63-in. long complete with one 5-contact female connector and one 4-contact male connector—less power switch—used in 8BT6 Model only	4.50
12823	Cable—Power cable (set end) approximately 44-in. long complete with one 5-contact female connector and one 4-contact male connector—less power switch—used in 8BK6 Model only	4.00
4288	Cap—Fuse connector male cap—Package of 10	.36
4937	Capacitor—.01 Mfd. (2 used in parallel) (C31, C32)	.25
4836	Capacitor—.05 Mfd. (C36)	.30
4841	Capacitor—0.1 Mfd. (C35)	.22
12821	Capacitor—0.1 Mfd. (C38)	.40
12820	Capacitor—0.25 Mfd. (C34)	.45
4840	Capacitor—0.25 Mfd. (C33)	.30
11387	Capacitor—10 Mfd. (C37)	.86
12819	Coil—Vibrator choke coil and terminal board assembly (L17)	.40
12179	Coil—Vibrator choke coil (L15)	.45
12793	Connector—4-contact male connector for power cable	.25
12791	Connector—5-contact female connector and cover for power cable	.30
4286	Ferrule—Fuse connector ferrule and bushing—Package of 10	.38
10907	Fuse—3-ampere—Package of 5 (F1)	.40
4290	Insulator—Fuse connector body insulator—Package of 10	.35
12813	Reactor—Air core reactor (L14)	.80
12818	Reactor—Iron core (L18)	.95
12825	Resistor—4 ohm—flexible type—(R13)	.25
5034	Resistor—56 ohm—carbon type—½ watt—Package of 5 (R11, R12)	1.00
4814	Socket—5-contact vibrator socket	.15
4284	Spring—Fuse connector spring—Package of 10	.30
12824	Switch—Power switch (S3, S4)	1.00
12816	Transformer—Vibrator transformer (T3)	3.00
12817	Vibrator—Complete (L16)	4.85
4285	Washer—Fuse connector insulating washer—Package of 10	.22
	MISCELLANEOUS ASSEMBLIES	
4289	Body—Fuse connector female body—Package of 10 (8BT—8BK)	.35
12938	Cable—Power cable (set end) approximately 60-in. long complete with four 2-contact male connectors and one 5-contact female connector—less power switch (8BT—8BK)	4.40
12786	Cable—Power cable (battery section) complete with battery connectors and female section of 4-contact connector (8BT6—8BK6)	2.00
4288	Cap—Fuse connector male cap—Package of 10 (8BT—8BK)	.36
12827	Connector—2-contact and guide pin male connector and cover for power cable Stock No. 12938 (8BT—8BK)	.30
12828	Connector—2-contact male connector for power cable Stock No. 12938 (8BT—8BK)	.20
12788	Connector—4-volt battery connector for Stock No. 12786—Package of 2 (8BT6—8BK6)	.20
12790	Connector—4-contact female connector for cable Stock No. 12786 (8BT6—8BK6)	.45
12791	Connector—5-contact female connector and cover for power cable for Stock No. 12938 (8BT—8BK)	.30
12787	Connector—6-volt battery connector for Stock No. 12786—Package of 2 (8BT6—8BK6)	.20
12698	Crystal—Station selector dial escutcheon and crystal	1.02
4286	Ferrule—Fuse connector ferrule and bushing—Package of 10 (8BT—8BK)	.38
3748	Fuse—½ ampere—Package of 5 (F1) (8BT—8BK)	.40
4290	Insulator—Fuse connector body insulator—Package of 10 (8BT—8BK)	.35
12699	Knob—Station selector knob (large)—Package of 5	.68
12700	Knob — Station selector vernier knob (small)—Package of 5	.58
11347	Knob—Volume control, range switch, tone switch or power switch knob—Package of 5	.75
12939	Resistor—0.36 ohm—flexible type—Package of 5 (R25) (8BT—8BK)	.55
11377	Screw—Chassis mounting screw assembly for table model only—Package of 4 (8BT—8BT6)	.12
12829	Switch—Power switch (S3) (8BT—8BK)	1.05
4285	Washer—Fuse connector insulating washer—Package of 10 (8BT—8BK)	.22

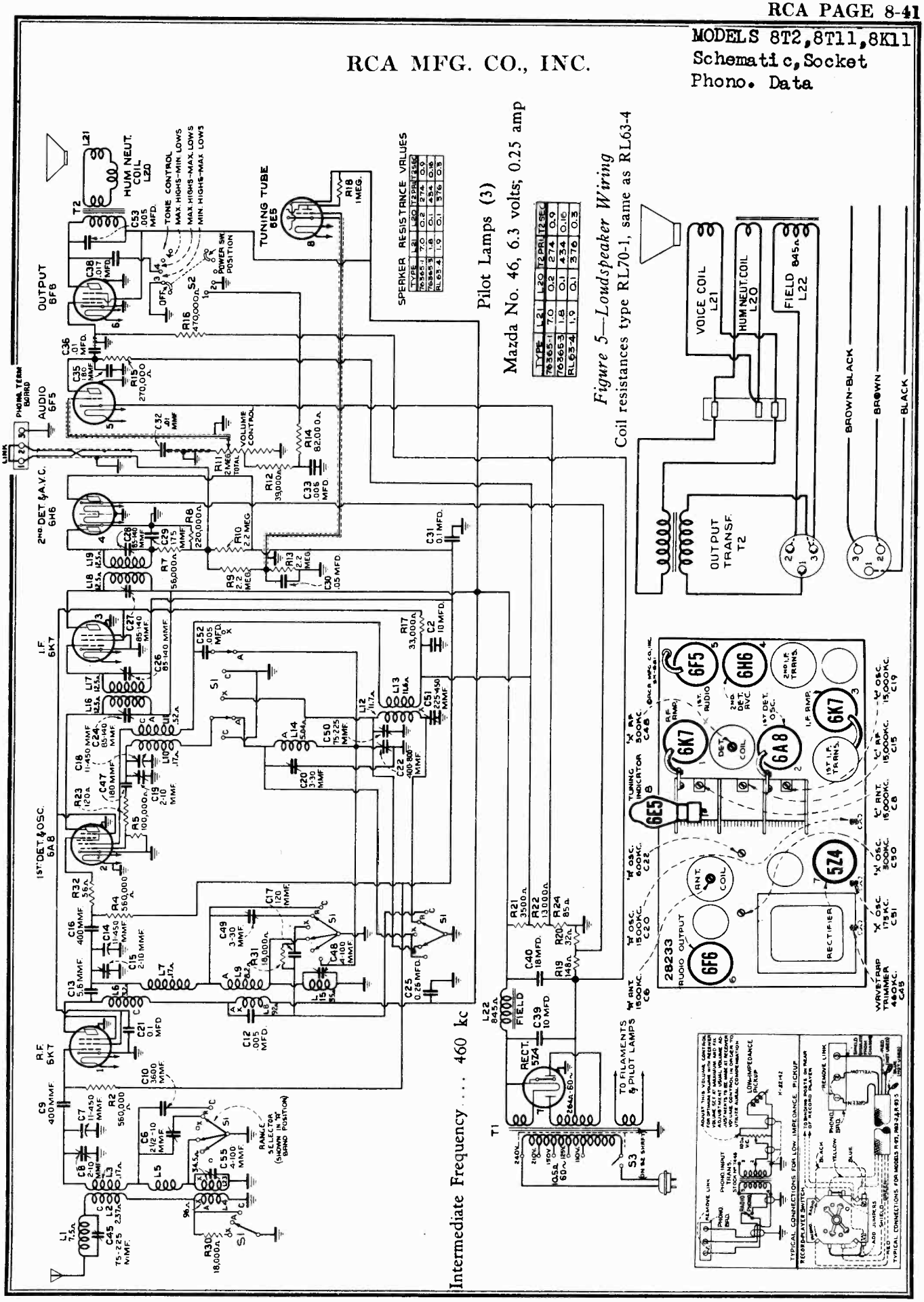
The prices quoted above are subject to change without notice.

Stock No.	DESCRIPTION	List Price
	RECEIVER ASSEMBLIES	
12706	Arm—Arm and hub assembly for operating shutter	$0.22
13098	Board—Antenna and ground terminal board	.25
12717	Board—Phonograph terminal board	.22
5237	Bushing—Variable tuning condenser mounting bushing assembly—Package of 3	.43
11625	Cable—Radiotron tuning tube cable complete with socket	1.26
12511	Cap—Contact cap—Package of 5	.15
4955	Capacitor—Adjustable trimmer (C45)	.48
11256	Capacitor—Adjustable trimmer (C50)	.48
11465	Capacitor—Adjustable trimmer (C22)	.48
12065	Capacitor—Adjustable trimmer (C51)	.65
12814	Capacitor—5.6 Mmfd.—(C13)	.20
12974	Capacitor—120 Mmfd.—(C17)	.20
13003	Capacitor—180 Mmfd.—(C35, C47)	.20
5116	Capacitor—175 Mmfd.—C29)	.18
11290	Capacitor—400 Mmfd.—(C9, C16)	.25
11621	Capacitor—3,600 Mmfd.—(C10)	.38
4868	Capacitor—.005 Mfd.—(C12, C33, C52, C53)	.20
11451	Capacitor—.017 Mfd.—(C38)	.18
11395	Capacitor—.01 Mfd.—(C32)	.18
4858	Capacitor—.01 Mfd.—(C36)	.25
4839	Capacitor—0.1 Mfd.—(C21)	.28
4841	Capacitor—0.1 Mfd.—(C31)	.22
5170	Capacitor—0.25 Mfd.—(C25)	.25
4836	Capacitor—.05 Mfd.—(C30)	.30
11240	Capacitor—10 Mfd.—(C39)	1.08
11387	Capacitor—10 Mfd.—(C2)	.86
5212	Capacitor—18 Mfd.—(C40)	1.16
12061	Coil—Antenna coil—Less shield—(L2, L3, L4, L5, L23, C6, C55)	1.90
12062	Coil—Detector coil—Less shield—(L6, L7, L8, L9, L15, C48, C49)	1.94
12063	Coil—Oscillator coil—Less shield—(L10, L11, L12, L13, L14, C20)	2.62
12965	Condenser—Three-gang variable tuning condsenser—(C7, C8, C14, C15, C18, C19)	6.15
13094	Dial—Station selector dial scale	$1.05
11394	Foot—Chassis foot assembly—Package of 2	.70
12712	Indicator—Station selector indicator pointer	.22
5226	Lamp—Dial lamp—Package of 5	.70
12718	Mask—Dial Light Diffuser with colored screen	.40
11393	Resistor—Voltage divider resistor—comprising one 3,500 ohm and one 13,000 ohm sections—(R21, R22)	.74
11329	Resistor—Voltage divider resistor—comprising one 148 ohm, one 32 ohm and one 85 ohm sections—(R19, R20, R24)	.52
12075	Resistor—56 ohms—Flexible type complete with contact cap—(R32)	.28
12071	Resistor—120 ohms—Carbon type—¼ watt—(R23)—Package of 5	1.00
12070	Resistor—18,000 ohms—Carbon type—1/10 watt—(R30, R31)—Package of 5	.75
5033	Resistor—33,000 ohms—Carbon type—1 watt—(R17)—Package of 5	1.10
11322	Resistor—39,000 ohms—Carbon type—¼ watt—(R12)—Package of 5	1.00
11365	Resistor—82,000 ohms—Carbon type—¼ watt—(R14)—Package of 5	1.00
3118	Resistor—100,000 ohms—Carbon type—¼ watt—(R5)—Package of 5	1.00
11453	Resistor—270,000 ohms—Carbon type—1/10 watt—(R15)—Package of 5	.75
11452	Resistor—470,000 ohms—Carbon type—1/10 watt—(R16)—Package of 5	.75
11397	Resistor 560,000 ohms—Carbon type—1/10 watt—(R2, R4)—Package of 5	.75
12013	Resistor—1 megohm—Carbon type—1/10 watt—(R18)—Package of 5	.75
11626	Resistor—2.2 megohms—Carbon type—¼ watt—(R9, R10, R13)—Package of 5	1.00
4669	Screw—No. 8-32 set screw for arm stk No. 12706—Package of 10	.25
12064	Shield—Antenna or detector coil shield	.28
11604	Shield—Oscillator coil shield	$0.24
11390	Shield—Intermediate frequency transformer shield	.25
12735	Shield—Dial lamp shield—Package of 5	.25
12971	Shutter—Dial scale holder and shutter assembly	.85
11222	Socket—Dial lamp socket	.18
11195	Socket—5-contact rectifier Radiotron socket	.15
11198	Socket—7-contact 6K7—6P5—or 6H6 Radiotron socket	.15
11196	Socket—8 contact 6A8 or 6F6 Radiotron socket	.15
12966	Switch—Range switch—(S1)	1.75
11392	Switch—Tone control and power switch assembly—(S2, S3)	1.14
11388	Transformer—First intermediate frequency transformer—(L16, L17, C24, C26)	1.90
11389	Transformer—Second intermediate frequency transformer—(L18, L19, C27, C28, C29, R7, R8)	3.02
11804	Transformer—Power transformer—105-125 volts—25-50 cycles (T1)	6.02
11805	Transformer—Power transformer—105-130, 140-160, 195-250 volts—40-60 cycles (T1)	7.95
11667	Trap—Wave trap—(L1, C45)	1.22
13144	Volume control—(R11)	1.00
	REPRODUCER ASSEMBLIES	
	Speaker No. RL63-4 or RL70-1	
11232	Board—Terminal board with two lead wire clips	.18
11231	Bolt—Yoke and core assembly bolt and nut	.16
8060	Bracket—Output transformer mounting bracket	.14
11257	Clamp—Cone center suspension clamping nut and screw assembly—Package of 5	.25
11254	Coil—Field coil—(L22)	2.00
11233	Coil—Neutralizing coil (L20)	.30
11235	Cone—Reproducer cone—(L21)—(Speaker No. RL63-4)—Models 8T2 or 8T11	1.00
11258	Cone—Reproducer cone—(L21)—(Speaker No. RL70-1)—Model 8K11	1.00
5119	Connector—3-contact female connector for reproducer cable	.25
5118	Connector—3 contact male connector for reproducer	.25
9618	Reproducer—Complete (Speaker No. RL63-4)—Models 8T2 or 8T11	6.40
9619	Reproducer—Complete (Speaker No. RL70-1)—Model 8K11	6.05
11253	Transformer—Output transformer—(T2)	1.56
11886	Washer—Spring washer used to hold field coil securely—Package of 5	.20
	Speaker No. 76365-1	
11836	Cone—Reproducer cone	1.75
5118	Connector—3-contact male connector for reproducer	.25
9634	Reproducer—Complete	$6.40
11837	Transformer—Output transformer (Field and hum coils are not removable)	1.56
11844	Coil—Field coil	2.00
11842	Coil—Hum neutralizing coil	.30
11838	Cone—Reproducer Cone	2.00
5118	Connector—3 contact male connector for reproducer	.25
9635	Reproducer—Complete	6.40
11839	Spring—Reproducer center support clamping spring—Package of 2	.30
11843	Transformer—Output transformer	1.56
	MISCELLANEOUS ASSEMBLIES	
11996	Bracket—Tuning tube mounting bracket and clamp	.22
12666	Cover—Reproducer cover—(Model 8K11)	.65
12698	Crystal—Station selector escutcheon and crystal—(Model 8T2)	1.02
13303	Crystal—Station selector escutcheon and crystal—(Model 8T11 or 8K11)	1.50
11276	Escutcheon—Tuning tube escutcheon—(Model 8T2)	.40
13275	Escutcheon—Tuning tube escutcheon (Model 8T11 or 8K11)	.25
11347	Knob—Range switch, tone control or volume control knob—Package of 5 (Model 8T2)	.75
11610	Knob—Station selector knob—includes one large and one small knob—Package of 5—(Model 8T2)	1.00
13304	Knob—Large station selector knob—Model 8T11 only—Package of 5	.75
13395	Knob—Large station selector knob—Model 8K11 only—Package of 5	.80
13305	Knob—Small (Vernier) Station selector knob—Model 8T11 only—Package of 5	.80
13396	Knob—Small (Vernier) Station selector knob—Model 8K11 only—Package of 5	.75
13306	Knob—Tone control, volume control or range switch knob—Model 8T11 only—Package of 5	.80
13278	Knob—Tone control, volume control or range switch knob—Model 8K11 only—Package of 5	.80
11210	Screw—Chassis mounting screw assembly for console model only—Package of 4	.28
11377	Screw—Chassis mounting screw assembly for table model only—Package of 4	.12
4982	Spring—Retaining spring for large knob in Stk. No. 11610, 13304 and 13395—Package of 10	.50
11349	Spring—Retaining spring for knob Stk. No. 11347, 13278, 13305, 13306, 13396 and small knob in Stk. No. 11610—Package of 5	.25

The prices quoted above are subject to change without notice.

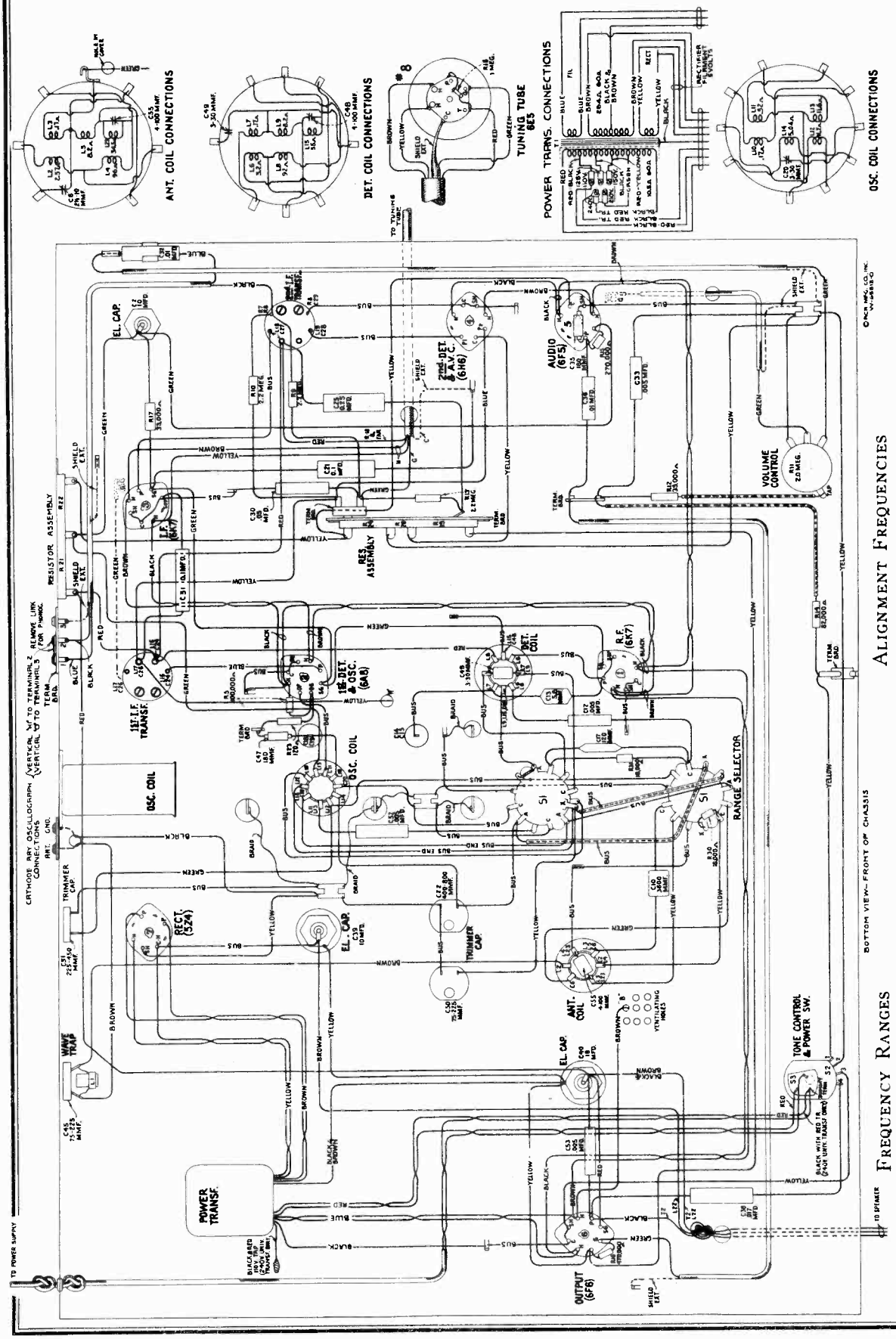
MODELS 8T2, 8T11, 8K11
Schematic, Socket
Phono. Data

RCA MFG. CO., INC.



MODELS 8T2,8T11,8K11
Chassis Wiring

RCA MFG. CO., INC.



MODELS 8T2,8T11,8K11
Voltage,Resistance
Trimmers

RCA MFG. CO., INC.

Power Supply Ratings

Rating A ..... 105-125 volts, 50-60 cycles, 100 watts
Rating B ..... 105-125 volts, 25-60 cycles, 105 watts
Rating C ..... 100-130/140-160/195-250 volts, 40-60 cycles, 100 watts

Power Output Rating

Undistorted ..... 2¼ watts
Maximum ..... 5 watts

Loudspeaker

Type ..... Electrodynamic
Voice Coil Impedance ..... 2.25 ohms at 400 cycles

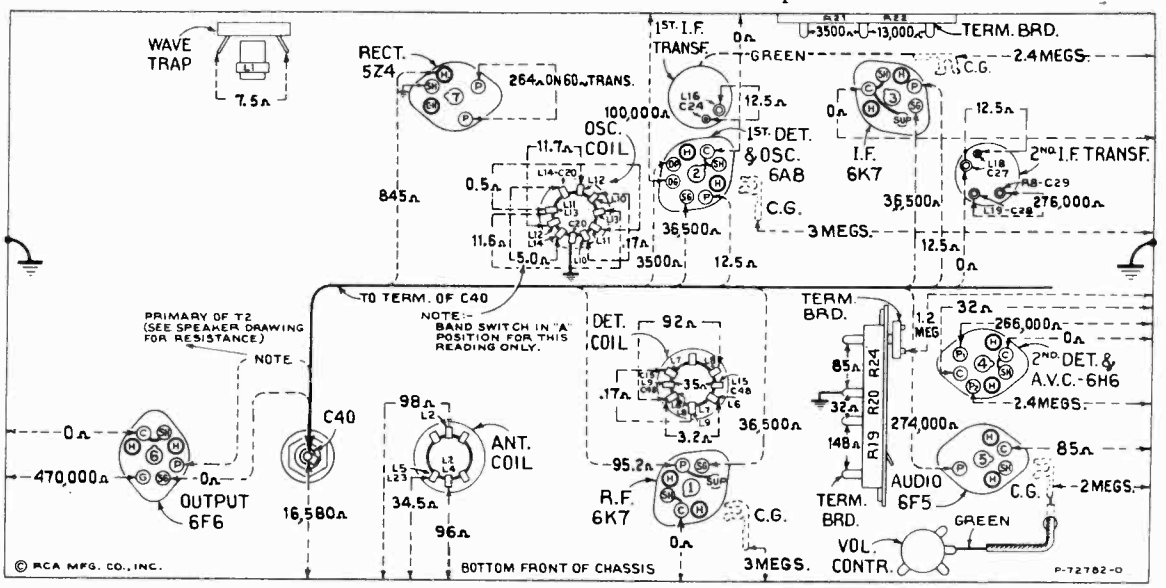


Figure 4—Resistance Diagram

Power supply disconnected—Radiotrons in sockets—Tuning condenser in full-mesh—Range selector in "Long wave" position—Volume control maximum—Power switch-Tone in "OFF" position

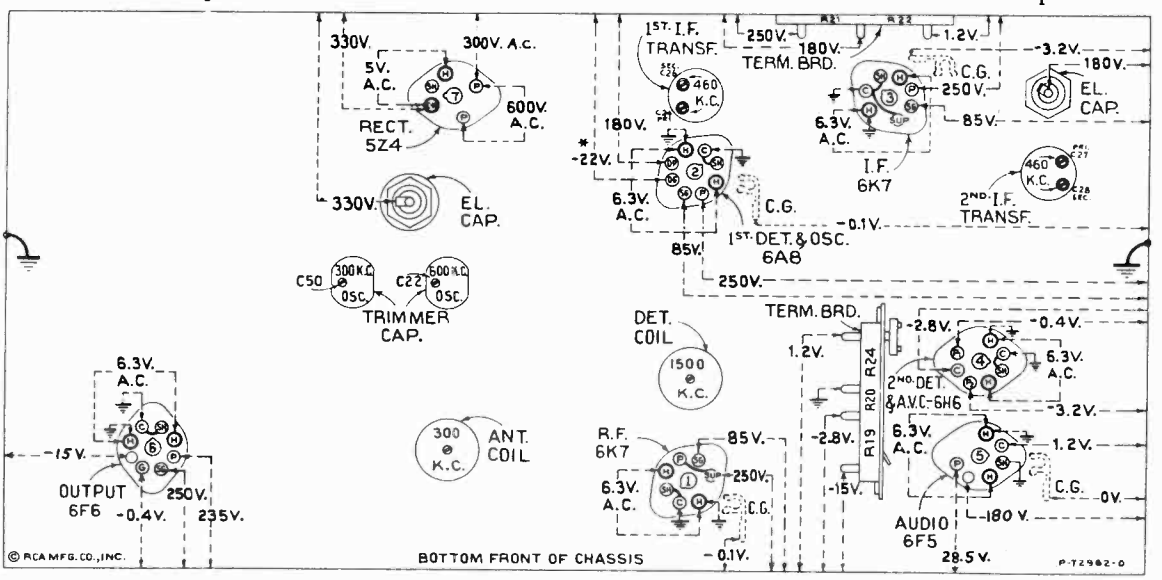


Figure 6—Radiotron Socket Voltages, Coil, and Trimmer Locations

Measured at 115 volts, 60-cycle supply—Tuned to approximately 1,000 kc—No signal being received—Volume control minimum—Power switch–Tone full clockwise

Radiotron Cathode Current Readings

Measured with Milliammeter Connected at Tube Socket Cathode Terminals under Conditions Similar to Those of Voltage Measurements

(1) RCA-6K7—R-F ..... 12.5 ma.
(2) RCA-6A8—Det.-Osc. ..... 13.8 ma.
(3) RCA-6K7—I.F. ..... 9.0 ma.
(4) RCA-6H6—2nd Det.-A.V.C. ..... —
(5) RCA-6F5—Audio ..... 0.25 ma.
(6) RCA-6F6—Power ..... 40.0 ma.
(7) RCA-5Z4—Rect. ..... 90.0 ma.*
(8) RCA-6E5—Eye ..... 3.0 ma.

(* Cannot be measured at socket.)

The conventional Superheterodyne type of circuit, consisting of an r-f stage, a combined first-detector—oscillator stage, a single i-f stage, a diode-detector—automatic-volume-control stage, an audio voltage-amplifier stage, an audio power-output stage, and a high-voltage rectifier power-supply stage is used.

Tuned Circuits

The antenna coil system and the detector coil system each consist of two series-connected primary and three series-connected secondary windings to provide the three ranges of tuning. The oscillator coil system is wound on a single form. A range selector switch (S1) is used for connecting the various sections of these three coil systems into the circuit to provide operation on the band desired. The coils are tuned by a variable three-section gang condenser having trimmer capacitors in shunt with each section. There are additional trimmer capacitors across the section of each coil used for the "Medium wave" (A) band as well as the "Long wave" (X) band. A series trimmer is also associated with the "Medium wave" (A) and "Long wave" (X) band oscillator coils.

The intermediate-frequency amplifier system consists of an RCA-6K7 in a transformer-coupled circuit. This stage operates at a basic frequency of 460 kc. Each winding of both i-f transformers (input and output) is tuned by an adjustable trimmer.

Detector and A.V.C.

The modulated signal as obtained from the output of the i-f stage is detected by an RCA-6H6 twin-diode tube (No. 1 di de). The audio frequency secured by this process is transferred to the a-f system for amplification and final reproduction. The d-c voltage which results from detection of the signal is used for automatic volume control. This voltage, which develops across resistor R8, is applied as automatic control-grid bias to the r-f, first-detector, and i-f tubes through a suitable resistance filter circuit. The No. 2 diode of the RCA-6H6 is used to supply residual bias for the controlled tubes under conditions of little or no signal. This diode, under such conditions, draws current which flows through resistors R10 and R8, thereby maintaining the desired minimum operating bias on such tubes. On application of signal energy above a certain level, however, the auxiliary bias-diode ceases to draw current and the a.v.c diode takes over the biasing function.

Audio System

The manual volume control consists of an acoustically tapered potentiometer in the audio circuit between the output of the detector diode and the input grid of the audio-voltage-amplifier tube. This control has a tone compensating filter connected to it so that the correct aural balance will be obtained at different volume settings.

Resistance-capacitance coupling is used between the first-audio stage and the power-output stage. The output of the power amplifier is transformer-coupled into the dynamic loudspeaker. High-frequency tone control is effected by a capacitor across the plate circuit of the output tube. Speech-music control is effected by a resistor connected to the compensated volume control circuit. Control of tone is obtained by means of the switch (S?).

"Magic Eye"

An RCA-6E5 cathode-ray tuning tube is used as a means of visually indicating when the receiver is accurately tuned to the incoming signal. This tube consists of an amplifier section and a cathode-ray section built in the same glass envelope. Correct tuning of the receiver to the incoming carrier is evidenced by the minimum width of the dark sector of the tuning tube.

Rectifier

The power required for operation of this receiver is supplied through transformer T1. This transformer has an efficient electrostatic shield between its primary and secondary windings. This shield prevents interference which is on the power-supply circuit from entering the receiver and conversely reduces the tendency of the receiver to re-radiate into the power circuit. An RCA-5Z4 furnishes the d-c voltages necessary for plate, screen, cathode, and grid potentials. The field winding of the loudspeaker is used as a reactor in the filter circuit from which it simultaneously receives its magnetizing current.

Alignment Procedure

Precise alignment is vital to the proper functioning of this receiver. There are four trimming adjustments provided in the i-f system, five in the oscillator coil system, three in the detector coil system, and three in the antenna coil system. Each of these trimmers has been accurately adjusted during manufacture and should remain properly aligned unless affected by abnormal conditions of climate or have been altered for service purposes. Incorrect alignment is usually evidenced by loss of sensitivity, improper tone quality, and poor selectivity. These indications will generally be present together.

The correct performance of these receivers can only be obtained when the alignment is performed with adequate and reliable test apparatus and in the sequence given. The manufacturer of these instruments has a complete assortment of such service equipment available for sale through its dealers and distributors.

A test oscillator (signal generator) is required as a source of the specified alignment frequencies. Visual indication of the receiver output during the adjustments is necessary to enable the serviceman to obtain an accuracy of alignment which is not possible by listening to the signal. The **RCA Stock No. 9595 Full-Range Test Oscillator** and the **RCA Stock No. 4317 Neon Output Indicator** are especially suitable and fulfill the above requirements.

The following procedure should be adhered to in adjusting the various trimmer capacitors.

I-F Trimmer Adjustments

The four trimmers of the two i-f transformers are located as shown by figure 6. Each must be aligned to a basic frequency of **460 kc.** To do this, attach the output indicator across the voice-coil circuit. Attach the receiver chassis to a good external ground. Connect the output of the test oscillator between the control-grid of the RCA-6A8 first-detector tube and chassis-ground through a **.001 mfd.** capacitor. Tune the test oscillator to **460 kc.** Advance the receiver volume control to its full-on position and adjust the receiver tuning control to a point where no interference is encountered from broadcast stations, or short stator of oscillator tuning capacitor **C18** to chassis eliminating local oscillator signals. Increase the output of the test oscillator until a slight indication is apparent on the output indicator. Adjust the two trimmers, **C28** and **C27** of the second i-f transformer to produce maximum (peak) indicated receiver output. Then, adjust the two trimmers, **C26** and **C24**, of the first i-f transformer for maximum (peak) receiver output as shown by the indicating device. During these adjustments, regulate the test-oscillator output so that the receiver output indication is always as low as possible. By doing so, broadness of tuning, due to a.v.c., action will be avoided. It is advisable to repeat the adjustment of all i-f trimmers a second time to assure that the inter-action between them has not disturbed the original adjustment.

R-F Trimmer Adjustments

The eleven trimmers associated with the r-f, first detector, and oscillator tuned circuits have their locations shown by figures 3 and 6. The three trimmers which are at all times directly in shunt with the variable tuning condensers necessitate that the "Short wave" (C) band be aligned first. The range selector switch should, therefore, be turned to its "Short wave" position for the first adjustments. Leave the output indicator connected to the output system.

Calibrate the dial by rotating the tuning control until the variable condenser plates are in their full-mesh (maximum capacity) position and adjust the dial pointer so that its end points to the horizontal graduation (520 kc) at the low-frequency end of the "Medium wave" (A) dial scale.

Wave-Trap Adjustment

Connect the test oscillator to the antenna and ground terminals of the receiver, leaving it tuned to 460 kc. Adjust the wave-trap trimmer **C45** for maximum suppression of the **460 kc** signal. An increase in test-oscillator output may be necessary before the point of minimum output (maximum suppression of signal) is obtained.

"Short Wave" Band

(a) Adjust the test oscillator to **15,000 kc** and set the receiver tuning control to a dial reading of **15,000 kc.**

(b) Adjust trimmer **C19** on the oscillator section of the variable condenser to the point at which it produces maximum indicated receiver output. Two points may be found, each of which produces such a maximum. The one of **maximum trimmer capacitance** is correct and should be used. The local (heterodyne) oscillator will be **460 kc** below the signal frequency at this adjustment point.

(c) Adjust trimmer **C15** of the detector section of the variable condenser, simultaneously rocking the receiver tuning control backward and forward through the **15,000 kc** input signal, until maximum receiver output results from these combined operations.

(d) With the receiver tuning control set to **15,000 kc** adjust trimmer **C8** on the antenna section of the variable condenser to the point which produces maximum (peak) indicated receiver output.

"Medium Wave" Band

(e) Change the receiver range selector to its "Medium wave" (A) band position and set the receiver tuning control to a dial reading of **1,500 kc.** Tune the test oscillator to **1,500 kc** and regulate its output to produce a slight indication on the receiver output indicating device.

(f) Adjust the high-frequency trimmers of the oscillator, detector, and antenna coils, **C20, C49** and **C6** respectively, to the points at which each produces maximum indicated receiver output.

(g) Shift the test-oscillator frequency to **600 kc** and tune the receiver to pick up this signal, disregarding the dial reading at which it is best received.

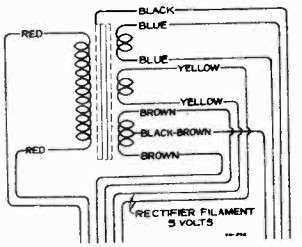
(h) Adjust the low-frequency trimmer **C22** of the oscillator coil, simultaneously rocking the tuning control of the receiver backward and forward through the signal, until maximum indicated receiver output results from these combined operations. The adjustment of **C19, C15** and **C8** should be corrected at **15,000 kc** as in (b), (c), and (d); also **C20, C49** and **C6** should be corrected at **1,500 kc,** as in (f) to compensate for any changes caused by the adjustment of the low-frequency oscillator coil trimmer **C22.**

"Long Wave" Band

(i) Change receiver band selector to "Long wave" (X) band and set receiver tuning control to a dial reading of **300 kc.** Tune test oscillator to **300 kc** and adjust oscillator, detector, and antenna trimmers **C50, C48** and **C55,** respectively, for maximum indicated receiver output.

(j) Set receiver to **175 kc** and tune test oscillator to **175 kc.** Adjust trimmer **C51** for maximum indicated output, simultaneously rocking tuning control of the receiver backward and forward through the signal.

(k) The adjustment of **C50, C48** and **C55** should now be repeated at **300 kc** as described in (i) to compensate for any changes caused by the adjustment of the low-frequency trimmer **C51.**



D. C. Resistance Values

110 volts, 50-60 cycles	110 volts, 25 cycles
Primary, 5.34 ohms	Primary, 7.37 ohms
Secondary, 330 ohms	Secondary, 430 ohms

Figure 7—Standard Transformer

RCA MFG. CO., INC.

MODEL 8U
Schematic, Trans. Data
Spkr. Wiring

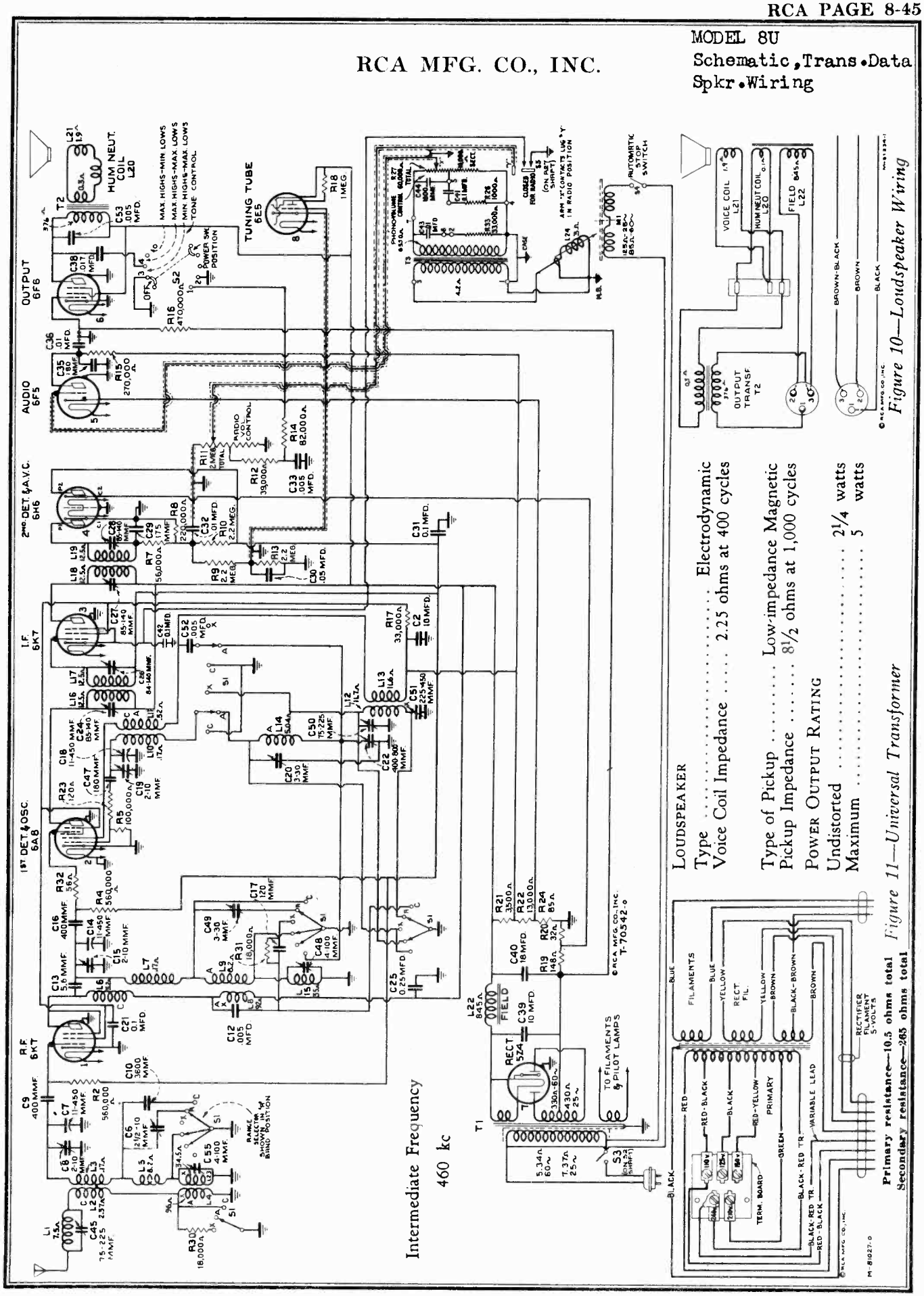
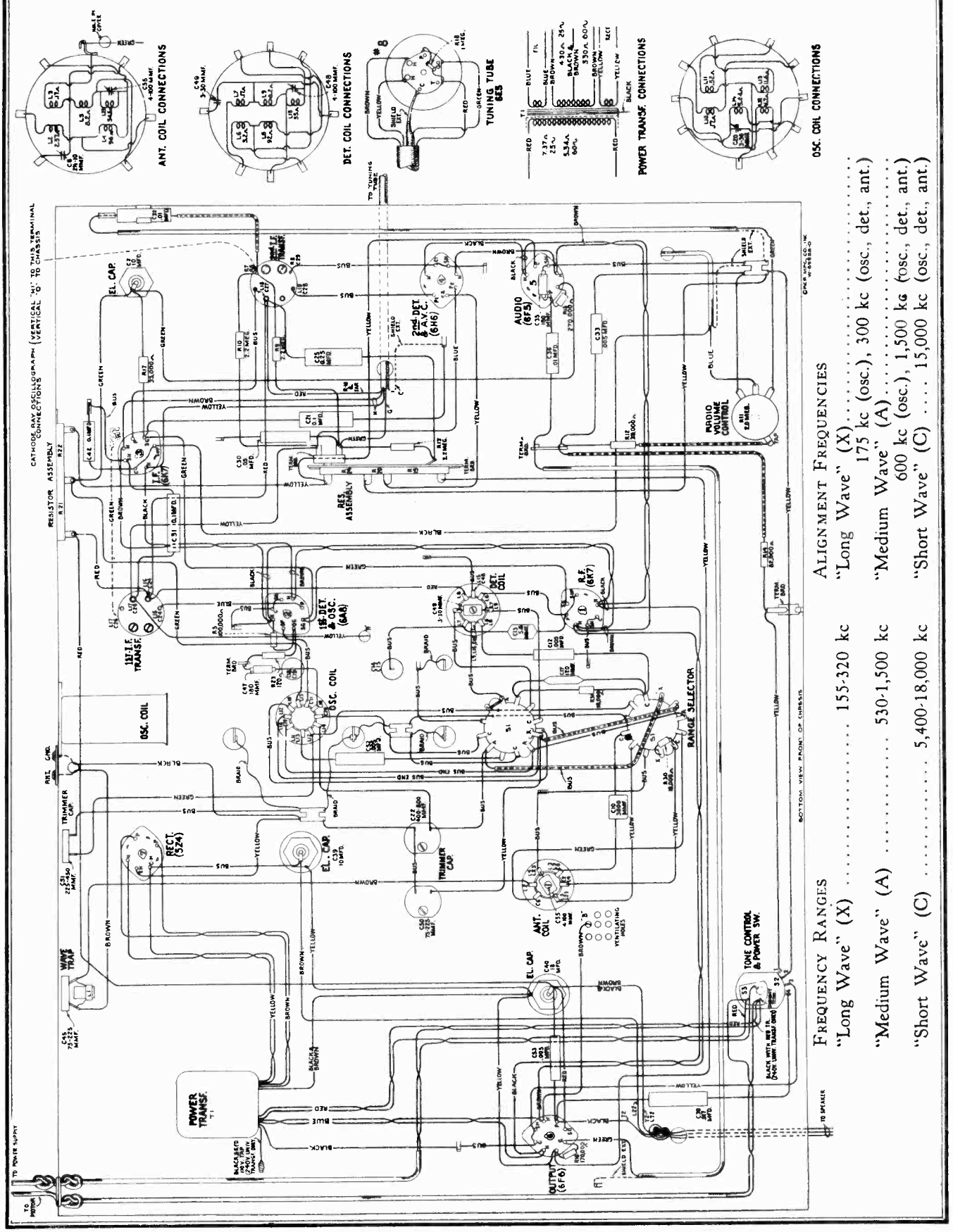


Figure 10—Loudspeaker Wiring

Figure 11—Universal Transformer

MODEL 8U
Chassis Wiring

RCA MFG. CO., INC.



Frequency Ranges

"Long Wave" (X)	155-320 kc
"Medium Wave" (A)	530-1,500 kc
"Short Wave" (C)	5,400-18,000 kc

Alignment Frequencies

"Long Wave" (X)	175 kc (osc.), 300 kc (osc., det., ant.)
"Medium Wave" (A)	600 kc (osc.), 1,500 kc (osc., det., ant.)
"Short Wave" (C)	15,000 kc (osc., det., ant.)

RCA MFG. CO., INC.

MODEL 8U
Voltage, Resistance
Socket, Trimmers

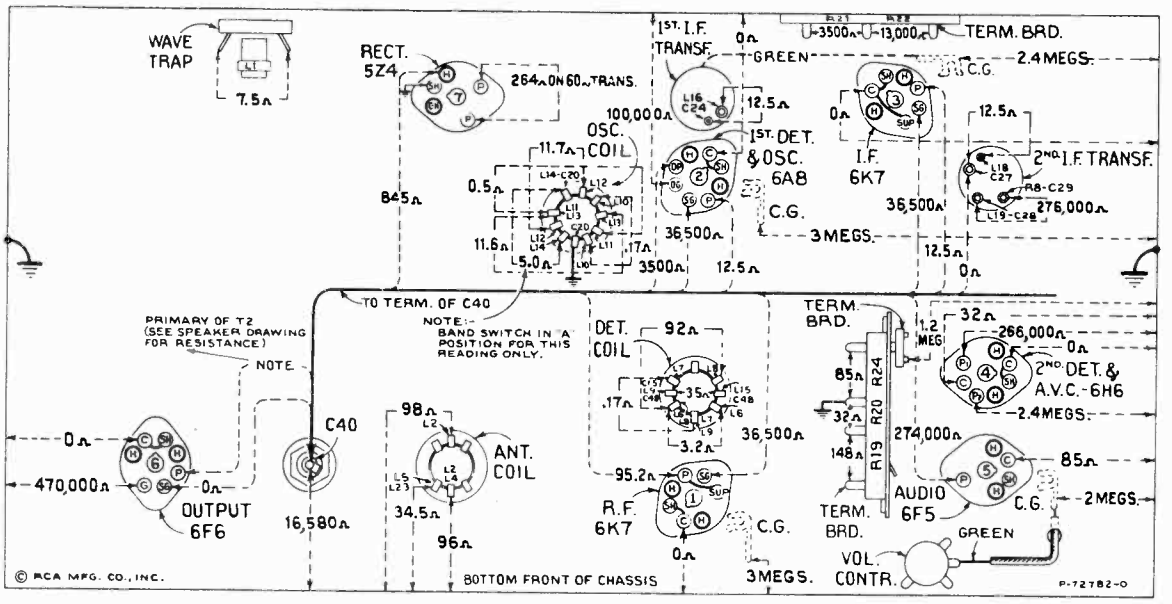
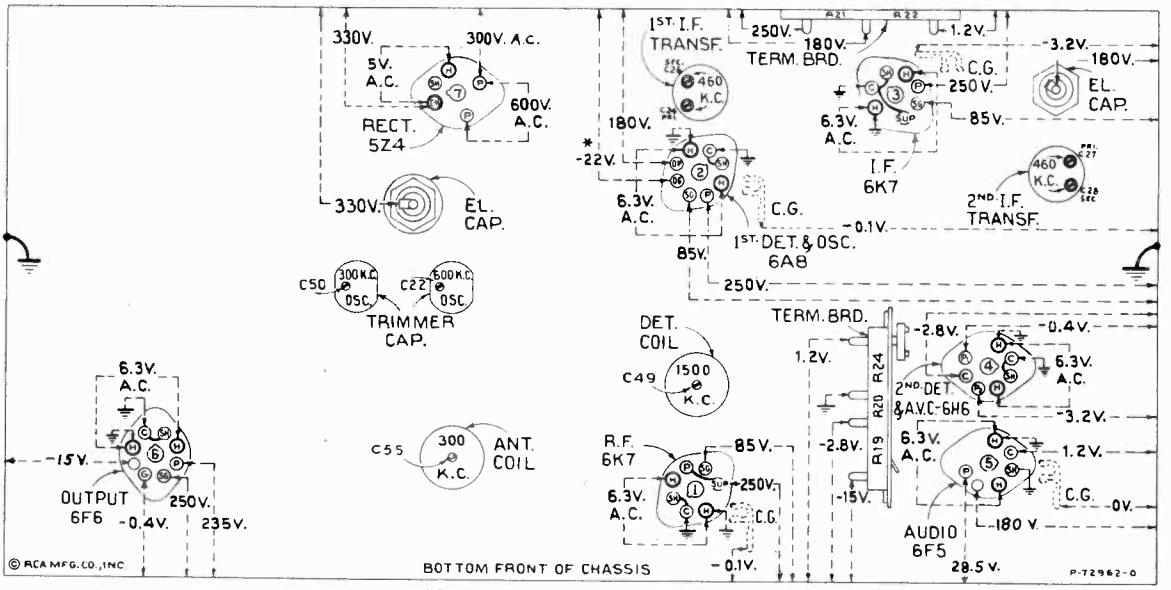


Figure 4—Resistance Diagram

Power supply disconnected—Radiotrons in sockets—Tuning condenser in full-mesh—Range selector in "Long wave" position—Volume control maximum—Power switch-Tone in "OFF" position—Radio-Record switch to "Radio"



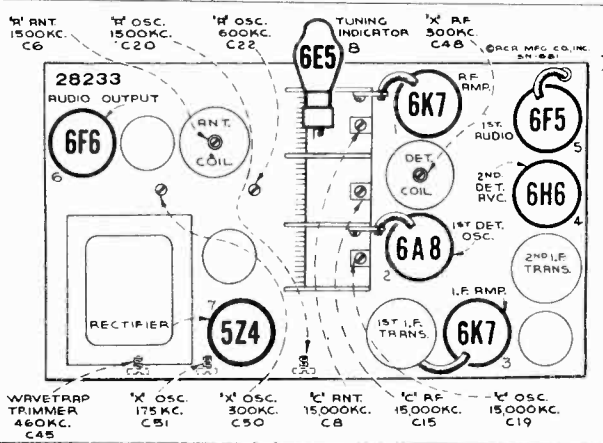


Figure 5—Radiotron Socket Voltages, Coil, and Trimmer Locations

Measured at 115 volts, 60-cycle supply—Tuned to approximately 1,000 kc—No signal being received—Volume control minimum—Power switch-Tone full clockwise—Radio-Record switch to "Radio"

Radiotron Cathode Current Readings

Measured with Milliammeter Connected at Tube Socket Cathode Terminals under Conditions Similar to Those of Voltage Measurements

(1)	RCA-6K7—R-F	12.5 ma.
(2)	RCA-6A8—Det.-Osc.	13.8 ma.
(3)	RCA-6K7—I.F.	9.0 ma.
(4)	RCA-6H6—2nd Det.-A.V.C.	—
(5)	RCA-6F5—Audio	0.25 ma.
(6)	RCA-6F6—Power	40.0 ma.
(7)	RCA-5Z4—Rect.	90.0 ma.*
(8)	RCA-6E5—Eye	3.0 ma.

(* Cannot be measured at socket.)

MODEL 8U
Phono. Wiring
Motor Details

RCA MFG. CO., INC.

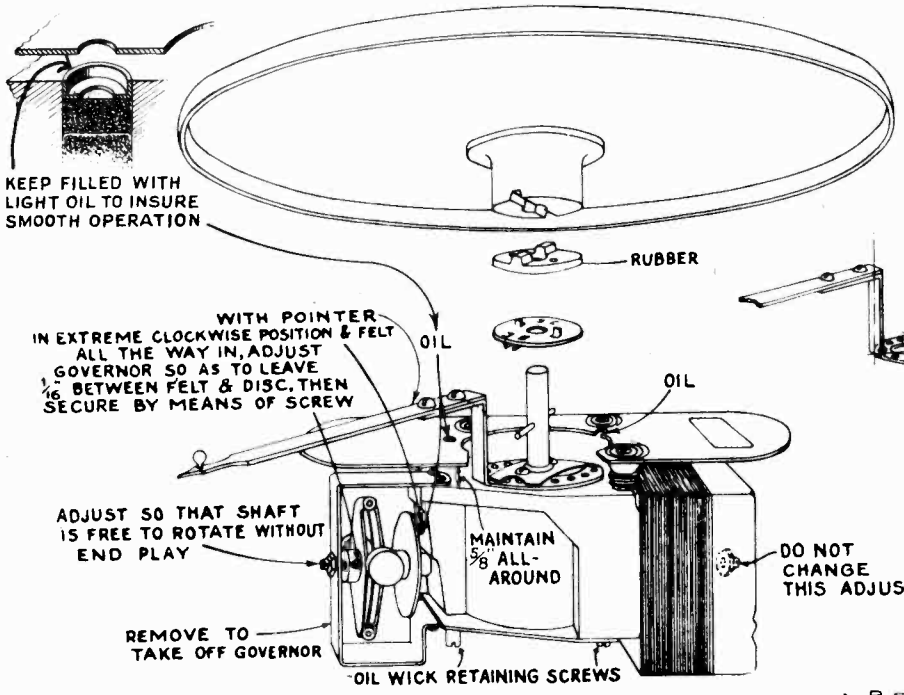


Figure 8—Motor Details

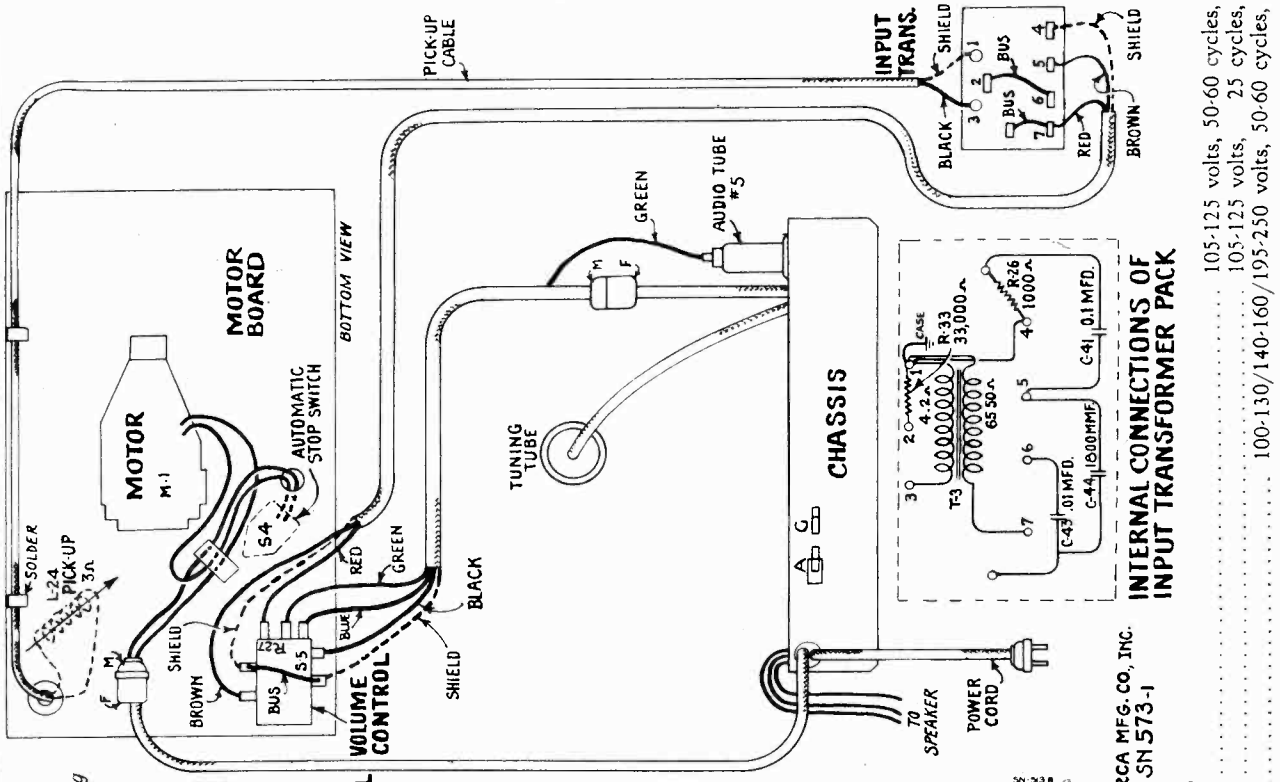
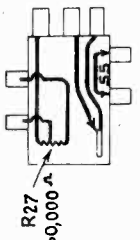


Figure 6—Assembly Wiring



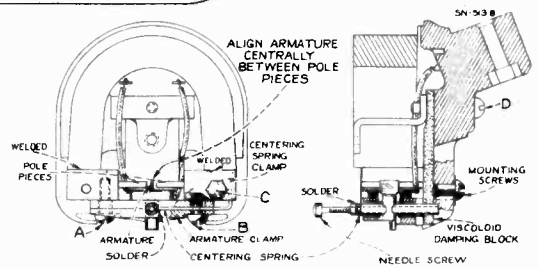


Figure 7—Details of Pickup

POWER SUPPLY RATING

Rating A	105-125 volts, 50-60 cycles, 135 watts
Rating B	105-125 volts, 25 cycles, 140 watts
Rating C	100-130/140-160/195-250 volts, 50-60 cycles, 135 watts

The conventional superheterodyne type of circuit, consisting of an r-f stage, a combined first-detector—oscillator stage, a single i-f stage, a diode-detector—automatic-volume-control stage, an audio voltage-amplifier stage, an audio power-output stage, a high-voltage rectifier power-supply stage, and a tuning indicator "Magic Eye" stage, is used

Tuned Circuits

The antenna coil system and the detector coil system each consist of two series-connected primary and three series-connected secondary windings to provide the three ranges of tuning. The oscillator coil system is wound on a single form. A range selector switch (S1) is used for connecting the various sections of these three coil systems into the circuit to provide operation on the band desired. The coils are tuned by a variable three-section gang condenser having trimmer capacitors in shunt with each section. There are additional trimmer capacitors across the section of each coil used for the "Medium wave" (A) band as well as the "Long wave" (X) band. A series trimmer is also associated with the "Medium wave" (A) and "Long wave" (X) band oscillator coils.

The intermediate-frequency amplifier system consists of an RCA-6K7 in a transformer-coupled circuit. This stage operates at a basic frequency of 460 kc. Each winding of both i-f transformers (input and output) is tuned by an adjustable trimmer.

Detector and A.V.C.

The modulated signal as obtained from the output of the i-f stage is detected by an RCA-6H6 twin-diode tube (No. 1 diode). The audio frequency secured by this process is transferred to the a-f system for amplification and final reproduction. The d-c voltage which results from detection of the signal is used for automatic volume control. This voltage, which develops across resistor R8, is applied as automatic control-grid bias to the r-f, first-detector, and i-f tubes through a suitable resistance filter circuit. The No. 2 diode of the RCA-6H6 is used to supply residual bias for the controlled tubes under conditions of little or no signal. This diode, under such conditions, draws current which flows through resistors R10 and R8, thereby maintaining the desired minimum operating bias on such tubes. On application of signal energy above a certain level, however, the auxiliary bias-diode ceases to draw current and the a.v.c diode takes over the biasing function.

Audio System

The manual volume control consists of an acoustically tapered potentiometer in the audio circuit between the output of the detector diode and the input grid of the audio-voltage-amplifier tube. This control has a tone compensating filter connected to it so that the correct aural balance will be obtained at different volume settings.

Resistance-capacitance coupling is used between the first-audio stage and the power-output stage. The output of the power amplifier is transformer-coupled into the dynamic loudspeaker. High-frequency tone control is effected by a capacitor across the plate circuit of the output tube. Speech-music control is effected by a resistor connected to the compensated volume control circuit. Control of tone is obtained by means of the switch (S2).

Phonograph Circuit

The electrical impulses generated in the pickup L24 are boosted in the step-up transformer T3, after which they are applied to the grid of the RCA-6F5 audio amplifier stage through the compensated phonograph volume control R27. This phonograph volume control also incorporates switches for transferring from radio to record reproduction. In the radio position, arm "X" of the phonograph volume control contacts lug "Y" which completes the audio circuit from the radio volume control R11 to the grid of the RCA-6F5 audio amplifier; also, switch S5 closes which completes the cathode circuit of the RCA-6K7 i-f amplifier stage. In the phonograph position, switch S5 opens and arm "X" of the phonograph volume control disconnects from lug "Y" and moves onto the phonograph volume control resistance as shown by figure 2.

"Magic Eye"

An RCA-6E5 cathode-ray tuning tube is used as a means of visually indicating when the receiver is accurately tuned to the incoming signal. This tube consists of an amplifier section and a cathode-ray section built in the same glass envelope. Correct tuning of the receiver to the incoming carrier is evidenced by the minimum width of the dark sector of the tuning tube.

Rectifier

The power required for operation of this receiver is supplied through transformer T1. This transformer has an efficient electrostatic shield between its primary and secondary windings. This shield prevents interference which is on the power-supply circuit from entering the receiver and conversely reduces the tendency of the receiver to re-radiate into the power circuit. An RCA-5Z4 furnishes the d-c voltages necessary for plate, screen, cathode, and grid potentials. The field winding of the loudspeaker is used as a reactor in the filter circuit from which it simultaneously receives its magnetizing current.

Phonograph Mechanism

An improved manually-operated phonograph mechanism is used in this model. The 12-inch turntable will accommodate either the 10-inch or the 12-inch phonograph records. The turntable rotates at a speed of 78 r.p.m. A speed regulator is provided for accurate adjustment of this speed. *It is important that a machine of any particular rating be operated at the frequency and voltage for which it is rated.* Attempts to operate at ratings other than specified for the particular instrument may result in damage to both the phonograph motor and the radio receiver. An automatic switch is provided to turn "off" the phonograph motor at the completion of record play when the eccentric-type inside groove record is used.

Alignment Procedure

Precise alignment is vital to the proper functioning of this receiver. There are four trimming adjustments provided in the i-f system, five in the oscillator coil system, three in the detector coil system, and three in the antenna coil system. Each of these trimmers has been accurately adjusted during manufacture and should remain properly aligned unless affected by abnormal conditions of climate or have been altered for service purposes. Incorrect alignment is usually evidenced by loss of sensitivity, improper tone quality, and poor selectivity. These indications will generally be present together.

The correct performance of this receiver can only be obtained when the alignment is performed with adequate and reliable test apparatus and in the sequence given. The manufacturer of this instrument has a complete assortment of such service equipment available for sale through its dealers and distributors.

Two methods of alignment are applicable. One method requires the cathode-ray oscillograph, while the other requires a voltmeter or glow-type indicator. The oscillographic method is advantageous in that the indication is in the form of a wave-image which represents the resonance characteristic of the tuned circuits. Alignment by this method should be performed with equipment such as an **RCA Stock No. 9545 Cathode-Ray Oscillograph** and an **RCA Stock No. 9558 Frequency Modulator.** For the output indicator method, an instrument such as an **RCA Stock No. 4317** should be used. Either of the above methods requires a reliable test oscillator for the source of alignment frequencies such as the **RCA Stock No. 9595 Test Oscillator.** Cathode-ray alignment is similar to the output indicator alignment outlined below, except as follows: The frequency modulator should be used to sweep the test oscillator signal when aligning the i-f amplifier and the low-frequency oscillator series trimmers. It will only be necessary to first adjust the trimmers to peak response, as outlined below, without the frequency modulator connected. Then, interconnect the test oscillator with the frequency modulator and re-tune the test oscillator (increase frequency) until the forward and reverse curves coincide at their highest points. Next, adjust the trimmers until the curves coincide throughout their length and have maximum amplitude. The proper place for connection of the oscillograph input to the receiver is indicated on the Chassis Wiring Diagram (figure 3). The high-frequency trimmers on all three bands should be adjusted for maximum (peak) amplitude of the images.

I-F Trimmer Adjustments

The four trimmers of the two i-f transformers are located as shown by figure 5. Each must be aligned to a basic frequency of **460 kc.** To do this, attach the output indicator across the voice-coil circuit. Attach the receiver chassis to a good external ground. Connect the output of the test oscillator between the control-grid of the RCA-6A8 first-detector tube and chassis-ground through a **.001 mfd.** capacitor. Tune the test oscillator to **460 kc.** Advance the receiver volume control to its full-on position and adjust the receiver tuning control to a point where no interference is encountered from broadcast stations, or short stator of oscillator tuning capacitor **C18** to chassis eliminating local oscillator signals. Increase the output of the test oscillator until a slight indication is apparent on the output indicator. Adjust the two trimmers, **C28** and **C27** of the second i-f transformer to produce maximum (peak) indicated receiver output. Then, adjust the two trimmers, **C26** and **C24,** of the first i-f transformer for maximum (peak) receiver output as shown by the indicating device. During these adjustments, regulate the test-oscillator output so that the receiver output indication is always as low as possible. By doing so, broadness of tuning, due to a.v.c., action will be avoided. It is advisable to repeat the adjustment of all i-f trimmers a second time to assure that the inter-action between them has not disturbed the original adjustment.

R-F Trimmer Adjustments

The eleven trimmers associated with the r-f, first detector, and oscillator tuned circuits have their locations shown by figures 1 and 5. The three trimmers which are at all times directly in shunt with the variable tuning condensers necessitate that the "Short wave" (C) band be aligned first. The range selector switch should, therefore, be turned to its "Short wave" position for the first adjustments. Leave the output indicator connected to the output system.

Calibrate the dial by rotating the tuning control until the variable condenser plates are in their full-mesh (maximum capacity) position and adjust the dial pointer so that its end points to the horizontal graduation (**520 kc**) at the low-frequency end of the "Medium wave" (A) dial scale.

Wave-Trap Adjustment

Connect the test oscillator to the antenna and ground terminals of the receiver, leaving it tuned to **460 kc.** Adjust the wave-trap trimmer **C45** for maximum suppression of the **460 kc** signal. An increase in test-oscillator output may be necessary before the point of minimum output (maximum suppression of signal) is obtained.

"Short Wave" Band

(a) Adjust the test oscillator to **15,000 kc** and set the receiver tuning control to a dial reading of **15,000 kc.**

(b) Adjust trimmer **C19** on the oscillator section of the variable condenser to the point at which it produces maximum indicated receiver output. Two points may be found, each of which produces such a maximum. The one of **maximum trimmer capacitance** is correct and should be used. The local (heterodyne) oscillator will be **460 kc** below the signal frequency at this adjustment point.

(c) Adjust trimmer **C15** of the detector section of the variable condenser, simultaneously rocking the receiver tuning control backward and forward through the **15,000 kc** input signal, until maximum receiver output results from these combined operations.

(d) With the receiver tuning control set to **15,000 kc** adjust trimmer **C8** on the antenna section of the variable condenser to the point which produces maximum (peak) indicated receiver output.

"Medium Wave" Band

(e) Change the receiver range selector to its "Medium wave" (A) band position and set the receiver tuning control to a dial reading of **1,500 kc.** Tune the test oscillator to **1,500 kc** and regulate its output to produce a slight indication on the receiver output indicating device.

(f) Adjust the high-frequency trimmers of the oscillator, detector, and antenna coils, **C20, C49,** and **C6** respectively, to the points at which each produces maximum indicated receiver output.

(g) Shift the test-oscillator frequency to **600 kc** and tune the receiver to pick up this signal, disregarding the dial reading at which it is best received.

(h) Adjust the low-frequency trimmer **C22** of the oscillator coil, simultaneously rocking the tuning control of the receiver backward and forward through the signal, until maximum indicated receiver output results from these combined operations. The adjustment of **C19,**

C15, and C8 should be corrected at 15,000 kc as in (b), (c), and (d); also C20, C49, and C6 should be corrected at 1,500 kc, as in (f) to compensate for any changes caused by the adjustment of the low-frequency oscillator coil trimmer C22.

Long Wave" Band

(i) Change receiver band selector to "Long wave" (X) band and set receiver tuning control to a dial reading of 300 kc. Tune test oscillator to 300 kc and adjust oscillator, detector, and antenna trimmers C50, C48, and C55, respectively, for maximum indicated receiver output.

(j) Set receiver to 175 kc and tune test oscillator to 175 kc. Adjust trimmer C51 for maximum indicated output, simultaneously rocking tuning control of the receiver backward and forward through the signal.

(k) The adjustment of C50, C48, and C55 should now be repeated at 300 kc as described in (i) to compensate for any changes caused by the adjustment of the low-frequency trimmer C51.

Phonograph Mechanism

The phonograph motor is of the governor induction type and designed to be simple and foolproof. Under normal operating conditions, service difficulties should be negligible. Occasionally, however, certain adjustments may be required. These adjustments are illustrated and explained in figure 8. Application of oil to the felt pad which rubs against the governor disc will insure smooth operation.

Magnetic Pickup

The pickup used in the phonograph unit is of an improved design. The horseshoe magnet is rigidly welded to the pole pieces and is irremovable. There is a centering spring attached to the armature to maintain proper adjustment and to provide a limiting effect on the movement of the armature. The frequency response is substantially uniform over a wide range. Service operations which may be necessary on the pickup are as follows:

Centering Armature

Refer to figure 7 showing the pickup inner structure. The armature is shown in its proper relation to the magnet pole pieces, i. e., exactly centered. Whenever this centering adjustment has been disturbed, the screws A, B, and C should be loosened and the armature clamp adjusted to the point where the vertical axis of the armature is at right angles to the horizontal axis of the pole pieces, and centered between them. This centering operation may be facilitated by inserting a small rod or nail into the armature needle hole, using it as a lever to test the angular movement of the armature. The limitations of the movement in each direction will be caused by the armature striking the pole pieces. The proper adjustment is obtained when there is equal angular displacement of the armature and adjustment rod or nail to each side of the vertical axis of the magnet and coil assembly. The screws A and B should then be secured, observing care not to disturb the adjustment of the armature clamp. Then place the pickup in a vise and secure the centering spring-clamp by means of the screw C, allowing the centering spring to remain in the position at which the armature is exactly centered between the pole pieces. With a little practice, the correct adjustment of the armature may be readily obtained. The air gap between the pole pieces and the armature should be kept free from dust, filings, and other such foreign materials which would obstruct the movement of the pickup armature.

Damping Block

The viscoloid block which is attached to the back end of the armature shank serves as a mechanical filter to eliminate undesirable resonances and to cause the frequency response to be uniform. Should it be necessary to replace this damping block, it may be done by removing screw D and the cover support bracket from the mechanism and taking off the old viscoloid block. The surface of the armature which is in contact with the viscoloid should be thoroughly

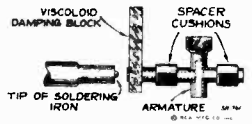


Figure 9—Special Soldering-Iron Tip

cleaned with fine emery cloth. Then insert the new block so that it occupies the same position as it did originally. Make certain that the block is in correct vertical alignment with the armature. The hole in the new viscoloid block is somewhat smaller than the diameter of the armature in order to permit a snug fit. With the viscoloid aligned on the armature, screw D and the cover support bracket should then be replaced. Heat should be applied to the armature (viscoloid side) so that the viscoloid block will fuse at the point of contact and become rigidly attached to the armature. A special-tip soldering iron constructed as shown in figure 9 will be found very useful in performing this operation. The iron should be applied only long enough to slightly melt the block and cause a small bulge on both sides.

Replacing Coil

Whenever there is defective operation due to an open or shorted pickup coil, this coil should be replaced. The method of replacement will be obvious upon inspection of the pickup assembly and by study of the cut-a-way illustrations. Make sure that the new coil is properly centered with the hole in the support strip and glued securely in that position. It is important to re-adjust the armature as previously explained after re-assembly of the mechanism. Only rosin core solder should be used for soldering the coil leads in the pickup. This same type of solder should be used when necessary for soldering the centering spring to the armature.

Magnetizing

Loss of magnetization will not usually occur when the pickup has received normal care because the magnet and pole pieces are one unit and the magnetic circuit remains practically closed at all times. When the pickup has been mishandled, subjected to a strong a-c field, jolted, or dropped, there may be an appreciable loss of magnetic strength, in which case it will be necessary to re-magnetize the entire structure. To do this, it will be necessary to first remove the pickup mechanism from the tone arm, and then remove the magnet assembly. Place the magnet assembly on the poles of a standard pickup magnetizer such as the **RCA Stock No. 9549 Pickup Magnetizer** and charging the magnet in accordance with the instructions accompanying the magnetizer. It is preferable to check the polarity of the pickup magnet and to re-magnetize it so that the same polarity is maintained.

Loudspeaker

Centering of the loudspeaker voice coil is made in the usual manner with three narrow paper feelers after first removing the front paper dust cover. This may be removed by softening its cement with a very light application of acetone, using care not to allow the acetone to flow down into the air gap. The dust cover should be cemented back in place with ambroid upon completion of adjustment.

Universal Transformer

The transformer used on some models of this receiver is adaptable to several ranges of voltage as given under Rating C of Electrical Specifications. Its schematic and wiring are shown by figure 11. Terminals are provided at the top of the transformer case for changing the primary connections to suit the voltage being used. Note that a 110-volt tap is brought out separately for supplying a phonograph motor.

Stock No.	REPLACEMENT PARTS	List Price
	RECEIVER ASSEMBLIES	
12706	Arm—Arm and hub assembly for operating shutter	$0.22
13098	Board—Antenna and ground terminal board	.25
5237	Bushing—Variable tuning condenser mounting bushing assembly—Package of 3	.43
11625	Cable—Radiotron tuning tube cable complete with socket	1.26
11759	Cable—2-conductor shielded volume control cable—complete with 4-contact female connector	.92
12511	Cap—Contact cap—Package of 5	.15
11465	Capacitor—Adjustable trimmer (C22)	.48
11256	Capacitor—Adjustable trimmer (C50)	.48
4955	Capacitor—Adjustable trimmer (C45)	.48
12065	Capacitor—Adjustable trimmer (C51)	.65
12814	Capacitor—5.6 Mmfd.—(C13)	.20
12974	Capacitor—120 Mmfd.—(C17)	.20
5116	Capacitor—175 Mmfd.—(C29)	.18
13003	Capacitor—180 Mmfd.—(C35, C47)	.20
11290	Capacitor—400 Mmfd.—(C9, C16)	.25
11621	Capacitor—3,600 Mmfd.—(C10)	.38
4868	Capacitor—.005 Mfd.—(C12, C33, C52, C53)	.20
11451	Capacitor—.017 Mfd.—(C38)	.18
11395	Capacitor—.01 Mfd.—(C32)	.18
4858	Capacitor—.01 Mfd.—(C36)	.25
11394	Foot—Chassis foot assembly—Package of 2	$0.70
12712	Indicator—Station selector indicator pointer	.22
5226	Lamp—Dial lamp—Package of 5	.70
12718	Mask—Dial Light Diffuser with colored screen	.40
11393	Resistor—Voltage divider resistor—comprising one 3,500 ohm and one 13,000 ohm sections—(R21, R22)	.74
11329	Resistor—Voltage divider resistor—comprising one 148 ohm, one 32 ohm and one 85 ohm sections—(R19, R20, R24)	.52
12075	Resistor—56 ohms—Flexible type complete with contact cap—(R32)	.28
12071	Resistor—120 ohms—Carbon type—¼ watt—(R23)—Package of 5	1.00
12070	Resistor—18,000 ohms—Carbon type—1/10 watt—(R30, R31)—Package of 5	.75
5033	Resistor—33,000 ohms—Carbon type—1 watt—(R17)—Package of 5	1.10
11322	Resistor—39,000 ohms—Carbon type—¼ watt—(R12)—Package of 5	1.00
11365	Resistor—82,000 ohms—Carbon type—¼ watt—(R14)—Package of 5	1.00
3118	Resistor—100,000 ohms—Carbon type—¼ watt—(R5)—Package of 5	1.00
11453	Resistor—270,000 ohms—Carbon type—1/10 watt—(R15)—Package of 5	.75
11452	Resistor—470,000 ohms—Carbon type—1/10 watt—(R16)—Package of 5	.75
11397	Resistor 560,000 ohms—Carbon type—1/10 watt—(R2, R4)—Package of 5	.75
12013	Resistor—1 megohm—Carbon type—1/10 watt—(R18)—Package of 5	.75
11626	Resistor—2.2 megohms—Carbon type—¼ watt—(R9, R10, R13)—Package of 5	1.00
4669	Screw—No. 8-32 set screw for arm Stk No. 12706—Package of 10	.25
12064	Shield—Antenna or detector coil shield	.28
11604	Shield—Oscillator coil shield	.24
11390	Shield—Intermediate frequency transformer shield	.25
12735	Shield—Dial lamp shield—Package of 5	.25
12971	Shutter—Dial scale holder and shutter assembly	.85
11222	Socket—Dial lamp socket	.18
11195	Socket—5-contact rectifier Radiotron socket	.15
4839	Capacitor—0.1 Mfd.—(C21)	.28
4841	Capacitor—0.1 Mfd.—(C31)	.22
11414	Capacitor—0.1 Mfd.—(C42)	.20
5170	Capacitor—0.25 Mfd.—(C25)	.25
4836	Capacitor—.05 Mfd.—(C30)	.30
11240	Capacitor—10 Mfd.—(C39)	1.08
11387	Capacitor—10 Mfd.—(C2)	.86
5212	Capacitor—18 Mfd.—(C40)	1.16
12061	Coil—Antenna coil—Less shield—(L2, L3, L4, L5, L23, C6, C55)	1.90
12062	Coil—Detector coil—Less shield—(L6, L7, L8, L9, L15, C48, C49)	1.94
12063	Coil—Oscillator coil—Less shield—(L10, L11, L12, L13, L14, C20)	2.62
12965	Condenser—Three-gang variable tuning condenser—(C7, C8, C14, C15, C18, C19)	6.15
4153	Connector—4-contact female connector for volume control cable	.48
4573	Connector—2-contact female connector for motor cable	.30
13094	Dial—Station selector dial scale	1.05
11198	Socket—7-contact 6K7—6F5—or 6H6 Radiotron socket	.15
11196	Socket—8 contact 6A8 or 6F6 Radiotron socket	.15
12849	Spring—Tension spring shutter—Package of 5	.18
12966	Switch—Range switch—(S1)	1.75
11392	Switch—Tone control and power switch assembly—(S2 S3)	1.14

PRICES SUBJECT TO CHANGE WITHOUT NOTICE

MODEL 8U
Parts List, Page 2

RCA MFG. CO., INC.

Stock No.	DESCRIPTION	List Price
11388	Transformer—First intermediate frequency transformer—(L16, L17, C24, C26)	1.90
11389	Transformer—Second intermediate frequency transformer—(L18, L19, C27, C28, C29, R7, R8)	3.02
11803	Transformer—Power transformer—105-125 volts—50-60 cycles—(T1)	4.38
11805	Transformer—Power transformer—105-130, 140-160, 195-250 volts—40-60 cycles (T1)	7.95
11667	Trap—Wave trap—(L1, C45)	1.22
13144	Volume control—(R11)	1.00
	MOTOR ASSEMBLIES	
11703	Governor—Governor complete for phonograph motor—Stock No. 11701 or No. 11702	3.05
11701	Motor—Phonograph turntable motor—110 volts—50 to 60 cycles—(M1)	21.20
	MOTOR BOARD ASSEMBLIES	
4594	Box—Used needle box (cup)	.30
4577	Connector—2-contact male connector for motor cable	.30
7084	Cover—Turntable cover	.40
11704	Damper—Turntable rubber damper and damper plate	.24
4596	Escutcheon—Speed regulator escutcheon plate	.36
4597	Screw—Motor mounting screw assembly—comprising four screws, four lockwashers, four spacers, and four nuts	.22
11696	Turntable—Complete	2.48
11695	Volume control—Phonograph volume control—(R27, S5)	1.60
	ECCENTRIC AUTOMATIC BRAKE SWITCH ASSEMBLIES	
3994	Cover—Eccentric automatic switch cover and screw	.26
10174	Springs—Automatic brake springs—comprising one each of four springs—Package of 2 sets	.50
6896	Switch—Eccentric automatic brake and switch assembly—less switch cover	2.50
3322	Switch—Eccentric automatic switch only—less cover—(S13)	.75
	PICKUP AND ARM ASSEMBLIES	
11944	Arm—Pickup arm complete—less pickup unit	6.00
13404	Armature—Pickup armature	.95
11548	Back—Pickup housing back	.52
11946	Coil—Pickup coil—(L24)	.65
3521	Cover—Pickup back cover	.18
11708	Cover—Pickup front cover	.15
12354	Damper—Pickup damper	.16
3516	Damper—Pickup arm damper—comprising one upper and one lower damper, one upper bushing and one lower bearing	.14
3390	Escutcheon—Pickup arm escutcheon	.46
11945	Pickup unit—Complete—(L24)	5.50
3389	Rod—Eccentric automatic brake trip rod—Package of 5	$0.40
3387	Screw assembly—Pickup mounting screw assembly—comprising one screw, one lockwasher and one nut—Package of 10	.50
11549	Screw—Pickup front cover screw—Package of 10	.42
11547	Screw—Pickup needle holding screw—Package of 10	.42
	REPRODUCER ASSEMBLIES	
11232	Board—Terminal board with two lead wire clips	.18
11231	Bolt—Yoke and core assembly bolt and nut	.16
8060	Bracket—Output transformer mounting bracket	.14
11257	Clamp—Cone center suspension clamping nut and screw assembly—Package of 5	.25
11254	Coil—Field coil—(L22)	2.00
11233	Coil—Neutralizing coil (L20)	.30
11258	Cone—Reproducer cone—(L21)	1.00
5118	Connector—3 contact male connector for reproducer	.25
5119	Connector—3-contact female connector for reproducer cable	.25
9619	Reproducer—Complete	6.05
11253	Transformer—Output transformer—(T2)	1.56
11886	Washer—Spring washer used to hold field coil securely—Package of 5	.20
	MISCELLANEOUS ASSEMBLIES	
11996	Bracket—Tuning tube mounting bracket and clamp	.22
11947	Cable—2-conductor shielded cable, approximately 35 inches long—connects volume control to input transformer	.85
11948	Cable—3-conductor shielded volume control cable (control end)—complete with 4-contact male connector	1.50
6123	Connector—4-contact male connector for volume control cable	.30
12698	Crystal—Station selector escutcheon and crystal	1.02
11276	Escutcheon—Tuning tube escutcheon	.40
11347	Knob—Phonograph volume control, radio volume control, range switch, or tone control and power switch knob—Package of 5	.75
11610	Knob—Station selector knob assembly, comprising one large and one small knob—Package of 5	1.00
12556	Receptacle—Needle holder	.40
11210	Screw—Chassis mounting screw assembly—Package of 4	.28
11349	Spring—Retaining spring for knob Stk. No. 11347, and small knob in Stk. No. 11610—Package of 5	.25
4982	Spring—Retaining spring for large knob in Stk. No. 11610—Package of 10	.50
3391	Spring—Suspension spring and washer assembly for mounting motor board, comprising 1 bolt, 1 top spring, 1 bottom spring, 2 cup washers, 1 C washer and 1 cap nut	.50
11949	Transformer—Phonograph input transformer pack, comprising one input transformer, one 1,800 Mmfd., one .01 Mfd. and one 0.1 Mfd. capacitors and one 1,000-ohm, one 33,000-ohm resistors (T3, C41, C43, C44, R26, R33)	7.05

The prices quoted above are subject to change without notice.

MODEL CV-8 "Pak-O-Powr"
Schematic, Chassis Wiring Parts

RCA MFG. CO., INC.

MODEL CV-8 PAK-O-POWR

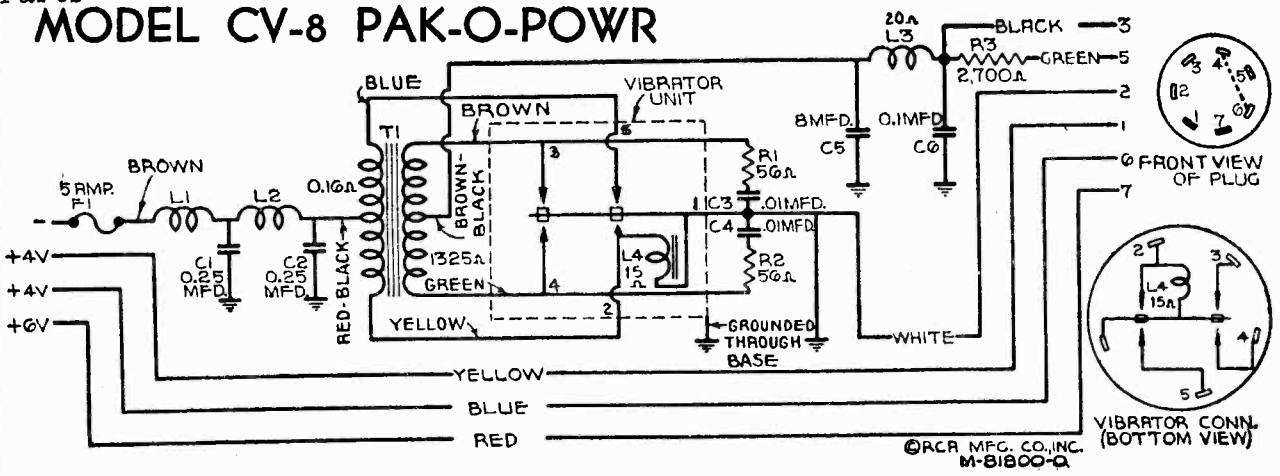


Figure 1. - Schematic Circuit Diagram

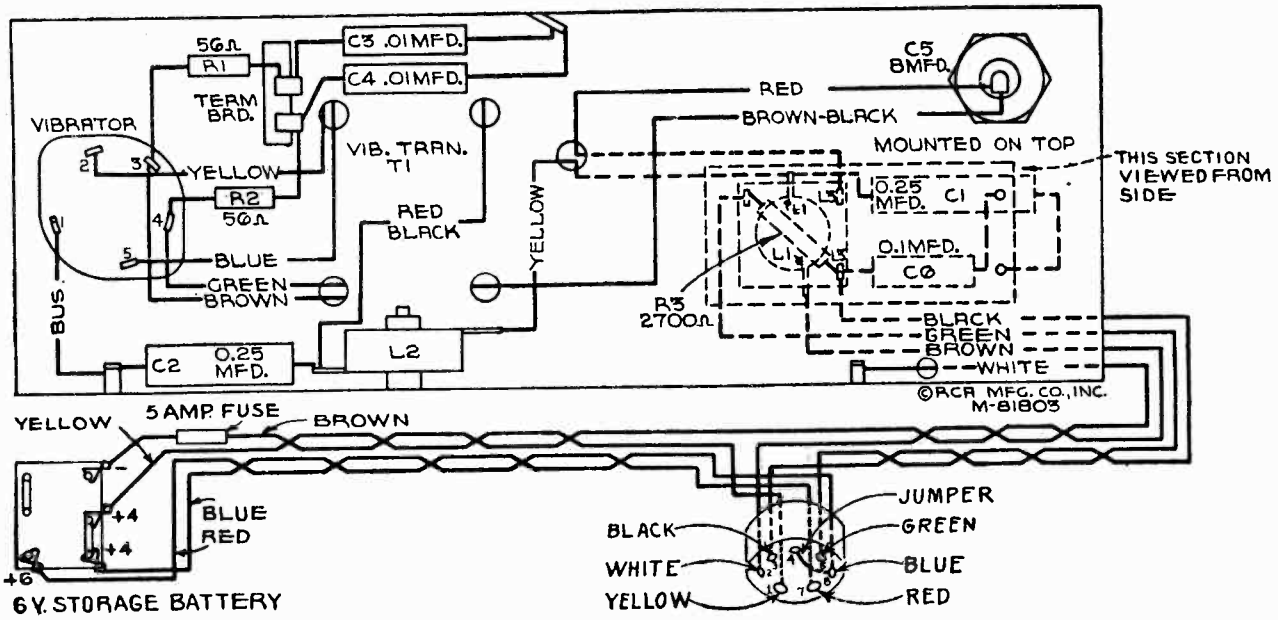


Figure 2. - Chassis Wiring Diagram

Stock No.	Description
13046	Capacitor--8 mfd. (C5)
14289	Clip--Two battery clips, one marked "+" and one unmarked
12819	Coil--Choke coil and terminal board assembly (L3)
12179	Coil--Choke coil. (L1, L2)
5140	Fuse--5 ampere (F1)
4290	Insulator--Fuse holder insulating sleeve
14419	Mounting--Rubber mounting for vibrator chassis
14409	Plug--7-contact female plug for battery cable
13220	Resistor--56 ohms, carbon type, 1/4 watt (R1, R2)
14421	Resistor--2700 ohms, insulated, 1 watt (R3)
4284	Spring--Fuse holder tension spring
14420	Transformer--Vibrator transformer (T1)
14422	Vibrator--Plug-in vibrator unit (L4)
4285	Washer--Fuse holder insulating washer

MODEL 8U2
Schematic, Trans. Data

RCA MFG. CO., INC.

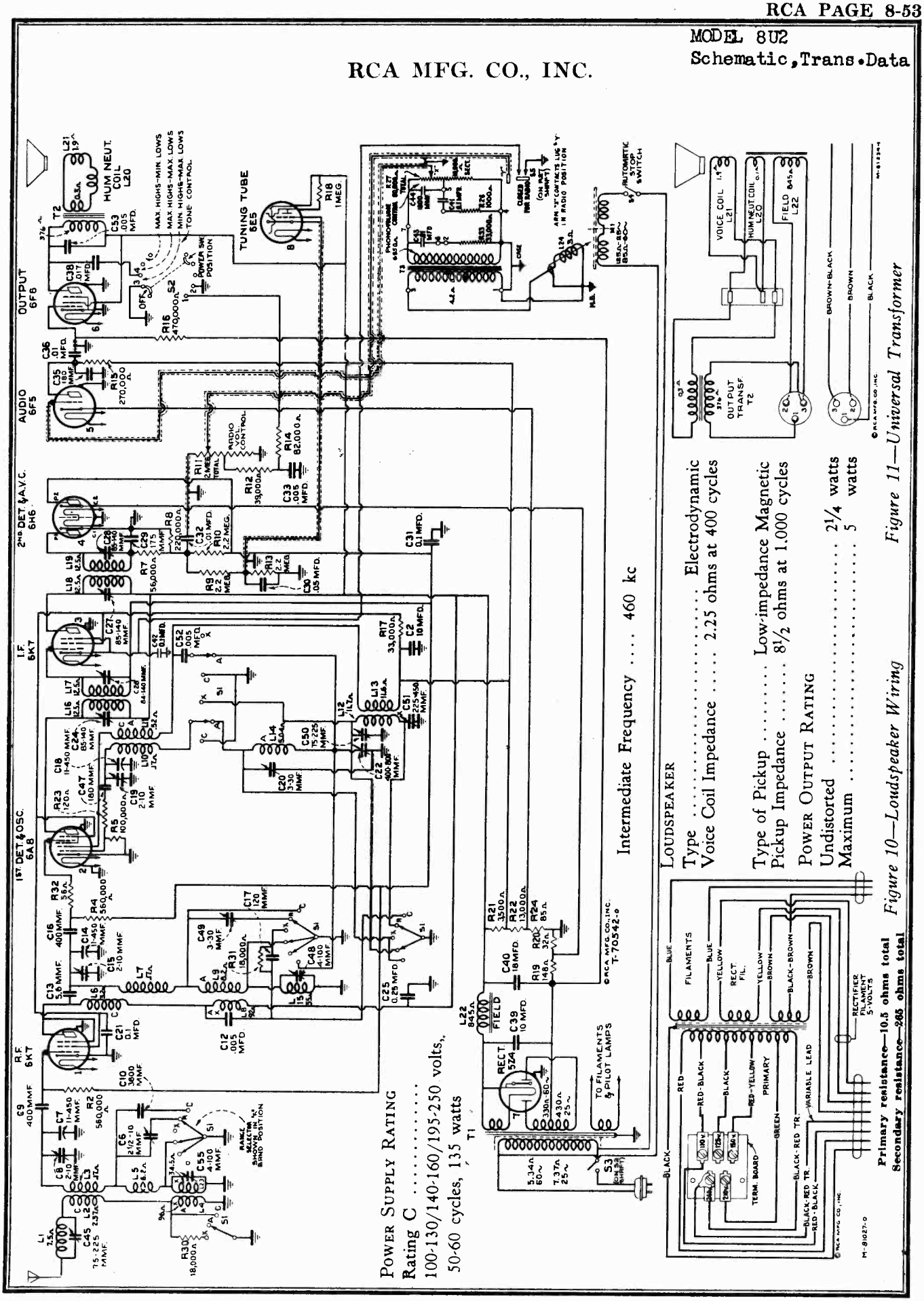
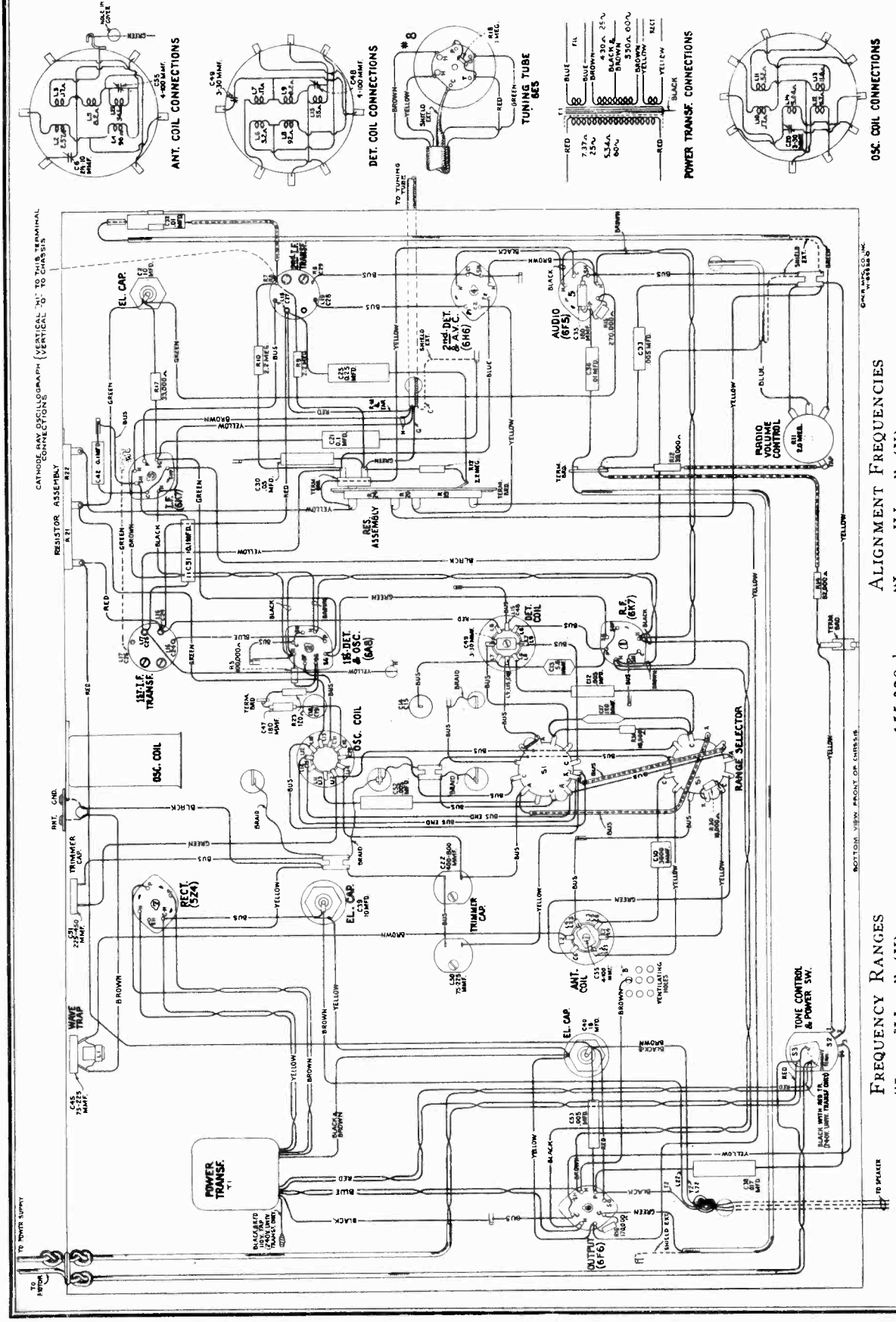


Figure 10—Loudspeaker Wiring

Figure 11—Universal Transformer

MODEL 8U2
Chassis Wiring

RCA MFG. CO., INC.



Frequency Ranges

"Long Wave" (X)	155-320 kc
"Medium Wave" (A)	530-1,500 kc
"Short Wave" (C)	5,400-18,000 kc

Alignment Frequencies

"Long Wave" (X)	175 kc (osc.), 300 kc (osc., det., ant.)
"Medium Wave" (A)	600 kc (osc.), 1,500 kc (osc., det., ant.)
"Short Wave" (C)	15,000 kc (osc., det., ant.)

RCA MFG. CO., INC.

MODEL 8U2
Voltage, Resistance
Socket, Trimmers

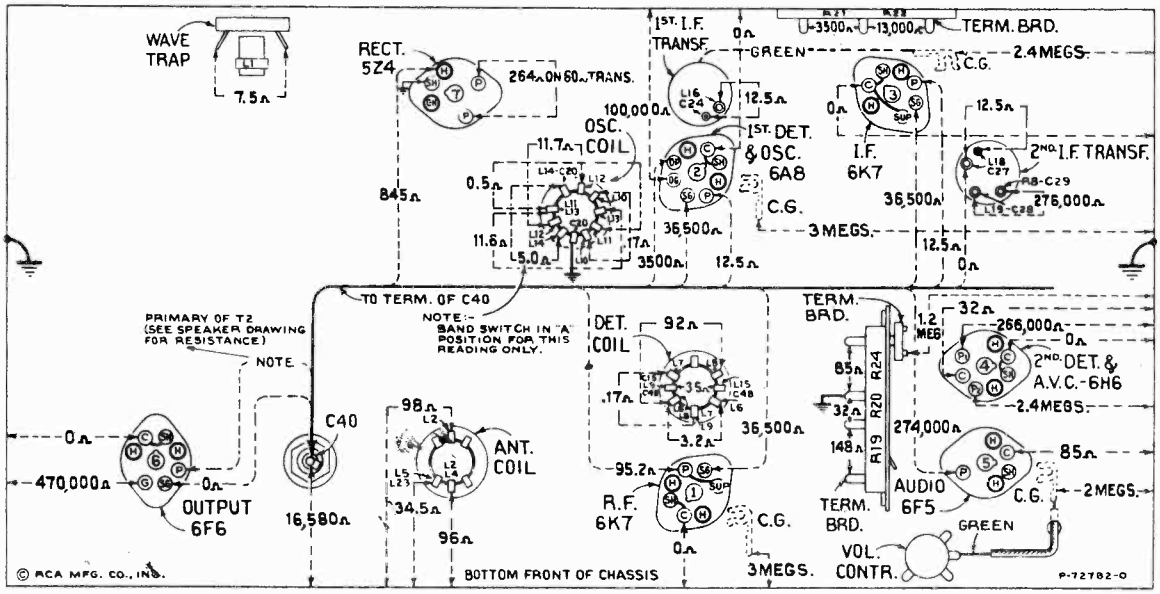


Figure 4—Resistance Diagram

Power supply disconnected—Radiotrons in sockets—Tuning condenser in full-mesh—Range selector "Long wave" position—Volume control maximum—Power switch-Tone in "OFF" position—Radio-Record switch to "Radio"

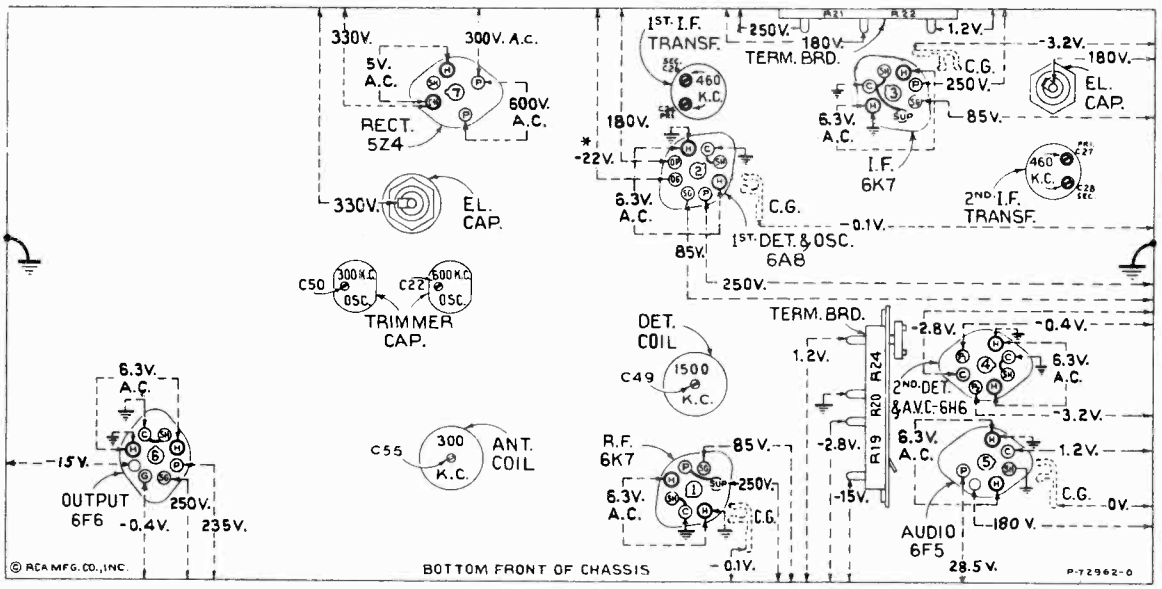


Figure 5—Radiotron Socket Voltages, Coil, and Trimmer Locations

Measured at 115 volts, 60-cycle supply—Tuned to approximately 1,000 kc—No signal being received—Volume control minimum—Power switch-Tone full clockwise—Radio-Record switch to "Radio"

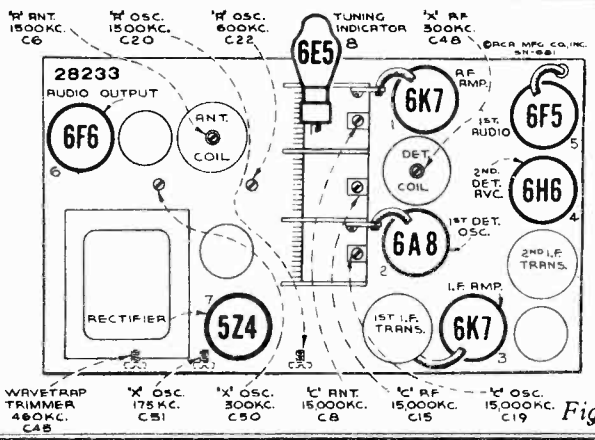


Figure 1—Radiotron, Coil, and Trimmer Locations

Radiotron Cathode Current Readings

Measured with Milliammeter Connected at Tube Socket Cathode Terminals under Conditions Similar to Those of Voltage Measurements

(1)	RCA-6K7—R-F	12.5 ma.
(2)	RCA-6A8—Det.-Osc.	13.8 ma.
(3)	RCA-6K7—I.F.	9.0 ma.
(4)	RCA-6H6—2nd Det.-A.V.C.	—
(5)	RCA-6F5—Audio	0.25 ma.
(6)	RCA-6F6—Power	40.0 ma.
(7)	RCA-5Z4—Rect.	90.0 ma.*
(8)	RCA-6E5—Eye	3.0 ma.

(* Cannot be measured at socket.)

MODEL 8U2
Assembly Wiring
Phono.Details,Pick-up

RCA MFG. CO., INC.

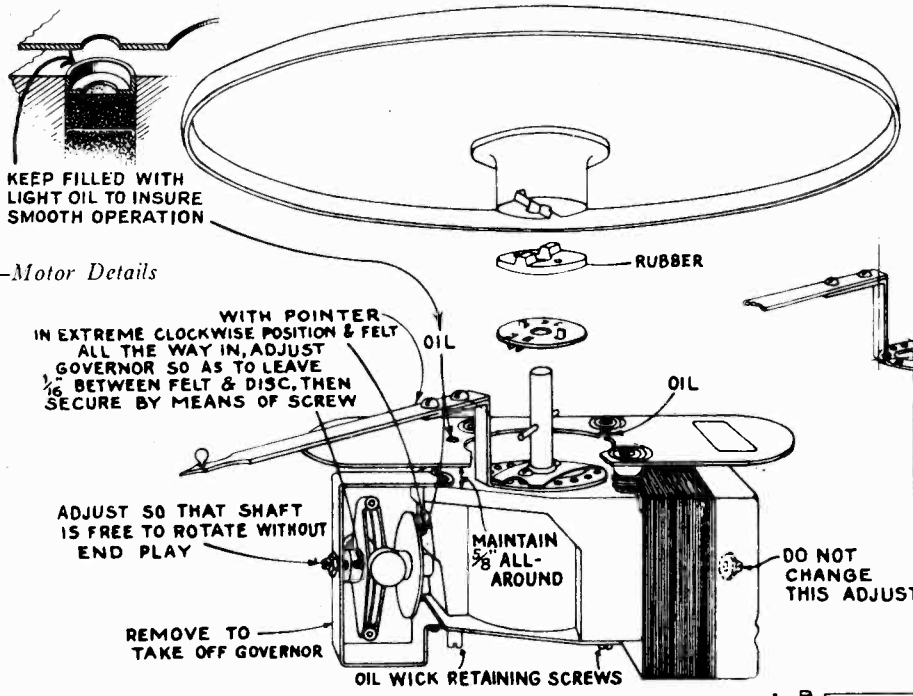


Figure 8—Motor Details

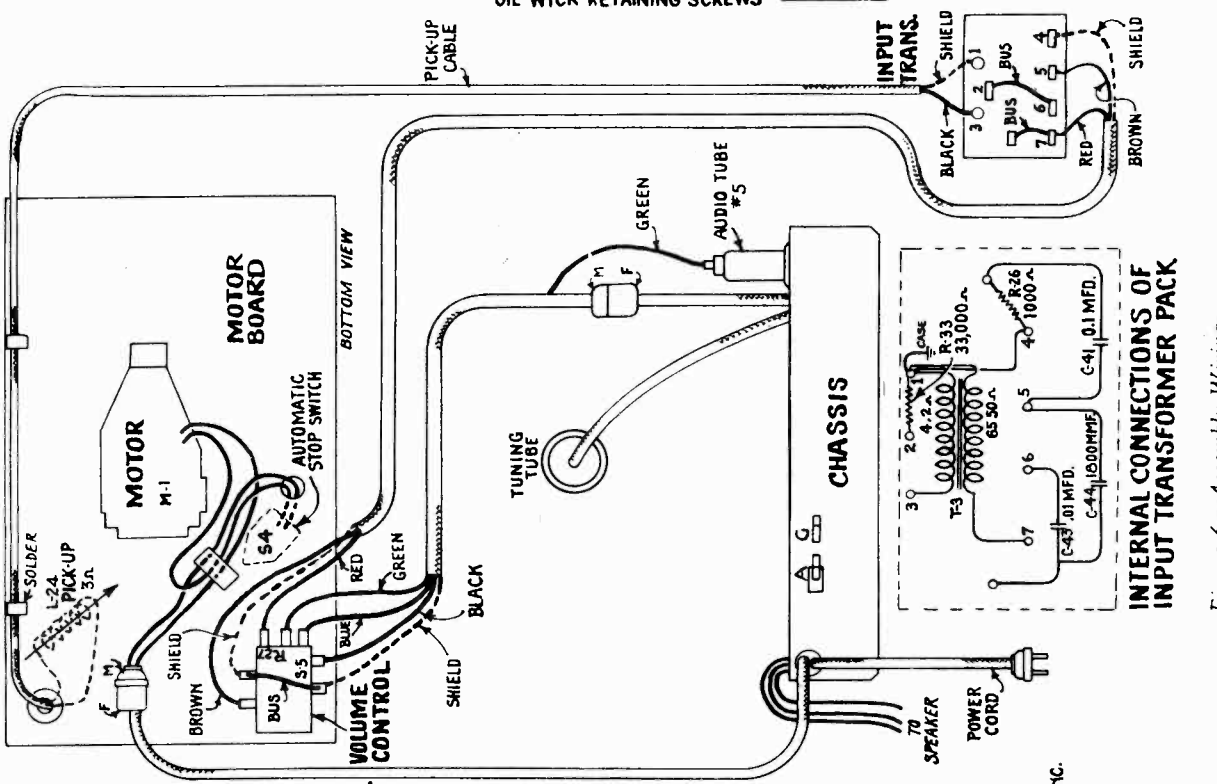


Figure 6—Assembly Wiring

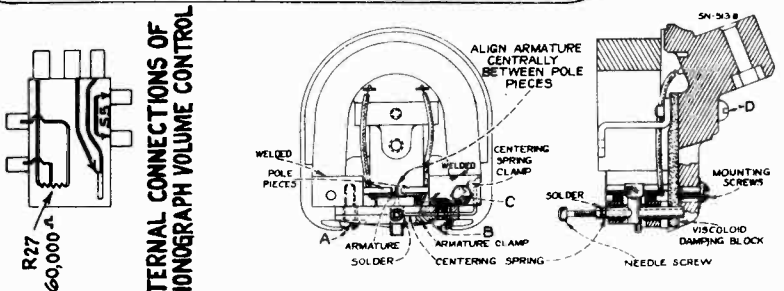


Figure 7—Details of Pickup

Alignment Procedure

Precise alignment is vital to the proper functioning of this receiver. There are four trimming adjustments provided in the i-f system, five in the oscillator coil system, three in the detector coil system, and three in the antenna coil system. Each of these trimmers has been accurately adjusted during manufacture and should remain properly aligned unless affected by abnormal conditions of climate or have been altered for service purposes. Incorrect alignment is usually evidenced by loss of sensitivity, improper tone quality, and poor selectivity. These indications will generally be present together.

The correct performance of this receiver can only be obtained when the alignment is performed with adequate and reliable test apparatus and in the sequence given. The manufacturer of this instrument has a complete assortment of such service equipment available for sale through its dealers and distributors.

Two methods of alignment are applicable. One method requires the cathode-ray oscillograph, while the other requires a voltmeter or glow-type indicator. The oscillographic method is advantageous in that the indication is in the form of a wave-image which represents the resonance characteristic of the tuned circuits. Alignment by this method should be performed with equipment such as an RCA Stock No. 9545 Cathode-Ray Oscillograph and an RCA Stock No. 9558 Frequency Modulator. For the output indicator method, an instrument such as an RCA Stock No. 4317 should be used. Either of the above methods requires a reliable test oscillator for the source of alignment frequencies such as the RCA Stock No. 9595 Test Oscillator. Cathode-ray alignment is similar to the output indicator alignment outlined below, except as follows: The frequency modulator should be used to sweep the test oscillator signal when aligning the i-f amplifier and the low-frequency oscillator series trimmers. It will only be necessary to first adjust the trimmers to peak response, as outlined below, without the frequency modulator connected. Then, interconnect the test oscillator with the frequency modulator and re-tune the test oscillator (increase frequency) until the forward and reverse curves coincide at their highest points. Next, adjust the trimmers until the curves coincide throughout their length and have maximum amplitude. The proper place for connection of the oscillograph input to the receiver is indicated on the Chassis Wiring Diagram (figure 3). The high-frequency trimmers on all three bands should be adjusted for maximum (peak) amplitude of the images.

I-F Trimmer Adjustments

The four trimmers of the two i-f transformers are located as shown by figure 5. Each must be aligned to a basic frequency of 460 kc. To do this, attach the output indicator across the voice-coil circuit. Attach the receiver chassis to a good external ground. Connect the output of the test oscillator between the control-grid of the RCA-6A8 first-detector tube and chassis-ground through a .001 mfd. capacitor. Tune the test oscillator to 460 kc. Advance the receiver volume control to its full-on position and adjust the receiver tuning control to a point where no interference is encountered from broadcast stations, or short stator of oscillator tuning capacitor C18 to chassis eliminating local oscillator signals. Increase the output of the test oscillator until a slight indication is apparent on the output indicator. Adjust the two trimmers, C28 and C27 of the second i-f transformer to produce maximum (peak) indicated receiver output. Then, adjust the two trimmers, C26 and C24, of the first i-f transformer for maximum (peak) receiver output as shown by the indicating device. During these adjustments, regulate the test-oscillator output so that the receiver output indication is always as low as possible. By doing so, broadness of tuning, due to a.v.c., action will be avoided. It is advisable to repeat the adjustment of all i-f trimmers a second time to assure that the inter-action between them has not disturbed the original adjustment.

R-F Trimmer Adjustments

The eleven trimmers associated with the r-f, first detector, and oscillator tuned circuits have their locations shown by figures 1 and 5. The three trimmers which are at all times directly in shunt with the variable tuning condensers necessitate that the "Short wave" (C) band be aligned first. The range selector switch should, therefore, be turned to its "Short wave" position for the first adjustments. Leave the output indicator connected to the output system.

Calibrate the dial by rotating the tuning control until the variable condenser plates are in their full-mesh (maximum capacity) position and adjust the dial pointer so that its end points to the horizontal graduation (520 kc) at the low-frequency end of the "Medium wave" (A) dial scale.

Wave-Trap Adjustment

Connect the test oscillator to the antenna and ground terminals of the receiver, leaving it tuned to 460 kc. Adjust the wave-trap trimmer C45 for maximum suppression of the 460 kc signal. An increase in test-oscillator output may be necessary before the point of minimum output (maximum suppression of signal) is obtained.

"Short Wave" Band

(a) Adjust the test oscillator to 15,000 kc and set the receiver tuning control to a dial reading of 15,000 kc.

(b) Adjust trimmer C19 on the oscillator section of the variable condenser to the point at which it produces maximum indicated receiver output. Two points may be found, each of which produces such a maximum. The one of **maximum trimmer capacitance** is correct and should be used. The local (heterodyne) oscillator will be 460 kc below the signal frequency at this adjustment point.

(c) Adjust trimmer C15 of the detector section of the variable condenser, simultaneously rocking the receiver tuning control backward and forward through the 15,000 kc input signal, until maximum receiver output results from these combined operations.

(d) With the receiver tuning control set to 15,000 kc adjust trimmer C8 on the antenna section of the variable condenser to the point which produces maximum (peak) indicated receiver output.

"Medium Wave" Band

(e) Change the receiver range selector to its "Medium wave" (A) band position and set the receiver tuning control to a dial reading of 1,500 kc. Tune the test oscillator to 1,500 kc and regulate its output to produce a slight indication on the receiver output indicating device.

(f) Adjust the high-frequency trimmers of the oscillator, detector, and antenna coils, C20, C49, and C6 respectively, to the points at which each produces maximum indicated receiver output.

(g) Shift the test-oscillator frequency to 600 kc and tune the receiver to pick up this signal, disregarding the dial reading at which it is best received.

(h) Adjust the low-frequency trimmer C22 of the oscillator coil, simultaneously rocking the tuning control of the receiver backward and forward through the signal, until maximum indicated receiver output results from these combined operations. The adjustment of C19, C15, and C8 should be corrected at 15,000 kc as in (b), (c), and (d); also C20, C49, and C6 should be corrected at 1,500 kc, as in (f) to compensate for any changes caused by the adjustment of the low-frequency oscillator coil trimmer C22.

Long Wave" Band

(i) Change receiver band selector to "Long wave" (X) band and set receiver tuning control to a dial reading of 300 kc. Tune test oscillator to 300 kc and adjust oscillator, detector, and antenna trimmers C50, C48, and C55, respectively, for maximum indicated receiver output.

(j) Set receiver to 175 kc and tune test oscillator to 175 kc. Adjust trimmer C51 for maximum indicated output, simultaneously rocking tuning control of the receiver backward and forward through the signal.

(k) The adjustment of C50, C48, and C55 should now be repeated at 300 kc as described in (i) to compensate for any changes caused by the adjustment of the low-frequency trimmer C51.

REPLACEMENT PARTS

Stock No.	DESCRIPTION	List Price
	RECEIVER ASSEMBLIES	
12706	Arm—Arm and hub assembly for operating shutter	$0.22
13098	Board—Antenna and ground terminal board	.25
5237	Bushing—Variable tuning condenser mounting bushing assembly—Package of 3	.43
11625	Cable—Radiotron tuning tube cable complete with socket	1.26
11759	Cable—2-conductor shielded volume control cable—complete with 4-contact female connector	.92
12511	Cap—Contact cap—Package of 5	.15
11465	Capacitor—Adjustable trimmer (C22)	.48
11256	Capacitor—Adjustable trimmer (C50)	.48
4955	Capacitor—Adjustable trimmer (C45)	.48
12065	Capacitor—Adjustable trimmer (C51)	.65
12814	Capacitor—5.6 Mmfd.—(C13)	.20
12974	Capacitor—120 Mmfd.—(C17)	.20
5116	Capacitor—175 Mmfd.—C29)	.18
13003	Capacitor—180 Mmfd.—(C35, C47)	.20
11290	Capacitor—400 Mmfd.—(C9, C16)	.25
11621	Capacitor—3,600 Mmfd.—(C10)	.38
4868	Capacitor—.005 Mfd.—(C12, C33, C52, C53)	.20
11451	Capacitor—.017 Mfd.—(C38)	.18
11395	Capacitor—.01 Mfd.—(C32)	.18
4858	Capacitor—.01 Mfd.—(C36)	.25
4839	Capacitor—0.1 Mfd.—(C21)	.28
4841	Capacitor—0.1 Mfd.—(C31)	.22
11414	Capacitor—0.1 Mfd.—(C42)	.20
5170	Capacitor—0.25 Mfd.—(C25)	.25
4836	Capacitor—.05 Mfd.—(C30)	.30
11240	Capacitor—10 Mfd.—(C39)	1.08
11387	Capacitor—10 Mfd.—(C2)	.86
5212	Capacitor—18 Mfd.—(C40)	1.16
12061	Coil—Antenna coil—Less shield—(L2, L3, L4, L5, L23, C6, C55)	1.90
12062	Coil—Detector coil—Less shield—(L6, L7, L8, L9, L15, C48, C49)	1.94
12063	Coil—Oscillator coil—Less shield—(L10, L11, L12, L13, L14, C20)	2.62
12965	Condenser—Three-gang variable tuning condenser—(C7, C8, C14, C15, C18, C19)	6.15
4153	Connector—4-contact female connector for volume control cable	.48
4573	Connector—2-contact female connector for motor cable	.30
13094	Dial—Station selector dial scale	1.05
11394	Foot—Chassis foot assembly—Package of 2	$0.70
12712	Indicator—Station selector indicator pointer	.22
5226	Lamp—Dial lamp—Package of 5	.70
12718	Mask—Dial Light Diffuser with colored screen	.40
11393	Resistor—Voltage divider resistor—comprising one 3,500 ohm and one 13,000 ohm sections—(R21, R22)	.74
11329	Resistor—Voltage divider resistor—comprising one 148 ohm, one 32 ohm and one 85 ohm sections—(R19, R20, R24)	.52
12075	Resistor—56 ohms—Flexible type complete with contact cap—(R32)	.28
12071	Resistor—120 ohms—Carbon type—¼ watt—(R23)—Package of 5	1.00
12070	Resistor—18,000 ohms—Carbon type—1/10 watt—(R30, R31)—Package of 5	.75
5033	Resistor—33,000 ohms—Carbon type—1 watt—(R17)—Package of 5	1.10
11322	Resistor—39,000 ohms—Carbon type—¼ watt—(R12)—Package of 5	1.00
11365	Resistor—82,000 ohms—Carbon type—¼ watt—(R14)—Package of 5	1.00
3118	Resistor—100,000 ohms—Carbon type—¼ watt—(R5)—Package of 5	1.00
11453	Resistor—270,000 ohms—Carbon type—1/10 watt—(R15)—Package of 5	.75
11452	Resistor—470,000 ohms—Carbon type—1/10 watt—(R16)—Package of 5	.75
11397	Resistor 560,000 ohms—Carbon type—1/10 watt—(R2, R4)—Package of 5	.75
12013	Resistor—1 megohm—Carbon type—1/10 watt—(R18)—Package of 5	.75
11626	Resistor—2.2 megohms—Carbon type—¼ watt—(R9, R10, R13)—Package of 5	1.00
4669	Screw—No. 8-32 set screw for arm Stk No. 12706—Package of 10	.25
12064	Shield—Antenna or detector coil shield	.28
11604	Shield—Oscillator coil shield	.24
11390	Shield—Intermediate frequency transformer shield	.25
12735	Shield—Dial lamp shield—Package of 5	.25
12971	Shutter—Dial scale holder and shutter assembly	.85
11222	Socket—Dial lamp socket	.18
11195	Socket—5-contact rectifier Radiotron socket	.15
11198	Socket—7-contact 6K7—6F5—or 6H6 Radiotron socket	.15
11196	Socket—8 contact 6A8 or 6F6 Radiotron socket	.15
12849	Spring—Tension spring shutter—Package of 5	.18
12966	Switch—Range switch—(S1)	1.75
11392	Switch—Tone control and power switch assembly—(S2, S3)	1.14
11388	Transformer—First intermediate frequency transformer—(L16, L17, C24, C26)	1.90

The prices quoted above are subject to change without notice.

MODEL 8U2
Parts, Page 2

RCA MFG. CO., INC.

Stock No.	DESCRIPTION	List Price
11389	Transformer—Second intermediate frequency transformer—(L18, L19, C27, C28, C29, R7, R8)	3.02
11803	Transformer—Power transformer—105-125 volts—50-60 cycles—(T1)	4.38
11805	Transformer—Power transformer—105-130, 140-160, 195-250 volts—40-60 cycles (T1)	7.95
11667	Trap—Wave trap—(L1, C45)	1.22
13144	Volume control—(R11)	1.00
	MOTOR ASSEMBLIES	
11703	Governor—Governor complete for phonograph motor—Stock No. 11701 or No. 11702	3.05
11701	Motor—Phonograph turntable motor—110 volts—50 to 60 cycles—(M1)	21.20
	MOTOR BOARD ASSEMBLIES	
4594	Box—Used needle box (cup)	.30
4577	Connector—2-contact male connector for motor cable	.30
7084	Cover—Turntable cover	.40
11704	Damper—Turntable rubber damper and damper plate	.24
4596	Escutcheon—Speed regulator escutcheon plate	.36
4597	Screw—Motor mounting screw assembly—comprising four screws, four lockwashers, four spacers, and four nuts	.22
11696	Turntable—Complete	2.48
11695	Volume control—Phonograph volume control—(R27, S5)	1.60
	ECCENTRIC AUTOMATIC BRAKE SWITCH ASSEMBLIES	
3994	Cover—Eccentric automatic switch cover and screw	.26
10174	Springs—Automatic brake springs—comprising one each of four springs—Package of 2 sets	.50
6896	Switch—Eccentric automatic brake and switch assembly—less switch cover	2.50
3322	Switch—Eccentric automatic switch only—less cover—(S13)	.75
	PICKUP AND ARM ASSEMBLIES	
11944	Arm—Pickup arm complete—less pickup unit	6.00
13404	Armature—Pickup armature	.95
11548	Back—Pickup housing back	.52
11946	Coil—Pickup coil—(L24)	.65
3521	Cover—Pickup back cover	.18
11708	Cover—Pickup front cover	.15
12354	Damper—Pickup damper	.16
3516	Damper—Pickup arm damper—comprising one upper and one lower damper, one upper bushing and one lower bearing	.14
3390	Escutcheon—Pickup arm escutcheon	.46
11945	Pickup unit—Complete—(L24)	5.50
11949	Transformer—Phonograph input transformer pack, comprising one input transformer, one 1,800 Mmfd., one .01 Mfd. and one 0.1 Mfd. capacitors and one 1,000-ohm, one 33,000-ohm resistors (T3, C41, C43, C44, R26, R33)	7.05

Stock No.	DESCRIPTION	List Price
3389	Rod—Eccentric automatic brake trip rod—Package of 5	$0.40
3387	Screw assembly—Pickup mounting screw assembly—comprising one screw, one lockwasher and one nut—Package of 10	.50
11549	Screw—Pickup front cover screw—Package of 10	.42
11547	Screw—Pickup needle holding screw—Package of 10	.42
	REPRODUCER ASSEMBLIES	
11232	Board—Terminal board with two lead wire clips	.18
11231	Bolt—Yoke and core assembly bolt and nut	.16
8060	Bracket—Output transformer mounting bracket	.14
11257	Clamp—Cone center suspension clamping nut and screw assembly—Package of 5	.25
11254	Coil—Field coil—(L22)	2.00
11233	Coil—Neutralizing coil (L20)	.30
11258	Cone—Reproducer cone—(L21)	1.00
5118	Connector—3 contact male connector for reproducer	.25
5119	Connector—3-contact female connector for reproducer cable	.25
9619	Reproducer—Complete	6.05
11253	Transformer—Output transformer—(T2)	1.56
11886	Washer—Spring washer used to hold field coil securely—Package of 5	.20
	MISCELLANEOUS ASSEMBLIES	
11996	Bracket—Tuning tube mounting bracket and clamp	.22
11947	Cable—2-conductor shielded cable, approximately 35 inches long—connects volume control to input transformer	.85
11948	Cable—3-conductor shielded volume control cable (control end)—complete with 4-contact male connector	1.50
6123	Connector—4-contact male connector for volume control cable	.30
12698	Crystal—Station selector escutcheon and crystal	1.02
11276	Escutcheon—Tuning tube escutcheon	.40
11347	Knob—Phonograph volume control, radio volume control, range switch, or tone control and power switch knob—Package of 5	.75
11610	Knob—Station selector knob assembly, comprising one large and one small knob—Package of 5	1.00
12556	Receptacle—Needle holder	.40
11210	Screw—Chassis mounting screw assembly—Package of 4	.28
11349	Spring—Retaining spring for knob Stk. No. 11347, and small knob in Stk. No. 11610—Package of 5	.25
4982	Spring—Retaining spring for large knob in Stk. No. 11610—Package of 10	.50
3391	Spring—Suspension spring and washer assembly for mounting motor board, comprising 1 bolt, 1 top spring, 1 bottom spring, 2 cup washers, 1 C washer and 1 cap nut	.50

PRICES SUBJECT TO CHANGE WITHOUT NOTICE

RCA MFG. CO., INC.

MODEL 9K1
Schematic, Socket
Trimmers

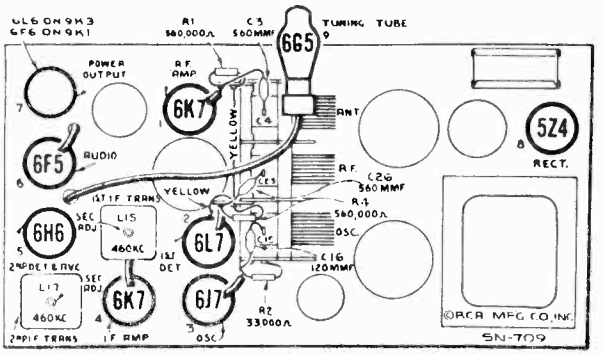


Figure 9—Radiotron and I-F Trimmer Locations

Figure 1—Schematic Circuit Diagram (Model 9K1)

Frequency Ranges	
"Standard Broadcast" (A)	530-1,800 kc
"Medium Wave" (B)	1,800-6,400 kc
"Short Wave" (C)	6,400-23,000 kc

Alignment Frequencies	
"Short Wave" (C)	20,000 kc (osc., det., ant.)
"Medium Wave" (B)	6,000 kc (osc., det., ant.)
"Standard Broadcast" (A)	600 kc (osc.), 1,500 kc (osc., det., ant.)

Intermediate Frequency ..... 460 kc

Pilot Lamps (3, Model 9K1) (4, Model 9K3) ..... Mazda No. 46, 6.3 volts, 0.25 amp.

Power Supply Ratings		9K1	9K3
Rating A	105-125 volts, 50-60 cycles	95 watts	135 watts
Rating B	105-125 volts, 25-60 cycles	95 watts	135 watts
Rating C	100-130/140-160/195-250 volts, 40-60 cycles	95 watts	135 watts

MODEL 9K1
Chassis Wiring

RCA MFG. CO., INC.

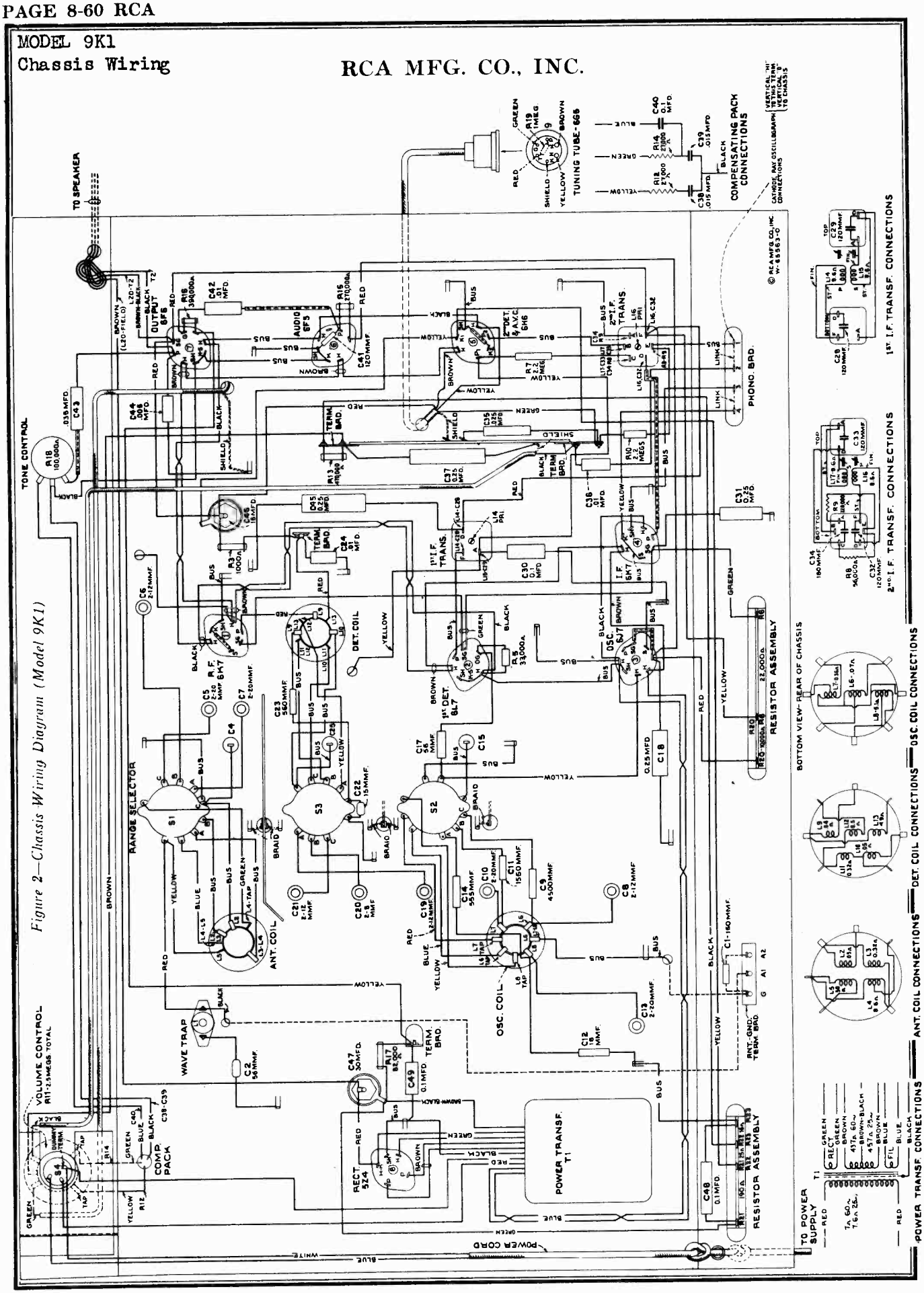


Figure 2—Chassis Wiring Diagram (Model 9K1)

RCA MFG. CO., INC.

MODEL 9K3
Schematic, Trans. Data
Spkr. Wiring

Figure 8—Loudspeaker Wiring

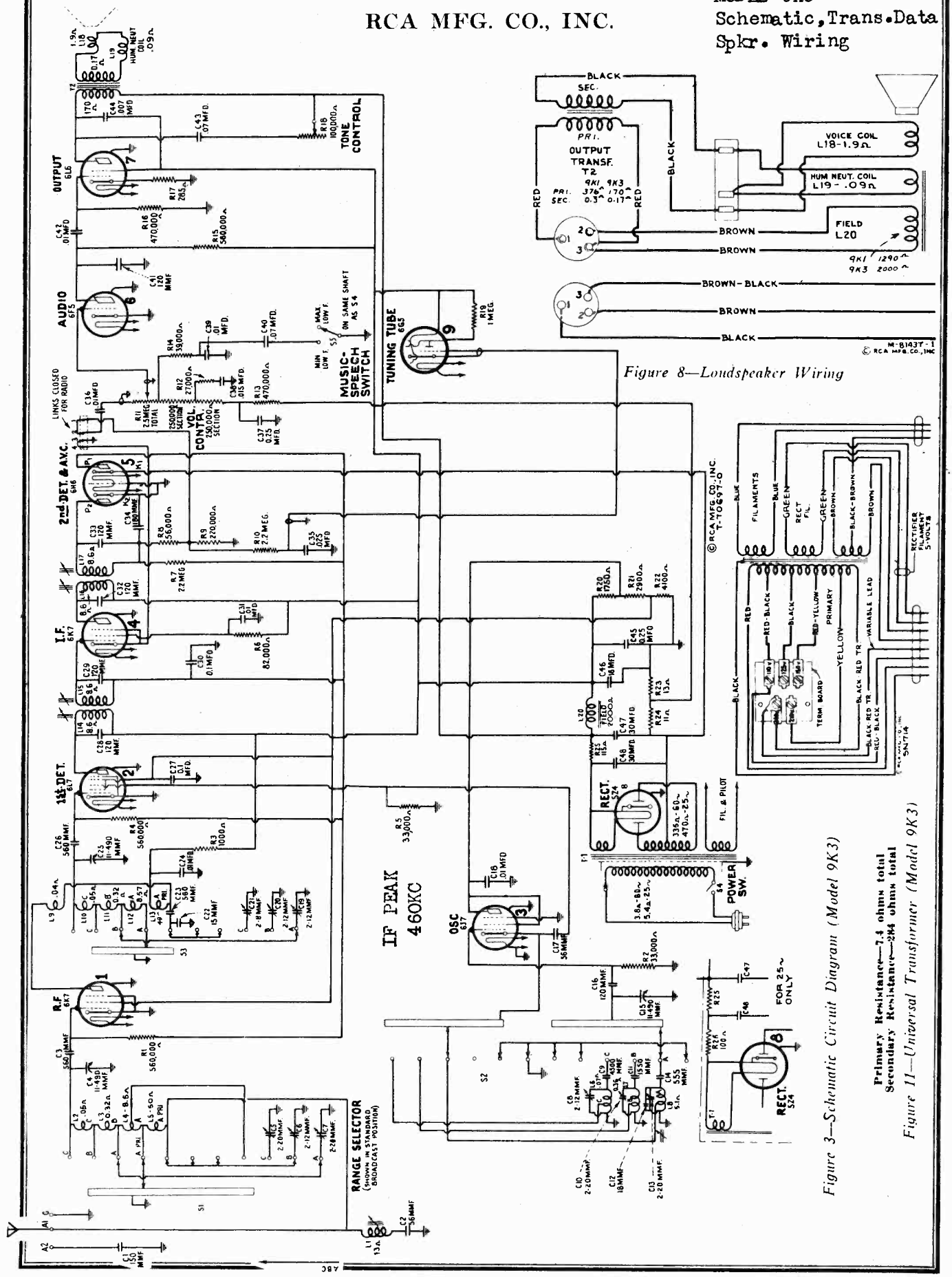


Figure 3—Schematic Circuit Diagram (Model 9K3)

Primary Resistance—7.4 ohms total
Secondary Resistance—284 ohms total

Figure 11—Universal Transformer (Model 9K3)

MODEL 9K3
Chassis Wiring

RCA MFG. CO., INC.

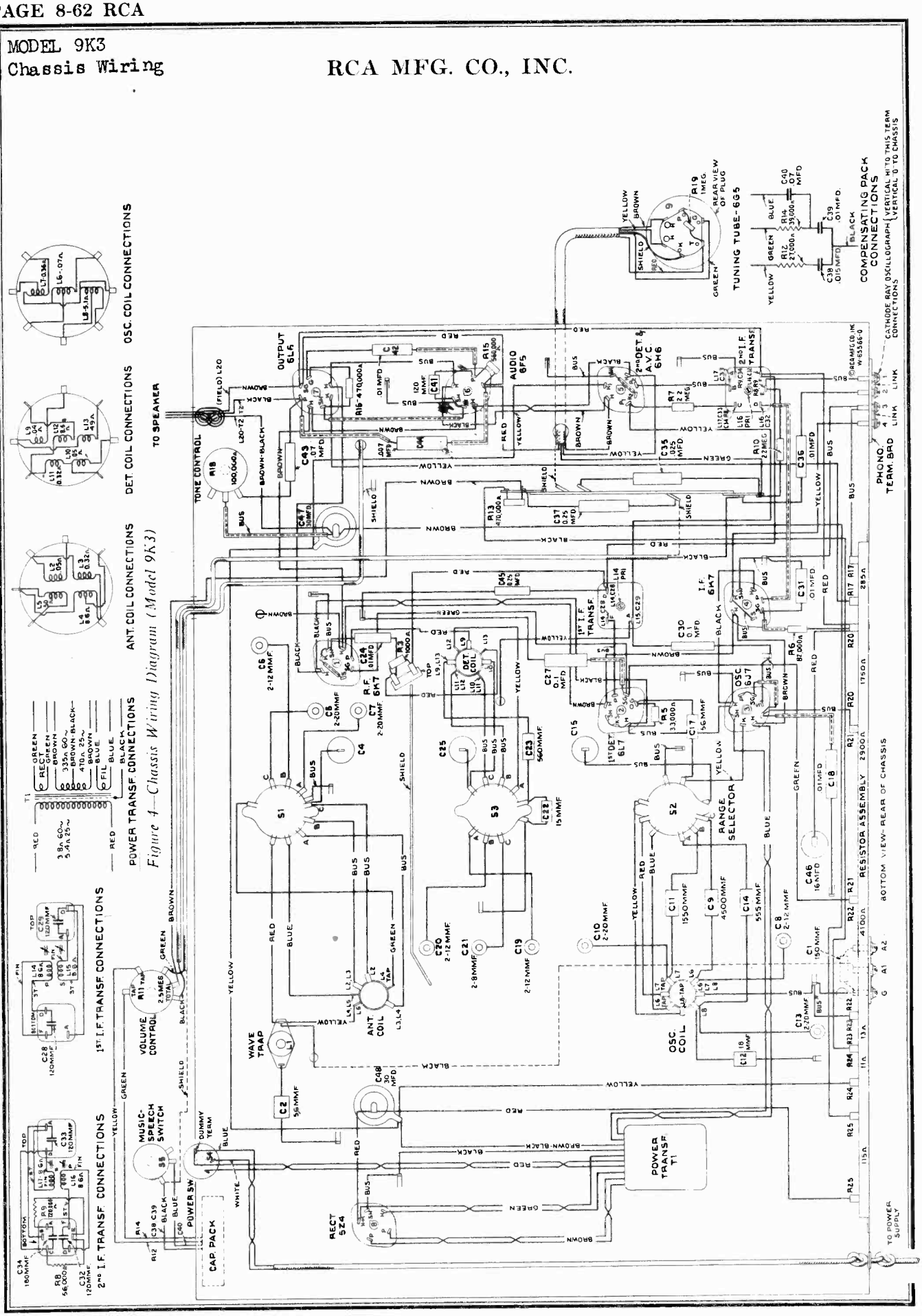


Figure 4—Chassis Wiring Diagram (Model 9K3)

RCA MFG. CO., INC.

MODELS 9K1, 9K3
Voltage, Socket
Trimmers

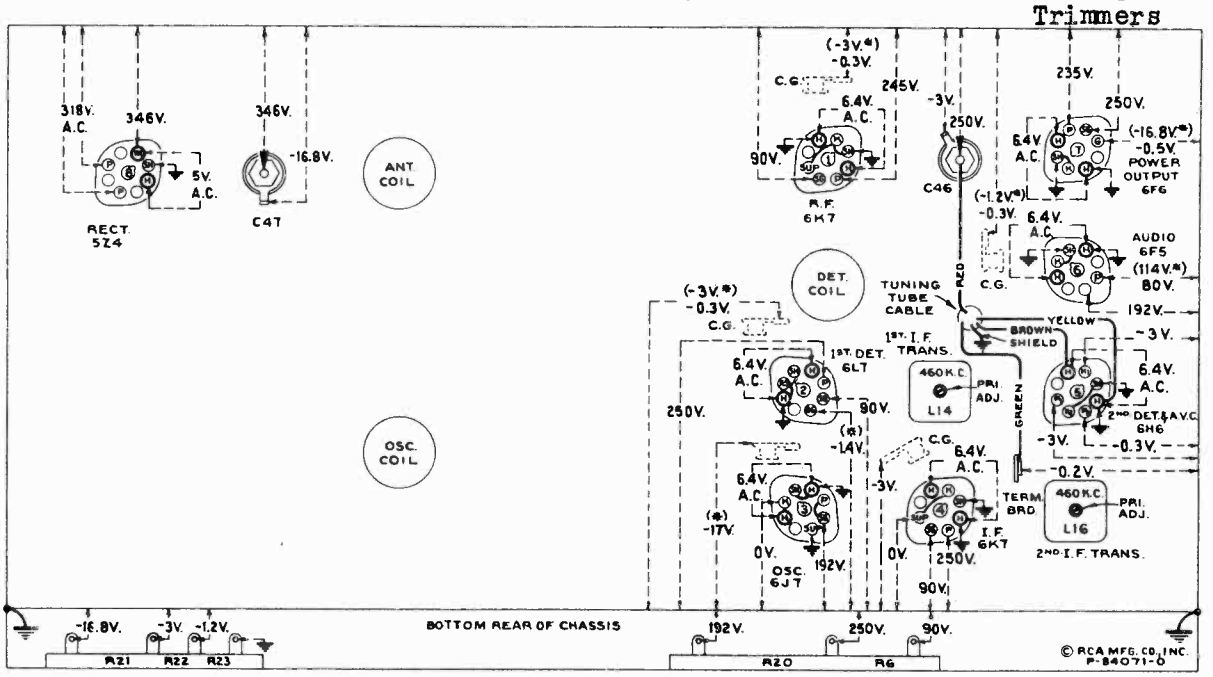
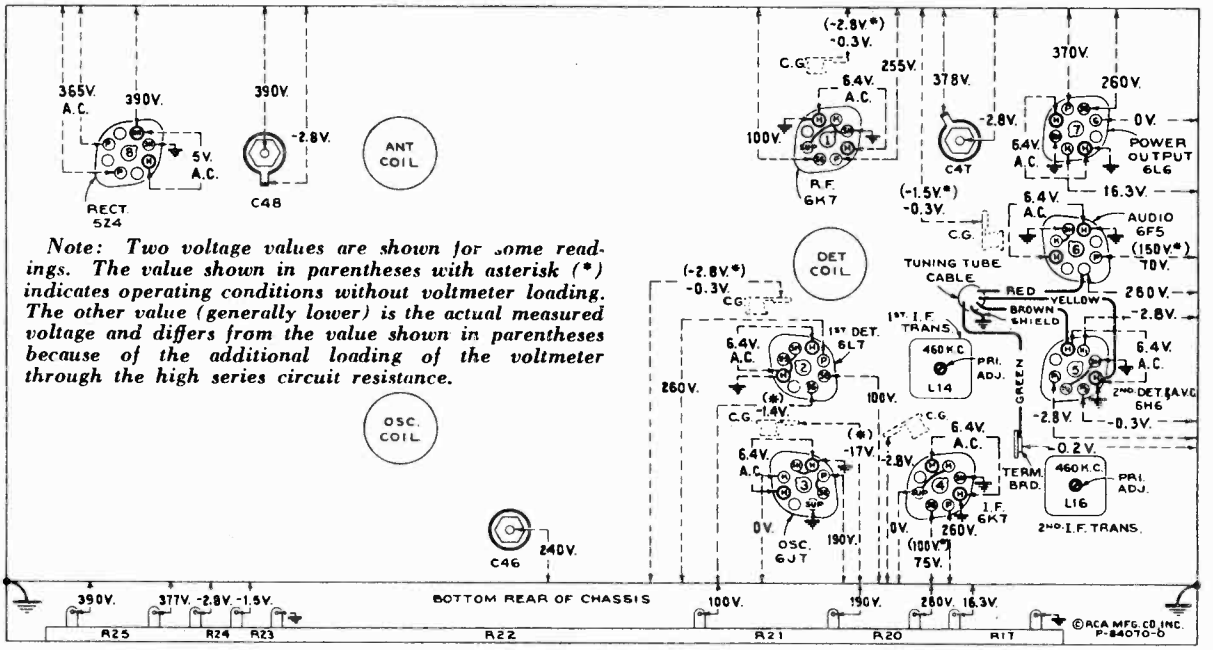


Figure 6—Radiotron Socket Voltages and I-F Trimmer Locations (Model 9K1)



***Note:** Two voltage values are shown for some readings. The value shown in parentheses with asterisk (*) indicates operating conditions without voltmeter loading. The other value (generally lower) is the actual measured voltage and differs from the value shown in parentheses because of the additional loading of the voltmeter through the high series circuit resistance.*

Figure 7—Radiotron Socket Voltages and I-F Trimmer Locations (Model 9K3)

Measured at 115 volts, 60-cycle supply—Tuned to approximately 1,000 kc ("Standard broadcast")—No signal being received—Volume control minimum

Radiotron Cathode Current Readings

Measured with Milliammeter Connected at Tube Socket Cathode Terminals Under Conditions Similar to Those of Voltage Measurements

	9K1	9K3		9K1	9K3
(1) RCA-6K7—R-F Amp.	7.5	7.5 ma.	(6) RCA-6F5—1st Audio	0.3	0.2 ma.
(2) RCA-6L7—1st Det.	6.4	7.2 ma.	(7) RCA-6F6—Output	41	— ma.
(3) RCA-6J7—Osc.	5.4	6.3 ma.	(7) RCA-6L6—Output	—	60 ma.
(4) RCA-6K7—I-F Amp.	7.5	7.5 ma.	(8) RCA-5Z4—Rectifier	72*	118 ma.*
(5) RCA-6H6—2nd Det. & A.V.C.	—	—	(9) RCA-6G5—Tuning Tube	2.0	2.0 ma.

(*Cannot be measured at socket.)

MODELS 9K1, 9K3
Alignment, Trimmers

RCA MFG. CO., INC.

Alignment Procedure

Calibrate the tuning dial by adjusting dial pointer to the low-frequency (end) calibration mark on "Standard broadcast" scale with the gang tuning-condenser plates in full-mesh position. This is a friction adjustment.

Perform alignment in proper order, tabulated below, starting with No. 1 and following all operations across, then No. 2, etc. Adjustment locations are shown on Figures 5, 6, 7, and 9.

Cathode-ray alignment is preferable; the connections to the chassis are shown in Figures 2 and 4. If an output indicator is used, connect it across the loudspeaker voice-coil and advance the receiver volume control to full-volume position.

Connect the "low" output terminal of the test oscillator to the receiver chassis for all alignment operations. Regulate the output of the test oscillator so that minimum signal is applied to the receiver to obtain an observable output indication. This will avoid a-v-c action.

The term "Dummy antenna" means the device which must be connected between the "high" test-oscillator output and the point of connection to the receiver in order to obtain ideal alignment. "No signal, 550-750 kc" means that the receiver should be tuned to a point between 550 and 750 kc where no signal or interferenee is received from a station or local (heterodyne) oscillator.

For further details on alignment, refer to booklet "RCA Victor Receiver Alignment."

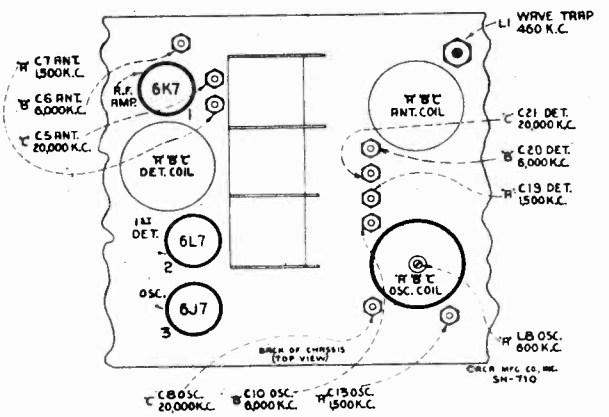


Figure 5—R-F Trimmer Locations

Note.—The locations of C20 and C21 are interchanged on some chassis of Model 9K1.

Order of Alignment	Test Oscillator			Receiver Dial Setting	Circuit to Adjust	Adjustment Symbols	Adjust to Obtain
	Connection to Receiver	Dummy Antenna	Frequency Setting				
1	6K7 I-F Grid Cap	.001 Mfd.	460 kc	No Signal 550-750 kc	2nd I-F Trans.	L16 and L17	Max. (peak)
2	6L7 Det. Grid Cap	.001 Mfd.	460 kc	No Signal 550-750 kc	1st I-F Trans.	L14 and L15	Max. (peak)
3	"A1" Ant. Term.	200 Mmfd.	460 kc	No Signal 550-750 kc	Wave Trap	L1	Minimum Output
4	"A1" Ant. Term.	300 Ohms	20,000 kc	20,000 kc	"C" Osc.	C8	Max. (peak)*
5	"A1" Ant. Term.	300 Ohms	20,000 kc	Rock thru 20,000 kc	"C" Det.	C21	Max. (peak)†
6	"A1" Ant. Term.	300 Ohms	20,000 kc	20,000 kc	"C" Ant.	C5	Max. (peak)‡
7	"A1" Ant. Term.	300 Ohms	6,000 kc	6,000 kc	"B" Osc.	C10	Max. (peak)
8	"A1" Ant. Term.	300 Ohms	6,000 kc	6,000 kc	"B" Det.	C20	Max. (peak)
9	"A1" Ant. Term.	300 Ohms	6,000 kc	6,000 kc	"B" Ant.	C6	Max. (peak)
10	"A1" Ant. Term.	200 Mmfd.	600 kc	600 kc	"A" L-F Osc.	L8	Max. (peak)
11	"A1" Ant. Term.	200 Mmfd.	1,500 kc	1,500 kc	"A" H-F Osc.	C13	Max. (peak)
12	"A1" Ant. Term.	200 Mmfd.	600 kc	Rock thru 600 kc	"A" L-F Osc.	L8	Max. (peak)
13	"A1" Ant. Term.	200 Mmfd.	1,500 kc	1,500 kc	"A" H-F Osc.	C13	Max. (peak)
14	"A1" Ant. Term.	200 Mmfd.	1,500 kc	1,500 kc	"A" Det.	C19	Max. (peak)
15	"A1" Ant. Term.	200 Mmfd.	1,500 kc	1,500 kc	"A" Ant.	C7	Max. (peak)

* Use minimum capacity peak if two peaks can be obtained.
† Use maximum capacity peak if two peaks can be obtained.
‡ After this adjustment, check for image signal by shifting receiver dial to 19,080 kc.

General Description

These receivers each employ a nine-tube, three-band superheterodyne circuit. Model 9K1 uses an RCA-6F6 power-output tube, delivering a maximum output of 4.5 watts, while Model 9K3 uses an RCA-6L6 beam-power-output tube, delivering a maximum output of 12.5 watts. The tuning range for each model is continuous from 530 to 23,000 kc, which includes the standard broadcast band and the important short-wave bands at 49, 31, 25, 19, 16, and 13 meters, along with channels assigned for police, aviation, and amateur communication.

Features of design include an r-f amplifier stage; magnetite-core adjusted i-f transformers, wave-trap, and low-frequency oscillator tracking; full automatic volume control; phonograph terminal board; "Magic Eye" tuning tube; 12-inch electrodynamic loudspeaker; new plunger-type, air-dielectric trimming capacitors; aural-compensated audio volume control; continuous high-frequency tone control; and a two-point low-frequency tone control. In addition, Model 9K3 has a cabinet incorporating the "Magic Voice."

Service Data

The various diagrams of this booklet contain such information as will be needed to isolate causes for defective operation if such develops. The ratings of the resistors, capacitors, coils, etc., are indicated adjacent to the symbols signifying these parts on the diagrams. Identification titles such as R1, L1, C1, etc., provide reference between the illustrations and Replacement Parts List. The coils, transformer windings, and reactors are rated in terms of d-c resistance to permit continuity checks.

Phonograph Attachment.—A terminal board is provided for connecting a phonograph into the audio-amplifying circuit. RCA Victor Models R-93, R-93-2, R-93-A, or R-94 Record Players should be connected as follows: Remove the two links from the phonograph terminal board. Connect green wire in Radio-Record switch cable to terminal 2; yellow to terminal 1; red to terminal 4; and both the blue lead and shield to terminal 3. Connect a 2-conductor twisted cable between the Record Player binding posts and the screw terminals on Radio-Record switch.

Loudspeaker.—Centering of the loudspeaker is made in the usual manner with three narrow paper feelers after first removing the front dust cover. This may be removed by softening its cement with a light application of acetone, using care not to allow the acetone to flow into the air gap. The dust cover should be cemented back in place with ambroid upon completion of adjustment.

Selector Dial (Model 9K3).—Figure 10 illustrates the relation of the various parts of the dial mechanism when in its "Standard broadcast" position with the range switch likewise turned to its "Standard broadcast" position. In re-assembling the dial after repairs, see that the gears are meshed in accordance with the diagram, at the same time noting that the range switch is in its "Standard broadcast" position and the lever attached to the range-switch shaft placed in the position shown.

To adjust the dial mechanism, set the range switch to its "Standard broadcast" position. Place a straight-edge across the center of the dial so that its edge is even with the lower (end) marking at both the low-frequency and high-frequency ends of the dial. Under such conditions the straight-edge should be parallel with the top of the chassis base. If the straight-edge is not parallel with the top of the chassis base, loosen the nut on the rear of the roller link pivot stud and move the stud up or down until the link roller moves the dial to the desired position so that the end calibration marks obtain the position mentioned above. Tighten the nut on the roller link pivot stud.

Set the gang tuning condenser to its maximum capacity position. Adjust the dial pointer to the low-frequency (end) mark on "Standard broadcast" scale. This is a friction adjustment.

With the gang tuning condenser plates still in full mesh, loosen the two set screws on the vernier-dial hub. Rotate the vernier dial until the "0" marking is in a vertical plane above the center of the shaft. Tighten set screws.

Antenna and Ground Terminals.—These receivers are equipped with an antenna-ground terminal board having three terminals. These terminals are marked "A2," "A1," and "G," the latter being the ground terminal and should always be connected to a good external ground. The transmission-line leads of the RCA RK-40A antenna system should be connected to terminals "A2" and "A1." The receiver coupling units of the RCA RK-40 and the RCA Spider-Web antenna systems should be connected to terminals "A1" and "G." Connect a single-wire antenna to terminal "A1."

Power Output	9K1	9K3
Undistorted	2.0 watts	7.0 watts
Maximum	4.5 watts	12.5 watts

Loudspeaker	
Type	12-inch Electrodynamic
Impedance (v. c.)	2.2 ohms at 400 cycles

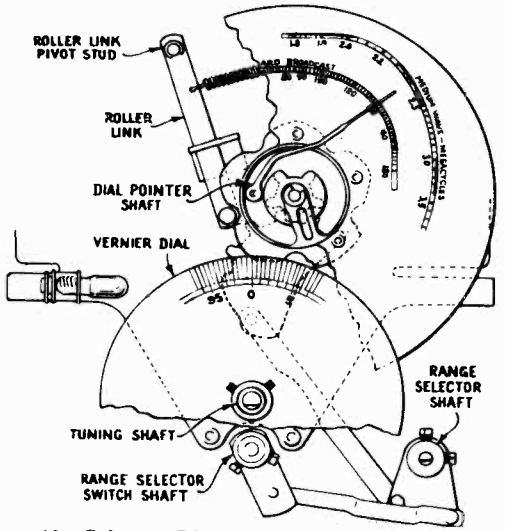


Figure 10—Selector Dial Mechanism (Model 9K3)

PARTS

Stock No.	Description
	REPRODUCER ASSEMBLIES (Model 9K1 Only)
12641	Board—3-contact reproducer terminal board
12640	Bracket—Output transformer mounting bracket and clamp
12012	Coil—Field coil (L20)
11469	Coil—Neutralizing coil (L19)
12667	Cone—Reproducer cone and dust cap (L18)
5118	Connector—3-contact male speaker cable connector
9696	Reproducer—Complete
11253	Transformer—Output transformer (T2)
11886	Washer—Spring washer to hold field coil securely
	REPRODUCER ASSEMBLIES (Model 9K3 Only)
12914	Board—Reproducer terminal board
13842	Bracket—Output transformer mounting bracket and clamp
13660	Coil—Field coil (L20)
11469	Coil—Neutralizing coil (L19)
12667	Cone—Reproducer cone and dust cap (L18)
5118	Connector—3-contact male speaker cable connector
9778	Reproducer—Complete
12913	Transformer—Output transformer (T2)
11886	Washer—Spring washer to hold field coil securely

Prices quoted above are subject to change without notice.

MODELS 9K1, 9K3
Parts, Page 2

RCA MFG. CO., INC.

STOCK No.	DESCRIPTION
13834	Resistor—100 ohms, wire wound, 4 watts, for 25-cycle model only (R26) (Model 9K3 only)
5112	Resistor—1,000 ohms, carbon type, ¼ watt (R3)
11300	Resistor—33,000 ohms, carbon type, 1/10 watt (R2, R5)
11282	Resistor—56,000 ohms, carbon type, 1/10 watt (R8)
11365	Resistor—82,000 ohms, carbon type, ¼ watt (Model 9K1, R17) (Model 9K3, R6)
11398	Resistor—220,000 ohms, carbon type, 1/10 watt (R9)
11453	Resistor—270,000 ohms, carbon type, 1/10 watt (R15) (Model 9K1 only)
13005	Resistor—390,000 ohms, carbon type, 1/10 watt (R16) (Model 9K1 only)
11172	Resistor—470,000 ohms, carbon type, ¼ watt (R13)
11452	Resistor—470,000 ohms, carbon type, 1/10 watt (R16) (Model 9K3 only)
11397	Resistor—560,000 ohms, carbon type, 1/10 watt (R1, R4)
5035	Resistor—560,000 ohms, carbon type, ¼ watt (R15) (Model 9K3 only)
12013	Resistor—1 megohm, carbon type, 1/10 watt (R19)
11626	Resistor—2.2 megohms, carbon type, ¼ watt (Model 9K1, R10) (Model 9K3, R7, R10)
12679	Resistor—2.2 megohms, insulated, ¼ watt (R7) (Model 9K1 only)
12927	Resistor—Voltage divider, comprising one 16-ohm, one 25-ohm, and one 190-ohm sections (R21, R22, R23) (Model 9K1 only)
12715	Resistor—Voltage divider, comprising one 10,000-ohm, and one 22,000-ohm sections (R6, R20) (Model 9K1 only)
13840	Resistor—Voltage divider, comprising one 115-ohm, one 11-ohm, one 13-ohm, one 4,100-ohm, one 2,900-ohm, one 1,750-ohm, and one 285-ohm sections (R17, R20, R21, R22, R23, R24, R25) (Model 9K3 only)
4669	Screw—No. 8-32 x 5/32 set screw for link, Stock No. 12868 (Model 9K3 only)
3903	Screw—No. 8-32 x 3/16 headless, cup-point set screw for dial, Stock No. 12870 (Model 9K3 only)
12925	Shaft—Range switch and band indicator operating shaft and hub assembly (Model 9K3 only)
12710	Shield—Coil shield for Stock No. 12709
12799	Shield—Coil shield for Stock Nos. 12708 and 13654
12926	Shield—Chassis end shield and mounting foot assembly
12733	Shield—Dial lamp shield (Model 9K1 only)
12008	Shield—I. F. transformer shield for Stock Nos. 12652 and 12653
12607	Shield—Top shield for I. F. transformer, Stock No. 12652
12581	Shield—Top shield for I. F. transformer, Stock No. 12653
13652	Shutter—Dial scale holder and shutter assembly complete with link (Model 9K1 only)
11195	Socket—5-contact 5Z4 Radiotron socket
11198	Socket—7-contact 6F5, 6H6, 6K7, or 6L7 Radiotron socket
11196	Socket—8-contact 6F6, 6J7, or 6L6 Radiotron socket
11222	Socket—Dial lamp socket (Model 9K1, all sockets) (Model 9K3, upper right or lower left socket)
13095	Socket—Upper left or lower right dial lamp socket (Model 9K3 only)
11381	Socket—Tuning tube socket and cover
12007	Spring—Retaining spring for core, Stock Nos. 12006, 12664, or 12800
12849	Spring—Tension spring for dial shutter link (Model 9K1 only)
13648	Switch—Range switch (S1, S2, S3) (Model 9K1 only)
13839	Switch—Range switch (S1, S2, S3) (Model 9K3 only)
13649	Tone control (R18) (Model 9K1 only)
12921	Tone control—High-frequency tone control (R18) (Model 9K3 only)
12860	Tone control—Low-frequency tone control switch and power switch (S4, S5) (Model 9K3 only)
12652	Transformer—First I. F. transformer, complete (L14, L15, C28, C29)
12653	Transformer—Second I. F. transformer, complete (L16, L17, C32, C33, C34, R8, R9)
12918	Transformer—Power transformer, 105-125 volts, 50-60 cycles (T1) (Model 9K1 only)
12857	Transformer—Power transformer, 105-125 volts, 25-60 cycles (T1) (Model 9K1 only)
11211	Transformer—Power transformer, 105-125 volts, 50-60 cycles (T1) (Model 9K3 only)
11212	Transformer—Power transformer, 105-125 volts, 25-60 cycles (T1) (Model 9K3 only)
11213	Transformer—Power transformer, 100-250 volts, 40-60 cycles (T1) (Model 9K3 only)
12654	Trap—Wave trap, complete (L1)
13647	Volume control and power switch (R11, S4) (Model 9K1 only)
12861	Volume control (R11) (Model 9K3 only)
	RECEIVER ASSEMBLIES
12706	Arm—Hub and arm assembly complete with set screws for operating shutter link (located on range-switch shaft) (Model 9K1 only)
12806	Board—3-contact antenna and ground terminal board
12863	Board—4-contact and 2-link phonograph terminal board
12929	Bracket—Mounting bracket for L. F. tone control or volume control (Model 9K3 only)
5237	Bushing—Variable condenser mounting bushing assembly
13656	Button—Plug button for top of detector coil shield, Stock No. 12799
11625	Cable—Tuning tube cable and socket
12511	Cap—Grid contact cap
12884	Capacitor—Adjustable trimmer (long) (C5, C7, C10, C13)
12714	Capacitor—Adjustable trimmer (medium) (C6, C8, C19, C21)
12807	Capacitor—Adjustable trimmer (short) (C20)
12896	Capacitor—15 Mmfd. (C22)
12722	Capacitor—18 Mmfd. (C12)
12723	Capacitor—56 Mmfd. (C2, C17)
12404	Capacitor—120 Mmfd. (C28, C29, C32, C33)
12724	Capacitor—120 Mmfd. (C16, C41)
12725	Capacitor—150 Mmfd. (C1)
12406	Capacitor—180 Mmfd. (C34)
12727	Capacitor—555 Mmfd. (C14)
12537	Capacitor—560 Mmfd. (C3, C23, C26)
12729	Capacitor—1,550 Mmfd. (C11)
12728	Capacitor—4,500 Mmfd. (C9)
4838	Capacitor—.005 Mfd. (C44) (Model 9K1 only)
13033	Capacitor—.007 Mfd. (C44) (Model 9K3 only)
4858	Capacitor—.01 Mfd. (Model 9K1, C24, C36, C42) (Model 9K3, C18, C24, C31, C36, C42)
4870	Capacitor—.025 Mfd. (C35)
12670	Capacitor—.035 Mfd. (C43 (Model 9K1 only)
13841	Capacitor—.07 Mfd. (C43) (Model 9K3 only)
4841	Capacitor—0.1 Mfd. (Model 9K1, C30, C48, C49) (Model 9K3, C27, C30)
4840	Capacitor—0.25 Mfd. (Model 9K1, C31, C37 (Model 9K3, C37)
5170	Capacitor—0.25 Mfd. (Model 9K1, C18, C45) (Model 9K3, C45)
5212	Capacitor—16 Mfd. (C46)
12467	Capacitor—30 Mfd. (Model 9K1, C47) (Model 9K3, C47, C48)
13655	Capacitor pack—Comprising two sections each .015 Mfd., one section 0.1 Mfd., and two 27,000-ohm resistors (C38, C39, C40, R12, R14) (Model 9K1 only)
12708	Coil—Antenna coil and shield (L2, L3, L4, L5)
13654	Coil—Detector coil and shield (L9, L10, L11, L12, L13)
12709	Coil—Oscillator coil and shield (L6, L7, L8)
13657	Compensator pack—Comprising one .015 Mfd., one .01 Mfd., one .07 Mfd. capacitors and one 27,000-ohm and one 39,000-ohm resistors (C38, C39, C40, R12, R14) (Model 9K3 only)
13650	Condenser—3-gang variable tuning condenser (C4, C15, C25) (Model 9K1 only)
12922	Condenser—3-gang variable tuning condenser (C4, C15, C25) (Model 9K3 only)
5119	Connector—3-contact female connector for reproducer cable
12006	Core—Adjustable core and stud for Stock Nos. 12652 and 12653
12664	Core—Adjustable core and stud for Stock No. 12654
12800	Core—Adjustable core and stud for Stock No. 12709
13653	Dial—Station selector dial scale (Model 9K1 only)
12870	Dial—Vernier dial and disc assembly (Model 9K3 only)
13651	Drive—Variable tuning condenser vernier drive with pinion gear (Model 9K1 only)
12712	Indicator—Station selector indicator pointer (Model 9K1 only)
5226	Lamp—Dial lamp, 6.3 volts
12868	Link—Range switch and band indicator operating link, complete with set screws (Model 9K3 only)
13683	Mask—Dial scale mask, complete with colored screens (Model 9K1 only)
	DRIVE ASSEMBLIES (Model 9K3 Only)
10705	Ball—5/32-inch diameter steel ball for planetary drive
10941	Ball—⅛-inch diameter steel ball for planetary drive bearing
12904	Bushing—Plate and bushing assembly for planetary drive mounting
12905	Coupling—Flexible coupling and shaft assembly, complete
12909	Dial—Band indicating dial and cam assembly
12899	Drive—Variable tuning condenser drive, complete—including mounting bracket, drive, dial scale and indicator, less vernier dial, Stock No. 12870, and link, Stock No. 12868
12906	Gear—Anti-lash drive gear, complete
12910	Gear—Sector gear and link assembly for band selector
12908	Indicator—Station selector indicator pointer
8051	Link—Link and roller assembly, complete with spring
12911	Screen—Dial lamp screen and light diffuser
4669	Screw—Set screw for flexible coupling or gear, Stock Nos. 12905 and 12906
12901	Shaft—Direct drive shaft and pinion gear for planetary drive
12900	Shaft—Vernier drive shaft for planetary drive
12903	Spring—Tension spring for planetary drive bearing
12907	Spring—Tension spring for gear, Stock No. 12906
8052	Spring—Tension spring for link, Stock No. 8051
	MISCELLANEOUS ASSEMBLIES (Model 9K1 Only)
11996	Bracket—Tuning tube mounting bracket and clamp
12666	Cover—Reproducer field coil and yoke cover
12698	Crystal—Station selector escutcheon and crystal
12742	Escutcheon—Tuning tube escutcheon
12699	Knob—Large station selector knob
12700	Knob—Small (vernier) station selector knob
11347	Knob—Range switch, tone control, or volume control knob
11210	Screw—Chassis mounting screw, washer, and lockwasher assembly
4982	Spring—Retaining spring for knob, Stock No. 12699
11349	Spring—Retaining spring for knob, Stock Nos. 11347 or 12700
	MISCELLANEOUS ASSEMBLIES (Model 9K3 Only)
13615	Bracket—Tuning tube mounting bracket and clamp
12915	Crystal—Station selector escutcheon and crystal
12742	Escutcheon—Tuning tube escutcheon
12699	Knob—Large station selector knob
12700	Knob—Small (vernier) station selector knob
11347	Knob—Low-frequency tone control and power switch, volume control, range switch or high-frequency tone control knob
11210	Screw—Chassis mounting screw assembly
11349	Spring—Retaining spring for knob, Stock Nos. 11347 or 12700
4982	Spring—Retaining spring for knob, Stock No. 12699

The prices quoted above are subject to change without notice.

RCA MFG. CO., INC

MODELS 9U, 9U2
Schematic

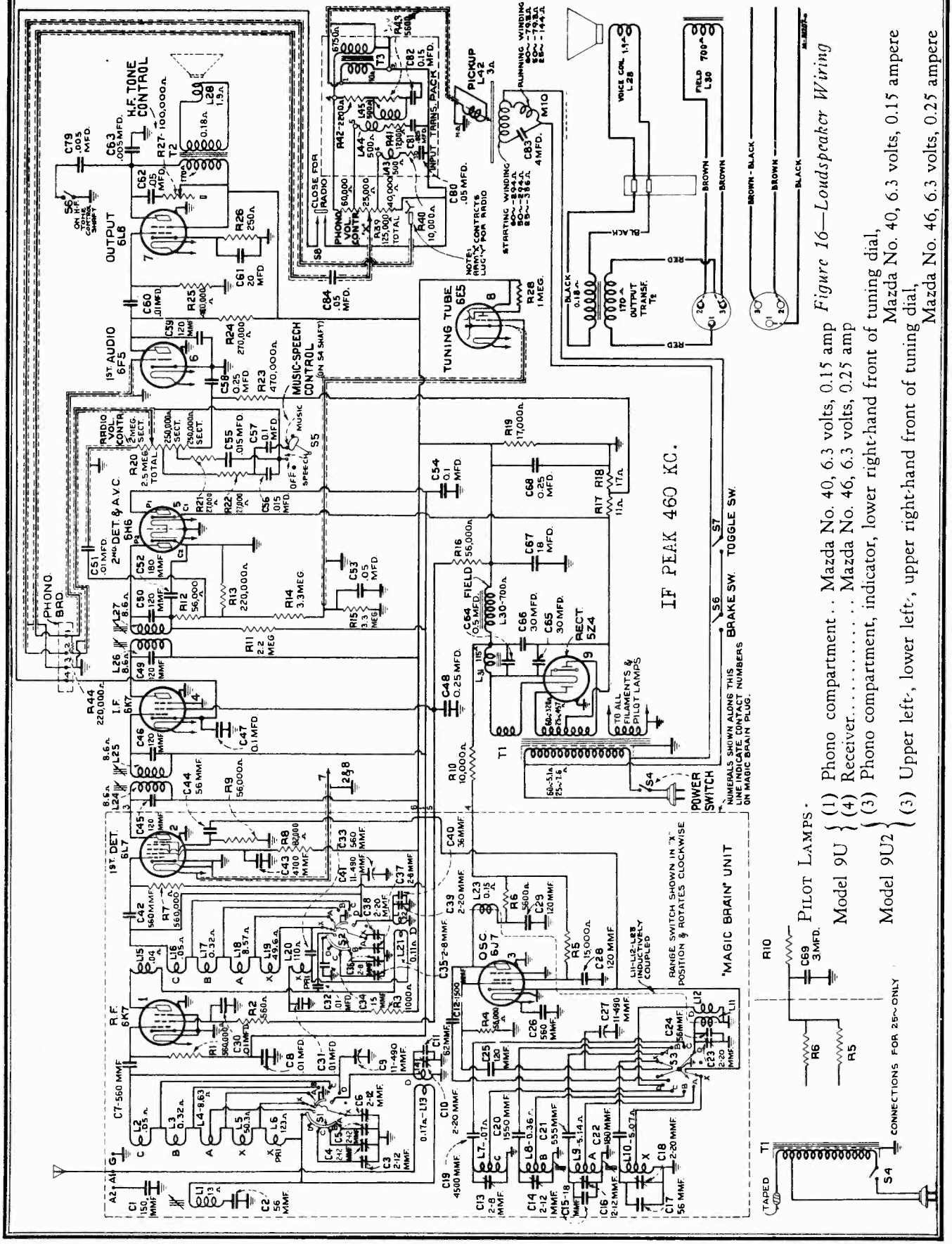
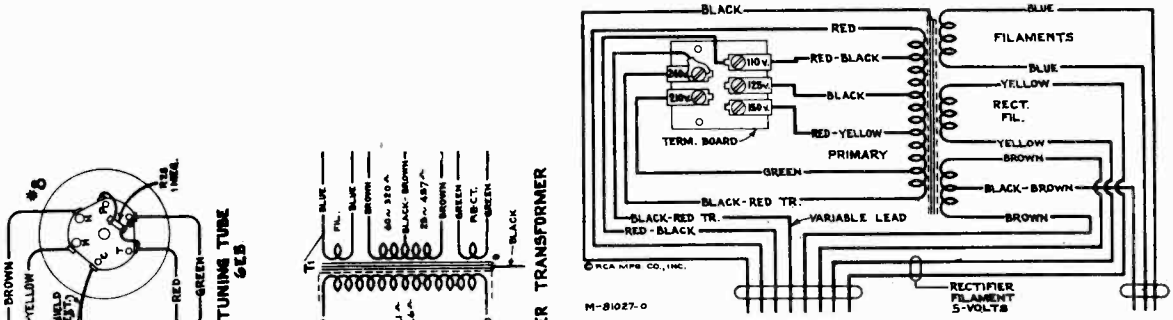


Figure 16—Loudspeaker Wiring

MODEL 9U
Chassis Wiring

RCA MFG. CO., INC.



Primary resistance—10 ohms total
Secondary resistance—266 ohms total

Figure 15—Universal Transformer

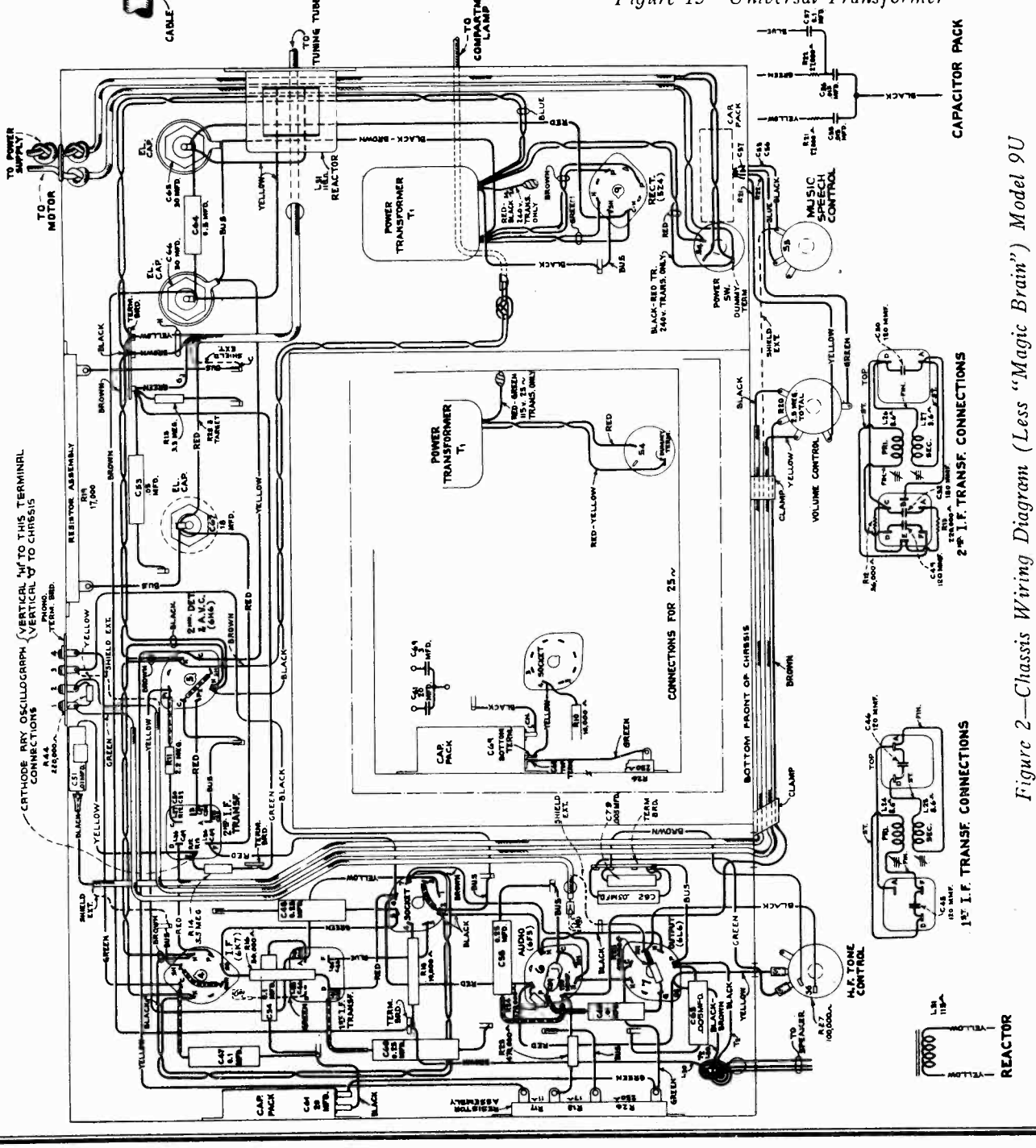


Figure 2—Chassis Wiring Diagram (Less "Magic Brain") Model 9U

RCA MFG. CO., INC.

MODELS 9U, 9U2
"Magic Brain" Wiring

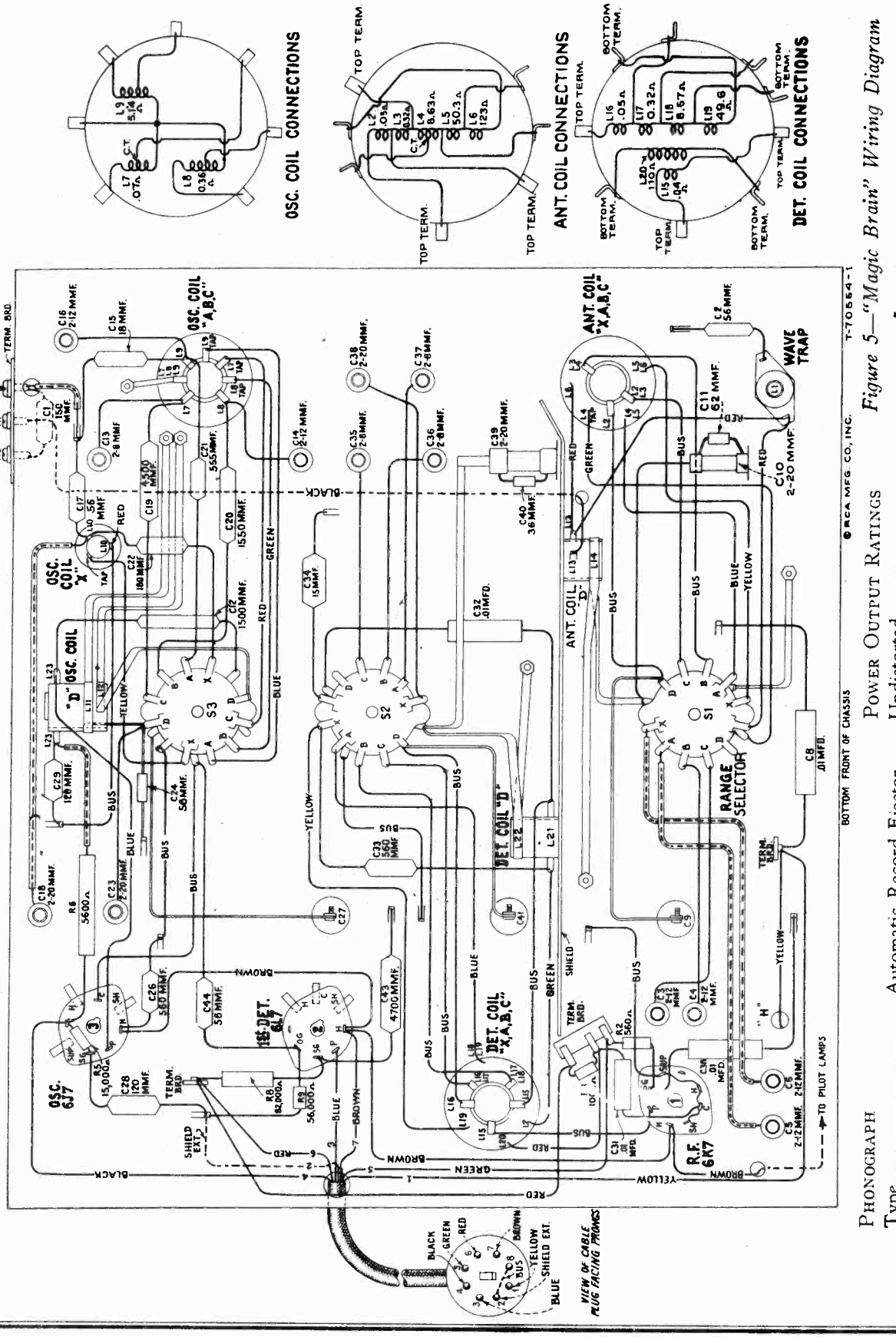


Figure 5—"Magic Brain" Wiring Diagram

PHONOGRAPH

Type..... Automatic Record Ejector
Record Capacity..... Seven 10-inch or Six 12-inch
Turntable Speed..... 78 R.P.M.
Type of Pickup..... Low-Impedance Magnetic
Pickup Impedance..... 8.5 ohms at 1,000 cycles

POWER OUTPUT RATINGS

Undistorted..... 5 watts
Maximum..... 9 watts

LOUDSPEAKER

Type..... 12-inch Electrodynamic
Impedance (V.C.)..... 2.2 ohms at 400 cycles

MODEL 9U2
Chassis Wiring

RCA MFG. CO., INC.

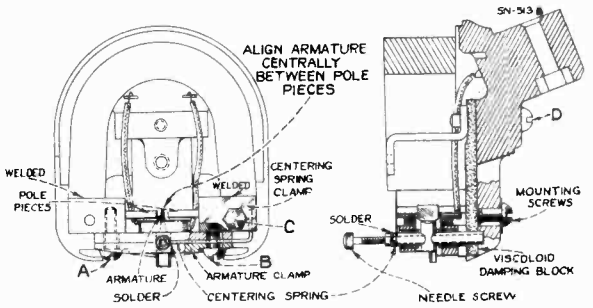


Figure 13—Details of Pickup

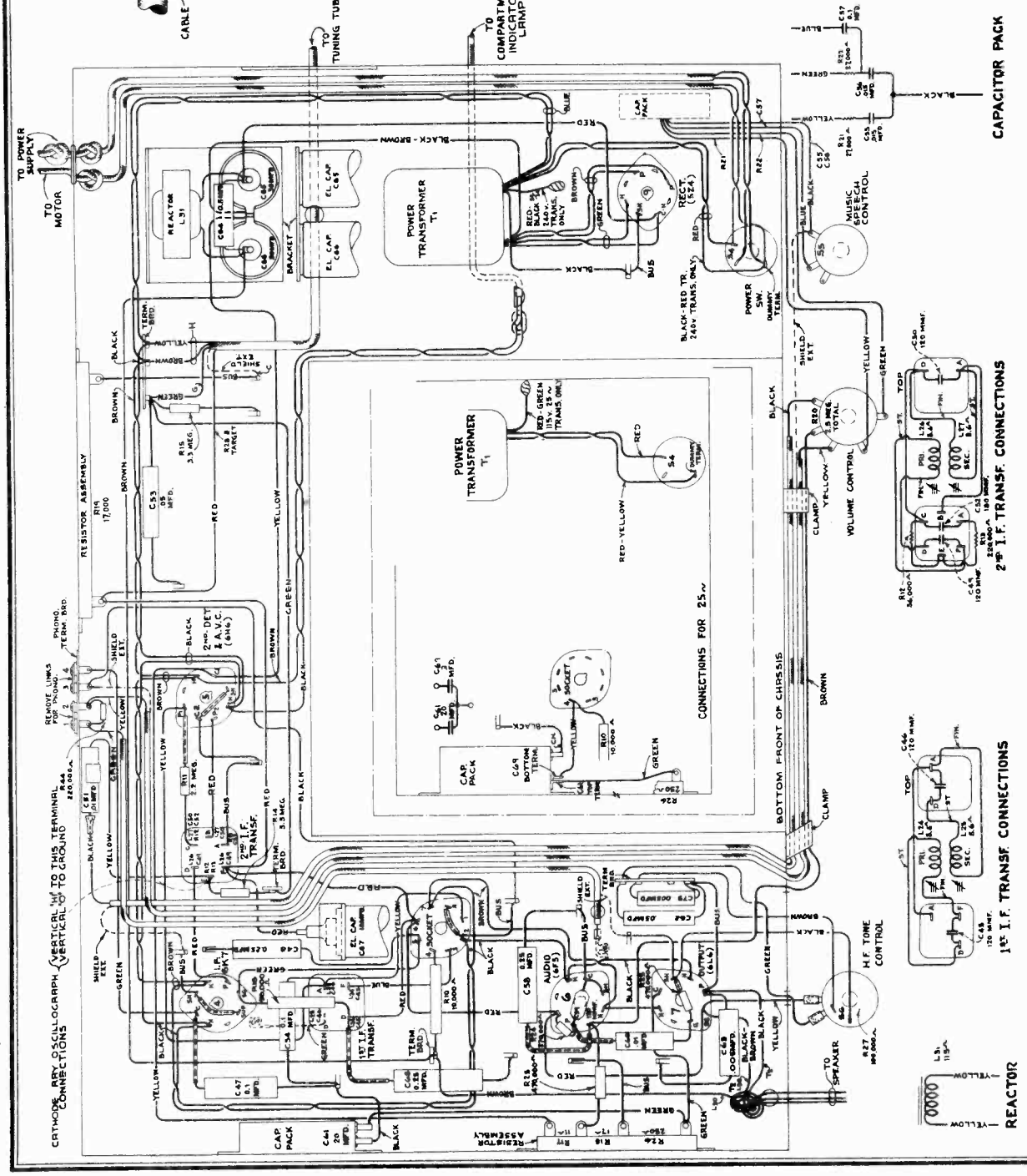


Figure 3—Chassis Wiring Diagram (Less "Magic Brain") Model 9U2

RCA MFG. CO., INC.

MODELS 9U, 9U2
Assembly Wiring
Dial Data

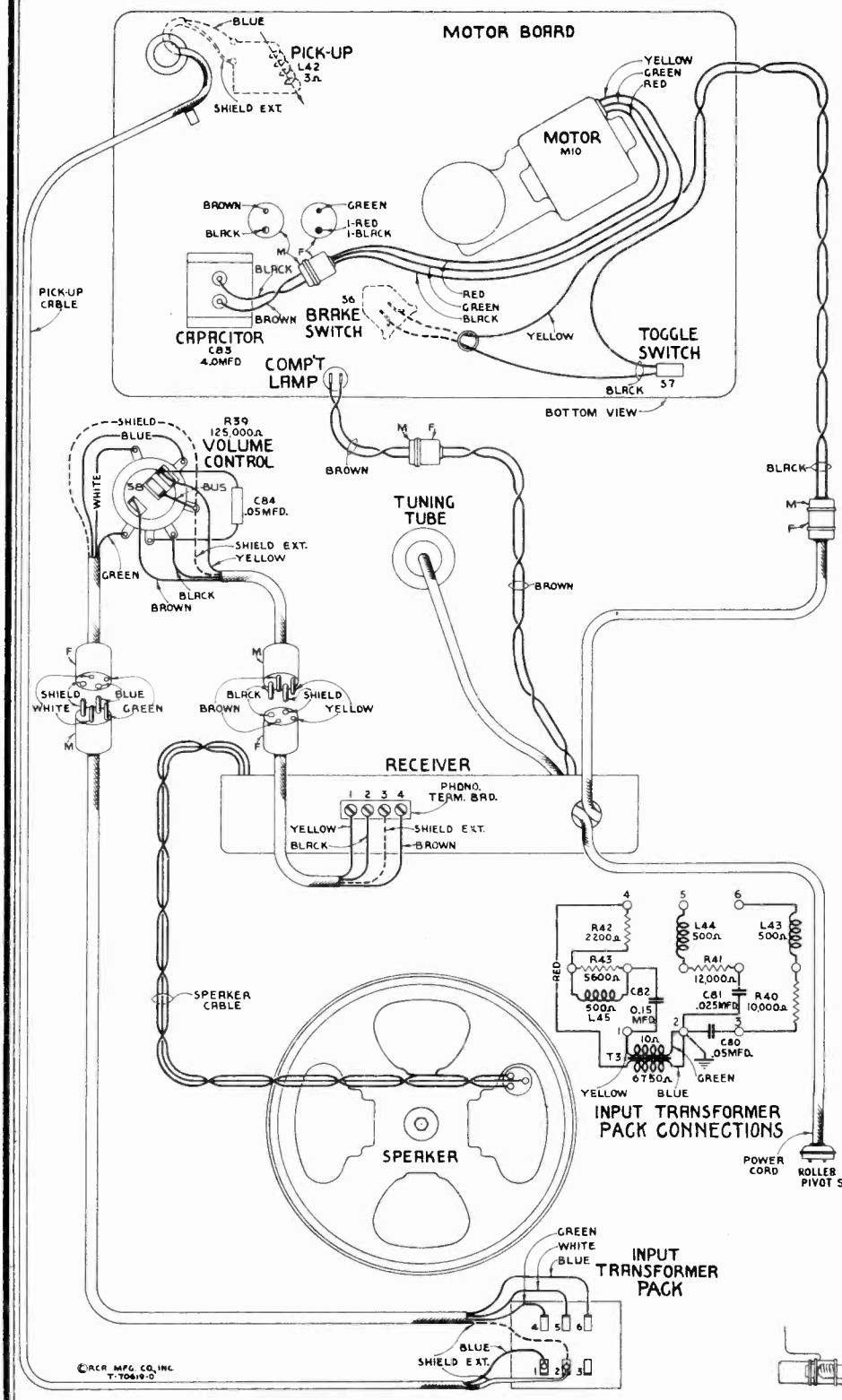


Figure 8—Assembly Wiring

Electrical Specifications

ALIGNMENT FREQUENCIES

"Long Wave" (X)	175 kc (osc.), 350 kc (osc., det., ant.)
"Standard Broadcast" (A)	600 kc (osc.), 1,500 kc (osc., det., ant.)
"Medium Wave" (B)	6,000 kc (osc., det., ant.)
"Short Wave" (C)	20,000 kc (osc., det., ant.)
"Ultra Short Wave" (D)	57,000 kc (osc., det., ant.)
Intermediate Frequency	460 kc

FREQUENCY RANGES

"Long Wave" (X)	150-410 kc
"Standard Broadcast" (A)	530-1,800 kc
"Medium Wave" (B)	1,800-6,400 kc
"Short Wave" (C)	6,400-23,000 kc
"Ultra Short Wave" (D)	23,000-60,000 kc

POWER SUPPLY RATINGS

Rating A-6 (Model 9U only)	105-125 volts, 60 cycles, 150 watts
Rating A-5 (Model 9U only)	105-125 volts, 50 cycles, 155 watts
Rating B-2	105-125 volts, 25 cycles, 150 watts
Rating C-6	105-130/140-160/200-250 volts, 60 cycles, 150 watts
Rating C-5	105-130/140-160/200-250 volts, 50 cycles, 155 watts

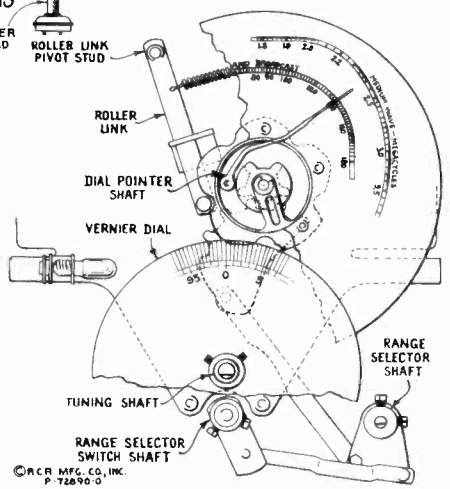


Figure 12—Selector Dial Change Mechanism

MODELS 9U, 9U2
Socket, Trimmers
Voltage, Resistance

RCA MFG. CO., INC.

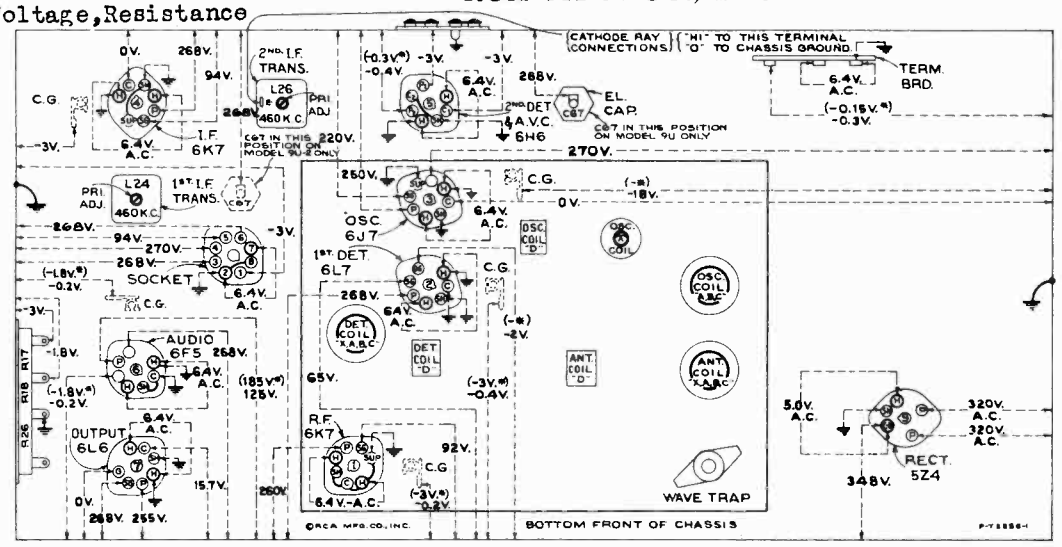


Figure 11—Radiotron Socket Voltages, Coil, and I-F Trimmer Locations

Measured at 115 volts, 60-cycle supply—Tuned to approximately 1,000 kc—No signal being received—Radio volume control counter-clockwise—Phono volume control extreme counter-clockwise—Other controls optional

Note: Two voltage values are shown for some readings. The value shown in parenthesis with asterisk (*) indicates operating conditions without voltmeter loading. The other value (generally lower) is the actual measured voltage and differs from the value shown in parenthesis because of the additional loading of the voltmeter through the high series circuit resistance.

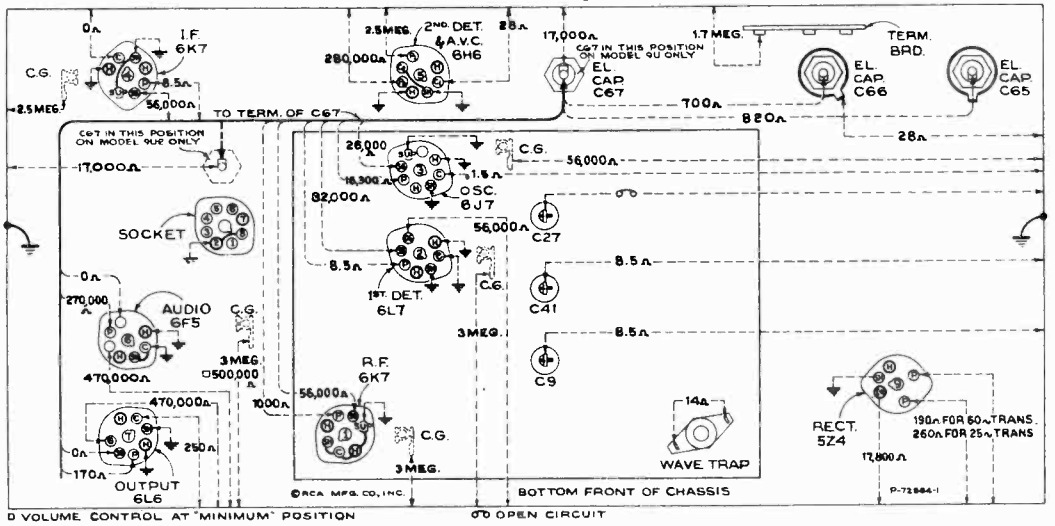


Figure 10—Resistance Diagram

Power supply disconnected—Radiotrons in sockets—Tuning condenser in full-mesh—Range selector in "Standard broadcast" position—Radio volume control clockwise—Phono volume control extreme counter-clockwise—Other controls optional

Radiotron Cathode Current Readings

Measured with Milliammeter Connected at Tube Socket Cathode Terminal under Conditions Similar to Those of Voltage Measurements

(1)	RCA-6K7—R-F	8.0 ma	
(2)	RCA-6L7—1st Det.	4.4 ma	
(3)	RCA-6J7—Osc.	6.7 ma	
(4)	RCA-6K7—I-F.	8.0 ma	
(5)	RCA-6H6—2nd Det.	—	
(6)	RCA-6F5—A.F.	0.3 ma.	
(7)	RCA-6L6—Power	63 ma.	
(8)	RCA-6E5—Eye	3.0 ma.	
(9)	RCA-5Z4—Rect.	110 ma.*	

(*Cannot be measured at socket)

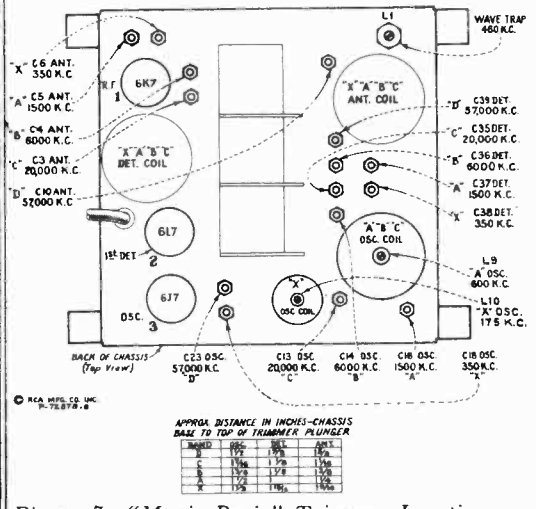


Figure 7—"Magic Brain" Trimmer Locations

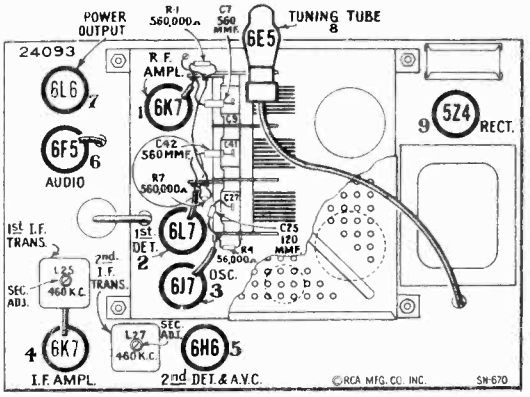


Figure 4—Radiotron and I-F Trimmer Locations

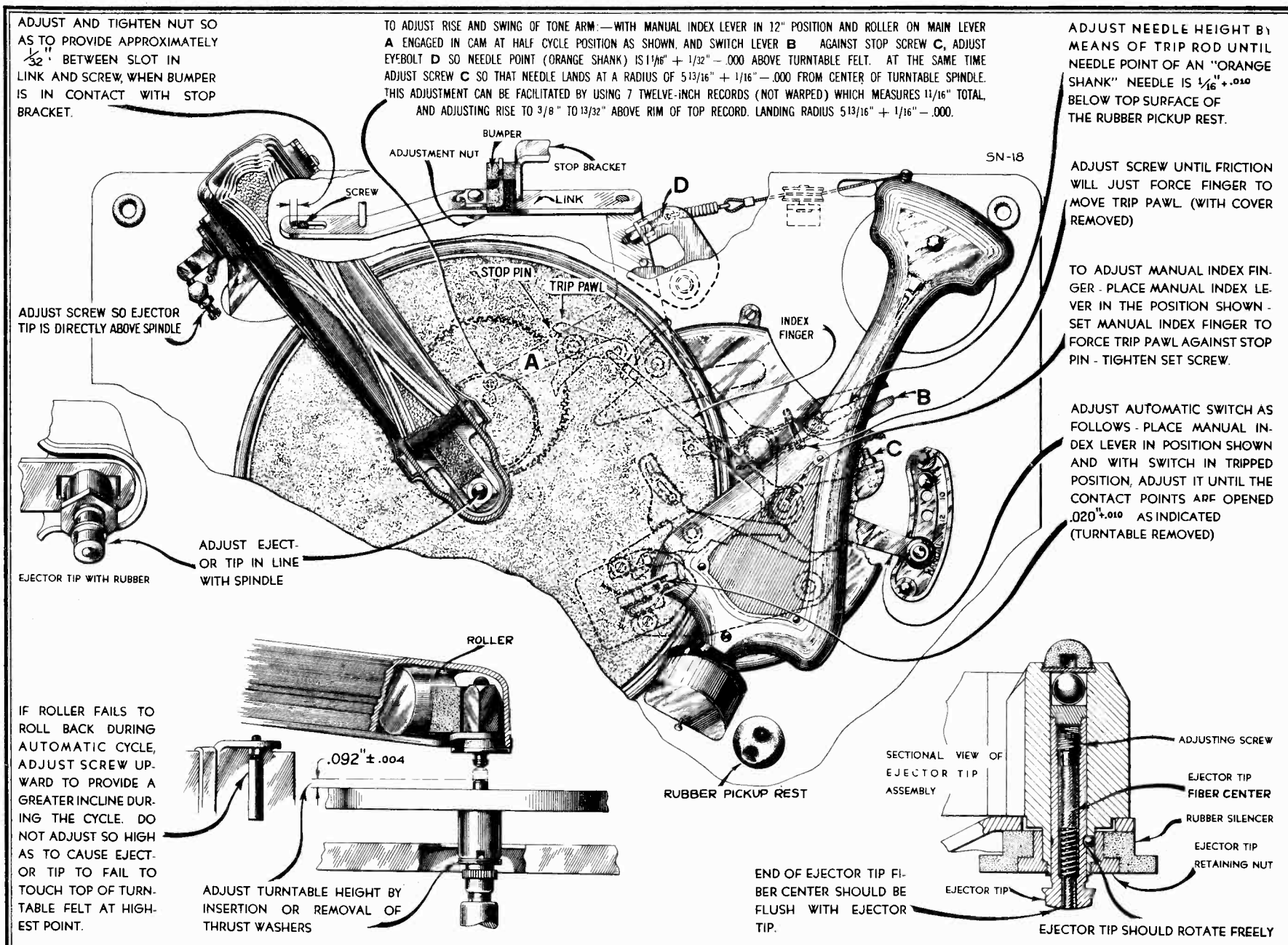


Figure 9—Automatic Record Changer Adjustments

There are seventeen adjustments required for the alignment of the oscillator, first-detector, and antenna-tuned circuits; one adjustment for the wave-trap; and four adjustments for the i-f system. Fifteen of these adjustments are made with plunger-type air trimming capacitors and require the use of an **RCA Stock No. 12636 Adjusting Tool.** Each of these capacitors has a lock nut for securing the plunger in place after adjustment. The remaining seven adjustments are made by means of screws attached to molded magnetite cores. These cores change the inductance of the particular coils in which they are inserted to provide exact alignment. All of these adjustments are accurately made during manufacture and should remain in proper alignment unless affected by abnormal conditions of climate or purported alterations for servicing, or unless altered by other means. Loss of sensitivity, improper tone quality, and poor selectivity are the usual indications of improper alignment. Such conditions will usually exist simultaneously. Correct performance of this receiver can only be obtained when these adjustments have been made by a skilled service engineer with the use of adequate and reliable test equipment. The manufacturer of this receiver has such test equipment available for sale through its distributors and dealers.

The extensive frequency range of this receiver necessitates a more or less involved method of alignment. However, if the following directions are carefully applied in the sequence given, normal performance of the instrument will be obtained.

The plunger-type air trimming capacitors have their approximate plunger settings tabulated on figure 7. If the plungers have been disturbed from their original adjustments, they may be roughly set to the specified dimensions prior to alignment.

For alignment, the test-oscillator frequency should be quite accurate. A convenient and reliable means of accurately checking the frequency of test oscillators, receivers, etc., is the **RCA Stock No. 9572 Crystal Calibrator.**

If the test-oscillator signal cannot be heard as the receiver (heterodyne) oscillator air-trimmer plunger is changed from its minimum-capacity to maximum-capacity position (receiver dial and test oscillator set to the specified frequencies, and the correct oscillator air-trimmer used) it may be an indication that the test-oscillator frequency is outside the range covered by the air-trimmer. Under such conditions, when a more accurate setting of the test oscillator cannot be determined, set the oscillator air-trimmer plungers to the approximate settings given on figure 7. Tune the test oscillator until the signal is heard in the speaker. Each of two test-oscillator settings (the fundamentals or the harmonics of which are 920 kc apart) produce a signal. The low-frequency test-oscillator setting should be used as this places the test-oscillator (signal) frequency 460 kc below the frequency of the receiver heterodyne oscillator.

Holes are provided in the top of the r-f and antenna coil cans on some models to enable a tuning check with the **RCA Stock No. 6679 Tuning Wand.** The hole in the top of the detector coil can has a cinch button which must be removed before insertion of the tuning wand. When the brass end of the wand is inserted in the coil, the inductance of the coil is decreased. If this results in an increase of output, the respective air-trimmer capacitance should be decreased (plunger pulled out). If inserting the iron end of the tuning wand causes an increase in output, resulting from an increase of inductance of the coil, the respective air-trimmer capacitance should be increased (plunger pushed in). If the range of the air trimmer is not sufficient to give the desired results, the lead-dress may be changed in the particular circuit being aligned, so as to cause the circuit to resonate within the range of the trimmer. An increase in the capacity-to-ground of the circuit will be required if the iron end of the tuning wand causes an increase of signal output when the air-trimmer plunger is full-in, while a decrease in the capacity-to-ground will be required if the brass end of the tuning wand causes an increase in signal output when the air-trimmer plunger is full-out.

In performing services on the "Magic Brain", the leads should be restored to their original positions, since the lead-dress is important for proper operation and dial calibration.

Precautionary Dressing of Leads for "Magic Brain" Alignment

(Refer to Figure 5)

Band "X"

1. Keep blue lead A of S1 to antenna coil L4-5 dressed away from chassis, and from yellow lead X of S1 to antenna coil L5-6.
2. Bus lead from C-10 to S1 should be as short as possible.
3. Keep blue lead A of S2 to detector coil L18-19 clear of chassis, coil shield, coil, and other leads.
4. Keep spaghetti lead C6 to X of S1 apart from spaghetti lead C5 to A of S1, and from chassis.

Band "A"

1. Keep green lead terminal S1 to antenna coil tap L4 away from chassis, coil shield, and coil.
2. Keep spaghetti lead C5 to A of S1 apart from spaghetti lead C6 to X of S1 and from chassis.

Band "C"

Lead from C19 to oscillator coil L7 should be maintained as short and straight as possible.

Two methods of alignment are applicable—one requires use of the cathode-ray oscillograph, and the other requires a voltmeter or glow-type indicator. The cathode-ray alignment method is advantageous in that the indication provided is in the form of a wave-image which represents the resonance characteristics of the circuit being tuned. This method is preferred because of the i-f characteristics of these receivers. This type of alignment is possible through use of apparatus such as the **RCA Stock No. 9558 Frequency Modulator** and the **RCA Stock No. 9545 Cathode-Ray Oscillograph.** If this equipment is not available, an approximate alignment may be performed by the output-indicator method with an instrument such as the **RCA Stock No. 4317 Neon Glow Indicator** attached across the loudspeaker voice coil. Alignment by this method is similar to the cathode-ray method outlined below except that the receiver volume control should be at maximum, the trimmers adjusted to peak response (with the exception of the wave-trap) and the test-oscillator sweeping operations omitted. Either of these methods require the use of a reliable test oscillator such as the **RCA Stock No. 9595.**

Cathode-Ray Alignment

Make alignment apparatus connections shown on figure 6. Remove the plug of the frequency-modulator cable from the test-oscillator jack. Connect the receiver chassis to a good external ground. Connect oscillograph "Vertical" input terminals as indicated on figure 11. Set oscillograph power switch to "On" and adjust "Intensity" and "Focus" controls to give a clearly defined spot, or line, on the screen. Set oscillograph "Ampl. A" switch to "On," "Vertical gain" control full-clockwise, "Ampl. B" switch to "Timing," "Range" switch to No. 2 position, and "Timing" switch to "Int." Place the "Sync." control, "Freq." control, and "Horizontal gain" control to about their mid-positions. For each of the following adjustments, the test-oscillator output must be regulated so that the image obtained on the oscillograph screen will be of the minimum size for accurate observation. The receiver volume-control setting is optional.

I-F Adjustments

(a) Turn range selector to its "Standard broadcast" (A) position and tune receiver to a position of no extraneous signals near **600 kc.** Connect the "Ant." output of the test oscillator to the grid cap of RCA-6K7 i-f tube (with grid lead in place) through a **.001-mfd.** capacitor, with "Gnd." to receiver chassis. Tune the test oscillator to **460 kc** and place its modulation switch to "On" and its output switch to "Hi."

(b) Turn on the receiver and test oscillator. Increase the output of the test oscillator until a deflection is noticeable on the oscillograph screen. The figures obtained represent several waves of the detected signal, the amplitude of which may be observed as an indication of output. Cause the wave-image formed (400-cycle waves) to be spread completely across the screen by adjusting the "Horizontal gain" control. The image should be synchronized and made to remain motionless by adjusting the "Sync." and "Freq." controls.

(c) Adjust the two magnetite core screws L27 and L26 (see figures 4 and 11) of the second i-f transformer (one on top and one on bottom) to produce maximum vertical deflection of the oscillographic image. This adjustment places the transformer in exact resonance with the **460-kc** signal.

(d) The sweeping operation should follow using the frequency modulator. Shift the oscillograph "Timing" switch to "Ext." Insert plug of frequency-modulator cable in test-oscillator jack. Turn the test-oscillator modulation switch to "Off." Turn on the frequency modulator and place its sweep-range switch to "Hi."

(e) Increase the frequency of the test oscillator by slowly turning its tuning control until two separate, distinct, and similar waves appear on the screen. If only one wave appears, increase the "Freq." control on the oscillograph to obtain two waves. These waves will be identical in shape, totally disconnected, and appear in reversed positions. They will have a common base line, which is discontinuous. Adjust the "Freq." and "Sync." controls of the oscillograph to make them remain motionless on the screen. Continue increasing the test-oscillator frequency until these forward and reverse curves move together and overlap, with their highest points exactly coincident. This condition will be obtained at a test-oscillator setting of **approximately 575 kc.**

(f) With the images established as in (e), re-adjust the two magnetite core screws **L27** and **L26** on the second i-f transformer so that they cause the curves on the oscillograph screen to become exactly coincident throughout their lengths and have maximum amplitude.

(g) Without altering the adjustments of the apparatus, shift the "Ant." output of the test oscillator to the input of the i-f system, i.e., to the **RCA-6L7** first-detector grid cap, through a **.001-mfd.** capacitor (with grid lead in place). Regulate the test-oscillator output so that the amplitude of the oscillographic image is approximately the same as used for adjustment (f) above.

(h) The two first i-f transformer magnetite core screws **L25** and **L24** (one on top and one on bottom) should then be adjusted so that they cause the forward and reverse curves to become coincident throughout their lengths and have maximum amplitude. The composite wave obtained in this manner represents the resonance characteristic of the total i-f system. Lack of symmetry or irregularity of the resultant image will indicate the presence of a defect in the i-f system.

R-F Adjustments

Make receiver dial adjustments as outlined by "Selector dial," figure 12. Alignment must be made in sequence of "Wave-trap," "Ultra short wave" band, "Short wave" band, "Medium wave" band, "Standard broadcast" band, and "Long wave" band.

"Wave-Trap" Adjustment

(a) Connect the output of the test oscillator to the antenna terminal "A1" through a **200-mmfd. (important).** capacitor. Remove the plug of the frequency-modulator cable from the test-oscillator jack. Turn test-oscillator modulation switch to "On." Shift the oscillograph "Timing" switch to "Int." Place receiver range selector in "Standard broadcast" position. Set the receiver dial to a position of no extraneous signals **near 600 kc.** Tune the test oscillator to **460 kc.** Adjust the wave-trap magnetite core screw to the point which causes minimum amplitude of output (maximum suppression of signal) as shown by the waves on the oscillograph. An increase of the test-oscillator output may be necessary before this point of minimum amplitude, obtained by correct adjustment of wave-trap screw, becomes apparent on oscillograph screen.

"Ultra Short Wave" Band

(b) Connect the "Ant." output of the test oscillator to the antenna terminal "A1" of the receiver through a **300-ohm** resistor. Set the receiver range selector to its "Ultra short wave" position and its dial pointer to **57,000 kc.** Adjust the test oscillator to **19,000 kc.** The third harmonic of **19,000 kc** is used for this adjustment. If the indication on the oscillograph screen is not sufficient for the following adjustments at **57,000 kc,** the vertical-input terminals of the cathode-ray oscillograph may be connected thus: "Hi" to the plate contact of the RCA-6L6 power-output tube socket with the "0" terminal to chassis-ground. The receiver should be turned off while making this connection since the plate potential is impressed across the oscillograph input and a severe shock will result if contact is made between these two points. If this connection is made, advance the receiver volume control to its maximum position. Adjust oscillator air-trimmer **C23** for maximum (peak) output. Two positions, each producing maximum output, may be found. The position of minimum capacitance (plunger near out) should be used. This places the receiver

heterodyne oscillator 460 kc higher in frequency than the incoming signal. Tighten lock nut. Adjust the detector air-trimmer C39, while slightly rocking the gang tuning condenser back and forth through the signal, for maximum (peak) output. Two peaks may be found on this trimmer. The peak of maximum capacitance (plunger near in) should be used. Tighten lock nut. Adjust the antenna air-trimmer C10 for maximum (peak) output while slightly rocking the gang tuning condenser back and forth through the signal. Two peaks may be found on this trimmer which produce maximum output. The peak with maximum capacitance (plunger near in) should be used. Tighten lock nut. Check the image frequency by changing the receiver dial setting to 56,080 kc. If the image signal is received at this position, the adjustment of the oscillator air-trimmer C23 has been correctly made. No adjustments should be made while checking for the image signal.

(c) Re-tune receiver for maximum response to 57,000 kc (not image response) without disturbing test-oscillator adjustments. Change test oscillator to 6,800—14,000 kc range. Tune test oscillator until signal is heard in speaker (should occur at approximately 14,250 kc, fourth harmonic of test oscillator used). Two test-oscillator settings (230 kc apart) will produce a signal at this point. The lower frequency test-oscillator setting should be used, as this places the test oscillator harmonic 460 kc below the frequency of the receiver heterodyne oscillator. Tune receiver for maximum response at a dial setting of approximately 28,500 kc (image should tune in at a dial setting approximately 27,580 kc) without altering test-oscillator adjustment. Test-oscillator second harmonic of 14,250 kc is used for the following check. Check calibration of receiver dial. A receiver-dial reading of less than 28,500 kc indicates that the inductance of the oscillator secondary coil L11 is too low and should be increased. If the receiver dial reading is greater than 28,500 kc, the inductance of L11 is too high and should be decreased. If it is necessary to change the inductance of L11, first remove bottom cover of "Magic Brain" and then set receiver dial pointer to 28,500 kc. To decrease inductance, move the grounded ends (straps) of L11 and L12 (see figure 5) nearer chassis. **Do not allow straps to touch chassis except where connected.** To increase inductance, move the straps farther away from chassis. Adjust position of straps till maximum (peak) output results. The alignment of the detector tuned circuit should next be checked at 28,500 kc without changing either the receiver or test oscillator adjustments. An increase of output when the brass end of a tuning wand is brought near L22 indicates that L22 is too high in inductance, while an increase when the iron end is brought near the coil indicates that the inductance is too low. The inductance of L22 may be varied by changing the spacing between the grounded end (strap) of L22 and the strap connected from C41 to contact on S2 (figure 5). An increase of spacing will increase the inductance, while a decrease of spacing will decrease the inductance. Adjust the spacing until maximum (peak) output results. Replace "Magic Brain" bottom cover and repeat adjustments in (b) prior to those of "Short wave" band.

"Short Wave" Band

(d) Set the receiver range selector to its "Short wave" position and its dial pointer to 20,000 kc. Adjust the test oscillator to 20,000 kc. If the vertical input cathode-ray connections were changed for adjustment (b) above, they should be restored to their original position as shown on figure 11. Adjust oscillator air-trimmer C13 until maximum (peak) output is reached. Two peaks may be found with this circuit. The peak with minimum capacitance (plunger near out) should be used. Tighten lock nut. Adjust detector air-trimmer C35 until maximum (peak) output is reached, while slightly rocking the gang tuning condenser back and forth through the signal. Two peaks may be found with this circuit. The peak with maximum capacitance (plunger near in) should be used. Tighten lock nut. Adjust antenna air-trimmer C3 until maximum (peak) output is reached while slightly rocking the gang tuning condenser back and forth through the signal. Two peaks may be found with this circuit. The peak with maximum capacity (plunger near in) should be used. Tighten lock nut. Check the image frequency by changing the receiver dial setting to 19,080 kc. The image signal should be received at this position indicating that the adjustment of C13 has been correctly made. No adjustments should be made while checking for the image signal.

"Medium Wave" Band

(e) Place receiver range selector to its "Medium wave" position with its dial pointer set to 6,000 kc. Tune the test oscillator to 6,000 kc. Adjust oscillator air-trimmer C14 to produce maximum (peak) output as shown by the waves on the oscillograph. Two peaks may be found with this circuit. The peak with minimum capacitance (plunger near out) should be used. Tighten lock nut. Adjust the detector air-trimmer C36 for maximum (peak) output while slightly rocking the gang tuning condenser back and forth through the signal. Two peaks may be found with this circuit. The peak with maximum capacitance (plunger near in) should be used. Tighten lock nut. Adjust antenna air-trimmer C4 to produce maximum (peak) output. Tighten lock nut.

"Standard Broadcast" Band

(f) Remove the 300-ohm resistor from between the test-oscillator "Ant." post and receiver antenna terminal "A1" and insert a 200-mmfd. capacitor in its place. Place receiver range selector to "Standard broadcast" position with receiver dial pointer set to 600 kc. Tune the test oscillator to 600 kc. Adjust oscillator magnetite core screw L9 (top of large oscillator coil can) for maximum (peak) output as shown by the waves on the oscillograph screen.

(g) Set receiver dial pointer to 1,500 kc. Tune test oscillator to 1,500 kc (1,500—3,100-kc range) and increase its output to produce a registration on the oscillograph screen. Carefully adjust the oscillator, detector, and antenna air-trimmers C16, C37 and C5, respectively, to produce maximum (peak) output as shown by the waves on the oscillograph screen. Shift the oscillograph "Timing" switch to "Ext." Place the frequency modulator sweep-range switch to its "Lo" position and insert plug of the frequency-modulator cable in test-oscillator jack. Turn test-oscillator modulation switch to "Off." Re-tune the test oscillator (increase frequency) until the forward and reverse waves show on the oscillograph screen and become coincident at their highest points. This will occur at a test-oscillator setting of approximately 1,680 kc. Adjust trimmers C16, C37, and C5 again, setting each to the point which produces the best coincidence and maximum amplitude of the images.

(h) Remove the plug of the frequency-modulator cable from the test-oscillator jack. Turn test-oscillator modulation switch to "On." Set oscillograph "Timing" switch to "Int." Tune test oscillator to 200 kc (200—400-kc range). Tune receiver for maximum response to this signal at a dial reading of approximately 600 kc. The third harmonic of the 200-kc signal is used for this adjustment. Shift oscillograph "Timing" switch to "Ext." Insert the plug of the frequency-modulator cable in test-oscillator jack. Turn test-oscillator modulation switch to "Off." Re-tune the test oscillator (increase frequency) until the forward and reverse waves show on the oscillograph screen. This will occur at a test-oscillator setting of approximately 230 kc. Disregarding the fact that the two images may or may not come together, adjust the oscillator magnetite core screw L9 (top of large oscillator coil can) to produce maximum (peak) amplitude of the images. Shift the oscillograph "Timing" switch to "Int." Remove the plug of the frequency-modulator cable from the test-oscillator jack. Turn the test-oscillator modulation switch to "On." Repeat adjustments in (g) above to compensate for any changes caused by the adjustment of L9 core, tightening lock nuts on C16, C37, and C5, respectively, after each is adjusted.

"Long Wave" Band

(i) Shift the oscillograph "Timing" switch to "Int." Remove the plug of the frequency-modulator cable from the test-oscillator jack. Turn the test-oscillator modulation switch to "On." Place receiver range selector to its "Long wave" position. Set the receiver dial pointer to 175 kc. Tune the test oscillator to 175 kc and increase its output until a deflection is noticeable on the oscillograph screen. Adjust oscillator magnetite core screw L10 (located on top of small oscillator coil can) so that maximum (peak) amplitude of output is shown on the oscillograph screen.

(j) Set receiver dial pointer to 350 kc. Tune test oscillator to 350 kc. Adjust the oscillator, detector, and antenna air-trimmers C18, C38, and C6 to produce maximum (peak) output as shown by the waves on the oscillograph screen. Without disturbing the connections, shift the oscillograph "Timing" switch to "Ext." Place the frequency-modulator sweep-range switch to its "Hi" position and insert plug of frequency-modulator cable in test-oscillator jack. Turn test-oscillator modulation switch to "Off." Re-tune the test oscillator (decrease frequency) until the forward and reverse waves show on the oscillograph screen and become coincident at their highest points. This will occur at a test-oscillator setting of approximately 198 kc. This setting places the test-oscillator frequency to 175 kc. The second harmonic is now used for the 350 kc adjustment. Adjust air-trimmers C18, C38, and C6, again, to produce maximum amplitude of the images and best coincidence throughout their lengths.

(k) Re-tune the receiver to approximately 175 kc so that the forward and reverse waves appear on the oscillograph screen. Adjust the oscillator magnetite core screw L10 to produce maximum (peak) amplitude of the waves, disregarding the fact that the two images may or may not come together.

(l) Shift the receiver dial setting to 350 kc without altering any other adjustments (frequency modulator still in operation). Adjust air-trimmers C18, C38, and C6, respectively, to produce maximum amplitude and best coincidence of the waves. These adjustments compensate for any changes caused by the adjustment of the magnetite core screw L10. Tighten lock nuts on C18, C38, and C6, respectively, after each is adjusted.

Selector Dial

Figure 12 illustrates the relation of the various parts of the dial mechanism when in its "Standard broadcast" position with the range switch likewise turned to its "Standard broadcast" position. In re-assembling the dial after repairs, see that the gears are meshed in accordance with the diagram, at the same time noting that the range switch in in its "Standard broadcast" position and the lever attached to the range-switch shaft placed in the position shown.

To adjust the dial mechanism, set the range switch to its "Standard broadcast" position. Place a straight-edge across the center of the dial so that its edge is even with the lower (end) marking at both the low-frequency and high-frequency ends of the dial. Under such conditions the straight-edge should be parallel with the top of the chassis base. If the straight-edge is not parallel with the top of the chassis base, loosen the nut on the rear of the roller link pivot stud and move the stud up or down until the link roller moves the dial to the desired position so that the end calibration marks obtain the position mentioned above. Tighten the nut on the roller link pivot stud.

Set the gang tuning condenser to its maximum capacity position. Adjust the dial pointer to the low-frequency (end) mark on "Standard broadcast" scale. This is a friction adjustment.

With the gang tuning condenser plates still in full mesh, loosen the two set screws on the vernier-dial hub. Rotate the vernier dial until the "0" marking is in a vertical plane above the center of the shaft. Tighten set screws.

Antenna and Ground Terminals

These receivers are equipped with an antenna-ground terminal board having three terminals. These terminals are marked "A2," "A1," and "G," the latter being the ground terminal and should always be connected to a good external ground. The transmission-line leads of the RCA RK-40A antenna system should be connected to terminals "A2" and "A1." The receiver coupling units of the RCA RK-40 and the RCA Spider-Web antenna systems should be connected to terminals "A1" and "G." Connect a single-wire antenna to terminal "A1."

Magnetic Pickup

The pickup used in the phonograph unit is of an improved design. The horseshoe magnet is rigidly

welded to the pole pieces and is irremovable. There is a centering spring attached to the armature to maintain proper adjustment and to provide a limiting effect on the movement of the armature. The frequency response is substantially uniform over a wide range. Service operations which may be necessary on the pickup are as follows:

Centering Armature

Refer to figure 13 showing the pickup inner structure. The armature is shown in its proper relation to the magnet pole pieces, i.e., exactly centered. Whenever this centering adjustment has been disturbed, the screws A, B, and C should be loosened and the armature clamp adjusted to the point where the vertical axis of the armature is at right angles to the horizontal axis of the pole pieces, and centered between them. This centering operation may be facilitated by inserting a small rod or nail into the armature needle hole, using it as a lever to test the angular movement of the armature. The limitations of the movement in each direction will be caused by the armature striking the pole pieces. The proper adjustment is obtained when there is equal angular displacement of the armature and adjustment rod or nail to each side of the vertical axis of the magnet and coil assembly. The screws A and B should then be secured, observing care not to disturb the adjustment of the armature clamp. Then place the pickup in a vise and secure the centering spring-clamp by means of the screw C, allowing the centering spring to remain in the position at which the armature is exactly centered between the pole pieces. With a little practice, the correct adjustment of the armature may be readily obtained. The air gap between the pole pieces and the armature should be kept free from dust, filings, and other such foreign materials which would obstruct the movement of the pickup armature.

Damping Block

The viscoloid block which is attached to the back end of the armature shank serves as a mechanical filter to eliminate undesirable resonances and to cause the frequency response to be uniform. Should it be necessary to replace this damping block, it may be done by removing screw D and the cover support bracket from the mechanism and taking off the old viscoloid block. The surface of the armature which is in contact with the viscoloid should be thoroughly cleaned with fine emery cloth. Then insert the new block so that it occupies the same position at it did originally. Make certain that the block is in correct vertical alignment with the armature. The hole in the new viscoloid block is somewhat smaller than the diameter of the armature in order to permit a snug fit. With the viscoloid aligned on the armature, screw D and the cover support bracket should then be replaced. Heat should be applied to the armature (viscoloid side) so that the viscoloid block will fuse at the point of contact and become rigidly attached to the armature. A special-tip soldering iron constructed as shown in figure 14 will be found very useful in performing this operation. The iron should be applied only long enough to slightly melt the block and cause a small bulge on both sides.

Replacing Coil

Whenever there is defective operation due to an open or shorted pickup coil, this coil should be replaced. The method of replacement will be obvious upon inspection of the pickup assembly and by study of the cut-a-way illustrations. Make sure that the new coil is properly centered with the hole in the support strip and glued securely in that position. It is important to re-adjust the armature as previously explained after re-assembly of the mechanism. Only rosin core solder should be used for soldering the coil leads in the pickup. This same type of solder should be used when necessary for soldering the centering spring to the armature.

Magnetizing

Loss of magnetization will not usually occur when the pickup has received normal care because the magnet and pole pieces are one unit and the magnetic circuit remains practically closed at all times. When the pickup has been mishandled, subjected to a strong a-c field, jolted, or dropped, there may be an appreciable loss of magnetic strength, in which case it will be necessary to re-magnetize the entire structure. To do this, it will be necessary to first remove the pickup mechanism from the tone arm, and then remove the magnet assembly. Place the magnet assembly on the poles of a standard pickup magnetizer such as the **RCA Stock No. 9549 Pickup Magnetizer** and charging the magnet in accordance with the instructions accompanying the magnetizer. It is preferable to check the polarity of the pickup magnet and to re-magnetize it so that the same polarity is maintained

Automatic Record Ejector

The record changing mechanism is designed to be simple and fool-proof. Under normal operating conditions, service difficulties should be negligible. Occasionally, however, certain adjustments may be required. These adjustments are illustrated and explained in figure 9.

It is important when servicing the automatic mechanism, to have it placed on a level support. It is also important to refrain from forcing the mechanism if there is a tendency to bind or jam, since bent levers and possibly broken parts may result.

The tip of the record ejector is adjustable in relation to the turntable spindle, the two being exactly coaxial when properly adjusted. To align the tip, remove the rubber silencer of the ejector assembly, loosen ejector tip retaining nut and slide the tip assembly to the position where it is in true-line with the axis of the turntable spindle. This adjustment may be simplified by placing several records on the turntable, depressing the spindle through the top record hole and lining up the ejector tip in the spindle hole of the record.

To insure that the ejector tip rotates freely, apply a slight amount of oil to the shank of the tip at the point where it is in contact with the ball bearing.

Loudspeaker

Centering of the loudspeaker voice coil is made in the usual manner with three narrow paper feelers after first removing the front paper dust cover. This may be removed by softening its cement with a very light application of acetone using care not to allow the acetone to flow down into the air gap. The dust cover may be cemented back in place with ambroid upon completion of adjustment.

Stock No.	Description	List Price
11723	Escutcheon—Pickup arm escutcheon	.62
11721	Pickup—Pickup unit, complete	5.50
11549	Screw—Pickup front cover screw—Package of 10	.42
3387	Screw—Nut and washer for mounting pickup to arm—Package of 10	.50
11547	Screw—Pickup needle screw—Package of 10	.42
	OPERATING MECHANISM	
6502	Cam—Cam and gear assembly	1.18
6808	Clutch—Trip lever friction clutch	.30
11558	Cover—Metal cover for trip lever and friction finger assembly	.36
6809	Finger—Manual index lever finger assembly	.25
3670	Finger—Friction finger assembly	.32
11554	Lever—Manual index lever—less pin	.62
11556	Lever—Main lever and link assembly	2.10
11557	Lever—Main spring lever	.42
3677	Lever—Pickup arm cable lever assembly—Comprising lever with cable screw, spring and nut	.40
1555	Lever—Trip lever and friction clutch assembly	.94
6503	Pawl—Trip pawl assembly	.40
4124	Plate—Eject arm actuating plate assembly	.50
4563	Screw—Cable lever screw and nut—Package of 10	.60
4564	Screw—Manual index lever finger set screw—Package of 10	.20
4059	Screw—Trip lever clutch tension adjustment screw—Package of 10	.22
4566	Screw—Special screw used to fasten main lever and link assembly bushing—Package of 10	.30
11559	Spacer—Pickup arm mounting spacer	.28
4127	Spring—Actuating spring—Package of 10	.24
3666	Spring—Cable lever tension spring—Package of 10	.44
4565	Spring—Manual index lever finger tension spring—Package of 10	.30
4061	Spring—Main spring lever tension spring—Package of 10	.38
2893	Spring—Trip lever latch plate tension—Package of 10	.30
2917	Washer—Spring washer—"U" type—Package of 10	.25
	MOTOR ASSEMBLIES	
9735	Motor—105-125 volts—25 cycles (M1)	49.50
9651	Motor—105-125 volts—50 cycles (M1)	35.35
9650	Motor—105-125 volts—60 cycles (M1)	35.35
12050	Suspension Spring—Motor mounting spring, washer, and stud assembly—Comprising six springs, six cup washers, three spring washers and three studs	.60
	AUTOMATIC SWITCH ASSEMBLIES	
3994	Cover—Motor switch cover	.26
10184	Plate—Automatic brake latch plate—Package of 5	.40
10174	Springs—Automatic brake springs—Package of 2 sets	.50
6805	Switch Assembly—Automatic switch, complete	1.90
3322	Switch—Motor switch (S6)	.75
	MOTOR BOARD ASSEMBLIES	
11881	Base—Phonograph compartment lamp socket and base	.55
12051	Capacitor—2 Mfd., complete with 2-contact male connector for use with motor, Stock No. 9650 or No. 9651 only (C83)	4.18
13101	Capacitor—4 Mfd., complete with 2-contact male connector for use with motor, Stock No. 9735 only (C83)	5.05
4674	Connector—2-contact male connector for Stock Nos. 12051, 13101 or phono compartment lamp leads	.25
4577	Connector—2-contact male connector motor cable	.30
11488	Connector—2-contact female connector for motor leads	.14
11542	Cover—Turntable cover	.88
11553	Escutcheon—Index escutcheon engraved "Manual—12—10"	.44
4340	Lamp—Phonograph compartment lamp—6.3 volts—Package of 5	.60
3764	Nut—Cap nut for motor board suspension assembly—Package of 4	.40
3672	Pin—Manual index pin	.42
11551	Rest—Pickup rest	.14
3654	Roller—Pickup arm cable guide roller—Comprising bracket, roller and guide pin	.34
11711	Shade—Phonograph compartment lamp shade	.16
3763	Suspension Spring—Suspension spring, washer and bolt assembly for motor board—Comprising one bolt, two cup washers, two springs, two "C" washers and one cap nut	.42
4671	Switch—Operating switch—toggle type (S7)	.72
11599	Turntable—Complete	2.90
	MISCELLANEOUS CABLE ASSEMBLIES	
13226	Cable—3-conductor shielded compensator cable (volume control end), approximately 18 inches long, complete with one 4-contact female connector, Stock No. 12494	2.20
13227	Cable—3-conductor shielded compensator cable (transformer end), approximately 8 inches long, complete with one 4-contact male connector, Stock No. 12565 and three pin type terminals—for Model 9U2 only	1.45
13232	Cable—3-conductor shielded compensator cable (transformer end), approximately 27 inches long, complete with one 4-contact male connector, Stock No. 12565 and three pin type terminals—for Model 9U only	2.00
13225	Cable—3-conductor shielded volume control cable (chassis end), approximately 13 inches long, complete with one 4-contact female connector, Stock No. 12494—for Model 9U2 only	1.75
13228	Cable—3-conductor shielded volume control cable (control end), approximately 9½ inches long, complete with one 4-contact male connector, Stock No. 12565	1.55
13231	Cable—3-conductor shielded volume control cable (chassis end), approximately 24 inches long, complete with one 4-contact female connector, Stock No. 12494—for Model 9U only	2.00
12494	Connector—4-contact female for cable, Stock Nos. 13225, 13226 or 13231	.18
12565	Connector—4-contact male for cable, Stock Nos. 13227, 13228 or 13232	.20
	REPRODUCER ASSEMBLIES	
12914	Board—3-contact reproducer terminal board	.25
12640	Bracket—Output transformer mounting bracket and clamp assembly	.18
12912	Coil—Field coil (L30)	1.70
12667	Cone—Reproducer cone and dust cap (L28)	1.00
5118	Plug—3-contact male reproducer plug	.25
9736	Reproducer—Complete	8.70
12913	Transformer—Output transformer (T2)	1.45
11886	Washer—Spring washer to hold field coil securely—Package of 5	.20
	MISCELLANEOUS ASSEMBLIES	
4391	Box—Used needle box	.70
11996	Bracket—Tuning lamp mounting bracket and clamp	.22

Prices quoted above are subject to change without notice.

RCA MFG. CO., INC.

Stock No.	Description	List Price
	RECEIVER ASSEMBLIES	
12863	Board—4 contact and 2 link phonograph terminal board	.25
4427	Bracket—Mounting bracket for H.F. tone control, L.F. tone control or volume control	.18
12867	Cable—Tuning lamp cable and socket	1.70
13230	Cable—2 conductor compartment and pilot lamp cable (chassis end) approx. 34-in. long complete with two female connectors Stock No. 11488—Model 9U2 only	1.30
12511	Cap—Grid contact cap—Package of 5	.15
12859	Capacitor Pack—Comprising two sections .015 Mfd., one section .1 Mfd., and two resistors 27,000 ohms each (C55, C56, C57, R21, R22)	1.50
12873	Capacitor Pack—Comprising one 3 Mfd. and one 20 Mfd. section used in 25 cycle Model only (C61, C69)	1.20
12724	Capacitor—120 Mmfd. (C59)	.28
12404	Capacitor—120 Mmfd. (C45, C46, C49, C50)	.26
12406	Capacitor—180 Mmfd. (C52)	.26
4838	Capacitor—.005 Mfd. (C63, C79)	.20
4624	Capacitor—.01 Mfd. (C51)	.54
4858	Capacitor—.01 Mfd. (C60)	.25
4836	Capacitor—.05 Mfd. (C53)	.30
4886	Capacitor—.05 Mfd. (C62)	.20
4841	Capacitor—0.1 Mfd. (C54)	.22
11414	Capacitor—0.1 Mfd. (C47)	.20
4840	Capacitor—.25 Mfd. (C58)	.30
5170	Capacitor—.25 Mfd. (C48, C68)	.25
12741	Capacitor—0.5 Mfd. (C64)	.30
5212	Capacitor—18 Mfd. (C67)	1.16
12872	Capacitor—20 Mfd. (C61)	.90
12467	Capacitor—30 Mfd. (C65, C66)	1.40
5119	Connector—3-contact female connector for speaker leads	.25
4373	Connector—2-contact female connector for motor cable (Chassis End)	.30
11488	Connector—2-contact female connector for phonograph compartment lamp cable (Chassis End)	.14
12006	Core—Adjustable core and stud for Stock No. 12652 and 12653	.22
12870	Dial—Vernier dial and disc assembly	.65
4340	Lamp—Dial lamp 6.3 volt, lower R.H. socket Model 9U2 only—Package of 5	.60
5226	Lamp—Dial lamp, 6.3 volt—Package of 5	.70
12868	Link—Range switch and band indicator operating link complete with set screw	.45
12871	Reactor—Filter reactor (L31)	1.50
12865	Resistor—Voltage divider resistor—Comprising one section 250 ohm, one section 17 ohm, and one section 11 ohm (R17, R18, R26)	.45
12876	Resistor—10,000 ohms—wire wound—10 watt (R10)	.55
12864	Resistor — 17,000 ohms — wire wound (R19)	.70
11282	Resistor—56,000 ohms—carbon type—1/10 watt (R12)—Package of 5	.75
12875	Resistor—56,000 ohms—carbon type—1 watt (R16)—Package of 5	1.10
12264	Resistor—220,000 ohms — insulated — ¼ watt (R44)—Package of 5	1.00
11398	Resistor—220,000 ohms—carbon type—1/10 watt (R13)—Package of 5	.75
11453	Resistor—270,000 ohms—carbon type—1/10 watt (R24)—Package of 5	.75
11172	Resistor—470,000 ohms—carbon type—¼ watt (R23)—Package of 5	1.00
11452	Resistor—470,000 ohms—carbon type—1/10 watt (R25)—Package of 5	.75
12013	Resistor—1 Megohm—carbon type—1/10 watt (R28)—Package of 5	.75
11626	Resistor—2.2 Megohm—carbon type—¼ watt (R11)—Package of 5	1.00
12874	Resistor—3.3 Megohm—carbon type—¼ watt (R14, R15)—Package of 5	1.00
4669	Screw—No. 8-32-5/32 set screw for link Stock No. 12868—Package of 10	.25
3903	Screw—No. 8-32-3/16 headless cup point set screw for Stock No. 12870—Package of 20	.36
12869	Shaft—Range switch and band indicator operating shaft and hub—assembly	.25
12008	Shield—I.F. transformer shield for Stock No. 12652, 12653	.28
12607	Shield—I.F. transformer shield top for Stock No. 12652	.30
12581	Shield—I.F. transformer shield top for Stock No. 12653	.36
12110	Shield—Shield cap for 6F5 Radiotron	.14
13095	Socket—Dial lamp socket, upper left or lower right hand	.25
11222	Socket—Dial lamp socket, upper right or lower left hand	.18
11381	Socket—Tuning lamp socket and cover	.45
11195	Socket—5-contact 5Z4 Radiotron socket	.15
11198	Socket—7-contact 6H6, 6K7, 6L6, or 6F5 Radiotron socket	.15
11196	Socket—8-contact socket for R.F. Unit power cable plug	.15
12007	Spring—Retaining spring for Stock No. 12006	.36
12860	Tone Control—Low frequency tone control and power switch (S4, S5)	1.50
13468	Tone Control—High frequency tone control (R27, S6)	1.50
12652	Transformer—First I.F. transformer complete (L24, L25, C45, C46)	1.60
12653	Transformer—Second I.F. transformer complete (L26, L27, C49, C50, C52, R12, R13)	2.06
12856	Transformer—Power transformer, 105-125 volt, 50-60 cycle (T1)	5.35
12857	Transformer—Power transformer, 105-125 volt, 25 cycle (T1)	7.10
12858	Transformer—Power transformer, 100-250 volt, 50-60 cycle (T1)	8.75
12861	Volume Control—(R20)	1.00
	MAGIC BRAIN UNIT ASSEMBLIES	
12806	Board—3-contact antenna and ground terminal board	.25
5237	Bushing—Variable condenser mounting bushing assembly—Package of 3	.43
12886	Cable—Shielded power cable approx. 4-in. long complete with 8-contact male plug	1.50
12511	Cap—Grid contact cap—Package of 5	.15
12714	Capacitor—Adjustable trimmer capacitor (C3, C4, C5, C6, C14, C16)	.38
12807	Capacitor—Adjustable trimmer capacitor (C13, C35, C36, C37)	.35
12884	Capacitor—Adjustable trimmer capacitor (C10, C18, C23, C38, C39)	.40
12896	Capacitor—15 Mmfd. (C34)	.20
12722	Capacitor—18 Mmfd. (C15)	.20
12891	Capacitor—36 Mmfd. (C40)	.20
12629	Capacitor—56 Mmfd. (C24)	.20
12895	Capacitor—56 Mmfd. (C17)	.20
12723	Capacitor—56 Mmfd. (C2, C44)	.20
13307	Capacitor—62 Mmfd. (C11)	.20
12724	Capacitor—120 Mmfd. (C25, C28, C29)	.28
12725	Capacitor—150 Mmfd. (C1)	.28
12894	Capacitor—180 Mmfd. (C22)	.20
12727	Capacitor—555 Mmfd. (C21)	.20
12537	Capacitor—560 Mmfd. (C7, C26, C33, C42)	.20
12898	Capacitor—1,500 Mmfd. (C12)	.20
12729	Capacitor—1,550 Mmfd. (C20)	.26
12728	Capacitor—4,500 Mmfd. (C19)	.36
12897	Capacitor—4,700 Mmfd. (C43)	.40
4858	Capacitor—.01 Mfd. (C8, C30, C31, C32)	.25
12879	Coil—Antenna coil and shield, XABC bands (L2, L3, L4, L5, L6)	1.90
12888	Coil—Antenna coil, "D" band (L13, L14)	.60
12880	Coil—Detector coil and shield, XABC bands (L15, L16, L17, L18, L19, L20)	2.05
12709	Coil—Oscillator coil and shield, ABC bands (L7, L8, L9)	2.02
12881	Coil—Oscillator coil and shield, X band only (L10)	.80
12890	Coil—Oscillator coil, "D" band (L11, L12, L23)	.70
12889	Coil—R.F. coil, "D" band (L21, L22)	.65
12877	Condenser—3-gang variable tuning condenser (C9, C27, C41)	5.10
12887	Connector—8-contact male connector and cover for power cable, Stock No. 12886	.40
12664	Core—Adjustable core and stud for Stock No. 12654	.22
12800	Core—Adjustable core and stud for Stock No. 12709	.20
12882	Core—Adjustable core and stud for Stock No. 12881	.20
11324	Resistor—560 ohms — carbon type — ¼ watt (R2)—Package of 5	1.00
5112	Resistor—1,000 ohms—carbon type—¼ watt (R3)—Package of 5	1.00
11298	Resistor—5,600 ohms — carbon type — 1 watt (R6)	.22
3998	Resistor—15,000 ohms—carbon type, ¼ watt (R5)—Package of 5	1.00
11282	Resistor—56,000 ohms — carbon type — 1/10 watt (R4, R9)—Package of 5	.75
8064	Resistor—82,000 ohms—carbon type, ½ watt (R8)—Package of 5	1.00
11397	Resistor—560,000 ohms—carbon type—1/10 watt (R1, R7)—Package of 5	.75
12651	Shield—Coil shield for Stock Nos. 12879 and 12880	.22
12710	Shield—Coil shield for Stock No. 12709	.28
12883	Shield—Coil shield for stock No. 12881	.20
11198	Socket—7-contact 6K7 Radiotron socket	.15
11279	Socket—7-contact 6L7 Radiotron socket	.20
12885	Socket—8-contact 6J7 Radiotron socket	.20
12007	Spring—Retaining spring for core, Stock Nos. 12664, 12800, 12882—Package of 10	.36
12878	Switch—Range switch and mounting nut (S1, S2, S3)	3.60
12654	Trap—Wave-trap, complete (L1)	.75
	DRIVE ASSEMBLIES	
10705	Ball—5/32-inch diameter steel ball for planetary drive—Package of 20	.25
10941	Ball—⅛-inch diameter steel ball for planetary drive bearing—Package of 20	.25
12904	Bushing—Plate and bushing assembly for planetary drive mounting	.20
12905	Coupling—Flexible coupling and shaft assembly, complete	.50
12909	Dial—Band indicating dial and cam assembly	1.05
12899	Drive—Variable tuning condenser drive, complete, including mounting bracket, drive, dial scale and indicator, less vernier dial, Stock No. 12870, and link, Stock No. 12868	4.40
12906	Gear—Anti-lash drive gear, complete	.75
12910	Gear—Sector gear and link assembly for band selector	.20
12908	Indicator—Station selector indicator pointer	.20
8051	Link—Link and roller assembly, complete with spring	.30
12911	Screen—Dial lamp and light diffuser	.20
4669	Screw—Set screw for flexible coupling or gear, Stock Nos. 12905 and 12906—Package of 10	.25
12901	Shaft—Direct drive shaft and pinion gear for planetary drive	.75
12900	Shaft—Vernier drive shaft for planetary drive	.25
12903	Spring—Tension spring for planetary drive bearing—Package of 10	.20
12907	Spring—Tension spring for gear, Stock No. 12906—Package of 10	.20
8052	Spring—Tension spring for link, Stock No. 8051—Package of 5	.32
	EJECT ARM ASSEMBLIES	
11541	Arm—Eject arm, complete	8.15
11533	Ball—1/16-inch diameter steel ball—Package of 10	.20
10129	Ball—3/16-inch diameter steel ball—Package of 20	.25
11529	Bearing—Ejector tip bearing and nut	.32
11538	Bracket—Eject arm bracket	1.72
11537	Collar—Eject arm shaft collar and set screw	.24
11540	Cover—Eject arm cover	1.52
11536	Cushion—Counter balance roller cushion located inside of eject arm	.14
4055	Post—Vertical adjustment post—located on eject arm bracket	.30
3729	Roller—Eject arm counter balance roller located inside of eject arm	.45
4580	Screw—No. 6—32-3/16-inch square head set screw for eject arm collar—Package of 10	.25
11534	Screw—No. 8—36-7/32-inch special screw for eject arm tip center adjustment—Package of 10	.14
11535	Shaft and Collar—Eject arm vertical action shaft and collar assembly	.15
11528	Silencer—Ejector tip silencer	.14
4067	Spring—Ejector arm bracket spring—Package of 10	.30
11531	Spring—Ejector tip spring—Package of 10	.42
11530	Tip—Ejector tip with tip center, adjusting screw and cap	.32
11539	Yoke—Eject arm yoke assembly	.94
	PICKUP AND ARM ASSEMBLIES	
13469	Arm—Pickup arm, complete less pickup unit	6.00
11724	Armature—Pickup armature	.38
11548	Back—Pickup back	.52
4064	Cable—Pickup arm operating cable—Package of 5	1.00
11722	Coil—Pickup coil (L24)	.52
13470	Connector—Shielded pickup cable and connector assembly—approximately 59 inches long	.90
11545	Cover—Pickup front cover	.22
11546	Cover—Pickup back cover with mounting screws	.14

Prices quoted above are subject to change without notice.

Stock No.	REPLACEMENT PARTS	List Price
3737	Damper—Pickup damper—Package of 5.	.65
3516	Damper—Damper assembly for pickup arm base—Comprising one upper and one lower damper, one upper bushing and one lower bearing	.14
13103	Cap — Pilot lamp cap — Package of 5 — Model 9U2 only	.65
4836	Capacitor—.05 Mfd. (for phonograph volume control) (C84)	.30
12915	Crystal—Station selector escutcheon and crystal	1.30
11580	Cover — Pilot lamp cover — Model 9U2 only	.12
12742	Escutcheon—Tuning lamp escutcheon	.22
4340	Lamp—Pilot lamp—6.3 volts—Package of 5—Model 9U2 only	.60
12699	Knob—Large station selector knob—Package of 5	.68
11347	Knob—Low frequency tone control and power switch phonograph or radio volume control, range switch, or high frequency tone control knob — Package of 5	.75
12700	Knob—Small (vernier) station selector knob—Package of 5	.58
11607	Receptacle—Needle card holder	.38
11210	Screw—Chassis mounting screw assembly for Model 9U only—Package of 4	.28
4560	Screw—Chassis mounting screw assembly (front)—Comprising one screw, one washer and one lockwasher—Package of 10—Model 9U2 only	.30
13102	Screw—Chassis mounting screw assembly (bottom)—Comprising one screw, two cushions, one spacer, one washer and one lockwasher — Package of 2 — for Model 9U2 only	.30
12916	Shield—Complete R.F. unit shield	.90
11573	Socket—Pilot lamp socket—Model 9U2 only	.28
11349	Spring—Retaining spring for knob, Stock Nos. 11347 and 12700—Package of 5.	.25
4982	Spring—Retaining spring for knob, Stock No. 12699—Package of 10	.50
13415	Tube—Magic voice tube—7 inches long.	.35
13416	Tube—Magic voice tube—8 inches long.	.35
13417	Tube—Magic voice tube—9 inches long.	.35
13127	Transformer — Phonograph input transformer — Comprising one transformer, three choke coils, three capacitors and four resistors (T3, L43, L44, L45, C80, C81, C82, R40, R41, R42, R43)	6.40
13126	Volume Control — Phonograph volume control and switch (R39, S8)	1.50

"Magic Brain"

The new "Magic Brain" is constructed as a separate, self-contained, completely shielded, five-band, oscillator-detector-antenna-tuning unit which plugs into the main chassis.

A single-wire antenna, or a doublet antenna, when connected to the proper input terminals of the receiver, is coupled to the control grid of the RCA-6K7 r-f amplifier tube through the tuned r-f transformer consisting of L6, L5, L4, L3, and L2 (except when range selector is in "Ultra short wave" position). The primary coil L13 of the "Ultra short wave" (D) band tuned r-f transformer remains in the antenna circuit at all times. A unique method of switching is used. In the "Long wave" (X) band, L6 becomes the primary with L5, L4, L3, and L2 as secondary. In the "Standard broadcast" (A) band, L5 becomes the primary with L4, L3, and L2 as secondary (L6 shorted out). In the "Medium wave" (B) band, L4 becomes the primary with L3 and L2 as secondary (L6 and L5 shorted out). In the "Short wave" (C) band, L3 becomes the primary with L2 as secondary (L6, L5, L4, and tap on L4 shorted out). The tap on L4 is provided to prevent interaction with L3 and L2 when operating receiver in "Short wave" band. In the "Ultra short wave" (D) band, L6, L5, L4, and L3 are shorted out and grounded, and secondary L14 is placed in shunt with L2. The latter connection prevents undesirable interaction of L2 with L14. This method of switching reduces the total number of coils and leads, and results in having a low-loss primary and secondary winding for each band with high efficiency of operation.

The band switching of the detector circuits is similar to that of the antenna circuits. Coils L15, L21, and L20 are always connected in series with the plate circuit of the RCA-6K7 r-f amplifier tube. In the "Long wave" (X) band, L19, L18, L17, and L16 are connected in series as the secondary circuit. The ground of the coil system is at the low end of L19. L20 acts as the primary which transfers energy to the secondary L19. Capacitor C33 resonates primary L20 at the proper frequency. In the "Standard broadcast" (A) band, L18, L17, and L16 are connected in series as the secondary circuit. The ground of the coil system is now between L18 and L19. L19 is used as the primary and is resonated at the proper frequency by capacitors C34 and C35 which are in shunt with this coil. Capacitor C33 is connected to transfer energy to the primary coil L19. In the "Medium wave" (B) band, L17 and L16 are connected in series as the secondary. The ground of the coil system is now between L17 and L18. L18 is used as the primary and is resonated at the proper frequency by capacitor C34 which is in shunt with this coil. L19 is shorted by the range selector. Capacitor C33 transfers the r-f energy from the plate circuit to the primary L18. In the "Short wave" (C) band, L16 is the secondary. The ground of the coil system is now between L16 and L17. L17 is used as the primary and is resonated to the proper frequency by capacitor C34. In addition, L15 acts as a high-frequency primary which resonates above 20 mc and improves the gain at the high-frequency end of the "Short wave" band. Coils L19 and L18 are shorted by the range selector. L21 is effectively r-f bypassed in this position by capacitor C32. In the "Ultra short wave" (D) band, L22 is the secondary, or grid coil, and consists of approximately a single turn of silver plated strap around a 7/8-inch coil form. The primary coils, L21 and L15 are in series on this band, with L21 acting as a low-frequency primary and L15 as a high-frequency primary. L16 is shunted by L22 instead of being shorted directly by the range selector. Any inductive effect of L16 is thus eliminated. L19, L18, and L17 are shorted directly by the range selector.

Separate windings, with the exception of L23, are employed in the oscillator stage for each position of the range selector. L23 (inductively coupled to L11 and L12) is placed in the oscillator plate circuit to provide additional feed-back when operating receiver on the "Ultra short wave" (D) band. This coil is effectively r-f bypassed by capacitor C12, when range selector is in the "Short wave" (C) position, to prevent undesirable reactions. Its effect on the remaining bands is negligible. The inherent stability of the oscillator circuit provides minimum frequency drift which is especially advantageous for high-frequency reception. The locally generated signal is capacitance coupled to grid No. 3 of the RCA-6L7 first detector.

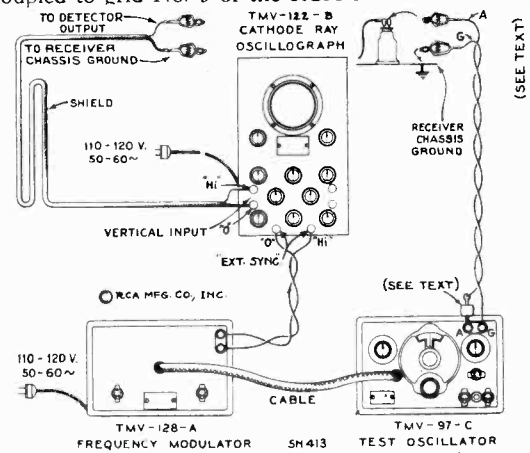
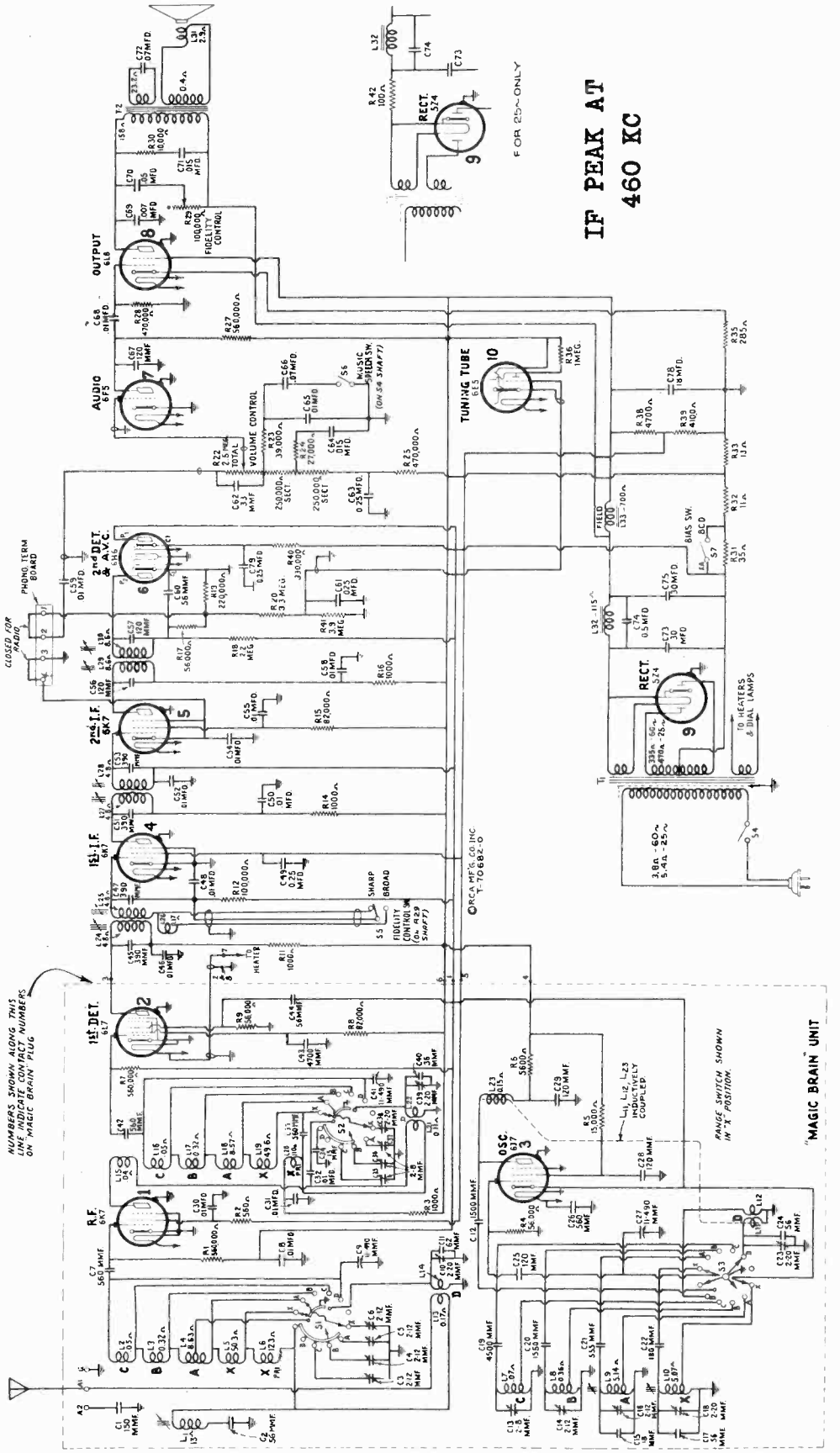


Figure 6—Alignment Apparatus Connections

MODELS 10K1
10T(2nd Prod.)

RCA MFG. CO., INC.

Schematic



MODELS 10K1,10T(2nd Prod.)
Chassis Wiring

RCA MFG. CO., INC.

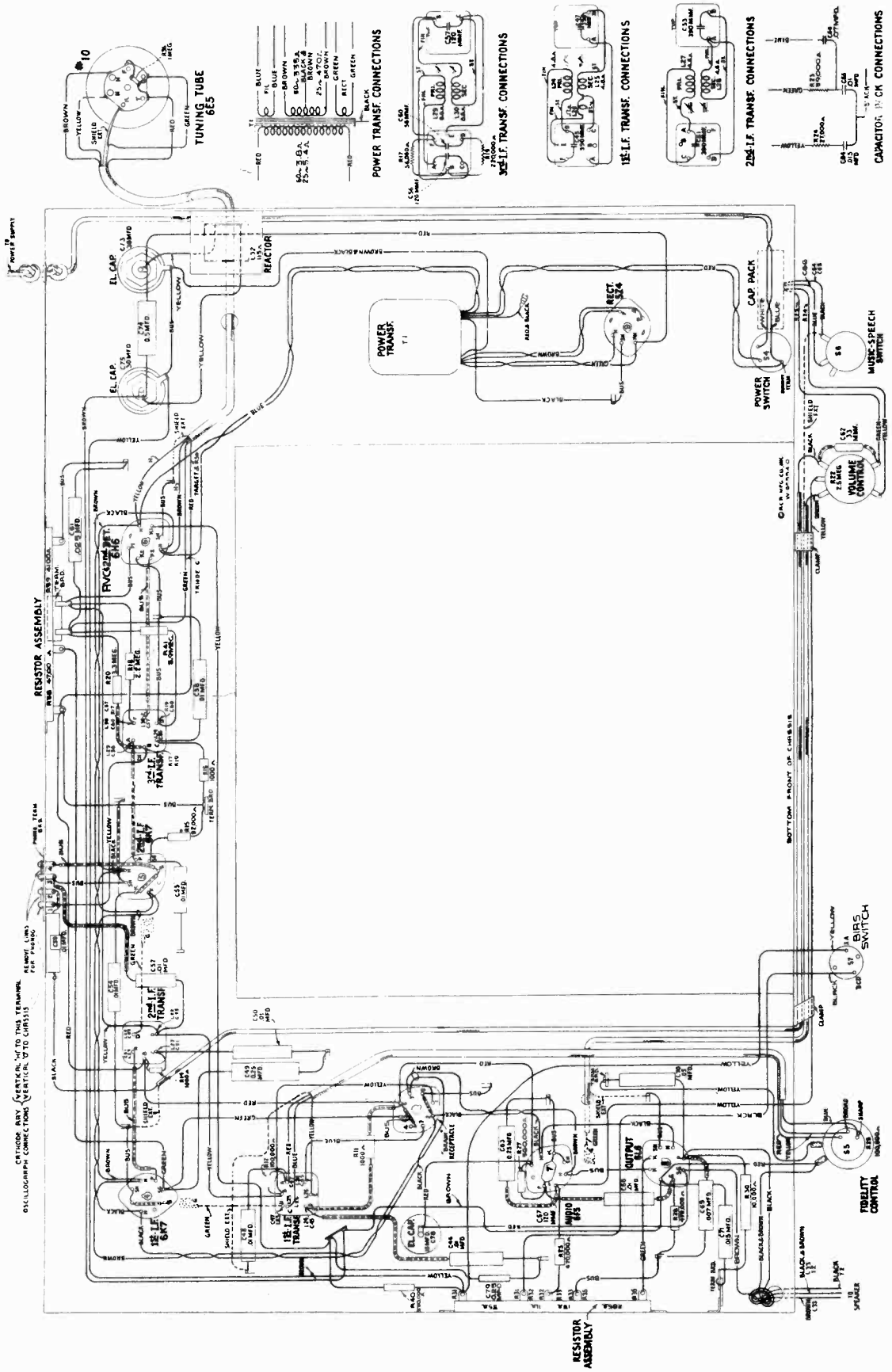


Figure 3—Chassis Wiring Diagram (Less "Magic Brain")
[Model 10K1 and Model 10T (Second Production)]

RCA MFG. CO., INC.

MODELS 10K1,10T(2nd Prod.)
Socket,Voltage,Trimmers
Notes

RCA VICTOR MODEL 10K1

and

MODEL 10T (Second Production)

TECHNICAL INFORMATION AND SERVICE DATA

These receivers are similar to Models 10T (first production) and 10K except for slight changes in the filter and bleeder circuits, loudspeakers, power transformers, and a few component parts. The loudspeakers, for the Model 10T second and first productions may be identified by the stampings RL63E1 and RL63D2 respectively. Model 10T (second production) chassis may be identified by visual inspection of the resistor assembly at the rear bottom of chassis. In the second production the assembly is comprised of one 4,700-ohm and one 4,100-ohm section (R38, R39), while the assembly in the first production consists of a single 17,000-ohm section R34. Model 10T (second production) has the 20 mfd. capacitor C76 at the bottom left rear of chassis omitted. Service data for Models 10T and 10K is directly applicable to these receivers except for the data contained herein. Power Supply Ratings (A, B and C)—135 watts. Undistorted and Maximum Power Outputs—7 and 10 watts. Cabinet Dimensions (height, width, and depth) Model 10K1—41, 29, and 14¾ inches. Weights (net and shipping) Model 10K1—91 and 135 pounds. Resistance Diagram and Cathode Current Readings to be disregarded. Universal Power Transformer resistances (pri. and sec.) —7.4 and 240 ohms total.

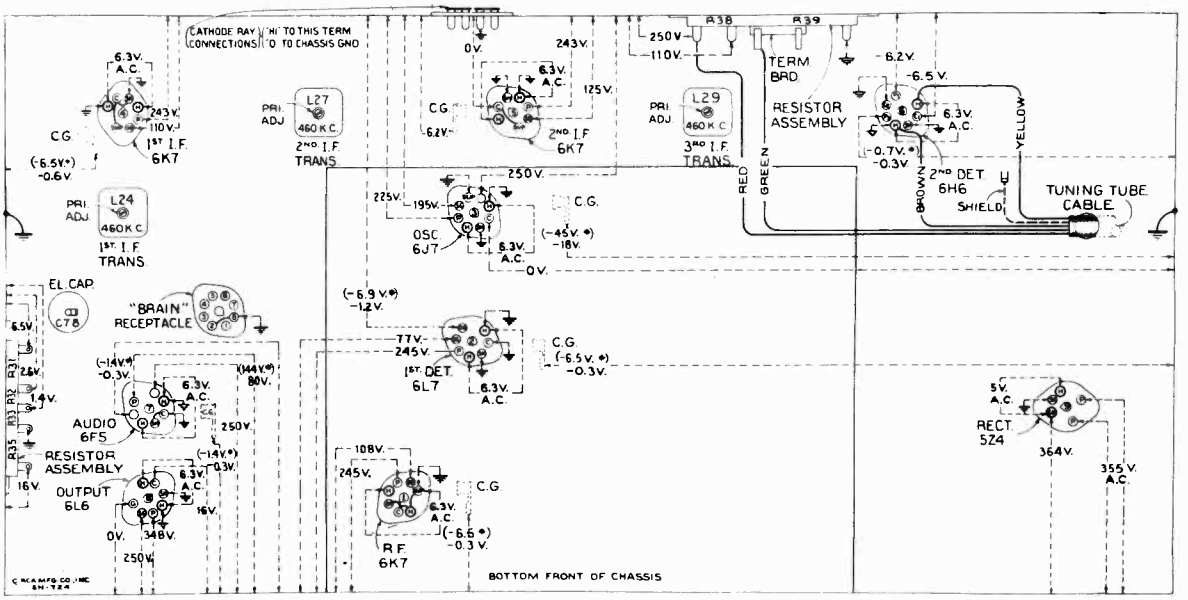


Figure 1—Radiotron Socket Voltages, Coil, and I-F Trimmer Locations
[Model 10K1 and Model 10T (Second Production)]

REPLACEMENT PARTS

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

STOCK No.	DESCRIPTION	STOCK No.	DESCRIPTION
	RECEIVER ASSEMBLIES	4886	Capacitor—.05 Mfd. (C70)
12863	Board—Phonograph input terminal board	4870	Capacitor—.025 Mfd. (C61)
4427	Bracket—Volume control mounting bracket	4840	Capacitor—0.25 Mfd. (C49, C63, C79)
12987	Bracket—Band changeover switch bracket	12741	Capacitor—0.5 Mfd. (C74)
12985	Cable—Tuning lamp cable and socket	5212	Capacitor—18 Mfd. (C78)
12991	Cable—3-conductor shielded fidelity control cable, approximately 7¼ inches long	12467	Capacitor—30 Mfd. (C73, C75)
12511	Cap—Grid contact cap	13657	Compensator Pack—Comprising one .015-Mfd., one .01-Mfd., one .07-Mfd. capacitors, one 27,000-ohm and one 39,000-ohm resistors (C64, C65, C66, R23, R24)
12948	Capacitor—33 Mmfd. (C62)		
12629	Capacitor—56 Mmfd. (C60)	12006	Core—Core and stud assembly for intermediate frequency transformer
12404	Capacitor—120 Mmfd. (C56, C57)		
12724	Capacitor—120 Mmfd. (C67)	12866	Foot—Chassis foot assembly
13022	Capacitor—390 Mmfd. (C45, C47, C51, C53)	5226	Lamp—Pilot lamp
13033	Capacitor—.007 Mfd. (C69)	12868	Link—Link mechanism on band indicator operating arm
4858	Capacitor—.01 Mfd. (C46, C48, C50, C52, C54, C55, C58, C68)	12871	Reactor—Filter reactor (L32)
		13658	Resistor—Voltage divider—Comprising one 4,700-ohm and one 4,100-ohm sections (R38, R39)
4624	Capacitor—.01 Mfd. (C59)		
11315	Capacitor—.015 Mfd. (C71)		

MODELS 10K1, 10T (2nd Prod.)
Parts

RCA MFG. CO., INC.

STOCK No.	DESCRIPTION
13659	Resistor—Voltage divider—Comprising one 285-ohm, one 13-ohm, one 11-ohm and one 35-ohm sections (R31, R32, R33, R35)
13834	Resistor—100 ohms—wire wound, 4 watt—For 25-cycle model only (R42)
12311	Resistor—1,000 ohms—insulated, ½ watt (R11, R16)
13030	Resistor—1,000 ohms—carbon type, 1/10 watt (R14)
13097	Resistor—10,000 ohms—insulated, 1 watt (R30)
11282	Resistor—56,000 ohms—carbon type, 1/10 watt (R17)
11365	Resistor—82,000 ohms—carbon type, ½ watt (R15)
11281	Resistor—100,000 ohms—carbon type, 1/10 watt (R12)
11398	Resistor—220,000 ohms—carbon type, 1/10 watt (R19)
5108	Resistor—330,000 ohms—carbon type, ½ watt (R40)
11172	Resistor—470,000 ohms—carbon type, ½ watt (R25, R28)
5035	Resistor—560,000 ohms—carbon type, ½ watt (R27)
12013	Resistor—1.0 megohm—carbon type, 1/10 watt—Located in tuning tube socket (R36)
11626	Resistor—2.2 megohm—carbon type, ½ watt (R18)
12874	Resistor—3.3 megohm—carbon type, ½ watt (R20)
13167	Resistor—3.9 megohm—carbon type, ½ watt (R41)
12870	Scale—Vernier dial scale
12008	Shield—Intermediate frequency transformer shield
12607	Shield—1st or 2nd I.F. transformer shield top
12581	Shield—3rd I.F. transformer shield top
11195	Socket—5-contact 5Z4 Radiotron socket
11198	Socket—7-contact 6K7 or 6H6 Radiotron socket
11196	Socket—8-contact 6F5, 6L6 Radiotron or Magic Brain power supply socket
13095	Socket—Upper left or lower right hand dial lamp socket
11222	Socket—Upper right or lower left hand dial lamp socket
11381	Socket—Tuning tube socket and cover
12007	Spring—Retaining spring for core in I.F. transformer
12986	Stud—Band indicator operating arm stud
12860	Switch—Low frequency tone and power switch (S4, S6)
12988	Switch—Bias switch (S7)
12979	Tone Control—High frequency tone and fidelity control (R29, S5)
12981	Transformer—First intermediate frequency transformer (L24, L25, L26, C45, C47)
12990	Transformer—Second intermediate frequency transformer (L27, L28, C51, C53)
12982	Transformer—Third intermediate frequency transformer (L29, L30, C56, C57, C60, R17, R19)
11211	Transformer—Power transformer, 105-125 volts, 50-60 cycles (T1)
11212	Transformer—Power transformer, 105-125 volts, 25-60 cycles (T1)
11213	Transformer—Power transformer, 110-125-150-210-240 volts, 40-60 cycles (T1)
12861	Volume Control (R22)

MAGIC BRAIN UNIT ASSEMBLIES

12806	Board—3-contact antenna and ground terminal board
5237	Bushing—Variable condenser mounting bushing assembly
12886	Cable—Shielded power cable, approximately 4 inches long, complete with 8-contact male plug
12511	Cap—Grid contact cap
12714	Capacitor—Adjustable trimmer capacitor (C3, C4, C5, C6, C14, C16)
12884	Capacitor—Adjustable trimmer capacitor (C10, C18, C23, C38, C39)
12807	Capacitor—Adjustable trimmer capacitor (C13, C35, C36, C37)
12896	Capacitor—15 Mmfd. (C34)
12722	Capacitor—18 Mmfd. (C15)
12891	Capacitor—36 Mmfd. (C40)
12629	Capacitor—56 Mmfd. (C24)
12895	Capacitor—56 Mmfd. (C17)
12723	Capacitor—56 Mmfd. (C2, C44)
13307	Capacitor—62 Mmfd. (C11)
12724	Capacitor—120 Mmfd. (C25, C28, C29)
12725	Capacitor—150 Mmfd. (C1)
12894	Capacitor—180 Mmfd. (C22)
12727	Capacitor—555 Mmfd. (C21)
12537	Capacitor—560 Mmfd. (C7, C26, C33, C42)
12898	Capacitor—1,500 Mmfd. (C12)
12729	Capacitor—1,550 Mmfd. (C20)
12728	Capacitor—4,500 Mmfd. (C19)
12897	Capacitor—4,700 Mmfd. (C43)
4858	Capacitor—.01 Mfd. (C8, C30, C31, C32)
12879	Coil—Antenna coil and shield, XABC bands (L2, L3, L4, L5, L6)
12888	Coil—Antenna coil, "D" band (L13, L14)
12880	Coil—Detector coil and shield, XABC bands (L15, L16, L17, L18, L19, L20)
12709	Coil—Oscillator coil and shield, ABC bands (L7, L8, L9)
12881	Coil—Oscillator coil and shield, X band only (L10)
12890	Coil—Oscillator coil, "D" band (L11, L12, L23)
12889	Coil—R.F. coil, "D" band (L21, L22)
12877	Condenser—3-gang variable tuning condenser (C9, C27, C41)
12887	Connector—8-contact male connector and cover for power cable, Stock No. 12886
12664	Core—Adjustable core and stud for Stock No. 12654
12800	Core—Adjustable core and stud for Stock No. 12709
12882	Core—Adjustable core and stud for Stock No. 12881
11324	Resistor—560 ohms—carbon type, ½ watt (R2)
5112	Resistor—1,000 ohms—carbon type, ½ watt (R3)
11298	Resistor—5,600 ohms—carbon type, 1 watt (R6)
3998	Resistor—15,000 ohms—carbon type, ½ watt (R5)
11282	Resistor—56,000 ohms—carbon type, 1/10 watt (R4, R9)
8064	Resistor—82,000 ohms—carbon type, ½ watt (R8)
11397	Resistor—560,000 ohms—carbon type, 1/10 watt (R1, R7)
12651	Shield—Coil shield for Stock Nos. 12879, 12880
12710	Shield—Coil shield for Stock No. 12709
12883	Shield—Coil shield for Stock No. 12881
11198	Socket—7-contact 6K7 Radiotron socket
11279	Socket—7-contact 6L7 Radiotron socket
12885	Socket—8-contact 6J7 Radiotron socket
12007	Spring—Retaining spring for core, Stock Nos. 12664, 12800, 12882
12878	Switch—Range switch and mounting nut (S1, S2, S3)
12654	Trap—Wave-trap, complete (L1)

DRIVE ASSEMBLIES

10705	Ball—5/32-inch diameter steel ball for planetary drive
10941	Ball—¼-inch diameter steel ball for planetary drive bearing
12904	Bushing—Plate and bushing assembly for planetary drive mounting
12905	Coupling—Flexible coupling and shaft assembly, complete
12909	Dial—Band indicating dial and cam assembly
12899	Drive—Variable tuning condenser drive, complete, including mounting bracket drive, dial scale and indicator, less vernier dial, Stock No. 12870 and link, Stock No. 12868
12906	Gear—Anti-lash drive gear, complete
12910	Gear—Sector gear and link assembly for band selector
12908	Indicator—Station selector indicator pointer
8051	Link—Link and roller assembly, complete with spring
12911	Screen—Dial lamp screen and light diffuser
4669	Screw—Set screw for flexible coupling or gear, Stock Nos. 12905 and 12906
12901	Shaft—Direct drive shaft and pinion gear for planetary drive
12900	Shaft—Vernier drive shaft for planetary drive
12903	Spring—Tension spring for planetary drive bearing
12907	Spring—Tension spring for gear, Stock No. 12906
8052	Spring—Tension spring for link, Stock No. 8051

REPRODUCER ASSEMBLIES

12914	Board—Reproducer terminal board
12640	Bracket—Output transformer mounting bracket and clamp (Model 10T, 2nd Production)
13842	Bracket—Output transformer mounting bracket and clamp (Model 10K1)
13660	Coil—Reproducer field coil (L33)
12642	Cone—Reproducer cone and dust cap (L31) (Model 10T, 2nd Production)
12667	Cone—Reproducer cone and dust cap (L31) (Model 10K1)
5118	Connector—3-contact male connector for speaker leads
9768	Reproducer, complete (Model 10T, 2nd Production)
9780	Reproducer, complete (Model 10K1)
13661	Transformer—Output transformer (T2, C72)
11886	Washer—Spring washer to hold field coil securely

MISCELLANEOUS ASSEMBLIES

12038	Band—Rubber band for tuning tube
11996	Bracket—Tuning lamp bracket and clamp
12915	Escutcheon—Station selector escutcheon and crystal
12742	Escutcheon—Tuning lamp escutcheon
12699	Knob—Large station selector knob
12700	Knob—Small (vernier) station selector knob
11347	Knob—Music-speech and power switch—volume control—range selector or fidelity control knob
11377	Screw—Chassis mounting screw assembly (Model 10T)
11210	Screw—Chassis mounting screw assembly (Model 10K1)
12916	Shield—Complete r-f unit top shield
4982	Spring—Holding spring for station selector or volume control knob, Stock No. 12699
11349	Spring—Retaining spring for knob, Stock Nos. 12700 and 11347

RCA MFG. CO., INC.

MODEL 13K
Schematic, Spkr. Wiring
Transformer Wiring

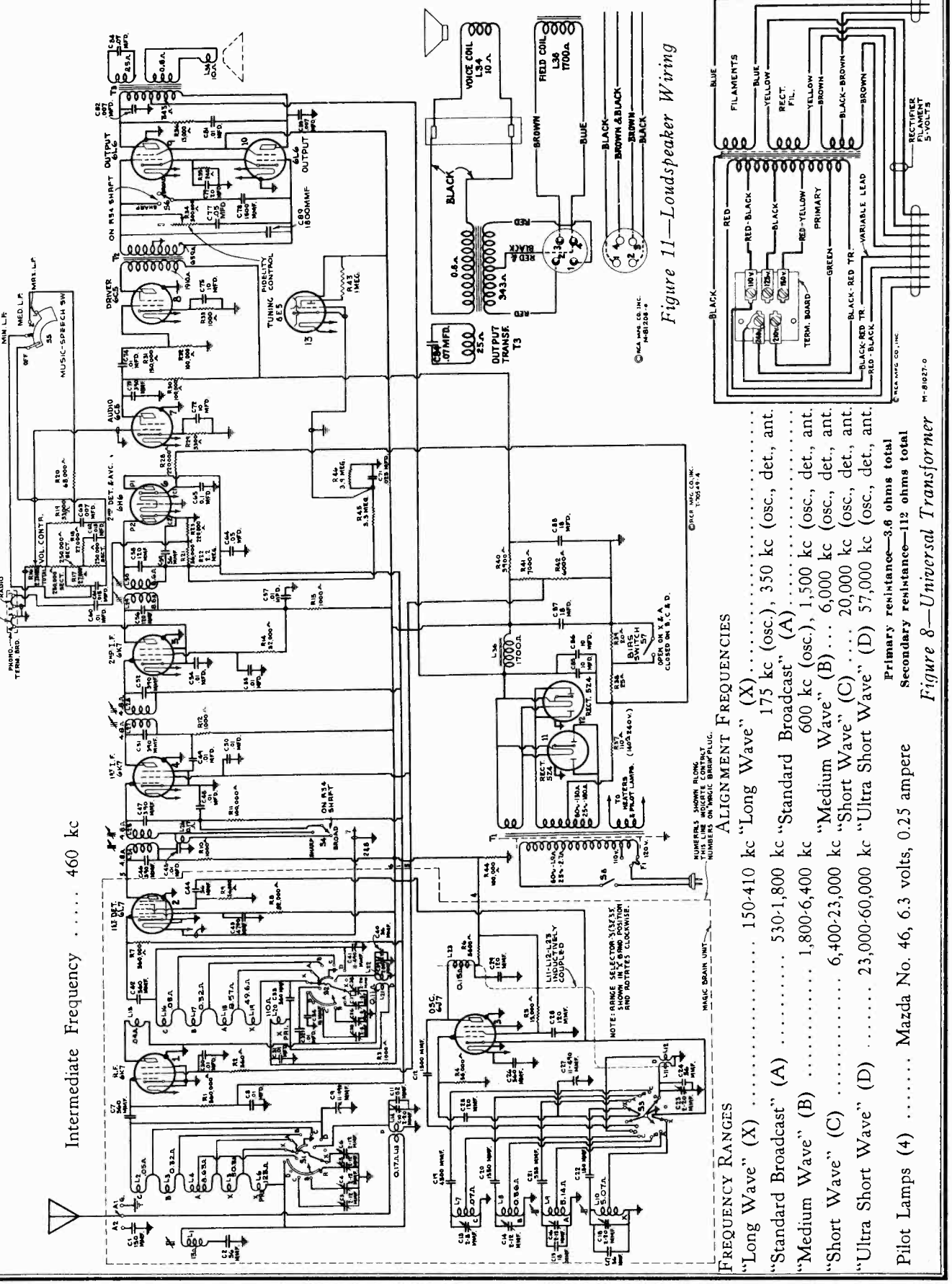


Figure 11—Loudspeaker Wiring

Figure 8—Universal Transformer

Intermediate Frequency ..... 460 kc

FREQUENCY RANGES

"Long Wave" (X) ..... 150-410 kc
"Standard Broadcast" (A) ..... 530-1,800 kc
"Medium Wave" (B) ..... 1,800-6,400 kc
"Short Wave" (C) ..... 6,400-23,000 kc
"Ultra Short Wave" (D) ..... 23,000-60,000 kc

ALIGNMENT FREQUENCIES

"Long Wave" (X) ..... 175 kc (osc.), 350 kc (osc., det., ant.
"Standard Broadcast" (A) ..... 600 kc (osc.), 1,500 kc (osc., det., ant.
"Medium Wave" (B) ... 6,000 kc (osc., det., ant.
"Short Wave" (C) .... 20,000 kc (osc., det., ant.
"Ultra Short Wave" (D) 57,000 kc (osc., det., ant.

Pilot Lamps (4) ..... Mazda No. 46, 6.3 volts, 0.25 ampere

Primary resistance—3.6 ohms total
Secondary resistance—112 ohms total

MODEL 13K
Chassis Wiring

RCA MFG. CO., INC.

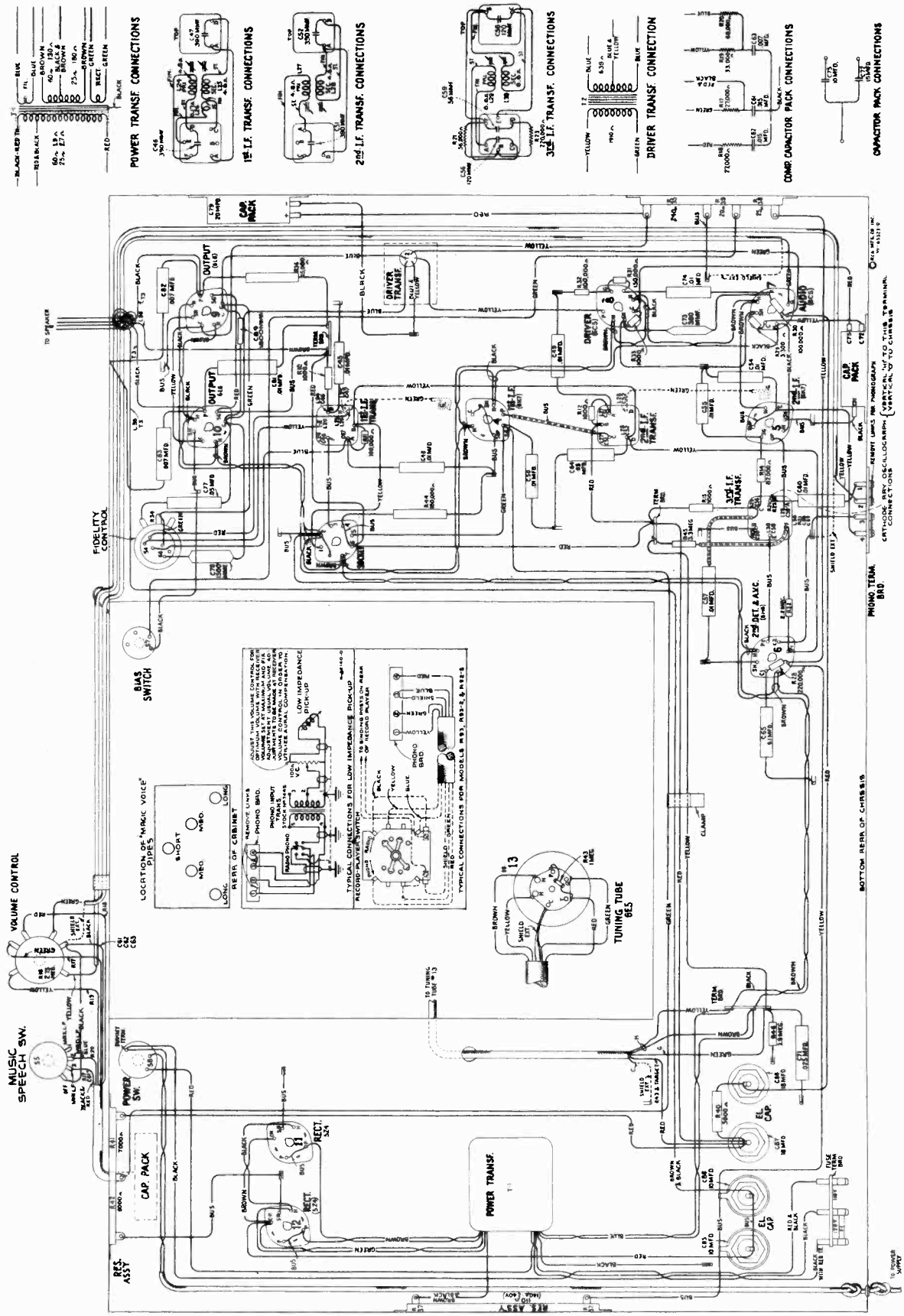


Figure 3—Chassis Wiring Diagram (Less "Magic Brain")

RCA MFG. CO., INC.

MODEL 13K
"Magic Brain"
Chassis Wiring

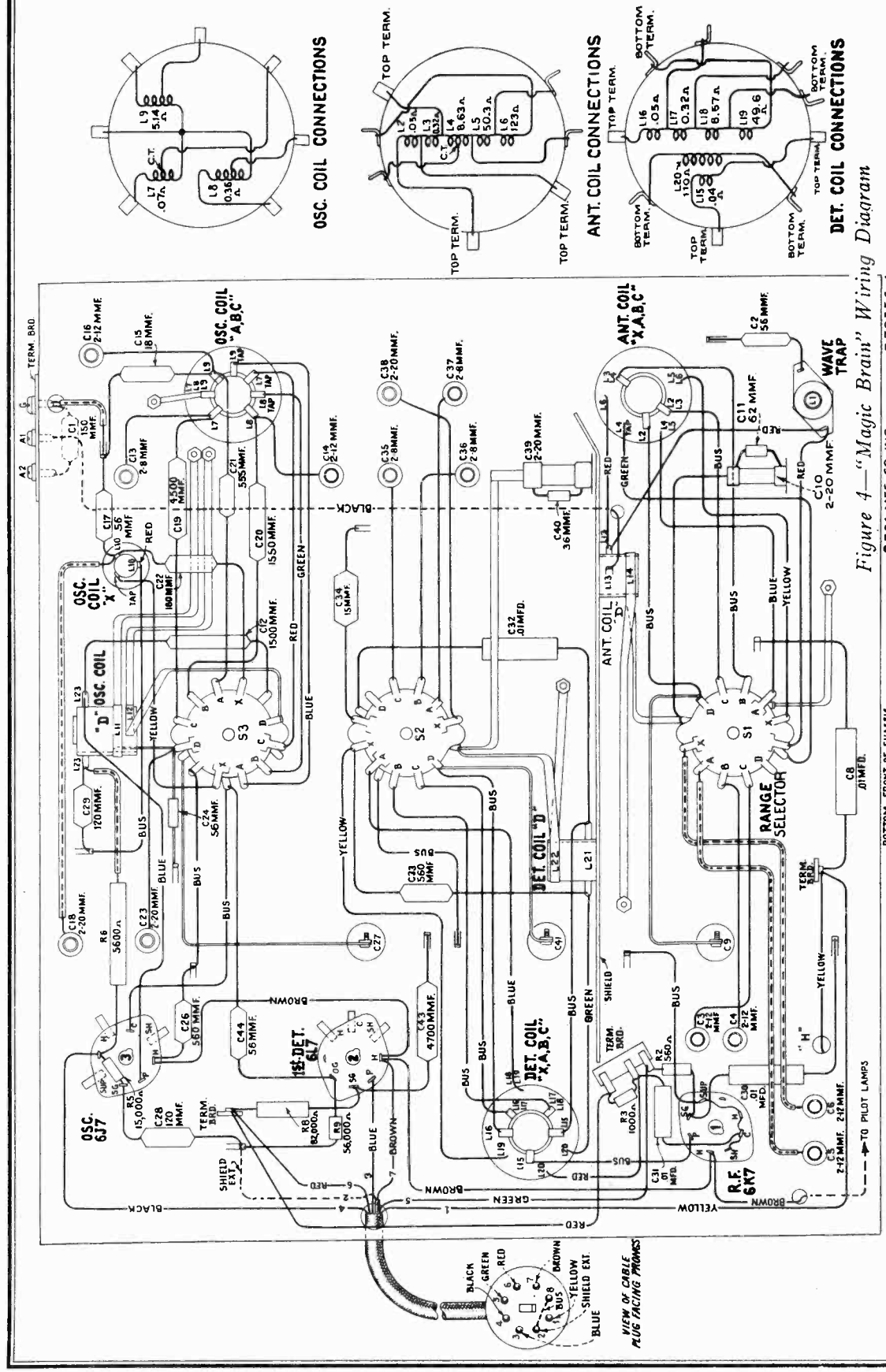


Figure 4—"Magic Brain" Wiring Diagram

POWER SUPPLY RATINGS

Rating A	105-125 volts, 50-60 cycles, 165 watts
Rating B	105-125 volts, 25-60 cycles, 165 watts
Rating C	100-130/140-160/195-250 volts, 40-60 cycles, 165 watts

POWER OUTPUT

Undistorted	20 watts
Maximum	30 watts

LOUDSPEAKER

Type	Electrodynamic
Impedance (v.c.)	11¼ ohms at 400 cycles

MODEL 13K
Resistance, Voltage
Socket, Trimmers

RCA MFG. CO., INC.

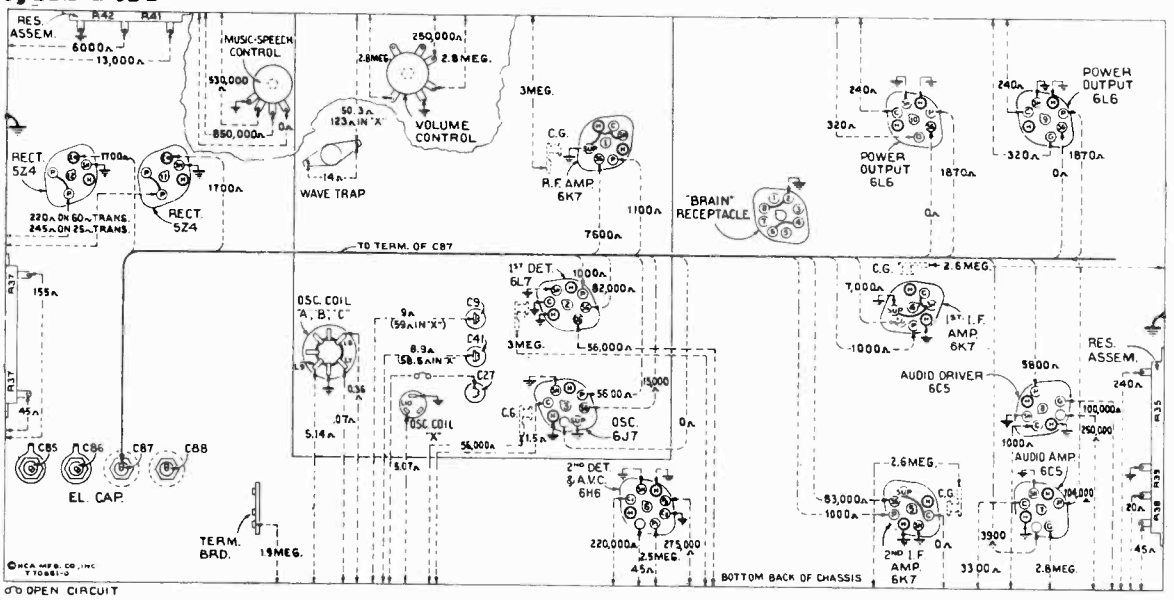


Figure 9—Resistance Diagram

Power supply disconnected—Radiotrons in sockets—Tuning condenser in full-mesh—Range selector in "Standard broadcast" position—Volume control maximum—Fidelity control optional—Music-speech Control Clockwise

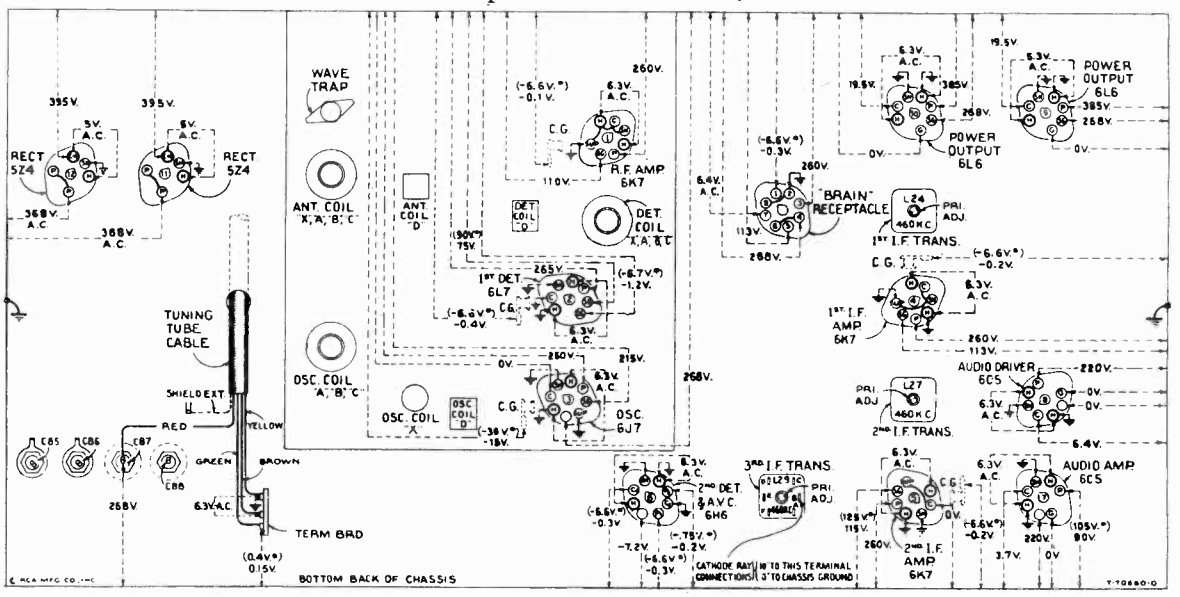


Figure 10—Radiotron Socket Voltages, Coil, and I-F Trimmer Locations

Measured at 115 volts, 60-cycle supply—Tuned to approximately 1,000 kc—No signal being received—Volume control minimum—Fidelity control optional

Radiotron Cathode Current Readings

Measured with Milliammeter Connected at Tube Socket Cathode Terminals under Conditions Similar to Those of Voltage Measurements

(1)	RCA-6K7—R-F Amp.	6.2 ma.
(2)	RCA-6L7—1st Det.	4.0 ma.
(3)	RCA-6J7—Osc.	6.6 ma.
(4)	RCA-6K7—1st I-F Amp.	6.2 ma.
(5)	RCA-6K7—2nd I-F Amp.	7.5 ma.
(6)	RCA-6H6—2nd Det.—A.V.C.	——
(7)	RCA-6C5—Audio Voltage Amp.	1.25 ma.
(8)	RCA-6C5—Audio Driver Amp.	6.4 ma.
(9)	RCA-6L6—Power Output	43 ma.
(10)	RCA-6L6—Power Output	43 ma.
(11)	RCA-5Z4—Rectifier	80 ma.*
(12)	RCA-5Z4—Rectifier	80 ma.*
(13)	RCA-6E5—Tuning Tube	3.0 ma.

Note: Two voltage values are shown for some readings. The value shown in parentheses with asterisk (*) indicates operating conditions without voltmeter loading. The other value (generally lower) is the actual measured voltage and differs from the value shown in parentheses because of the additional loading of the voltmeter through the high series circuit resistance.

(*Cannot be measured at socket)

Phonograph Terminal Board

A terminal board is provided for connecting a phonograph into the audio amplifying circuit. Typical methods of connecting a low-impedance pickup, or the RCA Victor Models R-93, R-93-2, and R-93-S Record Players are shown on the Schematic Diagram (figure 2).

Selector Dial

Figure 12 illustrates the relation of the various parts of the dial mechanism when in its "Standard broadcast" position with the range switch likewise turned to its "Standard broadcast" position. In re-assembling the dial after repairs, see that the gears are meshed in accordance with the diagram, at the same time noting that the range switch is in its "Standard broadcast" position and the lever attached to the range-switch shaft placed in the position shown.

To adjust the dial mechanism, set the range switch to its "Standard broadcast" position. Place a straight-edge across the center of the dial so that its edge is even with the lower (end) marking at both the low-frequency and high-frequency ends of the dial. Under such conditions the straight-edge should be parallel with the top of the chassis base. If the straight-edge is not parallel with the top of the chassis base, loosen the nut on the rear of the roller link pivot stud and move the stud up or down until the link roller moves the dial to the desired position so that the end calibration marks obtain the position mentioned above. Tighten the nut on the roller link pivot stud.

Set the gang tuning condenser to its maximum capacity position. Adjust the dial pointer to the low-frequency (end) mark on "Standard broadcast" scale. This is a friction adjustment.

With the gang tuning condenser plates still in full mesh, loosen the two set screws on the vernier-dial hub. Rotate the vernier dial until the "0" marking is in a vertical plane above the center of the shaft. Tighten set screws.

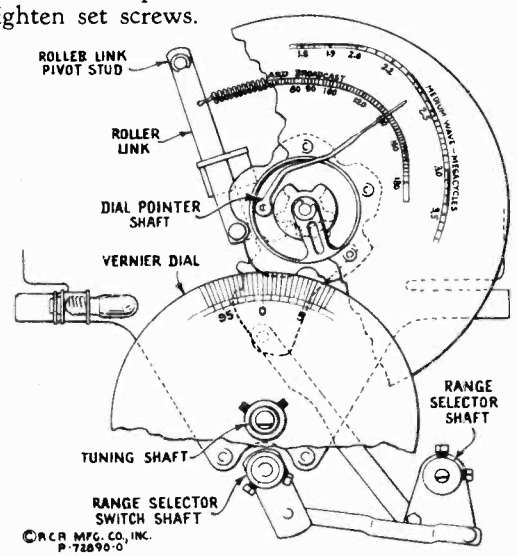


Figure 12—Selector Dial Change Mechanism

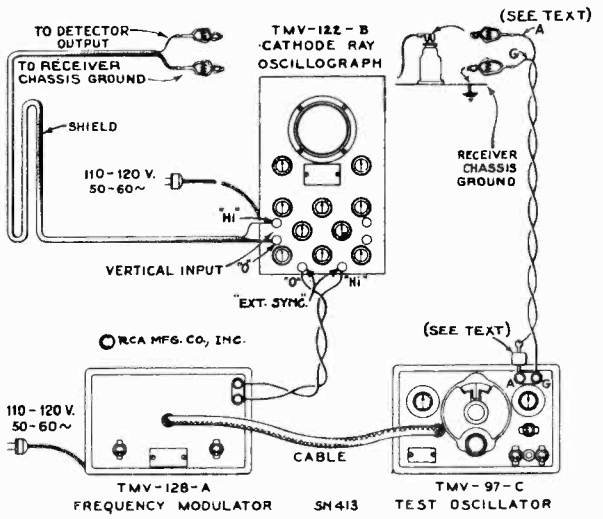


Figure 5—Alignment Apparatus Connections

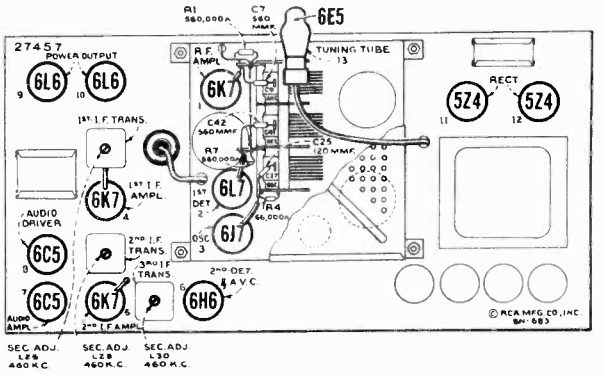


Figure 1—Radiotron and I-F Trimmer Locations

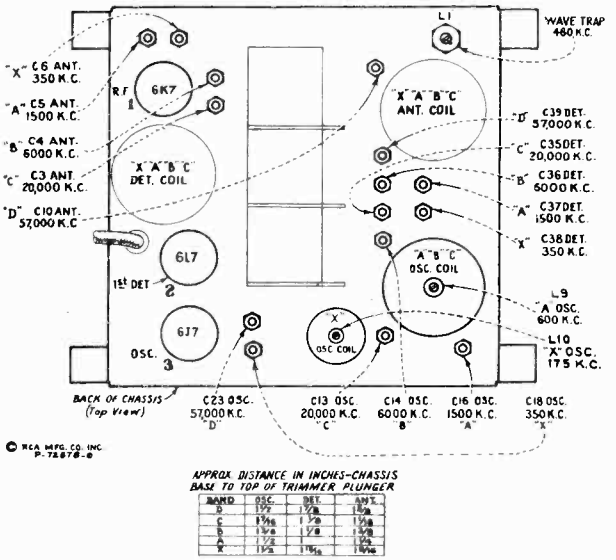


Figure 7—"Magic Brain" Trimmer Locations

Alignment Procedure

There are seventeen adjustments required for the alignment of the oscillator, first-detector, and antenna-tuned circuits; one adjustment for the wave-trap; and six adjustments for the i-f system. Fifteen of these adjustments are made with plunger-type air trimming capacitors and require the use of an **RCA Stock No. 12636 Adjusting Tool.** Each of these capacitors has a lock nut for securing the plunger in place after adjustment. The remaining nine adjustments are made by means of screws attached to molded magnetite cores. These cores change the inductance of the particular coils in which they are inserted to provide exact alignment. All of these adjustments are accurately made during manufacture and should remain in proper alignment unless affected by abnormal conditions of climate or purported alterations for servicing, or unless altered by other means. Loss of sensitivity, improper tone quality, and poor selectivity are the usual indications of improper alignment. Such conditions will usually exist simultaneously. Correct performance of this receiver can only be obtained when these adjustments have been made by a skilled service engineer with the use of adequate and reliable test equipment. The manufacturer of this receiver has such test equipment available for sale through its distributors and dealers.

The extensive frequency range of this receiver necessitates a more or less involved method of alignment. However, if the following directions are carefully applied in the sequence given, normal performance of the instrument will be obtained.

The plunger-type air trimming capacitors have their approximate plunger settings tabulated on figure 7. If the plungers have been disturbed from their original adjustments, they may be roughly set to the specified dimensions prior to alignment.

In performing services on the "Magic Brain", the leads should be restored to their original positions, since the lead-dress is important for proper operation and dial-calibration.

Precautionary Dressing of Leads for "Magic Brain" Alignment

(Refer to Figure 4)

Band "X"

1. Keep blue lead A of S1 to antenna coil L4-5 dressed away from chassis, and from yellow lead X of S1 to antenna coil L5-6.
2. Bus lead from C10 to S1 should be as short as possible.
3. Keep blue lead A of S2 to detector coil L18-19 clear of chassis, coil shield, coil, and other leads.
4. Keep spaghetti lead C6 to X of S1 apart from spaghetti lead of C5 to A of S1, and from chassis.

Band "A"

1. Keep green lead terminal S1 to antenna coil tap L4 away from chassis, coil shield, and coil.
2. Keep spaghetti lead C5 to A of S1 apart from spaghetti lead C6 to X of S1 and from chassis.

Band "C"

Lead from C19 to oscillator coil L7 should be maintained as short and straight as possible.

For alignment, the test-oscillator frequency should be quite accurate. A convenient and reliable means of accurately checking the frequency of test oscillators, receivers, etc., is the **RCA Stock No. 9572 Crystal Calibrator.**

If the test-oscillator signal cannot be heard as the receiver (heterodyne) oscillator air-trimmer plunger is changed from its minimum-capacity to maximum-capacity position (receiver dial and test oscillator set to the specified frequencies, and the correct oscillator air-trimmer used) it may be an indication that the test-oscillator frequency is outside the range covered by the air-trimmer. Under such conditions, when a more accurate setting of the test oscillator cannot be determined, set the oscillator air-trimmer plungers to the approximate settings given on figure 7. Tune the test oscillator until the signal is heard in the speaker. Each of two test-oscillator settings (the fundamentals or the harmonics of which are **920 kc** apart) produce a signal. The lower-frequency test-oscillator setting should be used as this places the test-oscillator (signal) frequency **460 kc** below the frequency of the receiver heterodyne oscillator.

Holes are provided in the top of the r-f and antenna coil cans on some models to enable a tuning check with the **RCA Stock No. 6679 Tuning Wand.** The hole in the top of the detector coil can has a cinch button which must be removed before insertion of the tuning wand. When the brass end of the wand is inserted in the coil, the inductance of the coil is decreased. If this results in an increase of output, the respective air-trimmer capacitance should be decreased (plunger pulled out). If inserting the iron end of the tuning wand causes an increase in output, resulting from an increase of inductance of the coil, the respective air-trimmer capacitance should be increased (plunger pushed in). If the range of the air trimmer is not sufficient to give the desired results, the lead-dress may be changed in the particular circuit being aligned, so as to cause the circuit to resonate within the range of the trimmer. An increase in the capacity-to-ground of the circuit will be required if the iron end of the tuning wand causes an increase of signal output when the air-trimmer plunger is full-in, while a decrease in the capacity-to-ground will be required if the brass end of the tuning wand causes an increase in signal output when the air-trimmer plunger is full-out.

Two methods of alignment are applicable—one requires use of the cathode-ray oscillograph, and the other requires a voltmeter or glow-type indicator. The cathode-ray alignment method is advantageous in that the indication provided is in the form of a wave-image which represents the resonance characteristics of the circuit being tuned. This method is preferred because of the i-f characteristics of this receiver. This type of alignment is possible through use of apparatus such as the **RCA Stock No. 9558 Frequency Modulator** and the **RCA Stock No. 9545 Cathode-Ray Oscillograph.** If this equipment is not available, an approximate alignment may be performed by the output-indicator method with an instrument such as the **RCA Stock No. 4317 Neon Glow Indicator** attached across the loud-speaker voice coil. Alignment by this method is similar to the cathode-ray method outlined below except that the receiver volume control should be at maximum, the trimmers adjusted to peak response (with the exception of the wave-trap) and the test-oscillator sweeping operations omitted. Either of these methods require the use of a reliable test oscillator such as the **RCA Stock No. 9595.**

Cathode-Ray Alignment

Make alignment apparatus connections shown on figure 5. Remove the plug of the frequency-modulator cable from the test-oscillator jack. Connect the receiver chassis to a good external ground. Connect oscillograph "Vertical" input terminals as indicated on figure 3. Set oscillograph power switch to "On" and adjust "Intensity" and "Focus" controls to give a clearly defined spot, or line, on the screen. Set oscillograph "Ampl. A" switch to "On," "Vertical gain" control full-clockwise, "Ampl. B" switch to "Timing," "Range" switch to No. 2 position, and "Timing" switch to "Int." Place the "Sync." control, "Freq." control, and "Horizontal gain" control to about their mid-positions. For each of the following adjustments, the test-oscillator output must be regulated so that the image obtained on the oscillograph screen will be of the minimum size for accurate observation. The receiver volume-control setting is optional.

I-F Adjustments

(a) Turn range selector to its "Standard broadcast" (A) position and tune receiver to a position of no extraneous signals **near 600 kc.** Set fidelity control to counter-clockwise position. Connect the "Ant." output of the test oscillator to the grid cap of RCA-6K7 second i-f tube (with grid lead in place) through a **.001-mfd.** capacitor, with "Gnd." to receiver chassis. Tune the test oscillator to **460 kc** and place its modulation switch to "On" and its output switch to "Hi."

(b) Turn on the receiver and test oscillator. Increase the output of the test oscillator until a deflection is noticeable on the oscillograph screen. The figures obtained represent several waves of the detected signal, the amplitude of which may be observed as an indication of output. Cause the wave-image formed (400-cycle waves) to be spread completely across the screen by adjusting the "Horizontal gain" control. The image should be synchronized and made to remain motionless by adjusting the "Sync." and "Freq." controls.

(c) Adjust the two magnetite core screws **L30** and **L29** (see figures 1 and 10) of the third i-f transformer (one on top and one on bottom) to produce maximum vertical deflection of the oscillographic image. This adjustment places the transformer in exact resonance with the **460 kc** signal.

(d) The sweeping operation should follow using the frequency modulator. Shift the oscillograph "Timing" switch to "Ext." Insert plug of frequency-modulator cable in test-oscillator jack. Turn the test-oscillator modulation switch to "Off." Turn on the frequency modulator and place its sweep-range switch to "Hi."

(e) Increase the frequency of the test oscillator by slowly turning its tuning control until two separate, distinct, and similar waves appear on the screen. If only one wave appears, increase the "Freq." control on the oscillograph to obtain two waves. These waves will be identical in shape, totally disconnected, and appear in reversed positions. They will have a common base line which is discontinuous. Adjust the "Freq." and "Sync." controls of the oscillograph to make them remain motionless on the screen. Continue increasing the test-oscillator frequency until these forward and reverse curves move together and overlap, with their highest points exactly coincident. This condition will be obtained at a test-oscillator setting of **approximately 575 kc.**

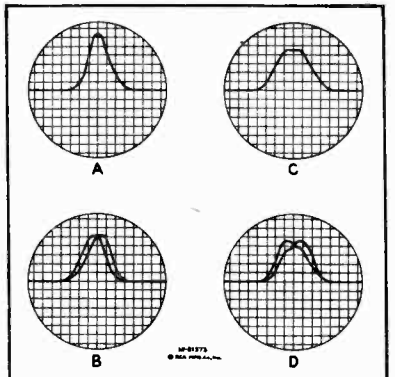


Figure 6—I-F Alignment Oscillograph Curves

A—**Correct** curve showing proper i-f alignment as obtained with fidelity control counter-clockwise.

B—**Incorrect** curve similar to A showing improper alignment of i-f system caused by one or more circuits being slightly detuned.

C—**Correct** showing broadening of curve A obtained when fidelity control is rotated fully clockwise.

D—**Incorrect** curve showing broadening of curve B obtained when fidelity control is rotated fully clockwise.

(f) With the images established as in (e), re-adjust the two magnetite core screws **L30** and **L29** on the third i-f transformer so that they cause the curves on the oscillograph screen to become exactly coincident throughout their lengths and have maximum amplitude.

(g) Without altering the adjustments of the apparatus, shift the "Ant." output of the test oscillator to the grid cap of the RCA-6K7 first i-f tube (with grid lead in place), through a **.001-mfd.** capacitor. Regulate the test-oscillator output so that the amplitude of the oscillographic image is approximately the same as used for adjustment (f) above.

(h) The two second i-f transformer magnetite core screws **L28** and **L27** (one on top and one on bottom) should then be adjusted so that they cause the forward and reverse curves to become coincident throughout their lengths and have maximum amplitude.

(i) Without altering the adjustments of the appara-

tus, shift the "Ant." output of the test oscillator to the input of the i-f system, i.e., to the grid cap of the RCA-6L7 first-detector, (with grid lead in place) through a .001-mfd. capacitor. Regulate the test-oscillator output so the amplitude of the oscillographic image is approximately the same as used for adjustment (h) above.

(j) The two first i-f transformer magnetite core screws L25 and L24 (one on top and one on bottom) should then be adjusted so that they cause the forward and reverse waves to coincide throughout their lengths and have maximum amplitude.

(k) Note width of oscillographic image at a point which is 50% of maximum amplitude. Turn receiver fidelity control to extreme clockwise position. Note width of oscillographic image at a point which is 50% of maximum amplitude. Under normal conditions the latter measurement should be approximately 60% greater in width than the former measurement. The image should also appear slightly double humped. These conditions indicate proper broadening of the band width of the i-f amplifier. Turn range selector to "Medium wave" (B) band and note increase of amplitude. The amplitude should increase several times. It may be necessary to decrease output of test oscillator to keep image on screen. Turn receiver fidelity control to extreme counterclockwise position and proceed to "R-F Adjustments."

R-F Adjustments

Make receiver dial adjustments as outlined by "Selector dial," figure 12. Alignment must be made in sequence of "Wave-trap," "Ultra short wave" band, "Short wave" band, "Medium wave" band, "Standard broadcast" band, and "Long wave" band.

"Wave-Trap" Adjustment

(a) Connect the "Ant." output of the test oscillator to the antenna terminal "A1" through a **200-mmfd. (important)** capacitor. Remove the plug of the frequency-modulator cable from the test-oscillator jack. Turn test-oscillator modulation switch to "On." Shift the oscillograph "Timing" switch to "Int." Place receiver range selector in "Standard broadcast" position. Set the receiver dial to a position of no extraneous signals **near 600 kc.** Tune the test oscillator to **460 kc.** Adjust the wave-trap magnetite core screw L1 to the point which causes minimum amplitude of output (maximum suppression of signal) as shown by the waves on the oscillograph. An increase of the test-oscillator output may be necessary before this point of minimum amplitude, obtained by correct adjustment of wave-trap screw, becomes apparent on oscillograph screen.

"Ultra Short Wave" Band

(b) Connect the "Ant." output of the test oscillator to the antenna terminal "A1" of the receiver through a **300-ohm** resistor. Set the receiver range selector to its "Ultra short wave" position and its dial pointer to **57,000 kc.** Adjust the test oscillator to **19,000 kc.** The third harmonic of **19,000 kc** is used for this adjustment.

Adjust oscillator air-trimmer **C23** for maximum (peak) output. Two positions, each producing maximum output, may be found. The position of minimum capacitance (plunger near out) should be used. This places the receiver beterodyne oscillator **460 kc** higher in frequency than the incoming signal. Tighten lock nut. Adjust the detector air-trimmer **C39,** while slightly rocking the gang tuning condenser back and forth through the signal, for maximum (peak) output. Two peaks may be found on this trimmer. The peak of maximum capacitance (plunger near in) should be used. Tighten lock nut. Adjust the antenna air-trimmer **C10** for maximum (peak) output while slightly rocking the gang tuning condenser back and forth through the signal. Two peaks may be found on this trimmer which produce maximum output. The peak with maximum capacitance (plunger near in) should be used. Tighten lock nut. Check the image frequency by changing the receiver dial setting to **56,080 kc.** If the image signal is received at this position, the adjustment of the oscillator air-trimmer **C23** has been correctly made. No adjustments should be made while checking for the image signal.

(c) Re-tune receiver for maximum response to the **57,000 kc** input signal (not image response) without disturbing test-oscillator adjustments. Change test oscillator to **6,800—14,000 kc** range. Tune test oscillator until signal is heard in speaker (should occur at approximately **14,250 kc,** fourth harmonic of test oscillator used). Two test-oscillator settings (230 kc apart) will produce a signal at this point. The lower frequency test-oscillator setting should be used as this places the test-oscillator harmonic **460 kc** below the frequency of the receiver heterodyne oscillator. Tune receiver for maximum response at a dial setting of approximately **28,500 kc** (image should tune in at a dial setting approximately **27,580 kc**) without altering test-oscillator adjustment. Test oscillator second harmonic of **14,250 kc** is used for the following check. Check calibration of receiver dial. A receiver-dial reading of less than **28,500 kc** indicates that the inductance of the oscillator secondary coil **L11** is too low and should be increased. If the receiver dial reading is greater than **28,500 kc,** the inductance of **L11** is too high and should be decreased. If it is necessary to change the inductance of **L11,** first remove bottom cover of "Magic Brain" and then set receiver dial pointer to **28,500 kc.** To decrease inductance, move the grounded ends (straps) of **L11** and **L12** (see figure 4) nearer chassis. **Do not allow straps to touch chassis except where connected.** To increase inductance, move the straps farther away from chassis. Adjust position of straps until maximum (peak) output results. The alignment of the detector tuned circuit should next be checked at **28,500 kc** without changing either the receiver or test-oscillator adjustments. An increase of output when the brass end of a tuning wand is brought near **L22** indicates that **L22** is too high in inductance, while an increase when the iron end is brought near the coil indicates that the inductance is too low. The inductance of **L22** may be varied by changing the spacing between the grounded end (strap) of **L22** and the strap connected from **C41** to contact on **S2** (figure 4). An increase of spacing will increase the inductance, while a decrease of spacing will decrease the inductance. Adjust the spacing until maximum (peak) output results. Replace "Magic Brain" bottom cover and repeat adjustments in (b) prior to those of "Short wave" band.

"Short Wave" Band

(d) Set the receiver range selector to its "Short wave" position and its dial pointer to **20,000 kc.** Adjust the test oscillator to **20,000 kc.** Adjust oscillator air-trimmer **C13** until maximum (peak) output is reached. Two peaks may be found with this circuit. The peak with minimum capacitance (plunger near out) should be used. Tighten lock nut. Adjust detector air-trimmer **C35** until maximum (peak) output is reached, while slightly rocking the gang tuning condenser back and forth through the signal. Two peaks may be found with this circuit. The peak with maximum capacitance (plunger near in) should be used. Tighten lock nut. Adjust antenna air-trimmer **C3** until maximum (peak) output is reached while slightly rocking the gang tuning condenser back and forth through the signal. Two peaks may be found with this circuit. The peak with maximum capacitance (plunger near in) should be used. Tighten lock nut. Check the image frequency by changing the receiver dial setting to **19,080 kc.** The image signal should be received at this position indicating that the adjustment of C13 has been correctly made. No adjustments should be made while checking for the image signal.

"Medium Wave Band"

(e) Place receiver range selector to its "Medium wave" position with its dial pointer set to **6,000 kc.** Tune the test oscillator to **6,000 kc.** Adjust oscillator air-trimmer **C14** to produce maximum (peak) output as shown by the waves on the oscillograph. Two peaks may be found with this circuit. The peak with minimum capacitance (plunger near out) should be used. Tighten lock nut. Adjust the detector air-trimmer **C36** for maximum (peak) output while slightly rocking the gang tuning condenser back and forth through the signal. Two peaks may be found with this circuit. The peak with maximum capacitance (plunger near in) should be used. Tighten lock nut. Adjust antenna air-trimmer **C4** to produce maximum (peak) output. Tighten lock nut.

"Standard Broadcast" Band

(f) Remove the **300-ohm** resistor from between the test-oscillator "Ant." post and receiver antenna terminal "A1" and insert a **200-mmfd.** capacitor in its place. Place receiver range selector to "Standard broadcast" position with receiver dial pointer set to **600 kc.** Tune the test oscillator to **600 kc.** Adjust oscillator magnetite core screw **L9** (top of large oscillator coil can) for maximum (peak) output as shown by the waves on the oscillograph screen.

(g) Set receiver dial pointer to **1,500 kc.** Tune test oscillator to **1,500 kc (1,500–3,100-kc range)** and increase its output to produce a registration on the oscillograph screen. Carefully adjust the oscillator, detector, and antenna air-trimmers **C16, C37,** and **C5,** respectively, to produce maximum (peak) output as shown by the waves on the oscillograph screen. Shift the oscillograph "Timing" switch to "Ext." Place the frequency modulator sweep-range switch to its "Lo" position and insert plug of the frequency-modulator cable in test-oscillator jack. Turn test-oscillator modulation switch to "Off." Re-tune the test oscillator (increase frequency) until the forward and reverse waves show on the oscillograph screen and become coincident at their highest points. This will occur at a test-oscillator setting of **approximately 1,680 kc.** Adjust air-trimmers **C16, C37,** and **C5** again, setting each to the point which produces the best coincidence and maximum amplitude of the images.

(h) Remove the plug of the frequency-modulator cable from the test-oscillator jack. Turn test-oscillator modulation switch to "On." Set oscillograph "Timing" switch to "Int." Tune test oscillator to **200 kc (200–400-kc range).** Tune receiver for maximum response to this signal at a dial reading of **approximately 600 kc.** The third harmonic of the **200-kc** signal is used for this adjustment. Shift oscillograph "Timing" switch to "Ext." Insert the plug of the frequency modulator cable in test-oscillator jack. Turn test-oscillator modulation switch to "Off." Re-tune the test oscillator (increase frequency) until the forward and reverse waves show on the oscillograph screen. This will occur at a test-oscillator setting of **approximately 230 kc.** Disregarding the fact that the two images may or may not come together, adjust the oscillator magnetite core screw **L9** (top of large oscillator coil can) to produce maximum (peak) amplitude of the images. Shift the oscillograph "Timing" switch to "Int." Remove the plug of the frequency-modulator cable from the test-oscillator jack. Turn the test-oscillator modulation switch to "On." Repeat adjustments in (g) above to compensate for any changes caused by the adjustment of **L9** core, tightening lock nuts on **C16, C37,** and **C5,** respectively, after each is adjusted.

"Long Wave" Band

(i) Shift the oscillograph "Timing" switch to "Int." Remove the plug of the frequency-modulator cable from the test-oscillator jack. Turn the test-oscillator modulation switch to "On." Place receiver range selector to its "Long wave" position. Set the receiver dial pointer to **175 kc.** Tune the test oscillator to 175 kc and increase its output until a deflection is noticeable on the oscillograph screen. Adjust oscillator magnetite core screw **L10** (located on top of small oscillator coil can) so that maximum (peak) amplitude of output is shown on the oscillograph screen.

(j) Set receiver dial pointer to **350 kc.** Tune test oscillator to **350 kc.** Adjust the oscillator, detector, and antenna air-trimmers **C18, C38,** and **C6** to produce maximum (peak) output as shown by the waves on the oscillograph screen. Without disturbing the connections, shift the oscillograph "Timing" switch to "Ext." Place the frequency-modulator sweep-range switch to its "Hi" position and insert plug of frequency-modulator cable in test-oscillator jack. Turn test-oscillator modulation switch to "Off." Re-tune the test oscillator (decrease frequency) until the

forward and reverse waves show on the oscillograph screen and become coincident at their highest points. This will occur at a test-oscillator setting of approximately 198 kc. This setting places the test-oscillator frequency to 175 kc. The second harmonic is now used for the 350 kc adjustment. Adjust air-trimmers C18, C38, and C6, again, to produce maximum amplitude of the images where they best coincide throughout their lengths.

(k) Re-tune the receiver to approximately 175 kc so that the forward and reverse waves appear on the oscillograph screen. Adjust the oscillator magnetite core screw L10 to produce maximum (peak) amplitude of the waves, disregarding the fact that the two images may or may not come together.

(l) Shift the receiver dial setting to 350 kc without altering any other adjustments (frequency modulator still in operation). Adjust air-trimmers C18, C38, and C6, respectively, to produce maximum amplitude and best coincidence of the waves. These adjustments compensate for any changes caused by the adjustment of the magnetite core screw L10. Tighten lock nuts on C18, C38, and C6, respectively, after each is adjusted.

Loudspeaker

Centering of the loudspeaker voice coil is made in the usual manner with three narrow paper feelers after first removing the front paper dust cover. This may be removed by softening its cement with a very light application of acetone using care not to allow the acetone to flow down into the air gap. The dust cover may be cemented back in place with ambroid upon completion of adjustment.

Antenna and Ground Terminals

These receivers are equipped with an antenna-ground terminal board having three terminals. These terminals are marked "A2," "A1," and "G," the latter being the ground terminal and should always be connected to a good external ground. The transmission-line leads of the RCA RK-40A antenna system should be connected to terminals "A2" and "A1." The receiver coupling units of the RCA RK-40 and the RCA Spider-Web antenna systems should be connected to terminals "A1" and "G." Connect a single-wire antenna to terminal "A1."

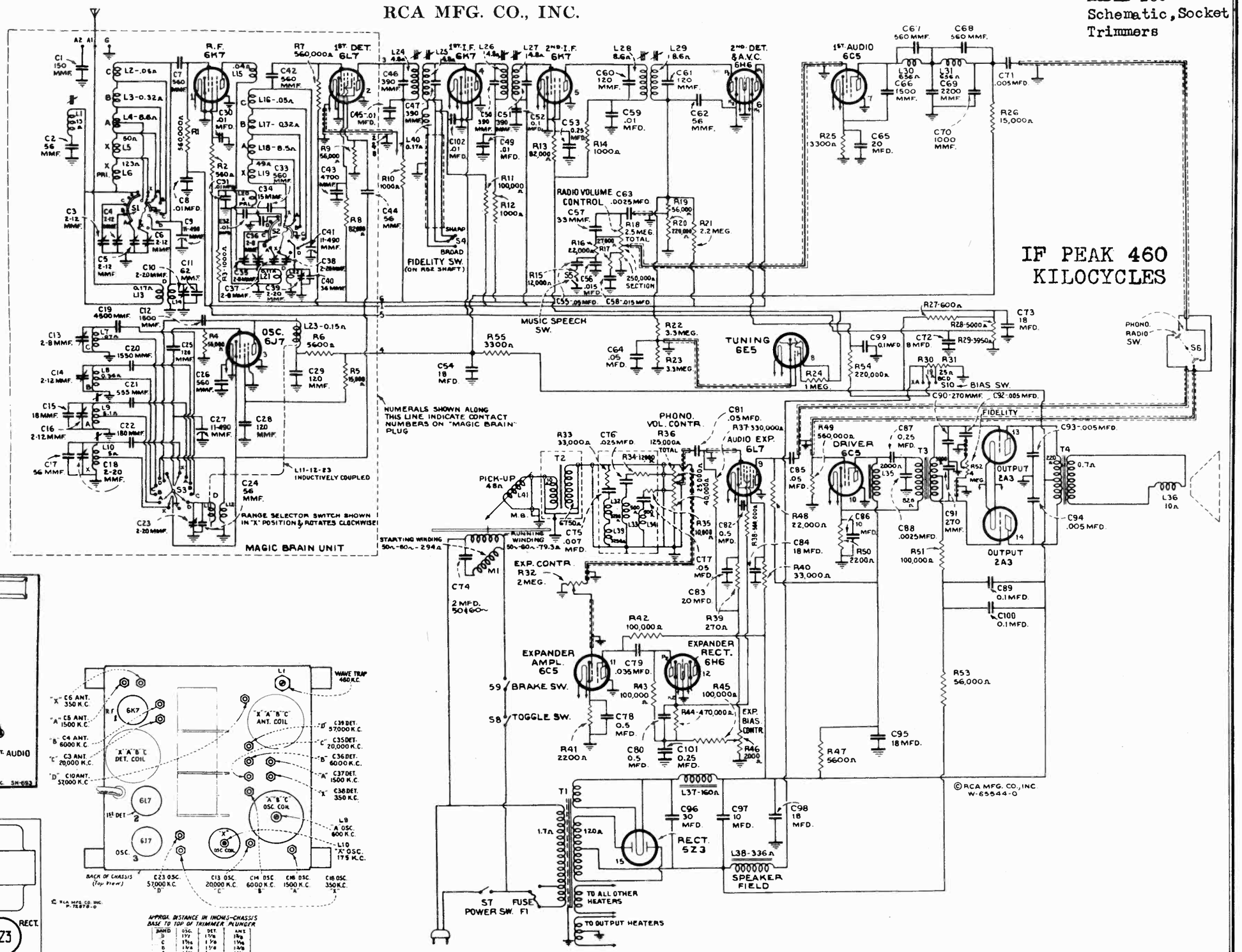
REPLACEMENT PARTS

Stock No.	DESCRIPTION	List Price
	RECEIVER ASSEMBLIES	
12863	Board—Phonograph terminal board	$0.25
12987	Bracket—Mounting bracket for bias switch	.15
4427	Bracket—Volume control and L. F. tone control mounting bracket	$0.18
13024	Cable—Tuning lamp cable and socket	1.25
12511	Cap—Grid contact cap—Package of 5	.15
12629	Capacitor—56 Mmfd. (C59)	$0.20
12404	Capacitor—120 Mmfd. (C56, C58)	.26
13034	Capacitor—390 Mmfd. (C73)	.25
13301	Capacitor—390 Mmfd. (C46, C47, C51, C52)	.25
12898	Capacitor—1,500 Mmfd. (C78)	.20
13580	Capacitor—1,800 Mmfd. (C89)	.25
13033	Capacitor—.007 Mfd. (C82, C83)	.20
4870	Capacitor—.025 Mfd. (C71)	.20
4858	Capacitor—.01 Mfd. (C45, C48, C49, C50, C54, C55, C57, C60, C74)	.25
4937	Capacitor—.01 Mfd. (C81)	.25
4836	Capacitor—.05 Mfd. (C64, C77)	.30
4841	Capacitor—0.1 Mfd. (C65)	.22
11203	Capacitor—10 Mfd. (C85, C86)	1.18
5212	Capacitor—18 Mfd. (C87, C88)	1.16
12470	Capacitor—20 Mfd. (C79)	1.10
13011	Capacitor—Compensating pack comprising two .015 Mfd., one .007 Mfd. capacitors and two 27,000-ohm, one 33,000-ohm, and one 68,000-ohm resistors (C61, C62, C63, R17, R18, R19, R20)	2.00
13025	Capacitor—Pack comprising two 10 Mfd. sections (C72, C75)	1.00
5040	Connector—4-contact female connector for speaker cable	.25
12006	Core—Adjustable core and stud for Stk. Nos. 12981, 12990, 12982	.22
5240	Cover—Fuse mounting cover	.24
12870	Dial—Vernier dial scale	.65
10907	Fuse—3 Amp.—Package of 5—(F1)	.40
5226	Lamp—Dial lamp—6.3 volts—Package of 5	.70
12868	Link—Range switch and band indicator operating link complete with set screws	.45
13012	Mounting—Fuse mounting, 100-120-volt models only	.35
13026	Mounting—Fuse mounting, 220-volt models only	.35
13027	Resistor—110 ohms, wire wound—used in 110-volt models only (R37)	.50
13029	Resistor—140 ohms, wire wound—used in 220-volt models only (R37)	.75
13030	Resistor—1,000 ohms—Carbon type—1/10 watt—Package of 5 (R12)	.75
5112	Resistor—1,000 ohms—Carbon type—¼ watt—Package of 5 (R10, R15)	1.00
13031	Resistor—3,300 ohms—Carbon type—1/10 watt—Package of 5 (R29)	.75
13032	Resistor—3,900 ohms—Carbon type—1 watt—Package of 5 (R40)	1.10
5114	Resistor—15,000 ohms—Carbon type—1 watt (R36)	.22
11282	Resistor—56,000 ohms—Carbon type—1/10 watt—Package of 5 (R21)	.75
11365	Resistor—82,000 ohms—Carbon type—¼ watt—Package of 5 (R14)	1.00
11281	Resistor—100,000 ohms—Carbon type—1/10 watt—Package of 5 (R11)	.75
12263	Resistor—100,000 ohms—Insulated—¼ watt—Package of 5 (R30)	1.00
3058	Resistor—100,000 ohms—Carbon type—1 watt—Package of 5 (R44)	1.10
12478	Resistor—150,000 ohms—Carbon type—1/10 watt—Package of 5 (R31)	.75
12264	Resistor—220,000 ohms—Insulated—¼ watt—Package of 5 (R28)	1.00
11398	Resistor—220,000 ohms—Carbon type—1/10 watt—Package of 5 (R23)	.75
12013	Resistor—1 meg—Carbon type—1/10 watt—Package of 5 (R43)	$0.75
12679	Resistor—2.2 meg—Insulated—¼ watt—Package of 5 (R22)	1.00
12874	Resistor—3.3 meg—Carbon type—¼ watt—Package of 5 (R45)	1.00
13167	Resistor—3.9 meg—Carbon type—¼ watt—Package of 5 (R46)	1.00
13017	Resistor—Voltage divider comprisiug one 7,000-ohm and one 6,000-ohm sections (R41, R42)	.90
13018	Resistor—Voltage divider comprising one 240-ohm, one 20-ohm and one 25-ohm sections (R35, R38, R39)	.55
4669	Screw—No. 8-32 x 5/32 set screw for link assembly—Stock No. 12868—Package of 10	.25
12008	Shield—I. F. transformer shield for Stock Nos. 12981. 12990. 12982	.28
12607	Shield—Transformer shield top for first or second I. F. transformer	.30
12581	Shield—Transformer shield top for third I. F. transformer	.36
11195	Socket—5-contact 5Z4 Radiotron socket	.15
11198	Socket—7-contact 6K7 or 6L6 Radiotron socket	.15
11196	Socket—8-contact 6C5 or 6H6 Radiotron and Magic Brain power supply socket	.15
11381	Socket—Tuning lamp socket and cover	.45
13095	Socket—Upper left or lower right hand dial lamp socket	.25
11222	Socket—Upper right or lower left hand dial lamp socket	.18
12007	Spring—Retaining spring for core, Stock No. 12006—Package of 10	.36
12986	Stud—Stud, nut and washer for connecting link assembly, Stock No. 12868, to sector gear and link, Stock No. 12910—Package of 5	.65
12988	Switch—Bias switch (S7)	.65
13015	Tone control—Fidelity control (R34, S4, S6)	1.00
13013	Tone control—Music-speech and power switch (S5, S8)	1.15
12981	Transformer—First I. F. transformer complete (L24, L25, L26, C46, C47)	2.15
12990	Transformer—Second I. F. transformer complete (L27, L28, C51, C52)	1.85
12982	Transformer—Third I. F. transformer complete (L29, L30, C56, C58, C59, R21, R23)	2.25
13023	Transformer—Driver transformer (T2)	2.25
13008	Transformer—Power transformer, 100-120 volts, 50-60 cycles (T1)	7.55
13009	Transformer—Power transformer, 100-120 volts, 25-50 cycles (T1)	11.20
13010	Transformer—Power transformer, 100-250 volts, 50-60 cycles (T1)	12.65
13014	Volume control—(R16)	1.00
	MAGIC BRAIN UNIT ASSEMBLIES	
12806	Board—3-contact antenna and ground terminal board	.25
5237	Bushing—Variable condenser mounting bushing assembly—Package of 3	.43
12886	Cable—Shielded power cable, approx. 4 inches long, complete with 8-contact male plug	1.50
12511	Cap—Grid contact cap—Package of 5	.15
12714	Capacitor—Adjustable trimmer capacitor (C3, C4, C5, C6, C14, C16)	$0.38
12807	Capacitor—Adjustable trimmer capacitor (C13, C35, C36, C37)	.35
12884	Capacitor—Adjustable trimmer capacitor (C10, C18, C23, C38, C39)	.40
12896	Capacitor—15 Mmfd. (C34)	.20
12722	Capacitor—18 Mmfd. (C15)	.20
12891	Capacitor—36 Mmfd. (C40)	.20
12629	Capacitor—56 Mmfd. (C24)	.20
12895	Capacitor—56 Mmfd. (C17)	.20
12723	Capacitor—56 Mmfd. (C2, C44)	.20
13307	Capacitor—62 Mmfd. (C11)	.20
12724	Capacitor—120 Mmfd. (C25, C28, C29)	.28
12725	Capacitor—150 Mmfd. (C1)	.28
12894	Capacitor—180 Mmfd. (C22)	.20
12727	Capacitor—555 Mmfd. (C21)	.20
12537	Capacitor—560 Mmfd. (C7, C26, C33, C42)	.20
12898	Capacitor—1500 Mmfd. (C12)	.20
12729	Capacitor—1550 Mmfd. (C20)	.26
12728	Capacitor—4500 Mmfd. (C19)	.36
12897	Capacitor—4700 Mmfd. (C43)	.40
4858	Capacitor—.01 Mfd. (C8, C30, C31, C32)	.25
12879	Coil—Antenna coil and shield XABC bands (L2, L3, L4, L5, L6)	1.90
12888	Coil—Antenna coil "D" band (L13, L14	.60
12880	Coil—Detector coil and shield XABC bands (L15, L16, L17, L18, L19, L20)	2.05
12709	Coil—Oscillator coil and shield ABC bands (L7, L8, L9)	2.02
12881	Coil—Oscillator coil and shield X band only (L10)	.80
12890	Coil—Oscillator coil "D" band (L11, L12, L23)	.70
12889	Coil—R. F. Coil "D" band (L21, L22)	.65
12877	Condenser—3 gang variable tuning condenser (C9, C27, C41)	5.10
12887	Connector—8 contact male connector and cover for power cable Stk. No. 12886	.40
12664	Core—Adjustable core and stud for Stk. No. 12654	.22
12800	Core—Adjustable core and stud for Stk. 12709	.20
12882	Core—Adjustable core and stud for Stk. No. 12881	.20
11324	Resistor—560 ohms—Carbon type—¼ watt (R2)—Package of 5	1.00
5112	Resistor—1,000 ohms—Carbon type—¼ watt (R3)—Package of 5	1.00
11298	Resistor—5,600 ohms—Carbon type—1 watt (R6)	.22
3998	Resistor—15,000 ohms—Carbon type—¼ watt (R5)—Package of 5	1.00
11282	Resistor—56,000 ohms—Carbon type—1/10 watt (R4, R9)—Package of 5	.75
8064	Resistor—82,000 ohms—Carbon type—½ watt (R8)—Package of 5	1.00
11397	Resistor—560,000 ohms—Carbon type—1/10 watt (R1, R7)—Package of 5	.75
12651	Shield—Coil shield for Stk. Nos. 12879 and 12880	.22
12710	Shield—Coil shield for Stk. No. 12709	.28
12883	Shield—Coil shield for Stk. No. 12881	.20
11198	Socket—7 contact 6K7 Radiotron socket	.15
11279	Socket—7 contact 6L7 Radiotron socket	.20
12885	Socket—8 contact 6J7 Radiotron socket	.20
12007	Spring—Retaining spring for core Stk. Nos. 12664, 12800 and 12882—Package of 10	.36
12878	Switch—Range switch and mounting nut (S1, S2, S3)	3.60
12654	Trap—Wave trap complete (L1)	.75
	DRIVE ASSEMBLIES	
10705	Ball—5/32 in. diameter steel ball for planetary drive—Package of 20	$0.25
10941	Ball—1/8 in. diameter steel ball for planetary drive bearing—Package of 20	.25
12904	Bushing—Plate and bushing assembly for planetary drive mounting	.20
12905	Coupling—Flexible coupling and shaft assembly complete	.50
12909	Dial—Band indicating dial and cam assembly	1.05
12899	Drive—Variable tuning condenser drive complete including mounting bracket, drive, dial scale, and indicator less vernier dial Stk. No. 12870 and link Stk. No. 12868	4.40
12906	Gear—Anti-lash drive gear complete	.75
12910	Gear—Sector gear and link assembly for band selector	.20
12908	Indicator—Station selector indicator pointer	.20
8151	Link—Link and roller assembly complete with springs	.30
12911	Screen—Dial lamp screen and light diffuser	.20
4669	Screw—Set screw for flexible coupling or gear stock Nos. 12905 and 12906—Package of 10	.25
12901	Shaft—Direct drive shaft and pinion gear for planetary drive	.75
12900	Shaft—Vernier drive shaft for planetary drive	.25
12903	Spring—Tension spring for planetary drive bearing—Package of 10	.20
12907	Spring—Tension spring for gear stock No. 12906—Package of 10	.20
8052	Spring—Tension spring for link stock No. 8051—Package of 5	32

The prices quoted above are subject to change without notice.

RCA MFG. CO., INC.

MODEL 15U
Schematic, Socket
Trimmers



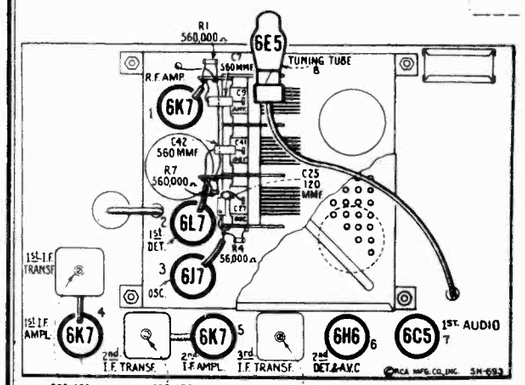


Figure 3—Radiotron and I-F Trimmer Locations

Figure 8—"Magic Brain" Trimmer Locations

Figure 1—Schematic Circuit Diagram

MODEL 15U
Receiver Chassis Wiring

RCA MFG. CO., INC.

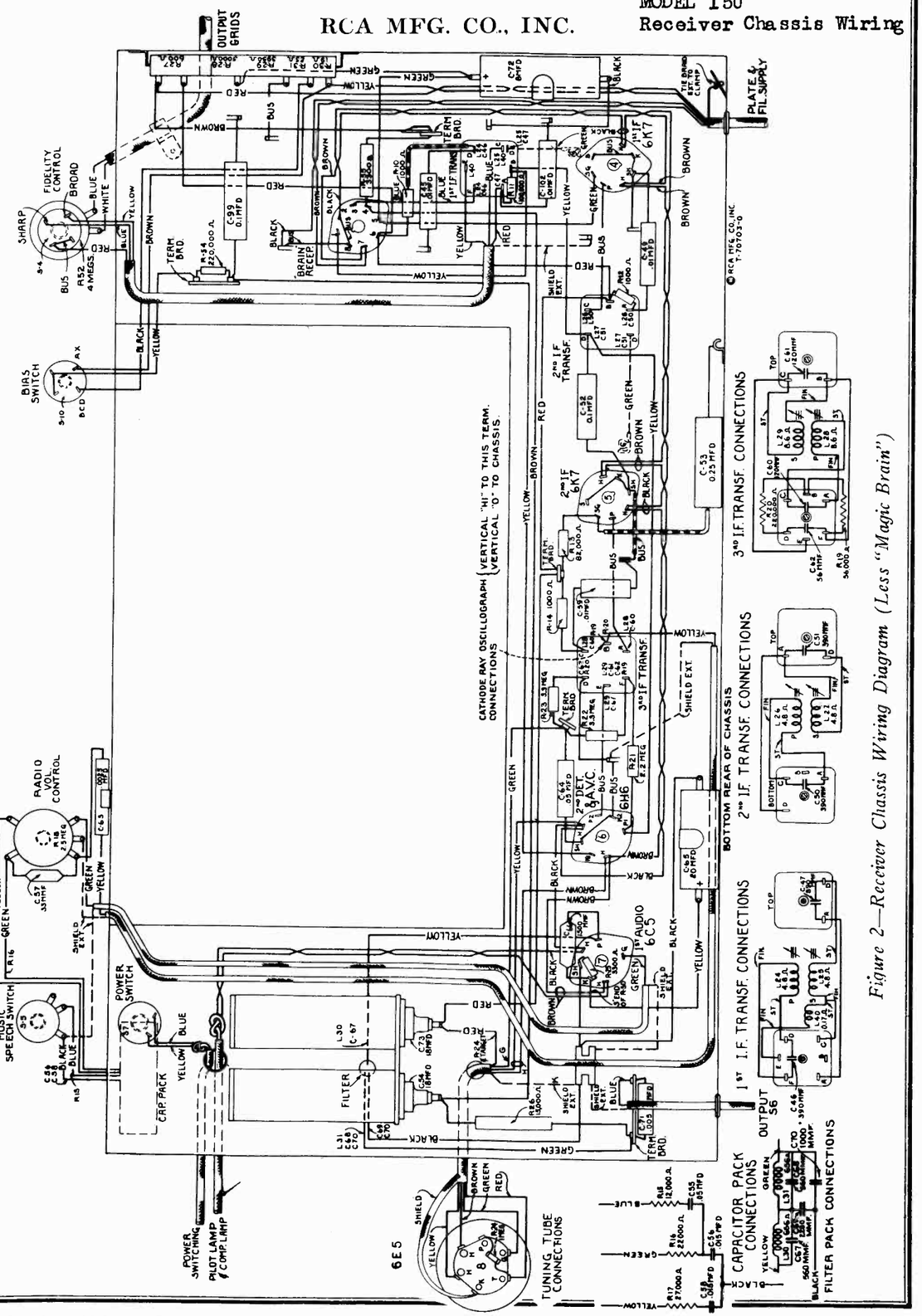


Figure 2—Receiver Chassis Wiring Diagram (Less "Magic Brain")

MODEL 15U
"Magic Brain"
Chassis Wiring

RCA MFG. CO., INC.

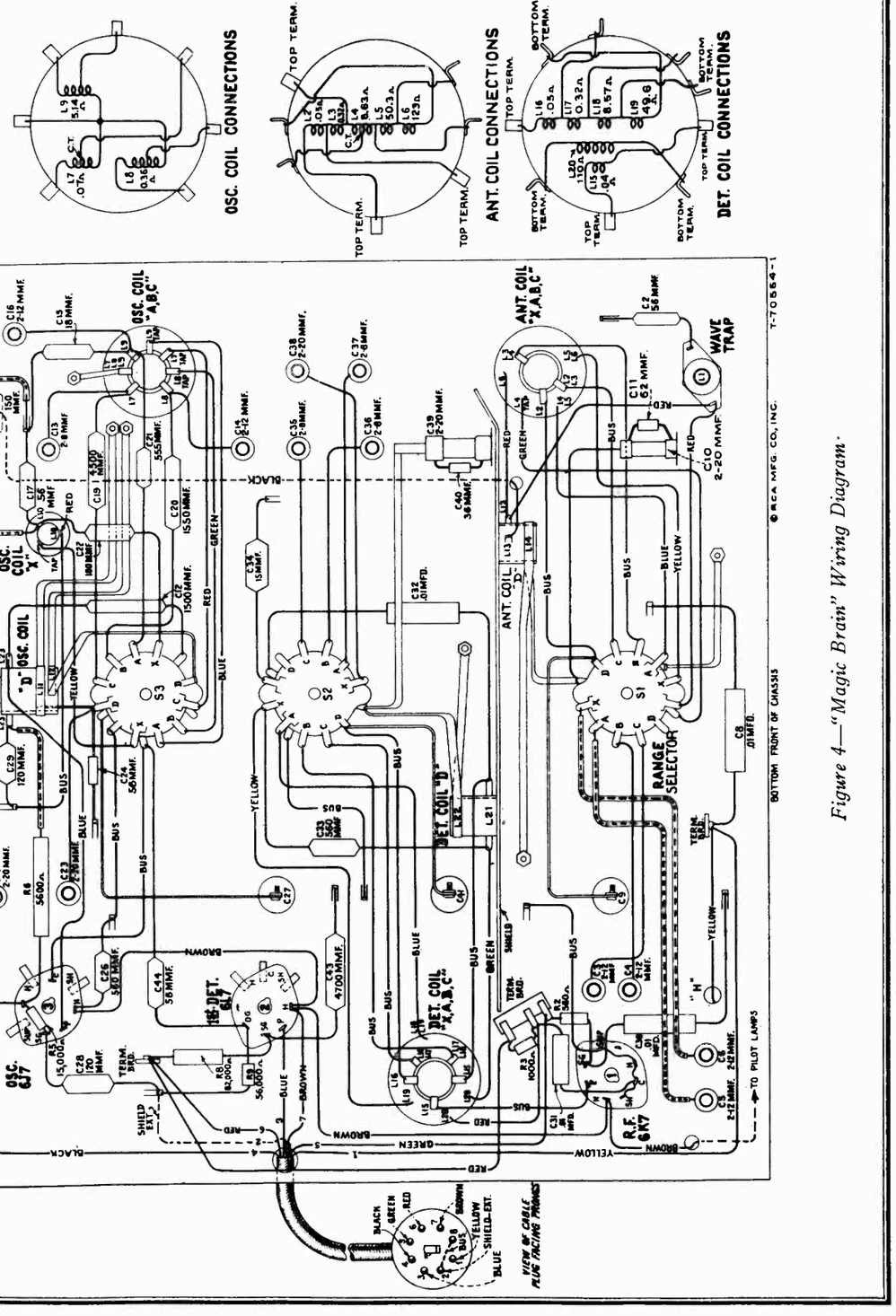


Figure 4—"Magic Brain" Wiring Diagram.

RCA MFG. CO., INC.

MODEL 15U
Power Amplifier
Chassis Wiring
Spkr. Wiring, Pick-up

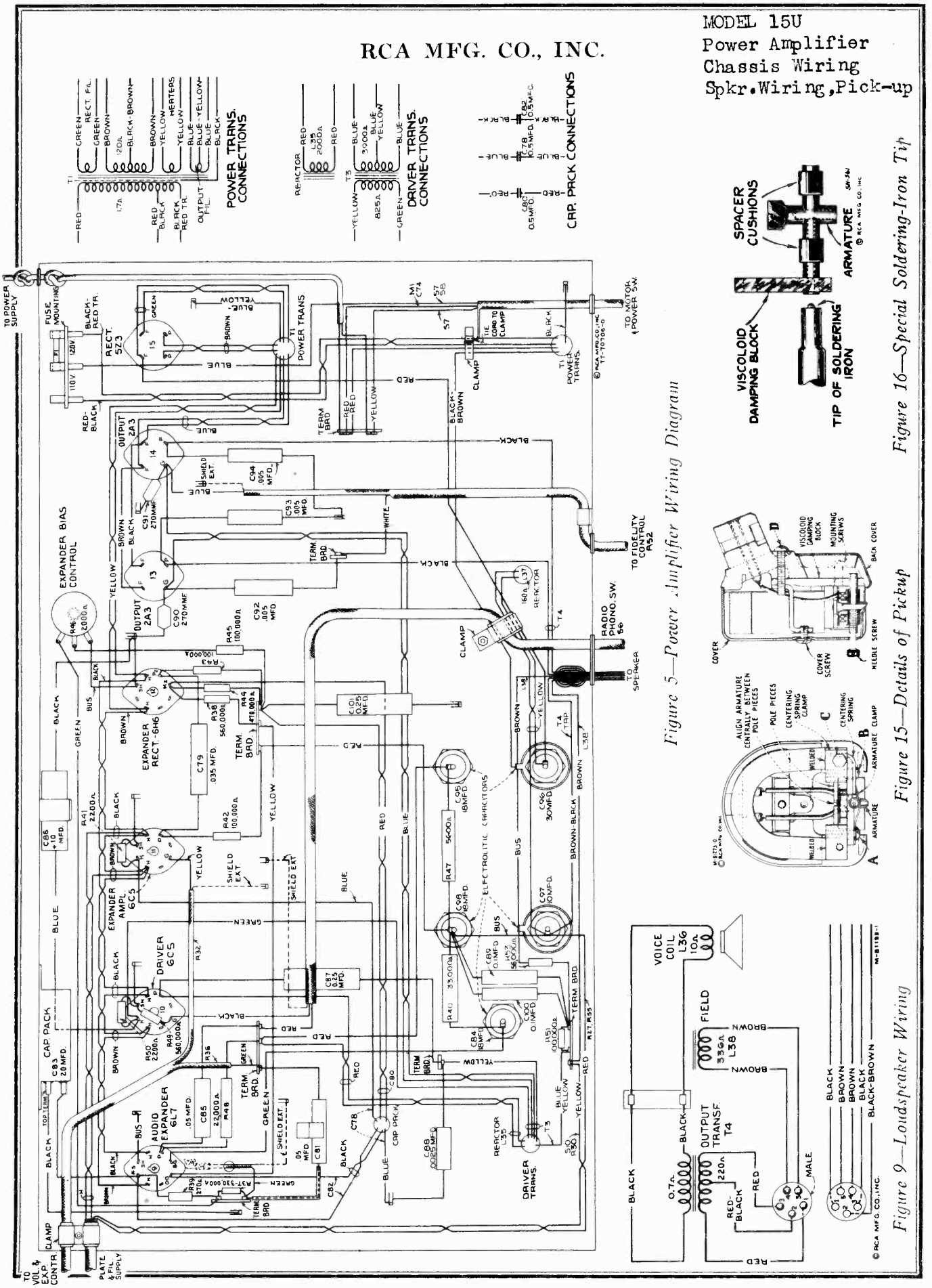


Figure 5—Power Amplifier Wiring Diagram

Figure 16—Special Soldering-Iron Tip

Figure 15—Details of Pickup

Figure 9—Loudspeaker Wiring

MODEL 15U
Specifications
Notes

RCA MFG. CO., INC.

Electrical Specifications

FREQUENCY RANGES

"Long Wave" (X)	150-410 kc
"Standard Broadcast" (A)	530-1,800 kc
"Medium-Wave" (B)	1,800-6,400 kc
"Short Wave" (C)	6,400-23,000 kc
"Ultra Short Wave" (D)	23,000-60,000 kc

ALIGNMENT FREQUENCIES

"Long Wave" (X)	175 kc (osc.), 350 kc (osc., det., ant.)
"Standard Broadcast" (A)	600 kc (osc.), 1,500 kc (osc., det., ant.)
"Medium Wave" (B)	6,000 kc (osc., det., ant.)
"Short Wave" (C)	20,000 kc (osc., det., ant.)
"Ultra Short Wave" (D)	57,000 kc (osc., det., ant.)

Intermediate Frequency ..... 460 kc

RADIOTRON COMPLEMENT

(1)	RCA-6K7	R-F Amplifier	
(2)	RCA-6L7	First Detector	
(3)	RCA-6J7	Heterodyne Oscillator	
(4)	RCA-6K7	First I-F Amplifier	
(5)	RCA-6K7	Second I-F Amplifier	
(6)	RCA-6H6	Second Detector and A.V.C.	
(7)	RCA-6C5	Audio Voltage Amplifier	
(8)	RCA-6E5	"Magic Eye" Tuning Indicator	
(9)	RCA-6L7	Audio Volume Expander	
(10)	RCA-6C5	Audio Driver Amplifier	
(11)	RCA-6C5	Expander Amplifier	
(12)	RCA-6H6	Expander Rectifier	
(13)	RCA-2A3	Power Output	
(14)	RCA-2A3	Power Output	
(15)	RCA-5Z3	Full-Wave Rectifier	

Pilot Lamps (6) ..... Mazda No. 40, 6.3 volts, 0.15 ampere

POWER-SUPPLY RATINGS

		Radio Only	Total
Rating A-6	105-125 volts, 60 cycles	180 watts	205 watts
Rating A-5	105-125 volts, 50 cycles	180 watts	210 watts

For 220-volt operation, a step-down transformer (Stock No. 7217) must be used.

Fuse Rating ..... 3 amperes

PHONOGRAPH

Type	Automatic Record Ejector
Record Capacity	Seven 10-inch or Six 12-inch
Turntable Speed	78 R.P.M.
Type of Pickup	Low-Impedance Magnetic
Pickup Impedance	100 ohms at 1,000 cycles

POWER-OUTPUT RATINGS

Undistorted	12 watts
Maximum	15 watts

LOUDSPEAKER

Type	Super 12-inch Electrodynamic
Impedance (V.C.)	11¼ ohms at 400 cycles

Mechanical Specifications

CABINET DIMENSIONS

Height	34 inches
Width	48⅞ inches
Depth	18 1/16 inches

WEIGHTS

Net	222 pounds
Shipping	311 pounds
Chassis Base Dimensions	15 inches x 9¾ inches x 3 inches
Over-all Height of Chassis	9¼ inches
Amplifier Base Dimensions	16¼ inches x 7½ inches x 2¾ inches
Over-all Height of Amplifier	7⅝ inches

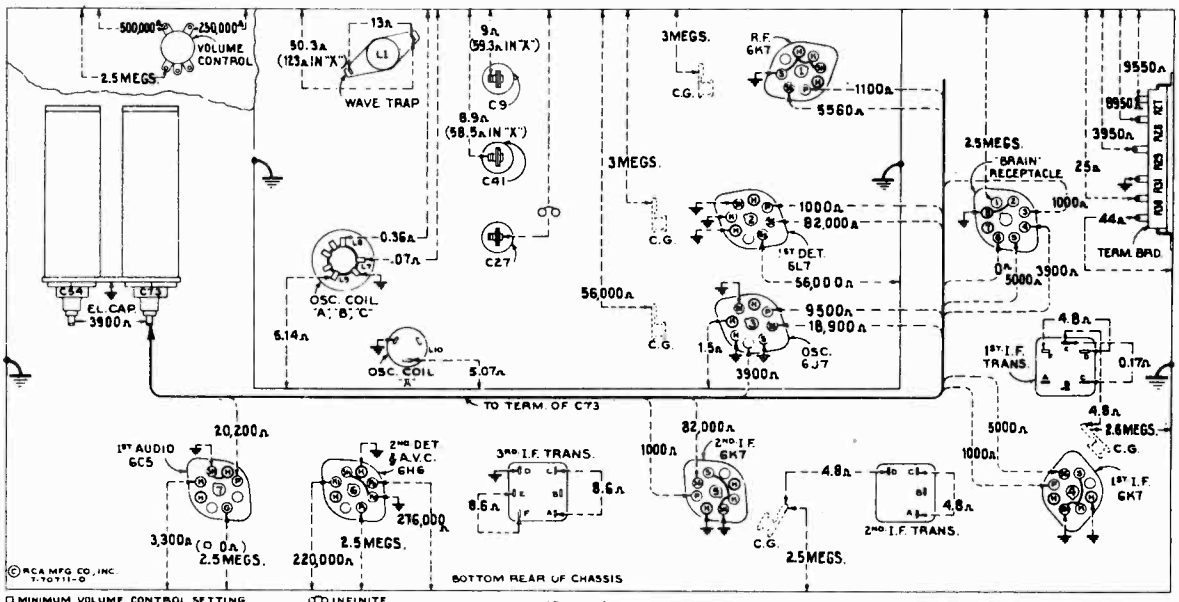
OPERATING CONTROLS

Radio	(1) Music-Speech—Power Switch, (2) Volume, (3) Tuning, (4) Range Selector (5) Fidelity
Phonograph	(1) Turntable Switch, (2) Radio-Phono Transfer Switch, (3) Index, (4) Dynamic Amplifier, (5) Phonograph Volume
Tuning Drive Ratios	20 to 1 and 100 to 1

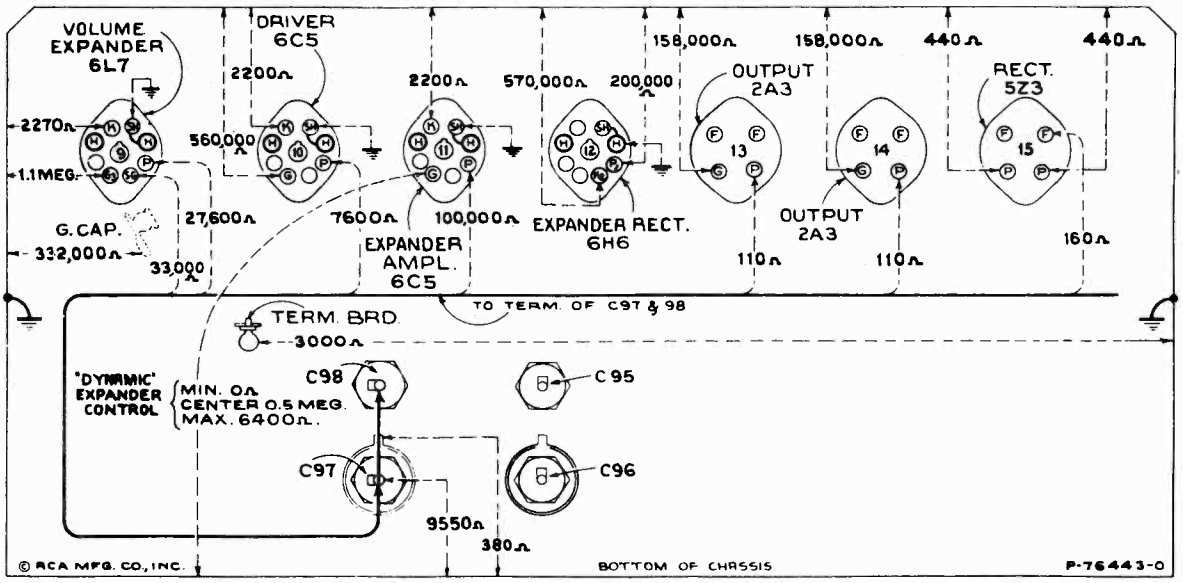
General Description

The Model 15U Phonograph-Radio Combination employs all of the latest developments in the art of record and radio reproduction. A few of the design features include higher-fidelity reproduction from both records and radio; the revolutionary dynamic expander; "Magic Brain"; improved automatic record changer; selector dial; "Magic Voice"; magnetite-core i-f transformers, wave-trap, and low-frequency oscillator tracking adjustments; new plunger-type air trimmers; and a super 12-inch electrodynamic loudspeaker with aluminum voice coil and high-frequency tone diffuser.

RCA MFG. CO., INC.



Receiver



Power Amplifier

Figure 10—Resistance Diagram

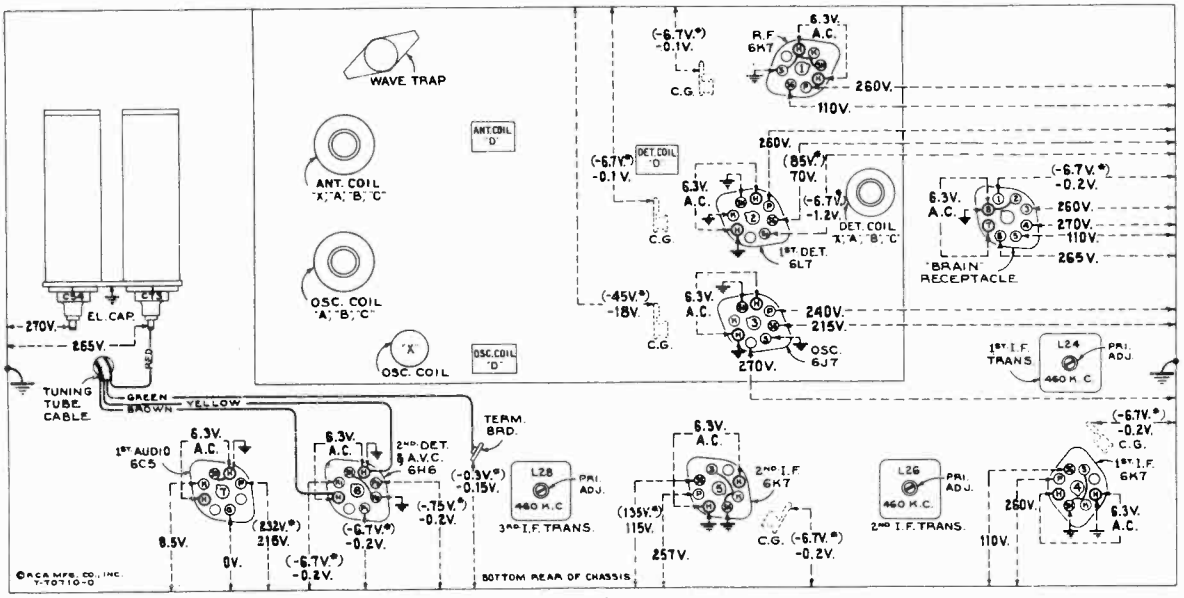
Power supply disconnected—Radiotrons in sockets—All cables connected—Tuning condenser in full-mesh—Range selector in "Standard broadcast" position—Both volume controls maximum—Radio-Phono switch either position

Resistance Measurements

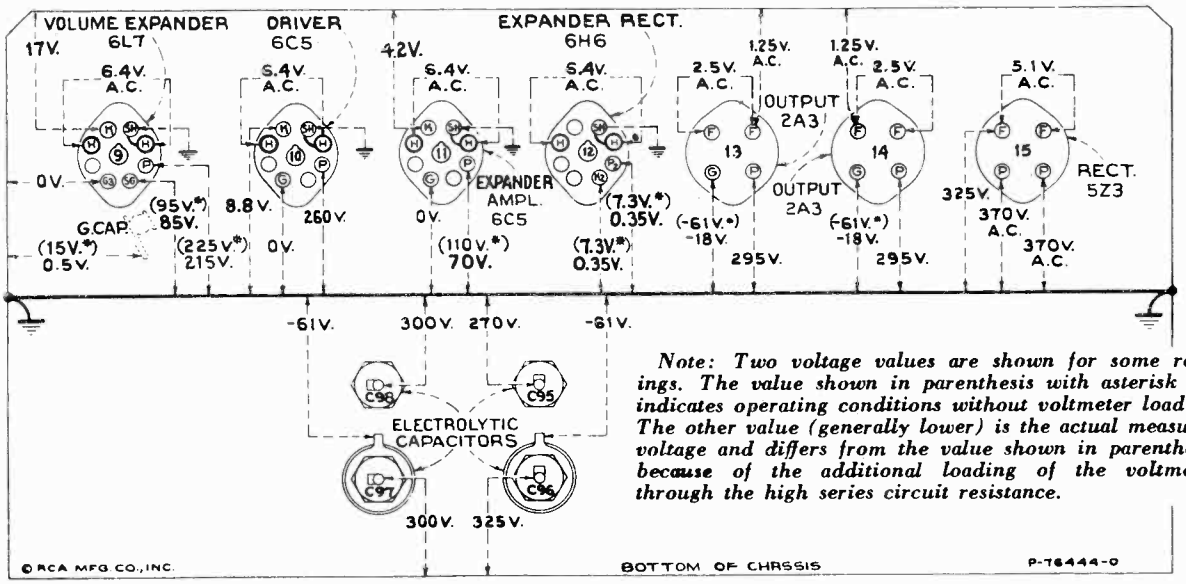
The resistance values shown between Radiotron socket contacts, grid caps, resistors, and terminals to chassis ground or other pertinent point on figure 10, permit a rapid continuity check of the circuits. The use of this diagram in conjunction with the Schematic Circuit Diagram, figure 1, and Wiring Diagrams, figures 2, 4, and 5, will permit the location of certain troubles which might otherwise be difficult to ascertain. Each value as specified should hold within ± 20%. Variations in excess of this limit will usually be indicative of trouble in circuit under test. When measuring the resistance between points of the circuit and ground, it will be necessary to connect the negative terminal of the resistance meter to chassis-ground. If the polarity of the resistance meter is not known, it may be readily ascertained by connecting a d-c voltmeter of indicated polarity across the terminals of the device.

MODEL 15U
Voltage, Socket
Trimmers

RCA MFG. CO., INC.



Receiver



***Note:** Two voltage values are shown for some readings. The value shown in parenthesis with asterisk (*) indicates operating conditions without voltmeter loading. The other value (generally lower) is the actual measured voltage and differs from the value shown in parenthesis because of the additional loading of the voltmeter through the high series circuit resistance.*

Power Amplifier

Figure 11—Radiotron Socket Voltages, Coil, and I-F Trimmer Locations

Measured at 115 volts, 60-cycle supply—Tuned to approximately 1,000 kc—No signal being received—Both volume controls minimum—Radio-Phono switch either position

Radiotron Cathode Current Readings

Measured with Milliammeter Connected at Tube Socket Cathode Terminal under Conditions Similar to Those of Voltage Measurements

(1)	RCA-6K7—R-F Amp.....	5.0 ma.	
(2)	RCA-6L7—1st Det.....	3.7 ma.	
(3)	RCA-6J7—Osc.	7.0 ma.	
(4)	RCA-6K7—1st I-F Amp.....	5.0 ma.	
(5)	RCA-6K7—2nd I-F Amp.....	7.5 ma.	
(6)	RCA-6H6—2nd Det.—A.V.C...	—	
(7)	RCA-6C5—Audio Voltage Amp.	2.5 ma.	
(8)	RCA-6E5—Tuning Tube.....	1.2 ma.	
(9)	RCA-6L7—Audio Volume Exp.	7.5 ma.	
(10)	RCA-6C5—Audio Driver.....	4.0 ma.	
(11)	RCA-6C5—Expander Amplifier.	1.9 ma.	
(12)	RCA-6H6—Expander Rectifier..	—	
(13)	RCA-2A3—Power Output.....	41.8 ma.	
(14)	RCA-2A3—Power Output.....	41.8 ma.	
(15)	RCA-5Z3—Rectifier	165 ma.*	

(*Cannot be measured at socket)

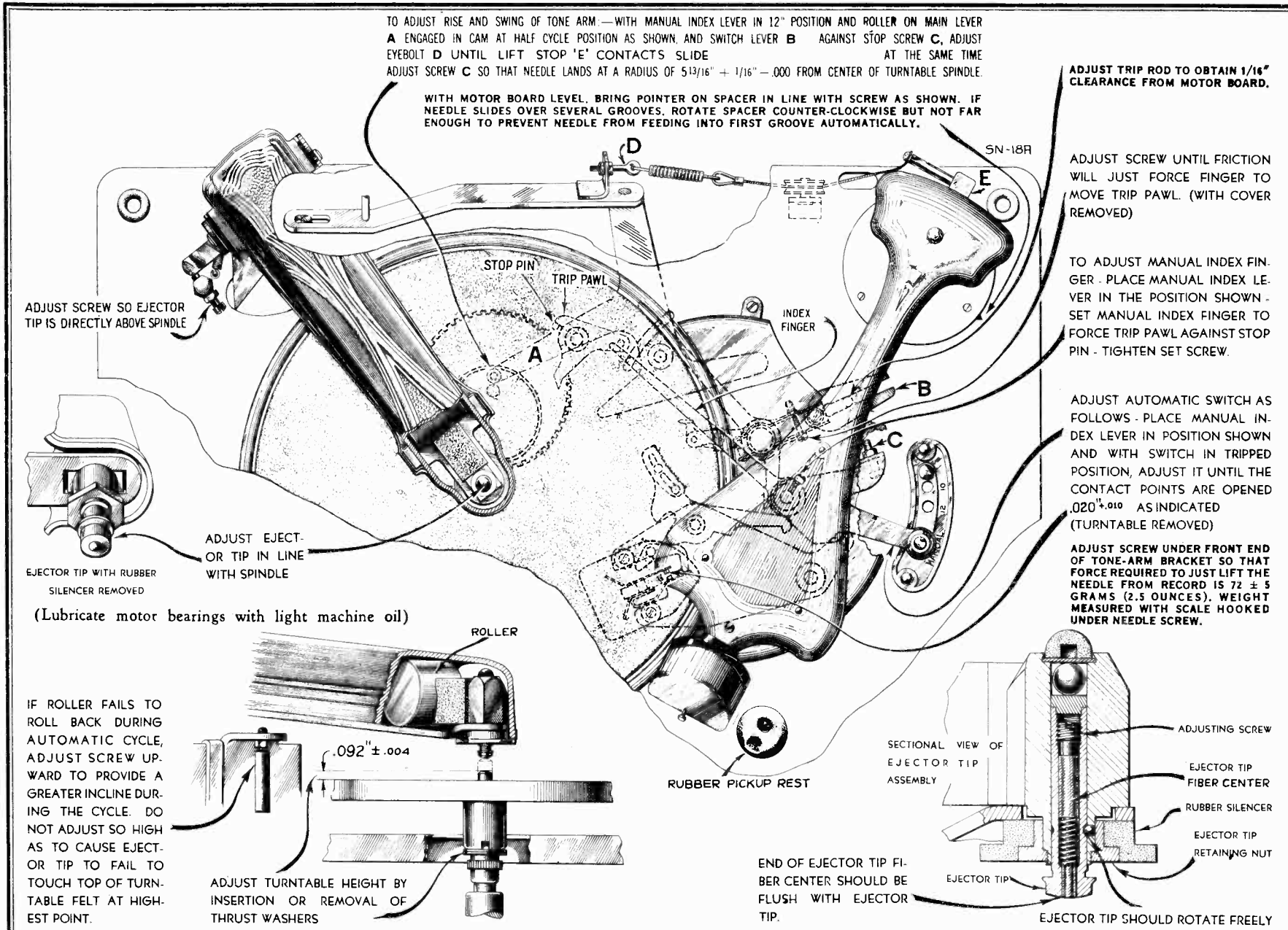


Figure 13—Automatic Record Changer Adjustments

Alignment Procedure

There are seventeen adjustments required for the alignment of the oscillator, first-detector, and antenna-tuned circuits; one adjustment for the wave-trap; and six adjustments for the i-f system. Fifteen of these adjustments are made with plunger-type air trimming capacitors and require the use of an **RCA Stock No. 12636 Adjusting Tool.** Each of these capacitors has a lock nut for securing the plunger in place after adjustment. The remaining nine adjustments are made by means of screws attached to molded magnetite cores. These cores change the inductance of the particular coils in which they are inserted to provide exact alignment. All of these adjustments are accurately made during manufacture and should remain in proper alignment unless affected by abnormal conditions of climate or purported alterations for servicing, or unless altered by other means. Loss of sensitivity, improper tone quality, and poor selectivity are the usual indications of improper alignment. Such conditions will usually exist simultaneously. Correct performance of this receiver can only be obtained when these adjustments have been made by a skilled service engineer with the use of adequate and reliable test equipment. The manufacturer of this receiver has such test equipment available for sale through its distributors and dealers.

The extensive frequency range of these receivers necessitates a more or less involved method of alignment. However, if the following directions are carefully applied in the sequence given, normal performance of the instruments will be obtained.

The plunger-type air trimming capacitors have their approximate plunger settings tabulated on figure 8. If the plungers have been disturbed from their original adjustments, they may be roughly set to the specified dimensions prior to alignment.

In performing services on the "Magic Brain", the leads should be restored to their original positions, since the lead-dress is important for proper operation and dial calibration.

Precautionary Dressing of Leads for "Magic Brain" Alignment
(Refer to Figure 4)

Band "X"

1. Keep blue lead A of S1 to antenna coil L4-5 dressed away from chassis, and from yellow lead X of S1 to antenna coil L5-6.
2. Bus lead from C10 to S1 should be as short as possible.
3. Keep blue lead A of S2 to detector coil L18-19 clear of chassis, coil shield, coil, and other leads.
4. Keep spaghetti lead C6 to X of S1 apart fron. spaghetti lead C5 to A of S1, and from chassis.

Band "A"

1. Keep green lead terminal S1 to antenna coil tap L4 away from chassis, coil shield, and coil.
2. Keep spaghetti lead C5 to A of S1 apart from spaghetti lead C6 to X of S1 and from chassis.

Band "C"

Lead from C19 to oscillator coil L7 should be maintained as short and straight as possible.

For alignment, the test-oscillator frequency should be quite accurate. A convenient and reliable means of accurately checking the frequency of test oscillators, receivers, etc., is the **RCA Stock No. 9572 Crystal Calibrator.**

If the test-oscillator signal cannot be heard as the receiver (heterodyne) oscillator air-trimmer plunger is changed from its minimum-capacity to maximum-capacity position (receiver dial and test oscillator set to the specified frequencies, and the correct oscillator air-trimmer used) it may be an indication that the test-oscillator frequency is outside the range covered by the air-trimmer. Under such conditions, when a more accurate setting of the test oscillator cannot be determined, set the oscillator air-trimmer plungers to the approximate settings given on figure 8. Tune the test oscillator until the signal is heard in the speaker. Each of two test-oscillator settings (the fundamentals or the harmonics of which are 920 kc apart) produce a signal. The lower-frequency test-oscillator setting should be used as this places the test-oscillator (signal) frequency 460 kc below the frequency of the receiver heterodyne oscillator.

Holes are provided in the top of the r-f and antenna coil cans on some models to enable a tuning check with the **RCA Stock No. 6679 Tuning Wand.** The hole in the top of the detector coil can has a cinch button which must be removed before insertion of the tuning wand. When the brass end of the wand is inserted in the coil, the inductance of the coil is decreased. If this results in an increase of output, the respective air-trimmer capacitance should be decreased (plunger pulled out). If inserting the iron end of the tuning wand causes an increase in output, resulting from an increase of inductance of the coil, the respective air-trimmer capacitance should be increased (plunger pushed in). If the range of the air trimmer is not sufficient to give the desired results, the lead-dress may be changed in the particular circuit being aligned, so as to cause the circuit to resonate within the range of the trimmer. An increase in the capacity-to-ground of the circuit will be required if the iron end of the tuning wand causes an increase of signal output when the air-trimmer plunger is full-in, while a decrease in the capacity-to-ground will be required if the brass end of the tuning wand causes an increase in signal output when the air-trimmer plunger is full-out.

Two methods of alignment are applicable—one requires use of the cathode-ray oscillograph, and the other requires a voltmeter or glow-type indicator. The cathode-ray alignment method is advantageous in that the indication provided is in the form of a wave-image which represents the resonance characteristics of the circuit being tuned. This method is preferred because of the i-f characteristics of these receivers. This type of alignment is possible through use of apparatus such as the **RCA Stock No. 9558 Frequency Modulator** and the **RCA Stock No. 9545 Cathode-Ray Oscillograph.** If this equipment is not available, an approximate alignment may be performed by the output-indicator method with an instrument such as the **RCA Stock No. 4317 Neon Glow Indicator** attached across the loudspeaker voice coil. Alignment by this method is similar to the cathode-ray method outlined below except that the receiver volume control should be at maximum, the trimmers adjusted to peak response and the test-oscillator sweeping operations omitted. Either of these methods require the use of a reliable test oscillator such as the **RCA Stock No. 9595.**

Cathode-Ray Alignment

Make alignment apparatus connections shown on figure 6. Remove the plug of the frequency-modulator cable from the test-oscillator jack. Connect the receiver chassis to a good external ground. Connect oscillograph "Vertical" input terminals as indicated on figure 2. Set oscillograph power switch to "On" and adjust "Intensity" and "Focus" controls to give a clearly defined spot, or line, on the screen. Set oscillograph "Ampl. A" switch to "On," "Vertical gain" control full-clockwise, "Ampl. B" switch to "Timing," "Range" switch to No. 2 position, and "Timing" switch to "Int." Place the "Sync." control, "Freq." control, and "Horizontal gain" control to about their mid-positions. For each of the following adjustments, the test-oscillator output must be regulated so that the image obtained on the oscillograph screen will be of the minimum size for accurate observation. The receiver volume-control setting is optional.

I-F Adjustments

(a) Set "Fidelity" control to counter-clockwise position, "Radio-Phono" switch to "Radio," and "Range Selector" to "Standard Broadcast" band. Connect the "Ant." output of the test oscillator to the grid cap of RCA-6K7 second i-f tube (with grid lead in place) through a **.001-mfd.** capacitor, with "Gnd." to receiver chassis. Tune the test oscillator to **460 kc** and place its modulation switch to "On" and its output switch to "Hi."

(b) Turn on the receiver and test oscillator. Increase the output of the test oscillator until a deflection is noticeable on the oscillograph screen. The figures obtained represent several waves of the detected signal, the amplitude of which may be observed as an indication of output. Cause the wave-image formed (400-cycle waves) to be spread completely across the screen by adjusting the "Horizontal gain" control. The image should be synchronized and made to remain motionless by adjusting the "Sync." and "Freq." controls.

(c) Adjust the two magnetite core screws **L29** and **L28** (see figures 3 and 11) of the third i-f transformer (one on top and one on bottom) to produce maximum vertical deflection of the oscillographic image. This adjustment places the transformer in exact resonance with the **460-kc** signal.

(d) The sweeping operation should follow using the frequency modulator. Shift the oscillograph "Timing" switch to "Ext." Insert plug of frequency-modulator cable in test-oscillator jack. Turn the test-oscillator modulation switch to "Off." Turn on the frequency modulator and place its sweep-range switch to "Hi."

(e) Increase the frequency of the test oscillator by slowly turning its tuning control until two separate, distinct, and similar waves appear on the screen. If only one wave appears, increase the "Freq." control on the oscillograph to obtain two waves. These waves will be identical in shape, totally disconnected, and appear in reversed positions. They will have a common base line, which is discontinuous. Adjust the "Freq" and "Sync." controls of the oscillograph to make them remain motionless on the screen. Continue increasing the test-oscillator frequency until these forward and reverse curves move together and overlap, with their highest points exactly coincident. This condition will be obtained at a test-oscillator setting of **approximately 575 kc.**

(f) With the images established as in (e), re-adjust the two magnetite core screws **L29** and **L28** on the third i-f transformer so that they cause the curves on the oscillograph screen to become exactly coincident throughout their lengths and have maximum amplitude.

(g) Without altering the adjustments of the apparatus, shift the "Ant." output of the test oscillator to the grid cap of the RCA-6K7 first i-f tube (with grid lead in place), through a **.001-mfd.** capacitor. Regulate the test-oscillator output so that the amplitude of the oscillographic image is approximately the same as used for adjustment (f) above.

(h) The two second i-f transformer magnetite core screws **L27** and **L26** (one on top and one on bottom) should then be adjusted so that they cause the forward and reverse curves to become coincident throughout their lengths and have maximum amplitude.

(i) Without altering the adjustments of the apparatus, shift the "Ant." output of the test oscillator to the input of the i-f system, i.e., to the grid cap of the RCA-6L7 first-detector, (with grid lead in place) through a **.001-mfd.** capacitor. Regulate the test-oscillator output so the amplitude of the oscillographic image is approximately the same as used for adjustment (h) above.

(j) The two first i-f transformer magnetite core screws **L25** and **L24** (one on top and one on bottom) should then be adjusted so that they cause the forward and reverse waves to become coincident throughout their lengths and have maximum amplitude.

(k) Note width of oscillographic image at a point which is 50% of maximum amplitude. Turn receiver fidelity control to extreme clockwise position. Note width of oscillographic image at a point which is 50% of maximum amplitude. Under normal conditions the latter measurement should be approximately 60% greater in width than the former measurement. The image should also appear slightly double humped. These conditions indicate proper broadening of the band width of the i-f amplifier. Turn range selector to "Medium wave" (B) band and note increase of amplitude. The amplitude should increase several times. It may be necessary to decrease output of test oscillator to keep image on screen. Turn receiver fidelity control to extreme counter-clockwise position and proceed to "R-F Adjustments."

R-F Adjustments

Make receiver dial adjustments as outlined by "Selector dial," figure 14. Alignment must be made in sequence of "Wave-trap," "Ultra short wave" band, "Short wave" band, "Medium wave" band, "Standard broadcast" band, and "Long wave" band.

"Wave-Trap" Adjustment

(a) Connect the "Ant." output of the test oscillator to the antenna terminal "A1" through a **200-mmfd. (important)** capacitor. Remove the plug of the frequency-modulator cable from the test-oscillator jack. Turn test-oscillator modulation switch to "On." Shift the oscillograph "Timing" switch to "Int." Place receiver range selector in "Standard broadcast" position. Set the receiver dial to a position of no extraneous signals **near 600 kc.** Tune the test oscillator to **460 kc.** Adjust the wave-trap magnetite core screw **L1** to the point which causes minimum amplitude of output **(maximum suppression of signal)** as shown

by the waves on the oscillograph. An increase of the test-oscillator output may be necessary before this point of minimum amplitude, obtained by correct adjustment of wave-trap screw, becomes apparent on oscillograph screen.

"Ultra Short Wave" Band

(b) Connect the "Ant." output of the test oscillator to the antenna terminal "A1" of the receiver through a **300-ohm** resistor. Set the receiver range selector to its "Ultra short wave" position and its dial pointer to **57,000 kc.** Adjust the test oscillator to **19,000 kc.** The third harmonic of **19,000 kc** is used for this adjustment.

Adjust oscillator air-trimmer **C23** for maximum (peak) output. Two positions, each producing maximum output, may be found. The position of minimum capacitance (plunger near out) should be used. This places the receiver heterodyne oscillator **460 kc** higher in frequency than the incoming signal. Tighten lock nut. Adjust the detector air-trimmer **C39,** while slightly rocking the gang tuning condenser back and forth through the signal, for maximum (peak) output. Two peaks may be found on this trimmer. The peak of maximum capacitance (plunger near in) should be used. Tighten lock nut. Adjust the antenna air-trimmer **C10** for maximum (peak) output while slightly rocking the gang tuning condenser back and forth through the signal. Two peaks may be found on this trimmer which produce maximum output. The peak with maximum capacitance (plunger near in) should be used. Tighten lock nut. Check the image frequency by changing the receiver dial setting to **56,080 kc.** If the image signal is received at this position, the adjustment of the oscillator air-trimmer **C23** has been correctly made. No adjustments should be made while checking for the image signal.

(c) Re-tune receiver for maximum response to 57,000 **kc** (not image response) without disturbing test-oscillator adjustments. Change test oscillator to **6,800—14,000 kc** range. Tune test oscillator until signal is heard in speaker (should occur at approximately **14,250 kc,** fourth harmonic of test oscillator used). Two test-oscillator settings (**230 kc** apart) will produce a signal at this point. The lower frequency test-oscillator setting should be used, as this places the test oscillator harmonic **460 kc** below the frequency of the receiver heterodyne oscillator. Tune receiver for maximum response at a dial setting of approximately **28,500 kc** (image should tune in at a dial setting approximately **27,580 kc**) without altering test-oscillator adjustment. Test-oscillator second harmonic of 14,250 **kc** is used for the following check. Check calibration of receiver dial. A receiver-dial reading of less than **28,500 kc** indicates that the inductance of the oscillator secondary coil **L11** is too low and should be increased. If the receiver dial reading is greater than **28,500 kc,** the inductance of **L11** is too high and should be decreased. If it is necessary to change the inductance of **L11,** first remove bottom cover of "Magic Brain" and then set receiver dial pointer to **28,500 kc.** To decrease inductance, move the grounded ends (straps) of **L11** and **L12** (see figure 4) nearer chassis. Do not allow straps to touch chassis except where connected. To increase inductance, move the straps farther away from chassis. Adjust position of straps until maximum (peak) output results. The alignment of the detector tuned circuit should next be checked at **28,500 kc** without changing either the receiver or test oscillator adjustments. An increase of output when the brass end of a tuning wand is brought near **L22** indicates that **L22** is too high in inductance, while an increase when the iron end is brought near the coil indicates that the inductance is too low. The inductance of **L22** may be varied by changing the spacing between the grounded end (strap) of **L22** and the strap connected from **C41** to contact on **S2** (figure 4). An increase of spacing will increase the inductance, while a decrease of spacing will decrease the inductance. Adjust the spacing until maximum (peak) output results. Replace "Magic Brain" bottom cover and repeat adjustments in (b) prior to those of "Short wave" band.

"Short Wave" Band

(d) Set the receiver range selector to its "Short wave" position and its dial pointer to **20,000 kc.** Adjust the test oscillator to **20,000 kc.** Adjust oscillator air-trimmer **C13** until maximum (peak) output is reached. Two peaks may be found with this circuit. The peak with minimum capacitance (plunger near out) should be used. Tighten lock nut. Adjust detector air-trimmer **C35** until maximum (peak) output is reached, while slightly rocking the gang tuning condenser back and forth through the signal. Two peaks may be found with this circuit. The peak with maximum capacitance (plunger near in) should be used. Tighten lock nut. Adjust antenna air-trimmer **C3** until maximum (peak) output is reached while slightly rocking the gang tuning condenser back and forth through the signal. Two peaks may be found with this circuit. The peak with maximum capacitance (plunger near in) should be used. Tighten lock nut. Check the image frequency by changing the receiver dial setting to **19,080 kc.** The image signal should be received at this position indicating that the adjustment of **C13** has been correctly made. No adjustments should be made while checking for the image signal.

"Medium Wave" Band

(e) Place receiver range selector to its "Medium wave" position with its dial pointer set to **6,000 kc.** Tune the test oscillator to **6,000 kc.** Adjust oscillator air-trimmer **C14** to produce maximum (peak) output as shown by the waves on the oscillograph. Two peaks may be found with this circuit. The peak with minimum capacitance (plunger near out) should be used. Tighten lock nut. Adjust the detector air-trimmer **C36** for maximum (peak) output while slightly rocking the gang tuning condenser back and forth through the signal. Two peaks may be found with this circuit. The peak with maximum capacitance (plunger near in) should be used. Tighten lock nut. Adjust antenna air-trimmer **C4** to produce maximum (peak) output. Tighten lock nut.

"Standard Broadcast" Band

(f) Remove the **300-ohm** resistor from between the test-oscillator "Ant." post and receiver antenna terminal "A1" and insert a **200-mmfd.** capacitor in its place. Place receiver range selector to "Standard broadcast" position with receiver dial pointer set to **600 kc.** Tune the test oscillator to **600 kc.** Adjust oscillator magnetite core screw **L9** (top of large oscillator coil can) for maximum (peak) output as shown by the waves on the oscillograph screen.

(g) Set receiver dial pointer to **1,500 kc.** Tune test oscillator to **1,500 kc (1,500–3,100-kc range)** and increase its output to produce a registration on the oscillograph screen. Carefully adjust the oscillator, detector, and antenna air-trimmers **C16, C37,** and **C5,** respectively, to produce maximum (peak) output as shown by the waves on the oscillograph screen. Shift the oscillograph "Timing" switch to "Ext." Place the frequency modulator sweep-range switch to its "Lo" position and insert plug of the frequency-modulator cable in test-oscillator jack. Turn test-oscillator modulation switch to "Off." Re-tune the test oscillator (increase frequency) until the forward and reverse waves show on the oscillograph screen and become coincident at their highest points. This will occur at a test-oscillator setting of **approximately 1,680 kc.** Adjust trimmers **C16, C37,** and **C5** again, setting each to the point which produces the best coincidence and maximum amplitude of the images.

(h) Remove the plug of the frequency-modulator cable from the test-oscillator jack. Turn test-oscillator modulation switch to "On." Set oscillograph "Timing" switch to "Int." Tune test oscillator to 200 **kc (200–400-kc** range). Tune receiver for maximum response to this signal at a dial reading of **approximately 600 kc.** The third harmonic of the **200-kc** signal is used for this adjustment Shift oscillograph "Timing" switch to "Ext." Insert the plug of the frequency modulator cable in test-oscillator jack. Turn test-oscillator modulation switch to "Off." Re-tune the test oscillator (increased frequency) until the forward and reverse waves show on the oscillograph screen. This will occur at a test-oscillator setting of **approximately 230 kc.** Disregarding the fact that the two images may or may not come together, adjust the oscillator magnetite core screw **L9** (top of large oscillator coil can) to produce maximum (peak) amplitude of the images. Shift the oscillograph "Timing" switch to "Int." Remove the plug of the frequency-modulator cable from the test-oscillator jack. Turn the test-oscillator modulation switch to "On." Repeat adjustments in (g) above to compensate for any changes caused by the adjustment of **L9** core, tightening lock nuts on **C16, C37,** and **C5,** respectively, after each is adjusted.

"Long Wave" Band

(i) Shift the oscillograph "Timing" switch to "Int." Remove the plug of the frequency-modulator cable from the test-oscillator jack. Turn the test-oscillator modulation switch to "On." Place receiver range selector to its "Long wave" position. Set the receiver dial pointer to **175 kc.** Tune the test oscillator to **175 kc** and increase its output until a deflection is noticeable on the oscillograph screen. Adjust oscillator magnetite core screw **L10** (located on top of small oscillator coil can) so that maximum (peak) amplitude of output is shown on the oscillograph screen.

(j) Set receiver dial pointer to **350 kc.** Tune test oscillator to **350 kc.** Adjust the oscillator, detector, and antenna air-trimmers **C18, C38,** and **C6** to produce maximum (peak) output as shown by the waves on the oscillograph screen. Without disturbing the connections, shift the oscillograph "Timing" switch to "Ext." Place the frequency-modulator sweep-range switch to its "Hi" position and insert plug of frequency-modulator cable in test-oscillator jack. Turn test-oscillator modulation switch to "Off." Re-tune the test oscillator (decrease frequency) until the forward and reverse waves show on the oscillograph screen and become coincident at their highest points. This will occur at a test-oscillator setting of **approximately 198 kc.** This setting places the test-oscillator frequency to **175 kc.** The second harmonic is now used for the **350 kc** adjustment. Adjust air-trimmers **C18, C38,** and **C6,** again, to produce maximum amplitude of the images and best coincident throughout their lengths.

(k) Re-tune the receiver to **approximately 175 kc** so that the forward and reverse waves appear on the oscillograph screen. Adjust the oscillator magnetite core screw **L10** to produce maximum (peak) amplitude of the waves, disregarding the fact that the two images may or may not come together.

(l) Shift the receiver dial setting to **350 kc** without altering any other adjustments (frequency modulator still in operation). Adjust air-trimmers **C18, C38,** and **C6,** respectively, to produce maximum amplitude and best coincidence of the waves. These adjustments compensate for any changes caused by the adjustment of the magnetite core screw **L10.** Tighten lock nuts on **C18, C38,** and **C6,** respectively, after each is adjusted.

Dynamic Amplifier Adjustments

It is essential that correct voltages and currents exist at the RCA-6L7 audio expander stage in order that the expanding function may take place in the proper manner. A screw-driver adjustment is accordingly provided to regulate the RCA-6L7 control grid No. 3 bias to the correct operating value. Two methods of adjustment are applicable. Either method requires a normal voltage of 300 volts across the filter output. The one to be preferred (a) requires the use of an **RCA Stock No. 9633 Beat-Frequency Oscillator** or the equivalent, a 100-ohm resistor, a 200-ohm resistor, and a 1,000-ohm-per-volt a-c voltmeter (rectifier-type) having a "low" range of 1.0 volt and a "high" range of 250 volts or greater. The less accurate method (b) requires the use of an **RCA Stock No. 12353 Split-Plate Adapter,** and a suitable d-c milliammeter. Both of these procedures are outlined below. **CAUTION: Before using either method, be sure that power-supply fuse is in proper position for the line voltage.**

(a) Preferred Method

Turn power switch off. Connect the 200-ohm and the 100-ohm resistors in series between the beat-frequency oscillator terminals (upper "250" and "CT") with the 100-ohm resistor connected to "CT." Calibrate the beat-frequency oscillator, adjust it to 1,000 cycles, and reduce its output. Connect the 1,000-ohm-per-volt a-c voltmeter (1-volt range) to the beat-frequency oscillator terminals (upper "250" and "CT"). Remove the male plug from the receptacle on the shielded cable running be-

tween the input transformer T2 and the compensator pack (see figure 12). Connect beat-frequency oscillator terminal "CT" to the large pin on the male plug. Connect the junction of the 200-ohm and the 100-ohm resistors to the small pin on the male plug.

Adjust beat-frequency oscillator output until the voltmeter reads exactly 1.0 volt. Remove the voltmeter leads from beat-frequency oscillator terminals without disturbing any of the oscillator adjustments. Place the voltmeter to its 250-volt or greater range and connect it between the plate prongs of the two RCA-2A3 power-output tubes. Connections to the tube prongs may be made by stripping approximately ½ inch of insulation from the ends of two short leads of rubber-covered wire, wrapping one bare end around each plate prong (being careful not to allow the bare ends to short on the chassis when the tubes are placed in their sockets), and connecting the voltmeter to these leads. **CAUTION: Do not touch these plate connections after the power is turned on since the potential at these points is rather high and carelessness might result in a serious shock.**

Set the "Dynamic amplifier" and "Fidelity control" to their extreme counter-clockwise positions. Set the "Phonograph volume" control to its extreme clockwise position. Turn on power switch and allow a few minutes for the instrument to become stabilized. Adjust the expander-bias control R46, on rear apron of amplifier (see figure 3), until the voltmeter reads 195 volts. Turn "Phonograph volume" control to extreme counter-clockwise position. Transfer lead from the junction of the 200-ohm and the 100-ohm resistors to the beat-frequency oscillator (upper "250") terminal without disturbing any of the oscillator adjustments. Adjust "Phonograph volume" control until the voltmeter reads 50 volts. Turn the "Dynamic amplifier" control to its extreme clockwise position allowing maximum expansion to take place. The voltmeter should now read not less than 150 volts if the expander circuit is operating correctly. Failure to do so indicates a defect in the system and the usual service procedure should be followed.

(b) **Alternate Method**

Turn power switch off. Place **RCA Stock No. 12353 Split-Plate Adapter** under the RCA-6L7 audio-volume expander. Connect a suitable d-c milliammeter to the adapter. Turn both the "Phonograph volume" and the "Dynamic amplifier" controls to their extreme counter-clockwise positions. Turn on power switch and allow a few minutes for the instrument to become stabilized. Adjust expander bias control R46, on rear apron of amplifier (see figure 3), to give 1.0 milliampere of plate current with no signal input to the dynamic amplifier.

Loudspeaker

Centering of the loudspeaker voice coil is made in the usual manner with three narrow paper feelers after first removing the front paper dust cover. This may be removed by softening its cement with a very light application of acetone using care not to allow the acetone to flow down into the air gap. The dust cover may be cemented back in place with ambroid upon completion of adjustment.

Antenna and Ground Terminals

These receivers are equipped with an antenna-ground terminal board having three terminals. These terminals are marked "A2," "A1," and "G," the latter being the ground terminal and should always be connected to a good external ground. The transmission-line leads of the RCA RK-40A antenna system should be connected to terminals "A2" and "A1." The receiver coupling units of the RCA RK-40 and the RCA Spider-Web antenna systems should be connected to terminals "A1" and "G." Connect a single-wire antenna to terminal "A1."

Selector Dial

Figure 14 illustrates the relation of the various parts of the dial mechanism when in its "Standard broadcast" position with the range switch likewise turned to its "Standard broadcast" position. In re-assembling the dial after repairs, see that the gears are meshed in accordance with the diagram, at the same time noting that the range switch is in its "Standard broadcast" position and the lever attached to the range-switch shaft placed in the position shown.

To adjust the dial mechanism, set the range switch to its "Standard broadcast" position. Place a straight-edge across the center of the dial so that its edge is even with the lower (end) marking at both the low-frequency and high-frequency ends of the dial. Under such conditions the straight-edge should be parallel with the top of the chassis base. If the straight-edge is not parallel with the top of the chassis base, loosen the nut on the rear of the roller link pivot stud and move the stud up or down until the link roller moves the dial to the desired position so that the end calibration marks obtain the position mentioned above. Tighten the nut on the roller link pivot stud.

Set the gang tuning condenser to its maximum capacity position. Adjust the dial pointer to the low-frequency (end) mark on "Standard broadcast" scale. This is a friction adjustment.

With the gang tuning condenser plates still in full mesh, loosen the two set screws on the vernier-dial hub. Rotate the vernier dial until the "0" marking is in a vertical plane above the center of the shaft. Tighten set screws.

Magnetic Pickup

The pickup used in the phonograph unit is of an improved design. The horseshoe magnet is rigidly welded to the pole pieces and is irremovable. There is a centering spring attached to the armature to maintain proper adjustment and to provide a limiting effect on the movement of the armature. The frequency response is substantially uniform over a wide range. Service operations which may be necessary on the pickup are as follows.

Centering Armature

Refer to figure 15 showing the pickup inner structure. The armature is shown in its proper relation to the magnet pole pieces, i.e., exactly centered. Whenever this centering adjustment has been disturbed, the screws A, B, and C should be loosened and the armature clamp adjusted to the point where the vertical axis of the armature is at right angles to the horizontal axis of the pole pieces, and centered between them. This centering operation may be facilitated by inserting a small rod or nail into the armature needle hole, using it as a lever to test the angular movement of the armature. The limitations of the movement in each direction will be caused by the armature striking the pole pieces. The proper adjustment is obtained when there is equal angular displacement of the armature and adjustment rod or nail to each side of the vertical axis of the magnet and coil assembly. The screws A and B should then be secured, observing care not to disturb the adjustment of the armature clamp. Then place the pickup in a vise and secure the centering spring-clamp by means of the screw C, allowing the centering spring to remain in the position at which the armature is exactly centered between the pole pieces. With a little practice, the correct adjustment of the armature may be readily obtained. The air gap between the pole pieces and the armature should be kept free from dust, filings, and other such foreign materials which would obstruct the movement of the pickup armature.

Damping Block

The viscoloid block which is attached to the back end of the armature shank serves as a mechanical filter to eliminate undesirable resonances and to cause the frequency response to be uniform. Should it be necessary to replace this damping block, it may be done by removing screw D and the cover support bracket from the mechanism and taking off the old viscoloid block. The surface of the armature which is in contact with the viscoloid should be thoroughly cleaned with fine emery cloth. Then insert the new block so that it occupies the same position at it did originally. Make certain that the block is in correct vertical alignment with the armature. The hole in the new viscoloid block is somewhat smaller than the diameter of the armature in order to permit a snug fit. With the viscoloid aligned on the armature, screw D and the cover support bracket should then be replaced. Heat should be applied to the armature (viscoloid side) so that the viscoloid block will fuse at the point of contact and become rigidly attached to the armature. A special-tip soldering iron constructed as shown in figure 16 will be found very useful in performing this operation. The iron should be applied only long enough to slightly melt the block and cause a small bulge on both sides.

Replacing Coil

Whenever there is defective operation due to an open or shorted pickup coil, this coil should be replaced. The method of replacement will be obvious upon inspection of the pickup assembly and by study of the cut-a-way illustrations. Make sure that the new coil is properly centered with the hole in the support strip and glued securely in that position. It is important to re-adjust the armature as previously explained after re-assembly of the mechanism. Only rosin core solder should be used for soldering the coil leads in the pickup. This same type of solder should be used when necessary for soldering the centering spring to the armature.

Magnetizing

Loss of magnetization will not usually occur when the pickup has received normal care because the magnet and pole pieces are one unit and the magnetic circuit remains practically closed at all times. When the pickup has been mishandled, subjected to a strong a-c field, jolted, or dropped, there may be an appreciable loss of magnetic strength, in which case it will be necessary to re-magnetize the entire structure. To do this, it will be necessary to first remove the pickup mechanism from the tone arm, and then remove the magnet assembly. Place the magnet assembly on the poles of a standard pickup magnetizer such as the **RCA Stock No. 9549 Pickup Magnetizer** and charging the magnet in accordance with the instructions accompanying the magnetizer. It is preferable to check the polarity of the pickup magnet and to re-magnetize it so that the same polarity is maintained.

Automatic Record Ejector

The record changing mechanism is designed to be simple and fool-proof. Under normal operating conditions, service difficulties should be negligible. Occasionally, however, certain adjustments may be required. These adjustments are illustrated and explained in figure 13.

It is important when servicing the automatic mechanism, to have it placed on a level support. It is also important to refrain from forcing the mechanism if there is a tendency to bind or jam, since bent levers and possibly broken parts may result.

The tip of the record ejector is adjustable in relation to the turntable spindle, the two being exactly coaxial when properly adjusted. To align the tip, remove the rubber silencer of the ejector assembly, loosen ejector tip retaining nut and slide the tip assembly to the position where it is in true-line with the axis of the turntable spindle. This adjustment may be simplified by placing several records on the turntable, depressing the spindle through the top record hole and lining up the ejector tip in the spindle hole of the record.

To insure that the ejector tip rotates freely, apply a slight amount of oil to the shank of the tip at the point where it is in contact with the ball bearing.

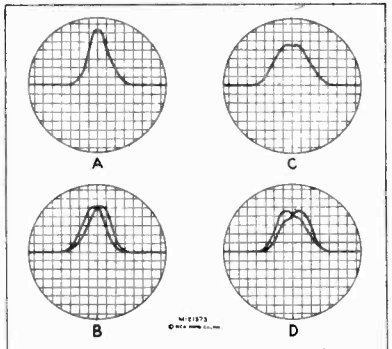


Figure 7—I-F Alignment Oscillograph Curves

A—Correct curve showing proper i-f alignment as obtained with fidelity control counter-clockwise.

B—Incorrect curve similar to A showing improper alignment of i-f system caused by one or more circuits being slightly detuned.

C—Correct showing broadening of curve A obtained when fidelity control is rotated fully clockwise.

D—Incorrect curve showing broadening of curve B obtained when fidelity control is rotated fully clockwise.

RCA MFG. CO., INC.

Stock No.	Description	List Price
	RECEIVER ASSEMBLIES	
4427	Bracket—Volume control mounting bracket	$0.18
12987	Bracket—Band changeover switch bracket	.15
12511	Cap—Grid contact cap—Package of 5	.15
12948	Capacitor—33 Mmfd. (C57)	.20
12629	Capacitor—56 Mmfd. (C62)	.20
12404	Capacitor—120 Mmfd. (C60, C61)	.26
13022	Capacitor—390 Mmfd. (C46, C47, C50, C51)	.25
12898	Capacitor—1500 Mmfd. (C66)	.20
13608	Capacitor—.0025 Mfd. (C63)	.30
4868	Capacitor—.005 Mfd. (C71)	.20
13138	Capacitor—.01 Mfd. (C45, C49, C59, C102)	.25
4836	Capacitor—.05 Mfd. (C64)	.30
4841	Capacitor—0.1 Mfd. (C52, C99)	.22
4840	Capacitor—0.25 Mfd. (C53)	.30
13610	Capacitor—8 Mfd. (C72)	1.00
5212	Capacitor—18 Mfd. (C54, C73)	1.16
13611	Capacitor—20 Mfd. (C65)	.85
13613	Compensator Pack—Comprising two .015 Mfd., one .05 Mfd. capacitors and one 27,000 ohms, one 22,000 ohms, one 12,000 ohms resistors (C55, C56, C58, R15, R16, R17)	1.20
12006	Core—Core and stud assembly for intermediate frequency transformers	.22
13612	Filter Pack—Comprising two .453 Henry Chokes, two 560 Mmfd., one 1,000 Mmfd. and one 2,200 Mmfd. capacitors (L30, L31, C67, C68, C69, C70)	2.95
12866	Foot—Chassis foot assembly—Package of 2	.75
4340	Lamp—Pilot lamp—Package of 5	.60
12868	Link—Link mechanism on band indicator operating arm	.45
13609	Resistor—Voltage divider—Comprising one 600 ohms, one 5,000 ohms, one 3,950 ohms, one 25 ohms and one 19 ohms sections (R27, R28, R29, R30, R31)	.95
12311	Resistor—1,000 ohms—insulated, ¼ watt (R12)—Package of 5	1.00
5112	Resistor—1,000 ohms—carbon type, ¼ watt (R10, R14)—Package of 5	1.00
5147	Resistor—3,300 ohms—carbon type, 1 watt (R55)	.22
12312	Resistor—3,300 ohms—insulated, ¼ watt (R25)—Package of 5	1.00
5114	Resistor—15,000 ohms—carbon type, 1 watt (R26)	.22
11282	Resistor—56,000 ohms—carbon type, 1/10 watt (R19)—Package of 5	.75
11365	Resistor—82,000 ohms—carbon type, ¼ watt (R13)—Package of 5	1.00
11281	Resistor—100,000 ohms—carbon type, 1/10 watt (R11)—Package of 5	.75
5158	Resistor—220,000 ohms—carbon type, ¼ watt (R54)—Package of 5	1.00
11398	Resistor—220,000 ohms—carbon type, 1/10 watt (R20)—Package of 5	.75
12013	Resistor—1.0 megohm—carbon type, 1/10 watt—located in tuning tube socket (R24)—Package of 5	.75
12679	Resistor—2.2 megohm—insulated, ¼ watt (R21)—Package of 5	1.00
12874	Resistor—3.3 megohm—carbon type, ¼ watt (R22, R23)—Package of 5	1.00
12870	Scale—Vernier dial scale	.65
12008	Shield—Intermediate frequency transformer shield	.28
12607	Shield—1st or 2nd I.F. transformer shield top	.30
12581	Shield—3rd I.F. transformer shield top	.36
11197	Socket—6-contact 6C5 Radiotron socket	.14
11198	Socket—7-contact 6K7 or 6H6 Radiotron socket	.15
13095	Socket—Upper left or lower right-hand dial lamp socket	.25
11222	Socket—Upper right or lower left-hand dial lamp socket	.18
11381	Socket—Tuning tube socket and cover	.45
11196	Socket—8-contact R.F. unit voltage supply socket	.15
12007	Spring—Retaining spring for core in I.F. transformer—Package of 10	.36
12986	Stud—Band indicator operating arm stud—Package of 5	.65
12860	Switch—Low frequency tone and power switch (S5, S7)	1.50
12988	Switch—Bias switch (S10)	.65
13616	Tone control—High frequency tone and fidelity control (R32, S4)	1.40
12981	Transformer—First intermediate frequency transformer (L24, L25, L40, C46, C47)	2.15
12990	Transformer—Second intermediate frequency transformer (L26, L27, C50, C51)	1.85
12982	Transformer—Third intermediate frequency transformer (L28, L29, C60, C61, C62, R19, R20)	2.25
12861	Volume Control (R18)	1.00
	MAGIC BRAIN UNIT ASSEMBLIES	
12806	Board—3-contact antenna and ground terminal board	.25
5237	Bushing—Variable condenser mounting bushing assembly—Package of 3	.43
12886	Cable—Shielded power cable, approximately 4 inches long, complete with 8-contact male plug	1.50
12511	Cap—Grid contact cap—Package of 5	.15
12714	Capacitor—Adjustable trimmer capacitor (C3, C4, C5, C6, C14, C16)	.38
12884	Capacitor—Adjustable trimmer capacitor (C10, C18, C23, C38, C39)	.40
12807	Capacitor—Adjustable trimmer capacitor (C13, C35, C36, C37)	.35
12896	Capacitor—15 Mmfd. (C34)	.20
12722	Capacitor—18 Mmfd. (C15)	.20
12891	Capacitor—36 Mmfd. (C40)	.20
12629	Capacitor—56 Mmfd. (C24)	.20
12895	Capacitor—56 Mmfd. (C17)	.20
12723	Capacitor—56 Mmfd. (C2, C44)	.20
13307	Capacitor—62 Mmfd. (C11)	.20
12724	Capacitor—120 Mmfd. (C25, C28, C29)	.28
12725	Capacitor—150 Mmfd. (C1)	.28
12894	Capacitor—180 Mmfd. (C22)	.20
12727	Capacitor—555 Mmfd. (C21)	.20
12537	Capacitor—560 Mmfd. (C7, C26, C33, C42)	.20
12898	Capacitor—1,500 Mmfd. (C12)	.20
12729	Capacitor—1,550 Mmfd. (C20)	.26
12728	Capacitor—4,500 Mmfd. (C19)	.36
12897	Capacitor—4,700 Mmfd. (C43)	.40
4858	Capacitor—.01 Mfd. (C8, C30, C31, C32)	.25
12879	Coil—Antenna coil and shield, XABC bands (L2, L3, L4, L5, L6)	1.90
12888	Coil—Antenna coil, "D" band (L13, L14)	.60
12880	Coil—Detector coil and shield, XABC bands (L15, L16, L17, L18, L19, L20)	2.05
12709	Coil—Oscillator coil and shield, ABC bands (L7, L8, L9)	2.02
12881	Coil—Oscillator coil and shield, X band only (L10)	.80
12890	Coil—Oscillator coil, "D" band (L11, L12, L23)	.70
12889	Coil—R.F. coil, "D" band (L21, L22)	.65
12877	Condenser—3-gang variable tuning condenser (C9, C27, C41)	5.10
12887	Connector—8-contact male connector and cover for power cable, Stock No. 12886	.40
12664	Core—Adjustable core and stud for Stock No. 12654	.22
12800	Core—Adjustable core and stud for Stock No. 12709	.20
12882	Core—Adjustable core and stud for Stock No. 12881	.20
11324	Resistor—560 ohms—carbon type, ¼ watt (R2)—Package of 5	1.00
5112	Resistor—1,000 ohms—carbon type, ¼ watt (R3)—Package of 5	1.00
11298	Resistor—5,600 ohms—carbon type, 1 watt (R6)	.22
3998	Resistor—15,000 ohms—carbon type, ¼ watt (R5)—Package of 5	1.00
11282	Resistor—56,000 ohms—carbon type, 1/10 watt (R4, R9)—Package of 5	.75
8064	Resistor—82,000 ohms—carbon type, ½ watt (R8)—Package of 5	1.00
11397	Resistor—560,000 ohms—carbon type, 1/10 watt (R1, R7)—Package of 5	.75
12651	Shield—Coil shield for Stock Nos. 12879, 12880	.22
12710	Shield—Coil shield for Stock No. 12709	.28
12883	Shield—Coil shield for Stock No. 12881	.20
11198	Socket—7-contact 6K7 Radiotron socket	.15
11279	Socket—7-contact 6L7 Radiotron socket	.20
12885	Socket—8-contact 6J7 Radiotron socket	.20
12007	Spring—Retaining spring for core, Stock Nos. 12664, 12800, 12882—Package of 10	.36
12878	Switch—Range switch and mounting nut (S1, S2, S3)	3.60
12654	Trap—Wave-trap, complete (L1)	.75
	DRIVE ASSEMBLIES	
10705	Ball—5/32-inch diameter steel ball for planetary drive—Package of 20	.25
10941	Ball—⅛-inch diameter steel ball for planetary drive bearing—Package of 20	.25
12904	Bushing—Plate and bushing assembly for planetary drive mounting	.20
12905	Coupling—Flexible coupling and shaft assembly, complete	.50
12909	Dial—Band indicating dial and cam assembly	1.05
12899	Drive—Variable tuning condenser drive, complete, including mounting bracket drive, dial scale and indicator, less vernier dial, Stock No. 12870 and link, Stock No. 12868	4.40
12906	Gear—Anti-lash drive gear, complete	.75
12910	Gear—Sector gear and link assembly for band selector	.20
12908	Indicator—Station selector indicator pointer	.20
8051	Link—Link and roller assembly, complete with spring	.30
12911	Screen—Dial lamp screen and light diffuser	.20
4669	Screw—Set screw for flexible coupling or gear, Stock Nos. 12905 and 12906—Package of 10	.25
12901	Shaft—Direct drive shaft and pinion gear for planetary drive	.75
12900	Shaft—Vernier drive shaft for planetary drive	.25
12903	Spring—Tension spring for planetary drive bearing—Package of 10	.20
12907	Spring—Tension spring for gear, Stock No. 12906—Package of 10	.20
8052	Spring—Tension spring for link, Stock No. 8051—Package of 5	.32
	AMPLIFIER ASSEMBLIES	
12511	Cap—Grid contact cap—Package of 5	.15
12110	Cap—Top shield cap for 6L7 Radiotron	.14
12488	Capacitor—270 Mmfd. (C90, C91)	14
5107	Capacitor—.0025 Mfd. (C88)	.16
4838	Capacitor—.005 Mfd. (C93, C94)	.20
4868	Capacitor—.005 Mfd. (C92)	.20
5196	Capacitor—.035 Mfd. (C79)	.18
4886	Capacitor—.05 Mfd. (C85)	.20
4518	Capacitor—.05 Mfd. (C81)	.52
4839	Capacitor—0.1 Mfd. (C89, C100)	.52
5170	Capacitor—.25 Mfd. (C87)	.25
4840	Capacitor—.25 Mfd. (C101)	.30
11240	Capacitor—10 Mfd. (C97)	1.08
12472	Capacitor—10 Mfd. (C86)	1.00
5212	Capacitor—18 Mfd. (C84, C95)	1.16
11496	Capacitor—18 Mfd. (C98)	1.15
12740	Capacitor—20 Mfd. (C83)	1.10
12467	Capacitor—30 Mfd. (C96)	1.40
12465	Capacitor—Capacitor pack, comprising 3 sections, each 0.5 Mfd. (C78, C80, C82)	1.50
11272	Clamp—Volume control or speaker cable clamp	.10
5240	Cover—Fuse cover	.24
12468	Expander—Control (R46)	1.00
10907	Fuse—3-ampere fuse (F1)—Package of 5	.40
5239	Mounting—Fuse mounting	.36
12471	Plate—6L7 socket mounting plate assembly, less socket	.15
12466	Reactor—Filter reactor (L37)	2.35
13454	Resistor—270 ohms—insulated, ¼ watt (R39)—Package of 5	1.00
12195	Resistor—2,200 ohms—insulated, ¼ watt (R41, R50)—Package of 5	1.00
11298	Resistor—5,600 ohms—carbon type, 1 watt (R47)	.22
11332	Resistor—22,000 ohms—carbon type, 1 watt (R48)—Package of 5	1.10
12487	Resistor—33,000 ohms—carbon type, 2 watt (R40)	.25
12286	Resistor—56,000 ohms—insulated, ¼ watt (R53)—Package of 5	1.00
12263	Resistor—100,000 ohms—insulated, ¼ watt (R42, R43, R45, R51)—Package of 5	1.00
12452	Resistor—330,000 ohms—insulated, ¼ watt (R37)—Package of 5	1.00
12285	Resistor—470,000 ohms—insulated, ¼ watt (R44)—Package of 5	1.00
12486	Resistor—560,000 ohms—insulated, ¼ watt (R38, R49)—Package of 5	1.00
4794	Socket—4-contact 5Z3 or 2A3 Radiotron socket	.15
11197	Socket—6-contact 6C5 Radiotron socket	.14
11198	Socket—7-contact 6H6 or 6L7 Radiotron socket	.15
12464	Transformer—Interstage transformer (T3, L35)	5.95
12463	Transformer—Power transformer, 105-125 volt, 50-60 cycle (T1)	8.58
	EJECT ARM ASSEMBLIES	
11541	Arm—Eject arm, complete	8.15
11533	Ball—1/16-inch diameter steel ball—Package of 10	.20
10129	Ball—3/16-inch diameter steel ball—Package of 20	.25
11529	Bearing—Ejector tip bearing and nut	.32
11538	Bracket—Eject arm bracket	1.72
11537	Collar—Eject arm shaft collar and set screw	.24
11540	Cover—Eject arm cover	1.52
11536	Cushion—Counter balance roller cushion located inside of eject arm	.14
4055	Post—Vertical adjustment post—located on eject arm bracket	.30
3729	Roller—Eject arm counter balance roller—located inside of eject arm	.45
4580	Screw—No. 6—32-3/16-inch square head set screw for eject arm collar—Package of 10	.25
11534	Screw—No. 8—36-7/32-inch special screw for eject arm tip center adjustment—Package of 10	.14
11535	Shaft and Collar—Eject arm vertical action shaft and collar assembly	.15
11528	Silencer—Ejector tip silencer	.14
4067	Spring—Ejector arm bracket spring—Package of 10	.30
11531	Spring—Ejector tip spring—Package of 10	.42
11530	Tip—Ejector tip with tip center, adjusting screw and cap	.32
11539	Yoke—Eject arm yoke assembly	.94
	PICKUP AND ARM ASSEMBLIES	
13627	Arm—Pickup arm, complete less pickup unit	8.45
11548	Back—Pickup back	.52
10941	Ball—Pickup arm pivot shaft ball bearing—Package of 20	.25
12543	Bracket—Pickup arm spring, adjusting bracket and screw	.12
13629	Cable—Pickup arm operating cable—Package of 5	1.20
12541	Coil—Pickup coil (L41)	.64
13630	Connector—Shielded pickup cable and connector assembly—approximately 43 inches long—less female connector	.45
11545	Cover—Pickup front cover	.22
11546	Cover—Pickup back cover with mounting screws	.14
12850	Damper—Damper assembly for pickup arm base—comprising one upper damper and bushing, one lower bushing and one lower bearing	.25
11723	Escutcheon—Pickup arm escutcheon	.62
14115	Mechanism—Comprising one armature and spring assembly, one armature clamp and one damper	1.35
13628	Pickup—Pickup unit, complete	7.00
12546	Plug—Pivot shaft bearing plug—Package of 2	.14
13631	Rod—Pickup arm trip rod and nut—Package of 5	.30
11549	Screw—Pickup front cover screw—Package of 10	.42
3387	Screw—Nut and washer for mounting pickup to arm—Package of 10	.50

The prices quoted above are subject to change without notice.

Stock No.	Description	List Price
12539	Screw—Pickup needle screw—Package of 10	.20
12544	Spring — Pickup arm adjusting spring — Package of 10	.25
	OPERATING MECHANISM	
13632	Cam—Cam and gear assembly	2.60
6808	Clutch—Trip lever friction clutch	.30
11558	Cover—Metal cover for trip lever and friction finger assembly	.36
6809	Finger—Manual index lever finger assembly	.25
3670	Finger—Friction finger assembly	.32
11554	Lever—Manual index lever—less pin	.62
13633	Lever—Main lever and link assembly	1.75
11557	Lever—Main spring lever	.42
11555	Lever—Trip lever and friction clutch assembly	.94
6503	Pawl—Trip pawl assembly	.40
3672	Pin—Manual index lever pin	.42
13635	Plate—Eject arm actuating plate assembly	.75
4564	Screw—Manual index lever finger set screw Package of 10	.20
4039	Screw—Trip lever clutch tension adjustment screw—Package of 10	.22
4566	Screw—Special screw used to fasten main lever and link assembly bushing—Package of 10	.30
13637	Spacer—Pickup arm mounting spacer	.60
13638	Spring—Actuating spring—Package of 10	.40
4565	Spring—Manual index lever finger tension spring—Package of 10	.30
4061	Spring—Main spring lever tension spring—Package of 10	.38
2893	Spring—Trip lever latch plate tension—Package of 10	.30
13634	Spring—Pickup arm cable tension spring—Package of 10	.35
3676	Spring—Cam and gear pawl tension spring —Package of 10	.52
13639	Spring—Cam and gear arm tension spring —Package of 10	.40
4125	Spring—Eject arm horizontal action tension spring—Package of 10	.42
13636	Stud—Pickup arm lift cable stud and nut—Package of 10	.40
2917	Washer—Spring washer—"U" type—Package of 10	.25
	MOTOR ASSEMBLIES	
9735	Motor—105-125 volts—25 cycles (M1)	49.50
9651	Motor—105-125 volts—50 cycles (M1)	35.35
9650	Motor—105-125 volts—60 cycles (M1)	35.35
12050	Suspension Spring — Motor mounting spring, washer, and stud assembly — Comprising six springs, six cup washers, three spring washers and three studs	.60
	AUTOMATIC SWITCH ASSEMBLIES	
3994	Cover—Motor switch cover	.26
10184	Plate — Automatic brake latch plate — Package of 5	.40
10174	Springs—Automatic brake springs—Package of 2 sets	.50
6805	Switch Assembly—Automatic switch, complete	1.90
3322	Switch—Motor switch (S9)	.75
	MOTOR BOARD ASSEMBLIES	
11881	Base — Phonograph compartment lamp socket and base	.55
12051	Capacitor—2 Mfd., complete with 2-contact male connector for use with motor, Stock No. 9650 or No. 9651 only (C74)	4.18
13101	Capacitor—4 Mfd., complete with 2-contact male connector for use with motor, Stock No. 9735 only (C74)	5.05
4674	Connector—2-contact male connector for Stock Nos. 12051, 13101 or phono compartment lamp leads	.25
4577	Connector—2-contact male connector for motor cable	.30
11488	Connector—2-contact female connector for motor leads	.14
11542	Cover—Turntable cover	.88
11553	Escutcheon — Index escutcheon engraved "Manual—12—10"	.44
4340	Lamp—Phonograph compartment lamp—6.3 volts—Package of 5	.60

Stock No.	Description	List Price
3764	Nut—Cap nut for motor board suspension assembly—Package of 4	.40
11551	Rest—Pickup rest	.14
3654	Roller—Pickup arm cable guide roller — Comprising bracket, roller and guide pin	.34
11711	Shade — Phonograph compartment lamp shade	.16
3763	Suspension Spring—Suspension spring, washer and bolt assembly for motor board — Comprising one bolt, two cup washers, two springs, two "C" washers and one cap nut	.42
4671	Switch — Operating switch — toggle type (S8)	.72
11599	Turntable—Complete	2.90
	REPRODUCER ASSEMBLIES	
13614	Coil — Field coil and magnet assembly (L38)	13.20
12474	Cone—Reproducer cone (L36)	1.35
12567	Plug—5-contact male reproducer plug	.22
9767	Reproducer—Complete	21.75
12568	Transformer—Output transformer (T4)	3.30
	MISCELLANEOUS CABLES AND PLUGS	
13644	Cable—3-conductor shielded compensation cable, approximately 33" long, complete with 4-contact male connector—connects compensator pack to phonograph volume control	2.20
12991	Cable—3-conductor shielded fidelity control cable, approximately 7½" long—connects fidelity control to receiver	.50
13645	Cable—2-conductor shielded grid switching cable, approximately 18" long, complete with 4-contact female connector—connects radio-record switch to amplifier	1.25
13625	Cable—Shielded input cable, approximately 14" long, complete with 4-contact male connector — connects amplifier to radio-record switch	.50
13621	Cable—2-conductor pilot and compartment lamp cable, approximately 13" long, complete with two 2-contact female connectors	1.00
13626	Cable—3-conductor motor and power switch cable, approximately 7½" long, complete with two female connectors — connects amplifier to phonograph motor and receiver power switch	1.65
13642	Cable—2-conductor motor power cable, approximately 35" long, complete with one 2-contact male and one 2-contact female connectors — connects cable stock No. 13626 to motor leads	1.90
13623	Cable—Single conductor shielded output cable, approximately 5" long, complete with 2-contact female connector — connects receiver to radio-record switch	.55
13641	Cable—Single conductor shielded output cable, approximately 10½" long, complete with 2-contact male connector—connects radio-record switch to radio receiver	.60
13620	Cable—4-conductor plate and filament supply cable, approximately 9" long, complete with 4-contact male connector—connects receiver to amplifier power supply	1.05
13619	Cable—2-conductor power cable, approximately 27" long, complete with 2-contact male connector—connects power switch to amplifier	.60
13624	Cable—4-conductor plate and filament supply cable, approximately 6" long, complete with 4-contact female connector—connects amplifier power supply to receiver	1.25
13622	Cable—2-conductor shielded tone control cable, approximately 28" long, complete with 4-contact male connector—connects receiver tone control to amplifier	.75
12490	Cable—2-conductor shielded tone control cable, approximately 10" long, complete with female connector—connects amplifier to receiver tone control	.58
12985	Cable—Tuning lamp cable and socket	1.70

Stock No.	Description	List Price
12491	Cable—2-conductor shielded volume control cable, approximately 7½" long, complete with 2 female connectors—connects amplifier to phonograph volume control and expander control	.68
13643	Cable—2-conductor shielded volume control cable, approximately 37½" long, complete with two 2-contact male connectors — connects phonograph volume control and expander control to amplifier	2.00
4674	Connector—2-contact male connector for cable stock Nos. 13619, 13641, 13643, pilot lamp socket leads, compensator pack or input transformer cables	.25
11488	Connector—2-contact female connector for cable stock Nos. 12491, 13621, 13623, 13626 or input transformer cable	.14
4577	Connector — 2-contact male connector for cable stock No. 13642	.30
12565	Connector—4-contact male connector for cable stock Nos. 13622, 13625 or 13644	.20
4573	Connector—2-contact female connector with oblong openings for cable stock Nos. 13626 or 13642	.30
12493	Connector—Speaker cable 5-contact female connector	.20
12494	Connector—4-contact female connector for cable stock Nos. 12490, 13645 or compensator pack cable	.18
11570	Connector — 4-contact male connector for cable stock No. 13620	.32
11971	Connector—4-contact female connector for cable stock No. 13624	.55
	MISCELLANEOUS ASSEMBLIES	
5211	Bolt — Speaker mounting bolt assembly — Package of 2	.24
4391	Box—Used needle box	.70
13615	Bracket—Tuning lamp mounting bracket and clamp	.25
13103	Cap—Pilot lamp cap and bull's-eye—Package of 5	.65
12560	Compensator Pack — Phonograph compensator pack complete with two shielded cables and connectors (L32, L33, L34, L39, C75, C76, C77, R33, R34, R35)	3.74
12915	Crystal — Station selector escutcheon and crystal	1.30
11580	Cover—Pilot lamp cover	.12
12742	Escutcheon—Tuning lamp escutcheon	.22
12552	Expander Control (R32)	1.06
4340	Lamp—Pilot lamp—6.3 volts—Package of 5	.60
12699	Knob—Large station selector knob—Package of 5	.68
12700	Knob—Small vernier station selector knob —Package of 5	.58
11347	Knob—Low frequency tone control and power switch, radio-record switch, radio volume control, range switch, or high frequency tone control knob — Package of 5	.75
11582	Knob—Phonograph volume control or expander control knob—Package of 5	.50
11607	Receptacle—Needle card holder	.38
11829	Roller—Record pocket slide roller—Package of 2	.55
4560	Screw—Chassis mounting screw assembly (front) — Comprising one screw, one washer and one lock washer—Package of 10	.30
13102	Screw—Chassis mounting screw assembly (bottom) — Comprising one screw, two cushions, one spacer, one washer and one lock washer—Package of 2	.30
11573	Socket—Pilot lamp socket	.28
11349	Spring—Retaining spring for knob, Stock Nos. 11347, 11582 and 12700—Package of 5	.25
4982	Spring—Retaining spring for knob, Stock No. 12699—Package of 10	.50
12824	Switch—Radio-record switch (S6)	1.00
12555	Transformer — Phonograph input transformer (T2)	6.00
7217	Transformer — Step-down transformer for 220 volts, 50-60 cycle operation	17.40
12554	Volume Control—Phonograph volume control (R36)	1.52

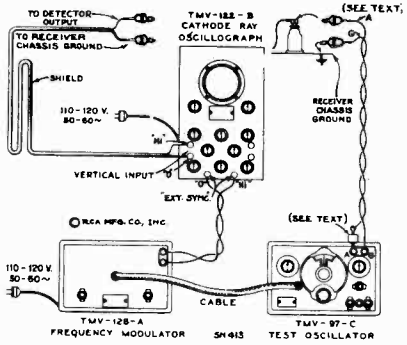


Figure 6—Alignment Apparatus Connections

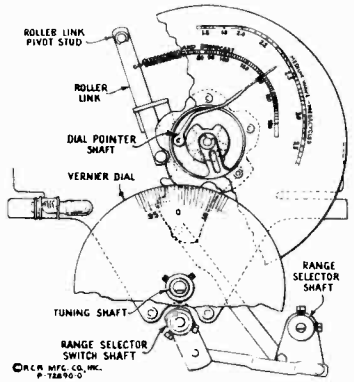


Figure 14—Selector Dial Change Mechanism

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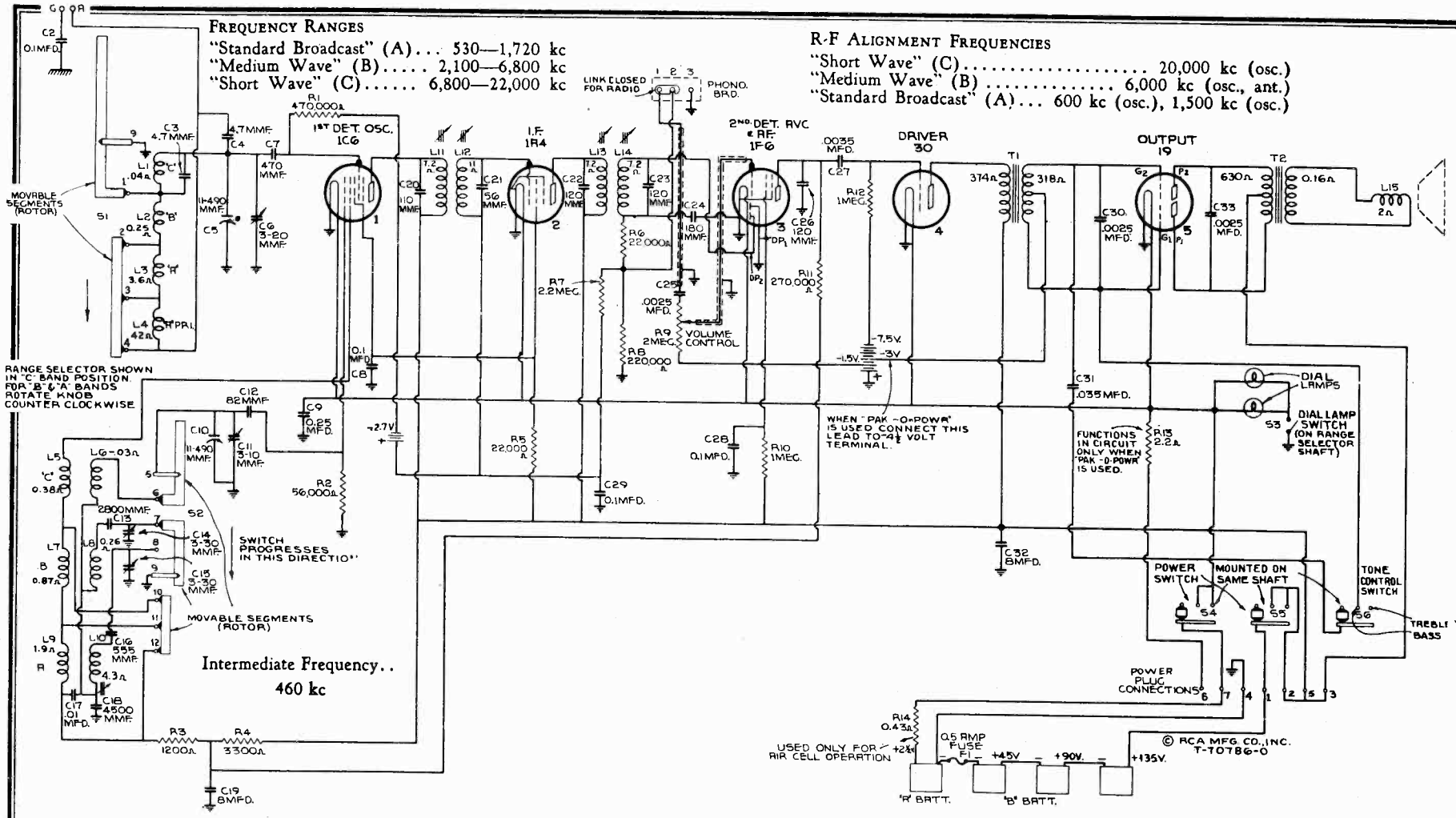
MODELS 85BK, 85BT
Schematic



Pilot Lamps (2)..... Mazda 2.0 volts, .06 ampere

BATTERIES REQUIRED

"A," one plug-in, 2½-volt Air Cell, or one 2-volt storage battery; "B," three 45-volt, heavy-duty, plug-in type B batteries; "C," one 7½-volt C battery tapped at —1½, —3, and —4½ volts, and three bias cells (Stock No. 12681).

CURRENT CONSUMPTION

"A" at 2 volts (pilot lamps off)..... 0.56 ampere
"A" at 2 volts (pilot lamps on)..... 0.68 ampere
"B" at 135 volts..... 19 milliamperes
Fuse Rating..... ½ ampere

POWER OUTPUT

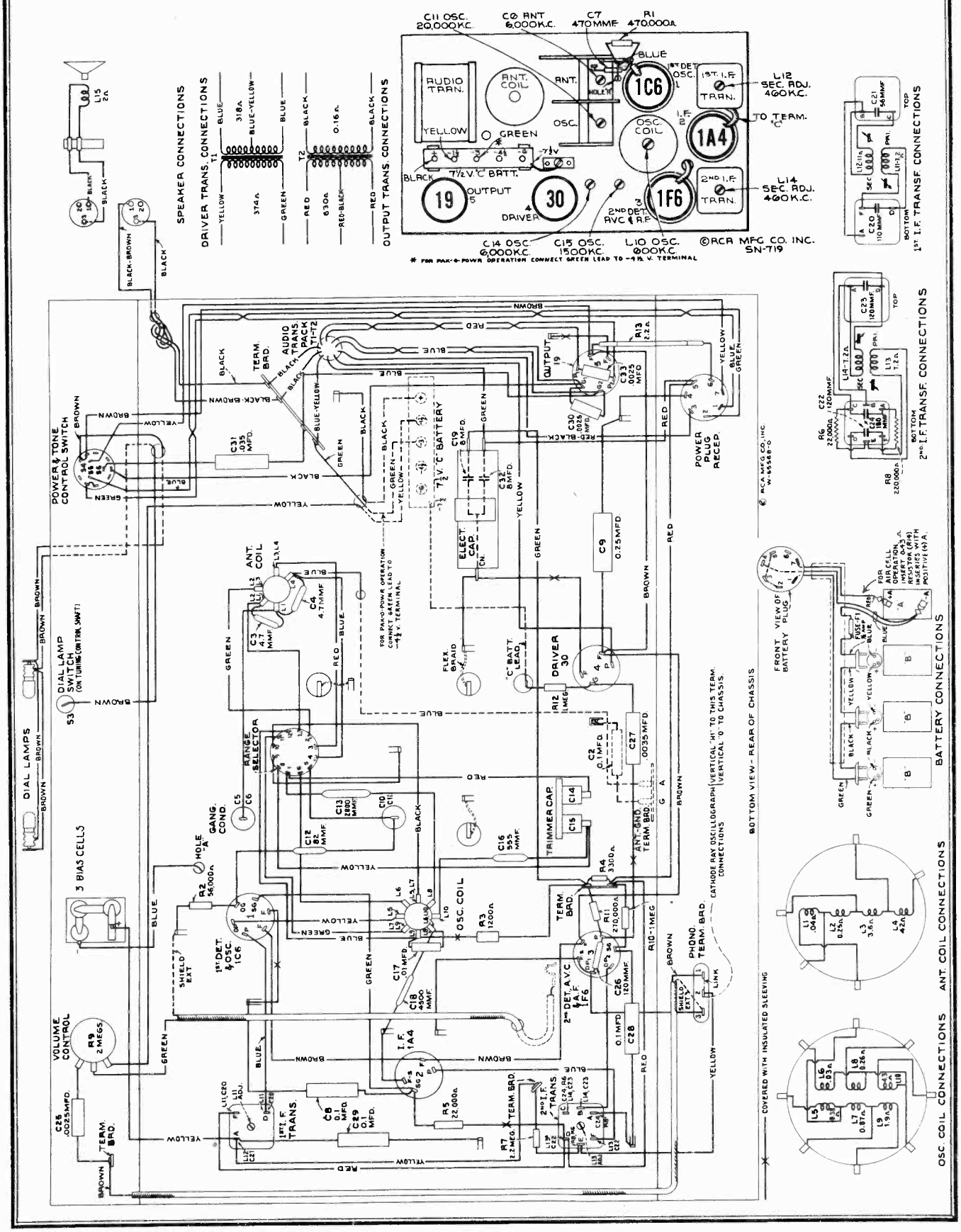
Undistorted ..... 1.2 watts
Maximum ..... 2.2 watts

LOUDSPEAKER

Type..... Permanent-Magnet Dynamic
Voice Coil Impedance..... 2.2 ohms at 400 cycles

MODELS 85BK,85BT
Chassis Wiring
Socket,Trimmers

RCA MFG. CO., INC.



RCA MFG. CO., INC.

Calibrate the tuning dial by adjusting main dial pointer to the low-frequency (end) calibration mark on dial with the gang tuning-condenser plates in full-mesh position; then adjust the small (vernier) pointer to "O." These are friction adjustments.

Perform alignment in proper order, tabulated below, starting with No. 1 and following all operations across, then No. 2, etc. Adjustment locations are shown on figures 1 and 4.

Cathode-ray alignment is highly preferable; the connections to the chassis are shown on figure 3. If an output indicator is used, connect it across the loudspeaker voice-coil and advance the receiver volume control to full-volume position.

Connect the "low" output terminal of the test oscillator to the receiver "G" (ground) terminal for all alignment operations. Regulate the output of the test oscillator so that minimum signal is applied to the receiver to obtain an observable output indication. This will avoid a-v-c action.

The term "Dummy antenna" means the device which must be connected between the "high" test-oscillator output and the point of connection to the receiver in order to obtain ideal alignment. "No-signal, 550-750 kc" means that the receiver should be tuned to a point between 550 and 750 kc where no signal or interference is received from a station or local (heterodyne) oscillator.

For further details on alignment, refer to booklet "RCA Victor Receiver Alignment."

Order of Alignment	Test Oscillator			Receiver Dial Setting	Circuit to Adjust	Adjustment Symbols	Adjust to Obtain
	Connection to Receiver	Dummy Antenna	Frequency Setting				
1	1A4 I-F Grid Cap	.001 Mfd.	460 kc	No Signal 550-750 kc	2nd I-F Trans.	L13 & L14	Max. (peak)
2	1C6 Det. Grid Cap	.001 Mfd.	460 kc	No Signal 550-750 kc	1st I-F Trans.	L11 & L12	Max. (peak)
3	Ant. Term.	300 Ohms	20,000 kc	20,000 kc	"C" Osc.	C11	Max. (peak)*‡
4	Ant. Term.	300 Ohms	6,000 kc	6,000 kc	"B" Osc.	C14	Max. (peak)*
5	Ant. Term.	300 Ohms	6,000 kc	6,000 kc	"B" Ant.	C6	Max. (peak)
6	Ant. Term.	200 Mmfd.	600 kc	600 kc	"A" L-F Osc.	L10	Max. (peak)
7	Ant. Term.	200 Mmfd.	1,500 kc	1,500 kc	"A" H-F Osc.	C15	Max. (peak)
8	Ant. Term.	200 Mmfd.	600 kc	Rock thru 600 kc	"A" L-F Osc.	L10	Max. (peak)
9	Ant. Term.	200 Mmfd.	1,500 kc	Rock thru 1,500 kc	"A" H-F Osc.	C15	Max. (peak)

*** Use minimum capacity peak if two peaks can be obtained.**
‡ After this adjustment, check for image signal by shifting receiver dial to 19,080 kc.

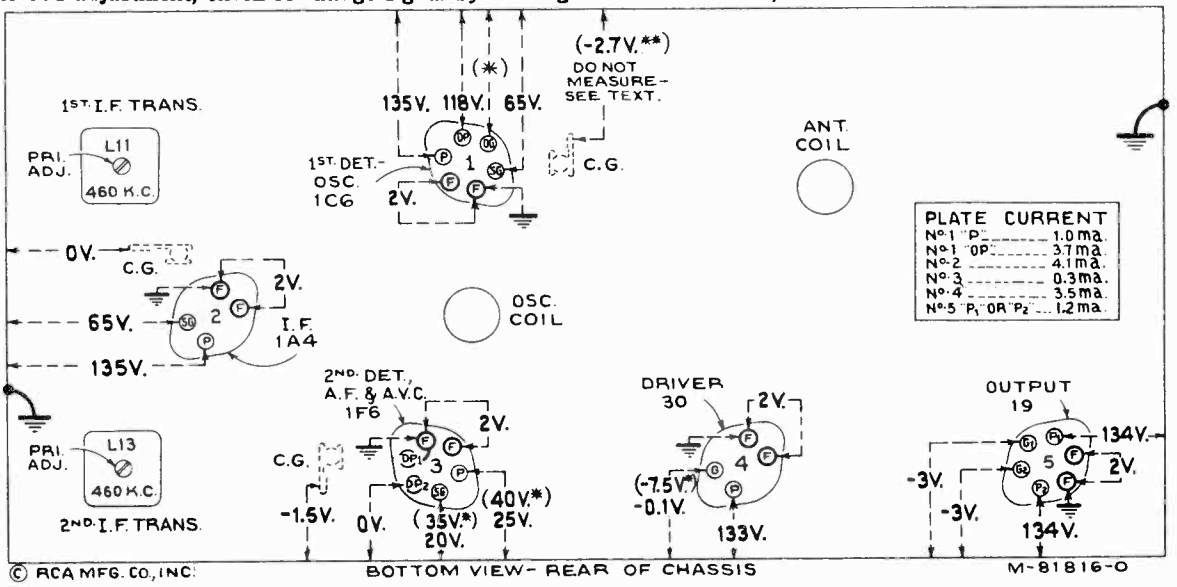


Figure 4—Radiotron Socket Voltages, Coil, and Trimmer Locations

Measured with all batteries at normal voltage—Tuned to approximately 1,000 kc—
No signal being received—Volume control minimum

***CAUTION: Do not attempt to measure voltage on control grid of the 1C6 with any conventional voltmeter due to presence of bias cells.*

Note: Two voltage values are shown for some readings. The higher value shown in parenthesis with asterisk (*) indicates operating conditions without voltmeter loading. The lower value is the actual measured voltage and differs from the higher value because of the additional loading of the voltmeter through the high series circuit resistance.

MODELS 85BK, 85BT
Notes, Parts

RCA MFG. CO., INC.

Precautionary Lead Dress.—(1) Twisted leads from filament switch to power plug must be dressed against bottom of end shield and fastened with tape. (2) Keep leads of C18 as short as possible. (3) Lead from L1 to C5-C6 should be 3¼ inches long. (4) Lead from L1-L2 to range switch should be 1⅝ inches long. (5) Keep lead from range switch to C10-C11 as short as possible. (6) Keep lead from range switch to L6 as short as possible. (7) Yellow lead from 2nd i-f transformer to phonograph terminal board must be dressed away from other wiring.

Phonograph Attachment.—A terminal board is provided for connecting a phonograph into the audio amplifying circuit. RCA Victor Model R-93-S Record Player should be connected as follows: Remove link between terminals 1 and 2 on terminal board. Connect green wire in Radio-Record switch cable to terminal 1, yellow to terminal 2, and shield extension to terminal 3. Tape unused red and blue leads separately. Connect a 2-conductor twisted cable between the Record Player binding posts and the screw terminals on Radio-Record switch.

Bias Cells.—Three bias cells are used only for the purpose of supplying bias potential to the 1C6 first-detector—oscillator tube. These cells should never be measured with an ordinary voltmeter or other device which draws any current. A simple check on these cells may be made by connecting a milliammeter in the plate circuit of the 1C6 tube and noting the plate current reading. Then carefully remove the cells and substitute a battery potential of 2.7 volts in their place and note the new reading on the milliammeter. If the first reading obtained (with bias cells) is more than 40% from the latter reading (with 2.7-volt battery), the bias cells should be replaced. This 40% difference is equivalent to a change of approximately 25% battery voltage.

Operation With CV-8 Pak-O-Powr.—These receivers may readily be operated from an RCA CV-8 Pak-O-Powr, in which case, a six-volt storage battery replaces the "A" and "B" batteries listed under "Batteries required." When using the CV-8, one cell (2 volts) of the storage battery supplies filament voltage to the tubes, while the other two cells (4 volts) supplies power for the CV-8. When installing, the seven prong CV-8 receptacle plugs into the seven prong plug on the rear apron of the receiver chassis and the four battery leads clip on terminals of the storage battery as follows: Red to +6 V.; Blue to + 4 V.; Yellow to + 4 V.; and brown (fused lead) to —V. The two four-volt leads (Blue and Yellow) should make separate connections to the same battery strap to avoid vibrator buzz which might otherwise result if these two leads are joined together or touch each other. Observe extreme care that proper connections are made to the battery, as a wrong connection will burn out the tubes. The green lead (originally connected to — 3 v. on the "C" battery) should be shifted to the — 4.5 volt tap. The other "C" battery connections remain unchanged.

The following changes under "Electrical specifications" become effective when employing the CV-8; "A" battery current drain at 6 volts, 1.65 amperes. Fuse rating, 5 amperes. Undistorted output, 1.3 watts. Maximum output, 1.8 watts. Under "Service data," the following voltages apply to the RCA-19 power-output tube. Either plate to chassis, 180 volts. Either grid to chassis, — 4½ volts. Plate current (either plate), 1.6 ma.

When servicing, the CV-8 chassis should be insulated from the receiver chassis to avoid vibrator buzz.

STOCK No.	DESCRIPTION
	RECEIVER ASSEMBLIES
14388	Belt—Variable condenser drive belt
13216	Board—Antenna and ground terminal board
12717	Board—Phonograph terminal board
14338	Bushing—Variable condenser mounting bushing and screw assembly
12607	Cap—First I.F. transformer shield top
12581	Cap—Second I.F. transformer shield top
12118	Cap—Grid contact cap
14383	Capacitor—Adjustable dual trimmer (C14, C15)
14392	Capacitor—4.7 Mmfd. (C3, C4)
12629	Capacitor—56 Mmfd. (C21)
12813	Capacitor—82 Mmfd. (C12)
14262	Capacitor—110 Mmfd. (C20)
12404	Capacitor—120 Mmfd. (C22, C23)
12724	Capacitor—120 Mmfd. (C26)
12406	Capacitor—180 Mmfd. (C24)
13052	Capacitor—470 Mmfd. (C7)
12727	Capacitor—555 Mmfd. (C6)
14407	Capacitor—2,800 Mmfd. (C13)
12728	Capacitor—4,500 Mmfd. (C18)
5107	Capacitor—.0025 Mfd. (C25, C30, C33)
5005	Capacitor—.0035 Mfd. (C27)
13138	Capacitor—.01 Mfd. (C17)
5196	Capacitor—.035 Mfd. (C31)
4841	Capacitor—0.1 Mfd. (C2, C8, C28, C29)
4840	Capacitor—0.25 Mfd. (C9)
5170	Capacitor—0.25 Mfd. (C25, C30, C33)
14403	Capacitor Pack—Comprising two sections each 8 Mfd. (C19, C32)
12681	Cell—Bias cell
14372	Coil—Antenna coil and shield (L1, L2, L3, L4)
14373	Coil—Oscillator coil and shield (L5, L6, L7, L8, L9, L10)
14397	Condenser—2-gang variable condenser (C5, C6, C10, C11)
5119	Connector—3-contact female connector for reproducer cable
12800	Core—Adjustable core and stud assembly for coil Stock No. 14373
12006	Core—Adjustable core and stud for I.F. transformer
14399	Dial—Station selector dial scale
14398	Drive—Variable condenser vernier drive pinion gear and shaft
14345	Drum—Variable condenser drive belt drum complete with set screws
30085	Gear—Indicator drive gear and hub assembly and pointer stem and gear assembly
14405	Holder—Bias cell holder
14341	Idler—Station selector drive belt idler
14344	Indicator—Station selector indicator pointer
14382	Indicator—Vernier indicator pointer
4348	Lamp—Dial lamp
14404	Plug—7-contact male plug located on rear apron of chassis for battery cable
14340	Pulley—Station selector drive belt pulley and knob shaft
14361	Reflector—Dial reflector and lamp bracket assembly
14343	Retainer—Drive shaft and pulley retainer—holds tuning knob shaft and pulley on range switch shaft
11283	Resistor—1,200 ohms, carbon type, ½ watt (R3)
13737	Resistor—3,300 ohms, carbon type, ½ watt (R4)
14284	Resistor—22,000 ohms, carbon type, 1/10 watt (R6)
11305	Resistor—22,000 ohms, insulated, ½ watt (R5)
5029	Resistor—56,000 ohms, carbon type, ½ watt (R2)
11398	Resistor—220,000 ohms, carbon type, 1/10 watt (R8)
11453	Resistor—270,000 ohms, carbon type, 1/10 watt (R11)
11452	Resistor—470,000 ohms, carbon type, 1/10 watt (R1)
12200	Resistor—1 megohm, insulated, ½ watt (R12)
13730	Resistor—1 megohm, carbon type, ½ watt (R10)
12679	Resistor—2.2 megohm, insulated, ½ watt (R7)
14406	Resistor—2.2 ohms, flexible type, 3 watts (R13)
14350	Screw—No. 8-32x3/16 square head set screw for gear Stock No. 30085 and drum Stock No. 14345
14374	Shield—Antenna coil shield
13311	Shield—Chassis end shield and rubber mounting foot assembly
12008	Shield—I.F. transformer shield
14375	Shield—Oscillator coil shield
3682	Shield—Radiotron shield
14171	Socket—Dial lamp socket
4794	Socket—4-contact 1A4 or 30 Radiotron socket
4786	Socket—6-contact 1C6, 1F6 or 19 Radiotron socket
12007	Spring—Retaining spring for core Stock No. 12006
12907	Spring—Tension spring for indicator drive gear Stock No. 30085
14342	Spring—Tension spring for idler Stock No. 14341
14402	Switch—Range switch (S1, S2)
14401	Switch—Tone control switch and power switch (S3, S4, S5, S6)
12803	Transformer—Audio transformer pack (T1, T2)
14261	Transformer—First I.F. transformer (L11, L12, C20, C21)
14283	Transformer—Second I.F. transformer (L13, L14, C22, C23, C24, R6, R8)
14400	Volume Control (R9)
14379	Washer—Felt washer for indicator pointer
	REPRODUCER ASSEMBLIES (RL-73-1)
12642	Cone—Reproducer cone and dust cap (L15)
5118	Plug—3-contact male connector for reproducer
9712	Reproducer complete
	MISCELLANEOUS ASSEMBLIES
4289	Body—Fuse holder female body
4286	Bushing—Fuse holder bushing and ferrule
14408	Cable—Battery cable complete with fuse, fuse holder, one 7-contact female connector, three 2-contact male connectors and two battery clips
4288	Cap—Fuse holder male cap
14289	Clip—Battery clips, one marked "+" and one unmarked
12827	Connector—2-contact male connector for battery cable
14409	Connector—7-contact connector for battery cable
14396	Escutcheon—Station selector escutcheon and crystal
3748	Fuse—½ ampere (F1)
4290	Insulator—Fuse holder insulating sleeve
14359	Knob—Station selector knob
14269	Knob—Volume control, tone control or range switch knob
14410	Resistor—0.43 ohms, flexible resistor, ½ watt complete with clip (R14)
11210	Screw—Chassis mounting screw and washer assembly—for Model 85BK
11377	Screw—Chassis mounting screw and washer assembly—for Model 85BT
4284	Spring—Fuse holder tension spring
4982	Spring—Retaining spring for knob Stock No. 14359
14270	Spring—Retaining spring for knob Stock No. 14269
4285	Washer—Fuse holder insulating washer

RCA MFG. CO., INC.

MODEL 85T
Schematic
Chassis Wiring

MODEL 85T

Five-Tube, Single-Band, A-C, Superheterodyne Receiver

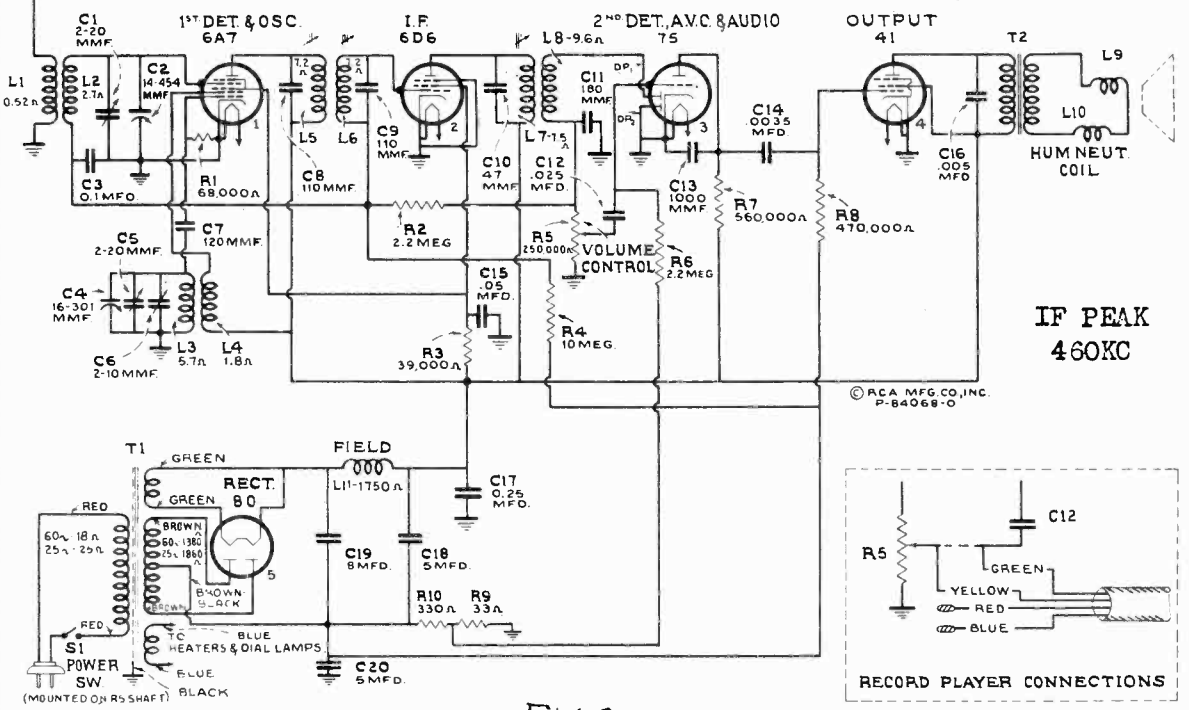


Fig. 2.

LOUDSPEAKER
Type ..... Electrodynamic
Voice Coil Impedance { (84011-3) 3.1— (84011-6) 2.7— } ohms at 400 cycles

POWER OUTPUT RATING
Undistorted .. 1.0 watts
Maximum ... 2.5 watts

POWER SUPPLY RATINGS
Rating A ..... 105-125 volts, 50-60 cycles, 55 watts
Rating B ..... 105-125 volts 25-60 cycles, 60 watts
Rating C .. 100-125/200-250 volts, 50-60 cycles, 55 watts
Pilot Lamp (1) .... Mazda No. 46, 6.3 volts, 0.25 ampere

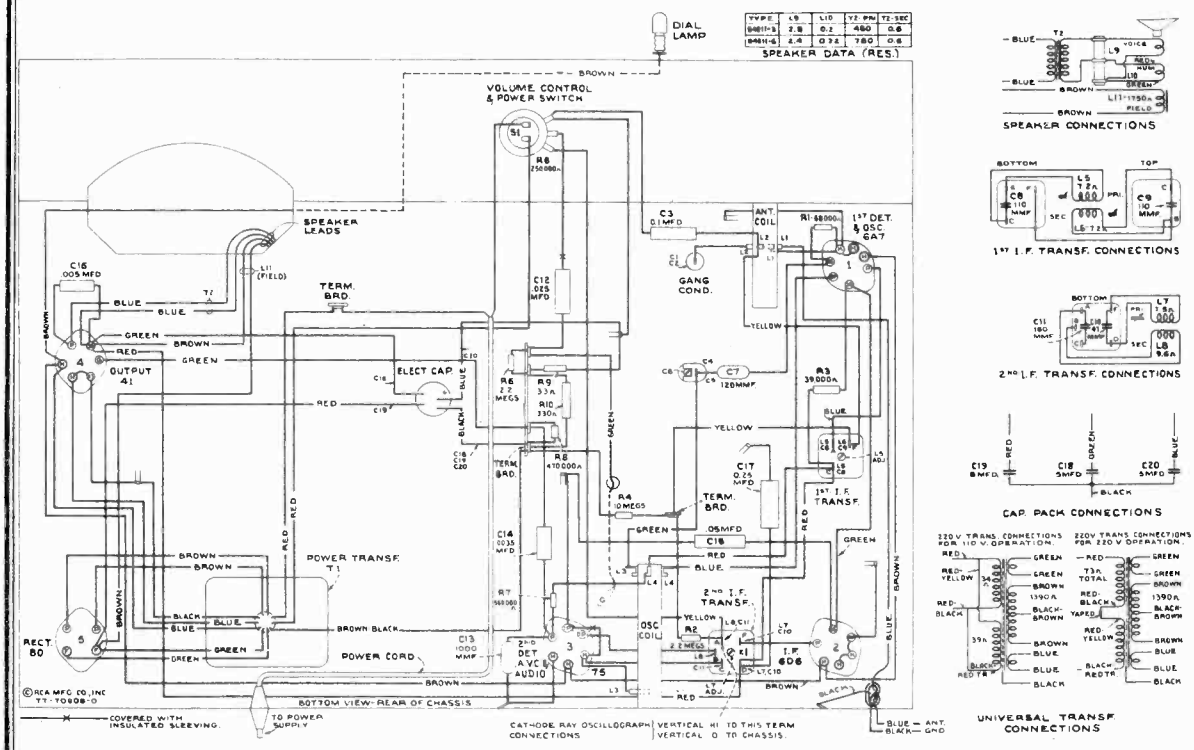


Figure 3—Chassis Wiring Diagram

Frequency Range ..... 530—1,720 kc R-F Alignment Frequency ..... 1,500 kc (osc., ant.)
Intermediate Frequency ..... 460 kc

MODEL 85T
Alignment, Voltage
Socket, Trimmers

RCA MFG. CO., INC.

Alignment Procedure

Calibrate the tuning dial by adjusting dial pointer to the center horizontal line with the gang tuning-condenser plates in full-mesh position. This is a screw-driver adjustment.

Perform alignment in proper order, tabulated below, starting with No. 1 and following all operations across, then No. 2, etc. Adjustment locations are shown on figures 1 and 4.

Cathode-ray alignment is preferable; the connections to the chassis are shown on figure 3. If an output indicator is used, connect it across the loudspeaker voice-coil and advance the receiver volume control to full-volume position.

Connect the "low" output terminal of the test oscillator to the receiver chassis for all alignment operations. Regulate the output of the test oscillator so that minimum signal is applied to the receiver to obtain an observable output indication. This will avoid a-v-c action.

The term "Dummy antenna" means the device which must be connected between the "high" test-oscillator output and the point of connection to the receiver in order to obtain ideal alignment. "No signal, 550-750 kc" means that the receiver should be tuned to a point between 550 and 750 kc where no signal or interference is received from a station or local (heterodyne) oscillator.

For further details on alignment, refer to booklet "RCA Victor Receiver Alignment."

Order of Alignment	Test Oscillator			Receiver Dial Setting	Circuit to Adjust	Adjustment Symbols	Adjust to Obtain
	Connection to Receiver	Dummy Antenna	Frequency Setting				
1	6D6 Grid Cap	.001 Mfd.	460 kc	No Signal 550-750 kc	2nd I-F Trans.	L7	Max. (peak)
2	6A7 Grid Cap	.001 Mfd.	460 kc	No Signal 550-750 kc	1st I-F Trans.	L5 and L6	Max. (peak)
3	Ant. Lead (blue)	200 Mmfd.	1,500 kc	1,500 kc	"A" Osc.	C5*	Max. (peak)
4	Ant. Lead (blue)	200 Mmfd.	1,500 kc	1,500 kc	"A" Ant.	C1	Max. (peak)

* Tighten capacitor C6 on bottom of gang (under chassis) for maximum capacity before adjusting C5.

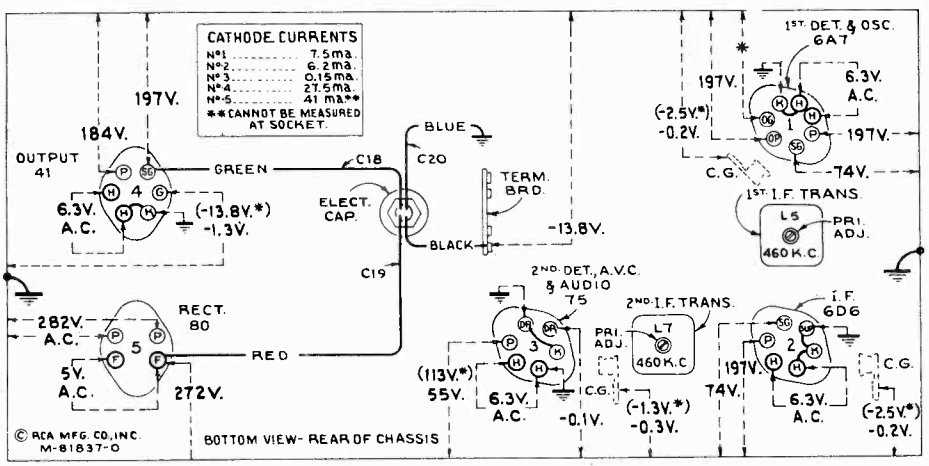


Figure 4—Radiotron Socket Voltages, Coil, and Trimmer Locations

Measured at 115 volts, 60-cycle supply—Tuned to approximately 1,000 kc ("Broadcast")—No signal being received—Volume control minimum

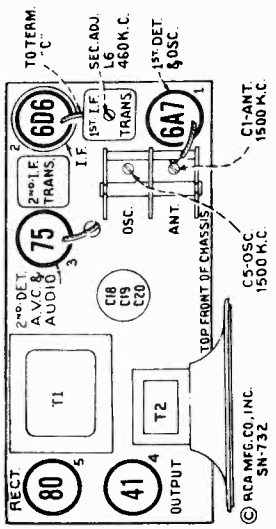


Figure 1—Radiotron, Coil, and Trimmer Locations

Note: Two voltage values are shown for some readings. The value shown in parentheses with asterisk (*) indicates operating conditions without voltmeter loading. The other value (generally lower) is the actual measured voltage and differs from the value shown in parentheses because of the additional loading of the voltmeter through the high series circuit resistance.

Voltage values as specified should hold within ±20% when the receiver is normally operative at its rated line voltage. To duplicate the conditions under which the voltages were measured requires a 1,000-ohm-per-volt d-c meter, having ranges of 10, 50, 250, and 500 volts. Use the nearest range above the specified measured voltage. A-c voltages were measured with a corresponding a-c meter.

RCA MFG. CO., INC.

General Description

This receiver employs a superheterodyne circuit, the arrangement of which is shown on figure 2. Its design includes magnetite-core adjusted i-f transformers; automatic volume control; resistance-coupled audio system; and a 5-inch, electrodynamic loudspeaker.

RADIOTRON COMPLEMENT

(1) RCA-6A7 ..... First Detector—Oscillator
(2) RCA-6D6 ..... Intermediate Amplifier
(3) RCA-75 ..... Second Det., A-F Amp. and A.V.C.
(4) RCA-41 ..... Audio Power Amplifier
(5) RCA-80 ..... Full-Wave Rectifier

Service Data

The various diagrams of this booklet contain such information as will be needed to isolate causes for defective operation if such develops. The ratings of the resistors, capacitors, coils, etc., are indicated adjacent to the symbols signifying these parts on the diagrams. Identification titles such as R1, L1, C1, etc., provide reference between the illustrations and Replacement Parts List. The coils, transformer windings, and reactors are rated in terms of d-c resistance to permit continuity checks.

Precautionary Lead Dress—(1) The green RCA-75 grid cap lead should be twisted with the yellow lead to the volume control to maintain proper position for prevention of hum pickup. (2) The green lead from oscillator coil L3 to tuning condenser C4 should be kept free from chassis. (3) Keep power cord and red primary leads of power transformer away from the green RCA-41 grid lead to prevent hum pickup. (4) Red lead from electrolytic capacitor C19 to RCA-80 socket should be dressed between power transformer and chassis apron to prevent hum pickup.

Phonograph Attachment—See Schematic Circuit Diagram, figure 2.

Loudspeaker—Centering of the loudspeaker voice coil is made in the usual manner with three narrow paper feelers.

REPLACEMENT PARTS

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

STOCK No.	DESCRIPTION
	RECEIVER ASSEMBLIES
14663	Belt—Variable condenser drive belt
14632	Bracket—Dial mounting bracket
12118	Cap—Grid contact cap
12405	Capacitor—47 Mmfd. (C10)
14262	Capacitor—110 Mmfd. (C8, C9)
12724	Capacitor—120 Mmfd. (C7)
12406	Capacitor—180 Mmfd. (C11)
12635	Capacitor—1,000 Mmfd. (C13)
5005	Capacitor—.0035 Mfd. (C14)
4838	Capacitor—.005 Mfd. (C16)
4870	Capacitor—.025 Mfd. (C12)
4886	Capacitor—.05 Mfd. (C15)
4841	Capacitor—0.1 Mfd. (C3)
12484	Capacitor—0.25 Mfd. (C17)
14669	Capacitor Pack—Comprising one 8-Mfd. and two 5-Mfd. sections (C18, C19, C20)
14670	Coil—Antenna coil (L1, L2)
14257	Coil—Oscillator coil (L3, L4)
14662	Condenser—2-gang variable condenser (C1, C2, C4, C5, C6)
12006	Core—Adjustable core and stud for I. F. transformer
14665	Dial—Station selector dial
14635	Indicator—Station selector indicator pointer
5226	Lamp—Dial lamp
14636	Pulley—Idler pulley—less spring
14664	Pulley—Variable condenser drive pulley—located on condenser shaft
14671	Resistor—33 Ohms—Carbon type, ½ watt (R9)
11670	Resistor—330 Ohms—Carbon type, 1 watt (R10)
8067	Resistor—39,000 Ohms—Carbon type, ½ watt (R3)
12333	Resistor—68,000 Ohms—Carbon type, ½ watt (R1)
11172	Resistor—470,000 Ohms—Carbon type, ½ watt (R8)
5035	Resistor—560,000 Ohms—Carbon type, ½ watt (R7)
11626	Resistor—2.2 Megohm—Carbon type, ½ watt (R2, R6)
13732	Resistor—10 Megohm—Carbon type, ½ watt (R4)
5129	Ring—Radiotron shield ring
4389	Screw—No. 6—32x3/16 headless set screw for pulley, Stock No. 14639
14638	Shaft—Station selector knob shaft and pulley
12008	Shield—First I. F. transformer shield
12408	Shield—Second I. F. transformer shield
11265	Shield—Radiotron shield
14658	Socket—Dial lamp socket
4794	Socket—4-contact 80 Radiotron socket
4786	Socket—6-contact 6D6, 41 or 75 Radiotron socket
4787	Socket—7-contact 6A7 Radiotron socket
14637	Spring—Idler pulley tension spring
12007	Spring—Retaining spring for core, Stock No. 12006
14376	Transformer—First I. F. transformer (L5, L6, C8, C9)
14642	Transformer—Second I. F. transformer (L7, L8, C10, C11)
14666	Transformer—Power transformer, 105-125 volts, 50-60 cycle (T1)
14667	Transformer—Power transformer, 105-125 volts, 25-60 cycle (T1)
14668	Transformer—Power transformer, 100-125/200-250 volts, 50-60 cycle (T1)
14645	Volume Control and power switch (R5, S1)
	REPRODUCER ASSEMBLIES
14676	Cone—Reproducer cone (L9) for speaker marked 84011-3
14939	Cone—Reproducer cone (L9) for speaker marked 84011-6
14675	Reproducer complete (84011-3)
14677	Transformer — Output transformer (T2) for speaker marked 84011-3
14940	Transformer — Output transformer (T2) for speaker marked 84011-6
	MISCELLANEOUS ASSEMBLIES
14654	Escutcheon—Station selector escutcheon and crystal
12673	Knob—Station selector or volume control knob
14267	Screw—Chassis mounting screw and washer
4119	Screw—No. 8-32 x ¼ headless set screw for knob, Stock No. 12673

MODEL 85T1
Notes,Parts

RCA MFG. CO., INC.

General Description

This receiver employs a superheterodyne circuit, the arrangement of which is shown on figure 2. Its design includes magnetite-core adjusted i-f transformers; automatic volume control; resistance-coupled audio system; and a 5-inch, electrodynamic loudspeaker.

RADIOTRON COMPLEMENT

(1) RCA-6A7 ..... First Detector—Oscillator
(2) RCA-6D6 ..... Intermediate Amplifier
(3) RCA-75 ..... Second Det., A-F Amp. and A.V.C.
(4) RCA-41 ..... Audio Power Amplifier
(5) RCA-80 ..... Full-Wave Rectifier

Service Data

The various diagrams of this booklet contain such information as will be needed to isolate causes for defective operation if such develops. The ratings of the resistors, capacitors, coils, etc., are indicated adjacent to the symbols signifying these parts on the diagrams. Identification titles such as R1, L1, C1, etc., provide reference between the illustrations and Replacement Parts List. The coils, transformer windings, and reactors are rated in terms of d-c resistance to permit continuity checks.

Precautionary Lead Dress—(1) Dress power line leads to the on-off switch away from grid connection terminal on volume control to reduce hum pickup. (2) Keep leads of capacitor C3 as short as possible. (3) Bus lead from range selector (ter. 6) to oscillator coil tap L6L8 should be maintained 3½ inches long for proper alignment. (4) Capacitor C25 should be dressed free of adjacent parts to maintain correct alignment at high-frequency end of "A" band. (5) Bus lead from range selector (ter. 3) to antenna coil L1 should be maintained 2¼ inches long for proper alignment. (6) The RCA-6A7 grid-cap lead (50-ohm resistor R18) to top of tuning capacitor C2 should be dressed properly to prevent shorts and should be maintained flexible to prevent acoustic howl.

Phonograph Attachment—See Schematic Circuit Diagram, figure 2.

Loudspeaker—Centering of the loudspeaker voice coil is made in the usual manner with three narrow paper feelers.

REPLACEMENT PARTS

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

STOCK No.	DESCRIPTION
	RECEIVER ASSEMBLIES
14634	Belt—Variable condenser drive belt
14632	Bracket—Dial mounting bracket
5237	Bushing—Variable condenser rubber mounting bushing
12118	Cap—Grid contact cap
12896	Capacitor—15 Mmfd. (C25)
12405	Capacitor—47 Mmfd. (C14)
14262	Capacitor—110 Mmfd. (C11, C12)
12724	Capacitor—120 Mmfd. (C7)
12406	Capacitor—180 Mmfd. (C16)
12812	Capacitor—450 Mmfd. (C8)
14724	Capacitor—560 Mmfd. (C17)
30245	Capacitor—.0045 Mfd. (C3)
4858	Capacitor—.01 Mfd. (C20, C22)
13138	Capacitor—.01 Mfd. (C9, C18)
4839	Capacitor—0.1 Mfd. (C4, C13, C19, C21)
12484	Capacitor—0.25 Mfd. (C15)
11203	Capacitor—10 Mfd. (C24)
5212	Capacitor—16 Mfd. (C23)
14377	Capacitor—16 Mfd. (C10)
14646	Coil—Antenna coil (L1, L2, L3)
14647	Coil—Oscillator coil (L6, L7, L8)
14633	Condenser—2-gang variable tuning condenser (C1, C2, C5, C6)
14648	Core—Adjustable core and stud for oscillator coil
12006	Core—Adjustable core and stud for I. F. transformer
14631	Dial—Station selector dial
14651	Drive—Variable condenser vernier drive and pinion gear
14635	Indicator—Station selector indicator pointer
5226	Lamp—Dial lamp
14636	Pulley—Idler pulley—less spring
14639	Pulley—Variable condenser drive pulley—located on condenser shaft
14660	Resistor—18 Ohms—Insulated, ½ watt (R14)
14653	Resistor—50 Ohms—Flexible type, 1/10 watt (R18)
13819	Resistor—270 Ohms—Wire wound, 1.1 watt (R15)
5175	Resistor—5,600 Ohms—Carbon type, ½ watt (R12)
14659	Resistor—6,800 Ohms—Carbon type, ½ watt (R3)
11305	Resistor—22,000 Ohms—Carbon type, ½ watt (R16)
5033	Resistor—33,000 Ohms—Carbon type, 1 watt (R4)
13735	Resistor—33,000 Ohms—Carbon type, ½ watt (R2)
11646	Resistor—47,000 Ohms—Carbon type, ½ watt (R9)
11323	Resistor—270,000 Ohms—Carbon type, ½ watt (R7, R8)
13733	Resistor—330,000 Ohms—Carbon type, ½ watt (R1)
13479	Resistor—390,000 Ohms—Carbon type, ½ watt (R10)
5035	Resistor—560,000 Ohms—Carbon type, ½ watt (R6)
12679	Resistor—2.2 Megohm—Insulated, ½ watt (R11)
14661	Resistor—6.8 Megohm—Insulated, ½ watt (R13)
5129	Ring—Radiotron shield ring
4389	Screw—No. 6—32 x 3/16 headless set screw for pulley, Stock No. 14639
14638	Shaft—Station selector knob shaft and pulley
12008	Shield—First I. F. transformer shield
12408	Shield—Second I. F. transformer shield
11265	Shield—Radiotron shield
14658	Socket—Dial lamp socket
4794	Socket—4-contact 80 Radiotron socket
4786	Socket—6-contact 6D6, 42 or 75 Radiotron socket
4787	Socket—7-contact 6A7 Radiotron socket
14637	Spring—Idler pulley tension spring
12007	Spring—Retaining spring for core, Stock Nos. 12006 and 14648
14640	Switch—Range switch (S2, S3)
14376	Transformer—First I. F. transformer (L4, L5, C11, C12)
14642	Transformer—Second I. F. transformer (L9, L10, C14, C16)
14655	Transformer—Power transformer, 105-125 volts, 50-60 cycle (T1)
14656	Transformer—Power transformer, 105-125 volts, 25-60 cycle (T1)
14657	Transformer—Power Transformer, 100-125/200-250 volts, 50-60 cycle (T1)
14645	Volume Control and power switch (R5, S1)
	REPRODUCER ASSEMBLIES
14679	Cone—Reproducer cone (L11) for speaker marked 84010-3
14941	Cone—Reproducer cone (L11) for speaker marked 84010-1
14678	Reproducer complete marked 84010-3
14680	Transformer — Output transformer (T2) for speaker marked 84010-3
14942	Transformer — Output transformer (T2) for speaker marked 84010-1
	MISCELLANEOUS ASSEMBLIES
14654	Escutcheon—Station selector escutcheon and crystal
12673	Knob—Station selector, volume control or range switch knob
14267	Screw—Chassis mounting screw and washer
4119	Screw—No. 8—32 x ¼ headless set screw for knob, Stock No. 12673

RCA MFG. CO., INC.

MODEL 85T1
Schematic
Chassis Wiring

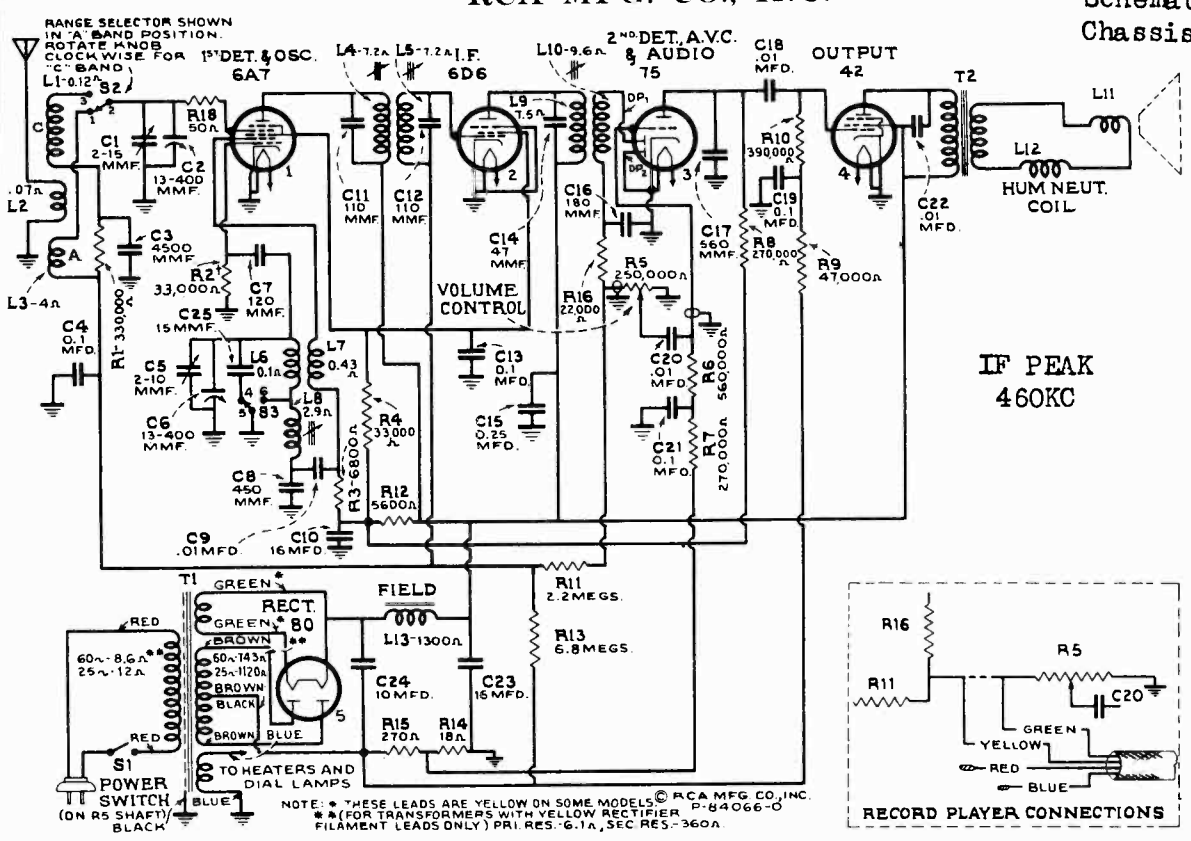
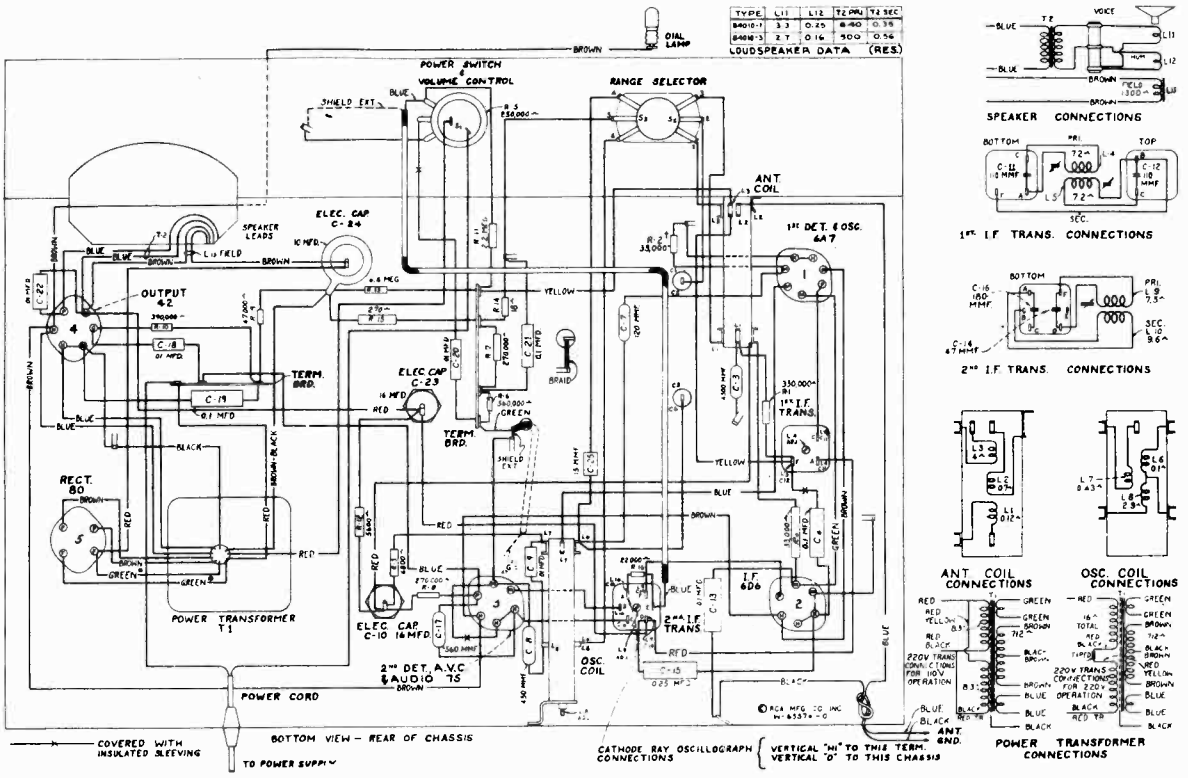


Figure 2—Schematic Circuit Diagram

† Resistor R2 is 56,000 ohms in some instruments. Replace with Stock No. 13735.



Power Output Rating

Loudspeaker
Type ..... Electrodynamic
Voice Coil Impedance { (84011-3) 3.1– (84011-6) 2.7– } ohms at 400 cycles
Undistorted ..... 1.0 watts
Maximum ..... 2.5 watts

Power Supply Ratings

Rating A ..... 105-125 volts, 50-60 cycles, 55 watts
Rating B ..... 105-125 volts, 25-60 cycles, 60 watts
Rating C .. 100-125/200-250 volts, 50-60 cycles, 55 watts
Pilot Lamp (1) ..... Mazda No. 46, 6.3 volts, 0.25 ampere

Frequency Ranges

"Broadcast" (A) ..... 540-1,720 kc
"Short Wave" (C) ..... 5,800-18,000 kc
Intermediate Frequency ..... 460 kc

R-F Alignment Frequencies

"Broadcast" (A) ..... 600 kc (osc.)
"Short Wave" (C) ..... 15,000 kc (osc., ant.)

MODEL 85T1
Alignment, Socket
Trimmers, Voltage

RCA MFG. CO., INC.

Alignment Procedure

Calibrate the tuning dial by adjusting dial pointer to the center horizontal line with the gang tuning-condenser plates in full-mesh position. This is a screw-driver adjustment.

Perform alignment in proper order, tabulated below, starting with No. 1 and following all operations across, then No. 2, etc. Adjustment locations are shown on figures 1 and 4.

Cathode-ray alignment is preferable; the connections to the chassis are shown on figure 3. If an output indicator is used, connect it across the loudspeaker voice-coil and advance the receiver volume control to full-volume position.

Connect the "low" output-terminal of the test oscillator to the receiver chassis for all alignment operations. Regulate the output of the test oscillator so that minimum signal is applied to the receiver to obtain an observable output indication. This will avoid a-v-c action.

The term "Dummy antenna" means the device which must be connected between the "high" test-oscillator output and the point of connection to the receiver in order to obtain ideal alignment. "No signal, 550-750 kc" means that the receiver should be tuned to a point between 550 and 750 kc where no signal or interference is received from a station or local (heterodyne) oscillator.

For further details on alignment, refer to booklet "RCA Victor Receiver Alignment."

Order of Alignment	Test Oscillator			Range-Selector	Receiver Dial Setting	Circuit to Adjust	Adjustment Symbols	Adjust to Obtain
	Connection to Receiver	Dummy Antenna	Frequency Setting					
1	6D6 I-F Grid Cap	.001 Mfd.	460 kc	"A" Left	No Signal 550-750 kc	2nd I-F Trans.	L9	Max. (peak)
2	6A7 Det. Grid Cap	.001 Mfd.	460 kc	"A" Left	No Signal 550-750 kc	1st I-F Trans.	L4 and L5	Max. (peak)
3	Ant. Lead (blue)	300 Ohms	15,000 kc	"C" Right	15,000 kc	"C" Osc.	C5	Max. (peak)†
4	Ant. Lead (blue)	300 Ohms	15,000 kc	"C" Right	Rock Through 15,000 kc	"C" Ant.	C1	Max. (peak)* ‡
5	Ant. Lead (blue)	200 Mmfd.	600 kc	"A" Left	600 kc	"A" Osc.	L8	Max. (peak)

† Use maximum capacity peak if two peaks can be obtained.
* Use minimum capacity peak if two peaks can be obtained.
‡ After this adjustment, check for image signal by shifting receiver dial to 15,920 kc.

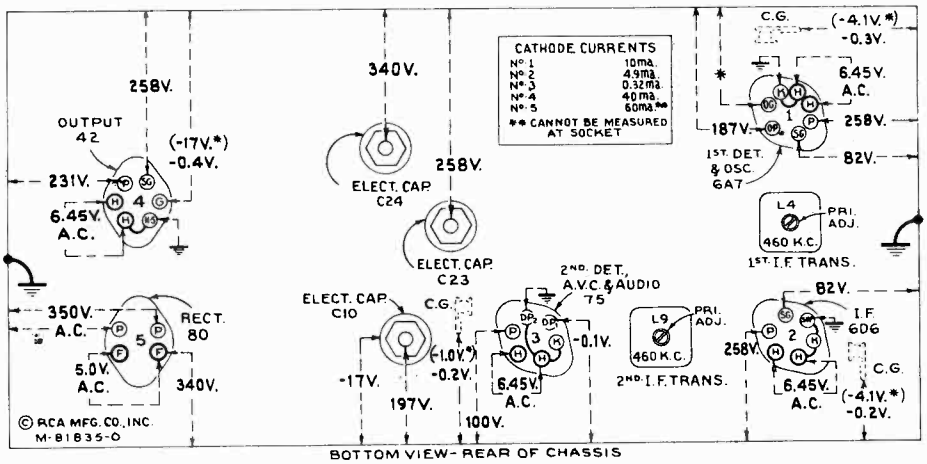


Figure 4—Radiotron Socket Voltages, Coil, and Trimmer Locations
Measured at 115 volts, 60-cycle supply—Tuned to approximately 1,000 kc ("Broadcast")—No signal being received—Volume control minimum

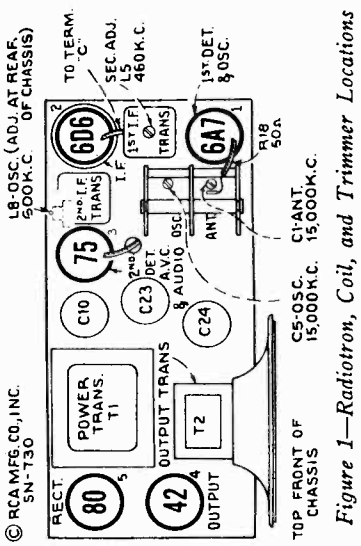


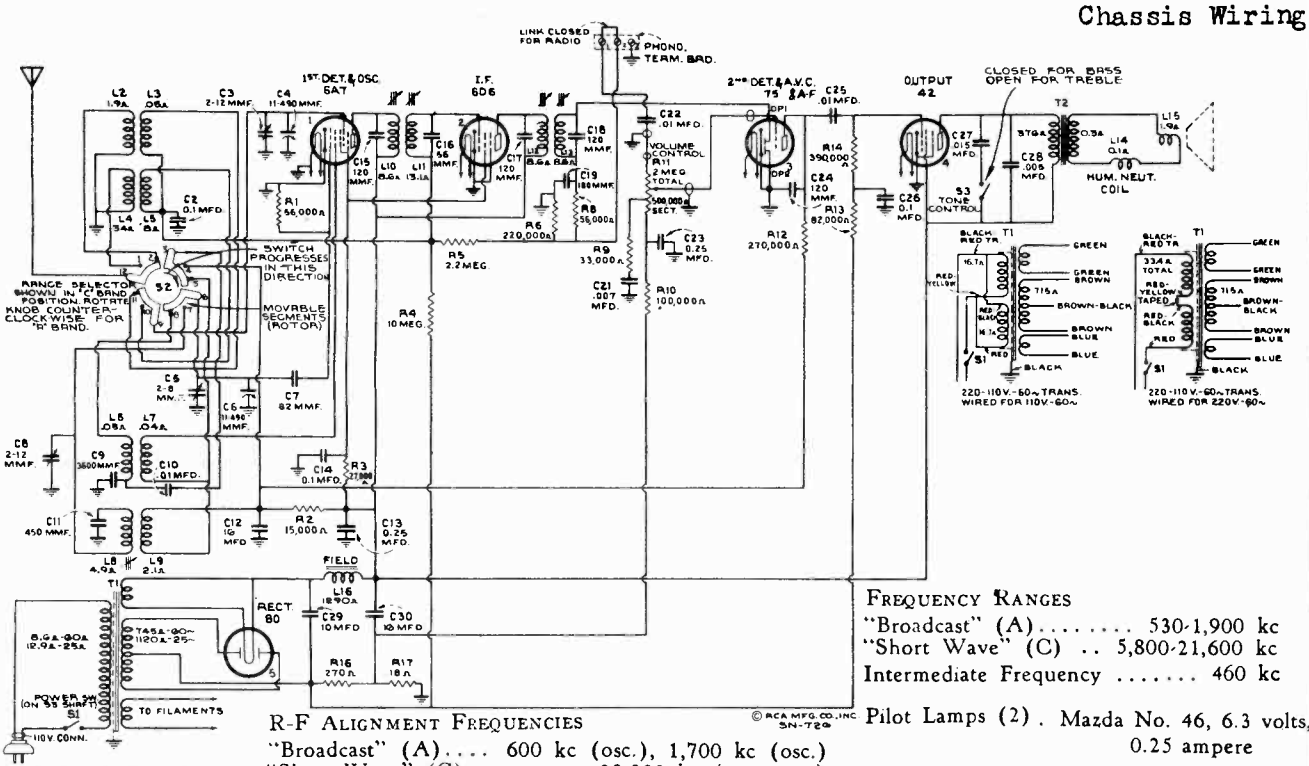
Figure 1—Radiotron, Coil, and Trimmer Locations

***Note:** Two voltage values are shown for some readings. The value shown in parentheses with asterisk (*) indicates operating conditions without voltmeter loading. The other value (generally lower) is the actual measured voltage and differs from the value shown in parentheses because of the additional loading of the voltmeter through the high series circuit resistance.*

Voltage values as specified should hold within ±20% when the receiver is normally operative at its rated line voltage. To duplicate the conditions under which the voltages were measured requires a 1,000-ohm-per-volt d-c meter, having ranges of 10, 50, 250, and 500 volts. Use the nearest range above the specified measured voltage. A-c voltages were measured with a corresponding a-c meter.

RCA MFG. CO., INC.

MODEL 85T5
Schematic
Chassis Wiring



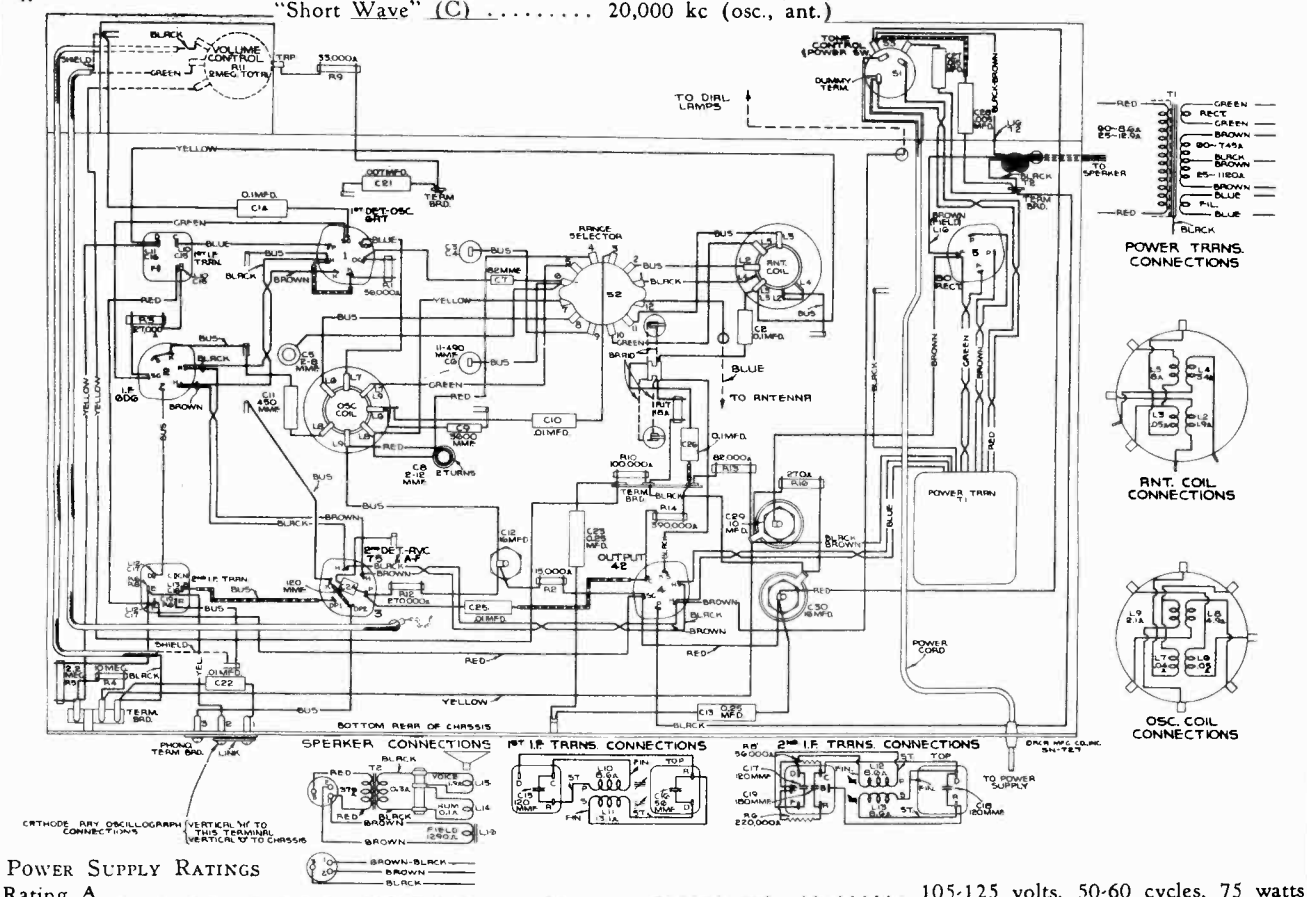
Frequency Ranges

"Broadcast" (A) ..... 530-1,900 kc
"Short Wave" (C) .. 5,800-21,600 kc
Intermediate Frequency ..... 460 kc

Pilot Lamps (2). Mazda No. 46, 6.3 volts, 0.25 ampere

R-F Alignment Frequencies

"Broadcast" (A).... 600 kc (osc.), 1,700 kc (osc.)
"Short Wave" (C) ..... 20,000 kc (osc., ant.)



Power Supply Ratings

Rating A ..... 105-125 volts, 50-60 cycles, 75 watts
Rating B ..... 105-125 volts, 25-60 cycles, 75 watts
Rating C ..... 100-125/200-250 volts, 50-60 cycles, 75 watts

Power Output Rating

Undistorted ..... 2.0 watts
Maximum ..... 4.5 watts

Loudspeaker

Type ..... Electrodynamic
Voice Coil Impedance ..... 2¼ ohms at 400 cycles

MODEL 85T5
Alignment, Socket Trimmers

RCA MFG. CO., INC.

Alignment Procedure

Calibrate the tuning dial by adjusting dial pointer to the low-frequency (end) calibration mark on "Broadcast" scale with the gang tuning-condenser plates in full-mesh position. This is a friction adjustment.

Perform alignment in proper order, tabulated below, starting with No. 1 and following all operations across, then No. 2, etc. Adjustment locations are shown on figures 1 and 4.

Cathode-ray alignment is preferable; the connections to the chassis are shown on Figure 3. If an output indicator is used, connect it across the loudspeaker voice-coil and advance the receiver volume control to full-volume position.

Connect the "low" output terminal of the test oscillator to the receiver chassis for all alignment operations. Regulate the output of the test oscillator so that minimum signal is applied to the receiver to obtain an observable output indication. This will avoid a-v-c action.

The term "Dummy antenna" means the device which must be connected between the "high" test-oscillator output and the point of connection to the receiver in order to obtain ideal alignment. "No signal, 550-750 kc" means that the receiver should be tuned to a point between 550 and 750 kc where no signal, or interference is received from a station or local (heterodyne) oscillator.

For further details on alignment, refer to booklet "RCA Victor Receiver Alignment."

Order of Alignment	Test Oscillator			Receiver Dial Setting	Circuit to Adjust	Adjustment Symbols	Adjust to Obtain
	Connection to Receiver	Dummy Antenna	Frequency Setting				
1	6D6 I-F Grid Cap	.001 Mfd.	460 kc	No Signal 550-750 kc	2nd I-F Trans.	L12 and L13	Max. (peak)
2	6A7 Det. Grid Cap	.001 Mfd.	460 kc	No Signal 550-750 kc	1st I-F Trans.	L10 and L11	Max. (peak)
3	Ant. Post	300 Ohms	20,000 kc	20,000 kc	"C" Osc.	C5	Max. (peak)*
4	Ant. Post	300 Ohms	20,000 kc	Rock Thru 20,000 kc	"C" Ant.	C3	Max. (peak)†
5	Ant. Post	200 Mmfd.	600 kc	600 kc	"A" L-F Osc.	L8	Max. (peak)
6	Ant. Post	200 Mmfd.	1,700 kc	1,700 kc	"A" H-F Osc.	C8	Max. (peak)
7	Ant. Post	200 Mmfd.	600 kc	Rock Thru 600 kc	"A" L-F Osc.	L8	Max. (peak)
8	Ant. Post	200 Mmfd.	1,700 kc	1,700 kc	"A" H-F Osc.	C8	Max. (peak)

* Use minimum capacity peak.
† Use maximum capacity peak.

Precautionary Lead Dress.—(1) Keep leads of C2 and C9 as short as possible. (2) Dress leads from power transformer and a-c switch away from antenna coil and associated wiring. (3) Red lead from range selector "ter 4" to oscillator coil L9 should have two tight turns around trimming capacitor C8.

Phonograph Attachment.—A terminal board is provided for connecting a phonograph into the audio-amplifying circuit. RCA Victor Models R-93, R-93-A, R-93-2, R-93-S, or R-94 Record Players should be connected as follows: Remove link between terminals 1 and 2 on receiver. Connect green wire in Radio-Record switch cable to terminal 1, yellow to terminal 2; and shield extension to terminal 3. Tape unused red and blue leads separately. Connect a 2-conductor twisted cable between the Record Player binding posts and the screw terminals on Radio-Record switch.

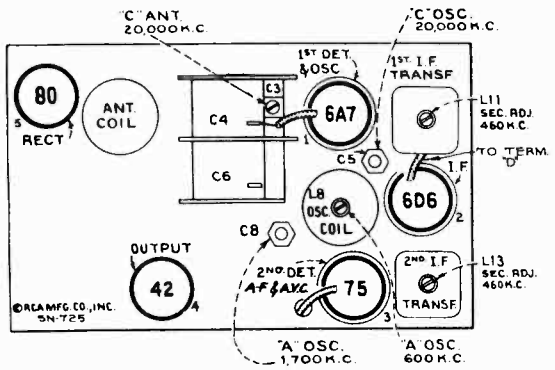


Figure 1—Radiotron, Coil, and Trimmer Locations

Loudspeaker.—Centering of the loudspeaker is made in the usual manner with three narrow paper feelers after first removing the front dust cover. This may be removed by softening its cement with a light application of acetone, using care not to allow the acetone to flow into the air gap. The dust cover should be cemented back in place with ambroid upon completion of adjustment.

MODEL 85T5
Voltage, Parts

RCA MFG. CO., INC.

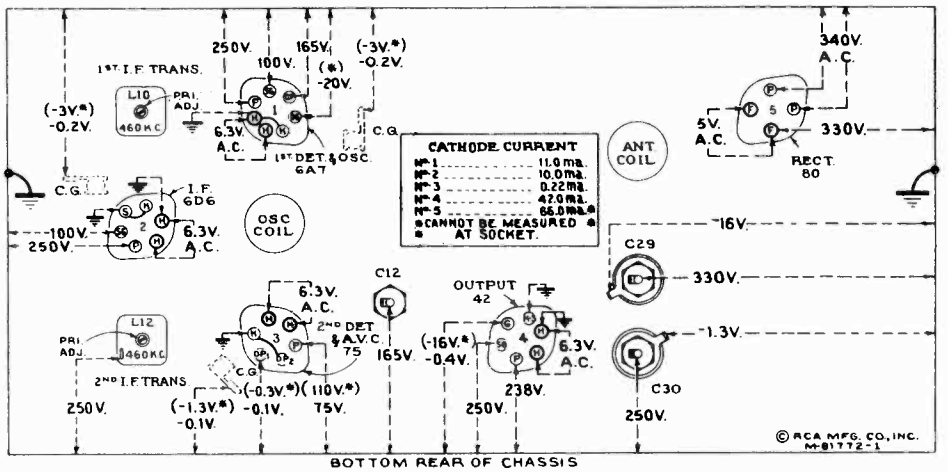


Figure 4—Radiotron Socket Voltages, Coil, and Trimmer Locations
Measured at 115 volts, 60-cycle supply—Tuned to approximately 1,000 kc ("Broadcast")—No signal being received—Volume control minimum

Note: Two voltage values are shown for some readings. The value shown in parentheses with asterisk (*) indicates operating conditions without voltmeter loading. The other value (generally lower) is the actual measured voltage and differs from the value shown in parentheses because of the additional loading of the voltmeter through the high series circuit resistance.

Voltage values as specified should hold with in ±20% when the receiver is normally operative at its rated line voltage. To duplicate the conditions under which the voltages were measured requires a 1,000-ohm-per-volt d-c meter, having ranges of 10, 50, 250, and 500 volts. Use the nearest range above the specified measured voltage. A-c voltages were measured with a corresponding a-c meter.

STOCK No.	DESCRIPTION
	RECEIVER ASSEMBLIES
14352	Belt—Variable condenser drive belt
12717	Board—Phonograph terminal board
14338	Bushing—Variable condenser mounting bushing assembly
12607	Cap—First I.F. transformer shield top
12581	Cap—Second I.F. transformer shield top
12118	Cap—Grid contact cap
12714	Capacitor—Adjustable trimmer (Medium) (C8)
12807	Capacitor—Adjustable trimmer (Short) (C5)
12629	Capacitor—56 Mmfd. (C16)
13394	Capacitor—82 Mmfd. (C7)
12404	Capacitor—120 Mmfd. (C15, C17, C18)
12724	Capacitor—120 Mmfd. (C24)
12406	Capacitor—180 Mmfd. (C19)
12812	Capacitor—450 Mmfd. (C11)
12811	Capacitor—3,600 Mmfd. (C9)
5148	Capacitor—.007 Mfd. (C21)
4868	Capacitor—.005 Mfd. (C28)
11315	Capacitor—.015 Mfd. (C27)
4858	Capacitor—.01 Mfd. (C10, C22, C25)
4841	Capacitor—0.1 Mfd. (C2, C14, C26)
4840	Capacitor—0.25 Mfd. (C23)
5170	Capacitor—0.25 Mfd. (C13)
11240	Capacitor—10 Mfd. (C29)
5212	Capacitor—16 Mfd. (C30)
14377	Capacitor—16 Mfd. (C12)
12797	Coil—Antenna coil and shield (L2, L3, L4, L5)
12798	Coil—Oscillator coil and shield (L6, L7, L8, L9)
14348	Condenser—2-gang variable tuning condenser (C3, C4, C6)
5119	Connector—3-contact female connector for speaker cable
12800	Core—Adjustable core and stud assembly for coil Stock No. 12798
12006	Core—Adjustable core and stud for transformer Stock No. 12801 and No. 12653
14339	Dial—Station dial and mounting bracket assembly
14353	Drive—Variable condenser vernier drive pinion gear and shaft
14345	Drum—Variable condenser drive belt drum complete with set screws
14349	Gear—Indicator drive gear and hub complete with set screws
14351	Gear—Indicator pointer stem and gear complete with tension spring
14341	Idler—Station selector drive belt idler
14344	Indicator—Station selector indicator pointer
5226	Lamp—Dial lamp
14028	Nut—Jamb nut for trimmer capacitors
14340	Pulley—Station selector drive belt pulley and knob shaft
14347	Reflector—Dial reflector and lamp bracket assembly
14343	Retainer—Drive shaft and pulley retainer—holds tuning knob shaft and pulley on range switch shaft
13674	Resistor—18 Ohms, Carbon type, ½ watt (R17)
13819	Resistor—270 Ohms, Insulated wire wound, 1.1 watt (R16)
12759	Resistor—15,000 Ohms, Carbon type, ½ watt (R2)
13177	Resistor—27,000 Ohms, Carbon type, 1 watt (R3)
13735	Resistor—33,000 Ohms, Carbon type, ½ watt (R9)
5029	Resistor—56,000 Ohms, Carbon type, ½ watt (R1)
11282	Resistor—56,000 Ohms, Carbon type, 1/10 watt (R8)

STOCK No.	DESCRIPTION
11365	Resistor—82,000 Ohms, Carbon type, ½ watt (R13)
5145	Resistor—100,000 Ohms, Carbon type, ½ watt (R10)
11398	Resistor—220,000 Ohms, Carbon type, 1/10 watt (R6)
11323	Resistor—270,000 Ohms, Carbon type, ½ watt (R12)
13479	Resistor—390,000 Ohms, Carbon type, ½ watt (R14)
11626	Resistor—2.2 Megohm, Carbon type, ½ watt (R5)
13732	Resistor—10 Megohm, Carbon type, ½ watt (R4)
14350	Screw—No. 8-32 x 3/16 Square head set screw for gear Stock No. 14349 and drum Stock No. 14345
12799	Shield—Antenna or oscillator coil shield
13311	Shield—Chassis end shield and mounting bracket assembly
12008	Shield—I. F. transformer shield for Stock No. 12801 and No. 12653
3682	Shield—Shield for 75 Radiotron
3950	Shield—Shield for 6D6 Radiotron
14114	Socket—Dial lamp socket
4794	Socket—4 contact 80 Radiotron socket
4786	Socket—6 contact 6D6, 42 or 75 Radiotron socket
4787	Socket—7 contact 6A7 Radiotron socket
12007	Spring—Retaining spring for core Stock No. 12006
14342	Spring—Tension spring for idler Stock No. 14341
12907	Spring—Tension spring for indicator gear Stock No. 14351
14336	Switch—Range switch (S2)
14337	Switch—Tone control switch and power switch (S1, S3)
12801	Transformer—First I. F. transformer (L10, L11, C15, C16)
12653	Transformer—Second I. F. transformer (L12, L13, C17, C18, R6, R8)
13392	Transformer—Power transformer, 105-125 volts, 50-60 cycle (T1)
13566	Transformer—Power transformer, 105-125 volts, 25-60 cycles (T1)
13393	Transformer—Power transformer, 105-125, 210-250 volts, 50-60 cycle (T1)
14335	Volume Control—(R11)
13192	Washer—Felt washer for indicator pointer
	REPRODUCER ASSEMBLIES (RL-63F-1)
14356	Board—3 contact reproducer terminal board
13866	Cap—Cone center dust cap
12012	Coil—Field coil (L16)
11469	Coil—Hum neutralizing coil (L14)
12642	Cone—Reproducer cone and dust cap (L15)
5118	Plug—3 contact male plug for reproducer
14360	Reproducer—Reproducer complete
14358	Screw—Screw, washer and lockwasher to hold core in yoke
14355	Transformer—Output transformer (T2)
14357	Washer—Spring washer to hold field coil
	MISCELLANEOUS ASSEMBLIES
14479	Escutcheon—Station selector escutcheon and crystal
14269	Knob—Volume control, tone control or range switch knob
14359	Knob—Station selector knob
11377	Screw—Chassis mounting screw and washer assembly
4982	Spring—Retaining spring for knob Stock No. 14359
14270	Spring—Retaining spring for knob Stock No. 14269

Precautionary Lead Dress.—(1) Twisted leads from filament switch to power plug must be dressed against bottom of end shield and fastened with tape. (2) Lead from term. No. 6 of S3 to chassis must be as short as possible and to same chassis lance as C15-C34. (3) Keep lead from term. No. 9 of S3 to L7-L8 as short as possible. (4) Keep lead from L7 to C11 as short as possible. (5) Keep lead from C10 to C11 as short as possible. (6) Keep leads of C41 as short as possible. (7) Keep lead from term. No. 20 of S2 to C13 as short as possible.

Phonograph Attachment.—A terminal board is provided for connecting a phonograph into the audio amplifying circuit. RCA Victor Model R-93-S Record Player should be connected as follows: Remove link between terminals 1 and 2 on terminal board. Connect green wire in Radio-Record switch cable to terminal 1, yellow to terminal 2, and shield extension to terminal 3. Tape unused red and blue leads separately. Connect a 2-conductor twisted cable between the Record Player binding posts and the screw terminals on Radio-Record switch.

Loudspeaker.—Centering of the loudspeaker is made in the usual manner with three narrow paper feelers after first removing the front dust cover. This may be removed by softening its cement with a light application of acetone, using care not to allow the acetone to flow into the air gap. The dust cover should be cemented back in place with ambroid upon completion of adjustment.

Bias Cells.—Three bias cells are used only for the purpose of supplying bias potential to the 1C6 first-detector—oscillator tube. These cells should never be measured with an ordinary voltmeter or other device which draws any current. A simple check on these cells may be made by connecting a milliammeter in the plate circuit of the 1C6 tube and noting the plate current reading. Then carefully remove the cells and substitute a battery potential of 2.7 volts in their place and note the new reading on the milliammeter. If the first reading obtained (with bias cells) is more than 40% from the latter reading (with 2.7-volt battery), the bias cells should be replaced. This 40% difference is equivalent to a change of approximately 25% battery voltage.

Operation With CV-8 Pak-O-Powr.—These receivers may readily be operated from an RCA CV-8 Pak-O-Powr, in which case, a six-volt storage battery replaces the "A" and "B" batteries listed under "Batteries required." When using the CV-8, one cell (2 volts) of the storage battery supplies filament voltage to the tubes, while the other two cells (4 volts) supplies power for the CV-8. When installing, the seven prong CV-8 receptacle plugs into the seven prong plug on the rear apron of the receiver chassis and the four battery leads clip on terminals of the storage battery as follows: Red to + 6 V.; Blue to + 4 V.; Yellow to + 4 V.; and brown (fused lead) to —V. The two four-volt leads (Blue and Yellow) should make separate connections to the same battery strap to avoid vibrator buzz which might otherwise result if these two leads are joined together or touch each other. Observe extreme care that proper connections are made to the battery, as a wrong connection will burn out the tubes. The green lead (originally connected to — 3 v. on the "C" battery) should be shifted to the — 4.5 volt tap. The other "C" battery connections remain unchanged.

STOCK No.	DESCRIPTION
	RECEIVER ASSEMBLIES
14388	Belt—Variable condenser drive belt
12717	Board—Phonograph terminal board
13218	Board—Antenna and ground terminal board
14338	Bushing—Variable condenser mounting bushing and screw assembly
12607	Cap—First I.F. transformer shield top
12581	Cap—Second I.F. transformer shield top
12118	Cap—Grid contact cap
14392	Capacitor—4.7 Mmfd. (C3, C9)
12629	Capacitor—56 Mmfd. (C17)
12723	Capacitor—56 Mmfd. (C24)
12813	Capacitor—82 Mmfd. (C14)
14262	Capacitor—110 Mmfd. (C16)
12724	Capacitor—120 Mmfd. (C28)
12404	Capacitor—120 Mmfd. (C20, C21)
12406	Capacitor—180 Mmfd. (C25)
13052	Capacitor—470 Mmfd. (C6, C12)
12727	Capacitor—555 Mmfd. (C38)
14417	Capacitor—680 Mmfd. (C8)
14407	Capacitor—2,800 Mmfd. (C36)
12728	Capacitor—4,500 Mmfd. (C41)
5005	Capacitor—.0035 Mfd. (C29)
5107	Capacitor—.0025 Mfd. (C26, C30, C32)
5196	Capacitor—.035 Mfd. (C31)
13138	Capacitor—.01 Mfd. (C7, C23, C40)
4841	Capacitor—0.1 Mfd. (C1, C19, C22, C27)
4840	Capacitor—0.25 Mfd. (C18, C33)
14383	Capacitor—Adjustable dual trimmer (C37, C39)
12884	Capacitor—Adjustable trimmer (long) (C4)
12714	Capacitor—Adjustable trimmer (medium) (C10)
12807	Capacitor—Adjustable trimmer (short) (C35)
14403	Capacitor—Pack comprising two sections each 8 Mfd. (C15, C34)
12681	Cell—Bias cell
14372	Coil—Antenna coil and shield (L1, L2, L3, L4)
14373	Coil—Oscillator coil and shield (L11, L12, L13, L14, L15, L16)
14414	Coil—R.F. coil and shield (L5, L6, L7, L8, L9, L10)
14411	Condenser—3-gang variable tuning condenser (C5, C11, C13)
5119	Connector—3-contact female connector for reproducer cable
12006	Core—Adjustable core and stud for I.F. transformers
12800	Core—Adjustable core and stud assembly for oscillator coil
14416	Dial—Station selector dial scale
14412	Drive—Variable condenser vernier drive shaft and pinion gear
14345	Drum—Variable condenser drive belt drum complete with set screws
14415	Foot—Chassis mounting foot and bracket assembly
30085	Gear—Indicator drive gear and hub assembly and pointer stem and gear assembly
14405	Holder—Bias cell holder
14341	Idler—Station selector drive belt idler
14344	Indicator—Station selector indicator pointer
14382	Indicator—Vernier indicator pointer
4348	Lamp—Dial lamp
14028	Nut—Jamb nut for air trimmer capacitors
14404	Plug—7-contact male plug located on rear apron of chassis for battery cable
14340	Pulley—Station selector drive belt pulley and knob shaft
14361	Reflector—Dial reflector and lamp bracket assembly
14406	Resistor—2.2 ohms, flexible type, 3 watt (R15)
5112	Resistor—1,000 ohms, carbon type, ½ watt (R2)
11283	Resistor—1,200 ohms, carbon type, ½ watt (R16)
5144	Resistor—2,700 ohms, carbon type, ½ watt (R14)
11305	Resistor—22,000 ohms, carbon type, ½ watt (R5)
14284	Resistor—22,000 ohms, carbon type, 1/10 watt (R7)
14390	Resistor—27,000 ohms, carbon type, 1/10 watt (R9)
12286	Resistor—56,000 ohms, insulated, ½ watt (R4)
13734	Resistor—120,000 ohms, carbon type, ½ watt (R12)
11398	Resistor—220,000 ohms, carbon type, 1/10 watt (R8)
11452	Resistor—470,000 ohms, carbon type, 1/10 watt (R1, R3)
13730	Resistor—1 megohm, carbon type, ½ watt (R11, R13)
11626	Resistor—2.2 megohm, carbon type, ½ watt (R6)
14343	Retainer—Drive shaft and pulley retainer
14350	Screw—No. 8-32x3/16 square head set screw for gear Stock No. 30085 and drum Stock No. 14345
12008	Shield I.F. transformer shield can
14374	Shield—R.F. or antenna coil shield
14375	Shield—Oscillator coil shield
3682	Shield—Radiotron shield
4794	Socket—4-contact 1A4 or 30 Radiotron socket
4786	Socket—6-contact 1C6, 1F6 or 19 Radiotron socket
14171	Socket—Dial lamp socket
12907	Spring—Tension spring for indicator drive gear Stock No. 30085
14342	Spring—Tension spring for idler Stock No. 14341
12007	Spring—Retaining spring for core Stock No. 12006
14413	Switch—Range switch (S1, S2)
14401	Switch—Tone control switch and power switch (S4, S5, S6, S7)
14261	Transformer—First I.F. transformer (L17, L18, C16, C17)
14283	Transformer—Second I.F. transformer (L19, L20, C20, C21, C25, R7, R8)
12803	Transformer—Audio transformer pack (T1, T2)
14379	Washer—Felt washer for indicator pointer
14335	Volume Control (R10)
	REPRODUCER ASSEMBLIES
	CONSOLE MODEL (Speaker No. RL71-1)
12667	Cone—Reproducer cone and dust cap (L21)
5118	Plug—3-contact male connector for reproducer
9713	Reproducer—Complete
	TABLE MODEL (Speaker No. RL73-1)
12642	Cone—Reproducer cone and dust cap (L21)
5118	Plug—3-contact male connector for reproducer
9712	Reproducer—Complete
	MISCELLANEOUS ASSEMBLIES
4289	Body—Fuse holder female body
4286	Bushing—Fuse holder bushing and ferrule
14408	Cable—Battery cable complete with fuse, fuse holder, one 7-contact female connector, three 2-contact male connectors and two battery clips
4288	Cap—Fuse holder male cap
14289	Clip—Battery clips, one marked "+" and one unmarked
12827	Connector—2-contact male connector for battery cable
14409	Connector—7-contact female connector for battery cable
14396	Escutcheon—Station selector escutcheon and crystal
3748	Fuse—½ ampere (F1)
14269	Knob—Volume control, tone control or range switch knob
14359	Knob—Station selector knob
4290	Insulator—Fuse holder insulating sleeve
14418	Resistor—0.33 ohms flexible resistor—½ watt, complete with clip (R17)
11210	Screw—Chassis mounting screw and washer for Model 86BK
11377	Screw—Chassis mounting screw and washer for Model 86BT
4284	Spring—Fuse holder tension spring
4982	Spring—Retaining spring for knob Stock No. 14359
14270	Spring—Retaining spring for knob Stock No. 14269
4285	Washer—Fuse holder insulating washer

The following changes under "Electrical specifications" become effective when employing the CV-8; "A" battery current drain at 6 volts, 1.65 amperes. Fuse rating, 5 amperes. Undistorted output, 1.3 watts. Maximum output, 1.8 watts. Under "Service data," the following voltages apply to the RCA-19 power-output tube. Either plate to chassis, 180 volts. Either grid to chassis, — 4½ volts. Plate current (either plate), 1.6 ma.

When servicing, the CV-8 chassis should be insulated from the receiver chassis to avoid vibrator buzz.

RCA MFG. CO., INC.

MODELS 86BK, 86BT
Schematic, Socket Trimmers

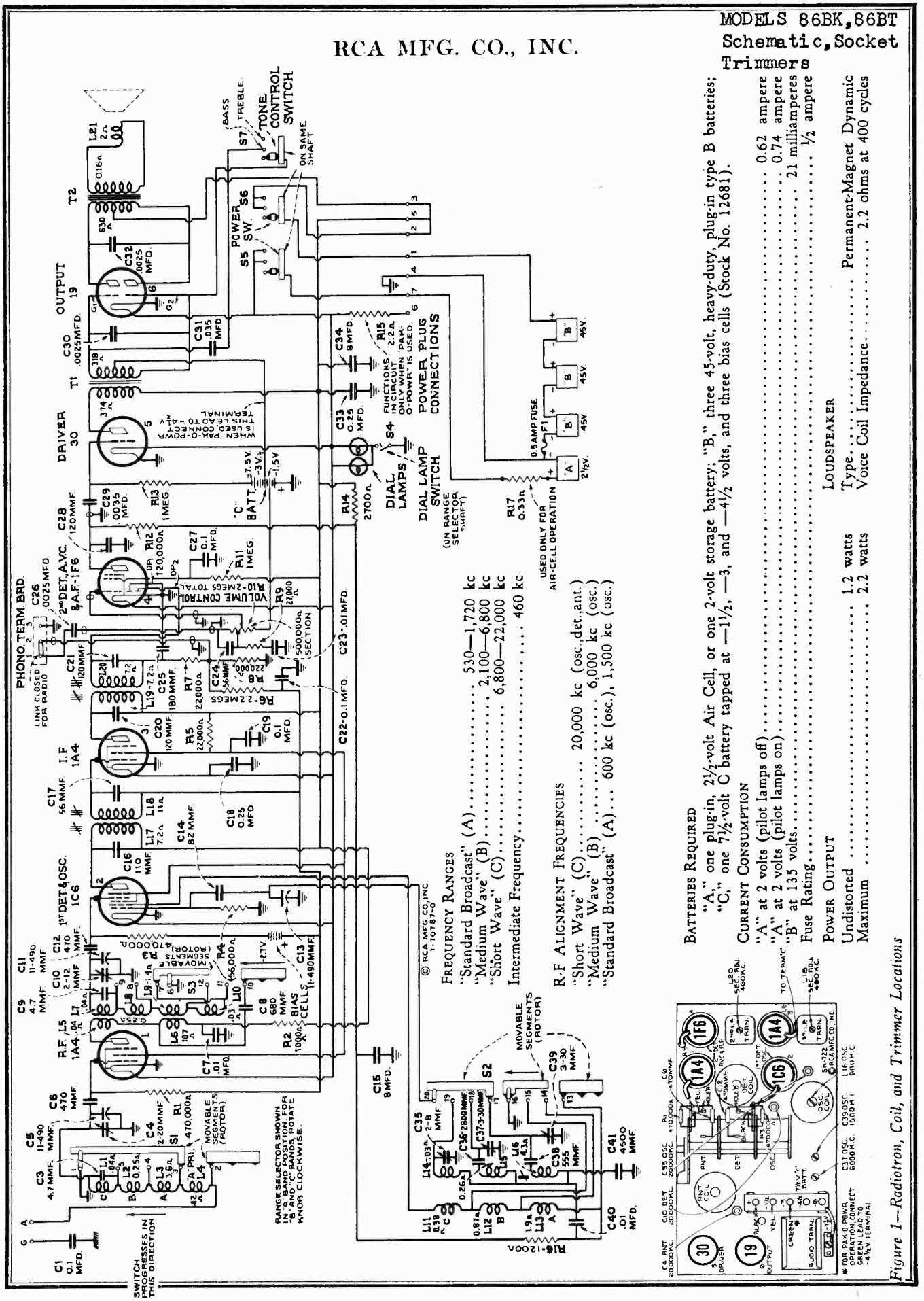
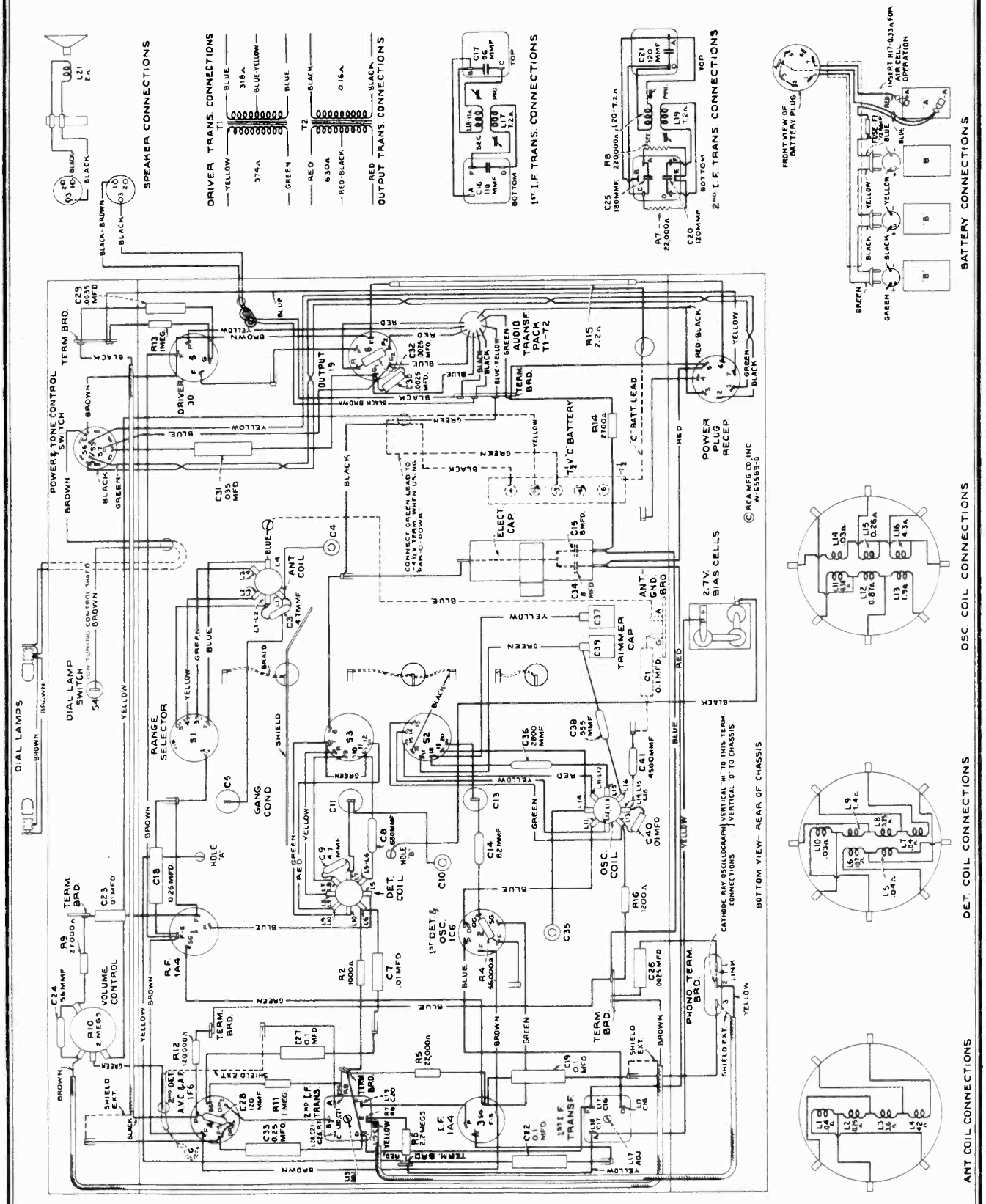


Figure 1—Radiotron, Coil, and Trimmer Locations

MODELS 86BK, 86BT
Chassis Wiring

RCA MFG. CO., INC.



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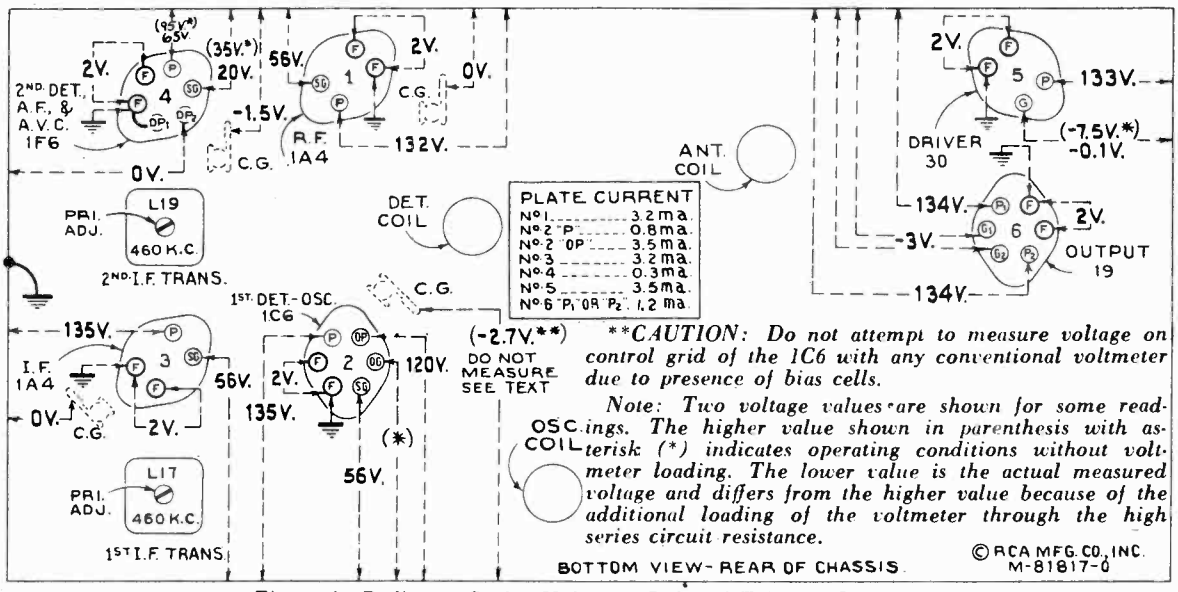


Figure 4—Radiotron Socket Voltages, Coil, and Trimmer Locations

Measured with all batteries at normal voltage—Tuned to approximately 1,000 kc—
No signal being received—Volume control minimum

***CAUTION: Do not attempt to measure voltage on control grid of the 1C6 with any conventional voltmeter due to presence of bias cells.*

Note: Two voltage values are shown for some readings. The higher value shown in parenthesis with asterisk (*) indicates operating conditions without voltmeter loading. The lower value is the actual measured voltage and differs from the higher value because of the additional loading of the voltmeter through the high series circuit resistance.

Alignment Procedure

Calibrate the tuning dial by adjusting main dial pointer to the low-frequency (end) calibration mark on dial with the gang tuning-condenser plates in full-mesh position; then adjust the small (vernier) pointer to "O." These are friction adjustments.

Perform alignment in proper order, tabulated below, starting with No. 1 and following all operations across, then No. 2, etc. Adjustment locations are shown on figures 1 and 4.

Cathode-ray alignment is highly preferable; the connections to the chassis are shown on figure 3. If an output indicator is used, connect it across the loudspeaker voice-coil and advance the receiver volume control to full-volume position.

Connect the "low" output terminal of the test oscillator to the receiver "G" (ground) terminal for all alignment operations. Regulate the output of the test oscillator so that minimum signal is applied to the receiver to obtain an observable output indication. This will avoid a-v-c action.

The term "Dummy antenna" means the device which must be connected between the "high" test-oscillator output and the point of connection to the receiver in order to obtain ideal alignment. "No signal, 550-750 kc" means that the receiver should be tuned to a point between 550 and 750 kc where no signal or interference is received from a station or local (heterodyne) oscillator.

For further details on alignment, refer to booklet "RCA Victor Receiver Alignment."

Order of Alignment	Test Oscillator			Receiver Dial Setting	Circuit to Adjust	Adjustment Symbols	Adjust to Obtain
	Connection to Receiver	Dummy Antenna	Frequency Setting				
1	1A4 I-F Grid Cap	.001 Mfd.	460 kc	No Signal 550-750 kc	2nd I-F Trans.	L19 and L20	Max. (peak)
2	1C6 Det. Grid Cap	.001 Mfd.	460 kc	No Signal 550-750 kc	1st I-F Trans.	L17 and L18	Max. (peak)
3	Ant. Term.	300 Ohms	20,000 kc	20,000 kc	"C" Osc.	C35	Max. (peak) *
4	Ant. Term.	300 Ohms	20,000 kc	20,000 kc	"C" Det.	C10	Max. (peak) †
5	Ant. Term.	300 Ohms	20,000 kc	20,000 kc	"C" Ant.	C4	Max. (peak) ‡
6	Ant. Term.	300 Ohms	6,000 kc	Rock Thru 6,000 kc	"B" Osc.	C37	Max. (peak) *
7	Ant. Term.	200 Mmfd.	600 kc	600 kc	"A" L-F Osc.	L16	Max. (peak)
8	Ant. Term.	200 Mmfd.	1,500 kc	1,500 kc	"A" H-F Osc.	C39	Max. (peak)
9	Ant. Term.	200 Mmfd.	600 kc	Rock Thru 600 kc	"A" L-F Osc.	L16	Max. (peak)
10	Ant. Term.	200 Mmfd.	1,500 kc	Rock Thru 1,500 kc	"A" H-F Osc.	C39	Max. (peak)

* Use minimum capacity peak if two peaks can be obtained.
† Use maximum capacity peak if two peaks can be obtained.
‡ After this adjustment, check for image signal by shifting receiver dial to 19,080 kc.

General Description

These receivers employ a conventional three-band superheterodyne circuit, the arrangement of which is shown by the Schematic Circuit Diagram. Models 87K, 86K, and 86K7 are console models, each employing a 12-inch electrodynamic loudspeaker. Models 87T, 86T, and 86T1 are ch. -type table models, each employing a 6-inch electrodynamic loudspeaker. Model 86E is an arm-chair model with the chassis mounted vertically to afford operation from the top, and includes a 12-inch electrodynamic loudspeaker. Models 87K and 87T incorporate a "Magic-Eye" tuning indicator.

The extensive tuning range afforded by the three tuning bands includes the "Standard broadcast" band and the important short-wave international broadcast bands of 49, 31, 25, 19, 16, and 13 meters along with channels assigned for police, aviation, and amateur communication.

Features of design include magnetite core i-f transformers and low-frequency oscillator tracking; antenna wave trap; full automatic volume control; phonograph terminal board; aural-compensated audio volume control; two-point, high-frequency tone control; dust-proof electrodynamic loudspeaker; "Magic-Eye" tuning tube on 87K and 87T only; and a new sunburst dial with band indicator and short-wave stations listed by name.

Service Data

The various diagrams of this booklet contain such information as will be needed to isolate causes for defective operation if such develops. The ratings of the resistors, capacitors, coils, etc., are indicated adjacent to the symbols signifying these parts on the diagrams. Identification titles such R1, L1, C1, etc., provide reference between the illustrations and Replacement Parts List. The coils, transformer windings, and reactors are rated in terms of d-c resistance to permit continuity checks.

Loudspeaker.—Centering of the loudspeaker is made in the usual manner with three narrow paper feelers after first removing the front dust cover. This may be removed by softening its cement with a light application of acetone, using care not to allow the acetone to flow into the air gap. The dust cover should be cemented back in place with ambroid upon completion of adjustment.

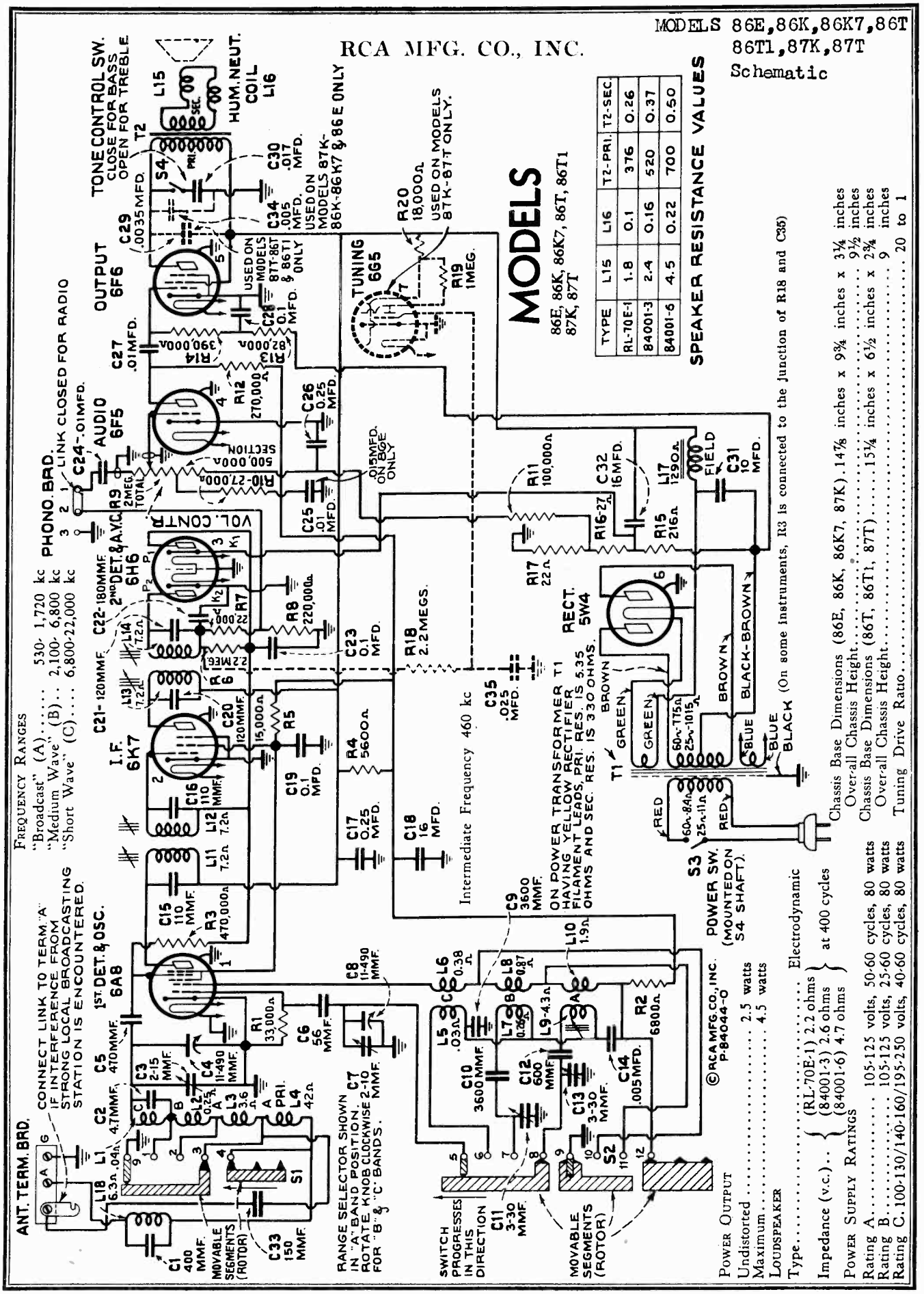
Phonograph Attachment.—A terminal board is provided for connecting a phonograph into the audio amplifying circuit. RCA Victor Models R-93, R-93-A, R-93-2, or R-94 Record Players should be connected as follows: Remove link between terminals 1 and 2 on terminal board. Connect green wire in Radio-Record switch cable to terminal 1, yellow to terminal 2, and shield extension to terminal 3. Tape unused red and blue leads separately. Connect a 2-conductor twisted cable between the Record Player binding posts and the screw terminals on Radio-Record switch.

Precautionary Lead Dress (Models 86E, 86K, 86K7, 87K).—(1) Keep bus lead from term. 9 of S1-S2 to ground lance as short as possible. (2) Bus lead from term. 6 of S1-S2 to L5 should be 4 inches long. (3) Bus lead from term. 5 of S1-S2 to C7-C8 should be 2⅛ inches long. (4) Keep bus lead from term. 1 of S1-S2 to L1-L2 as short as possible. (5) Bus lead from L1 to C3-C4 should be 3¾ inches long. (6) Keep C6, C9, C10, and C12 so that broad side is perpendicular to chassis and keep their leads as short as possible. (7) Keep blue lead from "OP" of tube 1 to L6 dressed away from chassis and other leads. (8) Yellow and green leads from terms. 11 and 12 of S1-S2 to oscillator coil must be twisted and dressed under all range switch bus leads. (9) Keep green lead from term. E of 2nd i-f trans. to term. 2 of phono. board as short as possible.

Precautionary Lead Dress (Models 86T, 86T1, 87T).—(1) Keep bus lead from term. 9 of S1-S2 to ground lance as short as possible. (2) Bus lead from term. 6 of S1-S2 to L5 should be 3¼ inches long. (3) Bus lead from term. 5 of S1-S2 to C7-C8 should be 2¼ inches long. (4) Keep bus lead from term. 1 of S1-S2 to L1-L2 as short as possible. (5) Bus lead from L1 to C3-C4 should be 3¼ inches long and dressed above bus lead from antenna coil to range switch. (6) Keep C6, C9, C10, and C12 so that broad side in perpendicular to chassis and keep their leads as short as possible. (7) Power cord should be dressed over C27 and under bus from C32 to "SG" of tube 5. (8) C26 from dummy term. of tube 4 must be grounded to end lug of R-17. (9) Keep green lead from term. E of 2nd i-f trans. to term. 2 of phono. board as short as possible. (10) Keep bus lead from term. 10 of S1-S2 to L6-L8 as short as possible. When necessary to replace bus leads, use only wire having same diameter as original.

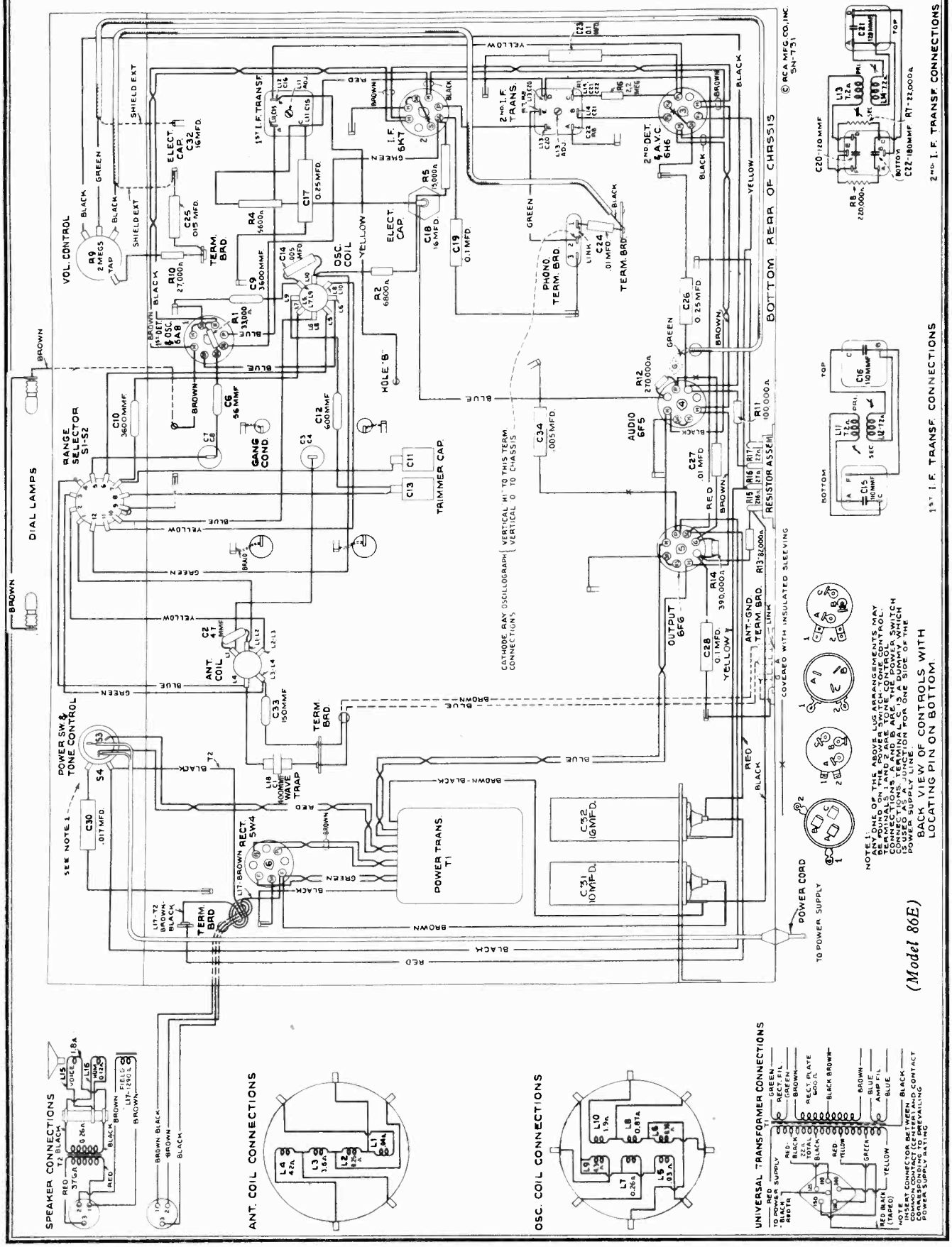
REPLACEMENT PARTS

STOCK No.	DESCRIPTION
	RECEIVER ASSEMBLIES
14380	Arm—Band indicator operating arm and hub—less set screw, Stock No. 14350
12038	Band—Rubber band for tuning tube
14384	Belt—Variable condenser drive belt for Models 86E, 86K, 86K7, and 87K only
14388	Belt—Variable condenser drive belt for Models 86T, 86T1, and 87T only
14378	Board—Antenna and ground terminal board
12717	Board—Phonograph terminal board
14338	Bushing—Variable condenser mounting bushing and screw assembly
14394	Cable—Tuning tube cable and socket, complete, for Models 87T and 87K only
12607	Cap—First I.F. transformer shield top
12581	Cap—Second I.F. transformer shield top
11350	Cap—Grid contact cap
14383	Capacitor—Adjustable dual trimmer (C11, C13)
14392	Capacitor—4.7 Mmfd. (C2)
12723	Capacitor—56 Mmfd. (C6)
14262	Capacitor—110 Mmfd. (C15, C16)
12404	Capacitor—120 Mmfd. (C20, C21)
12725	Capacitor—150 Mmfd. (C33)
12406	Capacitor—180 Mmfd. (C22)
13052	Capacitor—470 Mmfd. (C5)
14391	Capacitor—600 Mmfd. (C12)
12811	Capacitor—3.600 Mmfd. (C9, C10)
5005	Capacitor—.0035 Mfd. (C29) (Used in Models 86T, 86T1, and 87T only)
4838	Capacitor—.005 Mfd. (C34) (Used in Models 86E, 86K, 86K7 and 87K only)
4868	Capacitor—.005 Mfd. (C14)
13138	Capacitor—.01 Mfd. (C27)
14393	Capacitor—.01 Mfd. (C24, C25) (C25, .01 Mfd. used in Models 86K, 86K7, 86T, 86T1, 87K, and 87T only)
11315	Capacitor—.015 Mfd. (C25) (for Model 86E only)
11451	Capacitor—.017 Mfd. (C30)
4870	Capacitor—.025 Mfd. (C35) (Used in Models 87K and 87T only)
4841	Capacitor—0.1 Mfd. (C19, C23, C28)
4840	Capacitor—0.25 Mfd. (C26)
5170	Capacitor—0.25 Mfd. (C17)
11240	Capacitor—10 Mfd. (C31)
5212	Capacitor—16 Mfd. (C32)
14377	Capacitor—16 Mfd. (C18) (Models 86K, 86K7, 86T, 86T1, 87K, and 87T only)
30105	Capacitor—16 Mfd. (C18) (Model 86E only)
14372	Coil—Antenna coil and shield (L1, L2, L3, L4)
14373	Coil—Oscillator coil and shield (L5, L6, L7, L8, L9, L10)
14363	Condenser—2-gang variable tuning condenser (C3, C4, C7, C8)
5119	Connector—3-contact female connector for reproducer cable
12800	Core—Adjustable core and stud assembly for coil, Stock No. 14373
12006	Core—Adjustable core and stud for Stock Nos. 14376 and 14283
14385	Dial—Band indicator dial and mounting bracket assembly for Models 86K, 86K7, and 87K only
30106	Dial—Band indicator dial and mounting bracket assembly for Model 86E only
14389	Dial—Band indicator dial and mounting bracket assembly for Models 86T, 86T1, and 87T only
14381	Dial—Station selector dial scale for Models 86E, 86K, 86K7, 86T, and 86T1 only
14386	Dial—Station selector dial, complete, with tuning tube escutcheon assembly for Models 87K and 87T only
14364	Drive—Variable condenser vernier drive pinion gear and shaft
14345	Drum—Variable condenser drive belt drum, complete, with set screws
14387	Escutcheon—Tuning tube escutcheon for Models 87K and 87T only
11982	Fastener—Station selector dial scale fastener
30085	Gear—Indicator drive gear and hub assembly and indicator pointer stem and gear
14341	Idler—Station selector drive belt idler
14344	Indicator—Station selector indicator pointer
14382	Indicator—Vernier indicator pointer
5226	Lamp—Dial lamp
14340	Pulley—Station selector drive belt pulley and knob shaft
14361	Reflector—Dial reflector and lamp bracket assembly for Models 86E, 86K, 86K7, 86T, and 86T1 only
14362	Reflector—Dial reflector, lamp bracket and tuning tube bracket assembly for Models 87K and 87T only
14343	Retainer—Drive shaft and pulley retainer—holds tuning-knob shaft and pulley on range-switch shaft
11298	Resistor—5,600 Ohms, Carbon type, 1 Watt (R4)
11728	Resistor—6,800 Ohms, Carbon type, ½ Watt (R2)
5114	Resistor—15,000 Ohms, Carbon type, 1 Watt (R5)
14078	Resistor—18,000 Ohms, Carbon type, 1 Watt (R2Q), for Models 87K and 87T only
14284	Resistor—22,000 Ohms, Carbon type, 1/10 watt (R7)
11400	Resistor—27,000 Ohms, Carbon type, ½ Watt (R10), for Models 86E, 86K, 86K7, and 87K only
14390	Resistor—27,000 Ohms, Carbon type, 1/10 Watt (R10), for Models 86T, 86T1, and 87T only
13735	Resistor—33,000 Ohms, Carbon type, ½ Watt (R1)
11365	Resistor—82,000 Ohms, Carbon type, ½ Watt (R13)
5145	Resistor—100,000 Ohms, Carbon type, ½ Watt (R11)
11398	Resistor—220,000 Ohms, Carbon type, 1/10 Watt (R8)
11453	Resistor—270,000 Ohms, Carbon type, 1/10 Watt (R12)
13005	Resistor—390,000 Ohms, Carbon type, 1/10 Watt (R14)
11452	Resistor—470,000 Ohms, Carbon type, 1/10 Watt (R3)
12013	Resistor—1 Megohm, Carbon type, 1/10 Watt (R19), for Models 87K and 87T only
11626	Resistor—2.2 Megohm, Carbon type, ½ Watt (R6, R18) (R18 used in Models 87K and 87T only)
12004	Resistor—Voltage divider resistor—comprising one 216-ohm, one 27-ohm, and one 22-ohm sections (R15, R16, R17)
14350	Screw—No. 8-32 x 3/16 square-head set-screw for gear, Stock No. 30085, and drum, Stock No. 14345, and arm, Stock No. 14380
14374	Shield—Antenna coil shield
12008	Shield—First or Second I-F transformer shield
14375	Shield—Oscillator coil shield
14114	Socket—Dial lamp socket
11195	Socket—8-contact 5W4 Radiotron socket
11196	Socket—8-contact 6A8, 6K7, 6H6, 6P5, or 6F6 Radiotron socket
12007	Spring—Retaining spring for core, Stock Nos. 12006 and 12800
12907	Spring—Tension spring for indicator drive gear, Stock No. 30085
14342	Spring—Tension spring for idler, Stock No. 14341
14370	Switch—Range switch (S1, S2)
14371	Switch—Tone control switch and power switch (S3, S4)
14376	Transformer—First I-F transformer (L11, L12, C15, C16)
14283	Transformer—Second I-F transformer (L13, L14, C20, C21, C22, R7, R8)
14367	Transformer—Power transformer, 105-125 volts, 50-60 cycles (T1)
14368	Transformer—Power transformer, 105-125 volts, 25-60 cycles (T1)
14369	Transformer—Power transformer, 105-125/210-250 volts, 50-60 cycles (T1)
13838	Trap—Wave trap, complete (L18, C1)
14335	Volume Control (R9)
14379	Washer—Felt washer for indicator pointer
	REPRODUCER ASSEMBLIES Models 86T, 86T1, and 87T
14616	Coil—Field coil (L17) (for speaker marked 84001-3)
14614	Cone—Reproducer cone (L15) (for speaker marked 84001-3)
14934	Cone—Reproducer cone (L15) (for speaker marked 84001-6)
5118	Plug—3-contact male plug for reproducer
14613	Reproducer—Complete
14616	Transformer—Output transformer (T2) (for speaker marked 84001-3)
14935	Transformer—Output transformer (T2) (for speaker marked 84001-6)
	REPRODUCER ASSEMBLIES Models 86E, 86K, 86K7, and 87K (RL-70E-1)
13866	Cap—Dust cap for cone center
14354	Coil—Field coil (L17)
14469	Coil—Hum neutralizing coil (L16)
12667	Cone—Reproducer cone and dust cap (L15)
5118	Plug—3-contact male plug for reproducer
14395	Reproducer—Reproducer complete
14358	Screw—Screw, washer, and lockwasher to hold core in yoke
14355	Transformer—Output transformer (T2)
14357	Washer—Spring washer to hold field coil
	MISCELLANEOUS ASSEMBLIES
14396	Escutcheon—Station selector escutcheon and crystal
14359	Knob—Station selector knob
14269	Knob—Volume control, tone control or range switch knob
4560	Screw—Chassis mounting screw and washer assembly—(Model 86E only)
11210	Screw—Chassis mounting screw and washer assembly—(Models 86K, 86K7 and 87K only)
11377	Screw—Chassis mounting screw and washer assembly—(Models 86T, 86T1 or 87T only)
4982	Spring—Retaining spring for knob—Stock No. 14359
14270	Spring—Retaining spring for knob—Stock No. 14269



MODEL 86E
Chassis Wiring

RCA MFG. CO., INC.



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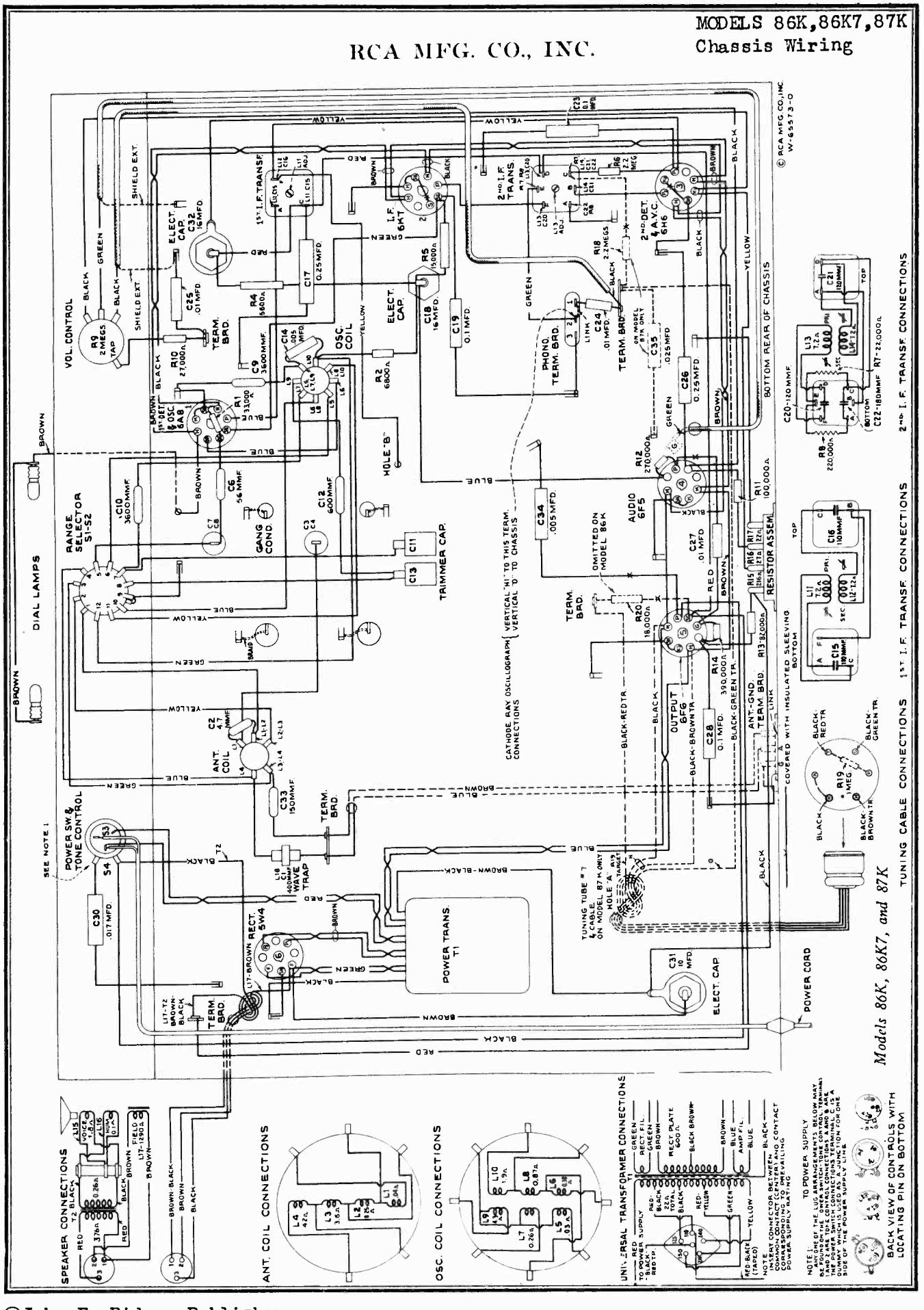
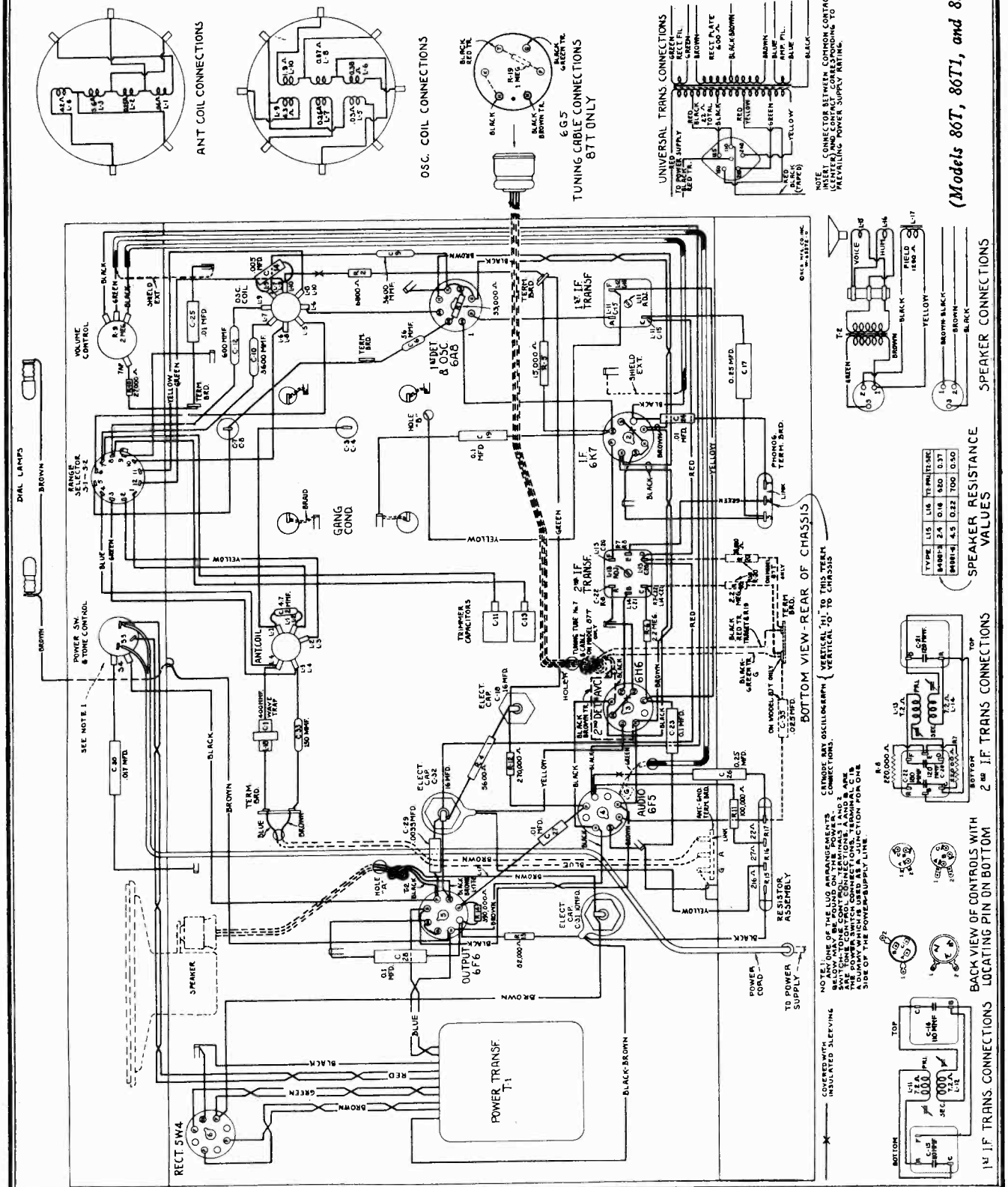
MODELS 86K,86K7,87K
Chassis Wiring



MODELS 86T,86T1,87T
Chassis Wiring

RCA MFG. CO., INC.



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MODELS 86E, 86K, 86K7, 87K
86T, 86T1, 87T
Voltage, Socket, Trimmers

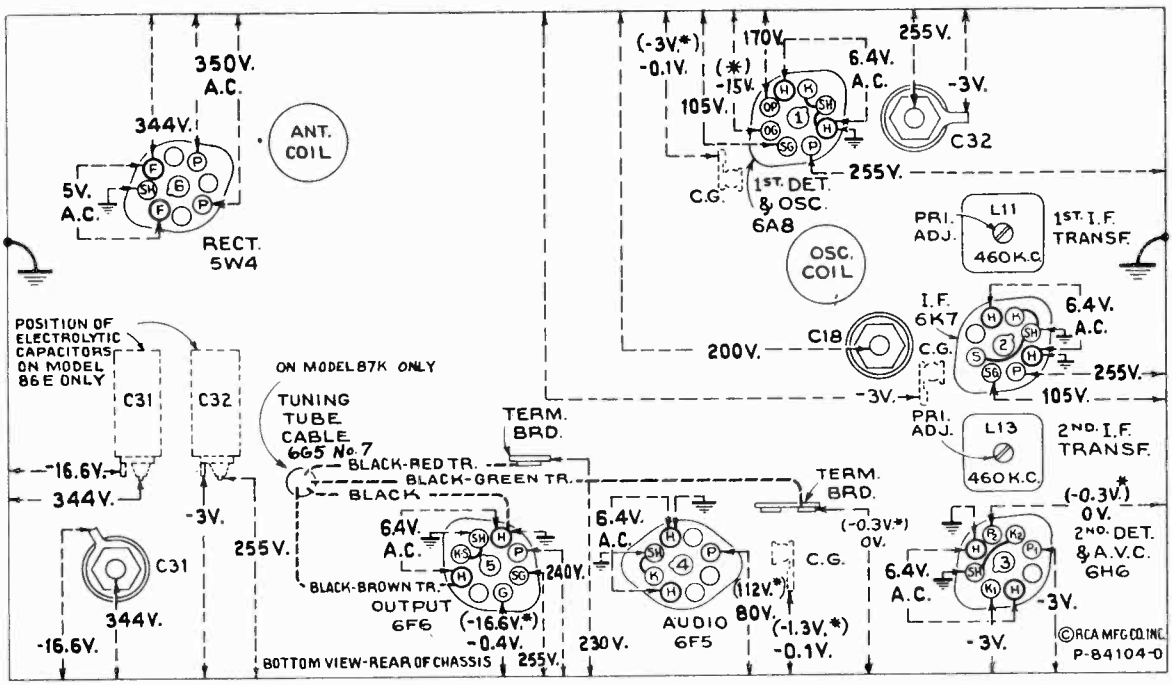


Figure 3—Radiotron Socket Voltages, Coil, and Trimmer Locations (Models 86E, 86K, 86K7, and 87K)

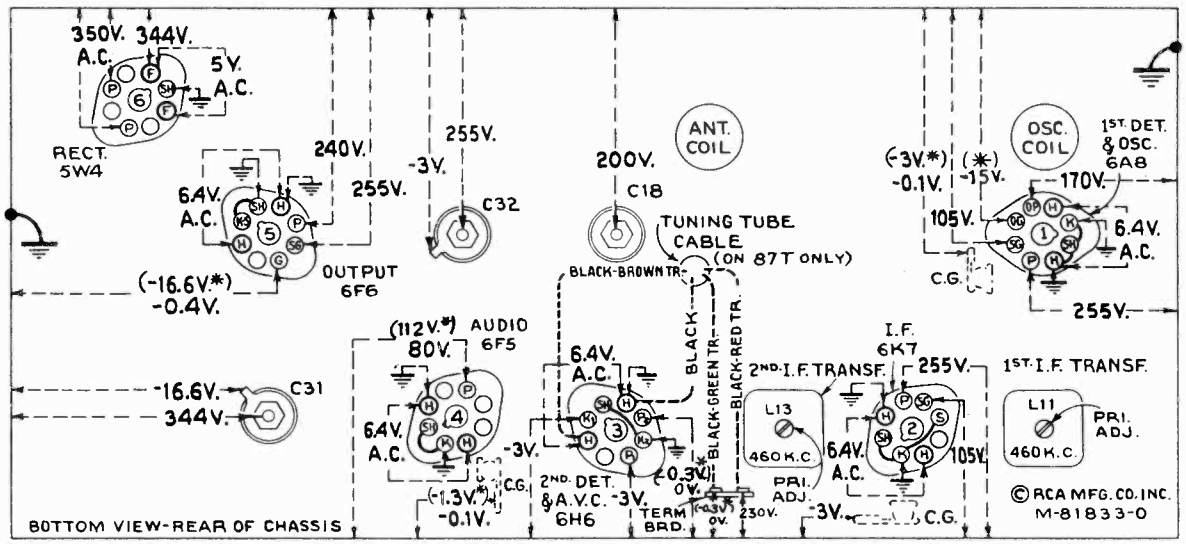


Figure 4—Radiotron Socket Voltages, Coil, and Trimmer Locations (Models 86T, 86T1, and 87T)

Measured at 115 volts, 60-cycle supply—Tuned to approximately 1,000 kc ("Standard Broadcast")—No signal being received—Volume control minimum

Note: Two voltage values are shown for some readings. The value shown in parentheses with asterisk (*) indicates operating conditions without voltmeter loading. The other value (generally lower) is the actual measured voltage and differs from the value shown in parentheses because of the additional loading of the voltmeter through the high series circuit resistance.

Voltage values as specified should hold within ±20% when the receiver is normally operative at its rated line voltage. To duplicate the conditions under which the voltages were measured requires a 1,000-ohm-per-volt d-c meter, having ranges of 10, 50, 250, and 500 volts. Use the nearest range above the specified measured voltage. A-c voltages were measured with a corresponding a-c meter.

MODELS 86E,86K,86K7,87K
86T,86T1,87T

RCA MFG. CO., INC.

Socket,Trimmers
Alignment

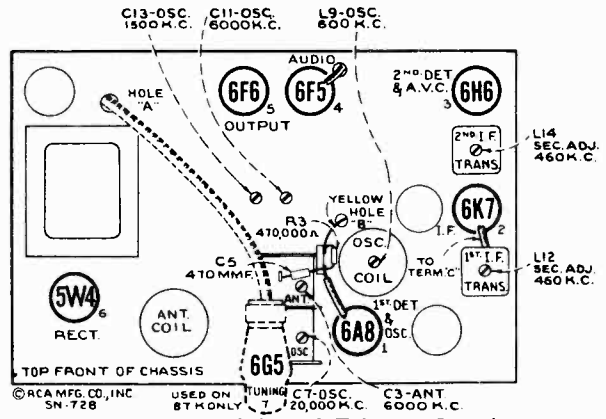


Figure 1—Radiotron, Coil, and Trimmer Locations (Models 86E, 86K, 86K7, and 87K)

Radiotron Cathode Current Readings

Measured with Milliammeter Connected at Tube Socket Cathode Terminals Under Conditions Similar to Those of Voltage Measurements

(1)	RCA-6A8—1st Det.—Osc.	14. ma.
(2)	RCA-6K7—I-F Amp.	8.5 ma.
(3)	RCA-6H6—2nd Det. and A.V.C.	.....
(4)	RCA-6F5—Audio Driver	0.26 ma.
(5)	RCA-6F6—Power Amplifier	37. ma.
(6)	RCA-5W4—Rectifier	63. ma.**
(7)	RCA-6G5—Tuning Tube	1.2 ma.

** Cannot be measured at socket.

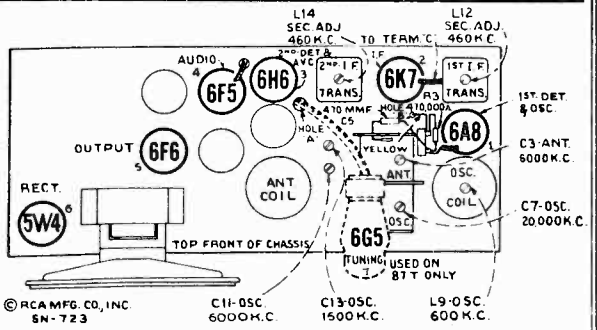


Figure 2—Radiotron, Coil, and Trimmer Locations (Models 86T, 86T1, and 87T)

R-F Alignment Frequencies

"Short Wave" (C)..... 20,000 kc (osc.)
"Medium Wave" (B)..... 6,000 kc (osc., ant.)
"Broadcast" (A)..... 600 kc (osc.), 1,500 kc (osc.)

Alignment Procedure

Calibrate the tuning dial by adjusting main dial pointer to the low-frequency (end) calibration mark on dial with the gang tuning-condenser plates in full-mesh position; then adjust the small (vernier) pointer to "O." These are friction adjustments.

Perform alignment in proper order, tabulated below, starting with No. 1 and following all operations across, then No. 2, etc. Adjustment locations are shown on figures 1, 2, 3, and 4.

Cathode-ray alignment is highly preferable; the connections to the chassis are shown on figures 6, 7, and 8. If an output indicator is used, connect it across the loudspeaker voice-coil and advance the receiver volume control to full-volume position.

Connect the "low" output terminal of the test oscillator to the receiver "G" (ground) terminal for all alignment operations. Regulate the output of the test oscillator so that minimum signal is applied to the receiver to obtain an observable output indication. This will avoid a-v-c action.

The term "Dummy antenna" means the device which must be connected between the "high" test-oscillator output and the point of connection to the receiver in order to obtain ideal alignment. "No signal, 550-750 kc" means that the receiver should be tuned to a point between 550 and 750 kc where no signal or interference is received from a station or local (heterodyne) oscillator.

For further details on alignment, refer to booklet "RCA Victor Receiver Alignment."

Order of Alignment	Test Oscillator: Connection to Receiver	Test Oscillator: Dummy Antenna	Test Oscillator: Frequency Setting	Range Selector	Receiver Dial Setting	Circuit to Adjust	Adjustment Symbols	Adjust to Obtain
1	6K7 I-F Grid Cap	.001 Mfd.	460 kc	"A" Left	No Signal 550-750 kc	2nd I-F Trans.	L13 and L14	Max. (peak)
2	6A8 Det. Grid Cap	.001 Mfd.	460 kc	"A"	No Signal 550-750 kc	1st I-F Trans.	L11 and L12	Max. (peak)
3	Ant. Term.	300 Ohms	20,000 kc	"C" Right	20,000 kc	"C" Osc.	C7	Max. (peak)*‡
4	Ant. Term.	300 Ohms	6,000 kc	"B" Center	6,000 kc	"B" Osc.	C11	Max. (peak)*
5	Ant. Term.	300 Ohms	6,000 kc	"B"	6,000 kc	"B" Ant.	C3	Max. (peak)
6	Ant. Term.	200 Mmfd.	600 kc	"A" Left	600 kc	"A" L-F Osc.	L9	Max. (peak)
7	Ant. Term.	200 Mmfd.	1,500 kc	"A"	1,500 kc	"A" H-F Osc.	C13	Max. (peak)
8	Ant. Term.	200 Mmfd.	600 kc	"A"	600 kc	"A" L-F Osc.	L9	Max. (peak)
9	Ant. Term.	200 Mmfd.	1,500 kc	"A"	1,500 kc	"A" H-F Osc.	C13	Max. (peak)

* Use minimum capacity peak if two peaks can be obtained.
‡ After this adjustment, check for image signal by shifting receiver dial to 19,080 kc.

RCA MFG. CO., INC.

MODEL 86X
Schematic, Socket
Chassis Wiring
Trimmers

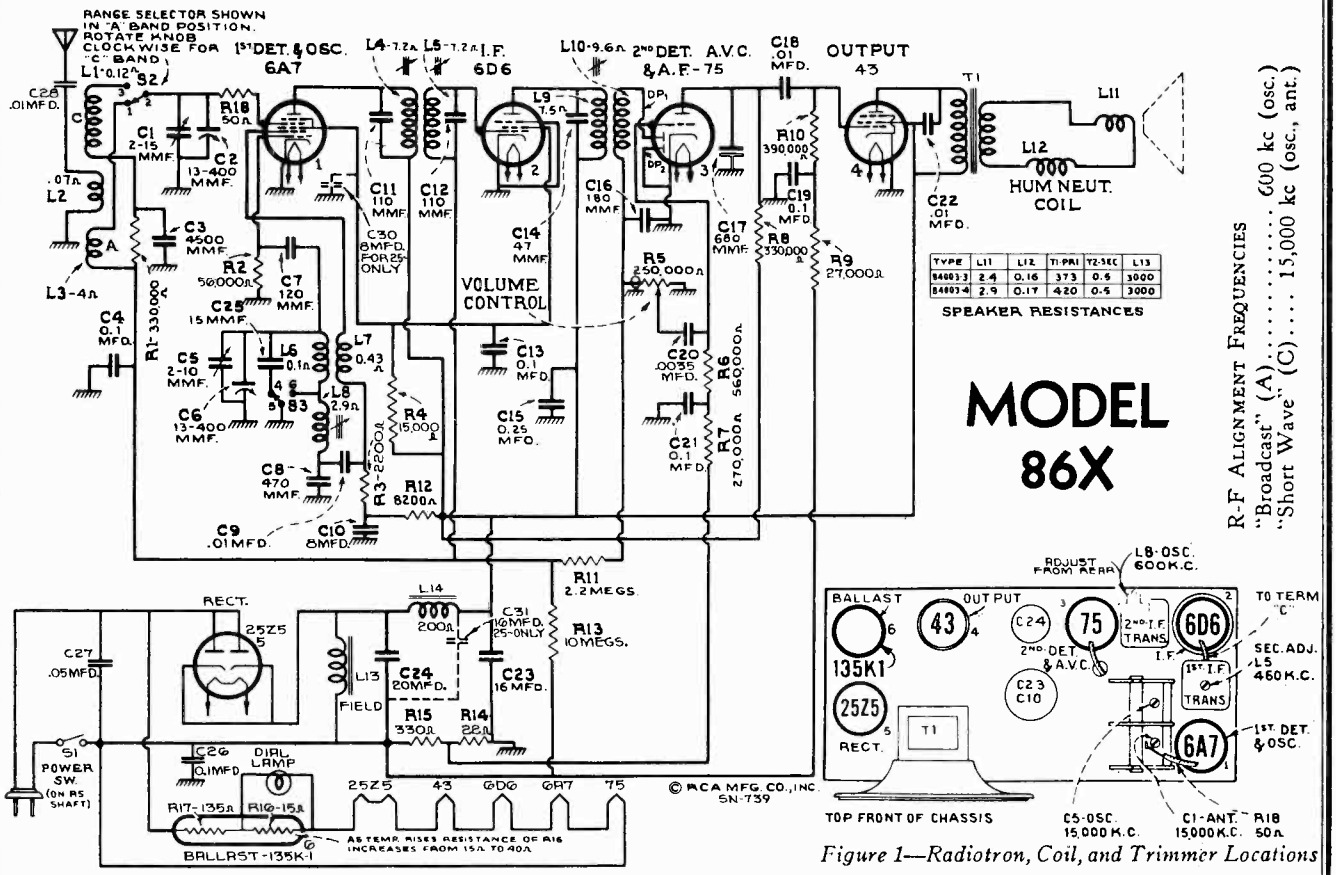
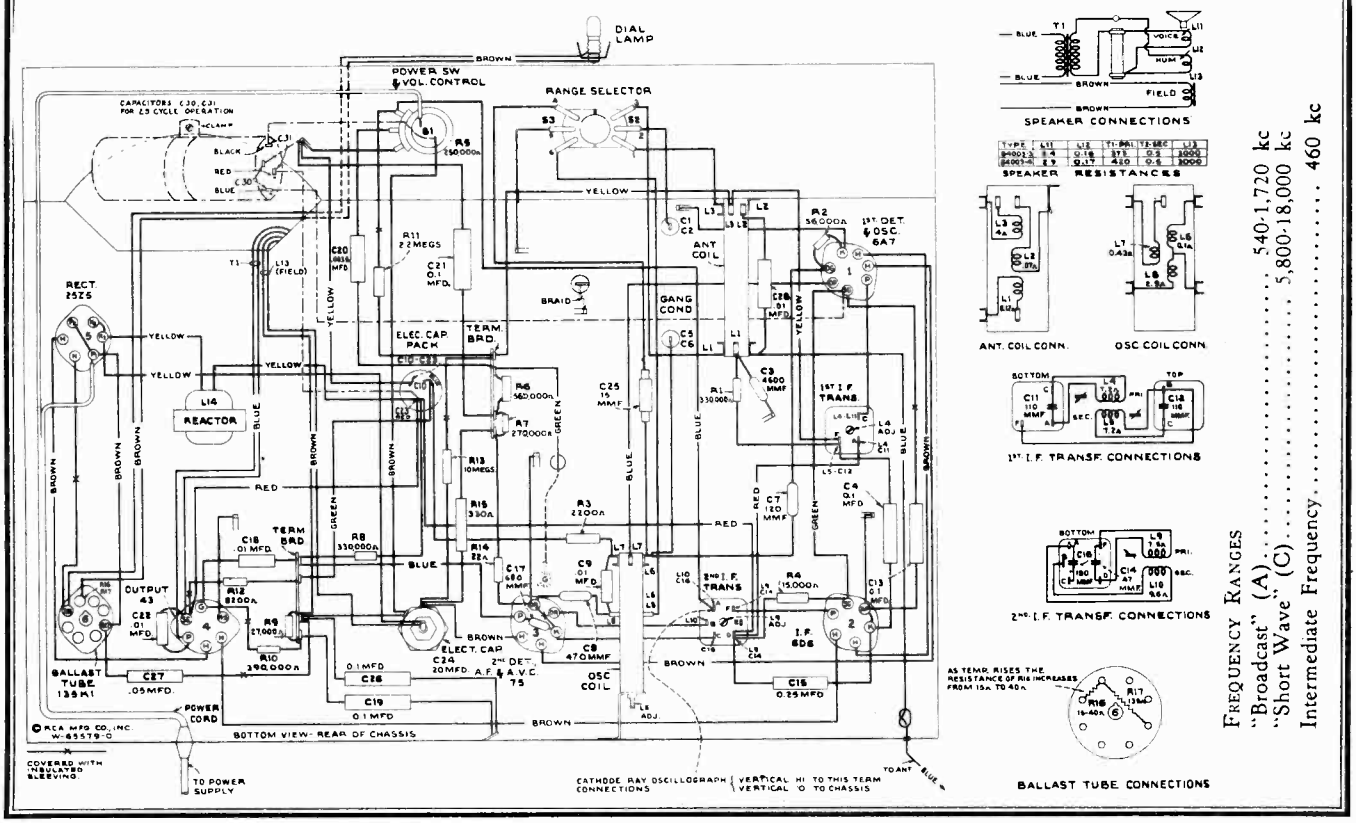


Figure 1—Radiotron, Coil, and Trimmer Locations



MODEL 86X
Alignment
Voltage

RCA MFG. CO., INC.

Alignment Procedure

Calibrate the tuning dial by adjusting dial pointer to the center horizontal line with the gang tuning-condenser plates in full-mesh position. This is a screw-driver adjustment.

Perform alignment in proper order, tabulated below, starting with No. 1 and following all operations across, then No. 2, etc. Adjustment locations are shown on figures 1 and 4.

Cathode-ray alignment is preferable; the connections to the chassis are shown on figure 3. If an output indicator is used, connect it across the loudspeaker voice-coil and advance the receiver volume control to full-volume position.

Connect the "low" output terminal of the test oscillator to the receiver chassis for all alignment operations. Regulate the output of the test oscillator so that minimum signal is applied to the receiver to obtain an observable output indication. This will avoid a-v-c action.

The term "Dummy antenna" means the device which must be connected between the "high" test-oscillator output and the point of connection to the receiver in order to obtain ideal alignment. "No signal, 550-750 kc" means that the receiver should be tuned to a point between 550 and 750 kc where no signal or interference is received from a station or local (heterodyne) oscillator.

For further details on alignment, refer to booklet "RCA Victor Receiver Alignment."

Order of Alignment	Test Oscillator			Range-Selector	Receiver Dial Setting	Circuit to Adjust	Adjustment Symbols	Adjust to Obtain
	Connection to Receiver	Dummy Antenna	Frequency Setting					
1	6D6 I-F Grid Cap	.001 Mfd.	460 kc	"A" Left	No Signal 550-750 kc	2nd I-F Trans.	L9	Max. (peak)
2	6A7 Det. Grid Cap	.001 Mfd.	460 kc	"A" Left	No Signal 550-750 kc	1st I-F Trans.	L4 and L5	Max. (peak)
3	Ant. Lead (blue)	300 Ohms	15,000 kc	"C" Right	15,000 kc	"C" Osc.	C5	Max. (peak)†
4	Ant. Lead (blue)	300 Ohms	15,000 kc	"C" Right	Rock Through 15,000 kc	"C" Ant.	C1	Max. (peak)*‡
5	Ant. Lead (blue)	200 Mmfd.	600 kc	"A" Left	600 kc	"A" Osc.	L8	Max. (peak)

† Use maximum capacity peak if two peaks can be obtained.

* Use minimum capacity peak if two peaks can be obtained.

‡ After this adjustment, check for image signal by shifting receiver dial to 15,920 kc.

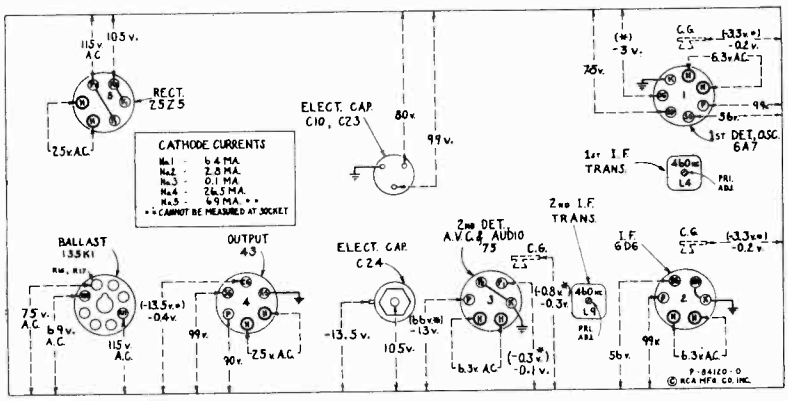


Figure 4—Radiotron Socket Voltages, Coil, and Trimmer Locations

Measured at 115 volts, 60-cycle supply—For 115-volt d-c supply approximately 10% lower, except heater voltage which remains the same—Tuned to approximately 1,000 kc ("Standard Broadcast")—No signal being received—Volume control minimum.

***Note:** Two voltage values are shown for some readings. The value shown in parentheses with asterisk (*) indicates operating conditions without voltmeter loading. The other value (generally lower) is the actual measured voltage and differs from the value shown in parentheses because of the additional loading of the voltmeter through the high series circuit resistance.*

Voltage values as specified should hold within ±20% when the receiver is normally operative at its rated line voltage. To duplicate the conditions under which the voltages were measured requires a 1,000-ohm-per-volt d-c meter, having ranges of 10, 50, 250 and 500 volts. Use the nearest range above the specified measured voltage. A-c voltages were measured with a corresponding a-c meter.

MODEL 86X
Notes,Parts

RCA MFG. CO., INC.

Electrical Specifications

Pilot Lamp (1) ..... Mazda No. 40, 6.3 volts, 0.15 ampere

POWER SUPPLY RATINGS

A-C Rating..... 105-125 volts, 50-100 cycles, 58 watts

POWER OUTPUT—(125 volt, A-C supply)

Undistorted..... 0.5 watt
Maximum ..... 1.2 watts

LOUDSPEAKER

Type..... 6-inch Electrodynamic

D-C Rating..... 105-125 volts, 58 watts

POWER OUTPUT—(125 volt, D-C supply)

Undistorted..... 0.4 watt
Maximum ..... 1.0 watt

Impedance (V.C.)..... {(84003-3) 2.6 ohms / (84003-4) 3.4 ohms} at 400 cycles

Service Data

CAUTION: The chassis is connected to one side of the power supply. Avoid contact of chassis or parts to external ground when servicing.

The various diagrams of this booklet contain such information as will be needed to isolate causes for defective operation if such develops. The ratings of the resistors, capacitors, coils, etc., are indicated adjacent to the symbols signifying these parts on the diagrams. Identification titles such as R1, L1, C1, etc., provide reference between the illustrations and Replacement Parts List. The coils, transformer windings, and reactors are rated in terms of d-c resistance to permit continuity checks.

Precautionary Lead Dress—(1) Dress power line leads to the on-off switch away from grid connection terminal on volume control to reduce hum pick-up. (2) Keep leads of capacitor C3 as short as possible. (3) Bus lead from range selector (ter. 6) to oscillator coil tap L6L8 should be maintained 3½ inches long for proper alignment. (4) Capacitor C25 should be dressed free of adjacent parts to maintain correct alignment at high-frequency end of "A" band. (5) Bus lead from range selector (ter. 3) to antenna coil L1 should be maintained 2¼ inches long for proper alignment. (6) The RCA-6A7 grid-cap lead (50-ohm resistor R18) to top of tuning capacitor C2 should be dressed properly to prevent shorts and should be maintained flexible to prevent acoustic howl.

Loudspeaker—Centering of the loudspeaker voice coil is made in the usual manner with three narrow paper feelers.

Operation on 25-Cycle A-C Supply—For 25-cycle operation, install RCA Stock No. 14767 capacitor pack and clamp under chassis below speaker and make connections as shown dotted on figure 3. Use a No. 6-32 machine screw for anchoring clamp in hole provided.

REPLACEMENT PARTS

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

STOCK No.	DESCRIPTION
	RECEIVER ASSEMBLIES
14634	Belt—Variable condenser drive belt
14632	Bracket—Dial mounting bracket
5237	Bushing—Variable condenser rubber mounting bushing
12118	Cap—Grid contact cap
12896	Capacitor—15 Mmfd. (C25)
12405	Capacitor—47 Mmfd. (C14)
14262	Capacitor—110 Mmfd. (C11, C12)
12724	Capacitor—120 Mmfd. (C7)
12406	Capacitor—180 Mmfd. (C16)
30396	Capacitor—470 Mmfd. (C8)
14498	Capacitor—680 Mmfd. (C17)
30245	Capacitor—.0045 Mfd. (C3)
5005	Capacitor—.0035 Mfd. (C20)
4858	Capacitor—.01 Mfd. (C28)
13138	Capacitor—.01 Mfd. (C9, C18, C22)
4836	Capacitor—.05 Mfd. (C27)
4839	Capacitor—0.1 Mfd. (C26)
4841	Capacitor—0.1 Mfd. (C4, C13, C19, C21)
4840	Capacitor—0.25 Mfd. (C15)
14643	Capacitor—20 Mfd. (C24)
14644	Capacitor Pack—Comprising one 16 Mfd. and one 8 Mfd. section (C10, C23)
14767	Capacitor Pack—Comprising one 16 Mfd. and one 8 Mfd. section and one clamp (for 25 cycle operation only) (C30, C31)
14646	Coil—Antenna coil (L1, L2, L3)
14647	Coil—Oscillator coil (L6, L7, L8)
14633	Condenser—2 gang variable tuning condenser (C1, C2, C5, C6)
14648	Core—Adjustable core and stud for Oscillator coil
12006	Core—Adjustable core and stud for I.F. transformer
14631	Dial—Station selector dial
14651	Drive—Variable condenser vernier drive and pinion gear
14635	Indicator—Station selector indicator pointer
4340	Lamp—Dial lamp
14636	Pulley—Idler pulley—less spring
14639	Pulley—Variable condenser drive pulley—located on condenser shaft
14641	Reactor—Filter reactor (L14)
14525	Resistor—22 Ohms—Carbon type, ½ watt (R14)
14653	Resistor—50 Ohms—Flexible type, 1/10 watt (R18)
14652	Resistor—330 Ohms—Wire wound, 1 watt (R15)
5159	Resistor—2,200 Ohms—Carbon type, ½ watt (R3)
14296	Resistor—8,200 Ohms—Carbon type, ½ watt (R12)
12759	Resistor—15,000 Ohms—Carbon type, ½ watt (R4)
11400	Resistor—27,000 Ohms—Carbon type, ½ watt (R9)
5029	Resistor—56,000 Ohms—Carbon type, ½ watt (R2)
11323	Resistor—270,000 Ohms—Carbon type, ½ watt (R7)
13733	Resistor—330,000 Ohms—Carbon type, ½ watt (R1, R8)
13479	Resistor—390,000 Ohms—Carbon type, ½ watt (R10)
5035	Resistor—560,000 Ohms—Carbon type, ½ watt (R6)
12679	Resistor—2.2 Megohm—Insulated, ½ watt (R11)
13601	Resistor—10 Megohm—Insulated, ½ watt (R13)
14649	Resistor—Ballast resistor tube type No. 135K1 (R16, R17)
5129	Ring—Radiotron shield ring
4389	Screw—No. 6—32x3/16 headless set screw for pulley No. 14639
14638	Shaft—Station selector knob shaft and pulley
12008	Shield—First I.F. transformer shield
12408	Shield—Second I.F. transformer shield
11265	Shield—Radiotron shield
14650	Socket—Dial lamp socket
4786	Socket—6-contact 6D6, 25Z5, 43 or 75 Radiotron socket
4787	Socket—7-contact 6A7 Radiotron socket
11196	Socket—8-contact ballast resistor socket
14637	Spring—Idler pulley tension spring
12007	Spring—Retaining spring for core Stock Nos. 12006 and 14648
14640	Switch—Range switch (S2, S3)
14376	Transformer—First I.F. transformer (L4, L5, C11, C12)
14642	Transformer—Second I.F. transformer (L9, L10, C14, C16)
14645	Volume Control and power switch (R5, S1)
	REPRODUCER ASSEMBLIES
14682	Cone—Reproducer cone (L11) for speaker marked 84003-3
14936	Cone—Reproducer cone (L11) for speaker marked 84003-4
14681	Reproducer Complete
14683	Transformer—Output transformer (T1) for speaker marked 84003-3
14937	Transformer—Output transformer (T1) for speaker marked 84003-4
	MISCELLANEOUS ASSEMBLIES
14654	Escutcheon—Station selector escutcheon and crystal
12673	Knob—Station selector, volume control or range switch knob
14267	Screw—Chassis mounting screw and washer
4119	Screw—No. 8—32x1/4 headless set screw for knob Stock No. 12673

MODEL 88K
Alignment, Parts

RCA MFG. CO., INC.

Calibrate the tuning dial by adjusting main dial pointer to the low-frequency (end) calibration mark on dial with the gang tuning-condenser plates in full-mesh position; then adjust the small (vernier) pointer to "O." These are friction adjustments.

Perform alignment in proper order, tabulated below, starting with No. 1 and following all operations across, then No. 2, etc. Adjustment locations are shown on figures 1 and 2.

Cathode-ray alignment is highly preferable; the connections to the chassis are shown on figure 4. If an output indicator is used, connect it across the loudspeaker voice-coil and advance the receiver volume control to full-volume position.

Connect the "low" output terminal of the test oscillator to the receiver "G" (ground) terminal for all alignment operations. Regulate the output of the test oscillator so that minimum signal is applied to the receiver to obtain an observable output indication. This will avoid a-v-c action.

The term "Dummy antenna" means the device which must be connected between the "high" test-oscillator output and the point of connection to the receiver in order to obtain ideal alignment. "No signal, 550-750 kc" means that the receiver should be tuned to a point between 550 and 750 kc where no signal or interference is received from a station or local (heterodyne) oscillator.

For further details on alignment, refer to booklet "RCA Victor Receiver Alignment."

Order of Alignment	Test Oscillator: Connection to Receiver	Test Oscillator: Dummy Antenna	Test Oscillator: Frequency Setting	Range Selector	Receiver Dial Setting	Circuit to Adjust	Adjustment Symbols	Adjust to Obtain
1	6K7 I-F Grid Cap	.001 Mfd.	460 kc	"A" Left	No Signal 550-750 kc	2nd I-F Trans.	L16 and L17	Max. (peak)
2	6L7 Det. Grid Cap	.001 Mfd.	460 kc	"A"	No Signal 550-750 kc	1st I-F Trans.	L14 and L15	Max. (peak)
3	Ant. Term.	300 Ohms	20,000 kc	"C" Right	20,000 kc	"C" Osc.	C20	Max. (peak) *
4	Ant. Term.	300 Ohms	20,000 kc	"C"	20,000 kc	"C" Det.	C9	Max. (peak) †
5	Ant. Term.	300 Ohms	20,000 kc	"C"	20,000 kc	"C" Ant.	C2	Max. (peak) ‡
6	Ant. Term.	300 Ohms	6,000 kc	"B" Center	6,000 kc	"B" Osc.	C23	Max. (peak) *
7	Ant. Term.	200 Mmfd.	600 kc	"A" Left	600 kc	"A" L-F Osc.	L13	Max. (peak)
8	Ant. Term.	200 Mmfd.	1,500 kc	"A"	1,500 kc	"A" H-F Osc.	C26	Max. (peak)
9	Ant. Term.	200 Mmfd.	600 kc	"A"	600 kc	"A" L-F Osc.	L13	Max. (peak)
10	Ant. Term.	200 Mmfd.	1,500 kc	"A"	1,500 kc	"A" H-F Osc.	C26	Max. (peak)

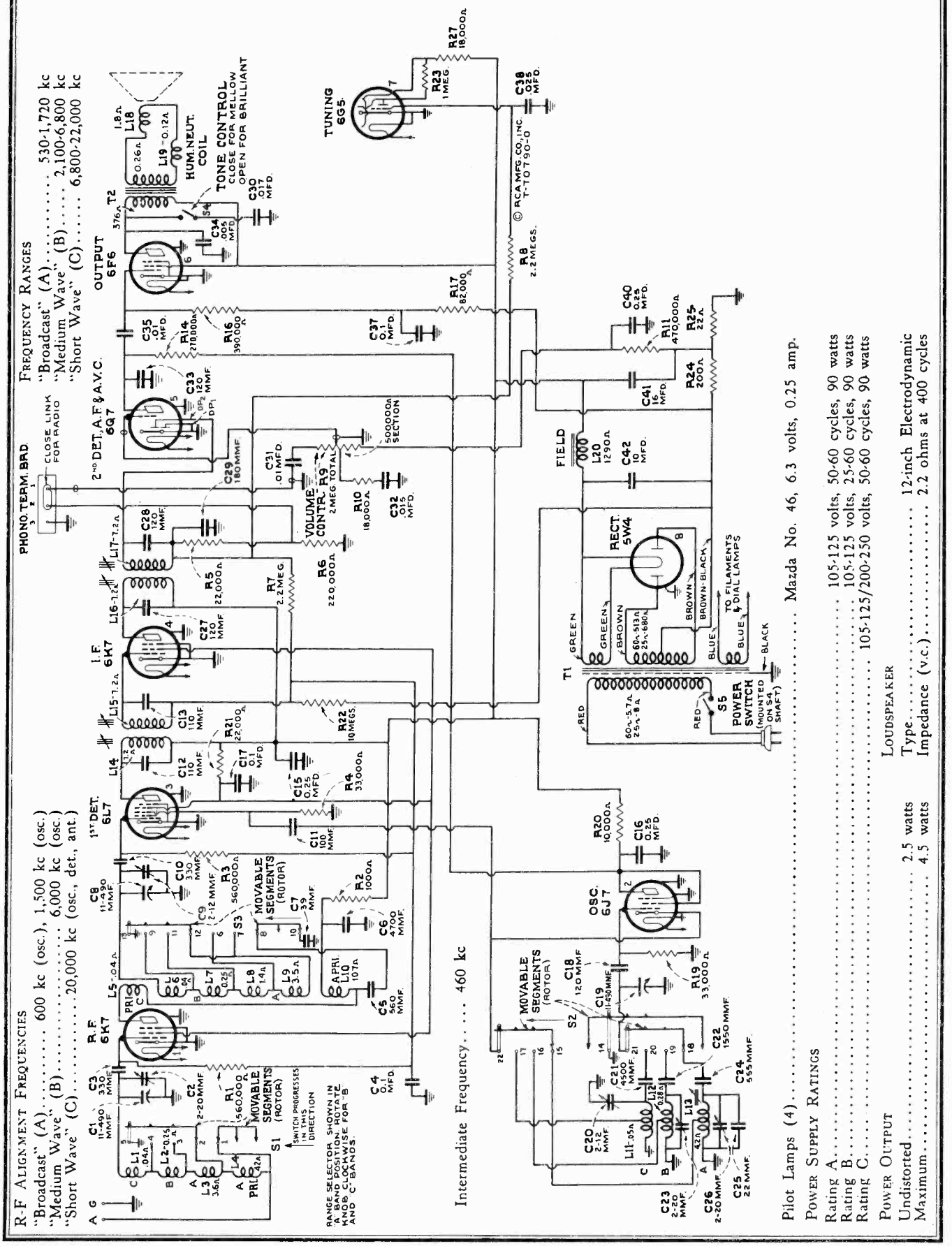
* Use minimum capacity peak if two peaks can be obtained.
† Use maximum capacity peak if two peaks can be obtained.
‡ After this adjustment, check for image signal by shifting receiver dial to 19,080 kc.

RECEIVER ASSEMBLIES

12038	Band—Rubber band for tuning tube
14384	Belt—Variable condenser drive belt
14517	Board—Antenna and ground terminal board
12717	Board—Phonograph terminal board
14338	Bushing—Variable condenser mounting bushing assembly
14524	Cable—Band indicator cable approx. 6½-in. long
14523	Cable—Tone control indicator cable approx. 3-in. long
14394	Cable—Tuning tube cable and socket
12607	Cap—First I-F transformer shield top
12581	Cap—Second I-F transformer shield top
11350	Cap—Grid contact cap
12884	Capacitor—Adjustable trimmer (long) (C2, C23, C26)
12714	Capacitor—Adjustable trimmer (medium) (C9, C20)
14021	Capacitor—22 Mmfd. (C25)
13545	Capacitor—39 Mmfd. (C7)
12720	Capacitor—100 Mmfd. (C11)
14262	Capacitor—110 Mmfd. (C12, C13)
12404	Capacitor—120 Mmfd. (C27, C28)
12724	Capacitor—120 Mmfd. (C18, C33)
12406	Capacitor—180 Mmfd. (C29)
12952	Capacitor—330 Mmfd. (C3, C10)
12727	Capacitor—555 Mmfd. (C24)
12537	Capacitor—560 Mmfd. (C5)
12729	Capacitor—1,550 Mmfd. (C22)
12728	Capacitor—4,500 Mmfd. (C21)
12897	Capacitor—4,700 Mmfd. (C6)
4838	Capacitor—.005 Mfd. (C34)
13138	Capacitor—.01 Mfd. (C31, C35)
11315	Capacitor—.015 Mfd. (C32)
4752	Capacitor—.017 Mfd. (C30)
4870	Capacitor—.025 Mfd. (C38)
4839	Capacitor—0.1 Mfd. (C4, C17, C37)
5170	Capacitor—0.25 Mfd. (C15)
12484	Capacitor—0.25 Mfd. (C16, C40)
11203	Capacitor—10 Mfd. (C42)
5212	Capacitor—16 Mfd. (C41)
14372	Coil—Antenna coil and shield (L1, L2, L3, L4)
14516	Coil—Oscillator coil and shield (L11, L12, L13)
14414	Coil—R.F. coil and shield (L5, L6, L7, L8, L9, L10)
14513	Condenser—3-gang variable tuning condenser (C1, C8, C19)
5119	Connector—3-contact female connector for speaker cable
12006	Core—Adjustable core and stud for Stock Nos. 14376 and 14283
12800	Core—Adjustable core and stud for coil Stock No. 14516
14518	Dial—Station selector dial scale complete with tuning tube escutcheon
14514	Drive—Variable condenser vernier drive pinion gear and shaft
14345	Drum—Variable condenser drive belt drum complete with set screws
14519	Indicator—Station selector indicator pointer
14520	Indicator—Vernier indicator pointer
5226	Lamp—Dial lamp
14028	Nut—Jamb nut for adjustable trimmer capacitor Stock Nos. 12714 and 12884
12471	Plate—6J7 Radiotron socket mounting plate and rubber cushions—less socket—Stock No. 11196
14340	Pulley—Station selector drive belt pulley and knob shaft
14522	Reflector—Dial reflector and bracket complete with dial lamp brackets, tuning lamp bracket, and tone and band indicators
14525	Resistor—22 Ohms, Carbon type, ½ watt (R25)
14526	Resistor—200 Ohms, Wire wound, 2½ watts (R24)
5112	Resistor—1,000 Ohms, Carbon type, ½ watt (R2)
8043	Resistor—10,000 Ohms, Carbon type, 2 watt (R20)
11175	Resistor—18,000 Ohms, Carbon type, ½ watt (R10)
14078	Resistor—18,000 Ohms, Carbon type, 1 watt (R27)
14284	Resistor—22,000 Ohms, Carbon type, 1/10 watt (R5)
13669	Resistor—22,000 Ohms, Carbon type, 2 watt (R21)
11300	Resistor—33,000 Ohms, Carbon type, 1/10 watt (R19)
13735	Resistor—33,000 Ohms, Carbon type, ½ watt (R4)
11365	Resistor—82,000 Ohms, Carbon type, ½ watt (R17)
11398	Resistor—220,000 Ohms, Carbon type 1/10 watt (R6)
11323	Resistor—270,000 Ohms, Carbon type, ½ watt (R14)
13005	Resistor—390,000 Ohms, Carbon type, 1/10 watt (R16)
11172	Resistor—470,000 Ohms, Carbon type, ½ watt (R11)
11397	Resistor—560,000 Ohms, Carbon type, 1/10 watt (R1, R3)
12013	Resistor—1 Megohm, Carbon type, 1/10 watt (R23)
11626	Resistor—2.2 Megohm, Carbon type, ½ watt (R7, R8)
13732	Resistor—10 Megohm, Carbon type, ½ watt (R22)
14343	Retainer—Station selector knob shaft and pulley retainer
14350	Screw—No. 8—32x3/16 square head set screw for hub and arm on tone or band indicator cable, drum Stock No. 14345, Gear Stock No. 30085
14374	Shield—Antenna or R-F coil shield
14375	Shield—Oscillator coil shield
12008	Shield—First or second I-F transformer shield
11195	Socket—5-contact 5W4 Radiotron socket
11196	Socket—8-contact 6F6, 6K7, 6J7, 6L7, or 6Q7 Radiotron socket
14114	Socket—Dial lamp socket
12007	Spring—Retaining spring for core Stock Nos. 12006 and 12800
12907	Spring—Tension spring for indicator drive gear Stock No. 30085
14342	Spring—Tension spring for idler Stock No. 14341
14371	Switch—Low frequency tone and power switch (S4, S5)
14515	Switch—Range switch (S1, S2, S3)
14376	Transformer—First I-F transformer (L14, L15, C12, C13)
14283	Transformer—Second I-F transformer (L16, L17, C27, C28, C29, R5, R6)
14511	Transformer—Power transformer, 105-125 volts, 50-60 cycles (T1)
14512	Transformer—Power transformer, 105-125 volts, 25-60 cycles (T1)
14335	Volume Control (R9)
14379	Washer—Felt washer for indicator pointer

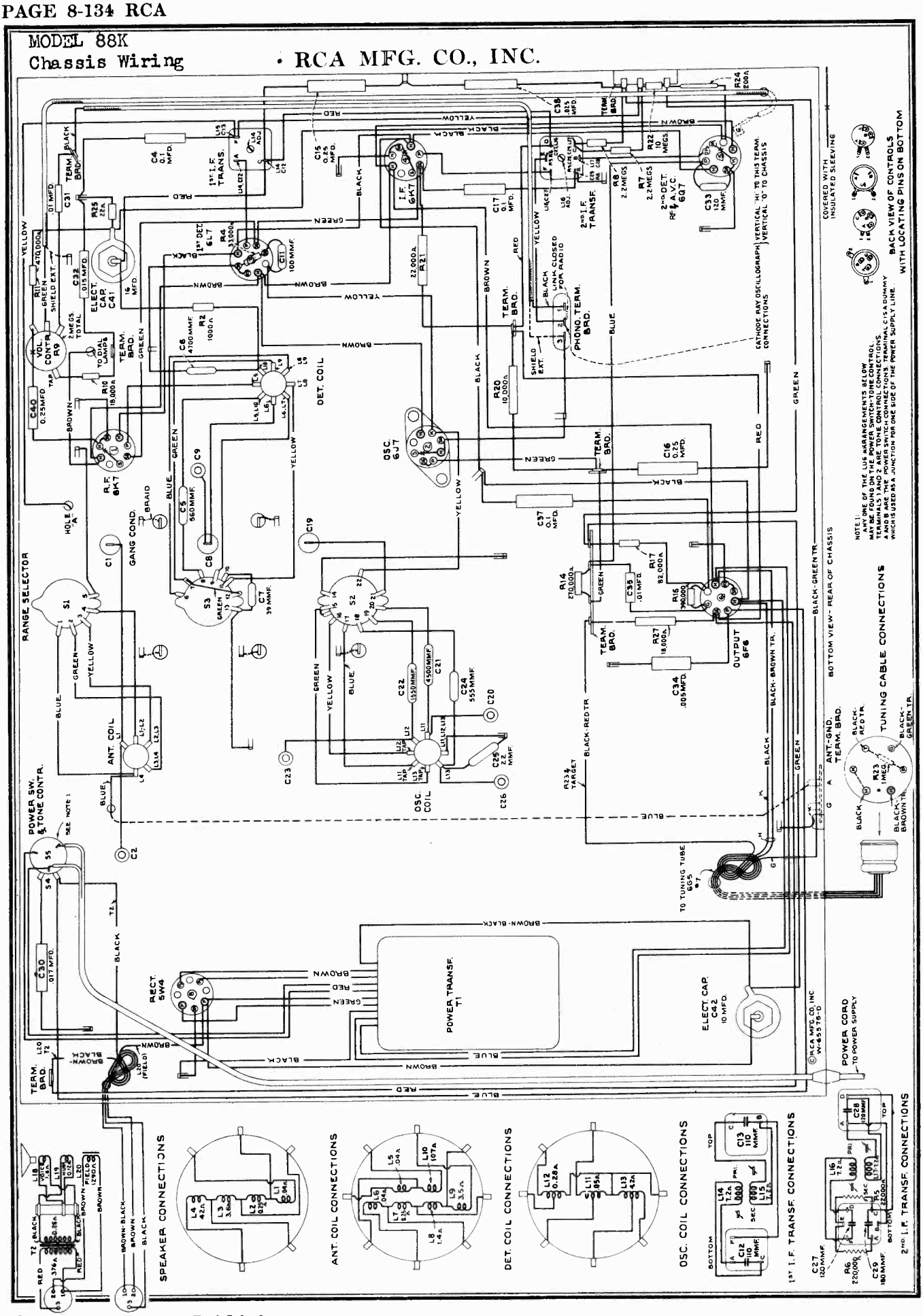
MODEL 88K
Schematic

RCA MFG. CO., INC.



MODEL 88K
Chassis Wiring

• RCA MFG. CO., INC.



RCA MFG. CO., INC.

MODEL 88K
Voltage, Socket
Trimmers, Notes

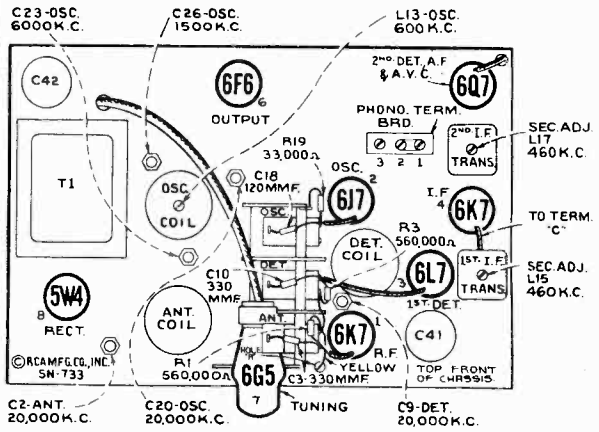


Figure 1—Radiotron, Coil, and Trimmer Locations

Service Data

Loudspeaker.—Centering of the loudspeaker is made in the usual manner with three narrow paper feelers after first removing the front dust cover. This may be removed by softening its cement with a light application of acetone, using care not to allow the acetone to flow into the air gap. The dust cover should be cemented back in place with ambroid upon completion of adjustment.

Phonograph Attachment.—A terminal board is provided for connecting a phonograph into the audio amplifying circuit. RCA Victor Models R-93, R-93-A, R-93-2, or R-94 Record Players should be connected as follows: Remove link between terminals 1 and 2 on terminal board. Connect green wire in Radio-Record switch cable to terminal 1, yellow to terminal 2, and shield extension to terminal 3. Tape unused red and blue leads separately. Connect a 2-conductor twisted cable between the Record Player binding posts and the screw terminals on Radio-Record switch.

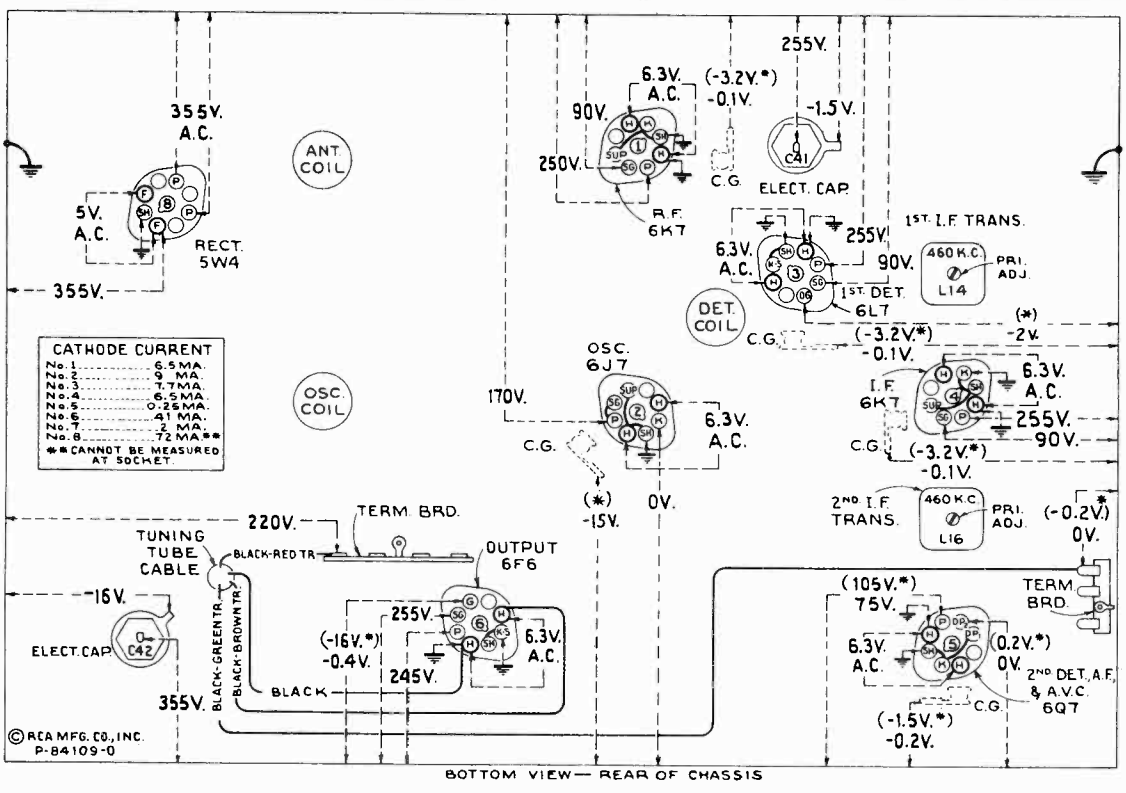


Figure 2—Radiotron Socket Voltages, Coil, and Trimmer Locations

Measured at 115 volts, 60-cycle supply—Tuned to approximately 1,000 kc ("Standard Broadcast")—No signal being received—Volume control minimum

Note: Two voltage values are shown for some readings. The value shown in parentheses with asterisk (*) indicates operating conditions without voltmeter loading. The other value (generally lower) is the actual measured voltage and differs from the value shown in parentheses because of the additional loading of the voltmeter through the high series circuit resistance.

Voltage values as specified should hold within ±20% when the receiver is normally operative at its rated line voltage. To duplicate the conditions under which the voltages were measured requires a 1,000-ohm-per-volt d-c meter, having ranges of 10, 50, 250, and 500 volts. Use the nearest range above the specified measured voltage. A-c voltages were measured with a corresponding a-c meter.

MODELS R-93-A, R-93-2
Motor Details

RCA MFG. CO., INC.

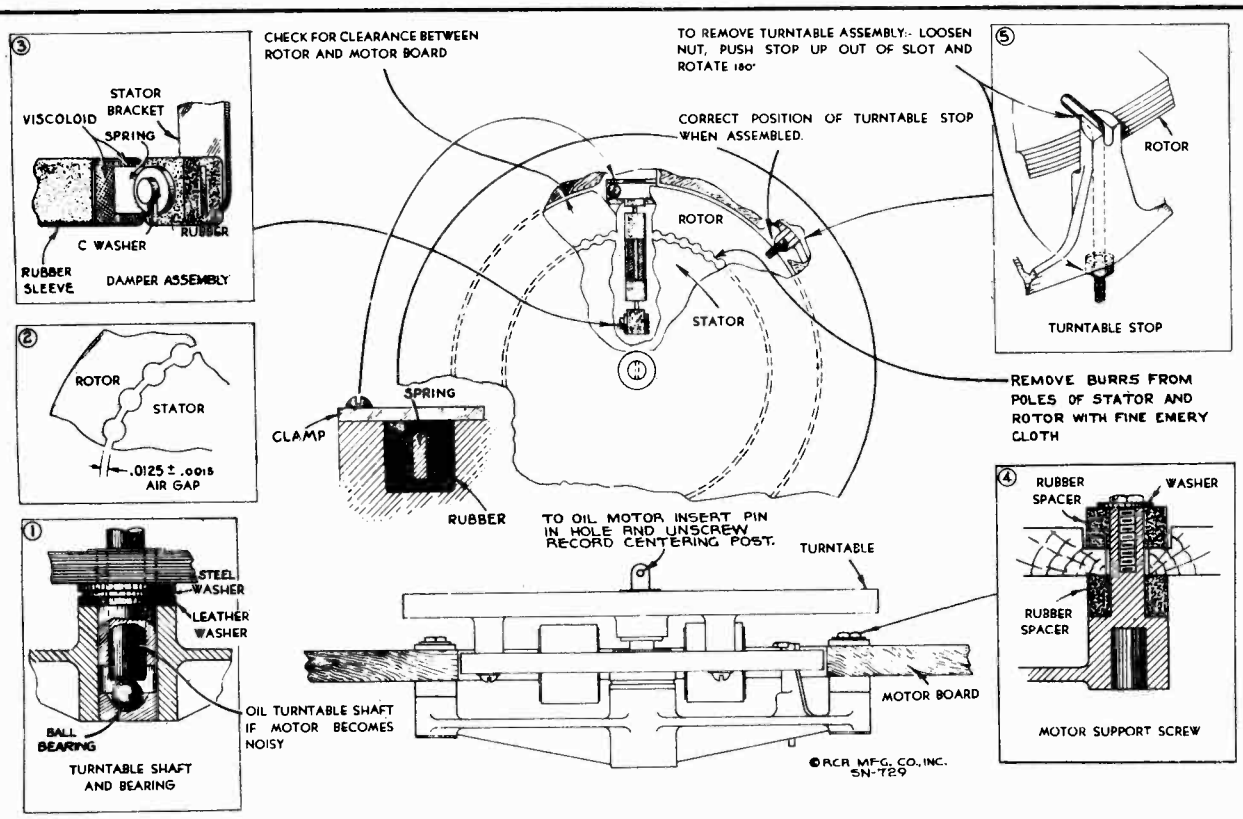


Figure 4—Details of Motor
[Model R-93-A (1st and 2nd prod.)]

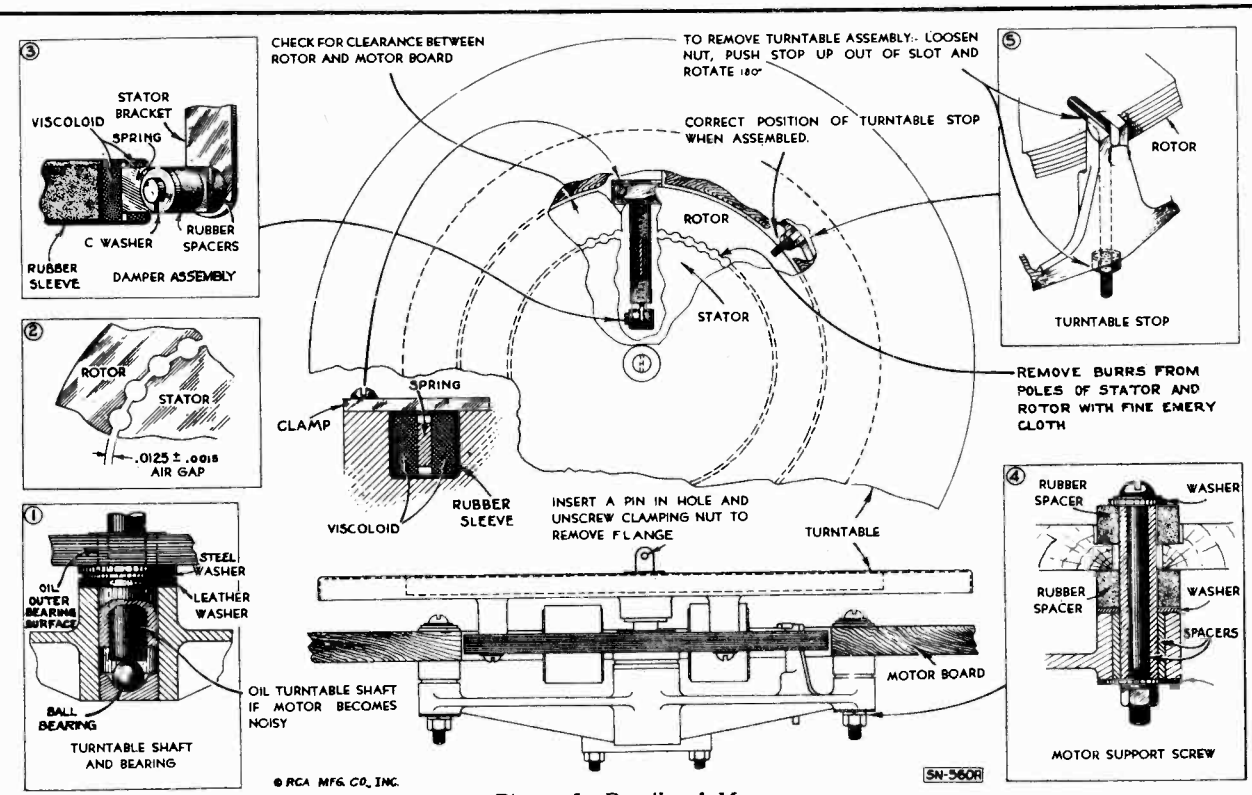


Figure 5—Details of Motor
[Model R-93-2 Deluxe (1st prod.)]

RCA MFG. CO., INC.

MODELS R-93-S,R-94
Motor Details
MODELS R-93(3rd Prod.)
R-93-A,R-93-S,R-94 R-93-2
Pick-up Details, Schematics

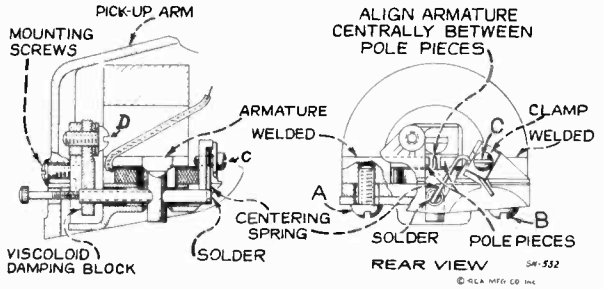


Figure 1—Details of Pickup
[Models R-93 (3rd prod.), R-93-A (1st prod.), R-93-2 Deluxe (1st prod.), and R-93-S (1st prod.)]

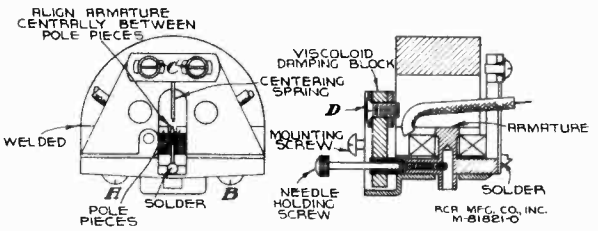


Figure 2—Details of Pickup
[Models R-93-A (2nd prod.) and R-94 Deluxe (1st prod.)]

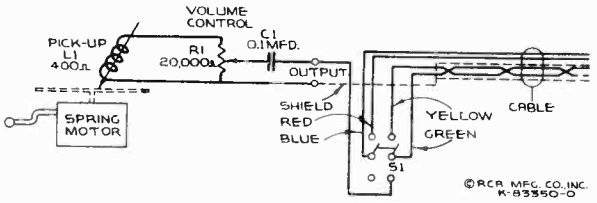
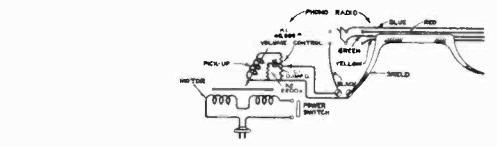


Figure 6—Schematic Circuit Diagram
[Model R-93-S (1st prod.)]



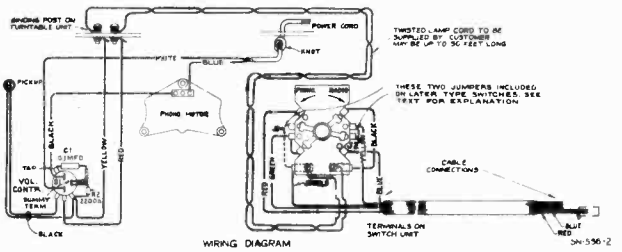


Figure 3—Wiring Diagram and Equivalent Schematic Circuit
[Models R-93-A (1st and 2nd prod.) and R-94 Deluxe (1st prod.)]

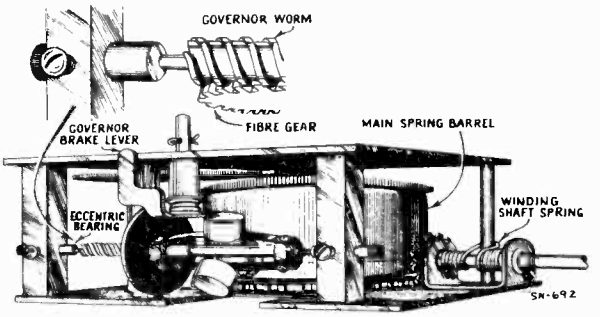


Figure 7—Details of Motor
[Model R-93-S (1st prod.)]

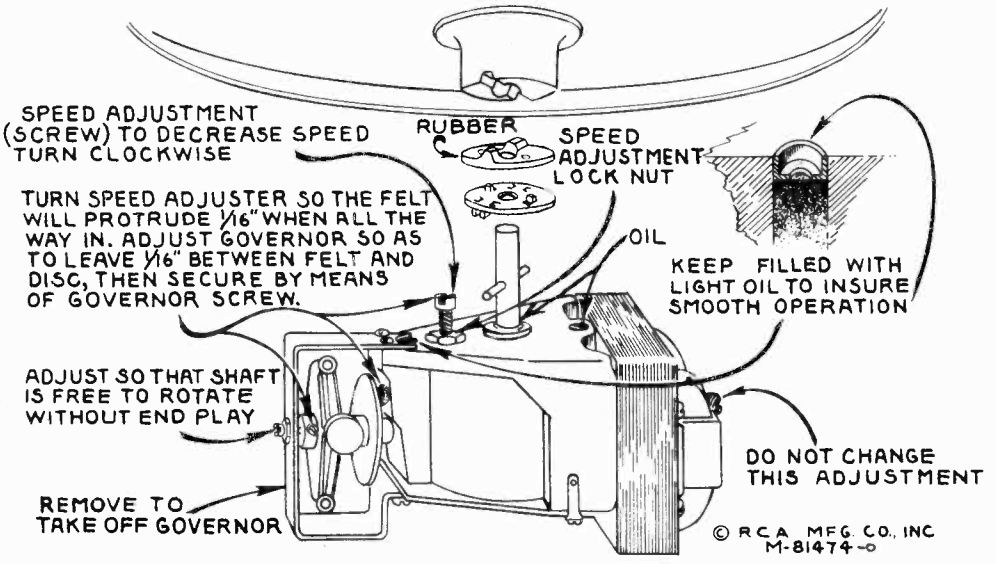


Figure 8—Details of Motor
[Model R-94 Deluxe (1st prod.)]

Introduction

The RCA Victor Record Players Models R-93 (third production), R-93-A (first and second production), R-93-2 Deluxe, R-93-S, and R-94 Deluxe are designed to provide record reproduction to the owner of a radio receiver by utilizing the audio amplifier system and loudspeaker of the radio receiver. Methods of connecting these record players to the radio receiver are outlined in the Model R-93 Service Notes (third edition) and in this booklet. Model R-93 (first and second production) is listed in the "Specifications" tabulation of this booklet, for convenient reference.

Note

1. (Applies to Model R-93-S only). It is necessary to short the 0.1 mfd. blocking capacitor C1 in Model R-93-S (see figure 6) for cases in which the control grid d-c bias, or cathode current flow, would be removed or prevented by this capacitor when the record player switch is thrown to "Phono" position. C1 is provided to permit operation on battery receivers without shorting bias batteries, etc. Cases in which it is necessary to short C1 are indicated in "RCA Victor Receivers—Details of Lead Connections" of this booklet.

2. (Record Player Switch Jumpers) — Some record player switches do not have jumpers J1 and J2 (see figure 3) attached. When the switch is so connected and turned to phonograph position, the voltage developed by the pickup is fed into the radio receiver through the green wire and shield, and at the same time the yellow wire is connected to shield. The jumpers J1 and J2 permit the yellow lead to kill radio by connection to shield. The jumpers should be removed where the yellow lead connects in such a position as to short bias batteries, etc. Check the switch to be used for the method chosen and use the jumpers accordingly. Correct jumper connections are indicated in "RCA Victor Receivers—Details of Lead Connections" of this booklet.

To prevent confusion, replacement parts lists are provided separately in this booklet for Models R-93 (third production), R-93-A (first and second production), R-93-2 Deluxe (first production), R-93-S (first production), and R-94 Deluxe (first production), respectively, and should be consulted whenever making replacements to these various models.

Description and Service Data

MODEL R-93

(Third Production)

(Walnut, Red, White, Black)

The Model R-93 (third production) in colors of Walnut, Red, White, or Black are similar electrically to the original R-93 (first and second production) but may be identified mechanically by the curved tone arm. The original Model R-93 had a straight tone arm. Refer to Model R-93 Service Notes (third edition) Phonograph Motor Service Data (second production motors) for motor details and adjustments.

MAGNETIC PICKUP

The pickup used in the phonograph unit is of an improved design. The horseshoe magnet is rigidly welded to the pole pieces and is irremovable. There is a centering spring attached to the armature to maintain proper adjustment and to provide a limiting effect on the movement of the armature. The frequency response is substantially uniform over a wide range. Service operations which may be necessary on the pickup are as follows:

CENTERING ARMATURE

Refer to figure 1 showing the pickup inner structure. The armature is shown in its proper relation to the magnet pole pieces, i. e., exactly centered. Whenever this centering adjustment has been disturbed it will be necessary to remove the pickup mechanism from the tone arm by removing the needle holding screw and the two mounting screws from the front of the tone arm, holding the pickup assembly to keep it from dropping. Unsolder the two leads from the lugs on the terminal board at the rear of the pickup. Insert a small rod or nail into the armature needle hole and replace the needle holding screw, tightening it to hold the rod securely. If the armature clamping screws A and B have not been disturbed, screw or screws C should be loosened which will permit the armature to be moved from side to side, the rod acting as a lever to perform this operation. The proper adjustment is obtained when the armature is moved to the extreme position on each side (the movement being limited by the armature striking the pole pieces) and then brought to the mid position between these two extremes. Screw or screws C should then be tightened. The armature position should then be central between the pole pieces and at right angles to them. With a little practice, the correct adjustment of the armature will be obtained. The air gap between the pole pieces and the armature should be kept free from dust, filings, and other foreign material which would obstruct the movement of the pickup armature.

DAMPING BLOCK

The viscoloid damping block which is attached to the front end of the armature shank serves as a mechanical filter to eliminate undesirable resonances and to cause the frequency response to be uniform. Should it be necessary to replace this damping block, the pickup mechanism should be removed from the tone arm as explained above. Remove screw D and the damping block from the pickup assembly. Make sure that the shaft of the armature which contacts the viscoloid is clean. Then insert the new damping block so that it occupies the same position as that of the original block, and is in correct vertical alignment with the armature. The hole in the block is somewhat smaller than the diameter of the armature in order to permit a snug fit. With the damping block properly aligned on the armature, screw D with its washer should then be replaced. Heat should be applied to the armature (viscoloid side) so that the damping block will fuse at the point of contact and become rigidly attached to the armature. A special-tip soldering iron, constructed as shown in Model R-93 Service Notes (third edition) figure 8, will be found very useful in performing this operation. The iron should be applied only long enough to slightly melt the block, causing a small bulge on both sides.

REPLACING COIL

Whenever there is defective operation due to an open or shorted pickup coil, this coil should be replaced. Remove the pickup mechanism and terminal board as described above. Remove screws A and B and the magnet assembly. Remove the bakelite coil support (with coil attached) and insert the new coil support assembly in its place, after which replace the magnet assembly and center the armature as described above, then re-assemble the remainder of the unit. Only rosin core solder should be used for soldering the coil leads and pickup leads to the pickup terminal board. This same type of solder should be used when necessary for soldering the centering spring to the armature.

MAGNETIZING

Loss of magnetization will not usually occur when the pickup has received normal care because the magnet and pole pieces are one unit and the magnetic circuit remains practically closed at all times. When the pickup has been mishandled, subjected to a strong a-c field, jolted, or dropped, there may be an appreciable loss of magnetic strength, in which case it will be necessary to remagnetize the entire structure. To do this, it will be necessary to first remove the pickup mechanism from the tone arm, and then remove the magnet assembly. Place the magnet assembly on the poles of a standard pickup magnetizer such as the RCA Stock No. 9549 Pickup Magnetizer and charging the magnet in accordance with the instructions accompanying the magnetizer. It is preferable to check the polarity of the pickup magnet and to remagnetize it so that the same polarity is maintained.

MODEL R-93-A

(First and Second Production)

(Walnut)

The cabinet of the Model R-93-A is similar to that of the Model R-93 Walnut finish. This model incorporates an acoustic compensated volume control, see figure 3. Model R-93-A (first production) and Model R-93-A (second production) differ only in the pickup construction, the essential difference being in the armature centering spring and spring clamps. Reference to pickup details, figures 1 and 2 will reveal the fact that the armature centering spring is respectively "V" and "T" shaped for the Model R-93-A (first and second productions). Refer to "Model R-93 (third production)" and figures 1 and 2 for pickup adjustments.

The motor differs slightly in construction and mounting details from that used in the Model R-93 (second production). Refer to figure 4 for motor details. Refer to Model R-93 Service Notes (third edition) for motor coil connections.

MODEL R-93-2 DE LUXE

(Walnut)

Model R-93-2 Deluxe is finished in walnut and is electrically identical to Model R-93 (third production), however, the cabinet is larger in size and has a hinged lid which may be closed while playing the records. The turntable is 10 inches in diameter. The motor differs slightly in construction from that used in the Model R-93 (second production). Refer to figure 5 for motor details and to Model R-93 Service Notes (third edition) for motor coil connections.

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MODEL R-93-S

(Walnut)

Model R-93-S has a spring wound motor and is primarily intended for use with battery receivers. The pickup and tonearm are identical to those described in "Model R-93 (third production)," therefore the adjustments will be the same. Reference to the Schematic diagram figure 6 will show a capacitor C1 in series with one of the leads to the binding posts. The purpose of C1 is to permit operation on battery receivers without shorting bias batteries, etc. Observe Note 1 under "Introduction" when making connections to radio receivers.

MOTOR

The drive motor is of simple design and substantial construction. It should require little or no service if properly maintained. Attention to lubrication of the moving parts and occasional cleaning of the mechanism will go far to prevent faulty operation. Should it become necessary to repair the motor, the following procedure should be applied referring to figure 7:

REMOVING MOTOR FROM CABINET—Remove the winding key. To dismount the motor, unscrew the spindle cap with a screwdriver and remove turntable, slightly tapping the spindle while exerting an upward lift on the turntable. Remove the bottom cover from the cabinet. Loosen the screw holding the speed regulating lever and remove the latter. The four nuts holding motor to motor board should then be loosened to permit removal of motor assembly.

Caution—Allow the motor mechanism to run down completely before attempting adjustment, repairs, or replacement.

REPLACING MAIN SPRING—In case of main spring failure the entire spring barrel and gear should be replaced. Remove spring barrel spindle screw by unscrewing to right. Remove the "C" washer and two pillar screws holding bottom plate. Remove plate and intermediate spindle shaft. Replace main spring barrel, intermediate spindle shaft, and bottom plates.

WINDING SHAFT SPRING—This spring functions as a friction rachet. It may be removed by first removing pin holding winding gear on shaft, removing shaft, and then the screw holding the spring.

GOVERNOR ADJUSTMENTS—The mesh of the worm and fibre gears is adjusted by rotation of the eccentric spindle bearings. The adjustments should be made so that the worm meshes properly with the fibre gear and rotates freely without binding. The bearings should be accurately aligned with each other. The minimum of spindle end play which permits smooth operation should be used.

SPEED REGULATOR LEVEL—After assembly, adjust the speed regulator until the turntable rotates at 78 r.p.m.; then loosen the speed regulator screw and set pointer to center of speed indicator scale; tighten screw and re-check turntable speed.

LUBRICATION—All moving parts of the motor should be thoroughly cleaned and lubricated every six months to prevent excess wear and improper operation. A small amount of grease should be applied to the worm gear of the governor, the gear of the winding shaft, and on the small pinion gear. All other points should be lubricated with a drop of light oil. All motor parts should be covered with a light film of oil to prevent rusting.

MODEL R-94 DE LUXE

(Walnut)

The Model R-94 Deluxe cabinet is finished in walnut and has a hinged lid which may be closed while playing the records. This model incorporates an acoustic compensated volume control, see figure 3. An improved type of pickup is used, the construction of which is illustrated in figure 2. Refer to "Model R-93 (third production)" and figure 2 for pickup adjustments.

MOTOR—The phonograph motor is of the governor induction type and is designed to be simple and foolproof. Occasionally, however, certain adjustments may be required. These adjustments are illustrated and explained in figure 8. Application of oil to the felt pad which rubs against the governor disc will insure smooth operation.

RCA VICTOR RECEIVERS—DETAILS OF LEAD CONNECTIONS

MODEL	METHOD OF CONNECTION	GREEN	YELLOW	RED	BLUE	SHIELD	SWITCH
5BT, 5T, 5T1, 5T4, 5T5, 5T6, 5T7, 5T8, 6K, 6K1, 6T, 6T5, 8BK, 8BK6, 8BT, 8BT6, 8K11, 8T2, 8T11	2. Term. Board	1	2	Tape	Tape	3	†
6BK, 6BK6, 6BT, 6BT6	2. Term. Board	1	2	Tape	Tape	3	††
7K, 7T, 7X, 7X1, 8K, 8K1, 8T, 8T10	2. Term. Board	1	2	Tape	Tape	3	†§
6K2, 6K3, 6K10, 6T2, 6T10, 7K1, 7X1	2. Term. Board	2	1	Tape	Tape	3	†
T9-7, T9-8	2. Term. Board	2	3	Tape	Tape	1	†
9K, 9K1, 9K2, 9K3, 9K10, 9T, 10K, 10K1, 10K11, 10T, 10T11, 13K, 15K	2. Term. Board	2	1	4	3	3	††
C6-12, C7-14, C8-19, C8-20, T6-11, T7-12, T8-18, T9-10	4. Grid Clip	Grid Cap Tube	Grid Clip	Tape	Tape	Chassis	†§
C11-3, C13-3, C15-4	5. Adapter	1st Audio Cathode	Cathode Socket Contact	I-F Cathode *	I-F Cathode Socket Contact	Chassis	††§
C6-8, T6-7	5. Adapter	Grid Cap Tube	Grid Clip	Tape	Tape	Both Adapter Cathode Terms.	†§

† Add Jumpers J1 and J2 to Phono-Radio Switch if not present. § Short 0.1 Mfd. Capacitor (C1) in R-93-S Record-Player
†† Remove Jumpers J1 and J2 to Phono-Radio Switch if present. * Use a second adapter.

MODELS R-93 (3rd Prod.)
R-93-S, R-94, R-93A, R-93-2 RCA MFG. CO., INC.
Specifications, Parts, Page 1

Specifications

Model	Cabinet Finish	Production	Tone Arm Style	Voltage	Freq. Cyc.	Power Consumption Watts	Motor Coil Res. Ohms Total	Type of Motor	Turntable Speed R.P.M.	Pickup Impedance 1000 cycles	Volume Control Resistance Ohms	Dimensions Inches: Height	Width	Depth	Turntable Dia. Inches	Weights: Net	Shipping
R-93	Walnut	Third	Curved	105—125	60	5	200	Synchronous (Manual Starting)	78	1,400	20,000	5	11	8	7	8½	10
					50	5	200										
R-93	Red White Black	Third	Curved	105—125	60	5	200	Synchronous (Manual Starting)	78	1,400	20,000	5	11	8	7	8½	10
				105—125	50	5	200										
				105—125	25	5	660										
				200—250	50	5	1,040										
R-93	Walnut	Second	Straight	105—125	60	5	200	Synchronous (Manual Starting)	78	1,400	20,000	5	11	8	7	8½	10
				105—125	50	5	200										
				105—125	25	5	660										
R-93	Walnut	First	Straight	105—125	60	5	218	Synchronous (Manual Starting)	78	1,400	20,000	5	11	8	7	8½	10
				105—125	50	5	218										
				105—125	25	5	960										
				200—250	50	5	1,270										
R-93-A	Walnut	First and Second	Curved	105—125	60	5	160	Synchronous (Manual Starting)	78	1,400	40,000 Tapped for Compensation	5⅝	11¼	9	7	10	12
				105—125	50	5	160										
				105—125	25	5	420										
				200—250	50	5	700										
R-93-2 Deluxe	Walnut	First	Curved	105—125	60	5	200	Synchronous (Manual Starting)	78	1,400	20,000	5½	13 7/16	13⅛	10	14	18
				105—125	50	5	200										
				105—125	25	5	660										
				200—250	50	5	1,040										
R-93-S	Walnut	First	Curved	—	—	—	—	Spring Wound	78 Adjustable	1,400	20,000	5½	12 5/16	10⅛	9	10	13
R-94 Deluxe	Walnut	First	Curved	105—125	60	25	100	Governor Induction (Self-Starting)	78 Adjustable	1,400	40,000 Tapped for Compensation	7¼	15½	13½	9	14	18
				105—125	50—60	25	70										
				200—250	50—60	25	290										

REPLACEMENT PARTS

STOCK No.	DESCRIPTION
	MOTOR ASSEMBLIES [Model R-93 (third production) Walnut]
10194	Ball—Steel ball bearing
11740	Base—Motor base and bearing assembly
11733	Coil—Stator assembly—comprising coil and laminations—105-125 volt, 60 cycle operation
11734	Coil—Stator assembly—comprising coil and laminations—105-125 volt, 50 cycle operation
11748	Damper—Motor damper assembly—comprising one damper, one damper plate, one screw, two rubber washers, and one "C" washer
11873	Motor—105-125 volts—60 cycle motor (M1)
11874	Motor—105-125 volts—50 cycle motor (M1)
4456	Motor Accessories—comprising three nuts, one shield and one screw
11876	Turntable — Turntable assembly complete — with rotor laminations—60 cycle operation
11875	Turntable — Turntable assembly complete — with rotor laminations—50-cycle operation
4083	Washer—Leather washer
4084	Washer—Metal washer
	MOTOR ASSEMBLIES [Model R-93 (third production) Red-White-Black]
10194	Ball—Steel ball bearing
11740	Base—Motor base and bearing assembly
11733	Coil—Stator assembly—comprising coil and lamination—110 volts, 60 cycle
11734	Coil—Stator assembly—comprising coil and lamination—110 volts, 50 cycle
11735	Coil—Stator assembly—comprising coil and lamination—110 volts, 25 cycle
13081	Coil—Stator assembly—comprising coil and lamination—220 volts, 50 cycle
11748	Damper—Motor damper assembly—comprising one damper, one damper plate, one screw, two rubber washers and one "C" washer
9721	Motor—110 volts, 60 cycle motor with red turntable (M1)
9725	Motor—110 volts, 60 cycle motor with white turntable (M1)
9729	Motor—110 volts, 60 cycle motor with black turntable (M1)
9722	Motor—110 volts, 50 cycle motor with red turntable (M1)
9726	Motor—110 volts, 50 cycle motor with white turntable (M1)
9730	Motor—110 volts, 50 cycle motor with black turntable (M1)
9723	Motor—110 volts, 25 cycle motor with red turntable (M1)
9727	Motor—110 volts, 25 cycle motor with white turntable (M1)
9731	Motor—110 volts, 25 cycle motor with black turntable (M1)

REPLACEMENT PARTS—(Continued)

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

STOCK No.	DESCRIPTION
9724	Motor—220 volts, 50 cycle motor with red turntable (M1)
9728	Motor—220 volts, 50 cycle motor with white turntable (M1)
9732	Motor—220 volts, 50 cycle motor with black turntable (M1)
13072	Turntable—Red turntable—complete with rotor lamination—60 cycle operation
13075	Turntable—White turntable—complete with rotor lamination—60 cycle operation
13078	Turntable—Black turntable—complete with rotor lamination—60 cycle operation
13073	Turntable—Red turntable—complete with rotor lamination—50 cycle operation
13076	Turntable—White turntable—complete with rotor lamination—50 cycle operation
13079	Turntable—Black turntable assembly — complete with rotor lamination—50 cycle operation
13074	Turntable—Red turntable assembly—complete with rotor lamination—25 cycle operation
13077	Turntable—White turntable assembly — complete with rotor lamination—25 cycle operation
13080	Turntable—Black turntable assembly — complete with rotor lamination—25 cycle operation
4083	Washer—Leather spacing washer
4084	Washer—Metal spacing washer
	MOTOR ASSEMBLIES [Model R-93-A (first and second production) Walnut]
10194	Ball—Steel ball bearing
14286	Base—Motor base and bearing assembly
14232	Cap—Turntable spindle cap
14223	Coil—Stator assembly—comprising coils and laminations —105-125 volts, 60 cycle
14224	Coil—Stator assembly—comprising coils and laminations —105-125 volts, 50 cycle
14225	Coil—Stator assembly—comprising coils and laminations —105-125 volts, 25 cycle
14226	Coil—Stator assembly—comprising coils and laminations —220 volts, 50 cycle
14228	Damper — Motor damper assembly — comprising one damper, one damper plate, one screw and one "C" washer
14216	Motor—105-125 volts—60 cycle (M1)
14217	Motor—105-125 volts—50 cycle (M1)
14218	Motor—105-125 volts—25 cycle (M1)
14219	Motor—220 volt—50 cycle (M1)
14227	Shield—Terminal board shield and nuts
14229	Stop—Turntable stop, lockwasher and nut—prevents removal of turntable
14220	Turntable—Turntable assembly—complete with rotor laminations—60 cycle operation
14221	Turntable—Turntable assembly—complete with rotor laminations—50 cycle operation
14222	Turntable—Turntable assembly—complete with rotor laminations—25 cycle operation
4083	Washer—Leather washer for turntable bearing
14230	Washer—Metal washer for turntable bearing
14231	Washer—Metal shim washer for turntable bearing
	MOTOR ASSEMBLIES [Model R-93-2 Deluxe (first production) Walnut]
10194	Ball—Steel ball bearing
11740	Base—Motor base and bearing assembly
11735	Coil—Stator assembly—Comprising coils and laminations —110 volts, 25 cycles
11734	Coil—Stator assembly—comprising coils and laminations —110 volts, 50 cycles
11733	Coil—Stator assembly—comprising coils and laminations —110 volts, 60 cycles
13081	Coil—Stator assembly—comprising coils and laminations 220 volts, 50 cycles
11748	Damper — Motor damper assembly — comprising one damper, one damper plate, one screw, two rubber washers and one "C" washer
9733	Motor—110 volts—25 cycles (M1)
12083	Motor—110 volts—50 cycles (M1)
12082	Motor—110 volts—60 cycles (M1)
9734	Motor—220 volts—50 cycles (M1)
13084	Turntable—Turntable assembly—complete with rotor laminations—25 cycle operation
12049	Turntable—Turntable assembly—complete with rotor laminations—50 cycle operation
12048	Turntable—Turntable assembly—complete with rotor laminations—60 cycle operation
4083	Washer—Leather spacing washer
4084	Washer—Metal spacing washer
	MOTOR ASSEMBLIES [Model R-93-S (first production) Walnut]
7937	Ball and Spring—Governor ball and spring assembly
7943	Barrel—Spring barrel—complete with winding gear and drive gear
7945	Gear—Intermediate gear, pinion and shaft
7938	Gear—Winding gear, sleeve and shaft
7940	Governor Assembly—Comprising governor, spindle, disc, collar, governor balls and springs assembled
7228	Grease—Motor grease—1 pint can
7228	Lubricant—Spring lubricant—1 pint can
7931	Motor—Motor complete with spindle cap
7227	Oil—Motor oil—1 pint can
7941	Plate—Motor top plate assembly
7944	Shaft—Regulator shaft—complete with friction lever and pad with cotter pin
7939	Spindle—Turntable spindle—complete with two gears
7957	Spring—Main spring for motor
7942	Spring—Winding shaft spring
	MOTOR ASSEMBLIES [Model R-94 Deluxe (first production) Walnut]
14328	Governor—Complete motor governor assembly
14325	Motor—105-125 volts—60 cycle (M1)
14326	Motor—105-125 volts—50-60 cycle (M1)
14327	Motor—200-250 volts—50-60 cycle (M1)
	PICKUP AND ARM ASSEMBLIES [Model R-93 (third production) Walnut]
3812	Armature—Pickup armature
4462	Cable—Pickup cable
11732	Coil—Pickup coil and support (L1)
5091	Cushion—Pickup armature cushion
4543	Damper—Pickup damper block complete—with damper plate, washer and screw
12329	Pickup and arm assembly complete
4387	Screw—Pickup arm set screw—used to fasten arm to pivot shaft
11951	Screw—Pickup needle holding screw
	PICKUP AND ARM ASSEMBLIES [Model R-93 (third production) Red-White-Black]
3812	Armature—Pickup armature
4462	Cable—Pickup cable
11732	Coil—Pickup coil and support (L1)
5091	Cushion—Pickup armature cushion
4543	Damper—Pickup damper block—complete with damper plate, washer and screw
12329	Pickup and arm assembly—complete
4387	Screw—Pickup arm set screw—used to fasten arm to pivot shaft
11951	Screw—Pickup needle holding screw
	PICKUP AND ARM ASSEMBLIES [Model R-93-A (first and second production) Walnut]
3812	Armature—Pickup armature (first production)
14294	Armature—Pickup armature (second production)
4462	Cable—Pickup cable
11732	Coil—Pickup coil and support (L1)
5091	Cushions—Pickup armature cushion
4543	Damper—Pickup damper block—complete with damper plate and washer
14928	Pickup and Assembly—Complete
4387	Screw—Pickup arm set screw—used to fasten arm to pivot shaft
11951	Screw—Pickup needle holding screw
	PICKUP AND ARM ASSEMBLIES [Model R-93-2 Deluxe (first production) Walnut]
11731	Armature—Pickup armature — complete with spacer cushions
11732	Coil—Pickup coil (L1)
4543	Damper—Pickup damper block—complete with damper plate and screw
11950	Pickup and Arm Assembly—Complete
5091	Spacer Cushions—Pickup armature spacer cushions
11951	Screw—Needle holding screw
	PICKUP AND ARM ASSEMBLIES [Model R-93-S (first production) Walnut]
3812	Armature—Pickup armature
4462	Cable—Pickup cable
11732	Coil—Pickup coil and support (L1)
5091	Cushion—Pickup armature cushion
4543	Damper—Pickup damper block—complete with damper plate, washer and screw
12329	Pickup and Arm Assembly—Complete
4387	Screws—Pickup arm set screw—used to fasten arm to pivot shaft
11951	Screw—Pickup needle holding screw

STOCK No.	DESCRIPTION
	PICKUP AND ARM ASSEMBLIES [Model R-94 Deluxe (first production) Walnut]
14291	Armature—Pickup armature assembly
11732	Coil—Pickup coil (L1)
14292	Damper—Pickup damper block—complete with clamp and screw
14329	Pickup and Arm—Complete
4387	Screw—No. 6-32x¼-in. headless set screw for pickup arm pivot shaft
3811	Screw—Needle holding screw
14213	Washer—Pickup arm stop washer
	CABINET ASSEMBLIES [Model R-93 (third production) Walnut]
X325	Bottom—Lower section of wood cabinet
X324	Cover—Upper section of wood cabinet
	CABINET ASSEMBLIES [Model R-93 (third production) Red-White-Black]
X314	Bottom—Lower section of red cabinet
X316	Bottom—Lower section of white cabinet
X318	Bottom—Lower section of black cabinet
X315	Cover—Top section of red cabinet
X317	Cover—Top section of white cabinet
X319	Cover—Top section of black cabinet
	CABINET ASSEMBLIES [Model R-93-A (first and second production) Walnut]
X356	Bottom—Lower section of wood cabinet
X357	Cover—Upper section of wood cabinet
	CABINET ASSEMBLIES [Model R-93-2 Deluxe (first production) Walnut]
X321	Bottom—Lower section of cabinet—less hinges and lid support
X320	Cover—Lid section of cabinet—less hinges and lid support
13085	Hinge—Cabinet hinge and screws
13086	Support—Cabinet lid support and screws
	CABINET ASSEMBLIES [Model R-93-S (first production) Walnut]
X322	Bottom—Lower section of wood cabinet
X323	Cover—Top section of wood cabinet
	CABINET ASSEMBLIES [Model R-94 Deluxe (first production) Walnut]
X370	Bottom—Lower section of cabinet—less hinges and lid support
X371	Cover—Lid section of cabinet—less hinges and lid support
13086	Hinge—Cabinet lid hinge and screws
13086	Support—Cabinet lid support and screws
	MISCELLANEOUS ASSEMBLIES [Model R-93 (third production) Walnut]
4459	Bracket—Volume control mounting bracket
4461	Cable—5-conductor Radio-Record switch cable
3829	Knob—Radio-Record switch knob
3961	Knob—Volume control knob
4458	Post—Binding post
3261	Rest—Pickup rest
11869	Screw—Motor mounting screw assembly—comprising one screw, three metal washers, two rubber washers, one lockwasher and one nut
4119	Screw—No. 8-32 x ¼-inch headless set screw for knob, Stock No. 3829
4460	Switch—Radio-Record switch (S2)
4502	Volume Control and switch (R1, S1)
	MISCELLANEOUS ASSEMBLIES [Model R-93-A (first and second production) Walnut]
4461	Cable—5-conductor Radio-Record switch cable
4841	Capacitor—0.1 Mfd. (C1)
3829	Knob—Radio-Record switch knob
3961	Knob—Volume control knob
4458	Post—Binding post
3261	Rest—Pickup rest
12195	Resistor—2,200 Ohms, insulated, ½ watt (R2)
14235	Screw—Motor mounting screw assembly—comprising one screw, one metal washer and two rubber washers
4119	Screw—No. 8-32x¼-in. headless screw for knob Stock No. 3829
4460	Switch—Radio-Record switch (S2)
14234	Volume Control and Switch (R1, S1)
	MISCELLANEOUS ASSEMBLIES [Model R-93-2 Deluxe (first production) Walnut]
4459	Bracket—Volume control mounting bracket
4461	Cable—5-conductor Radio-Record switch cable
3829	Knob—Radio-Record switch knob
3961	Knob—Volume control knob
4458	Post—Binding post
3261	Rest—Pickup rest
11869	Screw—Motor mounting screw assembly—comprising one screw, three metal washers, two rubber washers, one lockwasher, one nut and two spacers
4119	Screw—No. 8-32x¼-in. headless set screw for knob Stock No. 3829
4460	Switch—Radio-Record switch (S2)
4502	Volume Control and switch (R1, S1)
	MISCELLANEOUS ASSEMBLIES [Model R-93-S (first production) Walnut]
4459	Bracket—Mounting bracket for volume control
13089	Brake—Turntable brake assembly
4461	Cable—5-conductor Radio-Record switch cable
13087	Cap—Turntable spindle cap
4841	Capacitor—0.1 Mfd. (C1)
13093	Escutcheon—Winding key escutcheon and bushing
13091	Key—Motor winding key
3829	Knob—Radio-Record switch knob
3961	Knob—Volume control knob
7935	Leather—Friction leather for turntable brake
7936	Nut—Motor mounting nut assembly—comprising one nut, two washers, one lockwasher, one rubber cushion
4458	Post—Binding post
13090	Regulator—Motor speed regulator and plate
3261	Rest—Pickup rest
4119	Screw—No. 8-32x¼-in. headless set screw for knob Stock No. 3829
7934	Spring—Coil spring for turntable brake
4460	Switch—Radio-Record switch (S1)
13088	Turntable—Complete
13092	Volume Control (R1)
	MISCELLANEOUS ASSEMBLIES [Model R-94 Deluxe (first production) Walnut]
4461	5-conductor switch cable
4841	Capacitor—0.1 Mfd. (C1)
11704	Damper—Turntable damper and damper plate
3961	Knob—Volume control and switch knob
3829	Knob—Radio-Record switch knob
4458	Post—Binding post
3261	Rest—Pickup rest
13716	Resistor—2,200 Ohms, insulated, ½ watt (R2)
13573	Screw—Motor mounting screw assembly—comprising one screw, one spacer, one washer and one lockwasher
4119	Screw—No. 8-32x¼-in. headless set screw for knob Stock No. 3829
4460	Switch—Radio-Record switch (S2)
14204	Turntable—Complete
14234	Volume Control and Power Switch (R1, S1)

MODELS R-96, R-97
Parts

RCA MFG. CO., INC.

LOUDSPEAKER

Centering of the loudspeaker is made in the usual manner with three narrow paper feelers after first removing the front dust cover. This may be removed by softening its cement with a light application of acetone, using care not to allow the acetone to flow into the air gap. The dust cover should be cemented back in place with ambroid upon completion of adjustment.

REPLACEMENT PARTS

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

STOCK No.	DESCRIPTION
	AMPLIFIER ASSEMBLIES
12118	Cap—Grid contact cap
5005	Capacitor—.0035 Mfd. (C3)
4838	Capacitor—.005 Mfd. (C10)
13138	Capacitor—.01 Mfd. (C4, C8)
12670	Capacitor—.035 Mfd. (C9)
4839	Capacitor—0.1 Mfd. (C1, C2, C6)
5170	Capacitor—0.25 Mfd. (C7)
12484	Capacitor—0.25 Mfd. (C5)
11203	Capacitor—10 Mfd. (C11)
5212	Capacitor—16 Mfd. (C12)
14783	Connector—2-contact female connector for motor power cable
5119	Connector—3-contact female connector for reproducer cable
11955	Resistor—27 Ohms—Carbon type, ½ watt (R13)
11670	Resistor—330 Ohms—Carbon type, 1 watt (R12)
5159	Resistor—2,200 Ohms—Carbon type, ½ watt (R1, R2, R3)
5029	Resistor—56,000 Ohms—Carbon type, ½ watt (R9)
14943	Resistor—180,000 Ohms—Carbon type, ½ watt (R8)
11172	Resistor—470,000 Ohms—Carbon type, ½ watt (R6, R10)
13730	Resistor—1 Meg.—Carbon type, ½ watt (R5)
4241	Resistor—1.5 Meg.—Carbon type, ½ watt (R7)
4233	Shield—6C6 Radiotron shield
14278	Socket—Single contact female pickup cable socket
4794	Socket—4-contact 80 Radiotron socket
4786	Socket—6-contact 6C6 or 42 Radiotron socket
14797	Tone Control and power switch (R11, S1)
14796	Transformer—Power transformer—105-125 volts, 50-60 cycles (T1)
14843	Transformer—Power transformer—105-125 volts, 25-60 cycles (T1) (Model R97 only)
14798	Volume Control (R4)
	MOTORBOARD ASSEMBLIES (Model R-96)
14803	Brake—Turntable brake and motor switch
3261	Rest—Pickup rest
30248	Screw—Motor mounting screw, washer, rubber washers, clamp plate and spacer assembly
30100	Springs—Tension springs for brake Stock No. 14803 comprising 1 long and 1 short spring
14804	Switch—Motor switch (S2)—located on turntable brake Stock No. 14803
	MOTOR ASSEMBLIES (Model R-96)
11703	Governor—Complete motor governor, governor shaft and gear assembly
14800	Motor—105-125 volts, 60 cycle (MI)
	OPERATING MECHANISM ASSEMBLIES (Model R-97)
14199	Bushing—Record separator rotating shaft bushing
14183	Cam—Cam and gear assembly
6808	Clutch—Trip lever friction clutch
14197	Finger—Friction finger assembly
14186	Hub—Rotating hub and record separator complete with set screw
14189	Lever—Locating lever assembly
14201	Lever—Manual index lever assembly
14184	Lever—Main lever and link assembly
14194	Lever—Pickup arm lever complete with set screws
14193	Lever—Pickup lift cable lever
14198	Lever—Reject lever assembly
14185	Lever—Trip lever and friction clutch assembly
14196	Pawl—Trip pawl assembly
4563	Screw—Cable lever screw and two locknuts
4059	Screw—Trip lever clutch tension adjustment screw
14200	Screw—No. 8-32 special hex head screw and lockwasher for record separator shaft mounting
14188	Screw—No. 10-32x7/16 fillister-head cone-pointed set screw for rotating hub
14195	Screw—No. 10-32x5/16 fillister-head cone-pointed set screw for pickup arm lever
14187	Shaft—Rotating shaft for record separator
3676	Spring—Cam pawl tension spring
3666	Spring—Lift cable tension spring
14190	Spring—Locating lever pawl tension spring
14191	Spring—Locating lever or reject lever tension spring
14192	Spring—Main lever tension spring

STOCK No.	DESCRIPTION
	MOTORBOARD ASSEMBLIES (Model R-97)
14208	Bracket—Bumper bracket and bumper complete
14209	Bumper—Rubber bumper
14830	Cable—Shielded cable 13" long complete with single contact male connector—connects pickup shorting switch to input transformer or compensator
14212	Escutcheon—Manual index lever and switch escutcheon
14203	Post—Record post—located on front left hand corner of motorboard
14210	Rest—Pickup arm rest
14207	Roller—Pickup lift cable roller and bracket
14211	Socket—Motorboard socket and shell
14205	Support—Pickup arm mounting spacer, washers and nut
14206	Switch—Motor toggle switch (S2)
14629	Switch—Pickup shorting switch (S3)
14204	Turntable—Complete
14213	Washer—Pickup arm stop washer and spacing washer
	MOTOR ASSEMBLIES (Model R-97)
14215	Governor—Governor complete with motor Stock Nos. 9799, 14465 and 14466
14466	Motor—105-125 volts, 25 cycle (M1)
14465	Motor—105-125 volts, 50-60 cycle (M1)
9799	Motor—105-125 volts, 60 cycle (M1)
14214	Screw—Motor mounting screw and spacer assembly
	PICKUP AND ARM ASSEMBLIES (For Model R-96 only)
14291	Armature—Pickup armature
11732	Coil—Pickup coil (L1)
14292	Damper—Pickup damper assembly — comprising one damper, one clamp and one screw
14931	Pickup and Arm Complete
3811	Screw—Needle holding screw
	PICKUP AND ARM ASSEMBLIES (For Model R-97 only)
14291	Armature—Pickup armature assembly
4064	Cable—Pickup lift cable
11732	Coil—Pickup coil (L1)
14292	Damper—Pickup damper block complete with clamp and screw
14290	Pickup and Arm Complete
3811	Screw—Needle holding screw
4387	Screw—No. 6-32x¼" headless set screw for pickup arm pivot shaft
	REPRODUCER ASSEMBLIES (RL-63-F1)
14356	Board—3-contact reproducer terminal board
13866	Cap—Cone center dust cap
12012	Coil—Field coil (L4)
11469	Coil—Hum coil (L2)
12642	Cone—Reproducer cone and dust cap (L3)
5118	Plug—3-contact male plug for reproducer
14360	Reproducer—Reproducer complete
14358	Screw—Screw, washer and lockwasher to hold core in yoke
14355	Transformer—Output transformer (T2)
14357	Washer—Spring washer to hold field coil
	MISCELLANEOUS ASSEMBLIES
4391	Box—Needle box for Model R-97 only
11762	Box—Needle box for Model R-96 only
11704	Damper—Turntable damper and damper plate
12673	Knob—Volume control or tone control and power switch knob
14267	Screw—Amplifier chassis mounting screw and washer
30249	Screw—Motorboard mounting screw, spring, spacer, washer, lockwasher, and rubber washer assembly for Model R-96 only
30250	Screw—Motorboard mounting screw, spring, washers and rubber washer assembly for Model R-97 only
4119	Screw—No. 8-32 headless set screw for knob Stock No. 12673
14801	Turntable—Complete for Model R-96 only

MODELS R-96, R-97
Schematic
Chassis Wiring

RCA MFG. CO., INC.

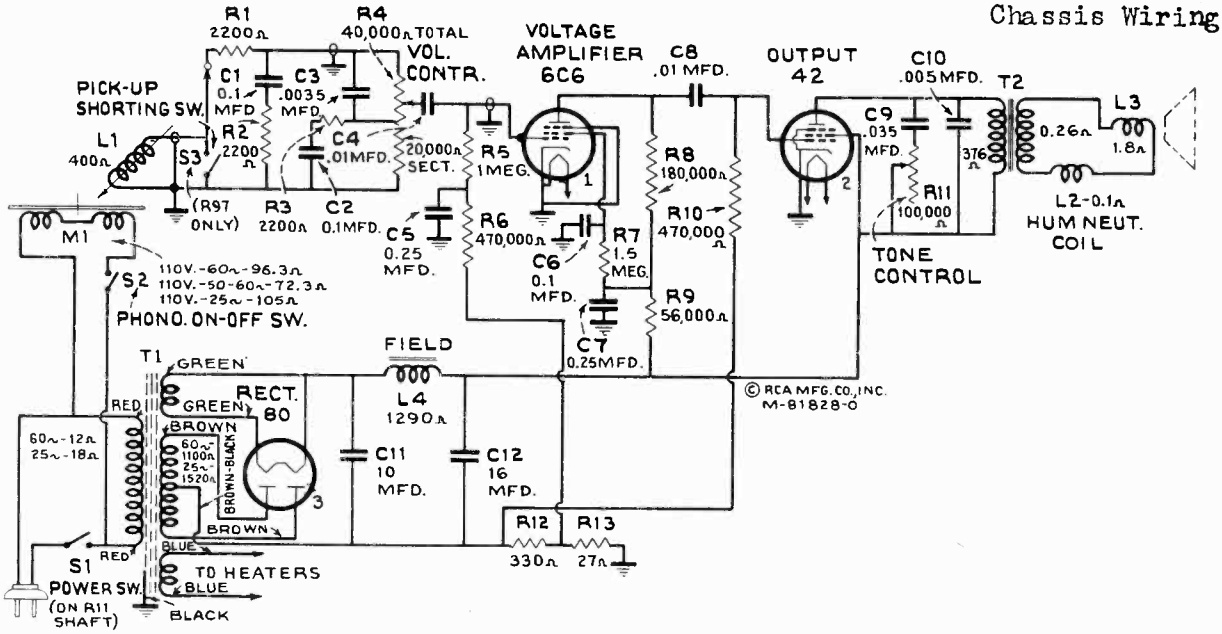


Figure 8—Schematic Circuit Diagram

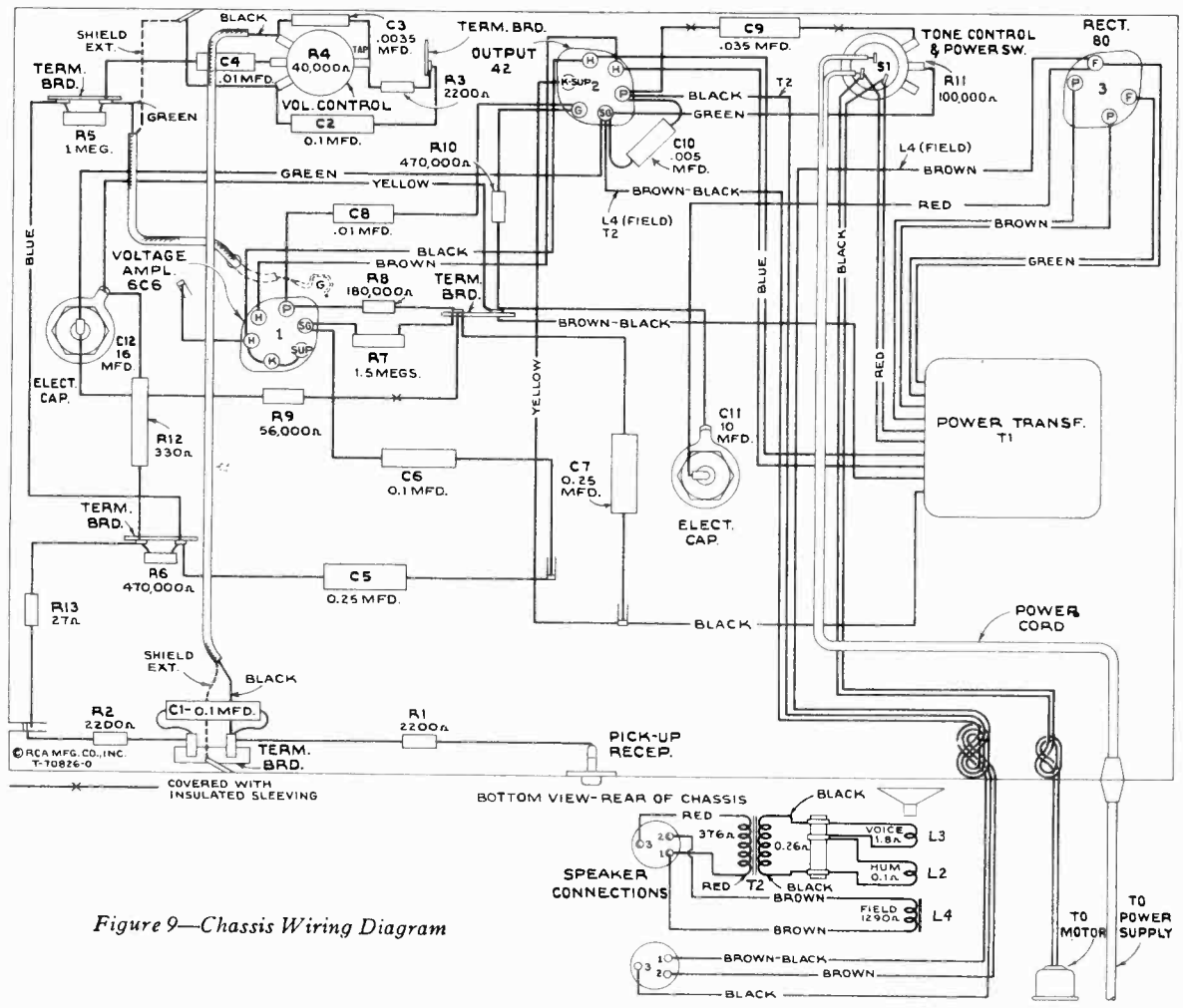
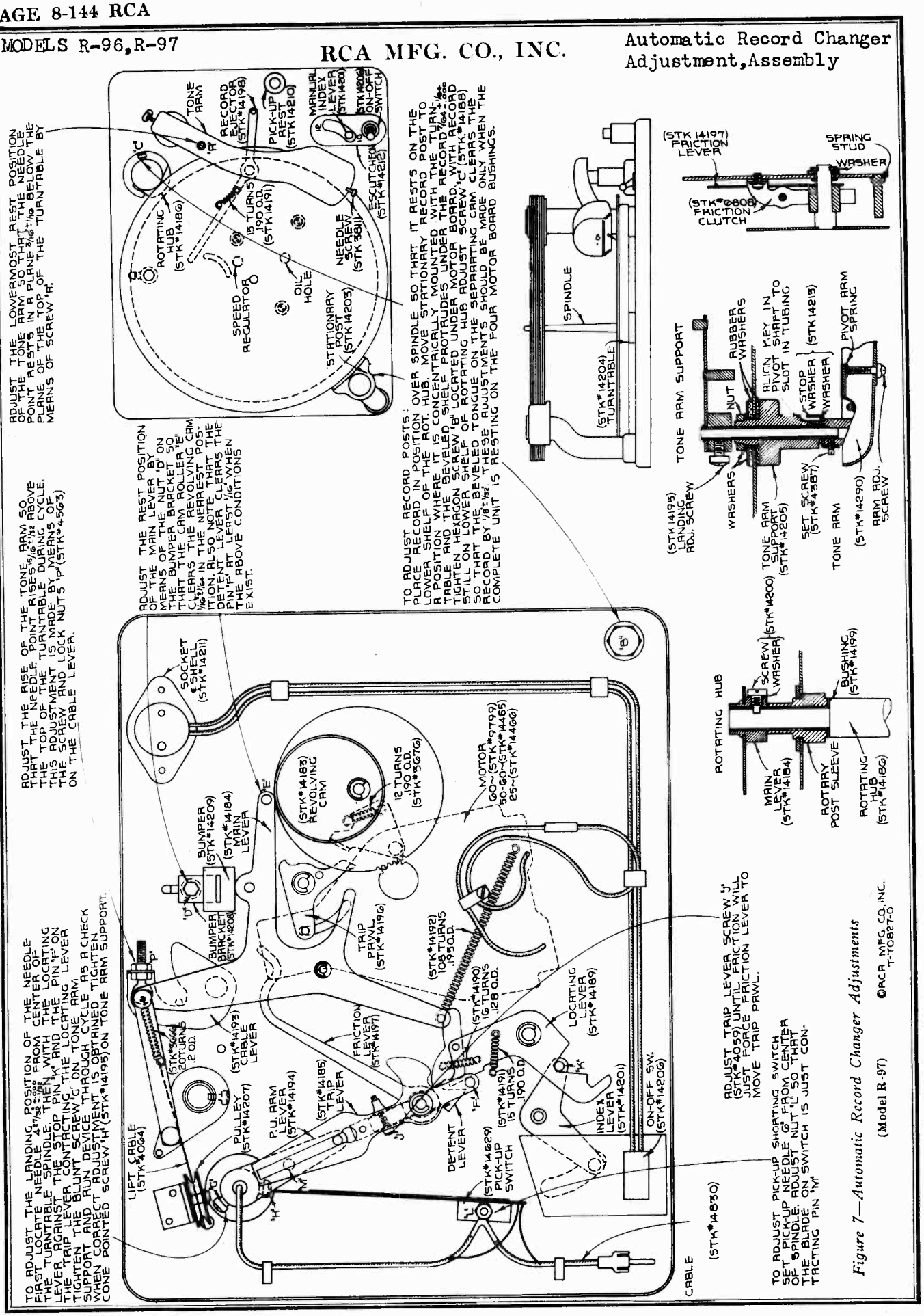


Figure 9—Chassis Wiring Diagram

MODELS R-96, R-97

RCA MFG. CO., INC.

Automatic Record Changer
Adjustment, Assembly



TO ADJUST THE LANDING POSITION OF THE NEEDLE FIRST LOCATE NEEDLE 4 7/32 ± 1/32 FROM CENTER OF THE TURNTABLE SPINDLE. THEN WITH THE LOCATING LEVER AGAINST THE STOP PIN 'K' AND THE PIN 'E' ON THE TRIP LEVER CONTACTING THE LOCATING LEVER TIGHTEN THE BLUNT SCREW 'G' ON TONE ARM SUPPORT AND RUN DEVICE THROUGH CYCLE AS A CHECK WHEN CORRECT ADJUSTMENT IS OBTAINED TIGHTEN CONE POINTED SCREW 'H' (STK*14195) ON TONE ARM SUPPORT.

ADJUST THE RISE OF THE TONE ARM SO THAT THE NEEDLE POINT RISES 5/64 ± 1/32 ABOVE THE TOP OF THE TURNTABLE DURING CYCLE. THIS ADJUSTMENT IS MADE BY MEANS OF THE SCREW AND LOCK NUT 'P' (STK*4563) ON THE CABLE LEVER.

ADJUST THE REST POSITION OF THE MAIN LEVER BY MEANS OF THE NUT 'D' ON THE BUMPER BRACKET SO THAT THE CAM ROLLER 'E' CLEARS THE REVOLVING CAM 1/64 ± 1/64 IN THE NEAREST POSITION. ALSO NOTE THAT THE DETENT LEVER CLEARS THE PIN 'F' AT LEAST 1/16 WHEN THE ABOVE CONDITIONS EXIST.

TO ADJUST RECORD POSTS: OVER SPINDLE SO THAT IT RESTS ON THE PLACE RECORD IN POSITION. ROT. HUB. MOVE STATIONARY RECORD POST TO LOWER SHELF OF THE ROT. HUB. IS CONCENTRICALLY MOUNTED WITH THE TURN-A POSITION WHERE IT IS CONCENTRICALLY MOUNTED WITH THE RECORD 7/64 ± 1/64 TABLE AND THE BEVELED SHELF 'B' LOCATED UNDER MOTOR BOARD. WITH RECORD TIGHTEN HEXAGON SCREW 'B' LOCATED UNDER MOTOR BOARD. WITH RECORD STILL ON LOWER SHELF OF ROTATING HUB ADJUST SCREW 'C' (STK*14188) SO THAT THE BEVELED TONGUE ON THE SEPARATING CAM CLEARS THE RECORD BY 1/8 ± 1/32. THESE ADJUSTMENTS SHOULD BE MADE ONLY WHEN THE COMPLETE UNIT IS RESTING ON THE FOUR MOTOR BOARD BUSHINGS.

ADJUST TRIP LEVER SCREW 'J' (STK*4059) UNTIL FRICTION WILL JUST FORCE FRICTION LEVER TO MOVE TRIP PAWL.

TO ADJUST PICK-UP SHORTING SWITCH SET PICK-UP NEEDLE 6 FROM CENTER OF SPINDLE. ADJUST NUT 'L' SO THAT THE BLADE ON SWITCH IS JUST CONTACTING PIN 'M'

Figure 7—Automatic Record Changer Adjustments

(Model R-97)

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MODEL R-96, R-97
Pick-up & Motor Details
Voltage, Notes, Socket
Adjustments

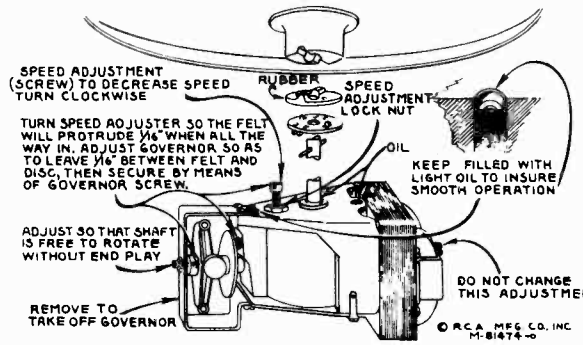


Figure 1—Details of Motor

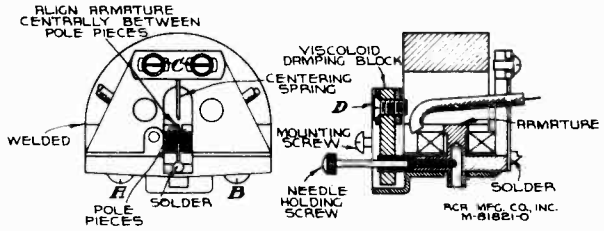


Figure 2—Details of Pickup

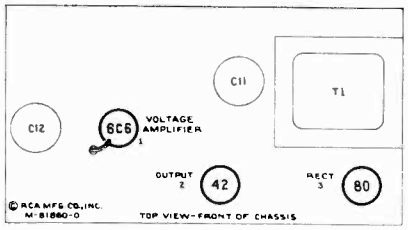


Figure 4—Radiotron Locations

Replacing Coil.—Whenever there is defective operation due to an open or shorted pickup coil, this coil should be replaced. Remove the pickup mechanism and terminal board as described above. Remove screws A and B and the magnet assembly. Remove the bakelite coil support (with coil attached) and insert the new coil support assembly in its place, after which replace the magnet assembly and center the armature as described above, then re-assemble the remainder of the unit. Only rosin core solder should be used for soldering the coil leads and pickup leads to the pickup terminal board. This same type of solder should be used when necessary for soldering the centering spring to the armature.

Magnetizing.—Loss of magnetization will not usually occur when the pickup has received normal care because the magnet and pole pieces are one unit and the magnetic circuit remains practically closed at all times. When the pickup has been mishandled, subjected to a strong a-c field, jolted, or dropped, there may be an appreciable loss of magnetic strength, in which case it will be necessary to remagnetize the entire structure. To do this, it will be necessary to first remove the pickup mechanism from the tone arm, and then remove the magnet assembly. Place the magnet assembly on the poles of a standard pickup magnetizer such as the RCA Stock No. 9549 Pickup Magnetizer and charge the magnet in accordance with the instructions accompanying the magnetizer. It is preferable to check the polarity of the pickup magnet and to remagnetize it so that the same polarity is maintained.

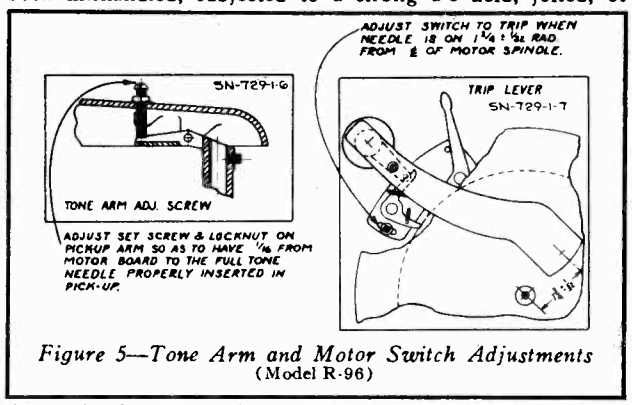


Figure 5—Tone Arm and Motor Switch Adjustments
(Model R-96)

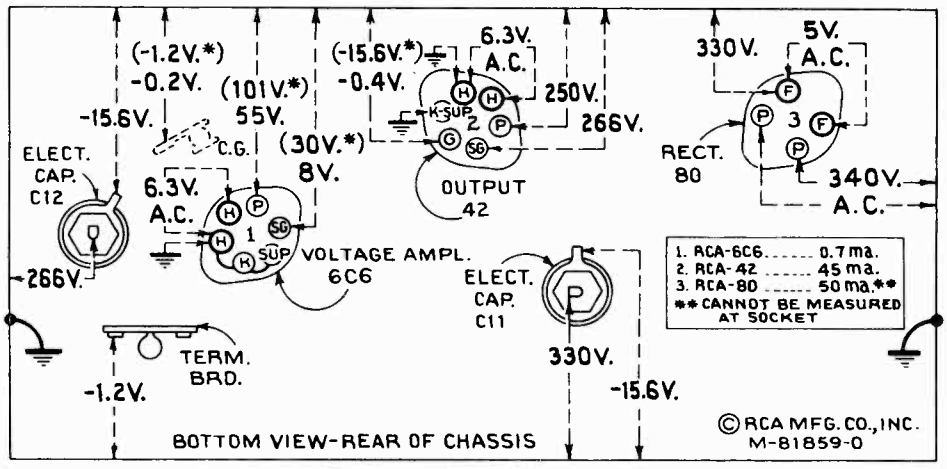


Figure 6—Radiotron Socket Voltages

Measured at 115 volts, 60-cycle supply—Volume control minimum

Note: Two voltage values are shown for some readings. The value shown in parentheses with asterisk (*) indicates operating conditions without voltmeter loading. The other value (generally lower) is the actual measured voltage and differs from the value shown in parentheses because of the additional loading of the voltmeter.

Voltage values as specified should hold within ±20% when instrument is normally operative at its rated line voltage. To duplicate the conditions under which the voltages were measured requires a 1,000-ohm-per-volt d-c meter, having ranges of 10, 50, 250, and 500 volts. Use the nearest range above the specified measured voltage. A-c voltages were measured with a corresponding a-c meter.

MODELS R-96, R-97
Notes

RCA MFG. CO., INC.

General Description

The Model R-97 Electric Phonograph consists of a three-tube audio amplifier, an eight-inch dust-proof electrodynamic loudspeaker, and an automatic record changer combined in a hinged-top table-type cabinet. Its design includes a phonograph compensation pack, resistance-coupled audio system, self-starting constant-speed motor, improved magnetic pickup, and a tone control. The phonograph mechanism will play a series of eight 10-inch records (changes seven) or repeat 12-inch records. It may be operated manually if desired.

The Model R-96 Electric Phonograph is identical to Model R-97 electrically, has a manually operated turntable, and a slightly different cabinet design.

The circuit arrangement of either instrument is shown on figure 8.

RADIOTRON COMPLEMENT

(1) RCA-6C6..... Audio Voltage Amplifier
(2) RCA-42..... Power Output
(3) RCA-80..... Rectifier

POWER SUPPLY RATINGS

Rating A-6	105-125 volts, 60 cycles, 90 watts
Rating A	105-125 volts, 50-60 cycles, 90 watts
Rating B-2	105-125 volts, 25 cycles, 90 watts
Rating C-6	105-125/200-250 volts, 60 cycles, 90 watts
Rating C-5	105-125/200-250 volts, 50-60 cycles, 90 watts

POWER OUTPUT

Undistorted	2.5 watts
Maximum	4.5 watts

LOUDSPEAKER

Type	8-inch Electrodynamic
Impedance (V.C.)	2.2 ohms at 400 cycles

MOTOR-BOARD

	R-96	R-97
Type	Manual	Automatic-Manual
Turntable Speed (adjustable)	78 r.p.m.	78 r.p.m.
Pickup	High-impedance Magnetic	
Pickup Impedance	1,400 ohms at 1,000 cycles	

AUTOMATIC RECORD CHANGER
(Model R-97)

The record changing mechanism is designed to be simple and fool-proof. Certain adjustments may be required occasionally. The adjustments are illustrated and explained in figures 1 and 7.

It is important when servicing the automatic mechanism, to have it placed on a level support. It is also important to refrain from forcing the mechanism if there is a tendency to bind or jam, since bent levers and possible broken parts may result.

CAUTION.—Do not leave records stacked on the record holder posts, when not in use, as they are liable to warp, particularly so in warm climates.

MOTOR ADJUSTMENTS

The phonograph motors are of the governor induction type and are designed to be simple and foolproof. Occasionally, however, certain adjustments may be required. These adjustments are illustrated and explained in figure 1. Application of oil to the felt pad which rubs against the governor disc will insure smooth operation.

MAGNETIC PICKUP

The pickup used is of an improved design. The horseshoe magnet is rigidly welded to the pole pieces and is irremovable. There is a centering spring attached to the armature to maintain proper adjustment and to provide a limiting effect on the movement of the armature. The frequency response is substantially uniform over a wide range. Service operations which may be necessary on the pickup are as follows:

Centering Armature.—Refer to figure 2 showing the pickup inner structure. The armature is shown in its proper relation to the magnet pole pieces, i. e., exactly centered. Whenever this centering adjustment has been disturbed it will be necessary to remove the pickup mechanism from the tone arm by removing the needle holding screw and the two mounting screws from the front of the tone arm, holding the pickup assembly to keep it from dropping. Unsolder the two leads from the lugs on the terminal board at the rear of the pickup. Insert a small rod or nail into the armature needle hole and replace the needle holding screw, tightening it to hold the rod securely. If the armature clamping screws A and B have not been disturbed, screws C should be loosened which will permit the armature to be moved from side to side, the rod acting as a lever to perform this operation. The proper adjustment is obtained when the armature is moved to the extreme position on each side (the movement being limited by the armature striking the pole pieces) and then brought to the mid position between these two extremes. Screws C should then be tightened. The armature position should then be central between the pole pieces and at right angles to them. With a little practice, the correct adjustment of the armature will be obtained. The air gap between the pole pieces and the armature should be kept free from dust, filings, and other foreign material which would obstruct the movement of the pickup armature.

Damping Block.—The viscoloid damping block which is attached to the front end of the armature shank serves as a mechanical filter to eliminate undesirable resonances and to cause the frequency response to be uniform. Should it be necessary to replace this damping block, the pickup mechanism should be removed from the tone arm as explained above. Remove screw D and the damping block from the pickup assembly. Make sure that the shaft of the armature

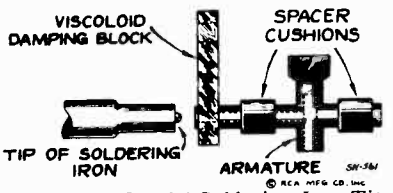


Figure 3—Special Soldering-Iron Tip

which contacts the viscoloid is clean. Then insert the new damping block so that it occupies the same position as that of the original block, and is in correct vertical alignment with the armature. The hole in the block is somewhat smaller than the diameter of the armature in order to permit a snug fit. With the damping block properly aligned on the armature, screw D with its washer should then be replaced. Heat should be applied to the armature (viscoloid side) so that the damping block will fuse at the point of contact and become rigidly attached to the armature. A special-tip soldering iron, constructed as shown in figure 3, will be found very useful in performing this operation. The iron should be applied only long enough to slightly melt the block, causing a small bulge on both sides.

RCA MFG. CO., INC.

MODEL U-101, U-103
Schematic
MODEL U-101
Chassis Wiring

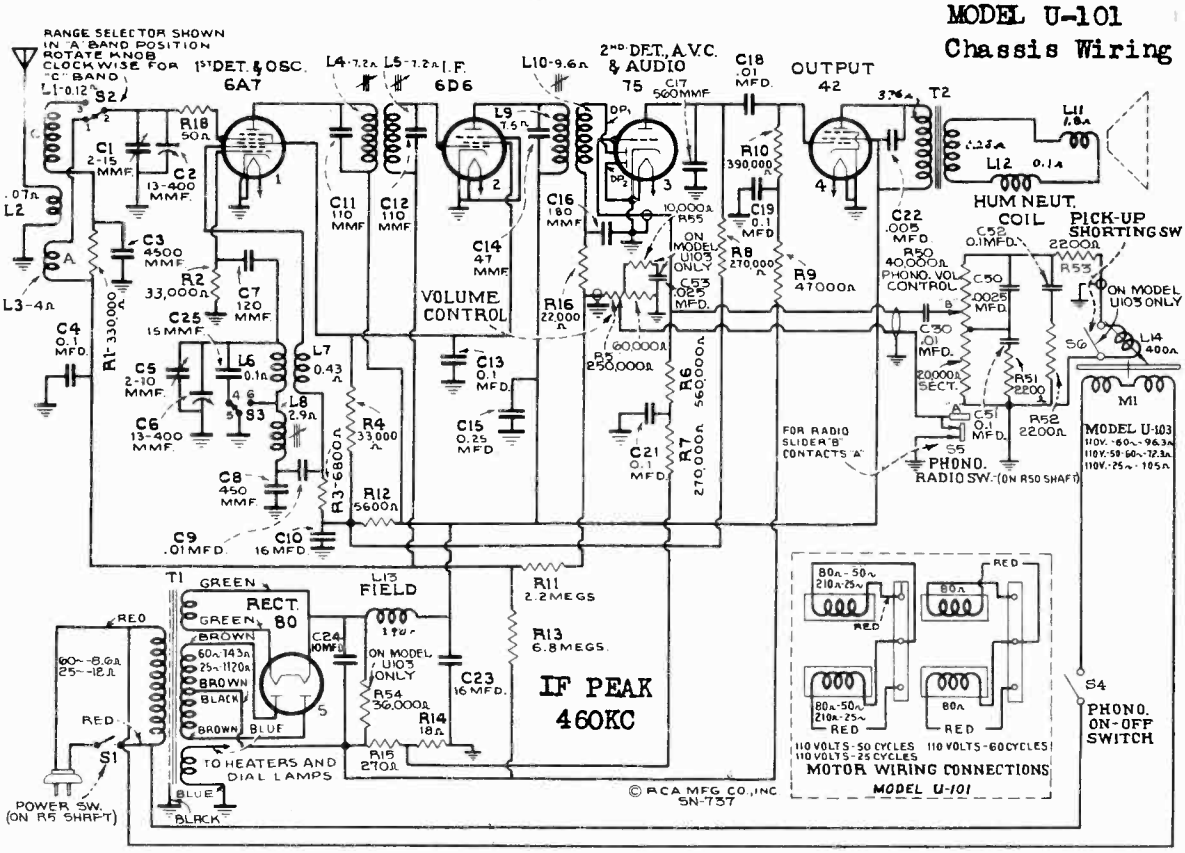


Figure 1—Schematic Circuit Diagram

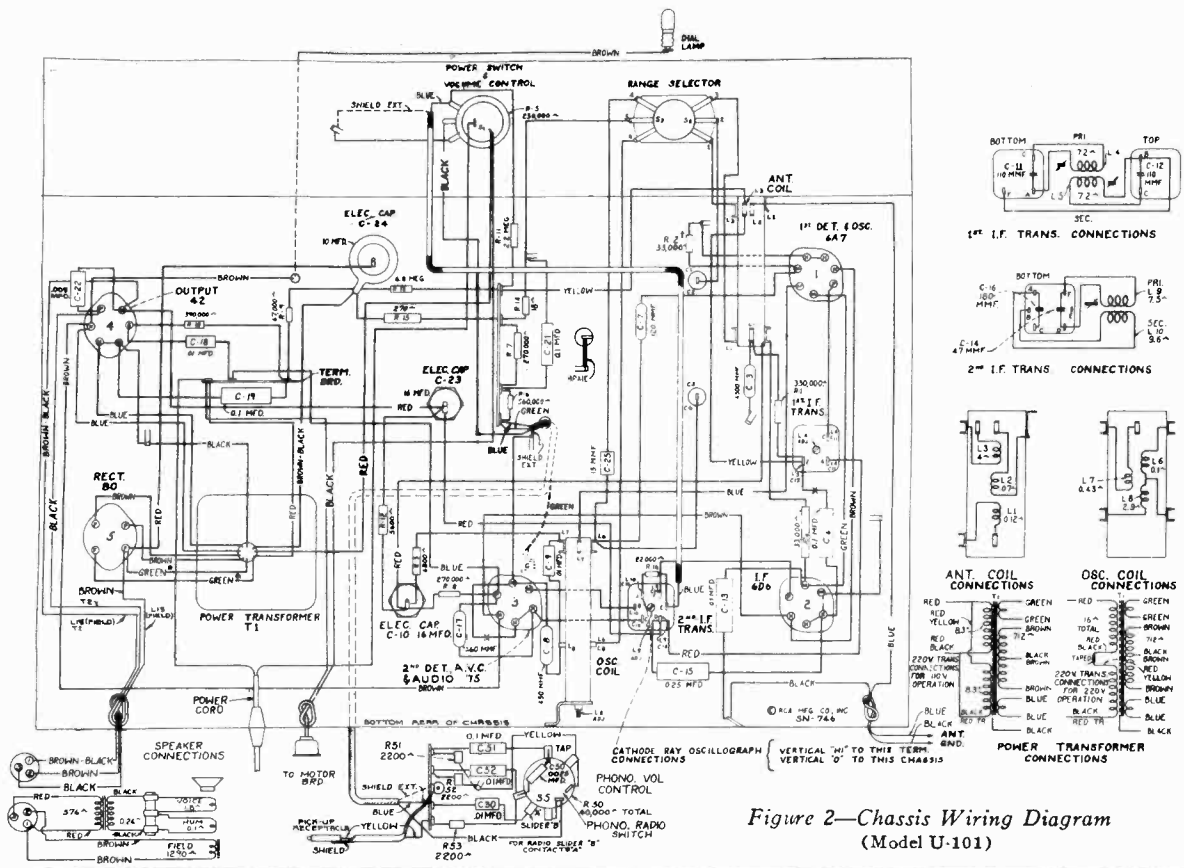


Figure 2—Chassis Wiring Diagram
(Model U-101)

MODEL U-103
Chassis Wiring

RCA MFG. CO., INC.

MODELS U-101, U-103
Alignment, Socket Trimmers

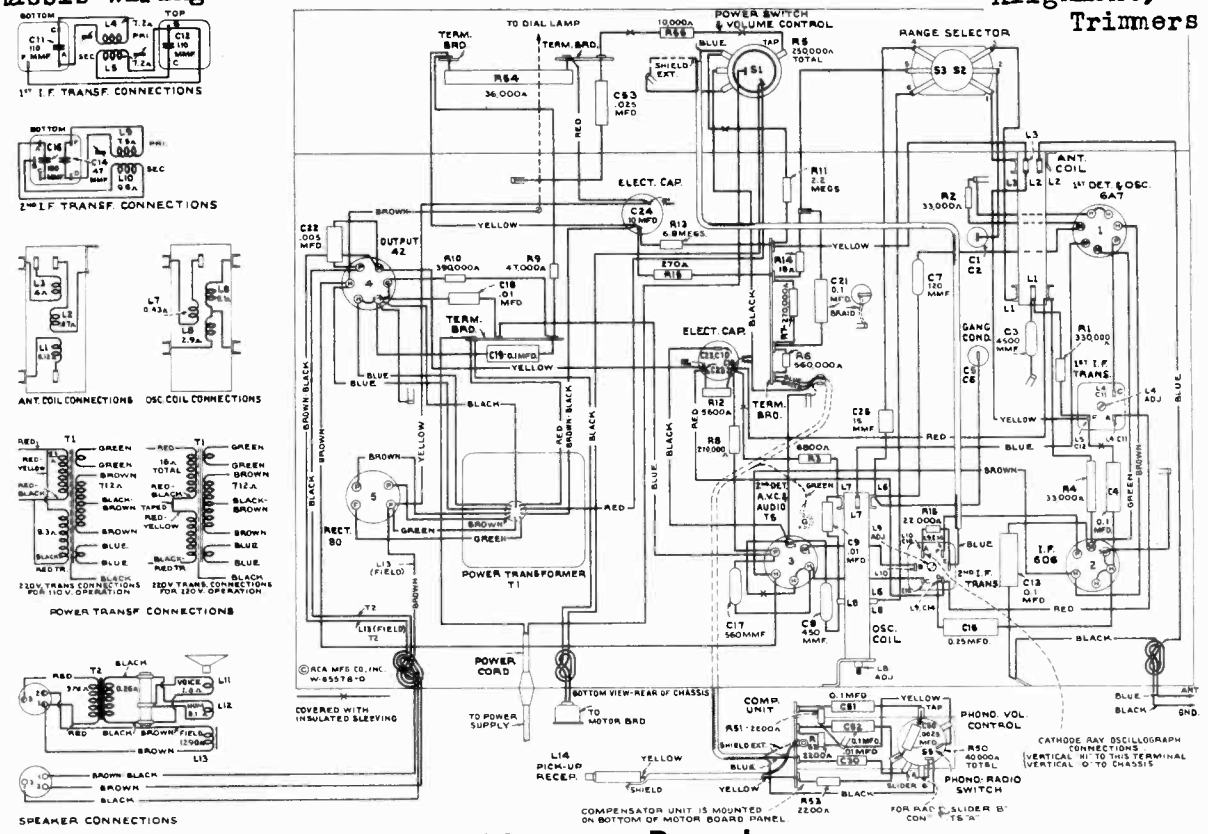
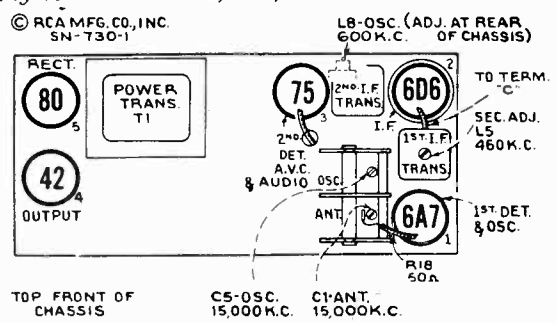


Figure 3—Chassis Wiring Diagram (Model U-103)

Alignment Procedure

Calibrate the tuning dial by adjusting dial pointer to the center horizontal line with the gang tuning-condenser plates in full-mesh position. This is a screw-driver adjustment.

Figure 11—Radiotron, Coil, and Trimmer Locations



Perform alignment in proper order, tabulated below, starting with No. 1 and following all operations across, then No. 2, etc. Adjustment locations are shown on figures 9, 10, and 11.

Cathode-ray alignment is preferable; the connections to the chassis are shown on figures 2 and 3. If an output indicator is used, connect it across the loudspeaker voice-coil and advance the receiver volume control to full-volume position.

Connect the "low" output terminal of the test oscillator to the receiver chassis for all alignment operations. Regulate the output of the test oscillator so that minimum signal is applied to the receiver to obtain an observable output indication. This will avoid a-v-c action.

The term "Dummy antenna" means the device which must be connected between the "high" test-oscillator output and the point of connection to the receiver in order to obtain ideal alignment. "No signal, 550-750 kc" means that the receiver should be tuned to a point between 550 and 750 kc where no signal or interference is received from a station or local (heterodyne) oscillator.

Order of Alignment	Test Oscillator			Range-Selector	Receiver Dial Setting	Circuit to Adjust	Adjustment Symbols	Adjust to Obtain
	Connection to Receiver	Dummy Antenna	Frequency Setting					
1	6D6 I-F Grid Cap	.001 Mfd.	460 kc	"A" Left	No Signal 550-750 kc	2nd I-F Trans.	L9	Max. (peak)
2	6A7 Det. Grid Cap	.001 Mfd.	460 kc	"A" Left	No Signal 550-750 kc	1st I-F Trans.	L4 and L5	Max. (peak)
3	Ant. Lead (blue)	300 Ohms	15,000 kc	"C" Right	15,000 kc	"C" Osc.	C5	Max. (peak)†
4	Ant. Lead (blue)	300 Ohms	15,000 kc	"C" Right	Rock Through 15,000 kc	"C" Ant.	C1	Max. (peak)*‡
5	Ant. Lead (blue)	200 Mmfd.	600 kc	"A" Left	600 kc	"A" Osc.	L8	Max. (peak)

* Use minimum capacity peak if two peaks can be obtained. † Use maximum capacity peak if two peaks can be obtained.
‡ After this adjustment, check for image signal by shifting receiver dial to 15,920 kc.

MODELS U-101, U-103
Socket, Trimmers, Voltage

RCA MFG. CO., INC.

MODEL U-101
Motor Details

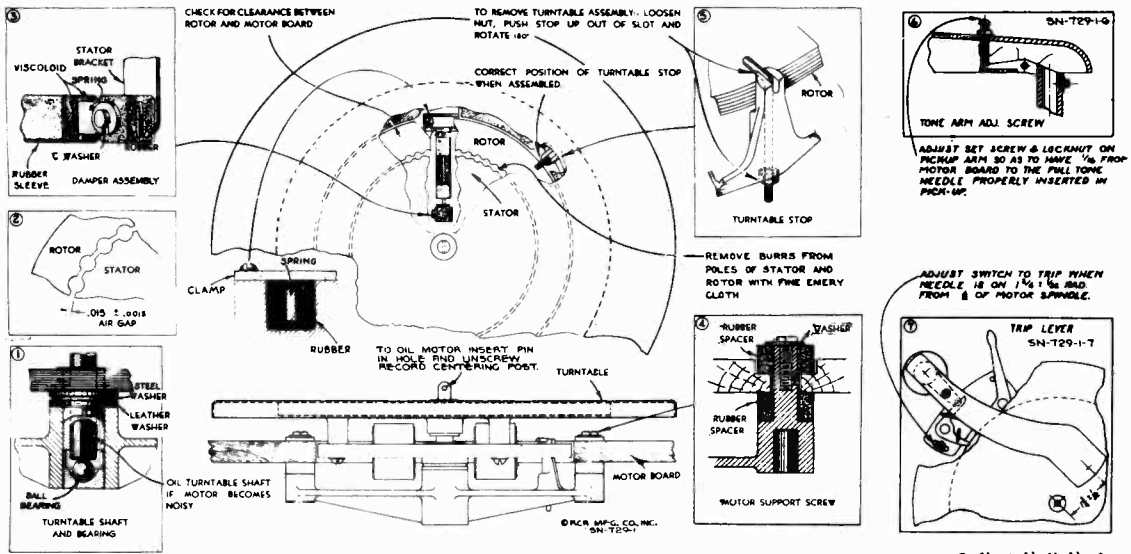


Figure 7—Details of Motor
(Model U-101)

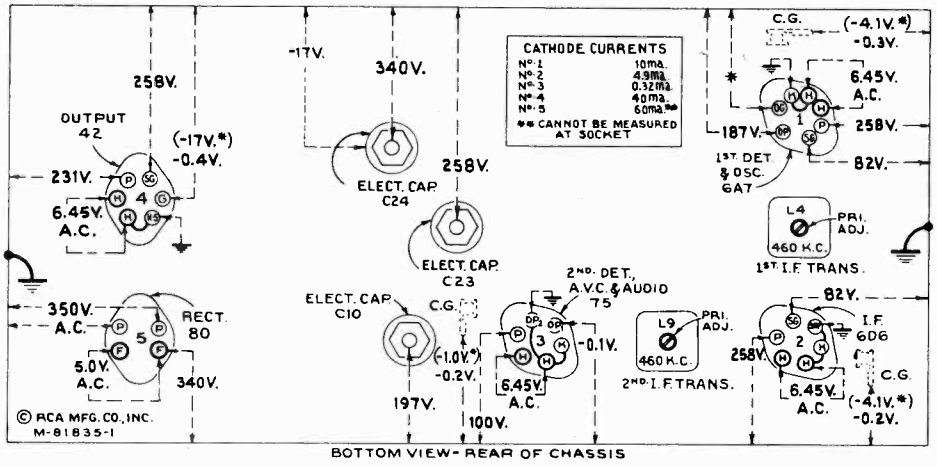


Figure 9—Radiotron Socket Voltages, Coil, and Trimmer Locations
(Model U-101)

Voltage values as specified should hold within ±20% when the receiver is normally operative at its rated line voltage. To duplicate the conditions under which the voltages were measured requires a 1,000-ohm-per-volt d-c meter, having ranges of 10, 50, 250, and 500 volts. Use the nearest range above the specified measured voltage. A-c voltages were measured with a corresponding a-c meter.

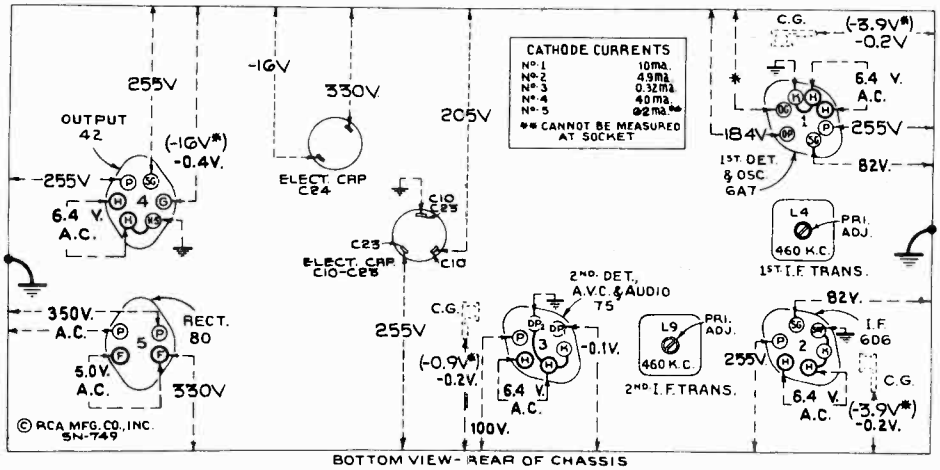


Figure 10—Radiotron Socket Voltages, Coil, and Trimmer Locations
(Model U-103)

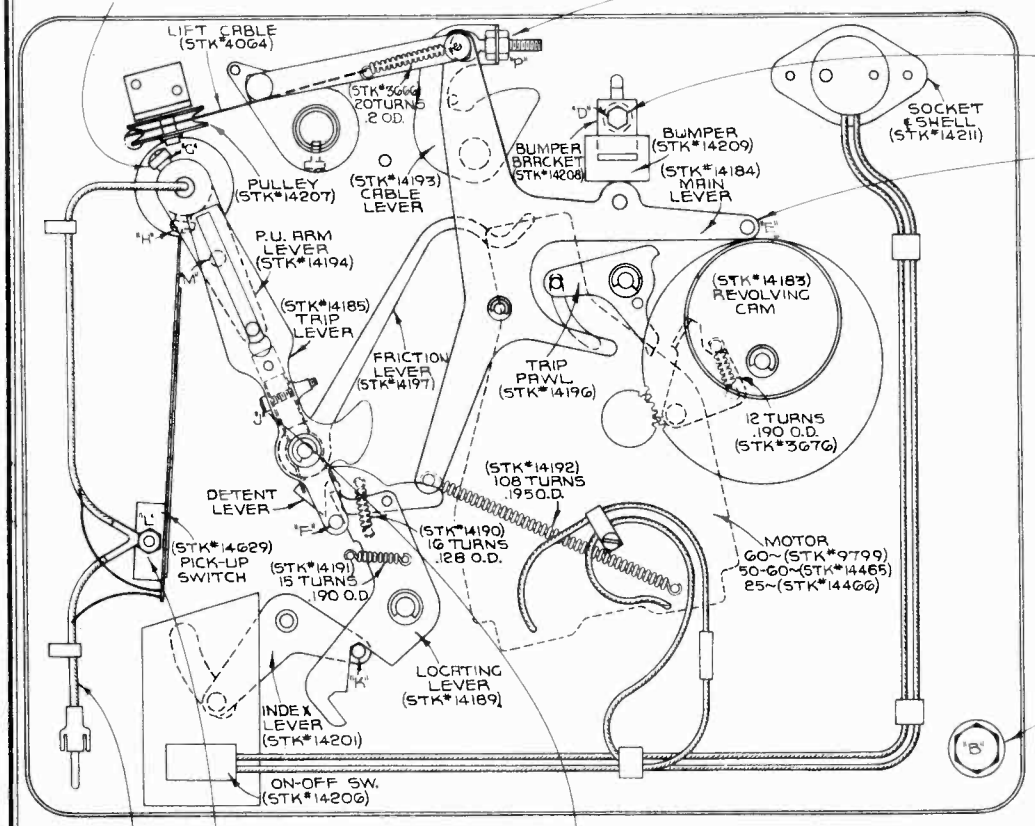
Measured at 115 volts, 60-cycle supply—Tuned to approximately 1,000 kc ("Broadcast")—No signal being received—Volume control minimum

Note: Two voltage values are shown for some readings. The value shown in parentheses with asterisk (*) indicates operating conditions without voltmeter loading. The other value (generally lower) is the actual measured voltage and differs from the value shown in parentheses because of the additional loading of the voltmeter through the high series circuit resistance.

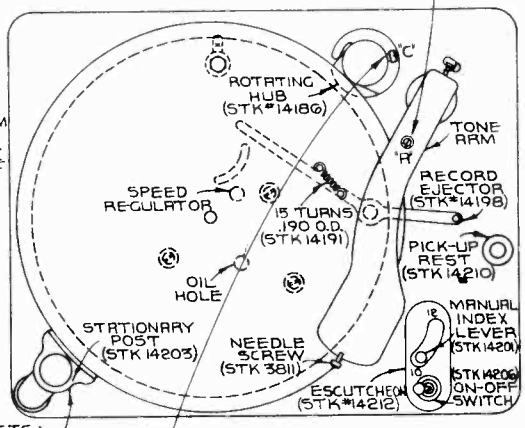
TO ADJUST THE LANDING POSITION OF THE NEEDLE FIRST LOCATE NEEDLE 4 31/32 ± .000 FROM CENTER OF THE TURNTABLE SPINDLE. THEN WITH THE LOCATING LEVER AGAINST THE STOP PIN "K" AND THE PIN "F" ON THE TRIP LEVER CONTACTING THE LOCATING LEVER TIGHTEN THE BLUNT SCREW 'G' ON TONE ARM SUPPORT AND RUN DEVICE THROUGH CYCLE AS A CHECK. WHEN CORRECT ADJUSTMENT IS OBTAINED TIGHTEN CONE POINTED SCREW 'H' (STK*14195) ON TONE ARM SUPPORT.

ADJUST THE RISE OF THE TONE ARM SO THAT THE NEEDLE POINT RISES 5/16 ± 1/32 ABOVE THE TOP OF THE TURNTABLE DURING CYCLE. THIS ADJUSTMENT IS MADE BY MEANS OF THE SCREW AND LOCK NUTS 'P' (STK*4503) ON THE CABLE LEVER.

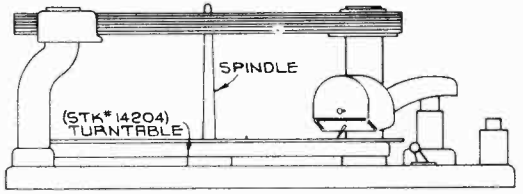
ADJUST THE LOWERMOST REST POSITION OF THE TONE ARM SO THAT THE NEEDLE POINT RESTS IN A PLANE 3/16 ± 1/16 BELOW THE PLANE OF THE TOP OF THE TURNTABLE BY MEANS OF SCREW 'R'.



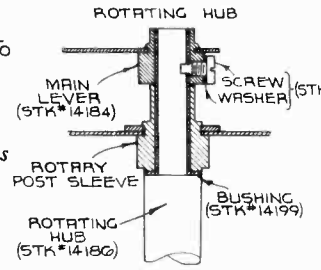
ADJUST THE REST POSITION OF THE MAIN LEVER BY MEANS OF THE NUT 'D' ON THE BUMPER BRACKET SO THAT THE CAM ROLLER 'E' CLEARS THE REVOLVING CAM 1/16 ± 1/64 IN THE NEAREST POSITION. ALSO NOTE THAT THE DETENT LEVER CLEARS THE PIN 'F' AT LEAST 1/16" WHEN THE ABOVE CONDITIONS EXIST.



TO ADJUST RECORD POSTS:
PLACE RECORD IN POSITION OVER SPINDLE SO THAT IT RESTS ON THE LOWER SHELF OF THE ROT. HUB. MOVE STATIONARY RECORD POST TO A POSITION WHERE IT IS CONCENTRICALLY MOUNTED WITH THE TURNTABLE AND THE BEVELED SHELF PROTRUDES UNDER THE RECORD 7/64 ± 1/64. TIGHTEN HEXAGON SCREW 'B' LOCATED UNDER MOTOR BOARD, WITH RECORD STILL ON LOWER SHELF OF ROTATING HUB ADJUST SCREW 'C' (STK*14188) SO THAT THE BEVELED TONGUE ON THE SEPARATING CAM CLEARS THE RECORD BY 1/8 ± 1/32. THESE ADJUSTMENTS SHOULD BE MADE ONLY WHEN THE COMPLETE UNIT IS RESTING ON THE FOUR MOTOR BOARD BUSHINGS.



ADJUST TRIP LEVER SCREW 'J' (STK*4059) UNTIL FRICTION WILL JUST FORCE FRICTION LEVER TO MOVE TRIP PAWL.



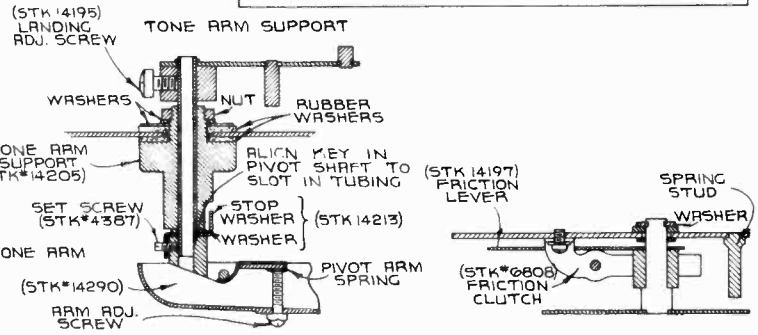


Figure 4—

Automatic Record Changer Adjustments
(Model U-103)

TO ADJUST PICK-UP SHORTING SWITCH SET PICK-UP NEEDLE 6" FROM CENTER OF SPINDLE. ADJUST NUT 'L' SO THAT THE BLADE ON SWITCH IS JUST CONTACTING PIN 'M'

RCA MFG. CO., INC.

MODEL U-103
Motor Details
Notes

POWER SUPPLY RATINGS

Model U-101	Radio Only	Total
A-6.. 105-125 volts, 60 cycles.....	75 watts..	80 watts
A-5.. 105-125 volts, 50 cycles.....	75 watts..	80 watts
B-2.. 105-125 volts, 25 cycles.....	80 watts..	85 watts
C-6.. 105-125/200-250 volts, 60 cycles..	75 watts..	80 watts
C-5.. 105-125/200-250 volts, 50 cycles..	75 watts..	80 watts

POWER OUTPUT RATING

Undistorted ..... 2.5 watts
Maximum ..... 4.5 watts

	Model U-101	Model U-103
Type.....	Manual.....	Automatic-Manual
Turntable Speed.....	78 r.p.m....	78 r.p.m.

Type of Pickup..... High-impedance magnetic
Pickup Impedance..... 1,400 ohms at 1,000 cycles

Model U-103	Radio Only	Total
A-6.. 105-125 volts, 60 cycles.....	75 watts..	100 watts
A .. 105-125 volts, 50-60 cycles.....	75 watts..	105 watts
B-2.. 105-125 volts, 25 cycles.....	80 watts..	105 watts
C-6.. 105-125/200-250 volts, 60 cycles.	75 watts..	100 watts
C ..105-125/200-250 volts, 50-60 cycles	75 watts..	105 watts

LOUDSPEAKER

Type ..... Electrodynamic
V.C. Impedance..... 2.2 ohms at 400 cycles

Automatic Record Mechanism
(Model U-103)

The record changing mechanism is designed to be simple and fool-proof. Certain adjustments may be required occasionally. The adjustments are illustrated and explained in figures 4 and 5.

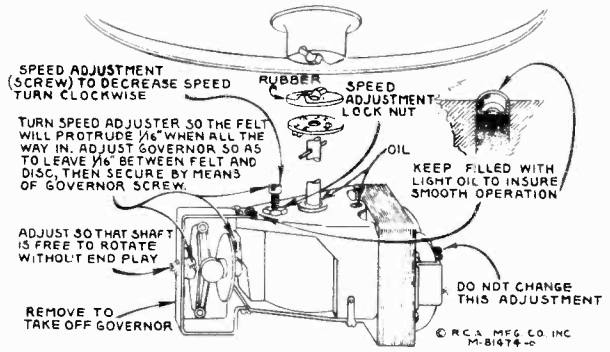


Figure 5—Details of Motor
(Model U-103)

It is important when servicing the automatic mechanism, to have it placed on a level support. It is also important to refrain from forcing the mechanism if there is a tendency to bind or jam, since bent levers and possible broken parts may result.

CAUTION.—Do not leave records stacked on the record holder posts, when not in use, as they are liable to warp, particularly so in warm climates.

MAGNETIC PICKUP

The pickup used in the phonograph unit is of an improved design. The horseshoe magnet is rigidly welded to the pole pieces and is irremovable. There is a centering spring attached to the armature to maintain proper adjustment and to provide a limiting effect on the movement of the armature. The frequency response is substantially uniform over a wide range. Service operations which may be necessary on the pickup are as follows:

Centering Armature.—Refer to figure 6 showing the pickup inner structure. The armature is shown in its proper relation to the magnet pole pieces, i. e., exactly centered. Whenever this centering adjustment has been disturbed it will be necessary to remove the pickup mechanism from the tone arm by removing the needle holding screw and the two mounting screws from the front of the tone arm, holding the pickup assembly to keep it from dropping. Unsolder the two leads from the lugs on the terminal board at the rear of the pickup. Insert a small rod or nail into the armature needle hole and replace the needle holding screw, tightening it to hold the rod securely. If the armature clamping screws A and B have not been disturbed, screws C should be loosened which will permit the armature to be moved from side to side, the rod acting as a lever to perform this operation. The proper adjustment is obtained when the armature is moved to the extreme position on each side (the movement being

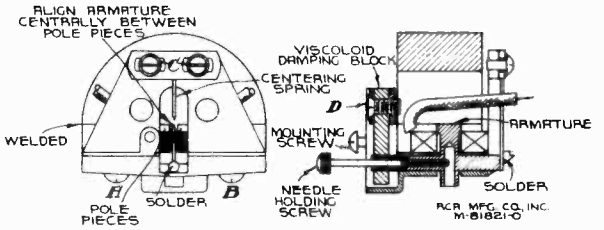


Figure 6—Details of Pickup

limited by the armature striking the pole pieces) and then brought to the mid position between these two extremes. Screws C should then be tightened. The armature position should then be central between the pole pieces and at right angles to them. With a little practice, the correct adjustment of the armature will be obtained. The air gap between the pole pieces and the armature should be kept free from dust, filings, and other foreign material which would obstruct the movement of the pickup armature.

Damping Block.—The viscoloid damping block which is attached to the front end of the armature shank serves as a mechanical filter to eliminate undesirable resonances and to cause the frequency response to be uniform. Should it be necessary to replace this damping block, the pickup mechanism should be removed from the tone arm as explained above. Remove screw D and the damping block from the pickup assembly. Make sure that the shaft of the armature which contacts the viscoloid is clean. Then insert the new damping block so that it occupies the same position as that of the original block, and is in correct vertical alignment with the armature. The hole in the block is somewhat smaller than the diameter of the armature in order to permit a snug fit. With the damping block properly aligned on the armature, screw D with its washer should then be replaced. Heat should be applied to the armature (viscoloid side) so that the damping block will fuse at the point of contact and become rigidly attached to the armature. A special-tip soldering iron, constructed as shown in figure 8 will be found very useful in performing this operation. The iron should be applied only long enough to slightly melt the block, causing a small bulge on both sides.

Replacing Coil.—Whenever there is defective operation due to an open or shorted pickup coil, this coil should be replaced. Remove the pickup mechanism and terminal board as described above. Remove screws A and B and the magnet assembly. Remove the bakelite coil support (with coil attached) and insert the new coil support assembly in its place, after which replace the magnet assembly and center the armature as described above, then re-assemble the remainder of the unit.

Magnetizing.—In case it becomes necessary to re-magnetize the unit, first remove the pickup mechanism from the tone arm, and then remove the magnet assembly. Place the mag-

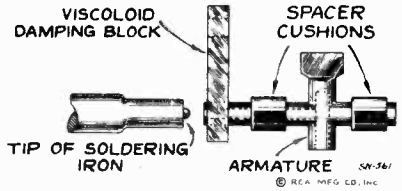


Figure 8—Special Soldering-Iron Tip

MODELS U-101, U-103
Parts

RCA MFG. CO., INC.

STOCK No.	DESCRIPTION
	RECEIVER ASSEMBLIES
14634	Belt—Variable condenser drive belt
14632	Bracket—Dial mounting bracket
5237	Bushing—Variable condenser rubber mounting bushing
14802	Cable—2-conductor shielded compensation cable complete with grid contact cap
12118	Cap—Grid contact cap
12896	Capacitor—15 Mmfd. (C25)
12405	Capacitor—47 Mmfd. (C14)
14262	Capacitor—110 Mmfd. (C11, C12)
12724	Capacitor—120 Mmfd. (C7)
12406	Capacitor—180 Mmfd. (C16)
12812	Capacitor—450 Mmfd. (C8)
14724	Capacitor—560 Mmfd. (C17)
12728	Capacitor—4,500 Mmfd. (C3)
4868	Capacitor—.005 Mfd. (C22)
13138	Capacitor—.01 Mfd. (C9, C18)
4870	Capacitor—.025 Mfd. (C53)
4839	Capacitor—0.1 Mfd. (C4, C13, C19, C21)
12484	Capacitor—0.25 Mfd. (C15)
14814	Capacitor—10 Mfd. (C24)
5212	Capacitor—16 Mfd. (C23)—Model U101 only
14377	Capacitor—16 Mfd. (C10)—Model U101 only
14813	Capacitor Pack—Comprising two 16 Mfd. sections (C10, C23)—Model U103 only
14646	Coil—Antenna coil (L1, L2, L3)
14647	Coil—Oscillator coil (L6, L7, L8)
14633	Condenser—2-gang variable tuning condenser (C1, C2, C5, C6)
14783	Connector—2-contact female for motor power cable
5119	Connector—3-contact female for speaker cable
14648	Core—Adjustable core and stud for oscillator coil
12006	Core—Adjustable core and stud for I.F. transformer
14631	Dial—Station selector dial
14651	Drive—Variable condenser vernier drive and pinion gear
14635	Indicator—Station selector indicator pointer
5226	Lamp—Dial lamp
14636	Pulley—Idler pulley—less spring
14639	Pulley — Variable condenser drive pulley — located on condenser shaft
14660	Resistor—18 ohms, insulated, ½ watt (R14)
14653	Resistor—50 ohms, flexible type, 1/10 watt (R18)
13819	Resistor—270 ohms, wire wound, 1.1 watt (R15)
5175	Resistor—5,600 ohms, carbon type, ½ watt (R12)
14659	Resistor—6,800 ohms, carbon type, ½ watt (R3)
14559	Resistor—10,000 ohms, insulated, ½ watt (R55)—Model U103 only
11305	Resistor—22,000 ohms, carbon type, ½ watt (R16)
13735	Resistor—33,000 ohms, carbon type, ½ watt (R2)
5033	Resistor—33,000 ohms, carbon type, 1 watt (R4)
5208	Resistor—36,000 ohms, wire wound, 20 watt (R54)—Model U103 only
11646	Resistor—47,000 ohms, carbon type, ½ watt (R9)
11323	Resistor—270,000 ohms, carbon type, ½ watt (R7, R8)
13733	Resistor—330,000 ohms, carbon type, ½ watt (R1)
13479	Resistor—390,000 ohms, carbon type, ½ watt (R10)
5035	Resistor—560,000 ohms, carbon type, ½ watt (R6)
12679	Resistor—2.2 meg., insulated, ½ watt (R11)
14661	Resistor—6.8 meg., insulated, ½ watt (R13)
5129	Ring—Radiotron shield ring
4389	Screw—No. 6-32x3/16 headless set screw for pulley No. 14639
14638	Shaft—Station selector knob shaft and pulley
12008	Shield—First I.F. transformer shield
12408	Shield—Second I.F. transformer shield
11265	Shield—Radiotron shield
14658	Socket—Dial lamp socket
4794	Socket—4-contact 80 Radiotron socket
4786	Socket—6-contact 6D6, or 42 or 75 Radiotron socket
4787	Socket—7-contact 6A7 Radiotron socket
14637	Spring—Idler pulley tension spring
12007	Spring—Retaining spring for core stock No. 12006 and No. 14648
14640	Switch—Range switch (S2, S3)
14376	Transformer—First I.F. transformer (L4, L5, C11, C12)
14642	Transformer—Second I.F. transformer (L9, L10, C14, C16)
14655	Transformer—Power transformer, 105-125 volts, 50-60 cycle (T1)
14656	Transformer—Power transformer, 105-125 volts, 25-60 cycle (T1)
14657	Transformer—Power transformer, 100-125/200-250 volts, 50-60 cycle (T1)
14726	Volume Control—and power switch (R5, S1)
	OPERATING MECHANISM ASSEMBLIES
	MODEL U-103
14199	Bushing—Record separator rotating shaft bushing
14183	Cam—Cam and gear assembly
6808	Clutch—Trip lever friction clutch
14197	Finger—Friction finger assembly
14186	Hub—Rotating hub and record separator complete with set screw
14189	Lever—Locating lever assembly
14184	Lever—Main lever and link assembly
14201	Lever—Manual index lever assembly
14193	Lever—Pickup lift cable lever
14194	Lever—Pickup arm lever complete with set screws
14198	Lever—Reject lever assembly
14185	Lever—Trip lever and friction clutch assembly
14196	Pawl—Trip pawl assembly
4563	Screw—Cable lever screw and two locknuts
4059	Screw—Trip lever clutch tension adjustment screw
14200	Screw—No. 8-32 special hex head screw and lockwasher for record separator shaft mounting
14195	Screw—No. 10-32x5/16 fillister-head, cone-pointed set screw for pickup arm lever
14188	Screw—No. 10-32x7/16 fillister-head, cone-pointed set screw for rotating hub
14187	Shaft—Rotating shaft for record separator
3676	Spring—Cam pawl tension spring
3666	Spring—Lift cable tension spring
14190	Spring—Locating lever pawl tension spring
14191	Spring—Locating lever or reject lever tension spring
14192	Spring—Main lever tension spring

STOCK No.	DESCRIPTION
	MOTORBOARD ASSEMBLIES
	MODEL U-101
14803	Brake—Turntable brake and motor switch
14805	Connector—2-contact male connector for motor and switch leads
3261	Rest—Pickup rest
14235	Screw—Motor mounting screw and washer
30100	Springs—Tension springs for brake Stock No. 14803—comprising 1 long and 1 short spring
14804	Switch—Motor switch (S4)—located on turntable brake Stock No. 14803
	MOTORBOARD ASSEMBLIES
	MODEL U-103
14208	Bracket—Bumper bracket and bumper complete
14209	Bumper—Rubber bumper
14830	Cable—Shielded cable 13-in. long complete with single contact male connector — connects pickup shorting switch to input transformer or compensator
11704	Damper—Turntable damper and damper plate
14212	Escutcheon—Manual index lever and switch escutcheon
14203	Post—Record post—located on front left hand corner of motorboard
14210	Rest—Pickup arm rest
14207	Roller—Pickup lift cable roller and bracket
14211	Socket—Motorboard socket and shell
14205	Support—Pickup arm mounting spacer, washers and nut
14206	Switch—Motor toggle switch (S4)
14629	Switch—Pickup shorting switch (S6)
14204	Turntable Complete
14213	Washer—Pickup arm stop washer and spacing washer
	MOTOR ASSEMBLIES
	MODEL U-101
10194	Ball—Steel ball bearing
14233	Base—Motor base and bearing assembly
14232	Cap—Turntable spindle cap
14223	Coil—Stator assembly—comprising coils and laminations —105-125 volts, 60 cycle
14224	Coil—Stator assembly—comprising coils and laminations —105-125 volts, 50 cycle
14225	Coil—Stator assembly—comprising coils and laminations —105-125 volts, 25 cycle
14228	Damper—Motor damper assembly comprising one damper, one damper plate, one screw and one "C" washer
14806	Motor—105-125 volts, 60 cycle (M1)
14807	Motor—105-125 volts, 50 cycle (M1)
14808	Motor—105-125 volts, 25 cycle (M1)
14227	Shield—Terminal board shield and nuts
14229	Stop—Turntable stop, lockwasher and nut—prevents removal of turntable
14809	Turntable—Turntable assembly complete with rotor laminations—60 cycle operation
14810	Turntable—Turntable assembly complete with rotor laminations—50 cycle operation
14811	Turntable—Turntable assembly complete with rotor laminations—25 cycle operation
14812	Turntable—10-in. turntable plate only
4083	Washer—Leather washer for turntable bearing
14230	Washer—Metal washer for turntable bearing
14231	Washer—Metal shim washer for turntable bearing
	MOTOR ASSEMBLIES
	MODEL U-103
14215	Governor—Governor complete for motor Stock No. 9799, No. 14465 and No. 14466
14466	Motor—105-125 volts, 25 cycle (M1)
14465	Motor—105-125 volts, 50-60 cycle (M1)
9799	Motor—105-125 volts, 60 cycle (M1)
14214	Screw—Motor mounting screw and spacer assembly
	PICKUP AND ARM ASSEMBLIES
	MODEL U-101
14291	Armature—Pickup armature
11732	Coil—Pickup coil (L14)
14292	Damper—Pickup damper assembly — comprising one damper, one clamp and one screw
14933	Pickup and Arm complete
3811	Screw—Needle holding screw
	PICKUP AND ARM ASSEMBLIES
	MODEL U-103
14291	Armature—Pickup armature assembly
4064	Cable—Pickup lift cable
11732	Coil—Pickup coil (L14)
14292	Damper—Pickup damper block complete with clamp and screw
14290	Pickup and Arm complete
3811	Screw—Needle holding screw
4387	Screw—No. 6-32x¼-in. headless set screw for pickup arm pivot shaft
	REPRODUCER ASSEMBLIES (RL63F-1)
	MODEL U-101
14356	Board—3-contact reproducer terminal board
13866	Cap—Cone center dust cap
12012	Coil—Field coil (L13)
11469	Coil—Hum neutralizing coil (L12)
12642	Cone—Reproducer cone and dust cap (L11)
5118	Plug—3-contact male plug for reproducer
14360	Reproducer—Complete
14358	Screw—Screw, washer and lockwasher to hold core in yoke
14355	Transformer—Output transformer (T2)
14357	Washer—Spring washer to hold field coil
	REPRODUCER ASSEMBLIES (RL70E-1)
	MODEL U-103
13866	Cap—Dust cap for cone center
14354	Coil—Field coil (L13)
11469	Coil—Hum neutralizing coil (L12)
12667	Cone—Reproducer cone and dust cap (L11)
5118	Plug—3-contact male plug for reproducer
14395	Reproducer—Complete
14358	Screw—Screw, washer and lockwasher to hold core in yoke
14355	Transformer—Output transformer (T2)
14357	Washer—Spring washer to hold field coil

MISCELLANEOUS ASSEMBLIES

11762	Box—Needle box—for Model U-101 only
14391	Box—Needle box—for Model U-103 only
14817	Cable—Shielded pickup cable complete with female connector—compensator (C50)
5107	Capacitor—.005 Mfd.
13138	Capacitor—.01 Mfd. (C30)
4841	Capacitor—0.1 Mfd. (C51, C52)
14654	Escutcheon—Station selector escutcheon and crystal
12673	Knob—Station selector, range switch, radio volume control or phonograph volume control knob
13716	Resistor—2,200 ohms, insulated, ½ watt (R51, R52, R53)
14267	Screw—Chassis mounting screw and washer—for Model U101 only
13573	Screw—Chassis mounting screw and washer—for Model U103 only
14816	Screw—Motorboard mounting screw and spacer—for Model U103 only
4119	Screw—No. 8-32 headless set screw for knob Stock No. 12873
14815	Volume Control—Phonograph volume control and radio-record switch (R50, S5)

Schematic, Notes

MODEL 811K

RCA MFG. CO., INC.

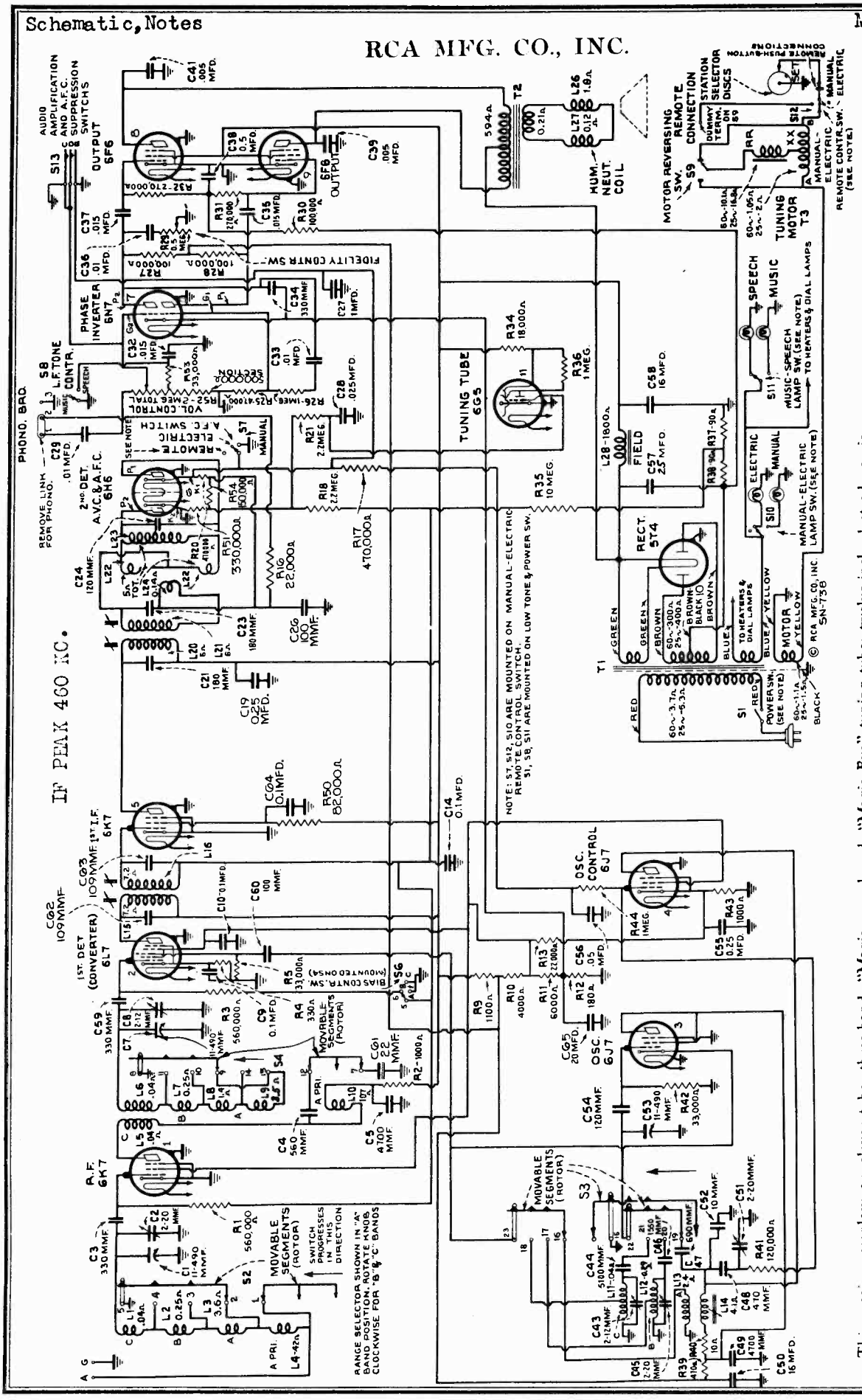


Figure 1—Schematic Circuit Diagram

This receiver employs an eleven-tube, three-band, "Magic Brain" superheterodyne circuit. Features of design include "Electric Tuning" with push-button operation; automatic frequency control; "qumulative-wound" antenna and detector coils; tuned r-f amplifier; magnetite-core adjusted i-f transformers and low-frequency "A" oscillator tracking; straight-line dial; automatic volume control; phonograph terminal board; "Magic Eye" tuning tube; twelve-inch electrodynamic loudspeaker; plunger-type, air-dielectric trimming capacitors; aural-compensated volume control; tone control; "Music-Speech" switch; audio phase inverter; and push-pull power output stage. In addition, this model has a cabinet incorporating the "Sonic Arc" Magic Voice.

MODEL 811K
Chassis Wiring

RCA MFG. CO., INC.

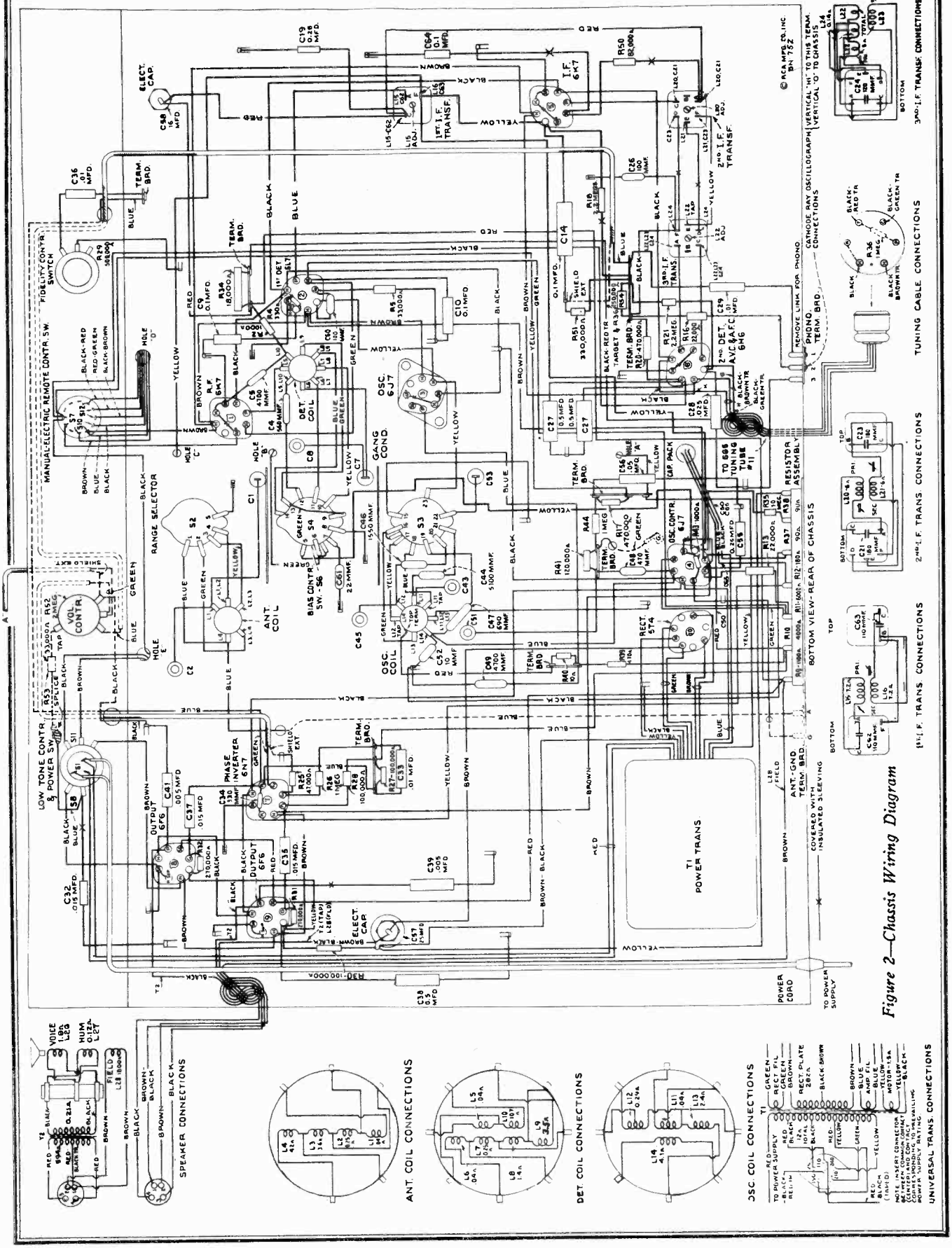


Figure 2—Chassis Wiring Diagram

MODEL 811K
Socket, Trimmers

RCA MFG. CO., INC.

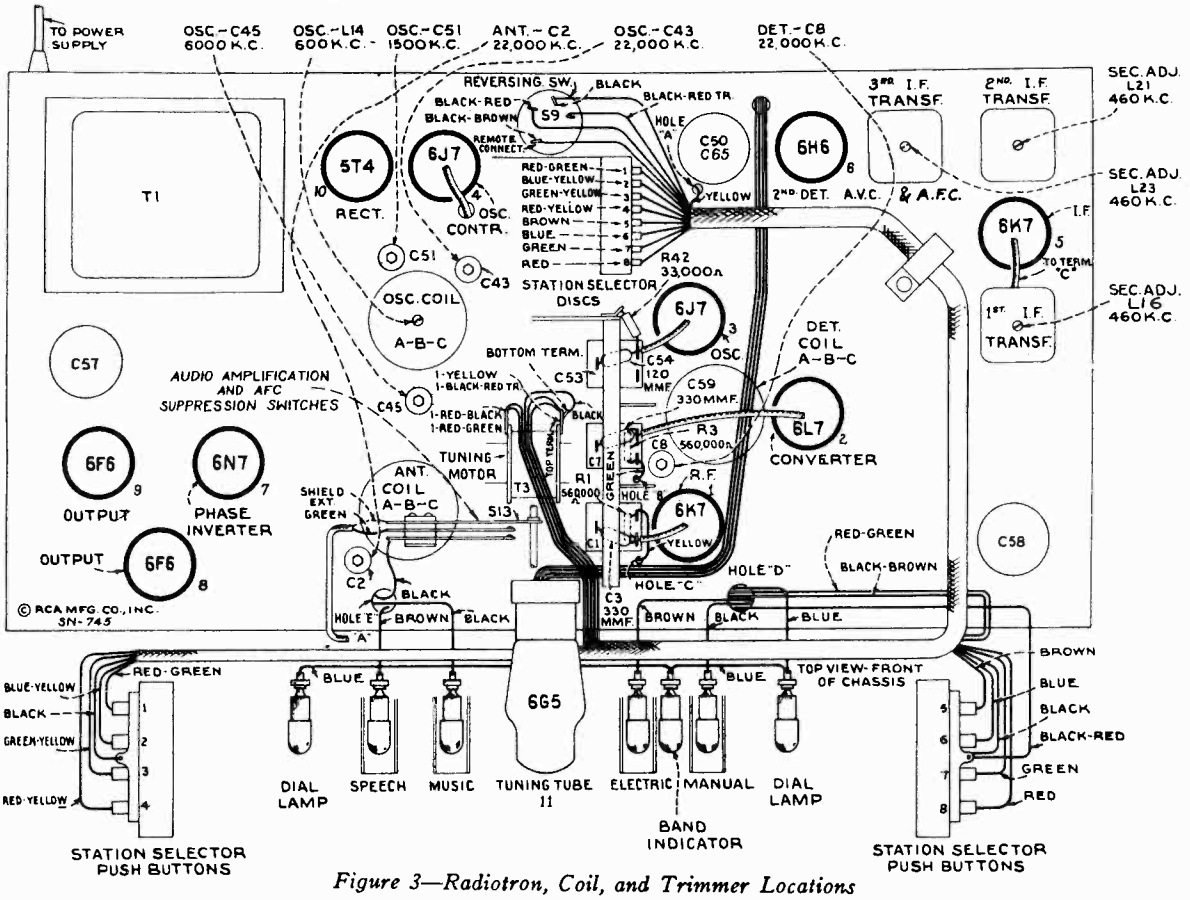


Figure 3—Radiotron, Coil, and Trimmer Locations

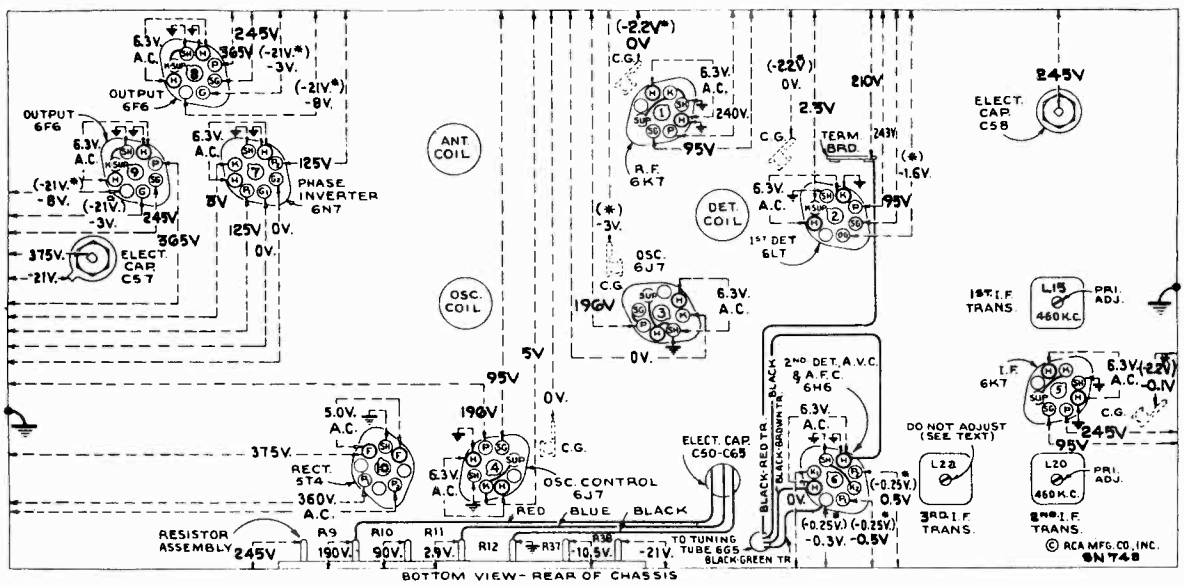


Figure 4—Radiotron Socket Voltages, Coil, and Trimmer Locations

Measured at 115 volts, 60-cycle supply—Tuned to approximately 1,000 kc ("Broadcast")—"Manual" control—No signal being received—Volume control minimum—Tone control optional

Note: Two voltage values are shown for some readings. The value shown in parentheses with asterisk (*) indicates operating conditions without voltmeter loading. The other value (generally lower) is the actual measured voltage and differs from the value shown in parentheses because of the additional loading of the voltmeter.

Voltage values as specified should hold within ±20% when the receiver is normally operative at its rated line voltage. To duplicate the conditions under which the voltages were measured requires a 1,000-ohm-per-volt d-c meter, having ranges of 10, 50, 250, and 500 volts. Use the nearest range above the specified measured voltage. A-c voltages were measured with a corresponding a-c meter.

MODEL 811K
Specifications
"Electric Tuning" Wiring

RCA MFG. CO., INC.

Electrical Specifications

FREQUENCY RANGES

"Broadcast" (A)	530-1,720 kc
"Medium Wave" (B)	2,100-6,800 kc
"Short Wave" (C)	6,800-23,500 kc

R-F ALIGNMENT FREQUENCIES

"Short Wave" (C)	20,000 kc (osc., det., ant.)
"Medium Wave" (B)	6,000 kc (osc.)
"Broadcast" (A)	600 kc (osc.), 1,500 kc (osc.)

Intermediate Frequency ..... 460 kc

RADIOTRON COMPLEMENT

(1) RCA-6K7	R-F Amplifier
(2) RCA-6L7	First Detector
(3) RCA-6J7	Heterodyne Oscillator
(4) RCA-6J7	Oscillator Control
(5) RCA-6K7	I-F Amplifier
(6) RCA-6H6	Second Detector, A.V.C., and A.F.C.
(7) RCA-6N7	Audio Phase Inverter
(8) RCA-6F6	Power Output
(9) RCA-6F6	Power Output
(10) RCA-5T4	Full-Wave Rectifier
(11) RCA-6G5	"Magic Eye" Tuning Tube

Pilot Lamps (6) ..... Mazda No. 46, 6.3 volts, 0.25 amp.

POWER SUPPLY RATINGS

Rating A	105-125 volts, 50-60 cycles, 140 watts
Rating B	105-125 volts, 25 cycles, 140 watts
Rating C	105-125/140-160/195-250 volts, 50-60 cycles, 140 watts

POWER OUTPUT

Undistorted	10 watts
Maximum	12½ watts

LOUDSPEAKER

Type	12-inch Electrodynamic
Impedance (v.c.)	2.2 ohms at 400 cycles

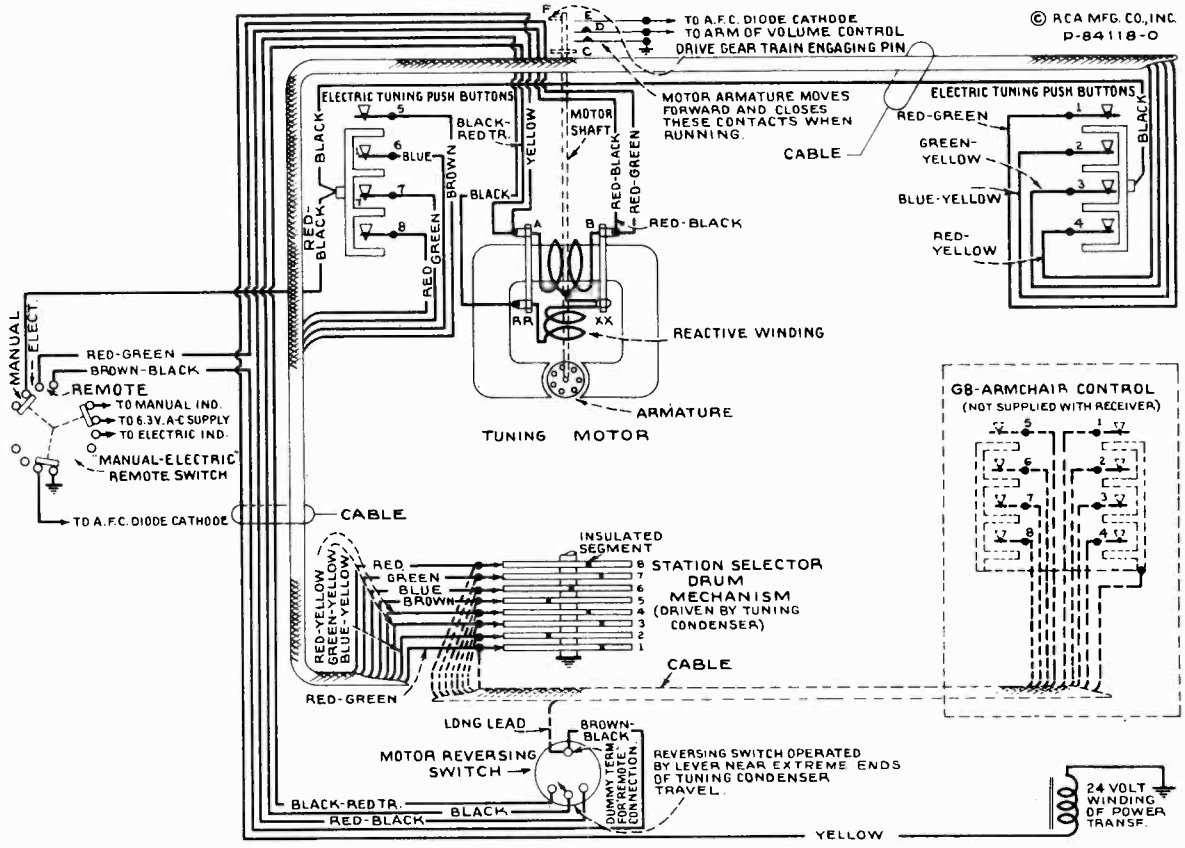


Figure 6—"Electric Tuning" Wiring Diagram
(Viewed from rear of chassis)

RCA MFG. CO., INC.

MODEL 811K
"Electric Tuning"
Adjustments, Assembly

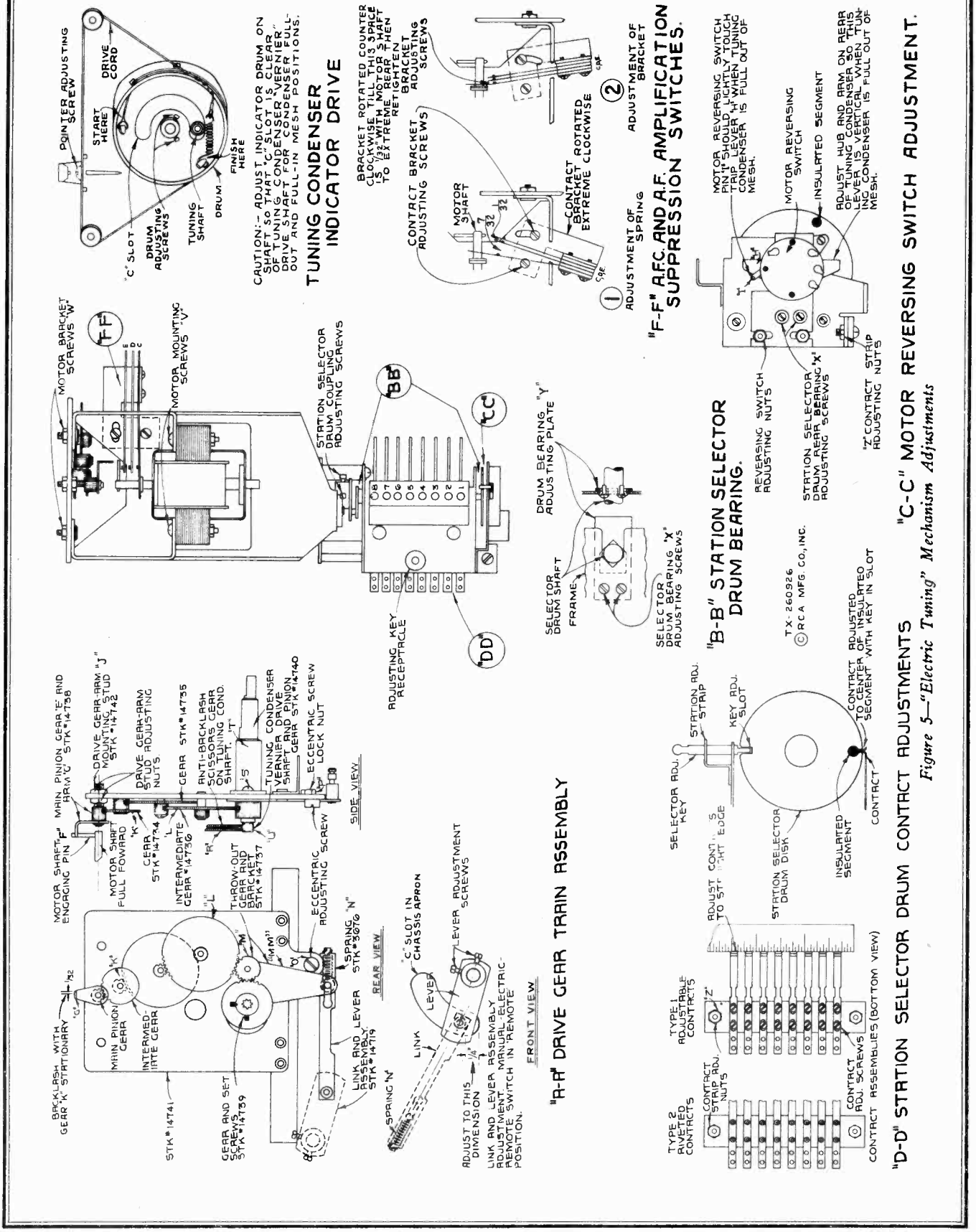


Figure 5—"Electric Tuning" Mechanism Adjustments

ALIGNMENT PROCEDURE

Calibrate the tuning dial by adjusting dial pointer to the left ends of horizontal calibration lines with the gang tuning-condenser plates fn full-mesh position. This is a screw-driver adjustment.

The "Manual-Electric-Remote" switch should be turned to "Manual" (right) during alignment unless otherwise specified.

CAUTION.—The magnetite core screw L22 on the bottom of the 3rd i-f transformer has been accurately adjusted, for an exact electral balance of coil L22 to center tap, during manufacture and **should not be disturbed.** However, if for any reason the adjustment has been moved from its original position, it will be necessary to mechanically adjust this screw until the end of the stud protrudes exactly 3/16 of an inch (six threads exposed) above the brass bushing prior to any alignment operations.

Perform alignment fn proper order, tabulated below, starting with No. 1 and following all operations across, then No. 2, etc. A-f-c discriminator adjustments should follow r-f and i-f adjustments tabulated below. Adjustment locations are shown on figures 3 and 4.

Cathode-ray alignment is preferable; the connections to the chassis are shown on figure 2. If an output indicator is used, connect it across the loudspeaker voice-coil and advance the receiver volume control to full-volume position.

Connect the "low" output terminal of the test oscillator to the receiver chassis for all alignment operations. Regulate the output of the test oscillator so that minimum signal is applied to the receiver to obtain an observable output indication. This will avoid a-v-c action.

The term "Dummy antenna" means the device which must be connected between the "high" test-oscillator output and the point of connection to the receiver in order to obtain ideal alignment. "No signal, 550-750 kc" means that the receiver should be tuned to a point between 550 and 750 kc where no signal or interference is received from a station or local (heterodyne) oscillator.

Order of Alignment	Test Oscillator: Connection to Receiver	Test Oscillator: Dummy Antenna	Test Oscillator: Frequency Setting	Range-Selector	Receiver Dial Setting	Circuit to Adjust	Adjustment Symbols	Adjust to Obtain
1	——	——	——	——	——	3rd I-F Trans.	L23	Turn Extreme Counter-clockwise
2	6K7 I-F Grid Cap	.001 Mfd.	460 kc	"A" Left	No Signal 550-750 kc	2nd I-F Trans.	L20 and L21	Max. (peak)
3	6L7 Det. Grid Cap	.001 Mfd.	460 kc	"A"	No Signal 550-750 kc	1st I-F Trans.	L15 and L16	Max. (peak)
4	Ant.	300 Ohms	20,000 kc	"C" Right	20,000 kc	"C" Osc.	C48	Max. (peak)*
5	Ant.	300 Ohms	20,000 kc	"C"	Rock thru 20,000 kc	"C" Det.	C8	Max. (peak)†
6	Ant.	300 Ohms	20,000 kc	"C"	20,000 kc	"C" Ant.	C2	Max. (peak)‡
7	Ant.	300 Ohms	6,000 kc	"B" Center	6,000 kc	"B" Osc.	C45	Max. (peak)*
8	Ant.	200 Mmfd.	600 kc	"A" Left	600 kc	"A" Osc.	L14	Max. (peak)
9	Ant.	200 Mmfd.	1,500 kc	"A"	1,500 kc	"A" Osc.	C51	Max. (peak)
10	Ant.	200 Mmfd.	600 kc	"A"	600 kc	"A" Osc.	L14	Max. (peak)
11	Ant.	200 Mmfd.	1,500 kc	"A"	1,500 kc	"A" Osc.	C51	Max. (peak)
12	Proceed to A-F-C Discriminator Adjustments Outlined Below							

* Use minimum capacity peak if two peaks can be obtained.
† Use maximum capacity peak if two peaks can be obtained.
‡ After this adjustment, check for image signal by shifting receiver dial to 19,080 kc.

A-F-C Discriminator Adjustments.—These adjustments are rather critical and should be performed with extreme care. Improper adjustment may result in complete failure of the oscillator control tube to function or else may cause it to detune the oscillator instead of tuning it to the signal. It is assumed that the magnetite core adjusting screw L23 (top of 3rd i-f transformer) has been turned all the way out (extreme counter-clockwise) prior to the preceding tabulated adjustments. Adjustments are as follows: Remove spring "N" on link and arm assembly which connects the "Manual-Electric-Remote" switch shaft to the throw-out gear bracket. Connect antenna to receiver antenna "A" terminal. With the "Manual-Electric-Remote" switch in "Manual" (right) position, tune in a strong local station near 600 kc or the low-frequency end of the "A" band as accurately as possible by means of the tuning tube "Magic Eye." The most accurate adjustment will be obtained by adjusting the "vernier" tuning knob mid-way between the two points where the eye just appears to start to open. This will place the generated i-f carrier signal frequency exactly in the center of the i-f amplifier response curve (should be 460 kc if i-f amplifier was properly aligned) and is the frequency to which the a-f-c discriminator (3rd i-f transformer) should be tuned to resonance. Without disturbing any of the receiver adjustments, place the "high" test-oscillator lead about ¾ of an inch from the grid cap lead of the RCA-6K7 i-f amplifier tube, adjust the test-oscillator output to maximum, turn test-oscillator "Modulation" off, and carefully zero-beat the test-oscillator frequency (approximately 460 kc) with the i-f carrier signal. Avoid placing the test-oscillator lead nearer to the grid cap lead than specified above, as doing so will tend to detune the i-f amplifier. It may be necessary to reduce the local station signal, during this operation, by shortening antenna lead or grounding antenna "A" terminal to chassis in order to increase the loudness of the beat note sufficiently for accurate zero-beat adjustment.

Throw "Manual-Electric-Remote" switch to "Electric" (center) position. A high whistle or beat note will now be heard. Turn the magnetite core screw L23 (top of 3rd i-f transformer) slowly clockwise. As this screw is turned, the beat note will first increase to a high audio frequency and will then decrease to a zero-beat and then increase in frequency again. The point of exact **zero-beat** is the position for correct adjustment of the discriminator. Zero-beat should also still exist when the "Manual-Electric-Remote" switch is thrown back to "Manual" position. The adjustment is now complete and may be checked by slightly detuning the receiver above and below the local station frequency with the "Manual-Electric-Remote" in "Manual" position, switching to "Electric" position, and noting the oscillator pull-in. Replace spring "N."

Radiotron Cathode Current Readings

Measured with Milliammeter Connected at Tube Socket Cathode Terminals Under Conditions Similar to Those of Voltage Measurements

(1)	RCA-6K7—R-F Amp.	8.5 ma.
(2)	RCA-6L7—1st Det.	7 ma.
(3)	RCA-6J7—Osc.	10 ma.
(4)	RCA-6J7—Osc. Control	1.2 ma.
(5)	RCA-6K7—I-F Amp.	8.5 ma.
(6)	RCA-6H6—2nd Det., A.V.C. and A.F.C.	——
(7)	RCA-6N7—Ph se Inverter	1.8 ma.
(8)	RCA-6F6—Output	26 ma.
(9)	RCA-6F6—Output	26 ma.
(10)	RCA-5T4—Rectifier	112 ma.*
(11)	RCA-6G5—Tuning Tube	2.5 ma.

(*Cannot be measured at socket)

ELECTRIC TUNING

Mechanism Adjustments

The electric tuning mechanism is designed to be as simple in construction and as fool proof in operation as is possible. In order to maintain the accurate results possible with this device care must be taken in effecting any repairs or adjustments. Reference should be made to figure 5 and the following:

A-F-C and A-F Amplification Suppression Switches.—This switch assembly is located on the motor bracket and closes due to solenoid action of motor armature. The tension of the long contact spring "C" is important in bringing about quick dis-engagement of the motor and in permitting the motor to pull into mesh with the drive mechanism. Normal adjustment is attained when the short springs "D" and "E" are aligned exactly straight with contact points separated approximately 1/32 of an inch and with the spring "C" spaced approximately 7/32 of an inch from spring "D" at the point of contact. If necessary, in order to obtain positive pull-in and quick dis-engagement of the motor, the tension of spring "C" should be increased or decreased by bending. This action should be checked with the front apron of the chassis raised two inches higher than the rear. Contacts of the switch must be kept clean. Crocus cloth or a relay burnisher may be used for this purpose.

Motor Reversing Switch.—It is necessary to automatically stop and reverse the drive motor before the tuning condenser reaches the ends of its travel. Approximately 175 degrees of sweep is required, and the reversal must take place above 1,700 kc and below 540 kc but not too near the limits of the scale. The coupling between the station selector drum and the tuning condenser shaft should be attached so that the reversing switch trip lever "H" is exactly vertical when the condenser is full-out of mesh. There should be 1/32 of an inch clearance between the end of the condenser shaft and the selector drum shaft. While the trip lever is in this position the reversing switch bracket should be adjusted by means of its elongated mounting holes until the switch pin "I" just lightly touches trip lever "H."

Main Pinion Gear.—Clearance between the small high-speed pinion gear "E" and the intermediate gear "K" determines the amount of mechanical noise produced. Correct adjustment will give approximately 1/32 of an inch movement of back lash at the end of pinion arm "G" when gear "K" is held stationary. Arm "G" must also be adjusted for correct mesh with motor shaft drive pin "F." With the motor shaft completely forward and pinion "E" tight against its front bearing, the pinion mounting stud "J" should be adjusted so that pin "F" meshes its full thickness with the rotating arm "G." An increase of this mesh will increase over travel on tuning while a decrease of mesh will decrease the lower travel. The elongated hole in the front bracket allows sufficient movement of the mounting stud "J" to permit above mentioned gear mesh adjustment.

"Manual-Electric-Remote" Changeover.—(1) Link and lever adjustment—To properly line up the mechanical link between the switch shaft and throw-out gear bracket "MM," the set screws holding the link lever on the switch shaft must be loosened, the switch turned to the "Remote" position (extreme left) and the link lever revolved until the distance between the bottom of its link-connecting pin (extends through chassis apron) and the bottom of the "C" slot, in front apron of chassis, is exactly ¼ of an inch. If this adjustment is not properly made, correct operation of "Electric" or "Remote" tuning will not result. (2) Throw-out Gear Adjustment—To obtain smooth operation on "Electric" or "Remote" positions it is important that the proper clearance is maintained between the throw-out gear "M" and the intermediate gear "L." With the "Manual-Electric-Remote" control thrown to "Remote" position (extreme left) adjust the mesh between these gears by means of the eccentric screw "O" and lock nut "P" on the throw-out gear bracket "MM" until there is approximately 1/64 of an inch backlash of gear "L" when gear "M" is held stationary.

Vernier Tuning.—In case it becomes necessary to remove tuning condenser drive shaft "T," it should be replaced by sliding anti-backlash gear "R" on condenser shaft apart so that compression amounting to one tooth on the gear is obtained in the springs. Adjust mesh of gear "R" with pinion gear "U" on vernier shaft before tightening screws "S" so that smooth tuning is obtained throughout the range.

Motor Alignment.—The motor shaft must be exactly aligned with the axis of the pinion gear with which it engages. This may be adjusted by loosening the mounting screws "V" of the motor and aligning shaft by sight. Correct alignment may be tested by slowly rotating motor and observing the relation between the pin "F" of the motor shaft and the arm "G" on the pinion. The relation of the two should remain the same throughout the revolution. Additional movement for adjustment may be obtained by the motor bracket screws "W" if necessary.

Station Selector Drum.—(1) Bearing Adjustment—The selector drum may be removed by unscrewing the two bearing adjusting screws "X" on the front and rear bearings and sliding shaft out of slots on frame. To replace drum, the reverse procedure should be followed holding bearing adjusting plates "Y" firmly against the shaft and tightening adjusting screws. (2) Contact adjustment—Two types of contact strips are used. They are designated on figure 5, as types 1 and 2, on which the individual contacts are respectively adjustable and fixed. On type 1, the individual contacts should be adjusted by setting the end contact springs near the mid-position of their travel and aligning the remaining springs to them by means of a straight edge. Either type of contact strip should be adjusted to the selector drum by placing two selector adjusting keys in the station adjustment strip, positions 1 and 8, loosening contact strip adjusting nuts "Z" and shifting the contact strip until the end contacts are exactly centered on the respective disc insulating segments. More accurate adjustment may be made by silhouetting the point of contact with a piece of white paper held behind the contact. Adjustment will be facilitated by removing complete assembly from rear of tuning condenser by unscrewing the three mounting screws. Contacts and discs must be kept free of dirt, filings, and other extraneous matter.

Lubrication.—The dial pointer slide should be greased with petrolatum. This same lubrication should be applied lightly to all gear faces of the drive mechanism and sparingly with a cloth to the station selector discs. Any good household oil, such as "3-IN-ONE," is suitable for the motor shaft bearings. A light grade of engine oil should be used for all gear bearings. Medium viscosity engine oil, similar to "PYROIL" (B), should be applied between the thrust washers on the motor shaft. "CASTORDAG," a mixture of graphite and castor oil, is recommended for use at the selector drum end-bearing slots and at the bearings of cable pulleys.

Station Adjustment

Any eight stations may be chosen for "Electric" tuning. Remove the two escutcheon plates from the side of the dial, place proper call letter labels in the celluloid windows, and replace escutcheons. Turn the power on and proceed to set up the "Electric" tuning as follows:

1. Set Range Selector to "Broadcast."
2. Turn "Manual-Electric-Remote" control to "Electric."
3. Press push button No. 1 and wait until station pointer comes to rest.
4. Turn the "Manual - Electric - Remote" control to "Manual."
5. Remove adjusting key from receptacle on top of station selector drum mechanism.
6. Insert key in position marked, "1" in station adjustment strip and push the key all the way down to properly fit in slot in disc.
7. Tune the receiver very carefully by means of the manual tuning knob and the "Magic Eye," to station chosen for No. 1.
8. Remove key.
9. Turn the "Manual-Electric-Remote" control to "Electric."

Button No. 1 is now properly set for "Electric" tuning. Proceed similarly for the other seven push buttons, matching each station on the dial with the same number on the station adjustment strip. Repeat the above steps but place the key respectively in positions 2, 3, 4, etc., and in each case tune to the proper station. Now when you press a button the desired station will be tuned in electrically.

Note.—In the event that all the push-button switches are locked "in" at once, they may be released by pressing either the upper left-hand or the lower right-hand push buttons (Nos. 1 or 8) in farther than would ordinarily be required.

Armchair Control

When a Model G-8 armchair control is attached to the receiver as shown in figure 6 it duplicates the action of the push buttons on the front panel when the "Manual-Electric-Remote" control is turned to "Remote" position.

REPLACEMENT PARTS

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

STOCK No.	DESCRIPTION
	RECEIVER ASSEMBLIES
14701	Arm—Hub and arm for operating band indicator shutter —located on range switch shaft
14726	Arm—Hub and arm complete with set screws—connects station selector drum to rear of tuning condenser shaft
14517	Board—Antenna and ground terminal board
12717	Board—Phonograph terminal board
5237	Bushing—Variable condenser rubber mounting bushing
13656	Button—Plug button for detector coil shield
14725	Cable—Tuning tube cable and socket
12607	Cap—Shield cap for first or second I.F. transformer
12581	Cap—Shield cap for third I.F. transformer
11350	Cap—Grid contact cap
12884	Capacitor—Adjustable trimmer (long) (C2, C45, C51)
12714	Capacitor—Adjustable trimmer (med.) (C8, C43)
13200	Capacitor—10 Mmfd. (C52)
14021	Capacitor—22 Mmfd. (C61)
12720	Capacitor—100 Mmfd. (C26, C60)
14262	Capacitor—109 Mfd. (C62, C63)
12404	Capacitor—120 Mmfd. (C24)
12724	Capacitor—120 Mmfd. (C54)
14712	Capacitor—180 Mmfd. (C21, C23)
12952	Capacitor—330 Mmfd. (C3, C34, C59)
13052	Capacitor—470 Mmfd. (C48)
14724	Capacitor—660 Mmfd. (C4)
14723	Capacitor—690 Mmfd. (C47)
12729	Capacitor—1,550 Mmfd. (C46)
12897	Capacitor—4,700 Mmfd. (C5, C49)
14722	Capacitor—5,100 Mmfd. (C44)
4838	Capacitor—.005 Mfd. (C39, C41)
13138	Capacitor—.01 Mfd. (C29, C33)
14393	Capacitor—.01 Mfd. (C36)
11315	Capacitor—.015 Mfd. (C32, C35, C37)
4870	Capacitor—.025 Mfd. (C28)
4886	Capacitor—.05 Mfd. (C56)
4841	Capacitor—0.1 Mfd. (C9, C10, C14, C64)
5170	Capacitor—0.25 Mfd. (C19)
4840	Capacitor—0.25 Mfd. (C55)
12741	Capacitor—0.5 Mfd. (C27 two in parallel, C38)
5212	Capacitor—16 Mfd. (C58)
14531	Capacitor—25 Mfd. (C57)
14829	Capacitor Pack—Comprising one 16 Mfd. and one 20 Mfd. sections (C50, C65)
14372	Coil—Antenna coil and shield (L1, L2, L3, L4)
14414	Coil—Detector coil and shield (L5, L6, L7, L8, L9, L10)
14713	Coil—Oscillator coil and shield (L11, L12, L13, L14)
14727	Condenser—3-gang variable tuning condenser, complete with gear train (C1, C7, C53)
5040	Connector—4-contact female connector for reproducer cable
14733	Contact—Spring contact for engaging discs in station selector drum for type 1 contact assembly
30365	Contact—Comprising 8 spring contacts assembled on insulating strip for engaging discs in station selector drum (type 2 contact assembly)
14699	Cord—Indicator pointer drive cord
12008	Core—Adjustable core and stud for I.F. transformer
12800	Core—Adjustable core and stud assembly for oscillator coil
14717	Dial—Station selector dial scale
14740	Drive—Tuning condenser vernier drive shaft and pinion gear
14698	Drum—Drum for indicator drive cord—fastens on tuning condenser shaft
14731	Drum—Station selector drum rotor—comprising 8 station selector contactor discs assembled on shaft
14738	Gear—Drive pinion gear and arm
14739	Gear—Drive gear and set screws—located on tuning condenser knob shaft
14734	Gear—Intermediate gear assembly—comprising one .749" O.D.—34 tooth—gear and one .291" O.D.—12 tooth pinion assembled
14735	Gear — Intermediate gear assembly — comprising one 1.541" O.D.—72 tooth gear and one .291" O.D.—12 tooth pinion assembled
14736	Gear — Intermediate gear assembly — comprising one 1.541" O.D.—72 tooth gear and one hub assembled
14737	Gear—Throw-out gear and bracket
14716	Holder—Dial scale holder and reflector, complete with holding springs for band indicating shutter
14715	Indicator—Station selector indicator pointer and support
5226	Lamp—Dial or indicating lamp
14719	Link—Link and lever assembly
14730	Motor—Tuning drive motor for 25-cycle models only (T3)
14729	Motor—Tuning drive motor for 60-cycle models only (T3)
14028	Nut—Jamb nut for trimmer, Stock Nos. 12714 and 12884
12471	Plate—Mounting plate for cushion socket—less socket
14741	Plate—Tuning condenser front plate and studs assembled for mounting drive gears
14697	Pulley—Indicator pointer cable pulley
13988	Resistor—10 ohms—carbon type, ½ watt (R40)
11932	Resistor—330 ohms—carbon type, 1/10 watt (R4)
5030	Resistor—470 ohms—carbon type, ½ watt (R39)
14720	Resistor—1,000 ohms—carbon type, ½ watt (R2, R43)
14078	Resistor—18,000 ohms—carbon type, 1 watt (R34)
11305	Resistor—22,000 ohms—carbon type, ½ watt (R16)
14721	Resistor—22,000 ohms—carbon type, ½ watt (R13)
11300	Resistor—33,000 ohms—carbon type, 1/10 watt (R42)
13735	Resistor—33,000 ohms—carbon type, ½ watt (R5)
12454	Resistor—33,000 ohms—insulated ½ watt (R53)
11846	Resistor—47,000 ohms—carbon type, ½ watt (R25)
11365	Resistor—82,000 ohms—carbon type, ½ watt (R50)
14560	Resistor—100,000 ohms—insulated, ½ watt (R27)
5145	Resistor — 100,000 ohms — carbon type, ½ watt (R28, R30)
13734	Resistor—120,000 ohms—carbon type, ½ watt (R41)
12478	Resistor—150,000 ohms—carbon type, 1/10 watt (R54)
11453	Resistor—270,000 ohms—carbon type, 1/10 watt (R31, R32)
11297	Resistor—330,000 ohms—carbon type, 1/10 watt (R51)
11172	Resistor—470,000 ohms—carbon type, ½ watt (R17)
11452	Resistor—470,000 ohms—carbon type, 1/10 watt (R20)
11397	Resistor—560,000 ohms—carbon type, 1/10 watt (R1, R3)
12018	Resistor—1 meg.—carbon type, 1/10 watt (R36)
13730	Resistor—1 meg.—carbon type, ½ watt (R26, R44)
11628	Resistor—2.2 meg.—carbon type, ½ watt (R18, R21)
13732	Resistor—10 meg.—carbon type, ½ watt (R35)
14692	Resistor—Voltage divider—comprising one 1,100 ohm, one 4,000 ohm, one 6,000 ohm, one 180 ohm and two 90 ohm sections (R9, R10, R11, R12, R37, R38)
14695	Rod—Tie rod for joining lockplate pawls on station selector push-button switches
4869	Screw—No. 8-32 x 5/32 square head set screw for arm, Stock No. 14701, or link, Stock No. 14719, or drum, Stock No. 14693
12418	Screw—No. 8-32 x 5/16 milled head set screw for gear, Stock No. 14739
14845	Selector—Station selector drum mechanism—comprising selector contactor discs, spring contacts, and motor reversing switch assembled in metal frame
14374	Shield—Antenna or detector coil shield
14375	Shield—Oscillator coil shield
12008	Shield—I.F. transformer shield
14718	Shutter—Band indicating shutter and arm assembly
14696	Slider—Indicator pointer holder and spring
11195	Socket—5-contact 5T4 Radiotron socket
11196	Socket—8-contact 6K7, 6L7, 6J7, 6H6, 6F6 or 6N7 Radiotron socket
14114	Socket—Dial or indicating lamp socket
12007	Spring—Retaining spring for core, Stock No. 12008
3676	Spring—Tension spring for link and lever, Stock No. 14719
13638	Spring—Tension spring for cord, Stock No. 14699
14694	Spring—Tension spring for lockplate pawl on station selector push-button switches
14742	Stud—Mounting stud for gear and arm, Stock No. 14738
14702	Switch—"Manual - Electric - Remote" switch (S7, S10, S12)
14705	Switch—L.F. tone and power switch (S1, S8, S11)
14732	Switch—Motor reversing switch and mounting plate for station selector (S9)
14704	Switch—Range switch (S2, S3, S4, S6)
14728	Switch—A-F-C and A-F amplication suppression switch (S13)
14693	Switch—Station selector button switch—comprising four contacts and corresponding lockplates, completely assembled on insulating strips
14764	Tone Control—H.F. tone control (R29)
14808	Transformer—First I.F. transformer (L15, L16, C62, C63)
14765	Transformer—Second I.F. transformer (L20, L21, C21, C23)
14709	Transformer—Third I.F. transformer (L22, L23, L24, C24)
14689	Transformer—Power transformer, 105-125 volts, 50-60 cycle (T1)
14690	Transformer—Power transformer, 105-125 volts, 25-60 cycle (T1)
14691	Transformer—Power transformer, 105-240 volts, 50-60 cycle (T1)
13144	Volume Control (R52)
	REPRODUCER ASSEMBLIES (Speaker No. RL-70E2)
13866	Cap—Dust cap for cone center
11234	Coil—Field coil (L28)
11469	Coil—Neutralizing coil (L27)
12667	Cone—Reproducer cone, voice coil, center suspension and dust cap (L26)
5039	Plug—4-contact male plug for reproducer
14535	Reproducer, complete
14534	Transformer—Output transformer (T2)
14357	Washer—Spring washer to hold field coil securely
	MISCELLANEOUS ASSEMBLIES
12038	Band—Rubber band for tuning tube
14744	Bracket—Tuning tube mounting bracket and clamp
14745	Button—Automatic station selector push button
14747	Card—Call letter cards for station selector
14750	Escutcheon—Station selector and tuning tube escutcheon and crystal—less buttons and station call letter cards
14743	Escutcheon—Station selector and tuning tube escutcheon —complete with crystal, indicating cards, and buttons —less station indicating cards
14749	Indicator—"Electric-Manual" indicator screen
14748	Indicator—"Music-Speech" indicator screen
14751	Key—Key for use in setting "Electric Tuning" mechanism
14359	Knob—Large station selector knob
14688	Knob—Range switch knob
14269	Knob—Volume control, "Manual-Electric-Remote" switch, H.F. tone control, L.F. tone control or small station selector knob
5210	Screw—Chassis mounting screw and washer assembly
14746	Shield—Celluloid shield for station call letter cards
4982	Spring—Retaining spring for knob, Stock No. 14359
14270	Spring—Retaining spring for knob, Stock Nos. 14269 and 14688

Loudspeaker.—Centering of the loudspeaker is made in the usual manner with three narrow paper feelers after first removing the front dust cover. This may be removed by softening its cement with a light application of acetone, using care not to allow the acetone to flow into the air gap. The dust cover should be cemented back in place with ambroid upon completion of adjustment.

Service Data

The various diagrams of this booklet contain such information as will be needed to isolate causes for defective operation if such develops. The ratings of the resistors, capacitors, coils, etc., are indicated adjacent to the symbols signifying these parts on the diagrams. Identification titles such as R1, L1, C1, etc., provide reference between the illustrations and Replacement Parts List. The coils, transformer windings, and reactors are rated in terms of d-c resistance to permit continuity checks.

Precautionary Lead Dress.—(1) Bus lead from oscillator coil directly to ground must be as short as possible for correct alignment, (2) bus lead from range switch S3 to oscillator section C53 of variable condenser should be 1½ inches long for correct alignment, (3) bus lead from detector coil to range switch S4 must be as short as possible for correct alignment, (4) bus lead from detector coil to detector section C7 of variable condenser should be 2½ inches long for correct alignment, (5) detector trimming capacitor C8 lead should connect directly to variable condenser C7, (6) bus lead from antenna section of range switch S2 to chassis ground lance must be as short as possible, (7) bus lead from antenna coil to range switch S2 should be 2¼ inches for correct alignment, (8) bus lead from antenna coil to antenna section C1 of variable condenser must be 3⅞ inches over-all with ½ inch bend at coil end for correct alignment, (9) filament leads should be dressed away from RCA-6N7 grids, pins Nos. 4 and 5, to reduce hum pickup, (10) resistors R41, R43, and R44 in the oscillator control tube circuit must be kept free of other component parts for satisfactory operation of the a-f-c circuit, (11) capacitor C29 and resistor R16 leads from terminal board to the phonograph terminal board should be as short as possible and dressed away from other parts to reduce hum pickup, (12) filament leads should all be twisted to reduce hum pickup, (13) filament leads should be dressed away from the terminal board near the 3rd i-f transformer. (14) Lead from the range switch S3 to the oscillator cathode socket terminal should be dressed under bus wire on socket to hold this lead down close to chassis.

Phonograph Attachment.—A terminal board is provided for connecting a phonograph into the audio-amplifying circuit. RCA Victor Models R-93, R-93-A, R-93-2, or R-94 Record Players should be connected as follows: Remove the link from the phonograph terminal board. Connect green wire in Radio-Record switch cable to terminal 1; yellow to terminal 2; shield to terminal 3; and tape up the red and blue. Connect a 2-conductor twisted cable between the Record Player binding posts and the screw-terminals on Radio-Record switch. If additional volume is desired, connect an RCA Stock No. 9632 transformer between the 2-conductor twisted cable and the screw-terminals on Radio-Record switch as follows: Yellow and brown transformer leads and one side of twisted cable to ground screw-terminal on switch; black transformer lead to other side of twisted cable; and blue transformer lead to other screw-terminal on switch.

STOCK No.	DESCRIPTION
	RECEIVER ASSEMBLIES
14701	Arm—Hub and arm for operating band indicator shutter —located on range switch shaft
14726	Arm—Hub and arm complete with set screws—connects station selector drum to rear of tuning condenser shaft
14517	Board—Antenna and ground terminal board
12717	Board—Phonograph terminal board
5237	Bushing—Variable condenser rubber mounting bushing
13656	Button—Plug button for detector coil shield
14725	Cable—Tuning tube cable and socket
12607	Cap—Shield cap for first or second I.F. transformer
12581	Cap—Shield cap for third or fourth I.F. transformer
11350	Cap—Grid contact cap
12884	Capacitor—Adjustable trimmer (long) (C2, C45, C51)
12714	Capacitor—Adjustable trimmer (med.) (C8, C43)
13200	Capaciton—10 Mmfd. (C52)
14021	Capacitor—22 Mmfd. (C30)
12613	Capacitor—82 Mmfd. (C6)
12720	Capacitor—100 Mmfd. (C26, C60)
12404	Capacitor—120 Mmfd. (C24)
12724	Capacitor—120 Mmfd. (C54)
14712	Capacitor—180 Mmfd. (C21, C23)
14711	Capacitor—220 Mmfd. (C17, C18)
12952	Capacitor—330 Mmfd. (C3, C34, C59)
14710	Capacitor—430 Mmfd. (C11, C15)
13052	Capacitor—470 Mmfd. (C48)
14724	Capacitor—660 Mmfd. (C4)
14723	Capacitor—690 Mmfd. (C47)
12729	Capacitor—1,550 Mmfd. (C46)
12897	Capacitor—4,700 Mmfd. (C5, C49)
14722	Capacitor—5,100 Mmfd. (C44)
4838	Capacitor—.005 Mfd. (C39, C40, C41)
13138	Capacitor—.01 Mfd. (C12, C13, C22, C29, C33)
14393	Capacitor—.01 Mfd. (C36)
11315	Capacitor—.015 Mfd. (C35, C37)
4870	Capacitor—.025 Mfd. (C28)
4886	Capacitor—.05 Mfd. (C20, C56)
4839	Capacitor—0.1 Mfd. (C9, C10, C14)
12484	Capacitor—0.25 Mfd. (C16, C19, C55)
12741	Capacitor—0.5 Mfd. (C27 two in parallel, C38)
5212	Capacitor—16 Mfd. (C58)
14531	Capacitor—25 Mfd. (C57)
14714	Capacitor Pack—Comprising one .015 Mfd. and one .010 Mfd. capacitor, one 27,000 ohm and one 39,000 ohm resistors (C31, C32, R23, R24)
14829	Capacitor Pack—Comprising one 16 Mfd. and one 20 Mfd. sections (C60, C61)
14372	Coil—Antenna coil and shield (L1, L2, L3, L4)
14414	Coil—Detector coil and shield (L5, L6, L7, L8, L9, L10)
14713	Coil—Oscillator coil and shield (L11, L12, L13, L14)
14727	Condenser—3-gang variable tuning condenser, complete with gear train (C1, C7, C53)
5040	Connector—4-contact female connector for reproducer cable
14733	Contact—Spring contact for engaging discs in station selector drum for type 1 contact assembly
30365	Contact—Comprising 8 spring contacts assembled on insulating strip for engaging discs in station selector drum (type 2 contact assembly)
14699	Cord—Indicator pointer drive cord
12006	Core—Adjustable core and stud for I.F. transformer
12800	Core—Adjustable core and stud assembly for oscillator coil
14717	Dial—Station selector dial scale
14740	Drive—Tuning condenser vernier drive shaft and pinion gear
14698	Drum—Drum for indicator drive cord—fastens on tuning condenser shaft
14731	Drum—Station selector drum rotor—comprising 8 station selector contactor discs assembled on shaft
14738	Gear—Drive pinion gear and arm
14739	Gear—Drive gear and set screws—located on tuning condenser knob shaft
14734	Gear—Intermediate gear assembly—comprising one .749" O.D.—34 tooth—gear and one .291" O.D.—12 tooth pinion assembled
14735	Gear — Intermediate gear assembly — comprising one 1.541" O.D.—72 tooth gear and one .291" O.D.—12 tooth pinion assembled
14736	Gear — Intermediate gear assembly — comprising one 1.541" O.D.—72 tooth gear and one hub assembled
14737	Gear—Throw-out gear and bracket
14716	Holder—Dial scale holder and reflector, complete with holding springs for band indicating shutter
14715	Indicator—Station selector indicator pointer and support
5226	Lamp—Dial or indicating lamp
14719	Link—Link and lever assembly
14730	Motor—Tuning drive motor for 25-cycle models only (T3)
14729	Motor—Tuning drive motor for 60-cycle models only (T3)
14028	Nut—Jamb nut for trimmer, Stock Nos. 12714 and 12884
12471	Plate—Mounting plate for cushion socket—less socket
14741	Plate—Tuning condenser front plate and studs assembled for mounting drive gears
14697	Pulley—Indicator pointer cable pulley
13988	Resistor—10 ohms—carbon type, ½ watt (R40)
11932	Resistor—330 ohms—carbon type, 1/10 watt (R4)
13250	Resistor—330 ohms—carbon type, ½ watt (R14)
5030	Resistor—470 ohms—carbon type, ½ watt (R39)
14720	Resistor—1,000 ohms—carbon type, ½ watt (R2, R8, R43)
14837	Resistor—1,000 ohms—carbon type, 1/10 watt (R6, R15)
14078	Resistor—18,000 ohms—carbon type, 1 watt (R34)
11305	Resistor—22,000 ohms—carbon type, ½ watt (R16)
14721	Resistor—22,000 ohms—carbon type, ½ watt (R13)
5033	Resistor—33,000 ohms—carbon type, 1 watt (R33)
11300	Resistor—33,000 ohms—carbon type, 1/10 watt (R42)
13735	Resistor—33,000 ohms—carbon type, ½ watt (R5)
11646	Resistor—47,000 ohms—carbon type, ½ watt (R25)
14560	Resistor—100,000 ohms—insulated, ½ watt (R27)
5145	Resistor—100,000 ohms—carbon type, ½ watt (R7, R28, R30)
13734	Resistor—120,000 ohms—carbon type, ½ watt (R41)
11453	Resistor—270,000 ohms—carbon type, 1/10 watt (R31, R32)
11172	Resistor—470,000 ohms—carbon type, ½ watt (R17)
11452	Resistor—470,000 ohms—carbon type, 1/10 watt (R18, R20)
11397	Resistor—560,000 ohms—carbon type, 1/10 watt (R1, R3)
12013	Resistor—1 meg.—carbon type, 1/10 watt (R36)
13730	Resistor—1 meg.—carbon type, ½ watt (R26, R44)
11628	Resistor—2.2 meg.—carbon type, ½ watt (R18, R21)
13732	Resistor—10 meg.—carbon type, ½ watt (R35)
14692	Resistor—Voltage divider—comprising one 1,100 ohm, one 4,000 ohm, one 6,000 ohm, one 180 ohm and two 90 ohm sections (R9, R10, R11, R12, R37, R38)
14695	Rod—Tie rod for joining lockplate pawls on station selector push-button switches
4869	Screw—No. 8-32 x 5/32 square head set screw for arm, Stock No. 14701, or link, Stock No. 14719, or drum, Stock No. 14693
12418	Screw—No. 8-32 x 3/16 milled head set screw for gear, Stock No. 14739
14848	Selector—Station selector drum mechanism—comprising selector contactor discs, spring contacts, and motor reversing switch assembled in metal frame
14376	Shield—Antenna or detector coil shield
14375	Shield—Oscillator coil shield
12008	Shield—I.F. transformer shield
14718	Shutter—Band indicating shutter and arm assembly

STOCK No.	DESCRIPTION
14696	Slider—Indicator pointer holder and spring
11195	Socket—5-contact 5T4 Radiotron socket
11196	Socket—8-contact 6K7, 6L7, 6J7, 6H6, 6F6 or 6N7 Radiotron socket
14114	Socket—Dial or indicating lamp socket
12007	Spring—Retaining spring for core, Stock No. 12006
3676	Spring—Tension spring for link and lever, Stock No. 14719
13638	Spring—Tension spring for cord, Stock No. 14699
14694	Spring—Tension spring for lockplate pawl on station selector push-button switches
14742	Stud—Mounting stud for gear and arm, Stock No. 14738
14702	Switch—"Manual - Electric - Remote" switch (S7, S10, S12)
14705	Switch—L.F. tone and power switch (S1, S8, S11)
14732	Switch—Motor reversing switch and mounting plate for station selector (S9)
14704	Switch—Range switch (S2, S3, S4, S6)
14728	Switch—A.F.C and A.F amplication suppression switch (S13)
14693	Switch—Station selector button switch—comprising four contacts and corresponding lockplates, completely assembled on insulating strips
14703	Tone Control—H.F. tone control (R29, S5)
14706	Transformer—First I.F. transformer (L15, L16, L17, C11, C15)
14707	Transformer—Second I.F. transformer (L18, L19, L29, C17, C18)
14708	Transformer—Third I.F. transformer (L20, L21, C21, C23)
14709	Transformer—Fourth I.F. transformer (L22, L23, L24, C24)
14689	Transformer—Power transformer, 105-125 volts, 50-60 cycle (T1)
14690	Transformer—Power transformer, 105-125 volts, 25-60 cycle (T1)
14691	Transformer—Power transformer, 105-240 volts, 50-60 cycle (T1)
12861	Volume Control (R22)

STOCK No.	DESCRIPTION
	REPRODUCER ASSEMBLIES (Speaker No. RL75-1)
14606	Cap—Dust cap for cone center
14603	Coil—Field coil (L28)
14604	Coil—Neutralizing coil (L27)
14602	Cone—Reproducer cone, voice coil, center suspension and dust cap (L26)
5039	Plug—4-contact male plug for reproducer
14600	Reproducer, complete
14601	Transformer—Output transformer (T2, C42)
14357	Washer—Spring washer to hold field coil securely
	MISCELLANEOUS ASSEMBLIES
12038	Band—Rubber band for tuning tube
14744	Bracket—Tuning tube mounting bracket and clamp
14745	Button—Automatic station selector push button
14747	Card—Call letter cards for station selector
14750	Escutcheon—Station selector and tuning tube escutcheon and crystal—less buttons and station call letter cards
14743	Escutcheon—Station selector and tuning tube escutcheon —complete with crystal, indicating cards, and buttons —less station indicating cards
14749	Indicator—"Electric-Manual" indicator screen
14748	Indicator—"Music-Speech" indicator screen
14751	Key—Key for use in setting "Electric Tuning" mechanism
14359	Knob—Large station selector knob
14688	Knob—Range switch knob
14289	Knob—Volume control, "Manual-Electric-Remote" switch, H.F. tone control, L.F. tone control or small station selector knob
5210	Screw—Chassis mounting screw and washer assembly
14746	Shield—Celluloid shield for station call letter cards
4982	Spring—Retaining spring for knob, Stock No. 14359
14270	Spring—Retaining spring for knob, Stock Nos. 14289 and 14688

Electrical Specifications

Frequency Ranges

"Broadcast" (A)	530-1,720 kc
"Medium Wave" (B)	2,100-6,800 kc
"Short Wave" (C)	6,800-23,500 kc

R-F Alignment Frequencies

"Short Wave" (C)	20,000 kc (osc., det., ant.)
"Medium Wave" (B)	6,000 kc (osc.)
"Broadcast" (A)	600 kc (osc.), 1,500 kc (osc.)

Intermediate Frequency ..... 460 kc

Radiotron Complement

(1)	RCA-6K7 — R-F Amplifier	(7)	RCA-6H6 — Second Detector, A.V.C., and A.F.C.
(2)	RCA-6L7 — First Detector	(8)	RCA-6N7 — Audio Phase Inverter
(3)	RCA-6J7 — Heterodyne Oscillator	(9)	RCA-6F6 — Power Output
(4)	RCA-6J7 — Oscillator Control	(10)	RCA-6F6 — Power Output
(5)	RCA-6K7 — First I-F Amplifier	(11)	RCA-5T4 — Full-Wave Rectifier
(6)	RCA-6K7 — Second I-F Amplifier	(12)	RCA-6G5 — "Magic Eye" Tuning Tube

Pilot Lamps (6) ..... Mazda No. 46, 6.3 volts, 0.25 amp.

Power Supply Ratings

Rating A	105-125 volts, 50-60 cycles, 145 watts
Rating B	105-125 volts, 25 cycles, 145 watts
Rating C	105-125/140-160/195-250 volts, 50-60 cycles, 145 watts

Power Output

Undistorted	10 watts
Maximum	12½ watts

Loudspeaker

Type	12-inch Electrodynamic
Impedance (v.c.)	11½ ohms at 400 cycles

Phonograph Attachment.—A terminal board is provided for connecting a phonograph into the audio-amplifying circuit. RCA Victor Models R-93, R-93-A, R-93-2, or R-94 Record Players should be connected as follows: Remove the link from the phonograph terminal board. Connect green wire in Radio-Record switch cable to terminal 1; yellow to terminal 2; shield to terminal 3; and tape up the red and blue. Connect a 2-conductor twisted cable between the Record Player binding posts and the screw-terminals on Radio-Record switch. If additional volume is desired, connect an RCA Stock No. 9632 transformer between the 2-conductor twisted cable and the screw-terminals on Radio-Record switch as follows: Yellow and brown transformer leads and one side of twisted cable to ground screw-terminal on switch; black transformer lead to other side of twisted cable; and blue transformer lead to other screw-terminal on switch.

Loudspeaker.—Centering of the loudspeaker is made in the usual manner with three narrow paper feelers after first removing the front dust cover. This may be removed by softening its cement with a light application of acetone, using care not to allow the acetone to flow into the air gap. The dust cover should be cemented back in place with ambroid upon completion of adjustment.

MODEL 812K
Schematic

RCA MFG. CO., INC.

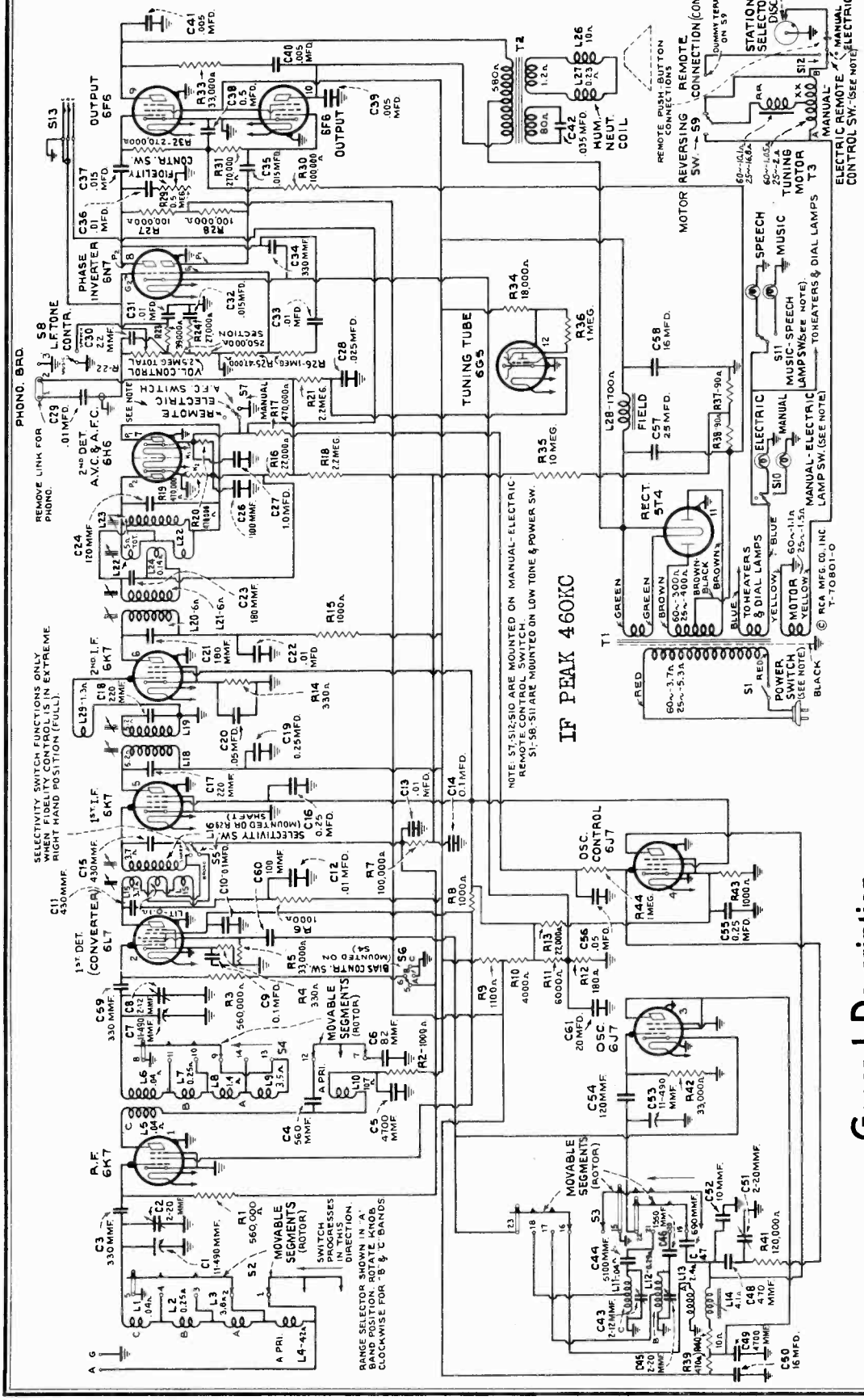


Figure 1—Schematic Circuit Diagram

General Description

This receiver employs a twelve-tube, three-band, "Magic Brain" superheterodyne circuit. Features of design include "Electric Tuning" with push-button operation; automatic frequency control; "cumulative-wound" antenna and detector coils; tuned r-f amplifier; magnetite-core adjusted i-f transformers and low-frequency "A" oscillator tracking; two-stage i-f amplifier; automatic volume control; phonograph terminal board; "Magic Eye" tuning tube; twelve-inch electrodynamic loudspeaker; plunger-type, air-dielectric trimming capacitors; two-point aural-compensated volume control; fidelity control; low-frequency tone control; audio phase inverter; and push-pull power output stage. In addition, this model has a cabinet incorporating the "Sonic Arc" Magic Voice.

MODEL 812K
Chassis Wiring

RCA MFG. CO., INC.

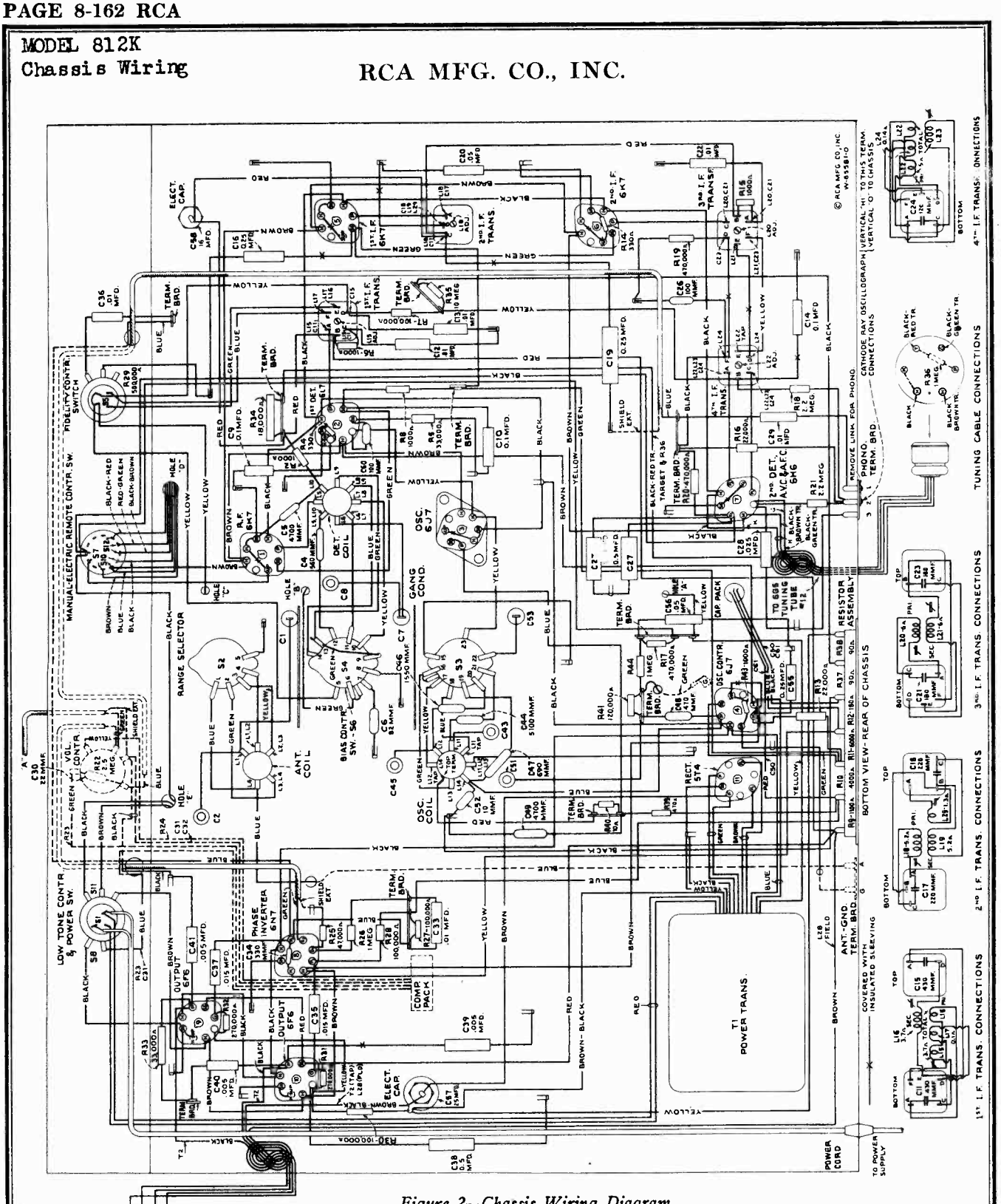


Figure 2—Chassis Wiring Diagram

MODEL 812K
Socket, Trimmers
Voltage

RCA MFG. CO., INC.

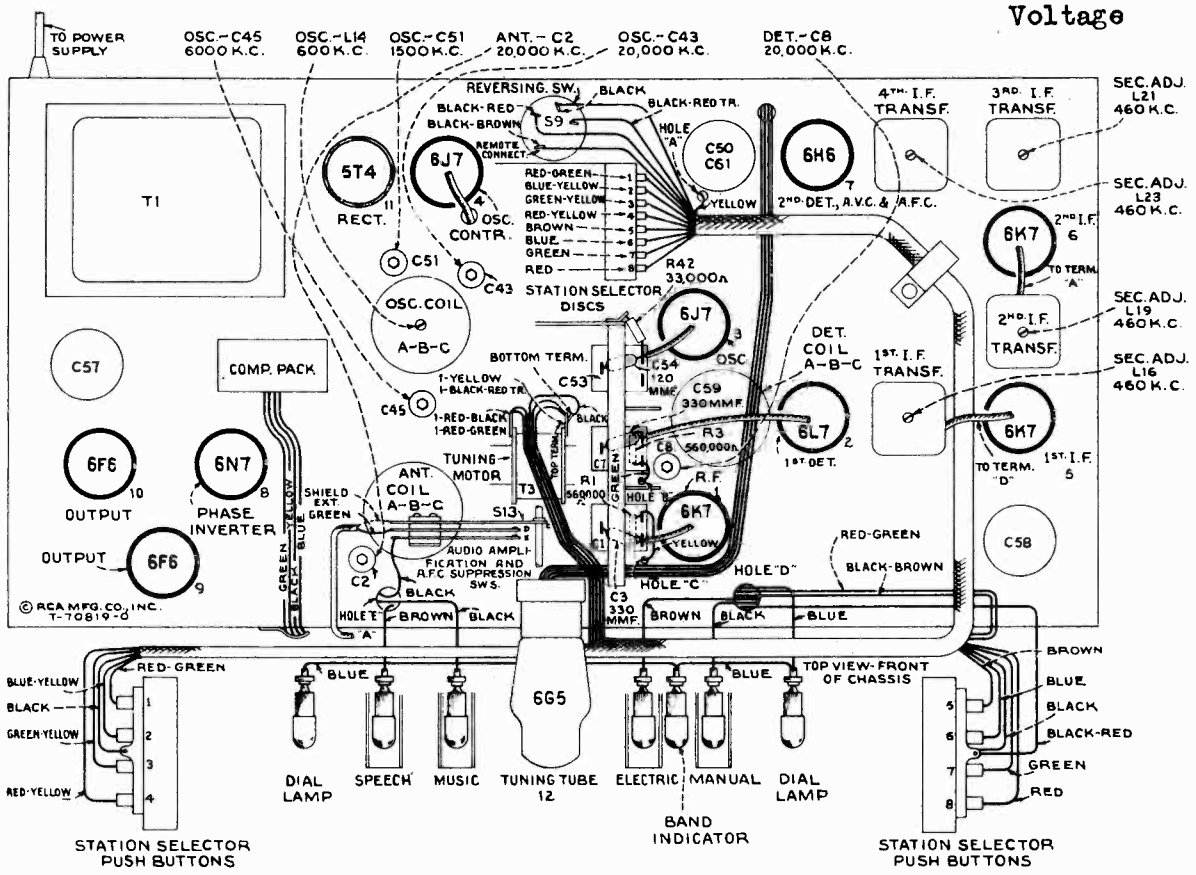


Figure 3—Radiotron, Coil, and Trimmer Locations

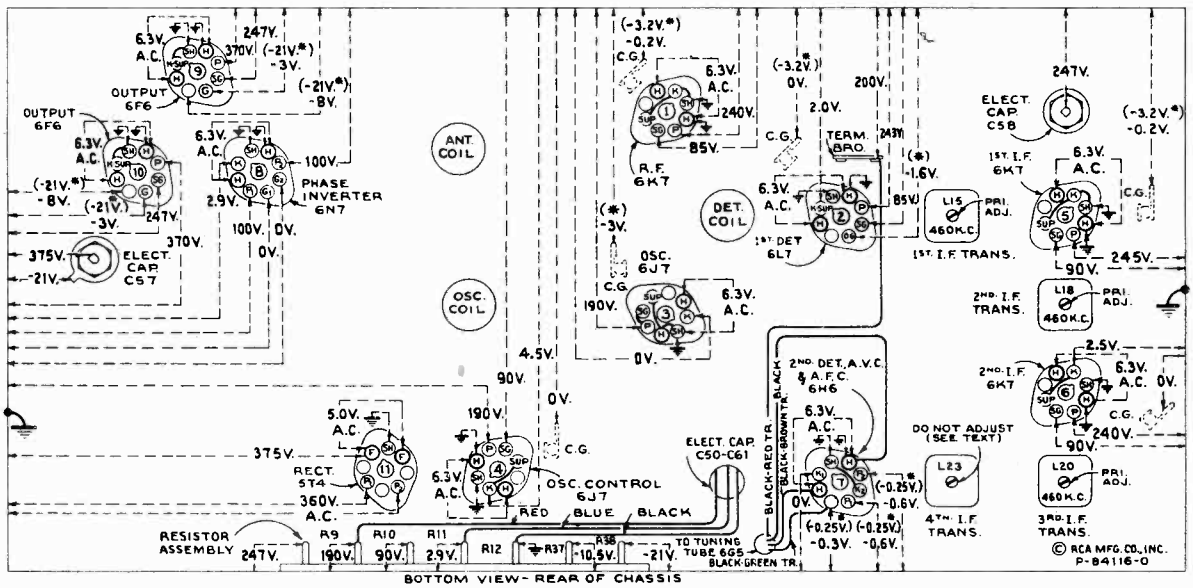


Figure 4—Radiotron Socket Voltages, Coil, and Trimmer Locations

Measured at 115 volts, 60-cycle supply—Tuned to approximately 1,000 kc ("Broadcast")—"Manual" control—No signal being received—Volume control minimum—Fidelity control optional

***Note:** Two voltage values are shown for some readings. The value shown in parentheses with asterisk (*) indicates operating conditions without voltmeter loading. The other value (generally lower) is the actual measured voltage and differs from the value shown in parentheses because of the additional loading of the voltmeter.*

Voltage values as specified should hold within ±20% when the receiver is normally operative at its rated line voltage. To duplicate the conditions under which the voltages were measured requires a 1,000-ohm-per-volt d-c meter, having ranges of 10, 50, 250, and 500 volts. Use the nearest range above the specified measured voltage. A-c voltages were measured with a corresponding a-c meter.

MODEL 812K
"Electric Tuning"
Assembly, Details
Adjustments

RCA MFG. CO., INC.

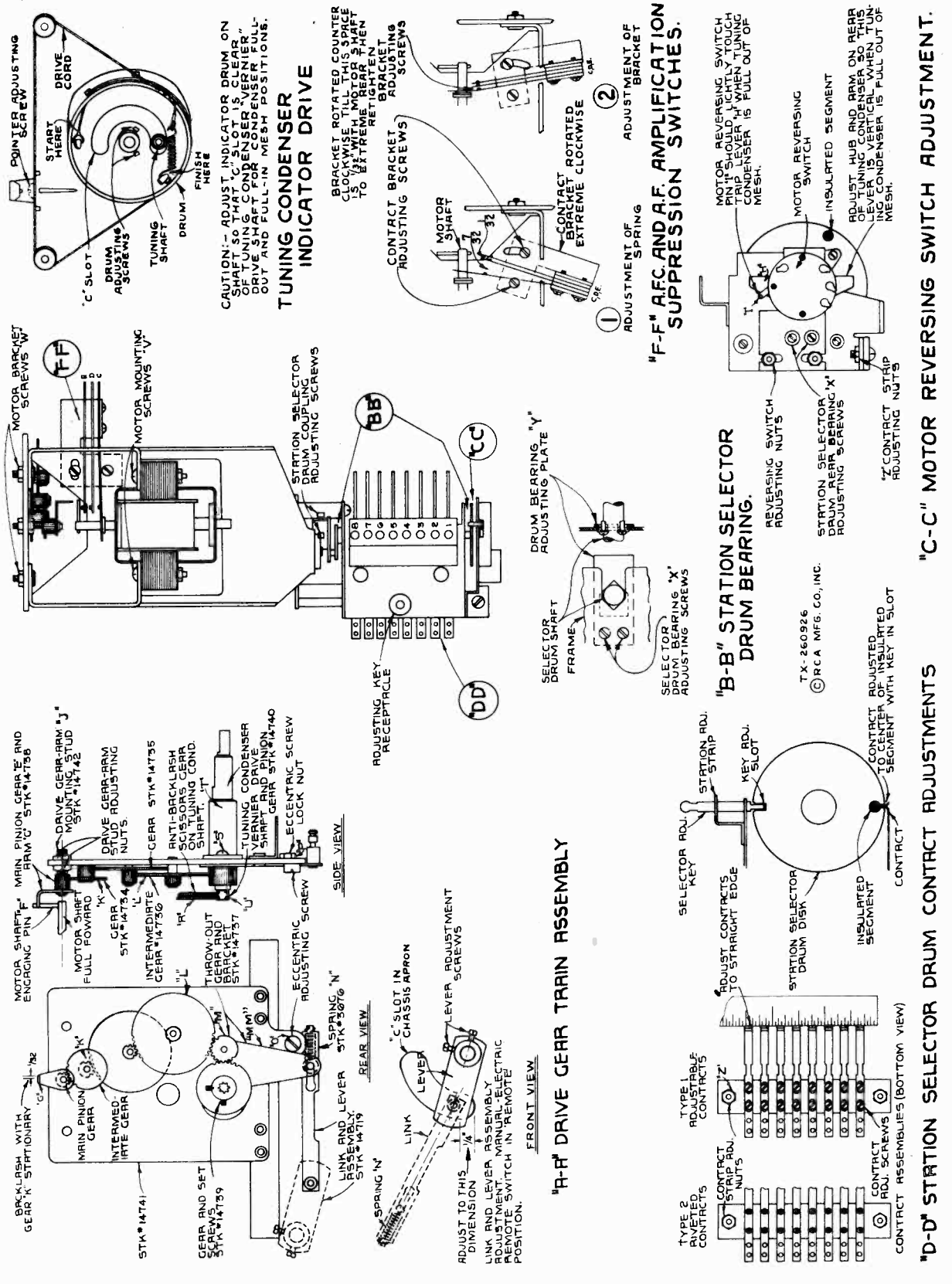


Figure 5—"Electric Tuning" Mechanism Adjustments

ALIGNMENT PROCEDURE

Calibrate the tuning dial by adjusting dial pointer to the left ends of horizontal calibration lines with the gang tuning-condenser plates in full-mesh position. This is a screw-driver adjustment.

The "Fidelity" control should be turned counter-clockwise during all alignment operations. The "Manual-Electric-Remote" switch should be turned to "Manual" (right) during alignment unless otherwise specified.

CAUTION.—The magnetite core screw L22 on the bottom of the 4th i-f transformer has been accurately adjusted, for an exact electral balance of coil L22 to center tap, during manufacture and **should not be disturbed.** However, if for any reason the adjustment has been moved from its original position, it will be necessary to mechanically adjust this screw until the end of the stud protrudes exactly 3/16 of an inch (six threads exposed) above the brass bushing prior to any alignment operations.

Perform alignment in proper order, tabulated below, starting with No. 1 and following all operations across, then No. 2, etc. A-f-c discriminator adjustments should follow r-f and i-f adjustments tabulated below. Adjustment locations are shown on figures 3 and 4.

Cathode-ray alignment is preferable; the connections to the chassis are shown on figure 2. If an output indicator is used, connect it across the loudspeaker voice-coil and advance the receiver volume control to full-volume position.

Connect the "low" output terminal of the test oscillator to the receiver chassis for all alignment operations. Regulate the output of the test oscillator so that minimum signal is applied to the receiver to obtain an observable output indication. This will avoid a-v-c action.

The term "Dummy antenna" means the device which must be connected between the "high" test-oscillator output and the point of connection to the receiver in order to obtain ideal alignment. "No signal, 550-750 kc" means that the receiver should be tuned to a point between 550 and 750 kc where no signal or interference is received from a station or local (heterodyne) oscillator.

For further details on alignment, refer to booklet "RCA Victor Receiver Alignment."

Order of Alignment	Test Oscillator: Connection to Receiver	Test Oscillator: Dummy Antenna	Test Oscillator: Frequency Setting	Range-Selector	Receiver Dial Setting	Circuit to Adjust	Adjustment Symbols	Adjust to Obtain
1	——	——	——	——	——	4th I-F Trans.	L23	Turn Extreme Counter-clockwise
2	6K7 2nd I-F Grid Cap	.001 Mfd.	460 kc	"A" Left	No Signal 550-750 kc	3rd I-F Trans.	L20 and L21	Max. (peak)
3	6K7 1st I-F Grid Cap	.001 Mfd.	460 kc	"A"	No Signal 550-750 kc	2nd I-F Trans.	L18 and L19	Max. (peak)
4	6L7 Det. Grid Cap	.001 Mfd.	460 kc	"A"	No Signal 550-750 kc	1st I-F Trans.	L15 and L16	Max. (peak)
5	Ant.	300 Ohms	20,000 kc	"C" Right	20,000 kc	"C" Osc.	C43	Max. (peak)*
6	Ant.	300 Ohms	20,000 kc	"C"	Rock thru 20,000 kc	"C" Det.	C8	Max. (peak)†
7	Ant.	300 Ohms	20,000 kc	"C"	20,000 kc	"C" Ant.	C2	Max. (peak)‡
8	Ant.	300 Ohms	6,000 kc	"B" Center	6,000 kc	"B" Osc.	C45	Max. (peak)*
9	Ant.	200 Mmfd.	600 kc	"A" Left	600 kc	"A" Osc.	L14	Max. (peak)
10	Ant.	200 Mmfd.	1,500 kc	"A"	1,500 kc	"A" Osc.	C51	Max. (peak)
11	Ant.	200 Mmfd.	600 kc	"A"	600 kc	"A" Osc.	L14	Max. (peak)
12	Ant.	200 Mmfd.	1,500 kc	"A"	1,500 kc	"A" Osc.	C51	Max. (peak)
13	Proceed to A-F-C Discriminator Adjustments Outlined Below							

* Use minimum capacity peak if two peaks can be obtained.
† Use maximum capacity peak if two peaks can be obtained.
‡ After this adjustment, check for image signal by shifting receiver dial to 19,080 kc.

A-F-C Discriminator Adjustments.—These adjustments are rather critical and should be performed with extreme care. Improper adjustment may result in complete failure of the oscillator control tube to function or else may cause it to detune the oscillator instead of tuning it to the signal. It is assumed that the magnetite core adjusting screw L23 (top of 4th i-f transformer) has been turned all the way out (extreme counter-clockwise) prior to the preceding tabulated adjustments. Adjustments are as follows: Remove spring "N" on link and arm assembly which connects the "Manual-Electric-Remote" switch shaft to the throw-out gear bracket. Turn "Fidelity" control counter-clockwise. Connect antenna to receiver antenna "A" terminal. With the "Manual-Electric-Remote" switch in "Manual" (right) position, tune in a strong local station near 600 kc or the low-frequency end of the "A" band as accurately as possible by means of the tuning tube "Magic Eye." The most accurate adjustment will be obtained by adjusting the "vernier" tuning knob mid-way between the two points where the eye just appears to start to open. This will place the generated i-f carrier signal frequency exactly in the center of the i-f amplifier response curve (should be 460 kc if i-f amplifier was properly aligned) and is the frequency to which the a-f-c discriminator (4th i-f transformer) should be tuned to resonance. Without disturbing any of the receiver adjustments, place the "high" test-oscillator lead about ¼ of an inch from the grid cap lead of the RCA-6K7, 1st i-f amplifier tube, adjust the test-oscillator output to maximum, turn test-oscillator "Modulation" off, and carefully zero-beat the test-oscillator frequency (approximately 460 kc) with the i-f carrier signal. Avoid placing the test-oscillator lead nearer to the grid cap lead than specified above, as doing so will tend to detune the i-f amplifier. It may be necessary to reduce the local station signal, during this operation, by shortening antenna lead or grounding antenna "A" terminal to chassis in order to increase the loudness of the beat note sufficiently for accurate zero-beat adjustment.

Throw "Manual-Electric-Remote" switch to "Electric" (center) position. A high whistle or beat note will now be heard. Turn the magnetite core screw L23 (top of 4th i-f transformer) slowly clockwise. As this screw is turned, the beat note will first increase to a high audio frequency and will then decrease to a zero-beat and then increase in frequency again. The point of exact **zero-beat is the position** for correct adjustment of the discriminator. Zero-beat **should** also still exist when the "Manual-Electric-Remote" **switch is** thrown back to "Manual" position. The adjustment is now complete and may be checked by slightly detuning the receiver above and below the local station frequency with the "Manual-Electric-Remote" in "Manual" position, switching to "Electric" position, and noting the oscillator pull-in. Replace spring "N."

Radiotron Cathode Current Readings

Measured with Milliammeter Connected at Tube Socket Cathode Terminals Under Conditions Similar to Those of Voltage Measurements

(1)	RCA-6K7—R-F Amp.	5.0 ma.
(2)	RCA-6L7—1st Det.	6.0 ma.
(3)	RCA-6J7—Osc.	8.5 ma.
(4)	RCA-6J7—Osc. Control	1.2 ma.
(5)	RCA-6K7—1st I-F Amp.	6.0 ma.
(6)	RCA-6K7—2nd I-F Amp.	7.5 ma.
(7)	RCA-6H6—2nd Det., A.V.C. and A.F.C.	—— ma.
(8)	RCA-6N7—Phase Inverter	1.8 ma.
(9)	RCA-6F6—Output	26 ma.
(10)	RCA-6F6—Output	26 ma.
(11)	RCA-5T4—Rectifier	118 ma.*
(12)	RCA-6G5—Tuning Tube	2.5 ma.

(*Cannot be measured at socket)

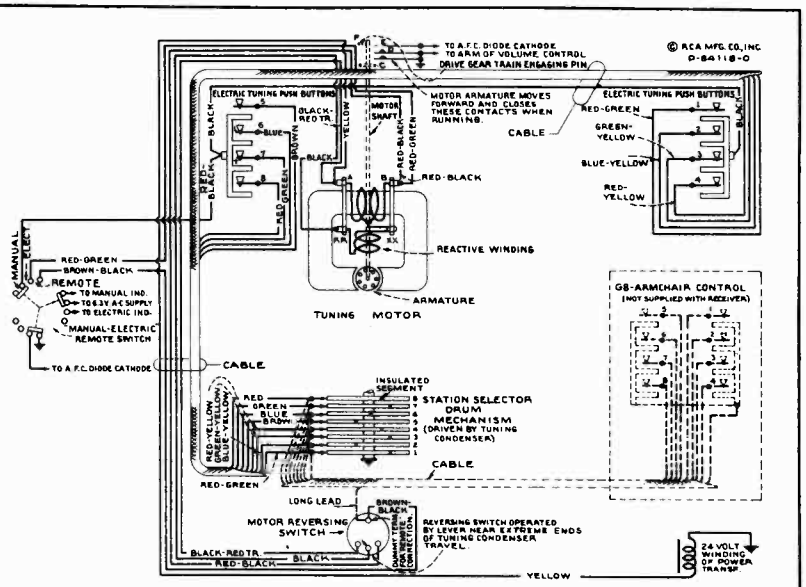


Figure 6—"Electric Tuning" Wiring Diagram (Viewed from rear of chassis)

Circuit Arrangement

The circuit consists of an r-f amplifier stage, first-detector (converter) stage, separate heterodyne-oscillator stage, oscillator control stage, two i-f amplifier stages, diode-detector—automatic volume and frequency control stage, audio phase-inverter voltage-amplifier stage, push-pull pentode power-amplifier stage, tuning indicator "Magic Eye," and a full-wave rectifier stage.

The antenna and detector coils are constructed with a special type of winding ("qumulative") to provide increased sensitivity and selectivity on the "A" band. The "A," "B," and "C" sections on both coils are wound on single forms and are series connected. The range selector operates in such a manner that the correct portions are selected for the primary and secondary windings on each band. The "A," "B," and "C" oscillator sections are likewise wound on a single form but are connected so they operate separately. Undesirable interaction of unused windings with the tuned circuits is prevented by shorting out the proper sections with the range selector.

The intermediate-frequency amplifier consists of two RCA-6K7 tubes in a two-stage transformer-coupled circuit. The windings of all i-f transformers are resonated by fixed capacitors and are adjusted by molded magnetite cores to tune to 460 kc. A third winding, L17, in the first i-f transformer, closely coupled to the primary, L15, is placed in series with the main secondary L16 when the fidelity control switch S5 is thrown to "broad" position (see figure 1), thereby increasing the coupling between the primary and secondary circuits with a consequent broadening of the band width of the i-f amplifier, permitting higher fidelity reception.

The function of the automatic-frequency-control circuit is to automatically change the frequency of the heterodyne oscillator so that the correct i-f frequency is formed for the i-f amplifier. The circuit consists essentially of an i-f discriminator which, as the name implies, discriminates or furnishes control voltage of the correct polarity to an oscillator frequency-control tube for generated i-f carrier frequencies slightly above and below 460 kc, or the frequency to which the i-f amplifier is tuned.

The plate circuit of the RCA-6J7 oscillator control tube is caused to act as an apparent variable inductance in parallel with the "A" band oscillator tuned circuit of which coil L14 is a part. The series combination of resistor R41 and the oscillator control-tube grid to cathode capacitance is also in parallel with the oscillator tuned circuit. Since the resistance of R41 is many times greater than the reactance of the grid-cathode capacitance, at the oscillator frequency, the r-f current through the combination will be practically in phase with the r-f voltage across the oscillator tuned circuit. However, the r-f voltage impressed across the grid-cathode capacitance section of the combination will lag the r-f voltage across the combination, or the tuned circuit, approximately 90 degrees. The grid-cathode r-f voltage will be amplified by the control tube but will be shifted an additional 180 degrees (grid and plate voltages of all tubes are always opposite in phase) so that the amplified r-f voltage appearing across the plate circuit will now lead the voltage across the combination or the tuned circuit by 90 degrees, or, in other words, the control tube is acting as an equivalent shunt inductance. The amount of this action is determined by the amplification of the tube, which in turn is governed by the grid-cathode bias voltage. In operation a residual bias is developed across the cathode resistor R43. The d-c control grid voltage is fed to the control grid from the discriminator circuit through resistor R44. If this voltage is negative with respect to ground, the amplification of the control tube will be decreased, the apparent plate circuit inductance of the tube increased, which will lower the frequency of the oscillator tube. The converse will occur when the grid voltage is positive with respect to ground.

The action of the discriminator circuit depends upon the fact that a 90-degree phase difference exists between the primary and secondary potentials of a double-tuned loosely-coupled transformer when the resonant frequency is applied and that this phase difference varies as the applied frequency varies; i.e., the maximum resultant response voltage across the primary and secondary windings connected in series will occur at a frequency either lower or higher in frequency than the frequency to which the individual windings are resonated, respectively depending on whether the windings are connected series aiding or opposing.

The discriminator, or fourth i-f transformer, consists of the primary winding, L24, which is a part of the third i-f transformer secondary tuned circuit (tuned to 460 kc) and the center-tapped secondary, L22. The upper and lower halves of L22 may be considered as two secondary coils, the upper series aiding and the lower series opposing the primary, L24. The magnetite core in L22 is inserted to inductively balance the two halves. The function of coil L23 (magnetite core adjusted), in parallel with L22, is to tune the secondary to 460 kc. Therefore, the maximum voltage will be applied to diode circuit P_2K_2 and R19 when the i-f signal frequency is above 460 kc and to the diode circuit P_1K_1 and R20 when the i-f signal frequency is below 460 kc. Resistors R19 and R20 are connected in series between ground and a point leading to the oscillator control tube grid.

D-c voltages, resulting from diode rectification, across R19 and R20 are always in opposition, consequently the oscillator control-tube grid-bias voltage is a differential amount, depending upon the i-f signal strength and its frequency deviation from the nominal value of 460 kc. The polarity of this differential oscillator control-tube grid-bias, with respect to ground, depends on whether the i-f signal frequency is above or below 460 kc, but is always in the direction which will bring the generated i-f frequency nearer to 460 kc. A-f-c action is automatically eliminated for "manual" tuning by grounding diode cathode K_1 through switch S7. A-v-c voltage and audio signal components are developed across resistor R19.

The RCA-6N7 twin-triode tube is operated as a phase inverter to supply audio signal voltage 180-degrees out-of-phase between the control grids of the two RCA-6F6 power output tubes for push-pull operation. Audio signals applied to the upper triode control grid through volume control R22 are amplified and shifted 180-degrees in phase. A portion of this amplified signal is applied to the lower triode control grid, through capacitor C33 and resistors R26 and R25, where it is amplified to approximately the same level as that in the plate circuit of the upper triode but approximately 180-degrees out-of-phase.

Principle of Operation

The electric tuning mechanism consists essentially of a quick engaging and dis-engaging reversible electric motor, tuning condenser driving gear train, and eight mechanically interlocked (pushing one button releases all others) station selector push buttons respectively wired to eight adjustable station selector contactor discs (each with a motor stopping insulated segment) mounted on a drum which is directly coupled to the gang tuning condenser shaft. The arrangement permits any one of eight pre-determined stations to be electrically tuned in by merely touching the correct push button.

The operation may be more readily understood by reference to figures 1, 5, and 6. When the motor is not energized, the armature is pushed to the rear or slightly out of the magnetic center by tension of contact spring "C" and the motor shaft is dis-engaged from the driving gear train. Pressing in any one of the eight push buttons will complete the motor circuit through a station selector contactor disc, assuming that the "Manual-Electric-Remote" switch is in "Electric" position and that the insulated segment in the contactor disc is not opposite its contactor. As the motor starts, the armature will be drawn forward, due to solenoid action, and the pin "F" on the end of its shaft will engage the arm "G" on the small main pinion gear, thereby driving the tuning mechanism. At the same time contact springs "E" and "D" will be grounded, causing suppression of audio amplification and automatic frequency control during the tuning cycle. The motor will continue to operate until the insulated segment in the selector disc breaks the motor circuit, whereupon spring "C" will instantly dis-engage the motor pin "F" from the arm "G" on the small pinion driving gear and open contacts "E" and "D." Pushing another button will cause the above mentioned cycle to be repeated except that the motor will be interrupted by the insulated segment on a corresponding disc. The discs are individually adjustable on a drum mechanism, providing a choice of eight "Electric Tuned" "Broadcast" stations. The arrangement of the motor is such that its rotation will continue in the same direction regardless of the number of "Electric" tuning cycles until the tuning condenser approaches either full-out or full-in of mesh, whereupon lever "H" trips switch S9 which reverses the direction of rotation. A throw-out idler gear is link-coupled to the "Manual-Electric-Remote" control to disconnect the motor drive gear train when the control is thrown to "Manual" position.

Mechanism Adjustments

The electric tuning mechanism is designed to be as simple in construction and as fool proof in operation as is possible. In order to maintain the accurate results possible with this device care must be taken in effecting any repairs or adjustments. Reference should be made to figure 5 and the following:

A-F-C and A-F Amplification Suppression Switches.—This switch assembly is located on the motor bracket and closes due to solenoid action of motor armature. The tension of the long contact spring "C" is important in bringing about quick dis-engagement of the motor and in permitting the motor to pull into mesh with the drive mechanism. Normal adjustment is attained when the short springs "D" and "E" are aligned exactly straight with contact points separated approximately 1/32 of an inch and with the spring "C" spaced approximately 7/32 of an inch from spring "D" at the point of contact. If necessary, in order to obtain positive pull-in and quick dis-engagement of the motor, the tension of spring "C" should be increased or decreased by bending. This action should be checked with the front apron of the chassis raised two inches higher than the rear. Contacts of the switch must be kept clean. Crocus cloth or a relay burnisher may be used for this purpose.

Motor Reversing Switch.—It is necessary to automatically stop and reverse the drive motor before the tuning condenser reaches the ends of its travel. Approximately 175 degrees of sweep is required, and the reversal must take place above 1,700 kc and below 540 kc but not too near the limits of the scale. The coupling between the station selector drum and the tuning condenser shaft should be attached so that the reversing switch trip lever "H" is exactly vertical when the condenser is full-out of mesh. There should be 1/32 of an inch clearance between the end of the condenser shaft and the selector drum shaft. While the trip lever is in this position the reversing switch bracket should be adjusted by means of its elongated mounting holes until the switch pin "I" just lightly touches trip lever "H."

Main Pinion Gear.—Clearance between the small high-speed pinion gear "E" and the intermediate gear "K" determines the amount of mechanical noise produced. Correct adjustment will give approximately 1/32 of an inch movement of back lash at the end of pinion arm "G" when gear "K" is held stationary. Arm "G" must also be adjusted for correct mesh with motor shaft drive pin "F." With the motor shaft completely forward and pinion "E" tight against its front bearing, the pinion mounting stud "J" should be adjusted so that pin "F" meshes its full thickness with the rotating arm "G." An increase of this mesh will increase over travel on tuning while a decrease of mesh will decrease the over travel. The elongated hole in the front bracket allows sufficient movement of the mounting stud "J" to permit above mentioned gear mesh adjustment.

"Manual-Electric-Remote" Changeover.—(1) Link and lever adjustment—To properly line up the mechanical link between the switch shaft and throw-out gear bracket "MM," the set screws holding the link lever on the switch shaft must be loosened, the switch turned to the "Remote" position (extreme left) and the link lever revolved until the distance between the bottom of its link-connecting pin (extends through chassis apron) and the bottom of the "C" slot, in front apron of chassis, is exactly ¼ of an inch. If this adjustment is not properly made, correct operation of "Electric" or "Remote" tuning will not result. (2) Throw-out Gear Adjustment—To obtain smooth operation on "Electric" or "Remote" positions it is important that the proper clearance is maintained between the throw-out gear "M" and the intermediate gear "L." With the "Manual-Electric-Remote" control thrown to "Remote" position (extreme left) adjust the mesh between these gears by means of the eccentric screw "O" and lock nut "P" on the throw-out gear bracket "MM" until there is approximately 1/64 of an inch backlash of gear "L" when gear "M" is held stationary.

Vernier Tuning.—In case it becomes necessary to remove tuning condenser drive shaft "T," it should be replaced by sliding anti-backlash gear "R" on condenser shaft apart so that compression amounting to one tooth on the gear is obtained in the springs. Adjust mesh of gear "R" with pinion gear "U" on vernier shaft before tightening screws "S" so that smooth tuning is obtained throughout the range.

Motor Alignment.—The motor shaft must be exactly aligned with the axis of the pinion gear with which it engages. This may be adjusted by loosening the mounting screws "V" of the motor and aligning shaft by sight. Correct alignment may be tested by slowly rotating motor and observing the relation between the pin "F" of the motor shaft and the arm "G" on the pinion. The relation of the two should remain the same throughout the revolution. Additional movement for adjustment may be obtained by the motor bracket screws "W" if necessary.

Station Selector Drum.—(1) Bearing Adjustment—The selector drum may be removed by unscrewing the two bearing adjusting screws "X" on the front and rear bearings and sliding shaft out of slots on frame. To replace drum, the reverse procedure should be followed holding bearing adjusting plates "Y" firmly against the shaft and tightening adjusting screws. (2) Contact adjustment—Two types of contact strips are used. They are designated on figure 5, as types 1 and 2, on which the individual contacts are respectively adjustable and fixed. On type 1, the individual contacts should be adjusted by setting the end contact springs near the mid-position of their travel and aligning the remaining springs to them by means of a straight edge. Either type of contact strip should be adjusted to the selector drum by placing two selector adjusting keys in the station adjustment strip, positions 1 and 8, loosening contact strip adjusting nuts "Z" and shifting the contact strip until the end contacts are exactly centered on the respective disc insulating segments. More accurate adjustment may be made by silhouetting the point of contact with a piece of white paper held behind the contact. Adjustment will be facilitated by removing complete assembly from rear of tuning condenser by unscrewing the three mounting screws. Contacts and discs must be kept free of dirt, filings, and other extraneous matter.

Lubrication.—The dial pointer slide should be greased with petrolatum. This same lubrication should be applied lightly to all gear faces of the drive mechanism and sparingly with a cloth to the station selector discs. Any good household oil, such as "3-IN-ONE," is suitable for the motor shaft bearings. A light grade of engine oil should be used for all gear bearings. Medium viscosity engine oil, similar to "PYROIL" (B), should be applied between the thrust washers on the motor shaft. "CASTORDAG," a mixture of graphite and castor oil, is recommended for use at the selector drum end-bearing slots and at the bearings of cable pulleys.

Station Adjustment

Any eight stations may be chosen for "Electric" tuning. Remove the two escutcheon plates from the side of the dial, place proper call letter labels in the celluloid windows, and replace escutcheons. Turn the power on and proceed to set up the "Electric" tuning as follows:

1. Set Range Selector to "Broadcast."
2. Turn "Manual-Electric-Remote" control to "Electric."
3. Turn Fidelity control counter-clockwise.
4. Press push button No. 1 and wait until station pointer comes to rest.
5. Turn the "Manual-Electric-Remote" control to "Manual."
6. Remove adjusting key from receptacle on top of station selector drum mechanism.
7. Insert key in position marked, "1" in station adjustment strip and push the key all the way down to properly fit in slot in disc.
8. Tune the receiver very carefully by means of the manual tuning knob and the "Magic Eye," to station chosen for No. 1.
9. Remove key.
10. Turn the "Manual-Electric-Remote" control to "Electric."

Button No. 1 is now properly set for "Electric" tuning. Proceed similarly for the other seven push buttons, matching each station on the dial with the same number on the station adjustment strip. Repeat the above steps but place the key respectively in positions 2, 3, 4, etc., and in each case tune to the proper station. Now when you press a button the desired station will be tuned in electrically.

RADIO MFG. ENGINEERS, INC.

MODEL RME 69-B Batt.
MODEL RME 69-A AC
or Batt. Schematics

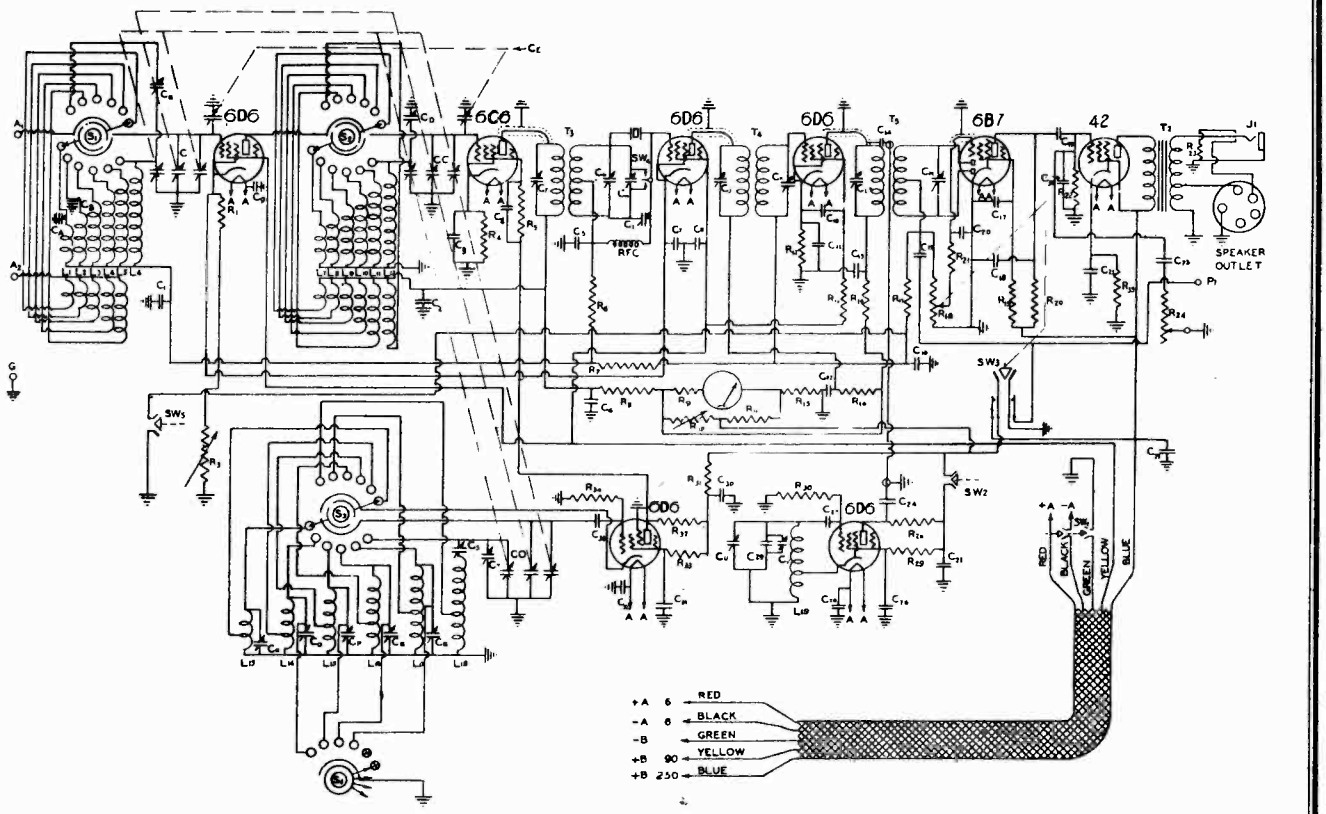


Fig. 16. Schematic Diagram of RME 69-B for Battery Operation

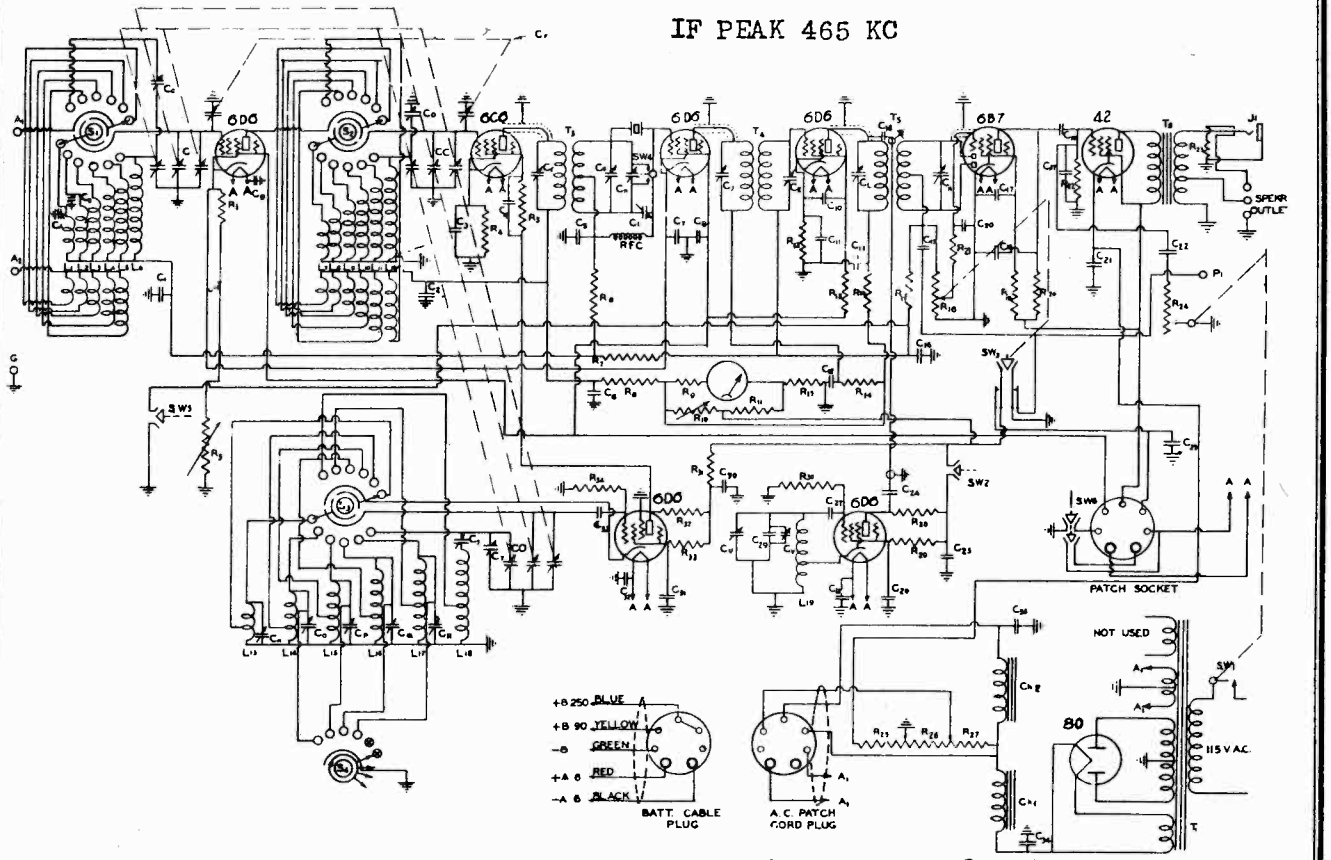


Fig. 17. Schematic Diagram of RME 69-A for AC or Battery Operation

MODEL RME 69-A AC or Batt.
MODEL RME 69-B Batt.
Parts List

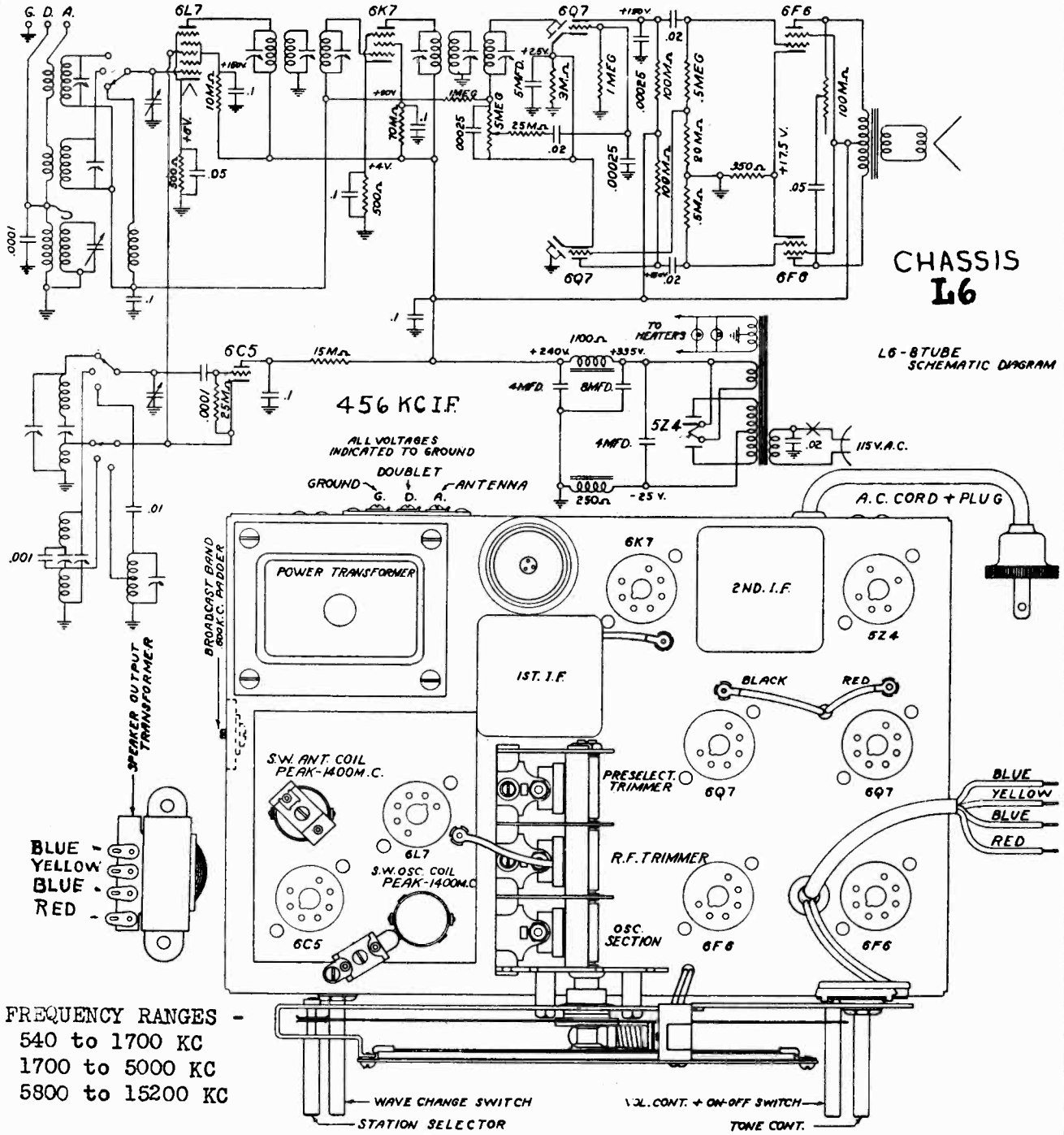
RADIO MFG. ENGINEERS, INC.

DESIGNATION	SPECIFICATION	DESIGNATION	SPECIFICATION
		S_1, S_2, S_3, S_4	Band change switch.
C_a and C_b	30 μμfd. adjustable mica padders.	SW1	115 volt line switch.
C_c	30 μμfd. mica padder.	SW2	Beat oscillator on and off switch.
C_d	Mica trimming condenser on center section of main tuning condenser. 50 μμfd. max.	SW3	Switch operated by control "H" for connecting monitor circuit and opening B supply to amplifier stages.
C_e	Dual section resonator control. 4 μμfd. minimum, 30 μμfd. maximum.	SW_4	Crystal switch for series or for parallel control.
$C_f, C_g, C_j, C_k, C_l, C_m$	Adjustable trimming condensers in the intermediate frequency transformers.	SW_5	Cut-off switch for removing AVC action (operated in tandem with R_3)
C_h	25 μμfd. midget air padder	R_{14}	2,000 ohms, 1/2 watt.
C_i, C_o, C_p, C_r	30 μμfd. mica adjustable phasing condenser.	R_{15}	10,000 ohms, 1/2 watt.
C_n	30 μμfd. adjustable padders.	R_{16}	2,000 ohms, 1/2 watt.
C_q	70 μμfd. adjustable padder.	R_{17}	1 megohm, 1/2 watt.
C_s	.0004 mica condenser shunted by 70 μμfd. mica adjustable trimmer.	R_{18}	250,000 ohm potentiometer audio level control.
C_t	Mica trimmer on the oscillator section of the main tuning condenser.	R_{19}	1 megohm, 1/2 watt.
C_u	70 μμfd. adjustable mica padder.	R_{20}	100,000 ohms, 1/2 watt.
C_v	25 μμfd. variable air condenser	R_{21}	50,000 ohm, 1/2 watt.
		R_{22}	250,000 ohms, 1/2 watt.
C_1	.01 μfd. 400 volts.	R_{23}	5,000 ohms, 1/2 watt.
C_2	.01 μfd. 400 volts.	R_{24}	1,000,000 ohms potentiometer.
C_3	.01 μfd. 400 volts.	R_{25}	410 ohms bleeder section.
C_4	.01 μfd. 400 volts.	R_{26}	7200 ohms, bleeder section.
C_5	.01 μfd. 400 volts.	R_{27}	6800 ohms, bleeder section.
C_6	.1 μfd. 400 volts.	R_{28}	10,000 ohms, 1/2 watt.
C_7	.1 μfd. 400 volts.	R_{29}	100,000 ohms, 1/2 watt.
C_8	.1 μfd. 400 volts.	R_{30}	100,000 ohms, 1/2 watt.
C_9	.002 moulded mica condenser.	R_{31}	2,000 ohms, 1/2 watt.
C_{10}	.01 μfd. 400 volts.	R_{32}	2,000 ohms, 1/2 watt.
C_{11}	.1 μfd. 400 volts.	R_{33}	50,000 ohms, 1/2 watt.
C_{12}	.1 μfd. 400 volts	R_{34}	50,000 ohms, 1/2 watt.
C_{13}	.1 μfd. 400 volts.		
C_{14}	1" of shielded braid wrapped around plate lead of second intermediate frequency amplifier tube. Approximate capacity 10 μμfds.	J_1	Headphone jack.
		RFC	16 millhenries.
		CH_1	30 henries, 100 ma.
		CH_2	30 henries, 50 ma.
C_{15}	.00025 μμfd.		
C_{16}	.01 μfd. 400 volts.	T_1	Main power transformer.
C_{17}	.1 μfd. 400 volts.	T_2	Audio output transformer to 4,000 ohms and 600 ohms.
C_{19}	.01 μfd. 400 volts.		
C_{20}	.00025 μfd. moulded mica condenser.	T_3	First intermediate frequency amplifier transformer.
C_{21}	20 μfd. 25 volt electrolytic.		
C_{22}	.01 μfd. 400 volts.	T_4	Second intermediate frequency amplifier transformer.
C_{23}	12 μfd. 450 volt electrolytic.		
C_{24}	.0001 moulded mica condenser	T_5	Third intermediate frequency amplifier transformer.
C_{25}	.01 400 volt electrolytic		
C_{26}	.01 μfd. 400 volt.		
C_{27}	.0001 μfd. moulded mica.	R_1	150 ohms, 1/2 watt.
C_{28}	.01 μfd. 400 volt.	R_2	20,000 ohms, 1 watt.
C_{29}	.00025 moulded ± 5%	R_3	30,000 ohms, variable.
C_{30}	.1 μfd. 400 volts.	R_4	5,000 ohms, 1/2 watt.
C_{31}	.01 μfd. 400 volts.	R_5	1 megohm, 1/2 watt.
C_{32}	.01 μfd. 400 volts.	R_6	250,000 ohms, 1/2 watt.
C_{33}	.0001 μfd. moulded ± 5%	R_7	100,000 ohms, 1/2 watt.
C_{34}	8 μfd. 450 volt electrolytic	R_8	2,000 ohms, 1/2 watt.
C_{35}	8 μfd. 450 volt electrolytic.	R_9	500 ohms, 1/2 watt ±5%
C_{37}	.00025 μfd. moulded condenser.	R_{10}	200 ohms, wire wound var. R meter balance
		R_{11}	1,000 ohms, 1/2 watt.
		R_{12}	500 ohms, 1/2 watt
		R_{13}	100,000 ohms, 2 watts.

L_1	Band 6 RF grid coil.	L_{10}	Band 3 first detector grid coil.
L_2	Band 5 RF grid coil.	L_{11}	Band 2 first detector grid coil.
L_3	Band 4 RF grid coil.	L_{12}	Band 1 first detector grid coil.
L_4	Band 3 RF grid coil.	L_{13}	Band 6 oscillator coil.
L_5	Band 2 RF grid coil.	L_{14}	Band 5 oscillator coil.
L_6	Band 1 RF grid coil.	L_{15}	Band 4 oscillator coil.
L_7	Band 6 first detector grid coil.	L_{16}	Band 3 oscillator coil.
L_8	Band 5 first detector grid coil.	L_{17}	Band 2 oscillator coil.
L_9	Band 4 first detector grid coil.	L_{18}	Band 1 oscillator coil.

RADIO PRODUCTS CORP.

MODEL Chassis L6
Schematic, Socket
Trimmers, Alignment
Voltage



FREQUENCY RANGES -
540 to 1700 KC
1700 to 5000 KC
5800 to 15200 KC

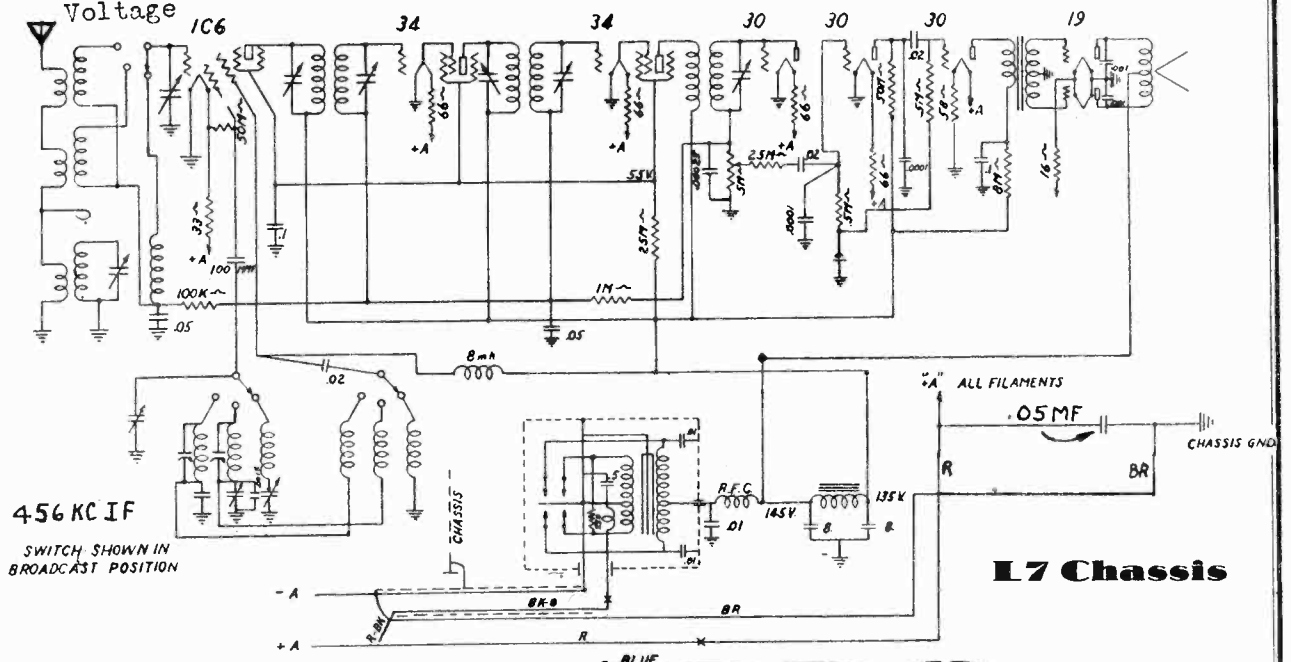
CONVENTIONAL ALIGNMENT - SEE THE SPECIAL SECTION

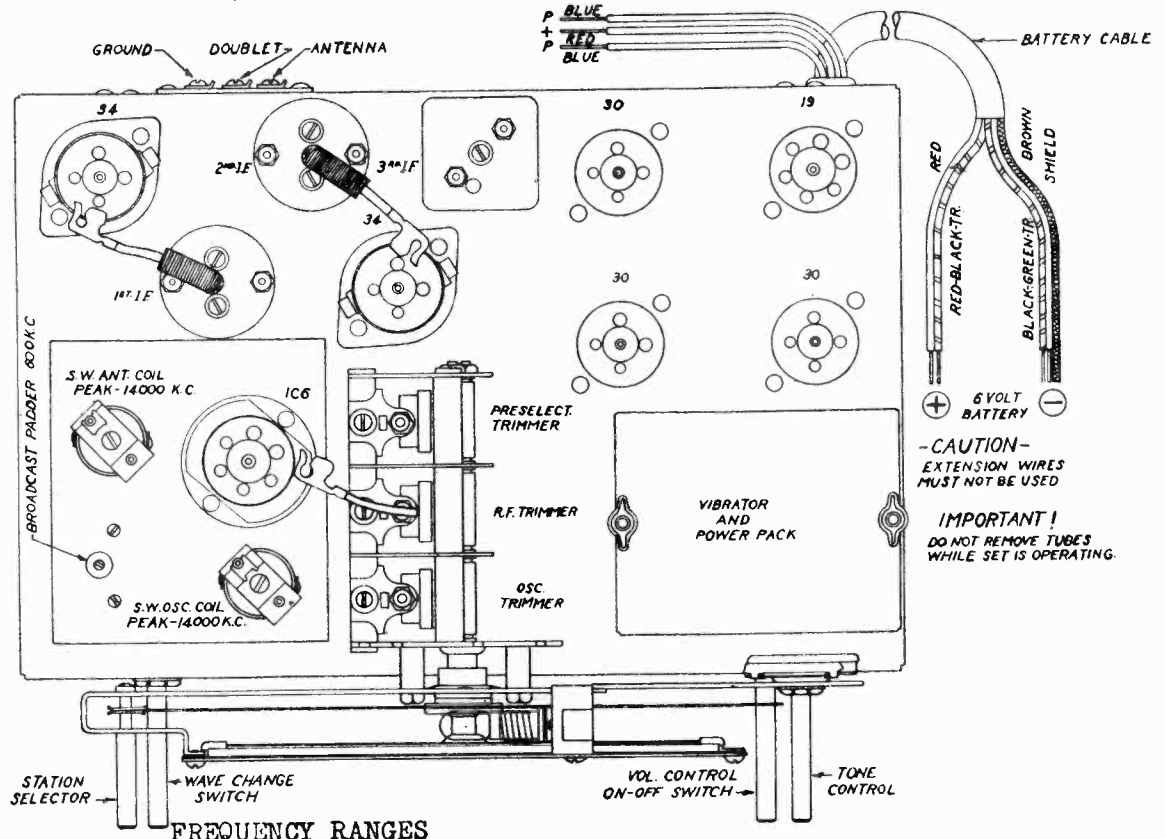
ROCK GANG CONDENSER DURING THE PADDING ADJUSTMENTS.

- BROADCAST - On bottom of chassis adjust OSC coil trimmer to 1400 KC peak. Next adjust gang condenser RF trimmers to the same frequency peak. Reset Generator and pad OSC to 600 KC peak. Rock gang during the padding adjustment.
- SHORTWAVE - Adjust OSC trimmer and then trimmer on ANT coil for 14000 KC peak. Check for weak image at 13100 KC.
- POLICE - Adjust OSC trimmer on coil (under chassis) then the ANT trimmer to 4000 KC peak. Pad POLICE OSC trimmer, under chassis (under gang) for 1800 KC maximum peak.

MODEL Chassis L7
Schematic, Socket
Trimmers, Alignment
Voltage

RADIO PRODUCTS CORP.





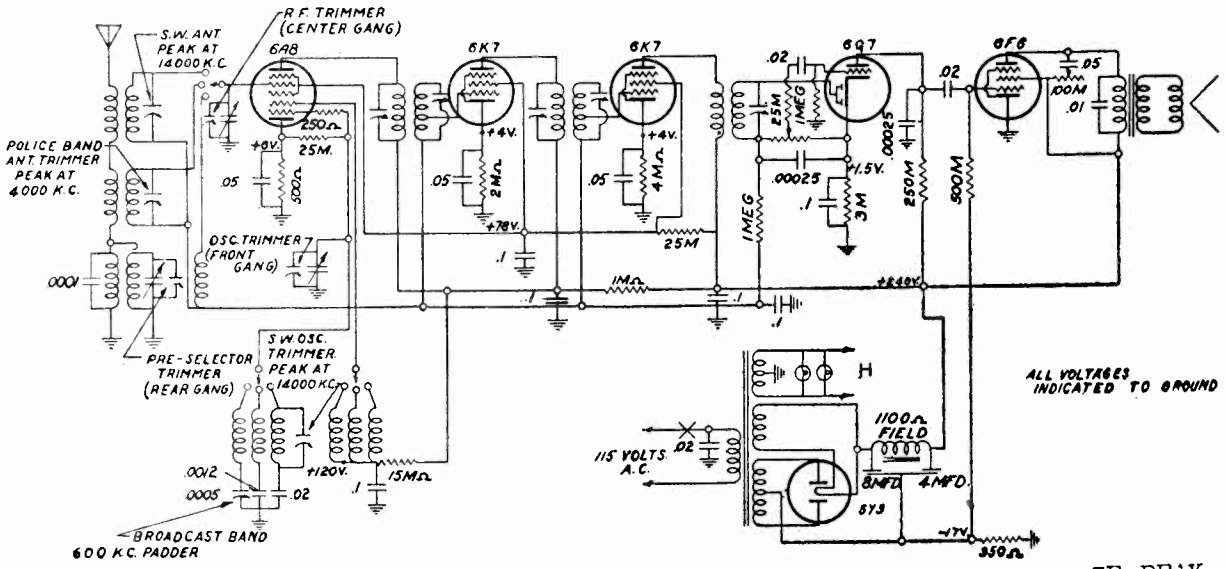
FREQUENCY RANGES

BROADCAST : 540 to 1700 KC - Adjust OSC, RF and then ANT trimmers on gang for max peak at 1400 KC. Pad OSC circuit at 600 KC to maximum peak while rocking gang.
SHORTWAVE : 5800 to 15200 KC - Adjust OSC and then ANT trimmers on coils for 14000 KC peak, check for weak image frequency at 13100 KC. No padding required.
POLICE : 1700 to 5000 KC - Adjust OSC trimmer(under chassis) on coil and ANT trimmer (under chassis on coil) to 4000 KC peak. Pad the OSC circuit (Under chassis directly under gang) to 1800 KC while rocking gang condenser.

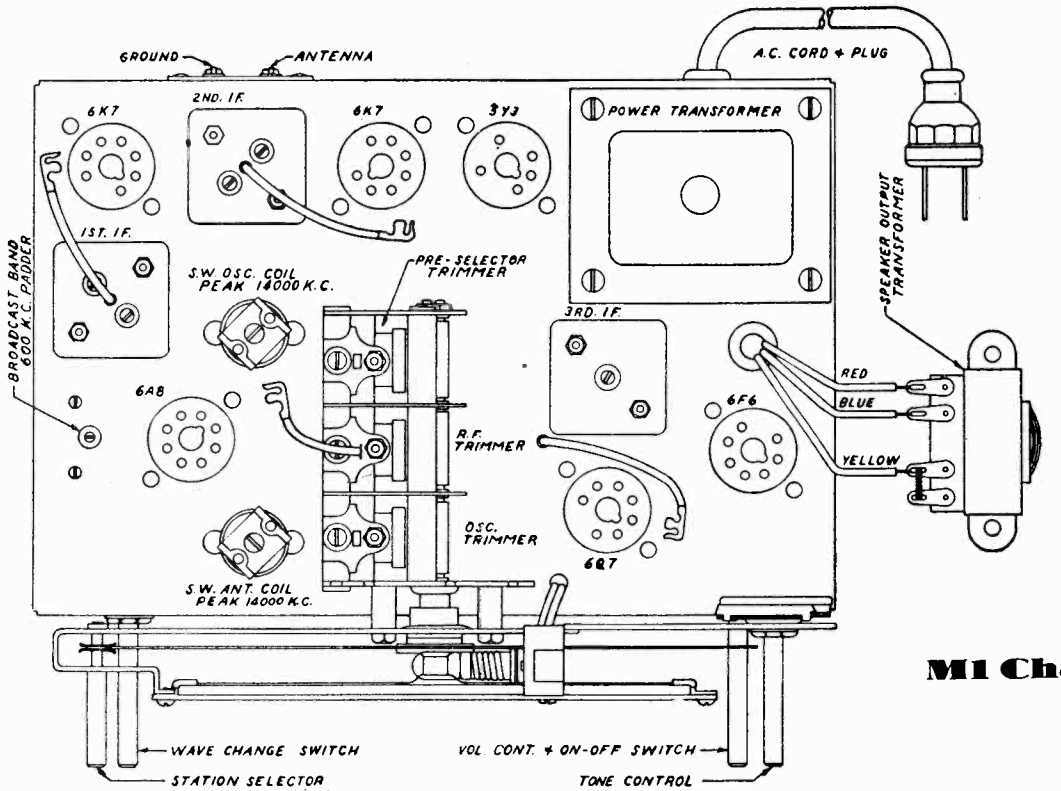
CONVENTIONAL ALIGNMENT - SEE THE SPECIAL SECTION

RADIO PRODUCTS CORP.

MODEL Chassis M 1
Schematic, Socket
Trimmers, Alignment
Voltage



IF PEAK
456 KC



M1 Chassis

CONVENTIONAL ALIGNMENT - SEE SPECIAL SECTION

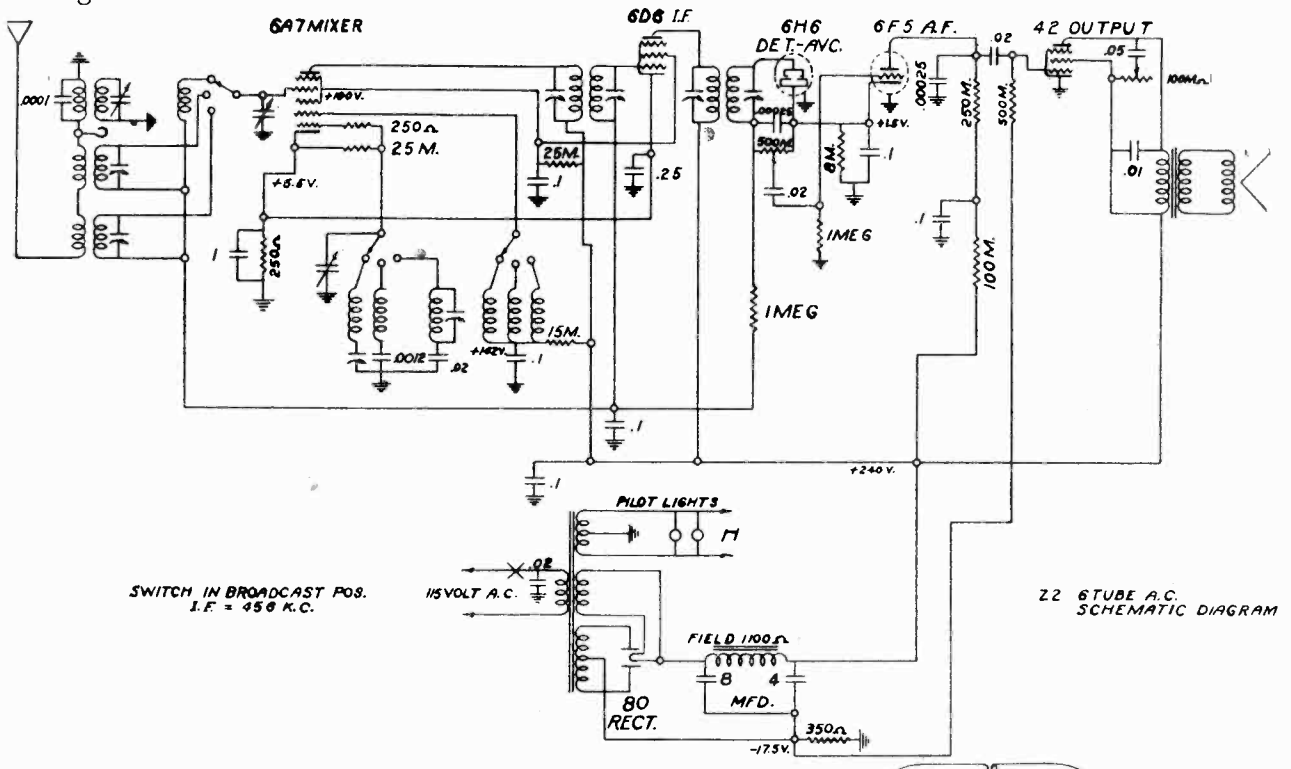
FREQUENCY RANGES - BROADCAST - 540 to 1700 KC - Adjust OSC, RF and ANT trimmers on gang condenser to a maximum peak of 1400 KC. Pad the OSC circuit at 600 KC while rocking gang condenser.

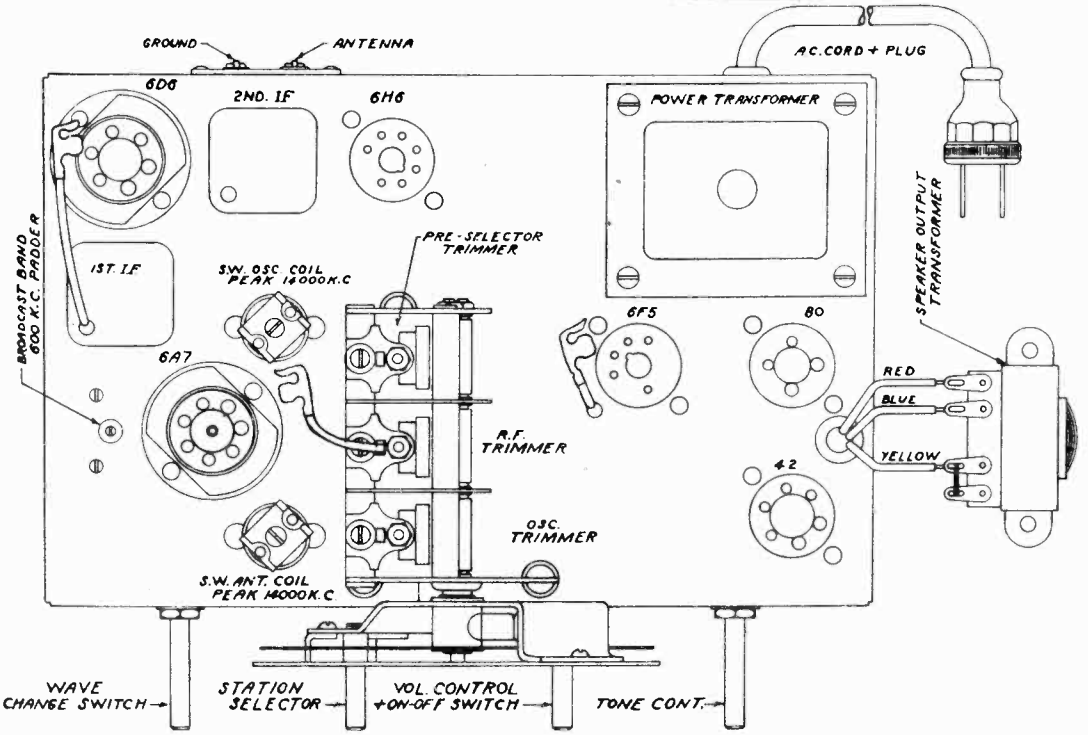
SHORTWAVE - 5800 to 15200 KC - ADJUST OSC and RF trimmers to maximum peak of 14000 KC. No other adjustments required.

POLICE - 1700 to 5000 KC - Adjust the ANT coil trimmer to resonance on 4000 KC signal, no other adjustments required.

MODEL Chassis Z 2
Schematic, Socket
Trimmers, Alignment
Voltage

RADIO PRODUCTS CORP.





CONVENTIONAL ALIGNMENT - SEE SPECIAL SECTION

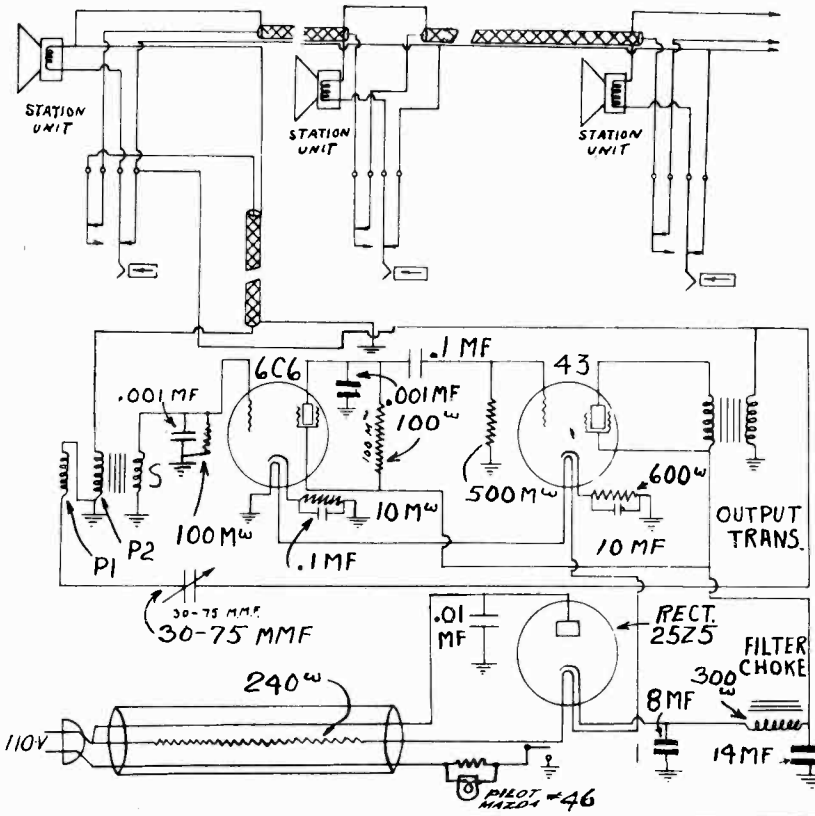
FREQUENCY RANGES - BROADCAST - 540 to 1700 KC - ADJUST OSC, RF AND ANT TRIMMERS ON GANG CONDENSER TO A MAXIMUM PEAK OF 1400 KC. PAD THE OSC CIRCUIT AT 600 KC WHILE ROCKING GANG CONDENSER.

SHORTWAVE - 5800 to 15200 KC - ADJUST OSC AND RF TRIMMERS TO A MAXIMUM PEAK OF 14000 KC. NO OTHER ADJUSTMENTS REQUIRED.

POLICE - 1700 to 5000 KC - ADJUST THE RF ANT COIL TRIMMER TO RESONANCE ON 4000 KC SIGNAL, NO OTHER ADJUSTMENTS REQUIRED.

RADOLEK CO.

MODEL 35 Common Talk Sys. Schematic, Data
MODEL 45 Selective System Schematic. Data



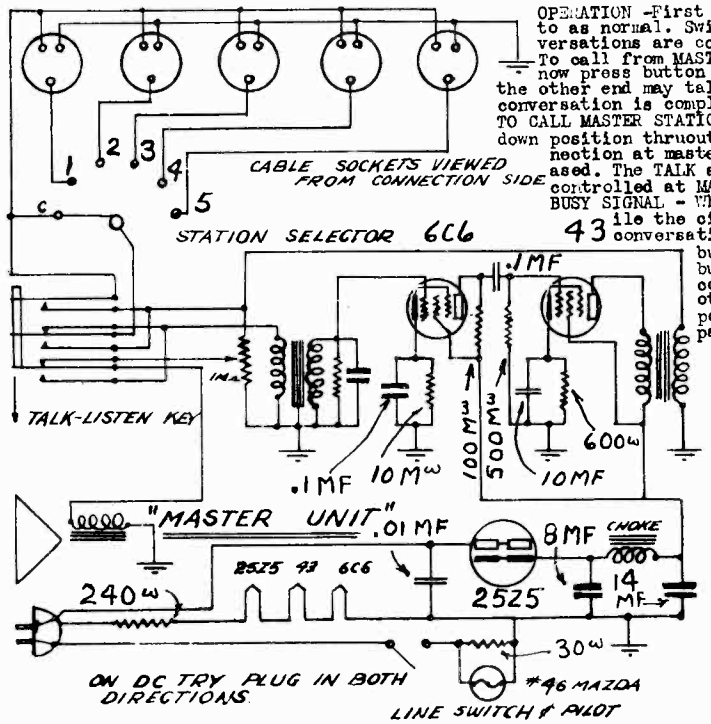
MODEL 35
COMMON TALK SYSTEM

OPERATION - To talk, press the button located on top of either unit or any outlying station unit; to listen, just release the button. When one unit is spoken into, all other stations will respond if buttons are in their normal positions.

To place the system into operation, connect cord to 110-120 volts AC or DC (check polarity for DC operation). To turn current on, operate toggle switch and note that pilot lamp is on. Insert one end of cable in socket located at rear of master station cabinet. Insert the plug on the other end of the cable into the socket marked "IN" of 1st station unit. A second station unit is connected by running the second cable from the "OUT" socket of the first station unit to the "IN" socket of the second. A third and fourth unit may be connected in the same fashion by the use of extra cables and station units.

WARNING - The amplifier chassis or the shields of the cable must not touch any grounded object such as radiators, conduit, water pipes, ect.

For distances over 100 feet use open wire system in stead of the twisted cables to reduce capacity.

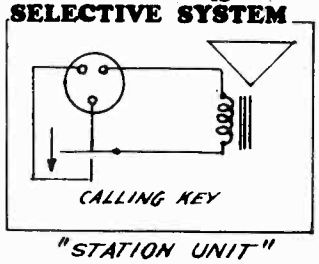


OPERATION -First position "C" of selector switch is referred to as normal. Switch must be returned to "C" after all conversations are completed so that outlying stations may call. To call from MASTER unit operate selector to desired station; now press button to talk and release to listen. The party on the other end may talk or listen without manual effort. When the conversation is completed return "C" to normal selector position.

TO CALL MASTER STATION- The party must HOLD the push button in down position thruout conversation, unless operator switches connection at master unit, in which case the button may be released. The TALK and LISTEN condition is under any condition controlled at MASTER station.

BUSY SIGNAL - When a party at any outlying station calls while the circuit is busy, he hears only that half of conversation originating at the calling station as a busy signal, and is expected to release the button and make his call later. If the busy conversation is on a selected circuit, another party calling will neither get a response nor create interferenoe to the busy parties.

MODEL 45 SELECTIVE SYSTEM

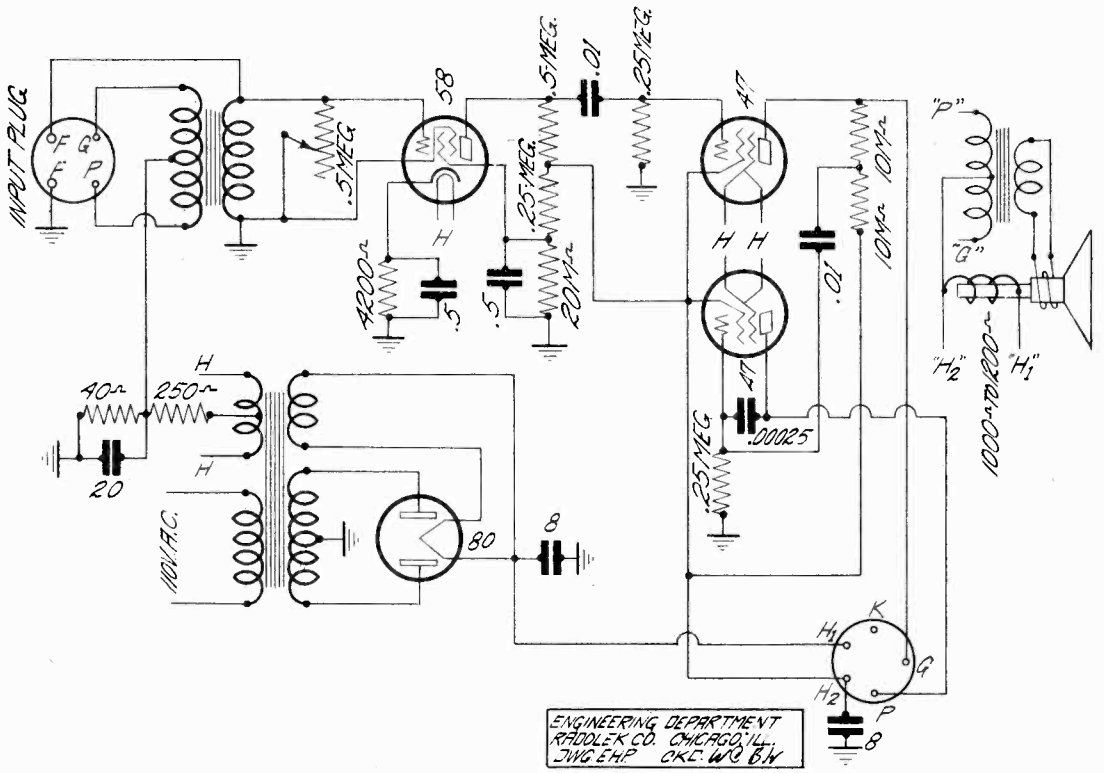


"STATION UNIT"

PREFABRICATED STATION CONNECTOR CABLES CONSIST OF TWISTED PAIR #22 STRANDED WIRE IN SHIELD WITH OVERALL COTTON BRAID.

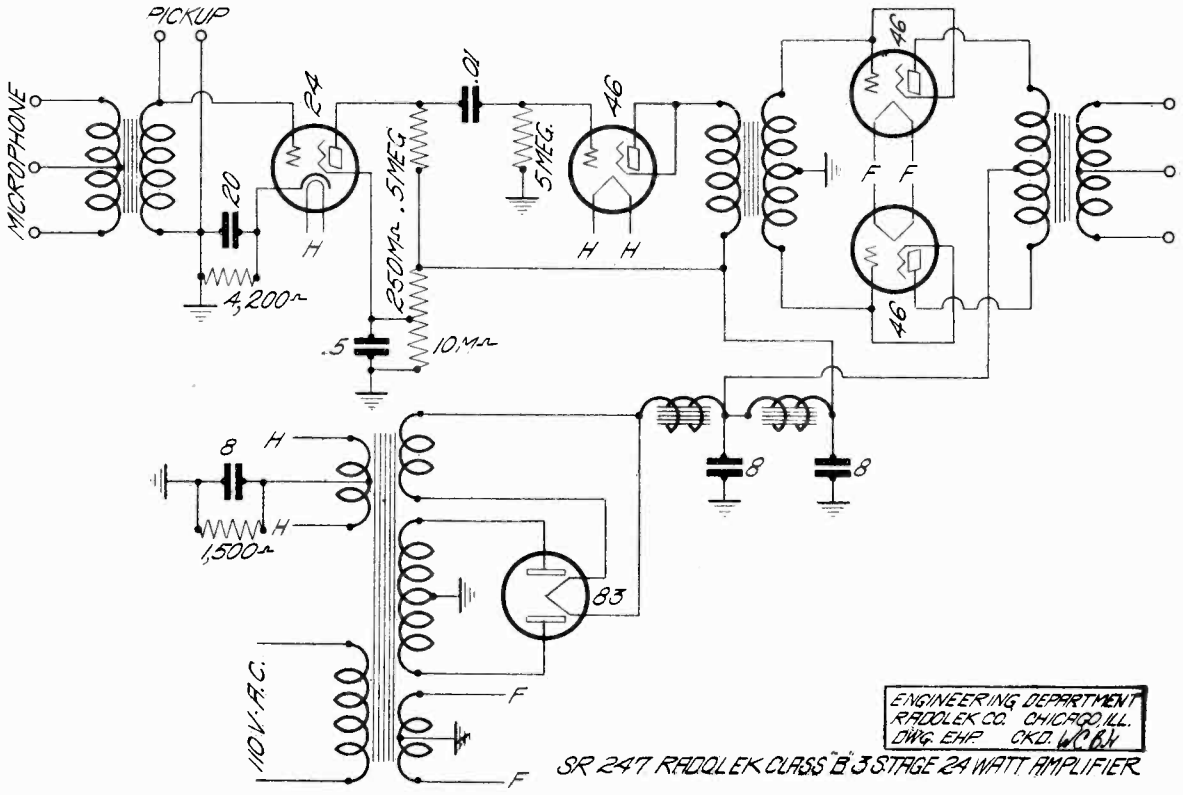
MODEL SR 241 Amplifier
MODEL SR 247 Amplifier
Schematics

RADOLEK CO.



ENGINEERING DEPARTMENT
RADOLEK CO. CHICAGO, ILL.
DWG. EHP CKD. WC BN

SR241 RADOLEK 2 STAGE P.P. UNIVERSAL INPUT AMPLIFIER

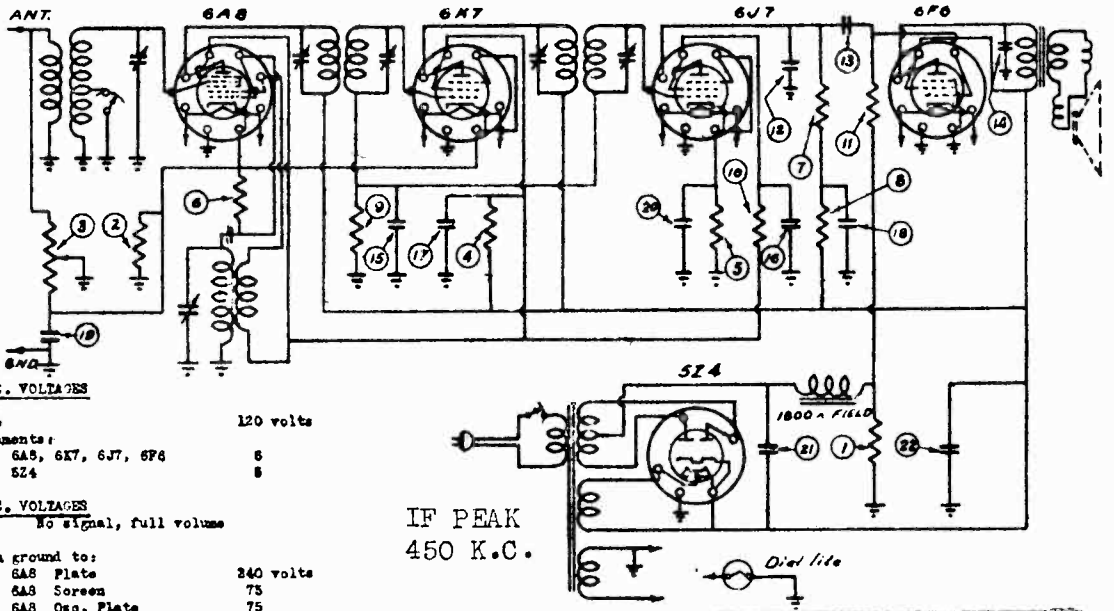


ENGINEERING DEPARTMENT
RADOLEK CO. CHICAGO, ILL.
DWG. EHP CKD. WC BN

SR 247 RADOLEK CLASS "B" 3 STAGE 24 WATT AMPLIFIER

REMLER COMPANY, LTD.

MODEL 46, Above Ser.#83786
MODEL 52, Above Ser.#78143
Schematics, Voltage, Trimmers
Alignment



A. C. VOLTAGES

Line	120 volts
Filaments:	
6A8, 6K7, 6J7, 6F6	6
5Z4	5

D. C. VOLTAGES
No signal, full volume

From ground to:	
6A8 Plate	240 volts
6A8 Screen	75
6A8 Osc. Plate	75
6A8 Cathode	3.3
6K7 Plate	240
6K7 Screen	75
6K7 Cathode	3.8
6J7 Plate	65
6J7 Screen	15
6J7 Cathode	2
6F6 Plate	230
6F6 Screen	240
6F6 Grid Bias	13

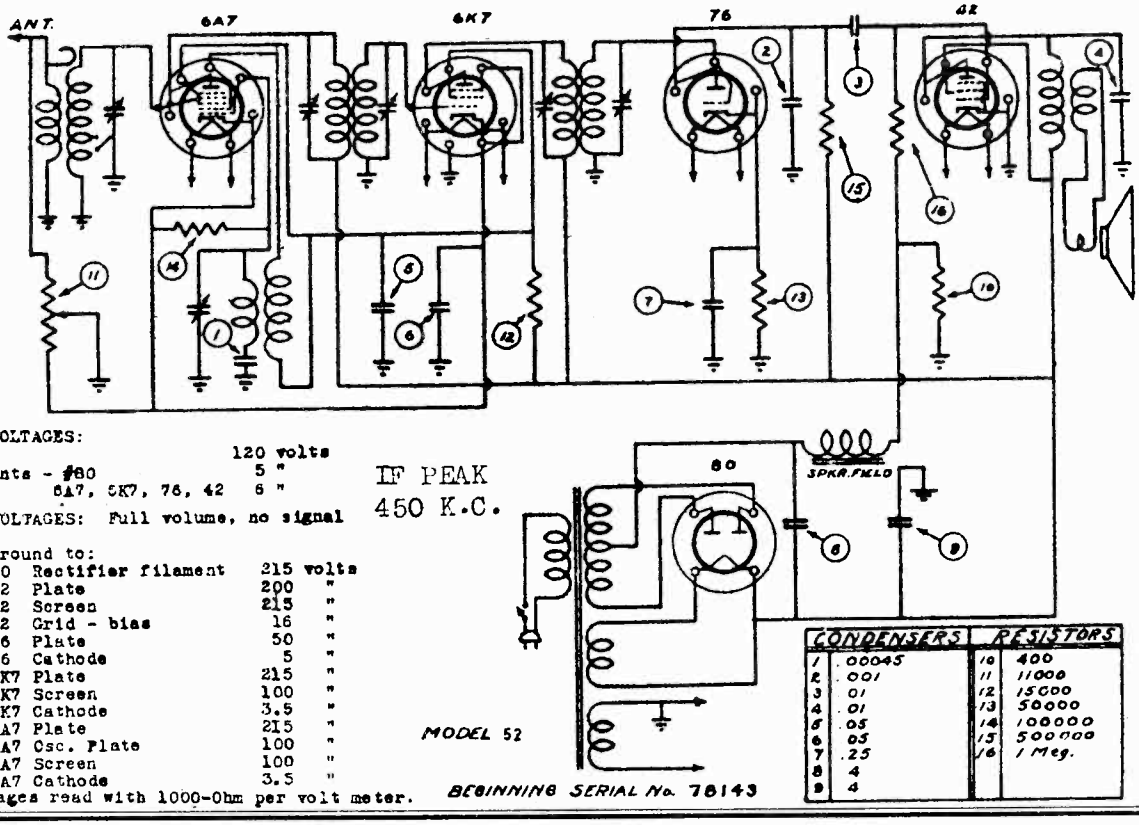
Voltages read with 1000-Ohm per volt meter.

MODEL 46

BEGINNING SERIAL No. 83786

RESISTORS		CONDENSERS		
1	400 OHMS	12	.001 MFD	
2	5000	13	.01	
3	11000-step 300	14	.01	
4	15000	15	.05	
5	25000	16	.05	
6	100000	17	.05	600 V.
7	250000	18	.05	
8	250000	19	1	
9	500000	20	.25	
10	1 Meg.	21	4	
11	1 Meg.	22	4	

The antenna-R.F. coil is located over the variable condenser and is trimmed by the trimmer on the rear section of the variable condenser. The oscillator coil is mounted under the chassis and is trimmed by the front trimmer section. The I.F. transformers and trimmers are mounted under the chassis. The I.F. frequency is 450 K.C.



A.C. VOLTAGES:

Line	120 volts
Filaments - #80	5 "
6A7, 6K7, 76, 42	6 "

D.C. VOLTAGES: Full volume, no signal

From ground to:	
80 Rectifier filament	215 volts
42 Plate	200 "
42 Screen	215 "
42 Grid - bias	16 "
76 Plate	50 "
76 Cathode	5 "
6K7 Plate	215 "
6K7 Screen	100 "
6K7 Cathode	3.5 "
6A7 Plate	215 "
6A7 Osc. Plate	100 "
6A7 Screen	100 "
6A7 Cathode	3.5 "

Voltages read with 1000-Ohm per volt meter.

MODEL 52

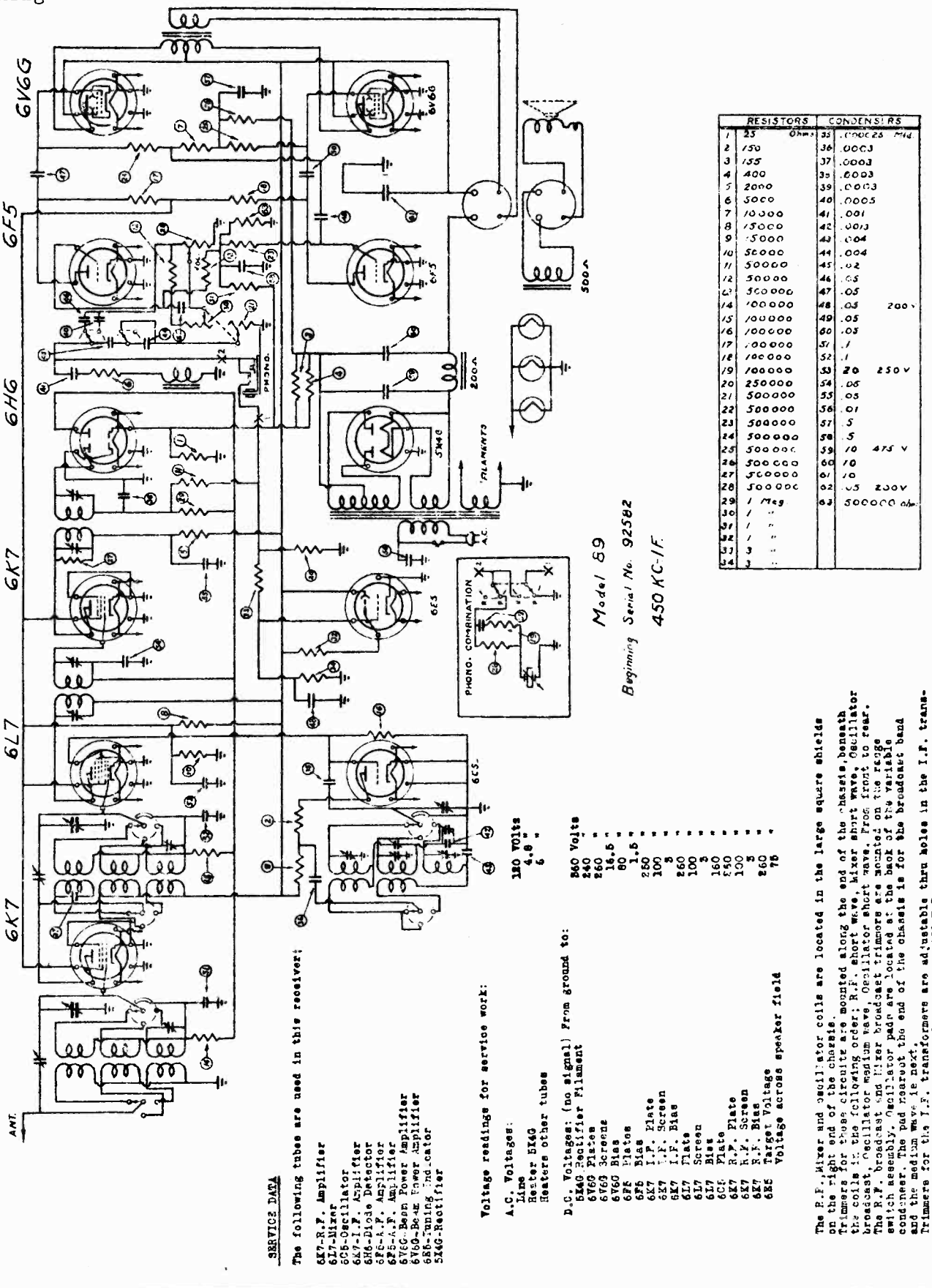
BEGINNING SERIAL No. 78143

CONDENSERS		RESISTORS	
1	.00045	10	400
2	.001	11	11000
3	.01	12	15000
4	.01	13	50000
5	.05	14	100000
6	.05	15	500000
7	.25	16	1 Meg.
8	4		
9	4		

The antenna-R.F. coil is located over the variable condenser and is trimmed by the trimmer on the rear section of the variable condenser. The oscillator coil is mounted under the chassis and is trimmed by the front trimmer section. The I.F. transformers and trimmers are mounted under the chassis. The I.F. frequency is 450 K.C.

MODEL 89, Above Ser.# 92582
Schematic, Voltage, Trimmers
Alignment

REMLER COMPANY, LTD.



	RESISTORS		CONDENSERS	
1	25	Ohms	.000025	Mfd.
2	150		.0003	
3	155		.0003	
4	400		.0003	
5	2000		.0003	
6	5000		.0005	
7	10000		.001	
8	15000		.003	
9	45000		.004	
10	50000		.004	
11	50000		.02	
12	50000		.05	
13	500000		.05	
14	1000000		.05	200 v
15	1000000		.05	
16	1000000		.05	
17	1000000		.1	
18	1000000		.1	
19	1000000		20	250 v
20	250000		.05	
21	500000		.05	
22	500000		.01	
23	500000		.5	
24	500000		.5	
25	500000		10	475 v
26	500000		10	
27	500000		10	
28	500000		.05	250v
29	1	Meg	500000	ohms
30	1			
31	1			
32	3			
33	3			
34	3			

SERVICE DATA

The following tubes are used in this receiver:

6K7-R.F. Amplifier
6L7-Mixer
6C5-Oscillator
6K7-I.F. Amplifier
6H6-Diode Detector
6F5-A.F. Amplifier
6F5-A.F. Amplifier
6V6G-Beam Power Amplifier
6V6G-Beam Power Amplifier
6E5-Tuning Indicator
5Y4G-Rectifier

Voltage readings for service work:

A.C. Voltages:
Line 120 Volts
Heater 5Y4G 4.8 "
Heaters other tubes 6 "

D.C. Voltages: (no signal) From ground to:

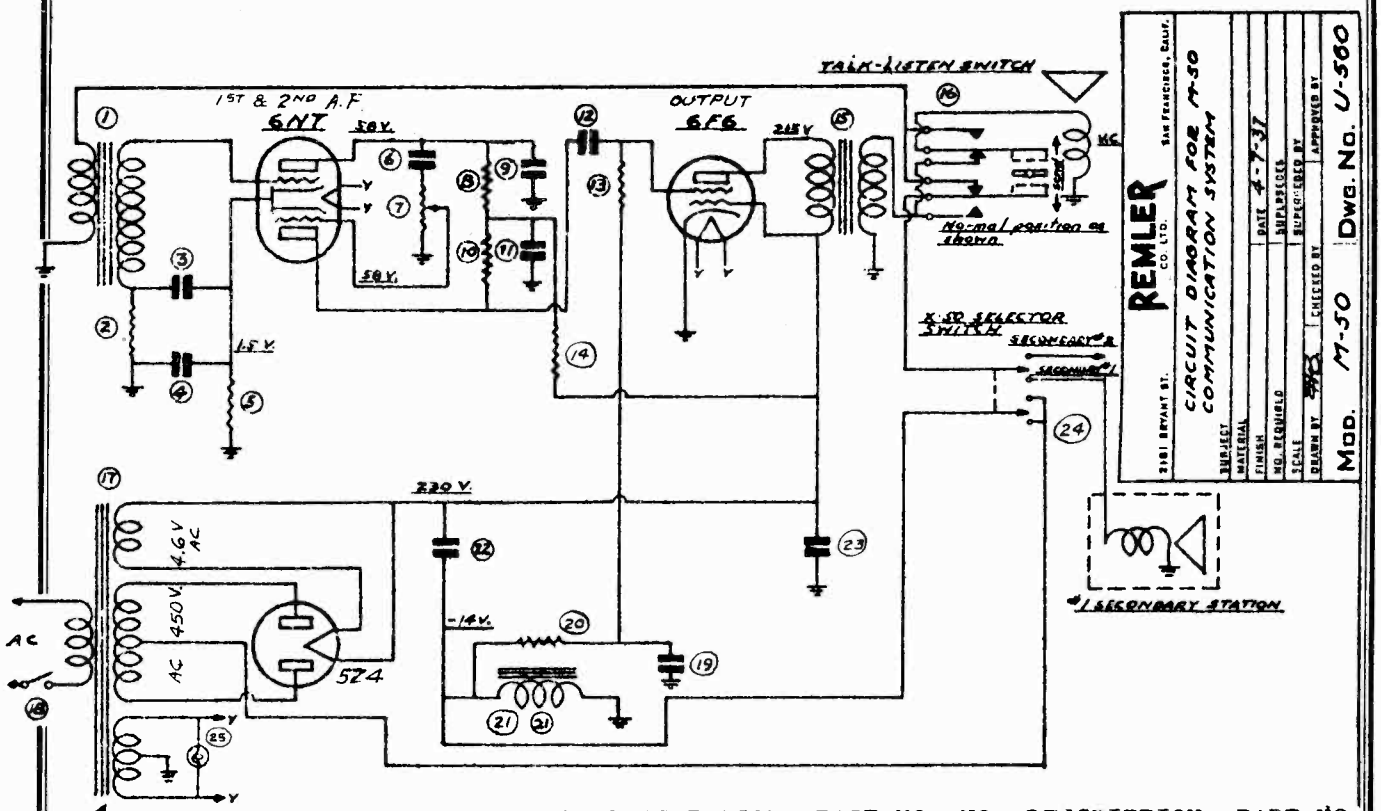
5Y4G Rectifier	Filament	360 Volts
6V6G	Plates	240 "
6V6G	Screens	260 "
6V6G	Bias	16.5 "
6F5	Plates	80 "
6F5	Bias	1.5 "
6K7	I.F. Plate	250 "
6K7	I.F. Screen	100 "
6K7	I.F. Bias	3 "
6L7	Plate	260 "
6L7	Screen	100 "
6L7	Bias	3 "
6C5	Plate	160 "
6K7	R.F. Plate	250 "
6K7	R.F. Screen	100 "
6K7	R.F. Bias	3 "
6E5	Target Voltage	260 "
	Voltage across speaker field	75

The R.F., Mixer and oscillator coils are located in the large square shields on the right end of the chassis.
Trimmers for these circuits are mounted along the end of the chassis, beneath the coils in the following order; R.F. short wave, mixer short wave, oscillator broadcast, oscillator medium wave, oscillator short wave. From front to rear.
The R.F. broadcast and mixer broadcast trimmers are mounted on the range switch assembly. Oscillator pads are located at the back of the variable condenser. The pad nearest the end of the chassis is for the broadcast band and the medium wave is next.
Trimmers for the I.F. transformers are adjustable thru holes in the I.F. transformer shield cans. The I.F. frequency is 450 K.C.

MODELS SC-50, SWC-50 Call-Back Connections

MODEL M-50 Communication Sys. Schematic, Parts

REMLER COMPANY, LTD.

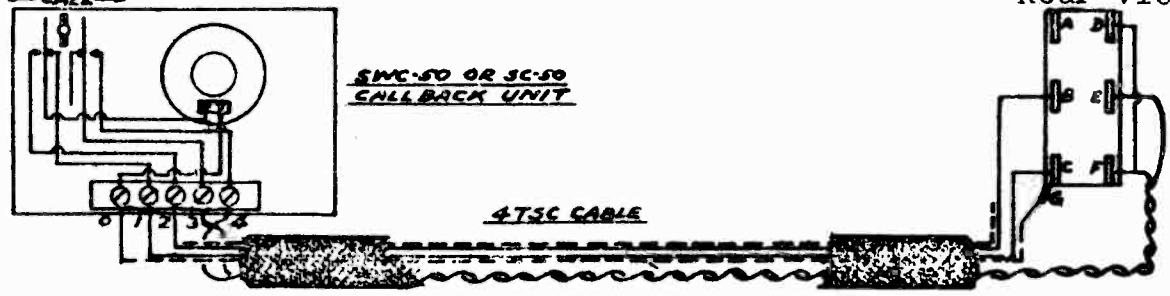


NO.	DESCRIPTION	PART NO.	NO.	DESCRIPTION	PART NO.	NO.	DESCRIPTION	PART NO.
1	Input Trans.	N 1539	3	.1MFD. 200V.		2	100M ohms ½watt	
15	Output Trans.	5C 1085	4	.1MFD. 200V.		5	2000M ohms ½watt	
17	Power Trans.	5C 1663	6	.0006 MFD.		7	500M ohms vol. cont.	
21	Choke	5000	9	.002 MFD. 600V.		8	100M ohms ½watt	
16	Talk-Listen 5W.	ST 522	11	.25 MFD. 400V.		10	100M ohms ½watt	
18	A.C. Switch	F 11	12	.004 MFD. 800V.		13	250M ohms ½watt	
24	Selector 5W.	X-50	18	.1 MFD. 200V.		14	100M ohm ½watt	
25	Pilot Light		22	4.MFD. 450V.)		20	1 MEG. ½ watt	
			23	4.MFD. 450V.)		21	Speaker	PMS.

SC-50 AND SWC-50 CALL-BACK SECONDARY

C-50 Call Back Switch
Rear View

X-50 Selector Key
as mounted in M-50 & M-70 Units
Rear View



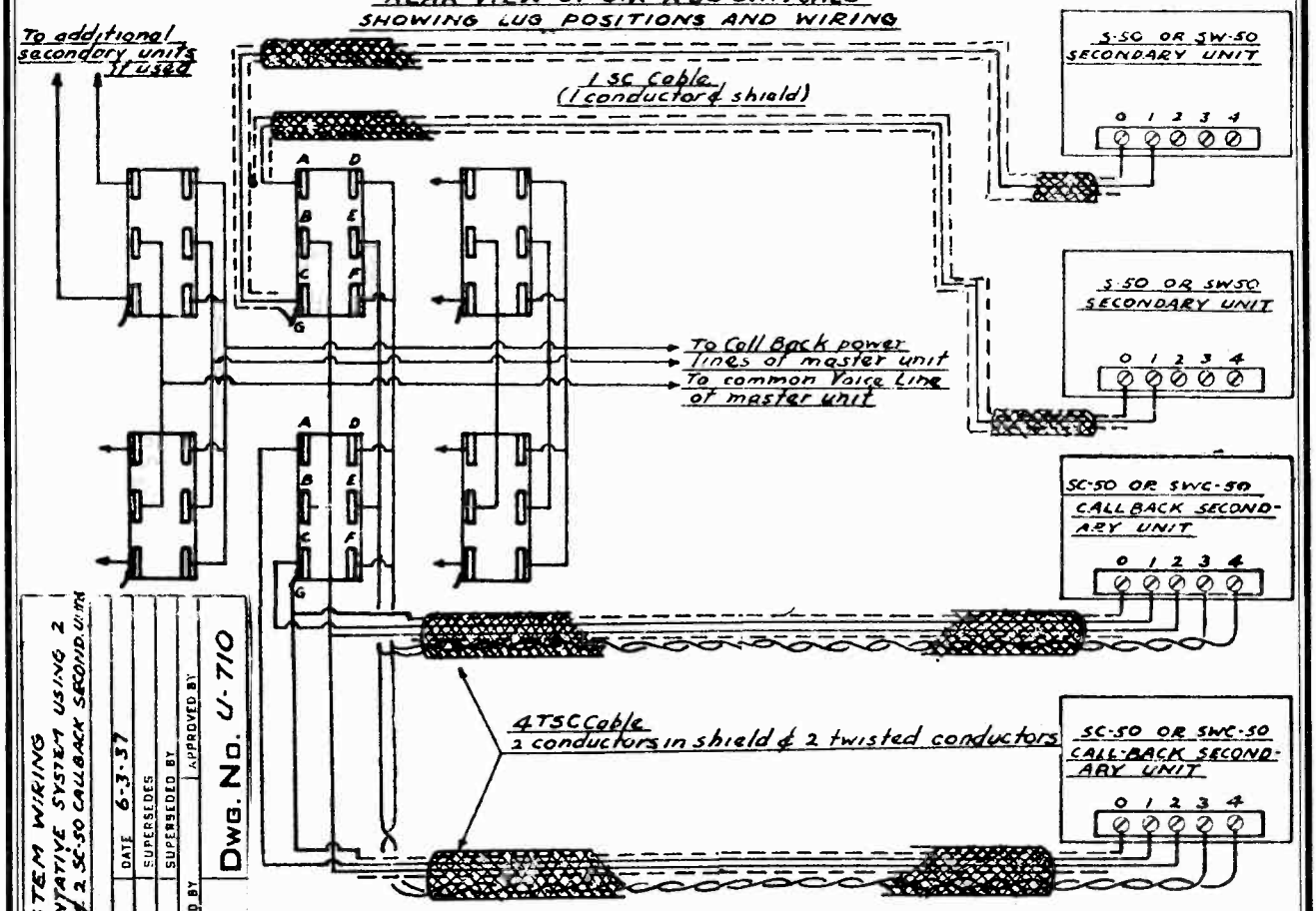
DWG. NO. 8

MODEL M-50 Communication Sys.
X-50 Switch Wiring, Data

REMLER COMPANY, LTD.

M-50 MULTIPLE STATION COMMUNICATION SYSTEM

REAR VIEW OF SIX X-50 SWITCHES
SHOWING LUG POSITIONS AND WIRING



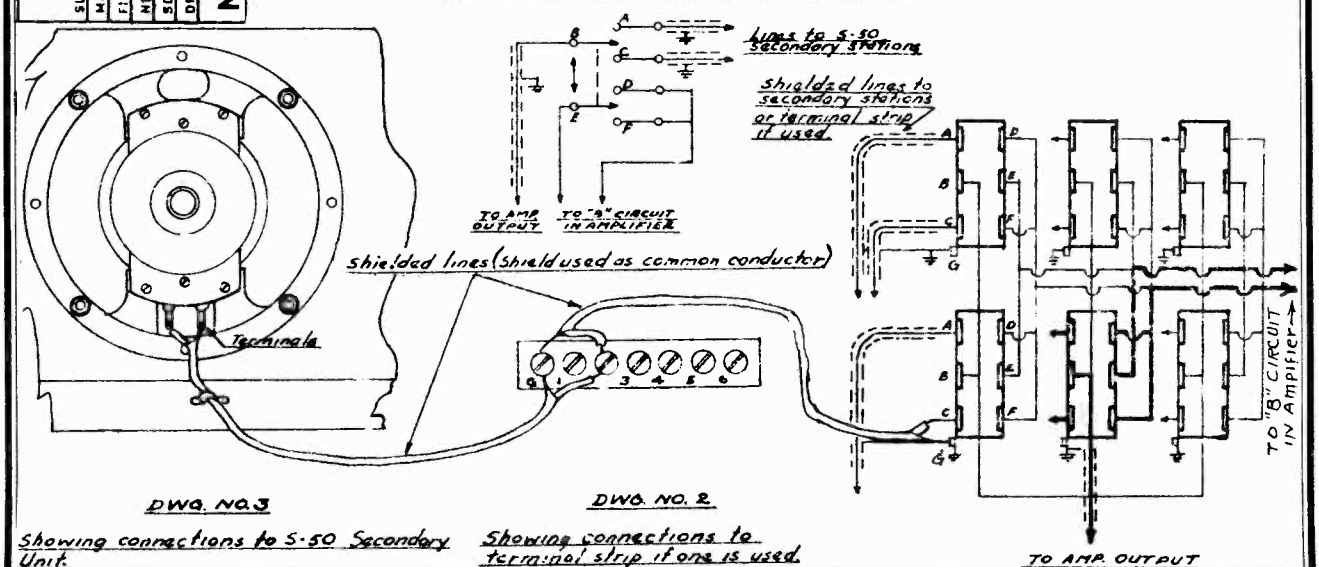
M-50 SYSTEM WIRING
SHOWING REPRESENTATIVE SYSTEM USING 2 SUBJECT S-50 SECONDARY & 2 SC-50 CALLBACK SECONDARIES

MATERIAL	DATE 6-3-37	CHECKED BY	APPROVED BY
FINISH	SUPERSEDES	SUPERSEDED BY	
NO. REQUIRED			
SCALE	DRAWN BY HS		

DWG. NO. U-710
MOD. M-50

The M-50 master station unit is equipped at the factory with one X-50 two station selector key which permits immediate hookup with two S-50 secondary station units. When more than two S-50 secondary units are used in the system, extra station selector keys, type S-50, are required. Each key will control two stations.

SCHEMATIC DIAGRAM FOR X-50 SWITCH WIRING



DWG. NO. 3
Showing connections to S-50 Secondary Unit.

DWG. NO. 2
Showing connections to terminal strip if one is used.

REMLER COMPANY, LTD.

WIRING INSTRUCTIONS FOR M-50 TYPE INTER-COMMUNICATION SYSTEM USING 18-T TERMINAL BLOCK AND 7-SC CABLE

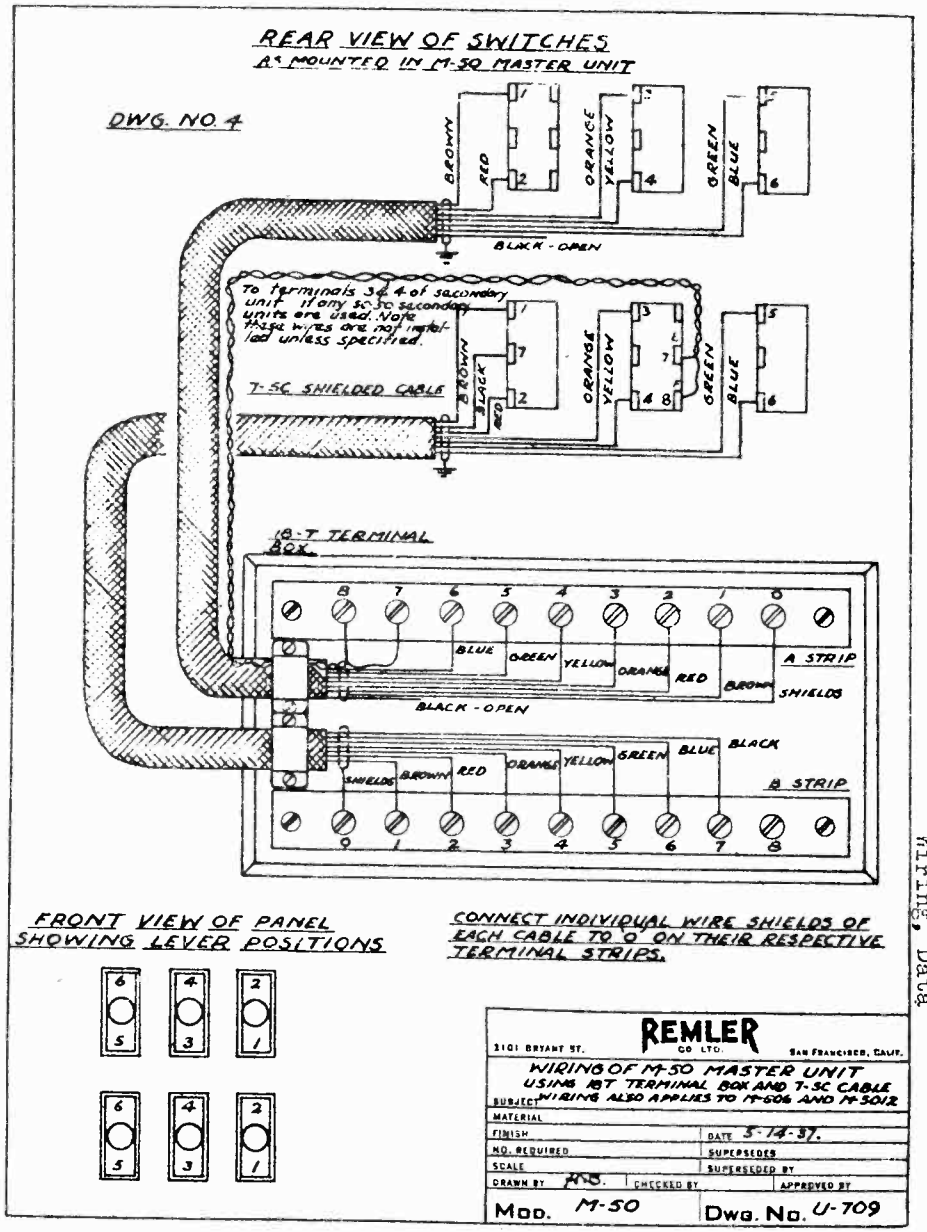
The 7-SC cable is a seven conductor cable with each conductor individually shielded. The shields are all bonded together and connected to a ground lug on the M-50 chassis and to "0" terminal on the 18-T block. The shields are used as the common or voice return circuit from the various secondary units. The conductors of the cable are connected to the selector switch "voice" terminals as shown in the upper section of the drawing. The conductors are color coded and are connected so that the brown wire of the upper cable goes to #1 terminal of the upper row of switches and to #1 terminal of the "A" terminal box strip. The brown wire of the lower cable goes to the #1 terminal of the "B" terminal box strip, etc. At the bottom of the drawing is shown the switch lever positions which correspond to the terminal box strip numbers.

The 18-T terminal box provides two strips called "A" strip and "B" strip, of nine terminals numbered from 0 to 8 each, which provide terminating points for all voice and call-back lines for twelve secondary units. The terminals "1" to "6" inclusive on each strip are the voice line terminals, only one secondary being connected to each terminal. The "0" terminals on each strip are the common ground or voice return terminals for all secondary units connected to the strip, as well as common ground for the call-back voice line if a call-back type of secondary is used. The "7" terminal on the "B" strip is the call-back voice line terminal for all call-back type secondaries. The terminals "7" and "8" on the "A" strip may be used for the call-back power terminals for all call-back type secondaries.

NOTE: The call-back power wires from the master unit to terminals "7" and "8" of "A" strip are not installed at the factory.

To illustrate a representative system using 1 - M-50 master unit, 4 - S-50 secondary units and 2 - SC-50 secondary call-back units, the connections are as follows:

Referring to Dwg. No. 8 of the secondary units, the "0" terminals on all secondaries are connected to "0" on the "A" strip. The "1" terminals on each secondary is connected to "1-2-3-4-5-6" (as required) on the "A" strip, one secondary only to each terminal. Terminals "2" of the SC-50 call-back secondaries are both connected to terminal "7" of "B" strip. Terminals #3 of the two SC-50 secondary units are both connected to terminal "7" of "A" strip and terminal #4 of both secondaries are connected to terminal "8" of "A" strip. The connections for additional secondary units, if used, are carried out in the same respective manner.



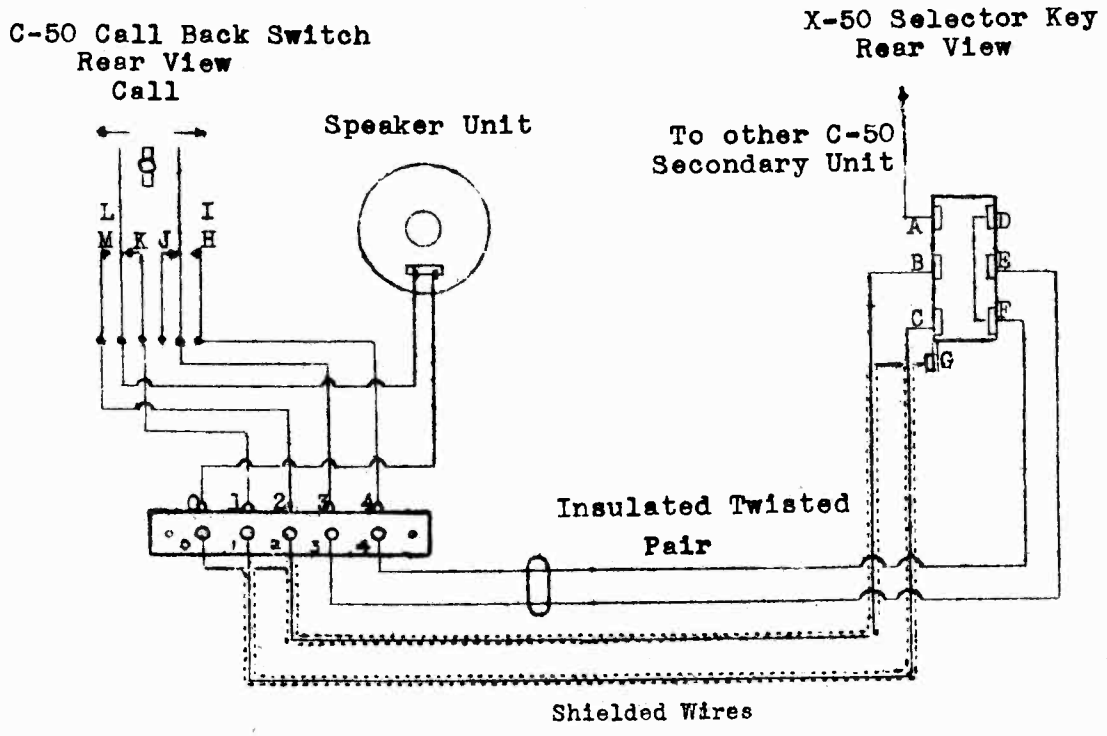
REMLER CO. LTD.	3101 BRYANT ST. SAN FRANCISCO, CALIF.
SUBJECT	WIRING OF M-50 MASTER UNIT USING 18T TERMINAL BOX AND 7-SC CABLE. WIRING ALSO APPLIES TO M-50G AND M-50J2
MATERIAL	
FINISH	DATE 5-14-37.
NO. REQUIRED	SUPERSEDES
SCALE	SUPERSEDED BY
DRAWN BY R.S.	CHECKED BY / APPROVED BY
MOD. M-50	DWG. NO. U-709

MODEL M-50 Communication Sys.
Master Unit
C-50 Call-Back Switch Wiring
Data

REMLER COMPANY, LTD.

C-50 Call Back Switch

DRAWING NO. 4



WIRING:

Two single-conductor shielded wires and a well insulated twisted pair are required for connections between the M-50 master unit and each SC-50 call back secondary unit. Referring to drawing No. 4, the insulated twisted pair of wires are connected to terminals E and (D-F) of the master unit selector key and are run to terminals No. 3 and 4 of SC-50 call back unit. One shielded connector is connected to terminal B of the selector key and run to terminal 2 of the secondary unit. The other shielded wire is connected to either terminals A or C of the selector key (as required) and to terminal one of the secondary unit. The shield of both shielded wires is connected to the ground lug G, of the selector key and to the zero terminal of the secondary unit. These connections, it will be noted, provide for turning on the plate supply of the master unit and for bridging around the selector keys in order to effect call back regardless of the position of these selector keys.

M-50 Master Unit

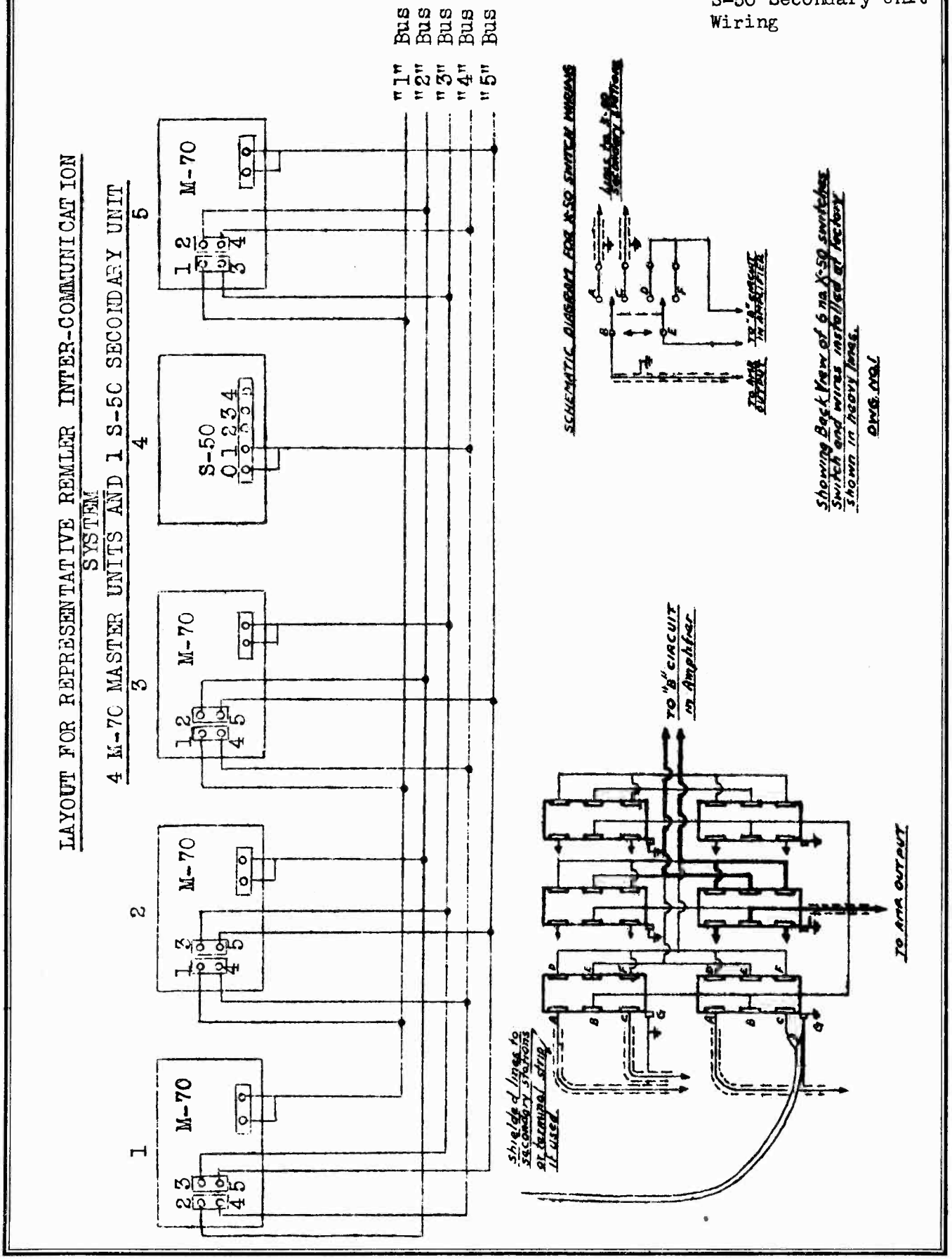
Additional selector keys may be installed on the M-50 master unit at any time, by removing the front switch cover-plate, cutting out the paper "knock-out" and installing the additional key switch in any of the five openings that are provided in the mounting plate. The key switch is fastened to the rear of the mounting plate with the grounding lug (G) (See drawing No. 1) at the lower left, looking at the rear of the unit. The necessary screws for mounting are furnished with each switch. When extra key switches are installed, certain common circuits must be connected from the original switch to all the additional switches added in multiple. The common leads are the amplifier output, which connects to the left hand center (B) terminal of each switch, and two leads which are used to break the plate circuit return of the amplifier, one lead connecting to the center right (E) terminal of each switch and the other lead connecting both the top and bottom right hand (D and F) terminals of each switch.

A cable clamp is provided on the chassis of the M-50 master unit, under which the leads to the switches should be clamped at the time they are installed.

MODEL M-70 Communication Sys.
Master Unit
S-50 Secondary Unit
Wiring

REMLER COMPANY, LTD.

LAYOUT FOR REPRESENTATIVE REMLER INTER-COMMUNICATION SYSTEM
4 M-70 MASTER UNITS AND 1 S-50 SECONDARY UNIT



INSTRUCTIONS FOR INSTALLATION AND OPERATION OF REMLER M-50 MULTIPLE STATION INTER-COMMUNICATION SYSTEM

The M-50 master station unit is equipped at the factory with one X-50 two-station selector key which permits immediate hookup with two S-50 or SC-50 secondary units. When more than two secondary stations are used in the system, extra station selector keys, type X-50, are required; each key will control two stations.

NOTE: The station selector key installed at the factory has wired to terminals "A" and "C" (See drawing No. 7), a short length of 1-SC cable. The lines from the secondary units may be spliced to this cable.

The wiring which is required between station units consists of one single-conductor-and shield voice line from the master station to each secondary station. We recommend for this wiring the use of our type 1-SC cable. The shield of the 1-SC cable is connected to terminal zero on the secondary unit (See drawing No. 8). The conductor of the cable is connected to terminal No. 1. The shield acts as one conductor and the insulated wire as the second conductor. These lines are then run to the M-50 master unit selector keys. On the M-50 unit the shields of the cable are soldered to ground lug "G" on the selector key (See drawing No. 7) and the insulated conductors are soldered to lugs "A" or "C". The lugs "A" and "C" are the voice terminals of the selector key and one secondary unit may be connected to each lug; that is, for every X-50 selector key two secondary units may be used.

Additional X-50 selector keys may be installed on the M-50 master unit at any time, by removing the front switch cover-plate, cutting out the paper "knock-out" and installing the additional key switch in any of the five openings that are provided in the mounting plate. The key switch is fastened to the rear of the mounting plate with the grounding lug (G) (See drawing No. 7) at the lower left, looking at the rear of the unit. The necessary screws for mounting are furnished with each switch. When extra key switches are installed, certain common circuits must be connected from the original switch to all the additional switches added in multiple. The common leads are the common voice line which connects to the left hand center (S) terminal of each switch, and two leads which are used to break the plate circuit return of the amplifier, known as the call-back power lines, one lead connecting to the center right (E) terminal of each switch and the other lead connecting both the top and bottom right hand (D and F) terminals of each switch.

If desired, a multiple conductor cable, our type 7-SC may be soldered to the terminals of the selector keys and to the terminals of a connecting block, our type 18-T, as shown on drawing No. 4. The terminal block may be mounted wherever convenient near the master unit. The shielded lines from the secondary stations may then be connected to this terminal block as described on Drawing No. 4.

A cable clamp is provided on the chassis of the M-50 master unit, under which the leads to the switches should be clamped at the time they are installed.

OPERATION:

After the system has been connected it may be placed in operation by turning the small rotary A.C. power switch knob, which is on the front of the M-50 unit, to the clockwise position. The pilot lamp on the front panel will glow, indicating that the power is on. When it is desired to communicate with a secondary station, the selector key should be thrown to that secondary station's position as indicated on the designation plate. After this selection is made, the talk-listen switch, which is operated by the lever on the extreme lower right of the cabinet, is depressed while speaking. When an answer is wanted, release the talk-listen switch lever which will automatically assume the receiving position so that the secondary unit may reply. When the communication is completed, the station selector key should be returned to the center or neutral position. When the key is in this neutral position the plate supply current is disconnected and the unit is silent. Located on the rear of the cabinet is the volume control knob. This knob should be adjusted to the desired volume level at the time of installation and should require no further attention.

NOTE: For installation information on the SC-50 and SWC-50 call-back type secondary units see drawing No. 8.

INSTRUCTIONS FOR INSTALLATION AND OPERATION OF REMLER M-70 MULTIPLE MASTER INTER-COMMUNICATION SYSTEM

The M-70 inter-communication unit is equipped with a relay which automatically arranges the terminal connections of the unit to enable it to operate as either a master station or a secondary station.

Whenever the M-70 station is not in use; that is, when the A.C. switch is turned off or when the selector keys are all in neutral, the station becomes a secondary unit with the secondary unit terminals connecting to two terminals, "M" (marked "zero" and "1") located on the back of the unit. From these two "M" or pickup" terminals, a shielded line must be run to the selector keys of every other M-70 station desiring to call this particular unit.

When the M-70 station is turned on and the selector keys thrown to call a secondary station, the relay converts the unit to a master station, enabling conversation to be held with the unit selected by the selector key; provided the called station is not in use. If the M-70 station called is carrying on a conversation at the time, a busy hum will be heard. If the station called has previously been called by another unit, the noise of this conversation will be heard indicating that the unit is in use.

The M-70 master station unit is equipped at the factory with one X-50 selector key which permits immediate hookup with two other M-70 master stations, two S-50 secondary stations, or one M-70 and one S-50. When more than two secondary stations are used in the system, extra station selector keys, type X-50, are required. Each additional key will accommodate two additional stations, either M-70 or S-50.

For the necessary wiring between units, we recommend the use of a single conductor shielded wire covered by a cloth braid. This wire is known as our type 1-SC. In multiple station systems it is usually preferable to use a multi-conductor cable from the selector keys of the M-70 unit to a conveniently mounted terminal block on the wall or floor near where the unit will be used. This cable (known as type 7-SC) consists of seven individually shielded wires, covered by a cloth braid, and may be purchased in any length desired. A wall mounting terminal block consisting of hardwood base, sufficient screw terminals for a complete thirteen station system and sheet metal protective cover is available completely assembled, or furnished in disassembled kit form at a lower price.

When wiring the M-70 units a shielded line should be connected to the "M" or pickup terminals of the unit, secured under the cable clamp provided, and run to every other station in the system desiring to call this unit. The shield must be connected to the "0" terminal and the hot wire connected to terminal "1". A separate wire need not be run to each other station, the one wire may be run consecutively from one station to the next with individual connecting wires tapped off this line at each unit.

The shielded line from each individual station unit must be soldered to the terminals of the desired selector key of the M-70 master. The shield should be connected to the ground lug "G" (see drawing No. 1) and the insulated or "hot" wire should be connected to the upper left ("A" terminal) or lower left ("C" terminal) of the selector key, when viewed from the back of the unit.

S-50 secondary stations are wired in the same manner, a shielded line being run from this secondary station to the selector key terminals of each M-70 master desiring to call this secondary. The shield is connected to terminal "0" and the hot wire to terminal "1" of the S-50 secondary unit.