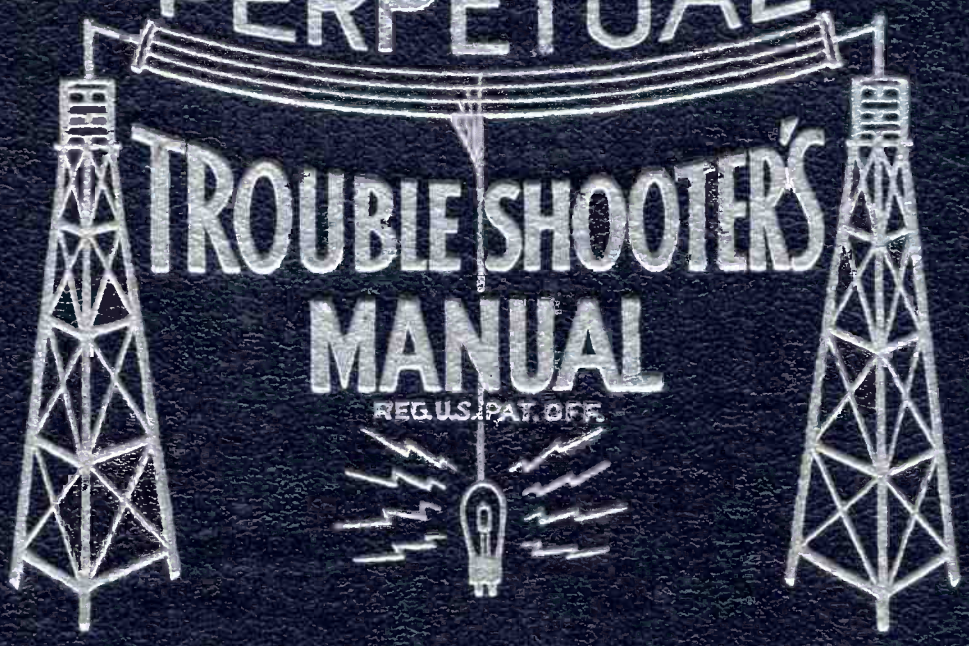
VOLUME VIII

PERPETUAL TROUBLE SHOOTER'S MANUAL

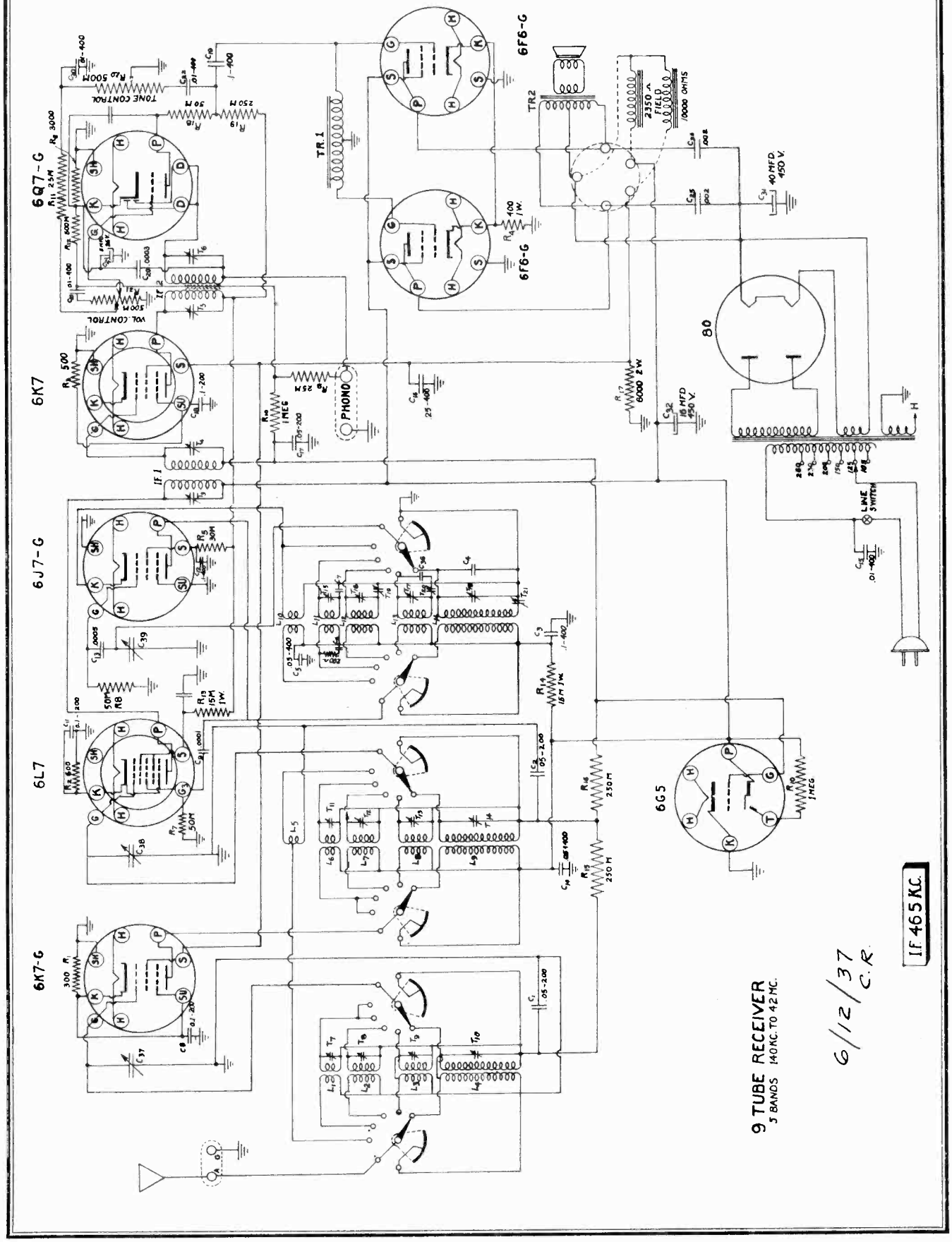
REG. U.S. PAT. OFF.



JOHN F. RIDER

MODELS 709, 719 International

SEARS-ROEBUCK & CO. Schematic



MODELS 709, 719
International
Voltage, Trimmers
Alignment

SEARS-ROEBUCK & CO.

SOCKET READINGS FOR MODEL A-9 SERIES

All Voltages taken from ground with line voltage 115 volts.

TUBE	POSITION	PLATE	SCREEN GRID	KATHODE	FILAMENT
6K7-G	1st. R.F.	250 V.	115 V.	2 V.	6 V.
6L7	Mixer	245 V.	172 V.	5.5 V.	6 V.
6J7	Oscillator	135 V.	155 V.	-	6 V.
6K7	I.F.	245 V.	115 V.	3.5 V.	6 V
6Q7-G	Diode Det.	60 V.	-	1 V.	6 V
6F6-G	P.P. Audio	325 V.	250 V.	19 V.	6 V
6F6-G	P.P. Audio	325 V.	250 V.	19 V.	6 V

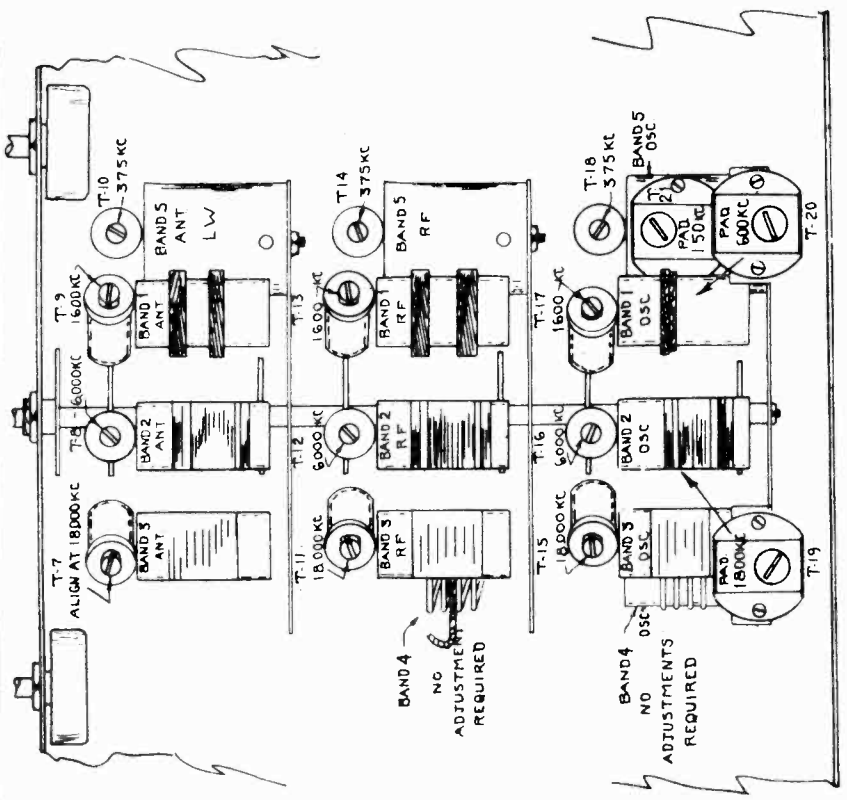
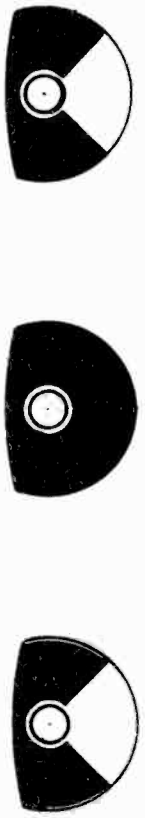


FIG. 5



THE ELECTRIC EYE

The movement of the Electric Eye or resonance indicator is easily understood, as the station is tuned in, the green sections of the eye will draw together or tend to draw together depending upon the strength of the station. Rotate the tuning knob back and forth until the exact resonance point is found.

SEARS-ROEBUCK & CO.

MODELS 709,719
International
Line Voltage Data
Socket, Trimmers
Alignment Notes

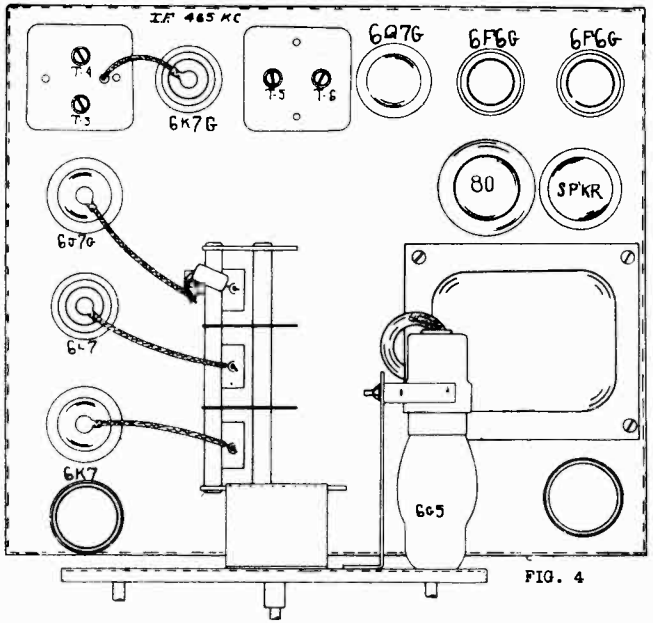


FIG. 4

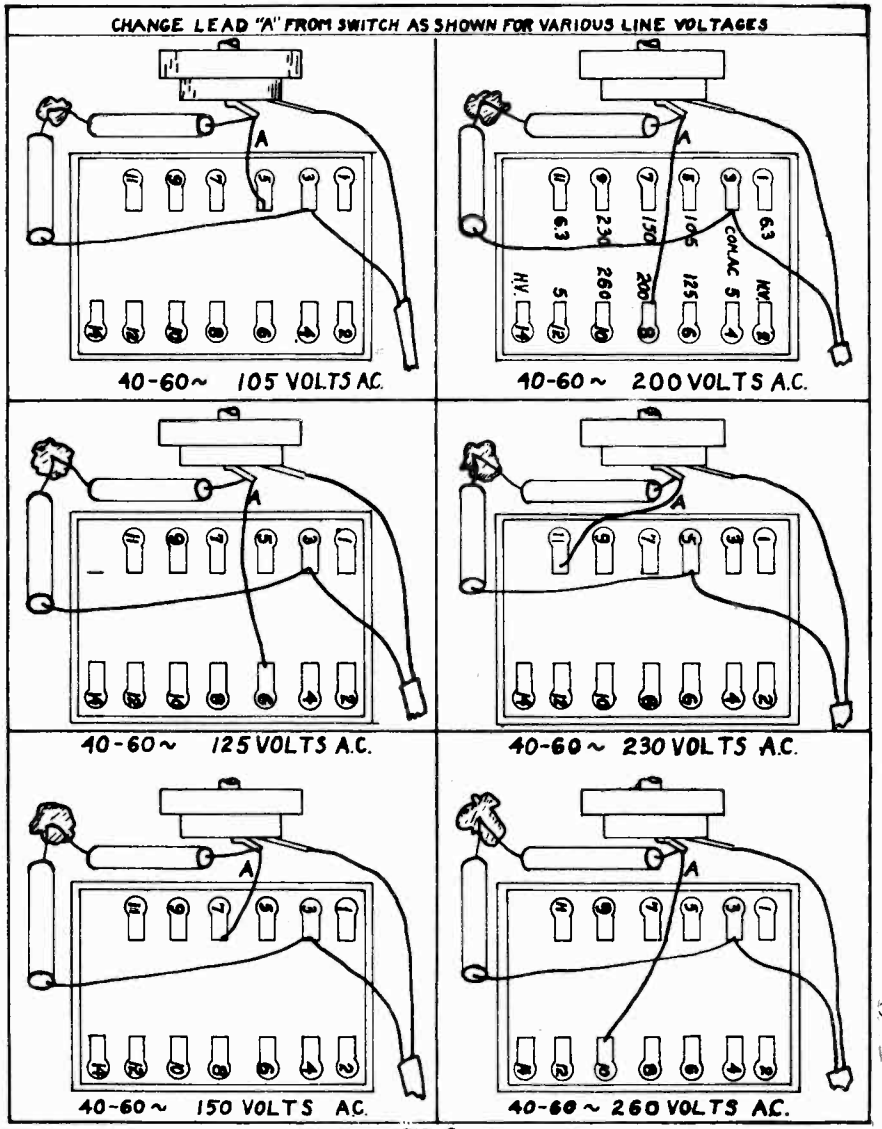


FIG. 3

NOTES ON ALIGNMENT

It is assumed that if an alignment procedure becomes necessary that the service man has an oscillator capable of accurately covering the range of the receiver and that a meter output indicator is used.

The I. F. Stages are aligned in the usual manner by feeding 465 KC into the grid of the 6L7 tube.

Follow Figure 4 and Figure 5 showing trimmer locations and alignment frequency.

Always adjust the oscillator first in any particular band.

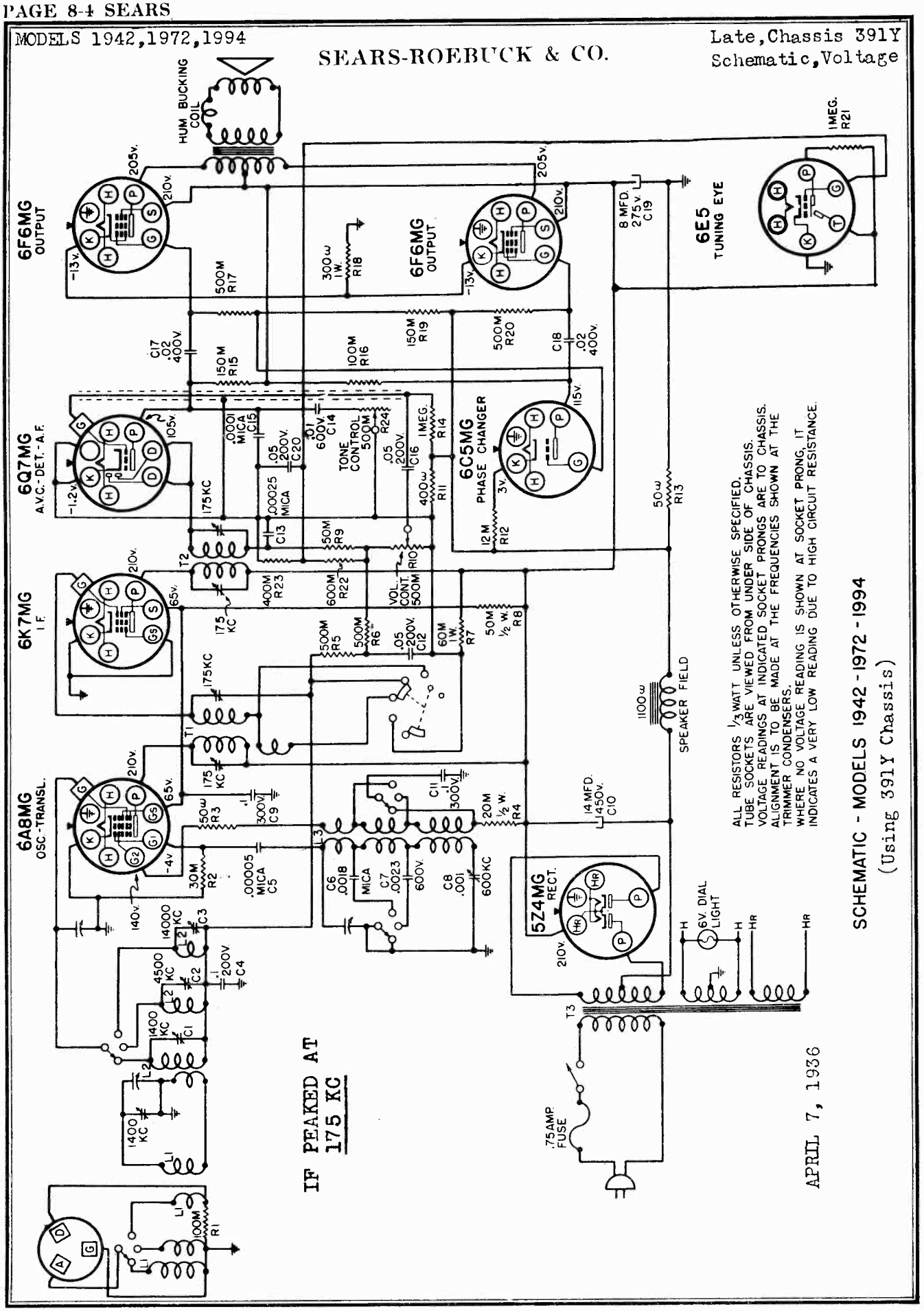
Use as low an output as possible from the test oscillator in making the various adjustments.

After trimming at the high frequency end of the dial and adjusting the padding condenser at the other end, always recheck the settings of the trimmer at the high frequency end of the dial.

BE SURE THAT THE ALIGNMENT SIGNAL IS THE TRUE FUNDAMENTAL AND NOT A HARMONIC.

Check for image frequency in the usual manner.

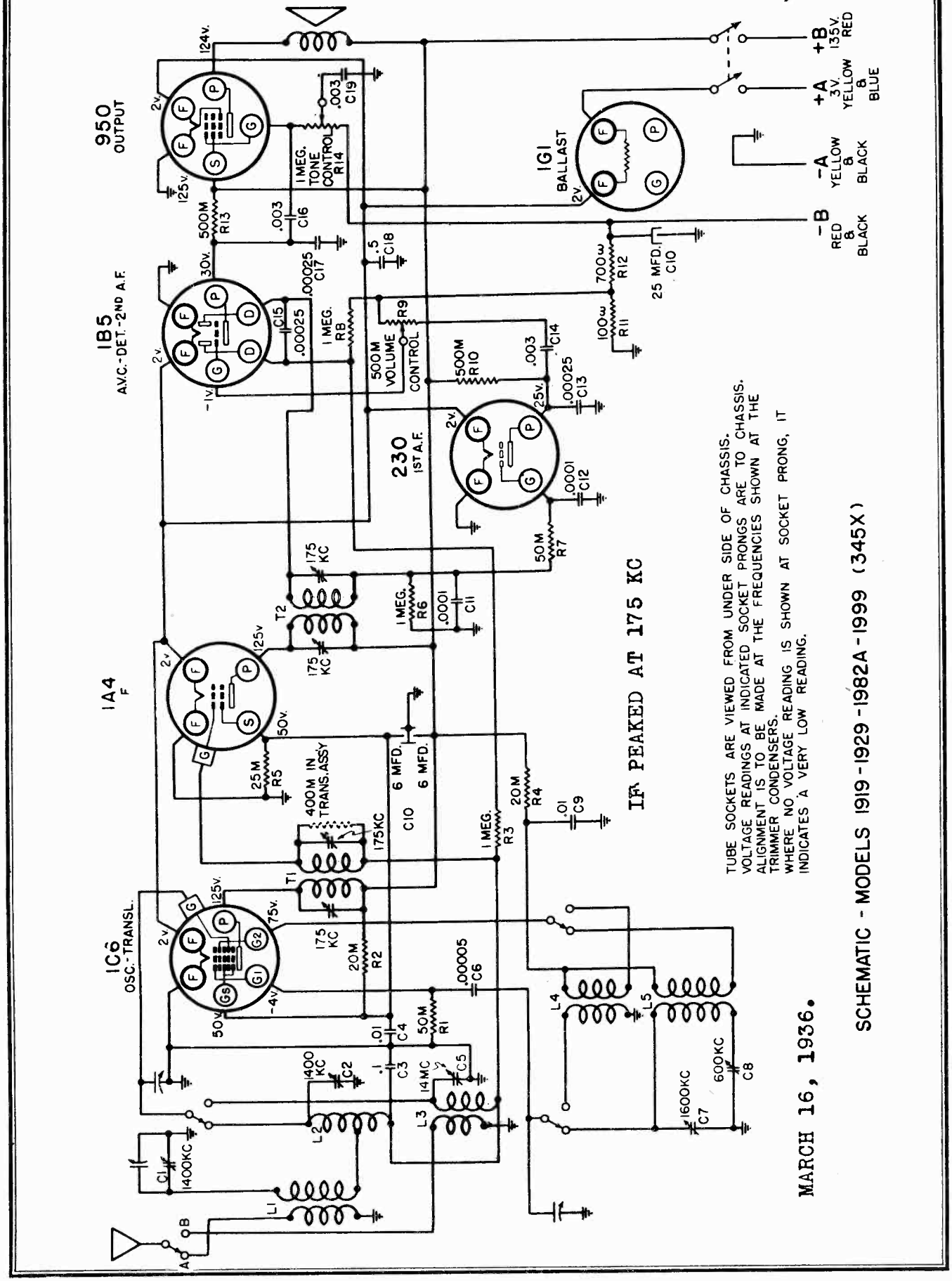
BEFORE STARTING ALIGNMENT CHECK POSITION OF TUNING HAND AND MAKE CERTAIN THAT IT IS EXACTLY STRAIGHT ACROSS ON THE FIRST CALIBRATION LINE WHEN THE CONDENSERS ARE AT MAXIMUM CAPACITY ROTATION.



Schematic, Voltage

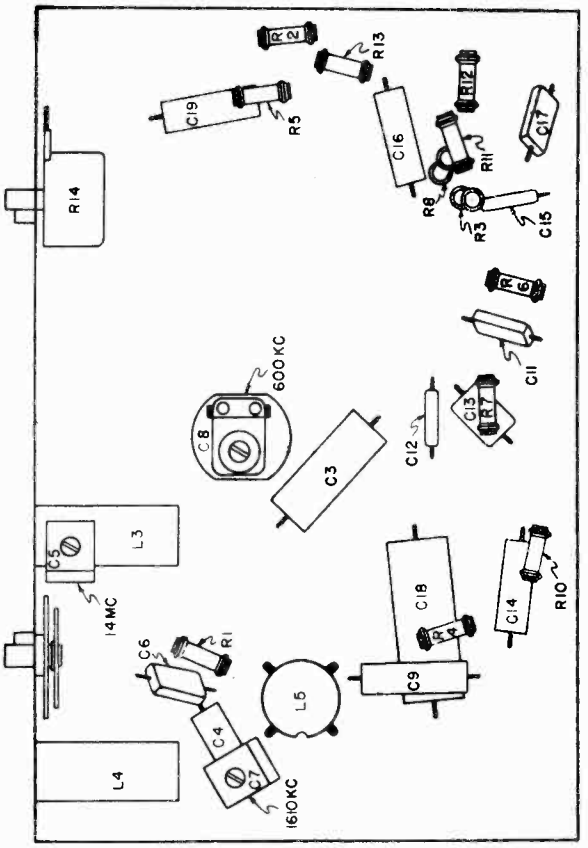
SEARS-ROEBUCK & CO.

MODELS 1919, 1929, 1982A
1999, 345X Chassis



MODELS 1919,1929,1982A
1999,345X Chassis
Chassis,Alignment,Data
Sensitivity

SEARS-ROEBUCK & CO.



C1, C2, C10, L1, L2, T1, T2 ARE MOUNTED ON TOP OF THE CHASSIS

LOCATIONS OF PARTS - MODELS 1919-1929-1982A-1999

ALIGNMENT PROCEDURE
IF Alignment

1. Connections:

Connect the ground lead of the test oscillator to the receiver chassis. Connect the output lead of the test oscillator, in series with a .1 mfd condenser, to the positions mentioned below for alignment. Connect the output meter, in series with a .5 mfd condenser, across the loud speaker terminals.

2. Receiver Settings:

Turn the Wave Band switch to the BROADCAST position and the Station Selector to about 550 kc. Turn the receiver Volume Control all the way on and the Tone Control to its brilliant position (clockwise).

3. Alignment:

(a) Set the test oscillator to 175 kc. Connect its output (through the .1 mfd condenser) to the control grid cap of the 1A4 tube and peak the IF output transformer. The IF output transformer is the one without a grid lead, mounted at the back of the chassis.

(b) Change the test oscillator output connection to the control grid of the 1C6 tube and peak the IF input transformer. This is the transformer with a grid lead, mounted alongside of the Variable Condenser.

(c) Change the test oscillator output connection back to the 1A4 tube and repeat operation "A". Then change the connection back to the 1C6 tube and repeat operation "B". Always keep the receiver Volume Control turned all the way on and the test oscillator output at its lowest possible value.

BROADCAST BAND ALIGNMENT

1. Connections:

The ground lead of the test oscillator is left connected to the receiver chassis as for IF alignment. Disconnect the .1 mfd condenser from the output lead of the test oscillator. In its stead a .0002 mfd mica condenser is to be connected from the antenna lead of the receiver to the output lead of the test oscillator.

2. Receiver Settings:

Turn the Wave Band switch to the BROADCAST position, the Volume Control all the way on, and the Tone Control to its brilliant position (clockwise).

3. Alignment:

(a) Set the test oscillator to 1610 kc. Open the variable condenser all the way and peak the broadcast oscillator trimmer, C7.

(b) Set the test oscillator to 1400 kc and tune in its signal. Then peak the broadcast antenna trimmer, C1, and the broadcast translator trimmer, C2. The antenna trimmer is the one on the variable condenser section nearest the dial. The translator trimmer is accessible through the hole in top of the translator shield can, mounted behind the volume control.

(c) Set the test oscillator to 600 kc and tune in its signal. Then adjust the broadcast oscillator padder, C8. The variable should be rocked a degree or two during the adjustment.

(d) Repeat the 1610 kc adjustment, then the 1400 kc adjustment, and then the 600 kc adjustment for greater accuracy. Always keep the receiver Volume Control all the way on and the test oscillator output at its lowest possible value.

(e) Check the dial calibration by setting the test oscillator to 1000 kc and tuning in its signal. If necessary, turn the dial pointer to 1000 kc, being careful that the variable condenser is not allowed to turn.

SHORT WAVE ALIGNMENT

1. Connections:

Connections remain the same as for Broadcast Band alignment except that the .0002 mfd condenser in series with the test oscillator output lead is disconnected and a 400 ohm resistor connected in its stead.

2. Receiver Settings:

Turn the Wave Band switch to the SHORT WAVE position. The Volume Control is to be left all the way on and the Tone Control in its brilliant position, as for Broadcast Band alignment.

3. Alignment:

(a) Set the test oscillator to 14,000 kc and tune in its signal. Peak the short wave translator trimmer, C5. The variable should be rocked a degree or two during the adjustment. If two peaks can be found at two different settings of the trimmer, use the adjustment in which the trimmer is screwed further out (lesser capacity).

(b) The calibration of this band may be varied by shifting the gray lead that runs from one of the short wave oscillator coil lugs to one of the mounting lugs. If this lead is shifted to change calibration, the 14,000 kc adjustment should be repeated.

SENSITIVITIES

The following figures are given as an indication of the approximate sensitivities that should be had at various points in the receiver. It is necessary to have a test oscillator with an accurately calibrated attenuator so that its power output can be known. The output meter is to be connected, in series with a .5 mfd condenser, across the loud speaker terminals. An output meter reading of 8½ volts should be obtained for each of the input voltages shown for the frequencies listed.

The Volume Control of the receiver must be all the way on and the Tone Control turned all the way to the right. The ground lead of the test oscillator is to be connected to the chassis and the output lead of the test oscillator connected in series with the value of condenser or resistor, shown in the following list for the particular frequency at which the measurement is being made.

INPUT POINT	DUMMY ANTENNA	FREQUENCY	MICROVOLTS
Translator Grid	.1 mfd.	175 kc.	55 *
IF Grid	.1 mfd.	175 kc.	3500 *
Translator Grid	.1 mfd.	1000 kc.	120
Stator, Ant. Cond.	.1 mfd.	1000 kc.	340
Antenna Lead	.00025 mfd.	600 kc.	30
Antenna Lead	.00025 mfd.	1000 kc.	30
Antenna Lead	.00025 mfd.	1400 kc.	45
Antenna Lead	400 ohms	6000 kc.	45
Antenna Lead	400 ohms	10000 kc.	20
Antenna Lead	400 ohms	14000 kc.	20

* With Wave Band Switch in BROADCAST position and dial pointer at 550 KC.

SILVERTONE MODELS 1919, 1929, 1982A, 1999

General Description:

Although these receivers have the same model numbers as the ones described in Service Manual #7, Fall 1935 Series, they use a different chassis and have a different tube complement. The chassis used in the models described in Manual #7 can be identified through the fact that they are rubber stamped "345". The chassis used in the models described in the present Manual are rubber stamped "345X".

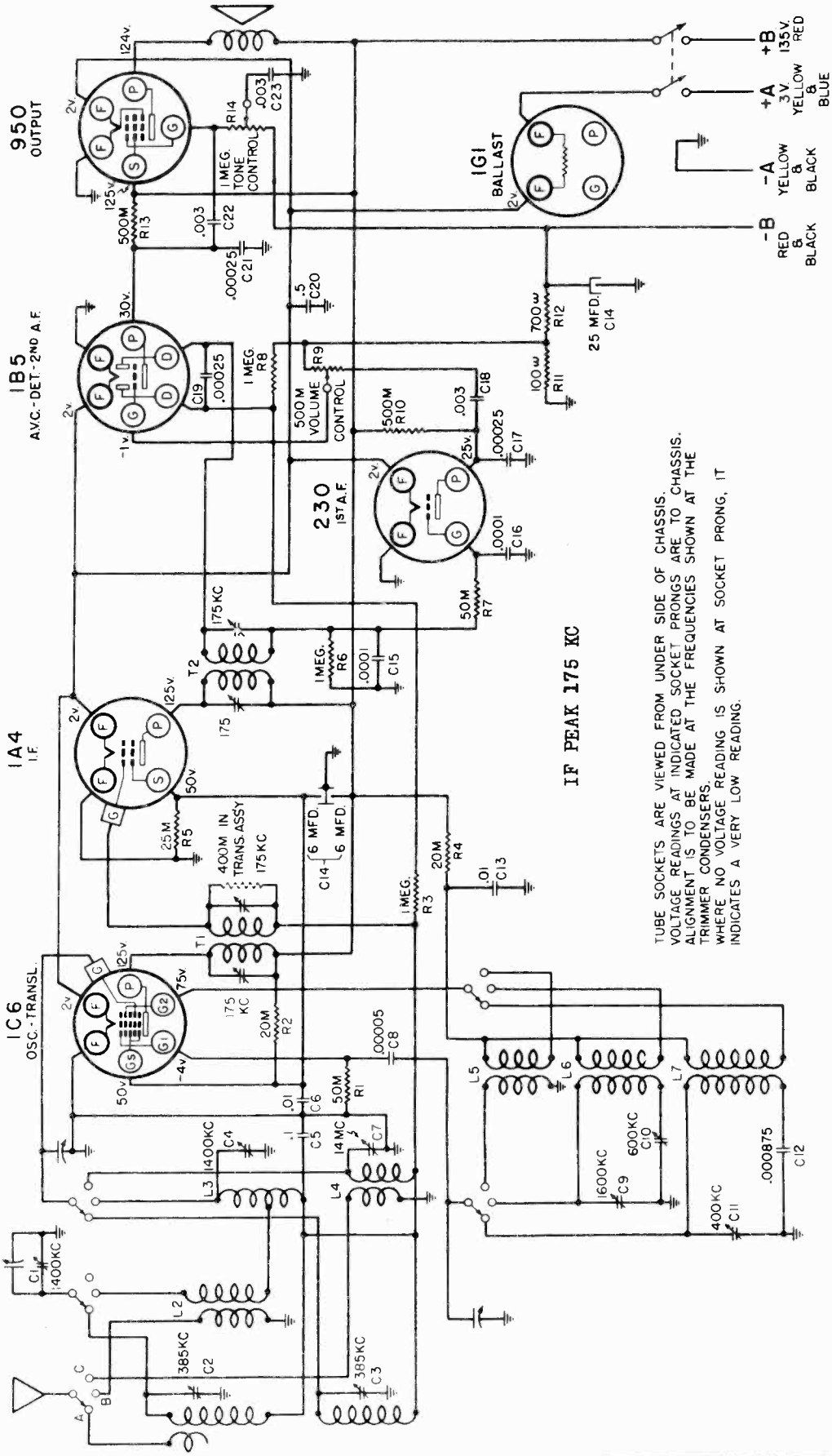
The Circuit:

These receivers are six tube battery powered superheterodynes, having a BROADCAST range and a FOREIGN Short Wave range. A filament Ballast tube is used to maintain the filament voltage at its proper value with a three volt dry cell block or an air cell "A" supply. If a two volt storage battery is used for "A" supply, the Ballast tube should be replaced by a Catalog #5022 adapter.

The diode current flowing through the 1 megohm resistor, R8, provides AVC voltage for the 1C6 and 1A4 tubes. The 100 ohm resistor, R11, provides residual bias.

MODELS 1947,1948
Schematic, Voltage

SEARS-ROEBUCK & CO.



Color Code Of The Electrolytic Condenser, C14:

Black - Common, grounded
Brown - Minus 25 mfd.
Red - Plus 6 mfd.
Blue - Plus 6 mfd.

These receivers are six tube battery powered superheterodynes. In addition to the BROADCAST range they incorporate a WEATHER Band and a Foreign SHORT WAVE range.

MODELS 1947,1948
Chassis,Trimmers
Alignment,Sensitivity

SEARS-ROEBUCK & CO.

ALIGNMENT PROCEDURE

IF Alignment:

1. Connect the high scale of the output meter, in series with a .5 mfd condenser, across the loud speaker terminals. Connect the ground lead of the test oscillator to the chassis. Turn the Wave Band switch to the BROADCAST position and the Station Selector to about 1000 kc. During all of the alignment procedure the Volume Control of the receiver must be on full, the Tone Control in its brilliant position (fully clockwise) and the output from the test oscillator kept at its lowest possible value.

2. Connect the output lead of the test oscillator, in series with a .1 mfd condenser, to the control grid of the 1A4 tube. Set the test oscillator to 175 kc and peak the IF output transformer. This transformer is the square can unit mounted behind the Variable Condenser.

3. Change the test oscillator output connection to the control grid of the 1C6 tube and peak the IF input transformer. (Leave the .1 mfd condenser connected in series with the test oscillator lead.) The IF input transformer is the square can unit with grid lead, mounted alongside of the Variable Condenser.

4. Change the test oscillator connection back to the 1A4 tube and recheck the IF output transformer adjustment. Then change the test oscillator connection to the 1C6 tube and recheck the IF input transformer adjustment.

RF Alignment; Broadcast Band B:

1. Leave the output meter connected across the loud speaker terminals and the ground lead of the test oscillator connected to the chassis, as for IF alignment. Connect the output lead of the test oscillator, in series with a .00025 mfd mica condenser, to the green antenna lead of the receiver. During all of the alignment the Volume Control must be turned on full, the Tone Control in its brilliant position and the output power from the test oscillator kept at its lowest possible value.

2. Turn the Wave Band switch to the "B" (BROADCAST) position. Open the Variable Condenser plates all the way. Set the test oscillator to 1600 kc and adjust the broadcast oscillator trimmer, C9, for maximum output meter reading.

3. Set the test oscillator to 1400 kc and tune in its signal. Then peak the broadcast antenna and translator trimmers. The antenna trimmer is the one mounted on the variable condenser section nearest the dial. The translator trimmer is accessible through the hole in the top of the round shield can mounted on top of the chassis, next to the IF input transformer. The variable should be rocked back and forth a degree or two while making the adjustments.

4. Set the test oscillator to 600 kc and tune in its signal. Peak the broadcast oscillator padder, C10. The variable should be rocked during the adjustment.

5. Repeat the 1600 kc and then the 1400 and 600 kc adjustments for greater accuracy.

RF Alignment; Long Wave Band A:

1. The Broadcast band must have been aligned before the Long Wave band. The output meter and test oscillator connections are the same as for Broadcast band alignment. Keep the receiver Volume Control on full, the Tone Control brilliant, and the test oscillator output powor at the lowest possible value.

2. Turn the Wave Band switch to the "A" position. Set the test oscillator to 400 kc. Open the variable condenser plates all the way and adjust the long wave oscillator trimmer, C11, for maximum output meter reading.

3. Set the test oscillator to 385 kc and tune in its signal. Then peak the preselector trimmers, C2 and C3.

4. Repeat the 400 kc and then the 385 kc adjustments for greater accuracy. Always keep the receiver Volume Control on full, the Tone Control in its brilliant position, and the test oscillator output at the lowest possible value consistent with a satisfactory output meter reading.

Short Wave Band C:

1. Remove the .00025 mfd condenser, used in series with the test oscillator output load for previous alignment. Replace this condenser with a 400 ohm carbon resistor. Turn the Wave Band switch to the "C" position. All other connections and settings remain the same as for previous alignment.

2. Set the test oscillator to 14,000 kc and tune in its signal. Then peak the short wave translator trimmer, C7. The variable should be rocked a degree or two during the adjustment. If two peaks can be obtained at two different settings of the trimmer, use the one in which the trimmer is screwed further out (lesser capacity).

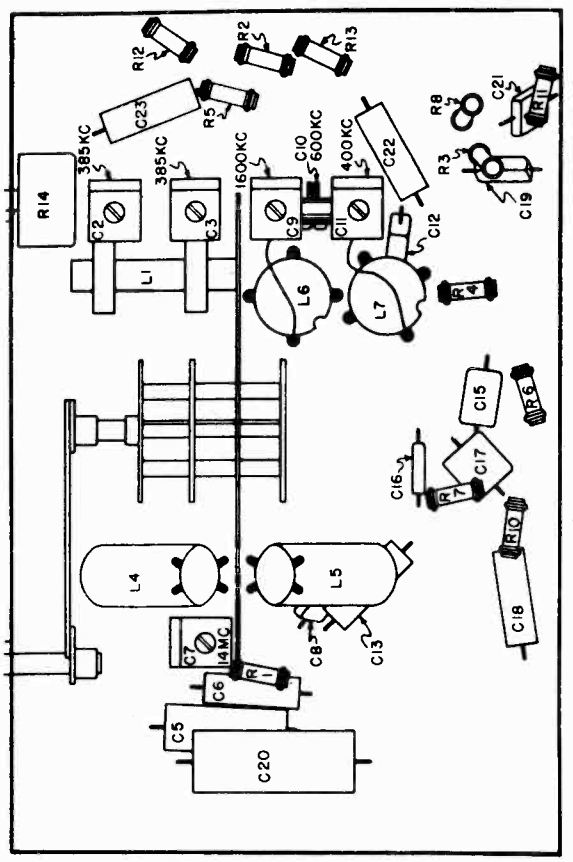
SENSITIVITIES

The following figures are given as an indication of sensitivities that should be had at various points in the receiver. It is necessary to have a test oscillator with an accurately calibrated attenuator so that its power output can be known. The output meter is to be connected, in series with a .5 mfd condenser, across the loud speaker terminals. An output meter reading of 8½ volts should be obtained for each of the Input voltages shown for the frequencies listed.

The Volume Control of the receiver must be all the way on and the Tone Control turned all the way to the right. The ground lead of the test oscillator is to be connected to the chassis and the output lead of the test oscillator connected in series with the value of condenser or resistor shown in the list for the particular frequency at which the measurement is being made.

INPUT POINT	DUMMY ANTENNA	FREQUENCY	MICROVOLTS
Translator Grid	.1 mfd	175 kc	55 *
IF Grid	.1 mfd	175 kc	3800 *
Translator Grid	.1 mfd	1000 kc	55
Stator, Ant. Cond.	.1 mfd	1000 kc	150
Antenna Lead	.00025 mfd	1000 kc	25
Antenna Lead	.00025 mfd	600 kc	35
Antenna Lead	.00025 mfd	1000 kc	40
Antenna Lead	.00025 mfd	1400 kc	60
Antenna Lead	.00025 mfd	400 kc	30
Antenna Lead	.00025 mfd	385 kc	35
Antenna Lead	.00025 mfd	225 kc	125
Antenna Lead	400 ohms	6000 kc	55
Antenna Lead	400 ohms	10000 kc	20
Antenna Lead	400 ohms	14000 kc	25

* Wave Switch in BROADCAST position and dial set at 550 kc.

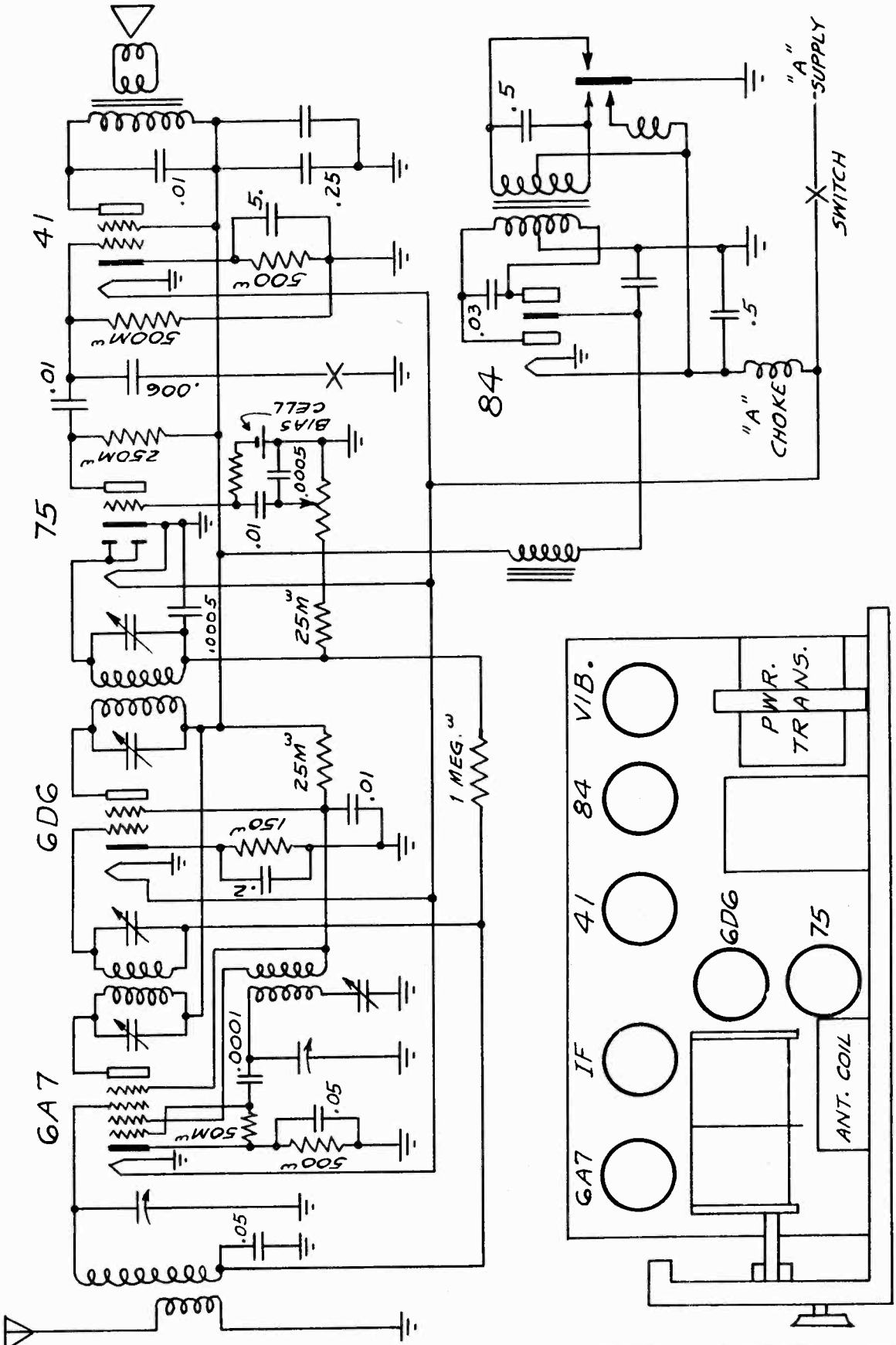


T1, T2, R9, C1, C4, C14, L2 & L3 ARE MOUNTED ON TOP OF THE CHASSIS.

LOCATIONS OF PARTS - MODELS 1947 - 1948

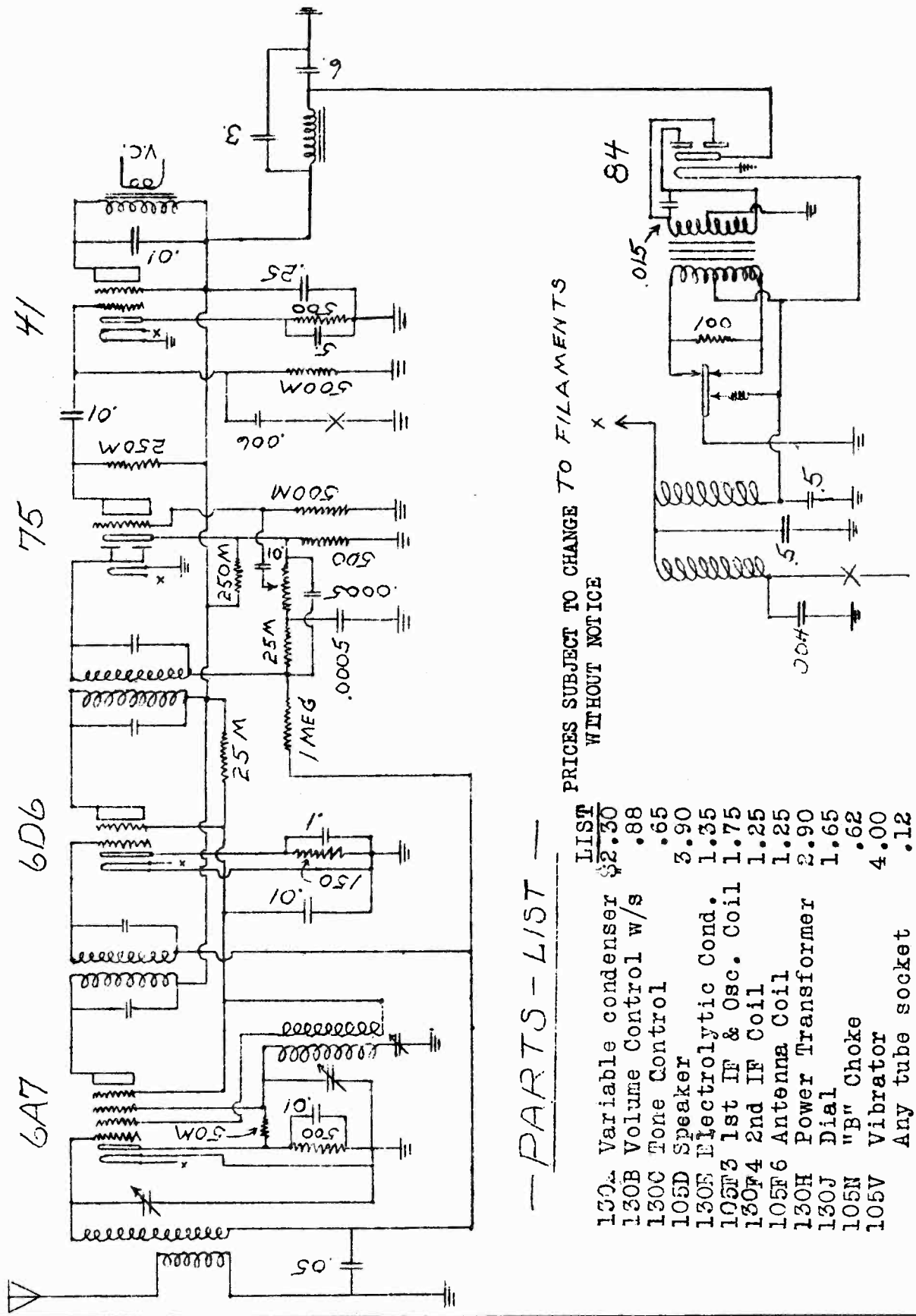
MODEL 1949 Auto
Schematic, Socket

SEARS-ROEBUCK & CO.



MODEL 1949A Auto
Schematic, Parts

SEARS-ROEBUCK & CO.

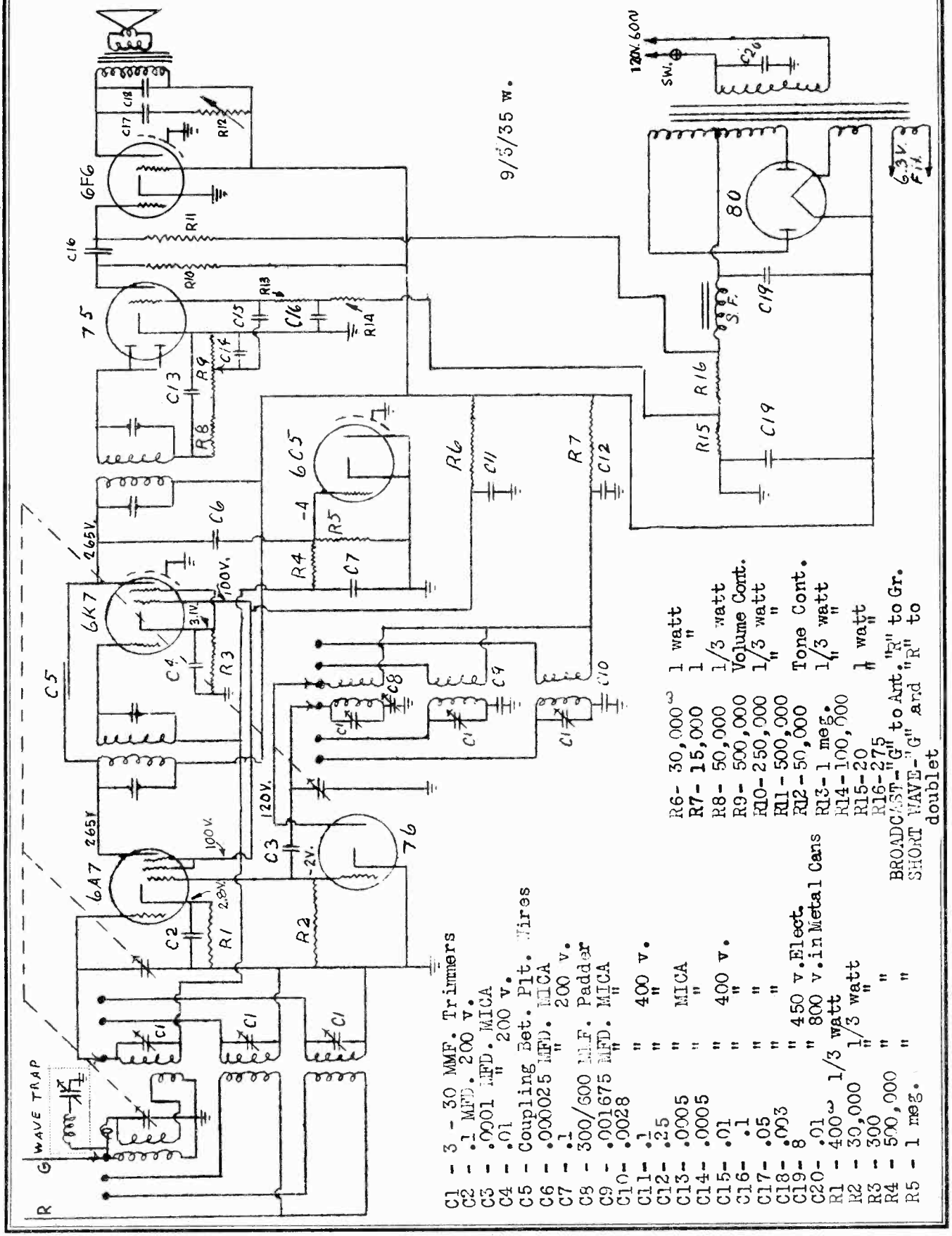


— PARTS - LIST —

		LIST
130A	Variable condenser	$2.30
130B	Volume Control w/s	.88
130C	Tone Control	.65
105D	Speaker	3.90
130E	Electrolytic Cond.	1.35
105F3	1st IF & Osc. Coil	1.75
130F4	2nd IF Coil	1.25
105F6	Antenna Coil	1.25
130H	Power Transformer	2.90
130J	Dial	1.65
105N	"B" Choke	.62
105V	Vibrator	4.00
	Any tube socket	.12
	Any carbon resistor	.10
	By pass condensers	.15

SEARS-ROEBUCK & CO.

MODEL 1970
Schematic



ALIGNMENT OF RECEIVER

1- Connect the test oscillator through a .1 mfd condenser to the control grid cap of the 6A7 tube, without removing the grid cap and being certain the shield cap is in place. The red and black wires coming from the receiver are connected together and connected to the ground lead of the test oscillator.

2- Connect the output meter to the voice coil of the speaker.

3- Advance volume control all the way on and turn tone control to "high" position.

4- Set the test oscillator to 456 KC and adjust the I F trimmer condensers for maximum output, using the weakest possible signal from the test oscillator in order to make the AVC action of the receiver inoperative. If the signal from the test oscillator is strong enough to produce more than a readable indication on the output meter then incorrect results may be obtained.

5- If, for any reason, the test oscillator cannot be controlled to give the desired low indication on the output meter, then it is permissable to slightly retard the volume control.

6- Set band switch of the receiver to position "B" (all the way to the right). Remove the test oscillator output lead from the grid of the 6A7 tube and connect it through a .00025 mfd condenser (instead of the .1mfd condenser) to the green antenna lead of the receiver. Tune the receiver to read 1400 KC on the dial and adjust the test oscillator to 1400 KC. When the signal is tuned in adjust the broadcast oscillator trimmer (see Fig.) for maximum response. Then adjust the broadcast preselector trimmer for maximum response. Then adjust the one trimmer located on the top of the center section of the variable condenser, in the same manner.

7- Apply a 600 KC signal to the antenna and tune this signal on the receiver. Adjust the padder condenser for maximum response. To make this adjustment it is necessary to tune the receiver back and forth past the signal at the same time that the padder is being carefully adjusted.

8- Apply a strong 456 KC signal to the antenna. Adjust the wave trap for minimum signal. (if the code interference is experienced with the receiver after all alignment adjustments have been made, then the wave trap should be adjusted to reduce the code interference to a minimum).

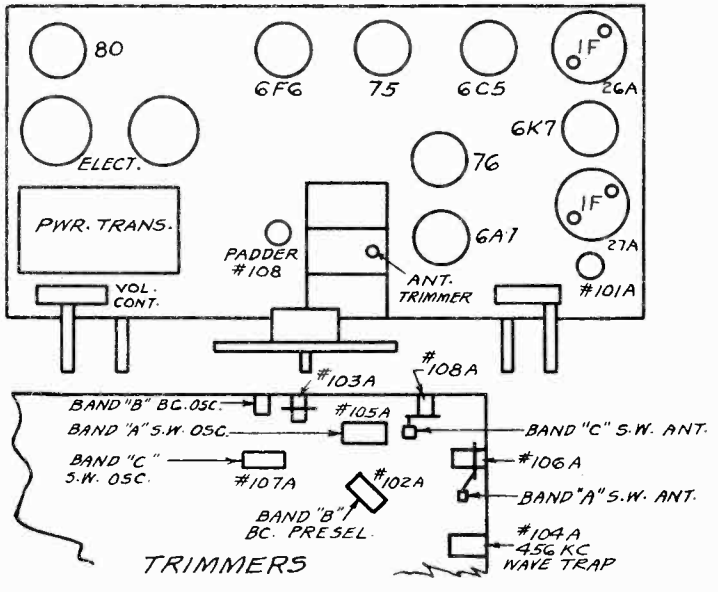
9- Set band switch on position "A" (center position). Connect a 400-ohm resistor between the test oscillator and receiver antenna lead, in place of the .00025 mfd condenser. Apply a 4 MC signal and tune in this signal for maximum response. Adjust antenna trimmer (see Fig. to identify "Band 'A' - SW - Antenna trimmer) for maximum response.
(Note: Maximum response may be had with the trimmer either practically open or practically closed. The closed position is the correct one.)

10- Set band switch on position "C" (all the way to the left.) Still using 400 ohms in series with the antenna, apply a 14 MC signal. Adjust dial to 14 MC. Adjust Band "C" oscillator trimmer for maximum response. If two points of response are noted, the correct adjustment is the one obtained when the least capacity is used (condenser open.) Adjust Band "C" antenna trimmer for maximum response, remembering that the point obtained with the antenna trimmer practically closed is the correct one.

VOLTAGES MEASURED FROM POINT TO CHASSIS, USING A 1000-ohm-per-volt meter.
(Line: 120 volts A.C.)

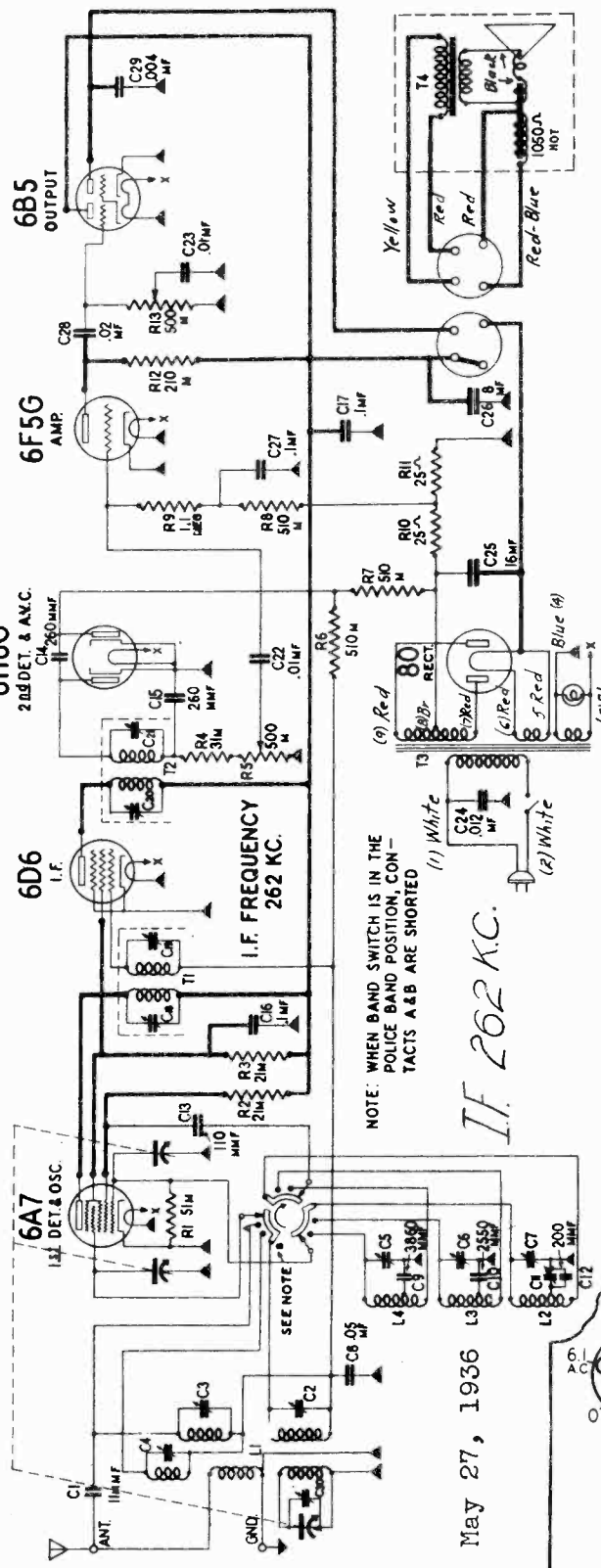
	750 volt scale	10 volt scale			
	PLATE	SCREEN GRID	CATHODE	GRID	FILAMENT
6A7	265 V	100 V	2.8 V		6.1 V AC
76	120 V			-2 V	6.1 V AC
6K6	265 V	100 V	3.1 V		6.1 V AC
6C5				-.4 V	6.1 V AC
75	190 V			-.4 V	6.1 V AC
6F6	250 V	265 V		* -.7 V	6.1 V AC
80	265 V	Filament to chassis			

* Does not indicate true grid voltage due to high resistance of grid circuit.



SEARS-ROEBUCK & CO.

MODELS 1986,1987,4403,4463
4464,4484,4563,4564,4584
Chassis 100150
Schematic,Socket,Voltage



May 27, 1936

POWER SUPPLY
All models available.....105-135 volts, 50-60 cycle, 50 watts

FREQUENCY RANGES
Band A.....525 to 1800 KC.
Band P.....1760 to 6000 KC.
Band F.....5800 to 18,100 KC.

INTERMEDIATE FREQUENCY.....262 KC

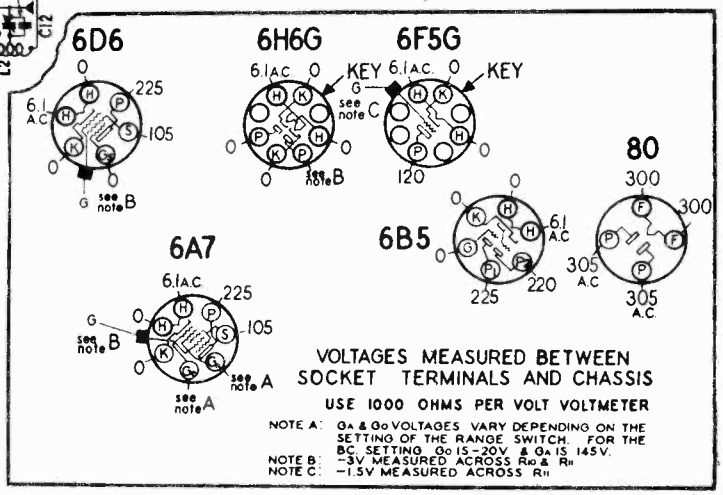
POWER OUTPUT
Type.....Class A
Undistorted.....2.5
Maximum.....3.3 Watts

ALIGNMENT FREQUENCIES
1400 KC.; 600 KC. (osc. padder)
5000 KC.
16,000 KC.

LOUD SPEAKER
Type.....Dynamic
Size.....6" or 8"
Field Coil Res.....1050 ohms (Hot)
Field Coil Voltage.....75 volts

CHASSIS FEATURES
Preselector on Bc. Band
Number of I.F. Stages.....1
Antenna.....Conventional

OPERATING FEATURES
Fidelity Range.....50-5000 cycles
Tone Control.....Variable
Automatic Volume Control



VOLTAGES MEASURED BETWEEN SOCKET TERMINALS AND CHASSIS
USE 1000 OHMS PER VOLT VOLTMETER

NOTE A: Ga & Go VOLTAGES VARY DEPENDING ON THE SETTING OF THE RANGE SWITCH. FOR THE BC SETTING Go IS -20V. & Ga IS 145V.
NOTE B: -3V MEASURED ACROSS R_{10} & R_{11}
NOTE C: -1.5V MEASURED ACROSS R_{11}

BOTTOM VIEW OF CHASSIS

MODELS 1986,1987,4403,4463
4464,4484,4563,4564,4584
Chassis 100150

SEARS-ROEBUCK & CO.

Socket,Trimmers,Chassis
Alignment

ALIGNMENT PROCEDURE

RELIMINARY

Output meter connections.....Across voice coil leads
Output meter reading to indicate 1 watt output.....2 volts
Average sensitivity in microvolts for 1 watt output.....See chart below

Dummy antenna value to be in series with generator output..See chart below
Connection of generator output lead.....See chart below
Generator modulation.....30%, 400 cycles

Position of volume control.....full clockwise
Position of tone control.....full clockwise

BAND SWITCH	POSITION OF * DIAL POINTER	GENERATOR FREQUENCY	DUMMY ANTENNA	GENERATOR CONNECTION	TRIMMERS ADJUSTED (In order shown)	MICRO VOLTS
Band A I.F.	1000 KC.	262 KC.	.1 Mfd.	6A7 Grid	C18, C19,	125
	1500	1500	.00025	Ant. Lead	C20, C21	50
	600(Rock)**	600	.00025	Ant. Lead	C7,C30,C2 C11	50
Band P	5000 KC.	5000 KC.	400 Ohm	Ant. Lead	*** C6, C4	85
Band F	16000 KC.	16000 KC.	400 Ohm	Ant. Lead	*** C5, C3	50

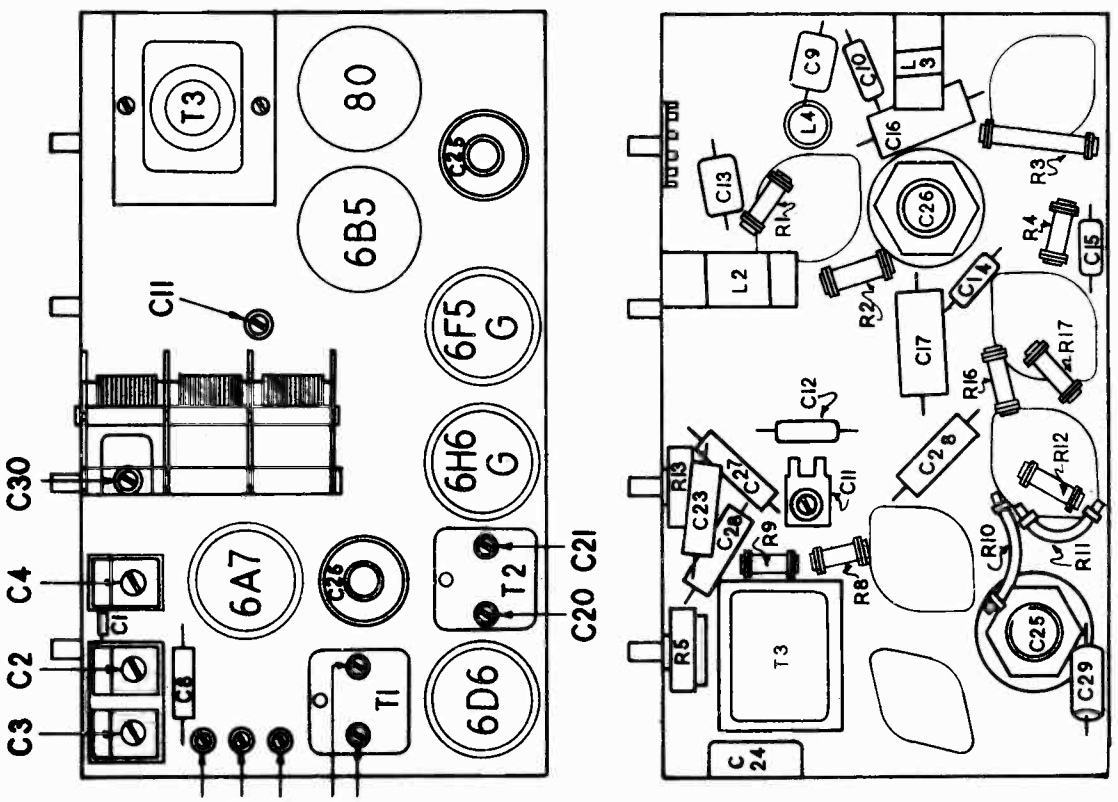
IMPORTANT ALIGNMENT NOTES

* Before attempting to align the receiver check to see that the dial pointer coincides with the horizontal dividing line of the scale when the gang condenser is in full mesh, and adjust if necessary.

After adjusting the I.F. trimmers C18, C19, C20 and C21, go back and repeat the adjustment, since the setting of each trimmer will have some effect on the others.

** When aligning the broadcast band at 600 KC. it is necessary to adjust trimmer C11 while slowly rocking the gang condenser through a small distance. Rocking the gang is essential if maximum sensitivity is to be obtained.

*** When aligning the short wave bands, care should be observed in adjusting trimmers C6 and C5, since, two possible adjustments of these trimmers will result in signal peaks. The proper peak is that which occurs with the trimmer screw farthest out.



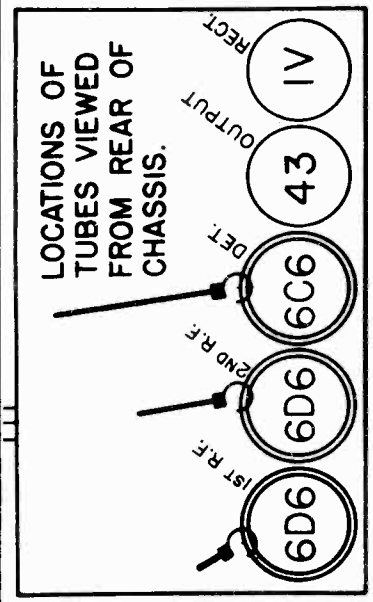
SEARS-ROEBUCK & CO.

MODELS 4414,4415,4500
4505,4506
Schematic,Socket,Chassis
Alignment

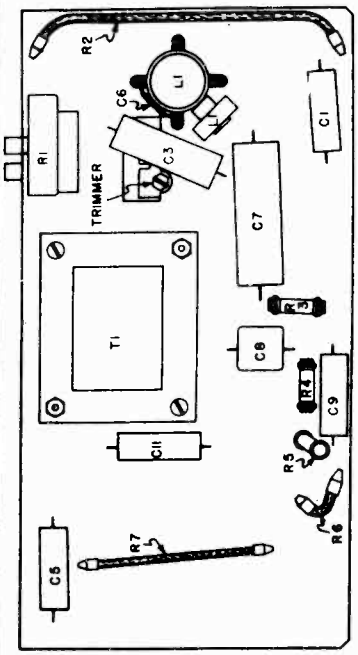
May 15, 1936

LOUD SPEAKER:
Type - - - - - - - - - - - - Dynamic
Size - - - - - - - - - - - - - - - - 5"
Field Coil Resistance - - 1750 ohms
Field Coil Voltage Drop App. 120 volts

POWER OUTPUT:
Type - - - - - - - Single Pentode
Undistorted - - - - .98 watts
Maximum - - - - - - 1.64 watts

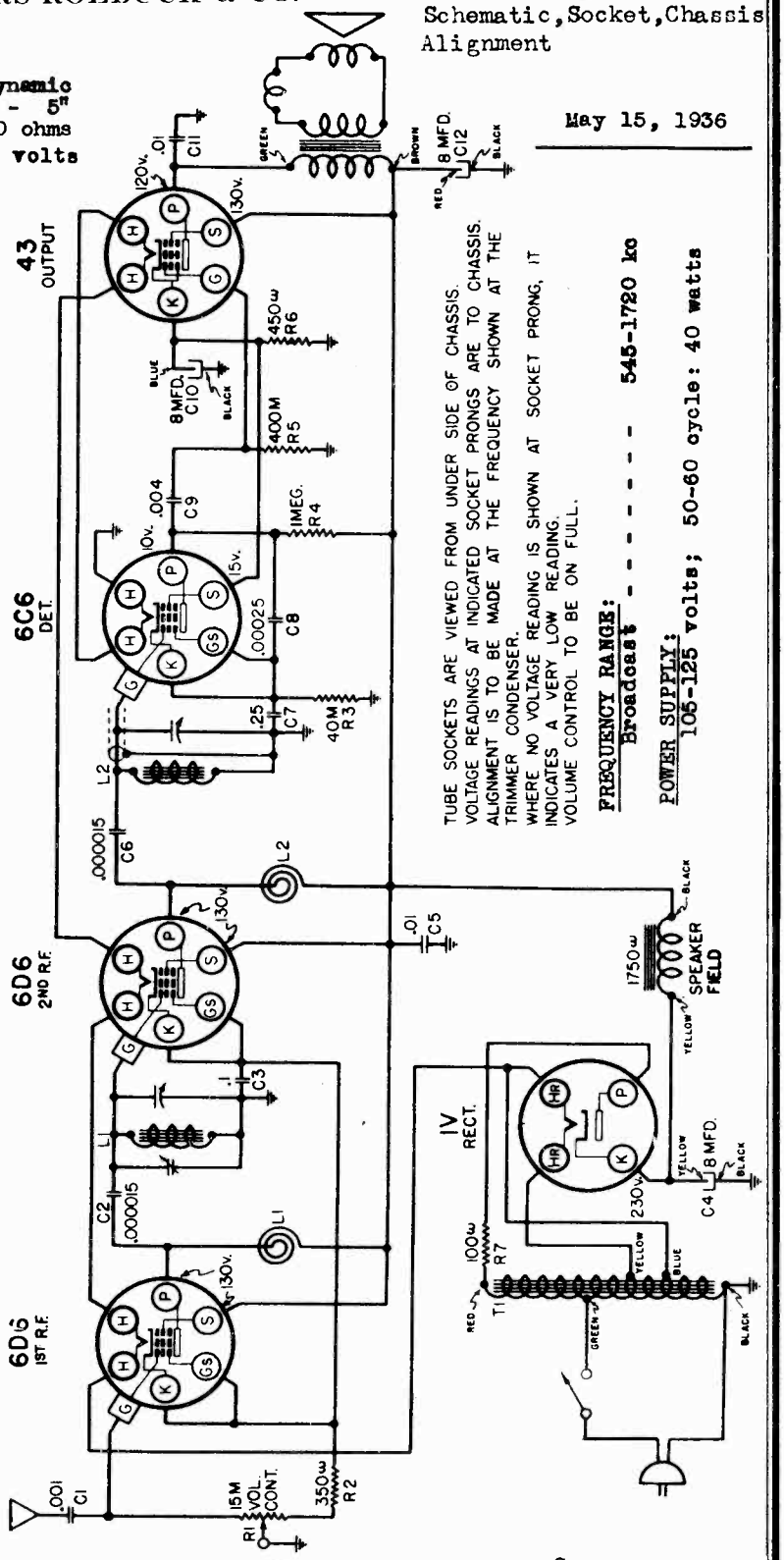


ARRANGEMENT OF TUBES



LOCATIONS OF PARTS UNDER CHASSIS

C4, C10, C12, & L1 ARE MOUNTED ON TOP OF CHASSIS.



TUBE SOCKETS ARE VIEWED FROM UNDER SIDE OF CHASSIS.
VOLTAGE READINGS AT INDICATED SOCKET PRONGS ARE TO CHASSIS.
ALIGNMENT IS TO BE MADE AT THE FREQUENCY SHOWN AT THE TRIMMER CONDENSER.
WHERE NO VOLTAGE READING IS SHOWN AT SOCKET PRONG, IT INDICATES A VERY LOW READING.
VOLUME CONTROL TO BE ON FULL.

FREQUENCY RANGE:
Broadcast - - - - - - - - - 545-1720 kc

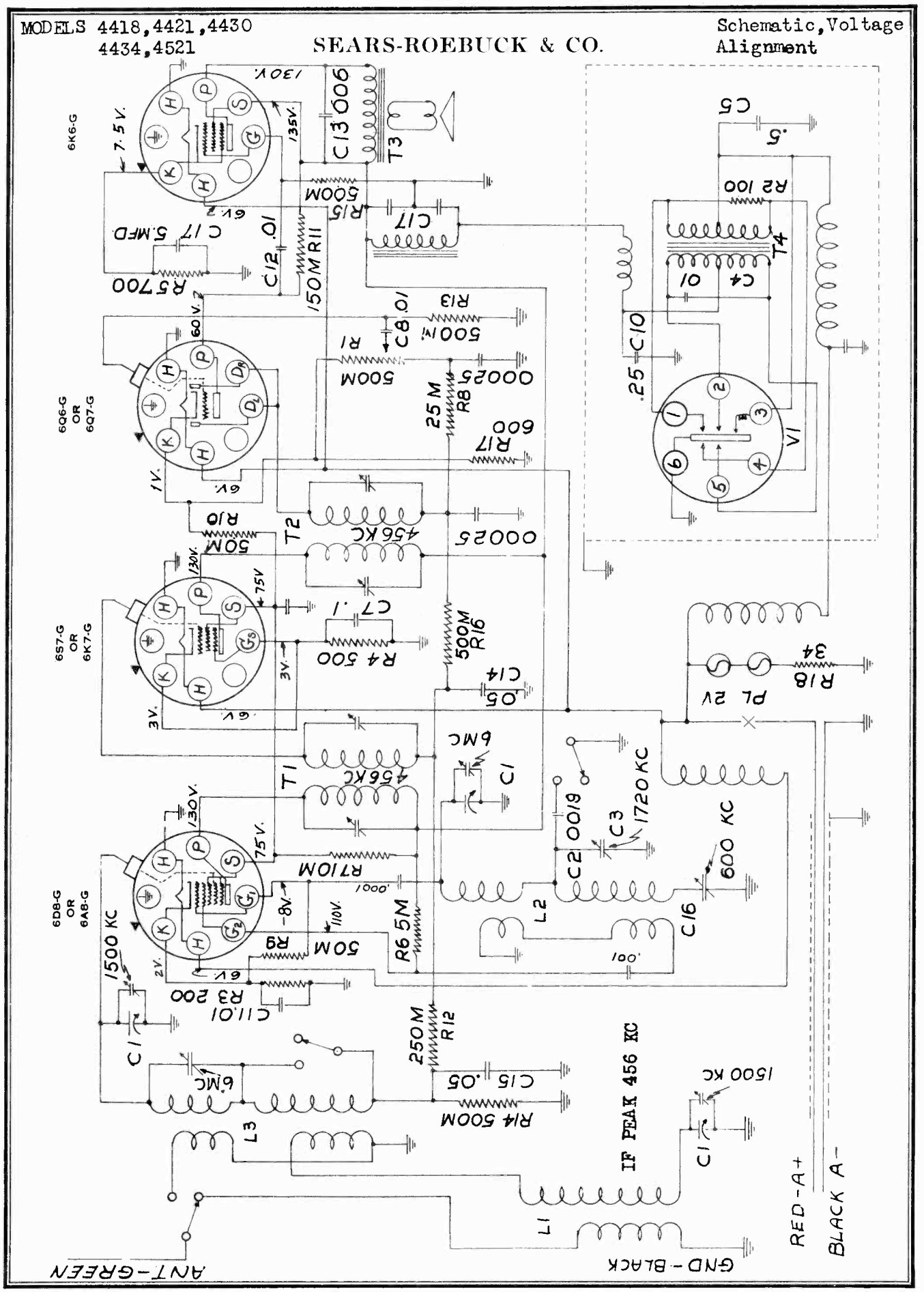
POWER SUPPLY:
105-125 volts; 50-60 cycle: 40 watts

ALIGNMENT: Tune in a 1400 kc sig. & adjust trimmer for Max. response. Vol. Cont. setting is reduced to give a low vol. level. Rock var. cond. a degree or two during adjustment. Trimmer is accessible when chassis is in cabinet, thru a hole in plate at bottom of cab. An insulated screw driver should be used. CAUTION: An auto-transf. is used instead of the usual power transf. having separate primary & secondary windings. The chassis may be above gnd. potential and care must thus be taken NOT to allow any grounded object to come in contact with the chassis while it is plugged into the line. The chassis is insulated from cabinet metal bottom cover with rubber grommets.

MODELS 4418,4421,4430
4434,4521

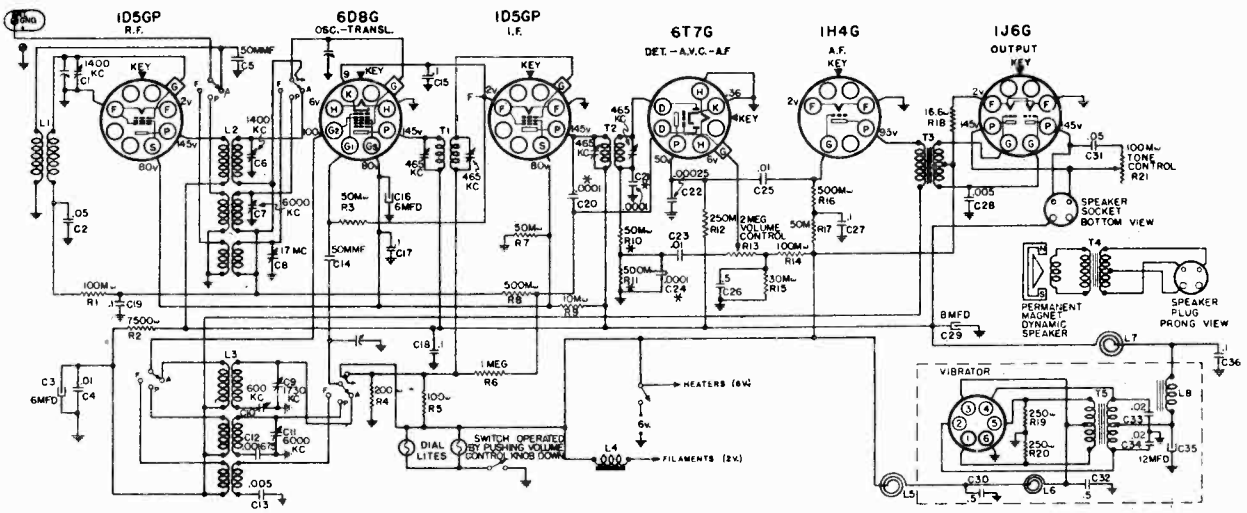
SEARS-ROEBUCK & CO.

Schematic, Voltage
Alignment



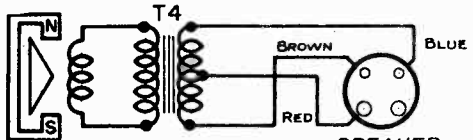
SEARS-ROEBUCK & CO.

MODELS 4419,4459,4519,4559
Schematic, Spkr. Wiring
Interference Elimination



January 27, 1937

IF PEAK 465 KC



PERMANENT MAGNET DYNAMIC

SPEAKER PLUG PRONG VIEW

TUBE SOCKETS ARE VIEWED FROM UNDER SIDE OF CHASSIS.
VOLTAGE READINGS AT INDICATED SOCKET PRONGS ARE TO CHASSIS.
ALIGNMENT IS TO BE MADE AT THE FREQUENCIES SHOWN AT THE TRIMMER CONDENSERS.
WHERE NO VOLTAGE READING IS SHOWN AT SOCKET PRONG, IT INDICATES A VERY LOW READING.
FIGURES AT CATHODES INDICATE CATHODE CURRENT IN MILLIAMPERES

ELIMINATING WHISTLE AT 930 KC:

A whistle, due to a beat between the second harmonic (930 kc) of the 465 kc IF, and a 930 kc signal may be experienced. In localities where the 930 kc station is one that is frequently listened to, it will be desirable to shift the whistle to some other point where it will not be objectionable. This can be done by shifting the IF frequency of the receiver.

Determine at what point between 900 kc and 960 kc the whistle will be least objectionable. Dividing this frequency by two will give the new IF frequency to which the receiver should be aligned. For example, if it is determined that a whistle at 915 kc would not be objectionable, the IF should be realigned at 915/2 or 457.5 kc.

Align the IF at the new frequency and then realign the rest of the receiver as described under, "ALIGNMENT PROCEDURE".

SET DEAD AT 2 MC ON BAND "P":

In original production receivers the 50M ohm resistor, R3, was connected to ground. In later production chassis, rubber stamped with the letter, "A", or a subsequent letter, the resistor connection was made to the cathode of the 6D8G tube. This prevents failure to oscillate at 2 mc on the Police Band with certain 6D8G tubes. Trouble of this sort in the field with earlier production receivers can be corrected by changing the oscillator tube or preferably by changing the connection of R3 to the cathode of the 6D8G tube.

WAVE-TRAP TO ELIMINATE INTERFERENCE FROM SHIP OR AIRPORT TRANSMITTERS:

In locations near ship transmitters or airports or air beacon stations, code interference may be experienced. Part #10153114256 wave-trap is designed to eliminate such interference.

Mount the trap, by means of two wood screws, at any convenient place on the chassis shelf or cabinet where it will be near the antenna terminal of the receiver. Connect the yellow lead of the wave-trap to the antenna downlead. Connect the green lead of the wave-trap to the antenna terminal of the receiver. Cut off any excess length of green wire from the trap so that the green lead from the wave-trap to the chassis is as short as possible. The yellow lead from the wave-trap should be run so that it is as far as possible from the green lead. Connect one of the black leads from the wave-trap to the ground terminal of the receiver. Connect the other wave-trap black lead to the ground used for the installation.

The trap is pre-tuned to the IF frequency so that normally no further adjustment is necessary. However, should interference still be experienced, tune the receiver between approximately 550 and 600 kc. Then adjust the wave-trap, by means of the trimmer screw at the bottom of the container, until the interference is eliminated. Addition of the trap will reduce the sensitivity of the receiver around 600 kc by approximately 50%. The customer should be forewarned of this to avoid complaints of reduced sensitivity.

MODELS 4419,4459,4519,4559
Socket,Trimmers,Chassis
Alignment,Sensitivity

SEARS-ROEBUCK & CO.

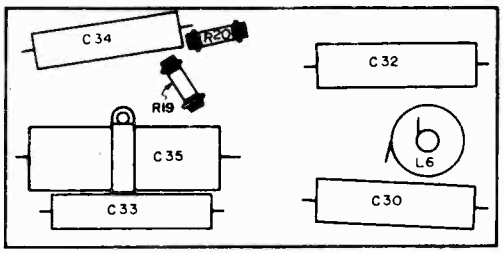
POWER OUTPUT:
Type . . . . . Class "B"
Undistorted . . . . . 0.8 watts
Maximum . . . . . 1.25 watts

WAVE BAND SWITCH POSITION	POSITION OF DIAL POINTER	GENERATOR FREQUENCY	DUMMY ANTENNA	GENERATOR CONNECTION	TRIMMERS ADJUSTED (IN ORDER SHOWN)	TRIMMER FUNCTION	APPROXIMATE MICROVOLTS
"A"	Closed	465 kc	.1 mfd.	6D8G Grid	T2,T1	IF	6300
"A"	Open	1730 kc	.0002 mfd.	Ant. Term.	C9	Oscillator	30
"A"	1400 kc	1400 kc	.0002 mfd.	Ant. Term.	C6,C1	Transl., Ant.	8
"A"	600 kc (rock)	600 kc	.0002 mfd.	Ant. Term.	C10	Padder	15
"P"	6 mc	6 mc	400 ohms	Ant. Term.	C11,C7 *	Osc., Transl.	30
"P"	2.2 mc	2.2 mc	400 ohms	Ant. Term.	-	-	150
"F"	17 mc	17 mc	400 ohms	Ant. Term.	**	-	-
"F"	17 mc (rock)	17 mc	400 ohms	Ant. Term.	C8	Translator	30
"F"	7 mc	7 mc	400 ohms	Ant. Term.	-	-	200

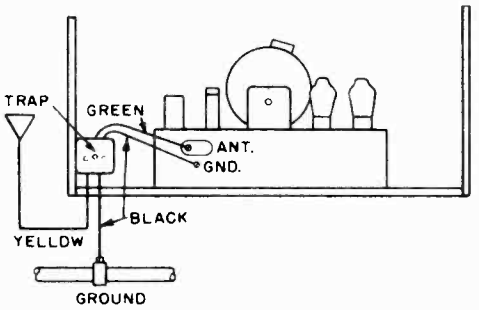
IMPORTANT ALIGNMENT NOTES

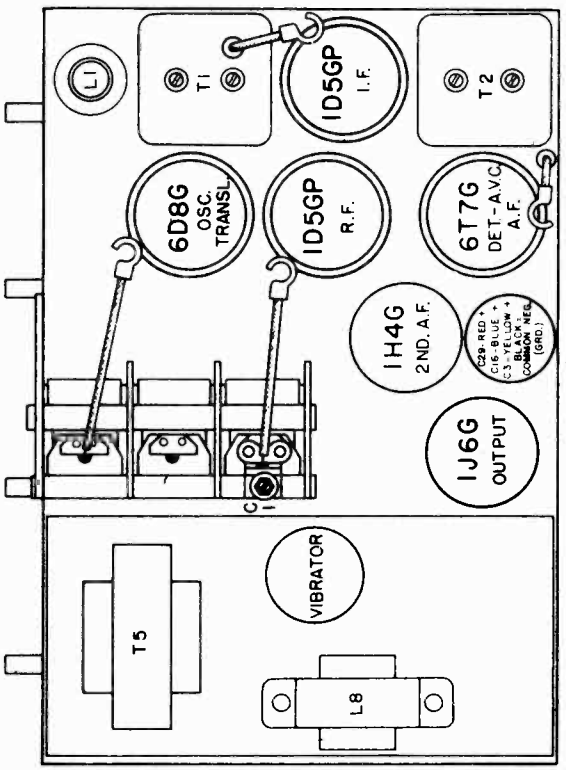
* When adjusting C11 two peaks may be found. The one in which the trimmer is screwed further out (lesser capacity) is the correct one.

** Twist or untwist the twisted leads on the wave switch until the 17 mc calibration is correct.

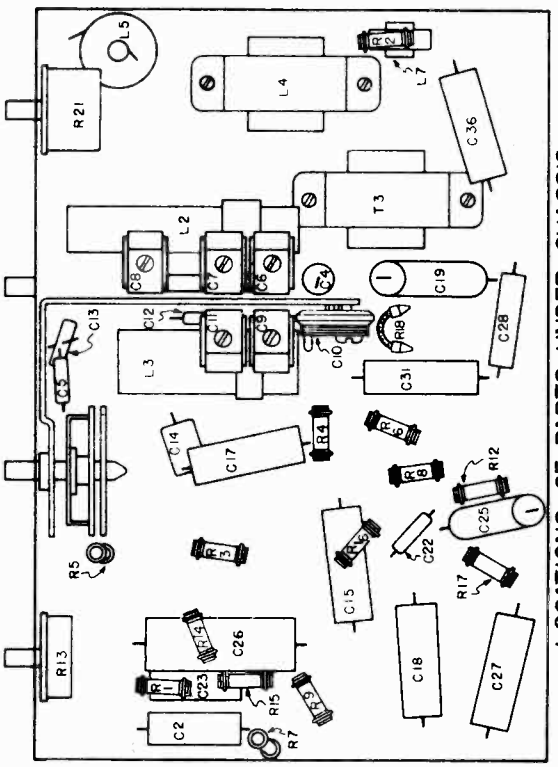


LOCATIONS OF PARTS IN BOTTOM OF POWER SUPPLY HOUSING





LOCATIONS OF PARTS ON TOP OF CHASSIS

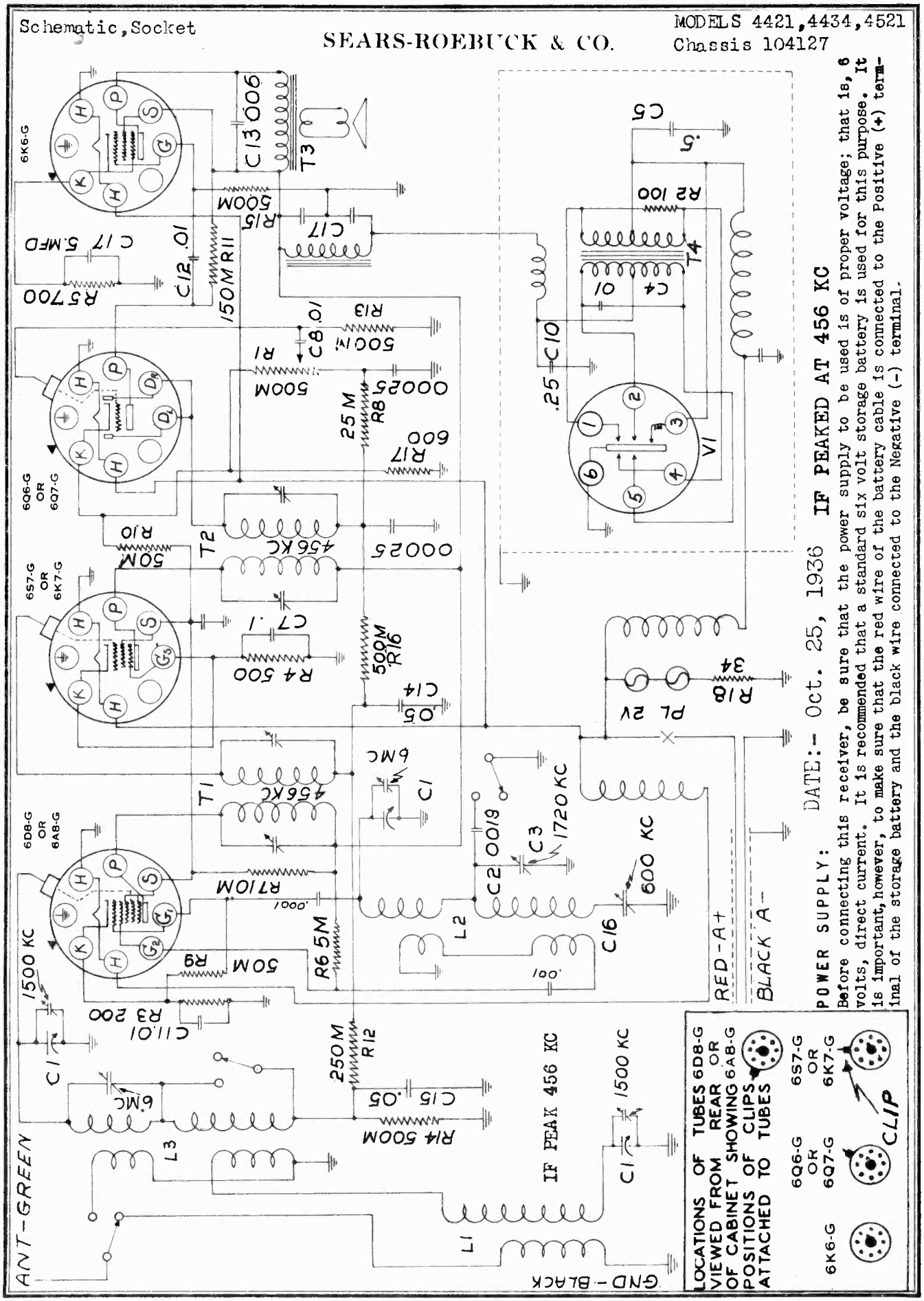


LOCATIONS OF PARTS UNDER CHASSIS

Schematic, Socket

SEARS-ROEBUCK & CO.

MODELS 4421, 4434, 4521
Chassis 104127



POWER SUPPLY: DATE:- Oct. 25, 1936 **IF PEAKED AT 456 KC**

Before connecting this receiver, be sure that the power supply to be used is of proper voltage; that is, 6 volts, direct current. It is recommended that a standard six volt storage battery is used for this purpose. It is important, however, to make sure that the red wire of the battery cable is connected to the Positive (+) terminal of the storage battery and the black wire connected to the Negative (-) terminal.

ALIGNMENT PROCEDURE

PRELIMINARY

Output meter connections ..... Across voice coil leads
Output meter to indicate 50 MW. ..... 7.5 Volt
Average sensitivity in microvolts for 50 MW. output .....See chart below

Generator ground connection ..... Receiver Chassis
Dummy ant. in series with generator output ..... See chart below
Connection of generator output lead ..... See chart below
Generator modulation ..... 30%; 400 cycles

Position of volume control ..... Maximum

BAND SWITCH	POSITION OF DIAL	GENERATOR FREQUENCY	DUMMY ANTENNA	GENERATOR CONNECTION	TRIMMERS ADJUSTED IN ORDER SHOWN	MV
BAND A	540 KC	456 KC	.1 MFD	6D8-G GRID		60
BAND PF	6 MC	6 MC	.400 ohm	Ant. LEAD	Trimmer on Var.Osc.Sec.	
BAND PF	6 MC	6 MC	.400 ohm	Ant. LEAD	Trimmer on Coil L2	40
BAND A	1720 KC	1720 KC	.00025	Ant. LEAD	C3	
BAND A	600 KC ROCKGANG	600 KC	.00025	Ant. LEAD	C-16	25
BAND A	1500 KC	1500 KC	.00025	Ant. LEAD	Trimmer on variable Trimmer on variable	25

Align Short Wave Before Broadcast band as indicated in chart.

IMPORTANT ALIGNMENT NOTES

Before attempting to align the receiver, check to see that the dial pointer coincides with the horizontal dividing line of the scale when the gang condenser is in full mesh.

After adjusting the I.F. trimmers, go back and repeat the adjustment, since the setting of each trimmer will have some effect on the others.

When aligning the broadcast band at 600 KC. it is necessary to adjust trimmer C-16 while slowly rocking the gang condenser through a small distance. Rocking the gang is essential if max. sensitivity is to be obtained.

When aligning the short wave band, care should be taken in adjusting the oscillator trimmer on the variable condenser, since two possible adjustments of these trimmers will result in signal peaks. The proper peak is that which occurs with the trimmer screw farthest out.

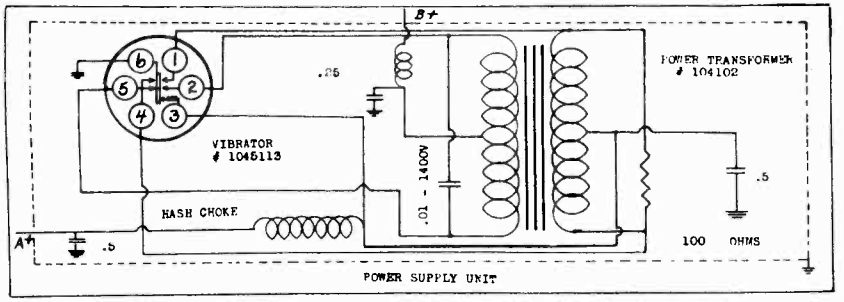


Fig. 3.

ELECTRICAL SPECIFICATIONS

TUBE COMPLEMENT
1 6D8G (6A8G) ..... 1st Det. & Osc. 1 6Q6G (6Q7G) 2nd Det.-AVC-Audio
1 6S7G (6K7G) ..... I.F. Amp. 1 6K6G ..... PWR Output

POWER SUPPLY
Standard Six Volt Storage Battery

FREQUENCY RANGES
Band A ..... 540-1720 KC.
Band PF ..... 2.1-7 MC.

ALIGNMENT FREQUENCIES
1720-1500 ..... 600 KC.
6 MC.

INTERMEDIATE FREQUENCY ..... 456 KC.

POWER OUTPUT
Type ..... Class A
Maximum ..... 1.06 Watts

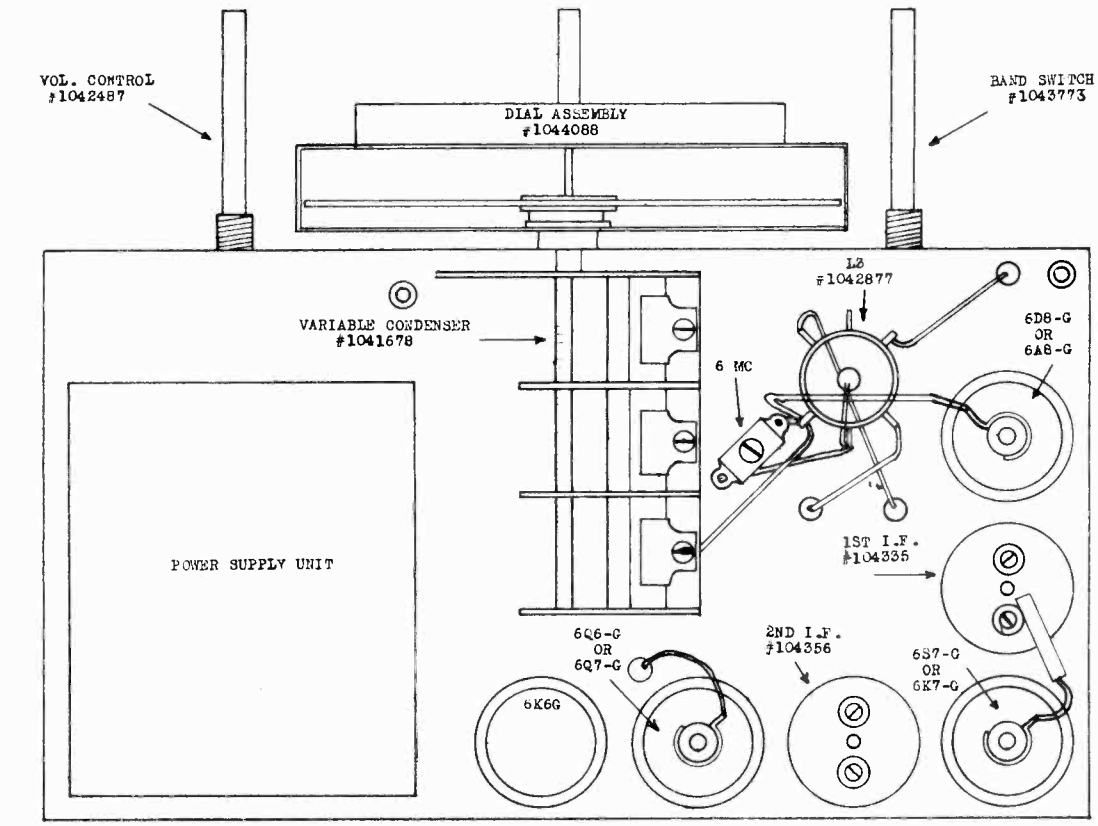
SPEAKER
Type ..... P.M. Dynamic
Size ..... 6 inch

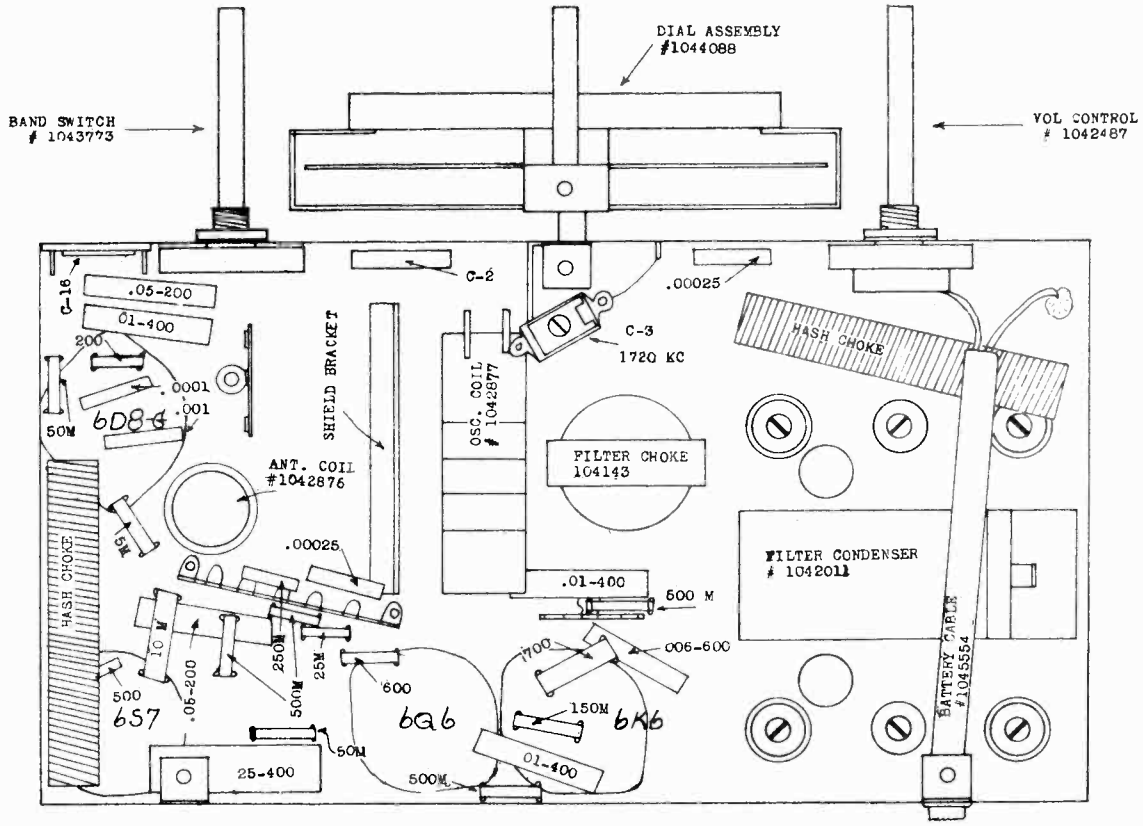
VOLTAGE CHART
All voltages measured from chassis to socket terminals. Use 1000 ohm per volt voltmeters.

TUBE	PRONG #1	#2	#3	#4	#5	#6	#7	#8	
6D8-G	0	0	130	75	-.8	110	6	2	
6S7-G	0	0	130	75	3		6	3	
6Q6-G	0	0	60				6	1	
6K6-G	0	0	130	135	0		6	7.5	

MODELS 4421,4434,4521
Socket,Trimmers,Chassis

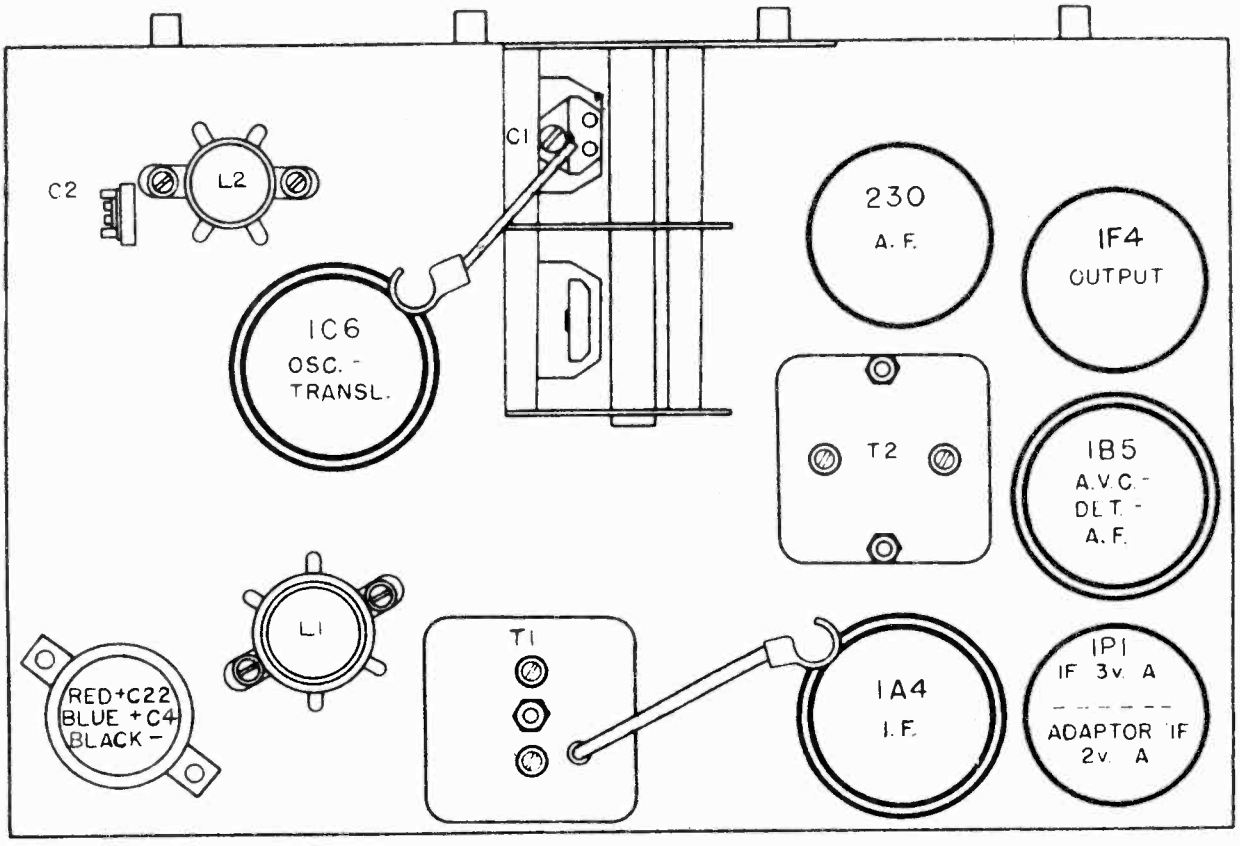
SEARS-ROEBUCK & CO.



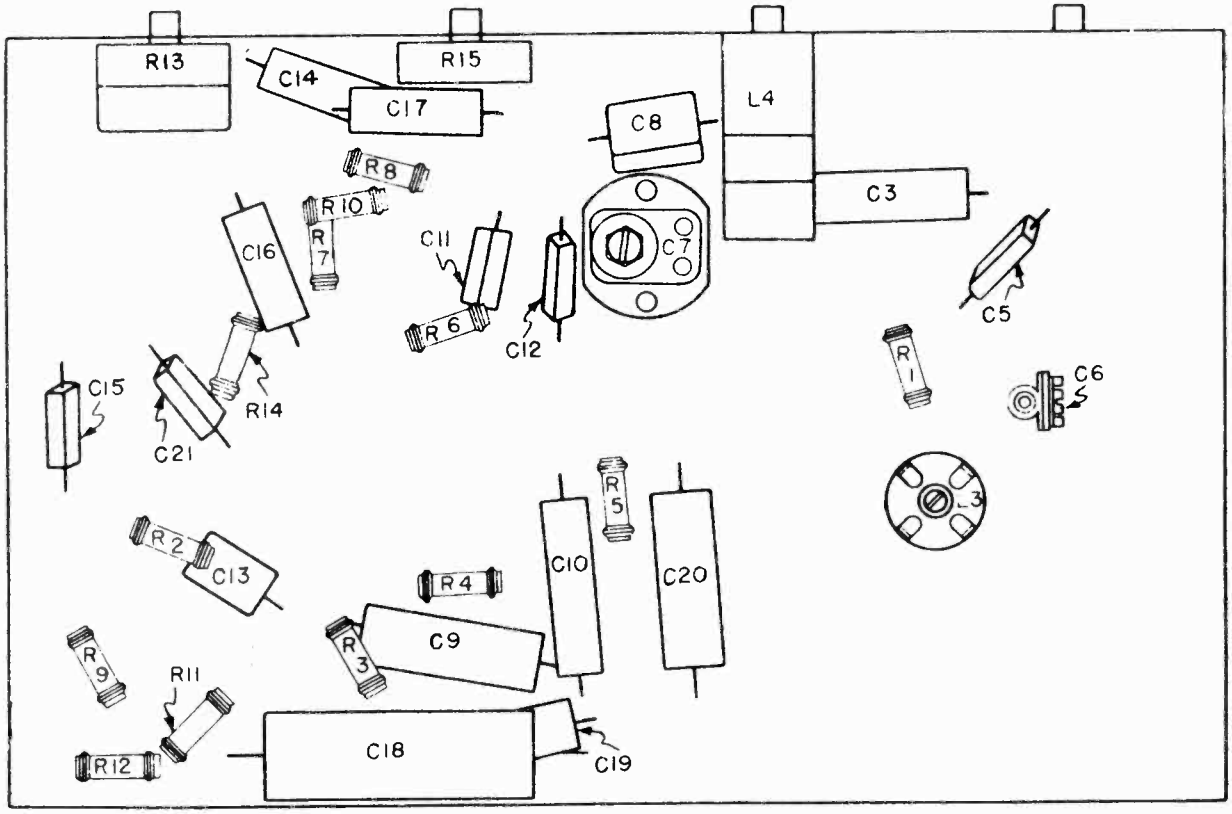


MODELS 4422,4423,4524A
4532,4542A
Socket,Trimmers,Chassis

SEARS-ROEBUCK & CO.



LOCATIONS OF PARTS ON TOP OF CHASSIS

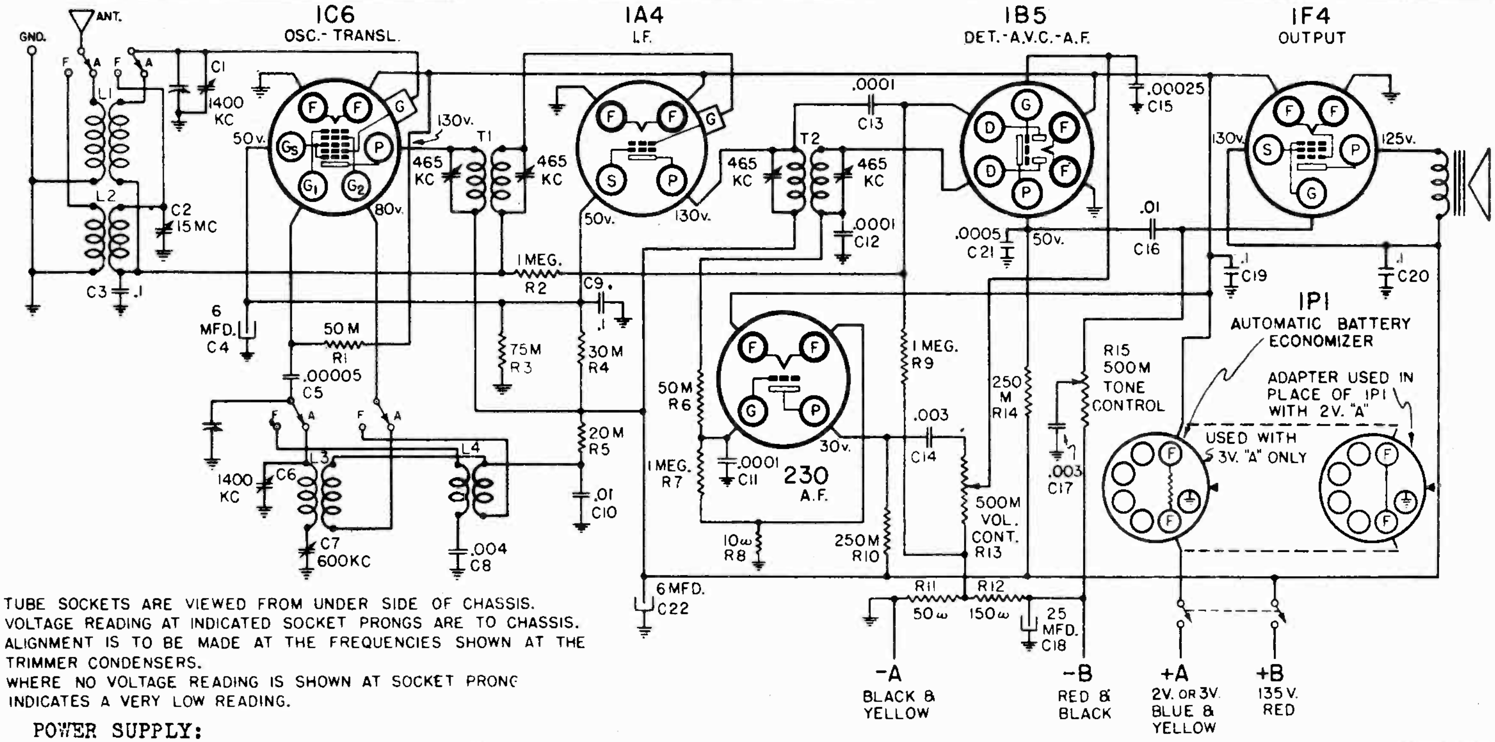


LOCATIONS OF PARTS UNDER CHASSIS

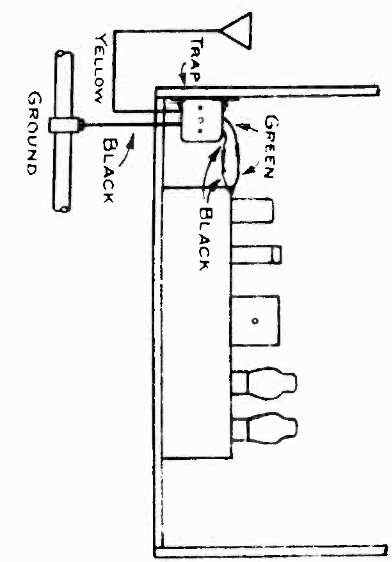
SEARS-ROEBUCK & CO.

MODELS 4422,4423,4524A
4532,4542A
Schematic,Voltage,Data

57RL 15
August 14, 1936



TUBE SOCKETS ARE VIEWED FROM UNDER SIDE OF CHASSIS.
VOLTAGE READING AT INDICATED SOCKET PRONGS ARE TO CHASSIS.
ALIGNMENT IS TO BE MADE AT THE FREQUENCIES SHOWN AT THE TRIMMER CONDENSERS.
WHERE NO VOLTAGE READING IS SHOWN AT SOCKET PRONG INDICATES A VERY LOW READING.



POWER SUPPLY:

"A" Battery (three volt)	1 - #5509P or #5023P
"A" Battery (two volt)	1 - #734
"B" Batteries	3 - #5503P
"A" Drain	.42 amperes
"B" Drain	20 ma

FREQUENCY RANGES:

Band "A"	540-1740 kc
Band "F"	5450-16500 kc

ALIGNMENT FREQUENCIES:

	Oscil. Trimmer	Ant-Transl. Trimmer	Padder
Band "A"	1400 kc	1400 kc	600 kc
Band "F"	-	15 mc	Fixed

INTERMEDIATE FREQUENCY - - - - - - - - - - 465 kc

POWER OUTPUT:

Type	Single Pentode
Undistorted	.325 watts
Maximum	.65 watts

LOUD SPEAKER:

Type	Magnetic
Size	6"
DC resistance	1000 ohms

OPERATING FEATURES:

Fiedlity Range	50 - 5000 cycles
Tone Control	Variable
Automatic Volume Control	
"On-Off" Indicator	

CHASSIS FEATURES:

Number IF stages	One
Antenna	Marconi

Automatic Battery Economizer - - Automatically compensates for decreased voltage from ageing "A" battery. (Three volt models only. Replaced by plug adapter with two volt storage "A".)

MODELS 4422,4423,4524A
4532,4542A

SEARS-ROEBUCK & CO.

Alignment, Sensitivity
Interference Elimination

PRELIMINARY:

Output meter connection - - - - - - - - - - - - - - - 4000 ohm meter, in series with a .5 mfd. condenser, across speaker terminals.

Output meter reading to indicate 50 milliwatts - - - - - - - - - - - - - - - - - - - 8.5 volts

Generator ground lead connection - Receiver chassis

Dummy antenna value to be in series with generator output - - - - - - - - - - See chart below

Connection of generator output lead - See chart below

Generator modulation - 30%, 400 cycles

Approximate average sensitivity in microvolts for 50 milliwatts output - - - See chart below

Position of volume control - Fully clockwise

Position of tone control - Fully clockwise

Position of dial pointer - - - - - - Along center line of dial with variable fully meshed.

WAVE BAND SWITCH POSITION	POSITION OF DIAL POINTER	GENERATOR FREQUENCY	DUMMY ANTENNA	GENERATOR CONNECTION	TRIMMER ADJUSTED (IN ORDER SHOWN)	MICROVOLTS
"A"	1000 kc	465 kc	.1 mfd.	1A4 Grid	T2	-
"A"	1000 kc	465 kc	.1 mfd.	1C6 Grid	T1	-
"A"	1400 kc	1400 kc	.0002 mfd.	Antenna Lead	C6,C1	15
"A"	600 kc (rock)	600 kc	.0002 mfd.	Antenna Lead	C7	15
"F"	15 mc (rock)	15 mc	400 ohms	Antenna Lead	C2	15
"F"	6 mc	6 mc	400 ohms	Antenna Lead	-	80

IMPORTANT ALIGNMENT NOTES

Where indicated by the word, "Rock", the variable should be rocked back and forth a degree or two while making the adjustment.

The figures given in the "Microvolts" column are only approximate.

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

After the alignment procedure has been completed, tune in a broadcast station at about 900 kc and, if necessary, shift the dial pointer to the station's frequency marking on the dial.

ELIMINATING WHISTLE AT 930 KC:

A whistle, due to a beat between the second harmonic (930 kc) of the 465 kc IF, and a 930 kc signal may be experienced. In localities where the 930 kc station is one that is frequently listened to, it will be desirable to shift the whistle to some other point where it will not be objectionable. This can be done by shifting the IF frequency of the receiver.

Determine at what point between 900 kc and 960 kc the whistle will be least objectionable. Dividing this frequency by two will give the new IF frequency to which the receiver should be aligned. For example, if it is determined that a whistle at 915 kc would not be objectionable, the IF should be realigned at 915/2 or 457.5 kc.

Align the IF at the new frequency and then realign the rest of the receiver as described under, "ALIGNMENT PROCEDURE".

WAVE-TRAP TO ELIMINATE INTERFERENCE FROM SHIP OR AIRPORT TRANSMITTERS:

In locations near ship transmitters or airports or air beacon stations, code interference may be experienced. Part #1013114256 wave-trap is designed to eliminate such interference.

Mount the trap, by means of two wood screws, at any convenient place on the chassis shelf or cabinet where it will be near the antenna terminal of the receiver. Connect the yellow lead of the wave-trap to the antenna downlead. Splice the green lead of the wave-trap to the green antenna lead of the receiver. Cut off any excess length of wire from the trap and from the chassis antenna lead so that the green lead from the wave-trap to the chassis is as short as possible. The yellow lead from the wave-trap should be run so that it is as far as possible from the green lead. Splice one of the black leads from the wave-trap to the black ground lead of the receiver. Connect the other wave-trap black lead to the ground used for the installation.

The trap is pre-tuned to the IF frequency so that normally no further adjustment is necessary. However, should interference still be experienced, tune the receiver between approximately 550 and 600 kc. Then adjust the wave-trap, by means of the trimmer screw at the bottom of the container, until the interference is eliminated. Addition of the trap will reduce the sensitivity of the receiver around 600 kc by approximately 50%. The customer should be forewarned of this to avoid complaints of reduced sensitivity.

MODELS 4426,4427,4446
4447,4526,4546

SEARS-ROEBUCK & CO

MODELS 4426A,4526A,4546A
Schematics,Voltage

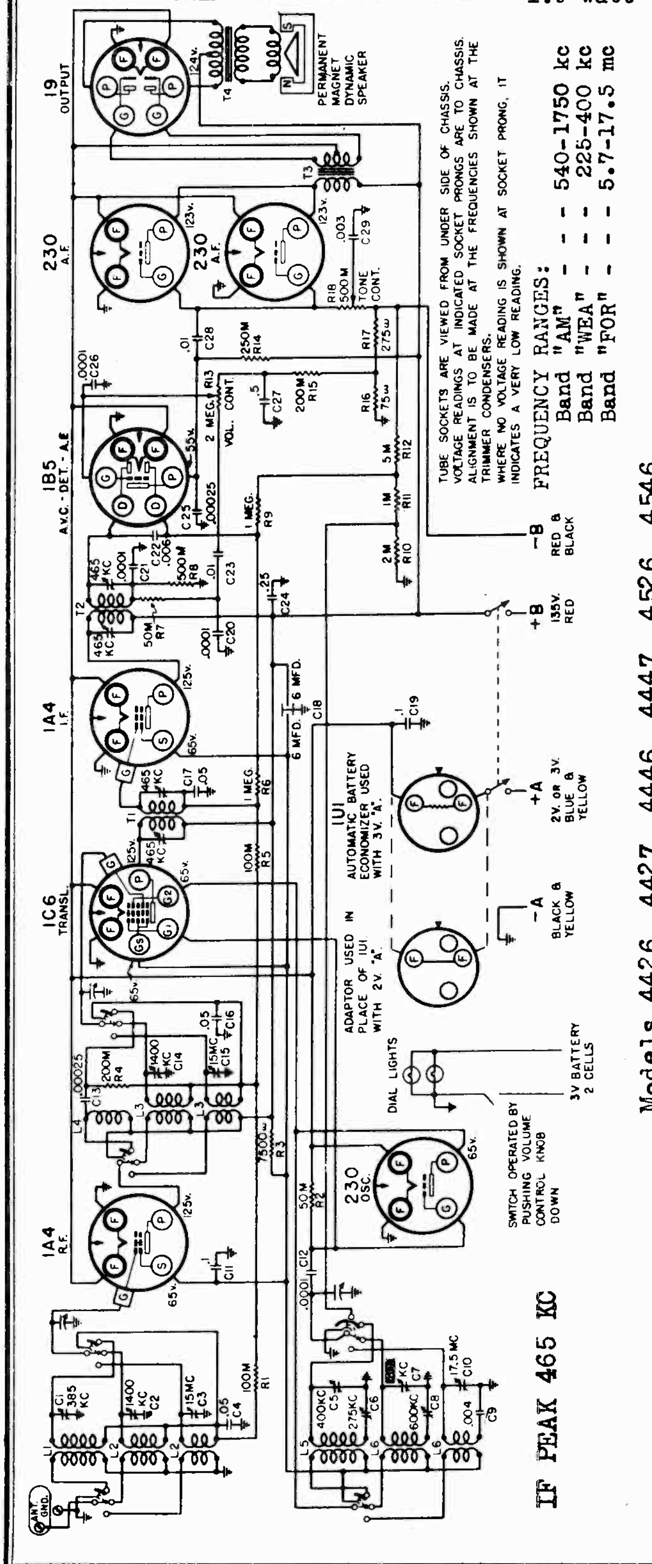
POWER SUPPLY:
"A" Battery (three volt) - 1 - #5502P
"A" Battery (two volt) - - - 1 - #5011
"B" Batteries - - - - - - - 3 - #5131P

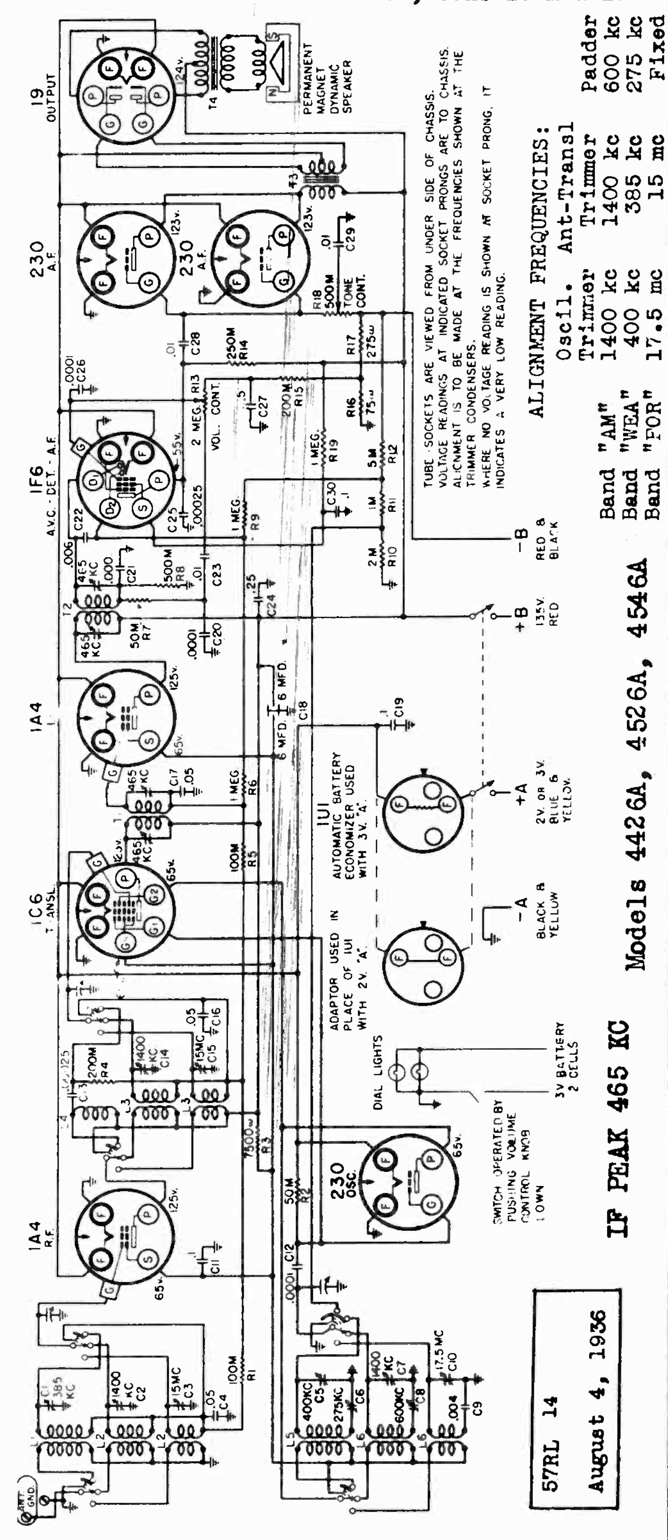
"A" Drain - - - - - - - - - .74 amperes
"B" Drain - - - - - - - - - - - 31 ma

INTERMEDIATE FREQUENCY - 465 kc

POWER OUTPUT:
Type - - - - - - - - - - - - Class "B"
Undistorted - - - - - - - - - - 1 watt
Maximum - - - - - - - - - - - 1.9 watt

LOUD SPEAKER:
Type - - - Permanent Magnet Dynamic
Size - - - - - - - 6½", table models;
8", console models





MODELS 4426,4427,4446
4447,4526,4546
MODELS 4426A,4526A,4546A
Alignment, Sensitivity
Interference Elimination

SEARS-ROEBUCK & CO.

ALIGNMENT PROCEDURE

PRELIMINARY:

Output meter connection - Across speaker voice coil

Output meter reading to indicate 50 milliwatts - - - - - - - - - - - - - - - - - - .34 volts

Average sensitivity in microvolts for 50 milliwatts output - - - - - - - - - See chart below

Generator ground lead connection - Receiver chassis

Dummy antenna value to be in series with generator output - - - - - - - - - - See chart below

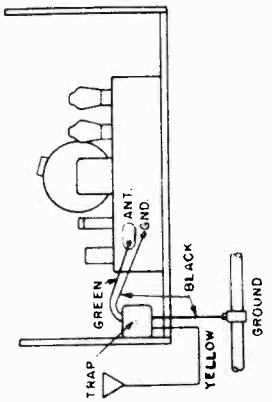
Connection of generator output lead - See chart below

Generator modulation - 30%, 400 cycles

Position of volume control - Fully on

Position of tone control - Fully clockwise

Position of dial pointer - - - - - - - To fall on second line from left, of ornamental lines running from the center of the dial to the band markings, when variable is fully meshed.



WAVE BAND SWITCH	POSITION OF VARIABLE	GENERATOR FREQUENCY	DUMMY ANTENNA	GENERATOR CONNECTION	TRIMMER ADJUSTMENTS (IN ORDER SHOWN)	MICROVOLTS
"A"	600 kc	465 kc	.1 mfd.	1A4 IF Grid	T2	-
"A"	600 kc	465 kc	.1 mfd.	1C6 Grid	T1	-
"A"	1400 kc	1400 kc	.0002 mfd.	Antenna Terminal	C7,C2,C14	6
"A"	600 kc (rock)	600 kc	.0002 mfd.	Antenna Terminal	C8	15
"W"	400 kc	400 kc	.0002 mfd.	Antenna Terminal	C5	30
"W"	385 kc	385 kc	.0002 mfd.	Antenna Terminal	C1	30
"W"	275 kc (rock)	275 kc	.0002 mfd.	Antenna Terminal	C6	60
"F"	17.5 mc	17.5 mc	400 ohms	Antenna Terminal	C10	10
"F"	15 mc	15 mc	400 ohms	Antenna Terminal	C3, C15	5
"F"	6 mc	6 mc	400 ohms	Antenna Terminal	None	60

IMPORTANT ALIGNMENT NOTES

Values shown under, "Microvolts" are approximate.

Where indicated by the word, "Rock", the variable should be rocked back and forth a degree or two during the adjustment.

The alignment procedure should be repeated band by band to secure greater accuracy. In particular, the WEATHER band alignment may have to be repeated several times since the adjustments have an effect on each other.

After the alignment has been completed, check the calibration by tuning in a broadcast station at about 900 kc. Adjust the dial pointer to the station's frequency, if necessary.

Always keep the output from the signal generator at its lowest possible value.

WAVE-TRAP TO ELIMINATE INTERFERENCE FROM SHIP OR AIRPORT TRANSMITTERS:

In locations near ship transmitters or airports or air beacon stations, code interference may be experienced. Part #1013114256 wave-trap is designed to eliminate such interference.

Mount the trap, by means of two wood screws, at any convenient place on the chassis shelf or cabinet where it will be near the antenna terminal of the receiver. Connect the yellow lead of the wave-trap to the antenna downlead. Connect the green lead of the wave-trap to the antenna terminal of the receiver. Cut off any excess length of green wire from the trap so that the green lead from the wave-trap to the chassis is as short as possible. The yellow lead from the wave-trap should be run so that it is as far as possible from the green lead. Splice one of the black leads from the wave-trap to the black ground lead of the receiver. Connect the other wave-trap black lead to the ground used for the installation.

The trap is pre-tuned to the IF frequency so that normally no further adjustment is necessary. However, should interference still be experienced, tune the receiver between approximately 550 and 600 kc. Then adjust the wave-trap, by means of the trimmer screw at the bottom of the container, until the interference is eliminated. Addition of the trap will reduce the sensitivity of the receiver around 600 kc by approximately 50%. The customer should be forewarned of this to avoid complaints of reduced sensitivity.

ELIMINATING WHISTLE AT 930 KC:

A whistle, due to a beat between the second harmonic (930 kc) of the 465 kc IF, and a 930 kc signal may be experienced. In localities where the 930 kc station is one that is frequently listened to, it will be desirable to shift the whistle to some other point where it will not be objectionable. This can be done by shifting the IF frequency of the receiver.

Determine at what point between 900 kc and 960 kc the whistle will be least objectionable. Dividing this frequency by two will give the new IF frequency to which the receiver should be aligned. For example, if it is determined that a whistle at 915 kc would not be objectionable, the IF should be realigned at 915/2 or 457.5 kc.

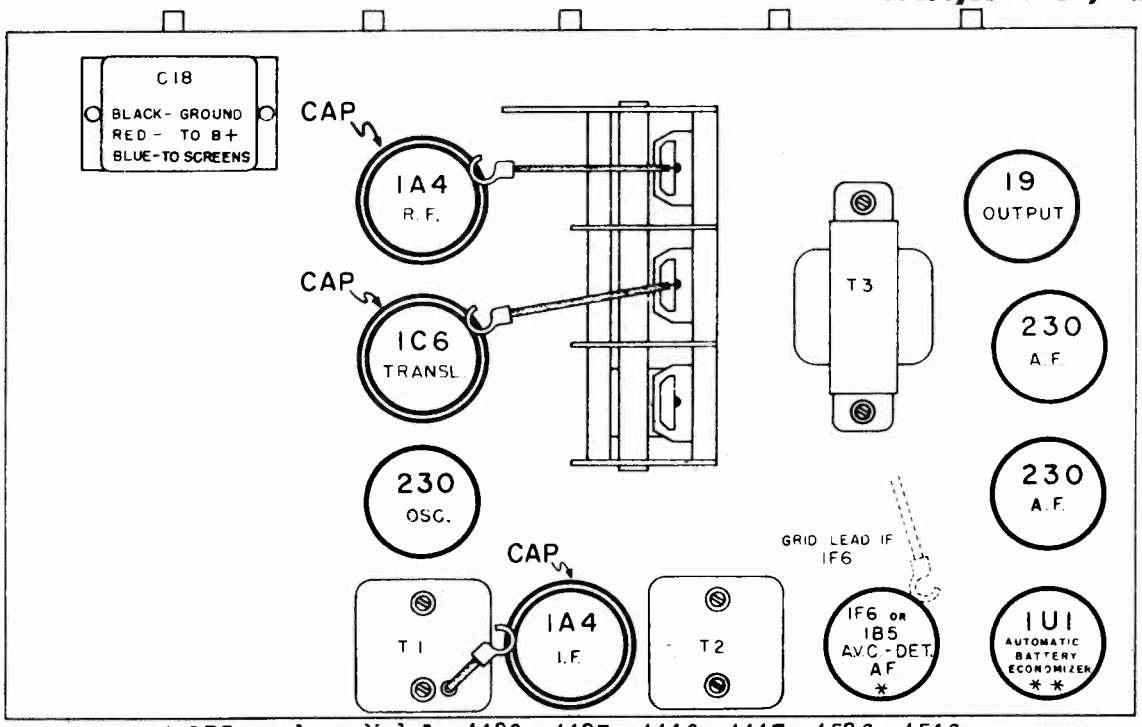
Align the IF at the new frequency and then realign the rest of the receiver as described under, "ALIGNMENT PROCEDURE".

BATTERY REPLACEMENT:

The dry "A" battery should be replaced when its voltage drops to 1.8 volts, under load. The "B" batteries should be replaced when the voltage of the 45 volt block has dropped to 34 volts, under load.

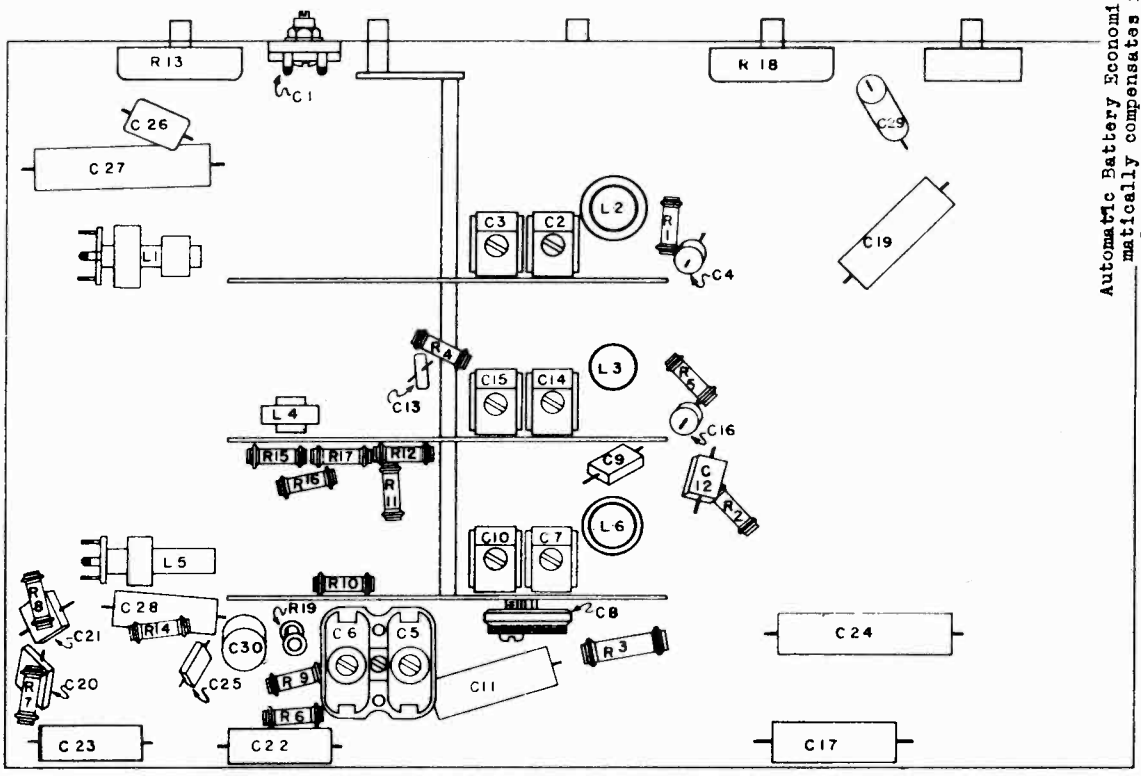
SEARS-ROEBUCK & CO.

MODELS 4426,4427,4446
4447,4526,4546
MODELS 4426A,4526A,4546A
Socket,Trimmers,Chassis



* 1B5 used on Models 4426, 4427, 4446, 4447, 4526, 4546
1F6 used on Models 4426A, 4526A, 4546A
** 1U1 used only with 3 volt dry A battery
Replaced by adapter for 2 volt storage A

LOCATIONS OF PARTS ON TOP OF CHASSIS



* Only for Models 4526A, 4426A, 4546A

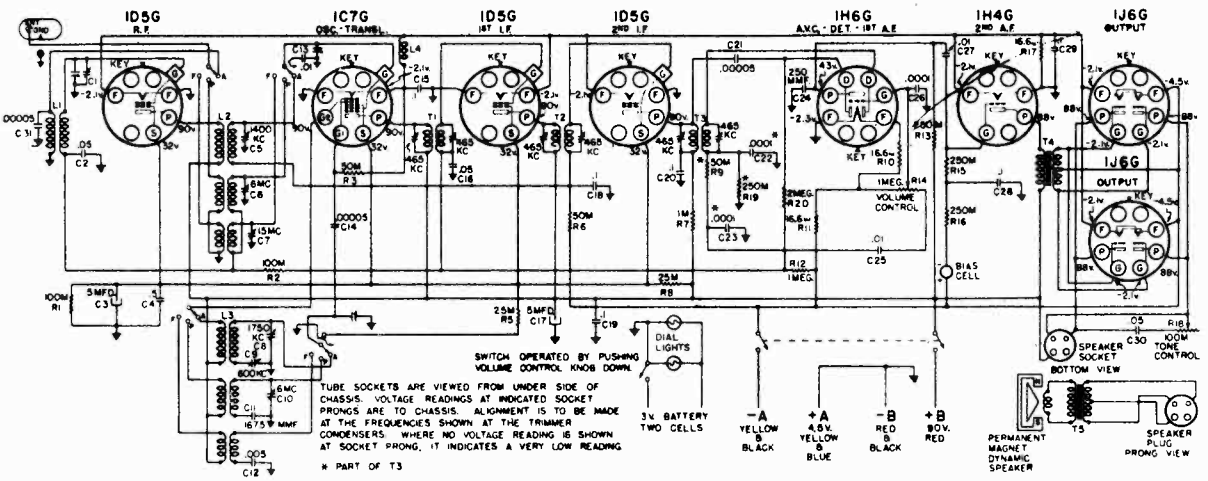
LOCATIONS OF PARTS UNDER CHASSIS

Automatic Battery Economizer - - Automatically compensates for decreased voltage from ageing "A" battery. (Three volt models only. Replaced by plug adapter with two volt storage "A".)

MODELS 4439,4440,4455
4456,4539

SEARS-ROEBUCK & CO.

Schematic,Voltage,Data

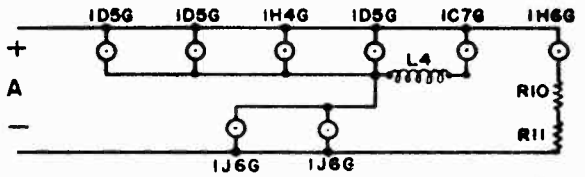


THE FILAMENT CIRCUIT:

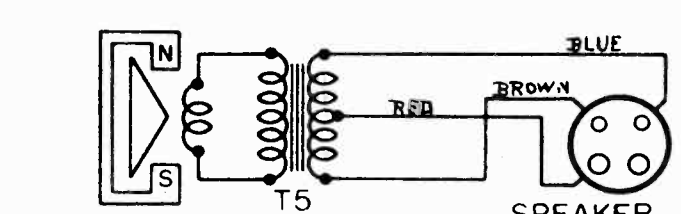
These models may be used with either a 4½ volt dry "A" battery or a 4 volt storage battery without requiring any changes in connections.

Since the tubes have two volt filaments and the "A" supply is four volts, the filaments are connected in a series parallel arrangement. The two 1J6G tubes are connected in parallel with each other to form one group. All of the other tubes except the 1H6G are connected in parallel to form a second group. These two groups are then connected in series across the "A" supply. The 1H6G tube is connected in series with the two resistors, R10 and R11, of 16.6 ohms each, across the "A" supply. A simplifed diagram of the filament circuit is shown below.

IF PEAK 465 KC

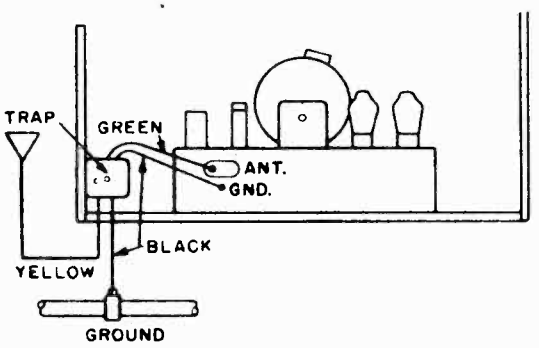


57RL 34
January 7, 1937



PERMANENT MAGNET DYNAMIC SPEAKER

SPEAKER PLUG PRONG VIEW



POWER SUPPLY:

"A" Battery (4½ volt dry)	1 - #5032P
"A" Battery (4 volt storage)	1 - #5049
"B" Batteries	2 - #5138P

"A" Drain	0.54 amperes
"B" Drain (no signal)	23 ma

FREQUENCY RANGES:

Band "A"	540-1750 kc
Band "P"	2-6.2 mc
Band "F"	6-18 mc

ALIGNMENT FREQUENCIES:

	Oscil. Trimmer	Ant.-Transl. Trimmer	Padder
Band "A"	1750 kc	1400 kc	600 kc
Band "P"	6 mc	6 mc	Fixed
Band "F"	-	17 mc	Fixed

INTERMEDIATE FREQUENCY . . . . . 465 kc

POWER OUTPUT:

Type	Parallel Class "B"
Undistorted	0.4 watt
Maximum	1 watt

LOUD SPEAKER:

Type	PM Dynamic
Size	6½"

SEARS-ROEBUCK & CO.

MODELS 4439,4440,4455
4456,4539
Socket,Trimmers,Chassis
Alignment,Sensitivity

ALIGNMENT PROCEDURE

PRELIMINARY:

Output meter connection . . . . . Across speaker voice coil
Output meter reading to indicate 50 milliwatts . . . . . 0.35 volts
Average sensitivity in microvolts for 50 milliwatts output . . . . . See chart below
Generator ground lead connection . . . . . Receiver chassis
Dummy antenna value to be in series with generator output . . . . . See chart below
Connection of generator output lead . . . . . See chart below
Generator modulation . . . . . 30%, 400 cycles
Position of Volume Control . . . . . Fully on
Position of Tone Control . . . . . Fully clockwise
Position of Dial Pointer . . . . . To fall on left edge of band indicator blocks when variable is fully meshed.

WAVE BAND SWITCH POSITION	POSITION OF DIAL POINTER	GENERATOR FREQUENCY	DUMMY ANTENNA	GENERATOR CONNECTION	TRIMMERS ADJUSTED (IN ORDER SHOWN)	TRIMMER FUNCTION	APPROXIMATE MICROVOLTS
"A"	550 kc	465 kc	.1 mfd.	1C7G Translator Grid	T3,T2,T1	IF Output, Interstage, Input	130
"A"	Variable Fully Open	1750 kc	.0002 mfd.	Ant. Term.	C8	Oscillator	30
"A"	1400 kc	1400 kc	.0002 mfd.	Ant. Term.	C5,C1	RF, Antenna	12
"A"	600 kc (rock)	600 kc	.0002 mfd.	Ant. Term.	C9	Osc. Pad.	12
"A"	540 kc	540 kc	.0002 mfd.	Ant. Term.	-	-	30
"B"	6 mc	6 mc	400 ohms	Ant. Term.	C10 *	Oscillator	-
"B"	6 mc	6 mc	400 ohms	Ant. Term.	C8	Translator	5
"B"	2 mc	2 mc	400 ohms	Ant. Term.	-	-	20
"B"	18 mc	18 mc	400 ohms	Ant. Term.	**	-	15
"B"	17 mc (rock)	17 mc	400 ohms	Ant. Term.	C7	Translator	6
"B"	6 mc	6 mc	400 ohms	Ant. Term.	-	-	25

IMPORTANT ALIGNMENT NOTES

There indicated by the word, "Rock", the variable should be rocked back and forth a degree or two while making the adjustment.

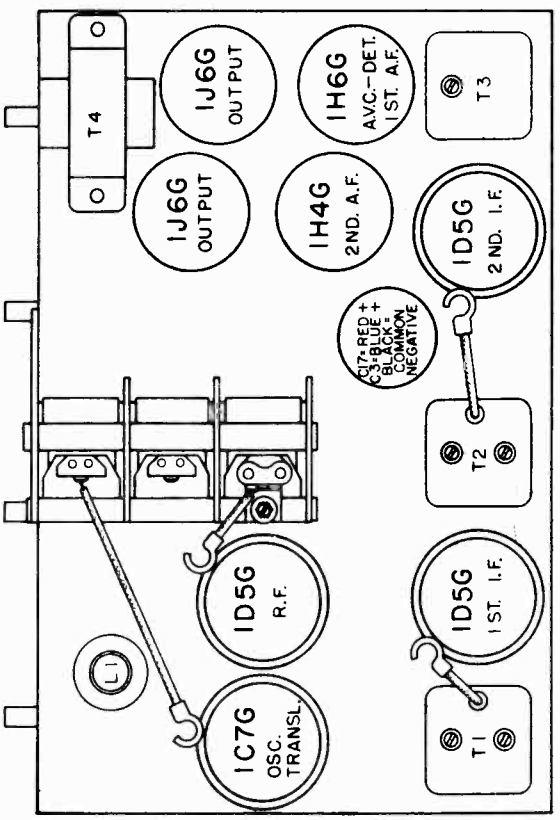
(*) Two peaks will be found at two different settings of the trimmer. The correct one is the one in which the trimmer is screwed further out (lesser capacity).

(**) Adjust the calibration at 18 mc by pushing the yellow lead that comes from the center section of the variable either nearer to or away from the variable.

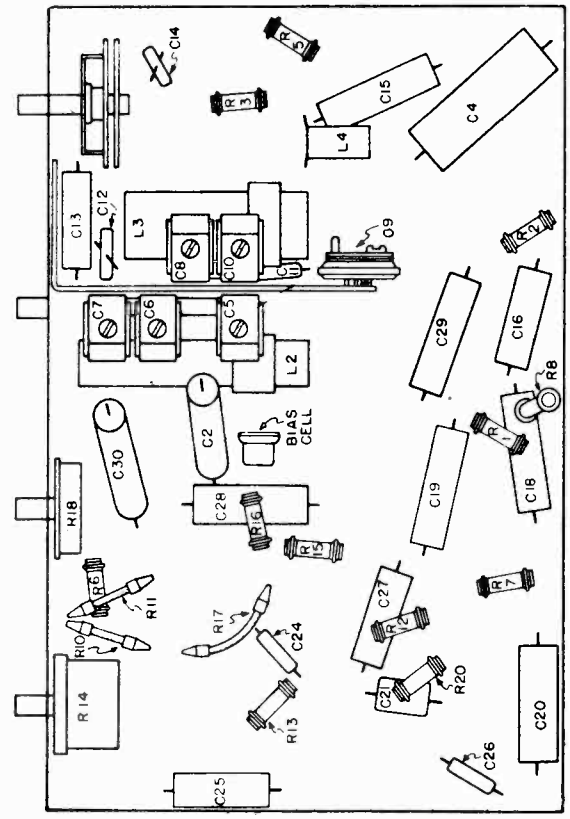
It is advisable to repeat the entire alignment procedure band by band and in the original order to insure greater accuracy.

Always keep the output power from the test oscillator at its lowest possible value. This will prevent the AVC action of the receiver from interfering with accurate alignment. As the sensitivity is increased by alignment, the generator output power should be reduced correspondingly.

Values shown under, "Microvolts", are only approximate.



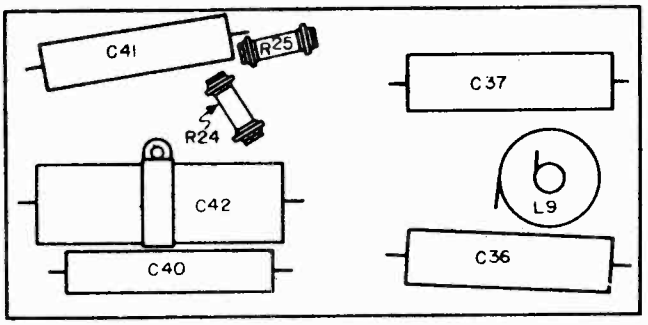
LOCATIONS OF PARTS ON TOP OF CHASSIS



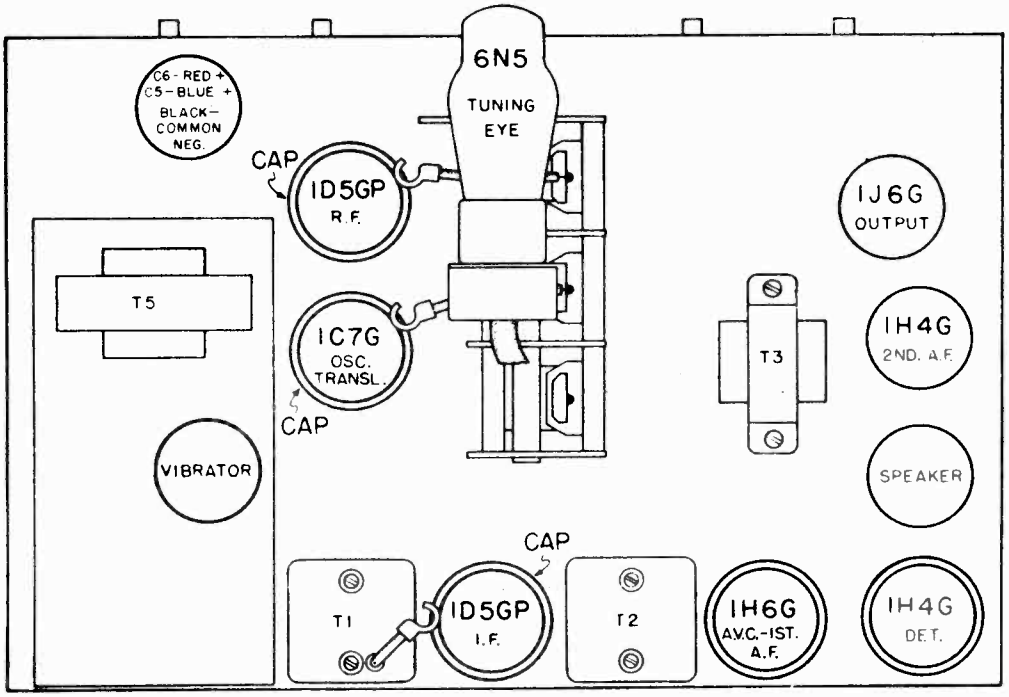
LOCATIONS OF PARTS UNDER CHASSIS

MODELS 4441, 4451
Socket, Trimmers
Chassis, Notes

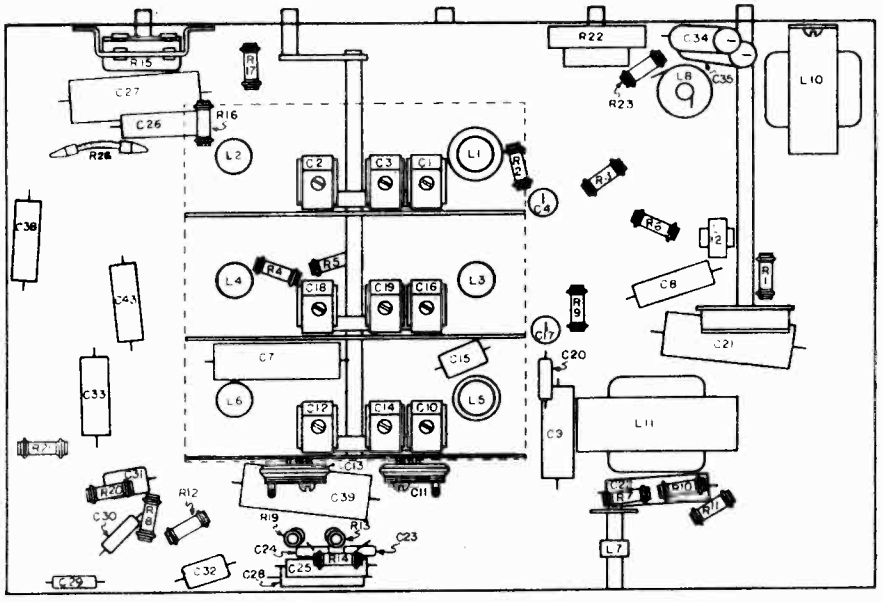
SEARS-ROEBUCK & CO.



LOCATIONS OF PARTS UNDER POWER SUPPLY UNIT



LOCATIONS OF PARTS ON TOP OF CHASSIS



LOCATIONS OF PARTS UNDER CHASSIS.

MECHANICAL SPECIFICATIONS

CHASSIS FEATURES:

Number RF stages	One on Broadcast band
Number IF stages	One
Number condensers in gang	Three
Antenna	Conventional
Synchronous Vibrator - Rectifier	

CONTROL OPERATION:

Turning right: Volume increase. Pushing down: Dial Light on; Tuning Eye on.
Turning right: "AM", "POL", "FM"
Dual ratio: 10 to 1; 50 to 1
Turning right: Power on; Bass to treble
Right: sharp. Left: broad.

OPERATING CONTROLS:

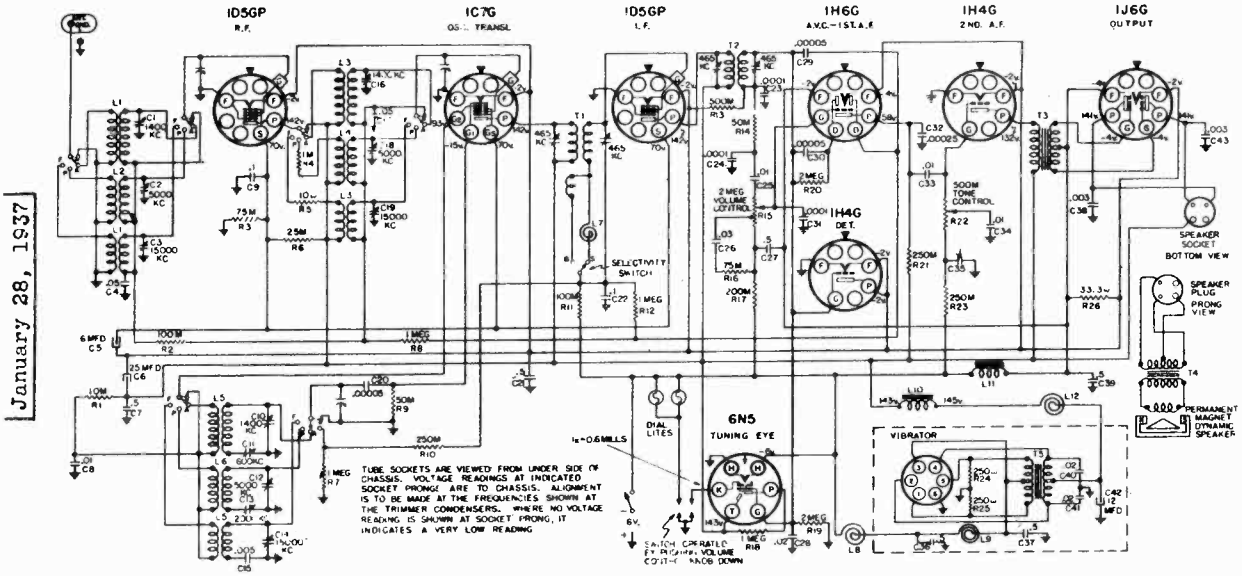
1. Left knob . . . Volume Control, Dial Light Switch, Tuning Eye Switch
2. Next to left knob . Wave Band Switch
3. Center knob . . . Station Selector
4. Next to right knob . "On-Off" Switch and Tone Control
5. Right knob . . . Selectivity Switch

Alignment, Sensitivity
Interference Elimination

SEARS-ROEBUCK & CO.

MODELS 4441, 4451
Schematic, Voltage

January 28, 1937



WAVE BAND SWITCH POSITION	POSITION OF DIAL POINTER	GENERATOR FREQUENCY	DUMMY ANTENNA	GENERATOR CONNECTION	TRIMMERS ADJUSTED (IN ORDER SHOWN)	TRIMMER FUNCTION	APPROXIMATE MICROVOLTS
"AM"	Closed	465 kc	.1 mfd.	1C7G Grid	T2, T1	IF	350
"AM"	1400 kc	1400 kc	.0002 mfd.	Ant. Term.	C10, C16, C1	Osc., Transl., RF	40
"AM"	600 kc (rock)	600 kc	.0002 mfd.	Ant. Term.	C11	Padder	40
"POL"	5 mc	5 mc	400 ohms	Ant. Term.	C12, C18, C2	Osc., Transl., RF	45
"POL"	2 mc (rock)	2 mc	400 ohms	Ant. Term.	C13	Padder	55
"FOR"	15 mc	15 mc	400 ohms	Ant. Term.	C14, C19, C3	Osc., Transl. RF	20
"FOR"	18 mc	18 mc	400 ohms	Ant. Term.	-	-	250
"FOR"	6 mc	6 mc	400 ohms	Ant. Term.	-	-	175

IMPORTANT ALIGNMENT NOTES

Where indicated by the word, "Rock", the variable should be rocked back and forth a degree or two while making the adjustment.

Always keep the output from the signal generator at its lowest possible value to prevent the AVC action of the receiver from interfering with accurate alignment. As the receiver sensitivity is increased through alignment, the output from the generator should be decreased to compensate.

ELIMINATING WHISTLE AT 930 KC:

A whistle, due to a beat between the second harmonic (930 kc) of the 465 kc IF, and a 930 kc signal may be experienced. In localities where the 930 kc station is one that is frequently listened to, it will be desirable to shift the whistle to some other point where it will not be objectionable. This can be done by shifting the IF frequency of the receiver.

Determine at what point between 900 kc and 960 kc the whistle will be least objectionable. Dividing this frequency by two will give the new IF frequency to which the receiver should be aligned. For example, if it is determined that a whistle at 915 kc would not be objectionable, the IF should be realigned at 915/2 or 457.5 kc.

Align the IF at the new frequency and then realign the rest of the receiver as described under, "ALIGNMENT PROCEDURE".

WAVE-TRAP TO ELIMINATE INTERFERENCE FROM SHIP OR AIRPORT TRANSMITTERS:

The trap is pre-tuned to the IF frequency so that normally no further adjustment is necessary. However, should interference still be experienced, tune the receiver between approximately 550 and 600 kc. Then adjust the wave-trap, by means of the trimmer screw at the bottom of the container, until the interference is eliminated. Addition of the trap will reduce the sensitivity of the receiver around 600 kc by approximately 50%. The customer should be forewarned of this to avoid complaints of reduced sensitivity.

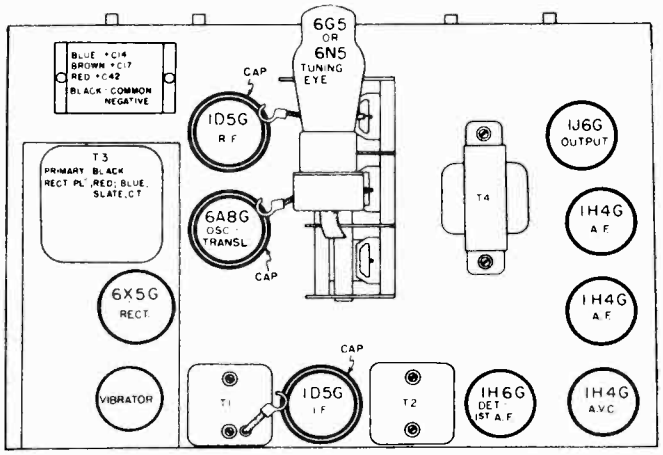
MODELS 4450,4550
Socket,Trimmers,Chassis
Sensitivity Notes, Data

SEARS-ROEBUCK & CO.

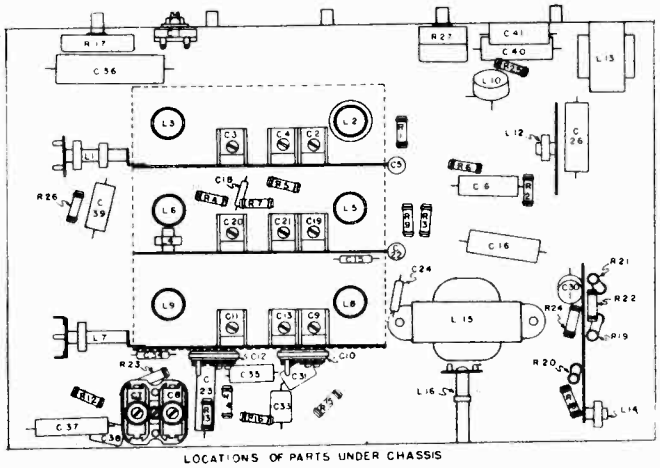
OPERATION OF THE 6G5 OR 6N5 TUNING EYE TUBE:

The type 6G5 or 6N5 tuning eye tube, used in this receiver, operates over a signal input range about three times greater than can be handled by the 6E5 tube,used in some of last years receivers. With the 6E5 tube, if the circuits are designed so that the tube responds to a moderately weak signal, it will overlap with strong signals. Any signal stronger than that required to close the eye cannot be tuned accurately by the eye. The 6G5 or 6N5 tube provides an even more sensitive indication for weak signals than the 6E5 and will not overlap except under extreme local conditions.

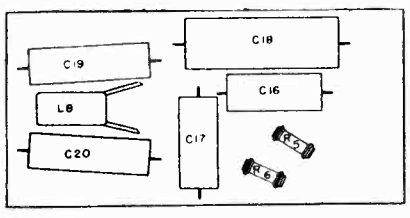
However, the range of signal input over which the receiver must work is so great that even this 6G5 or 6N5 variable mu tube cannot completely satisfy all conditions. In addition to the limitations of the tube itself, there are variations between receivers, even though they be of the same model, that affect the signal required to close the eye. If several tubes are available to choose from, it may be possible to select one that will operate more satisfactorily in a particular location.



LOCATIONS OF PARTS ON TOP OF CHASSIS



LOCATIONS OF PARTS UNDER CHASSIS



LOCATIONS OF PARTS UNDER POWER SUPPLY UNIT

FREQUENCY RANGES:
Band "WEA" - - - - - - - - - - 220-400 kc
Band "AM" - - - - - - - - - - 540-1750 kc
Band "POL" - - - - - - - - - - 1750-5850 kc
Band "FOR" - - - - - - - - - - 5.8-17.5 mc

OPERATING CONTROLS:
1. Right knob - - Selectivity Control
2. Next to right knob-"On-Off" Switch and Tone Control
3. Middle knob - - Station Selector
4. Next to left knob-Wave Band Switch
5. Left knob - - - - - - - - - - Volume

CHASSIS FEATURES:
Number RF stages - - - - - - - - - - One
Number IF stages - - - - - - - - - - One
Antenna - - - - - - - - - - Conventional

OPERATING FEATURES:
Fidelity Range - - 50 - 5000 cycles
Tone Control - - - - - - - - Variable
Selectivity Control - - Two position
Automatic Volume Control

CONTROL OPERATION:
Turning right: sharp. Left:broad
Turning right: Power on; bass to treble

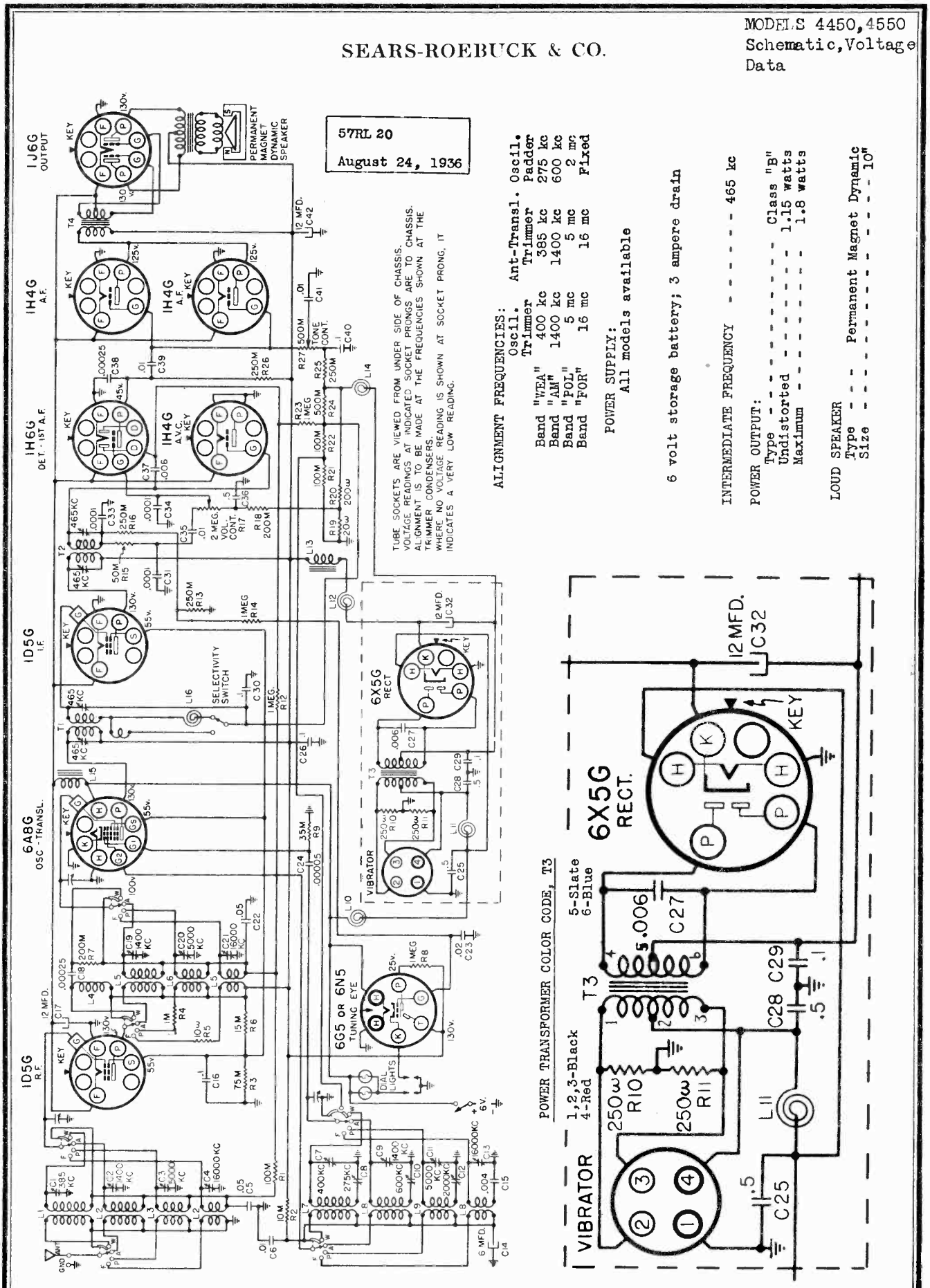
Tuning ratio: 10:1; 50:1
Turning right:"WEA","AM", "POL", "FOR"
Turning right: volume increase. Pushing down, illuminate dial and actuate tuning eye.

VARIABLE SELECTIVITY:

Variable Selectivity is obtained by a two position switch. It changes the selectivity of the IF input transformer, T1, by connecting or disconnecting coupling turns between primary and secondary. The coil, L16, compensates for the loss of inductance when the coupling turns are disconnected, thereby keeping the transformer tuned to 465 kc.

SEARS-ROEBUCK & CO.

MODELS 4450, 4550
Schematic, Voltage Data



ALIGNMENT FREQUENCIES:

	Oscil. Trimmer	Ant-Transl. Trimmer	Oscil. Padder
Band "WEA"	400 kc	385 kc	275 kc
Band "AM"	1400 kc	1400 kc	600 kc
Band "POL"	5 mc	5 mc	2 mc
Band "FOR"	16 mc	16 mc	Fixed

POWER SUPPLY:
All models available

6 volt storage battery; 3 ampere drain

INTERMEDIATE FREQUENCY - - - - - - - - - - - - 465 kc

POWER OUTPUT:
Type - Class "B"
Undistorted - - - - - - - - - - - - - - - - 1.15 watts
Maximum - - - - - - - - - - - - - - - - - - 1.8 watts

LOUD SPEAKER
Type - - - Permanent Magnet Dynamic
Size - 10"

MODELS 4450,4550
Alignment,Sensitivity
Whistle Elimination

SEARS-ROEBUCK & CO.

TEN TUBE, FOUR BAND, SIX VOLT STORAGE BATTERY OPERATED SUPERHETERODYNE

ALIGNMENT PROCEDURE

PRELIMINARY:

Output meter connections - - - - - - - - - - - - - - - - - Across speaker voice coil leads

Output meter reading to indicate .5 watts output - - - - - - - - - - - - - - - - 1.05 volts

Dummy antenna value to be in series with generator output - - - - - - - - - See chart below

Connection of generator output lead - See chart below

Connection of generator ground lead - Receiver chassis

Generator modulation - 30%, 400 cycles

Position of volume control - Fully clockwise

Position of tone control - Fully clockwise

Position of selectivity control - Fully clockwise

Position of dial pointer - - To fall on second line from right, of ornamental lines running from tuning eye toward dial center, when variable is fully meshed.

WAVE BAND SWITCH POSITION	POSITION OF DIAL POINTER	GENERATOR FREQUENCY	DUMMY ANTENNA	GENERATOR CONNECTION	TRIMMERS ADJUSTED (IN ORDER SHOWN)	APPROXIMATE MICROVOLTS
"AM"	550 kc	465 kc	.1 mfd.	6A8G Grid	T2,T1	-
"AM"	1400 kc	1400 kc	.0002 mfd.	Antenna Terminal	C9,C2,C19	15
"AM"	600 kc (rock)	600 kc	.0002 mfd.	Antenna Terminal	C10	30
"WEA"	Fully clockwise	400 kc	.0002 mfd.	Antenna Terminal	C7	50
"WEA"	385 kc	385 kc	.0002 mfd.	Antenna Terminal	C1	80
"WEA"	275 kc (rock)	275 kc	.0002 mfd.	Antenna Terminal	C8	175
"POL"	5 mc	5 mc	400 ohms	Antenna Terminal	C11,C3,C20	40
"POL"	2 mc (rock)	2 mc	400 ohms	Antenna Terminal	C12	65
"FOR"	16 mc	16 mc	400 ohms	Antenna Terminal	C13,C4,C21	30
"FOR"	6 mc	6 mc	400 ohms	Antenna Terminal	-	125

These models use a six volt storage battery for the "A" supply. A plug-in vibrator used with a step-up transformer and 6X5G rectifier tube furnishes the plate and screen voltage.

THE DIAL LIGHT AND TUNING EYE SWITCH:

Pushing down on the Volume Control knob actuates a switch to illuminate the dial. Pushing further down on the knob actuates another switch to cause the Tuning Eye to function. When the knob is released, both the dial light and the Tuning Eye become disconnected.

IMPORTANT ALIGNMENT NOTES

Where indicated by the word, "Rock", the variable should be rocked back and forth a degree or two while making the adjustment.

After completing the alignment for each band repeat it in the original order,for greater accuracy. This is particularly necessary for the Weather Band as the adjustments affect each other. Always keep the output power from the generator at its lowest possible value to prevent the AVC action of the set from interfering with accurate alignment.

After the alignment procedure has been completed, tune in a station at about 900 kc. If necessary, shift the dial pointer so that it indicates the station's frequency on the dial.

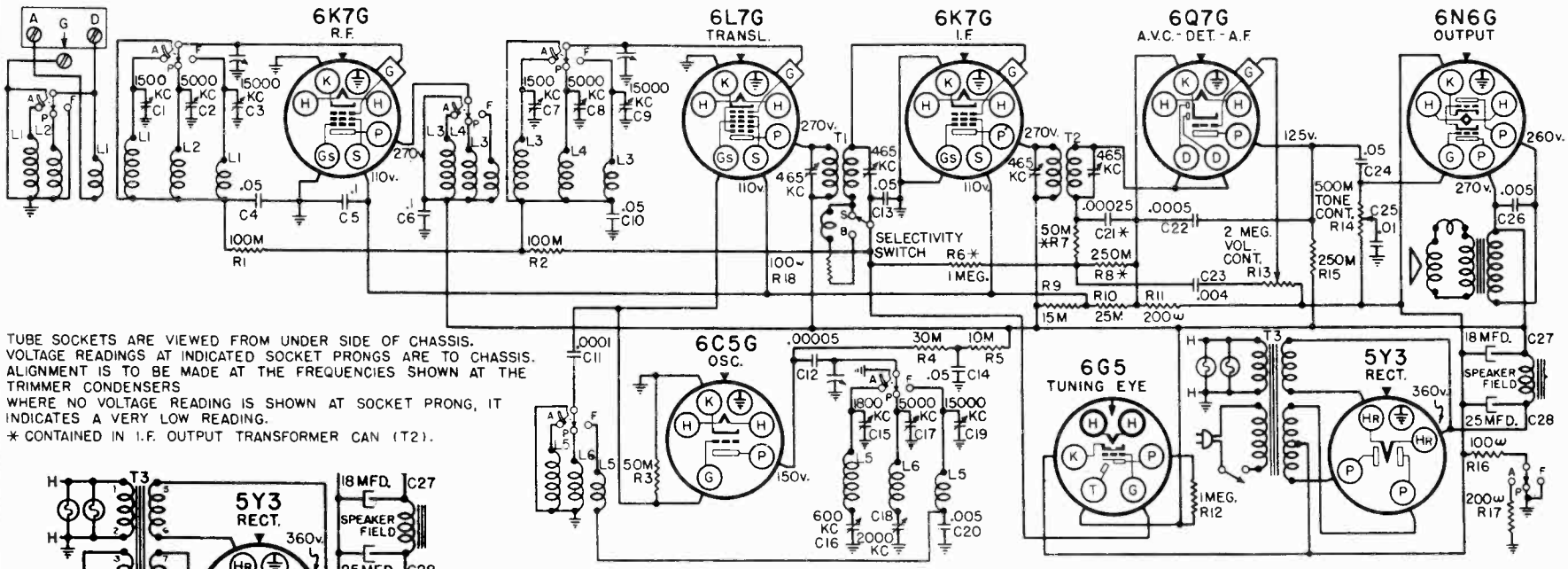
Values shown under, "Microvolts", are only approximate.

ELIMINATING WHISTLE AT 930 KC:

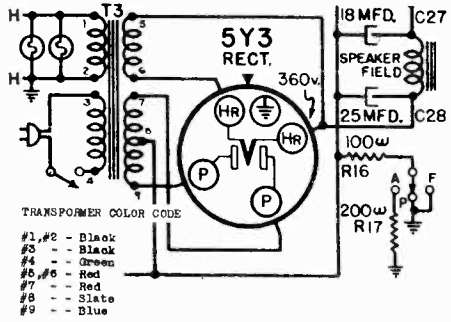
A whistle, due to a beat between the second harmonic (930 kc)of the 465 kc IF,and a 930 kc signal may be experienced. In localities where the 930 kc station is one that is frequently listened to, it will be desirable to shift the whistle to some other point where it will not be objectionable. This can be done by shifting the IF frequency of the receiver.

Determine at what point between 900 kc and 960 kc the whistle will be least objectionable. Dividing this frequency by two will give the new IF frequency to which the receiver should be aligned. For example, if it is determined that a whistle at 915 kc would not be objectionable, the IF should be realigned at 915/2 or 457.5 kc.

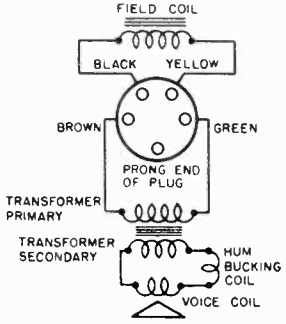
Align the IF at the new frequency and then realign the rest of the receiver as described under, "ALIGNMENT PROCEDURE".



TUBE SOCKETS ARE VIEWED FROM UNDER SIDE OF CHASSIS.
VOLTAGE READINGS AT INDICATED SOCKET PRONGS ARE TO CHASSIS.
ALIGNMENT IS TO BE MADE AT THE FREQUENCIES SHOWN AT THE TRIMMER CONDENSERS
WHERE NO VOLTAGE READING IS SHOWN AT SOCKET PRONG, IT INDICATES A VERY LOW READING.
* CONTAINED IN I.F. OUTPUT TRANSFORMER CAN (T2).



POWER TRANSFORMER COLOR CODE AND CONNECTIONS



SPEAKER CONNECTIONS

57RL -2
June 24, 1936

POWER SUPPLY:
All models available - - - - - - - - - - - - - - - - 105-125 volts, 50-60 cycle, 85 watts
All models available - - - - - - - - - - - - - - - - 105-125 volts, 25 cycle, 85 watts

FREQUENCY RANGES:

Band "A"	540-1800 kc
Band "P"	1800-6000 kc
Band "F"	6-18 mc

ALIGNMENT FREQUENCIES:

	Osc Trimmer	Ant-Transl Trimmer	Padder
Band "A"	1800 kc	1500 kc	600 kc
Band "P"	5000 kc	5000 kc	2000 kc
Band "F"	15 mc	15 mc	Fixed

INTERMEDIATE FREQUENCY - 465 kc

POWER OUTPUT:

Type	Single Pentode
Undistorted	3 watts
Maximum	9.3 watts

LOUD SPEAKER:

Type	Dynamic
Size	6" and 8"
Field coil resistance	1300 ohms
Field coil voltage drop	90 volts

ELIMINATING WHISTLE AT 930 KC:

A whistle, due to a beat between the second harmonic (930 kc) of the 465 kc IF, and a 930 kc signal may be experienced. In localities where the 930 kc station is one that is frequently listened to, it will be desirable to shift the whistle to some other point where it will not be objectionable. This can be done by shifting the IF frequency of the receiver.

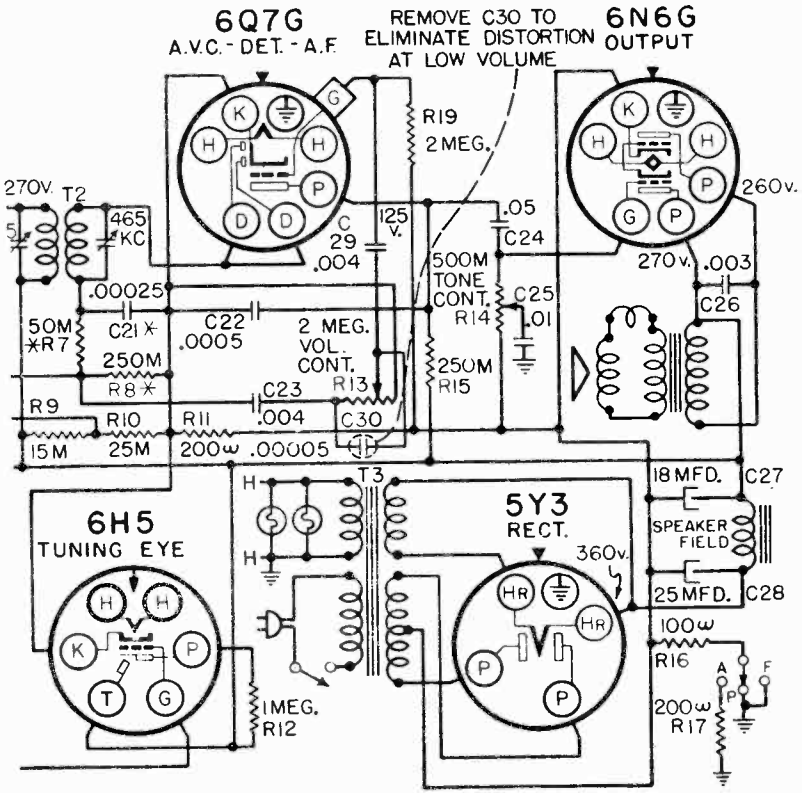
Determine at what point between 900 kc and 960 kc the whistle will be least objectionable. Dividing this frequency by two will give the new IF frequency to which the receiver should be aligned. For example, if it is determined that a whistle at 915 kc would not be objectionable, the IF should be realigned at 915/2 or 457.5 kc.

SUBJECT: ELIMINATING DISTORTION AT LOW VOLUME

Chassis In Which This Change May Be Necessary:

Chassis which are rubber stamped with the letter "H" after the number 101.410, on the Chassis Identification Sticker, are the only ones in which this change may be necessary. Chassis with any other rubber stamped letter or with no letter are not affected.

Chassis with the rubber stamped letter "H" have a 50 mmf. condenser, C30, connected from the high side of the Volume Control to the movable arm. If distortion, occurring only at low volume levels, is encountered, this 50 mmf. condenser should be removed from the circuit.



SUBJECT: APPROXIMATE AVERAGE SENSITIVITY IN MICROVOLTS FOR .5 WATTS OUTPUT

SUBJECT: PREVENTION OF MOTORBOATING

APPROXIMATE AVERAGE SENSITIVITY IN MICROVOLTS FOR .5 WATTS OUTPUT:

The generator connections and the receiver settings are to be as described in Service Instructions #57RL 12, for this model. The generator modulation is to be 30% at 400 cycles.

Band	Frequency	Microvolts
"A"	600 kc	25
"A"	1000 kc	15
"A"	1500 kc	12
"A"	1600 kc	30
"A"	1800 kc	100
"P"	2 mc	20
"P"	3 mc	8
"P"	5 mc	2
"P"	6 mc	8
"F"	6 mc	50
"P"	10 mc	8
"P"	12 mc	4
"F"	15 mc	2

PREVENTION OF MOTORBOATING:

If the two grid leads from the variable condenser, to the 6K7G RF tube and 6L7G translator tube, are too close together motorboating may occur. If necessary, separate the leads to prevent this possibility.

OPERATING FEATURES:
- Fidelity Range - - - 50 - 5000 cycles
- Tone Control - - - - - - - - Variable
- Selectivity Control - - Two position
- Resonance Indicator - - - Tuning Eye
- Sensitivity Control - - - Automatic
- Automatic Volume Control
- Dual Ratio Tuning

CHASSIS FEATURES:
- Number Tuned RF stages - - - - - - One
- Number IF stages - - - - - - - - - One
- Number condensers in gang - - - Three
- Antenna - - Doublet or Conventional

MECHANICAL SPECIFICATIONS

OPERATING CONTROLS:
1. Left knob - - "On-Off" switch and volume
2. Next to left knob - Wave Band Switch
3. Middle knob - - - Station Selector
4. Next to right knob - Tone Control
5. Right knob - - Selectivity Control

CONTROL OPERATION:
- Turning right; Power on; volume increase
- Turning right: "AM", "POL", "FOR"
- Tuning ratio: 10:1; 50:1
- Turning left: bass; right: treble
- Turning right: sharp; turning left: broad

ALIGNMENT PROCEDURE

PRELIMINARY:

Output meter connections - Across voice coil leads

Output meter reading to indicate .5 watts output - - - - - - - - - - - - - - - - 1.1 volts

Dummy antenna value to be in series with generator output - - - - - - - - - See chart below

Connection of generator output lead - See chart below

Connection of generator ground lead - Receiver chassis

Position of volume control - Fully on

Position of tone control - Fully clockwise

Position of selectivity control - Fully clockwise

Position of dial pointer - - To fall on second line from right, of ornamental lines running from tuning eye toward dial center, when variable is fully meshed.

WAVE BAND SWITCH POSITION	POSITION OF DIAL POINTER	GENERATOR FREQUENCY	DUMMY ANTENNA	GENERATOR CONNECTION	TRIMMERS ADJUSTED (IN ORDER SHOWN)
"A"	-	465 kc	.1 mfd.	6L7G Grid	T2,T1
"A"	1800 kc	1800 kc	.0002 mfd.	Antenna Terminal	C15
"A"	1500 kc	1500 kc	.0002 mfd.	Antenna Terminal	C1,C7
"A"	600 kc (Rock)	600 kc	.0002 mfd.	Antenna Terminal	C16
"P"	5000 kc	5000 kc	400 ohms	Antenna Terminal	C17 *
"P"	5000 kc	5000 kc	400 ohms	Antenna Terminal	C2,C8
"P"	2000 kc (Rock)	2000 kc	400 ohms	Antenna Terminal	C18
"P"	15 mc	15 mc	400 ohms	Antenna Terminal	C19 *
"P"	15 mc	15 mc	400 ohms	Antenna Terminal	C3,C9

IMPORTANT ALIGNMENT NOTES

* - Care must be taken in making this adjustment since two peaks may be obtained at two different settings of the trimmer. The proper peak is the one that is had when the trimmer is screwed furthest out (least capacity).

After completing the alignment for each band repeat it in the original order, for greater accuracy. Always keep the output power from the generator at its lowest possible value, to render the AVC action of the receiver inoperative.

Only the dummy antenna indicated in the chart for any particular band should be used. Disconnect the dummy antenna used for alignment of any other band.

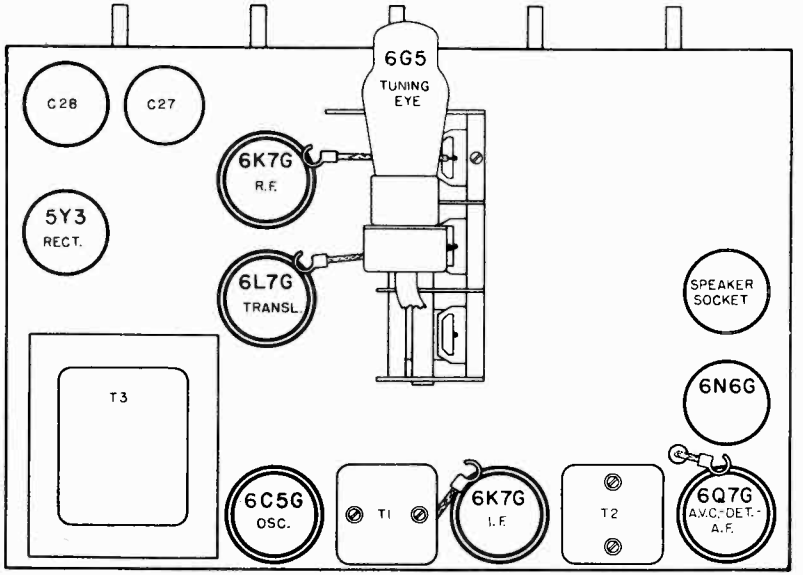
After the alignment procedure has been completed, tune in a station at about 1000 kc. If necessary, set the dial pointer to the exact frequency of the station

GENERAL INFORMATION

There is a terminal board at the rear of the chassis marked, "ANT", "DBL", "GND", indicating antenna, doublet, and ground, respectively. The "DBL" terminal is left unconnected when a conventional antenna is used. When a doublet is used, one wire of the twisted downlead is connected to the "ANT" terminal and the other downlead wire is connected to the "DBL" terminal.

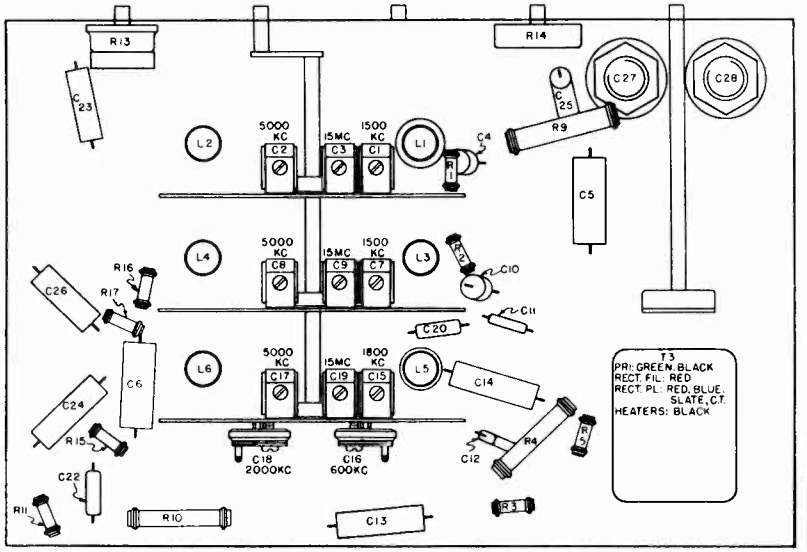
The sensitivity is automatically increased on bands "P" and "F" by removal of the residual bias furnished by the resistor, R17. This resistor is connected in the circuit only when the Wave Band switch is in position "A". Contacts on the Wave Band switch automatically perform this switching.

Variable selectivity is obtained by a two position switch. It changes the selectivity of the IF input transformer by connecting or disconnecting coupling turns between primary and secondary.



TOP OF CHASSIS

LOCATIONS OF PARTS UNDER CHASSIS

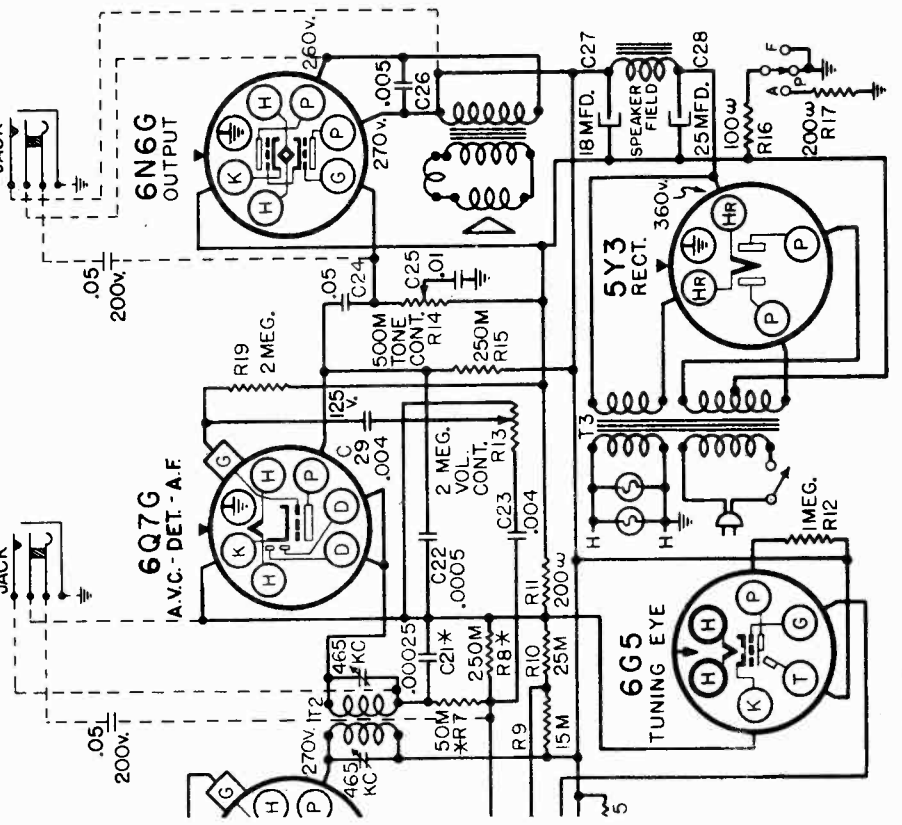


MODELS 4465,4485,4565,4585
Phono.Jack Connections
Interference Elimination
Notes

SEARS-ROEBUCK & CO.

CONNECTING A PHONOGRAPH PICK-UP JACK OR AN EARPHONE JACK:

A hole, plugged with a brass insert, will be found at the rear of the chassis. This hole is provided for the installation of either a phonograph pick-up jack or an earphone jack. The circuits are shown in the illustration below. The additional condensers are .05 mfd. 200 volts. The part number of the jack is 1011813585.



CONSOLE SPEAKERS:

In later production, the speaker of Console Models was mounted on felt cushions instead of being screwed directly to the baffle. For shipping purposes this cushion mounting is made rigid by screwing the two wooden strips, that hold the felt cushions, tightly to the baffle. To secure the advantage of the felt cushions and to insure best tone, the screw at each end of the two wooden strips should be loosened about one turn, thereby allowing the speaker to have a non-rigid mounting.

CONDENSER DRIVE:

A front bearing bracket was provided for the condenser drive shaft in later production to correct trouble due to slippage of the condenser drive. This slippage occurs because the rear bearing alone does not provide sufficiently rigid mounting for the drive shaft. This bracket, part #1014615096, can be added when necessary to sets not having it originally. It is mounted between the dial and the dial mounting bracket by means of the lower two dial mounting screws.

REPLACEMENT OF THE OSCILLATOR TUBE:

There are two types of 6C5G tubes, one shielded and the other unshielded. They can be told apart easily by appearance. The shielded type has a perforated mesh screen surrounding the other elements. This screen is about an inch in diameter and comes very close to the inside of the bulb. The unshielded type does not have this perforated mesh screen. The plate of the tube, of solid metal and about 3/8" diameter, is visible. It is important that only the unshielded type 6C5G, without the perforated mesh screen, be used in the oscillator socket. Use of the shielded type will upset band "2" calibration and interfere with proper performance.

THE WAVE SWITCH:

Two different types of Wave Switches have been used. They can be told apart by the construction of the index plate and indexing arm. In one type, part #1013714389 the indexing arm has two ball bearings that contact against the stops of the index plate. In the other type, part #1013715063, the index arm is in the shape of a flat "S" spring with a small roller and shaft at each end of the arm, to contact the stops of the index plate. Individual parts for the Wave Switches may be bought separately and are so listed in the Parts List. #1 contact plate is the one nearest the knob end of the shaft. #2 plate is the next one and #3 plate is the one farthest from the knob end of the shaft.

CORRECTION OF THE 6G5 CATHODE:

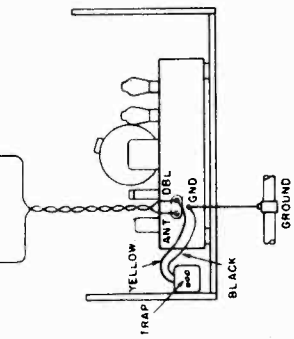
Examine the slate colored cathode lead of the 6G5 tuning eye tube. If it is connected to the cathode of the 6N6G it should be removed from there and connected instead to the cathode of the 6Q7G. The latter connection is the correct one and is shown in the portion of the schematic on the other side of this page. An indication of the incorrect connection is that the volume will increase if the 6G5 tube is removed from its socket.

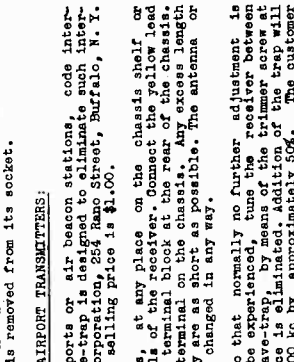
WAVE-TRAP TO ELIMINATE INTERFERENCE FROM SHIP OR AIRPORT TRANSMITTERS:

In locations near ship transmitters or airports or air beacon stations, code interference may be experienced. Part #1013115433 wave-trap is designed to eliminate such interference. It can be ordered from Colonial Radio Corporation, 254 Rano Street, Buffalo, N. Y. Use Purchase Order blank, form P5284. The retail selling price is $1.00.

Mount the trap, by means of two wood screws, at any place on the chassis shelf or cabinet where it will be near the antenna terminals of the receiver. Connect the yellow lead of the trap to the terminal marked, "DBL", on the terminal block at the rear of the chassis. Connect the black lead of the trap to the ground terminal on the chassis. Any excess length should be cut off the wave-trap leads so that they are as short as possible. The antenna or doublet connections to the receiver are not to be changed in any way.

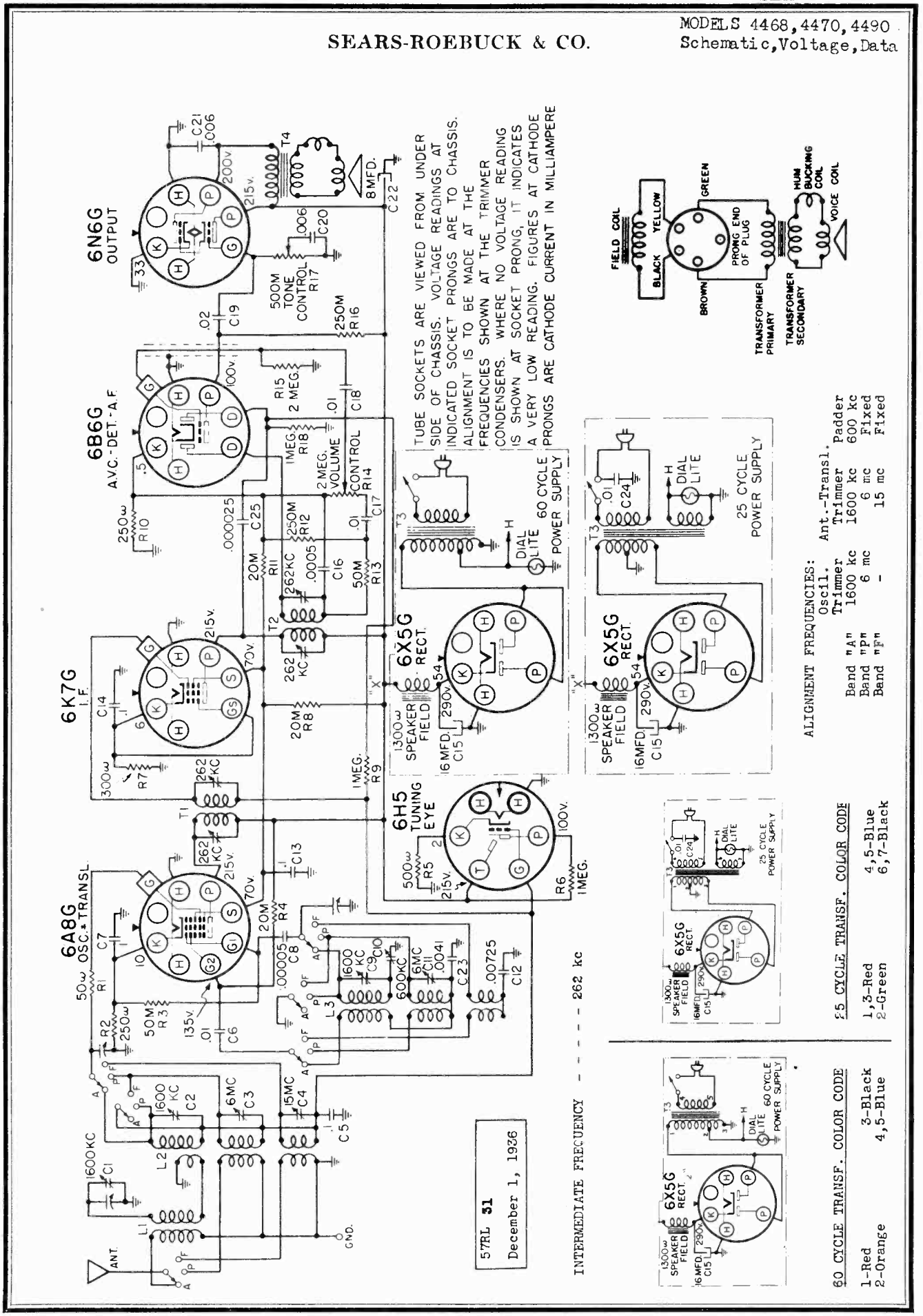
The trap is pre-tuned to the IF frequency so that normally no further adjustment is necessary. However, should interference still be experienced, tune the receiver between approximately 550 and 600 kc. Then adjust the wave-trap, by means of the trimmer screw at the bottom of the container, until the interference is eliminated. Addition of the trap will reduce the sensitivity of the receiver around 600 kc by approximately 50%. The customer should be forewarned of this to avoid complaints of reduced sensitivity.





SEARS-ROEBUCK & CO.

MODELS 4468, 4470, 4490
Schematic, Voltage, Data



ALIGNMENT PROCEDURE

PRELIMINARY:

Output meter connections - Across voice coil leads

Output meter reading to indicate .5 watts output - - - - - - - - - - - - - - - - - 1.3 volts

Average sensitivity in microvolts for .5 watts output - - - - - - - - - - See chart below

Dummy antenna value to be in series with generator output - - - - - - - - See chart below

Connection of generator output lead - See chart below

Generator modulation - 30%, 400 cycles

Position of Volume Control - Fully clockwise

Position of Tone Control - Fully clockwise

Position of Dial Pointer - - - To fall on center line of dial when variable is fully meshed.

WAVE BAND SWITCH POSITION	POSITION OF DIAL POINTER	GENERATOR FREQUENCY	DUMMY ANTENNA	GENERATOR CONNECTION	TRIMMERS ADJUSTED (IN ORDER SHOWN)	TRIMMER FUNCTION	APPROXIMATE MICROVOLTS
"A"	550 kc	262 kc	.1 mfd.	6A8G Grid	T2,T1	IF Output IF Input	-
"A"	1600 kc	1600 kc	.0002 mfd.	Ant. Term.	C9,C2,C1	Osc., transl., antenna	65
"A"	600 kc (rock)	600 kc	.0002 mfd.	Ant. Term.	C10	Osc. Pad.	50
"P"	6 mc	6 mc	400 ohms	Ant. Term.	C11	Oscillator	-
"P"	6 mc (rock)	6 mc	400 ohms	Ant. Term.	C3	Translator	60
"F"	15 mc (rock)	15 mc	400 ohms	Ant. Term.	C4	Translator	45
"F"	7 mc	7 mc	400 ohms	Ant. Term.	Loop at bracket end of L3	-	80

IMAGE ADJUSTMENT

Set the generator to 1524 kc and tune in the signal image at about 1000 kc on the receiver. The generator should be adjusted for high output (.1 volts). There is a lead running from L1 through a hole in the chassis to the wave switch. Adjust the position of this lead under the chassis for minimum image response.

IMPORTANT ALIGNMENT NOTES

Where indicated by the word, "Rock", the variable should be rocked back and forth a degree or two while making the adjustment.

It is advisable to repeat the entire alignment procedure band by band and in the original order to insure greater accuracy.

Always keep the output from the test oscillator at its lowest possible value. As the sensitivity is increased by alignment,the generator output should be reduced correspondingly.

After the alignment procedure has been completed, tune in a broadcast signal at about 1000 kc. If necessary, shift the dial pointer so that it indicates this frequency.

Values shown under, "Microvolts", are only approximate.

DIFFERENCES BETWEEN 25 CYCLE AND 60 CYCLE POWER SUPPLY:

The 6X5G rectifier tube is used as a half wave rectifier for 60 cycle supply. Full wave rectification is used for 25 cycle supply.

OPERATION OF THE 6H5 TUNING EYE TUBE:

The type 6H5 tuning eye tube, used in this receiver, operates over a signal input range about three times greater than can be handled by the 6E5 tube, used in some of last years receivers. With the 6E5 tube, if the circuits are designed so that the tube responds to a moderately weak signal, it will overlap with strong signals. Any signal stronger than that required to close the eye cannot be tuned accurately by the eye. The 6H5 tube provides an even more sensitive indication for weak signals than the 6E5 and will not overlap except under extreme local conditions.

However, the range of signal input over which the receiver must work is so great that even this 6H5 variable mu tube cannot completely satisfy all conditions. In addition to the limitations of the tube itself, there are variations between receivers, even though they be of the same model, that affect the signal required to close the eye. If several tubes are available to choose from, it may be possible to select one that will operate more satisfactorily in a particular location.

INSTALLING A WAVE-TRAP:

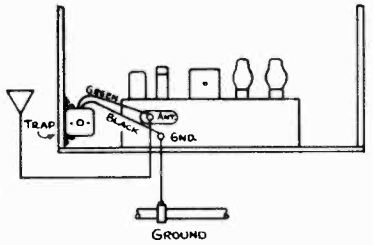
In locations near ship transmitters or airports or air beacon stations, code interference may be experienced. Part #1013114477 wave-trap is designed to eliminate this type of interference. These traps may be ordered from Colonial Radio Corporation, 254 Rano Street, Buffalo, N. Y., using Purchase Order blank, form F5284. The retail selling price of the #1013114477 wave-trap is $1.00. Be sure to mention the part number when ordering the wave-trap.

Mount the trap, by means of two wood screws, at any convenient place on the chassis shelf or cabinet where it will be near the antenna terminal of the receiver. Connect the green lead of the trap to the antenna terminal of the receiver. (The leadin from the antenna will also remain connected to the antenna terminal of the receiver.) Connect the black lead of the trap to ground.

The traps act as a series resonant circuit across antenna and ground. The traps are pre-tuned to the IF frequency so that ordinarily no further adjustment will be necessery. However, if interference still is experienced, tune the trap by means of the trimmer screw at the bottom of the container, until the interfering signal is eliminated.

POWER SUPPLY:
All models available - - - - - - - - - - - - - - - - 105-125 volts, 50-60 cycle, 55 watts
All models available - - - - - - - - - - - - - - - - 105-125 volts, 25 cycle, 45 watts

FRECUENCY RANGES:
Band "A" - - - - - - - - - - 540-1800 kc
Band "P" - - - - - - - - - - 2.2-6.5 mc
Band "F" - - - - - - - - - - 6.2-18 mc



POWER OUTPUT:
Type - - - - - - - - - Triple Twin
Undistorted - - - - - - - - - 2 watts
Maximum - - - - - - - - - - - - 4 watts

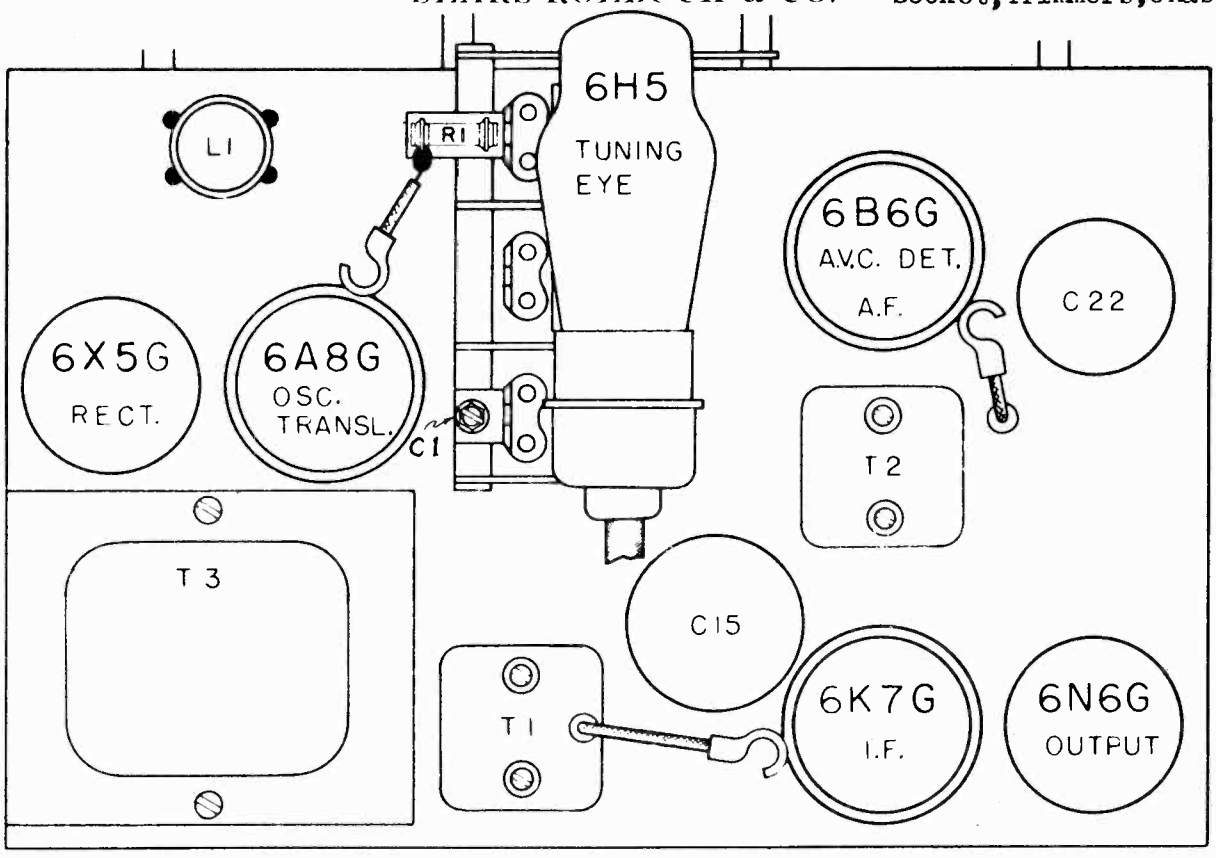
OPERATING FEATURES:
Fidelity Range - - 50 - 5000 cycles
Tone Control - - - - - - - - - - Variable
Automatic Volume Control

LOUD SPEAKER:
Type - - - - - - - - - - - - - Dynamic
Size - - - - - - - - - - - - 6" and 8"
Field coil resistance - - 1300 ohms
Field coil voltage drop - - 75 volts

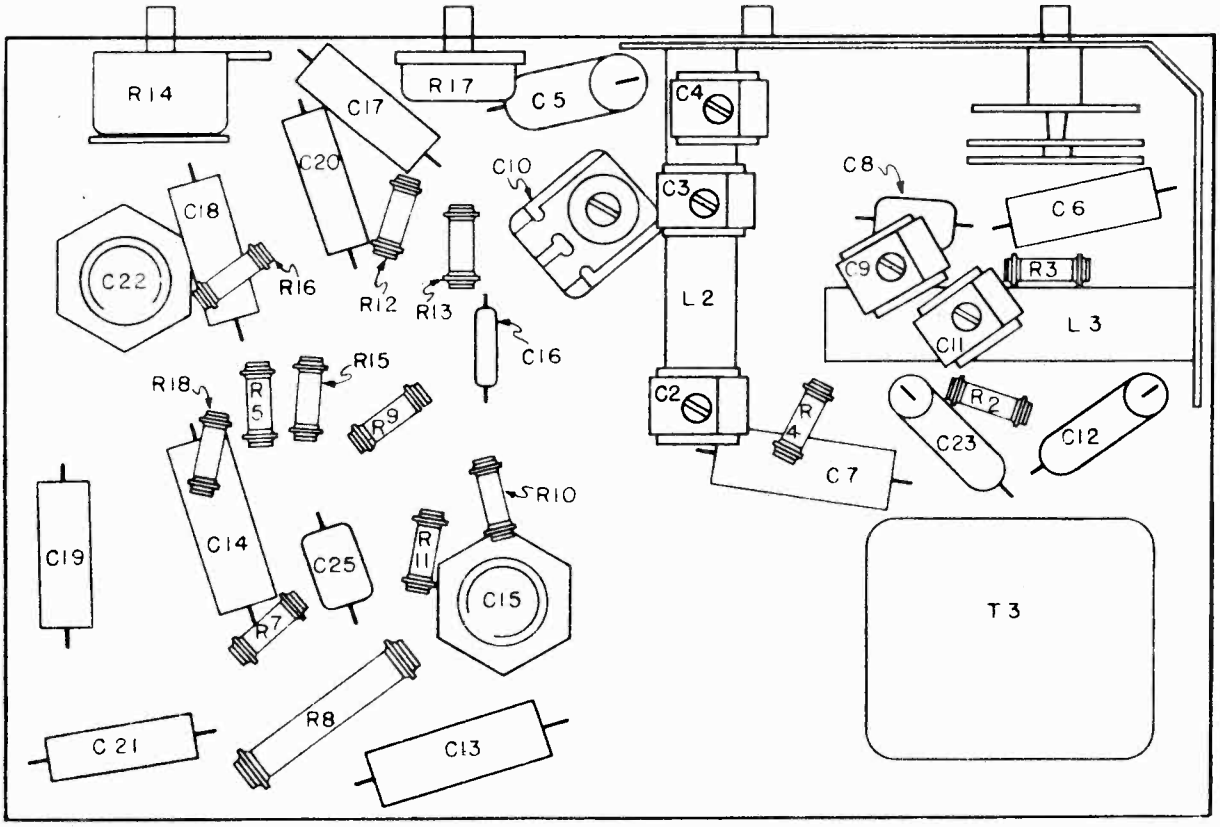
CHASSIS FEATURES:
Preselector on band "A"
Antenna - - - - - - - - Conventional
Tuning Eye

SEARS-ROEBUCK & CO.

MODELS 4468, 4470, 4490
Socket, Trimmers, Chassis



LOCATIONS OF PARTS TOP OF CHASSIS



LOCATIONS OF PARTS UNDER CHASSIS

MODELS 4486,4586,4586A
Whistle Elimination
Data

SEARS-ROEBUCK & CO.

GENERAL INFORMATION

The sensitivity is automatically increased on bands "P" and "F" by removal of the residual bias furnished by the resistor, R14. This resistor is connected in the circuit only when the Wave Band switch is in position "A". Contacts on the Wave Band switch automatically perform this switching.

Variable selectivity is obtained by a two position switch. It changes the selectivity of the IF input transformer by connecting or disconnecting coupling turns between primary and secondary.

ELIMINATING WHISTLE AT 930 KC:

A whistle, due to a beat between the second harmonic (930 kc)of the 465 kc IF,and a 930 kc signal may be experienced. In localities where the 930 kc station is one that is frequently listened to, it will be desirable to shift the whistle to some other point where it will not be objectionable. This can be done by shifting the IF frequency of the receiver.

Determine at what point between 900 kc and 960 kc the whistle will be least objectionable. Dividing this frequency by two will give the new IF frequency to which the receiver should be aligned. For example, if it is determined that a whistle at 915 kc would not be objectionable, the IF should be realigned at 915/2 or 457.5 kc.

Align the IF at the new frequency and then realign the receiver as described under, "ALIGNMENT PROCEDURE".

POWER SUPPLY:
All models available - - - - - - - - - - - - - - - - 105-125 volts, 50-60 cycle, 85 watts
All models available - - - - - - - - - - - - - - - - - - - 105-125 volts, 25 cycle, 90 watts

FREQUENCY RANGES:
Band "A" - - - - - - - - - 540-1800 kc
Band "P" - - - - - - - - - 1800-6000 kc
Band "F" - - - - - - - - - - - 6-18 mc

ALIGNMENT FREQUENCIES:

	Oscil. Trimmer	Ant-Transl. Trimmer	Oscil. Padder
Band "A"	1800 kc	1500 kc	600 kc
Band "P"	5 mc	5 mc	2 mc
Band "F"	15 mc	15 mc	Fixed

INTERMEDIATE FREQUENCY - 465 kc

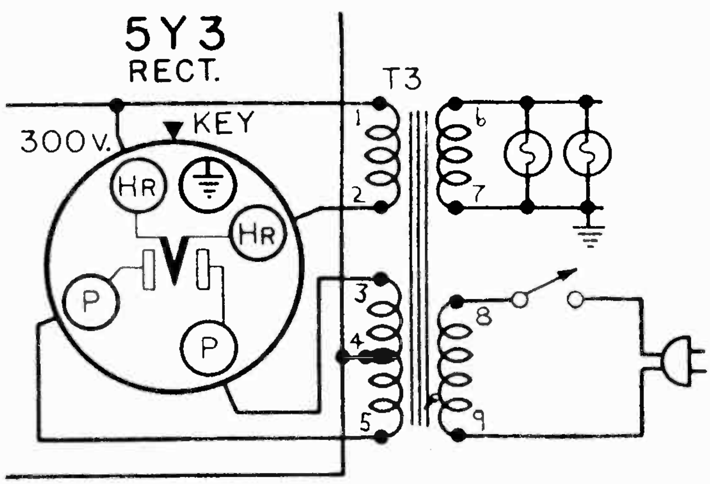
POWER OUTPUT:
Type - - - - - - - Push-Pull Pentode
Undistorted - - - - - - - - - - 6 watts
Maximum - - - - - - - - - - - 10 watts

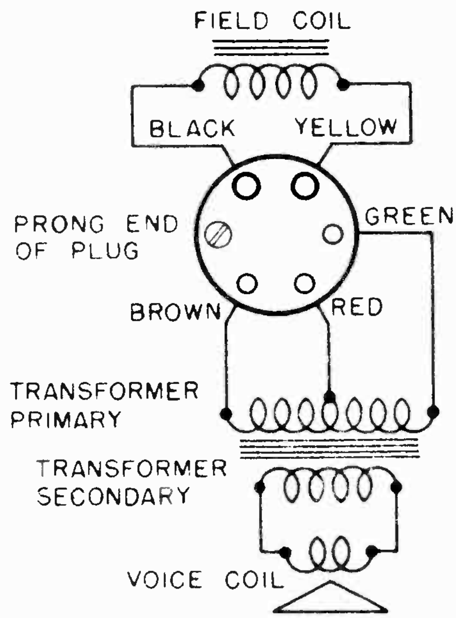
LOUD SPEAKER:
Type - - - - - - - - - - - - - Dynamic
Size - - - - - - - - - - - - - - - 10"
Field coil resistance - 650 ohms, hot
Speaker field coil voltage drop - - 60 volts

ELIMINATING HUM

Excessive hum may be caused by a faulty 6C5G phase changer tube. Such tubes may test O.K. in a tube tester but cause hum due to leakage between the heater and cathode. If excessive hum is encountered, try changing the 6C5G phase changer tube.

Under certain conditions reversing the line plug will eliminate hum.



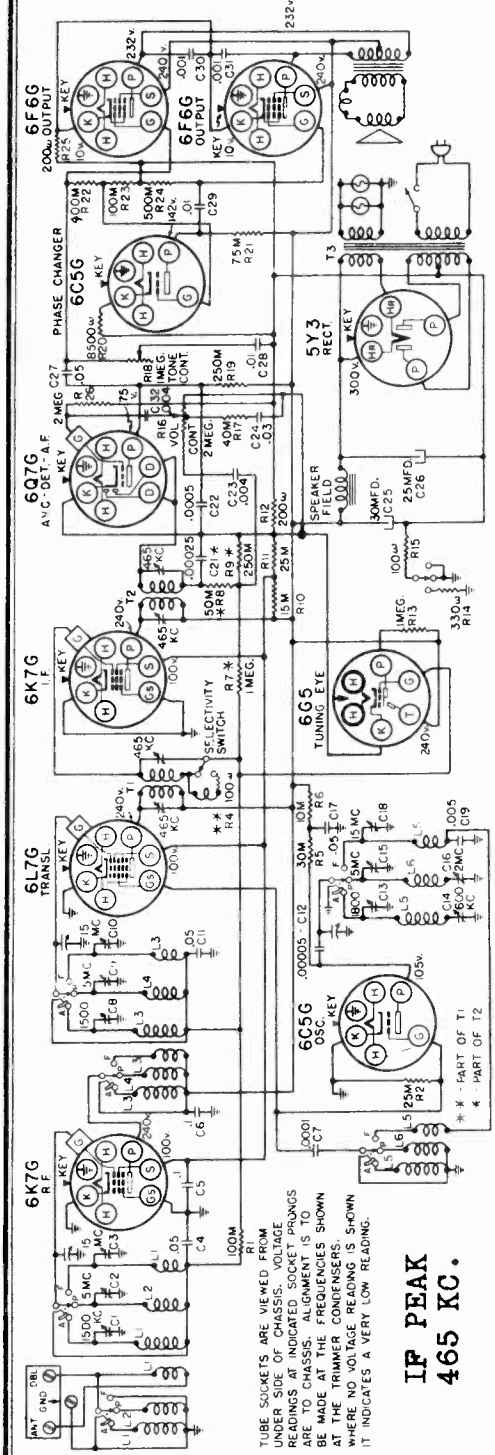


POWER TRANSFORMER COLOR CODE

1-Red	4-Slate	7-Black
2-Red	5-Blue	8-Green
3-Red	6-Black	9-Black

SEARS-ROEBUCK & CO.

MODELS 4486,4586,4586A
Schematic,Voltage
Phono.Pick-up Jack Data
Interference Elimination



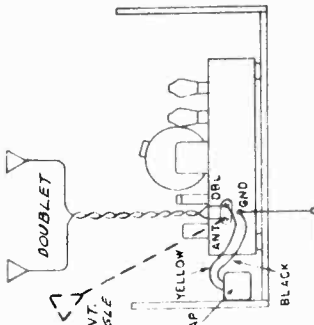
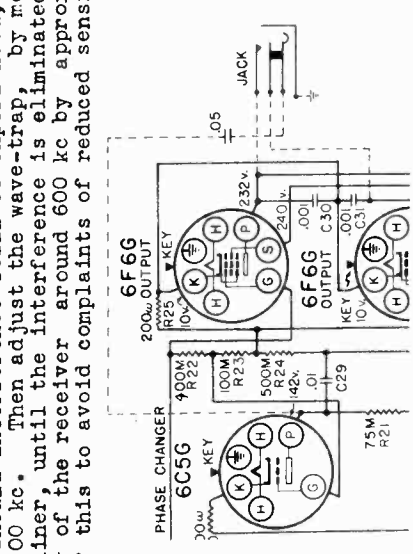


FIG. 1



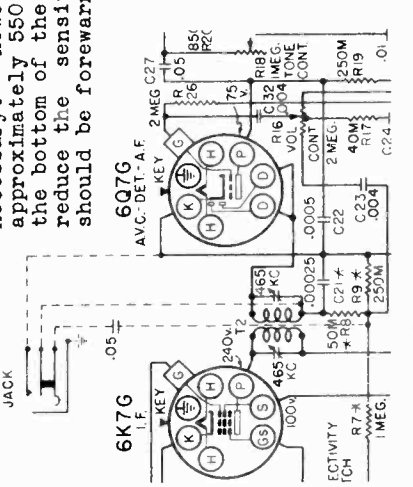


FIG. 2

WAVE-TRAP TO ELIMINATE INTERFERENCE FROM SHIP OR AIRPORT TRANSMITTERS:

In locations near ship transmitters or airports or air beacon stations, code interference may be experienced. Part #1013115433 wave-trap is designed to eliminate such interference. It can be ordered from Colonial Radio Corporation, 254 Rano Street, Buffalo, N. Y. Use Purchase Order blank, form F5284. The retail selling price is $1,00.

Mount the trap, by means of two wood screws, at any place on the chassis shelf or cabinet where it will be near the antenna terminals of the receiver. Connect the yellow lead of the trap to the terminal marked, "DBL", on the terminal block at the rear of the chassis. Connect the black lead of the trap to the ground terminal on the chassis. Any excess length should be cut off the wave-trap leads so that they are as short as possible. The antenna or doublet connections to the receiver are not to be changed in any way

The trap is pre-tuned to the IF frequency so that normally no further adjustment is necessary. However, should interference still be experienced, tune the receiver between approximately 550 and 600 kc. Then adjust the wave-trap, by means of the trimmer screw at the bottom of the container, until the interference is eliminated. Addition of the trap will reduce the sensitivity of the receiver around 600 kc by approximately 50%. The customer should be forewarned of this to avoid complaints of reduced sensitivity.

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August 20, 1936

CONNECTING A PHONOGRAPH PICK-UP JACK OR AN EARPHONE JACK:

A hole, plugged with a brass insert, will be found at the rear of the chassis. This hole is provided for the installation of either a phonograph pick-up jack or an earphone jack. The circuit for the earphone jack connection is shown in Fig. 1. The circuit for the phonograph pick-up jack connection is shown in Fig. 2. The condenser shown is .05 mfd. 200 volt. The part number of the jack is 1011613585. It can be ordered directly from Colonial Radio Corporation, 254 Rano Street, Buffalo, N. Y. The retail selling price is $.60.

MODELS 4486,4586,4586A
Socket,Trimmers,Chassis
Alignment,Sensitivity

SEARS-ROEBUCK & CO.

ALIGNMENT PROCEDURE

PRELIMINARY:

Output meter connections - Across speaker voice coil

Output meter reading to indicate .5 watts output - .85 volts

Approximate average sensitivity in microvolts for .5 watts output - See chart below

Dummy antenna value to be in series with generator output - See chart below

Connection of generator output lead - See chart below

Generator modulation - 30%, 400 cycles

Position of volume control - Fully clockwise

Position of tone control - Fully clockwise

Position of selectivity control - Fully clockwise

Position of dial pointer - - To fall on second line from right, of ornamental lines running from tuning eye toward center of dial, when variable is fully meshed.

WAVE BAND SWITCH POSITION	POSITION OF DIAL POINTER	GENERATOR FREQUENCY	DUMMY ANTENNA	GENERATOR CONNECTION	TRIMMERS ADJUSTED (IN ORDER SHOWN)	APPROXIMATE MICROVOLTS
"AM"	550 kc	465 kc	.1 mfd.	6L7 Grid	T2, T1	-
"AM"	1800 kc	1800 kc	.0002 mfd.	Antenna Terminal	C13	90
"AM"	1500 kc	1500 kc	.0002 mfd.	Antenna Terminal	C1, C8	20
"AM"	600 kc (rock)	600 kc	.0002 mfd.	Antenna Terminal	C14	32
"POL"	5000 kc	5000 kc	400 ohms	Antenna Terminal	C15 (*)	-
"POL"	5000 kc	5000 kc	400 ohms	Antenna Terminal	C2, C9	2
"POL"	2000 kc (rock)	2000 kc	400 ohms	Antenna Terminal	C16	18
"POR"	15 mc	15 mc	400 ohms	Antenna Terminal	C18 (*)	-
"POR"	15 mc	15 mc	400 ohms	Antenna Terminal	C3, C10	2
"POR"	6 mc	6 mc	400 ohms	Antenna Terminal	-	40

IMPORTANT ALIGNMENT NOTES

(*) If two peaks can be obtained at two different settings of the trimmer adjusting screw, use the adjustment in which the trimmer is screwed further out (lesser capacity).

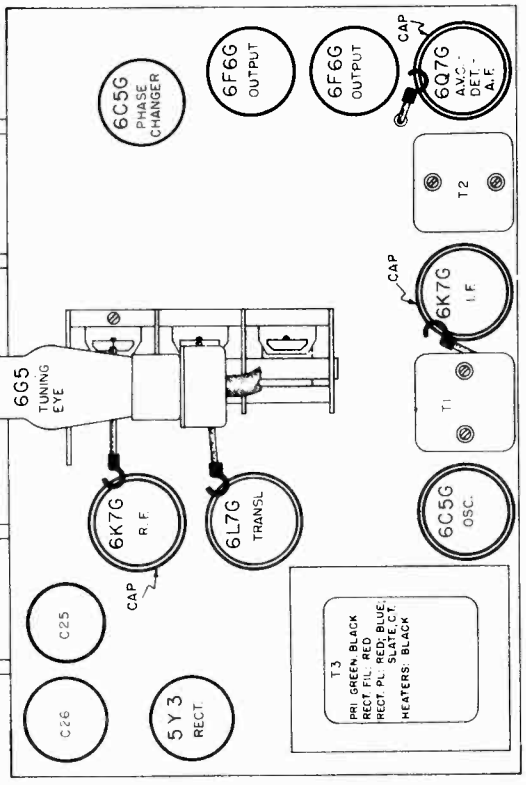
Where indicated by the word, "Rock", the variable should be rocked back and forth a degree or two while making the adjustment.

Each step of the alignment should be repeated in its original order for greater accuracy. Always keep the output from the generator at its lowest possible value, to prevent the AVC action of the set from interfering with accurate alignment.

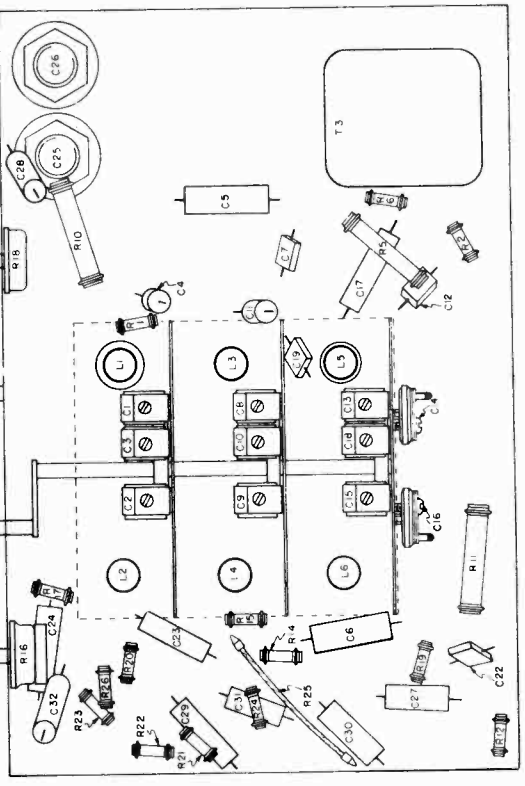
The shield plate that covers the coil assembly should be left in place while making the alignment adjustments. The trimmer screws are accessible through the holes in the shield.

Only the dummy antenna indicated in the chart for any particular band should be used. Remove the dummy antenna used for alignment of any other band.

After the alignment procedure has been completed, tune in a station at about 900 kc. If necessary, shift the dial pointer to the station's frequency on the dial.



LOCATIONS OF PARTS ON TOP OF CHASSIS -



LOCATIONS OF PARTS UNDER CHASSIS -

MODELS 4488, 4588
MODELS 4488A, 4588A
Schematics, Voltage

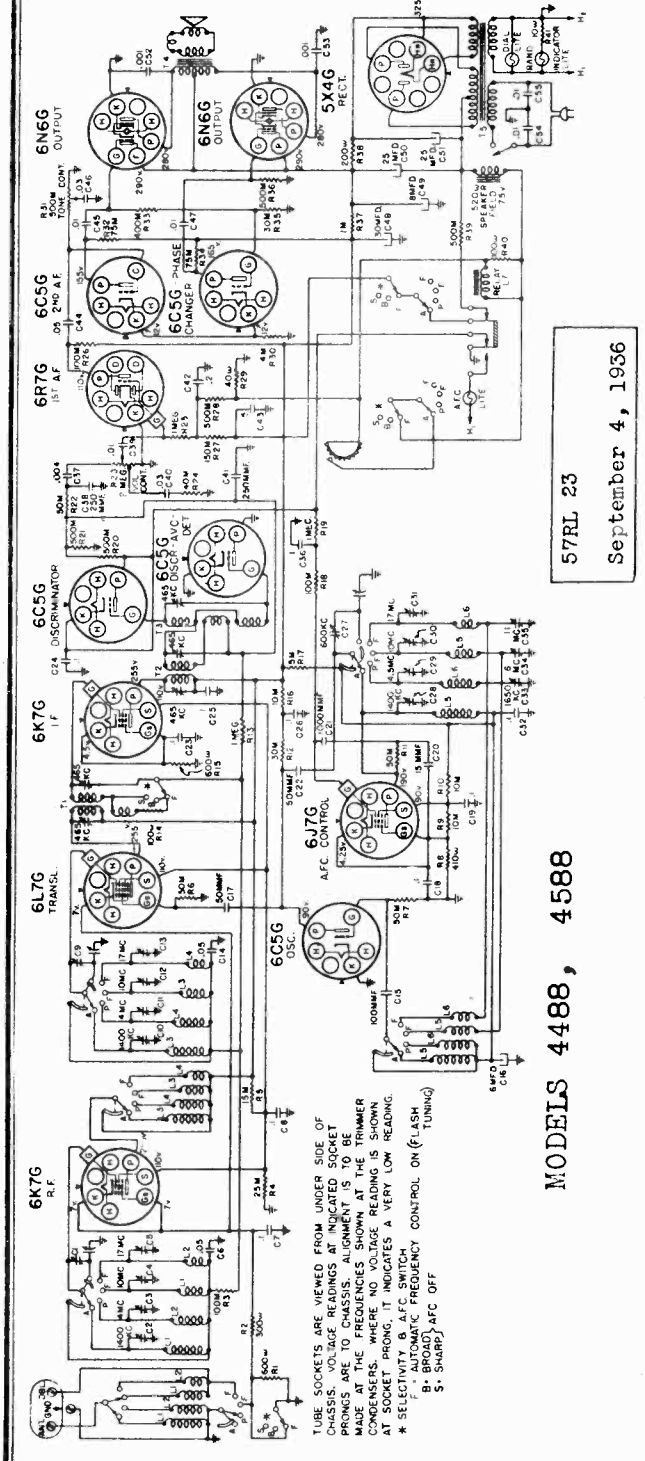
SEARS-ROEBUCK & CO.

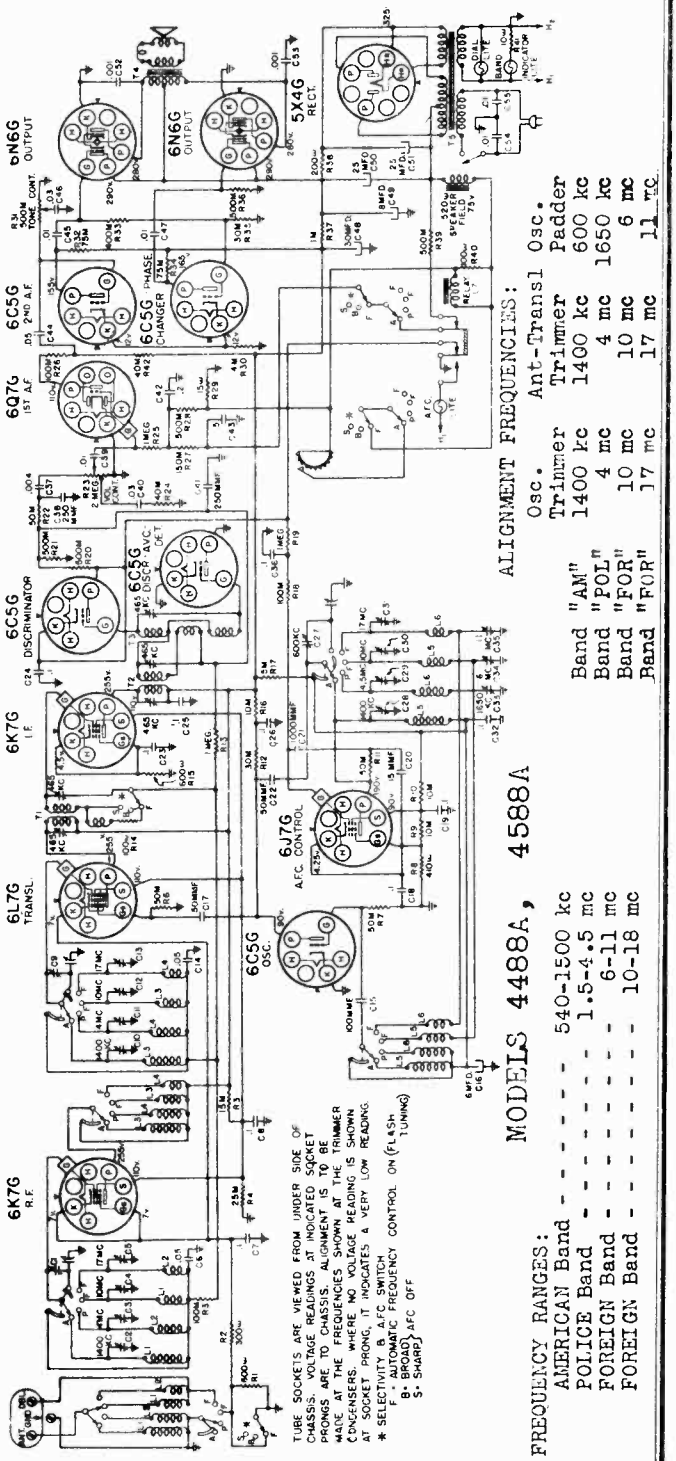
POWER SUPPLY:
All models available - - - - - - - - - - - - - - - - - 105-125 volts, 50-60 cycle, 135 watts
All models available - - - - - - - - - - - - - - - - - 105-125 volts, 25 cycle, 135 watts

INTERMEDIATE FREQUENCY - 465 kc

POWER OUTPUT:
Type - - - - - - - - Push-Pull
Undistorted - - - - - - - - 12.8 watts
Maximum - - - - - - - - - - 18.9 watts

LOUD SPEAKER:
Type - - - - - - - - - - - - - - Dynamic
Size - - - - - - - - - - - - - - - - - - 12"
Field coil resistance - - - 520 ohms
Field coil voltage drop - - - 75 volts





FREQUENCY RANGES:

AMERICAN Band - - - - - - - - -	540-1500 kc
POLICE Band - - - - - - - - - -	1.5-4.5 mc
FOREIGN Band - - - - - - - - -	6-11 mc
FOREIGN Band - - - - - - - - -	10-18 mc

ALIGNMENT FREQUENCIES:

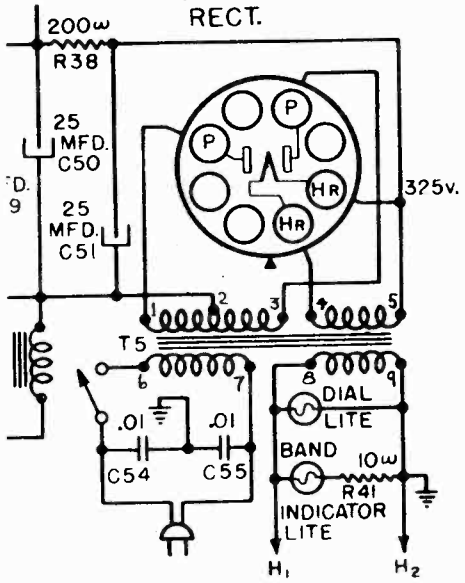
	Osc. Trimmer	Ant-Transl Osc. Trimmer	Padder
Band "AM"	1400 kc	1400 kc	600 kc
Band "POL"	4 mc	4 mc	1650 kc
Band "FOR"	10 mc	10 mc	6 mc
Band "FOR"	17 mc	17 mc	11 mc

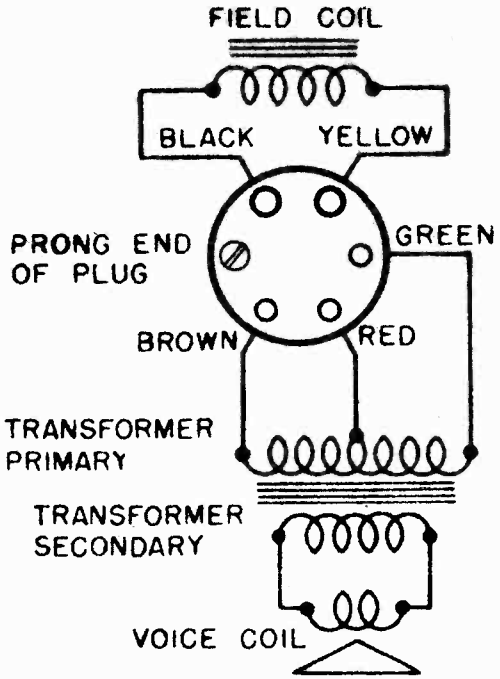
MODELS 4488,4588
Socket,Trimmers
Chassis,Color Code
MODELS 4488A,4588A
Color Code

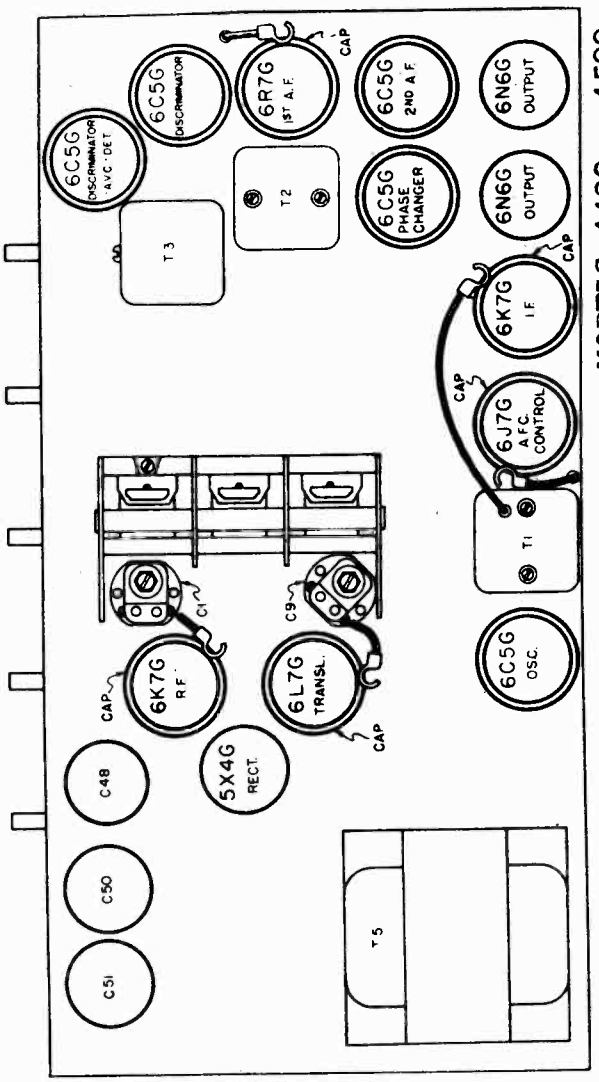
SEARS-ROEBUCK & CO.

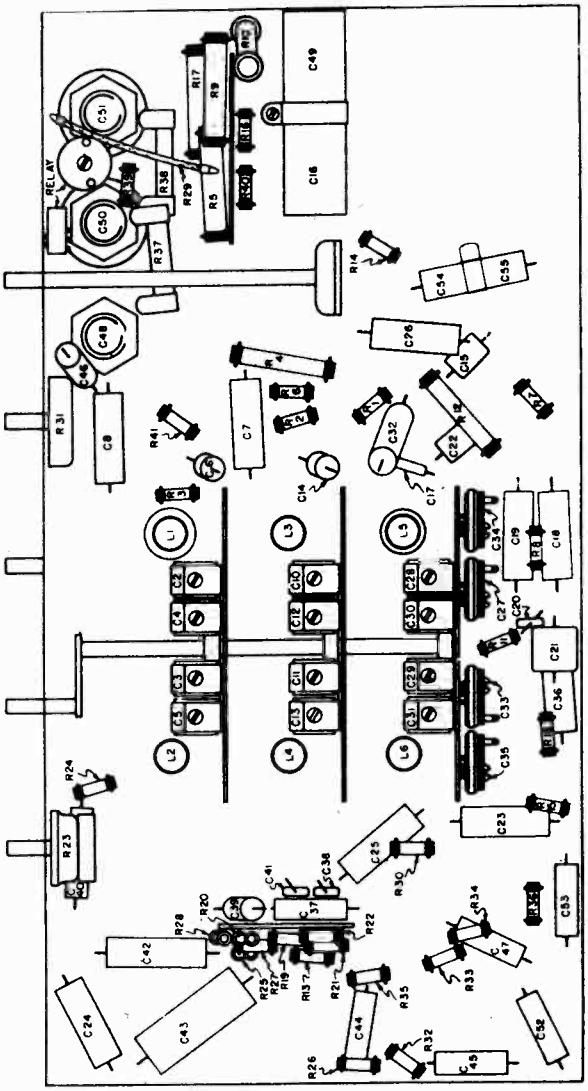
POWER TRANSFORMER, T5, COLOR CODE

1-Red
2-Slate
3-Blue
4&5-Red
6-Black
7-Green
8&9-Black







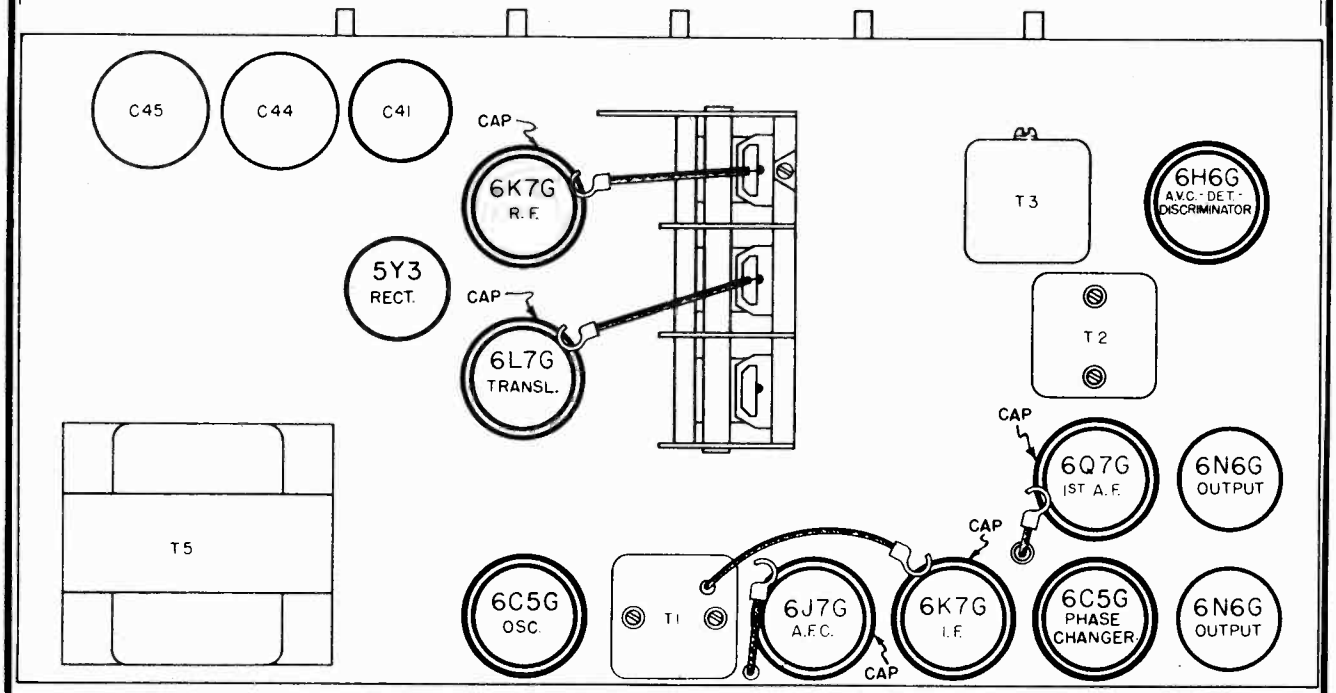


MODELS 4488A, 4588A
Socket, Trimmers
Chassis

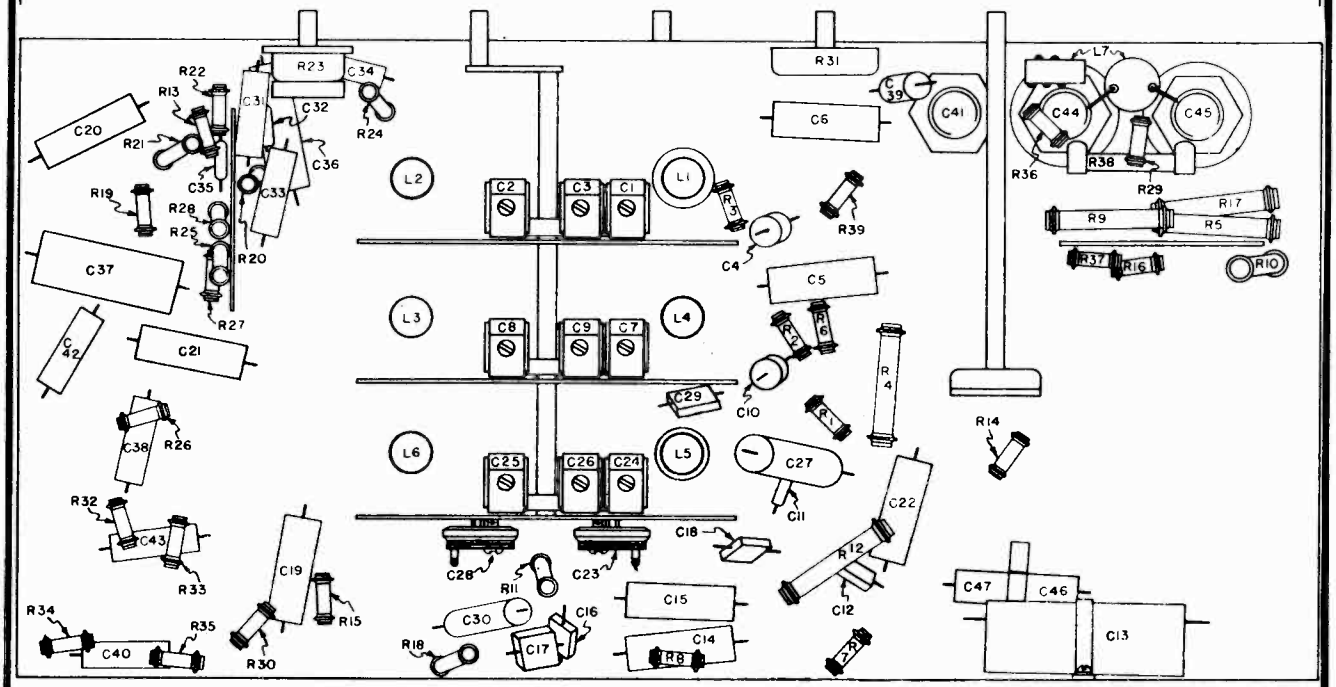
SEARS-ROEBUCK & CO.

OPERATING FEATURES:
- Fidelity Range - - - 30 - 8000 cycles
- Tone Control - - - - - - - Variable
- Selectivity Control - - Two position
- Automatic Frequency Control (Flash Tuning)
- Automatic Volume Control
- Illuminated Visual Band Indicator

CHASSIS FEATURES:
- Number RF stages - - - - - - - - - One
- Number IF stages - - - - - - - - - One
- Antenna - - Doublet or Conventional



LOCATIONS OF PARTS ON TOP OF CHASSIS



LOCATIONS OF PARTS UNDER CHASSIS

ALIGNMENT PROCEDURE

PRELIMINARY:

Output meter connections - Across speaker voice coil

Output meter reading to indicate .5 watts output - - - - - - - - - - - - - - - - - 2.5 volts

Dummy antenna value to be in series with generator output - - - - - - - - - See chart below

Connection of generator output lead - See chart below

Generator modulation - 30%, 400 cycles

Approximate average sensitivity in microvolts for .5 watts output - - - - See chart below

Position of Volume Control - Fully on

Position of Tone Control - Fully clockwise

Position of Flash Tuning and Selectivity Switch knob - - - - Sharp, fully counter clockwise

Position of Dial pointer - - - - - - - - To fall on 10 mc mark when variable is fully meshed

WAVE BAND SWITCH POSITION	POSITION OF DIAL POINTER	GENERATOR FREQUENCY	DUMMY ANTENNA	GENERATOR CONNECTION	TRIMMERS ADJUSTED (IN ORDER SHOWN)	APPROXIMATE MICROVOLTS
"AM"	550 kc	465 kc	.1 mfd.	6L7G Grid	T2,T1	-
"AM"	1400 kc	1400 kc	.0002 mfd.	Antenna Terminal	C28,C2,C10	15
"AM"	600 kc (Rock)	600 kc	.0002 mfd.	Antenna Terminal	C27	12
"POL"	4 mc	4 mc	400 ohms	Antenna Terminal	C29,C3,C11	2
"POL"	1650 kc (Rock)	1650 kc	400 ohms	Antenna Terminal	C33	30
"FOR" (Next to "POL")	10 mc	10 mc	400 ohms	Antenna Terminal	C30 *	-
"FOR" (Next to "POL")	6 mc (Rock)	6 mc	400 ohms	Antenna Terminal	C34	12
"FOR" (Next to "POL")	10 mc	10 mc	400 ohms	Antenna Terminal	C4,C12	2
"FOR" (Next to "POL")	6300 kc	6300 kc	400 ohms	Antenna Terminal	C1,C9 **	12
"FOR"	17 mc	17 mc	400 ohms	Antenna Terminal	C31 *	-
"FOR"	17 mc	17 mc	400 ohms	Antenna Terminal	C5,C13	2
"FOR"	11 mc (Rock)	11 mc	400 ohms	Antenna Terminal	C35	60

IMPORTANT ALIGNMENT NOTES

Where indicated by the word, "Rock", the variable should be rocked back and forth a degree or two while making the adjustment.

* Two peaks will be found at two different settings of the trimmer. Use the one in which the trimmer is screwed further in (greater capacity).

** Use a bakelite screw-driver in making these two adjustments. These adjustments should not be touched after this band has been lined up.

Repeat the entire alignment step by step in the original order for greater accuracy. Always keep the generator output power at its lowest possible value. This will prevent the AVC action of the receiver from interfering with accurate alignment.

The shield covering the coils at the bottom of the chassis should be left in place during the alignment. The trimmer condensers are accessible through the holes in the shield.

Only the dummy antenna indicated in the chart for any particular band should be used. Disconnect the dummy antenna used for alignment of any other band.

After the alignment procedure has been completed, tune in a station at about 900 kc. If necessary, shift the dial pointer to the exact frequency of the station.

After the alignment has been completed, the A.F.C. adjustment should be made as follows:

A.F.C. ADJUSTMENT

CAUTION: The right hand knob must be in the "B" (broad) position for operations 1 through 5. Two signal generators are necessary to make the adjustments. The Volume and Tone Controls must be turned all the way to the right. The generator ground connection is to be made to the chassis.

1. Set one signal generator to 1050 kc and 5000 microvolts output. Connect its output to the "ANT" terminal of the set, through a .0002 mfd. condenser.

2. Tune the receiver for maximum output (at 1050 kc). Then switch the signal generator modulation switch to the "off" position.

3. Short the movable arm to the toothed disc with a piece of wire. The Flash Tuning light should become illuminated.

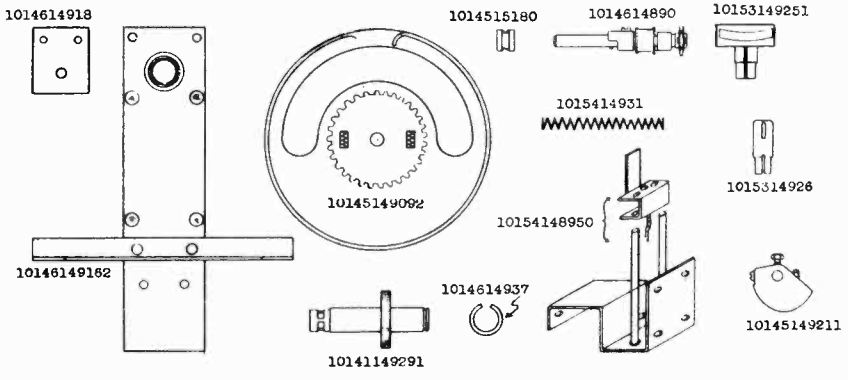
4. Set the second signal generator to 465 kc and 10,000 microvolts output. Connect its output, in series with a .000015 mfd. condenser to the control grid of the 6L7G tube.

5. Carefully turn the variable condenser until "zero beat" note is had (with right hand knob in "BROAD" position).

6. Turn the right hand knob to the "FLASH" position (fully clockwise). Then adjust the discriminator unit, T3, for "zero beat". The correct setting will be obtained at about the center of T3 trimmer range. The adjustment is a very sharp one.

7. Turn the right hand knob to the "SHARP" and then to the "BROAD" positions. The receiver still should give zero beat in the "SHARP" and "BROAD" positions if the A.F.C. is properly adjusted. If it does not, carefully repeat operation #6.

8. The A.F.C. can be checked for "pull in" in the following manner. Remove the signal generator connection from the 6L7G grid. Switch on the modulation of the 1050 kc generator and set the generator to give 5000 microvolts output. Reduce the Volume Control setting of the receiver to give 1.5 volts reading on the output meter. Increase the signal generator frequency until the output meter reads .5 volt. Note the frequency of the signal generator at this output meter reading. Then decrease the signal generator frequency from 1050 kc until the output meter again reads .5 volt and note the signal generator frequency. If the A.F.C. is operating properly, the signal generator can be shifted 15 to 20 kc either side of 1050 kc before the output meter reading is reduced from 1.5 volts to .5 volt.



DIAL DRIVE REPLACEMENT PARTS

THE AUTOMATIC FREQUENCY CONTROL - FLASH TUNING:

These models incorporate a completely new feature, Automatic Frequency Control - Flash Tuning. This double feature, which is designed to operate only on the AMERICAN band, does several things. The Automatic Frequency Control removes the necessity for accurate tuning. Depending upon the strength of the station, it is necessary to tune only to within 15 kc or less of the station's frequency. The Automatic Frequency Control then will "take hold" and tune the station far more accurately than can be done manually. This is done entirely with radio circuits, no moving parts being involved.

The Flash Tuning mechanism greatly simplifies tuning. It is necessary merely to turn the dial pointer to the station's call letters. The call letters then will become illuminated and, by virtue of the A.F.C., the station will automatically be tuned in exactly. Until the station's position is reached, the receiver is completely silent. A description of how the circuits of the A.F.C. - Flash Tuning feature work is given after the following instructions for setting up the Flash Tuning feature.

SETTING UP:

1. The glass in the cabinet front panel must be removed to allow insertion of the station call letters, as described later. This glass is held in place by a split ring (the split is at the top). See Fig. 1. The tool illustrated is furnished in the same envelope with the Instructions. Use the screw-driver end of this tool to remove the split ring by prying out one of its ends, as indicated in Fig. 1. Be very careful not to insert the tool so deep that it touches the glass, else the glass may become chipped.

The glass can be removed by placing the hand on it and tipping the cabinet forward. Take care during the operation not to allow the split ring to fly out or the glass to drop and break.

2. Make a list of the broadcasting stations to which you desire to have the FLASH TUNING mechanism respond. These stations must be local stations or strong stations at medium distance that give reliable daylight reception. A sheet containing the call letters of broadcasting stations is furnished in the same envelope with the Instruction Leaflet. Cut out the call letters of the selected stations. The short vertical lines before and after the station's call letters and the long horizontal lines will serve as a guide along which to cut. When properly done, these cut slips will be a trifle over 1¼" long and 1/4" wide.

3. Turn the Flash Tuning and Selectivity Switch knob to the "SHARP" position. Then tune in the first station on your list of selected stations.

4. Leaving your station tuned in, go to the rear of the radio. You will see a semi circular toothed disc, as illustrated in Fig. 2. There is also a flat spring arm, with a small rounded projection near its end, that moves over the teeth of this semi circular disc as the Station Selector knob is turned. Still leaving your station tuned in, carefully note which tooth on the semi circular disc is directly under the rounded projection of the spring arm. Mark this tooth with a pencil. Note that there is a double row of teeth and either the tooth that faces you or the tooth that faces the front of the radio may be bent up, depending upon which one is nearer the rounded projection of the spring arm. After you have marked the tooth, turn off the radio. Then tune away from the station (with the Station Selector knob, not the movable arm) and bend this marked tooth straight up, using the slotted end of the tool provided. See Fig. 2. It is important that the slot of the tool fit as far down as possible on the tooth before bending. This is necessary so that the complete tooth will be bent up instead of just part of the tooth. When this is properly done, the projection of the spring arm will touch the bent up tooth when the toothed disc is rotated by turning the Station Selector knob.

5. Turn the radio on again and tune in the next station on your list of selected stations. Mark the tooth that now is under the projection of the spring arm when this station is tuned in. Turn off the radio, tune away from the station so that the spring arm will not be in the way and bend up this marked tooth, using the tool provided. Proceed in the same mannor for each of the other stations on your selected list. Turn off the radio each time before bending up the tooth. Otherwise a slight spark may occur, although there is no danger of shock. When properly done, the spring arm will touch each of the teeth that has been bent up but will not touch any of the other teeth, as the Station Selector knob is turned.

6. Turn the Flash Tuning and Selectivity Switch knob to the "FLASH" position. Now again tune in the first station on your selected list. As its position is reached, the bent up tooth will touch the spring arm and a light will flash on the dial at a position opposite the end of the dial pointer.

7. A small envelope containing celluloid tabs is furnished in the same large envelope with the Instructions. Select the cut out slip bearing the call letters of your chosen station. Bend the end of the slip, opposite the call letters, over one of the celluloid tabs so that the call letters will be under the celluloid. See Fig. 3. Then place the tab and call letter slip under the holder at the outside edge of the dial at a point opposite the end of the dial pointer. The call letters will then be illuminated whenever the dial pointer is opposite them (and the radio is switched to the AMERICAN band and the right hand knob is in the "FLASH" position).

8. In the same manner, insert the proper call letter slip and a celluloid tab for each of the other stations selected. (These tabs can be pulled out and the call letters of other stations inserted at any time should you wish to change the selection of stations.)

9. Replace the glass in the cabinet front panel. Hold it centered in the escutcheon with one hand, insert one end of the split ring in place as shown in Fig. 4 and continue pressing the remainder of the ring into place until it is completely seated. It may be helpful to tip the cabinet back against the wall to prevent the possibility of the glass falling out during the operation.

10. If two of the selected stations are powerful ones and close together in frequency (10 to 20 kc) the receiver may go from one to the other if the stations are "fading", or if their relative strength varies with the time of day. To correct this, bend down the teeth originally bent up for the two stations and instead bend up the two adjacent teeth which are further apart.

HOW THE A.F.C. - FLASH TUNING CIRCUITS OPERATE:

The I.F. frequency of the receiver is 465 kc. If a station is tuned in exactly, then the oscillator frequency is 465 kc higher than the station's frequency, creating an I.F. of 465 kc. However, if the receiver is tunod, for example, 5 kc lower than the station's frequency, the oscillator frequency will be 5 kc lower and the resultant I.F. will be 460 kc. Similarly, if the receiver is tuned 5 kc higher than the station's frequency, the resultant I.F. will be 470 kc. The I.F. is fed to the discriminator transformer, T3. By means of the tuned circuits of the discriminator transformer, I.F. higher than 465 kc is fed through one of the 6C5G discriminator tubes, and frequencies lower than 465 kc are fed through the other 6C5G discriminator tube. These tubes act as rectifiers, creating voltage drops across the 500M ohm resistors, R20 and R21. The polarity and value of the voltage drops, with respect to ground, across these two resistors depend upon the extent to which the I.F. is higher or lower than 465 kc. This voltage, developed by the discriminator circuit, is fed to the control grid of the 6J7G Automatic Frequency Control tube to control the oscillator frequency, as described in the following paragraph.

The oscillator coil inductance, L5, determines the oscillator frequency for any given position of the variable condenser. If another inductance were connected in parallel to it, the total inductance would be lessened and the oscillator frequency would increase. The combination of the 6J7G A.F.C. tube together with the condensers, C20, C21 and the resistor, R11, have the effect of an inductance in parallel with the inductance, L5. This is so for the following reason:

In an inductance the phase relations between the voltage across it and the current through it are such that the voltage leads the current by 90 degrees. The phase relations of the voltage and current in the plate circuit of the 6J7G tube are such that the voltage leads the current by 90 degrees. Therefore, this combination acts as an inductance in parallel to the inductance L5. The extent to which it does so is determined by the value of the voltage impressed on the control grid of the 6J7G tube. This voltage is obtained from the discriminator circuit as previously described. The effect of this equivalent parallel inductance is to change the AMERICAN band oscillator frequency. By properly choosing constants, this oscillator frequency change can be made to compensate almost exactly for the oscillator frequency error due to inexact tuning. In this way, the I.F. is always 465 kc, which is equivalent to perfect tuning, provided the station is approached nearly enough so that the A.F.C. can take hold. As mentioned previously, this is within 15 kc of the station for strong stations, but decreases for weaker stations.

The A.F.C. tube is connected in the circuit all the time and on all bands. However, the voltage from the discriminator circuit is fed to its control grid only on the AMERICAN band and when the Variable Selectivity - Flash Tuning knob is turned to the "FLASH" position. On all other bands and positions of the Selectivity - Flash Tuning knob the control grid bias of the 6J7G tube is fixed. Therefore, it corrects the I.F. frequency only on the AMERICAN band.

The Flash Tuning mechanism consists essentially of the toothed disc at the rear of the variable condenser and the relay, L7. The function of the toothed disc is to operate the relay when the variable condenser is turned to the various pre-selected stations. The relay contacts close the Flash Tuning light circuit, illuminating the station's call letters. At the same time they remove the high negative bias which blocks off the audio, keeping the receiver silent until the pre-selected station is tuned in.

The relay coil normally is energized. It is short circuited by the bent up tooth of the disc contacting the movable arm. This is why the Flash Tuning light flashes for a second or so when the receiver is first turned on -- the rectifier has not heated sufficiently to furnish current to energize the relay.

IF THE A.F.C. - FLASH TUNING MECHANISM DOES NOT OPERATE PROPERLY:

If the A.F.C. Flash Tuning mechanism does not operate properly, first check the toothed disc and spring arm. The spring arm should touch each of the teeth that have been bent up and should not touch any of the other teeth, as the Station Selector knob is turned. To adjust the spring arm, so that it does touch only the bent up teeth, proceed as follows. Loosen the screw marked, "Adjusting Screw", in Fig. 2, which will permit the spring arm to be tipped so that it does make contact only with the bent up teeth. Then tighten the adjusting screw.

Another likely cause of improper A.F.C. - Flash Tuning operation is the relay. A small amount of dust may interfere with proper closing of the contacts. Blow out the contacts or pass a strip of plain paper back and forth between them. Two types of relay have been used. The earlier type is part #1013814997. It can be identified through the fact that the relay coil leads are black. The later type relay is part #1013815558. Its leads are colored. This later type will be supplied for replacement. The earlier type relay is shown schematically in Fig. 5. The later type, in Fig. 6. The proper sequence of operation for the contacts is indicated under each illustration. If necessary, slightly bend the contacts so that they do operate in the sequence indicated. The tension of the springs should be such that the relay closes with a current of 60 milliamperes. This can be tested by connecting the relay in series with a six volt storage battery, a 100 ohm rheostat, and a milliammeter of the proper range.

WHEN FLASH TUNING LIGHT STAYS ON, OR LIGHT COMES ON BUT RADIO IS INOPERATIVE IN FLASH TUNING POSITION CHECK THE RELAY CONTACTS AS OUTLINED BELOW:

Fig. 5

Fig. 6

WITH RELAY NOT EXCITED - CIRCUIT	1-2	OPEN	WITH RELAY NOT EXCITED - CIRCUIT	1-2	OPEN
	3-4	OPEN		2-3	CLOSED
	4-5	CLOSED		4-5	OPEN
WITH RELAY EXCITED - CIRCUIT	1-2	CLOSED	WITH RELAY EXCITED - CIRCUIT	1-2	CLOSED
	3-4	CLOSED		2-3	OPEN
	4-5	OPEN		4-5	CLOSED

If the later type relay is used to replace the earlier type, the connections to the relay must be changed. The following tabulation shows to what lugs of the newer type relay the connections should be made after removing them from the lugs of the old relay.

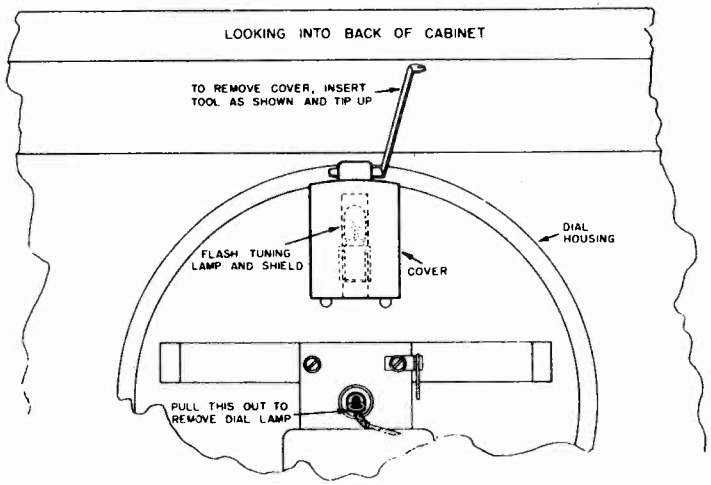
ORIGINAL RELAY	NEW TYPE RELAY
Wire from lug #1	To lug #5
Wire from lug #2	To lug #4
Wire from lug #3	To lug #1
Wire from lug #4	To lug #2
Wire from lug #5	To lug #3

REPLACING THE DIAL LAMPS:

There are three lamps in the dial mechanism. The lamp that illuminates the dial is in the center of the dial. It can be removed for replacement by pulling the small handle that projects from the rear center of the dial housing. (Accessible from the back of the radio.) When putting the lamp holder back into place be careful that it is not pushed in too far lest the dial pointer be pushed off of its shaft. Position the lamp so that the dial is illuminated to the best advantage.

The FLASH TUNING lamp (the one that moves around the outer edge of the dial and flashes on for the station call letters) is accessible for replacement through a small removable cover at the top of the dial housing. (Accessible from the rear of the radio.) This cover snaps on the top of the dial housing and can be removed with the fingers or by means of the tool, as shown in Fig. 7. Turn the Station Selector knob so that the dial pointer is straight up. The lamp shade can then be removed by grasping the end of it and pulling it up through the opening in the dial housing. The lamp can then be removed and replaced. When putting the lamp shade back the narrow slit in it must face the front of the dial so that the light will fall on the dial. The arm that carries the Flash Tuning lamp must coincide in position with the dial pointer. If it has shifted on its shaft, it can be moved to coincide with the dial pointer and its set screws tightened. This can be done either by removing the cover at the top of the dial housing (with the chassis out of the cabinet) or the dial can be removed from the housing as described in the paragraph that follows the next one. If the light is only slightly out of line with the pointer, it can be made to coincide by turning the lamp shade slightly.

The BAND INDICATOR lamp (the one that lights up the three Wave Band designations) circuit contains a special resistor that reduces the voltage to this lamp so that it probably never will burn out. Should replacement of the BAND INDICATOR lamp ever be necessary, the chassis must be taken out of the cabinet and the dial removed in order to gain access to the lamp. This procedure is described in the following paragraph. For replacement of any of the lamps use only the same type as supplied originally.



Loosen the set screws in the knobs at the front of the radio and remove the knobs. Remove the four screws that are under the shelf on which the chassis rests. Remove the single screw that is in the speaker plug and pull out the speaker plug from the back of the radio. The chassis then can be taken out of the cabinet. Rotate the Station Selector shaft (the middle one) to the right until the dial pointer goes as far as it can go. Carefully note the exact position of the dial pointer on the dial. Then pull the pointer off of its shaft. Now carefully bend up the metal tabs that hold the dial in the dial housing. Bend the tabs only far enough to permit removal of the dial. If the tabs are bent too far up, they may break off when bent down again. The complete dial assembly together with the station call letter tab holder can then be removed from the housing. When this is done, the BAND INDICATOR lamp and shield will be accessible. Pull the shield off the lamp socket and replace the lamp. The shield must be put back on so that the band designations are evenly illuminated. When re-assembling, leave the Station Selector shaft turned all the way to the right, as was done before pulling the dial pointer off of its shaft. Then push the dial pointer back on its shaft so that it comes to the same position on the dial as was noted for it before it was pulled off its shaft.

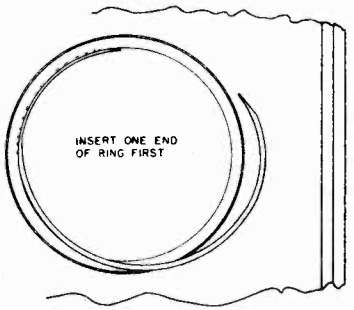


Fig. 1

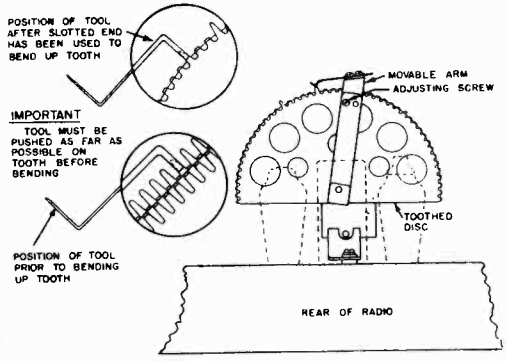


Fig. 2

SEARS-ROEBUCK & CO.

MODELS 4488, 4588
MODELS 4488A, 4588A
Interference Elimination
Phono.Pickup Jack Data

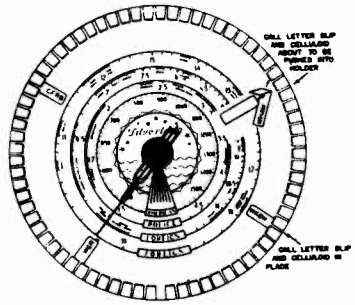


Fig. 3

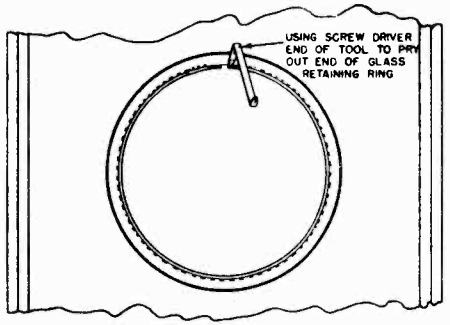
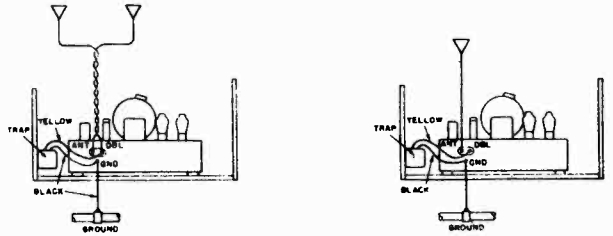


Fig. 4

WAVE-TRAP TO ELIMINATE INTERFERENCE FROM SHIP OR AIRPORT TRANSMITTERS:

In locations near ship transmitters or airports or air beacon stations, code interference may be experienced. Part #1013115433 wave-trap is designed to eliminate such interference. It can be ordered from Colonial Radio Corporation, 254 Rano Street, Buffalo, N. Y. Use Purchase Order blank, form P5284. The retail selling price is $1.00.

Mount the trap, by means of two wood screws, at any place on the chassis shelf or cabinet where it will be near the antenna terminals of the receiver. Connect the yellow lead of the trap to the terminal marked, "DBL", on the terminal block at the rear of the chassis. Connect the black lead of the trap to the ground terminal of the chassis. Any excess length should be cut off the leads so that they are as short as possible. The antenna or doublet connections to the receiver are not to be changed in any way.



The trap is pre-tuned to the IF frequency so that normally no further adjustment is necessary. However, should interference still be experienced, tune the receiver between approximately 550 and 600 kc. Then adjust the wave-trap, by means of the trimmer screw at the bottom of the container, until the interference is eliminated. Addition of the trap will reduce the sensitivity of the receiver around 600 kc by approximately 50%. The customer should be forewarned of this to avoid complaints of reduced sensitivity.

ELIMINATING WHISTLE AT 930 KC:

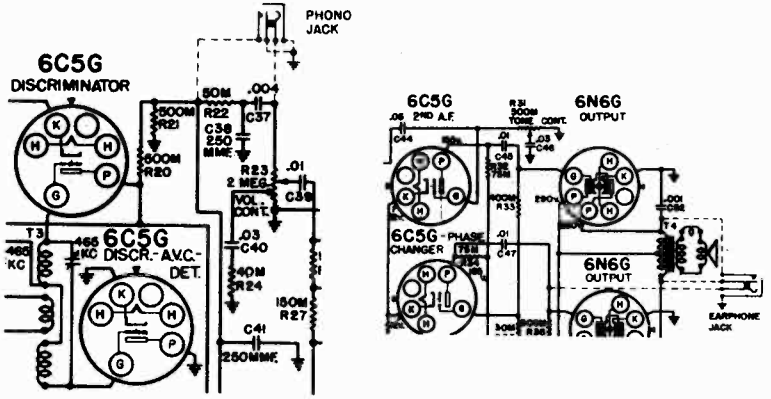
A whistle, due to a beat between the second harmonic (930 kc) of the 465 kc IF, and a 930 kc signal may be experienced. In localities where the 930 kc station is one that is frequently listened to, it will be desirable to shift the whistle to some other point where it will not be objectionable. This can be done by shifting the IF frequency of the receiver.

Determine at what point between 900 kc and 960 kc the whistle will be least objectionable. Dividing this frequency by two will give the new IF frequency to which the receiver should be aligned. For example, if it is determined that a whistle at 915 kc would not be objectionable, the IF should be realigned at 915/2 or 457.5 kc. Try to keep the new IF frequency as near 465 kc as possible.

Align the IF at the new frequency and then realign the antenna, translator, and oscillator stages. Then re-adjust the A.F.C. according to the procedure described in this Manual, but setting the signal generator to the new IF frequency instead of 465 kc.

INSTALLING A JACK FOR THE USE OF EARPHONES AND PHONOGRAPH PICK-UP:

There is a hole, plugged with a brass insert, at the rear of the chassis. This hole is provided so that a jack can be installed for earphone or phonograph pick-up connections. The Schematic section shows the connections. With the connections as shown, the loud speaker will not operate when the earphones are plugged in. If it is desired to have the loud speaker operate at the same time the earphones are plugged in, the connections to the two lugs furthest from the frame of the jack should be omitted. Otherwise the earphone plug must be removed from its jack when loud speaker reception is wanted. If the jack is wired as a phonograph pick-up jack, the right hand knob of the receiver must not be in the "FLASH" position when phonograph operation is wanted. It may be put in either the "B" or "SHARP" position. The Volume and Tone Controls of the receiver will function for phonograph reproduction.



ANTENNA CONNECTIONS:

There is a terminal board at the rear of the chassis marked, "ANT", "DBL", "GND", indicating antenna, doublet, and ground, respectively. The "DBL" terminal is left unconnected when a conventional antenna is used. When a doublet is used, one wire of the twisted downlead is connected to the "ANT" terminal and the other downlead wire is connected to the "DBL" terminal.

VARIABLE SELECTIVITY:

Variable Selectivity is obtained by connecting or disconnecting coupling turns between primary and secondary of the IF input transformer, T1. In the "SHARP" position of the right hand control knob, the coupling turns are disconnected and the Selectivity becomes sharp. In the "B" position (broad) the coupling turns are connected and Selectivity is broadened, thereby increasing the high frequency audio response of the receiver.

REPLACEMENT OF THE OSCILLATOR TUBE:

There are two types of 6C5G tubes, one shielded and the other unshielded. They can be told apart easily by appearance. The shielded type has a perforated mesh screen surrounding the other elements. This screen is about an inch in diameter and comes very close to the inside of the bulb. The unshielded type does not have this perforated mesh screen. The plate of the tube, of solid metal and about 3/8" diameter, is visible. It is important that only the unshielded type 6C5G, without the perforated mesh screen, be used in the oscillator socket. Use of the shielded type will upset the calibration of the Foreign bands and interfere with proper performance.

THE AVC CIRCUIT:

The voltage drop across the 500M ohm resistor, R21, is fed to the control grids of the 6K7G and 6L7G tubes to provide AVC. The drop across this resistor is also used in the discriminator circuit as described previously. The audio voltage across the resistor is coupled to the AF stages through the condenser, C37.

MECHANICAL SPECIFICATIONS

OPERATING CONTROLS:

1. Left knob - - "On-Off" Switch and Volume
2. Next to left knob-Wave Band Switch
3. Middle knob - - - Station Selector
4. Next to right knob - Tone Control
5. Right knob - - - Flash Tuning and Selectivity Control

CONTROL OPERATION:

Turning right: Power on; volume increase
Turning right: "AM", "POL", "FOR", "FOR"
Tuning ratio: 10:1; 50:1
Turning right: bass to treble
Turning right: sharp; broad; Flash Tuning

CHASSIS DESIGNATION IF THE CHANGES MENTIONED IN THIS SUPPLEMENT HAVE ALREADY BEEN MADE:

Chassis in which all the changes mentioned in this Supplement have been made at the factory will be indicated by the letter, "D", or a subsequent letter rubber stamped on the Chassis Identification Sticker at the rear of the chassis. Accordingly, do not attempt to make any of these changes on chassis marked with the letter, "D", or subsequent letter.

To Correct Relay Trouble	(1 - type #3 relay (1 - 1M ohm, 1/3 watt resistor (1 - .05 mfd. 200 volt condenser (1 - .1 mfd. 200 volt condenser
To Correct Faulty A.F.C. Muting	(1 - 500M ohm, 1/3 watt resistor (1 - .1 mfd. 200 volt condenser
To Correct Too High Minimum Volume	1 - .05 mfd. 200 volt condenser
To Replace 6R7G Tube With 6Q7G Tube	(1 - 500M ohm, 1/3 watt resistor (1 - .1 mfd. 200 volt condenser

CORRECTING RELAY TROUBLE:

Relay trouble usually is indicated by one or more of the following symptoms:

1. Flash Tuning light stays on at all times.
2. Receiver does not operate in "Flash" position.
3. Flash Tuning light does not light (although this may be due to a burnt out bulb).
4. Radio remains muted even though not in Flash position.

The Service Instructions, 57RL 23, for this Model describe two types of relay and mention that the second type should be used to correct these difficulties. The method of identifying these two types of relay by the color of their coil leads, as described in the manual, has been discontinued. A third type of relay, part #1013815562, has been developed and will be the one supplied for replacement purposes even though the original one was type #1 or type #2. The tabulation below shows how the three types of relay can be identified.

Relay Type Number	Identification
#1	No shield cover. Shield cover but no paint spot on shield cover. Yellow paint spot on shield cover.
#2	Red paint spot on cover. Red and green paint spot on cover.
#3	Blue paint spot on cover.

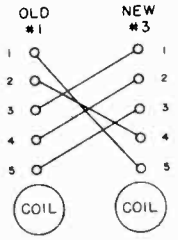
Relay type #1 was the first one used and most of the relay trouble probably will be experienced with this type. Relay type #2 is considerably improved and should give very much less trouble than type #1. It has the same coil construction as type #1 but has a different contact arrangement. Relay type #3 has the same contact arrangement as type #2 but has considerably stiffer springs and heavier contact pressure. It also has a higher resistance coil requiring 85 milliamperes to actuate the relay instead of the 60 milliamperes minimum required for type #1 and #2.

THE TYPE #3 RELAY SHOULD BE INSTALLED IN THE EVENT OF ANY RELAY TROUBLE WITH EITHER TYPE #1 OR TYPE #2 RELAY.

Replacing Relay Types #1 Or #2 With Type #3:

The connections to the terminals of the type #2 relay remain the same for the new type #3. The changes in connections from type #1 to #3 are: Consider the terminal to be numbered from 1 to 5 with terminal 5 the one nearest the coil. The lead that originally connected to terminal 1 of the type #1 relay is to be connected to terminal 5 of the type #3 relay. The original terminal 2 connection is to be changed to terminal 4. The original terminal 3 connection, to terminal 1. The original terminal 4 connection, to terminal 2. The original terminal 5 connection to terminal 3.

CHANGING TERMINAL CONNECTIONS FROM TYPE #1 RELAY TO TYPE #3 RELAY:



In addition, certain circuit changes are required when relay type #3 is installed. The resistor, R40, across the relay coil must be changed to 1000 ohms, 1/3 watt. In addition, a .05 mfd. 200 volt condenser is connected from the spring arm that contacts the teeth of the semi circular toothed disc to the movable arm. A .1 mfd. 200 volt condenser is connected from the toothed comb to ground. These condensers are C56 and C57 in the Schematic Section, Fig. 1. Fig. 2 shows how the condensers should be mounted.

CORRECTING DIAL DRIVE SLIPPAGE:

Dial drive slippage may be due to the movable arm being set too close to the toothed disc. The arm will then press unnecessarily hard against the bent up teeth, making the condenser too hard to turn. If this appears to be the case, the adjusting screw on the movable arm should be loosened and the arm re-set so that it does not press too hard against the teeth.

ELIMINATING RECEPTION OF STATION OTHER THAN CHOSEN A.F.C. STATION:

The following condition sometimes occurs. Normally, a station that has been set up on the toothed disc will be heard whenever the dial pointer is turned to its call letters. It sometimes happens though that the station will only be heard if it is approached from one end of the dial but an adjacent station will be heard if approached from the other end of the dial. This is due to the fact that the proper tooth was not selected carefully enough for the station, and an adjacent tooth was bent up instead. The remedy is to put the receiver in the "SHARP" position, tune in the desired station very carefully, and to be sure to bend up the tooth that is under the projection or the contacting arm.

CORRECTING FAULTY A.F.C. MUTING:

Normally, when the receiver is in the Flash Tuning position, a station will not be heard until the Flash Tuning light operates. If the muting is faulty, the station may be heard before its call letters become illuminated and may continue to be heard after the pointer has been turned past the station's position and the Flash Tuning light has gone out. If this type of trouble is encountered, it can be corrected by making the circuit changes shown in Fig. 3. The dotted lines indicate the new connections. "X"'s indicate old connections to be broken. As will be seen, the original suppressor to cathode connections of both 6K7G tubes are to be broken. The cathode connections of the tubes remain as they were. The suppressors of the two tubes are to be connected together by a 500M ohm resistor, R43. A .1 mfd. 200 volt condenser, C58, is to be connected directly from the suppressor terminal of the 6K7G RF tube socket to ground. The suppressor of the 6K7G IF tube is to be connected to the junction of R27 and C43, as shown in Fig. 3. These changes increase the muting action by putting a negative biasing voltage on the suppressors of the RF and IF tubes.

NOTE: In extreme cases, that is if the receiver is located near a very powerful station, muting may be still unsatisfactory on that station even after the changes mentioned in the preceding paragraph have been made. If desired, in such extreme cases, the muting can be further improved by changing the value of R39 from 500M ohms (750M ohms in some sets) to 100M ohms. However, doing so will increase the amount of "thump" or "click" that occurs when tuning stations in or out. Since this change is only for extreme cases the 100M ohm resistor is not included in the kits.

CORRECTING TOO HIGH MINIMUM VOLUME:

Sometimes, with the Volume Control set to its lowest position, the volume still is too high. This will occur in either the Flash Tuning positions or the conventional "Broad" and "Sharp" positions. To correct this, examine the lead that runs from the plate of the IF tube to the IF transformer. This lead must not be permitted to come close to the grid terminal of the 6C5G phase changer tube socket. There should be at least 1/2" clearance between the lead and the 6C5G grid terminal. In later production, this lead was covered with copper shielding braid and it may be desirable to add such shielding. This shielding also prevents regeneration which may occur under certain conditions. If shielding is added, the IF output transformer, T2, must be realigned. In addition, the condenser, C39, connected to the movable arm of the Volume Control, should be changed from .01 mfd. to .05 mfd. to help reduce minimum volume. It is advisable to cover the shielding with insulating tubing.

If the center tap lug of the Volume Control is grounding to the chassis, it will prevent the volume from going to a low value. Examine this lug to be sure that it is not grounding to the chassis.

There have been instances of defective Volume Controls caused by arcing of the switch, burning the resistance element. Controls have been improved, eliminating this condition and it will not occur in replacement controls.

CORRECTING MICROPHONICS:

Trouble may be experienced in the Model 101412 (not the 101412A) due to a microphonic 6R7G tube. This is particularly true of 6R7G tubes having a yellow colored Silvertone label. Tubes with a gray label are of different manufacture and are less microphonic. However, changing the circuit to use a 6Q7G tube instead of a 6R7G tube will correct microphonics. 6Q7G tubes having either a yellow or a gray label are satisfactory. The circuit changes, converting the 101412 into a 101412A, are described in the following paragraph.

As shown in the Schematic Section, Fig. 4, the connection of C44 is changed to the other side of R26. The 40M ohm, 1/3 watt resistor, R42, is added. The value of R29 is changed from 40 ohms to 15 ohms. In the illustration, the solid lines indicate the original 101412 connections. "X"'s indicate original connections to be broken. Dotted lines show new 101412A connections.

SEARS-ROEBUCK & CO.

MODELS 4488, 4588, 4588A
Changes Schematics

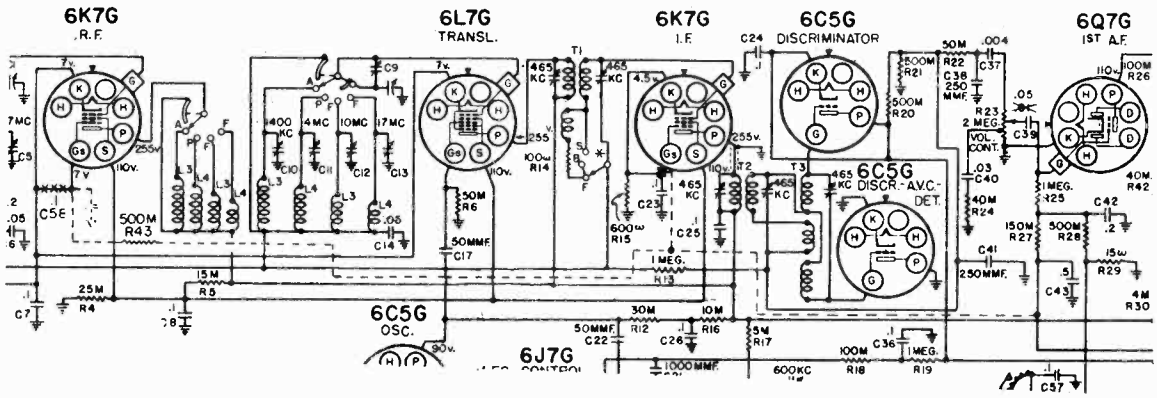


FIG. 3

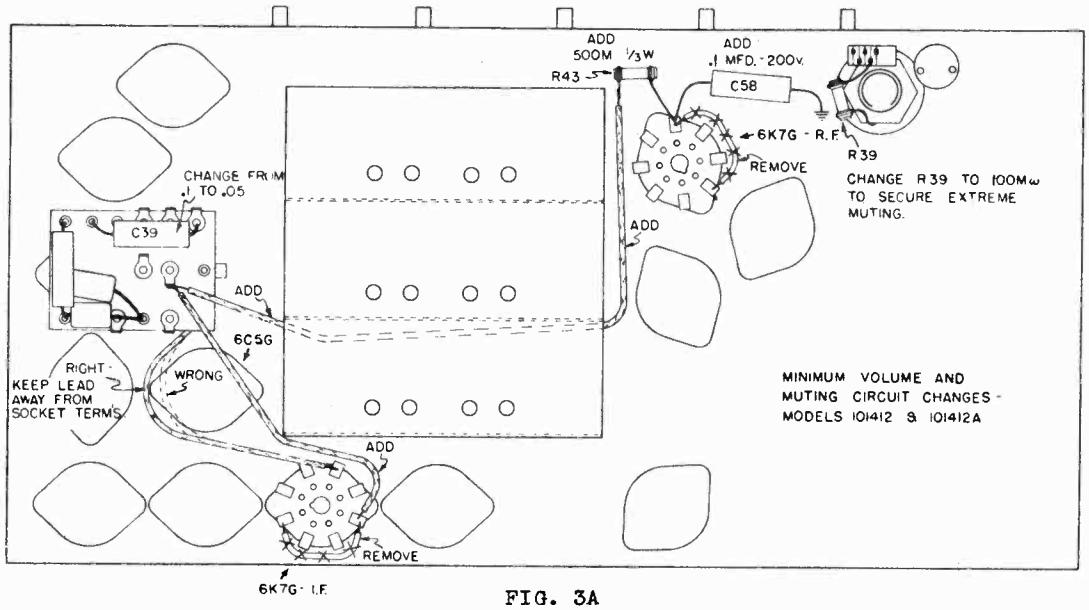


FIG. 3A

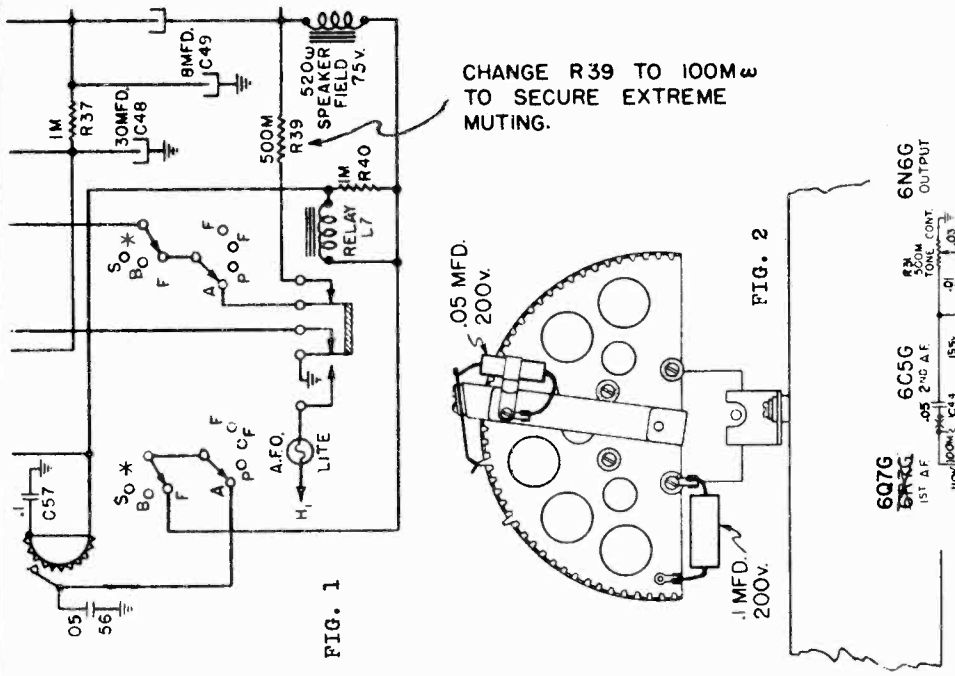


FIG. 1

FIG. 2

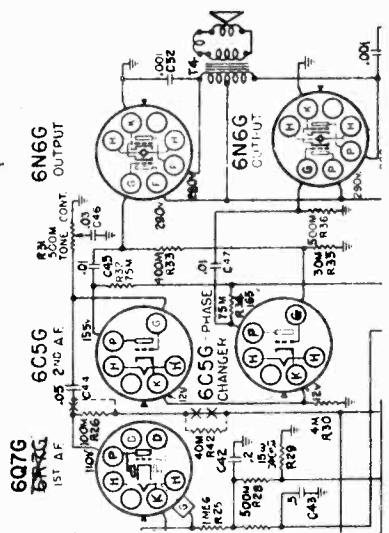
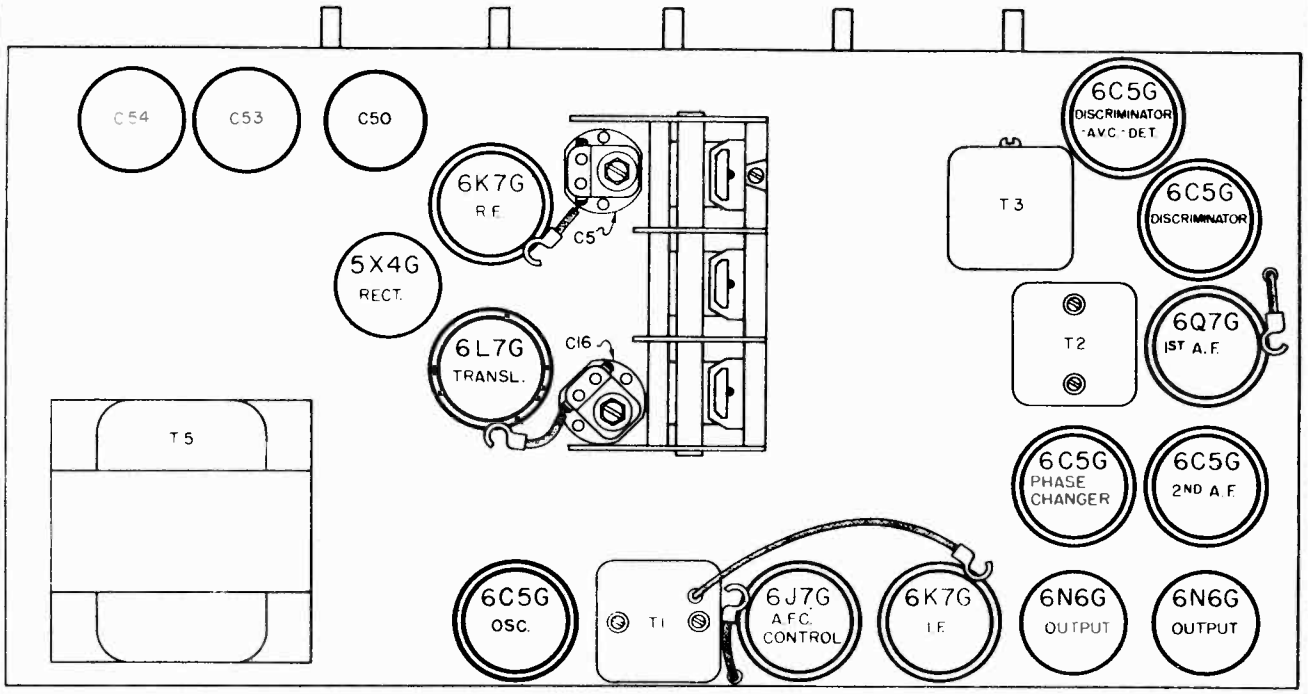


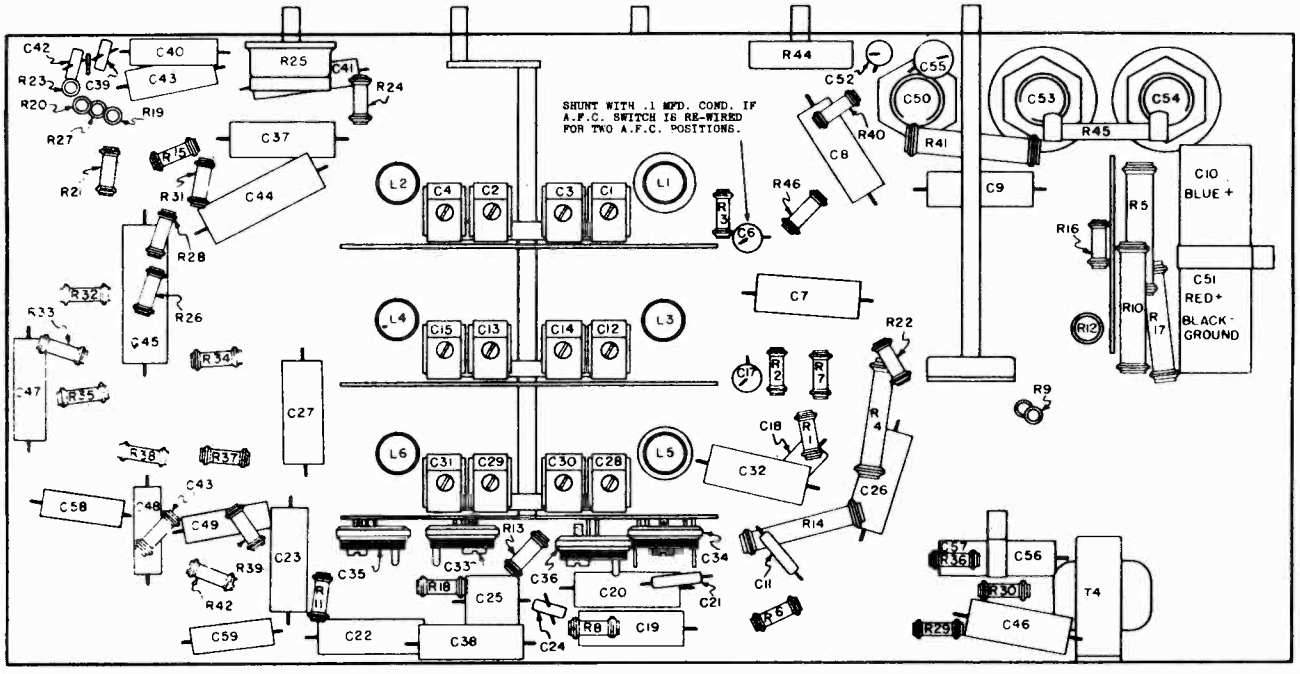
FIG. 4

MODELS 4488B, 4588B
Socket, Trimmers
Chassis

SEARS-ROEBUCK & CO.



LOCATIONS OF PARTS ON TOP OF CHASSIS - 101412B



LOCATIONS OF PARTS UNDER CHASSIS - 101412B

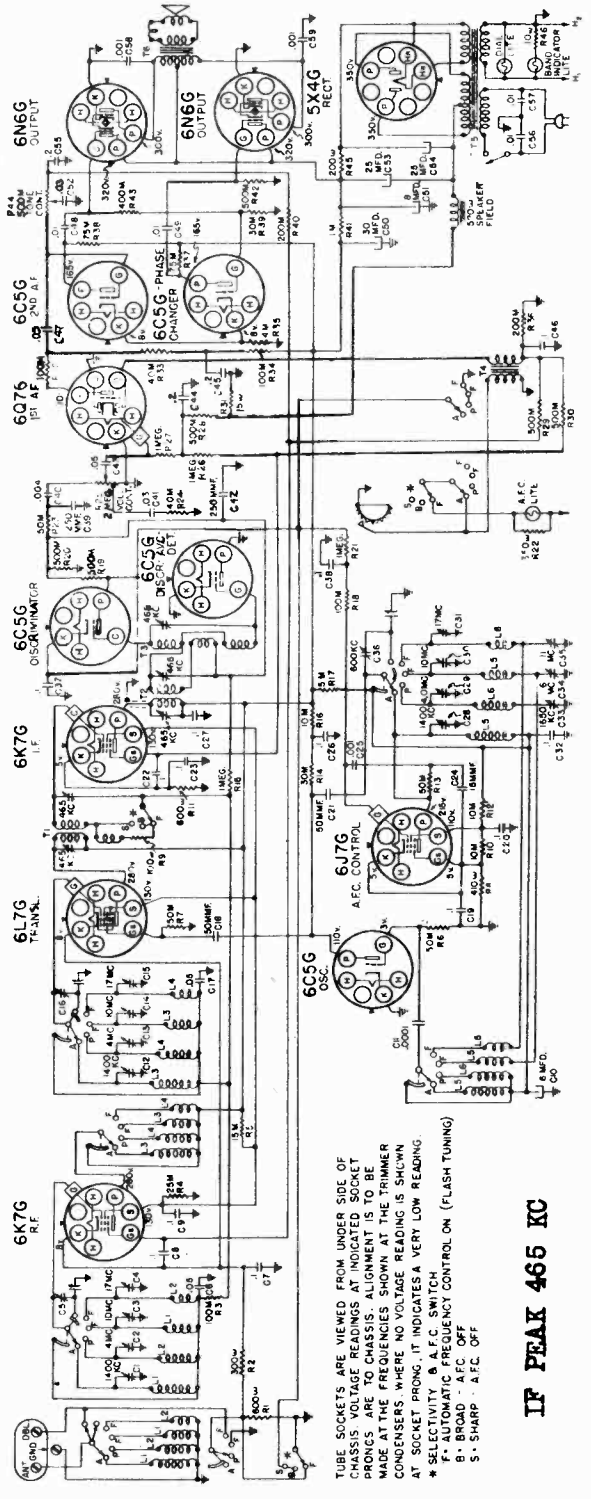
MODELS 4488B, 4588B
Schematics, Voltage

SEARS-ROEBUCK & CO.

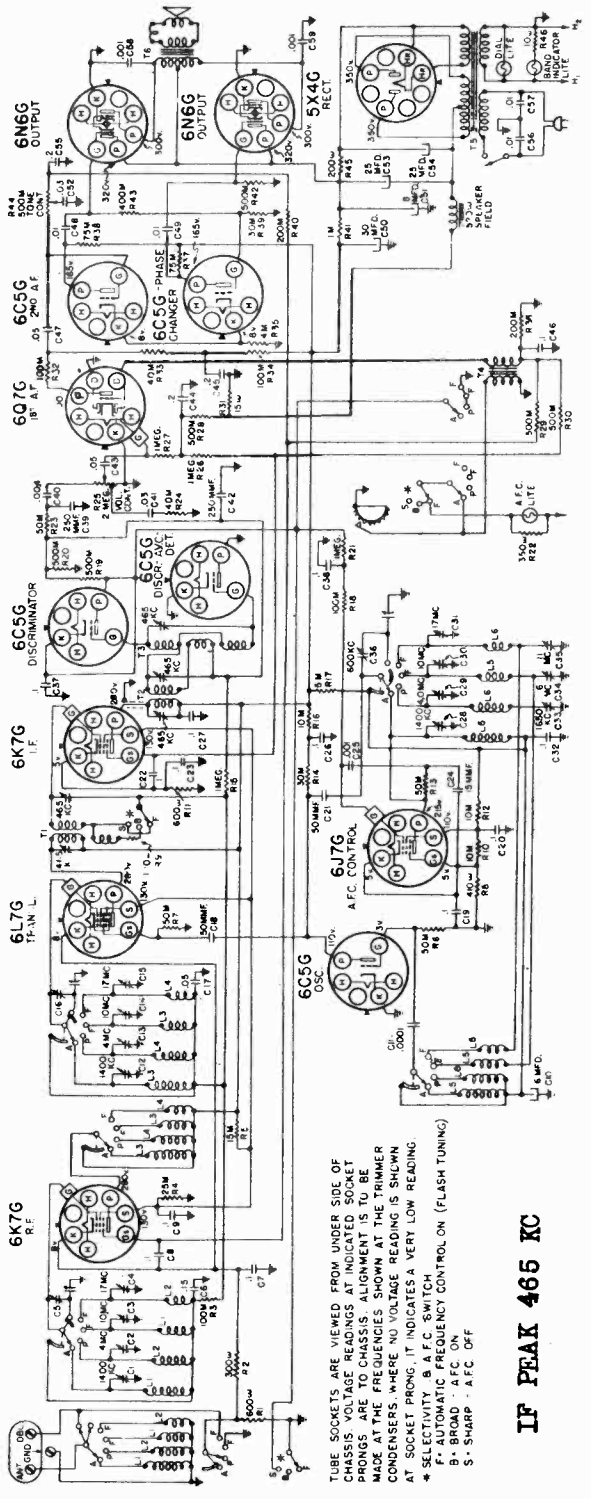
THIRTEEN TUBE, FOUR BAND SUPERHETERODYNE

MODELS 4488B, 4588B

57RL 23
Supplement No. 3
October 30, 1936



WIRING DIAGRAM - 101412B - ONE A.F.C. POSITION



WIRING DIAGRAM - 101412B - TWO A.F.C. POSITIONS

MODELS 4488, 4488B, 4588, 4588A, 458HB

SUBJECT: A.F.C. INACCURACY DUE TO DIFFERENCE IN LINE VOLTAGE

The setting of the teeth for A.F.C. stations is affected by the voltage of the power supply line. For example, suppose the stations to be set up at the Retail Store on a 120 volt line. If the radio is then delivered to the customer's home and the voltage there is considerably lower, say 105 volts, the A.F.C. settings will not be correct. The shift may amount to three or four kilocycles.

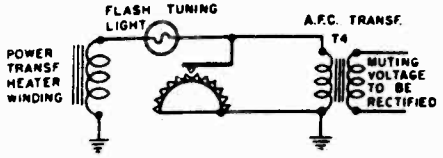
Accordingly, if the A.F.C. stations are not set up at the customer's home, care must be taken to see that the line voltage at the time the stations are set up is the same as the average line voltage at the customer's home. It may be necessary to use a series resistor or a booster transformer to duplicate the line voltage conditions that exist at the customer's home.

SUBJECT: CIRCUIT CHANGES TO ELIMINATE ADJACENT CHANNEL INTERFERENCE IN MODELS 4488-4588-4488A-4588A-4488B-4588B

ELIMINATION OF THE RELAY:

The 101412 and 101412A chassis, described in Service Instructions 57RL 23 and in Supplement #1, use a relay to accomplish the various switching required by the Automatic Frequency Control - Flash Tuning feature. In later production of this Model the circuit was changed, eliminating the relay. A transformer is used in place of the relay to accomplish the same results. Such chassis are identified by the number, 101412B.

The simplified diagram below shows how the transformer is used to mute the receiver and to operate the Flash Tuning light.



The A.F.C. transformer is a step-up transformer. Its primary is connected, in series with the Flash Tuning light bulb, across the heater winding of the power transformer. The toothed disc and contacting arm is connected across the primary of the A.F.C. transformer, as shown. The operation then is as follows: When the contacting arm is not engaging a bent-up tooth on the disc, the power transformer heater voltage is impressed, in series with the Flash Tuning light bulb, upon the primary of the A.F.C. transformer. Although current flows through the primary, its impedance is too high to pass sufficient current to light the Flash Tuning light bulb. The voltage impressed on the A.F.C. transformer primary is stepped up in the secondary and rectified by one of the diode plates of the 6Q7G tube. This diode voltage (approximately 60 volts) is applied to the suppressors of the RF and IF tubes and to the control grid of the second AF tube, to provide muting. These are the conditions that exist when the right hand knob is turned to a Flash position and the receiver is tuned between Flash stations.

When the receiver is tuned to a Flash station, the contacting arm touches the tooth bent up for the station. This short circuits the primary of the A.F.C. transformer. With the impedance of this primary removed from the circuit the full voltage of the heater winding is impressed across the Flash Tuning light bulb causing it to light. Since the A.F.C. primary is short circuited, no voltage is developed across its secondary, thereby removing the muting bias. The receiver then is in operating condition and receives the station selected for Flash Tuning.

In the original sets using a relay, one set of contacts on the relay was used to prevent the A.F.C. from operating until the bent up tooth contacted the movable arm. This was necessary to prevent a strong station from being "pulled over" from an adjacent channel as the receiver was tuned through it, since the receiver was alive up to the audio stage. When the A.F.C. transformer is used in place of the relay, this "pull over" cannot occur because the receiver is made inoperative right at its input by muting of the RF tube.

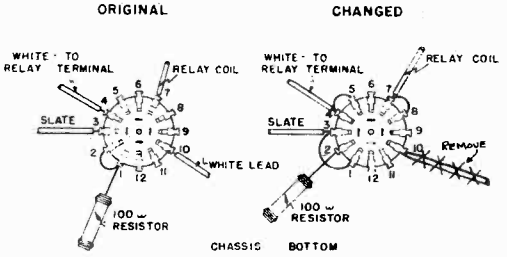
IMPORTANT NOTE IN SETTING UP A.F.C. STATIONS:

IT IS VERY IMPORTANT THAT THE RECEIVER BE TURNED ON FOR TWENTY MINUTES BEFORE SETTING UP A.F.C. STATIONS ON THE TOOTHED DISC. IF STATIONS ARE SET UP WITH THE RECEIVER "COLD", FREQUENCY DRIFT MAY CHANGE THE ACCURACY AND RELIABILITY OF THE SETTING WHEN THE RECEIVER WARMS UP.

CHANGE IN CONNECTIONS AND OPERATION OF THE FLASH TUNING - SELECTIVITY SWITCH (RIGHT HAND KNOB):

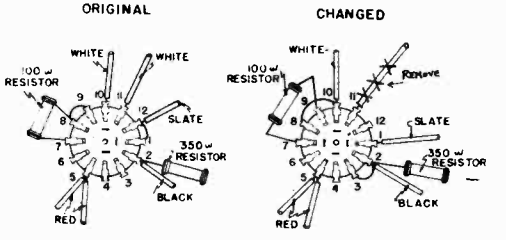
The right hand knob has three positions marked, "SHARP"; "B" (BROAD); "FLASH". In all of the sets using a relay and in the first production of those using a transformer the receiver operated in the conventional manner in the "SHARP" and "B" positions. In the "FLASH" position, the A.F.C. and Flash Tuning circuits were connected. In later production sets using the transformer, the operation and connections of the A.F.C. - Selectivity Switch have been changed so that the radio operates in the conventional manner only in the "SHARP" position. In the "B" position, the A.F.C. is connected and Selectivity is broad. In the "FLASH" position, the A.F.C. also is connected and Selectivity is sharp. In other words, in latest production there are two A.F.C. positions with a choice of broad or sharp selectivity. There is one non-A.F.C. position with sharp selectivity.

With the original connection of the A.F.C. switch, providing only broad selectivity in the "FLASH" position, difficulty may be encountered in some locations due to adjacent channel interference or heterodyne whistles. If such difficulty is encountered in sets having the original connection, the circuit may be changed to provide the two selectivity positions for A.F.C. - Flash Tuning. Fig. 1 shows the switch connection changes for sets using the relay. Fig. 2 shows the switch connection changes for sets having an A.F.C. transformer. Note that in relay sets the original lug #10 connection is removed entirely from the switch. In transformer sets the original #11 connection is removed entirely. In addition, in sets of all types (101412, 101412A, 101412B), a .1 mfd. condenser must be shunted across the .05 mfd. condenser, C6. See the Locations of Parts diagram. In later production of Model 101412B, embodying the two A.F.C. - Selectivity positions, a .15 mfd. condenser is used for C6.



FLASH TUNING - SELECTIVITY SWITCH CIRCUIT CHANGE. SETS WITH RELAY.

FIG. 1



FLASH TUNING - SELECTIVITY SWITCH CIRCUIT CHANGE. SETS WITH TRANSFORMER.

FIG. 2

FLASH TUNING SWITCH
VIEWED FROM REAR

MODELS 4488, 4588, 4488A, 4588A, 4488B, 4588B

FLASH TUNING SWITCH
VIEWED FROM REAR

SEARS-ROEBUCK & CO.

MODELS 4488, 4588, 4488A
4588A, 4488B, 4588B
Revised Alignment
AFC Adjustment

IMPORTANT NOTE ABOUT SETTING UP A.F.C. STATIONS ON ADJACENT CHANNELS:

In paragraph #10 under, "SETTING UP THE AUTOMATIC FREQUENCY CONTROL", in the Service Instructions, the suggestion is made that if adjacent channel stations are selected the two teeth further apart be used instead of the correct ones for the stations. For example, suppose a 700 kc and a 710 kc station is to be selected. Instead of bending up the teeth corresponding to 700 kc and 710 kc, the teeth corresponding to approximately 697 kc and 713 kc would be bent up instead. The purpose of this is to prevent the receiver from jumping from one station to the other as their signal strengths vary. This suggestion will be helpful only if the station is sufficiently strong. Otherwise the mistuning will affect the tone quality. It is best to select, for A.F.C. tuning, stations at least 20 kc apart in frequency.

CHANGE IN PROCEDURE FOR REMOVING DIAL GLASS FOR SETTING UP FLASH TUNING STATION CALL LETTERS:

The Service Instructions for this model describe how to remove the dial glass by taking off the split retaining ring that holds it. In receivers using the 101412B chassis this procedure has been simplified by using an escutcheon with the dial glass moulded into it. It is held in place in the front of the cabinet by four screws. Accordingly, it is necessary merely to remove these four screws in order to take off the moulded escutcheon and dial glass.

CHANGE IN PHONOGRAPH PICK-UP JACK OPERATION:

The Service Instructions for this model state that if a phonograph pick-up jack is used the right hand knob must be in either the "B" or "SHARP" position. This is true only for those receivers that are wired to have the one A.F.C. position ("Flash"). In later production receivers having the two A.F.C. positions ("B" and "FLASH") or in receivers that are changed to provide these two positions, the right hand knob must be in the "SHARP" position for phonograph operation. This must be done, of course, to remove the muting from the audio tube, permitting phonograph reproduction.

REVISED ALIGNMENT PROCEDURE:

PRELIMINARY:

Output meter connections - Across speaker voice coil

Output meter reading to indicate .5 watts output - - - - - - - - - - - - - - - - - - 2.5 volts

Dummy antenna value to be in series with generator output - - - - - - - - - - See chart below

Connection of generator output lead - See chart below

Generator modulation - 30%, 400 cycles

Approximate average sensitivity in microvolts for .5 watts output - - - - - See chart below

Position of Volume Control - Fully on

Position of Tone Control - Fully clockwise

Position of Flash Tuning and Selectivity Switch knob - - - - Sharp, fully counter clockwise

Position of Dial Pointer - - - - - - - - To fall on 10 mc mark when variable is fully meshed

WAVE BAND SWITCH POSITION	POSITION OF DIAL POINTER	GENERATOR FREQUENCY	DUMMY ANTENNA	GENERATOR CONNECTION	TRIMMERS ADJUSTED (IN ORDER SHOWN)	TRIMMER FUNCTION	APPROXIMATE MICROVOLTS
"AM"	550 kc	465 kc	.1 mfd.	6L7G Grid	T2,T1	IF Output IF Input	-
"AM"	1400 kc	1400 kc	.0002 mfd.	Ant. Term.	C28,C1, C12	Osc., Ant., Translator	30
"AM"	600 kc (†)	600 kc	.0002 mfd.	Ant. Term.	C36	Osc. Pad.	12
"POL"	4 mc	4 mc	400 ohms	Ant. Term.	C29,C2, C13	Osc., Ant., Translator	4
"POL"	1650 kc (†)	1650 kc	400 ohms	Ant. Term.	C33	Osc. Pad.	30
"FOR" (Next to "POL")	10 mc	10 mc	400 ohms	Ant. Term.	C30 *	Oscillator	-
"FOR" (Next to "POL")	6 mc (†)	6 mc	400 ohms	Ant. Term.	C34	Osc. Pad.	20
"FOR" (Next to "POL")	10 mc	10 mc	400 ohms	Ant. Term.	C5,C14	Ant., Transl.	4
"FOR" (Next to "POL")	6300 kc	6300 kc	400 ohms	Ant. Term.	C5,C16 **	Ant. Pad., Transl. Pad.	20
"FOR"	17 mc	17 mc	400 ohms	Ant. Term.	C31 *	Oscillator	-
"FOR"	17 mc	17 mc	400 ohms	Ant. Term.	C4,C15	Ant., Transl.	8
"FOR"	11 mc (†)	11 mc	400 ohms	Ant. Term.	C35	Osc. Pad.	60

IMPORTANT ALIGNMENT NOTES

Where indicated by (†) the variable should be rocked back and forth a degree or two while making the adjustment.

* Two peaks will be found at two different settings of the trimmer. Use the one in which the trimmer is screwed further in (greater capacity).

** Use a bakelite screw-driver in making these two adjustments. These adjustments should not be touched after this band has been lined up.

Repeat the entire alignment step by step in the original order for greater accuracy. Always keep the generator output power at its lowest possible value. This will prevent the AVC action of the receiver from interfering with accurate alignment.

The shield covering the coils at the bottom of the chassis should be left in place during the alignment. The trimmer condensers are accessible through the holes in the shield.

Only the dummy antenna indicated in the chart for any particular band should be used. Disconnect the dummy antenna used for alignment of any other band. No connection is to be made to the doublet terminal.

After the alignment has been completed, the A.F.C. adjustment should be made as follows:

A.F.C. ADJUSTMENT

CAUTION: The right hand knob must be in the "SHARP" position for operations 1 through 5. It is preferable to have two signal generators to make the adjustments. However, if two generators are not available, a broadcast station of approximately 1000 kc can be used for one of the generators. However, the station chosen must be of medium strength. That is, one just capable of giving satisfactory reception without back ground noise. Do not use a strong station. The Volume and Tone Controls must be turned all the way to the right. The generator ground connection is to be made to the chassis.

1. Set one signal generator (or the broadcast station) to 1000 kc and 5000 microvolts output. Connect its output to the "ANT" terminal of the set, through a .0002 mfd. condenser.

2. Tune the receiver for maximum output (at 1000 kc). Then switch the signal generator modulation switch to the "Off" position.

3. Short the movable arm to the toothed disc with a piece of wire. The Flash Tuning light should become illuminated.

4. Set the second signal generator to 465 kc and 10,000 microvolts output. Connect its output, in series with a .000015 mfd. condenser to the control grid of the 6L7G tube. Turn the modulation switch to the "Off" position.

5. Carefully turn the variable condenser until "zero beat" note is had (with right hand knob in "SHARP" position).

6. Turn the right hand knob to the "FLASH" position (fully clockwise). Then adjust the discriminator unit, T3, for "zero beat". The correct setting will be obtained at about the center of T3 trimmer range. The adjustment is a very sharp one.

7. Turn the right hand knob to the "SHARP" and then to the "BROAD" positions. The receiver still should give zero beat in the "SHARP" and "BROAD" positions if the A.F.C. is properly adjusted. If it does not, carefully repeat operation #6.

8. The A.F.C. can be checked for "pull in" in the following manner. Remove the signal generator connection from the 6L7G grid. (Two generators must be used.) Switch on the modulation of the 1000 kc generator and set the generator to give 5000 microvolts output. Reduce the Volume Control setting of the receiver to give 1.5 volts reading on the output meter. Increase the signal generator frequency until the output meter reads .5 volt. Note the frequency of the signal generator at this output meter reading. Then decrease the signal generator frequency from 1000 kc until the output meter again reads .5 volt and note the signal generator frequency. If the A.F.C. is operating properly, the signal generator can be shifted 15 to 20 kc either side of 1000 kc before the output meter reading is reduced from 1.5 volts to .5 volt.

MODELS 4502,4504,4508
Schematic,Voltage

SEARS-ROEBUCK & CO.

Notes

POWER SUPPLY:
All models available - 25-60 cycle or DC, 48 watts

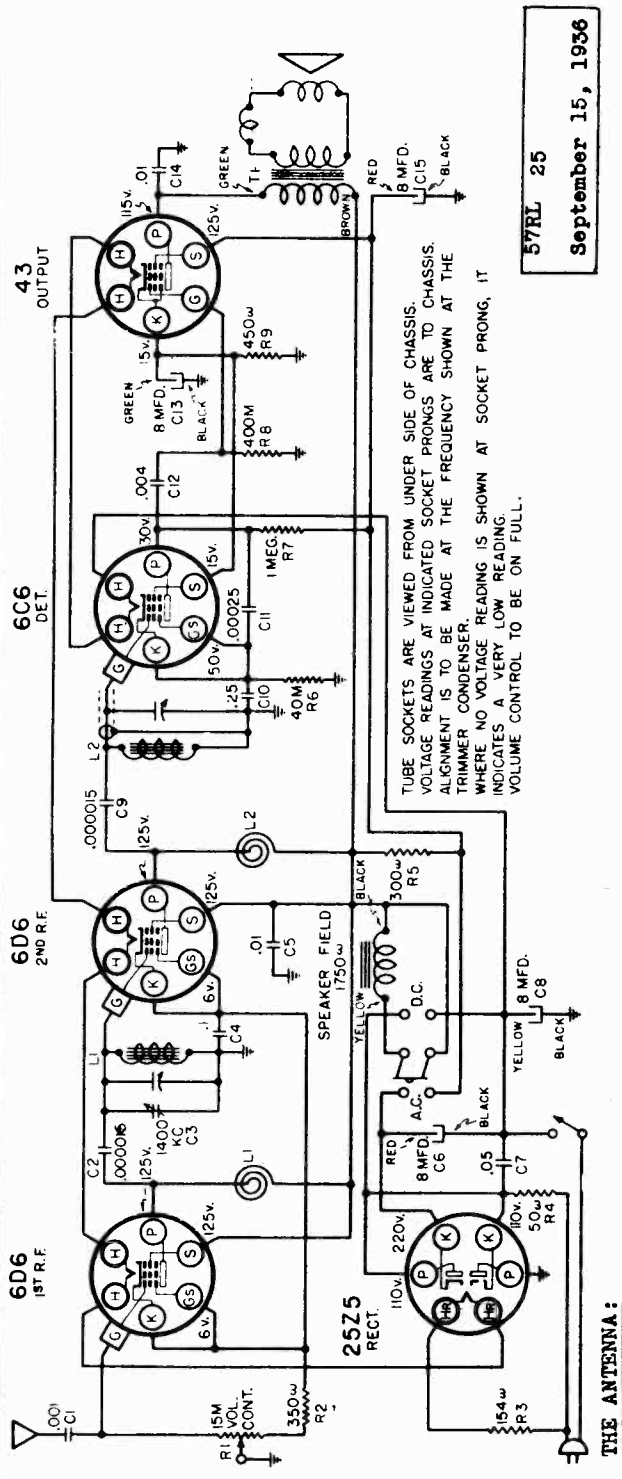
FREQUENCY RANGE:
Broadcast - - - - - - - - - 545-1720 kc

POWER OUTPUT:
Type - - - - - - - - - Single Pentode
Undistorted - - - - - - - - - - 1 watt
Maximum - - - - - - - - - - - 1.85 watts

ALIGNMENT FREQUENCY:
1400 kc

LOUD SPEAKER:
Type - - - - - - - - - - - - - Dynamic
Size - - - - - - - - - - - - - - - - 5"
Field Coil Resistance - - - 1750 ohms
Field Coil Voltage Drop (Approximate)- 120 volts

OPERATING FEATURES:
Fidelity Range - - - 100 - 3000 cycles
Tone Control - - - - - - - - - - - - None
Sensitivity Control - - - - - - - None
Automatic Volume Control - - - - None



THE ANTENNA:

An attached antenna wire is supplied with the receiver. It should be uncoiled and extended as far from the radio as possible. If interference between stations is encountered, uncoil the antenna only far enough to obtain satisfactory reception, free of interference. In locations remote from broadcasting stations additional pick-up can be had by connecting the end of the antenna to a conventional outdoor antenna leadin.

THE FILAMENT CIRCUIT AND POWER SUPPLY:

The filaments of all of the tubes are connected in series. Accordingly, if any one tube burns out the others will not light. It is necessary to replace only the burned out tube; the others then will light. A resistor, built into the line cord, reduces the line voltage to the value required by the tube filaments.

There is an AC-DC switch, accessible from the bottom of the cabinet and operated with a screw-driver. This switch must be in the proper position for AC or DC operation, as shown on the label at the bottom of the cabinet. If the receiver is operated from DC, the polarity of the line cord plug must be correct. If the receiver fails to operate after allowing a minute or two for the tubes to become heated, turn the plug half way around and re-insert it in its receptacle.

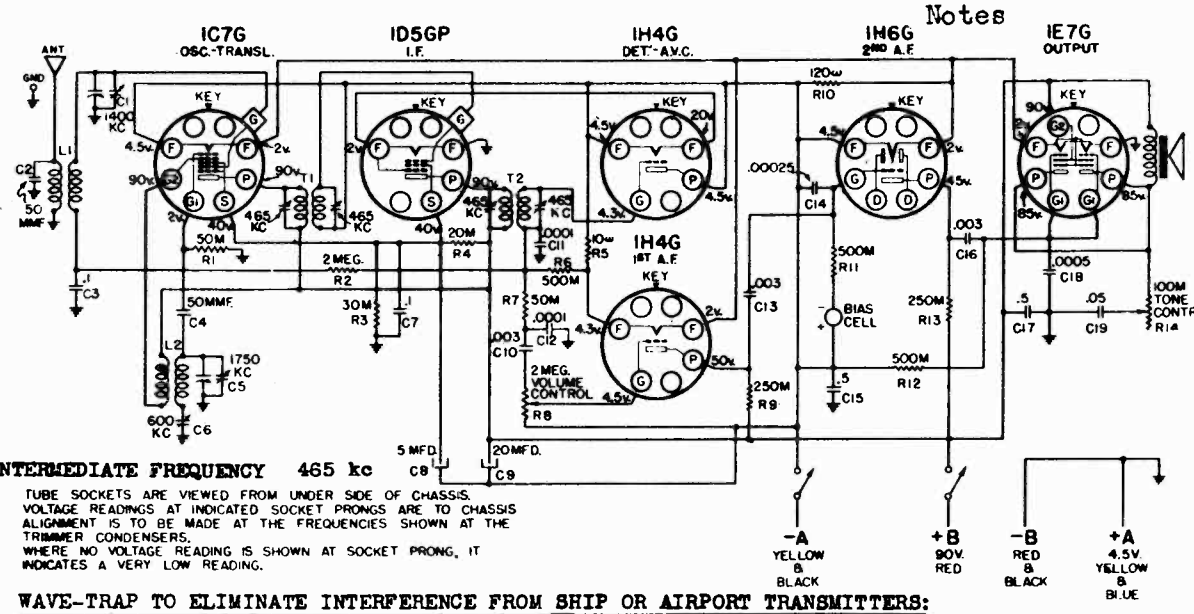
The line cord must not be shortened or altered in any way. To do so would affect the value of resistance built into it.

CAUTION:

Under certain conditions, the chassis may be above ground potential by a value equal to the line voltage. For this reason, care must be taken not to allow any grounded object to come in contact with the chassis while the power cord is plugged into the line. The chassis is insulated from the metal bottom cover of the cabinet by means of rubber grommets.

SEARS-ROEBUCK & CO.

MODELS 4498,4499,4598
Schematic, Voltage Notes



INTERMEDIATE FREQUENCY 465 kc

TUBE SOCKETS ARE VIEWED FROM UNDER SIDE OF CHASSIS.
VOLTAGE READINGS AT INDICATED SOCKET PRONGS ARE TO CHASSIS
ALIGNMENT IS TO BE MADE AT THE FREQUENCIES SHOWN AT THE TRIMMER CONDENSERS.
WHERE NO VOLTAGE READING IS SHOWN AT SOCKET PRONG, IT INDICATES A VERY LOW READING.

WAVE-TRAP TO ELIMINATE INTERFERENCE FROM SHIP OR AIRPORT TRANSMITTERS:

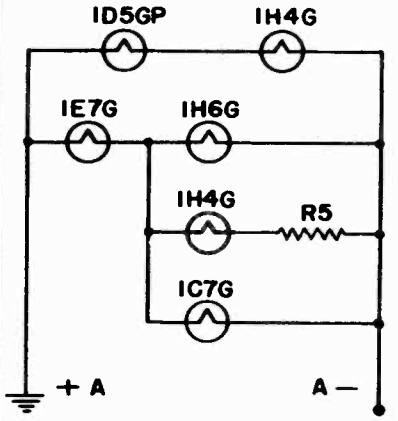
In locations near ship transmitters or airports or air beacon stations, code interference may be experienced. Part #1013114256 wave-trap is designed to eliminate such interference.

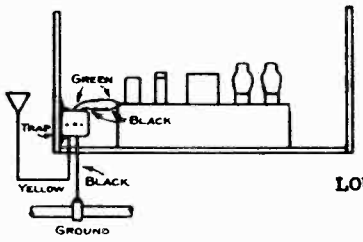
Mount the trap, by means of two wood screws, at any convenient place on the chassis shelf or cabinet where it will be near the antenna terminal of the receiver. Connect the yellow lead of the wave-trap to the antenna downlead. Splice the green lead of the wave-trap to the green antenna lead of the receiver. Cut off any excess length of wire from the trap and from the chassis antenna lead so that the green lead from the wave-trap to the chassis is as short as possible. The yellow lead from the wave-trap should be run so that it is as far as possible from the green lead. Splice one of the black leads from the wave-trap to the black ground lead of the receiver. Connect the other wave-trap black lead to the ground used for the installation.

The trap is pre-tuned to the IF frequency so that normally no further adjustment is necessary. However, should interference still be experienced, tune the receiver between approximately 550 and 600 kc. Then adjust the wave-trap, by means of the trimmer screw at the bottom of the container, until the interference is eliminated. Addition of the trap will reduce the sensitivity of the receiver around 600 kc by approximately 50%. The customer should be forewarned of this to avoid complaints of reduced sensitivity.

THE FILAMENT CIRCUIT:

Since the tube filaments are rated at two volts and the "A" supply is four volts, a series parallel arrangement is used for the tube filament circuit. Accordingly, if any one tube burns out its companion tube will also be affected. It is necessary to replace only the burned out tube. A simplified circuit of the filament connections is shown below.





POWER OUTPUT:

Type	Twin Pentode
Undistorted	0.25 watts
Maximum	0.6 watts

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January 25, 1937

LOUD SPEAKER:

Type	Magnetic
Size	6"
Approximate DC resistance	1000 ohms

POWER SUPPLY:

"A" Battery (4½ volt dry)	1 - #5031P	"A" Drain	0.3 amperes
"A" Battery (4 volt storage)	1 - #5049	"B" Drain	22 ma
"B" Batteries	2 - #5131P		

FREQUENCY RANGE:

Broadcast	540-1750 kc

ALIGNMENT FREQUENCIES:

Oscillator Trimmer	Translator Trimmer	Padder
1750 kc	1400 kc	600 kc

MODELS 4498, 4499, 4598
Socket, Trimmers, Notes
Alignment, Sensitivity

SEARS-ROEBUCK & CO.

ALIGNMENT PROCEDURE

PRELIMINARY:

Output meter connections . . . . . 4000 ohm meter, in series with a .5 mfd. condenser, across speaker terminals.

Output meter reading to indicate 50 milliwatts . . . . . 8.5 volts

Average sensitivity in microvolts for 50 milliwatts output . . . . . See chart below

Generator ground lead connection . . . . . Receiver chassis

Dummy antenna value to be in series with generator output . . . . . See chart below

Connection of generator output lead . . . . . See chart below

Generator modulation . . . . . 30%, 400 cycles

Position of Volume Control . . . . . Fully on

POSITION OF VARIABLE	GENERATOR FREQUENCY	DUMMY ANTENNA	GENERATOR CONNECTION	TRIMER ADJUSTMENTS (IN ORDER SHOWN)	TRIMER FUNCTION	APPROXIMATE MICROVOLTS
Closed	465 kc	.1 mfd.	1C7G Transl. Grid	T2, T1	IF	60
Fully Open	1750 kc	.0002 mfd.	Antenna Lead	C5	Osc. Trim.	90
1400 kc	1400 kc	.0002 mfd.	Antenna Lead	C1	Transl. Trimmer	20
600 kc (rock)	600 kc	.0002 mfd.	Antenna Lead	C8	Osc. Pad.	45

IMPORTANT ALIGNMENT NOTES

The variable should be rocked back and forth a degree or two while making the 600 kc adjustment.

The alignment procedure should be repeated in the original order, step by step, to insure greater accuracy.

Always keep the output power from the generator at its lowest possible value to prevent the AVC of the receiver from interfering with accurate alignment.

After the alignment has been completed, check the calibration by tuning in a broadcast station at about 900 kc. Adjust the dial pointer to the station's frequency, if necessary.

BATTERY CONNECTIONS:

A-	Black and yellow
A+	Yellow and blue
B-	Red and black
B+ 90B	Red

SPEAKER ADJUSTMENT:

There are two adjusting screws at the rear of the speaker, as shown in the illustration. Speaker rattle can be corrected by turning these screws. Tighten one and loosen the other slightly until the rattle is eliminated.

ELIMINATING WHISTLE AT 930 KC:

A whistle, due to a beat between the second harmonic (930 kc) of the 465 kc IF, and a 930 kc signal may be experienced. In localities where the 930 kc station is one that is frequently listened to, it will be desirable to shift the whistle to some other point where it will not be objectionable. This can be done by shifting the IF frequency of the receiver.

Determine at what point between 900 kc and 960 kc the whistle will be least objectionable. Dividing this frequency by two will give the new IF frequency to which the receiver should be aligned. For example, if it is determined that a whistle at 915 kc would not be objectionable, the IF should be realigned at 915/2 or 457.5 kc.

Align the IF at the new frequency and then realign the rest of the receiver as described under, "ALIGNMENT PROCEDURE".

BATTERY REPLACEMENT:

The dry "A" battery should be replaced when its voltage drops to 3.4 volts, under load. The "B" batteries should be replaced when the total voltage has dropped to 68 volts, under load.

THE BIAS CELL:

The bias cell is filled with thick liquid. When the receiver is in its normal position the bias cell will be mounted on its side, which is the correct position, so that the liquid will come into contact with the carbon block and the inside of the metal container. However, the receiver may be stood on its end when working on it on the service bench. In this position the bias cell may be upright and the liquid may not touch the carbon block. If this happens, it will cause severe distortion. Accordingly, the necessary precaution should be observed when working on the receiver on the service bench.

LOCATIONS OF PARTS UNDER CHASSIS.

LOCATIONS OF PARTS ON TOP OF CHASSIS.

OPERATING FEATURES:
Fidelity Range . . . . 50 - 3000 cycles
Automatic Volume Control

CHASSIS FEATURES:
Number RF stages . . . . . None
Number IF stages . . . . . One
Number condensers in gang . . . . Two
Antenna . . . . . Conventional
Dial calibrated in kilocycles and meters

MODELS 4501,4503,4507
Schematic,Voltage,Notes

SEARS-ROEBUCK & CO.

POWER SUPPLY:
All models available - - - - - - - - - - - - 105-125 volts; 50-60 cycle AC only, 40 watts

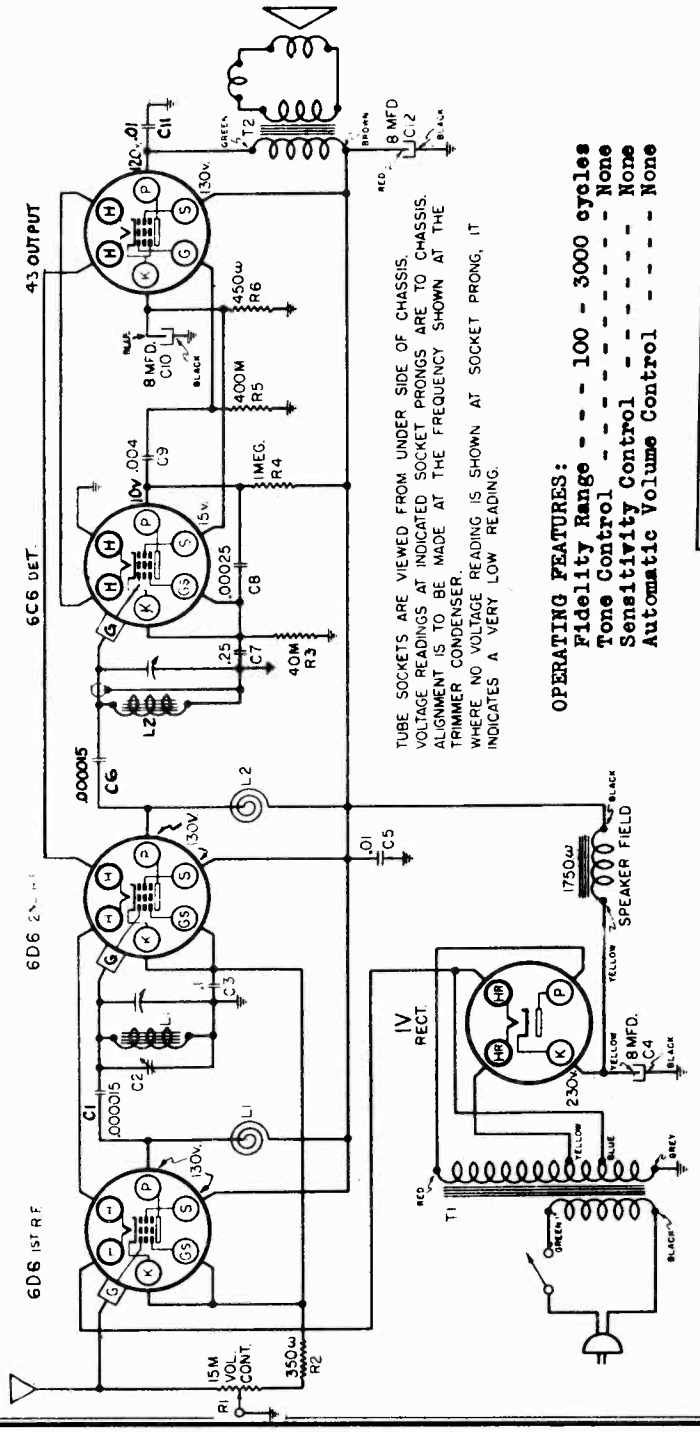
FREQUENCY RANGE:
Broadcast - - - - - - - - - 545-1720 kc

ALIGNMENT FREQUENCY:
1400 kc

POWER OUTPUT:
Type - - - - - - - - - - Single Pentode
Undistorted - - - - - - - - - .98 watts
Maximum - - - - - - - - - - 1.64 watts

LOUD SPEAKER:
Type - - - - - - - - - - - - - Dynamic
Size - - - - - - - - - - - - - - - - - - 5"
Field coil resistance - - 1750 ohms
Field coil voltage drop (approximate)- 120 volts

CHASSIS FEATURES:
Number of tuned RF stages - - - - Two
Number of condensers in gang - - - Two
Antenna - - - - - - - - Self-contained
Dial - KC calibration on large tuning knob.



OPERATING FEATURES:
Fidelity Range - - - 100 - 3000 cycles
Tone Control - - - - - - - - - None
Sensitivity Control - - - - - - None
Automatic Volume Control - - - - None

57RL 24

September 15, 1936

GENERAL INFORMATION

THE ANTENNA:

An attached antenna wire is supplied with the receiver. It should be uncoiled and extended as far from the radio as possible. If interference between stations is encountered, uncoil the antenna only far enough to obtain satisfactory reception, free of interference. In locations remote from broadcasting stations additional pick-up can be had by connecting the end of the antenna to a conventional outdoor antenna leadin.

THE FILAMENT CIRCUIT:

All of the tubes, except the 1V, are connected in series. Accordingly, if any one tube burns out the others will not light. It is necessary to replace only the burned out tube; the others then will light.

THE POWER TRANSFORMER:

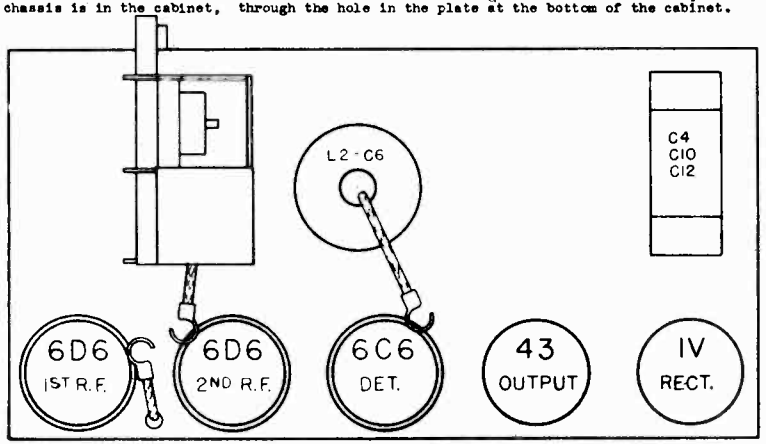
The Model 101426 is identical to the Model 101393 except that the 101426 uses a power transformer with separate primary and secondary. (The 101393 uses an auto-transformer.) Accordingly, the chassis of the 101426 is at ground potential. (The 101393 chassis under certain conditions may be above ground potential by an amount equal to the line voltage.)

ALIGNMENT PROCEDURE

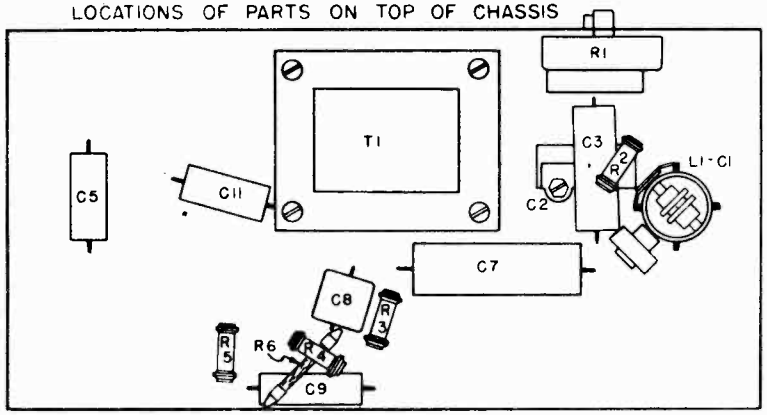
The receiver need not be taken out of the cabinet for alignment.

Either a broadcast signal of about 1400 kc or a test oscillator signal may be used. If a broadcast signal is used, the antenna of the receiver should be extended as in a normal installation. If a test oscillator signal is used, a wire should be connected to the test oscillator output and run parallel to but insulated from the receiver's antenna wire. The generator ground connection should be connected to ground.

Tune in the 1400 kc signal and adjust the trimmer for maximum loud speaker response. This can be done most accurately if the Volume Control setting is reduced to give a low volume level. The variable should be rocked a degree or two during the adjustment. The location of this trimmer is shown in the Location of Parts Diagram. It is accessible, when the chassis is in the cabinet, through the hole in the plate at the bottom of the cabinet.



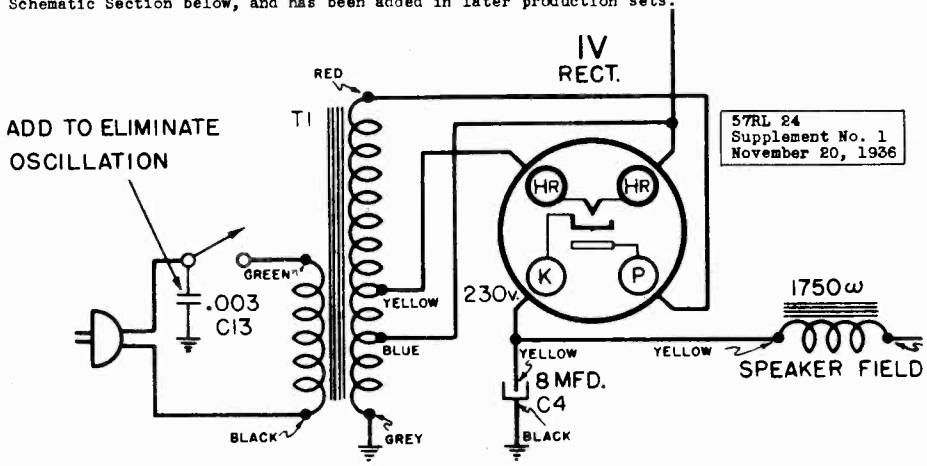
LOCATIONS OF PARTS ON TOP OF CHASSIS



LOCATIONS OF PARTS UNDER CHASSIS

SUBJECT: ELIMINATING OSCILLATION

Oscillation may occur due to variations in tubes. To overcome such oscillation, connect a .003 condenser from the line side of the switch to the chassis. This condenser must be of at least 600 volts rating, or higher, preferably 800 volts. This condenser is C13 in the Schematic Section below, and has been added in later production sets.



SCHEMATIC LOCATION	PART NUMBER	DESCRIPTION
C5,C11		Condenser - .01 mfd. 400 V.
C9		Condenser - .004 mfd. 400 V.
C8		Condenser - .00025 " mica
R1	1012414034	Control - Volume, with "On-Off" switch
	1015514739	Cord - Line, white
	1015514061	Cord - Line, black
	1015514721	Cord - Line, brown
	10160140611	Cover - Cabinet bottom
	1015414052	Grommet - Chassis mounting
	1013914735	Knob - Tuning, ivory, black lettered calibration
	1013914736	Knob - Tuning, ivory, gold lettered calibration
	1013914538	Knob - Tuning, ivory, brown lettered calibration
	1013914322	Knob - Volume control, ivory
	1013914039	Knob - Volume control, black
	1013914537	Knob - Volume control, brown
R4		Resistor - 1 megohm, 1/3 watt
R5		Resistor - 400M ohms, 1/3 watt
R3		Resistor - 40M ohms, 1/3 watt
R6		Resistor - 450 ohms, 1 watt, flexible
R2		Resistor - 350 ohms, 1/3 watt
	1015314244	Shield - Tube
	101188515	Socket - 4 prong
	101188092	Socket - 6 prong
	1015814068	Speaker - 5", Dynamic
	1015714871	Cone and voice coil
	1011514872	Field coil
T2	1011314873	Transformer
T1	1011014063	Transformer - Power

POWER TRANSFORMER COLOR CODE

1-Green	4-Yellow
2-Black	5-Blue
3-Red	6-Grey

REPLACEMENT PARTS AND PRICE LIST

SCHEMATIC LOCATION	PART NUMBER	DESCRIPTION
	1015514737	Antenna Cord - White
	1015514030	Antenna Cord - Black
	1015514723	Antenna Cord - Brown
	1015414200	Button - Snap, variable condenser shield mounting
	10160143181	Cabinet - Ivory (With grille cloths)
	10160140281	Cabinet - Black (With grille cloths)
	10160145341	Cabinet - Brown (With grille cloths)
	1015414479	Clip - Grid
	10160145351	Cloth - Grille, front, ivory, with paper baffle
	10160147401	Cloth - Grille, front, gold, with paper baffle
	1016014536	Cloth - Grille, rear, ivory
	1016014741	Cloth - Grille, rear, gold
L1-C1, L2-C6	1012814032	Coil - RF
	1011614035	Condenser - Variable
C4,C10, C12	1012015401	Condenser - Electrolytic, triple, dry
C7		Condenser - .25 mfd. 200 V.
C3		Condenser - .1 mfd. 200 V.

WHEN NO PART NUMBER IS ASSIGNED ORDER BY DESCRIPTION AND RATING

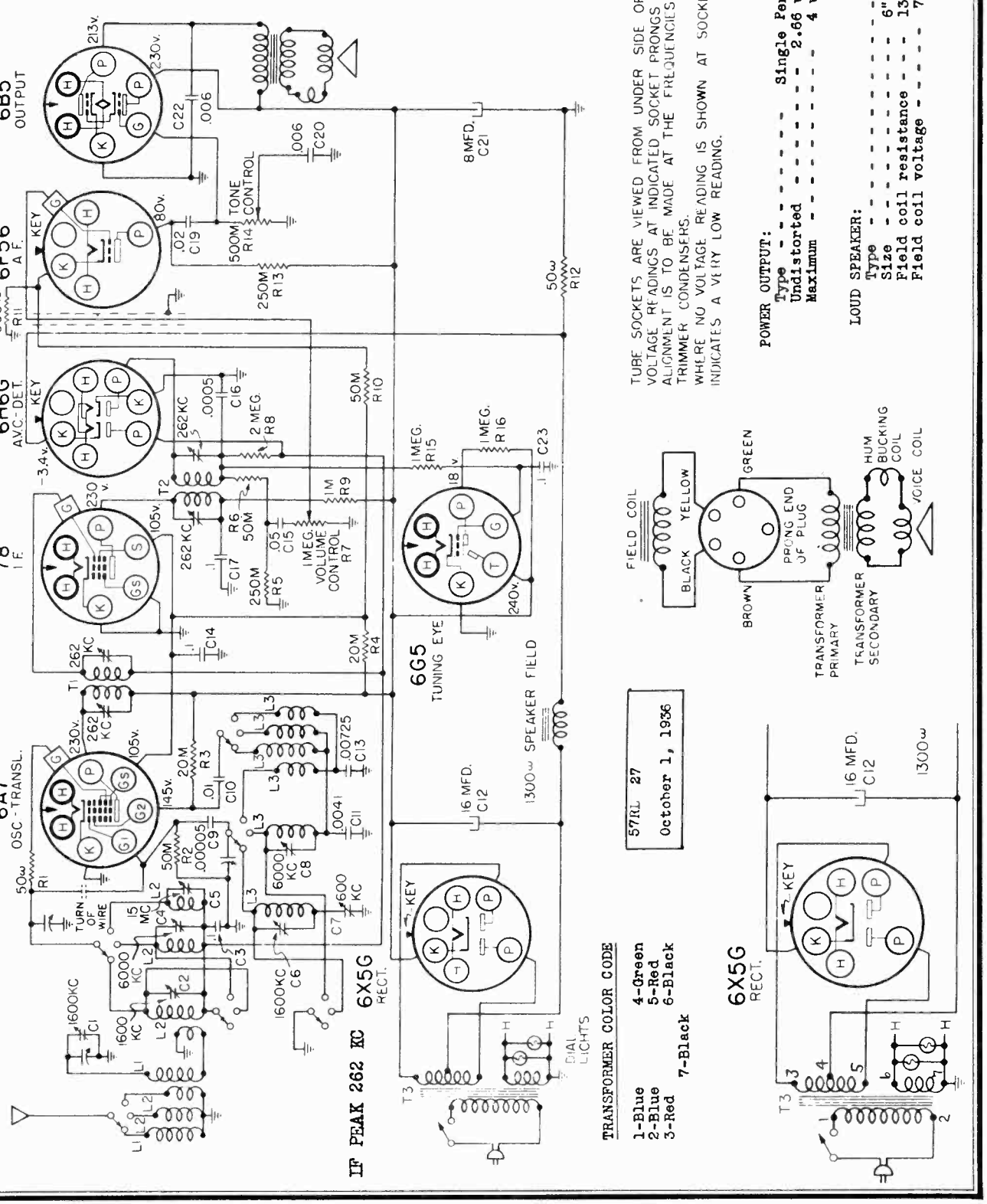
MODELS 4569,4589
Schematic,Voltage

SEARS-ROEBUCK & CO.

POWER SUPPLY:
All models available - 105-125 volts, 50-60 cycle, 48 watts
All models available - - - 105-125 volts, 25 cycle, 50 watts

FREQUENCY RANGES:
Band "A" - - - - - - - - - 545-1825 kc
Band "P" - - - - - - - - - - 2.1-6.5 mc
Band "F" - - - - - - - - - - 6.2-19 mc

INTERMEDIATE FREQUENCY - - - - - - - - - - - - - 262 kc



TUBE SOCKETS ARE VIEWED FROM UNDER SIDE OF CHASSIS.
VOLTAGE READINGS AT INDICATED SOCKET PRONGS ARE TO CHASSIS
ALIGNMENT IS TO BE MADE AT THE FREQUENCIES SHOWN AT THE TRIMMER CONDENSERS.
WHERE NO VOLTAGE READING IS SHOWN AT SOCKET PRONG, IT INDICATES A VERY LOW READING.

POWER OUTPUT:
Type - - - - - - - - - - - - Single Pentode
Undistorted - - - - - - - - - - 2.66 watts
Maximum - - - - - - - - - - - - 4 watts

LOUD SPEAKER:
Type - - - - - - - - - - - - - - -Dynamic
Size - - - - - - - - - - - - - - - 6" and 8"
Field coil resistance - - - - 1300 ohms
Field coil voltage - - - - - - 75 volts

TRANSFORMER COLOR CODE

1-Blue	4-Green
2-Blue	5-Red
3-Red	6-Black
	7-Black

57RL 27
October 1, 1936

IF PEAK 262 KC

SEARS-ROEBUCK & CO.

ALIGNMENT PROCEDURE

PRELIMINARY:

Output meter connections - Across voice coil leads

Output meter reading to indicate .5 watts output - - - - - - - - - - - - - - - - - - -1.3 volts

Average sensitivity in microvolts for .5 watts output - - - - - - - - - - - - See chart below

Dummy antenna value to be in series with generator output - - - - - - - - - - See chart below

Connection of generator output lead - See chart below

Generator modulation - 30%, 400 cycles

Position of volume control - Fully clockwise

Position of tone control - Fully clockwise

WAVE BAND SWITCH POSITION	POSITION OF DIAL POINTER	GENERATOR FREQUENCY	DUMMY ANTENNA	GENERATOR CONNECTION	TRIMMERS ADJUSTED (IN ORDER SHOWN)	APPROXIMATE MICROVOLTS
"A"	-	262 kc	.1 mfd.	6A7 Grid	T2,T1	150
-	To fall on first short line on dial between 550 and Tuning Eye when variable is fully meshed.	-	-	-	-	-
"A"	1500 kc	1600 kc	.0002 mfd.	Antenna Terminal	C6,C2,C1	40
"A"	600 kc (rock)	600 kc	.0002 mfd.	Antenna Terminal	C7	40
"P"	6 mc	6 mc	400 ohms	Antenna Terminal	C8	-
"P"	6 mc (rock)	6 mc	400 ohms	Antenna Terminal	C4	25
"P"	15 mc (rock)	15 mc	400 ohms	Antenna Terminal	C5	25
"P"	7 mc	7 mc	400 ohms	Antenna Terminal	Loop at bracket end of L3	80

IMAGE ADJUSTMENT

Set the generator to 1524 kc and tune in the signal image at about 1000 kc on the receiver. The generator should be adjusted for high output (.1 volts). There is a lead running from L1 through a hole in the chassis to the wave switch. Adjust the position of this lead under the chassis for minimum image response.

IMPORTANT ALIGNMENT NOTES

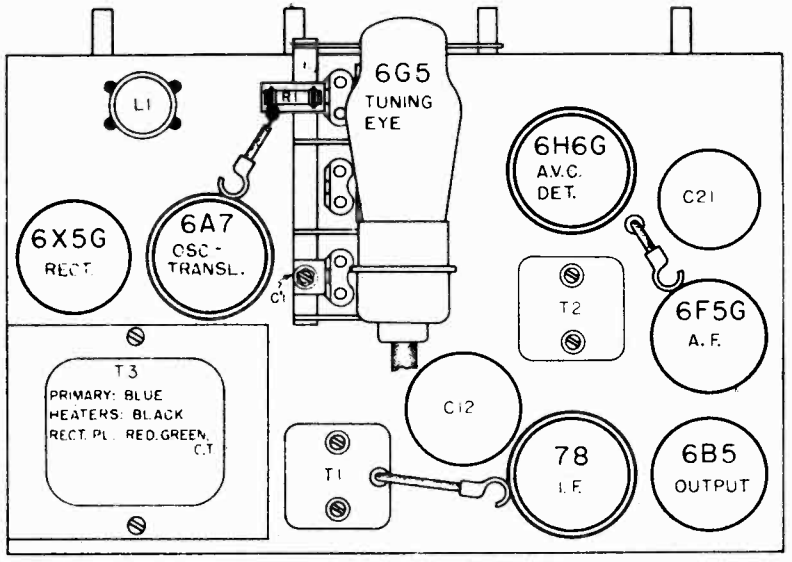
Where indicated by the word, "Rock", the variable should be rocked back and forth a degree or two while making the adjustment.

It is advisable to repeat the entire alignment procedure band by band and in the original order to insure greater accuracy.

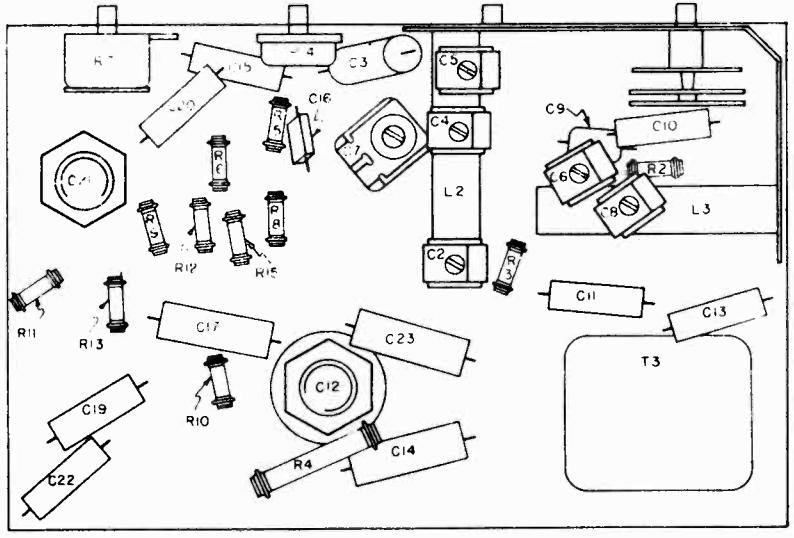
Always keep the output from the test oscillator at its lowest possible value. As the sensitivity is increased by alignment, the generator output should be reduced correspondingly. This will prevent the AVC from interfering with accurate alignment.

After the alignment procedure has been completed, tune in a broadcast signal at about 900 kc. If necessary, shift the dial pointer so that it indicates this frequency.

Values shown under, "Microvolts", are only approximate.



LOCATIONS OF PARTS ON TOP OF CHASSIS



LOCATIONS OF PARTS UNDER CHASSIS

SEARS-ROEBUCK & CO.

MODEL 4587
Schematic, Voltage Data

POWER SUPPLY:
All models available - - - - - - - - - - - - - - - - 105-125 volts, 50-60 cycle, 110 watts
All models available - - - - - - - - - - - - - - - - - - 105-125 volts, 25 cycle, 110 watts

FREQUENCY RANGES:
AMERICAN Band - - - - - - - 540-1550 kc
POLICE Band - - - - - - - -1550-5400 kc
FOREIGN Band - - - - - - - 5.9-17 mc

ALIGNMENT FREQUENCIES:

	Osc. Trimmer	Ant-Transl. Trimmer	Osc. Padder
Band "AM"	1400 kc	1400 kc	600 kc
Band "POL"	4 mc	4 mc	1.8 mc
Band "FOR"	15 mc	15 mc	Fixed

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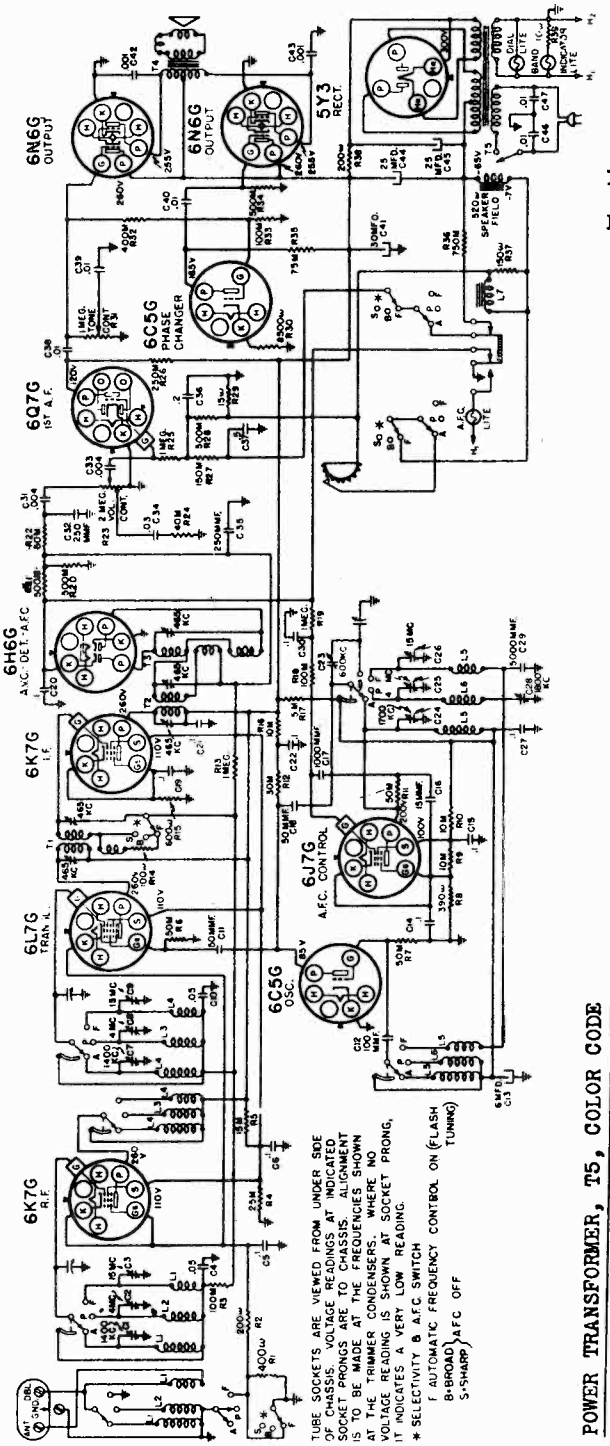
September 10, 1936

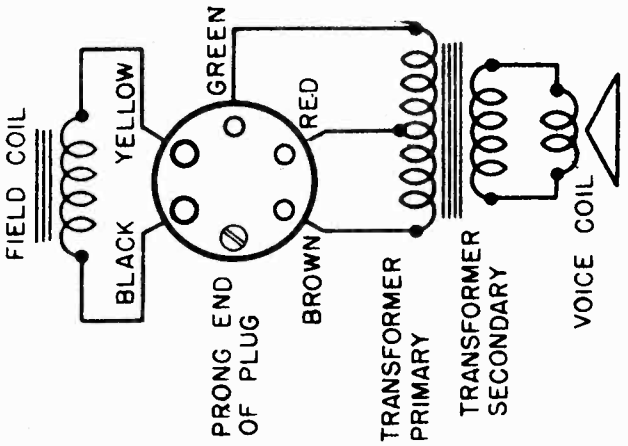
INTERMEDIATE FREQUENCY - - - - - - - - - - - - 465 kc

POWER OUTPUT:
Type - - - - - - - - Push-Pull
Undistored - - - - - - - - - - 9 watts
Maximum - - - - - - - - - - 11.4 watts

LOUD SPEAKER:
Type - - - - - - - - - - - - - Dynamic
Size - - - - - - - - - - - - - - - - 10"
Field coil resistance - - - 520 ohms
Field coil voltage drop - - -60 volts

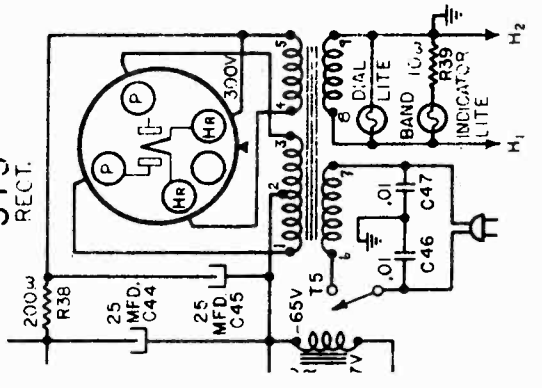
CHASSIS FEATURES:
Number RF stages - - - - - - - - - One
Number IF stages - - - - - - - - - One
Antenna - - Doublet or Conventional





POWER TRANSFORMER, T5, COLOR CODE

1-Red
2-Slate
3-Blue
4&5-Red
6-Black
7-Green
8&9-Black



MODEL 4587
Socket, Trimmers

Chassis, Notes

SEARS-ROEBUCK & CO.

WAVE-TRAP TO ELIMINATE INTERFERENCE FROM SHIP OR AIRPORT TRANSMITTERS:

Mount the trap, by means of two wood screws, at any place on the chassis shelf or cabinet where it will be near the antenna terminals of the receiver. Connect the yellow lead of the trap to the terminal marked, "DBL", on the terminal block at the rear of the chassis. Connect the black lead of the trap to the ground terminal of the chassis. Any excess length should be cut off the leads so that they are as short as possible. The antenna or doublet connections to the receiver are not to be changed in any way.

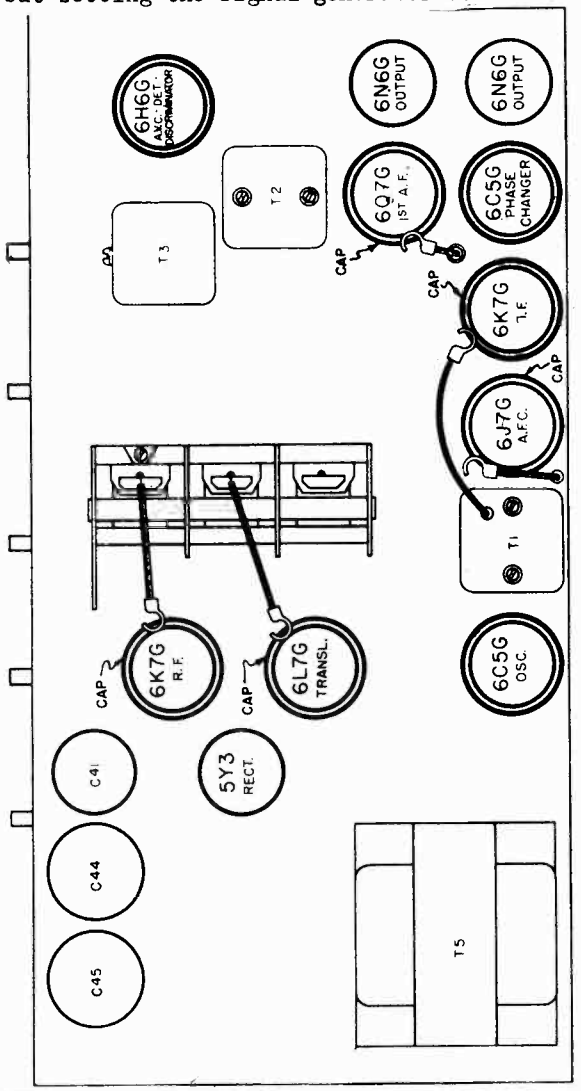
The trap is pre-tuned to the IF frequency so that normally no further adjustment is necessary. However, should interference still be experienced, tune the receiver between approximately 550 and 600 kc. Then adjust the wave-trap, by means of the trimmer screw at the bottom of the container, until the interference is eliminated. Addition of the trap will reduce the sensitivity of the receiver around 600 kc by approximately 50%. The customer should be forewarned of this to avoid complaints of reduced sensitivity. See Dw65.

ELIMINATING WHISTLE AT 930 KC:

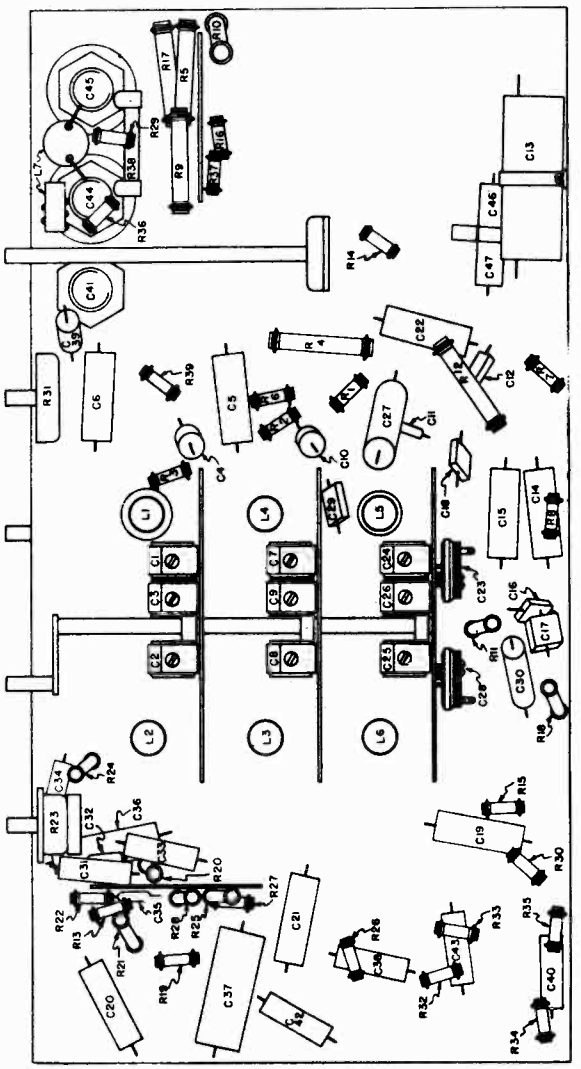
A whistle, due to a beat between the second harmonic (930 kc) of the 465 kc IF, and a 930 kc signal may be experienced. In localities where the 930 kc station is one that is frequently listened to, it will be desirable to shift the whistle to some other point where it will not be objectionable. This can be done by shifting the IF frequency of the receiver.

Determine at what point between 900 kc and 960 kc the whistle will be least objectionable. Dividing this frequency by two will give the new IF frequency to which the receiver should be aligned. For example, if it is determined that a whistle at 915 kc would not be objectionable, the IF should be realigned at 915/2 or 457.5 kc. Try to keep the new IF frequency as near 465 kc as possible.

Align the IF at the new frequency and then realign the antenna, translator, and oscillator stages. Then re-adjust the A.F.C. according to the procedure described in this Manual, but setting the signal generator to the new IF frequency instead of 465 kc.



LOCATIONS OF PARTS ON TOP OF CHASSIS



LOCATIONS OF PARTS UNDER CHASSIS

ALIGNMENT PROCEDURE

PRELIMINARY:

Output meter connections - Across speaker voice coil

Output meter reading to indicate .5 watts output - 1.1 volts

Dummy antenna value to be in series with generator output - - - - - - - - - - See chart below

Connection of generator output lead - See chart below

Generator modulation - 30%, 400 cycles

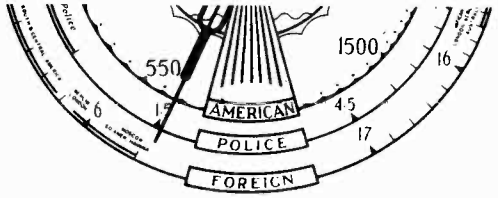
Approximate average sensitivity in microvolts for .5 watts output - - - - - - See chart below

Position of Volume Control - Fully on

Position of Tone Control - Fully clockwise

Position of Flash Tuning and Selectivity Switch knob - - - - Sharp, fully counter clockwise

Position of Dial Pointer when variable is fully meshed - - - - - - - - As illustrated below



WAVE BAND SWITCH POSITION	POSITION OF DIAL POINTER	GENERATOR FREQUENCY	DUMMY ANTENNA	GENERATOR CONNECTION	TRIMMERS ADJUSTED (IN ORDER SHOWN)	APPROXIMATE MICROVOLTS
"AM"	550 kc	465 kc	.1 mfd.	6L7G Grid	T2,T1	-
"AM"	1400 kc	1400 kc	.0002 mfd.	Antenna Terminal	C24,C1,C7	15
"AM"	600 kc (rock)	600 kc	.0002 mfd.	Antenna Terminal	C23	20
"POL"	4 mc	4 mc	400 ohms	Antenna Terminal	C25,C2,C8	6
"POL"	1.8 mc (rock)	1.8 mc	400 ohms	Antenna Terminal	C28	40
"FOR"	15 mc	15 mc	400 ohms	Antenna Terminal	C26,C3,C9	5
"FOR"	6 mc	6 mc	400 ohms	Antenna Terminal	-	60

IMPORTANT ALIGNMENT NOTES

Where indicated by the word, "Rock", the variable should be rocked back and forth a degree or two while making the adjustment.

Repeat the entire alignment step by step in the original order for greater accuracy. Always keep the generator output power at its lowest possible value. This will prevent the AVC action of the receiver from interfering with accurate alignment.

The shield covering the coils at the bottom of the chassis should be left in place during the alignment. The trimmer condensers are accessible through the holes in the shield.

Only the dummy antenna indicated in the chart for any particular band should be used. Disconnect the dummy antenna used for alignment of any other band.

After the alignment has been completed, the A.F.C. adjustment should be made as follows:

A.F.C. ADJUSTMENT

CAUTION: The right hand knob must be in the "B" (broad) position for operations 1 through 5. Two signal generators are necessary to make the adjustments. The Volume and Tone Controls must be turned all the way to the right. The generator ground connection is to be made to the chassis.

1. Set one signal generator to 1050 kc and 5000 microvolts output. Connect its output to the "ANT" terminal of the set, through a .0002 mfd. condenser.

2. Tune the receiver for maximum output (at 1050 kc). Then switch the signal generator modulation switch to the "off" position.

3. Short the movable arm to the toothed disc with a piece of wire. The Flash Tuning light should become illuminated.

4. Set the second signal generator to 465 kc and 10,000 microvolts output. Connect its output, in series with a .000015 mfd. condenser to the control grid of the 6L7G tube.

5. Carefully turn the variable condenser until "zero beat" note is had (with right hand knob in "BROAD" position).

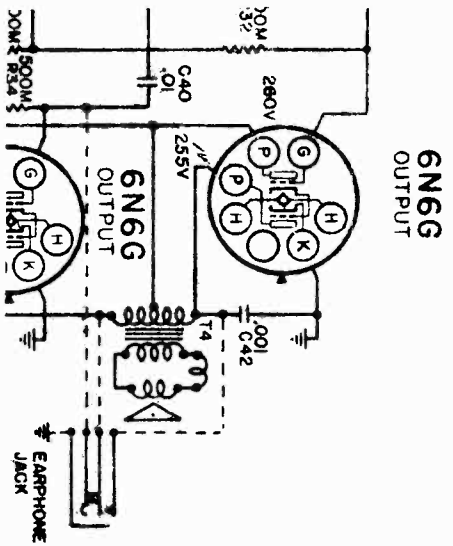
6. Turn the right hand knob to the "FLASH" position (fully clockwise). Then adjust the discriminator unit, T3, for "zero beat". The correct setting will be obtained at about the center of T3 trimmer range. The adjustment is a very sharp one.

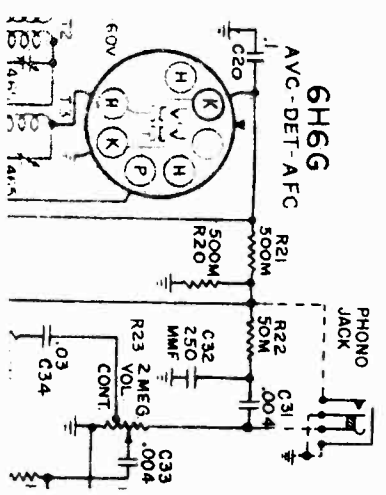
7. Turn the right hand knob to the "SHARP" and then to the "BROAD" positions. The receiver still should give zero beat in the "SHARP" and "BROAD" positions if the A.F.C. is properly adjusted. If it does not, carefully repeat operation #6.

8. The A.F.C. can be checked for "pull in" in the following manner. Remove the signal generator connection from the 6L7G grid. Switch on the modulation of the 1050 kc generator and set the generator to give 5000 microvolts output. Reduce the Volume Control setting of the receiver to give 1.5 volts reading on the output meter. Increase the signal generator frequency until the output meter reads .5 volt. Note the frequency of the signal generator at this output meter reading. Then decrease the signal generator frequency from 1050 kc until the output meter again reads .5 volt and note the signal generator frequency. If the A.F.C. is operating properly, the signal generator can be shifted 15 to 20 kc either side of 1050 kc before the output meter reading is reduced from 1.5 volts to .5 volt.

INSTALLING A JACK FOR THE USE OF EARPHONES AND PHONOGRAPH PICK-UP:

There is a hole, plugged with a brass insert, at the rear of the chassis. This hole is provided so that a jack can be installed for earphone or phonograph pick-up connections. The Schematic section shows the connections. With the connections as shown, the loud speaker will not operate when the earphones are plugged in. If it is desired to have the loud speaker operate at the same time the earphones are plugged in, the connections to the two lugs furthest from the frame of the jack should be omitted. Otherwise the earphone plug must be removed from its jack when loud speaker reception is wanted. If the jack is wired as a phonograph pick-up jack, the right hand knob of the receiver must not be in the "FLASH" position when phonograph operation is wanted. It may be put in either the "B" or "SHARP" position. The Volume and Tone Controls of the receiver will function for phonograph reproduction.





MODEL 4587
Dial Data

SEARS-ROEBUCK & CO.

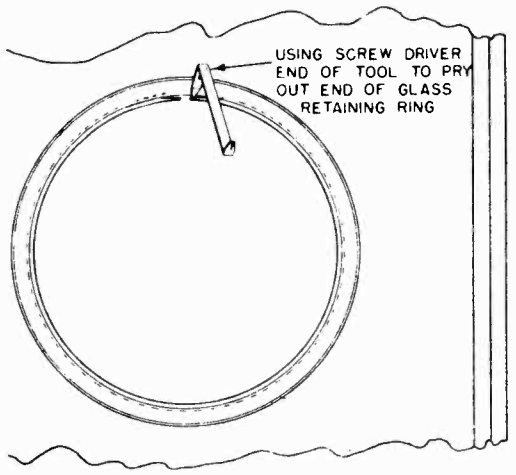


FIG. 1

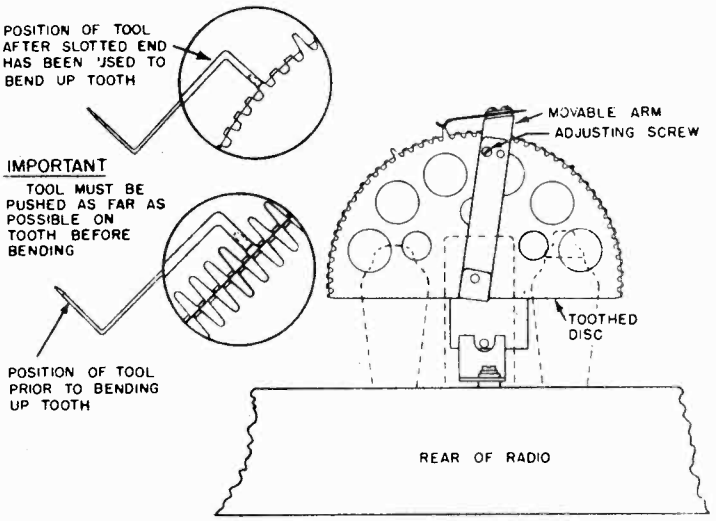


FIG. 2

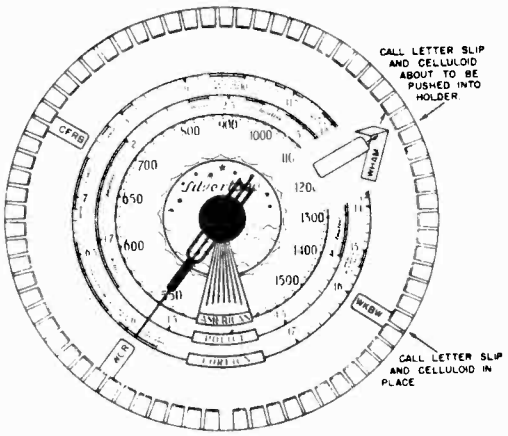


FIG. 3

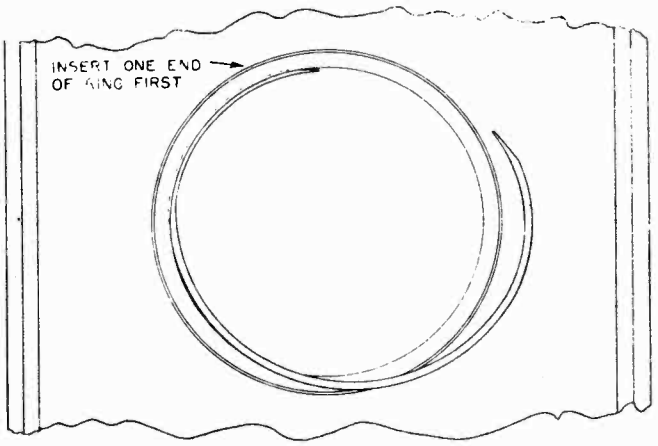


FIG. 4

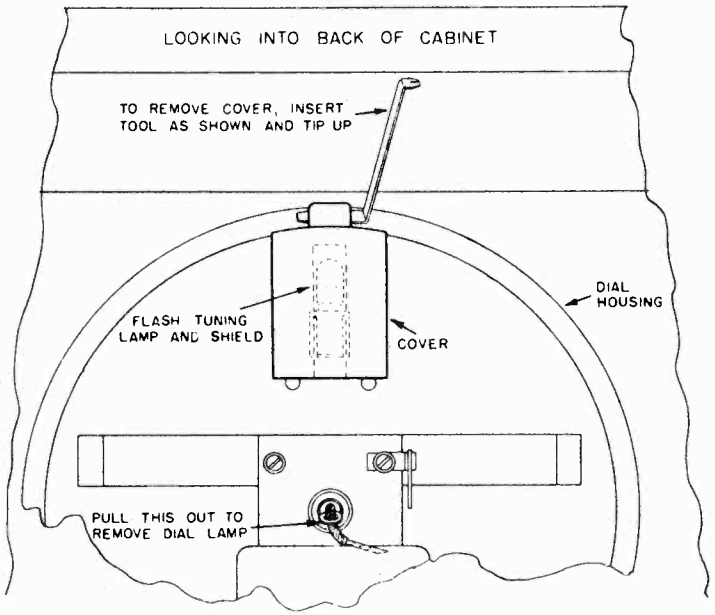
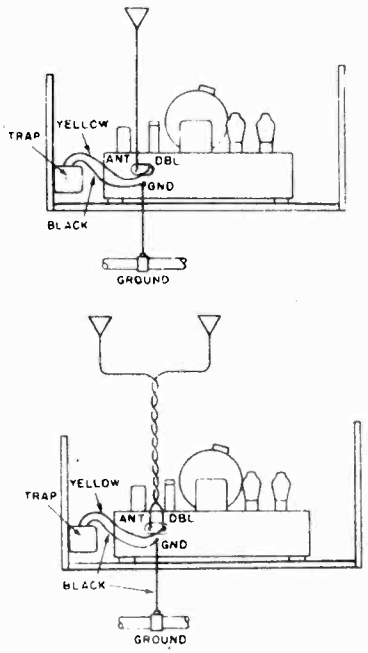


FIG. 7



GENERAL INFORMATION

THE AUTOMATIC FREQUENCY CONTROL - FLASH TUNING:

These models incorporate a completely new feature, Automatic Frequency Control - Flash Tuning. This double feature, which is designed to operate only on the AMERICAN band, does several things. The Automatic Frequency Control removes the necessity for accurate tuning. Depending upon the strength of the station, it is necessary to tune only to within 15 kc or less of the station's frequency. The Automatic Frequency Control then will "take hold" and tune the station far more accurately than can be done manually. This is done entirely with radio circuits, no moving parts being involved.

The Flash Tuning mechanism greatly simplifies tuning. It is necessary merely to turn the dial pointer to the station's call letters. The call letters then will become illuminated and, by virtue of the A.F.C., the station will automatically be tuned in exactly. Until the station's position is reached, the receiver is completely silent. A description of how the circuits of the A.F.C. - Flash Tuning feature work is given after the following instructions for setting up the Flash Tuning feature.

SETTING UP:

1. The glass in the cabinet front panel must be removed to allow insertion of the station call letters, as described later. This glass is held in place by a split ring (the split is at the top). See Fig. 1. The tool illustrated is furnished in the same envelope with the Instructions. Use the screw-driver end of this tool to remove the split ring by prying out one of its ends, as indicated in Fig. 1. Be very careful not to insert the tool so deep that it touches the glass, else the glass may become chipped.

The glass can be removed by placing the hand on it and tipping the cabinet forward. Take care during the operation not to allow the split ring to fly out or the glass to drop and break.

2. Make a list of the broadcasting stations to which you desire to have the FLASH TUNING mechanism respond. These stations must be local stations or strong stations at medium distance that give reliable daylight reception. A sheet containing the call letters of broadcasting stations is furnished in the same envelope with the Instruction Leaflet. Cut out the call letters of the selected stations. The short vertical lines before and after the station's call letters and the long horizontal lines will serve as a guide along which to cut. When properly done, these cut slips will be a trifle over 1¼" long and 1/4" wide.

3. Turn the Flash Tuning and Selectivity Switch knob to the "SHARP" position. Then tune in the first station on your list of selected stations.

4. Leaving your station tuned in, go to the rear of the radio. You will see a semi circular toothed disc, as illustrated in Fig. 2. There is also a flat spring arm, with a small rounded projection near its end, that moves over the teeth of this semi circular disc as the Station Selector knob is turned. Still leaving your station tuned in, carefully note which tooth on the semi circular disc is directly under the rounded projection of the spring arm. Mark this tooth with a pencil. Note that there is a double row of teeth and either the tooth that faces you or the tooth that faces the front of the radio may be bent up, depending upon which one is nearer the rounded projection of the spring arm. After you have marked the tooth, turn off the radio. Then tune away from the station (with the Station Selector knob, not the movable arm) and bend this marked tooth straight up, using the slotted end of the tool provided. See Fig. 2. It is important that the slot of the tool fit as far down as possible on the tooth before bending. This is necessary so that the complete tooth will be bent up instead of just part of the tooth. When this is properly done, the projection of the spring arm will touch the bent up tooth when the toothed disc is rotated by turning the Station Selector knob.

5. Turn the radio on again and tune in the next station on your list of selected stations. Mark the tooth that now is under the projection of the spring arm when this station is tuned in. Turn off the radio, tune away from the station so that the spring arm will not be in the way and bend up this marked tooth, using the tool provided. Proceed in the same manner for each of the other stations on your selected list. Turn off the radio each time before bending up the tooth. Otherwise a slight spark may occur, although there is no danger of shock. When properly done, the spring arm will touch each of the teeth that has been bent up but will not touch any of the other teeth, as the Station Selector knob is turned.

6. Turn the Flash Tuning and Selectivity Switch knob to the "FLASH" position. Now again tune in the first station on your selected list. As its position is reached, the bent up tooth will touch the spring arm and a light will flash on the dial at a position opposite the end of the dial pointer.

7. A small envelope containing celluloid tabs is furnished in the same large envelope with the Instructions. Select the cut out slip bearing the call letters of your chosen station. Bend the end of the slip, opposite the call letters, over one of the celluloid tabs so that the call letters will be under the celluloid. See Fig. 3. Then place the tab and call letter slip under the holder at the outside edge of the dial at a point opposite the end of the dial pointer. The call letters will then be illuminated whenever the dial pointer is opposite them (and the radio is switched to the AMERICAN band and the right hand knob is in the "FLASH" position).

8. In the same manner, insert the proper call letter slip and a celluloid tab for each of the other stations selected. (These tabs can be pulled out and the call letters of other stations inserted at any time should you wish to change the selection of stations.)

9. Replace the glass in the cabinet front panel. Hold it centered in the escutcheon with one hand, insert one end of the split ring in place as shown in Fig. 4 and continue pressing the remainder of the ring into place until it is completely seated. It may be helpful to tip the cabinet back against the wall to prevent the possibility of the glass falling out during the operation.

10. If two of the selected stations are powerful ones and close together in frequency (10 to 20 kc) the receiver may go from one to the other if the stations are "fading", or if their relative strength varies with the time of day. To correct this, bend down the teeth originally bent up for the two stations and instead bend up the two adjacent teeth which are further apart.

HOW THE A.F.C. - FLASH TUNING CIRCUITS OPERATE:

The I.F. frequency of the receiver is 465 kc. If a station is tuned in exactly, then the oscillator frequency is 465 kc higher than the station's frequency, creating an I.F. of 465 kc. However, if the receiver is tuned, for example, 5 kc lower than the station's frequency, the oscillator frequency will be 5 kc lower and the resultant I.F. will be 460 kc. Similarly, if the receiver is tuned 5 kc higher than the station's frequency, the resultant I.F. will be 470 kc. The I.F. is fed to the discriminator transformer, T3. By means of the tuned circuits of the discriminator transformer, I.F. higher than 465 kc is fed through one of the diode plates of the 6H6G tube and frequencies lower than 465 kc are fed through the other diode plate of the 6H6G tube. The resultant diode current creates voltage drops across the 500M ohm resistors, R20 and R21. The polarity and value of the voltage drops, with respect to ground, across these two resistors depend upon the extent to which the I.F. is higher or lower than 465 kc. This voltage, developed by the discriminator circuit, is fed to the control grid of the 6J7G Automatic Frequency Control tube to control the oscillator frequency, as described in the following paragraph.

The oscillator coil inductance, L5, determines the oscillator frequency for any given position of the variable condenser. If another inductance were connected in parallel to it, the total inductance would be lessened and the oscillator frequency would increase. The combination of the 6J7G A.F.C. tube together with the condensers, C16, C17 and the resistor, R11, have the effect of an inductance in parallel with the inductance, L5. This is so for the following reason:

In an inductance the phase relations between the voltage across it and the current through it are such that the voltage leads the current by 90 degrees. The phase relations of the voltage and current in the plate circuit of the 6J7G tube are such that the voltage leads the current by 90 degrees. Therefore, this combination acts as an inductance in parallel to the inductance L5. The extent to which it does so is determined by the value of the voltage impressed on the control grid of the 6J7G tube. This voltage is obtained from the discriminator circuit as previously described. The effect of this equivalent parallel inductance is to change the AMERICAN band oscillator frequency. By properly choosing constants, this oscillator frequency change can be made to compensate almost exactly for the oscillator frequency error due to inexact tuning. In this way, the I.F. is always 465 kc, which is equivalent to perfect tuning, provided the station is approached nearly enough so that the A.F.C. can take hold. As mentioned previously, this is within 15 kc of the station for strong stations, but decreases for weaker stations.

The A.F.C. tube is connected in the circuit all the time and on all bands. However, the voltage from the discriminator circuit is fed to its control grid only on the AMERICAN band and when the Variable Selectivity - Flash Tuning knob is turned to the "FLASH" position. On all other bands and positions of the Selectivity - Flash Tuning knob the control grid bias of the 6J7G tube is fixed. Therefore, it corrects the I.F. frequency only on the AMERICAN band.

The Flash Tuning mechanism consists essentially of the toothed disc at the rear of the variable condenser and the relay, L7. The function of the toothed disc is to operate the relay when the variable condenser is turned to the various pre-selected stations. The relay contacts close the Flash Tuning light circuit, illuminating the station's call letters. At the same time they remove the high negative bias which blocks off the audio, keeping the receiver silent until the pre-selected station is tuned in.

The relay coil normally is energized. It is short circuited by the bent up tooth of the disc contacting the movable arm. This is why the Flash Tuning light flashes for a second or so when the receiver is first turned on -- the rectifier has not heated sufficiently to furnish current to energize the relay.

IF THE A.F.C. - FLASH TUNING MECHANISM DOES NOT OPERATE PROPERLY:

If the A.F.C. Flash Tuning mechanism does not operate properly, first check the toothed disc and spring arm. The spring arm should touch each of the teeth that have been bent up and should not touch any of the other teeth, as the Station Selector knob is turned. To adjust the spring arm, so that it does touch only the bent up teeth, proceed as follows. Loosen the screw marked, "Adjusting Screw", in Fig. 2, which will permit the spring arm to be tipped so that it does make contact only with the bent up teeth. Then tighten the adjusting screw.

Another likely cause of improper A.F.C. - Flash Tuning operation is the relay. A small amount of dust may interfere with proper closing of the contacts. Blow out the contacts or pass a strip of plain paper back and forth between them. Two types of relay have been used. The earlier type is part #1013814997. It can be identified through the fact that the relay coil leads are black. The later type relay is part #1013815558. Its leads are colored. This later type will be supplied for replacement. The earlier type relay is shown schematically in Fig. 5. The later type, in Fig. 6. The proper sequence of operation for the contacts is indicated under each illustration. If necessary, slightly bend the contacts so that they do operate in the sequence indicated. The tension of the springs should be such that the relay closes with a current of 60 milliamperes. This can be tested by connecting the relay in series with a six volt storage battery, a 100 ohm rheostat, and a milliammeter of the proper range.

FIG. 5

FIG. 6

WITH RELAY NOT EXCITED - CIRCUIT	1-2	OPEN	WITH RELAY NOT EXCITED - CIRCUIT	1-2	OPEN
	3-4	OPEN		2-3	CLOSED
	4-5	CLOSED		4-5	OPEN
WITH RELAY EXCITED - CIRCUIT	1-2	CLOSED	WITH RELAY EXCITED - CIRCUIT	1-2	CLOSED
	3-4	CLOSED		2-3	OPEN
	4-5	OPEN		4-5	CLOSED

WHEN FLASH TUNING LIGHT STAYS ON, OR LIGHT COMES ON BUT RADIO IS INOPERATIVE IN FLASH TUNING POSITION CHECK THE RELAY CONTACTS AS OUTLINED ABOVE.

If the later type relay is used to replace the earlier type, the connections to the relay must be changed. The following tabulation shows to what lugs of the newer type relay the connections should be made after removing them from the lugs of the old relay.

ORIGINAL RELAY	NEW TYPE RELAY
Wire from lug #1	To lug #5
Wire from lug #2	To lug #4
Wire from lug #3	To lug #1
Wire from lug #4	To lug #2
Wire from lug #5	To lug #3

REPLACING THE DIAL LAMPS:

There are three lamps in the dial mechanism. The lamp that illuminates the dial is in the center of the dial. It can be removed for replacement by pulling the small handle that projects from the rear center of the dial housing. (Accessible from the back of the radio.) When putting the lamp holder back into place be careful that it is not pushed in too far lest the dial pointer be pushed off of its shaft. Position the lamp so that the dial is illuminated to the best advantage.

The FLASH TUNING lamp (the one that moves around the outer edge of the dial and flashes on for the station call letters) is accessible for replacement through a small removable cover at the top of the dial housing. (Accessible from the rear of the radio.) This cover snaps on the top of the dial housing and can be removed with the fingers or by means of the tool, as shown in Fig. 7. Turn the Station Selector knob so that the dial pointer is straight up. The lamp shade can then be removed by grasping the end of it and pulling it up through the opening in the dial housing. The lamp can then be removed and replaced. When putting the lamp shade back the narrow slit in it must face the front of the dial so that the light will fall on the dial. The arm that carries the Flash Tuning lamp must coincide in position with the dial pointer. If it has shifted on its shaft, it can be moved to coincide with the dial pointer and its set screws tightened. This can be done either by removing the cover at the top of the dial housing (with the chassis out of the cabinet) or the dial can be removed from the housing as described in the paragraph that follows the next one. If the light is only slightly out of line with the pointer, it can be made to coincide by turning the lamp shade slightly.

The BAND INDICATOR lamp (the one that lights up the three Wave Band designations) circuit contains a special resistor that reduces the voltage to this lamp so that it probably never will burn out. Should replacement of the BAND INDICATOR lamp ever be necessary, the chassis must be taken out of the cabinet and the dial removed in order to gain access to the lamp. This procedure is described in the following paragraph. For replacement of any of the lamps use only the same type as supplied originally.

Loosen the set screws in the knobs at the front of the radio and remove the knobs. Remove the four screws that are under the shelf on which the chassis rests. Remove the single screw that is in the speaker plug and pull out the speaker plug from the back of the radio. The chassis then can be taken out of the cabinet. Rotate the Station Selector shaft (the middle one) to the right until the dial pointer goes as far as it can go. Carefully note the exact position of the dial pointer on the dial. Then pull the pointer off of its shaft. Now carefully bend up the metal tabs that hold the dial in the dial housing. Bend the tabs only far enough to permit removal of the dial. If the tabs are bent too far up, they may break off when bent down again. The complete dial assembly together with the station call letter tab holder can then be removed from the housing. When this is done, the BAND INDICATOR lamp and shield will be assessible. Pull the shield off the lamp socket and replace the lamp. The shield must be put back on so that the band designations are evenly illuminated. When re-assembling, leave the Station Selector shaft turned all the way to the right, as was done before pulling the dial pointer off of its shaft. Then push the dial pointer back on its shaft so that it comes to the same position on the dial as was noted for it before it was pulled off its shaft.

ANTENNA CONNECTIONS:

There is a terminal board at the rear of the chassis marked, "ANT", "DBL", "GND", indicating antenna, doublet, and ground, respectively. The "DBL" terminal is left unconnected when a conventional antenna is used. When a doublet is used, one wire of the twisted downlead is connected to the "ANT" terminal and the other downlead wire is connected to the "DBL" terminal.

VARIABLE SELECTIVITY:

Variable Selectivity is obtained by connecting or disconnecting coupling turns between primary and secondary of the IF input transformer, T1. In the "SHARP" position of the right hand control knob, the coupling turns are disconnected and the Selectivity becomes sharp. In the "B" position (broad) the coupling turns are connected and Selectivity is broadened, thereby increasing the high frequency audio response of the receiver.

REPLACEMENT OF THE OSCILLATOR TUBE:

There are two types of 6C5G tubes, one shielded and the other unshielded. They can be told apart easily by appearance. The shielded type has a perforated mesh screen surrounding the other elements. This screen is about an inch in diameter and comes very close to the inside of the bulb. The unshieldad type does not have this perforated mesh screen. The plate of the tube, of solid metal and about 3/8" diameter, is visible. It is important that only the unshielded type 6C5G, without the perforated mesh screen, be used in the oscillator socket. Use of the shielded type will upset the calibration of the Foreign band and interfere with proper performance.

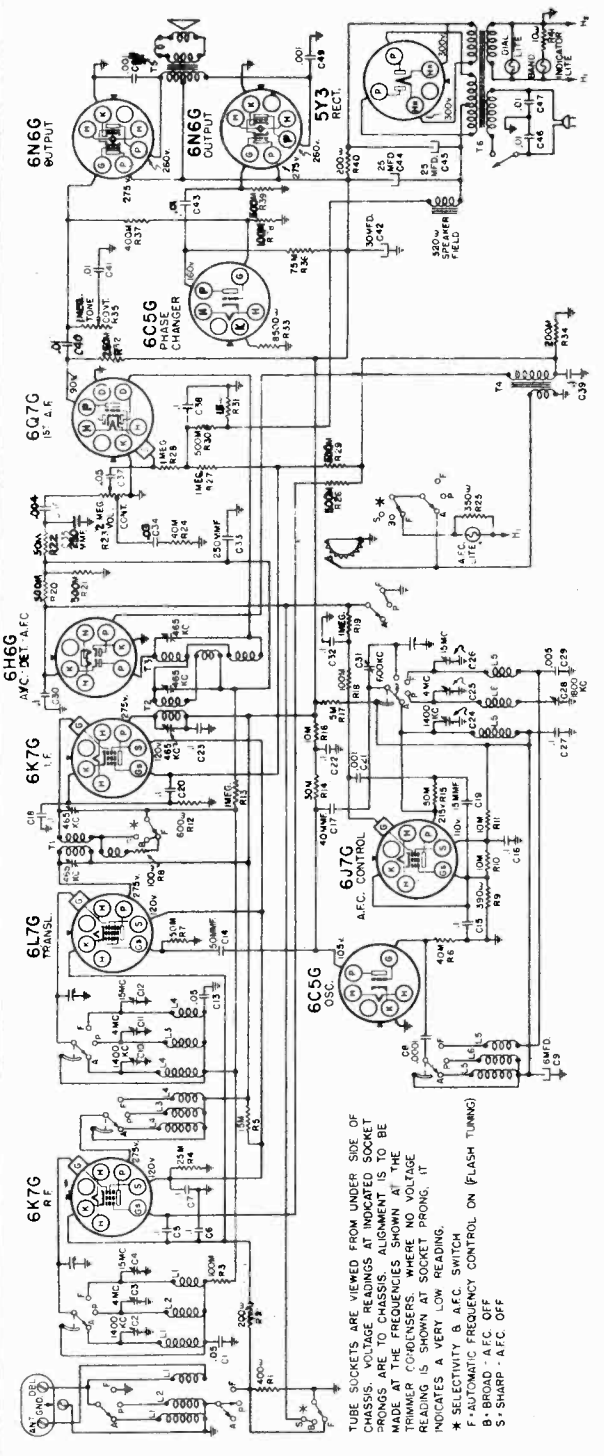
THE AVC CIRCUIT:

The voltage drop across the 500M ohm resistor, R21, is fed to the control grids of the 6K7G and 6L7G tubes to provide AVC. The drop across this resistor is also used in the discriminator circuit as described previously. The audio voltage across the resistor is coupled to the AF stages through the condenser, C31.

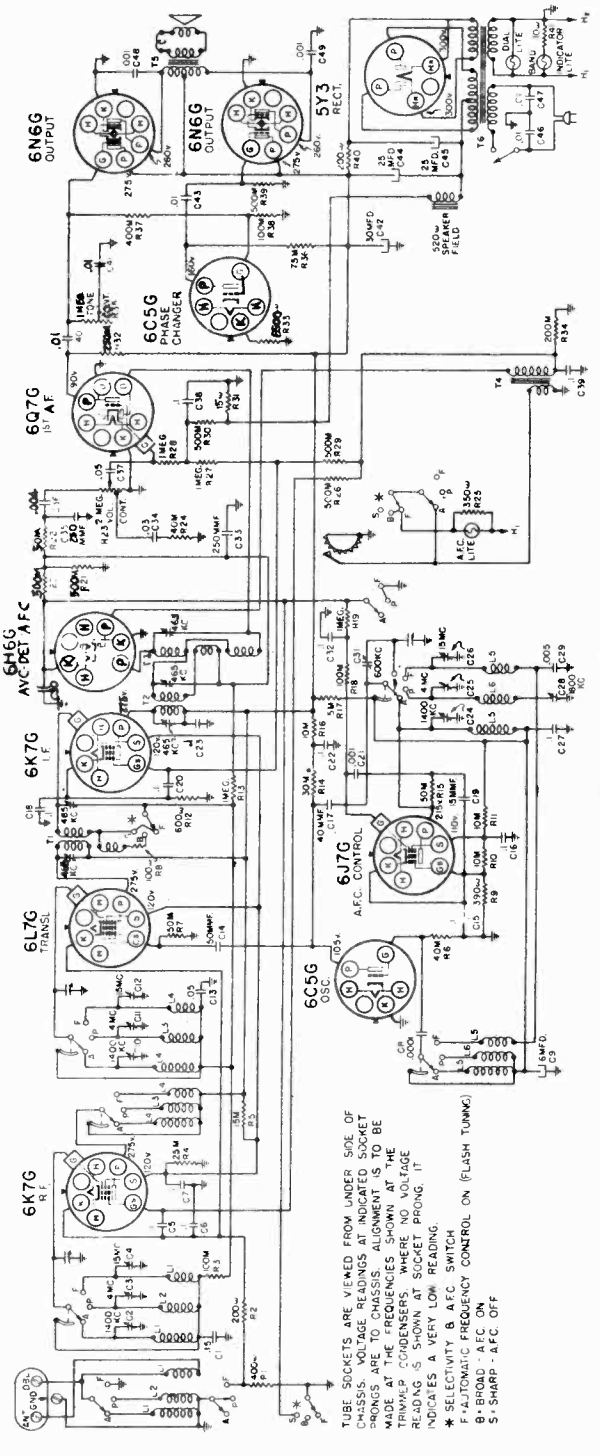
MODEL 4587A
Schematics

SEARS-ROEBUCK & CO.

57RL 22
Supplement No. 8
October 28, 1936



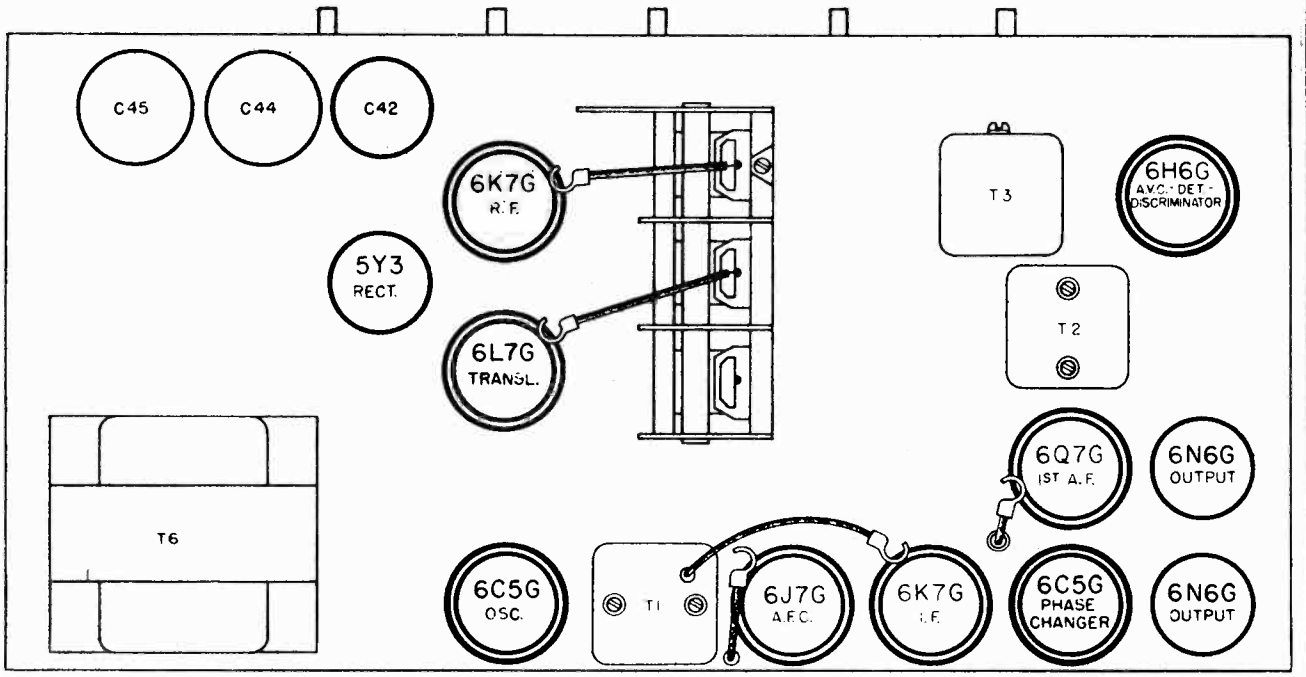
ONE A.F.C. POSITION



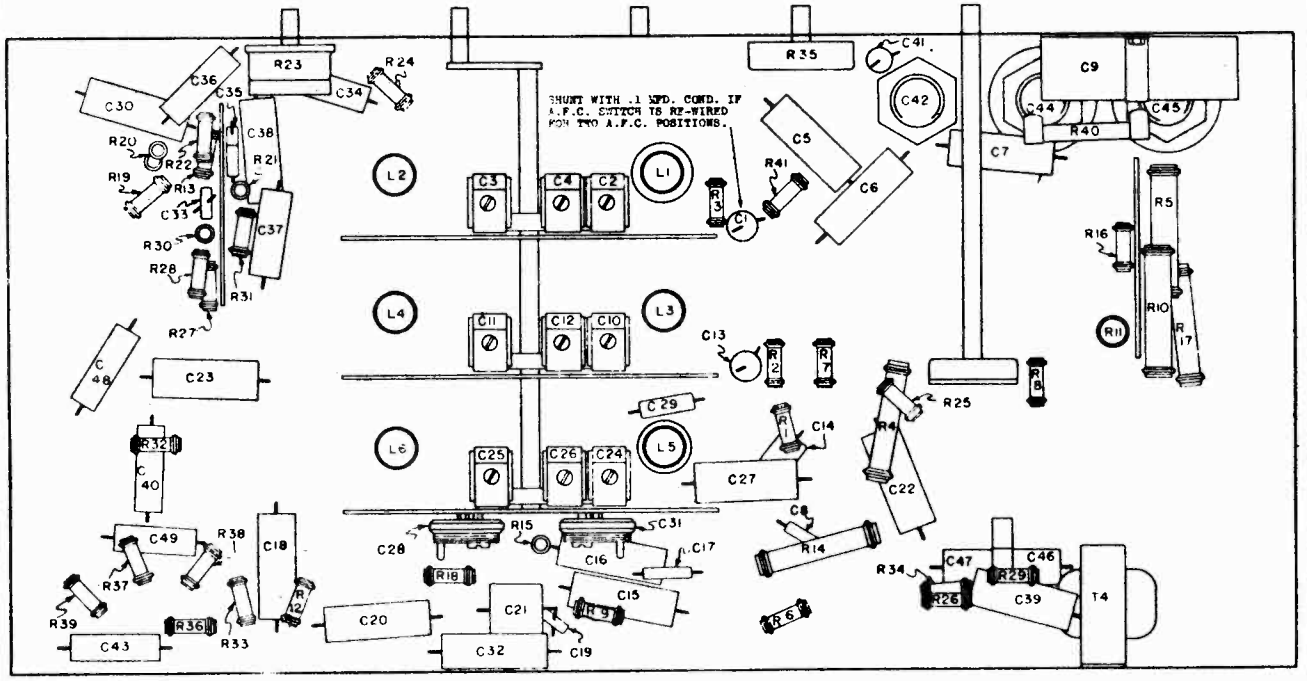
TWO A.F.C. POSITIONS

MODEL 4587A
Socket, Trimmers
Chassis

SEARS-ROEBUCK & CO.



LOCATIONS OF PARTS ON TOP OF CHASSIS



LOCATIONS OF PARTS UNDER CHASSIS

REVISED ALIGNMENT PROCEDURE:

PRELIMINARY:

Output meter connections - Across speaker voice coil

Output meter reading to indicate .5 watts output - - - - - - - - - - - - - - - - - 1.1 volts

Dummy antenna value to be in series with generator output - - - - - - - - - - See chart below

Connection of generator output lead - See chart below

Generator modulation - 30%, 400 cycles

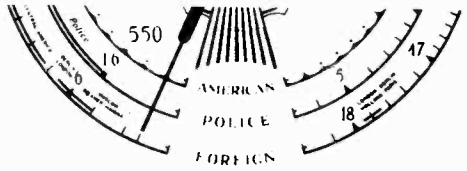
Approximate average sensitivity in microvolts for .5 watts output - - - - - - See chart below

Position of Volume Control - Fully on

Position of Tone Control - Fully clockwise

Position of Flash Tuning and Selectivity Switch Knob - - - - Sharp, fully counter clockwise

Position of Dial Pointer when variable is fully meshed - - - - - - - - - As illustrated below



WAVE BAND SWITCH POSITION	POSITION OF DIAL POINTER	GENERATOR FREQUENCY	DUMMY ANTENNA	GENERATOR CONNECTION	TRIMMERS ADJUSTED (IN ORDER SHOWN)	TRIMMER FUNCTION	APPROXIMATE MICROVOLTS
"AM"	550 kc	465 kc	.1 mfd.	6L7G Grid	T2,T1	IF Output IF Input	-
"AM"	1400 kc	1400 kc	.0002 mfd.	Ant. Term.	C24,C2, C10	Osc., Ant., Translator	20
"AM"	600 kc *	600 kc	.0002 mfd.	Ant. Term.	C31	Osc. Pad.	20
"POL"	4 mc	4 mc	400 ohms	Ant. Term.	C25,C3, C11	Osc., Ant., Translator	6
"POL"	1.8 mc *	1.8 mc	400 ohms	Ant. Term.	C28	Osc. Pad.	40
"FOR"	Var. Fully Open	18 mc	400 ohms	Ant. Term.	C26	Osc.	-
"FOR"	15 mc	15 mc	400 ohms	Ant. Term.	C4,C12	Ant.,Transl.	5
"FOR"	6 mc	6 mc	400 ohms	Ant. Term.	-	-	60

IMPORTANT ALIGNMENT NOTES

* Where indicated by (*) the variable should be rocked back and forth a degree or two while making the adjustment.

Repeat the entire alignment step by step in the original order for greater accuracy. Always keep the generator output power at its lowest possible value. This will prevent the AVC action of the receiver from interfering with accurate alignment.

The shield covering the coils at the bottom of the chassis should be left in place during the alignment. The trimmer condensers are accessible through the holes in the shield.

Only the dummy antenna indicated in the chart for any particular band should be used. Disconnect the dummy antenna used for alignment of any other band.

After the alignment has been completed, the A.F.C. adjustment should be made as follows:

A.F.C. ADJUSTMENT

CAUTION: The right hand knob must be in the "SHARP" position for operations 1 through 5. It is preferable to have two signal generators to make the adjustments. However, if two generators are not available, a broadcast station of approximately 1050 kc can be used for one of the generators. However, the station chosen must be of medium strength. That is, one just capable of giving satisfactory reception without back ground noise. Do not use a strong station. The Volume and Tone Controls must be turned all the way to the right. The generator ground connection is to be made to the chassis.

1. Set one signal generator (or the broadcast station) to 1050 kc and 5000 microvolts output. Connect its output to the "ANT" terminal of the set, through a .0002 mfd. condenser.

2. Tune the receiver for maximum output (at 1050 kc). Then switch the signal generator modulation switch to the "Off" position.

3. Short the movable arm to the toothed disc with a piece of wire. The Flash Tuning light should become illuminated.

4. Set the second signal generator to 465 kc and 10,000 microvolts output. Connect its output, in series with a .000015 mfd. condenser to the control grid of the 6L7G tube. Turn the modulation switch to the "Off" position.

5. Carefully turn the variable condenser until "zero beat" note is had (with right hand knob in "SHARP" position).

6. Turn the right hand knob to the "FLASH" position (fully clockwise). Then adjust the discriminator unit, T3, for "zero beat". The correct setting will be obtained at about the center of T3 trimmer range. The adjustment is a very sharp one.

7. Turn the right hand knob to the "SHARP" and then to the "BROAD" positions. The receiver still should give zero beat in the "SHARP" and "BROAD" positions if the A.F.C. is properly adjusted. If it does not, carefully repeat operation #6.

8. The A.F.C. can be checked for "pull in" in the following manner. Remove the signal generator connection from the 6L7G grid. (Two generators must be used.) Switch on the modulation of the 1050 kc generator and set the generator to give 5000 microvolts output. Reduce the Volume Control setting of the receiver to give 1.5 volts reading on the output meter. Increase the signal generator frequency until the output meter reads .5 volt. Note the frequency of the signal generator at this output meter reading. Then decrease the signal generator frequency from 1050 kc until the output meter again reads .5 volt and note the signal generator frequency. If the A.F.C. is operating properly, the signal generator can be shifted 15 to 20 kc either side of 1050 kc before the output meter reading is reduced from 1.5 volts to .5 volt.

INCREASED FREQUENCY RANGE:

It will be noticed that the frequency range of the Police band of the Model 10141lA has been extended to approximately 5 megacycles and the frequency range of the Foreign band to approximately 18 megacycles.

CHANGE IN PROCEDURE FOR REMOVING DIAL GLASS FOR SETTING UP FLASH TUNING STATION CALL LETTERS:

The Service Instructions for this model describe how to remove the dial glass by taking off the split retaining ring that holds it. In receivers using the 10141lA chassis this procedure has been simplified by using an escutcheon with the dial glass moulded into it. It is held in place in the front of the cabinet by four screws. Accordingly, it is necessary merely to remove these four screws in order to take off the moulded escutcheon and dial glass.

CHANGE IN PHONOGRAPH PICK-UP JACK OPERATION:

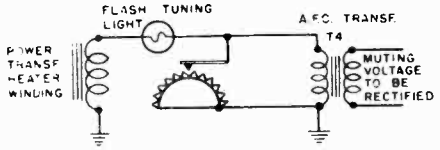
The Service Instructions for this model state that if a phonograph pick-up jack is used the right hand knob must be in either the "B" or "SHARP" position. This is true only for those receivers that are wired to have the one A.F.C. position ("FLASH"). In later production receivers having the two A.F.C. positions ("B" and "FLASH") or in receivers that are changed to provide these two positions, the right hand knob must be in the "SHARP" position for phonograph operation. This must be done, of course, to remove the muting from the first audio tube, permitting phonograph reproduction.

SUBJECT: CIRCUIT CHANGE TO ELIMINATE ADJACENT CHANNEL INTERFERENCE IN MODELS 4587-4587A

ELIMINATION OF THE RELAY:

The 101411 chassis (Model 4587), described in Service Instructions 57RL 22 and in Supplement #1, uses a relay to accomplish the various switching required by the Automatic Frequency Control - Flash Tuning feature. In later production of this Model the circuit was changed, eliminating the relay. A transformer is used in place of the relay to accomplish the same results. Such chassis are identified by the number, 101411A (Model 4587A).

The simplified diagram below shows how the transformer is used to mute the receiver and to operate the Flash Tuning light.



The A.F.C. transformer is a step-up transformer. Its primary is connected, in series with the Flash Tuning light bulb, across the heater winding of the power transformer. The toothed disc and contacting arm is connected across the primary of the A.F.C. transformer, as shown. The operation then is as follows: When the contacting arm is not engaging a bent-up tooth on the disc, the power transformer heater voltage is impressed, in series with the Flash Tuning light bulb, upon the primary of the A.F.C. transformer. Although current flows through the primary, its impedance is too high to pass sufficient current to light the Flash Tuning light bulb. The voltage impressed on the A.F.C. transformer primary is stepped up in the secondary and rectified by one of the diode plates of the 6H6G tube. This diode voltage (approximately 60 volts) is applied to the suppressors of the RF and IF tubes and to the control grid of the first AF tube, to provide muting. These are the conditions that exist when the right hand knob is turned to a Flash position and the receiver is tuned between Flash stations.

When the receiver is tuned to a Flash station, the contacting arm touches the tooth bent up for the station. This short circuits the primary of the A.F.C. transformer. With the impedance of this primary removed from the circuit the full voltage of the heater winding is impressed across the Flash Tuning light bulb causing it to light. Since the A.F.C. primary is short circuited, no voltage is developed across its secondary, thereby removing the muting bias. The receiver then is in operating condition and receives the station selected for Flash Tuning.

In the original sets using a relay, one set of contacts on the relay was used to prevent the A.F.C. from operating until the bent up tooth contacted the movable arm. This was necessary to prevent a strong station from being "pulled over" from an adjacent channel as the receiver was tuned through it, since the receiver was alive up to the audio stage. When the A.F.C. transformer is used in place of the relay, this "pull over" cannot occur because the receiver is made inoperative right at its input by muting of the RF tube.

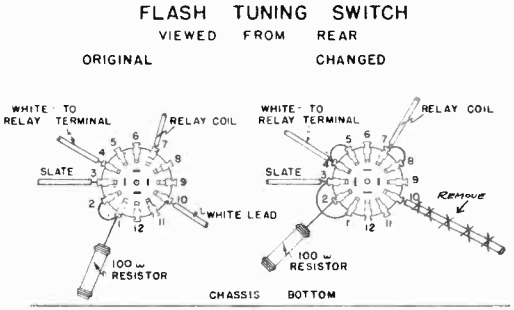
IMPORTANT NOTE IN SETTING UP A.F.C. STATIONS:

IT IS VERY IMPORTANT THAT THE RECEIVER BE TURNED ON FOR TWENTY MINUTES BEFORE SETTING UP A.F.C. STATIONS ON THE TOOTHED DISC. IF STATIONS ARE SET UP WITH THE RECEIVER "COLD", FREQUENCY DRIFT MAY CHANGE THE ACCURACY AND RELIABILITY OF THE SETTING WHEN THE RECEIVER WARMS UP.

CHANGE IN CONNECTIONS AND OPERATION OF THE FLASH TUNING - SELECTIVITY SWITCH (RIGHT HAND KNOB):

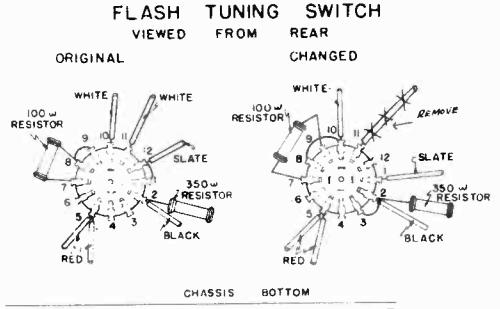
The right hand knob has three positions marked, "SHARP"; "B" (BROAD); "FLASH". In all of the sets using a relay and in the first production of those using a transformer the receiver operated in the conventional manner in the "SHARP" and "B" positions. In the "FLASH" position, the A.F.C. and Flash Tuning circuits were connected. In later production sets using the transformer, the operation and connections of the A.F.C. - Selectivity Switch have been changed so that the radio operates in the conventional manner only in the "SHARP" position. In the "B" position, the A.F.C. is connected and Selectivity is broad. In the "FLASH" position, the A.F.C. also is connected and Selectivity is sharp. In other words, in latest production there are two A.F.C. positions with a choice of broad or sharp selectivity. There is one non-A.F.C. position with sharp selectivity.

With the original connection of the A.F.C. switch, providing only broad selectivity in the "FLASH" position, difficulty may be encountered in some locations due to adjacent channel interference or heterodyne whistles. If such difficulty is encountered in sets having the original connection, the circuit may be changed to provide the two selectivity positions for A.F.C. - Flash Tuning. Fig. 1 shows the switch connection changes for sets using the relay. Fig. 2 shows the switch connection changes for sets having an A.F.C. transformer. Note that in relay sets the original lug #10 connection is removed entirely from the switch. In transformer sets the original #11 connection is removed entirely. In addition, in relay sets (101411), a .1 mfd. condenser must be shunted across the .05 mfd. condenser, C4. In transformer sets (101411A), the .05 mfd. condenser that must be shunted is C1. See the Locations of Parts diagram. In later production of Model 101411A, embodying the two A.F.C. - Selectivity positions, a .15 mfd. condenser is used for C4.



FLASH TUNING - SELECTIVITY SWITCH CIRCUIT CHANGE. SETS WITH RELAY.

FIG. 1



FLASH TUNING - SELECTIVITY SWITCH CIRCUIT CHANGE. SETS WITH TRANSFORMER.

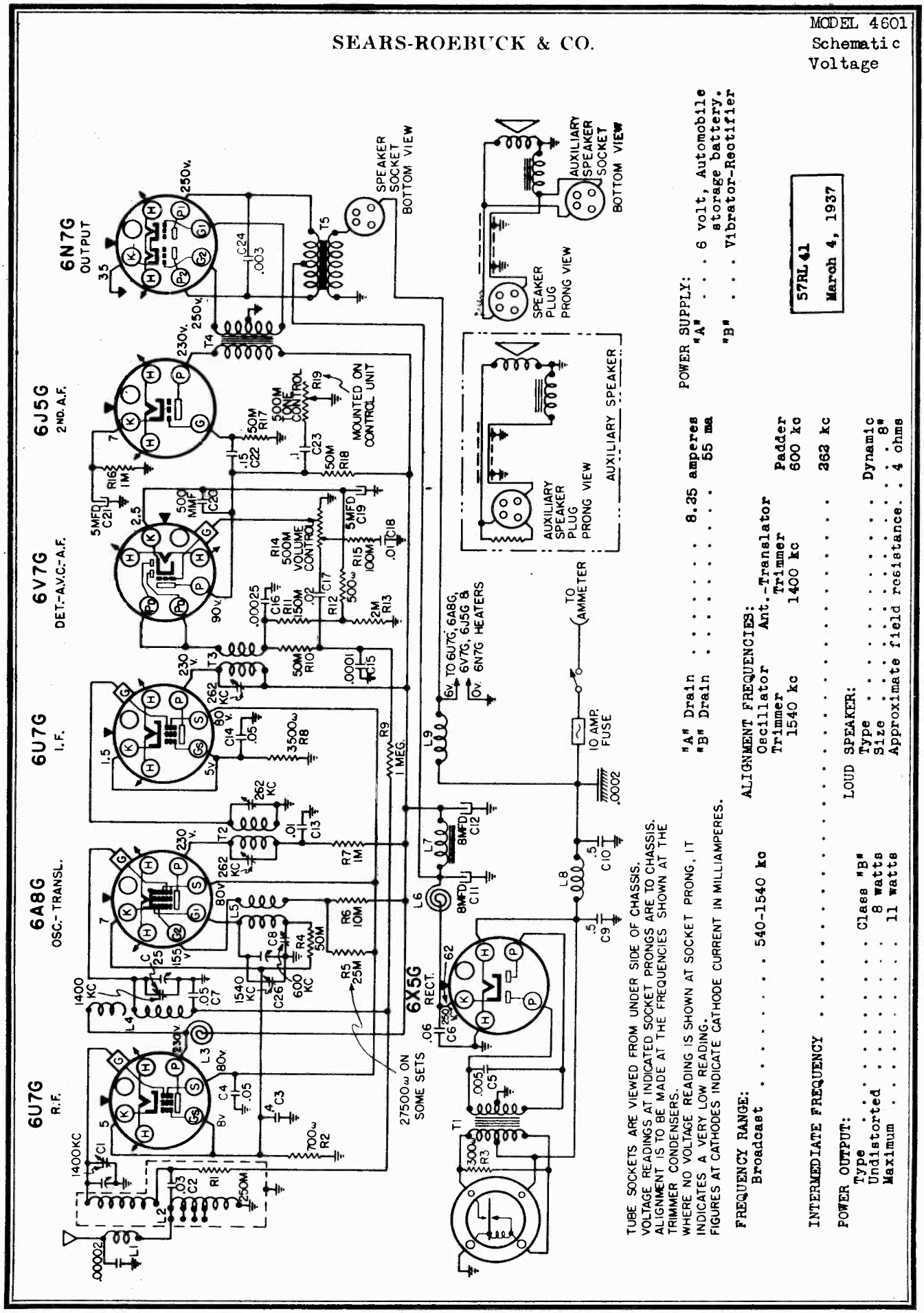
FIG. 2

IMPORTANT NOTE ABOUT SETTING UP A.F.C. STATIONS ON ADJACENT CHANNELS:

In paragraph #10 under, "SETTING UP THE AUTOMATIC FREQUENCY CONTROL", in the Service Instructions, the suggestion is made that if adjacent channel stations are selected the two teeth further apart be used instead of the correct ones for the stations. For example, suppose a 700 kc and a 710 kc station is to be selected. Instead of bending up the teeth corresponding to 700 kc and 710 kc, the teeth corresponding to approximately 697 kc and 713 kc would be bent up instead. The purpose of this is to prevent the receiver from jumping from one station to the other as their signal strengths vary. This suggestion will be helpful only if the station is sufficiently strong. Otherwise the mistuning will affect the tone quality. It is best to select, for A.F.C. tuning, stations at least 20 kc apart in frequency.

SEARS-ROEBUCK & CO.

MODEL 4601
Schematic
Voltage



TUBE SOCKETS ARE VIEWED FROM UNDER SIDE OF CHASSIS.
VOLTAGE READINGS AT INDICATED SOCKET PRONGS ARE TO CHASSIS.
ALIGNMENT IS TO BE MADE AT THE FREQUENCIES SHOWN AT THE TRIMMER CONDENSERS.
WHERE NO VOLTAGE READING IS SHOWN AT SOCKET PRONG, IT INDICATES A VERY LOW READING.
FIGURES AT CATHODES INDICATE CATHODE CURRENT IN MILLIAMPERES.

POWER SUPPLY:
"A" . . . 6 volt, Automobile storage battery.
"B" . . . Vibrator-Rectifier

"A" Drain . . . . . 8.35 amperes
"B" Drain . . . . . 55 ma

ALIGNMENT FREQUENCIES:

	Oscillator	Ant.-Translator	
	Trimmer	Trimmer	Padder
	1540 kc	1400 kc	600 kc

INTERMEDIATE FREQUENCY . . . . . 262 kc

FREQUENCY RANGE:
Broadcast . . . . . 540-1540 kc

LOUD SPEAKER:
Type . . . . . Dynamic
Size . . . . . 8"
Approximate field resistance. . 4 ohms

POWER OUTPUT:
Type . . . . . Class "B"
Undistorted . . . . . 8 watts
Maximum . . . . . 11 watts

57RL41
March 4, 1937

MODEL 4601
Socket, Trimmers
Alignment, Sensitivity

SEARS-ROEBUCK & CO.

ALIGNMENT PROCEDURE

PRELIMINARY:

Output meter connections . . . . . Across loud speaker voice coil
Output meter reading to indicate 1 watt . . . . . 1.05 volts
Average sensitivity in microvolts for 1 watt output . . . . . See chart below
Generator ground lead connection . . . . . Receiver chassis
Dummy antenna value to be in series with generator output . . . . . See chart below
Connection of generator output lead . . . . . See chart below
Generator modulation . . . . . 30%, 400 cycles
Position of Volume Control . . . . . Fully on
Position of Tone Control . . . . . Fully clockwise (treble)
Position of Antenna Tap . . . . . #2 hole
The Chassis must be in its case although the covers may be removed during the alignment procedure.

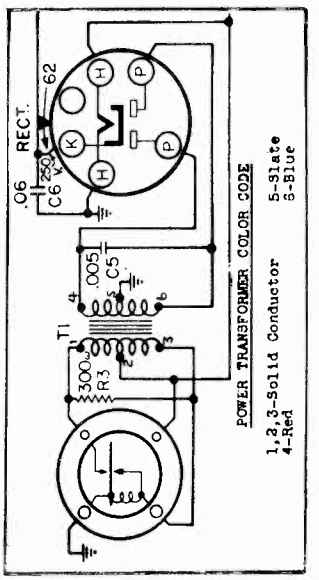
POSITION OF VARIABLE	GENERATOR FREQUENCY	DUMMY ANTENNA	GENERATOR CONNECTION	TRIMMER ADJUSTMENTS (IN ORDER SHOWN)	TRIMMER FUNCTION	APPROXIMATE MICROVOLTS
Closed	262 kc	.1 mfd.	6A8G Grid	T3, T2	IF	600
Fully Open	1540 kc	.0002 mfd.	Antenna Conn.	C26	Osc. Trim.	1
1400 kc	1400 kc	.0002 mfd.	Antenna Conn.	C1, C25	Ant. Transl.	1
600 kc (rock)	600 kc	.0002 mfd.	Antenna Conn.	C8	Padder	2

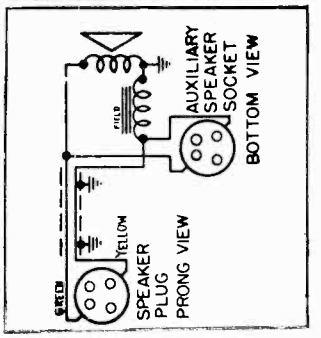
IMPORTANT ALIGNMENT NOTES

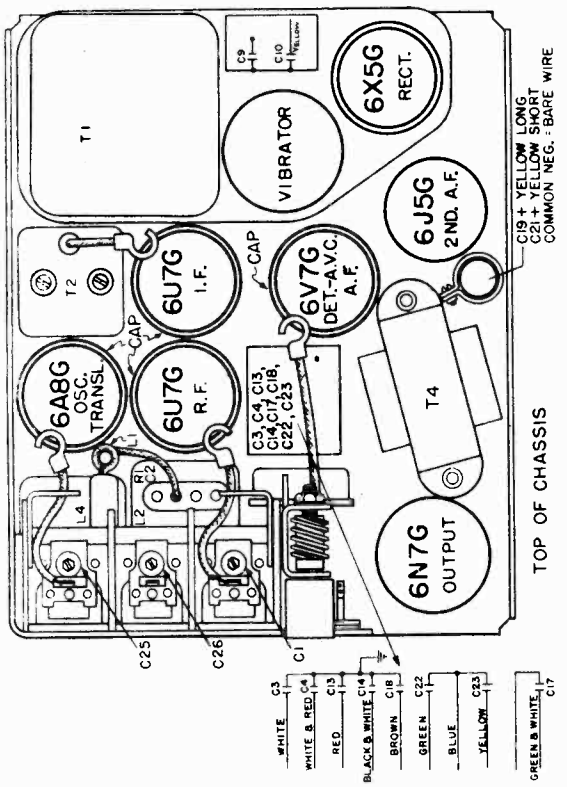
The variable should be rocked back and forth a degree or two while making the 600 kc adjustment.

The alignment procedure should be repeated in the original order, step by step, to insure greater accuracy.

Always keep the output power from the generator at its lowest possible value to prevent the AVC of the receiver from interfering with accurate alignment.

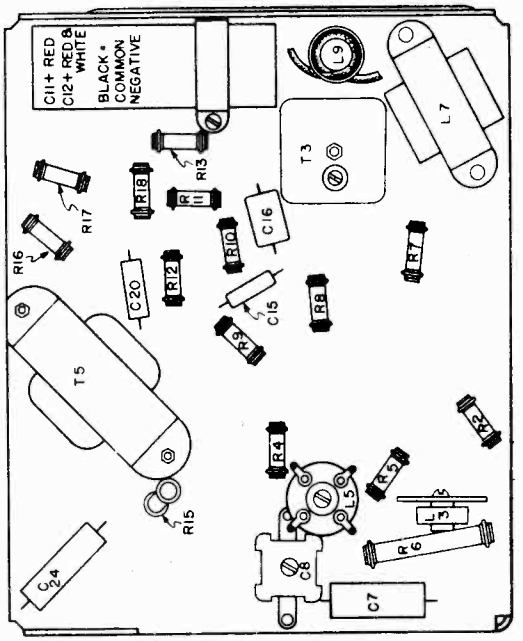






TOP OF CHASSIS

LOCATIONS OF PARTS

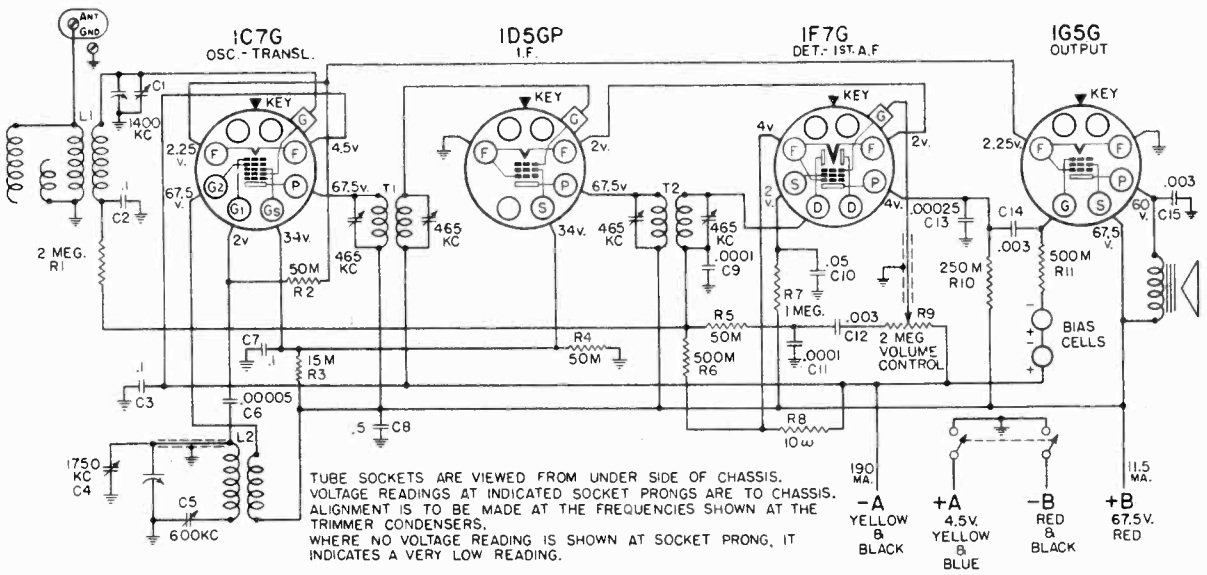


UNDER CHASSIS

Trimmers, Chassis, Alignment
Sensitivity, Notes

SEARS-ROEBUCK & CO.

MODELS 4602-3, 4620-1, 4630-1
4720, 4730
Schematic, Voltage, Socket



TUBE SOCKETS ARE VIEWED FROM UNDER SIDE OF CHASSIS.
VOLTAGE READINGS AT INDICATED SOCKET PRONGS ARE TO CHASSIS.
ALIGNMENT IS TO BE MADE AT THE FREQUENCIES SHOWN AT THE TRIMMER CONDENSERS.
WHERE NO VOLTAGE READING IS SHOWN AT SOCKET PRONG, IT INDICATES A VERY LOW READING.

JUNE 3, 1937

INTERMEDIATE FREQUENCY . . . . . 465 kc

POWER OUTPUT:
Type . . . . . Single Pentode
Undistorted . . . . . 0.135 watts
Maximum . . . . . 0.2 watts

POWER SUPPLY:
"A" Battery (4½ volt dry) . . 1 - #5030
"A" Battery (4 volt storage) 1 - #5049
"B" Battery (67½ volts) . . . 1 - #5040
"A" Drain . . . . . 0.18 amperes
"B" Drain . . . . . 15 ma

LOUD SPEAKER:
Type . . . . . Magnetic
Size . . . . . 6 inch
DC resistance . . . . App. 1500 ohms

ALIGNMENT PROCEDURE

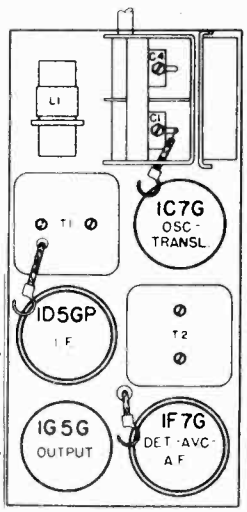
PRELIMINARY:

Output meter connections . . . . . 4000 ohm Weston meter, across speaker terminals
Output meter reading to indicate 50 milliwatts . . . . . 9.4 volts
Average sensitivity in microvolts for 50 milliwatts output . . . . . See chart below
Generator ground lead connection . . . . . Receiver chassis
Dummy antenna value to be in series with generator output . . . . . See chart below
Connection of generator output lead . . . . . See chart below
Generator modulation . . . . . 30%, 400 cycles
Position of Volume Control . . . . . Fully on

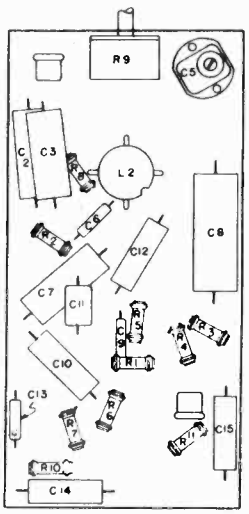
POSITION OF VARIABLE	GENERATOR FREQUENCY	DUMMY ANTENNA	GENERATOR CONNECTION	TRIMMER ADJUSTMENTS (IN ORDER SHOWN)	TRIMMER FUNCTION	APPROXIMATE MICROVOLTS
Closed	465 kc	.1 mfd.	1C7G Transl. Grid	T2, T1	IF	225
1400 kc *	1400 kc	.0008 mfd.	Antenna Term.	C1, C4	Translator Oscillator	85
600 kc (rock)	600 kc	.0002 mfd.	Antenna Term.	C5	Padder	60

IMPORTANT ALIGNMENT NOTES

* Using the dial as a template make a dummy dial of cardboard with only the 1400 kc calibration on it. Slip this dummy dial over the shaft, hold it horizontal so that the 1400 mark will come at the same position as the 1400 mark of the actual dial and turn the dial pointer to the 1400 kc mark. (The dial pointer should be horizontal when the condenser is fully open or fully meshed.)



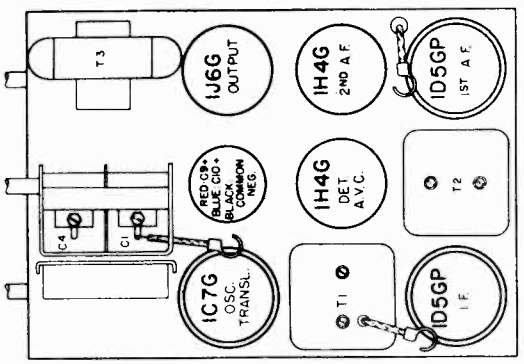
LOCATIONS OF PARTS ON TOP OF CHASSIS.



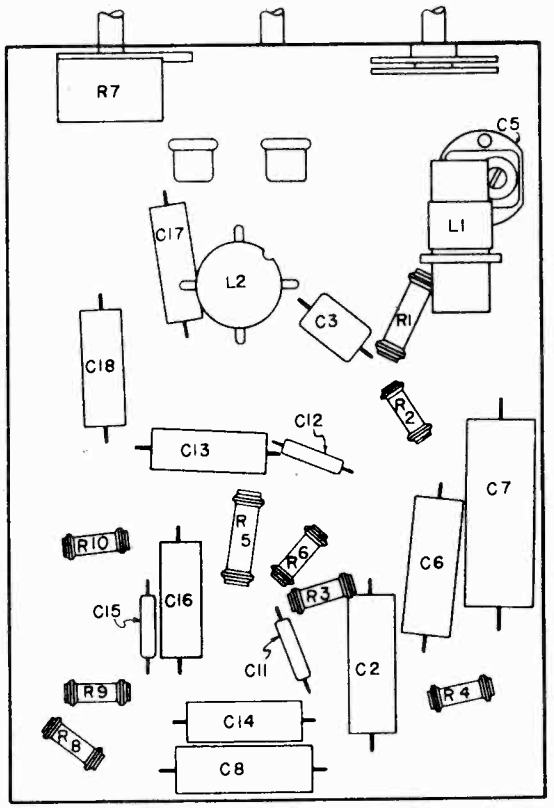
LOCATIONS OF PARTS UNDER CHASSIS.

MODELS 4604-5,4624-5,4634-5
4724
Schematic,Voltage,Socket
Trimmers,Chassis,Alignment

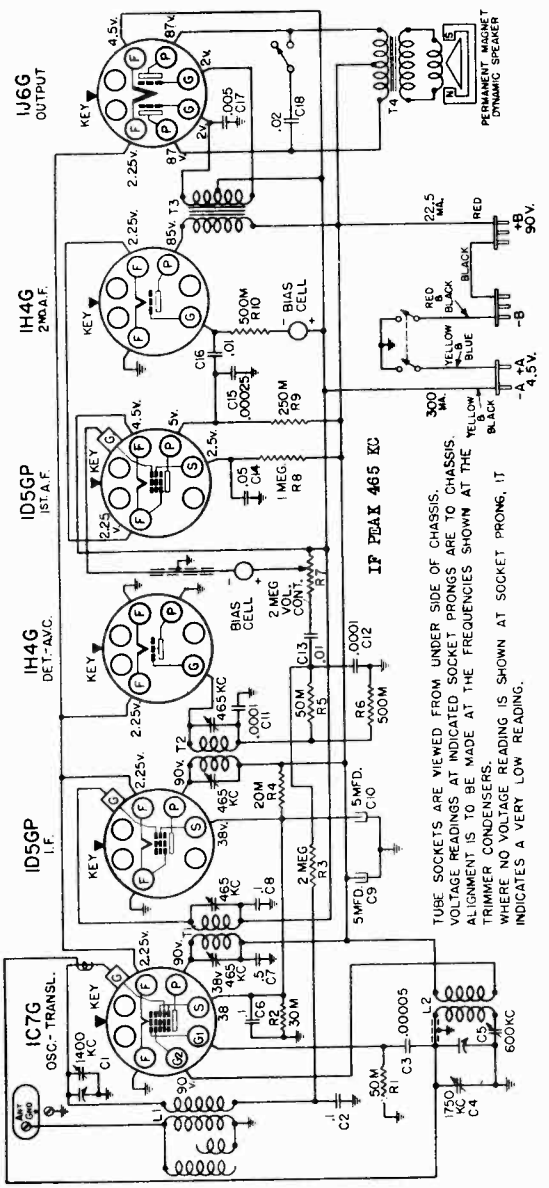
SEARS-ROEBUCK & CO.



LOCATIONS OF PARTS ON TOP OF CHASSIS.



LOCATIONS OF PARTS UNDER CHASSIS.



JUNE 4, 1937

ALIGNMENT PROCEDURE

PRELIMINARY:

Output meter connection . . . . . Across loud speaker voice coil

Output meter reading to indicate 50 milliwatts . . . . . 0.37 volts

Generator ground lead connection . . . . . Receiver chassis

Dummy antenna value to be in series with generator output . . . . . See chart below

Connection of generator output lead . . . . . See chart below

Generator modulation . . . . . 30%, 400 cycles

Approximate average sensitivity in microvolts for 50 milliwatts output . . . See chart below

Position of Volume Control . . . . . Fully clockwise

Position of Tone Control . . . . . Fully clockwise

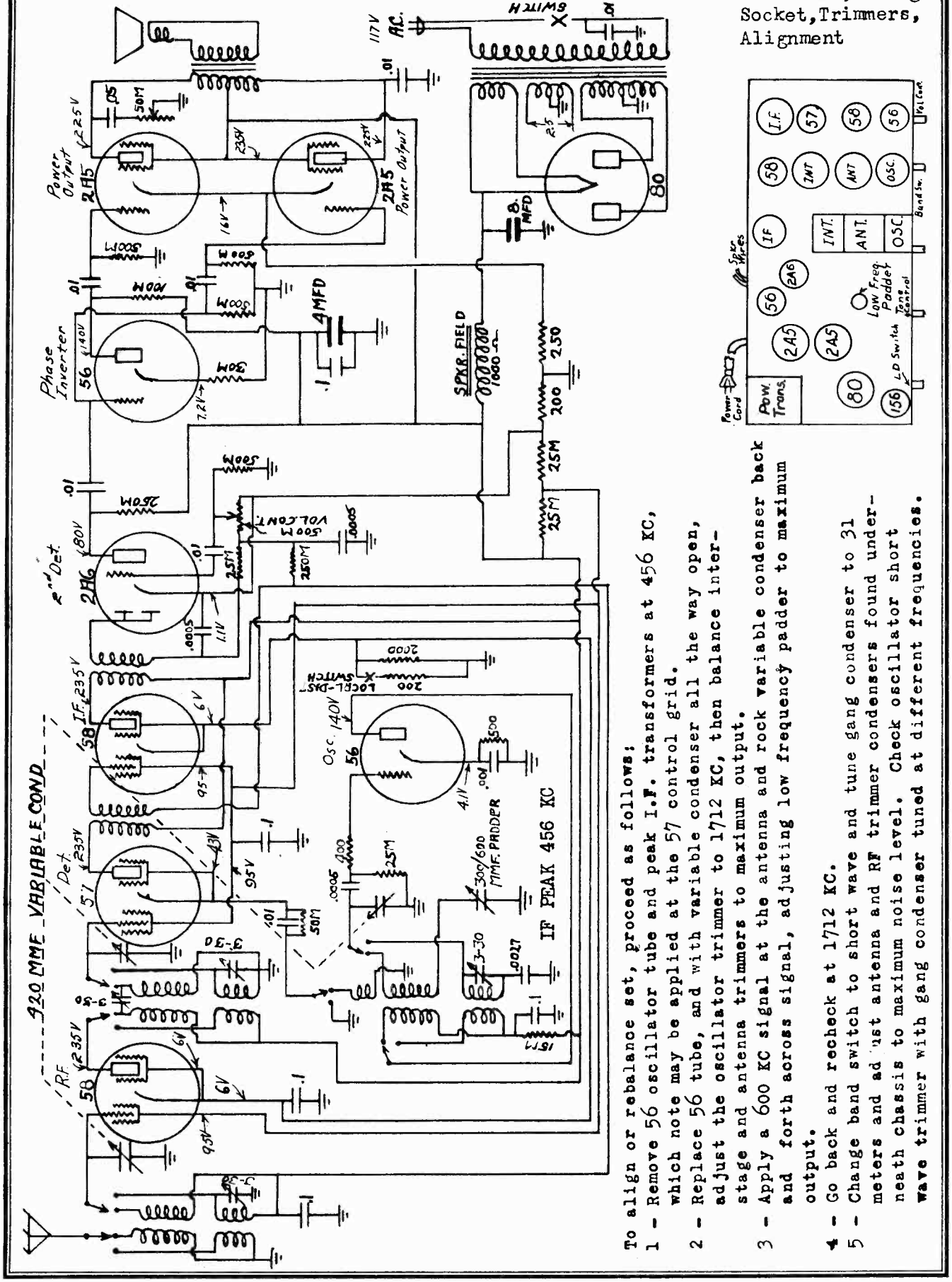
POSITION OF VARIABLE	GENERATOR FREQUENCY	DUMMY ANTENNA	GENERATOR CONNECTION	TRIMMER ADJUSTMENTS (IN ORDER SHOWN)	TRIMMER FUNCTION	APPROXIMATE MICROVOLTS
Closed	465 kc	.1 mfd.	1G7G Transl. Grid	T2, T1	IF	160
1400 kc *	1400 kc	.0002 mfd.	Antenna Term.	C4, C1	Oscillator Translator	50
600 kc (rock)	600 kc	.0002 mfd.	Antenna Term.	C5	Padder	25

IMPORTANT ALIGNMENT NOTES

* Using the dial as a template make a dummy dial of cardboard with only the 1400 kc calibration on it. Slip this dummy dial over the shaft, hold it horizontal so that the 1400 mark will come at the same position as the 1400 mark of the actual dial and turn the dial pointer to the 1400 kc mark. (The dial pointer should be horizontal when the condenser is fully open or fully meshed.)

SEARS-ROEBUCK & CO.

MODEL 7143
Schematic, Voltage
Socket, Trimmers,
Alignment



To align or rebalance set, proceed as follows:

1 - Remove 56 oscillator tube and peak I.F. transformers at 456 KC, which note may be applied at the 57 control grid.

2 - Replace 56 tube, and with variable condenser all the way open, adjust the oscillator trimmer to 1712 KC, then balance interstage and antenna trimmers to maximum output.

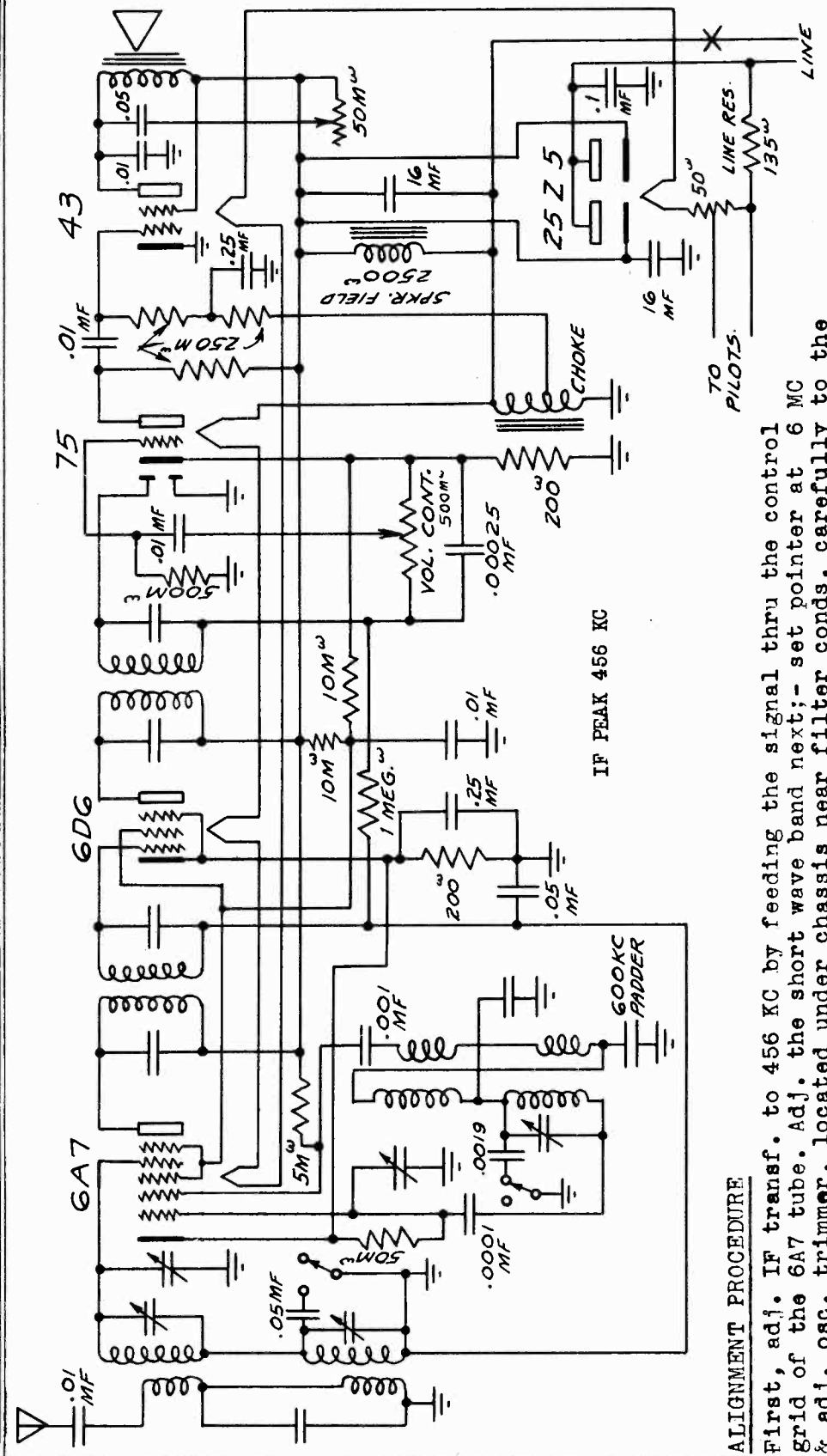
3 - Apply a 600 KC signal at the antenna and rock variable condenser back and forth across signal, adjusting low frequency padder to maximum output.

4 - Go back and recheck at 1712 KC.

5 - Change band switch to short wave and tune gang condenser to 31 meters and adjust antenna and RF trimmer condensers found underneath chassis to maximum noise level. Check oscillator short wave trimmer with gang condenser tuned at different frequencies.

MODEL 7172X
Schematic
Alignment

SEARS-ROEBUCK & CO.



ALIGNMENT PROCEDURE

First, adj. IF transf. to 456 KC by feeding the signal thru the control grid of the 6A7 tube. Adj. the short wave band next;- set pointer at 6 MC & adj. osc. trimmer, located under chassis near filter conds. carefully to the fundamental rather than image(fund. is second peak as you adj. from max. cap.); then adj. the short wave ant. trimmer, located on top of chassis near var. cond., for max. signal; next dial across short wave band checking it at 2.5 and 4 MC to see that it does not stop oscillating. If this should occur, try changing 6A7 tubes to find one that will oscillate at 2.2 MC. If you experience any difficulty in finding a satisfactory tube, it may be necessary to use separate bias on 6A7(200 ohm res. and .1/4 mfd cond.) in order to use the tubes available.

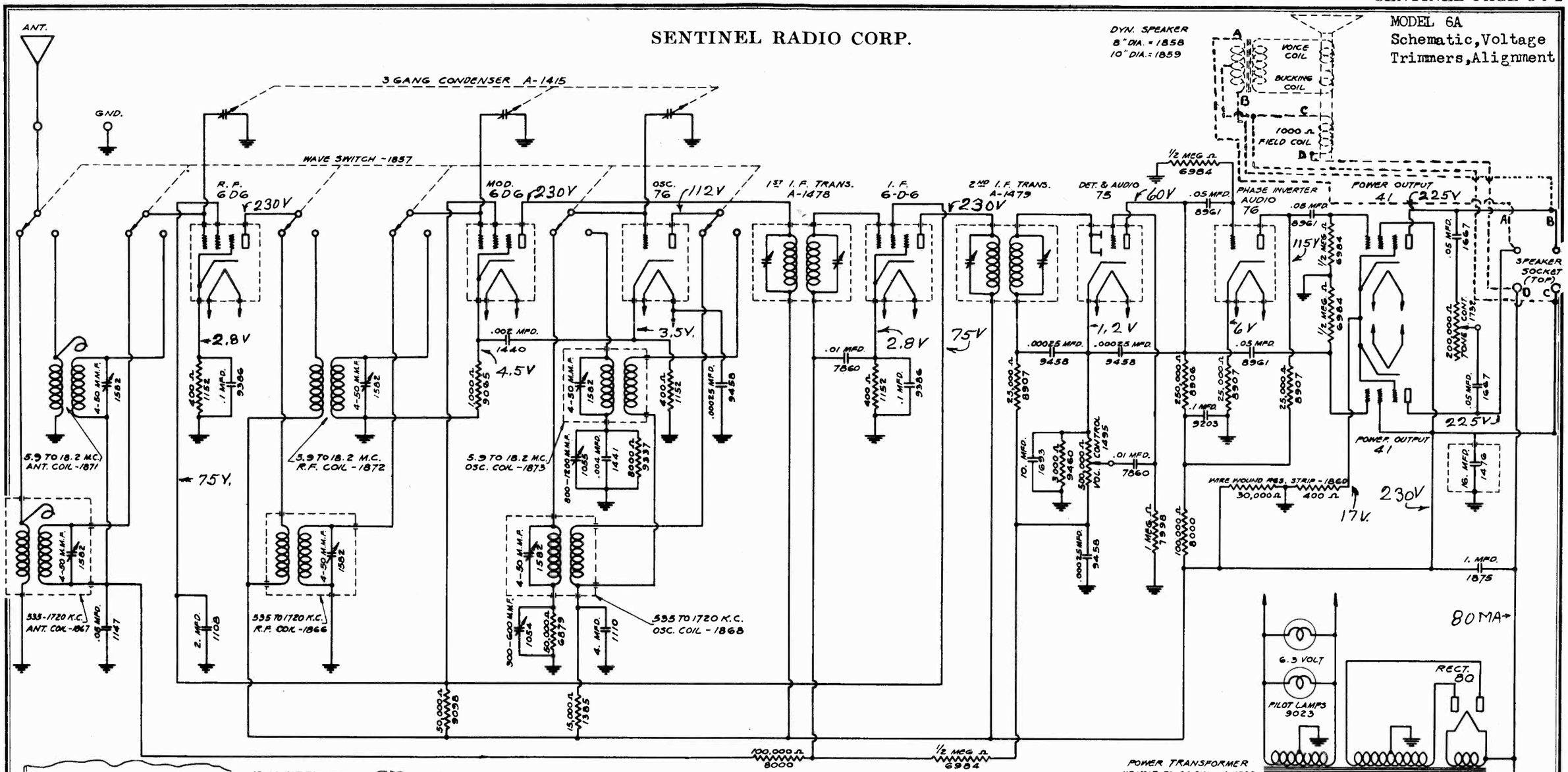
Now, set band switch to broadcast position and adj. padder at about 600 Kc for max. gain, rocking the var. cond. with each adj. of the padder - then with gang all the way open, adj. B.C. osc. trimmer located under chassis near outer edge, to 1717 KC and set B.C. ant. trimmer located on top of chassis near outer edge, for maximum gain.

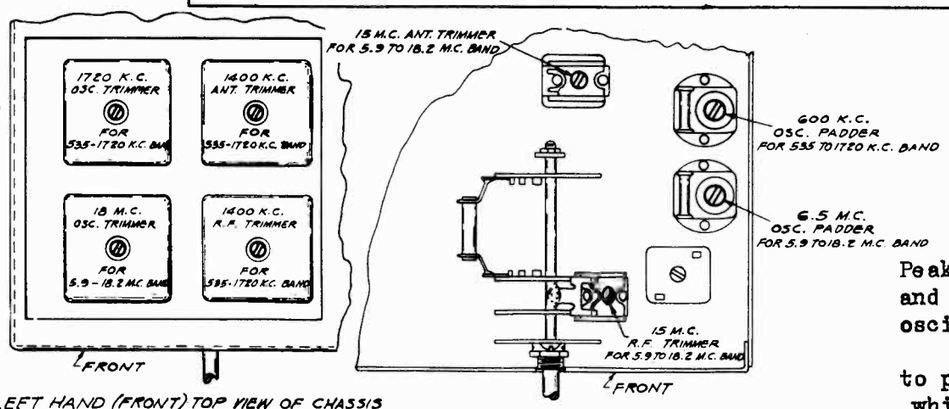
DO NOT CONNECT A GROUND TO THIS SET.

This set is designed to operate on 105-125 volts AC-DC

SENTINEL RADIO CORP.

MODEL 6A
Schematic, Voltage
Trimmers, Alignment





LEFT HAND (FRONT) TOP VIEW OF CHASSIS SHOWING LOCATION OF TRIMMERS

RIGHT HAND (FRONT) BOTTOM VIEW OF CHASSIS SHOWING LOCATION OF TRIMMERS & PADDERS

FREQUENCY RANGE -
1720 to 535 KC
5.9 to 18.2 MC

NOTE:
1. I.F. = 465 K.C.
2. ALL NOS. SHOWN RELATIVE TO PARTS ARE OUR PART NUMBERS.
3. NUMBERS SHOWN WITH PREFIX "A" ARE COMPLETE ASSEMBLIES.

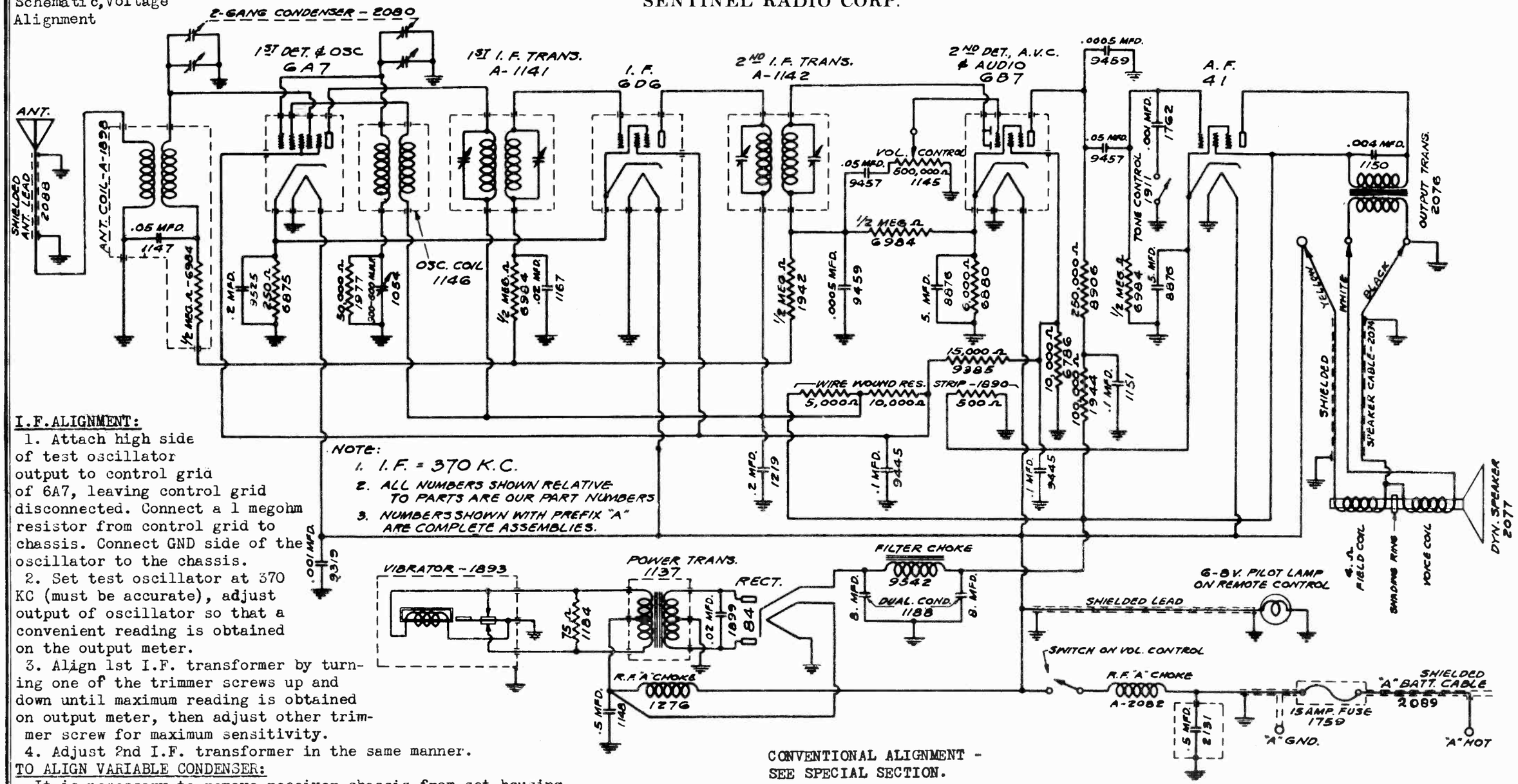
CONVENTIONAL ALIGNMENT - SEE SPECIAL SECTION.

Peak I-F trimmers at 465 KC. BROADCAST - Dial and trimmer to 1720 KC, peak oscillator trimmer. Dial and generator to 1400 KC, peak antenna and R-F trimmers. Dial and generator at 600 KC, pad the oscillator circuit for maximum peak, while rocking the variable gang condenser.

FOREIGN - Dial and generator at 18 MC, adjust the oscillator trimmer to peak. Dial and generator to 15 MC, adjust the R-F and antenna trimmers to maximum sensitivity while rocking the variable condenser across the signal. Dial and generator at 6.5 MC, pad the FOREIGN band oscillator circuit to maximum peak while rocking the variable condenser

MODEL 10MF
Schematic, Voltage
Alignment

SENTINEL RADIO CORP.



NOTE:
1. I.F. = 370 K.C.
2. ALL NUMBERS SHOWN RELATIVE TO PARTS ARE OUR PART NUMBERS
3. NUMBERS SHOWN WITH PREFIX "A" ARE COMPLETE ASSEMBLIES.

CONVENTIONAL ALIGNMENT - SEE SPECIAL SECTION.

I.F. ALIGNMENT:

1. Attach high side of test oscillator output to control grid of 6A7, leaving control grid disconnected. Connect a 1 megohm resistor from control grid to chassis. Connect GND side of the oscillator to the chassis.
2. Set test oscillator at 370 KC (must be accurate), adjust output of oscillator so that a convenient reading is obtained on the output meter.
3. Align 1st I.F. transformer by turning one of the trimmer screws up and down until maximum reading is obtained on output meter, then adjust other trimmer screw for maximum sensitivity.
4. Adjust 2nd I.F. transformer in the same manner.

TO ALIGN VARIABLE CONDENSER:

It is necessary to remove receiver chassis from set housing to align variable gang and padding condensers.

1. Properly connect the remote control head, shafts, and adjust the dial needle on the dial face from the back so that the dial calibration is correct.
2. Connect the high output side of test oscillator to ANT. and GND. to chassis.
3. Tune the receiver dial and set the test oscillator frequency to 1400 KC. Bring the 1400 KC signal to maximum output by adjusting trimmer located on top of oscillator section (front section) of gang condenser. Next adjust the antenna section (rear section) for maximum 1400 KC signal sensitivity.
4. Tune receiver dial and set test oscillator to approximately 600 KC and while rocking gang condenser adjust the 600 KC padding condenser, which is located and accessible thru the hole in the left hand side of chassis, for maximum output.

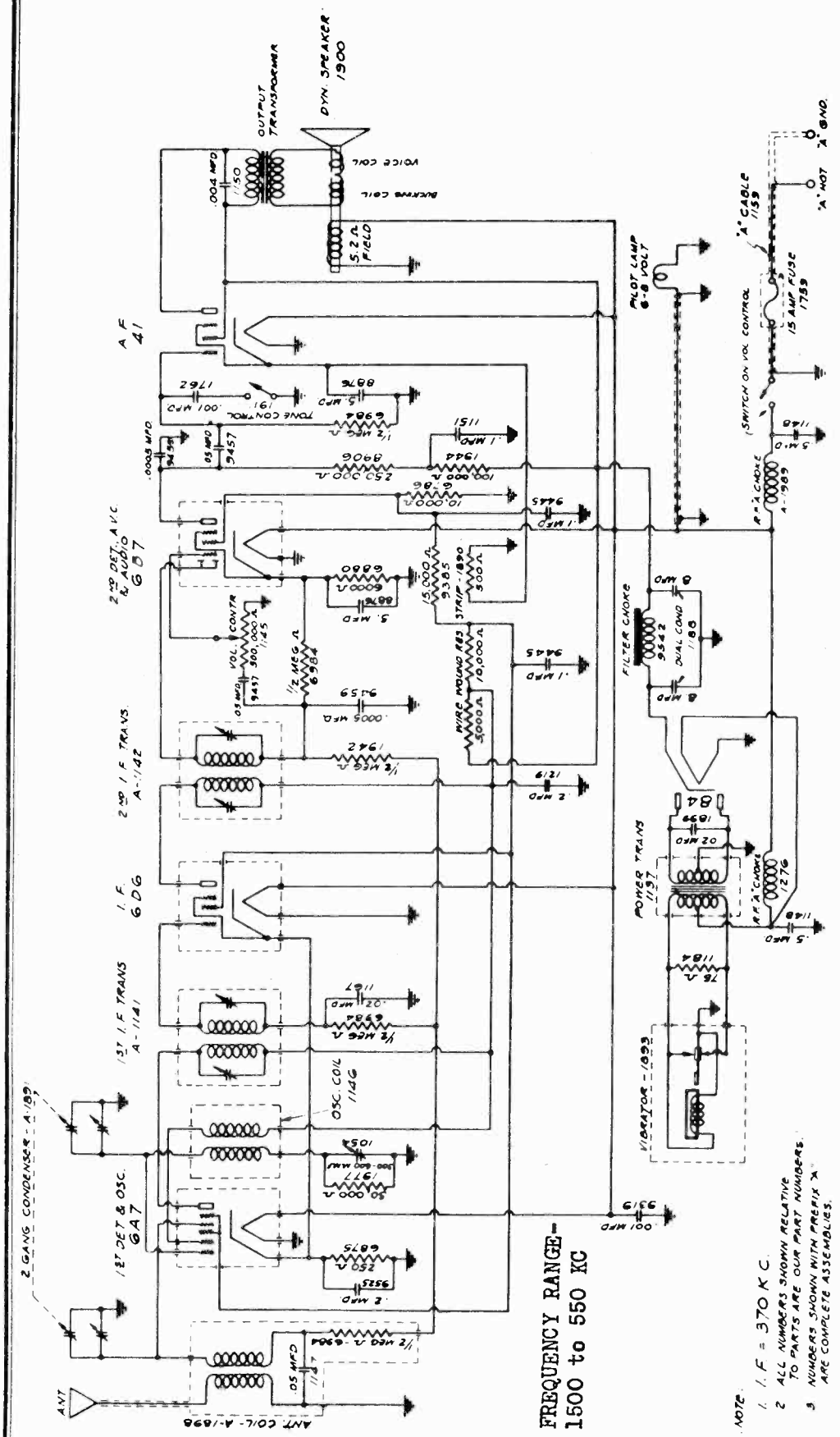
VOLTAGE TABLE

TYPE OF TUBE	POSITION OF TUBE	FILAMENT VOLTS	PLATE VOLTS	CATHODE VOLTS	SCREEN VOLTS	GRID NO.1	GRID NO. 3 & 5
6A7	OSCILLATOR AND MODULATOR	6	180	3.6		180	75
6D6	INTERMEDIATE FREQUENCY	6	180	3.6	75		
6B7	2ND DETECTOR DIODE & AVC	6	32*	1.9	30*		
41	OUTPUT	6	220	15	230		
84	RECTIFIER	6		230			

* COMPARATIVE VOLTAGE ONLY. READ ALL VOLTAGES FROM SOCKET TO CHASSIS. TOTAL "A" CURRENT 5.9 AMPERES.

SENTINEL RADIO CORP.

MODEL 10M
Schematic, Voltage
Alignment



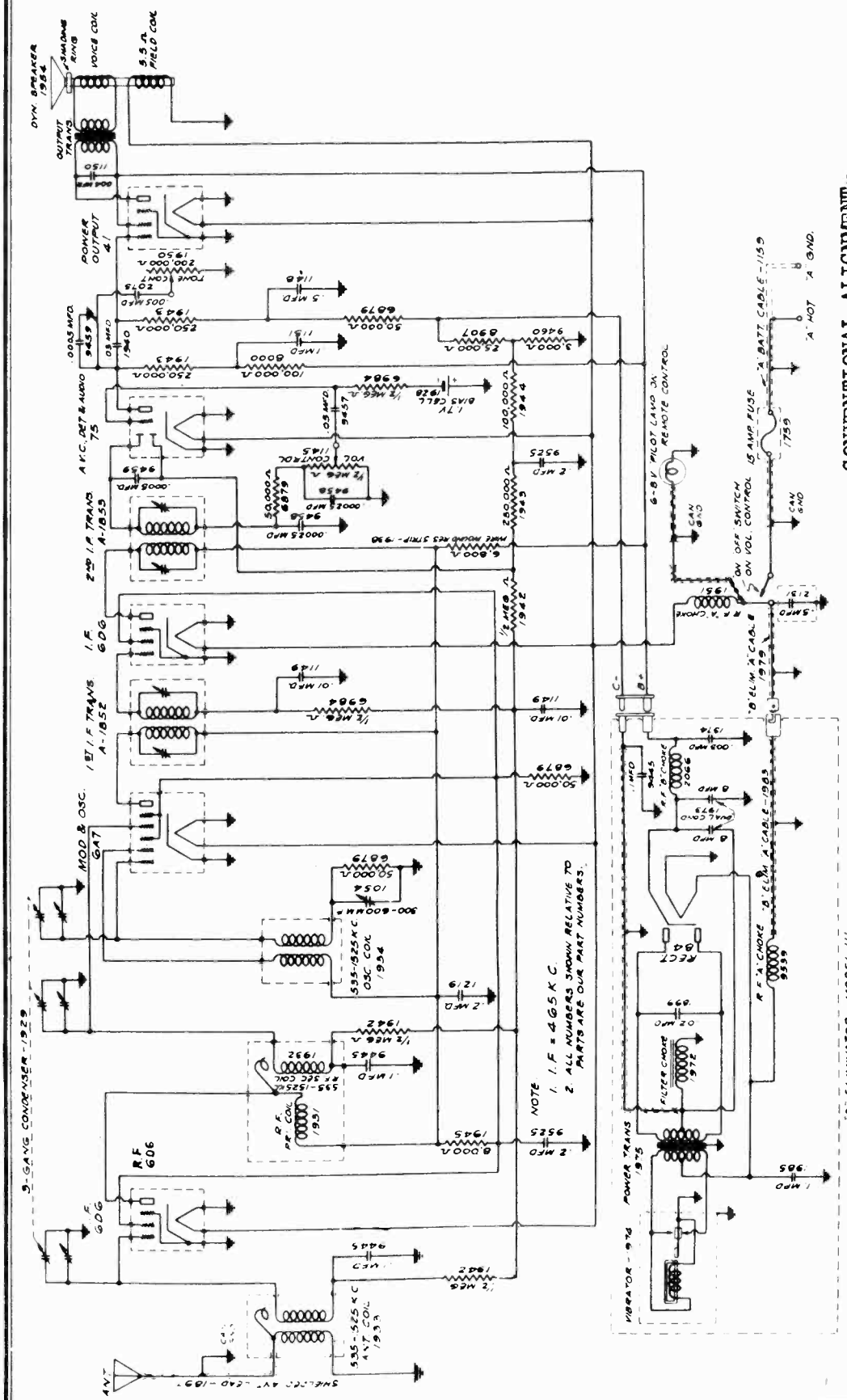
CONVENTIONAL ALIGNMENT (see special section) ALSO, the alignment frequencies and procedure is the same as for MODEL 10 MF. (See The Index.)

TUBE TYPE	TUBE POSITION	FILAMENT VOLTS	PLATE VOLTS	CATHODE VOLTS	SCREEN GRID VOLTS	GRID No.1	GRIDS No. 3&5
6A7	- OSC. & MOD.	6	- 180	- 3.6	-	- 180	- 75
6D6	- I-F	6	- 180	- 3.6	- 75	-	-
6B7	- 2nd Det & AVC	6	- 32 *	- 1.9	- 30*	-	-
41	- OUTPUT	6	- 220	- 15	- 230	-	-
84	- RECTIFIER	6	-	- 230	-	-	-

* Comparative voltage only. TOTAL "A" VOLTAGE TOTAL "A" CURRENT 5.9 AMP

MODEL 11M
Schematic, Voltage
Alignment

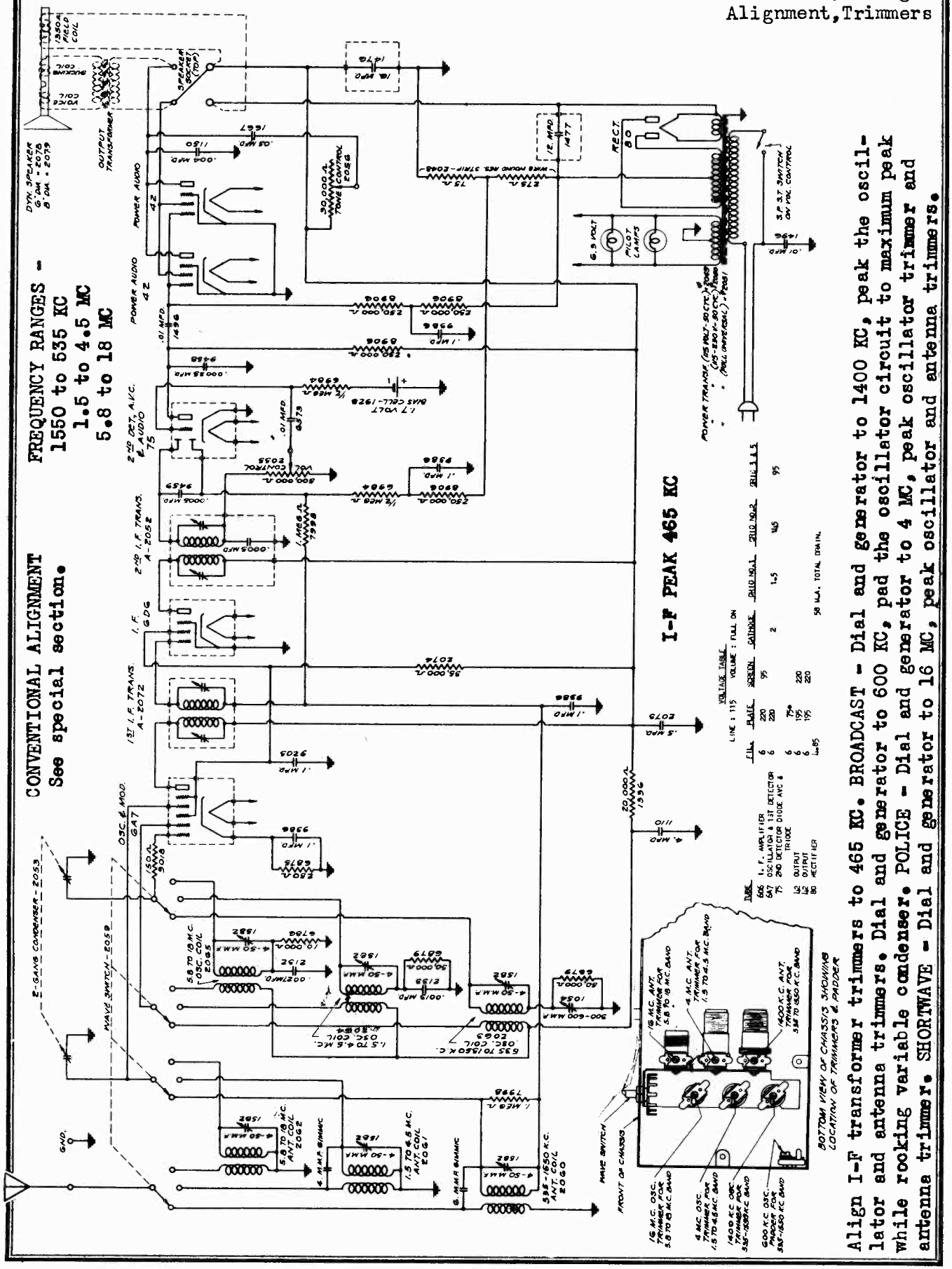
SENTINEL RADIO CORP.



TUBE TYPE	POSITION	FIL. VOLTS	PLATE VOLTS	SCREEN VOLTS	GRID NO.1	GRIDS NOS. 3 & 5
6D6	RF	6	125	100	2	100
6A7	OSC. MOD.	6	125	60	2	100
6D6	IF	6	125	60		
75	2nd Det. AVC	6	75*			
41	OUTPUT	6	200	210		
84	RECTIFIER	6				

SENTINEL RADIO CORP.

MODEL 19A
Schematic, Voltage
Alignment, Trimmers



Align I-F transformer trimmers to 465 KC. BROADCAST - Dial and generator to 1400 KC, peak the oscillator and antenna trimmers. Dial and generator to 600 KC, pad the oscillator circuit to maximum peak while rocking variable condenser. POLICE - Dial and generator to 4 MC, peak oscillator trimmer and antenna trimmer. SHORTWAVE - Dial and generator to 16 MC, peak oscillator and antenna trimmers.

MODEL 30A
Schematic, Parts
Alignment, Voltage

SENTINEL RADIO CORP.

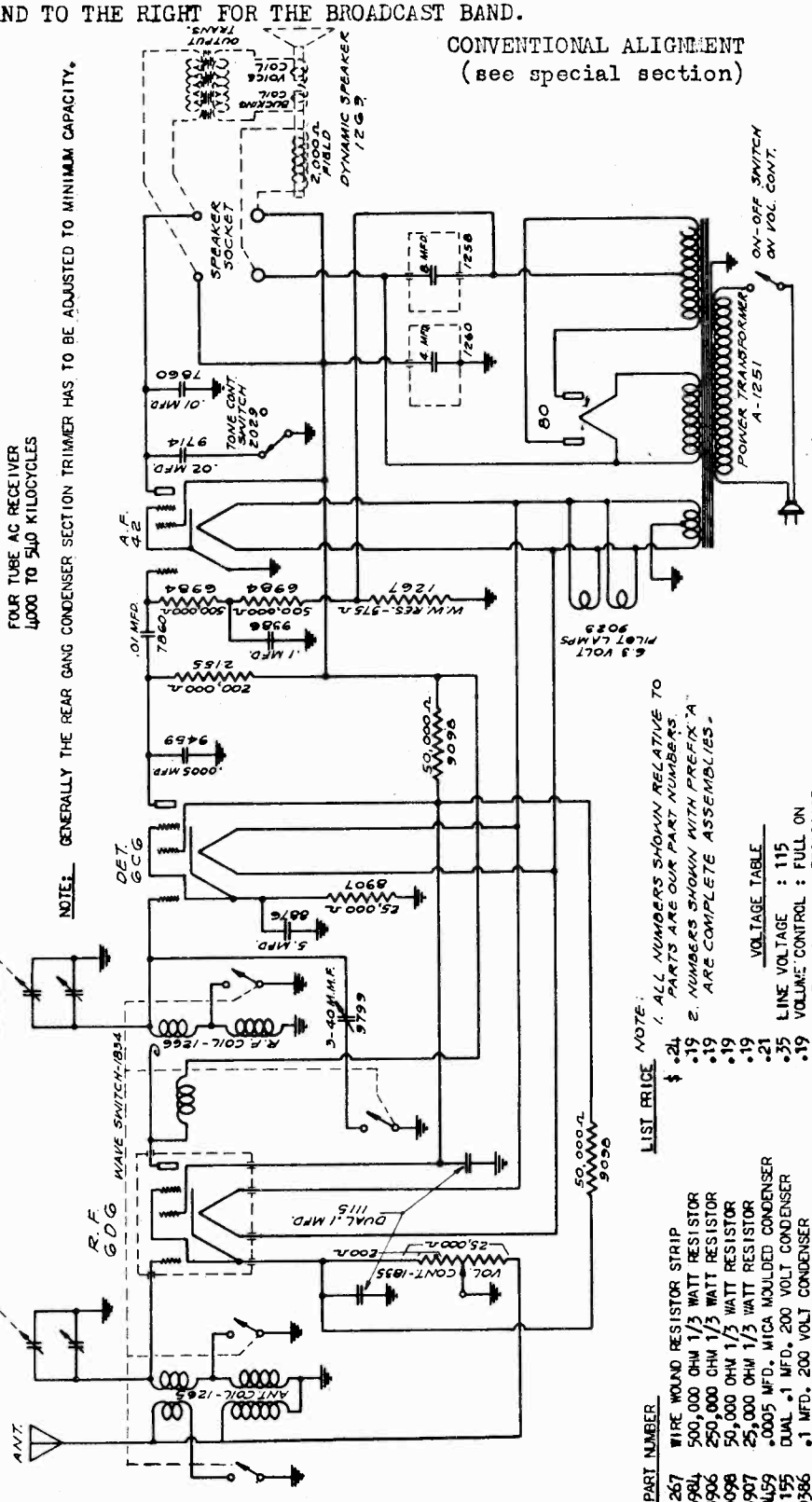
BAND SELECTOR SWITCH

THIS RECEIVER IS DESIGNED FOR TWO FREQUENCY BANDS. BROADCAST BAND FROM 1720 to 540 KC. POLICE, AIRCRAFT AND AMATEUR BAND 1.5 MC. to 4 MC. SWITCH TO LEFT POSITION FOR SHORT WAVE AND TO THE RIGHT FOR THE BROADCAST BAND.

CONVENTIONAL ALIGNMENT
(see special section)

FOUR TUBE AC RECEIVER
1400 TO 540 KILOCYCLES

NOTE: GENERALLY THE REAR GANG CONDENSER SECTION TRIMMER HAS TO BE ADJUSTED TO MINIMUM CAPACITY.



PART NUMBER		LIST PRICE
1267	WIRE WOUND RESISTOR STRIP	$ .24
6984	500,000 OHM 1/3 WATT RESISTOR	.19
8906	250,000 OHM 1/3 WATT RESISTOR	.19
9098	50,000 OHM 1/3 WATT RESISTOR	.19
8907	25,000 OHM 1/3 WATT RESISTOR	.19
9459	.0005 MFD. MICA MOULDED CONDENSER	.21
1155	DUAL .1 MFD. 200 VOLT CONDENSER	.35
9386	.1 MFD. 200 VOLT CONDENSER	.19
7860	.01 MFD. 400 VOLT CONDENSER	.17
9714	.02 MFD. 400 VOLT CONDENSER	.18
1740	15/16" KNOB	.22
1739	13/16" KNOB	.22
1269	DYNAMIC SPEAKER	5.25
1265	ANTENNA COIL	$1.27
1266	R. F. COIL	1.27
2017	TWO GANG CONDENSER	2.25
9799	TRIMMER CONDENSER	.15
2105	DIAL ASSEMBLY (SPECIFY REQUIRED NAME)	2.00
1834	WAVE SWITCH	.47
9023	PILOT LIGHT LAMP BULB 6.3 VOLTS	.19
1251	POWER TRANSFORMER	3.20
1258	8 MFD. WET ELECTROLYTIC CONDENSER	1.16
1260	4 MFD. WET ELECTROLYTIC CONDENSER	1.02
8876	5 MFD. DRY ELECTROLYTIC CONDENSER	.85
1835	VOLUME CONTROL	1.15
2029	TONE CONTROL	.36

PRICES ARE SUBJECT TO CHANGE WITHOUT NOTICE.

NOTE:
1. ALL NUMBERS SHOWN RELATIVE TO PARTS ARE OUR PART NUMBERS
2. NUMBERS SHOWN WITH PREFIX "A" ARE COMPLETE ASSEMBLIES.

VOLTAGE TABLE

LINE VOLTAGE : 115
VOLUME CONTROL : FULL ON
WAVE BAND : BROADCAST

TUBE		FILAMENT	PLATE	SCREEN	CATHODE
606	RADIO FREQUENCY	6	225	85	2
606	DETECTOR	6	105*	85	3.5
42	OUTPUT	6	200	225	15**
80	RECTIFIER	4.9			

READ ALL VOLTAGES FROM SOCKET PRONG TO GROUND UNLESS OTHERWISE SPECIFIED. (EXCEPT FILAMENT)

** READ FROM 375 OHM RESISTOR #1267 TO GROUND.

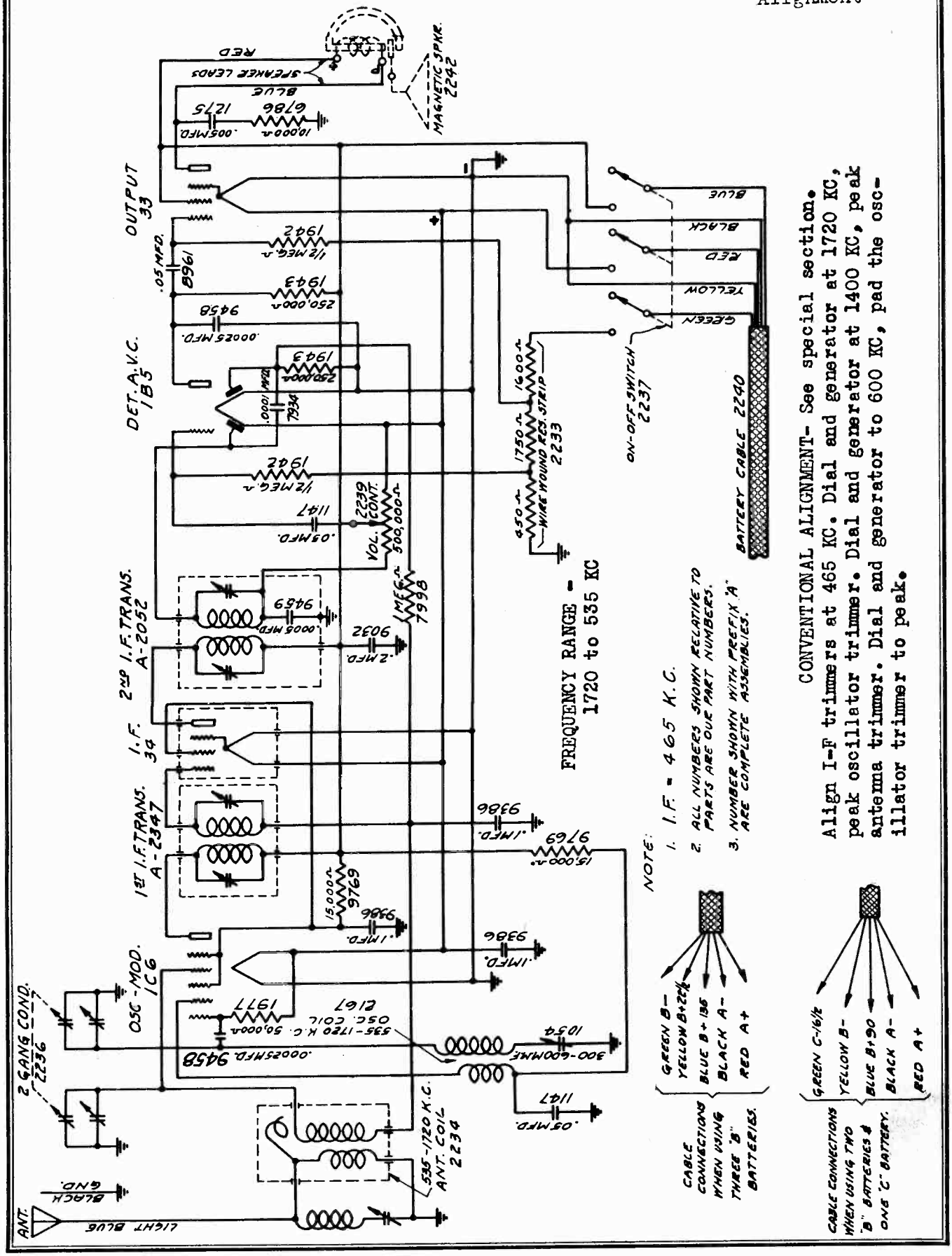
* COMPARATIVE VOLTAGE IS NOT TRUE VOLTAGE APPLIED.

TO ALIGN THE VARIABLE CONDENSER: IT IS IMPORTANT WHEN ALIGNING TO FOLLOW THE PROCEDURE CAREFULLY, OTHERWISE THE RECEIVER WILL LACK SENSITIVITY AND THE DIAL CALIBRATION WILL BE INCORRECT.

1. CONNECT THE HIGH OUTPUT SIDE OF THE OSCILLATOR TO THE RECEIVER ANTENNA LEAD AND THE GROUND TO THE CHASSIS.
2. PLACE THE BAND SELECTOR SWITCH FOR OPERATION ON THE BROADCAST BAND, TUNE THE RECEIVER TO EXACTLY 1400 KILOCYCLES ON THE DIAL AND SET THE TEST OSCILLATOR FREQUENCY TO 1400 KILOCYCLES. THEN BRING IN THE 1400 KILOCYCLE SIGNAL TO MAXIMUM OUTPUT BY ADJUSTING THE TRIMMER CONDENSERS LOCATED ON TOP OF THE GANG CONDENSER.
3. SET THE BAND SELECTOR SWITCH FOR OPERATION ON THE SHORT WAVE BAND, TUNE THE RECEIVER DIAL TO EXACTLY 4 MEGACYCLES AND SET THE TEST OSCILLATOR TO THIS FREQUENCY. THEN ADJUST THE TRIMMER CONDENSER MOUNTED ON THE COIL LOCATED UNDERNEATH THE CHASSIS FOR MAXIMUM SENSITIVITY. ROCK GANG CONDENSER WHEN MAKING THIS ADJUSTMENT.

SENTINEL RADIO CORP.

MODEL 32B
Schematic, Parts
Alignment

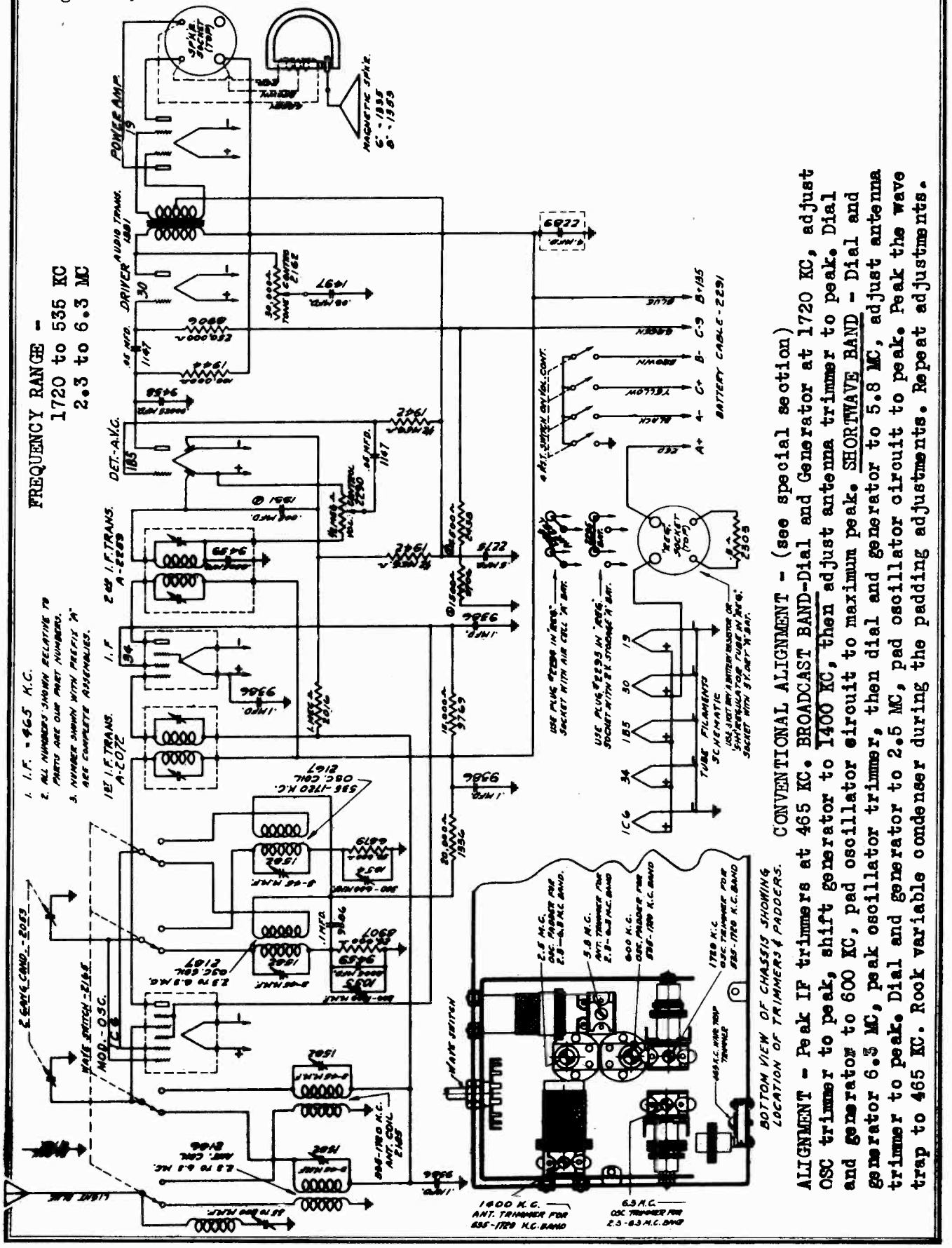


CONVENTIONAL ALIGNMENT- See special section.

Align I-F trimmers at 465 KC. Dial and generator at 1720 KC, peak oscillator trimmer. Dial and generator at 1400 KC, peak antenna trimmer. Dial and generator to 600 KC, pad the oscillator trimmer to peak.

MODEL 33B
Schematic, Parts
Alignment, Trimmers

SENTINEL RADIO CORP

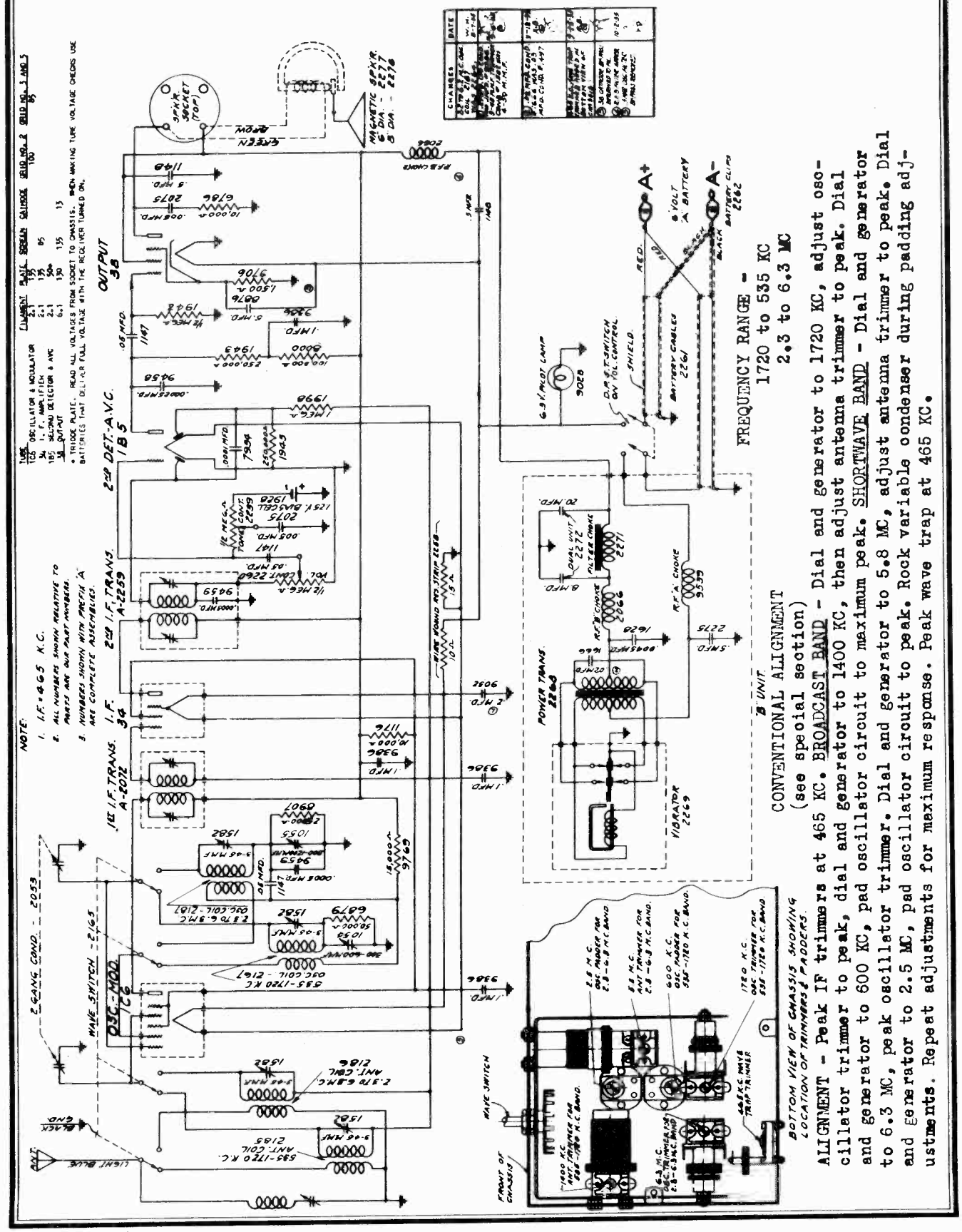


CONVENTIONAL ALIGNMENT - (see special section)

ALIGNMENT - Peak IF trimmers at 465 KC. BROADCAST BAND-Dial and Generator at 1720 KC, adjust OSC trimmer to peak, shift generator to 1400 KC, then adjust antenna trimmer to peak. Dial and generator to 600 KC, pad oscillator circuit to maximum peak. SHORTWAVE BAND - Dial and generator 6.3 MC, peak oscillator trimmer, then dial and generator to 5.8 MC, adjust antenna trimmer to peak. Dial and generator to 2.5 MC, pad oscillator circuit to peak. Peak the wave trap to 465 KC. Rock variable condenser during the padding adjustments. Repeat adjustments.

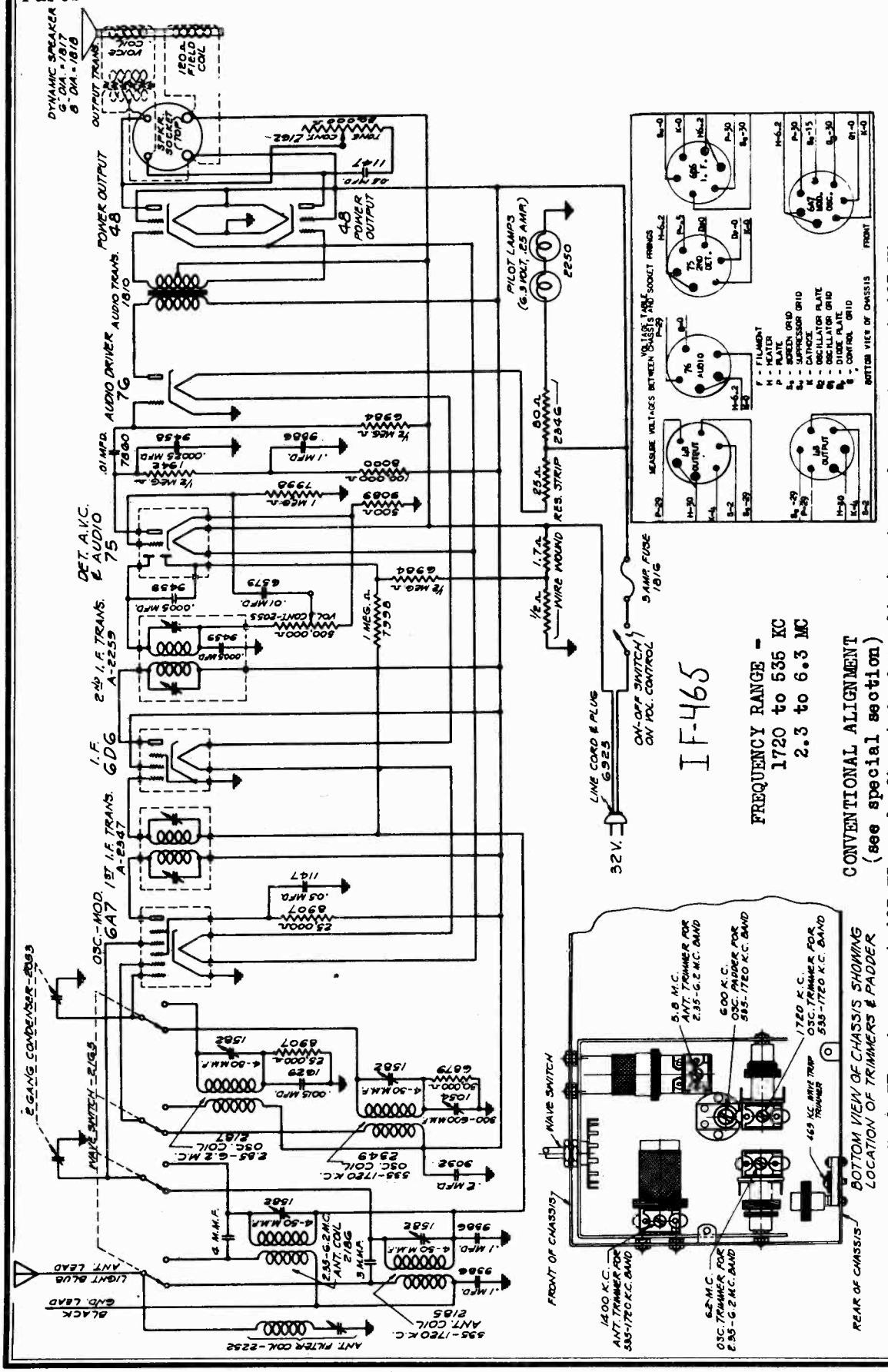
SENTINEL RADIO CORP.

MODEL 34B
Schematic, Trimmers
Alignment, Parts
Changes



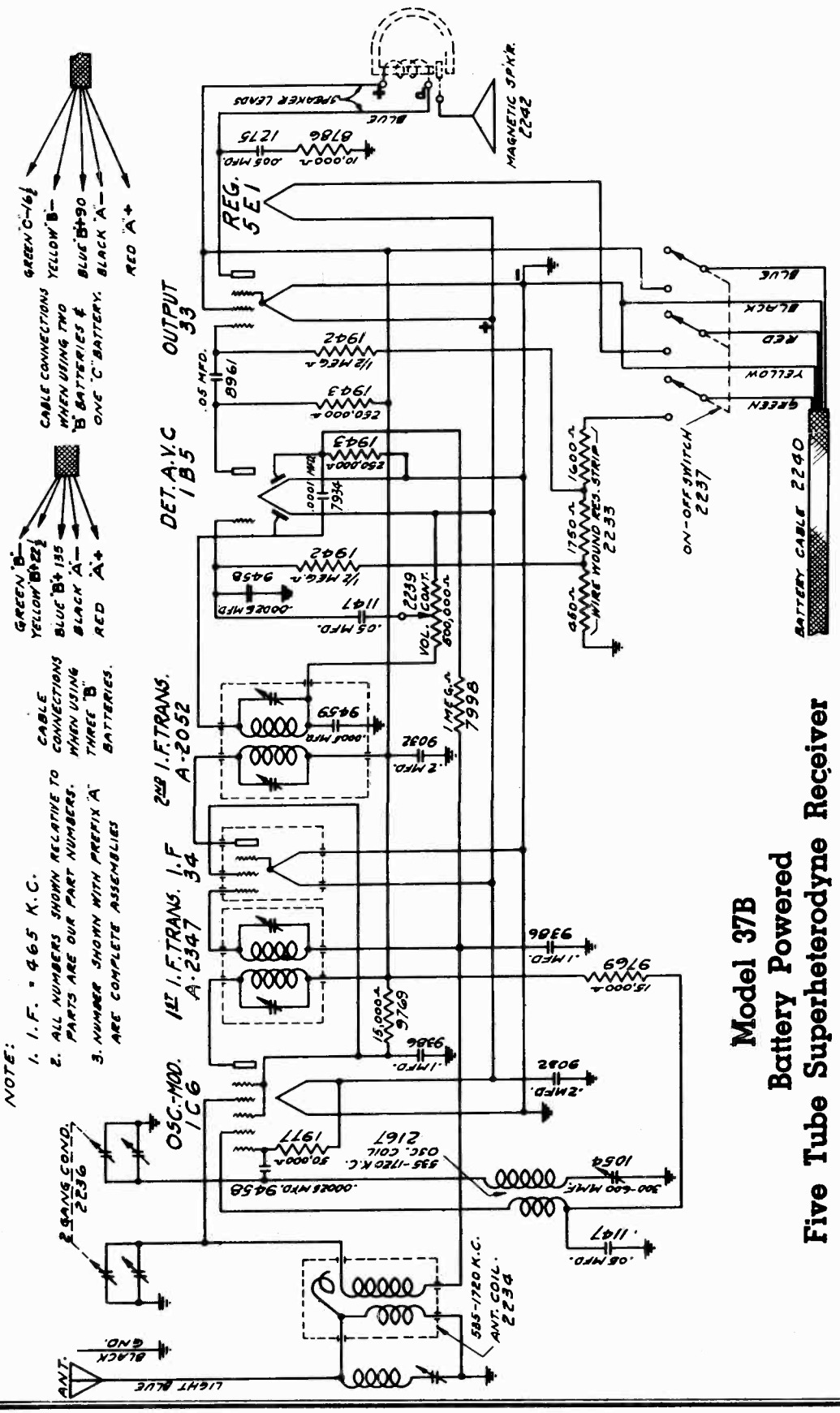
MODEL 36L
Schematic, Voltage
Alignment, Trimmers
Parts

SENTINEL RADIO CORP.



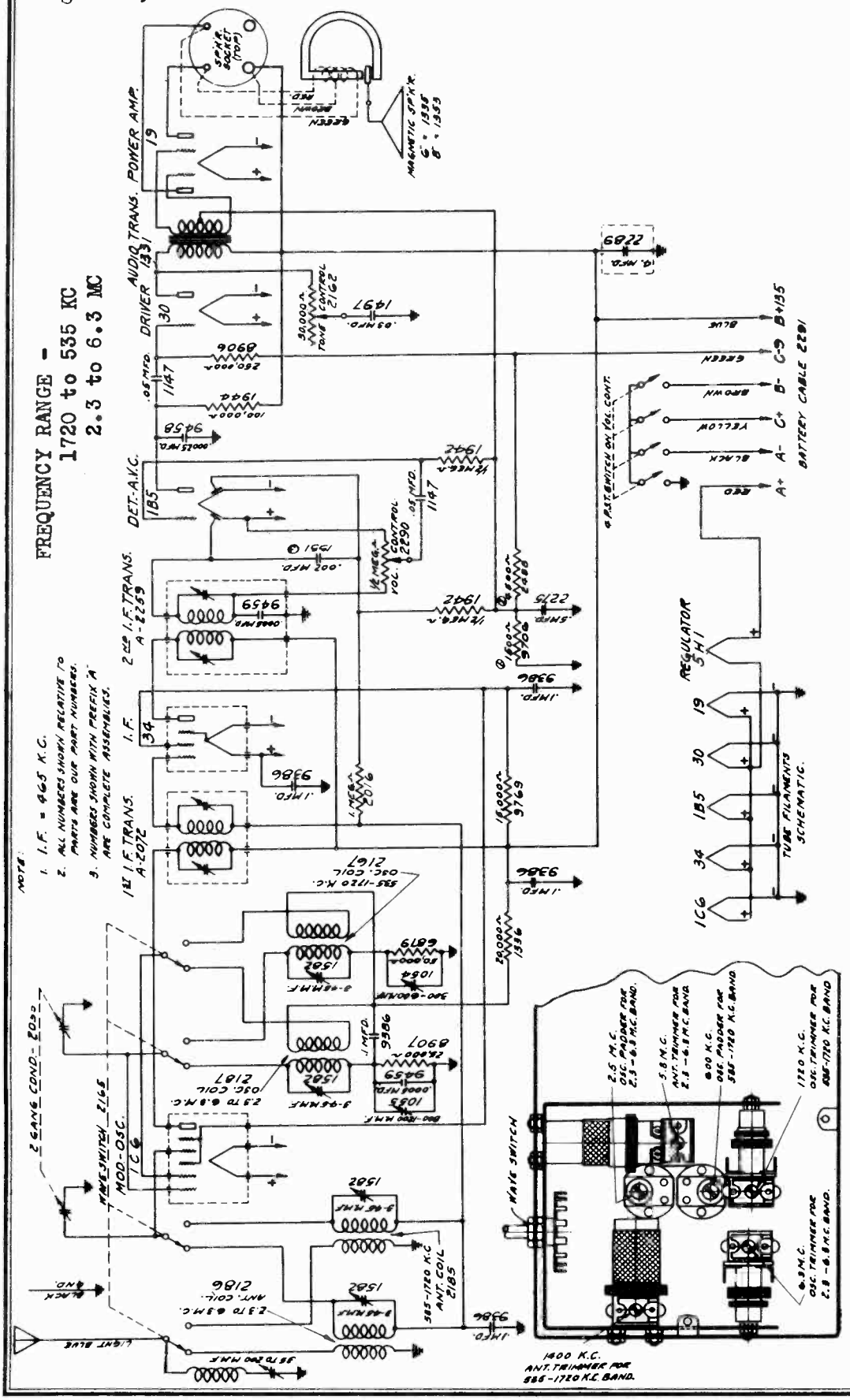
SENTINEL RADIO CORP.

MODEL 37B
Schematic, Parts
Alignment



MODEL 38B
Schematic, Trimmers
Alignment, Parts

SENTINEL RADIO CORP.

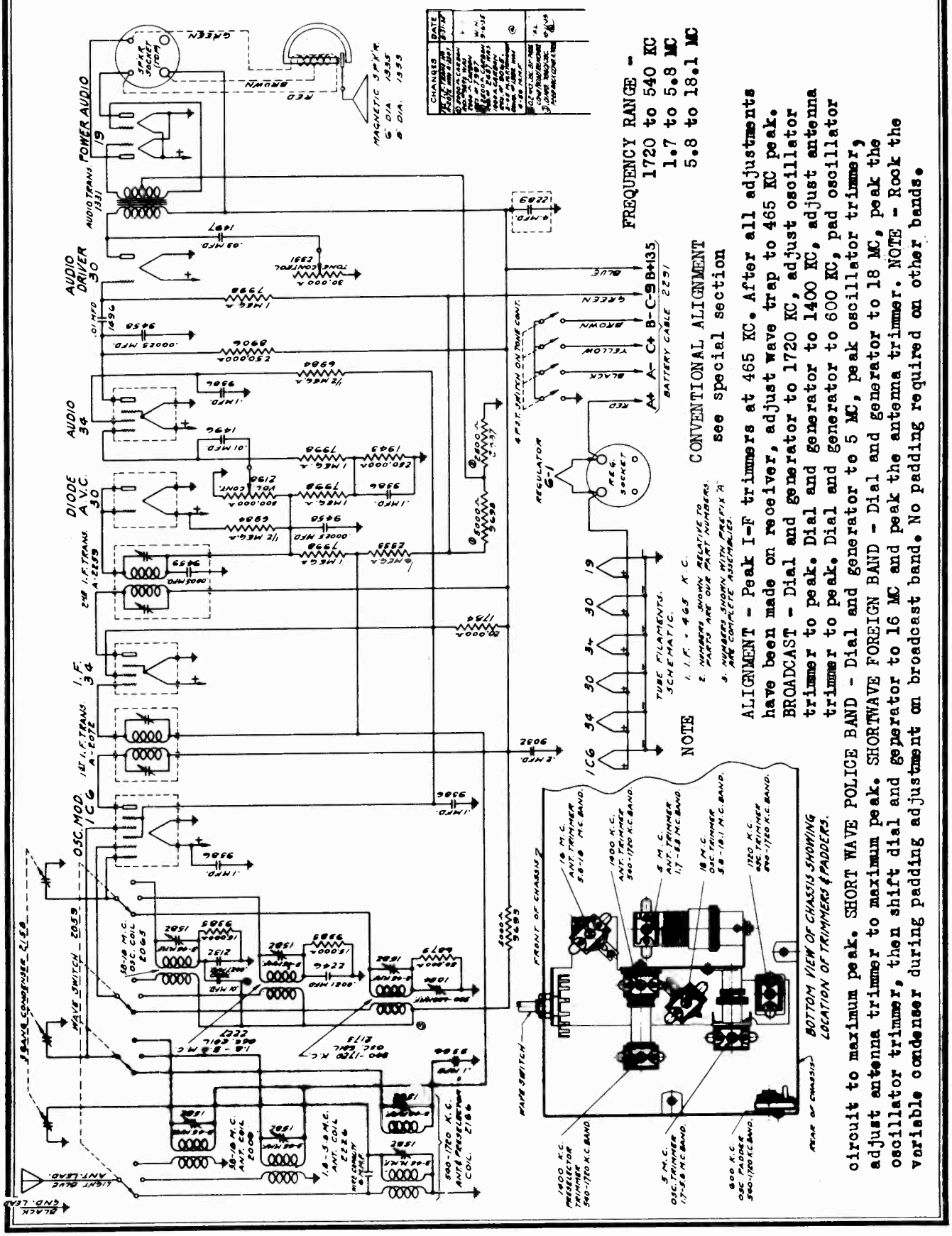


CONVENTIONAL ALIGNMENT - see special section

ALIGNMENT - Peak I-F transformer trimmers at 465 KC. After R-F adjustments, peak the wave trap at 465 KC. BROADCAST BAND - Dial and generator at 1720 KC, peak oscillator trimmer. Dial and generator at 1400 KC, adjust antenna trimmer to peak. Dial and generator at 600 KC, pad oscillator circuit to maximum peak. SHORTWAVE BAND - Dial and generator at 6.3 MC, adjust oscillator trimmer to maximum peak. Dial and generator to 5.8 MC, adjust antenna trimmer to maximum peak. The short wave oscillator circuit is then padded at 2.5 MC. While making padding adjustments, rock the variable condenser.

SENTINEL RADIO CORP.

MODEL 39B
Schematic, Trimmers
Alignment, Changes, Parts



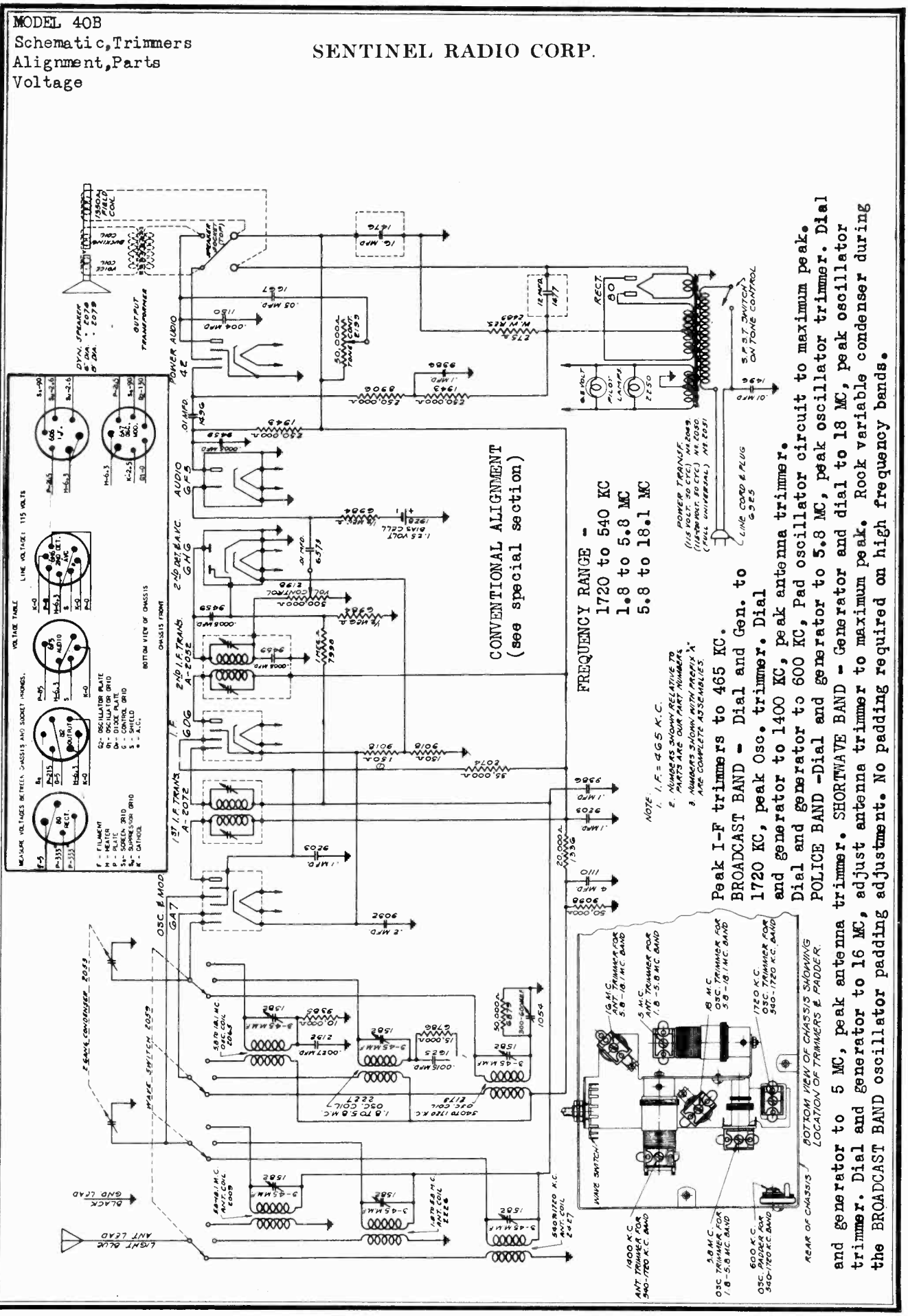
FREQUENCY RANGE -
1720 to 540 KC
1.7 to 5.8 MC
5.8 to 18.1 MC

CONVENTIONAL ALIGNMENT
see special section

ALIGNMENT - Peak I-F trimmers at 465 KC. After all adjustments have been made on receiver, adjust wave trap to 465 KC peak. BROADCAST - Dial and generator to 1720 KC, adjust oscillator trimmer to peak. Dial and generator to 1400 KC, adjust antenna trimmer to peak. Dial and generator to 600 KC, pad oscillator trimmer to peak. Dial and generator to 5 MC, peak oscillator trimmer, adjust antenna trimmer to maximum peak. SHORTWAVE FOREIGN BAND - Dial and generator to 18 MC, peak the oscillator trimmer, then shift dial and generator to 16 MC and peak the antenna trimmer. NOTE - Rock the variable condenser during padding adjustment on broadcast band. No padding required on other bands.

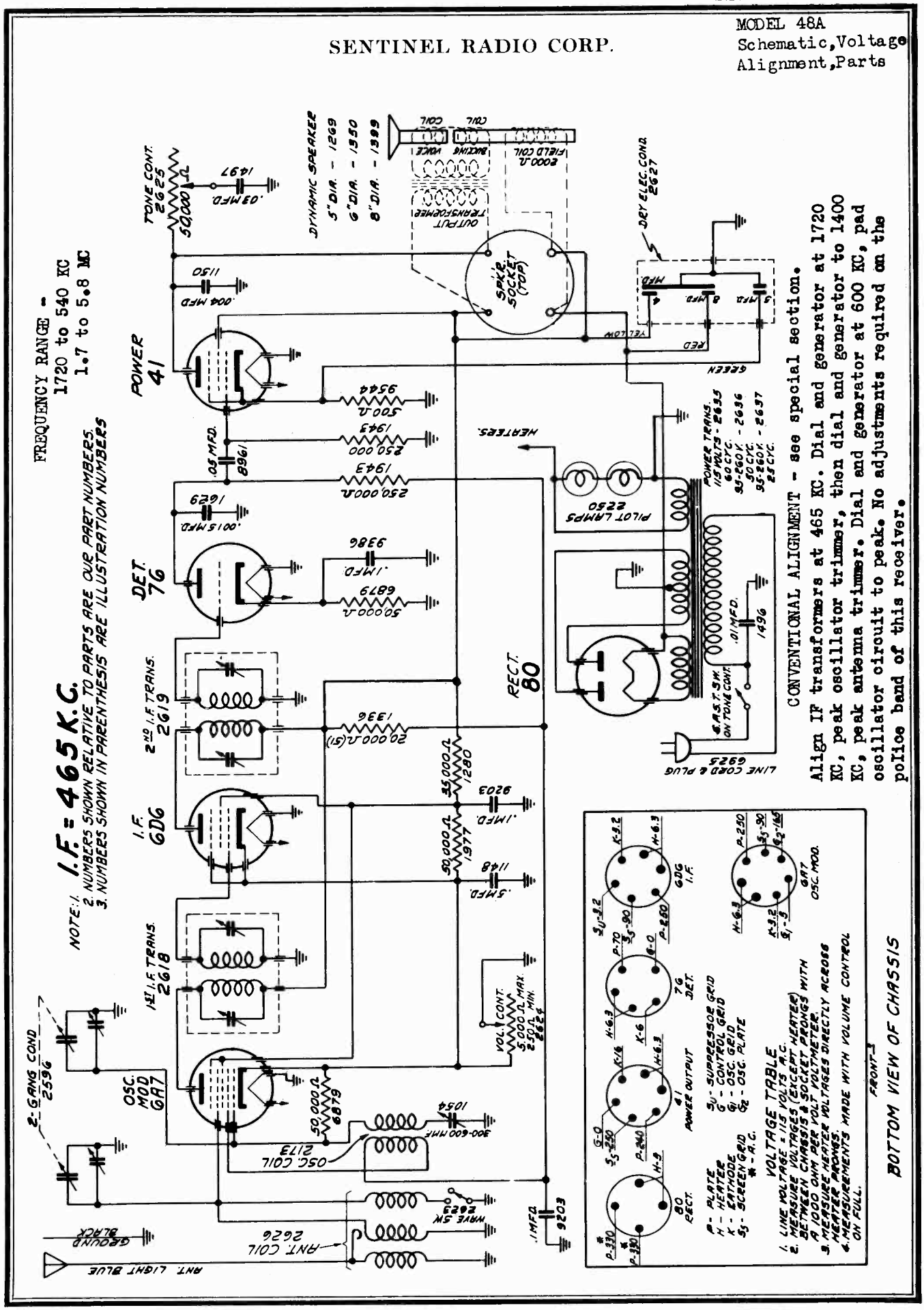
MODEL 40B
Schematic, Trimmers
Alignment, Parts
Voltage

SENTINEL RADIO CORP.



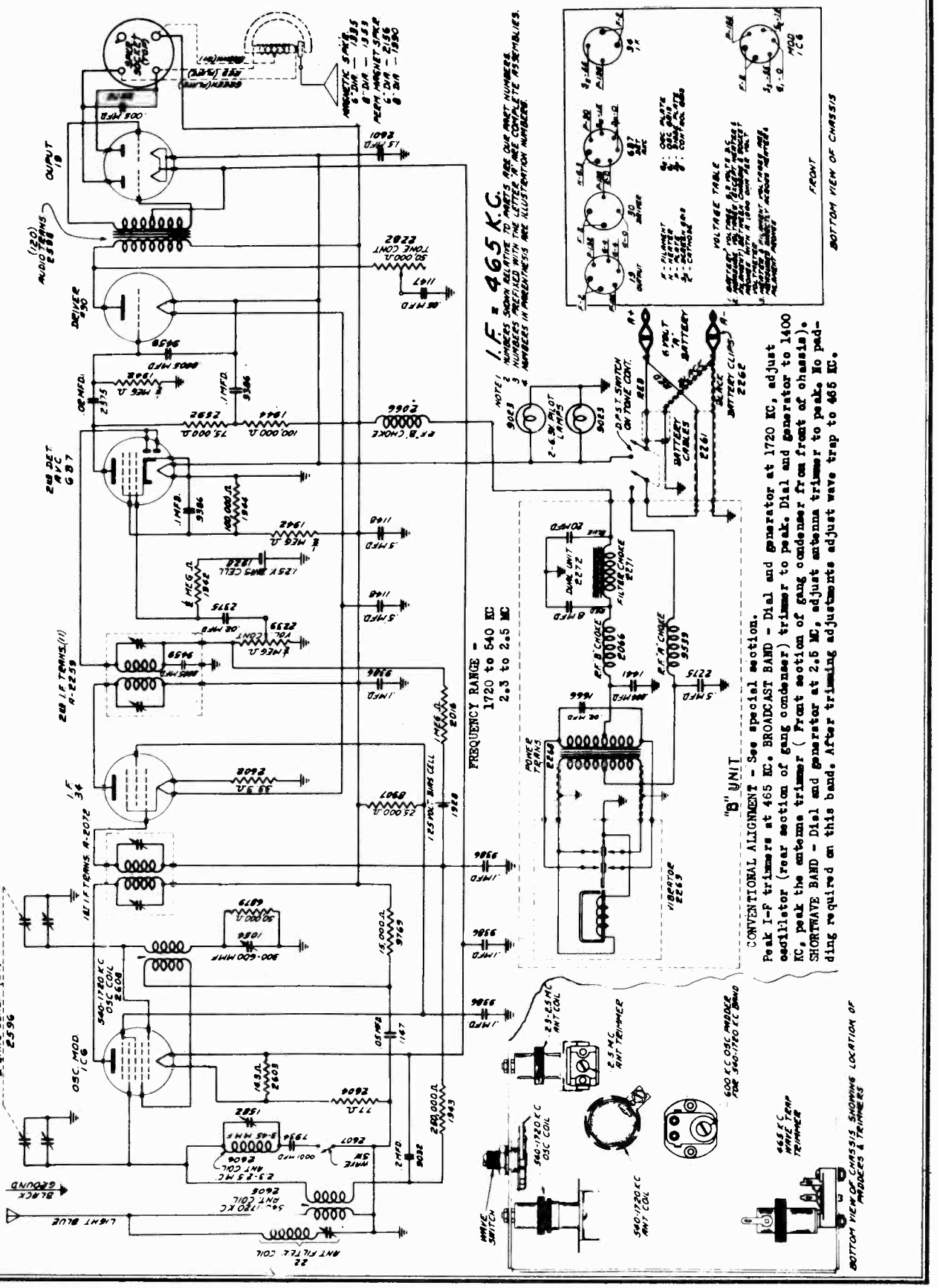
SENTINEL RADIO CORP.

MODEL 48A
Schematic, Voltage
Alignment, Parts



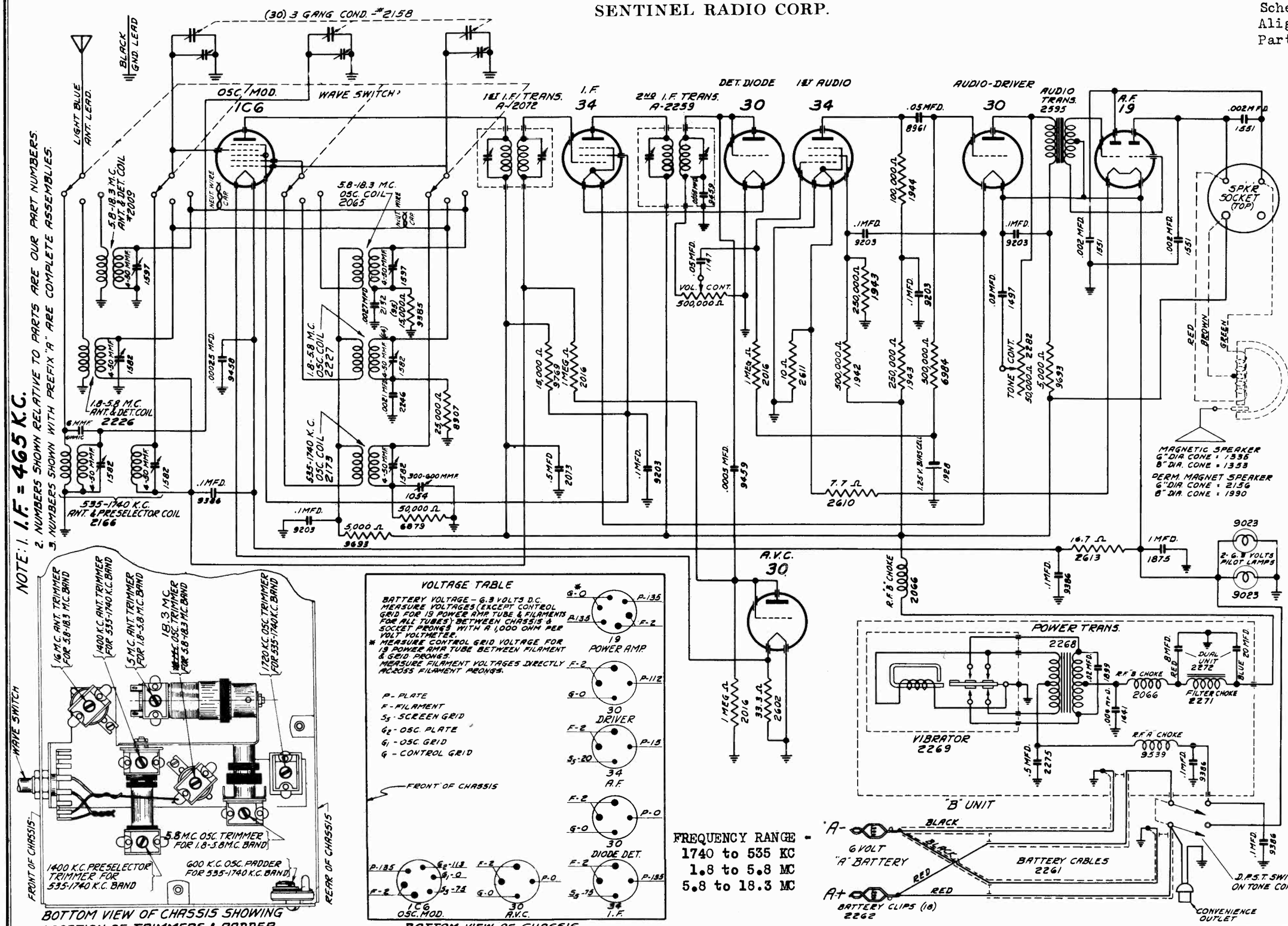
MODEL 49B
Schematic, Voltage
Trimmers, Alignment
Parts

SENTINEL RADIO CORP.



MODEL 50B
Schematic, Voltage
Alignment, Trimmers
Parts

SENTINEL RADIO CORP.



NOTE: 1. I.F. = 465 K.C.
2. NUMBERS SHOWN WITH PREFIX "A" ARE COMPLETE ASSEMBLIES.
3. NUMBERS SHOWN RELATIVE TO PARTS ARE OUR PART NUMBERS.

BOTTOM VIEW OF CHASSIS SHOWING LOCATION OF TRIMMERS & PADDER

VOLTAGE TABLE

BATTERY VOLTAGE - 6.3 VOLTS D.C.
MEASURE VOLTAGES (EXCEPT CONTROL GRID FOR 19 POWER AMP TUBE & FILAMENTS FOR ALL TUBES) BETWEEN CHASSIS & SOCKET PRONGS WITH A 1,000 OHM PER VOLT VOLTMETER.
* MEASURE CONTROL GRID VOLTAGE FOR 19 POWER AMP TUBE BETWEEN FILAMENT & GRID PRONGS.
MEASURE FILAMENT VOLTAGES DIRECTLY ACROSS FILAMENT PRONGS.

P - PLATE
F - FILAMENT
S_3 - SCREEN GRID
G_2 - OSC. PLATE
G_1 - OSC. GRID
G - CONTROL GRID

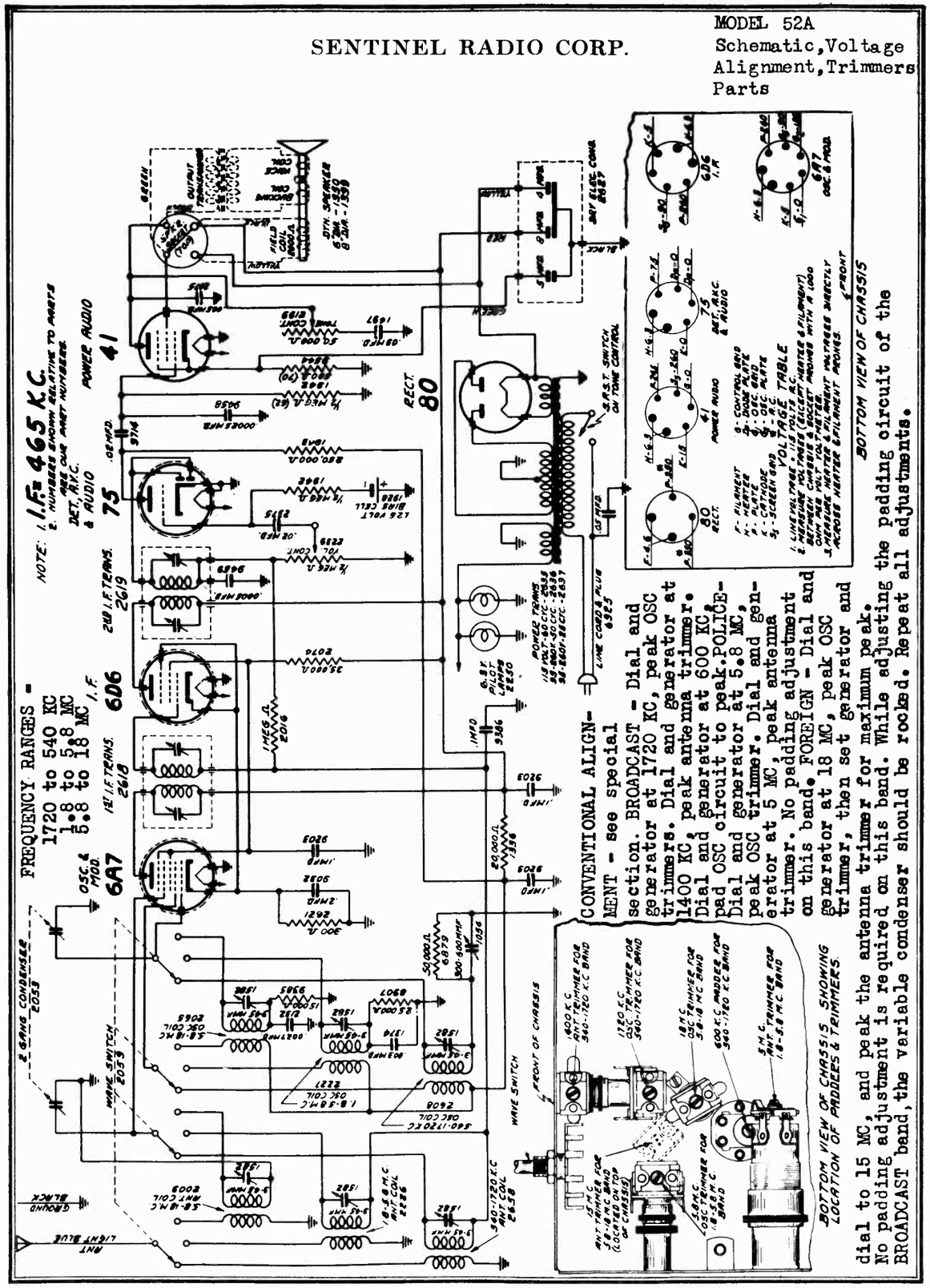
BOTTOM VIEW OF CHASSIS

FREQUENCY RANGE -
1740 to 535 KC
1.8 to 5.8 MC
5.8 to 18.3 MC

CONVENTIONAL ALIGNMENT - see special section.
Peak I-F trimmers at 465 KC. BROADCAST BAND Dial and generator at 1720 KC, peak oscillator trimmer. Dial and generator at 1400 KC, peak antenna trimmers peaked. Dial and generator at 600 KC, pad oscillator circuit to peak. POLICE - Dial and generator to 5.8 MC, peak antenna trimmer. Dial and generator at 5 MC, peak oscillator trimmer. Dial and generator to 16 MC, adjust antenna trimmer to peak. NOTE - No padding adjustments required on shortwave bands.

SENTINEL RADIO CORP.

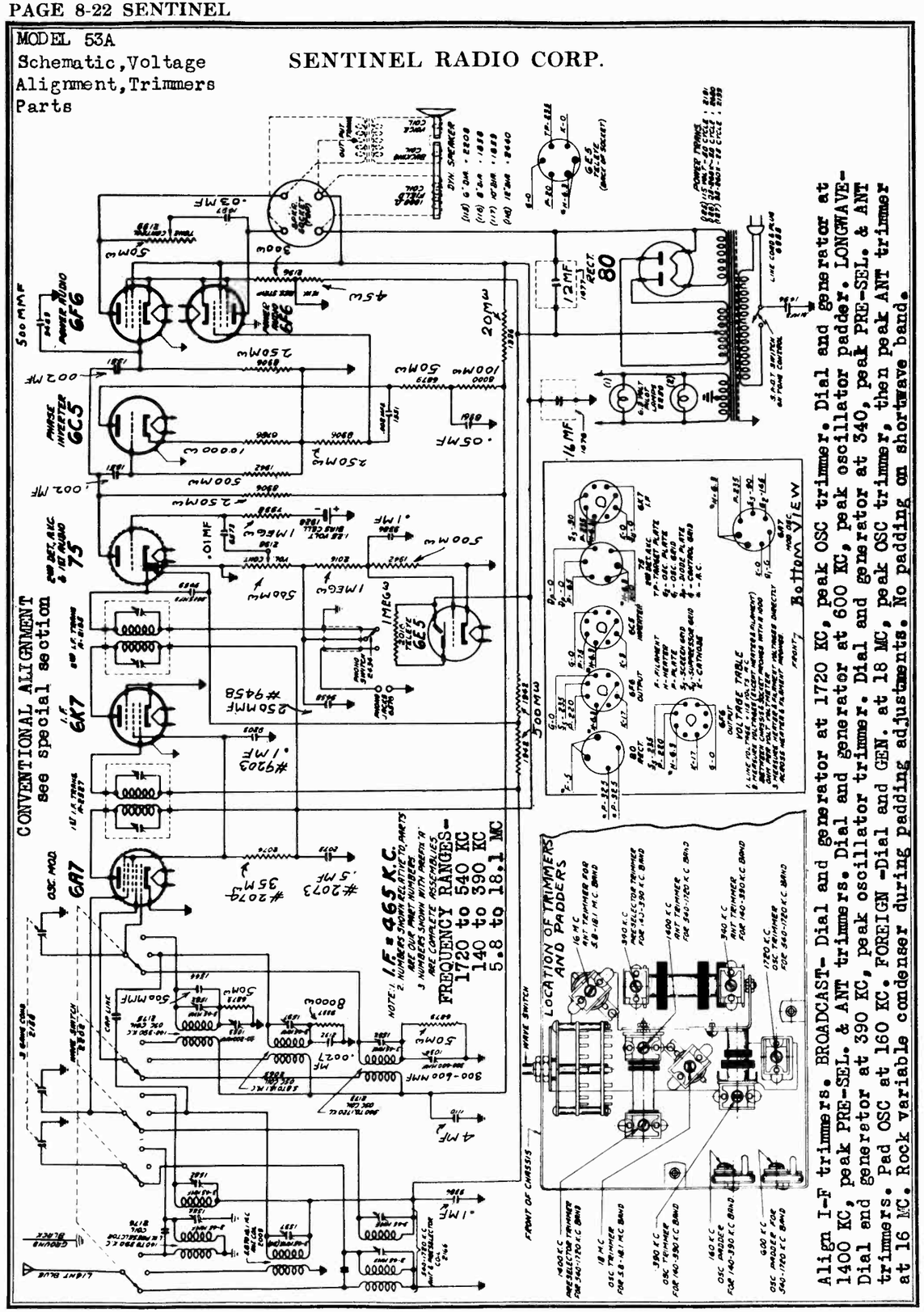
MODEL 52A
Schematic, Voltage
Alignment, Trimmers
Parts



CONVENTIONAL ALIGNMENT - see special section. BROADCAST - Dial and generator at 1720 KC, peak trimmers. Dial and generator at 600 KC, peak 1400 KC, peak antenna trimmer. Dial and generator at 1400 KC. Pad OSC circuit to peak. Dial and generator at 5.8 MC, peak OSC trimmer. Dial and generator at 5 MC, peak antenna trimmer. No padding adjustment is required on this band. While dial to 15 MC, and peak the antenna trimmer for maximum peak. No padding adjustment is required on this band. While adjusting the padding circuit of the BROADCAST band, the variable condenser should be rocked. Repeat all adjustments.

MODEL 53A
Schematic, Voltage
Alignment, Trimmers
Parts

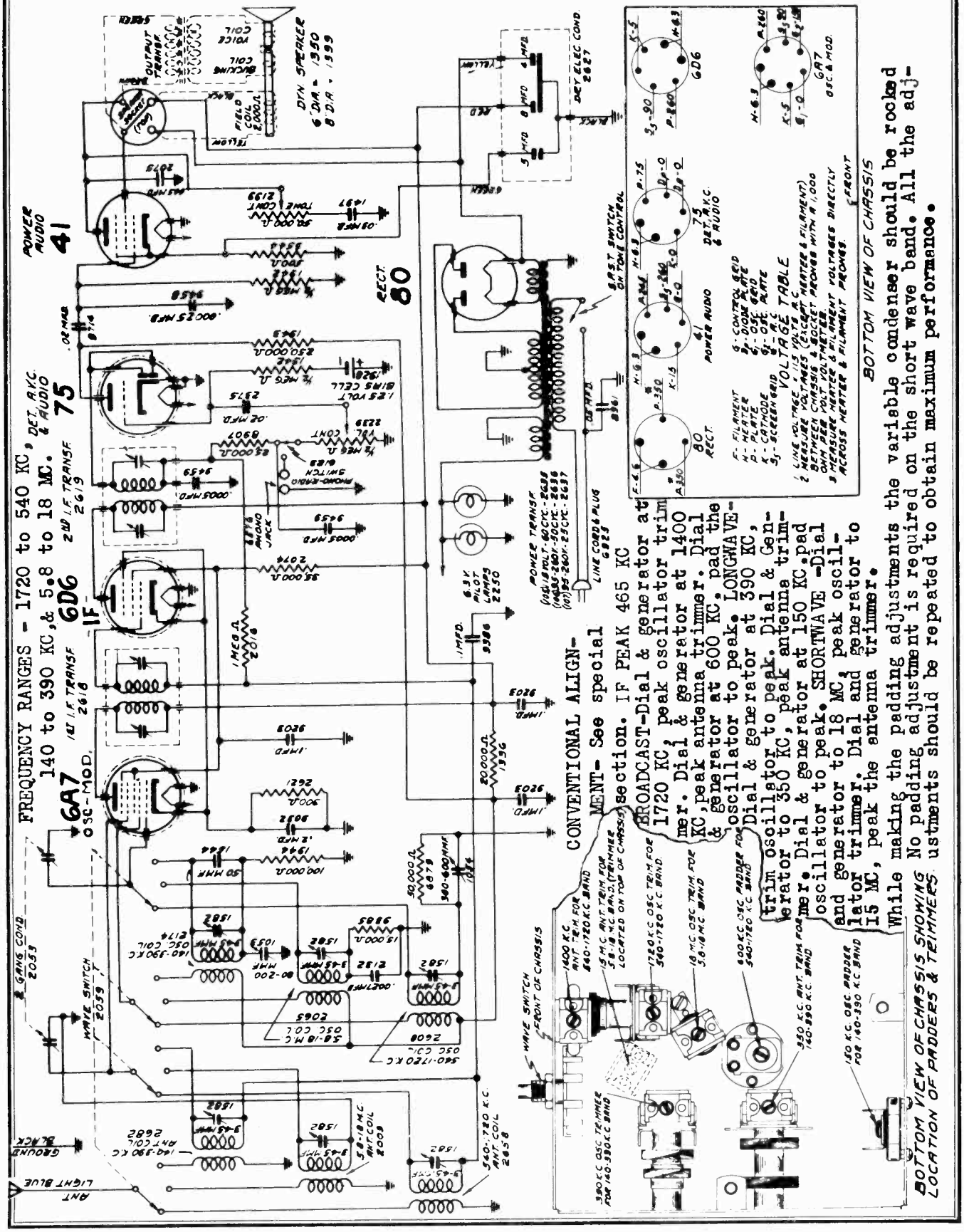
SENTINEL RADIO CORP.



Align I-F trimmers. BROADCAST- Dial and generator at 1720 KC, peak PRE-SEL. & ANT trimmers. Dial and generator at 600 KC, peak oscillator trimmer. Dial and generator at 390 KC, peak oscillator trimmer. Dial and GEN. at 18 MC, peak OSC trimmer, then peak ANT trimmer at 16 MC. Rock variable condenser during padding adjustments. No padding on shortwave band.

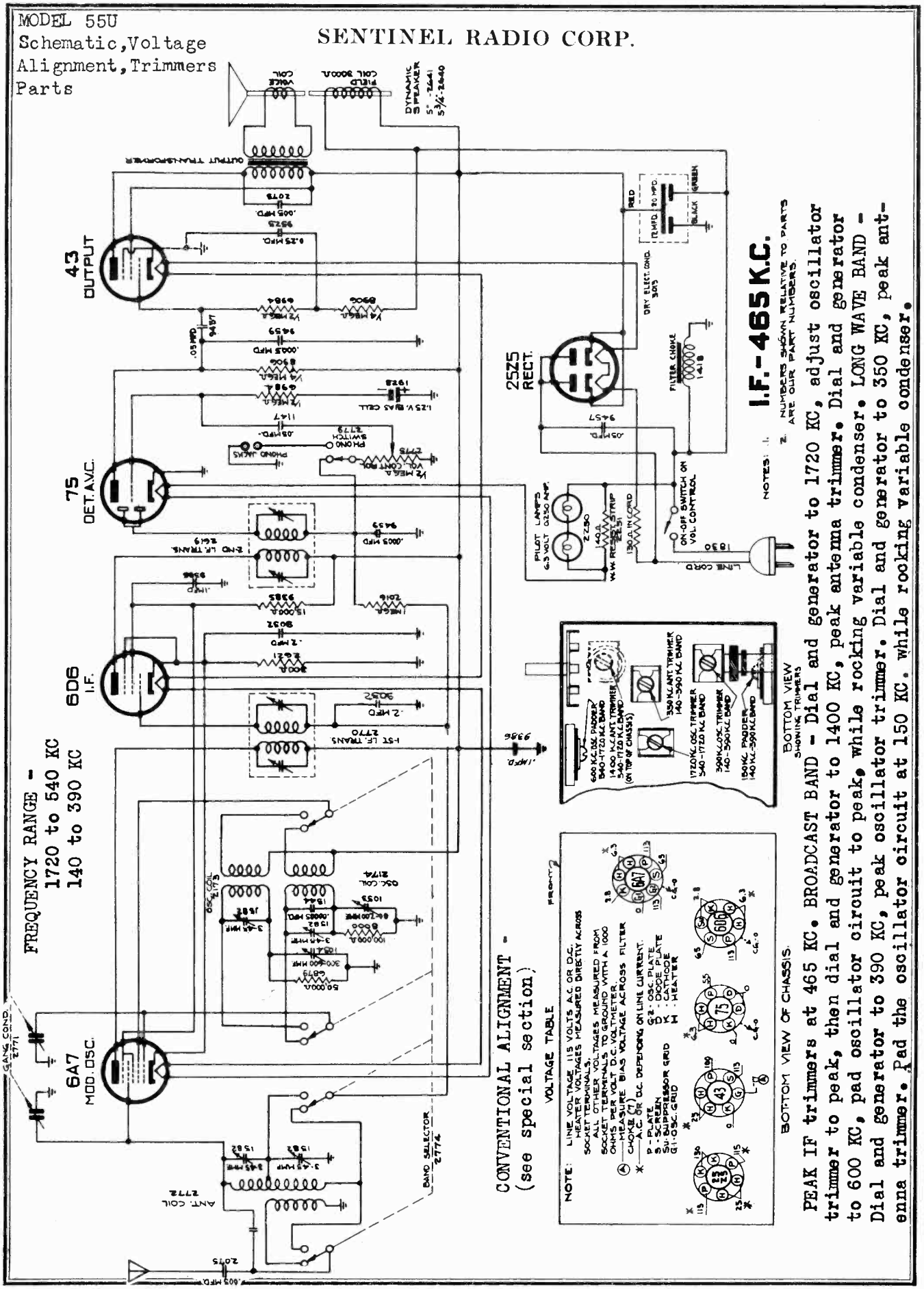
SENTINEL RADIO CORP.

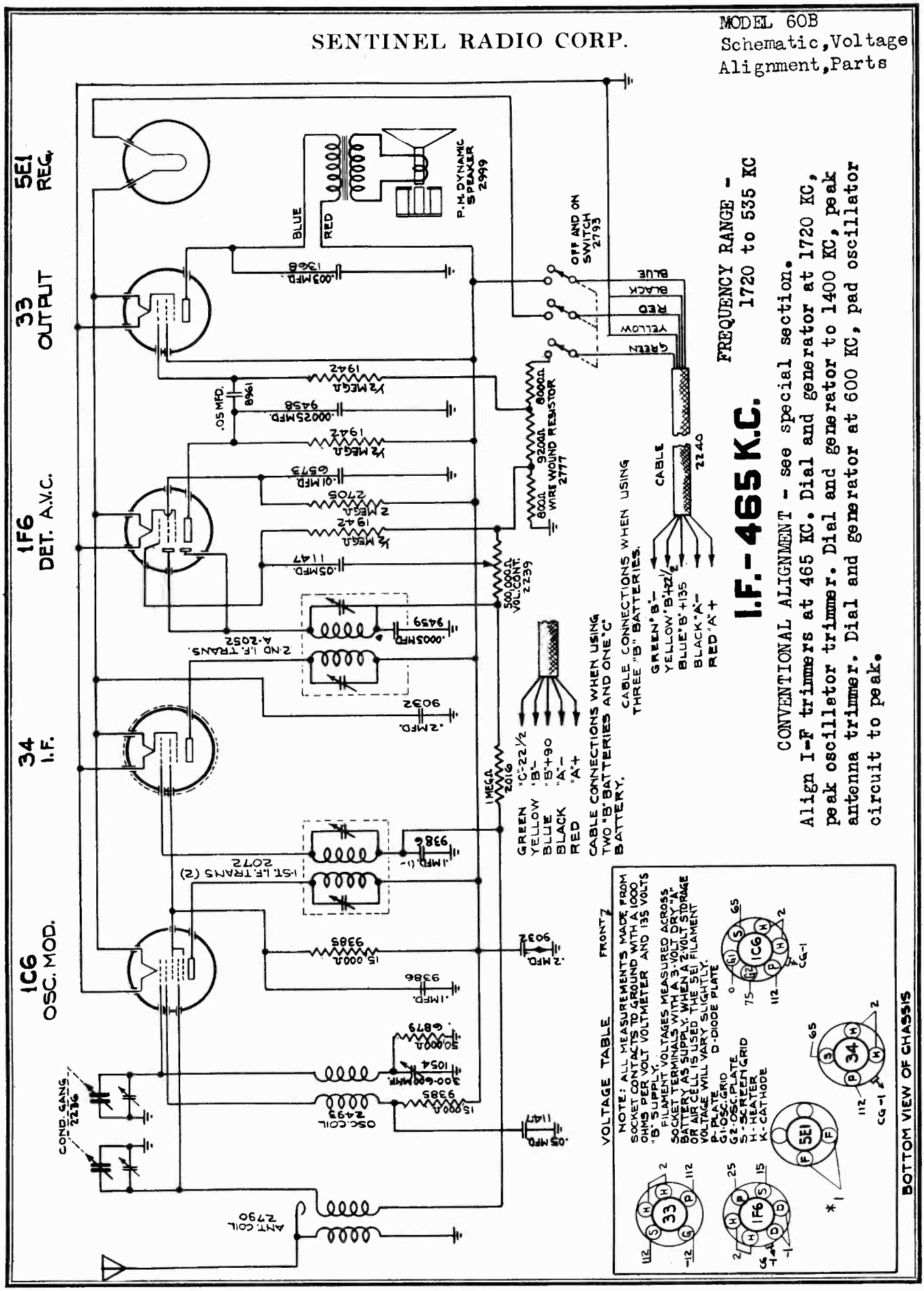
MODEL 54A
Schematic, Trimmers
Voltage, Alignment
Parts



MODEL 55U
Schematic, Voltage
Alignment, Trimmers
Parts

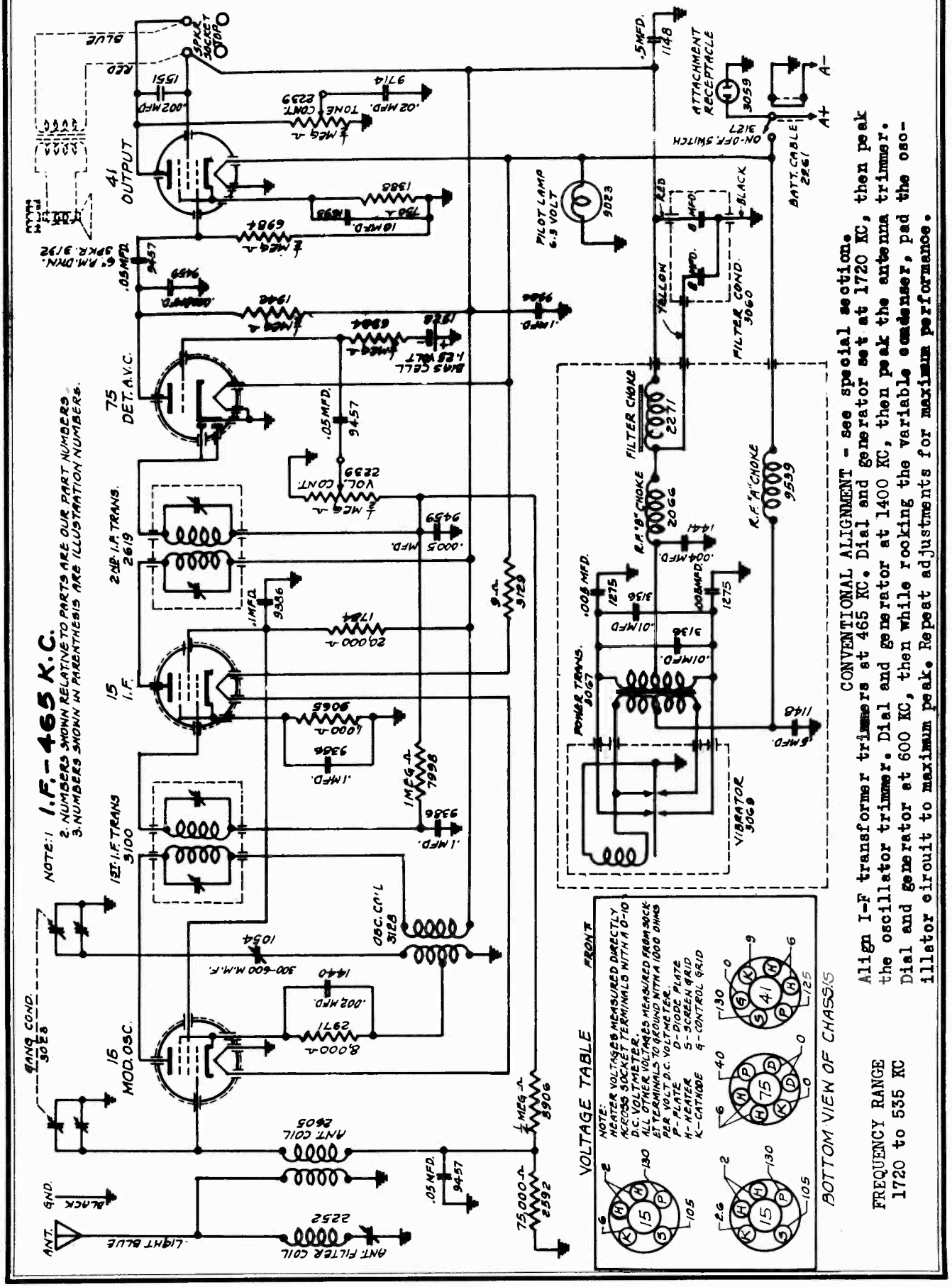
SENTINEL RADIO CORP.





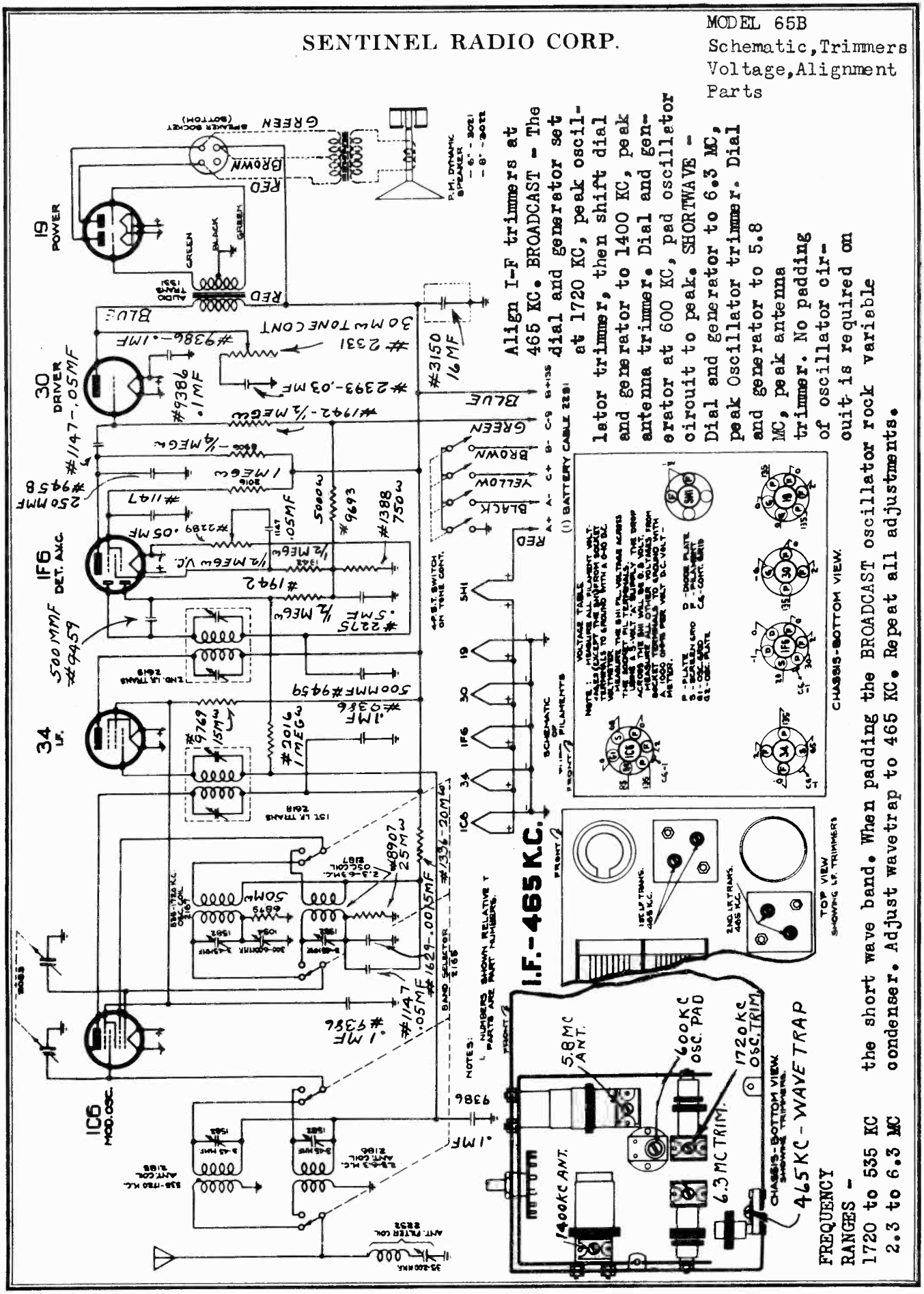
MODEL 63B
Schematic, Voltage
Alignment, Parts

SENTINEL RADIO CORP.



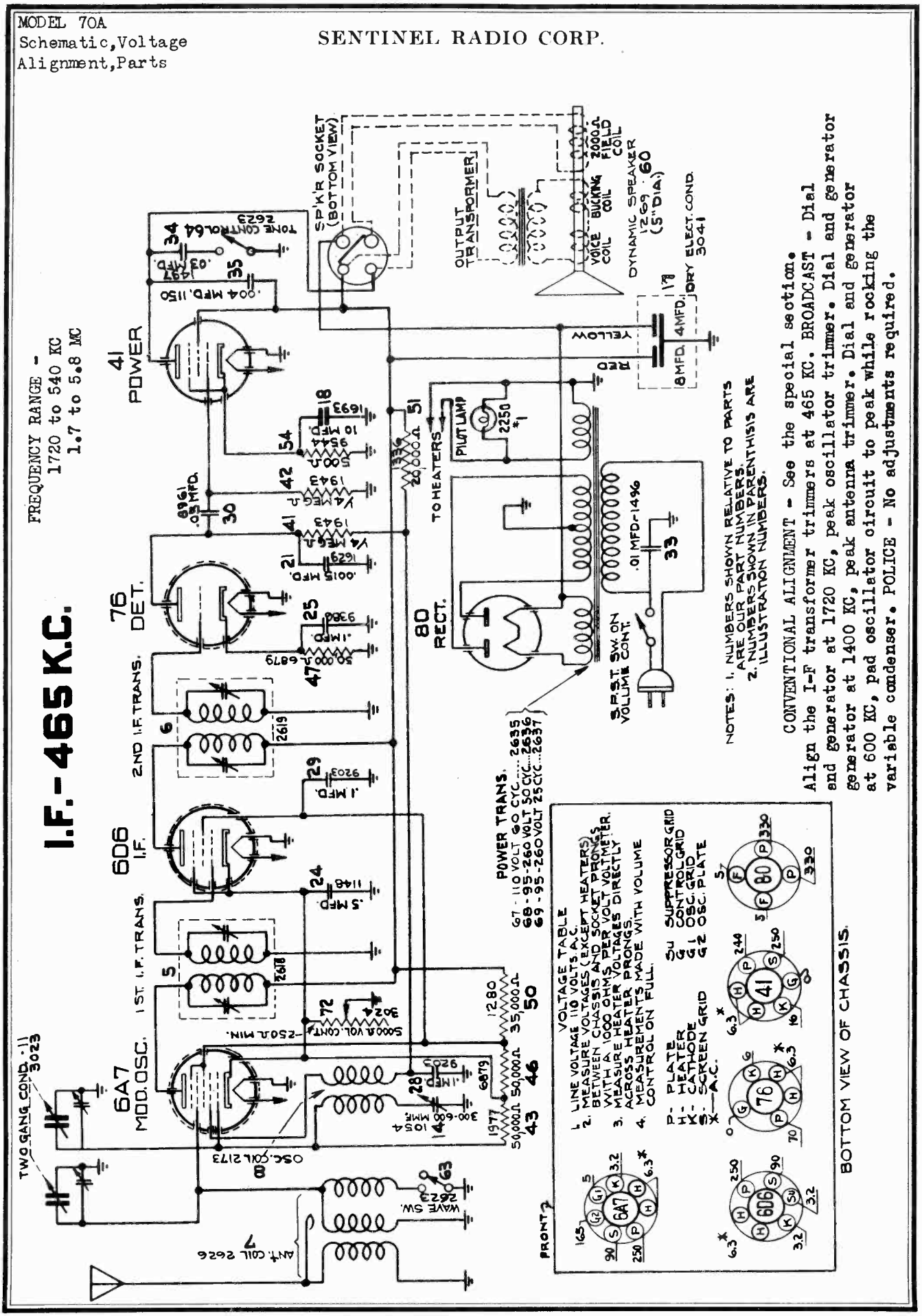
SENTINEL RADIO CORP.

MODEL 65B
Schematic, Trimmers
Voltage, Alignment
Parts



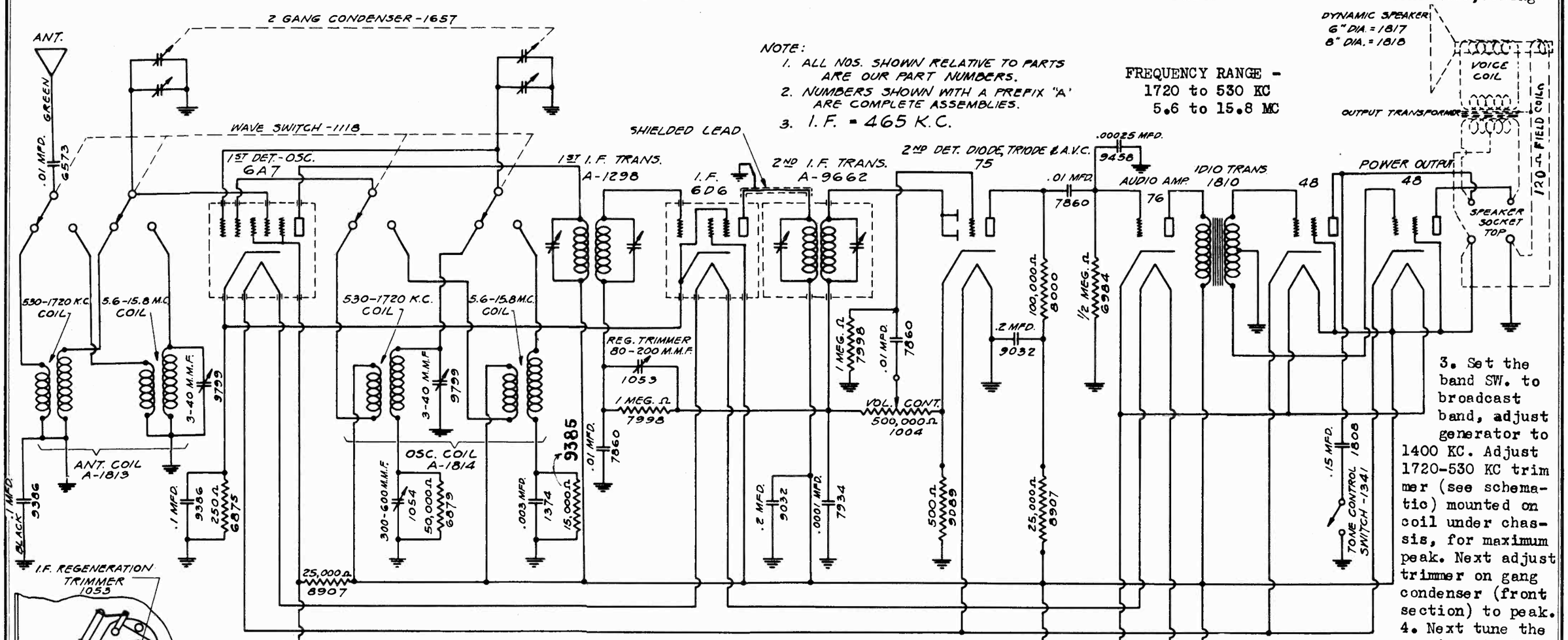
MODEL 70A
Schematic, Voltage
Alignment, Parts

SENTINEL RADIO CORP.



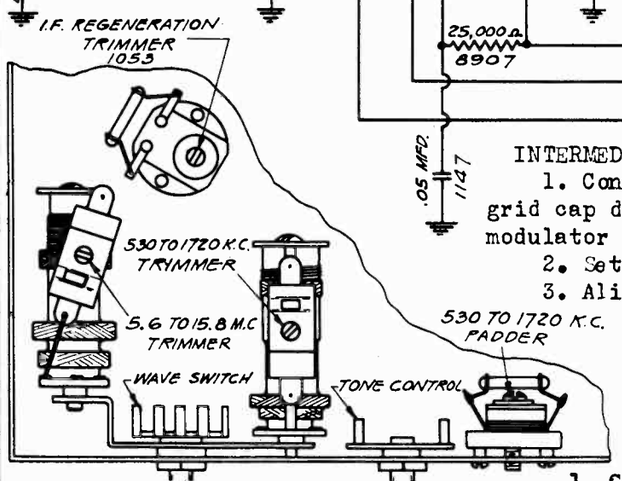
SENTINEL RADIO CORP.

Trimmers, Alignment Parts — MODEL 6900 Schematic, Voltage



NOTE:
1. ALL NOS. SHOWN RELATIVE TO PARTS ARE OUR PART NUMBERS.
2. NUMBERS SHOWN WITH A PREFIX "A" ARE COMPLETE ASSEMBLIES.
3. I. F. = 465 K.C.

FREQUENCY RANGE -
1720 to 530 KC
5.6 to 15.8 MC



LOCATION OF PADDERS & TRIMMERS IN LEFT HAND (FRONT) BOTTOM OF CHASSIS

INTERMEDIATE ALIGNMENT -

1. Connect generator output to control grid of the 6A7. Leave grid cap disconnected, then connect a 1 megohm resistor from the modulator grid to chassis ground.
2. Set generator frequency to 465 KC 9 must be accurate).
3. Align 1st I-F transformer by adjusting each transformer.
4. Adjust 2nd I-F transformer in the same manner.
5. Adjust the I-F regeneration trimmer located under chassis for maximum 465 KC signal. If adjustment of this trimmer causes receiver to oscillate, always adjust to point where oscillation just stops, then back 1/8 turn.

ALIGNMENT OF VARIABLE CONDENSER

1. Connect generator thru 250 MMF condenser to set antenna lead and the ground to chassis.
2. Place band selector SW. on 15.8 to 5.6 MC band, tune the receiver to exactly 14 MC. Then bring receiver to maximum output by adjusting trimmer condenser located on top of gang condenser (OSC section). When adjusting this trimmer, two peaks, the fundamental and image peak will be noticed. Care must be taken that the fundamental is used for the adjustment. Back trimmer to minimum capacity, next screw down until 1st peak (fundamental) is obtained. When fundamental peak is obtained adjust trimmer to maximum output at 14 MC.
3. Set the band SW. to broadcast band, adjust generator to 1400 KC. Adjust 1720-530 KC trimmer (see schematic) mounted on coil under chassis, for maximum peak. Next adjust trimmer on gang condenser (front section) to peak.
4. Next tune the receiver to the generator at 600 KC, adjust padder trimmer located on, and accessible thru small hole at front of chassis.
5. Recheck 1400 KC signal setting.
6. Place band SW. on 15.8 to 5.6 MC band, generator frequency to 14 MC. While rocking the variable gang condenser adjust the 5.6 to 15.8 trimmer, mounted oneone of the coils underneath the chassis.

CONVENTIONAL ALIGNMENT
(see special section)

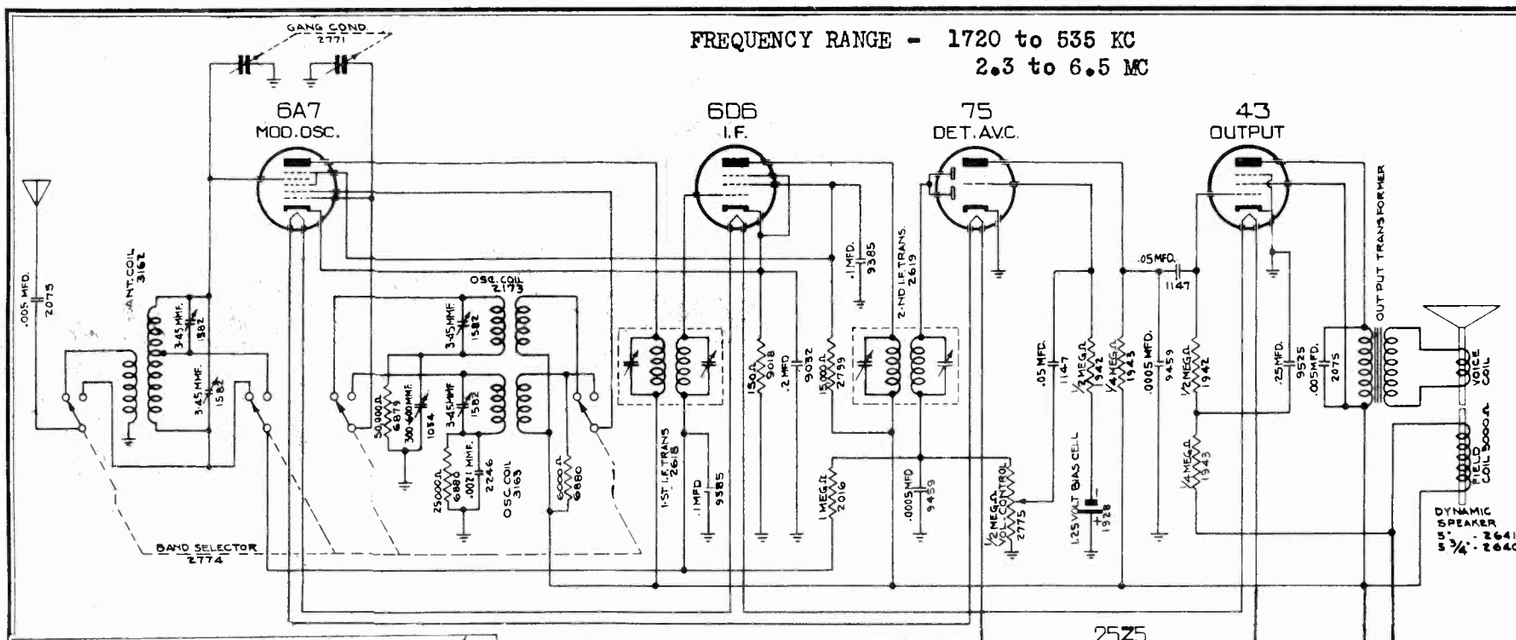
VOLTAGE TABLE

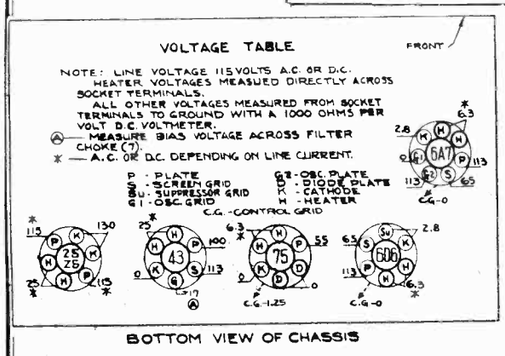
Battery Voltage - 32 Volts
Wave Band - Broadcast

TUBE		FILAMENT	PLATE	SCREEN	CATHODE	GRID NO.2	GRID NO. 3 & 5
6A7	1st Detector & Oscillator	6	32		.5	32	15
6D6	I. F. Amplifier	6	32	32	.6		
75	2nd Detector & A.V.C	6	5*				
76	1st Audio	6	30				
48	Output	6	30	32	5		
48	Output	6	30	32	5		

Triode plate comperative voltage only
Read all voltages from socket to chassis.

FREQUENCY RANGE - 1720 to 535 KC
2.3 to 6.5 MC

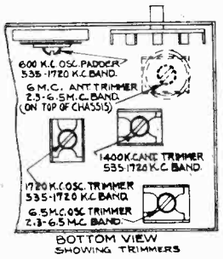




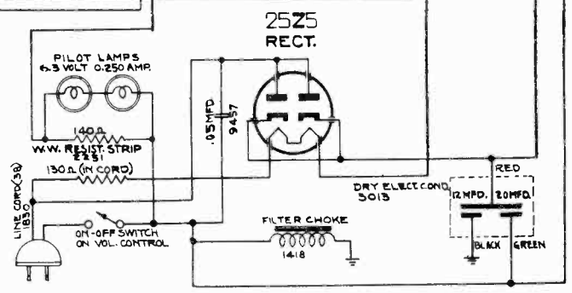
BOTTOM VIEW OF CHASSIS

I.F. - 465 K.C.

NUMBERS SHOWN RELATIVE TO PARTS ARE OUR PART NUMBERS.



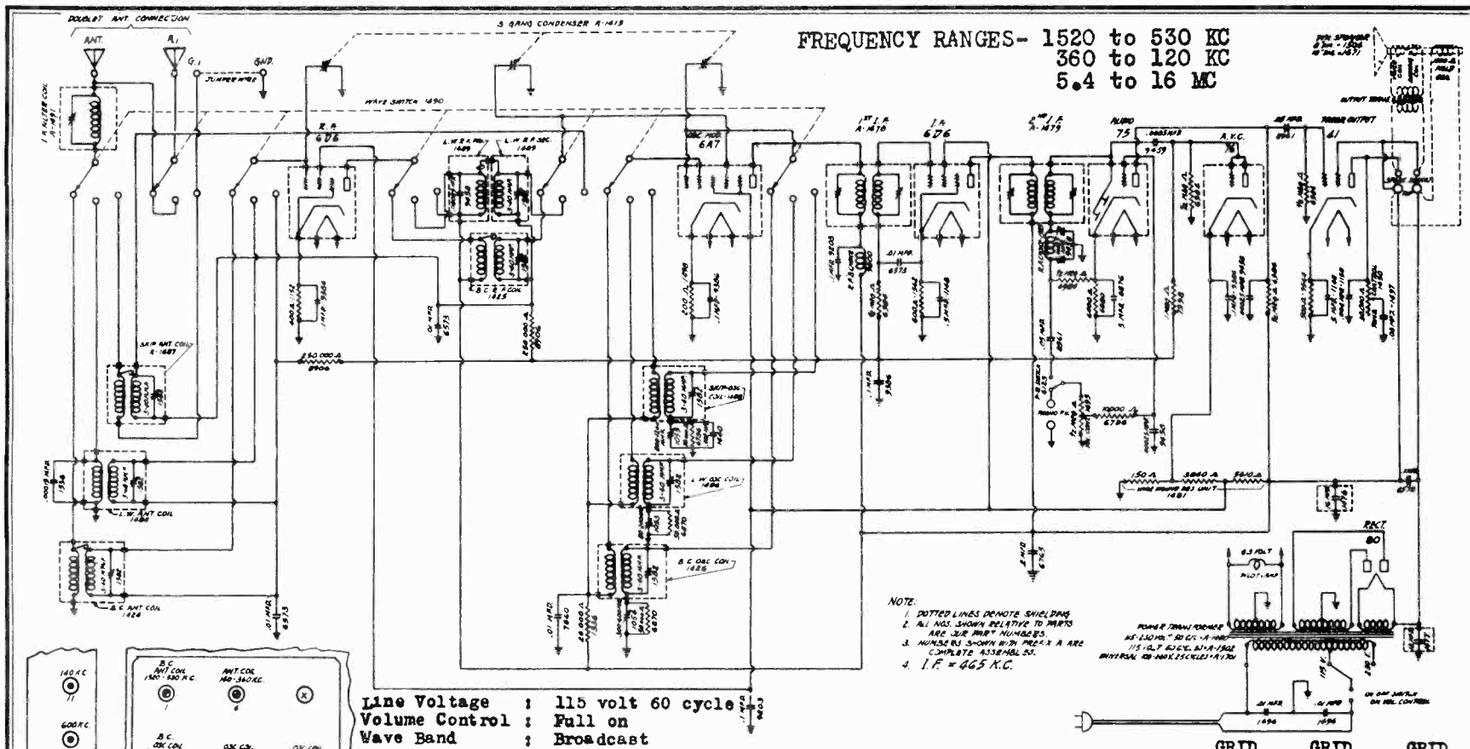
BOTTOM VIEW SHOWING TRIMMERS

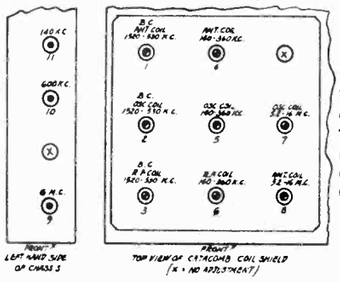


CONVENTIONAL ALIGNMENT - see special section.

Align I-F trimmers at 465 KC. BROADCAST - Dial and generator at 1720 KC, peak oscillator trimmer. Dial and generator at 1400 KC, peak the antenna trimmer. Dial and generator at 600 KC, pad the oscillator circuit while rocking the variable condenser. SHORTWAVE - Dial and generator at 6.5 MC, peak the oscillator trimmer to maximum, then dial and generator to 6 MC, peak the antenna trimmer. No padding adjustment required on this band.

FREQUENCY RANGES- 1520 to 530 KC
360 to 120 KC
5.4 to 16 MC





Line Voltage : 115 volt 60 cycle
Volume Control : Full on
Wave Band : Broadcast

TUBE		FIL.	PLATE	SCREEN	CATHODE	GRID No.1	GRID No.2	GRID No. 3 & 5
6A7	Oscillator & 1st Detector	6.2	250	94	2.5	4.5	175	94
6D6	R. F.	6.2	250	94	3.4			
6D6	I. F.	6.2	250	94	3.2			
75	2nd Det. & 1st Audio	6.2	70#		1.2			
76	A. V. C.	6.2			3.4			
41	Output	6.2	250	94	15			
80	Rectifier	4.9			80 M. A. Total Drain			

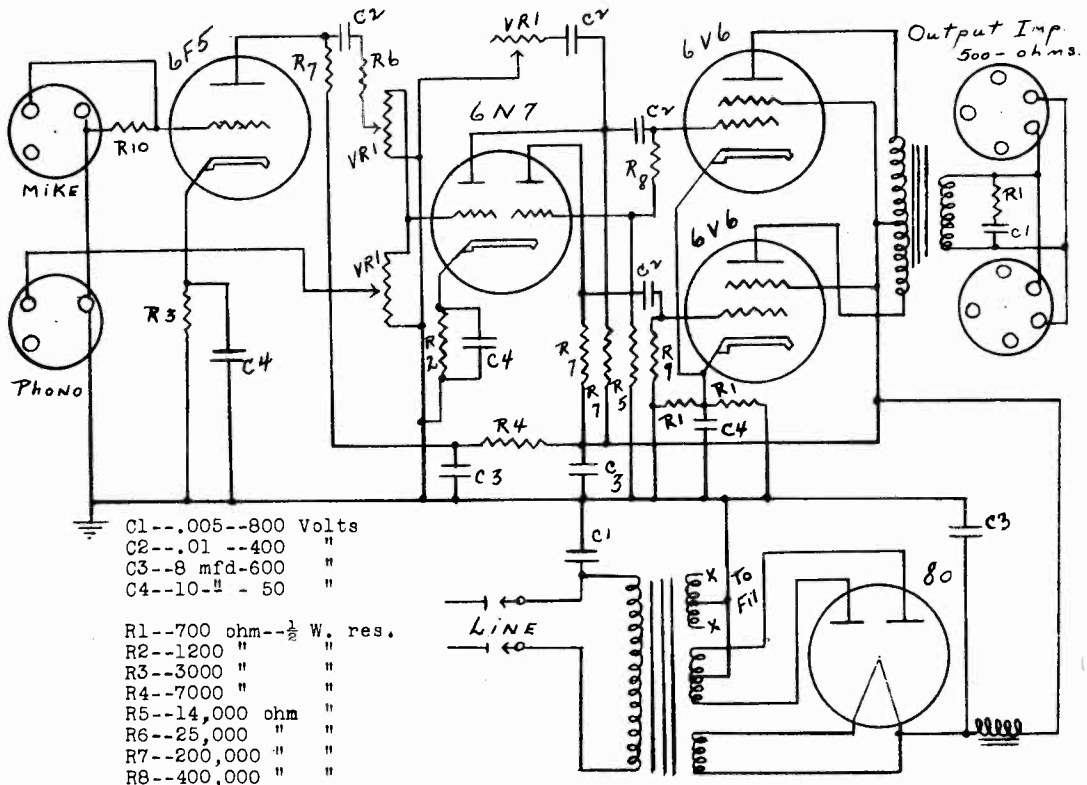
CONVENTIONAL ALIGNMENT (see special section)

- Triode Plate
Read all voltages from socket to chassis with 1000 ohm per volt meter.

Align I-F transformer trimmers at 465 KC. BROADCAST - Dial and generator at 1400 KC, peak trimmers No. 2, then Nos. 1 and 3. Dial and generator at 600 KC, adjust trimmer No. 10 to maximum peak. LONG-WAVE- Dial and generator at 350 KC, adjust trimmers No.5, then 4 and 6, to peak. Dial and generator at 150 KC, peak trimmer No. 11. SHORTWAVE - Dial and generator at 15 MC, peak trimmer No. 6, then trimmers Nos. 7 and 8. (Note- on first node from minimum). Dial and generator at 6 MC, peak trimmer No. 9. Adjust wave trap for minimum signal on 465 KC. Rock variable condenser during padding.

SETCHELL CARLSON, INC.

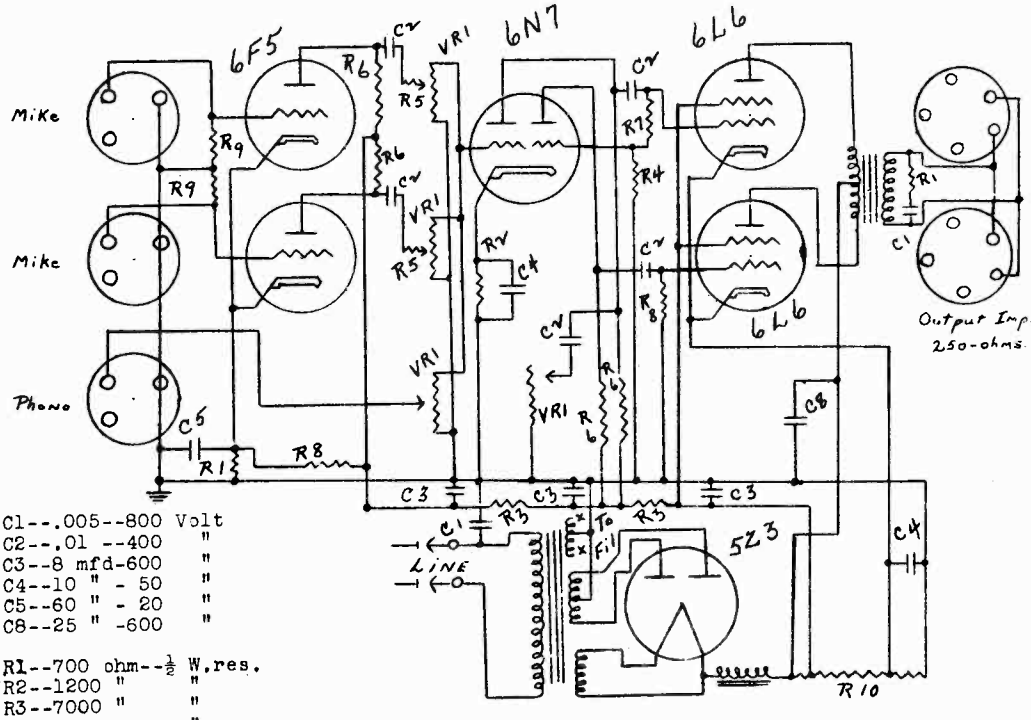
MODEL PA 13 Amplifier
MODEL PA 25 Amplifier
Schematics



C1--.005--800 Volts
C2--.01 --400 "
C3--8 mfd-600 "
C4--10-" - 50 "

R1--700 ohm--½ W. res.
R2--1200 " "
R3--3000 " "
R4--7000 " "
R5--14,000 ohm "
R6--25,000 " "
R7--200,000 " "
R8--400,000 " "
R9--500,000 " "
R10--1 meg. " "
VR1--1½ meg." Potentiometer

MODEL P.A. 13



C1--.005--800 Volt
C2--.01 --400 "
C3--8 mfd-600 "
C4--10 " - 50 "
C5--60 " - 20 "
C8--25 " -600 "

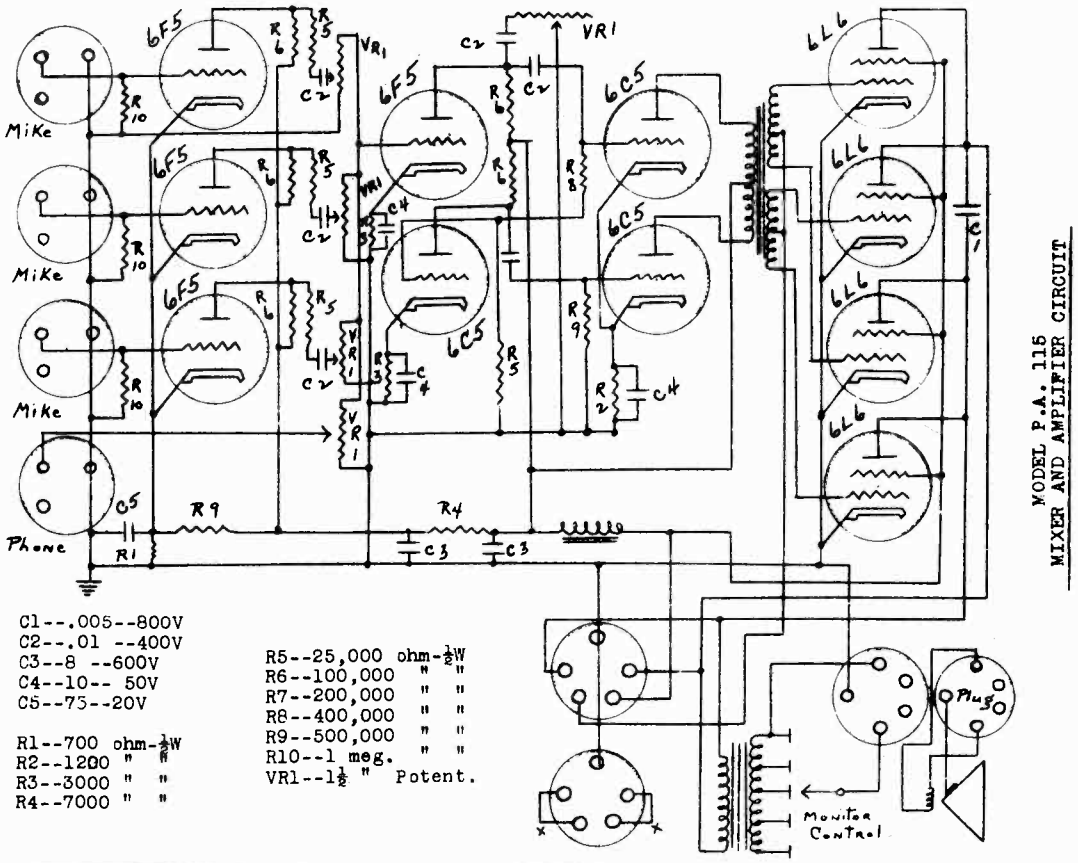
R1--700 ohm--½ W.res.
R2--1200 " "
R3--7000 " "
R4--14,000 ohm "
R5--25,000 " "
R6--200,000 " "
R7--400,000 " "
R8--500,000 " "
R9--1 meg. " "

R10--6635 Ohm tapped 100 W.
VR1--1½ meg." Potentiometer

MODEL P.A. 25

MODEL PA 115 Amplifier
Schematic

SETCHELL CARLSON, INC.

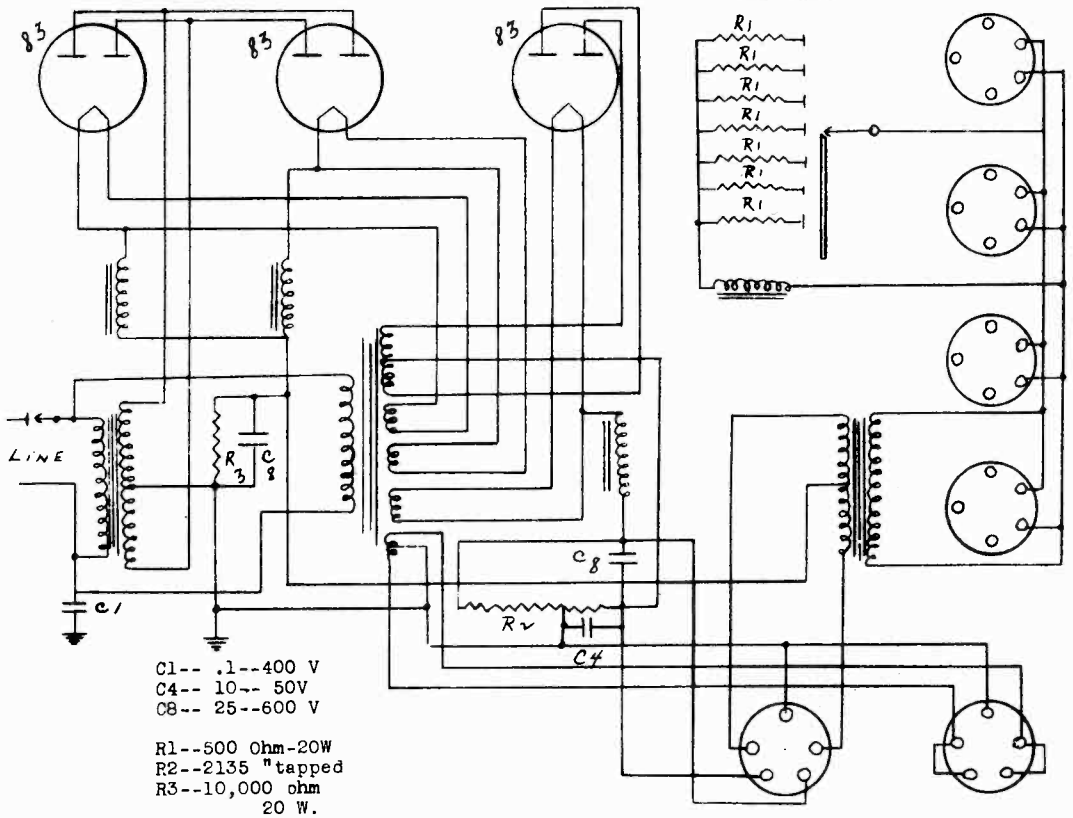


MODEL P.A. 115
MIXER AND AMPLIFIER CIRCUIT

C1--.005--800V
C2--.01 --400V
C3--8 --600V
C4--10-- 50V
C5--75--20V

R1--700 ohm-½W
R2--1200 " "
R3--3000 " "
R4--7000 " "

R5--25,000 ohm-½W
R6--100,000 " "
R7--200,000 " "
R8--400,000 " "
R9--500,000 " "
R10--1 meg. " "
VR1--1½ " Potent.



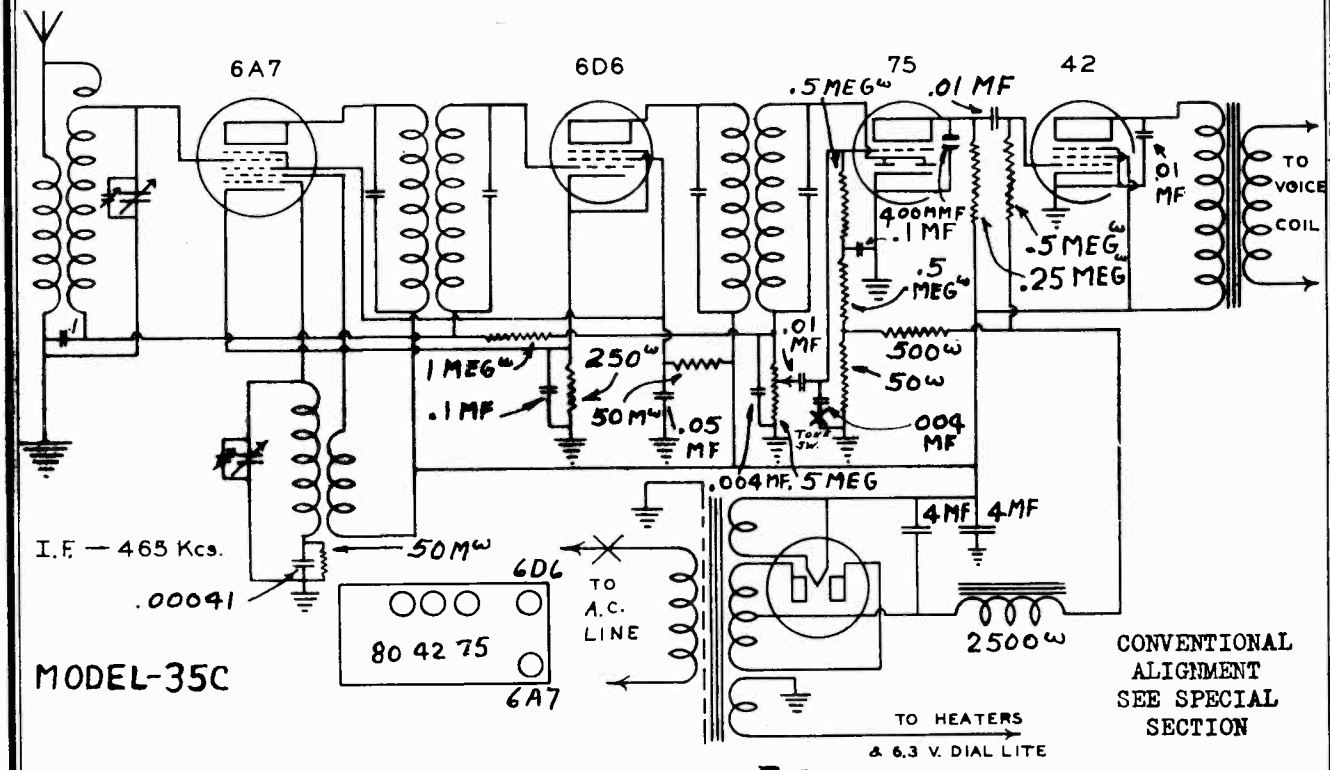
MODEL P.A. 115
POWER AND OUTPUT CIRCUIT

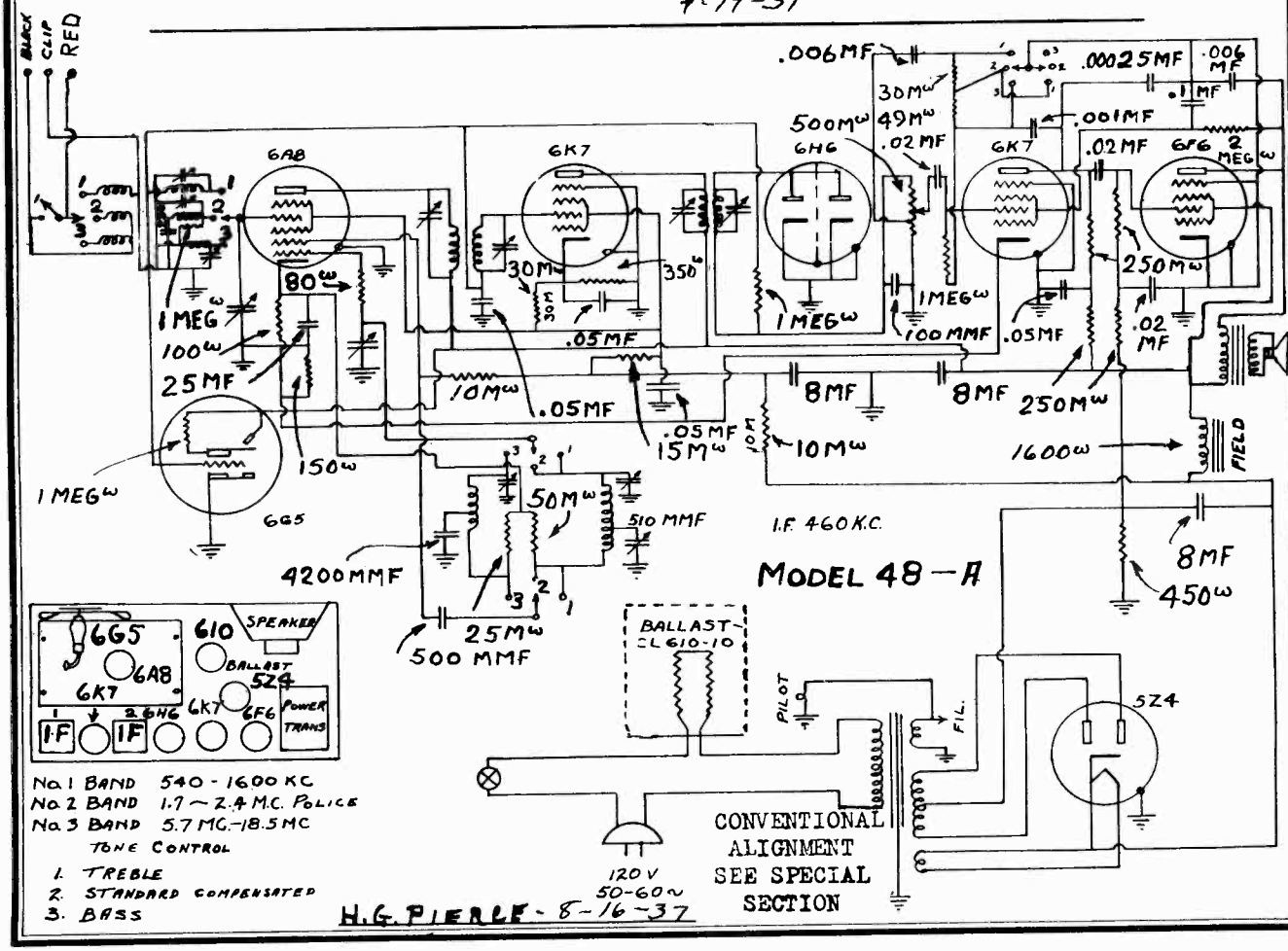
C1-- .1--400 V
C4-- 10-- 50V
C8-- 25--600 V

R1--500 Ohm-20W
R2--2135 "tapped
R3--10,000 ohm
20 W.

SHELLEY RADIO CO.

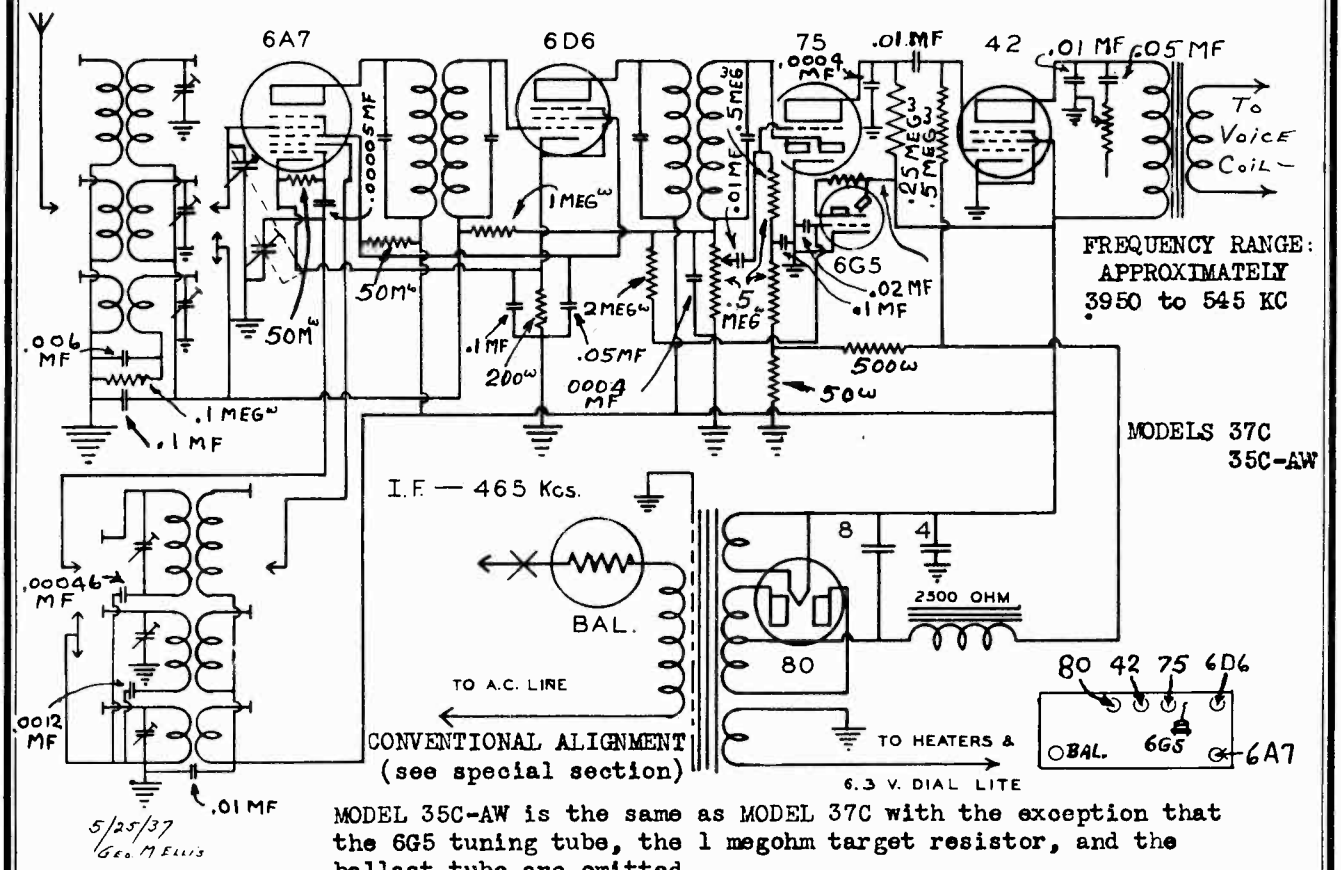
MODEL 35-C
MODEL 48-A
Schematics
Socket



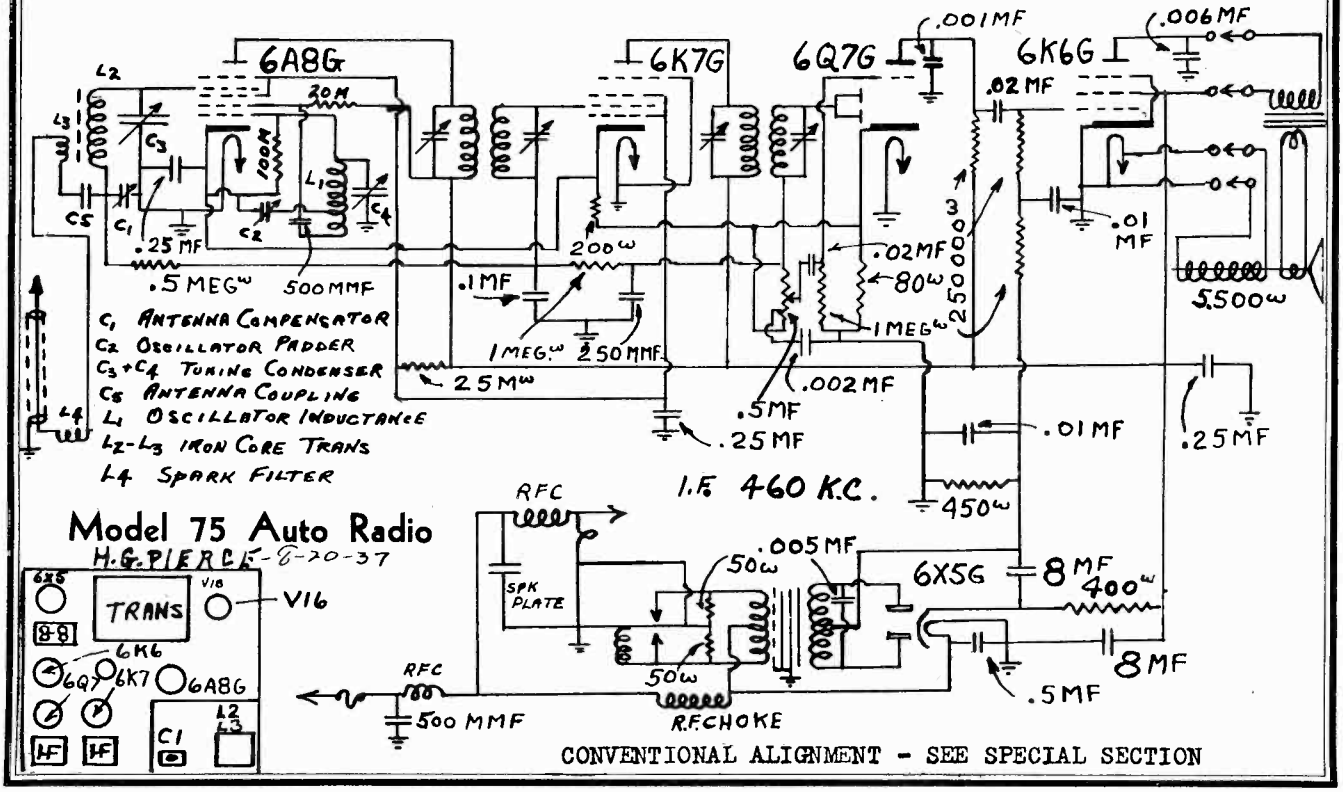


MODELS 35C-AW, 37-C
MODEL 75 Auto
Schematics, Socket
Alignment

SHELLEY RADIO CO.



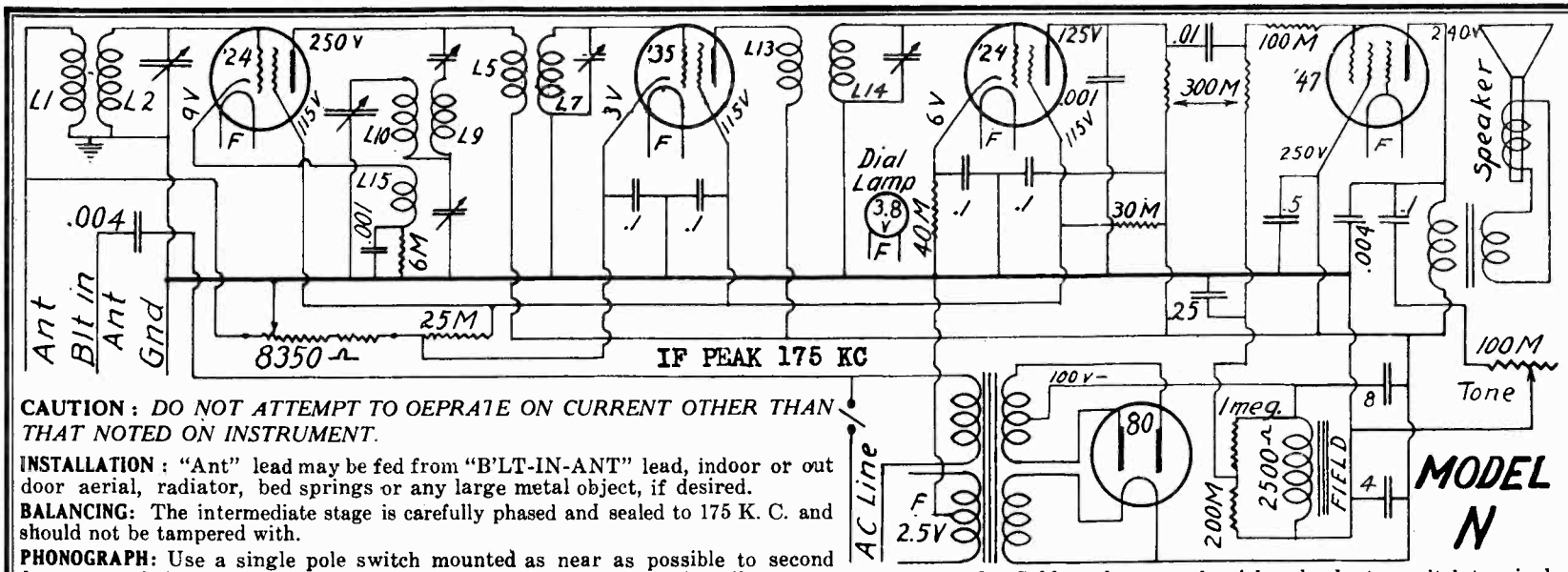
MODEL 35C-AW is the same as MODEL 37C with the exception that the 6G5 tuning tube, the 1 megohm target resistor, and the ballast tube are omitted.



CONVENTIONAL ALIGNMENT - SEE SPECIAL SECTION

SIMPLEX RADIO CO.

MODEL N (A.C.)
MODEL P Ser. # 161001 & up (AC)
MODEL P Ser. # 165200 & up (AC)
Schematics, Alignment, Voltage



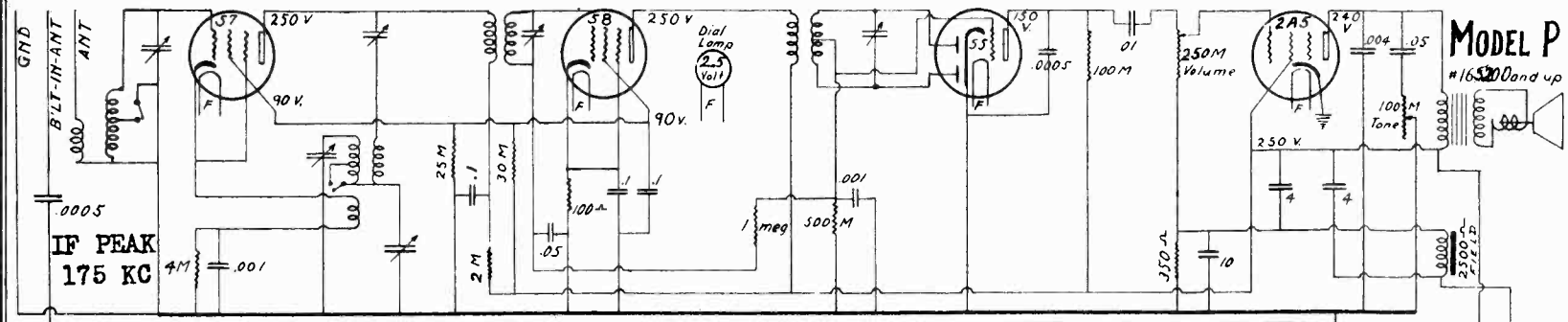
CAUTION: *DO NOT ATTEMPT TO OEPRATE ON CURRENT OTHER THAN THAT NOTED ON INSTRUMENT.*

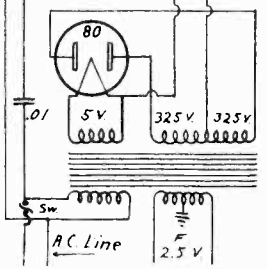
INSTALLATION: "Ant" lead may be fed from "B'LT-IN-ANT" lead, indoor or out door aerial, radiator, bed springs or any large metal object, if desired.

BALANCING: The intermediate stage is carefully phased and sealed to 175 K. C. and should not be tampered with.

PHONOGRAPH: Use a single pole switch mounted as near as possible to second detector socket, connect in series with lead from ground end of grid coil of second detector tube. Solder phonograph pickup leads to switch terminals

CONVENTIONAL ALIGNMENT - See the special section.





CAUTION: *Do not attempt to operate on current other than that noted on instrument.*

INSTALLATION: "Ant" lead may be fed from "B'LT-IN-ANT" lead, indoor or out door aerial, radiator, bed springs or any large metal object, if desired.

BALANCING: The intermediate stage is carefully phased and sealed to 175 K. C. and should not be tampered with.

THE TONE CONTROL: is on short wave when turned to extreme left. A slight turn to right is regular broadcast. Further movement is tone control.

PHONOGRAPH: Use a single pole switch mounted as near as possible to socket marked "55"; connect one side to green resistor with yellow dot at end attached to yellow wire; connect other side. in series with phonograph pickup leads, to chassis.

Receivers of SERIAL # 161001 to 165200 use 500000 ohm volume control, those of SERIAL # 165200 & up use 250000 ohm volume control.

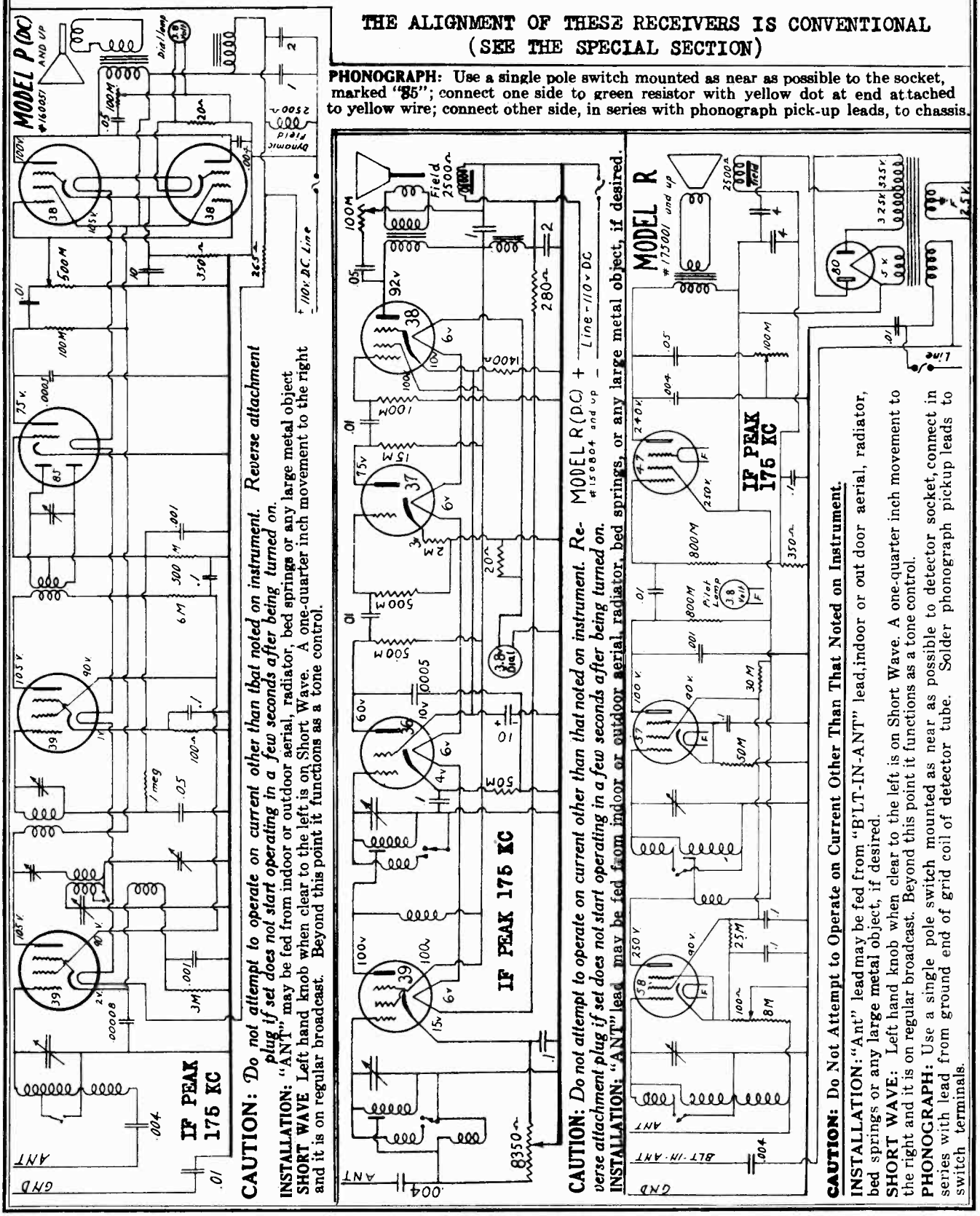
CONVENTIONAL ALIGNMENT - See the special section.

MODEL P(DC) Ser.#160051 & up
MODEL R(DC) Ser.#150804 & up
MODEL R(AC) Ser.#175001 & up
Schematics, Voltage, Alignment

SIMPLEX RADIO CO.

THE ALIGNMENT OF THESE RECEIVERS IS CONVENTIONAL (SEE THE SPECIAL SECTION)

PHONOGRAPH: Use a single pole switch mounted as near as possible to the socket, marked "85"; connect one side to green resistor with yellow dot at end attached to yellow wire; connect other side, in series with phonograph pick-up leads, to chassis.



MODEL 6C1 Auto
Schematic, Socket
Trimmers, Spkr. Data

SOBOL BROS.

Series 6C1 6 TUBE AUTOMOBILE RADIO

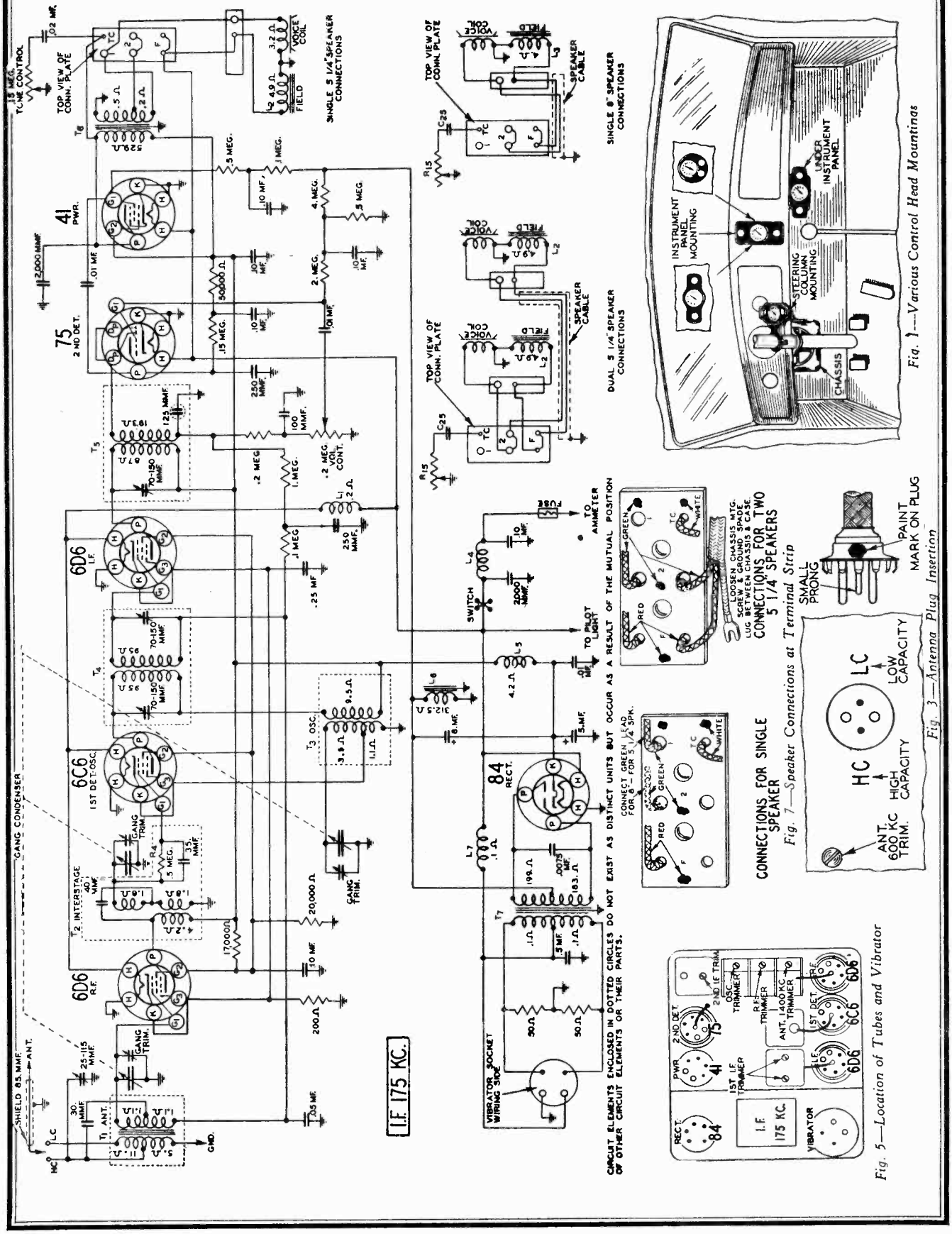


Fig. 1—Various Control Head Mountings

Fig. 3—Antenna Plug Insertion

Fig. 7—Speaker Connections at Terminal Strip

Fig. 5—Location of Tubes and Vibrator

Set the signal generator for 175 KC and connect the output of the signal generator through a .05 mf. condenser to the stator of the R.F. interstage section of the tuning condenser. Set the volume control at maximum. The chassis should be in the case. Connect the ground lead of the signal generator to the chassis. Attenuate the signal from the signal generator to prevent the levelling off action of the AVC. Then adjust the three IF trimmers until maximum output is obtained—See Fig. 5.

Set the signal generator for 1581 KC. Turn the rotor of the tuning condenser to the full open position. Insert the antenna plug with the mark on the high capacity (HC) side. Connect the shielded antenna lead from the chassis through a 120 mmf. condenser to the antenna post of the signal generator. Adjust the trimmer of the oscillator section of the three gang condenser until maximum output is obtained.

Set the signal generator for 1400 KC. Turn the rotor of the tuning condenser carefully until maximum output is obtained. Adjust the R.F. interstage and antenna 1400 KC trimmers for maximum output. Do not change the setting of the oscillator trimmer.

Then set the signal generator for 600 KC. Tune in this signal and adjust the 600 KC antenna trimmer to maximum (See Fig. 3 for location of this trimmer).

After the alignment procedure is completed, the antenna plug may be withdrawn and reinserted on the LC side if a low capacity (70 mmf.) car antenna is used.

Adjusting Antenna 600 KC Trimmer

Tune in a weak signal at approximately 600 KC with the volume control about three-fourths on. Turn the adjusting screw of the antenna 600 KC trimmer up or down until maximum output is obtained. See Fig. 3 for location of this trimmer.

If the total capacity of the antenna and shielded lead is approximately 200 mmf., which would be the case in a running board or ordinary roof antenna (not metal roof), insert the antenna plug with the mark on the HC side—See Fig. 3.

If the total capacity of the antenna and shielded lead is approximately 70 mmf., such as may be the case if a "fish pole" antenna is used, insert the antenna plug with the mark on the LC side.

Distributor Suppressor—Remove the high tension lead to the distributor. Insert a distributor suppressor and connect the wire to the other end of the suppressor (See Fig. 6). If this is not practical, cut the high tension lead *close to the distributor* and use a wood screw end type distributor suppressor in this line.

Generator Condenser—The generator condenser is installed at the cut-out as shown in Fig. 6. The lead from the condenser goes to the terminal on the cut-out.

In some of the new cars the cut-out relay is on the front of the dash or in some other location. It will be most convenient to mount this generator condenser at the relay.

Withdraw Antenna Cable Plug

Turn on the radio and start the engine.

If motor noise is heard, proceed as follows:

Shielding High Tension Lead—In some cars, when the coil is mounted on the dash, the high tension lead from the coil must be covered with braided shielding to within about four inches of the distributor and the shield grounded to the motor block or frame.

Bypass Condenser—Try a .25 or .5 mfd. condenser from the ammeter to ground. Try a condenser from the car fuse to ground, switch to ground, windshield wiper connections and various other 6 volt connections to ground, noting what effect these condensers have on the noise pick-up.

Try a .25 or .5 mfd. condenser from the "Hot" side of the coil primary to ground. In some cases this condenser may not help. It can be tried out, however, experimentally.

Spark Plug Suppressors—If motor noise persists, spark plug suppressors must be installed. One suppressor is put on each plug as shown in Fig. 6. These are not regularly supplied with the radio and must be purchased extra. Seventy percent of all cars will not require spark plug suppressors.

Care should be taken that a good mechanical and electrical connection is made between the spark plugs, suppressors and plug wires.

Instrument Panel Mounting Kits

Car	Year & Model	Kit No.
Buick	1937 40-60 Series	21A68
	1937 80-90 Series	21A69
	1936	21A16
Cadillac	1937	21A70
	1936	21A39
Chevrolet	1937 All Models	21A58
	1936-35 Standard & Master	21A11
Chrysler	1937 Royal	21A59
	1937 Imperial	21A71
	1937 Airflow	21A72
	1936 Six	21A19
	1936 Eight	21A30
	1936 Airflow	21A31
	1935-34 Except Imperial	21A47
DeSoto	1937	21A60
	1936 Airflow & Airstream Custom	21A22
	1936 Airstream DeLuxe	21A26
	1935 DeLuxe	21A46
	1934	21A47
Dodge	1937	21A61
	1936 DeLuxe	21A13
	1935	21A45
	1934	21A49

Car	Year & Model	Kit No.
Ford	1937 DeLuxe	21A74
	1937 Standard	21A73
	1936 Std. & DeLuxe	21A10
	1935 DeLuxe	21A32
	1935 Standard	21A38
	1934	
Hudson	1937	21A75
	1936	21A17
	1935	21A48
	1934	21A35
LaFayette	1936-35	21A50
LaSalle	1937	21A70
	1936	21A40
Lincoln	Zephyr 1937	21A76
	Zephyr 1936	21A10
Nash	1937 Ambassador	21A63
	1936-35	21A36
Nash Lafayette 400	1937	21A62
	1936	21A14
Oldsmobile	1935	21A34
	Six	21A56
Packard	1937 120-C	21A57
	Super 8 & 12	21A77
	1936 120-8	21A21
	1935 120	21A41

Car	Year & Model	Kit No.
Plymouth	1937 DeLuxe	21A78
	1937 Standard	21A64
	1936 DeLuxe	21A12
	1936-35 Standard	21A37
	1935 DeLuxe	21A33
	1934	21A49
Pontiac	1937	21A79
	1936-35 Standard-DeLuxe 6 & 8	21A15
Studebaker	1937 Dictator Coupe	21A65
	1937 Dictator	21A54
	1937 President	21A55
	1936 Dictator	21A20
	1936 President	21A24
Terraplane	1937	21A80
	1936	21A18
	1935	21A48
	1934	21A35
Steering column and under panel kit.	Chromium	21A66
	Black	21A67

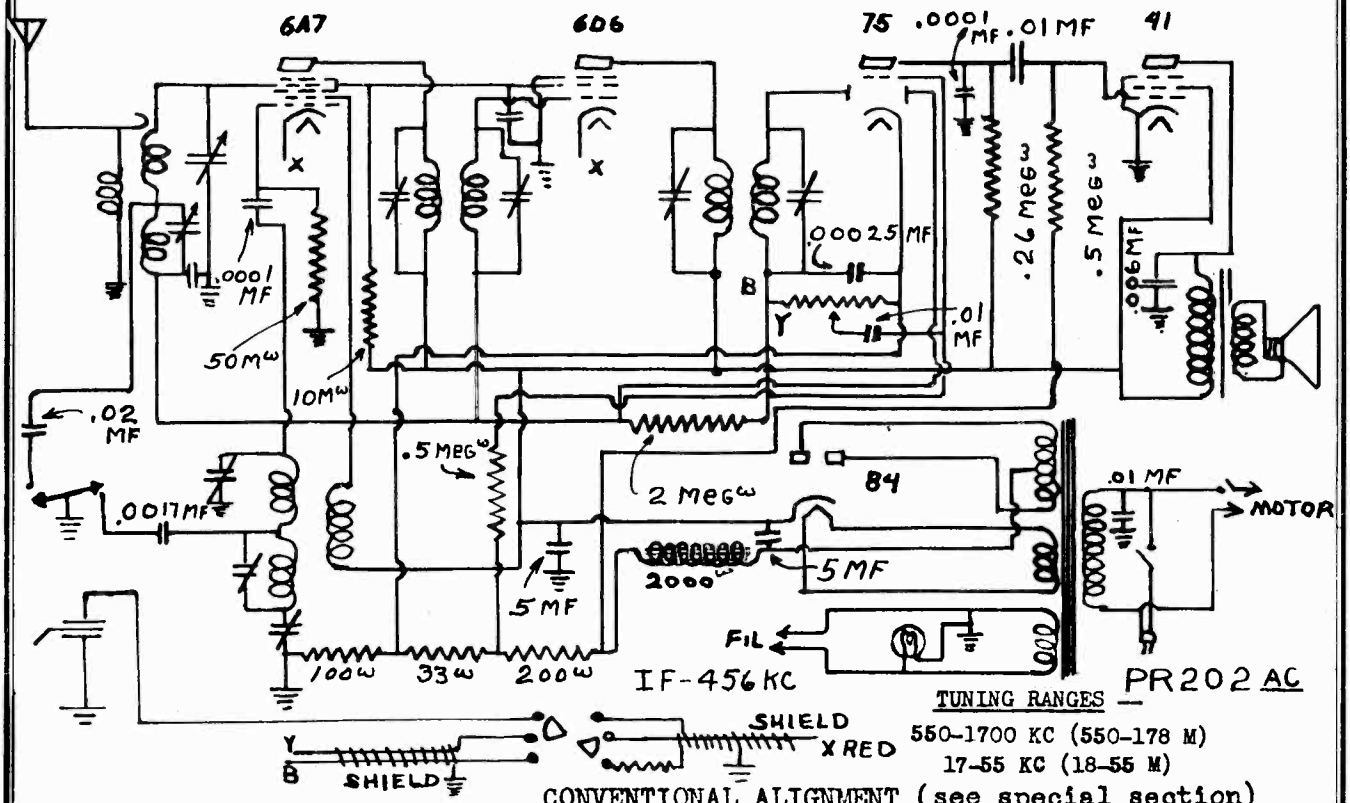
The mounting kit includes escutcheon plate, knobs, special mounting brackets and small items such as screws. The other items are shipped with the radio.

SONORA

MODELS PR-101, PR-202
MODELS PR-101 AC-DC
PR-300 AC-DC
PR-400 AC-DC

MODELS PR-101 and PR-202

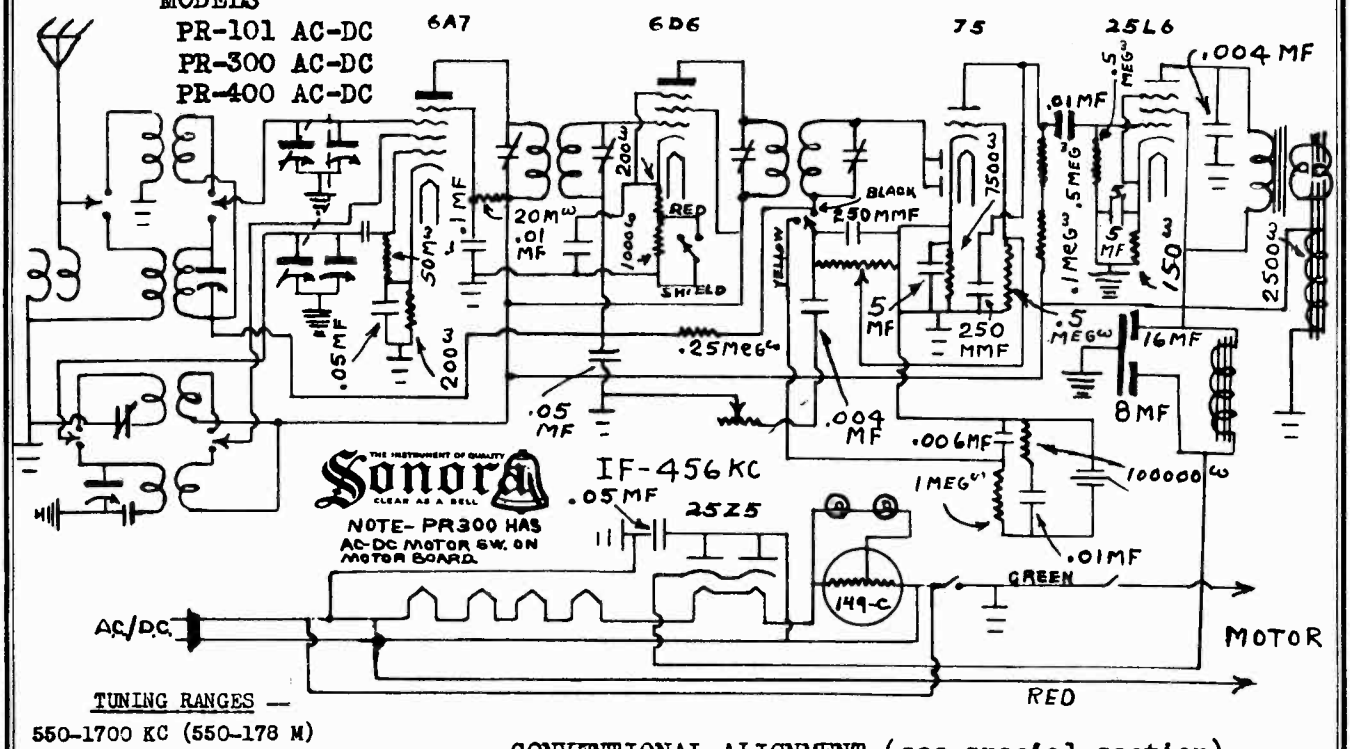
Schematics



TUNING RANGES —
550–1700 KC (550–178 M)
17–55 KC (18–55 M)

CONVENTIONAL ALIGNMENT (see special section)

MODELS PR-101 AC-DC, PR-300 AC-DC, PR-400 AC-DC



TUNING RANGES —
550–1700 KC (550–178 M)
17–55 KC (18–55 M)

CONVENTIONAL ALIGNMENT (see special section)

MODEL Playette, Data
MODEL P-101 Amplifier
MODEL P-300 Amplifier
Schematics

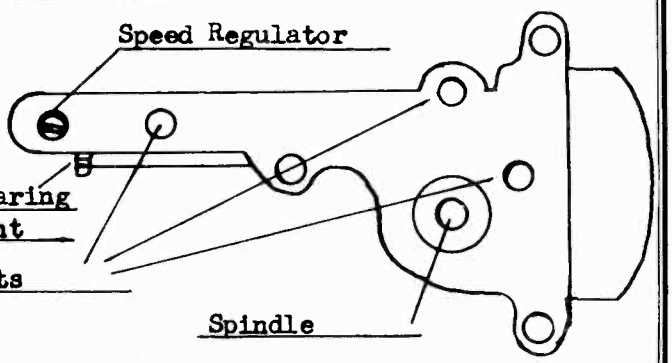
SONORA

INSTRUCTIONS FOR SONORA PLAYETTE

Note - If a corrective load for records recorded at constant velocity above 250 CPS and constant amplitude below 250 cycles is desired, connect .1 meg ohm resistor and a .01 MFD condenser in series across pickup leads. The volume control on the PLAYETTE must be in the full-on position. The volume control of the radio set or amplifier should be used in this case.

Oil moter regularly, once a month. To oil motor lift turn table so that oil cups are exposed.

Use SAE10 automobile oil. Do not use the oils of the 3-in-1 variety or type, or else life of the bearing will be impaired.



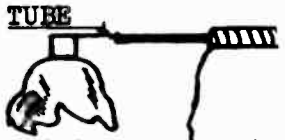
PLAYETTE AC 60-CYCLE MOTOR

PICKUP CONNECTIONS

1. Locate 1st AF tube
2. Locate grid connections in tube manuals or by reference to set manufacturers data.

CONNECT -

RED LEAD TO CAP OF TUBE

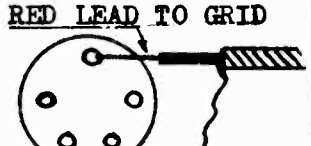


Shield wire to the chassis

CONNECT -

RED LEAD TO GRID

GLASS



Shield wire to chassis.

CONNECT *

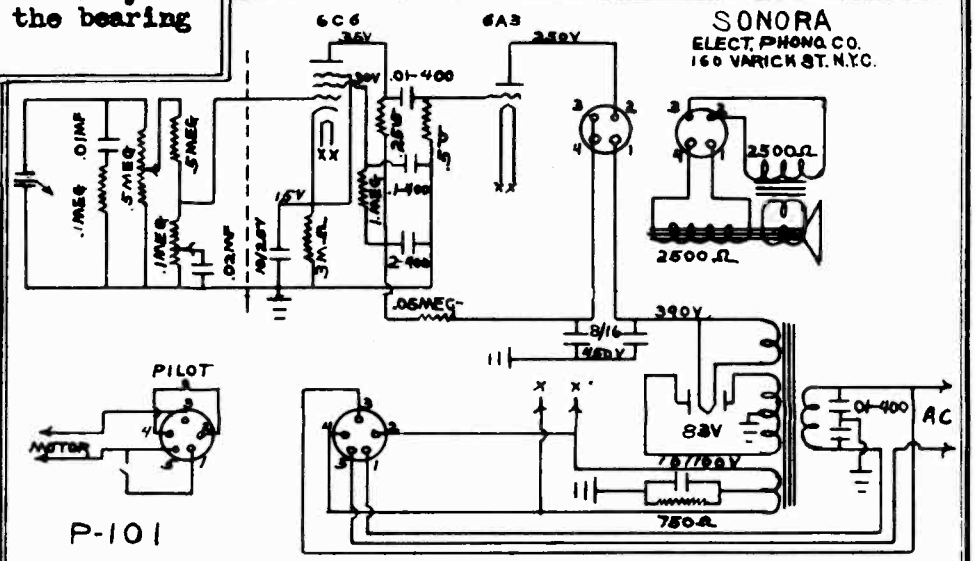
CONNECT-

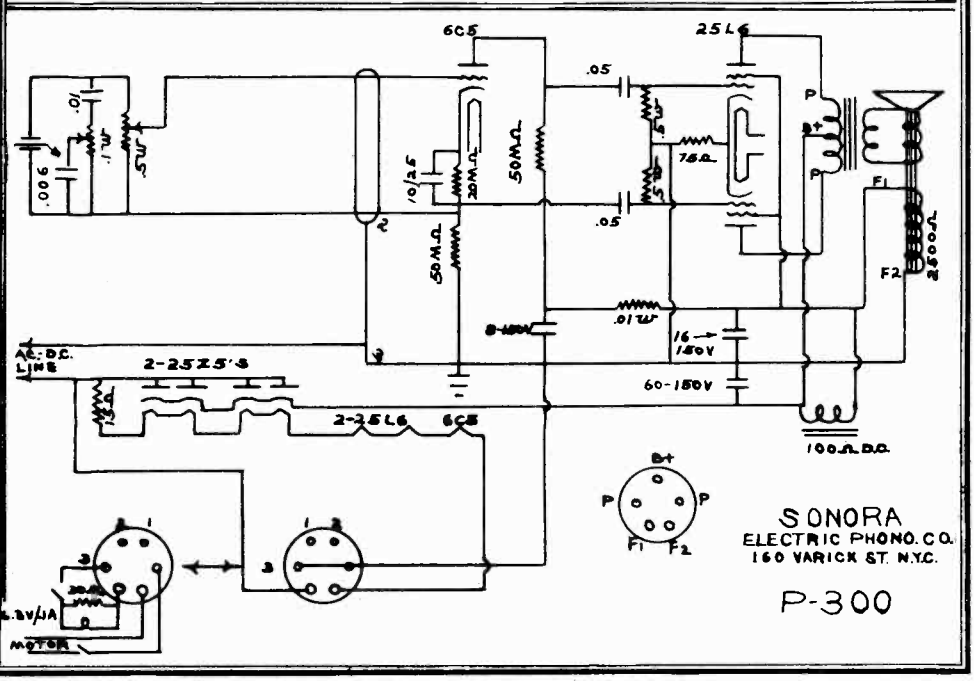
RED LEAD TO GRID

METAL TUBES

Shield wire to chassis

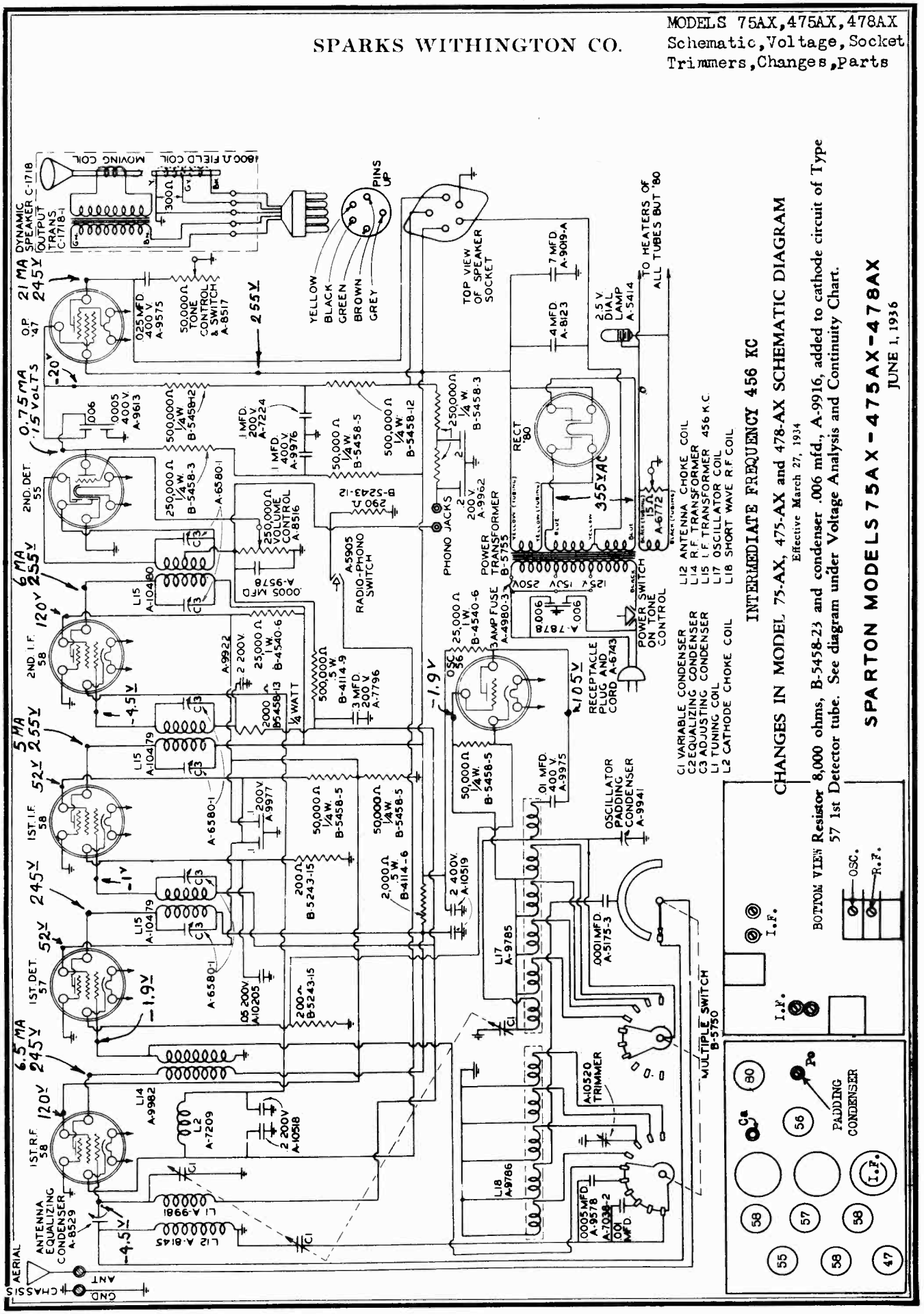
Be sure to connect radio antenna to ground so that radio signals will not mar phonograph reproductions





SPARKS WITHINGTON CO.

MODELS 75AX, 475AX, 478AX
Schematic, Voltage, Socket
Trimmers, Changes, Parts



A. ADJUSTMENT OF INTERMEDIATE FREQUENCY CONDENSERS.

1. Connect test oscillator leads to grid cap of 1st detector type 57 tube and ground. Adjust oscillator to 456 kc.
2. Allow to operate 15 minutes before making any adjustments.
3. Turn Band Selector Switch to Broadcast Band, and rotate volume control, tone control and inter-station noise suppressor clockwise as far as they will go.
4. Turn on test oscillator and adjust attenuator for one-half to three-quarter scale deflection of the output meter.
5. Adjust each pair of intermediate-frequency condensers (three pairs) until maximum deflection of the output meter is obtained with a minimum of signal energy from the test oscillator.

   NOTE: If the minimum signal of the oscillator is so great that accurate adjustment of the condensers becomes difficult, it is necessary to decrease the sensitivity of the receiver by turning the inter-station noise suppressor counter-clockwise. Do not turn the volume control knob.

   In order to adjust the 1st stage intermediate-frequency condensers on Models 75-A, 475-A, 478-A, 75-AX, 475-AX, 478-AX, it is necessary to remove the copper shield over the I-F transformer (located nearest the Antenna Post) and replace it with a specially prepared shield (SPARTON Part A-7506), which has two holes drilled in the top. A bakelite or insulated screw driver may then be inserted through the holes to reach the condensers. Never attempt to adjust these condensers without this shield in place.

B. ADJUSTMENT OF THE OSCILLATOR TRIMMER AND PADDING CONDENSER.

1. Turn the Station Selector until the variable condenser rotor plates are fully meshed (up against the stop). The dial should now read exactly 540 kc. If it does not, loosen set screws on the rotor shaft and, keeping the rotor plates tight against the stop, turn the dial until the hair-line is exactly on the 540 kc. calibration mark.
2. With the test oscillator leads connected to the Antenna and Ground Posts of the receiver, adjust the oscillator frequency to 172.5 kc. Then turn the Station Selector so that the hair-line is exactly on 1380 kc.
3. Turn the oscillator trimmer condenser, CO, to the right or left until the output meter deflection is greatest.

   CAUTION: Do not move the Station Selector after it has been set at 1380 kc.

4. Turn the Station Selector so that the hair-line is exactly on 690 kc. This dial setting should bring in the fourth harmonic of the test oscillator. However, if the padding condenser is very much out of adjustment no signal will be heard.

   CAUTION: Do not disturb the dial setting of 690 kc.

5. Adjust the padding condenser, PO, by turning to the right or left until the test oscillator harmonic is heard, and readjust for maximum deflection on the output meter.

6. It may be necessary to repeat the entire alignment procedure in order to be sure the adjustments are correct.

   NOTE: Exercise great care in making all adjustments. The foregoing adjustments are made on Broadcast Band frequencies and the performance of the Models 75-A, 475-A, 478-A, 75-AX, 475-AX, 478-AX, especially the sensitivity and calibration on short-waves, depends entirely on the accuracy with which they are made.

C. ADJUSTMENT OF THE RADIO-FREQUENCY ADJUSTABLE CONDENSERS.

1. Connect test oscillator leads to Antenna and Ground Posts and adjust oscillator for 172.5 kc. Do not disturb position of control knobs.
2. Turn station selector to 1380 kc., where the eighth harmonic of the oscillator should be heard.
3. Adjust the Antenna compensator by turning to the right or left until maximum deflection is obtained on the output meter.
4. Adjust R.F. Trimmer condenser for maximum signal response.

D. ADJUSTMENT OF THE RADIO-FREQUENCY TRIMMING CONDENSERS, OSCILLATOR TRIMMING CONDENSER AND PADDING CONDENSERS FOR SHORT WAVE BANDS ON MODELS 76, 134, 136.

NOTE: In the following procedure the Broadcast Band (Green) will be considered as No. 1 Band, the 1.5 to 3.4 Megacycle Band (Red) as No. 2 Band, the 3.4 to 6.8 Megacycle Band (Yellow) as No. 3 Band, the 6.8 to 12.5 Megacycle Band (Orange) as No. 4 Band and the 12.5 to 24 Megacycle Band (Lavender) as No. 5 Band.

1. Set Band Selector Switch on No. 2 Band (Red) and turn dial to 1.72 mc. If test oscillator harmonic cannot be heard, disconnect leads and attach antenna and ground and tune in short-wave signal of approximately this frequency.
2. Adjust No. 2 padding condenser (Cp_2). (There is no R-F trimmer for this band.)
3. Set Band Selector Switch on No. 3 Band (Yellow) and turn dial to a short-wave signal between 6.9 mc. and 6.8 mc.
4. Adjust No. 3 R-F Trimming Condenser (C_3).

5. Turn dial to receive a signal between 5.4 mc. and 4.2 mc.

6. Adjust No. 3 Padding Condenser (Cp_3).

7. Set Band Selector Switch on No. 4 Band (Orange) and turn dial to receive a signal between 11 mc. and 12.5 mc.

8. Adjust No. 4 R-F Trimming Condenser (C_4).

9. Turn dial to receive a signal between 6.8 and 8.0 mc.

10. Adjust No. 4 Padding Condenser (Cp_4).

11. Set Band Selector Switch on No. 5 Band (Lavender) and turn dial to receive a signal between 12.5 mc. and 14 mc.

12. Adjust No. 5 Padding Condenser (Cp_5).

13. Turn dial to receive a signal between 15 mc. and 24 mc.

14. Adjust No. 5 R-F Trimming Condenser (C_5).

15. Re-check all adjustments in order given above.

E. ALIGNING THE ANTENNA EQUALIZING CONDENSER, CA.

The antenna equalizing condenser should always be adjusted when the receiver is installed and with the regular aerial and ground connected. It is the purpose of this condenser to resonate the first tuned circuit with the antenna system to which the receiver is connected, thereby providing a maximum transfer of energy. The procedure of adjustment is as follows:

Tune in a weak distant station or oscillator signal between 1300 and 1400 kilocycles, turn the volume control on full, and rotate the inter-station noise suppressor control knob clockwise as far as it will go. Next, with a hex-socket insulated wrench, turn the hex-nut on the condenser to the position where the volume from the station "tuned-in" or the oscillator signal is the loudest. Once made, this adjustment need not be changed unless the antenna system is altered, the receiver is moved from one location to another, or the other condensers are re-adjusted.

NOTE: When antenna equalizing condenser is adjusted on oscillator signal, adjustment will not hold true when receiver is connected to aerial; this condenser must be aligned to antenna system.

F. INSTRUCTIONS FOR REPLACING DIAL LIGHTS IN MODEL 76, 134, 136.

NOTE: Dial Lights may be changed without removing the chassis.

1. Turn dial to 1500 kc.
2. Loosen set screw located directly over dial light shaft in front of the bevel gear parallel with the variable condenser plates.
3. Turn dial to 1200 kc.
4. Tighten set screw.
5. Turn dial to 1450 kc.

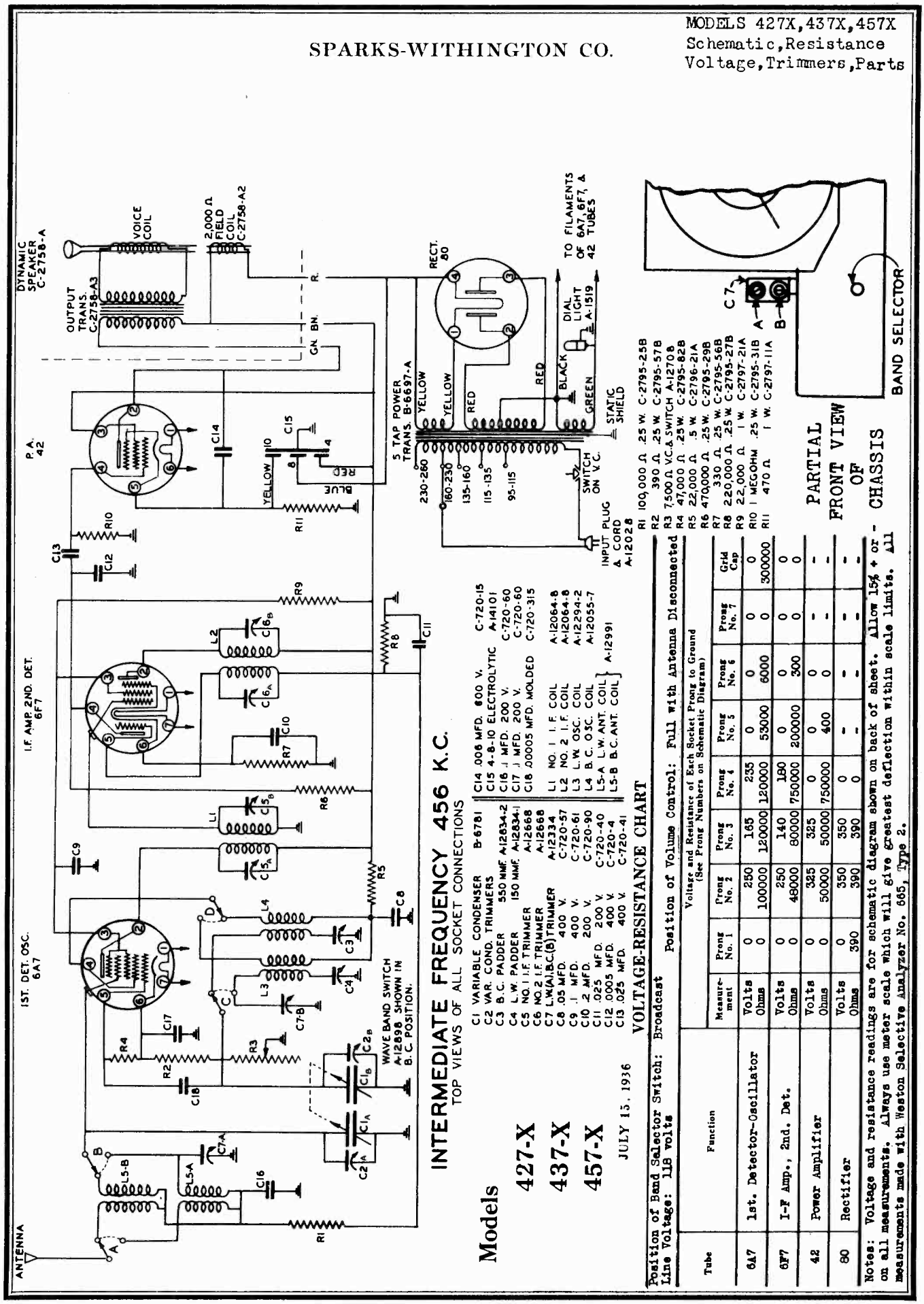
6. Hold dial drum to prevent turning and slide back the dial light ventilation cover.

7. Use a short length of 1/4 inch inside diameter rubber tubing slipped down over the bulb to remove or replace any dial lights.
8. Place dial light ventilation cover in original position.

9. Turn dial to 1200 kc.
10. Loosen set screw.
11. Turn to 1500 kc.
12. Tighten set screw.

SPARKS-WITHINGTON CO.

MODELS 427X, 437X, 457X
Schematic, Resistance
Voltage, Trimmers, Parts



INTERMEDIATE FREQUENCY 456 K.C.

TOP VIEWS OF ALL SOCKET CONNECTIONS

Models

427-X
437-X
457-X

JULY 15, 1936

C1 VARIABLE CONDENSER B-6781
C2 VAR. COND. TRIMMERS
C3 B.C. PADDER 550 MMF. A-12834-2
C4 L.W. PADDER 150 MMF. A-12834-1
C5 NO. 1 I.F. TRIMMER A-12668
C6 NO. 2 I.F. TRIMMER A-12668
C7 L.W.(A), B.C.(B) TRIMMER A-12334
C8 .05 MFD. 400 V. C-720-57
C9 .1 MFD. 400 V. C-720-61
C10 .2 MFD. 200 V. C-720-90
C11 .025 MFD. 200 V. C-720-40
C12 .0005 MFD. 400 V. C-720-4
C13 .025 MFD. 400 V. C-720-41
C14 .006 MFD. 600 V. C-720-15
C15 4-8-10 ELECTROLYTIC A-14101
C16 .1 MFD. 200 V. C-720-60
C17 .1 MFD. 200 V. C-720-60
C18 .00005 MFD. MOLDED C-720-315

L1 NO. 1 I.F. COIL A-12064-8
L2 NO. 2 I.F. COIL A-12064-8
L3 L.W. OSC. COIL A-12294-2
L4 B.C. OSC. COIL A-12055-7
L5-A L.W. ANT. COIL } A-12991
L5-B B.C. ANT. COIL }

R1 100,000 Ω .25 W. C-2795-25B
R2 390 Ω .25 W. C-2795-57B
R3 7,500 Ω V.C. & SWITCH A-12708
R4 47,000 Ω .25 W. C-2795-82B
R5 22,000 Ω .5 W. C-2796-21A
R6 470,000 Ω .25 W. C-2795-29B
R7 330 Ω .25 W. C-2795-56B
R8 220,000 Ω .25 W. C-2795-27B
R9 22,000 Ω 1 W. C-2797-21A
R10 1 MEGOHM .25 W. C-2795-31B
R11 470 Ω 1 W. C-2797-11A

VOLTAGE-RESISTANCE CHART

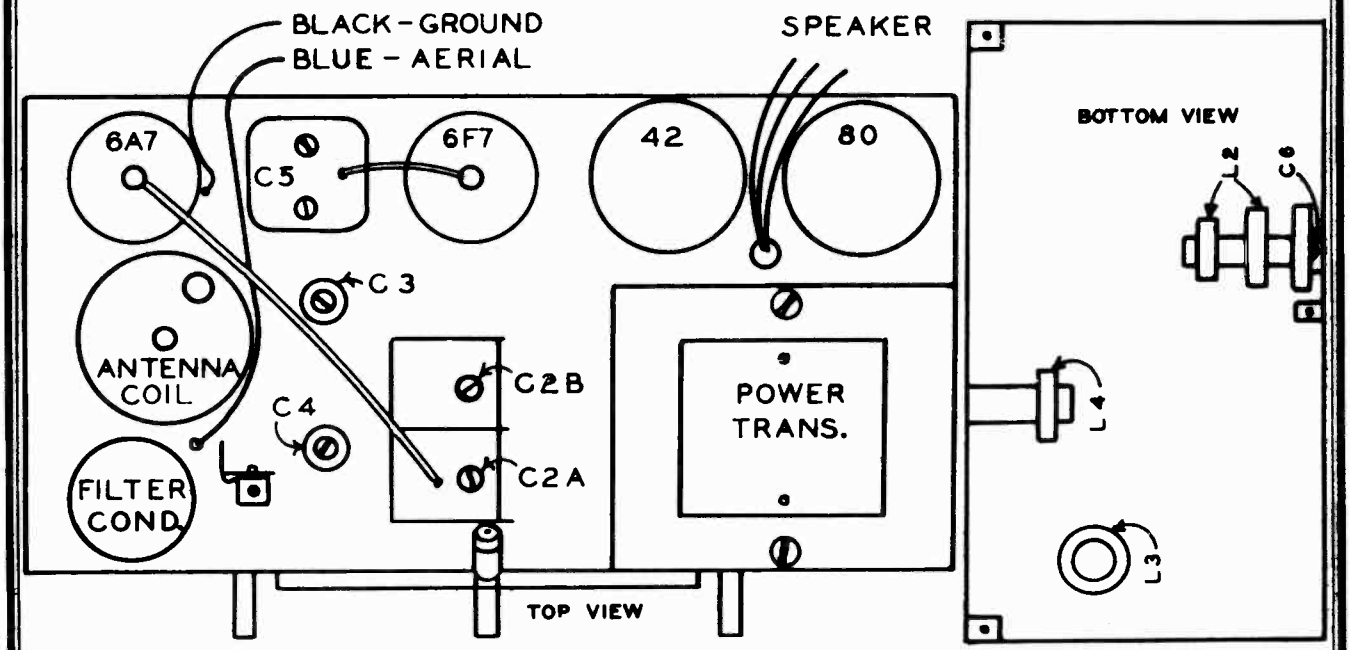
Position of Band Selector Switch: Broadcast
Line Voltage: 118 volts
Position of Volume Control: Full with Antenna Disconnected

Tube	Function	Measurement	Voltage and Resistance of Each Socket Prong to Ground (See Prong Numbers on Schematic Diagram) Prong No. 1	Prong No. 2	Prong No. 3	Prong No. 4	Prong No. 5	Prong No. 6	Prong No. 7	Grid Cap
6A7	1st. Detector-Oscillator	Volts	0	250	165	235	0	0	0	0
		Ohms	0	100000	120000	120000	53000	6000	0	300000
6F7	I-F Amp., 2nd. Det.	Volts	0	250	140	180	0	0	0	0
		Ohms	0	48000	80000	750000	200000	300	0	0
42	Power Amplifier	Volts	0	325	325	0	0	0	-	-
		Ohms	0	50000	50000	750000	400	0	-	-
80	Rectifier	Volts	0	350	350	0	-	-	-	-
		Ohms	390	390	390	0	-	-	-	-

Notes: Voltage and resistance readings are for schematic diagram shown on back of sheet. Allow 15% + or - on all measurements. Always use meter scale which will give greatest deflection within scale limits. All measurements made with Weston Selective Analyzer No. 665, Type 2.

MODELS 427X, 437X, 457X
Socket, Trimmers
Alignment

SPARKS WITHINGTON CO.



FOREWORD: The SPARTON Models 427-X, 437-X and 457-X (Export) are equipped with an adjustable power transformer for operation on various line voltages as indicated under the transformer terminal cover plate.

Before attempting to realign the circuits, be sure that the transformer tap is correctly adjusted for the line voltage to be used. Unless otherwise specified, the adjusting of any condenser consists of turning the adjusting screw or nut to the right or left until the output meter registers the greatest deflection.

Note: For proper alignment of these chasses, the procedure should be followed in the same order as given.

The dial pointer should be exactly parallel with the horizontal line of the dial scale when the condenser plates are fully meshed. If the pointer does not read correctly, remove the dial cover and move the pointer until it shows a correct reading.

A. Alignment of Intermediate-Frequency

1. Turn on receiver and test oscillator and allow both to operate several minutes before attempting to adjust any condenser.

2. Turn the band selector switch to the "Broadcast" position and turn the station selector knob until the rotor plates are completely out of mesh with the stator plates.

3. Connect antenna of test oscillator to grid cap of Type 6A7 1st detector-oscillator tube and ground of test oscillator to chassis frame of receiver. Connect output meter "high tap" from plate terminal of Type 42 tube to ground.

Note: It is advisable to read carefully the operating instructions included with the test oscillator.

4. Tune test oscillator to obtain a signal of 456 kilocycles.

5. Turn the volume control of receiver on full and adjust I-F condensers C5 and C6.

B. Alignment of Broadcast Band

1. Disconnect "antenna" lead of test oscillator from grid cap of Type 6A7 tube and connect it in series with a 150 mmf. condenser dummy antenna to the antenna terminal of the chassis.

2. Tune test oscillator and receiver to a wave length of 200 meters (1500 kilocycles) and adjust condenser C2-B (oscillator trimmer) and condenser C2-A (antenna trimmer).

3. Tune test oscillator and receiver to 500 meters (600 kilocycles) and adjust condenser C4 (oscillator padder).

4. Retune test oscillator and receiver to 200 meters and check the adjustments of condensers C2B and C2A.

5. Calibration of the broadcast band should also be checked at 550 meters (900 kilocycles).

C. Alignment of Long-Wave Band

1. Turn the band selector switch to the "long-wave" band, tune test oscillator and receiver to a wave length of 870 meters (345 kilocycles) and adjust condenser C7-B (long-wave oscillator trimmer) and condenser C7-A (long-wave antenna trimmer).

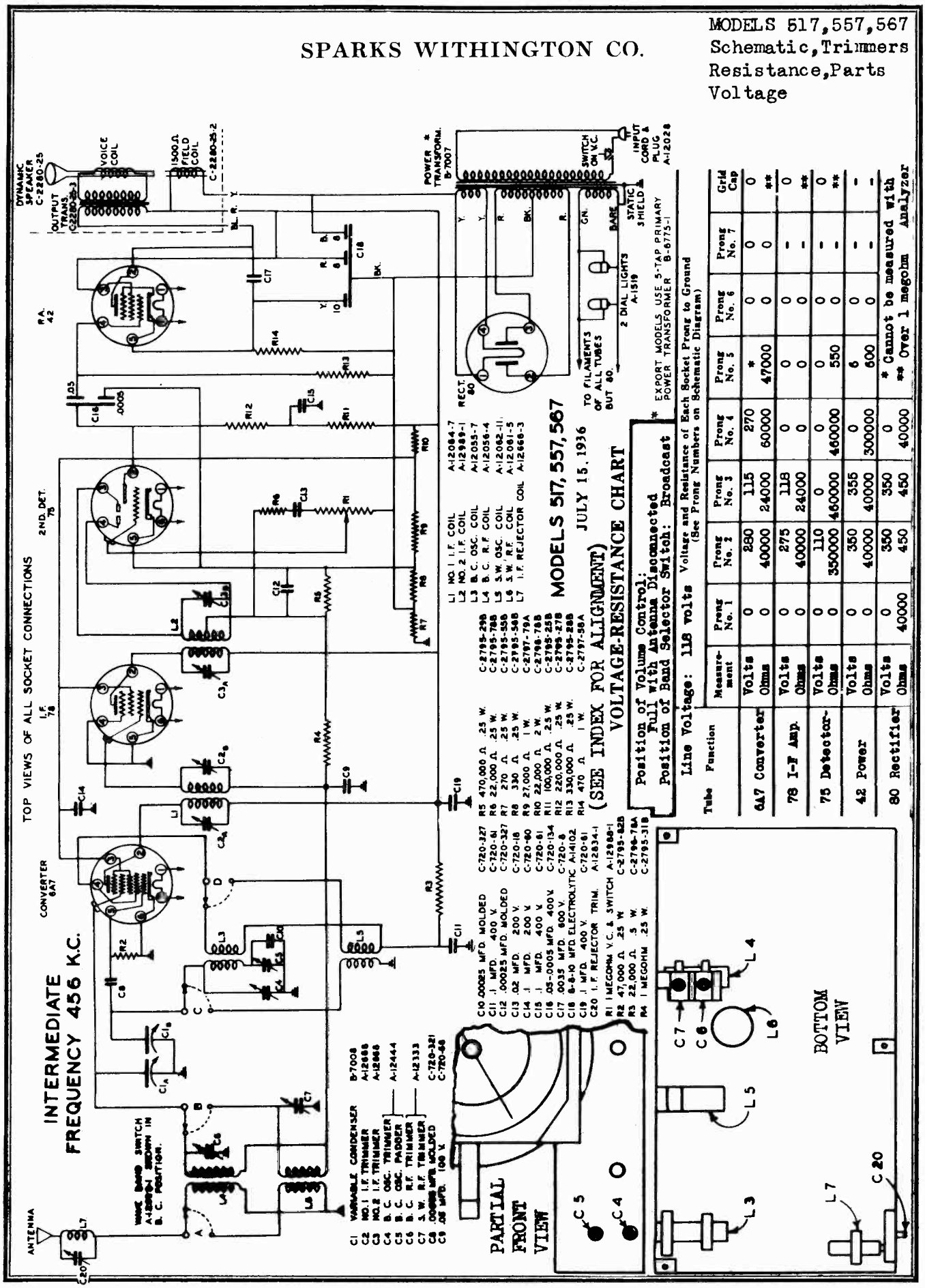
2. Tune test oscillator and receiver to a wave length of 2000 meters (150 kilocycles) and adjust condenser C5 (long-wave oscillator padder).

3. Retune test oscillator and receiver to 870 meters (345 kilocycles) and check the adjustment of condensers C7-B and C7-A.

Caution: All adjustments should be rechecked to assure accuracy and stability of adjustment and calibration.

SPARKS WITHINGTON CO.

MODELS 517,557,567
Schematic,Trimmers
Resistance,Parts
Voltage



Tube	Function	Measurement	Prong No. 1	Prong No. 2	Prong No. 3	Prong No. 4	Prong No. 5	Prong No. 6	Prong No. 7	Grid Cap
6A7	Converter	Volts	0	280	115	270	*	0	0	0
		Ohms	0	40000	24000	60000	47000	0	0	**
78	I-F Amp.	Volts	0	275	118	0	0	0	-	0
		Ohms	0	40000	24000	0	0	0	-	**
75	Detector-Amp.	Volts	0	110	0	0	0	0	-	0
		Ohms	0	350000	460000	460000	550	0	-	**
42	Power	Volts	0	350	355	0	6	0	-	-
		Ohms	0	40000	40000	300000	600	0	-	-
80	Rectifier	Volts	0	350	350	0	* Cannot be measured with			
		Ohms	40000	450	450	40000	** Over 1 megohm Analyzer			

MODELS 517,557,567
Socket,Trimmers,Alignment **SPARKS-WITHINGTON CO.**
MODELS 537,577
Alignment

ALIGNMENT FOR MODELS 517,557,and 567

A. Alignment of Intermediate-Frequency Stages

1. Turn on receiver and test oscillator and allow both to operate several minutes before attempting to adjust any condensers.

2. Turn the band selector switch to the broadcast position and turn the station selector knob until the rotor plates are completely out of mesh with the stator plates.

3. Connect "antenna" of test oscillator to grid cap of Type 6A7 1st detector-oscillator tube and "ground" of test oscillator to chassis frame of receiver. Connect output meter "high tap" from plate of Type 42 tube to ground.

Note: It is advisable to read carefully the operating instructions included with the test oscillator being used in the alignment procedure.

4. Tune test oscillator to obtain a signal of 456 kilocycles.

5. Turn the volume control of receiver on full and adjust I-F condensers C2 and C3 which are reached from the top of the chassis.

Note: Care should be taken when adjusting the I-F stages in order to insure proper and accurate adjustment.

B. Alignment of Broadcast Band

1. Disconnect "antenna" lead of test oscillator from grid cap of 1st detector-oscillator tube Type 6A7 and connect it in series with a 150 mmf. condenser dummy antenna to the antenna terminal of the chassis.

2. Tune test oscillator to a frequency of 456 kilocycles and adjust condenser C20 (reached from back of the chassis) to a point where the output of the receiver is at an absolute minimum.

Note: This condenser is the adjustment for the code rejector circuit and must be very carefully adjusted if best performance of the receiver is to be expected.

3. Tune test oscillator and receiver to a frequency of 1500 kilocycles and adjust condensers C4 (broadcast band oscillator trimmer) and C6 (broadcast antenna trimmer) reached from the bottom of the chassis.

4. Tune test oscillator and receiver to 600 kilocycles and adjust condenser C5 (broadcast oscillator padder) reached from the front of the chassis.

5. Retune test oscillator and receiver to 1500 kilocycles and check adjustments of condenser C4 and condenser C6. Calibration of the broadcast band should also be checked at 900 kilocycles and 600 kilocycles.

C. Alignment of Short-Wave Band

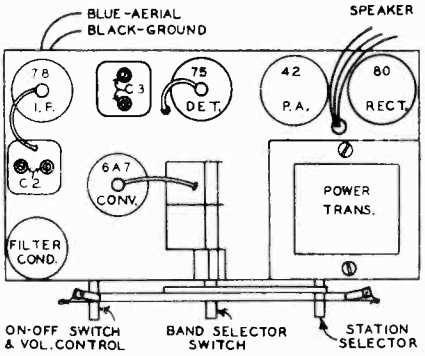
1. Turn the band selector switch to the short wave or "foreign" band.

2. Remove the 150 mmf. condenser from the test oscillator "antenna" lead and replace with a 400 ohm non-inductive resistor dummy antenna.

3. Tune test oscillator and receiver to a frequency of 15,000 kilocycles (15 megacycles) and adjust condenser C7 (short-wave antenna trimmer) reached from the bottom of the chassis.

Caution: On this band care must be taken to adjust this condenser to the fundamental of the 15 megacycle signal and not to the image. The image signal is equal to the fundamental minus twice the intermediate frequency of the receiver.

A set that is adjusted to the image frequency instead of to the fundamental may be detected by tuning over the band and checking the sensitivity at various points. If a dead spot appears near the center of the band, the adjustable condenser for that band has probably been adjusted to the image instead of to the fundamental.



This type of mis-alignment may also be detected by tuning the test oscillator to a frequency of 15 megacycles and the station selector of the receiver to approximately 15,900 kilocycles. If a strong signal is found approximately at this frequency, it indicates that the band has been adjusted to the image frequency. The normal image frequency for 15,000 kilocycles would be 15,000 kilocycles minus twice 456 kilocycles or approximately 14,100 kilocycles. Therefore, a signal of this frequency may be found with the test oscillator generating a 15,000 kilocycle.

Note: There are no other trimmers for the short-wave or foreign band. However, it is advisable to check the receiver for sensitivity and calibration at both 15,000 kilocycles and 7,500 kilocycles.

Important: All adjustments should be rechecked to assure accuracy and stability of adjustment and calibration.

ALIGNMENT FOR MODELS 537 and 577

A. Alignment of Intermediate-Frequency Stages

(1) Turn on receiver and test oscillator and allow both to operate several minutes before attempting to adjust any condensers.

(2) Turn the band selector switch to the broadcast "B" position and turn the station selector knob until the rotor plates are completely out of mesh with the stator plates.

(3) Connect "antenna" of test oscillator to grid cap of Type 6A8G 1st detector-oscillator tube and "ground" of test oscillator to chassis frame of receiver. Connect output meter "high tap" from plate of Type 6F6G tube to ground. NOTE: It is advisable to read carefully the operating instructions included with the test oscillator.

(4) Tune test oscillator to obtain a signal of 456 KC.

(5) Turn the volume control of receiver on full and adjust I.F. condensers C3 and C2. NOTE: The intermediate frequency circuits are quite selective and care must be taken to insure proper adjustment.

(6) Connect "antenna" of test oscillator to "A" post on chassis and "ground" of test oscillator to "G" post.

(7) Tune test oscillator to 456 KC. and adjust condenser C4 for minimum output.

NOTE: This adjustment is in the code rejector circuit and proper adjustment of this condenser is essential to satisfactory operation of the receiver.

B. Alignment of Broadcast Band

(1) Disconnect "antenna" lead of test oscillator from grid cap of first detector-oscillator tube and connect in series with a 150 mmf. condenser dummy antenna to the antenna terminal of the chassis.

(2) Tune test oscillator and receiver to a frequency of 1500 KC., and without disturbing the setting of the test oscillator or the station selector, adjust condensers C8 and C5 in the order given.

(3) Tune test oscillator and receiver to 600 KC. and adjust condenser C9.

(4) Retune test oscillator and receiver to 1500 KC. and check the adjustments of condensers C8 and C5.

(5) Calibration of the broadcast band should also be checked at 900 kilocycles and 600 kilocycles.

C. Alignment of Police Band

(1) Turn the band selector switch to the Police Band "P".

(2) Remove the 150 mmf. condenser from the "antenna" lead of test oscillator and replace with a 400 ohm non-inductive resistor dummy antenna.

(3) Tune test oscillator and receiver to 4.5 MC. and adjust condenser C7.

NOTE: There are no other adjustments in this band.

D. Alignment of Foreign Band

(1) Turn the band selector switch to the Foreign Band "F".

(2) Tune test oscillator and receiver to 15 MC. and adjust condenser C6.

CAUTION: On this band care must be taken to adjust the condenser to the fundamental of the signal and not to the image. The image signal is equal to the fundamental minus twice the intermediate frequency of the receiver.

A set that is adjusted to the image frequency instead of to the fundamental may be detected by tuning over the band and checking the sensitivity at various points. If a dead spot appears near the center of the band, the adjustable condensers for that band have probably been adjusted to the image instead of the fundamental.

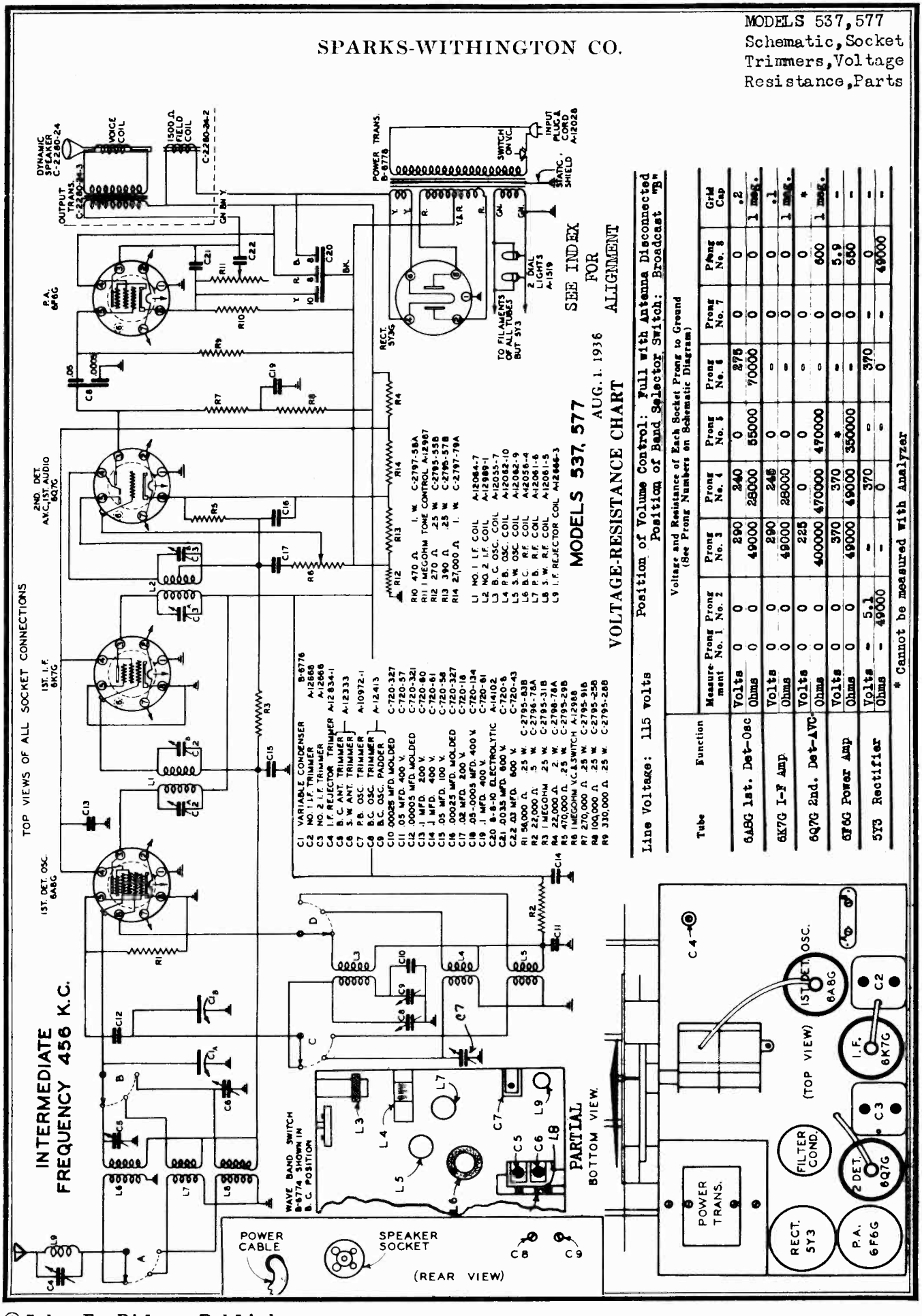
This type of mis-alignment may also be detected by tuning the test oscillator to a frequency of 15 megacycles and the station selector to approximately 15,900 KC. If a strong signal is found approximately at this frequency, it indicates that the band has been adjusted to the image frequency. The normal image frequency for 15,000 kilocycles would be 15,000 KC. minus twice 456 KC. or approximately 14,100 KC. Therefore a signal of this frequency may be found with the test oscillator generating a 15,000 KC. signal.

(3) Retune the test oscillator and receiver to 7.5 MC. and check sensitivity and calibration. (There are no other adjustments for this band.)

CAUTION: All adjustments should be rechecked to assure accuracy and stability of adjustment and calibration.

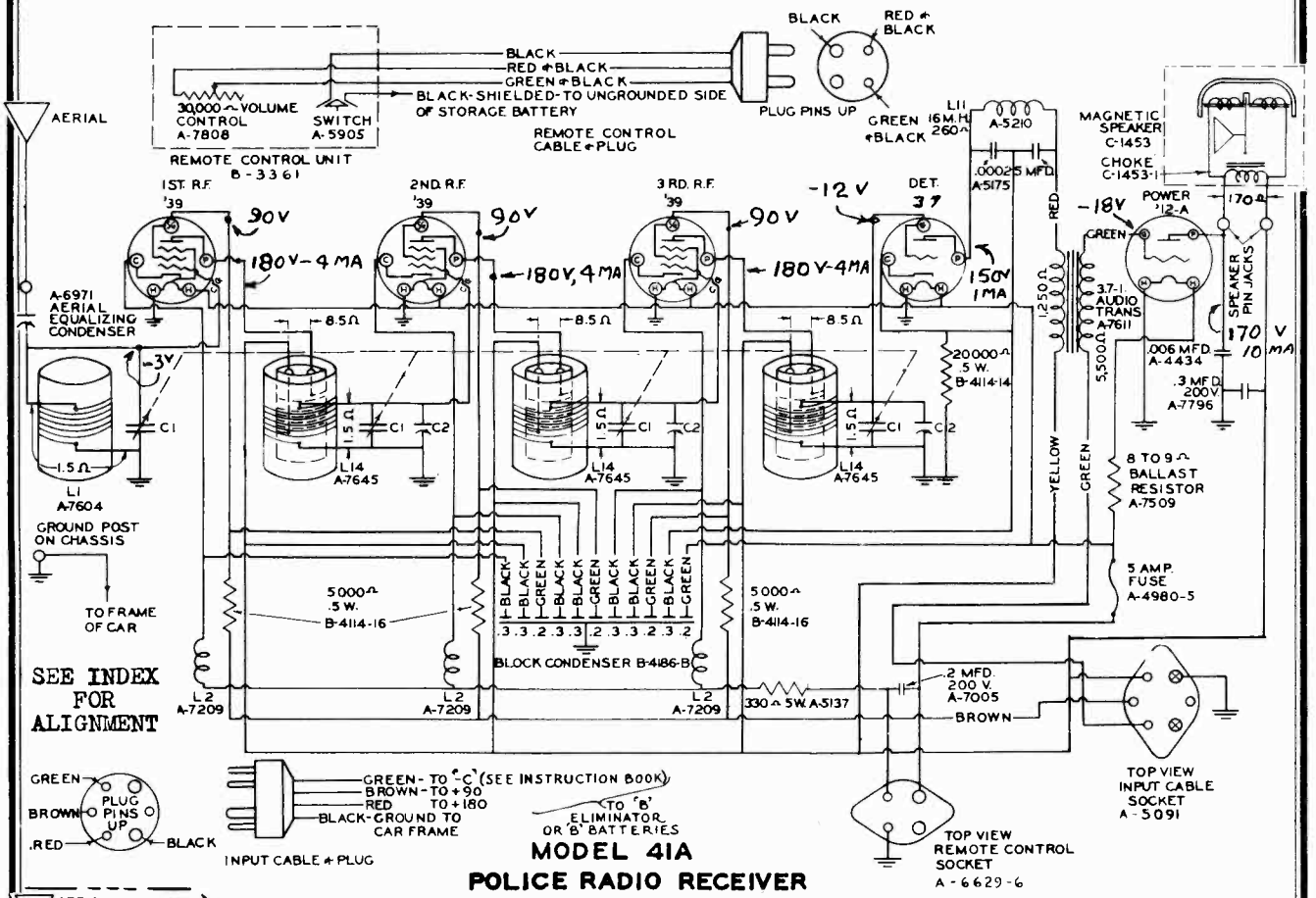
MODELS 537, 577
Schematic, Socket
Trimmers, Voltage
Resistance, Parts

SPARKS-WITHINGTON CO.

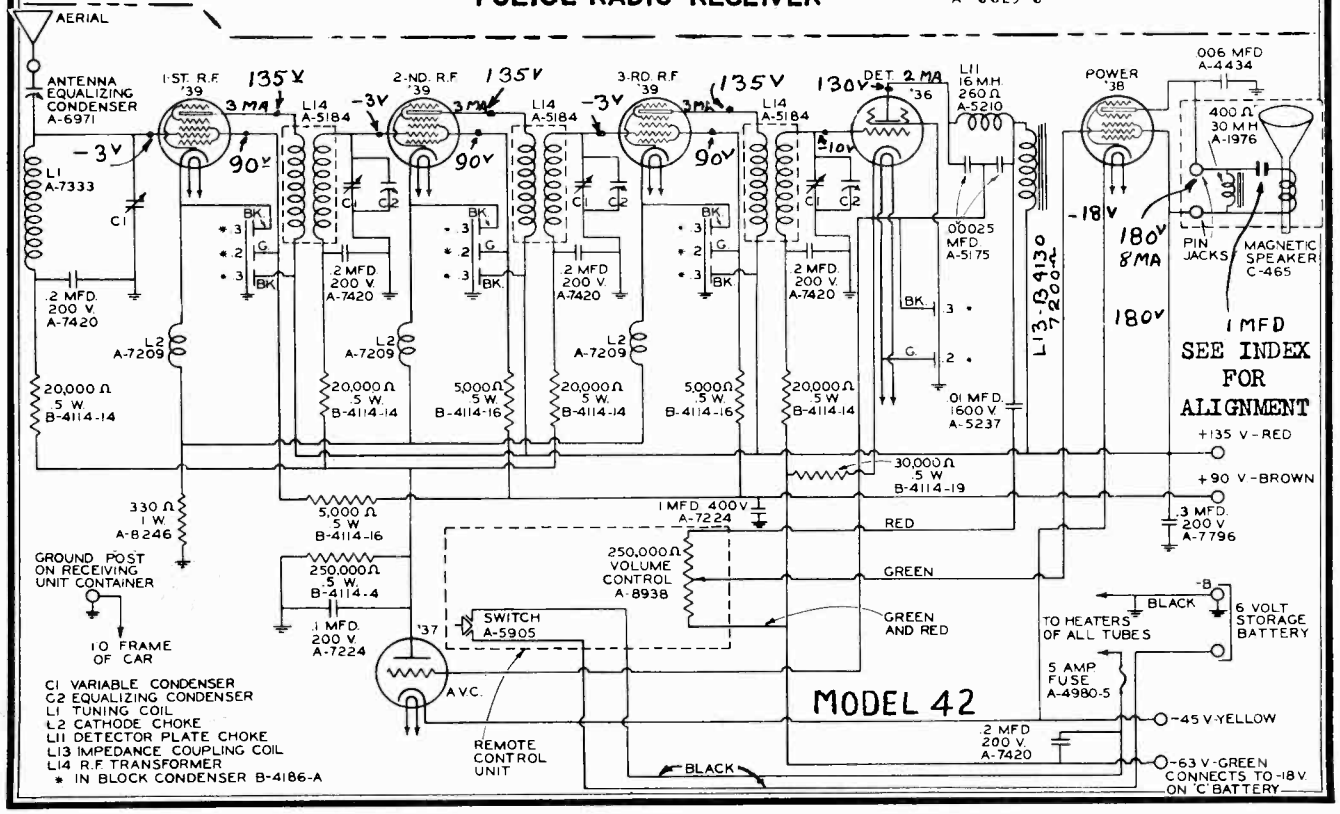


MODEL 41A
MODEL 42
Schematic
Voltage

SPARKS WITHINGTON CO.



MODEL 41A
POLICE RADIO RECEIVER

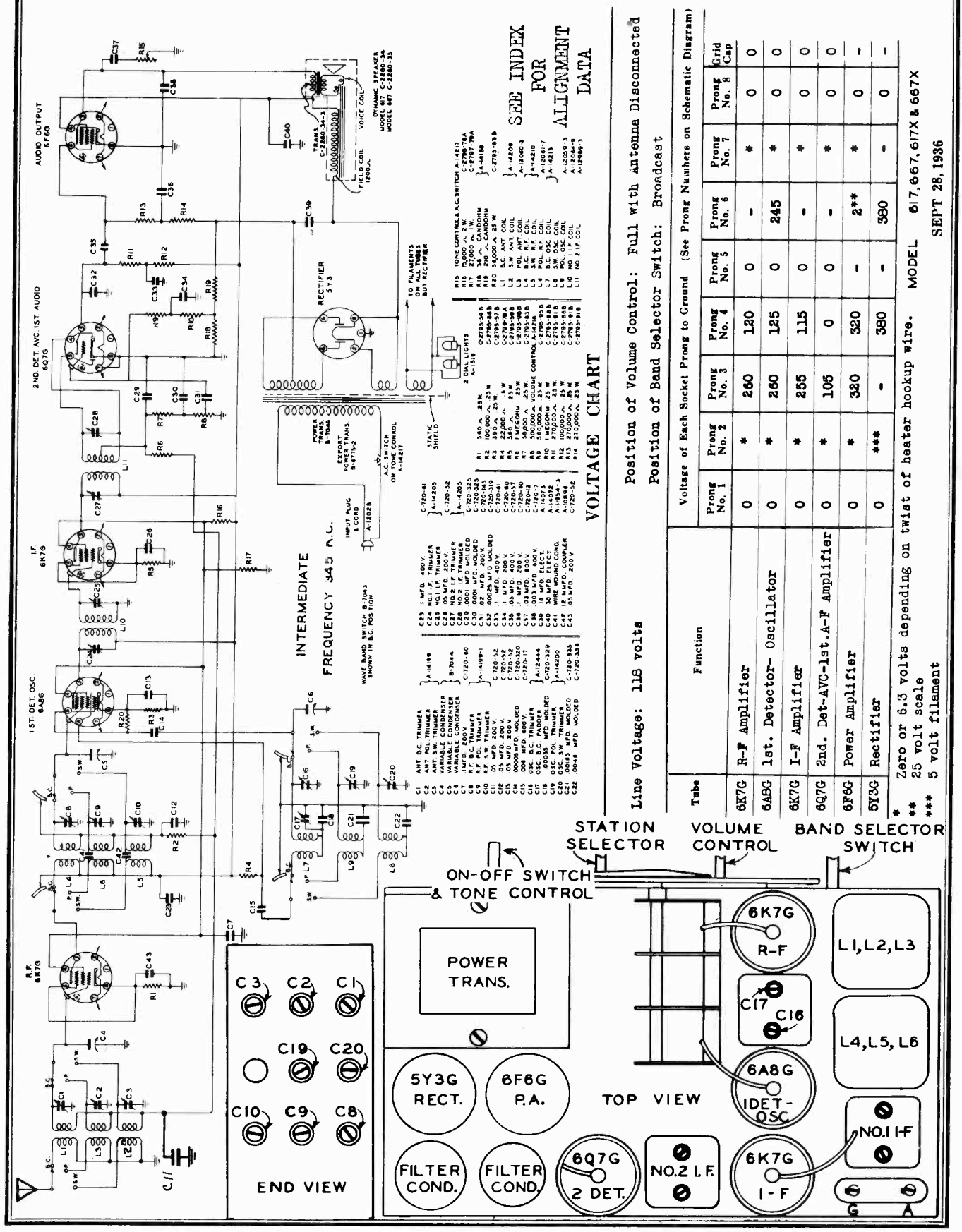


MODEL 42

MODELS 617, 667, 617X, 667X

SPARKS WITHINGTON CO.

Schematic, Socket, Voltage Trimmers, Parts



MODELS 617,667,617X,667X
Alignment

SPARKS-WITHINGTON CO.

Foreword: The SPARTON Models 617-X and 667-X are equipped with an adjustable power transformer for operation on various line voltages as indicated under the transformer terminal cover plate.

1. EQUIPMENT REQUIRED

A. Modulated test oscillator (crystal controlled or accurately calibrated) capable of generating frequencies from 345 to 18,000 kilocycles.

B. Output meter.

C. Part A-5732 adjusting wrench.

D. Dummy antennas, consisting of a 200 mmf. condenser and a 100 ohm non-inductive resistor.

2. STEP BY STEP PROCEDURE

NOTE: For proper alignment of these chassis, the procedure should be followed in the same order as given.

With the condenser plates fully meshed, the dial pointer should point to the first calibration marks immediately to the right of the band identification letters "P", "B" and "F". Any necessary correction may be made simply by moving the pointer on the shaft.

A. Alignment of Intermediate-Frequency Stages

(1) Turn on receiver and test oscillator and allow both to operate several minutes before attempting to adjust any condensers.

(2) Turn the band selector switch to the broadcast "B" position and turn the station selector knob until the rotor plates are completely out of mesh with the stator plates.

(3) Connect "antenna" of test oscillator to grid cap of Type 6A8G 1st detector-oscillator tube and "ground" of test oscillator to chassis frame of receiver. Connect output meter "high tap" from plate of Type 6F6G tube to ground. NOTE: It is advisable to read carefully the operating instructions included with the test oscillator.

(4) Tune test oscillator to obtain a signal of 345 KC.

(5) Turn the volume control of receiver on full and adjust I.F. condensers. NOTE: The intermediate frequency circuits are quite selective and care must be taken to insure proper adjustment. (See diagram for I.F. transformer and trimmer locations.)

(6) Connect "antenna" of test oscillator to "A" post on chassis and "ground" of test oscillator to "G" post.

B. Alignment of Broadcast Band

(1) Disconnect "antenna" lead of test oscillator from grid cap of first detector-oscillator tube and connect in series with a 200 mmf. condenser dummy antenna to the antenna terminal of the chassis.

(2) Tune test oscillator and receiver to a frequency of 1500 KC., and without disturbing the setting of the test oscillator or the station selector, adjust condensers C16, C8 and C1 in the order given.

(3) Tune test oscillator and receiver to 600 KC. and adjust condenser C17.

(4) Retune test oscillator and receiver to 1500 KC. and check the adjustments of condensers C16, C8 and C1.

(5) Calibration of the broadcast band should also be checked at 900 kilocycles and 600 kilocycles.

C. Alignment of Police Band

(1) Turn the band selector switch to the Police Band "P".

(2) Remove the 200 mmf. condenser from the "antenna" lead of test oscillator and replace with a 100 ohm non-inductive resistor dummy antenna.

(3) Tune test oscillator and receiver to 4.5 MC. and adjust condensers C19, C9 and C2.

NOTE: There are no other adjustments in this band.

D. Alignment of Foreign Band

(1) Turn the band selector switch to the Foreign Band "F".

(2) Tune test oscillator and receiver to 18 MC. and adjust condensers C20, C10 and C3.

(3) When making these adjustments, the station selector should be moved slightly back and forth in order to obtain maximum gain.

CAUTION: On this band care must be taken to adjust the condensers to the fundamental of the signal and not to the image. The image signal is equal to the fundamental minus twice the intermediate frequency of the receiver.

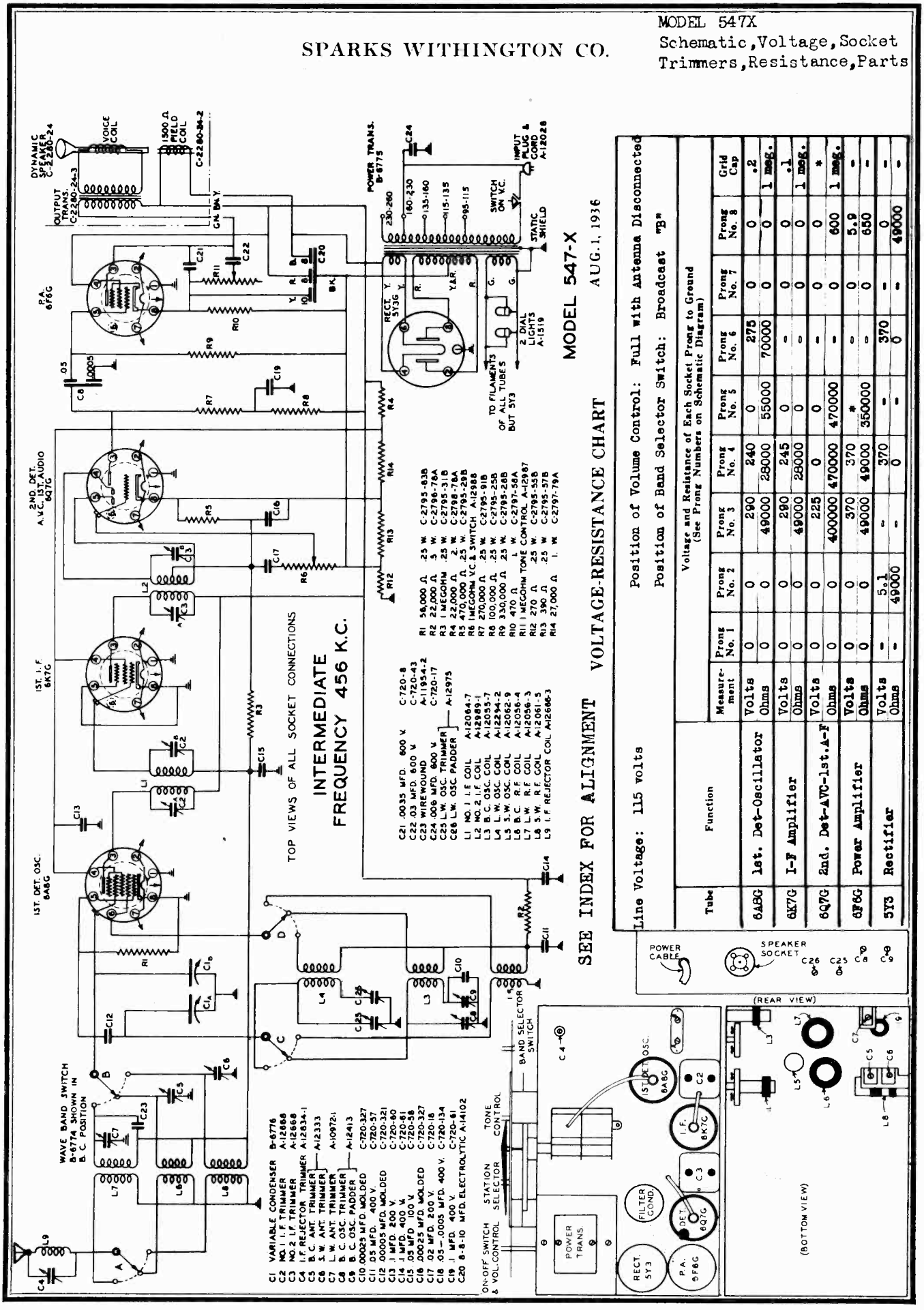
A set that is adjusted to the image frequency instead of to the fundamental may be detected by tuning over the band and checking the sensitivity at various points. If a dead spot appears near the center of the band, the adjustable condensers for that band have probably been adjusted to the image instead of the fundamental.

This type of mis-alignment may also be detected by tuning the test oscillator to a frequency of 15 megacycles and the station selector to approximately 15,700 KC. If a strong signal is found approximately at this frequency, it indicates that the band has been adjusted to the image frequency. The normal image frequency for 15,000 kilocycles would be 15,000 KC. minus twice 345 KC. or approximately 15,300 KC. Therefore a signal of this frequency may be found with the test oscillator generating a 15,000 KC. signal.

CAUTION: All adjustments should be rechecked to assure accuracy and stability of adjustment and calibration.

SPARKS WITHINGTON CO.

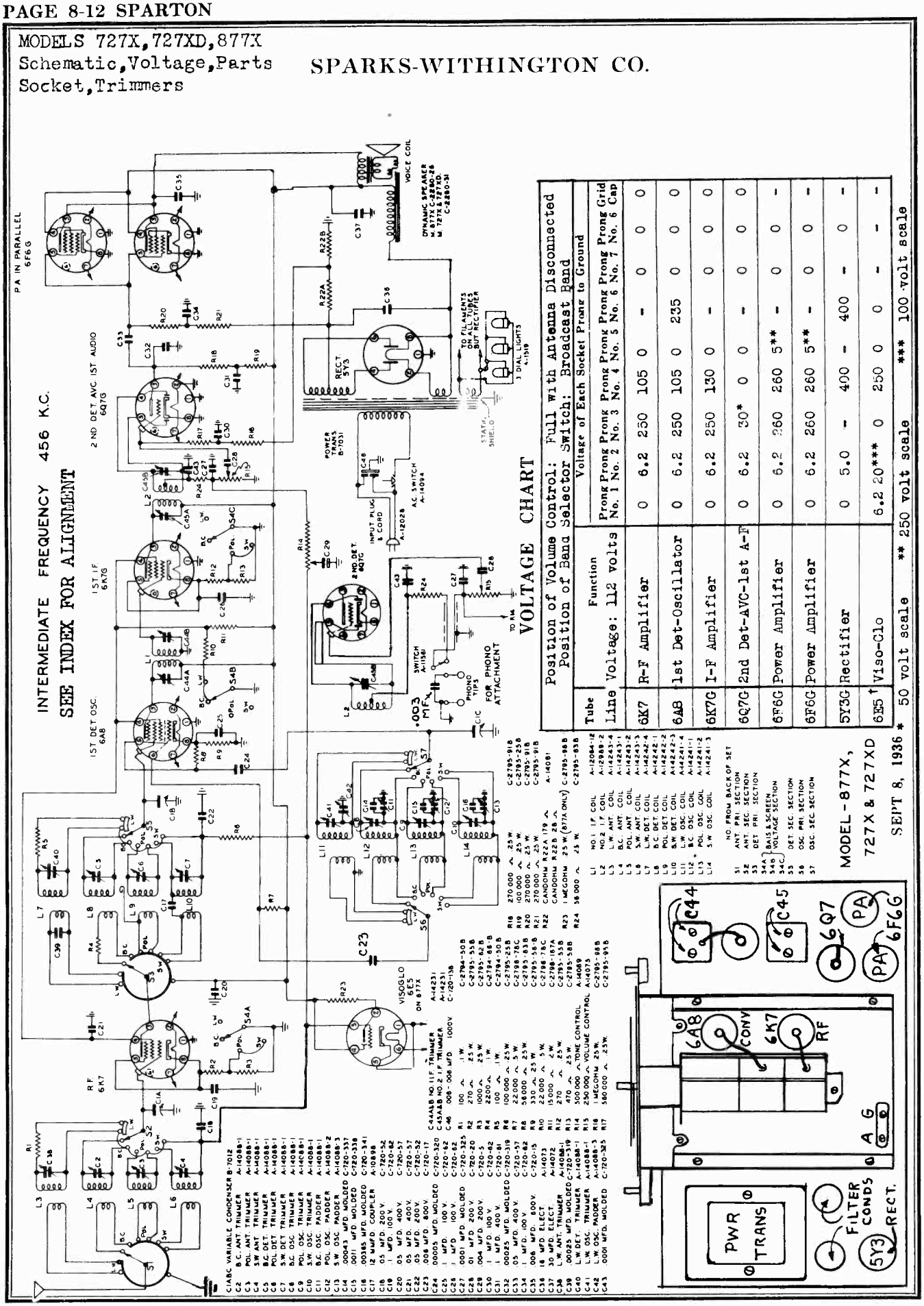
MODEL 547X
Schematic, Voltage, Socket
Trimmers, Resistance, Parts



Tube	Function	Measurement	Prong No. 1	Prong No. 2	Prong No. 3	Prong No. 4	Prong No. 5	Prong No. 6	Prong No. 7	Prong No. 8	Grid Cap
			Voltage and Resistance of Each Socket Prong to Ground (See Prong Numbers on Schematic Diagram)								
6A8G	1st. Det-Oscillator	Volts	0	0	290	240	0	275	0	0	.2
		Ohms	0	0	49000	28000	55000	70000	0	0	1 meg.
6K7G	I-F Amplifier	Volts	0	0	280	245	0	-	0	0	.1
		Ohms	0	0	49000	28000	0	-	0	0	1 meg.
6Q7G	2nd. Det-AVC-1st.A-F	Volts	0	0	225	0	0	-	0	0	*
		Ohms	0	0	400000	470000	470000	-	0	600	1 meg.
6F6G	Power Amplifier	Volts	0	0	370	370	*	-	0	5.9	-
		Ohms	0	0	49000	49000	350000	-	0	650	-
5Y3	Rectifier	Volts	-	5.1	-	370	-	370	-	0	-
		Ohms	-	49000	-	0	-	0	-	49000	-

MODELS 727X, 727XD, 877X
Schematic, Voltage, Parts
Socket, Trimmers

SPARKS-WITHINGTON CO.



VOLTAGE CHART

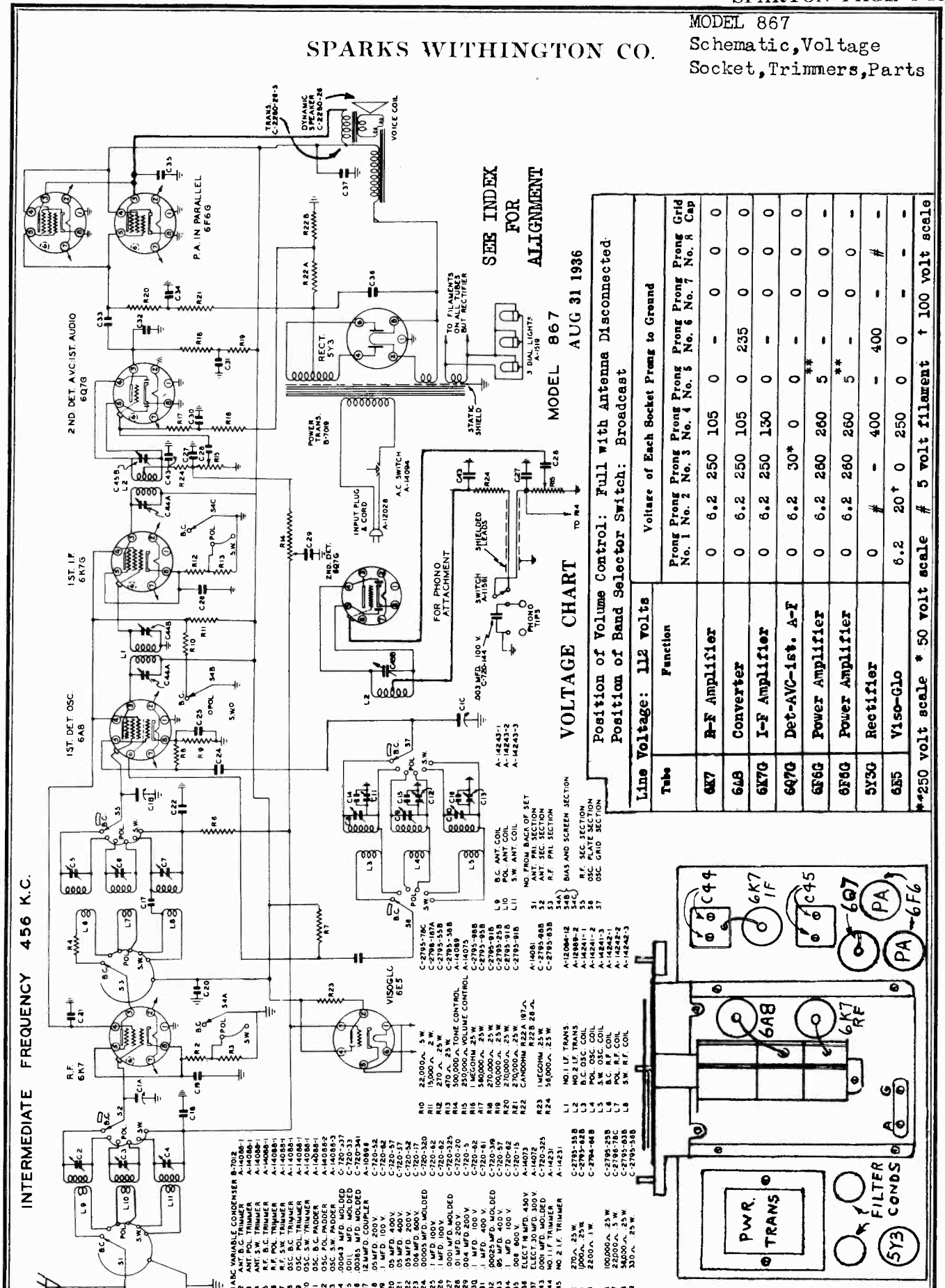
Position of Volume Control: Full with Antenna Disconnected
Position of Band Selector Switch: Broadcast Band

Tube	Function	Voltage of Each Socket Prong to Ground							
Line Voltage: 112 volts		Prong No. 1	Prong No. 2	Prong No. 3	Prong No. 4	Prong No. 5	Prong No. 6	Prong No. 7	Grid Cap
6K7	R-F Amplifier	0	6.2	250	105	0	-	0	0	0
6A8	1st Det-Oscillator	0	6.2	250	105	0	235	0	0	0
6K7G	I-F Amplifier	0	6.2	250	130	0	-	0	0	0
6Q7G	2nd Det-AVC-1st A-F	0	6.2	30*	0	0	-	0	0	0
6F6G	Power Amplifier	0	6.2	260	260	5**	-	0	0	-
6F6G	Power Amplifier	0	6.2	260	260	5**	-	0	0	-
5Y3G	Rectifier	0	5.0	-	400	-	400	-	0	-
6E5 †	Visa-Clo	6.2	20***	0	250	0	0	-	-	-

* 50 volt scale ** 250 volt scale *** 100 volt scale

SPARKS WITHINGTON CO.

MODEL 867
Schematic, Voltage
Socket, Trimmers, Parts



MODEL 547X
MODELS 727X,727XD,877X
MODELS 867

SPARKS-WITHINGTON CO

MODELS 827X,827XD,997X
MODEL 987
MODEL 1167
Alignment

ALIGNMENT
MODEL 547X

A. Alignment of Intermediate-Frequency Stages.

(1) Turn on receiver and test oscillator and allow both to operate several minutes before attempting to adjust any condensers.

(2) Turn the band selector switch to the Broadcast Band "B" position and turn the station selector knob until the rotor plates are completely out of mesh with the stator plates.

(3) Connect "antenna" of test oscillator in series with 150 mmf. condenser dummy antenna to grid cap of Type 6A8G 1st detector-oscillator tube and "ground" of test oscillator to chassis frame of receiver. Connect output meter "high tap" from plate of Type 6F6G tube to ground. NOTE: It is advisable to read carefully the operating instructions included with the test oscillator.

(4) Tune test oscillator to obtain a signal of 456 kilocycles.

(5) Turn the volume control of receiver on full and adjust IF condensers C3 and C2. NOTE: The intermediate frequency circuits are quite selective and care must be taken to insure proper adjustment.

(6) Disconnect test oscillator "antenna" and 150 mmf. condenser from grid cap of 6A8G tube, and connect oscillator "antenna" to antenna post of chassis.

(7) With the test oscillator generating a 456 KC. signal, adjust condenser C4 until a minimum of output is obtained. NOTE: This adjustment is in the code rejector circuit, and care should be taken to see that proper adjustment is made, otherwise the receiver will not operate with maximum efficiency.

B. Alignment of Long-Wave Band

(1) Insert the 150 mmf. condenser in series with the "antenna" lead of test oscillator and the antenna terminal of the chassis.

(2) Turn the band selector switch to the long wave "L" position, tune test oscillator and receiver to a wave length of 870 meters (345 KC.) and without disturbing the setting of the test oscillator or the station selector, adjust condensers C25 and C7 in the order given.

(3) Tune test oscillator and receiver to 2000 meters (150 KC.) and adjust condenser C26.

(4) Retune test oscillator and receiver to 345 kilocycles and check the adjustments of condensers C25 and C7.

C. Alignment of Broadcast Band

(1) Turn band selector switch to the broadcast band "B" position.

(2) Tune test oscillator and receiver to a wave length of 200 meters (1500 kilocycles) and adjust condenser C8 (oscillator trimmer) and condenser C5 (antenna trimmer).

(3) Tune test oscillator and receiver to 500 meters (600 kilocycles) and adjust condenser C9 (oscillator padder).

(4) Retune test oscillator and receiver to 200 meters and check the adjustments of condensers C8 and C5.

D. Alignment of Short-Wave Band.

(1) Turn the band selector switch to the short wave band "S" position.

(2) Remove the 150 mmf. condenser from "antenna" lead of test oscillator and replace with a 400 ohm non-inductive resistor dummy antenna.

(3) Tune test oscillator and receiver to 20 meters (15 megacycles) and adjust condenser C6.

CAUTION: On this band care must be taken to adjust the condenser to the fundamental of the signal and not to the image. The image signal is equal to the fundamental minus twice the intermediate frequency of the receiver.

A set that is adjusted to the image frequency instead of to the fundamental may be detected by tuning over the band and checking the sensitivity at various points. If a dead spot appears near the center of the band, the adjustable condensers for that band have probably been adjusted to the image instead of the fundamental.

This type of mis-alignment may also be detected by tuning the test oscillator to a frequency of 15 megacycles and the station selector to approximately 15,900 kilocycles. If a strong signal is found approximately at this frequency, it indicates that the band has been adjusted to the image frequency. The normal image frequency for 15,000 kilocycles would be 15,000 kilocycles minus twice 456 kilocycles or approximately 14,100 kilocycles. Therefore a signal of this frequency may be found with the test oscillator generating a 15,000 kilocycle signal.

ALIGNMENT
MODELS 727X,727XD,827X,827XD, 867,877X,987,997X, and 1167.

A. Alignment of Intermediate-Frequency Stages

NOTE: All of the above models except the Model 1167 employ I-F transformers with two trimmers. The first I-F transformer of the Model 1167 is equipped with a third tuned circuit which results in three trimmers for this I-F stage.

(1) Turn on receiver and test oscillator and allow both to operate several minutes before attempting to adjust any condensers.

(2) Turn the band selector switch to the Broadcast position (with white diamond illuminated) and turn the station selector knob until the rotor plates are completely out of mesh with the stator plates.

(3) Connect "antenna" of test oscillator to the grid cap of a Type 6A8 converter tube and "ground" of test oscillator to chassis frame of receiver. Connect output meter "high tap" from plate of power output tube to ground. Note: It is advisable to read carefully the operating instructions included with the test oscillator.

(4) Tune test oscillator to obtain a signal of 456 kilocycles.

(5) Turn the volume control of receiver on full and adjust I-F trimmers C44, C45 (C41, C42 on Model 987; C59, C60 on Model 1167) which are reached from the top of the chassis. NOTE: The intermediate frequency circuits are quite selective and care must be taken to insure proper adjustment.

B. Alignment of Broadcast Band

(1) Disconnect "antenna" lead of test oscillator from grid cap of converter tube and connect in series with a 200 mmf. condenser dummy antenna to the antenna terminal of the chassis.

(2) Tune receiver and test oscillator to a frequency of 1500 kilocycles and adjust condensers C8, C5 and C2 in the order given.

(3) Tune test oscillator and receiver to 600 kilocycles and adjust condenser C11.

(4) Retune test oscillator and receiver to 1500 kilocycles and check the adjustments of condensers C8, C5 and C2.

(5) Calibration of the broadcast band should also be checked at 900 kilocycles and 600 kilocycles.

C. Alignment of Long-Wave Band
(Except Models 867 and 987)

(1) Turn the band selector switch to the long-wave position (yellow diamond illuminated).

(2) Tune test oscillator and receiver to 345 kilocycles and adjust condensers C41, C40 and C38.

(3) Tune test oscillator and receiver to 150 kilocycles and adjust condenser C42.

(4) Retune test oscillator and receiver to 345 kilocycles and check the adjustments of condensers C41, C40 and C38.

D. Alignment of 1st. Short-Wave Band

(1) Turn band selector switch to the 1st short-wave band (red diamond illuminated).

(2) Tune test oscillator and receiver to 6 megacycles and adjust condensers, C9, C6 and C3.

(3) Tune test oscillator and receiver to 1.95 megacycles and adjust condenser C12.

(4) Retune test oscillator and receiver to 6 megacycles and check the adjustments of condensers C9, C6 and C3.

E. Alignment of 2nd. Short-Wave Band

(1) Connect the 100 ohm non-inductive dummy antenna resistor in series with the 200 mmf. condenser connected between the test oscillator "antenna" lead and the grid cap of the 6A8 converter tube.

(2) Turn the band selector switch to the 2nd short-wave band (blue diamond illuminated).

(3) Tune test oscillator and receiver to 18 megacycles and adjust condensers C10, C7 and C4.

(4) Tune test oscillator and receiver to 6 megacycles and adjust condenser C13.

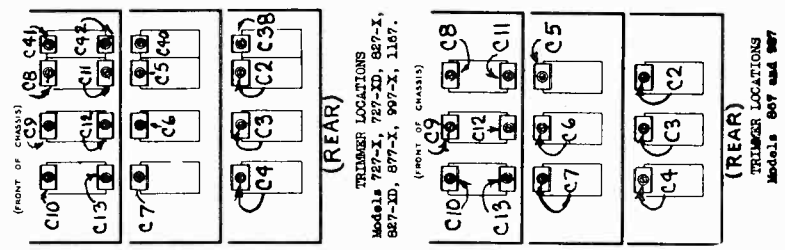
(5) Retune test oscillator and receiver to 18 megacycles and check adjustments of condensers C10, C7 and C4.

IMPORTANT: To obtain the best sensitivity at 18 megacycles on this band, the dial should be turned back and forth slightly while adjusting the antenna and R.F. trimmers.

CAUTION: On this band care must be taken to adjust the various condensers to the fundamental of the signal and not to the image. The image signal is equal to the fundamental minus twice the intermediate frequency of the receiver. A set that is adjusted to the image frequency instead of to the fundamental may be detected by tuning over the band and checking the sensitivity at various points. If a dead spot appears near the center of the band, the adjustable condensers for that band have probably been adjusted to the image instead of the fundamental.

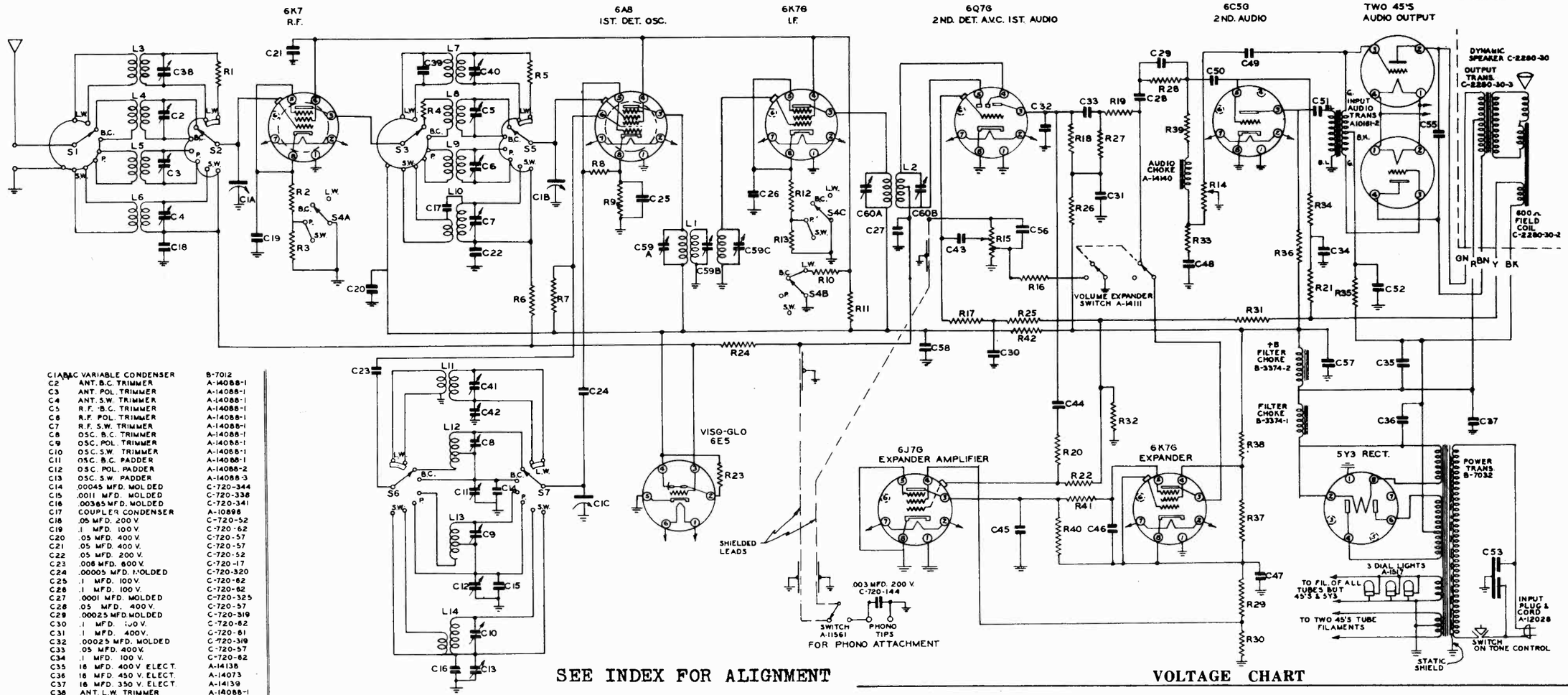
This type of mis-alignment may also be detected by tuning the test oscillator to a frequency of 15 megacycles and the station selector to approximately 15,900 kilocycles. If a strong signal is found approximately at this frequency, it indicates that the band has been adjusted to the image frequency. The normal image frequency for 15 megacycles or 15,000 kilocycles would be 15,000 kilocycles minus twice 456 kilocycles or approximately 14,100 kilocycles. Therefore a signal of this frequency may be found with the test oscillator generating a 15 megacycle signal.

CAUTION: All adjustments should be rechecked to assure accuracy and stability of adjustment and calibration.



SPARKS WITHINGTON CO.

MODEL 1167
Schematic, Voltage
Parts



C1A&C	VARIABLE CONDENSER	B-7012
C2	ANT. B.C. TRIMMER	A-14088-1
C3	ANT. POL. TRIMMER	A-14088-1
C4	ANT. S.W. TRIMMER	A-14088-1
C5	R.F. B.C. TRIMMER	A-14088-1
C6	R.F. POL. TRIMMER	A-14088-1
C7	R.F. S.W. TRIMMER	A-14088-1
C8	OSC. B.C. TRIMMER	A-14088-1
C9	OSC. POL. TRIMMER	A-14088-1
C10	OSC. S.W. TRIMMER	A-14088-1
C11	OSC. B.C. PADDER	A-14088-1
C12	OSC. POL. PADDER	A-14088-2
C13	OSC. S.W. PADDER	A-14088-3
C14	.00045 MFD. MOLDED	C-720-344
C15	.0011 MFD. MOLDED	C-720-338
C16	.00365 MFD. MOLDED	C-720-341
C17	COUPLER CONDENSER	A-10898
C18	.05 MFD. 200 V.	C-720-52
C19	.1 MFD. 100 V.	C-720-62
C20	.05 MFD. 400 V.	C-720-57
C21	.05 MFD. 400 V.	C-720-57
C22	.05 MFD. 200 V.	C-720-52
C23	.008 MFD. 600 V.	C-720-17
C24	.00005 MFD. MOLDED	C-720-320
C25	.1 MFD. 100 V.	C-720-62
C26	.1 MFD. 100 V.	C-720-62
C27	.0001 MFD. MOLDED	C-720-325
C28	.05 MFD. 400 V.	C-720-57
C29	.00025 MFD. MOLDED	C-720-319
C30	.1 MFD. 400 V.	C-720-62
C31	.1 MFD. 400 V.	C-720-61
C32	.00025 MFD. MOLDED	C-720-319
C33	.05 MFD. 400 V.	C-720-57
C34	.1 MFD. 100 V.	C-720-62
C35	18 MFD. 400 V. ELECT.	A-14138
C36	18 MFD. 450 V. ELECT.	A-14073
C37	18 MFD. 350 V. ELECT.	A-14139
C38	ANT. L.W. TRIMMER	A-14088-1
C39	.00025 MFD. MOLDED	C-720-319
C40	R.F. L.W. TRIMMER	A-14088-1
C41	OSC. L.W. TRIMMER	A-14088-1
C42	OSC. L.W. PADDER	A-14088-3
C43	.05 MFD. 200 V.	C-720-52
C44	.008 MFD. 600 V.	C-720-17
C45	.3 MFD. 200 V.	C-720-91
C46	.2 MFD. 200 V.	C-720-87
C47	.5 MFD. 200 V.	C-720-104
C48	.001 MFD. 400 V.	C-720-136
C49	.01 MFD. 400 V.	C-720-25
C50	.01 MFD. 200 V.	C-720-20
C51	.2 MFD. 400 V.	C-720-88
C52	.3 MFD. 200 V.	C-720-31
C53	.006-.006 MFD. 600 V.	C-720-150
C55	.01 MFD. 600 V.	C-720-105
C56	.00025 MFD. MOLDED	C-720-319
C57	25 MFD. 325 V. ELECT.	A-14184
C58	.1 MFD. 400 V.	C-720-61
C59A,B&C	NO. 1 I.F. TRIMMER	A-14152
C60A&B	NO. 2 I.F. TRIMMER	A-14375

L1	NO. 1 I.F. COIL	A-14149
L2	NO. 2 I.F. COIL	A-12989-2
L3	ANT. L.W. COIL	A-14243-4
L4	ANT. B.C. COIL	A-14243-1
L5	ANT. POL. COIL	A-14243-2
L6	ANT. S.W. COIL	A-14243-3
L7	R.F. L.W. COIL	A-14242-4
L8	R.F. B.C. COIL	A-14242-1
L9	R.F. POL. COIL	A-14242-2
L10	R.F. S.W. COIL	A-14242-3
L11	OSC. L.W. COIL	A-14241-4
L12	OSC. B.C. COIL	A-14241-1
L13	OSC. POL. COIL	A-14241-2
L14	OSC. S.W. COIL	A-14241-3

NO.	FROM BACK OF SET
S1	ANT. PRI. SECTION
S2	ANT. SEC. SECTION
S3	R.F. PRI. SECTION
S4A	R.F. BAIS SECTION
S4B	SCREEN SECTION
S4C	I.F. BAIS SECTION
S5	R.F. SEC. SECTION
S6	OSC. PRI. SECTION
S7	OSC. SEC. SECTION

R1	100 Ω	1W.	C-2794-50B
R2	270 Ω	.25W.	C-2795-55B
R3	1000 Ω	.25 W.	C-2795-62B
R4	2200 Ω	.1 W.	C-2794-66B
R5	100 Ω	.1 W.	C-2794-50B
R6	100 000 Ω	.25W	C-2795-25B
R7	22 000 Ω	.5 W.	C-2796-78C
R8	56 000 Ω	.25W.	C-2795-83B
R9	330 Ω	.25 W.	C-2795-58B
R10	22 000 Ω	.5 W.	C-2796-78C
R11	15 000 Ω	2 W.	C-2798-187A
R12	270 Ω	.25 W.	C-2795-55B
R13	470 Ω	.25 W.	C-2795-58B
R14	TONE CONTROL & A.C. SWITCH		A-14137
R15	VOLUME CONTROL		A-14110
R16	56 000 Ω	.25 W.	C-2795-83B
R17	.1 MEGOHM	.25 W.	C-2795-98B
R18	270 000 Ω	.25 W.	C-2795-91B
R19	100 000 Ω	.25 W.	C-2795-25B
R20	1 MEGOHM	.25 W.	C-2795-98B
R21	270 000 Ω	.25 W.	C-2795-91B
R22	470 000 Ω	.25 W.	C-2795-94B
R23	1 MEGOHM	.25 W.	C-2795-98B
R24	1 MEGOHM	.25 W.	C-2795-98B
R25	470 000 Ω	.25 W.	C-2795-94B
R26	56 000 Ω	.25 W.	C-2795-83B
R27	680 000 Ω	.25 W.	C-2795-96B
R28	120 000 Ω	.25 W.	C-2795-87B
R29	82 00 Ω	1 W.	C-2797-181A
R30	2400 Ω	.5 W.	C-2798-168A
R31	27 OHMS	.25 W.	C-2795-121B
R32	2.7 OHMS	.25 W.	C-2795-121B
R33	100 000 Ω	.25 W.	C-2795-25B
R34	470 000 Ω	.25 W.	C-2795-94B
R35	56 000 Ω	.25 W.	C-2795-83B
R36	27 000 Ω	1 W.	C-2797-79A
R37	750 OHMS	.25 W.	C-2795-156B
R38	27 000 Ω	2 W.	C-2798-193A
R39	27000 Ω	.25 W.	C-2795-79B
R40	470 000 Ω	.25 W.	C-2795-94B
R41	1 MEGOHM	.25 W.	C-2795-98B
R42	910 OHM	2 W.	C-2798-158A

SEE INDEX FOR ALIGNMENT

SCHEMATIC DIAGRAM
SPARTON SUPERHETERODYNE MODEL 1167
INTERMEDIATE FREQUENCY 456 K.C.

* 250 volt scale
** 25 volt scale
*** Cannot be measured

† 100 volt scale
†† 50 volt scale
††† 5 volt filament

(ORIGINAL) EFFECTIVE OCT 18, 1936

VOLTAGE CHART

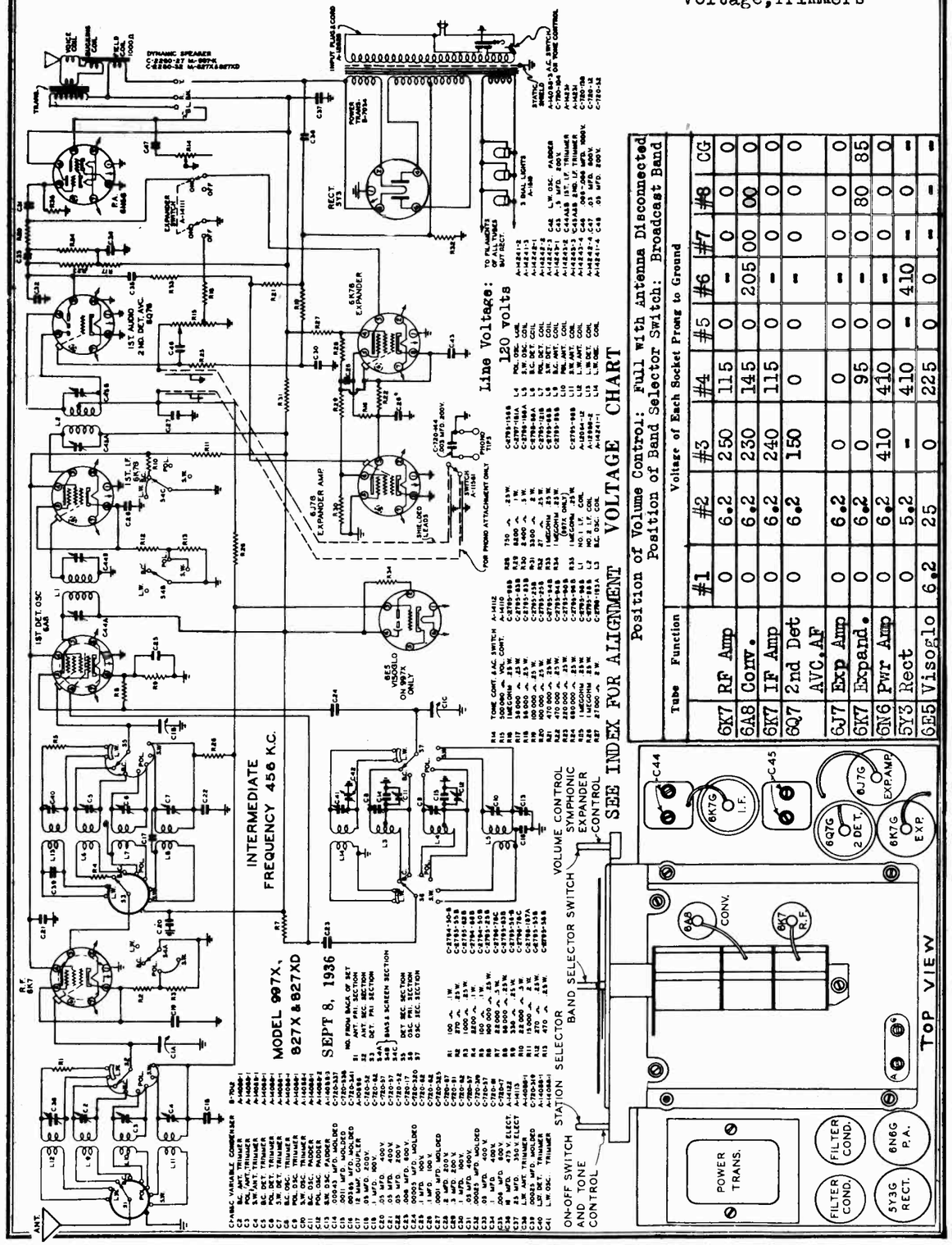
Line Voltage: 118 volts — Position of Volume Control: Full with Antenna Disconnected
Symphonic Expander Control: Off — Position of Band Selector Switch: Broadcast Band

Tube	Function	Voltage of Each Socket Prong to Ground (See Prong Numbers on Schematic Diagram)								
		Prong No. 1	Prong No. 2	Prong No. 3	Prong No. 4	Prong No. 5	Prong No. 6	Prong No. 7	Prong No. 8	Grid Cap
6K7	R-F Amplifier	0	0	240	100	0	-	6.1	0	0
6A8	1st. Det-Oscillator	0	0	250	115	0	225	6.1	0	0
6K7G	I-F Amplifier	0	6.1	245	100	0	-	0	0	0
6Q7G	2 Det-AVC-1st A-F Amplifier	0	0	105	0	0	0	6.1	0	0
6J7G	Expander Amplifier	0	0	25*	15**	0	-	6.1	0	0
6K7G	Symphonic Expander	0	0	0	74	4†	68	6.1	68	68
6C5G	2nd. A-F Amplifier	0	0	240	-	***	***	6.1	0	-
45	Power Amplifier	1.1	280	32††	1.1	-	-	-	-	-
45	Power Amplifier	1.1	280	32††	1.1	-	-	-	-	-
5Y3G	Rectifier	-	†††	-	370	-	370	-	†††	-
6E5	Viso-Glo	6.1	20†	0	250	0	0	-	-	-

Notes: Voltage readings are for schematic diagram. Allow 15% + or - on all measurements. Always use meter scale which will give greatest deflection within scale limits except as noted below. All measurements made with Weston Selective Analyzer No. 665, Type 2.

MODELS 827X, 827XD, 997X
Schematic, Socket, Parts
Voltage, Trimmers

SPARKS-WITHINGTON CO.



Line Voltage: 120 volts

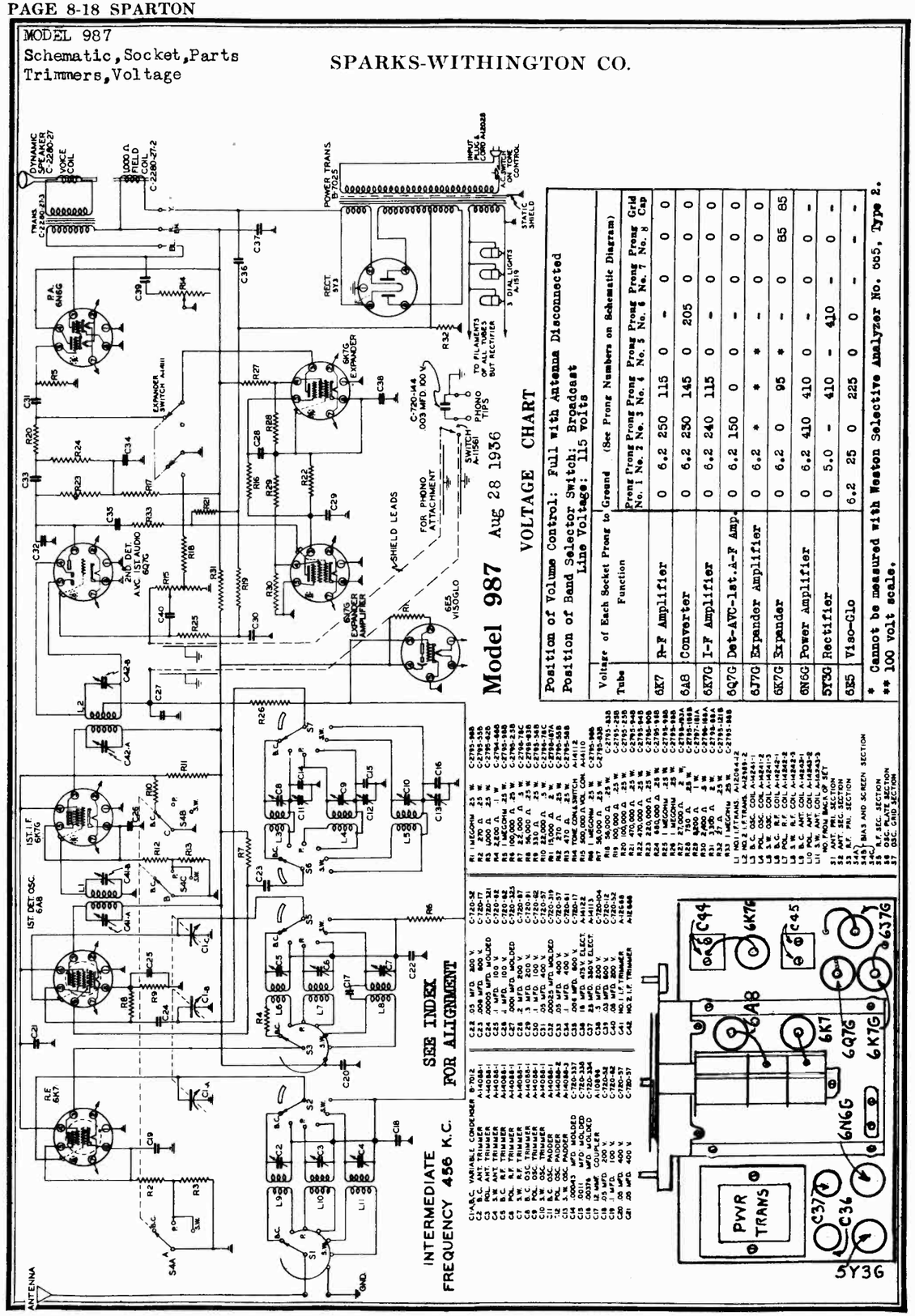
VOLTAGE CHART

Position of Volume Control: Full with Antenna Disconnected
Position of Band Selector Switch: Broadcast Band

Tube	Function	Voltage of Each Socket Prong to Ground #1	#2	#3	#4	#5	#6	#7	#8	CG
6K7	RF Amp	0	6.2	250	115	0	-	0	0	0
6A8	Conv.	0	6.2	230	145	0	205	00	00	0
6K7	IF Amp	0	6.2	240	115	0	-	0	0	0
6Q7	2nd Det AVC, AF	0	6.2	150	0	0	-	0	0	0
6J7	Exp Amp	0	6.2	0	0	0	-	0	0	0
6K7	Expand.	0	6.2	0	95	0	-	0	80	85
6N6	Pwr Amp	0	6.2	410	410	0	-	0	0	-
5Y3	Rect	0	5.2	-	410	-	410	-	0	-
6E5	Visoglo	6.2	25	0	225	0	0	-	-	-

MODEL 987
Schematic, Socket, Parts
Trimmers, Voltage

SPARKS-WITHINGTON CO.



VOLTAGE CHART

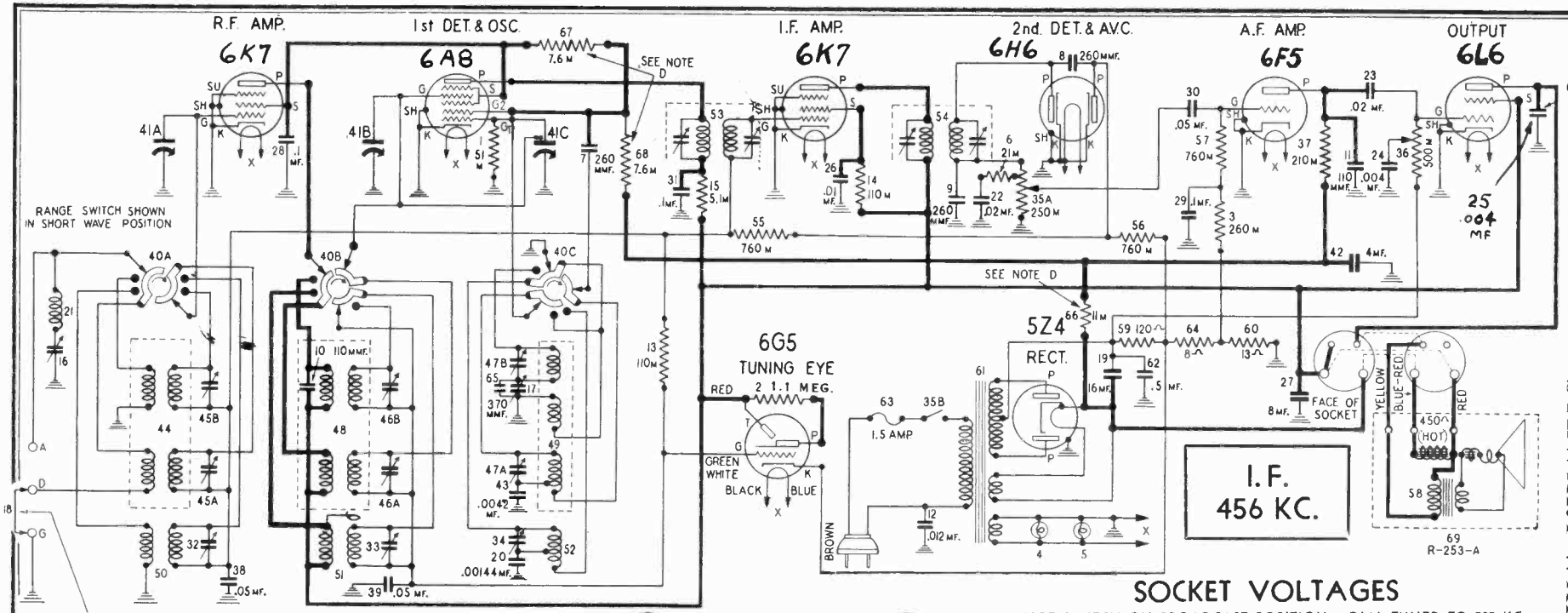
Position of Volume Control: Full with Antenna Disconnected
Position of Band Selector Switch: Broadcast
Line Voltage: 115 volts

Tube	Function	Voltage of Each Socket Prong to Ground (See Prong Numbers on Schematic Diagram) Prong No. 1	Prong No. 2	Prong No. 3	Prong No. 4	Prong No. 5	Prong No. 6	Prong No. 7	Prong No. 8	Grid Cap
6K7	R-F Amplifier	0	6.2	250	115	0	-	0	0	0
6A8	Converter	0	6.2	250	145	0	205	00	00	0
6K7G	I-F Amplifier	0	6.2	240	115	0	-	0	0	0
6Q7G	Det-AVC-1st.a-F Amp.	0	6.2	150	0	0	-	0	0	0
6J7G	Expander Amplifier	0	6.2	*	*	*	-	0	0	0
6K7G	Expander	0	6.2	0	95	*	-	0	85	85
6N6G	Power Amplifier	0	6.2	410	410	0	-	0	0	-
5Y3G	Rectifier	0	5.0	-	410	-	410	-	0	-
6E5	Visoglo	6.2	25	0	225	0	0	-	-	-

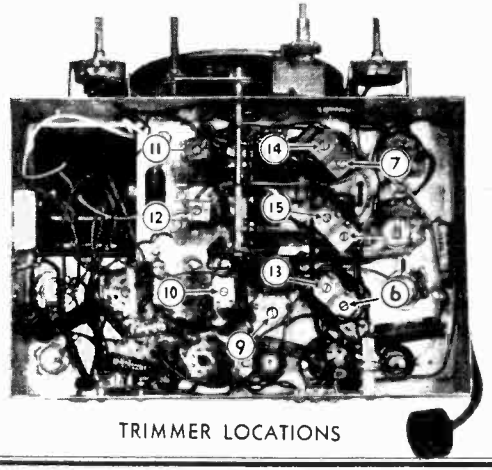
* Cannot be measured with Weston Selective Analyzer No. 665, Type 2.
** 100 volt scale.

STEWART-WARNER CORP.

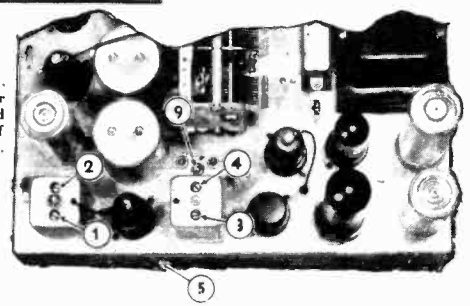
MODELS 1471 to 1479
Chassis R-147
Schematic, Socket



NOTE D:
In receivers having serial numbers below 351,736, resistor 67 is omitted, and the screen grids of the 6K7, R.F. amplifier and the 6A8 receive their current through a 31,000 ohm, 1 watt carbon resistor which is connected to the screen grid of the 6L6. In addition, resistor 66 has a rating of 30,000 ohms, 1 watt and resistor 68 has a rating of 16,000 ohms, ¼ watt.



TRIMMER LOCATIONS

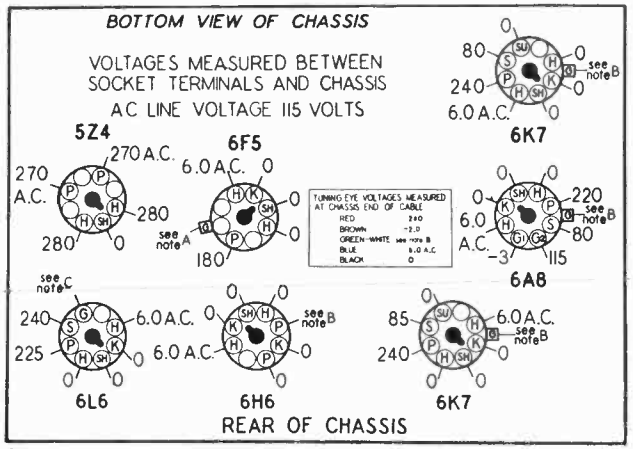


ALIGNMENT

Trimmer Number		Alignment Frequency
1	1st I.F. transformer trimmer	456 KC.
2	1st I.F. transformer trimmer	456 KC.
3	2nd I.F. tranformer trimmer	456 KC.
4	2nd I.F. tranformer trimmer	456 KC.
5	Wave trap trimmer	456 KC.
6	Broadcast oscillator shunt trimmer	1500 KC.
7	Broadcast antenna shunt trimmer	1500 KC.
8	Broadcast detector shunt trimmer	1500 KC.
9	Broadcast oscillator series padder	600 KC.
10	Police oscillator shunt trimmer	5 MC.
11	Police antenna shunt trimmer	5 MC.
12	Police detector shunt trimmer	5 MC.
13	Short wave oscillator shunt trimmer	16 MC.
14	Short wave antenna shunt trimmer	16 MC.
15	Short wave detector shunt trimmer	16 MC.

SOCKET VOLTAGES

RANGE SWITCH ON BROADCAST POSITION
VOLUME CONTROL ON FULL
DIAL TUNED TO 525 KC.
ANTENNA GROUNDED



IMPORTANT: Use a high resistance voltmeter of 1000 ohms per volt.

NOTE A: The grid bias for the 6F5 is −1.3 volts measured across resistor 60.

NOTE B: The grid bias for the 6A8, 6K7's, and the anode voltage of the A.V.C. section of the 6H6 is −2.0 volts measured across resistors 60 and 64.

NOTE C: The grid bias for the 6L6 output tube is −13.0 volts measured across resistor 59, 64 and 60.

MODELS 1471 to 1479
Chassis R-147
Alignment, Parts

STEWART-WARNER CORP.

MODEL R-147

ALIGNING THE I. F. AMPLIFIER: Turn the volume control to maximum volume position and keep it in this position throughout the entire alignment procedure. Turn the range switch to the broadcast position (fully clockwise).

Connect the test oscillator output leads to the 6A8 control grid and chassis with a **.1 mfd. condenser in series with the oscillator output.** Set the oscillator to exactly 456 KC. Set the receiver dial at any point where it has no tuning effect on the oscillator signal.

Adjust the four I.F. trimmers, Nos. 1, 2, 3 and 4, for maximum output meter deflection, then repeat the trimmer adjustment.

WAVE-TRAP ADJUSTMENT: The wave-trap adjusting trimmer, No. 5, is located on the back of the chassis. Leave the test oscillator at 456 KC. Connect the oscillator output to the A and G terminals with a 400 ohm resistor in series with the A terminal and oscillator output. Then adjust the wave-trap trimmer No. 5 for **minimum** output. If some particular station with a frequency near 456 KC. causes code interference, it may be desirable to adjust the wave-trap on the actual frequency of the interfering station.

BROADCAST BAND CALIBRATION AND ALIGNMENT: With the gang condenser in full mesh, the dial pointer should be on the white horizontal line below 530 KC. on the dial scale. Leave the range switch in the extreme clockwise position, and leave the test oscillator connected to the A and G terminals of the receiver through a 400 ohm resistor.

Adjust the test oscillator to exactly 1500 KC. and turn the receiver dial pointer to 1500 KC. on the tuning dial. To calibrate the dial, adjust trimmer No. 6 for maximum output.

Carefully tune the receiver to the signal and adjust trimmers Nos. 7 and 8 for maximum output.

Adjust the test oscillator to 600 KC. and tune the receiver to the signal. Adjust trimmer No. 9 for maximum output. Then try to increase the output meter reading by detuning No. 9 slightly and retuning the receiver dial. If the output goes down, detune the trimmer in the opposite direction. Continue detuning the trimmer and retuning the receiver dial until maximum output meter deflection is secured. This operation is commonly known as "rocking" and when performed as described will give maximum selectivity and sensitivity even though the dial may be slightly off calibration at 600 KC.

BAND NO. 2 CALIBRATION AND ALIGNMENT: Turn the range switch to the center position.

Adjust the test oscillator to exactly 5.0 MC. and turn the receiver dial pointer to exactly 5.0 MC. on the tuning dial.

To calibrate the dial, adjust trimmer No. 10 for maximum output. If two peaks are found, the proper one is that with the trimmer screw farthest **out.**

Carefully tune the receiver to the signal and adjust trimmers Nos. 11 and 12 for maximum output. Then try to increase the output by detuning No. 12 slightly and retuning the receiver dial. Continue detuning No. 12 and retuning the dial until the output meter deflection is a maximum. Then readjust No. 11 for maximum output.

BAND NO. 3 CALIBRATION AND ALIGNMENT: Turn the range switch to the extreme counter-clockwise position. Be sure the D and G terminals on the antenna terminal strip are connected together.

Set the test oscillator to 16 MC. and turn the receiver dial pointer to exactly 16 MC. on the tuning dial.

To calibrate the dial, adjust trimmer No. 13 for maximum output. Check to see that it has been adjusted to the proper peak by tuning the receiver to approximately 15.1 MC. A repeat signal should be heard at this point. If none is present, even with greatly increased oscillator output, retune the receiver to 16 MC. and adjust trimmer No. 13 to the proper peak with the trimmer screw farther **out.**

Carefully tune the receiver to the signal and adjust trimmers Nos. 14 and 15 to a peak. Then try to increase the output by detuning No. 15 slightly and retuning the dial until a maximum output meter deflection is secured. Then readjust No. 14 for maximum output. Check the adjustment by tuning the receiver to the image at about 15.1 MC. The image should be much weaker than the 16 MC. signal. If the signal at 15.1 MC. dial setting is equal to or stronger than the 16 MC. signal, trimmer No. 15 is not set to the proper peak. Turn this trimmer in a turn or so, then readjust as above.

MODEL R-147 PARTS LIST

Diagram Number	Part Number	Description	List Price
1	83080	51,000 ohm ¼ watt carbon resistor	$ .20
2	84235	1.1 megohm ¼ watt carbon resistor	.12
3	83082	260,000 ohm ¼ watt carbon resistor	.20
4-5	83278	Pilot lamp No. 40, 6-8 volts	.15
6	83286	21,000 ohm ¾ watt carbon resistor	.20
7-8-9	83539	260 mmfd. mica condenser	.15
10-11	83783	110 mmfd. mica condenser	.20
12	83976	.012 mfd. 1000 V. shielded condenser	.35
13-14	84198	110,000 ohms ¼ watt carbon resistor	.30
15	84720	5100 ohms ¼ watt carbon resistor	.12
16	85285	Wave trap condenser	.40
17	85285	Padding condenser	.40
18	85321	Ground connector	.01
19	85431	16 mfd. 400 V. Electrolytic condenser	1.25
20	85562	.00144 mfd. mica condenser	.30
21	88014	Antenna trap coil	.50
22-23	88026	.02 mfd. 400 V. paper condenser	.30
24-25	88029	.004 mfd. 400 V. paper condenser	.30
26	88030	.01 mfd. 400 V. paper condenser	.30
27	88033	.8 mfd. 350 V. electrolytic condenser	1.10
28-29	88046	.1 mfd. 150 V. paper condenser	.30
30	88189	.05 mfd. 200 V. paper condenser	.35
31	88191	.1 mfd. 300 V. paper condenser	.35
32-33-34	88477	Trimmer condenser	.12
35A 35B	88487	Volume control (250,000 ohms) A. C. line switch	1.25
36	88488	Tone control (500,000 ohms)	.80
37	88532	210,000 ohms ¼ watt carbon resistor	.12
38-39	88534	.05 mfd. 150 V. condenser (low loss)	.24
40A to C	88573	Range switch	2.50
41A to C	88574	Three gang condenser	5.00
42	88576	4 mfd. 250 V. electrolytic condenser	.80
43	88587	.0042 mfd. mica condenser	.35
44	88592	Antenna coil and shield assem. (B.C.& S.W.) with trimmer	2.20
45A-45B 46A-46B 47A-47B	88596	Trimmer condenser	.25
48	88597	R. F. coil and shield assem. (B.C.&S.W.) with trimmer	2.40
49	88599	Oscillator coil and shield assem. (B.C.&S.W.) with trimmer	2.20
50	88602	Antenna coil assem.(Police)with trimmer	.85
51	88604	R. F. coil assem. (Police) with trimmer	1.00
52	88605	Oscil. coil assem. (Police) with trimmer	.70
53	88606	1st I.F. transformer	2.50
54	88607	2nd I.F. transformer	2.50
55-56-57	88854	760,000 ohms ¼ watt carbon resistor	.12
58	88870	Output transformer (on R-253 speaker)	2.50
59	88896	120 ohms 2 watt carbon resistor	.18
60	88897	13 ohms ½ watt carbon resistor	.12
61	88898	Power transformer, 115 volts—60 cycles	6.00
62	88990	.5 mfd. 150 V. paper condenser	.35
63	89002	Fuse, 1.5 amperes	.10
64	89004	8 ohms ½ watt wire wound resistor	.15
65	89525	370 mmfd. mica condenser	.32
66	89751	11,000 ohm 1 watt carbon resistor	.12
67	89752	7,600 ohm ½ watt carbon resistor	.12
68	89754	7,600 ohm 1 watt carbon resistor	.12
69	R-253-A	12 inch dynamic speaker	11.50

MISCELLANEOUS PARTS

Part No.	DESCRIPTION	
67977	#14 x 1¼ chassis mtg. screw	$0.03
77381	Flat steel washer	.01
84128	Rubber chassis mtg. bushing	.03
85066	G.D.A. terminal strip	.20
85321	Ground connector	.01
88056	Fuse strip	.16
88057	Fuse cover	.06
88675	Speaker socket	.12
88831	Bracket for range selector shaft	.02
88832	Shaft for range selector knob	.10
88956	Escutcheon with glass	1.65
88975	Link and lever assembly	.14
88982	Compression spring	.01
88985	Tuning knob, front section	.20
88986	Tuning knob, rear section	.25
88995	Escutcheon for tuning eye	.30
88996	Knob, range switch	.15
89027	Spring washer (for planetary drive)	.01
89038	Knob; tone and volume controls	.20
89119	Tuning indicator cable and plug	1.50

TUNING DRIVE AND DIAL PARTS

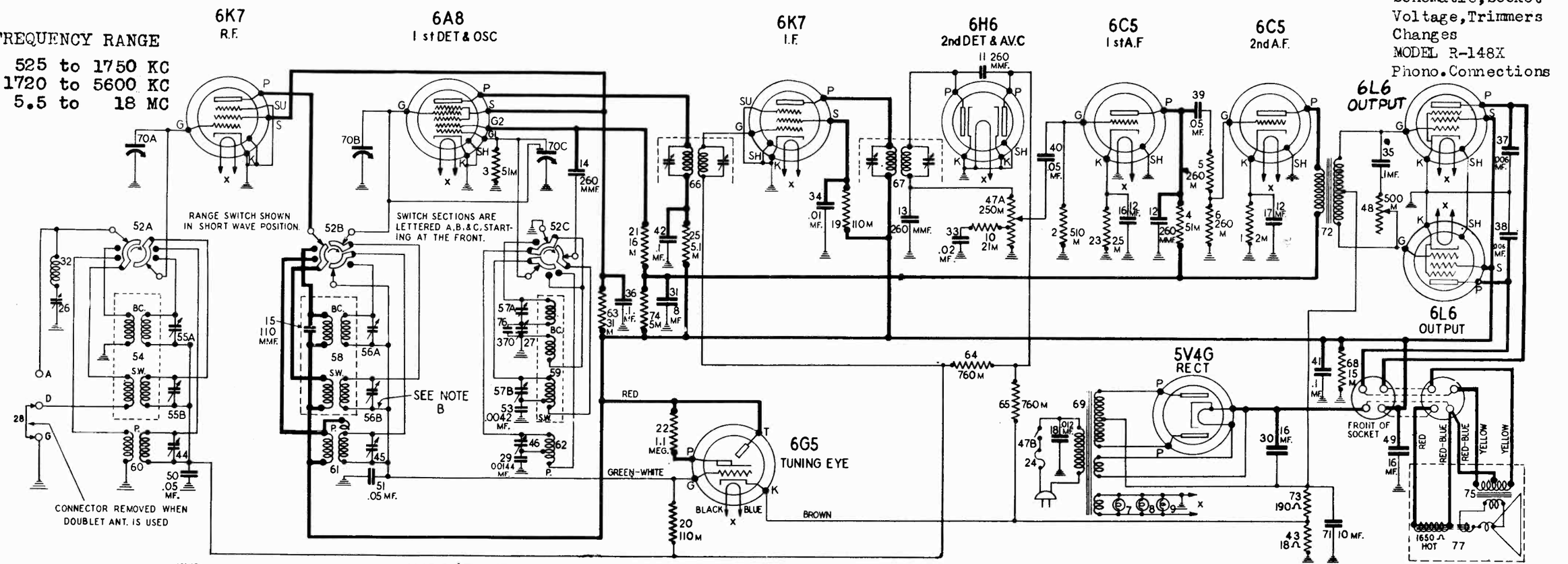
Part No.	DESCRIPTION	
83278	Pilot lamp #40 6-8 volts	$0.15
85902	Dual ratio planetary dial drive	.90
88835	Idler gear and pinion assembly	.25
88839	Tension spring (for idler gear)	.10
88840	Dial disc and bushing assembly	.40
88844	Dial ring bracket and shaft assembly (for edge lighting)	1.00
88900	Dial scale (for rear lighting)	2.00
88977	Band indicator and link assembly	.60
88998	Second pointer	.05
89001	Main pointer and stud assembly	.10
89144	Tension spring (for idler gear)	.10
89283	Pilot lamp socket	.10
89284	Pilot lamp shield	.02
89287	Dial scale (for edge lighting)	1.75
89288	Dial background (with edge lighting)	.12
89297	Bracket and light bracket assembly (for idler gear)	.20
89484	Dial ring bracket and shaft assembly (for rear lighting)	1.10

PRICES SUBJECT TO CHANGE WITHOUT NOTICE

STEWART-WARNER CORP.

MODELS 1481 to 1489
Chassis R-148
Schematic, Socket Voltage, Trimmers Changes
MODEL R-148X
Phono. Connections

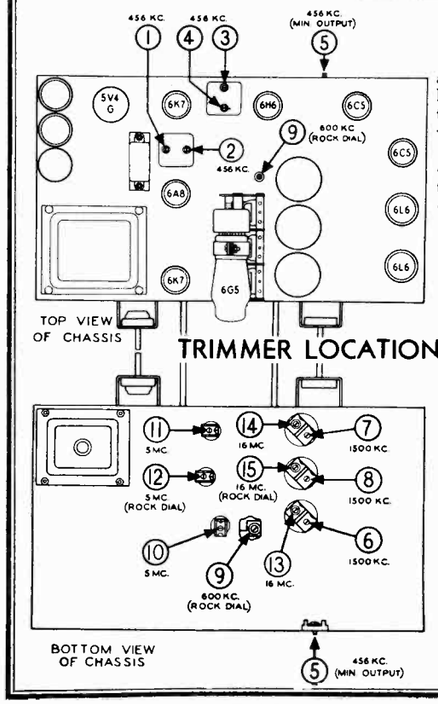
FREQUENCY RANGE
525 to 1750 KC
1720 to 5600 KC
5.5 to 18 MC



IMPORTANT

In aligning this chassis it is absolutely essential to connect a .1 to .25 mfd. condenser in series with the oscillator output lead when aligning the I.F. trimmers. If no condenser is used, the oscillator may short out all bias on the 6A8 and 6K7 tubes which results in improper alignment.

In aligning all other trimmers but the I.F. trimmers, a 400 or 500 ohm carbon resistor must be connected in series with the oscillator output and receiver antenna terminal. **Do not omit this resistor or the alignment will be incorrect.**



TRIMMER LOCATIONS

ALIGNMENT

I.F. AMPLIFIER

Trimmer No.

1, 2 — First I.F. transformer trimmers
3, 4 — Second I.F. transformer trimmers

WAVE TRAP

5 — 456 KC. wavetrap trimmer

BAND No. 1 (BROADCAST) (527 to 1750 KC.)

6 — Broadcast band oscillator shunt trimmer
7 — Broadcast band antenna shunt trimmer
8 — Broadcast band detector shunt trimmer
9 — Broadcast band oscillator series padder

BAND No. 2 (1720 to 5600 KC.)

10 — Band No. 2 oscillator shunt trimmer
11 — Band No. 2 antenna shunt trimmer
12 — Band No. 2 detector shunt trimmer

BAND No. 3 (5.5 to 18 MC.)

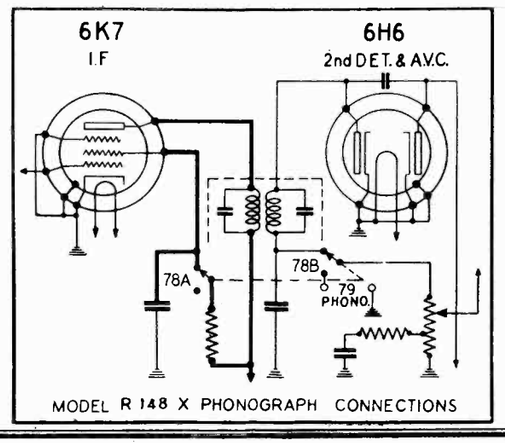
13 — Band No. 3 oscillator shunt trimmer
14 — Band No. 3 antenna shunt trimmer
15 — Band No. 3 detector shunt trimmer

NOTE B: In chassis stamped with the letter "H," the lead indicated does not connect to A.V.C. but is by-passed to ground through an .05 mfd. condenser and is connected through a 110,000 ohm resistor to a permanent bias of 1.8 volts at the Negative end of resistor No. 43.

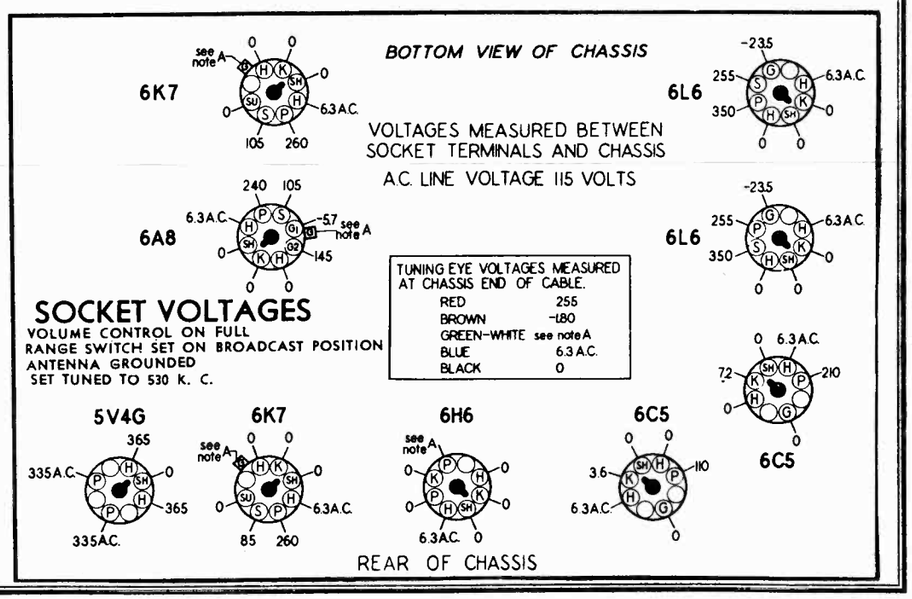
IMPORTANT: Use a high resistance voltmeter of 1,000 ohms per volt.

NOTE A: —1.8 volts measured across resistor 43.

I.F. FREQUENCY 456 KC.



MODEL R 148 X PHONOGRAPH CONNECTIONS



MODELS 1481 to 1489
Chassis R-148
Alignment, Parts

STEWART WARNER CORP.

ALIGNMENT OF THE I.F. AMPLIFIER

1. (a) Turn the volume control to maximum volume position and keep it in this position throughout the entire alignment procedure.

(b) Connect the test oscillator output leads to the 6A8 control grid and the chassis with a **.1 or .25 mfd. condenser in series with the oscillator lead to the 6A8 grid.**

(c) Set the test oscillator to exactly 456 KC. Adjust the output of the test oscillator to give about half scale deflection on the output meter.

(d) Turn the range switch to the extreme clockwise position and set the tuning dial to any point where there is no tuning effect on the oscillator signal.

(e) Adjust the four I.F. transformer trimmers (trimmers No. 1, 2, 3, and 4) for maximum output meter deflection.

(f) Repeat the four trimmer adjustments, since the adjustment of each trimmer has some effect on the others.

2. (a) Leave the test oscillator at 456 KC. but connect the oscillator output to the A and G terminals of the receiver with a 400 or 500 ohm carbon resistor in series with the oscillator output and the A terminal.

(b) Adjust trimmer No. 5 for **minimum** output. Increase the oscillator output as necessary to obtain a clearly defined point of minimum output. If some particular station with a frequency slightly different than 456 KC. causes code interference, it may be advisable to adjust trimmer No. 5 on the actual frequency of the interfering station.

BAND NO. 1 (BROADCAST) CALIBRATION

3. (a) Check the position of the dial pointer on its shaft by turning the tuning knob until the rotor plates of the gang condenser are in full mesh. The slow-moving dial pointer should then coincide with the low frequency end of the dial scale. If it does not, hold the dial gear and turn the pointer to the correct position.

(b) Turn the range switch control to the extreme right position. (Clockwise.)

(c) Connect a 400 or 500 ohm carbon resistor in series with the test oscillator output and the receiver antenna terminal. (Note: This resistor should remain connected for all subsequent adjustments.

(d) Ground the receiver.

(e) Adjust the test oscillator to exactly 1500 KC.

(f) Tune in the 1500 KC. oscillator signal or a station above 1300 KC. on the dial and determine whether the dial calibration is correct at the high frequency end of the dial. If it is not correct, adjust trimmer No. 6 to give proper calibration. Do not adjust this trimmer if the dial calibration is correct at the high frequency end of the dial.

BAND NO. 1 (BROADCAST) ALIGNMENT

4. (a) With the test oscillator set at 1500 KC. tune the receiver to the signal for maximum output.

(b) Adjust trimmers No. 7 and 8 for maximum output. Do not touch trimmer No. 6 as this will change the calibration.

(c) Adjust the test oscillator to exactly 600 KC. and tune the receiver to the signal. Adjust trimmer No. 9 for maximum output. Then try to increase the output by detuning the trimmer and retuning the receiver dial. If this reduces the output, detune the trimmer on the opposite direction. Continue detuning the trimmer and retuning the dial until a maximum output meter deflection is secured. This operation is commonly known as "rocking." The object of this adjustment is to find the combination of trimmer adjustment and tuning condenser position which gives the maximum output. This adjustment should not be changed regardless of whether the dial reads exactly 600 KC. or slightly off 600 KC. for maximum output.

(d) Check the adjustment of trimmers Nos. 6, 7 and 8 at 1500 KC.

BAND NO. 2 CALIBRATION

5. (a) Turn the range switch to the center position.

(b) Adjust the test oscillator to exactly 5.0 MC.

(c) Tune in the 5 MC. oscillator signal at or near 5 MC. on the receiver dial to determine whether the receiver dial calibration is correct at 5 MC. If it is, do not adjust trimmer No. 10. If the calibration is incorrect, set the dial pointer at 5 MC. on the dial, and adjust trimmer No. 10 until the oscillator signal comes in at this point. If there are two peaks, the proper one is that with the trimmer screw farthest **out.**

BAND NO. 2 ALIGNMENT

6. (a) With the test oscillator set at 5.0 MC., tune the receiver for maximum output.

(b) Adjust trimmer No. 11 and 12 for maximum output. After this is done try to increase the output meter reading by detuning No. 12 slightly and retuning the receiver dial. If the output goes down, detune the trimmer in the opposite direction. Continue detuning No. 12 and retuning the set until maximum output meter deflection is secured. Then readjust No. 11

BAND NO. 3 CALIBRATION

7. (a) Turn the range switch to the extreme left (counter clockwise.)

(b) Be sure that the D and G terminals on the antenna terminal strip are connected together.

(c) Adjust the test oscillator to exactly 16 megacycles.

(d) Tune in the 16 MC. oscillator signal at or near 16 MC. on the receiver dial to determine whether the receiver dial calibration is correct at 16 MC. If it is, do not adjust trimmer No. 13. If the calibration is incorrect, set the receiver dial pointer exactly at 16 MC. and adjust trimmer No. 13 until the oscillator signal comes in at this point.

(e) Check to see that trimmer No. 13 is adjusted to the proper peak by tuning the receiver to approximately 15.1 MC. If a repeat signal is not heard at this point, even with greatly increased oscillator output, retune the receiver to 16.0 MC. and adjust trimmer No. 13 to the proper peak with the trimmer screw farther **out.**

BAND NO. 3 ALIGNMENT

8. (a) With the test oscillator set at 16 MC. tune the receiver for maximum output.

(b) Adjust trimmer No. 14 and 15 for maximum output. After this is done, try to increase the output meter deflection by detuning No. 15 slightly and retuning the receiver dial. If this causes the output to drop, detune the trimmer in the opposite direction. Continue detuning No. 15 and retuning the set until the output is at a maximum. Then readjust No. 14.

(c) Check the adjustment of No. 15 by tuning the receiver to the image at 15.1 MC. and noting if the image is much weaker than the 16 MC. signal. If the signal at 15.1 MC. dial setting is equal to or stronger than the 16 MC. signal, trimmer No. 15 is not set to the proper peak. Turn the trimmer in a turn or so, then readjust as in 8 (b).

Diag. No.	Part No.	DESCRIPTION	List Price
1	67303	2000 ohm ¼ watt carbon resistor	$0.15
2	83072	510,000 ohm ¼ watt carbon resistor	.12
3-4	83080	51,000 ohm ¼ watt carbon resistor	.12
5-6	83082	260,000 ohm ¼ watt carbon resistor	.12
7-8-9	83278	Pilot lamp (6-8 volt)	.15
10	83286	21,000 ohm ¼ watt carbon resistor	.12
11-12 / 13-14	83539	260 mmfd. mica condenser	.20
15	83783	110 mmfd. mica condenser	.20
16-17	83803	12 mfd. 15V. electrolytic condenser	.80
18	83976	.012 mfd. 1000 V. shielded condenser	.45
19-20	84198	110,000 ohm ¼ watt carbon resistor	.12
21	84199	16,000 ohm ¼ watt carbon resistor	.12
22	84235	1.1 megohm ¼ watt carbon resistor	.12
23	84236	2,500 ohm ¼ watt carbon resistor	.12
24	84672	Fuse, 2 amperes	.10
25	84720	5,100 ohm ¼ watt carbon resistor	.12
26	85285	Antenna trap condenser	.40
27	85285	Padding trimmer	.10
28	85321	Ground connector (on terminal strip)	.01
29	85562	.001440 mfd. mica condenser	.25
30	85583	16 mfd. 450 V. electrolytic condenser	2.50
31	88007	8 mfd. 250 V. electrolytic condenser	1.00
32	88014	Antenna trap coil	.50
33	88026	.02 mfd. 400 V. paper condenser	.25
34	88030	.01 mfd. 400 V. paper condenser	.25
35-36	88046	.1 mfd. 150 V. paper condenser	.25
37-38	88185	.006 mfd. 600 V. paper condenser	.25
39-40	88189	.05 mfd. 200 V. paper condenser	.25
41-42	88191	.1 mfd. 300 V. paper condenser	.25
43	88584	18 ohm ½ watt wire wound resistor	.15
44 / 45 / 46	88477	Trimmer condenser	.15
47A / 47B	88487	(Vol. control (250,000 ohm) Tap 50,000 ohms from ground and A.C. line switch	1.25
48	88488	Tone control (500,000 ohms)	.80
49	88511	16 mfd. 300 V. electrolytic condenser	1.10
50-51	88534	.05 mfd. 150 V. condenser (low loss)	.25
52A / 52B / 52C	88573	Range switch	2.50
53	88587	.0042 mfd. mica condenser	$0.35
54	88592	Ant. coil & shield (B.C. & S.W.) with trimmer	2.70
55A-55B / 56A-56B / 57A-57B	88596	Trimmer condenser	.30
58	88597	R.F. coil & shield (B.C. & S.W.) with trimmer	3.10
59	88599	Oscillator coil & shield (B.C. & S.W.) with trimmer	2.50
60	88602	Antenna coil assembly (Police) with trimmer	.85
61	88604	R.F. coil assembly (Police) with trimmer	.90
62	88605	Oscillator coil assembly (Police) with trimmer	.70
63	88852	31,000 ohm ¼ watt carbon resistor	.15
64-65	88854	760,000 ohm ¼ watt carbon resistor	.12
66	89005	1st I.F. transformer	2.50
67	89006	2nd I.F. transformer	2.40
68	89032	15,000 ohm bleeder resistor	.50
69	89035	Power transformer 115 V.—60 cycles (See Part No. 89473 for other voltages)	7.50
70A / 70B / 70C	89044	Variable gang condenser	5.20
71	89053	10 mfd. 25 V. electrolytic condenser	.92
72	89062	Push-pull input transformer	3.00
73	89065	190 ohm 3 watt wire wound resistor	.50
74	89255	5000 ohm 1 watt carbon resistor	.15
75	89293	Output transformer (R-254-A spkr.)	3.25
76	89525	370 mmfd. mica condenser	.30
77	R-254-A	12" dynamic speaker	12.75

PRICES SUBJECT TO CHANGE WITHOUT NOTICE

MODELS 1301 to 1309
Chassis R-130
Trimmers, Alignment, Parts

STEWART WARNER CORP.

MODEL R-130 CHASSIS (Receiver Models 1301 to 1309)

ALIGNING EQUIPMENT

Experience has definitely shown that a selective radio chassis such as the Stewart-Warner Model R130 cannot be properly aligned by ear or "on the air". **An output meter and a high grade modulated service oscillator are absolutely essential.**

The oscillator should be capable of generating the frequencies of 456 KC., 600 KC., 1400 KC., and a short wave range extending to 4000 K.C. or more.

When using your oscillator do not rely on calibration curves for frequency determination but check the frequencies by comparison with broadcast station signals.

PRELIMINARY STEPS

To align the R130 chassis proceed as follows:

1. Remove the chassis from the cabinet.
2. Connect the output meter across the primary of the output transformer on the dynamic speaker (red and yellow wires on terminal strip.)
3. Turn the volume control to maximum volume position.

ALIGNMENT OF THE I. F. AMPLIFIER

1. (a) Set the test oscillator to exactly 456 KC.

(b) Connect the output leads of the oscillator to the 6A7 control grid and ground.

(c) Set the range switch (right hand knob) to the broadcast position (fully clockwise). Make certain that no station is tuned in.

(d) Carefully adjust the I.F. transformer trimmers Nos. 1, 2, 3, and 4 for maximum output meter deflection.

(e) Repeat the four trimmer adjustments since the adjustment of each trimmer has some effect on the others.

BROADCAST RANGE CALIBRATION

1. Check the position of the pointer on the condenser shaft by turning the rotor plates of the gang condenser to full mesh by means of the tuning knob. The pointer should then coincide with the heavy horizontal line separating the broadcast and short-wave dial scales. If it does not, remove the dial glass and turn the pointer to the proper position, being careful not to break or bend the pointer.

2. Turn the range switch (right hand knob) to the maximum clockwise position, which is the broadcast setting.

3. To calibrate the set at the high frequency end, use a broadcast station signal between 1300 and 1420 KC. If no such station can be heard, you can use a 1400 KC. signal from your oscillator provided its calibration is accurately known.

(a) Turn the set dial to the exact frequency setting of the signal (either a station or the oscillator).

(b) Carefully adjust trimmer No. 5 (broadcast oscillator calibration trimmer) until the signal may be tuned in with maximum volume at its correct frequency setting.

BROADCAST RANGE ALIGNMENT

IMPORTANT

4. Connect a .0001 MICA CONDENSER in series with the test oscillator output and the blue receiver antenna lead. IT IS ABSOLUTELY ESSENTIAL THAT THIS CONDENSER REMAIN CONNECTED FOR ALL BROADCAST AND SHORT WAVE ADJUSTMENTS in order to secure proper alignment of the antenna stage. Do not connect any resistor in series with the .0001 mfd. condenser.

Ground the receiver chassis and connect the oscillator ground lead to the chassis.

5. (a) Set the test oscillator to approximately 1400 KC. and carefully tune the receiver to the signal.

(b) Adjust trimmers No. 6 and No. 7 (broadcast detector shunt trimmer and broadcast pre-selector shunt trimmer respectively) for maximum output meter reading.

(c) Retune the receiver and check the adjustments of trimmers No. 6 and No. 7. Do not touch trimmer No. 5 since this will change the calibration.

6. (a) Set the test oscillator to approximately 600 KC. and tune the receiver to the signal.

(b) Adjust trimmer No. 8 (broadcast oscillator padding trimmer) to get maximum output meter deflection.

(c) Retune the receiver dial to a peak and readjust trimmer No. 8:

(d) Continue this procedure of adjusting the trimmer and retuning the set until the output meter reading cannot be increased. **This procedure must be followed or the receiver will not be properly aligned.**

7. Repeat 5 a, 5 b, and 5 c.

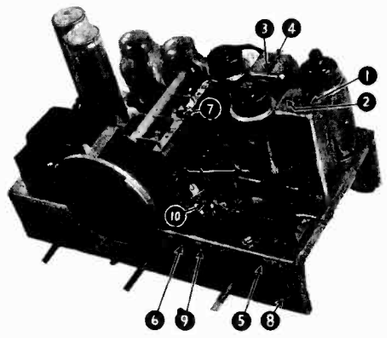
SHORT WAVE RANGE CALIBRATION

1. Turn the receiver range switch to the short wave band position (counter-clockwise).

2. Adjust the test oscillator to exactly 16,000 KC. If you cannot obtain this frequency on your oscillator, you may use the second harmonic of 8000 KC., or the fourth harmonic of 4000 KC., either of which will give a 16,000 KC. signal.

3. (a) Set the receiver dial at 16.0 MC. on the dial scale and adjust trimmer No. 9 (shortwave oscillator calibration trimmer) until the signal may be tuned in at the correct dial setting with maximum volume. There will be two peaks. The proper one is that with the trimmer screw farthest out.

(b) To be sure you have not adjusted trimmer No. 9 to the image frequency, check this point by setting the receiver dial to the image frequency, approximately 15.1 MC., and see if the image signal can be heard. **(The image frequency is always the signal frequency minus twice the I.F. frequency or in this case 16,000 — 912 = 15,088 KC. or approximately 15.1 MC.)** If no signal can be heard at 15.1 MC. dial setting even with greatly increased test oscillator output, but can be heard at 16.9 MC dial setting, trimmer No. 9 is evidently improperly adjusted to the image frequency and so must be reset to the proper peak with the screw farther out. After readjusting trimmer No. 9, again check to see that the image comes in at 15.1 MC. dial setting and not at 16.9 MC dial setting.



SHORT WAVE RANGE ALIGNMENT

4. (a) Tune the set very carefully to the oscillator frequency, 16.0 MC for maximum output meter reading.

(b) Adjust trimmer No. 10 (shortwave range detector shunt trimmer) to a peak. After this is done try to increase the output meter reading by detuning trimmer No. 10 slightly and retuning the receiver dial. Continue detuning trimmer No. 10 and retuning the set until maximum output meter deflection is secured.

NOTE: In some cases, the receiver will oscillate when trimmer No. 10 is set with the trimmer screw too far out. This oscillation which can be eliminated by correct adjustment, is normal when the detector circuit is tuned to the receiver oscillator frequency instead of to the correct signal frequency.

If the set seems to motorboat when making the short wave adjustments, reduce the output of the oscillator. This motorboating will stop when an antenna is connected to the set.

(c) Check the adjustment of trimmer No. 10 by tuning the receiver to about 15.1 MC. and noting if the image signal at this point is much weaker than the 16 MC. signal. If the signal at the 15.1 MC. dial setting is equal to or stronger than the 16 MC. signal, trimmer No. 10 is not properly adjusted and must be readjusted in accordance with 4 (b) with the trimmer screw **FARTHER IN.**

MISCELLANEOUS PARTS NOT SHOWN ON DIAGRAM

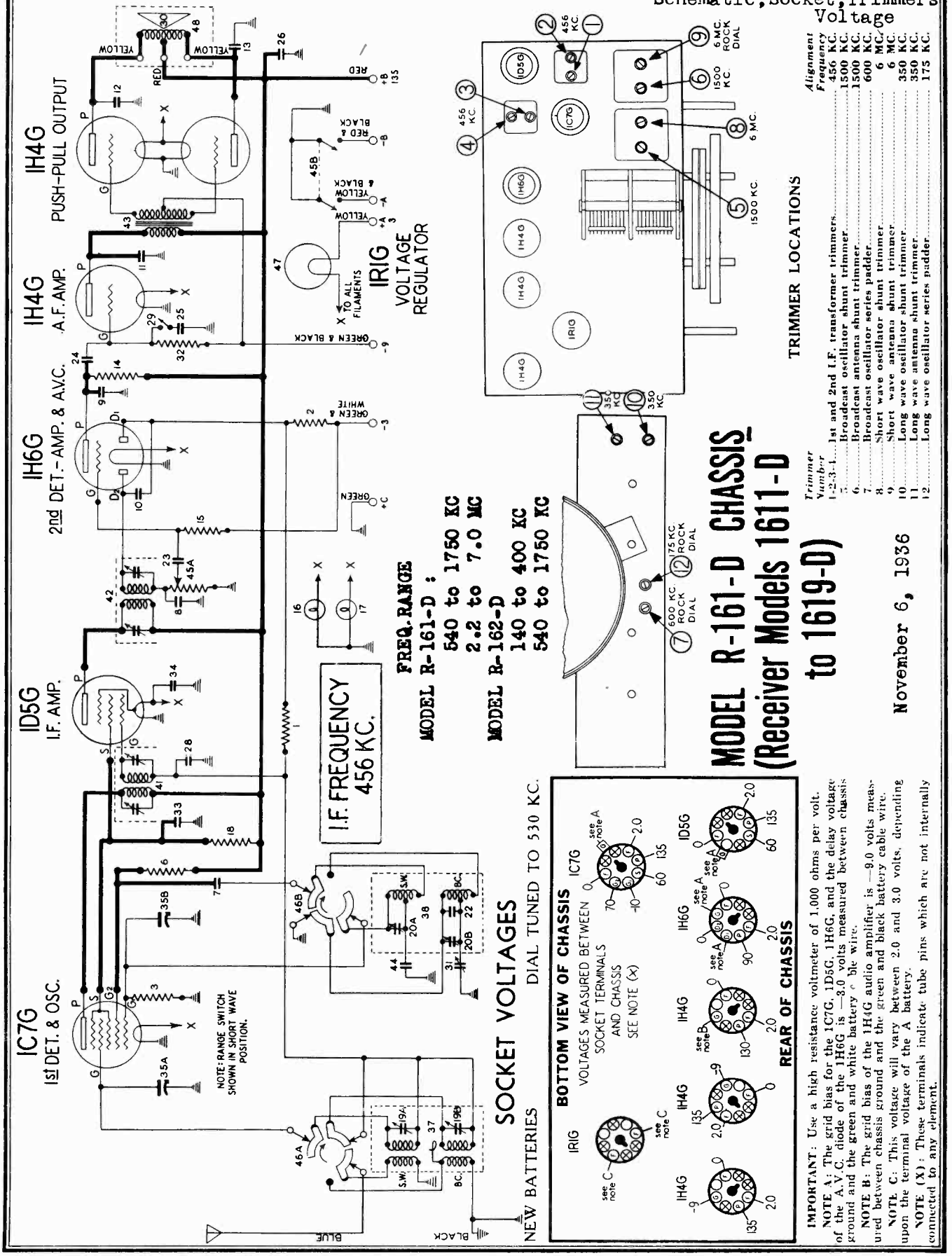
67568	Embossed insulating washer for mtg. elect. condenser	.05
83560	Tube shield	.15
83668	Electrolytic condenser mtg. nut	.03
83718	Gang condenser mtg. cup washer	.01
84428	Rubber chassis mtg. washer	.03
84493	Chassis mounting screw (No. 10x1¼ self tapping)	.03
84751	Dial mechanism	3.00
84752	Dial drive disc	.35
84753	Dial (Celluloid)	.65
84754	Dial pointer	.30
84755	Dial gasket	.04
84756	Dial glass	.20
84757	Dial glass retainer ring	.04
84758	Dial light socket	.15
84794	Dial escutcheon	.50
84797	Knobs (R-1301 and R-1302)	.15
84805	Felt knob washer	.01
84924	Dial escutcheon mtg. screw No. 1 x 3/8" oval H.W.S.	.01
84935	Knobs (R-1305 only)	.15

PRICES SUBJECT TO CHANGE WITHOUT NOTICE

MODELS 1611-D to 1619-D

STEWART WARNER CORP. Chassis R-161-D

Schematic, Socket, Trimmers Voltage



Trimmer Number	Alignment Frequency
1-2-3-4	1st and 2nd I.F. transformer trimmers	456 KC.
5	Broadcast oscillator shunt trimmer	1500 KC.
6	Broadcast antenna shunt trimmer	1500 KC.
7	Broadcast oscillator series padder	600 KC.
8	Short wave oscillator shunt trimmer	6 MC.
9	Short wave antenna shunt trimmer	6 MC.
10	Long wave oscillator shunt trimmer	350 KC.
11	Long wave antenna shunt trimmer	350 KC.
12	Long wave oscillator series padder	175 KC.

IMPORTANT: Use a high resistance voltmeter of 1,000 ohms per volt.

NOTE A: The grid bias for the 1C7G, 1D5G, 1H6G, and the delay voltage of the A.V.C. diode of the 1H6G is —3.0 volts measured between chassis ground and the green and white battery cable wire.

NOTE B: The grid bias of the 1H4G audio amplifier is —9.0 volts measured between chassis ground and the green and black battery cable wire.

NOTE C: This voltage will vary between 2.0 and 3.0 volts, depending upon the terminal voltage of the A battery.

NOTE (X): These terminals indicate tube pins which are not internally connected to any element.

MODELS 1611-D to 1619-D
Chassis R-161-D
Alignment, Parts, Notes

STEWART-WARNER CORP.

CALIBRATION AND ALIGNMENT

ALIGNING EQUIPMENT: For proper alignment, an output meter and an accurately calibrated oscillator with a tuning range from 175 KC. to 6 MC. are required.

Connect the output meter across the plates of the output tubes. Convenient points to make the plate connections are the yellow wires on the speaker terminal strip.

ALIGNING THE I.F. AMPLIFIER: Turn the volume control to maximum volume position and keep it in this position throughout the entire alignment procedure. Turn the range switch to the broadcast position (center position).

Connect the test oscillator output leads to the 1C7G control grid and chassis with a .1 mfd. condenser in series with the oscillator output. Set the oscillator to exactly 456 KC. Set the receiver dial at any point where it has no tuning effect on the oscillator signal.

Adjust the four I.F. trimmers, Nos. 1, 2, 3 and 4, for maximum output meter deflection, then repeat the trimmer adjustment.

BROADCAST BAND CALIBRATION AND ALIGNMENT: With the gang condenser in full mesh, the dial pointer should be on the yellow horizontal line below 530 KC. on the dial scale.

Leave the range switch in the center position. Connect a 400 or 500 ohm carbon resistor in series with the oscillator output and the receiver antenna lead (blue wire in the back of the chassis). Connect the grounded oscillator output wire to the receiver ground lead (black wire in back of chassis).

Adjust the test oscillator to exactly 1500 KC. Tune in the 1500 KC. oscillator signal or a station above 1300 KC. on the dial and determine whether the dial calibration is correct at the high frequency end of the dial. If the calibration is correct, do not adjust the broadcast oscillator shunt trimmer No 5. If the calibration is incorrect, adjust trimmer No. 5 to give proper calibration.

Carefully tune the receiver to the 1500 KC. oscillator signal and adjust trimmer No. 6 for maximum output.

Adjust the test oscillator to 600 KC. and tune the receiver to the signal. Adjust trimmer No. 7 for maximum output. Then try to increase the output meter reading by detuning No. 7 slightly and retuning the receiver dial. If the output goes down, detune the trimmer in the opposite direction. Continue detuning the trimmer and retuning the receiver dial until maximum output meter deflection is secured. This operation is commonly known as "rocking" and when performed as described will give maximum selectivity and sensitivity even though the dial may be slightly off calibration at 600 KC.

Repeat the adjustment of Nos. 5 and 6 at 1500 KC.

SHORT WAVE BAND CALIBRATION AND ALIGNMENT: Turn the range switch to the short wave band (maximum counter-clockwise position).

Adjust the test oscillator to exactly 6.0 MC.

Tune in the 6 MC. oscillator signal at or near 6 MC. on the receiver dial to determine whether the receiver dial calibration is correct at 6 MC. If it is, do not adjust the short wave band oscillator shunt trimmer No. 8. If the calibration is incorrect, set the dial pointer to 6 MC. on the dial, and adjust the oscillator shunt trimmer No. 8 until the oscillator signal comes in at this point. If there are two peaks, the proper one is that with the trimmer screw farthest out.

Carefully tune the receiver to the signal and adjust trimmer No. 9 for maximum output. Then try to increase the output by detuning No. 9 slightly and retuning the receiver. Continue detuning No. 9 and retuning the receiver until the output meter deflection is a maximum.

LONG WAVE BAND CALIBRATION AND ALIGNMENT: Turn the range switch to the long wave band position (maximum clockwise position) and adjust the test oscillator to exactly 350 KC.

Tune in the oscillator signal at or near 350 KC. on the receiver dial to determine whether the dial calibration is correct at this point. If it is, do not adjust trimmer No. 10. If the calibration is incorrect, set the receiver dial pointer to 350 KC. and adjust trimmer No. 10 for maximum output.

Carefully tune the receiver to the signal, then adjust trimmer No. 11 for maximum output.

Adjust the test oscillator to 175 KC. and tune in the signal at or near 175 KC. on the receiver dial. Adjust padder No. 12 for maximum output, then try to increase the output by detuning padder No. 12 and retuning the receiver dial.

Repeat the adjustment of trimmers Nos. 10 and 11 at 350 KC.

USE OF BALLAST PLUG

The Model R-162-D radio chassis is designed to operate with either a large 3 volt dry cell or a 2¼ volt Eveready Air Cell. This is possible because the 1R1G tube maintains the proper filament voltage for any battery voltage between 2 and 3 volts. The receiver is also designed to operate from a 2 volt storage cell. However, if this is done it is desirable to omit the 1R1G voltage regulator and insert a special plug in the 1R1G socket which carries our part number 89588 and has a list price of $0.30.

USE OF B AND C BATTERY PACK

To convert the R-162-D chassis for operation with a plug-in B and C battery unit such as the Burgess No. G90 D6, a special cable terminating in a plug that fits the socket of the B and C pack must be substituted for the regular cable. This special cable carries our part number 89487 and has a list price of $1.40. The color codes of the old and new cables are identical. There is no green C plus wire on the new cable since the connection is made in the B and C unit.

Diagram Number	Part Number	Description	List Price
1, 2	83072	510,000 ohm ¼ watt carbon resistor	$0.12
3	83080	51,000 ohm ¼ watt carbon resistor	.12
6	83286	21,000 ohm ¼ watt carbon resistor	.12
7, 8, 9	83539	260 mmfd. mica condenser	.20
10	83783	110 mmfd. mica condenser	.20
11, 12, 13	83784	.0011 mfd. mica condenser	.25
14	84198	110,000 ohm ¼ watt carbon resistor	.12
15, 32	84235	1.1 megohm ¼ watt carbon resistor	.12
16, 17	84515	Dial lamps 2 volt .06 ampere	.25
18	84353	26,000 ohm ¼ watt carbon resistor	.20
19A, 19B 20A, 20B	85087	Dual trimmer condenser	.35
22	85454	11 mmfd. Mica Condenser	.15
23, 24	88026	.02 mfd. 400 volt paper condenser	.25
25	88029	.004 mfd. 400 volt paper condenser	.25
26	88046	.1 mfd. 150 volt paper condenser	.25
28	88189	.05 mfd. 200 volt paper condenser	.25
29	89331	Tone control switch	.75
30	88437	Diaphragm for R-234D Speaker	$1.00
31	88478	Variable padding condenser	.38
33, 34	88990	.5 mfd. 150 volt paper condenser	.35
35A, 35B	89205	Gang Condenser	4.00
37	89207	Antenna coil & shield (B.C. & S.W.) with trimmers	1.90
38	89209	Oscillator coil & shield (B.C. & S.W.) with trimmers	3.00
41	89226	1st I.F. transformer & shield	2.50
42	89227	2nd I.F. transformer & shield	2.50
43	89228	Push pull input audio transformer	3.50
44	89275	.002 mfd. mica condenser	.40
45A, 45B	89330	{Volume control 500,000 ohm {Off-on switch	1.20
29	89331	Tone control switch	.75
46A, 46B	89334	Range switch	1.40
47		1R1G Voltage regulator tube	1.50
48	R-234-D	6 inch Magnetic speaker	5.75

TUNING DRIVE AND DIAL PARTS

Part Number	Description	List Price
13923	Spring washer for tuning drive shaft	$0.05
81068	Dial drive cord—per ft.	.05
81069	Dial cord tension spring	.10
88561	Dial pointer & stud assembly	.12
88956	Dial escutcheon with glass	1.65
89171	Dial bracket and ring assembly	1.20
89175	Drive shaft	.10
89176	Retaining ring for tuning drive shaft	.02
89283	Dial lamp socket	.10
89285	Dial background	.12
89298	Dial drum and bushing assembly	.60
89353	Dial scale	1.80
89189	Dial lamp shield	.12
89799	Dial scale retaining clip	.02

MISCELLANEOUS PARTS

Part Number	Description	List Price
67032	Felt washer for knob, per C	$0.35
67590	Flat steel mounting washer	.01
84428	Chassis mounting bushing (rubber)	.03
84493	No. 10 x 1¼ chassis mounting screw	.02
84805	Felt washer (used with chassis mtg. screw)	.01
88161	Tube shield	.08
88164	Tube shield cap—slotted	.06
88165	Tube shield cap—plain	.06
88436	Diaphragm gasket for R-234-D speaker	.15
88958	No. 2 x ⅜ R.H.W. Screw for escutcheon	.01
89347	Battery cable (for R-1621-D)	.90
89460	Knob—for range switch	.30
89461	Knob—for range, tone, tuning & volume control	.25
89487	B & C battery cable and plug, complete (special used with B & C battery pack)	1.40
89504	Battery cable (for R-1625-D)	.80
89588	Ballast tube plug (used in place of 1R1G tube with 2 volt battery)	.30

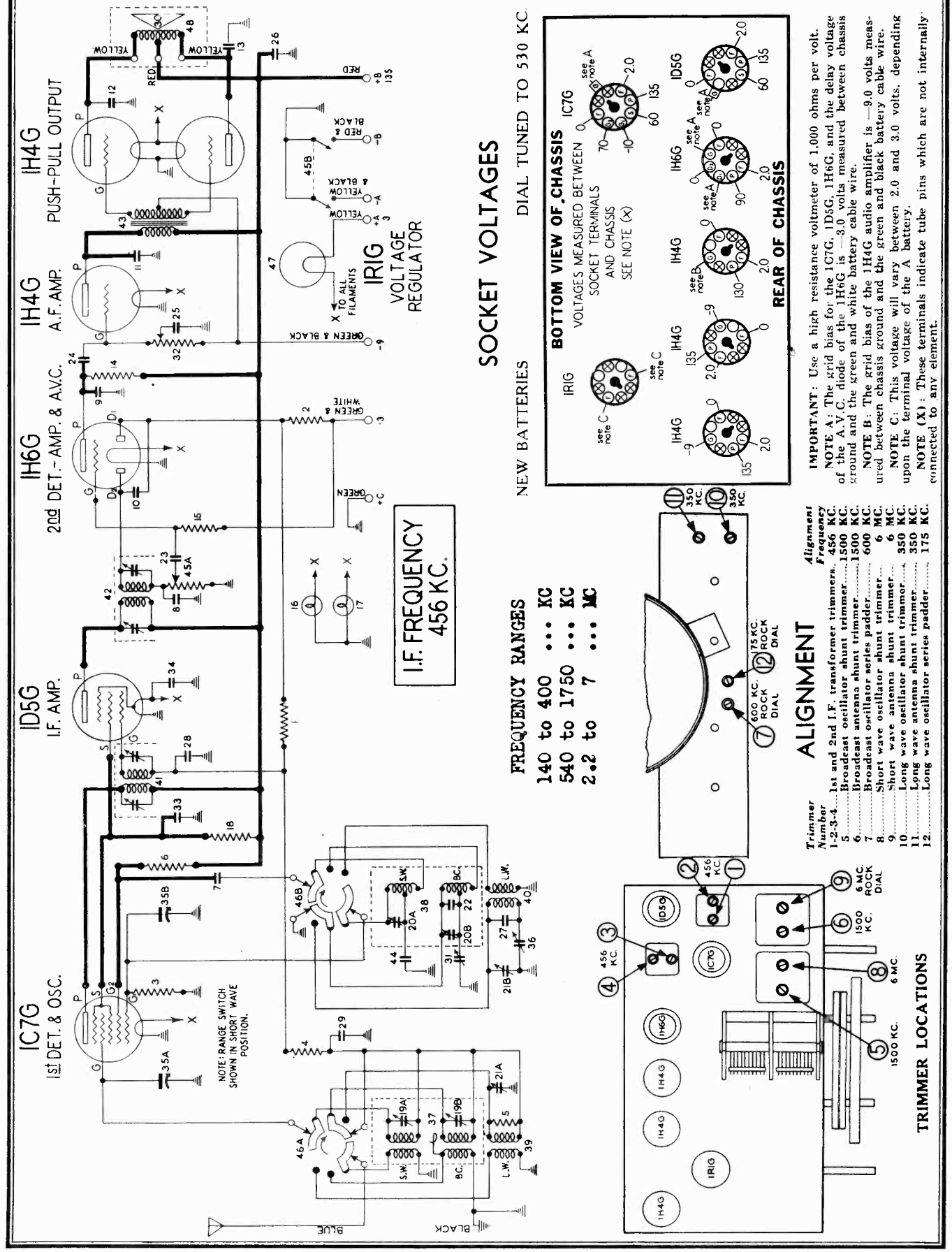
PRICES SUBJECT TO CHANGE WITHOUT NOTICE

In order to keep battery drain at a minimum, 60 milliampere dial light bulbs are used. In replacing these, be sure to use the correct type. Do not use ordinary 2.5 volt dial light bulbs as they will cause short life of the "A" battery.

Schematic, Socket, Trimmers
Voltage

STEWART-WARNER CORP. Chassis R-162-D

MODELS 1621-D to 1629-D



IMPORTANT: Use a high resistance voltmeter of 1,000 ohms per volt.

NOTE A: The grid bias for the 1C7G, 1D5G, 1H6G, and the delay voltage of the A.V.C. diode of the 1H6G is —3.0 volts measured between chassis ground and the green and white battery cable wire.

NOTE B: The grid bias of the 1H4G audio amplifier is —9.0 volts measured between chassis ground and the green and black battery cable wire.

NOTE C: This voltage will vary between 2.0 and 3.0 volts, depending upon the terminal voltage of the A battery.

NOTE (X): These terminals indicate tube pins which are not internally connected to any element.

Trimmer Number	Alignment Frequency
1-2-3-4 ..... 1st and 2nd I.F. transformer trimmers.	456 KC.
5 ..... Broadcast oscillator shunt trimmer	1500 KC.
6 ..... Broadcast antenna shunt trimmer	1500 KC.
7 ..... Broadcast oscillator series padder	600 KC.
8 ..... Short wave oscillator shunt trimmer	6 MC.
9 ..... Short wave antenna shunt trimmer	6 MC.
10 ..... Long wave oscillator shunt trimmer	350 KC.
11 ..... Long wave antenna shunt trimmer	350 KC.
12 ..... Long wave oscillator series padder	175 KC.

MODELS 1621-D to 1629-D
Chassis R-162-D
Alignment, Parts, Notes

STEWART WARNER CORP

ALIGNING THE I.F. AMPLIFIER: Turn the volume control to maximum volume position and keep it in this position throughout the entire alignment procedure. Turn the range switch to the broadcast position (center position).

Connect the test oscillator output leads to the 1C7G control grid and chassis with a .1 mfd. condenser in series with the oscillator output. Set the oscillator to exactly 456 KC. Set the receiver dial at any point where it has no tuning effect or the oscillator signal.

Adjust the four I.F. trimmers, Nos. 1, 2, 3 and 4, for maximum output meter deflection, then repeat the trimmer adjustment.

BROADCAST BAND CALIBRATION AND ALIGNMENT: With the gang condenser in full mesh, the dial pointer should be on the yellow horizontal line below 530 KC. on the dial scale.

Leave the range switch in the center position. Connect a 400 or 500 ohm carbon resistor in series with the oscillator output and the receiver antenna lead (blue wire in the back of the chassis). Connect the grounded oscillator output wire to the receiver ground lead (black wire in back of chassis).

Adjust the test oscillator to exactly 1500 KC. Tune in the 1500 KC. oscillator signal or a station above 1300 KC. on the dial and determine whether the dial calibration is correct at the high frequency end of the dial. If the calibration is correct, do not adjust the broadcast oscillator shunt trimmer No. 5. If the calibration is incorrect, adjust trimmer No. 5 to give proper calibration.

Carefully tune the receiver to the 1500 KC. oscillator signal and adjust trimmer No. 6 for maximum output.

Adjust the test oscillator to 600 KC. and tune the receiver to the signal. Adjust trimmer No. 7 for maximum output. Then try to increase the output meter reading by detuning No. 7 slightly and retuning the receiver dial. If the output goes down, detune the trimmer in the opposite direction. Continue detuning the trimmer and retuning the receiver dial until maximum output meter deflection is secured. This operation is commonly known as "rocking" and when performed as described will give maximum selectivity and sensitivity even though the dial may be slightly off calibration at 600 KC.

Repeat the adjustment of Nos. 5 and 6 at 1500 KC.

SHORT WAVE BAND CALIBRATION AND ALIGNMENT: Turn the range switch to the short wave band (maximum counter-clockwise position).

Adjust the test oscillator to exactly 6.0 MC.

Tune in the 6 MC. oscillator signal at or near 6 MC. on the receiver dial to determine whether the receiver dial calibration is correct at 6 MC. If it is, do not adjust the short wave band oscillator shunt trimmer No. 8. If the calibration is incorrect, set the dial pointer to 6 MC. on the dial, and adjust the oscillator shunt trimmer No. 8 until the oscillator signal comes in at this point. If there are two peaks, the proper one is that with the trimmer screw farthest out.

Carefully tune the receiver to the signal and adjust trimmer No. 9 for maximum output. Then try to increase the output by detuning No. 9 slightly and retuning the receiver. Continue detuning No. 9 and retuning the receiver until the output meter deflection is a maximum.

LONG WAVE BAND CALIBRATION AND ALIGNMENT: Turn the range switch to the long wave band position (maximum clockwise position) and adjust the test oscillator to exactly 350 KC.

Tune in the oscillator signal at or near 350 KC. on the receiver dial to determine whether the dial calibration is correct at this point. If it is, do not adjust trimmer No. 10. If the calibration is incorrect, set the receiver dial pointer to 350 KC. and adjust trimmer No. 10 for maximum output.

Carefully tune the receiver to the signal, then adjust trimmer No. 11 for maximum output.

Adjust the test oscillator to 175 KC. and tune in the signal at or near 175 KC. on the receiver dial. Adjust padder No. 12 for maximum output, then try to increase the output by detuning padder No. 12 and retuning the receiver dial.

Repeat the adjustment of trimmers Nos. 10 and 11 at 350 KC.

USE OF BALLAST PLUG

The Model R-162-D radio chassis is designed to operate with either a large 3 volt dry cell or a 2¼ volt Eveready Air Cell. This is possible because the 1R1G tube maintains the proper filament voltage for any battery voltage between 2 and 3 volts. The receiver is also designed to operate from a 2 volt storage cell. However, if this is done it is desirable to omit the 1R1G voltage regulator and insert a special plug in the 1R1G socket which carries our part number 89588 and has a list price of $0.30.

USE OF B AND C BATTERY PACK

To convert the R-162-D chassis for operation with a plug-in B and C battery unit such as the Burgess No. G90 D6, a special cable terminating in a plug that fits the socket of the B and C pack must be substituted for the regular cable. This special cable carries our part number 89487 and has a list price of $1.40. The color codes of the old and new cables are identical. There is no green C plus wire on the new cable since the connection is made in the B and C unit.

Model R-162-D

PARTS LIST

Diagram Number	Part Number	Description	List Price
1, 2	83072	510,000 ohm ¼ watt carbon resistor	$0.12
3	83080	51,000 ohm ¼ watt carbon resistor	.12
4, 5	83082	260,000 ohm ¼ watt carbon resistor	.12
6	83286	21,000 ohm ¼ watt carbon resistor	.12
7, 8, 9	83539	260 mmfd. mica condenser	.20
10	83783	110 mmfd. mica condenser	.20
11, 12, 13	83784	.0011 mfd. mica condenser	.25
14	84198	110,000 ohm ¼ watt carbon resistor	.12
15	84235	1.1 megohm ¼ watt carbon resistor	.12
16, 17	84515	Dial lamp 2 volt .06 ampere	.25
19A, 19B; 20A, 20B; 21A, 21B	85087	Dual trimmer condenser	.35
22	85454	11 mmfd. Mica Condenser	.15
23, 24	88026	.02 mfd. 400 volt paper condenser	.25
25	88030	.01 mfd. 400 volt paper condenser	.25
26	88046	.1 mfd. 150 volt paper condenser	.25
27	88173	50 mmfd. Mica Condenser	.20
28, 29	88189	.05 mfd. 200 volt paper condenser	.25
30	88437	Speaker diaphragm for R-234-D Speaker	1.00
	88459	Speaker diaphragm for R-235-D speaker	1.20
31	88478	Variable padding condenser	$0.38
32	88488	Tone control—500,000 ohm	.80
33, 34	88990	.5 mfd. 150 volt paper condenser	.35
35A, 35B	89205	Gang Condenser	4.00
36	89206	Variable padding condenser	.45
37	89207	Antenna coil & shield (B.C. & S.W.) with trimmers	1.90
38	89209	Oscillator coil & shield (B.C. & S.W.) with trimmers	3.00
39	89211	Antenna coil (L.W.)	1.40
40	89212	Oscillator coil (L.W.)	1.00
41	89226	1st I.F. transformer & shield	2.50
42	89227	2nd I.F. transformer & sheild	2.50
43	89228	Push pull input audio transformer	3.50
44	89275	.002 mfd. mica condenser	.10
45A; 45B	89330	Volume control 500,000 ohm; Off-on line switch	1.20
46A, 46B	89357	Range Switch	1.50
47		1R1G Voltage regulator tube	1.50
48	R-234-D	6 inch Magnetic speaker	5.75
	R-235-D	8 inch Magnetic speaker	6.50

TUNING DRIVE AND DIAL PARTS

Part Number	Description	List Price
13923	Spring washer for tuning drive shaft	$0.05
81068	Dial drive cord—per ft.	.05
81069	Dial cord tension spring	.10
88564	Dial pointer & stud assembly	.12
88956	Dial escutcheon with glass	1.65
89174	Dial bracket and ring assembly	1.20
89175	Drive shaft	.10
89176	Retaining ring for tuning drive shaf:	.02
89283	Dial lamp socket	.10
89285	Dial background	.12
89298	Dial drum and bushing assembly	.60
89353	Dial scale	1.80
89489	Dial lamp shield	.12
89799	Dial scale retaining clip	.02

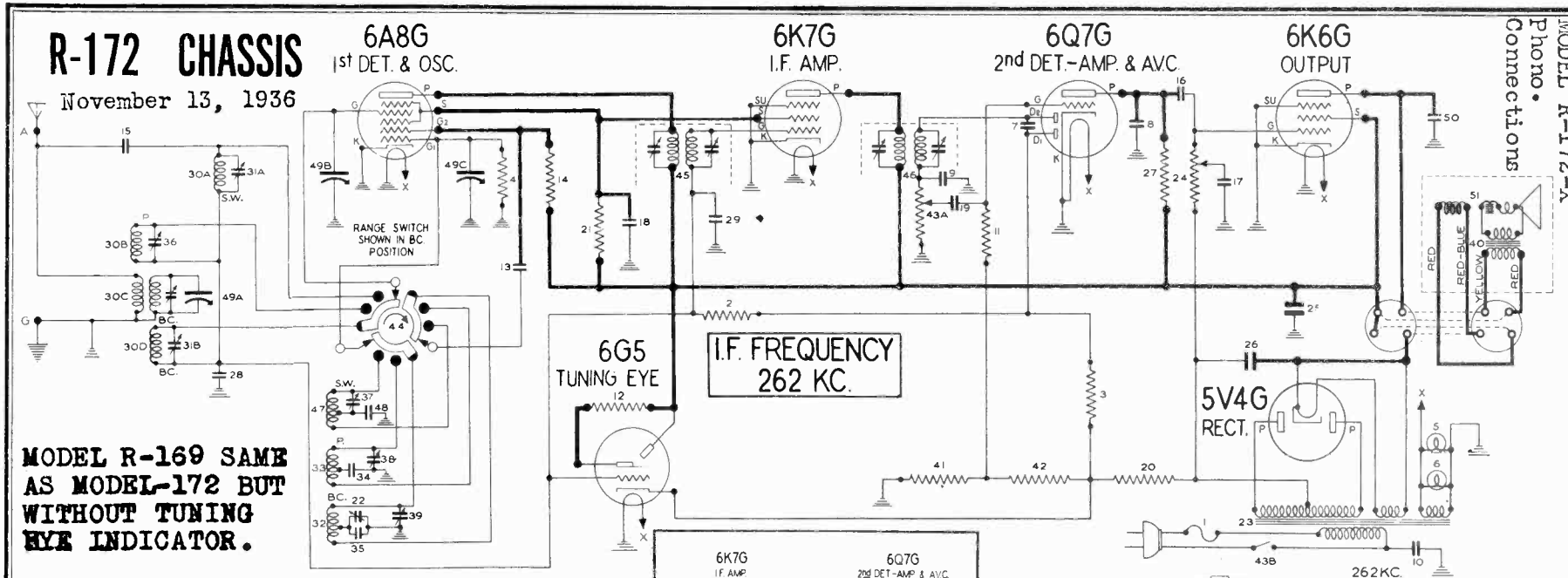
MISCELLANEOUS PARTS

Part Number	Description	List Price
67032	Felt washer for knob, per C	$0.35
67590	Flat steel mounting washer	.01
84128	Chassis mounting bushing (rubber)	.03
84193	No. 10 x 1¼ chassis mounting screw	.02
84805	Felt washer (used with chassis mtg. screw)	.01
88161	Tube shield	.08
88164	Tube shield cap—slotted	.06
88165	Tube shield cap—plain	.06
88436	Diaphragm gasket for R-234-D speaker	.15
88958	No. 2 x ⅜ R.H.W. Screw for escutcheon	.01
89347	Battery cable (for R-1621-D)	.90
89460	Knob—for range switch	.30
89461	Knob—for range, tone, tuning & volume control	.25
89487	B & C battery cable and plug, complete (special used with B & C battery pack)	1.40
89504	Battery cable (for R-1625-D)	.80
89588	Ballast tube plug (used in place of 1R1G tube with 2 volt battery)	.30

PRICES SUBJECT TO CHANGE WITHOUT NOTICE

R-172 CHASSIS

November 13, 1936

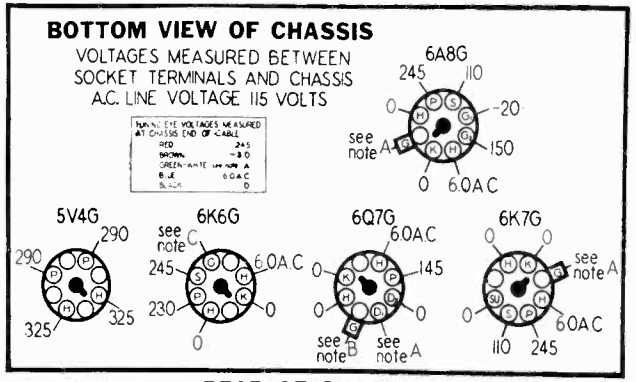


MODEL R-169 SAME AS MODEL-172 BUT WITHOUT TUNING EYE INDICATOR.

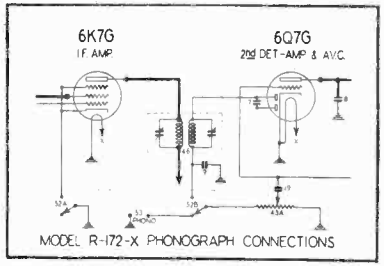
SOCKET VOLTAGES

VOLUME CONTROL ON FULL
RANGE SWITCH SET ON BROADCAST POSITION

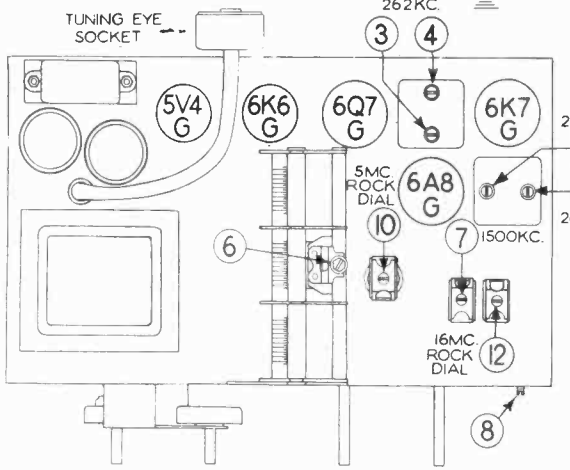
ANTENNA GROUNDED
DIAL TUNED TO 530 KC.



REAR OF CHASSIS



TUNING RANGE
525 KC to 18.1 MC



TRIMMER LOCATIONS

ALIGNMENT

Trimmer Number		Alignment Frequency
1.	2nd I.F. transformer trimmer	262 KC.
2.	2nd I.F. transformer trimmer	262 KC.
3.	1st I.F. transformer trimmer	262 KC.
4.	1st I.F. transformer trimmer	262 KC.
5.	Broadcast oscillator shunt trimmer	1500 KC.
6.	Broadcast antenna shunt trimmer	1500 KC.
7.	Broadcast detector shunt trimmer	1500 KC.
8.	Broadcast oscillator series padder	600 KC.
9.	Police oscillator shunt trimmer	5 MC.
10.	Police antenna shunt trimmer	5 MC.
11.	Short wave oscillator shunt trimmer	16 MC.
12.	Short wave antenna shunt trimmer	16 MC.

IMPORTANT: Use a high resistance voltmeter of 1000 ohms per volt.

NOTE A: The grid bias for the 6A8G, 6K7G, and the anode voltage of the A.V.C. section of the 6Q7G is —3 volts measured across resistors 41 and 42.

NOTE B: The grid bias for the audio section of the 6Q7G is —2 volts measured across resistor 41.

NOTE C: The grid bias for the 6K6G output tube is —18 volts measured across resistors 41, 42 and 20.

Schematic, Socket, Trimmers
Voltage, Notes
MODEL R-172-X
Phono. Connections

STEWART-WARNER CORP.

Chassis R-169
MODELS 1691 to 1695
MODELS 1721 to 1729
Chassis R-172

MODELS 1691 to 1695
Chassis R-169
MODELS 1721 to 1729
Chassis R-172
Alignment, Parts

STEWART-WARNER CORP.

CALIBRATION AND ALIGNMENT

ALIGNING EQUIPMENT: For proper alignment, an output meter and an accurately calibrated oscillator with a tuning range from 262 KC. to 16 MC. are required.

Connect the output meter from the plate of the output tube to chassis. A convenient point to make the plate connection is to the yellow wire on the speaker socket.

ALIGNING THE I. F. AMPLIFIER: Turn the volume control to maximum volume position and keep it in this position throughout the entire alignment procedure. Turn the range switch to the broadcast position (fully clockwise).

Connect the test oscillator output leads to the 6A8 control grid and chassis with a .1 mfd. condenser in series with the oscillator output. Set the oscillator to exactly 262 KC. Set the receiver dial at any point where it has no tuning effect on the oscillator signal.

Adjust the four I.F. trimmers, Nos. 1, 2, 3 and 4, for maximum output meter deflection, then repeat the trimmer adjustment.

BROADCAST BAND CALIBRATION AND ALIGNMENT

With the gang condenser in full mesh, the dial pointer should be on the white horizontal line below 530 KC. on the dial scale. If it does not, hold the dial gear and turn the pointer to the correct position.

Turn the range switch to the extreme clockwise position and connect the test oscillator output to the A and G terminals of the receiver with a 400 ohm carbon resistor in series with the A terminal and the oscillator output.

Adjust the test oscillator to exactly 1500 KC.

Tune in the 1500 KC. oscillator signal or a station above 1300 KC. on the dial and determine whether the dial calibration is correct at the high frequency end of the dial. If the calibration is correct, do not adjust the broadcast oscillator shunt trimmer No. 5. If the calibration is incorrect, adjust trimmer No. 5 to give proper calibration.

Carefully tune the receiver to the signal and adjust trimmers Nos. 6 and 7 for maximum output.

Adjust the test oscillator to 600 KC. and tune the receiver to the signal. Adjust trimmer No. 8 for maximum output. Then try to increase the output meter reading by detuning No. 8 slightly and retuning the receiver dial. If the output goes down, detune the trimmer in the opposite direction. Continue detuning the trimmer and retuning the receiver dial until maximum output meter deflection is secured. This operation is commonly known as "rocking" and when performed as described will give maximum selectivity and sensitivity even though the dial may be slightly off calibration at 600 KC.

POLICE BAND CALIBRATION AND ALIGNMENT

Turn the range switch to the center position. Adjust the test oscillator to exactly 5.0 MC. Tune in the 5 MC. oscillator signal at or near 5 MC. on the receiver dial to determine whether the receiver dial calibration is correct at 5 MC. If it is, do not adjust police band oscillator shunt trimmer No. 9. If the calibration is incorrect, set the dial pointer to 5 MC. on the dial, and adjust the oscillator shunt trimmer No. 9 until the oscillator signal comes in at this point. If there are two peaks, the proper one is that with the trimmer screw farthest out.

Carefully tune the receiver to the signal and adjust trimmer No. 10 for maximum output. Then try to increase the output by detuning No. 10 slightly and retuning the receiver dial. Continue detuning No. 10 and retuning the dial until the output meter deflection is a maximum.

SHORT WAVE BAND CALIBRATION AND ALIGNMENT

Turn the range switch to the extreme counter-clockwise position. Set the test oscillator to 16 MC. Tune in the 16 MC. oscillator signal at 16 MC. on the receiver dial to determine whether the receiver dial calibration is correct at 16 MC. If it is, do not adjust the short wave band oscillator shunt trimmer No. 11. If the calibration is incorrect, set the receiver dial pointer exactly at 16 MC. and adjust the oscillator shunt trimmer No. 11 until the oscillator signal comes in at this point.

Check to see that it has been adjusted to the proper peak by tuning the receiver to approximately 15.5 MC. A repeat signal should be heard at this point. If none is present, even with greatly increased oscillator output, retune the receiver to 16 MC. and adjust trimmer No. 11 to the proper peak with the trimmer screw farther out.

Carefully tune the receiver to the signal and adjust trimmer No. 12 to a peak. Then try to increase the output by detuning the trimmer slightly and retuning the dial until a maximum output meter deflection is secured. Check the adjustment by tuning the receiver to the image at about 15.5 MC. The image should be much weaker than the 16 MC. signal. If the signal at 15.5 MC. dial setting is equal to or stronger than the 16 MC. signal, trimmer No. 12 is not set to the proper peak. Turn the trimmer in a turn or so, then readjust as above.

Diagram Number	Part Number	Description	List Price
1	38841	Fuse, 1 amp., 250 volt	$0.10
2-3	83072	510,000 ohm ¼ watt carbon resistor	.12
4	83080	51,000 ohm ¼ watt carbon resistor	.12
5-6	83278	Dial lamps	.15
7-8	83539	260 mmfd. mica condenser	.20
9	83783	110 mmfd. mica condenser	.20
10	83976	.012 mfd. 1000 volt shielded condenser	.40
11-12	84235	1.1 megohm ¼ watt carbon resistor	.12
13	85061	51 mmfd. mica condenser	.15
14	85442	21,000 ohm ½ watt carbon resistor	.15
15	85454	11 mmfd. mica condenser	.15
16	88026	.02 mfd. 400 volt paper condenser	.25
17	88030	.01 mfd. 400 volt paper condenser	.25
18	88046	.1 mfd. 150 volt paper condenser	.25
19	88189	.05 mfd. 200 volt paper condenser	.25
20	88463	270 ohm 1 watt carbon resistor	.15
21	88464	26,000 ohm 1 watt carbon resistor	.15
22	88478	Padding condenser	.38
23	88481	Power transformer (115 volt—60 cycle)	5.00
24	88488	Tone control—500,000 ohm	.80
25	88511	16 mfd. 300 volt electrolytic condenser	1.10
26	88512	16 mfd. 400 volt electrolytic condenser	1.10
27	88532	210,000 ohm ¼ watt carbon resistor	.12
28, 29	88534	.05 mfd. 150 volt condenser (low loss)	.25
30A to D	88648	Antenna and preselector coil assembly	2.30
31A-31B	88654	Dual trimmer condenser	.30
32	88660	Oscillator coil (BC.)	.60
33	88665	Oscillator coil (Police)	.58
34	88681	.00255 mfd. mica condenser	.30
35	88686	200 mmfd. mica condenser	$0.14
36-37 38-39	88688	Trimmer condenser	.12
40	88796	Output transformer for R-248A spkr.	2.50
40	88912	Output transformer for R-247-A spkr.	2.00
41	88920	35 ohm ½ watt wire wound resistor	.12
42	89116	20 ohm ½ watt wire wound resistor	.12
43A 43B	89606	Volume control—250,000 ohm A.C. line switch	1.20
44	89607	Range switch	1.25
45	89608	1st I.F. transformer	2.40
46	89609	2nd I.F. transformer	2.25
47	89615	Oscillator coil (S.W.)	.75
48	89635	.00195 mfd. mica condenser	.50
49A to C	89649	Gang condenser	5.00
	89653	262 KC. wave trap (spl. for service only)	1.50
50	89826	.004 mfd. 750 volt paper condenser	.24
51	R-247-A	8 inch dynamic speaker	9.00
51	R-248-A	12 inch dynamic speaker	11.50

MODEL R-172-X PARTS

52A & 52B	84404	Phonograph toggle switch	$1.10
1	88055	Fuse, ¾ amp., used for Line voltages of 200 to 240 volts	.12
23	89216	Power transformer (100-240 volts, 25-133 cycles)	11.50
53	89709	Phonograph terminal strip	.15

TUNING DRIVE AND DIAL PARTS

Part Number	Description	List Price
88564	Pointer and stud assembly	$0.12
88743	Dial drive shaft	.15
88744	Dial drive shaft retainer spring	.05
88745	Dial ring and bracket assembly (for edge lighting)	.90
88748	Dial disc and bushing assembly	.30
88956	Escutcheon with glass	1.65
89283	Dial lamp socket	.10
89284	Dial lamp shield	.02
89285	Dial background	.12
89600	Dial scale	1.90
89799	Dial scale retaining clip	.02

MISCELLANEOUS PARTS

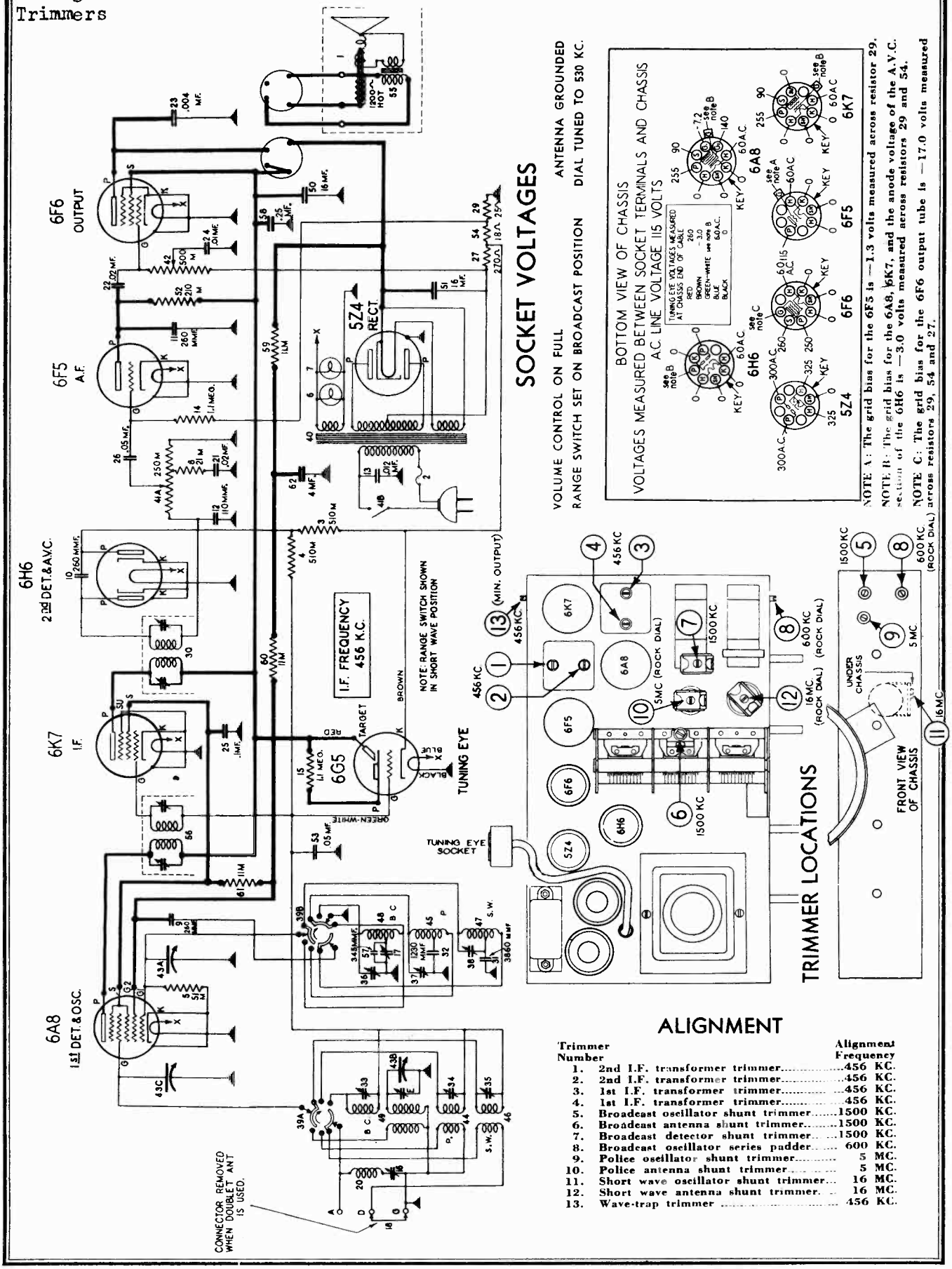
Part Number	Description	List Price
67032	Felt washer for back of knob—per C	$0.35
67568	Embossed washer for 88512 electrolytic condenser	.05
67590	Flat steel mounting washer	.01
84428	Rubber mounting bushing for chassis	.03
84493	No. 10 x 1¼ chassis mounting screw	.02
84805	Felt washer (used with mounting screw)	.01
84981	Tube shield (plain section)	.08
84982	Tube shield (slotted section)	.08
84983	Spring ring for tube shields	.03
85785	Terminal strip (antenna and ground)	.15
88056	Fuse mounting strip	.08
88057	Fuse cover	.08
88631	Speaker cable plug	.06
88675	Speaker socket	.15
88822	Speaker mounting screw for 1691A (ornamental head)	.02
88958	No. 2 x ⅜ R.H.W. escutcheon screw	.01
88983	Knob (for tone, tuning and volume control)	.15
88984	Knob (for range switch)	.20

PRICES SUBJECT TO CHANGE WITHOUT NOTICE

Schematic, Socket Voltage Trimmers

STEWART-WARNER CORP.

MODELS 1731 to 1739
Chassis R-173



ALIGNMENT

Trimmer Number		Alignment Frequency
1.	2nd I.F. transformer trimmer	456 KC.
2.	2nd I.F. transformer trimmer	456 KC.
3.	1st I.F. transformer trimmer	456 KC.
4.	1st I.F. transformer trimmer	456 KC.
5.	Broadcast oscillator shunt trimmer	1500 KC.
6.	Broadcast antenna shunt trimmer	1500 KC.
7.	Broadcast detector shunt trimmer	1500 KC.
8.	Broadcast oscillator series padder	600 KC.
9.	Police oscillator shunt trimmer	5 MC.
10.	Police antenna shunt trimmer	5 MC.
11.	Short wave oscillator shunt trimmer	16 MC.
12.	Short wave antenna shunt trimmer	16 MC.
13.	Wave-trap trimmer	456 KC.

MODELS 1731 to 1739
Chassis R-173
Alignment, Parts

STEWART-WARNER CORP.

MODEL R-173-X
Phono. Connections, Parts

ALIGNING THE I. F. AMPLIFIER: Turn the volume control to maximum volume position and keep it in this position throughout the entire alignment procedure. Turn the range switch to the broadcast position (fully clockwise).

Connect the test oscillator output leads to the 6A8 control grid and chassis with a **.1 mfd. condenser in series with the oscillator output.** Set the oscillator to exactly 456 KC. Set the receiver dial at any point where it has no tuning effect on the oscillator signal.

Adjust the four I.F. trimmers Nos. 1, 2, 3 and 4, for maximum output meter deflection, then repeat the trimmer adjustment.

BROADCAST BAND CALIBRATION AND ALIGNMENT: With the gang condenser in full mesh, the dial pointer should be on the white horizontal line below 530 KC. on the dial scale.

Turn the range switch to the extreme clockwise position and connect the test oscillator output to the A and G terminals of the receiver with a 400 ohm carbon resistor in series with the A terminal and the oscillator output.

Adjust the test oscillator to exactly 1500 KC. and turn the receiver dial pointer to 1500 KC. on the tuning dial. To calibrate the dial, adjust trimmer No. 5 for maximum output.

Carefully tune the receiver to the signal and adjust trimmers Nos. 6 and 7 for maximum output.

Adjust the test oscillator to 600 KC. and tune the receiver to the signal. Adjust trimmer No. 8 for **maximum output.** Then try to increase the output meter reading by detuning No. 8 slightly and retuning the receiver dial. If the output goes down, detune the trimmer in the opposite direction. Continue detuning the trimmer and retuning the receiver dial until maximum output meter deflection is secured. This operation is commonly known as "rocking" and when performed as described will give maximum selectivity and sensitivity even though the dial may be slightly off calibration at 600 KC.

WAVE-TRAP ADJUSTMENT: The wave-trap adjusting trimmer, No. 13, is located on the back of the chassis. Leave the test oscillator connected to the A and G terminals through a 400 ohm resistor and set the oscillator at 456 KC. Then adjust the wave-trap trimmer No. 13 for minimum output. If some particular station with a frequency near 456 KC. causes code interference, it may be desirable to adjust the wave-trap on the actual frequency of the interfering station.

Check the adjustment of trimmers 5, 6, and 7 at 1500 KC.

BAND NO. 2 CALIBRATION AND ALIGNMENT: Turn the range switch to the center position.

Adjust the test oscillator to exactly 5.0 MC. and turn the receiver dial pointer to exactly 5.0 MC. on the tuning dial.

To calibrate the dial, adjust trimmer No. 9 for maximum output. If two peaks are found, the proper one is that with the trimmer screw farthest **out.**

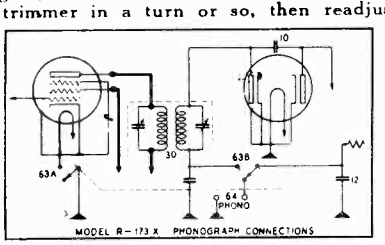
Carefully tune the receiver to the signal and adjust trimmer No. 10 for maximum output. Then try to increase the output by detuning No. 10 slightly and retuning the receiver dial. Continue detuning No. 10 and retuning the dial until the output meter deflection is a maximum.

BAND NO. 3 CALIBRATION AND ALIGNMENT: Turn the range switch to the extreme counter-clockwise position. Be sure the D and G terminals on the antenna terminal strip are connected together.

Set the test oscillator to 16 MC. and turn the receiver dial pointer to exactly 16 MC. on the tuning dial.

To calibrate the dial, adjust trimmer No. 11 for maximum output. Check to see that it has been adjusted to the proper peak by tuning the receiver to approximately 15.1 MC. A repeat signal should be heard at this point. If none is present, even with greatly increased oscillator output, retune the receiver to 16 MC. and adjust trimmer No. 11 to the proper peak with the trimmer screw farther **out.**

Carefully tune the receiver to the signal and adjust trimmer No. 12 to a peak. Then try to increase the output by detuning the trimmer slightly and retuning the dial until a maximum output meter deflection is secured. Check the adjustment by tuning the receiver to the image at about 15.1 MC. The image should be much weaker than the 16 MC. signal. If the signal at 15.1 MC. dial setting is equal to or stronger than the 16 MC. signal, trimmer No. 12 is not set to the proper peak. Turn the trimmer in a turn or so, then readjust as above.



MODEL R-173-X PHONOGRAPH CONNECTIONS

MODEL R-173 PARTS LIST

Diagram Number	Part Number	DESCRIPTION	List Price
1	R-247-A	8" Dynamic Speaker	$9.00
	R-248-A	12" Dynamic Speaker	11.50
2	88841	Fuse. 1 ampere	.10
3-4	83072	510,000 ohm ¼ watt carbon resistor	.12
5	83080	51,000 ohm ¼ watt carbon resistor	.12
6-7	83278	Pilot lamp, 6-8 volt	.15
8	83286	21,000 ohm ¼ watt carbon resistor	.12
9-10-11	83539	260 mmfd. mica condenser	.20
12	83783	110 mmfd. mica condenser	.20
13	83976	.012 mfd. 1000 v. shielded condenser	.40
14-15	84235	1.1 megohm ¼ watt carbon resistor	.12
16	85285	Wave trap trimmer	.40
17	85285	Padding trimmer	.40
18	85321	Ground connector	.01
20	88014	Wave trap coil	.50
21-22	88026	.02 mfd. 400 v. paper condenser	.30
23	89826	.004 mfd. 750 v. paper condenser	.24
24	88030	.01 mfd. 400 v. paper condenser	.30
25	88046	.1 mfd. 150 v. paper condenser	.30
26	88189	.05 mfd. 200 v. paper condenser	.25
27	88463	270 ohm 1 watt carbon resistor	.15
29	88465	25 ohm ½ watt wire wound resistor	.15
56	88466	1st I.F. Transformer	2.40
30	88468	2nd I.F. transformer	2.40
31	88472	3860 mmfd. mica condenser	.50
32	88473	1230 mmfd. mica condenser	.25
33-34-35 36-37-38	88477	Trimmer condenser	.12
39A&B	88480	Range switch	1.90
40	88481	Power transformer, 115 v. 60 cycle	5.00
41-A	88487	Volume control (250,000 ohm)	1.25
41-B		A. C. line switch	
42	88488	Tone control (500,000 ohm)	.80
43A to C	89619	Three gang condenser	5.00
44	88499	Antenna coil (Police)	.85
45	88501	Oscillator coil (Police)	.65
46	88502	Antenna coil (S.W.)	.80
47	88504	Oscillator coil (S.W.)	.80
48	88506	Oscillator coil (B.C.)	.55
49	88507	Antenna coil (B.C.)	1.60
50	88511	16 mfd. 300 v. electrolytic condenser	1.10
51	88512	16 mfd. 400 v. elertrolytic condenser	1.10
52	88532	210,000 ohm ¼ watt carbon resistor	.12
53	88534	.05 mfd. 150 v. condenser (low loss)	.25
54	88581	18 ohm ½ watt wire wound resistor	.15
55	88796	Output transformer (on R-248-A speaker)	2.50
55	88912	Output transformer (on R-247-A speaker)	2.00
57	89564	345 mmfd. mica condenser	.40
58	89643	.25 mfd. 300 volt paper condenser	.50
43A to C	89649	Three gang condenser	5.00
59-60	89751	11,000 ohm 1 watt carbon resistor	.12
61	89753	11,000 ohm ½ watt carbon resistor	.15
62	89755	4 mfd. 250 volt elertrolytic condenser	1.00
23	89826	.004 mfd. 750 v. paper condenser	.24

R-173-X PARTS

63A & B	84404	Phonograph toggle switch	$1.10
2	85055	Fuse. ¾ amp. (Use on line voltages of 200 to 240)	.12
40	89216	Power transformer 100 to 240 volt. 25 to 133 cycles.	11.50
64	89709	Phonograph terminal strip	.15

MISCELLANEOUS PARTS NOT SHOWN IN CIRCUIT DIAGRAM

Part Number	DESCRIPTION	List Price
67590	Flat steel mtg. washer	$ .01
67568	Embossed washer for 88512 electrolytic condenser	.05
84428	Rubber chassis mtg. bushing	.03
84493	No. 10 x 1¼ chassis mtg. screw	.02
84805	Felt washer (Used with chassis mtg. screw)	.01
85066	G.D.A. terminal strip	.20
88056	Fuse mounting	.08
88057	Fuse cover	.08
88675	Speaker socket	.15
88958	No. 2 x ⅜ wood screw for escutcheon (each)	.01
89038	Knob, volume, tone & tuning control	.20
89119	Tuning eye cable and plug	1.50
89749	Knob, range switch	.20

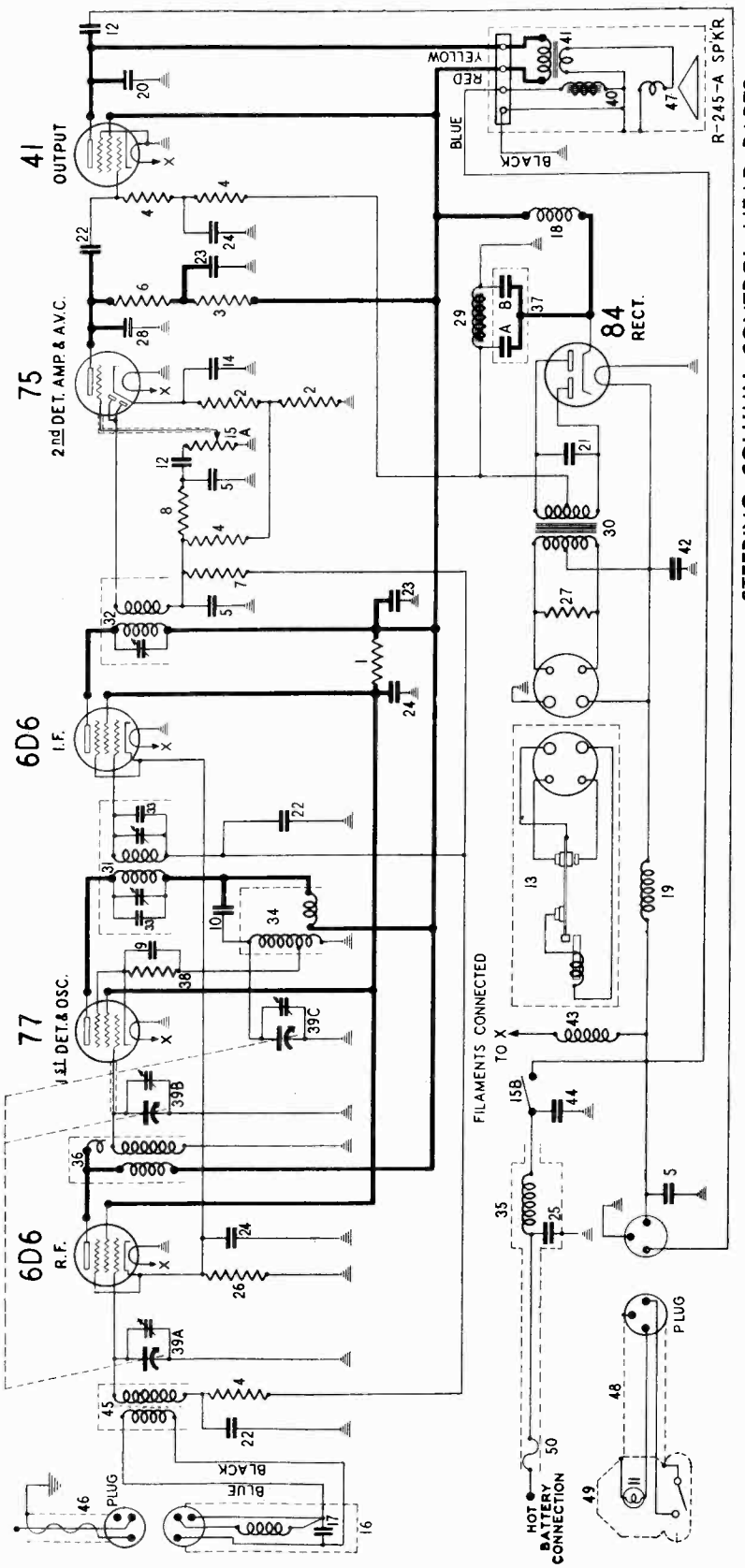
TUNING DRIVE AND DIAL PARTS

Part Number	DESCRIPTION	List Price
81068	Dial drive cord (per ft.)	$ .05
81069	Tension spring for drive cord	.10
81145	Spring clip for pointer shaft	.10
88956	Escutcheon with glass	1.65
88998	Second pointer	.05
89283	Pilot lamp socket	.10
89281	Pilot lamp shield	.02
89514	Dial drum bushing and gear	1.25
89660	Dial scale	1.80
89666	Dial ring bracket and shaft assembly	2.50
89675	Dial background	.12
89693	Main pointer and second pointer shaft assembly	.50
89698	Pointer and stud	.14

PRICES SUBJECT TO CHANGE WITHOUT NOTICE

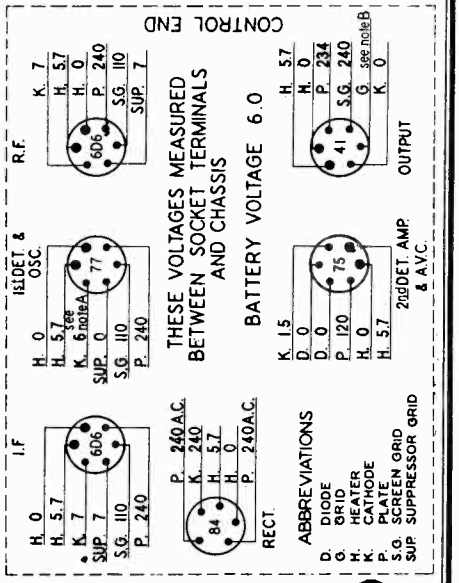
MODEL Firestone R-1431 Auto

STEWART-WARNER CORP. Schematic, Voltage, Parts



SOCKET VOLTAGES

BOTTOM VIEW



ABBREVIATIONS

D. DIODE
G. GRID
H. HEATER
K. CATHODE
P. PLATE
S.G. SCREEN GRID
SUP. SUPPRESSOR GRID

I.F. FREQUENCY 177.5 KC.

FIRESTONE - STEWART - WARNER

MODEL R-1431 AUTO RADIO

STEERING COLUMN CONTROL HEAD PARTS

88333	Shell for control head (right-hand mounting)	.50
88334	Bracket for control head mounting	.50
88337	Shell mounting screw #1-72 R.H.M.S.	.01
88338	Knob for control head	.25
88339	Pilot light and tone control cable with plug and socket	.90
88385	Extra length pilot light and tone control cable with plug and socket (43")	1.00
88410	Shell for control head (left-hand mounting)	.50

FLEXIBLE SHAFTS

88406	18" tuning and volume control shaft	2.00
88407	24" tuning and volume control shaft	1.50
88408	30" tuning and volume control shaft	2.00
88409	36" tuning and volume control shaft	2.00

SPECIAL ACCESSORIES

88422	Ford distributor condenser	.70
88429	Distributor suppressor	.35
88430	Dome light filter	1.00
88431	Shielded loom with connector tip for antenna lead-in	.40

PRICES SUBJECT TO CHANGE WITHOUT NOTICE

IMPORTANT: Use a high resistance voltmeter of 1000 ohms per volt. Make allowances for battery voltage variation.

NOTE A: The cathode voltage of the 77 varies from 6 to 10 volts, depending on the gang condenser setting.

NOTE B: The grid bias on the 41 output tube is —18 volts, measured from the chassis to the ungrounded filter choke terminal.

MODEL Firestone R-1431 Auto Alignment, Parts

STEWART-WARNER CORP.

The signal picked up by the antenna is carried to the receiver from the lead-in by means of a specially designed transmission line (No. 46 in the diagram). The effect of this transmission line when properly installed is to reduce ignition interference. It accomplishes this result by eliminating a large part of the car chassis from the receiver antenna circuit. **NOTE:** This antenna lead must not be cut, since cutting would destroy its effectiveness in minimizing ignition noise pickup in the antenna circuit.

The signal is fed through an antenna filter to the primary of the antenna transformer. The filter cut-off occurs at a frequency slightly above the broadcast band where it is most effective in removing any ignition interference picked up by the antenna.

The antenna transformer is wound on a special iron core, the effect of which is to diminish noise by increasing the signal to-noise ratio.

The signal is then tuned and amplified in an R. F. stage using a 6D6 tube. Further amplification and frequency conversion to 177.5 KC. take place in the 77 combination first detector and oscillator tube. The 177.5 KC. signal is amplified in the I.F. stage which uses a 6D6 tube and is then rectified in the diode section of the 75 second detector tube.

The rectified current produces a modulated D.C. voltage across the diode load resistor. (No. 4 in the circuit diagram). In order to obtain more quiet tuning between stations, a small detection delay or "squelch" is provided by returning the diode load resistor to the midpoint of the second detector bias resistance. This point is approximately ¾ volt lower in potential than the cathode.

The audio component of the rectified voltage appears across the 500,000 ohm volume control resistor. Any part or all of this signal may be impressed on the triode section of the 75 tube where audio amplification takes place. The triode section of the 75 is resistance coupled to the 41 output tube. Bias for the 41 tube is obtained by grid return connection to the ungrounded end of the filter choke which is connected in the B— lead.

The modulated drop across resistor No. 4 is filtered and applied to the grid returns of the 6D6 R.F. and I.F. tubes to provide A.V.C.

CALIBRATION AND ALIGNMENT

A good modulated oscillator and a sensitive output meter are necessary for proper calibration and alignment of the R.F. and I.F. stages of this receiver. The output of the test oscillator must be adjustable to give a very weak signal which will not actuate the A.V.C. of the receiver. The output meter must be sensitive enough to give sufficient reading with such a weak signal.

The output meter may be conveniently connected between the chassis and the yellow lead terminal on pilot light and tone control lead socket. You will find that the yellow lead is connected through an .02 mfd. condenser to the plate of the 41 output tube. However, if the output meter is suitable, it should be connected across the speaker voice coil.

During all calibration and alignment adjustments, keep the volume control full on.

I. F. ALIGNMENT

The I.F. trimmers are located on top of the I.F. transformers which may be reached by removing the receiver top cover. Pull out the antenna plug. The test oscillator should be set to exactly 177.5 KC. and connected from the control grid of the 77 to ground. Adjust the test oscillator output to give about half-scale reading of the output meter. Tune the set to make certain that no station signal is tuned in, since this would affect the output meter reading. Adjust all three I.F. trimmers to give maximum output reading.

In adjusting the I.F. transformer trimmers, it is desirable to use a bakelite screw driver or one having only a small metal tip. After the I.F. trimmers have been aligned once, go back and repeat the procedure, since any adjustment of one will affect the others to some extent.

DIAL CALIBRATION

The dial of the control head is calibrated in kilocycles except that one zero is omitted. Sets using the steering column control head or the Ford dash control head are calibrated as follows:

Tune in a station of known frequency between 800 and 1100 KC. Loosen the set screw in the right hand knob and remove the knob. Loosen the set screw in the knob shaft, and by rotating the knob shaft, turn the pointer until it indicates the frequency of the station which has been tuned in. Then re-tighten the set screw and replace the knob.

If the set is used with a dash control head other than that for the Ford, calibrate as follows:

Turn the knob to the right as far as it will go, and then turn it to the end in the other direction. It is necessary to continue to turn the knob after the dial pointer reaches the end stop, until the knob will turn no farther.

If the set is badly out of calibration, so that when the dial reads correctly at the low frequency end, it is off at the high frequency end, it will be necessary to adjust the oscillator shunt trimmer as explained below. The oscillator shunt trimmer is located on the oscillator section of the gang condenser which can be reached when the receiver bottom cover is removed. Connect a .00025 mfd. mica condenser in series with the output of the test oscillator and the antenna lead of the receiver. This condenser is essential to the proper adjustment of the antenna stage. Set the test oscillator to exactly 600 KC. Tune the receiver to maximum output. If the control head is of the steering column or Ford dash control type, calibrate at the low end of the dial by setting the pointer to read exactly 60 (600 KC.).

Set the test oscillator to exactly 1400 KC. Turn the gang condenser by means of the tuning knob until the dial pointer indicates 140 (1400 KC.). Adjust the oscillator shunt trimmer (on gang condenser section third from shaft end) for maximum output. Adjust the two trimmers nearest the shaft end as explained under R.F. alignment.

R. F. ALIGNMENT

With the test oscillator set to approximately 1400 KC., tune the set very carefully for maximum output.

Adjust the output of the test oscillator to the minimum value which will give sufficient output meter deflection. Adjust the two trimmers nearest to the shaft end of the gang condenser to give maximum output meter reading.

R-1431 PARTS LIST

Diag. No.	Part No.	DESCRIPTION	List Price
1	66023	60,000 ohm 1 watt carbon resistor	$0.25
2	67303	2,000 ohm ¼ watt carbon resistor	.25
3	83080	51,000 ohm ¼ watt carbon resistor	.20
4	83082	260,000 ohm ¼ watt carbon resistor	.20
5	83539	260 mmfd. mica condenser	.25
6	84198	110,000 ohm ¼ watt carbon resistor	.30
7	84235	1.1 megohm ¼ watt carbon resistor	.20
8	84238	11,000 ohm ¼ watt carbon resistor	.20
9	84282	.001 mfd. mica condenser	.25
10	84833	70 mmfd. mica condenser	.20
11	85296	Pilot lamp 6-8 volt (bayonet base)	.18
12	88026	.02 mfd. 400 volt paper condenser	.30
13	88156	Vibrator	3.50
14	88170	10 mfd. 25 volt electrolytic condenser	.80
15A, 15B	88171	{Volume control 500,00 ohm / Line switch}	1.20
16	88172	Antenna Filter	1.20
17	88173	50 mmfd. mica condenser	.20
18	88181	R. F. choke coil	.40
19	88183	R. F. choke coil (to vibrator)	.25
20	88185	.006 mfd. 600 volt paper condenser	.35
21	88187	.01 mfd. 1500 volt paper condenser	.40
22	88189	.05 mfd. 200 volt paper condenser	.35
23	88191	.1 mfd. 300 volt paper condenser	.35
24	88193	.25 mfd. 150 volt paper condenser	.35
25	88195	.5 mfd. 150 volt paper condenser	.50
26	88203	600 ohm ¼ watt carbon resistor	.15
27	88204	210 ohm ½ watt carbon resistor	.15
28	88205	.0021 mfd. mica condenser	$0.35
29	88210	Filter choke	1.25
30	88213	Power transformer	3.50
31	88222	1st I.F. transformer	2.75
32	88223	2nd I.F. transformer	2.60
33	88233	110 mmfd. mica condenser	.25
34	88234	Oscillator coil and shield assembly	1.50
35	88239	"A" filter	1.00
36	88250	R.F. coil and shield assembly	1.50
37A, 37B	88256	{Elcetrolytic condenser 4 mfd. 350 volt / Electrolytic condenser 8 mfd. 350 volt}	2.40
38	88257	9,500 ohm ¼ watt carbon resistor	.15
39A to C	88258	Three gang variable condenser	6.00
40	88274	Field coil and housing (for R-245-A spkr.)	2.50
41	88276	Output transformer	2.00
42	88285	1.25 mfd. 150 volt paper condenser	.80
43	88289	R.F. choke (to filaments)	.20
44	88298	.25 mfd. 150 volt paper condenser (low reactance)	.40
45	88312	Antenna coil and shield assem. (Iron core)	2.00
46	88327	Antenna cable and plug	1.10
47	88328	Diaphragm and shell assem. (R-245-A spkr.)	2.10
48	88339	Pilot light and tone control cable with plug	.90
49	88364	Control head less shell, knobs and shafts	3.50
50	88365	Fuse, 10 amperes	.05
	83777	Battery lead and fuse housing	.50
12412		Split lockwasher for receiver mounting	$0.02
17166		Hex nut for receiver mounting ½" - 13	.05
84990		Receiver mounting plate	.60
85012		Receiver mounting bolt, ½" - 13 x 2"	.06
88326		Complete accessories for installation	3.28
88335		Shakeproof lockwasher for receiver mounting	.04
88336		Large flat washer for receiver mounting	.04
83319		Fuse insulator tube	.02
83777		Battery lead and fuse housing	.50
88159		Vibrator shield	.35
88161		Tube shield half section (short)	.08
88162		Tube shield half section (long)	.08
88164		Tube shield cap (long)	.06
88165		Tube shield cap (short)	.06
88297		Speaker mounting screw #8 - 32 special head	.02
88319		Self tapping screw #8 x ¼" for receiver cover mtg.	.02
88321		Receiver case assembly (less covers)	5.00
88327		Antenna cable	1.10
88330		Receiver case cover with tube location label	1.00
88350		Interference filter condenser with bracket, .5 mfd., 150 V.	.70

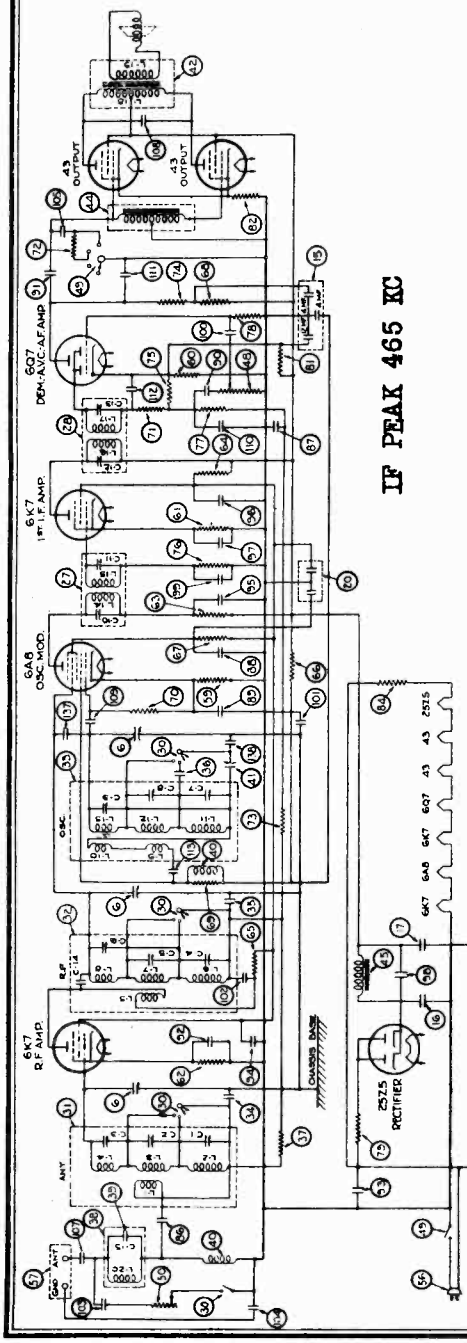
PRICES SUBJECT TO CHANGE WITHOUT NOTICE

MODELS 126H, 126L

STROMBERG-CARLSON TEL. MFG. CO. Schematic, Parts

Tuning Ranges ..... A—540 to 1500 Kc.; B—1450 to 3500 Kc.; C—5600 to 18,000 Kc.
Number and Types of Tubes ..... 2 No. 6K7, 1 No. 6A8, 1 No. 6Q7, 2 No. 43, 1 No. 25Z5
Power Supply Voltage ..... 105 to 125 Volts
Power Supply Frequency (For AC Operation) ..... 50 to 60 Cycles
Input Power Rating ..... 55 Watts
Frequency of Intermediate Amplifier ..... 465 Kilocycles

No. 126-H ..50 to 60 Cycles; P-26844 Chassis Assembly; P-26886 Loud Speaker
No. 126-L ..50 to 60 Cycles; P-26844 Chassis Assembly; P-26887 Loud Speaker



Item Number	Piece Number	Part
5	26848	Dial Assembly
6	26414	Gang Tuning Capacitor Assembly
8	26852	Lamp Socket Assembly
9	26059	Bracket (Chassis Spacer)
11	25952	Pilot Lamp
15	26164	Electrolytic Capacitor Assembly, 4 Mf., 150 Volts; 4 Mf., 150 Volts; 12 Mf., 25 Volts
16	26163	Electrolytic Capacitor, 40 Mf.
17	26163	Electrolytic Capacitor, 40 Mf.
20	26878	Electrolytic Capacitor Assembly (Two 4 Mf.)
27	26141	1st I. F. Transformer
28	25506	2nd I. F. Transformer
30	26864	Range Switch
31	25510	Coil Assembly, Antenna
32	25511	Coil Assembly, R. F.
33	25512	Coil Assembly, Oscillator
34	25486	Capacitor, .002 Mf.
35	25527	Capacitor, .0027 Mf.
36	25490	Capacitor, .0038 Mf.
37	26383	Resistor, Type "EF", .1 Megohm
38	25513	Coil Assembly (Wave Trap)
39	25488	Capacitor .002 Mf.
40	25814	Coil Assembly, R. F. Choke, 5 Millihenrys
41	26047	Capacitor, Oscillator Series Aligner
42	26855	Transformer, Audio Output
44	26865	Transformer, Audio Input
45	25936	Choke Assembly (Filter of Rectifier)
48	26114	Potentiometer (Volume Control)
49	26271	Switch ("Off-On" and Tone Control)
50	26095	Potentiometer (Sensitivity Control)
51	26499	Knob (For Sensitivity Control)
52	22974	Socket, 6 Prong
54	25539	Socket, 8 Prong
56	24268	Cord, Power Supply
59	26326	Resistor, Type "E", 270 Ohms
60	26327	Resistor, Type "E", 330 Ohms
61	26329	Resistor, Type "E", 470 Ohms
62	26331	Resistor, Type "E", 680 Ohms
63	26333	Resistor, Type "E", 1000 Ohms
64	26333	Resistor, Type "E", 1000 Ohms
65	26345	Resistor, Type "E", 10,000 Ohms
66	26333	Resistor, Type "E", 1000 Ohms
67	26345	Resistor, Type "E", 10,000 Ohms
69	26350	Resistor, Type "E", 27,000 Ohms
70	26353	Resistor, Type "E", 47,000 Ohms
71	26353	Resistor, Type "E", 47,000 Ohms
72	26353	Resistor, Type "E", 47,000 Ohms
73	26357	Resistor, Type "E", .1 Megohm
74	26362	Resistor, Type "E", .27 Megohm
75	26365	Resistor, Type "E", .47 Megohm
76	26365	Resistor, Type "E", .47 Megohm
77	26369	Resistor, Type "E", 1 Megohm
78	26373	Resistor, Type "E", 2.2 Megohms
79	25911	Resistor, Type "B", 50 Ohms
81	26408	Resistor, Type "C", 27,000 Ohms
82	26869	Resistor, Type "B", 310 Ohms
84	25914	Resistor, Voltage Divider
86	25150	Capacitor Assembly, .02 Mf.
87	25150	Capacitor Assembly, .02 Mf.
88	25150	Capacitor Assembly, .02 Mf.
89	25150	Capacitor Assembly, .02 Mf.
90	25150	Capacitor Assembly, .02 Mf.
91	25150	Capacitor Assembly, .02 Mf.
92	25150	Capacitor Assembly, .02 Mf.
94	24402	Capacitor Assembly, .1 Mf.
95	24402	Capacitor Assembly, .1 Mf.
96	24402	Capacitor Assembly, .1 Mf.
97	24402	Capacitor Assembly, .1 Mf.
98	26890	Capacitor Assembly, .8 Mf.
99	24405	Capacitor Assembly, .04 Mf.
100	24405	Capacitor Assembly, .04 Mf.
101	25389	Capacitor Assembly, .2 Mf.
102	25481	Capacitor Assembly, .002 Mf.
103	25149	Capacitor Assembly, .01 Mf.
104	25149	Capacitor Assembly, .01 Mf.
105	26151	Capacitor Assembly, .005 Mf.
107	25533	Capacitor Assembly, .006 Mf.
108	26151	Capacitor Assembly, .005 Mf.
109	24559	Capacitor, Type "O", 100 Mmf.
110	24559	Capacitor, Type "O", 100 Mmf.
111	24559	Capacitor, Type "O", 100 Mmf.
112	24559	Capacitor, Type "O", 100 Mmf.
113	25487	Capacitor, Type "W", .001 Mf.
137	26417	Capacitor (Gimmick)
138	25489	Capacitor, .00125 Mf.

MISCELLANEOUS PARTS

Piece Number	Part
26302	Knob (For Volume Control)
26385	Knob (For Range Switch)
26884	Knob (For Off-On-Switch and Tone Control)
26305	Knob (For Large Portion of Tuning Shaft)
26306	Knob (For Vernier Portion of Tuning Shaft)

MODELS 126H, 126L
Alignment, Voltage STROMBERG-CARLSON TEL. MFG. CO.

Intermediate Frequency Amplifier Adjustments

The intermediate frequency used in these receivers is 465 kilocycles. In making these I. F. circuit adjustments always align in the following order:

1. Secondary of 2nd I. F. Transformer (Capacitor C-13).
2. Primary of 2nd I. F. Transformer (Capacitor C-12).
3. Secondary of 1st I. F. Transformer (Capacitor C-11).
4. Primary of 1st I. F. Transformer (Capacitor C-10).

Radio Frequency Adjustments

The adjustments of the aligning capacitors used in the radio frequency circuits in this receiver should be very carefully made in the following order and at the frequencies specified below:

1. Oscillator's "C" Band Shunt Aligner at 17 Megacycles (Capacitor C-9).
2. R. F. Interstage "C" Band Shunt Aligner at 17 Megacycles (Capacitor C-6).
3. Antenna "C" Band Shunt Aligner at 17 Megacycles (Capacitor C-3).
4. Oscillator's "B" Band Shunt Aligner at 3.4 Megacycles (Capacitor C-8).
5. R. F. Interstage "B" Band Shunt Aligner at 3.4 Megacycles (Capacitor C-5).
6. Antenna "B" Band Shunt Aligner at 3.4 Megacycles (Capacitor C-2).
7. Oscillator's "A" Band Shunt Aligner at 1.4 Megacycles (Capacitor C-7).
8. R. F. Interstage "A" Band Shunt Aligner at 1.4 Megacycles (Capacitor C-4).
9. Antenna "A" Band Shunt Aligner at 1.4 Megacycles (Capacitor C-1).
10. Oscillator's "A" Band Series Aligner at 0.6 Megacycles (Capacitor, Item No. 41).
11. Oscillator's "A" Band Shunt Aligner at 1.4 Megacycles (Capacitor C-7).
12. R. F. Interstage "A" Band Shunt Aligner at 1.4 Megacycles (Capacitor C-4).
13. Antenna "A" Band Shunt Aligner at 1.4 Megacycles (Capacitor C-1).

NORMAL VOLTAGE READINGS

These voltage readings are obtained by measuring between the various tube socket contacts and the heavy bus wire with the tubes in their respective sockets. The receiver is, therefore, in operation when the measurements are made. The heavy bus wire, which is the negative side of the grid and plate voltages, is plainly marked on the schematic and wiring diagram shown on pages three and four. Figure 2 shows the terminal layout of the sockets with the proper terminal numbers.

Voltages are given for a line voltage of 120 volts, A. C. Allowance should be made for the difference when the line voltage is higher or lower.

IMPORTANT—If the receiver is operated from a direct current power supply circuit, the various voltages measured will be slightly lower than those listed in the table for A. C. operation. A meter having a resistance of 1000 ohms per volt should be used for measuring the D. C. voltages. Voltage values shown are those obtained on the lowest possible scale of a meter having the following ranges: O-2.5, O-10, O-100, O-250, O-500, O-1000 volts except when an asterisk appears after any given voltage value in which case the 1000 volt scale was used.

When the receiver is being operated from an alternating current power supply circuit, it will be necessary to have a high resistance A. C. voltmeter for checking the A. C. voltages.

			Terminals of Sockets								*Heater Voltages Between Heater Terminals*	
Tube	*Circuit*	*Cap*	1	2	3	4	5	6	7	8	*Socket Terminal Numbers*	*Volts*
6K7	R. F. Amp.	0	0	*12.8*	+42	+93	+3.7	0	*6.4*	+3.7	2-7	*6.4*
6A8	Mod.—Osc.	0	0	*12.8*	+100	+64	—4.8	+100	*19.2*	+1.6	2-7	*6.4*
6K7	I. F. Amp.	0	0	*26*	+102	+93	+3.1	0	*19.6*	+3.1	2-7	*6.4*
6Q7	Dem.—A.V.C.—Audio	0	0	*0*	+61*	0	0	+93	*6.4*	+1.1	2-7	*6.4*
43	Audio Output	—	*26*	+100	+103	0	+14.5	*53*			1-6	*27*
43	Audio Output	—	*53.2*	+100	+103	0	+14.5	*80.2*			1-6	*27*
25Z5	Rectifier	—	*80*	*116*	+108	+108	*116*	*105*			1-6	*25*
Voltage across pilot lamps—*28.7* volts.												

A. C. voltages are indicated by italics; when the receiver is operated from a D. C. power supply, D. C. voltages will be obtained in place of the A. C. voltages.
Receiver tuned to 1000 kc., no signal.

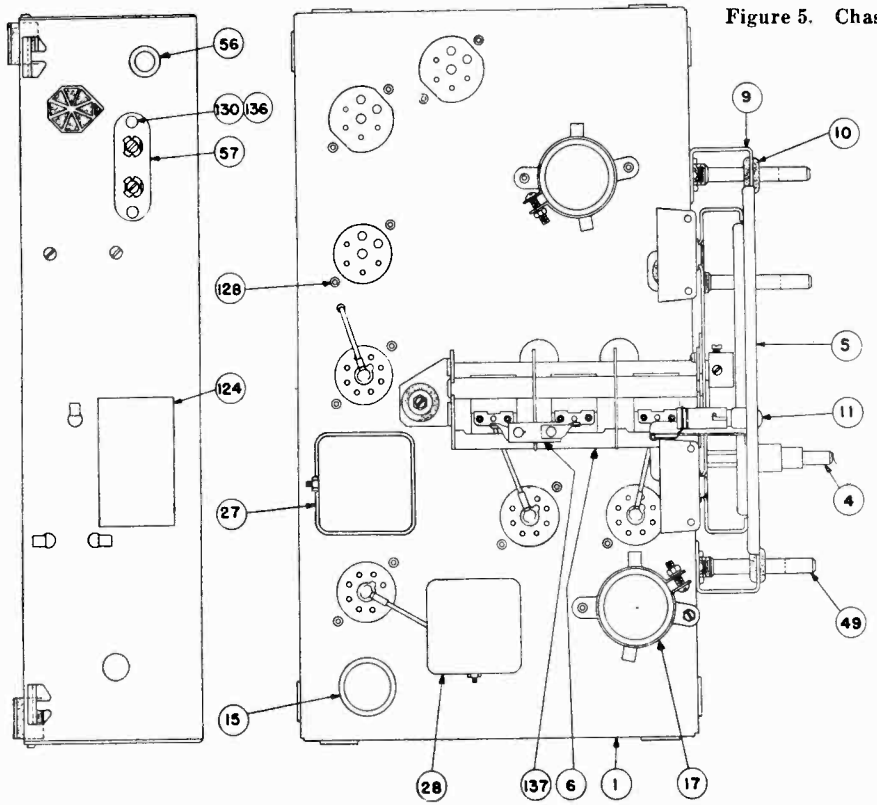


Figure 5. Chassis Assembly.

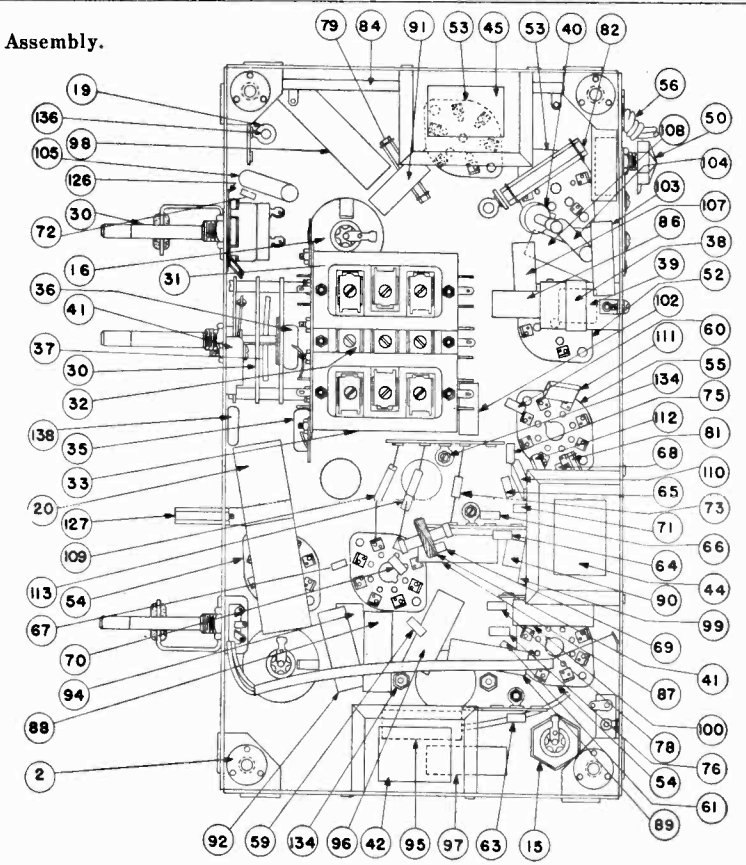


Fig. 2. Terminal Layout for Voltage Measurement Chart and Location of the Various Aligning Capacitors.

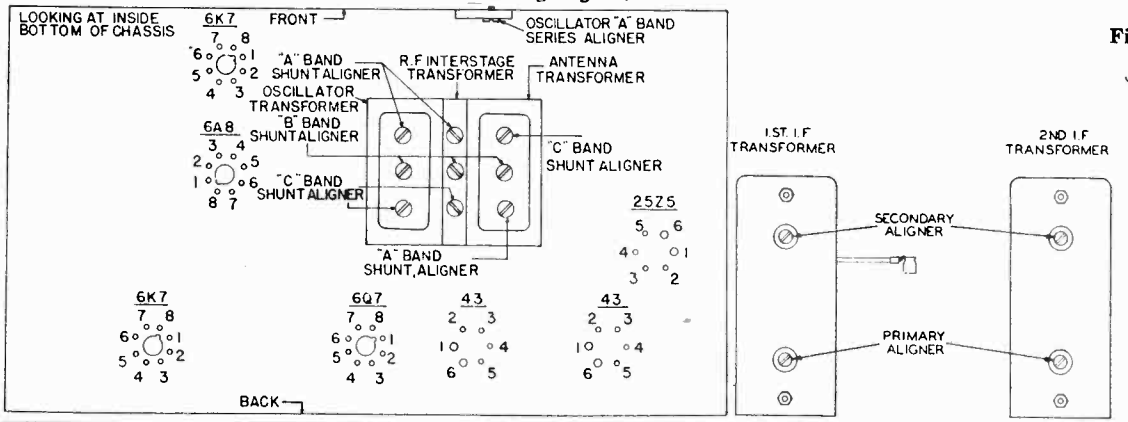
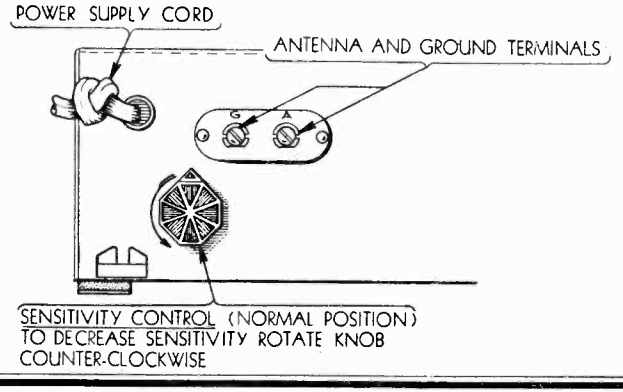


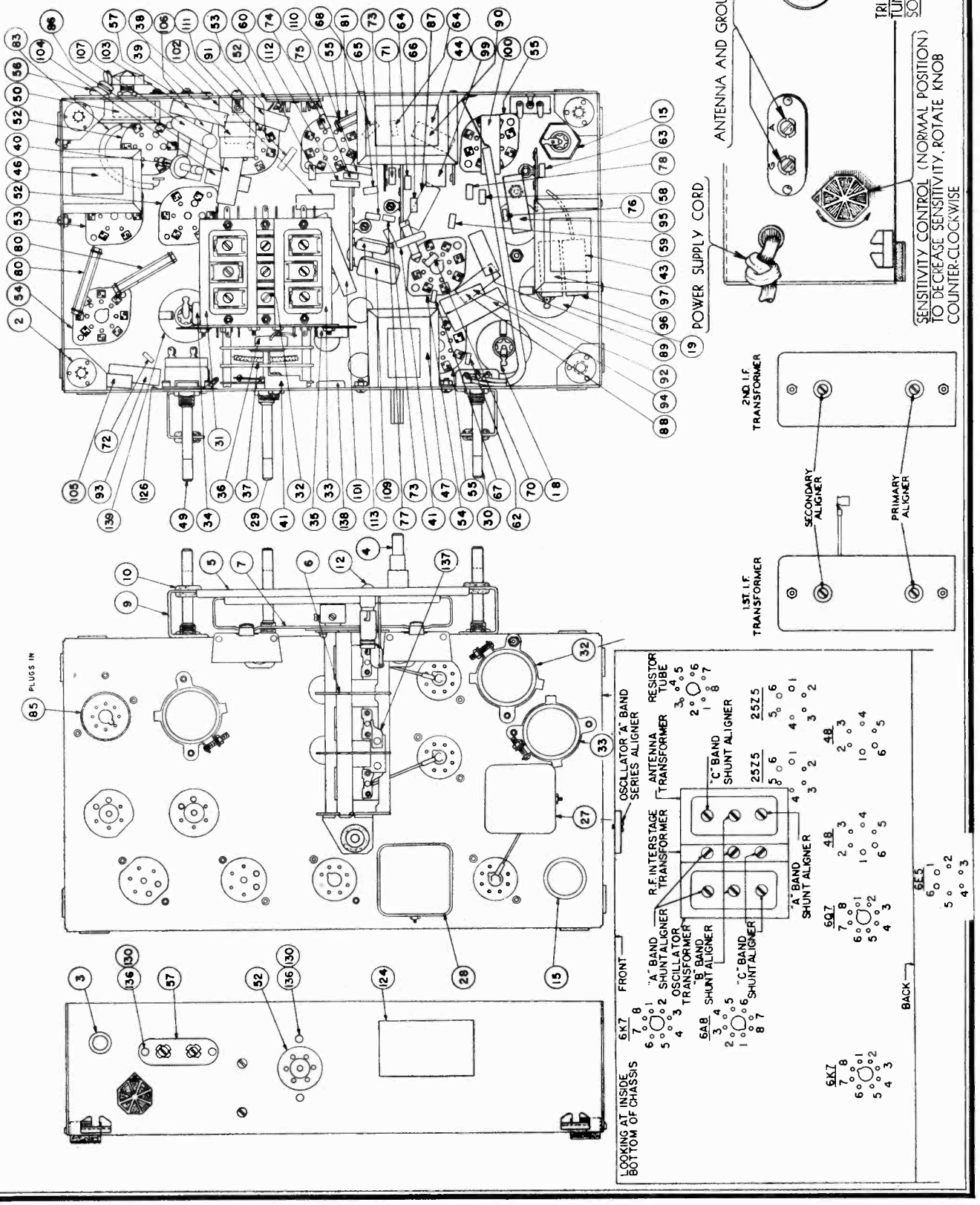
Fig. 1. Location and Operation of Sensitivity Control.



MODELS 127H, 127M
Socket, Trimmers
Chassis

STROMBERG-CARLSON TEL. MFG. CO.

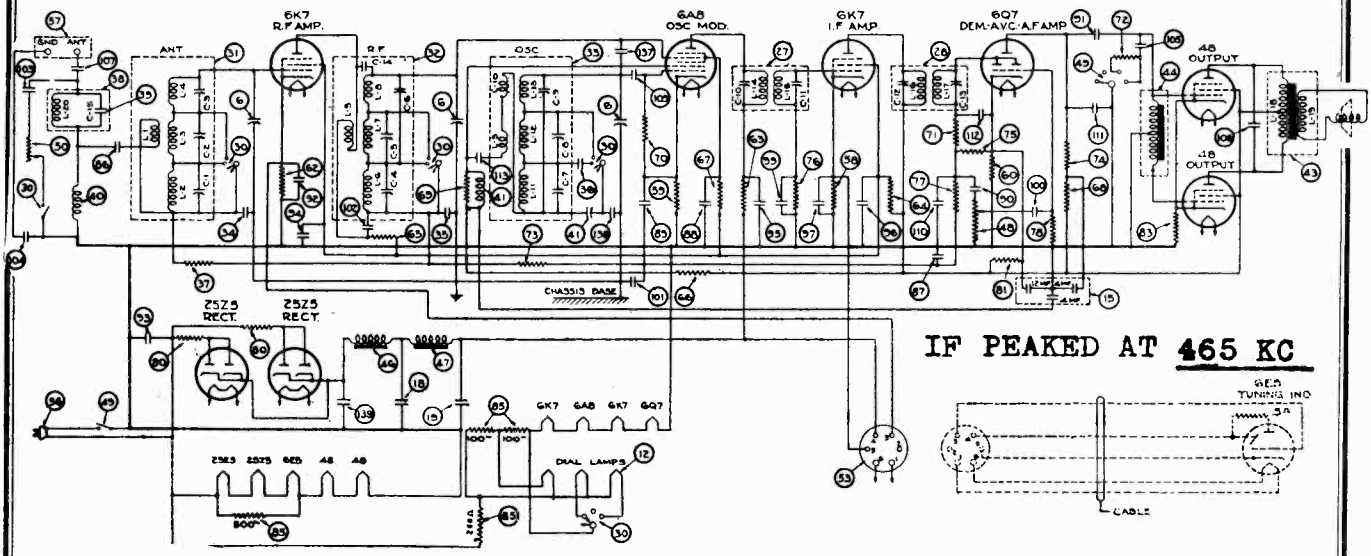
Tuning Ranges	A—540 to 1500 Kc.; B—1450 to 3500 Kc.; C—5600 to 18,000 Kc.
Number and Types of Tubes	2 No. 6K7, 1 No. 6A8, 1 No. 6Q7, 2 No. 48, 1 No. 6E5, 2 No. 25Z5
Power Supply Voltage	105 to 125 Volts
Power Supply Frequency (For A. C. operation)	50 to 60 Cycles
Input Power Rating	98 Watts
Frequency of Intermediate Amplifier	465 Kilocycles



MODELS 127H, 127M

STROMBERG-CARLSON TEL. MFG. CO.

Schematic, Parts



REPLACEMENT PARTS

Item Number	Piece Number	Part
5	26848	Dial Assembly
6	26414	Gang Tuning Capacitor Assembly
7	26850	Lamp Socket Assembly
9	26059	Bracket (Chassis Spacer)
12	26287	Pilot Lamp
15	26164	Electrolytic Capacitor Assembly, 4 Mf., 150 Volts; 4 Mf., 150 Volts; 12 Mf., 25 Volts
18	26162	Electrolytic Capacitor, 25 Mf.
19	26162	Electrolytic Capacitor, 25 Mf.
27	26141	1st I. F. Transformer
28	25506	2nd I. F. Transformer
30	26864	Range Switch
31	25510	Coil Assembly, Antenna
32	25511	Coil Assembly, R. F.
33	25512	Coil Assembly, Oscillator
34	25488	Capacitor, .002 Mf.
35	25527	Capacitor, .0027 Mf.
36	25490	Capacitor, .0038 Mf.
37	26383	Resistor, Type "EI", .1 Megohm
38	25513	Coil Assembly (Wave Trap)
39	25488	Capacitor, .002 Mf.
40	25814	Coil Assembly, R. F. Choke, 5 Millihenrys
41	26047	Capacitor, Oscillator Series Aligner
43	26857	Transformer, Audio Output
44	26865	Transformer, Audio Input
46	26859	Choke Assembly (Filter of Rectifier)
47	26861	Choke Assembly (Filter of Rectifier)
48	26114	Potentiometer (Volume Control)
49	26271	Switch ("Off-On" and Tone Control)
50	26095	Potentiometer. Sensitivity Control
51	26499	Knob (For Sensitivity Control)
53	22974	Socket, 6 Prong
55	25539	Socket, 8 Prong
56	24268	Cord, Power Supply
58	26324	Resistor, Type "E", 180 Ohms
59	26326	Resistor, Type "E", 270 Ohms
60	26327	Resistor, Type "E", 330 Ohms
62	26331	Resistor, Type "E", 680 Ohms
63	26333	Resistor, Type "E", 1000 Ohms
64	26333	Resistor, Type "E", 1000 Ohms
65	26345	Resistor, Type "E", 10,000 Ohms
66	26333	Resistor, Type "E", 1000 Ohms
67	26345	Resistor, Type "E", 10,000 Ohms
68	26345	Resistor, Type "E", 10,000 Ohms
69	26350	Resistor, Type "E", 27,000 Ohms
70	26353	Resistor, Type "E", 47,000 Ohms
71	26353	Resistor, Type "E", 47,000 Ohms
72	26353	Resistor, Type "E", 47,000 Ohms
73	26357	Resistor, Type "E", .1 Megohm
75	26365	Resistor, Type "E", .47 Megohm
76	26365	Resistor, Type "E", .47 Megohm
77	26369	Resistor, Type "E", 1 Megohm
78	26373	Resistor, Type "E", 2.2 Megohms
80	25911	Resistor, Type "B", 50 Ohms
81	26408	Resistor, Type "C", 27,000 Ohms
83	26870	Resistor, Flexible, 155 Ohms
85	26871	Resistor, "B" Voltage Divider
86	25150	Capacitor Assembly, .02 Mf.
87	25150	Capacitor Assembly, .02 Mf.
88	25150	Capacitor Assembly, .02 Mf.
89	25150	Capacitor Assembly, .02 Mf.
90	25150	Capacitor Assembly, .02 Mf.
91	25150	Capacitor Assembly, .02 Mf.
92	25150	Capacitor Assembly, .02 Mf.
93	25150	Capacitor Assembly, .02 Mf.
94	24402	Capacitor Assembly, .1 Mf.
95	24402	Capacitor Assembly, .1 Mf.
96	24402	Capacitor Assembly, .1 Mf.
97	24402	Capacitor Assembly, .1 Mf.
99	24405	Capacitor Assembly, .04 Mf.
100	24405	Capacitor Assembly, .04 Mf.
101	25389	Capacitor Assembly, .2 Mf.
102	25481	Capacitor Assembly, .002 Mf.
103	25149	Capacitor Assembly, .01 Mf.
104	25149	Capacitor Assembly, .01 Mf.
105	26151	Capacitor Assembly, .005 Mf.
106	25149	Capacitor Assembly, .01 Mf.
107	25533	Capacitor Assembly, .006 Mf.
109	24559	Capacitor, Type "O", 100 Mmf.
110	24559	Capacitor, Type "O", 100 Mmf.
111	24559	Capacitor, Type "O", 100 Mmf.
112	24559	Capacitor, Type "O", 100 Mmf.
113	25487	Capacitor, Type "W", .001 Mf.
137	26417	Capacitor (Gimmick)
138	25489	Capacitor, .00125 Mf.
139	27014	Electrolytic Capacitor, 40 Mf.

MISCELLANEOUS PARTS

Piece Number	Part
26491	Plug (For Tri-Focal Tuning Unit Cable)
26365	Resistor, Type "E", .47 Megohm (Used at Socket of No. 6E5 Tube)
26302	Knob (For Volume Control).
26385	Knob (For Range Switch)
26384	Knob (For Off-On-Tone Control)
26305	Knob (For Large Portion of Tuning Shaft)
26306	Knob (For Vernier Portion of Tuning Shaft)

MODELS 127H,127M
Alignment,Voltage

STROMBERG-CARLSON TEL. MFG. CO.

Intermediate Frequency Amplifier Adjustments

The intermediate frequency used in these receivers is 465 kilocycles. In making these I. F. circuit adjustments always align in the following order:

1. Secondary of 2nd I. F. Transformer (Capacitor C-13).
2. Primary of 2nd I. F. Transformer (Capacitor C-12).
3. Secondary of 1st I. F. Transformer (Capacitor C-11).
4. Primary of 1st I. F. Transformer (Capacitor C-10).

Radio Frequency Adjustments

The adjustments of the aligning capacitors used in the radio frequency circuits in this receiver should be very carefully made in the following order and at the frequencies specified below:

1. Oscillator's "C" Band Shunt Aligner at 17 Megacycles (Capacitor C-9).
2. R. F. Interstage "C" Band Shunt Aligner at 17 Megacycles (Capacitor C-6).
3. Antenna "C" Band Shunt Aligner at 17 Megacycles (Capacitor C-3).
4. Oscillator's "B" Band Shunt Aligner at 3.4 Megacycles (Capacitor C-8).
5. R. F. Interstage "B" Band Shunt Aligner at 3.4 Megacycles (Capacitor C-5).
6. Antenna "B" Band Shunt Aligner at 3.4 Megacycles (Capacitor C-2).
7. Oscillator's "A" Band Shunt Aligner at 1.4 Megacycles (Capacitor C-7).
8. R. F. Interstage "A" Band Shunt Aligner at 1.4 Megacycles (Capacitor C-4).
9. Antenna "A" Band Shunt Aligner at 1.4 Megacycles (Capacitor C-1).
10. Oscillator's "A" Band Series Aligner at 0.6 Megacycles (Capacitor, Item No. 41).
11. Oscillator's "A" Band Shunt Aligner at 1.4 Megacycles (Capacitor C-7).
12. R. F. Interstage "A" Band Shunt Aligner at 1.4 Megacycles (Capacitor C-4).
13. Antenna "A" Band Shunt Aligner at 1.4 Megacycles (Capacitor C-1).

NORMAL VOLTAGE READINGS

These voltage readings are obtained by measuring between the various tube socket contacts and the heavy bus wire with the tubes in their respective sockets. The receiver is, therefore, in operation when the measurements are made. The heavy bus wire, which is the negative side of the grid and plate voltages, is plainly marked on the schematic and wiring diagram shown on pages three and five. Figure 2 shows the terminal layout of the sockets with the proper terminal numbers.

Voltages are given for a line voltage of 120 volts, A. C. Allowance should be made for the difference when the line voltage is higher or lower.

IMPORTANT—If the receiver is operated from a direct current power supply circuit, the various voltages measured will be slightly lower than those listed in the table for A. C. operation. A meter having a resistance of 1000 ohms per volt should be used for measuring the D. C. voltages. Voltage values shown are those obtained on the lowest possible scale of a meter having the following ranges: 0-2.5, 0-10, 0-100, 0-250, 0-500, 0-1000 volts except when an asterisk appears after any given voltage value in which case the 1000 volt scale was used.

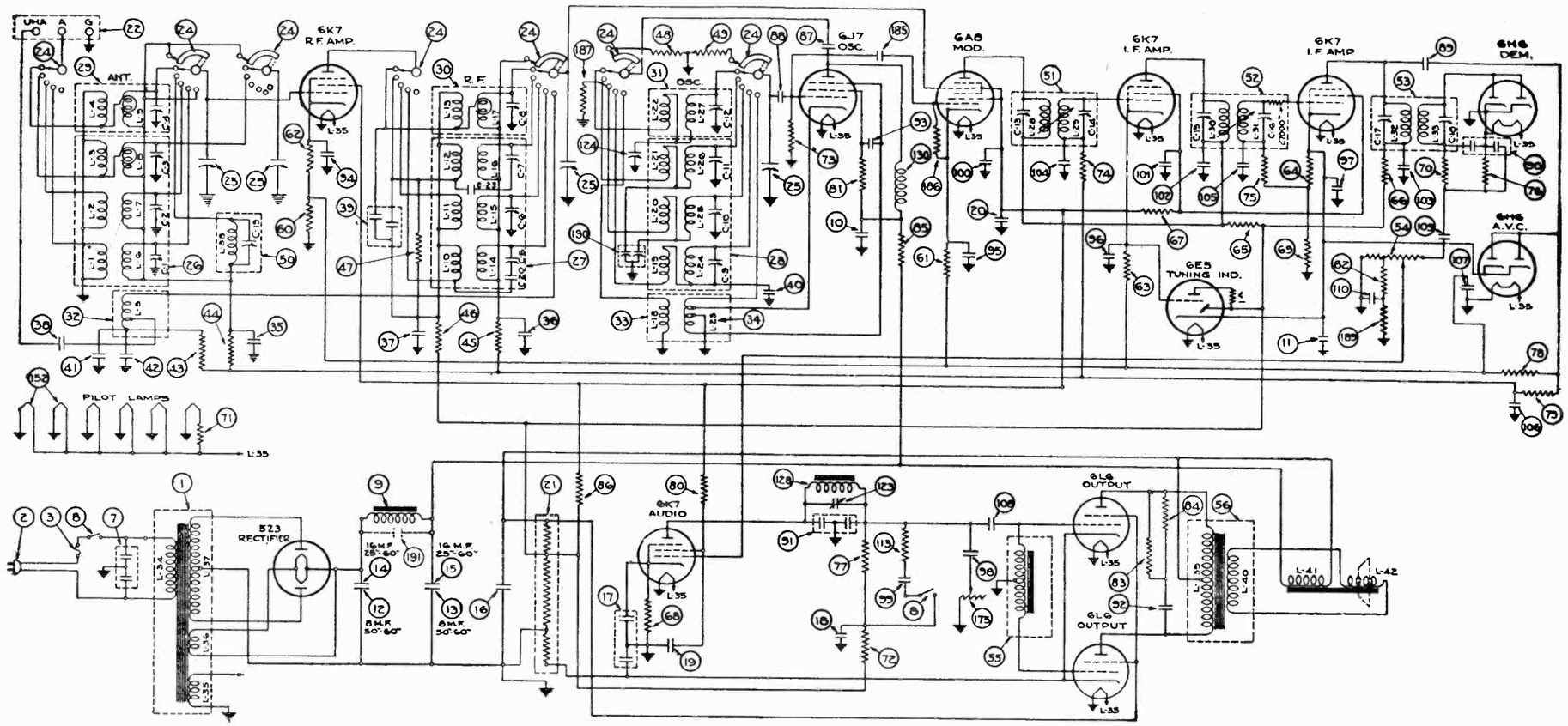
When the receiver is being operated from an alternating current power supply circuit, it will be necessary to have a high resistance A. C. voltmeter for checking the A. C. voltages.

			Terminals of Sockets								*Heater Voltages Between Heater Terminals*	
Tube	*Circuit*	*Cap*	1	2	3	4	5	6	7	8	*Socket Terminal Numbers*	*Volts*
6K7	R. F. Amp.	0	0	*18*	+33	+88	+4	0	*24*	+4	2-7	*6*
6A8	Mod.—Osc.	0	0	*18*	+95	+60	—7	+95	*12*	+1.5	2-7	*6*
6K7	I. F. Amp.	0	0	*6*	+99	+88	+2	0	*12*	+2.2	2-7	*6*
6Q7	Dem.—A.V.C.—Audio Amp.	0	0	0	+50*	0	0	+88	*6*	+1	2-7	*6*
48	Audio Output	—	*61*	+106	+106	0	+17	*31*	—	—	1-6	*30*
48	Audio Output	—	*0*	+106	+106	0	+17	*30*	—	—	1-6	*30*
6E5	Tuning Ind.	—	*61*	+0.5	+3.9	+99	+2.2	*67*	—	—	1-6	*6*
25Z5	Rectifier	—	*95*	*116*	+112	+116	*114*	*70*	—	—	1-6	*25*
25Z5	Rectifier	—	*120*	*116*	+112	+112	*116*	*95*	—	—	1-6	*25*
Resistor	Voltage Divider	—	*37*	*65*	*37*	—	*120*	—	*25*	*32*	—	—

Voltage across pilot lamps—*12* volts.

A. C. voltages are indicated by italics; when the receiver is operated from a D.C. power supply, D.C. voltages will be obtained in place of the A.C. voltages.
Receiver tuned to 1000 kc., no signal.

STROMBERG-CARLSON TEL. MFG. CO.

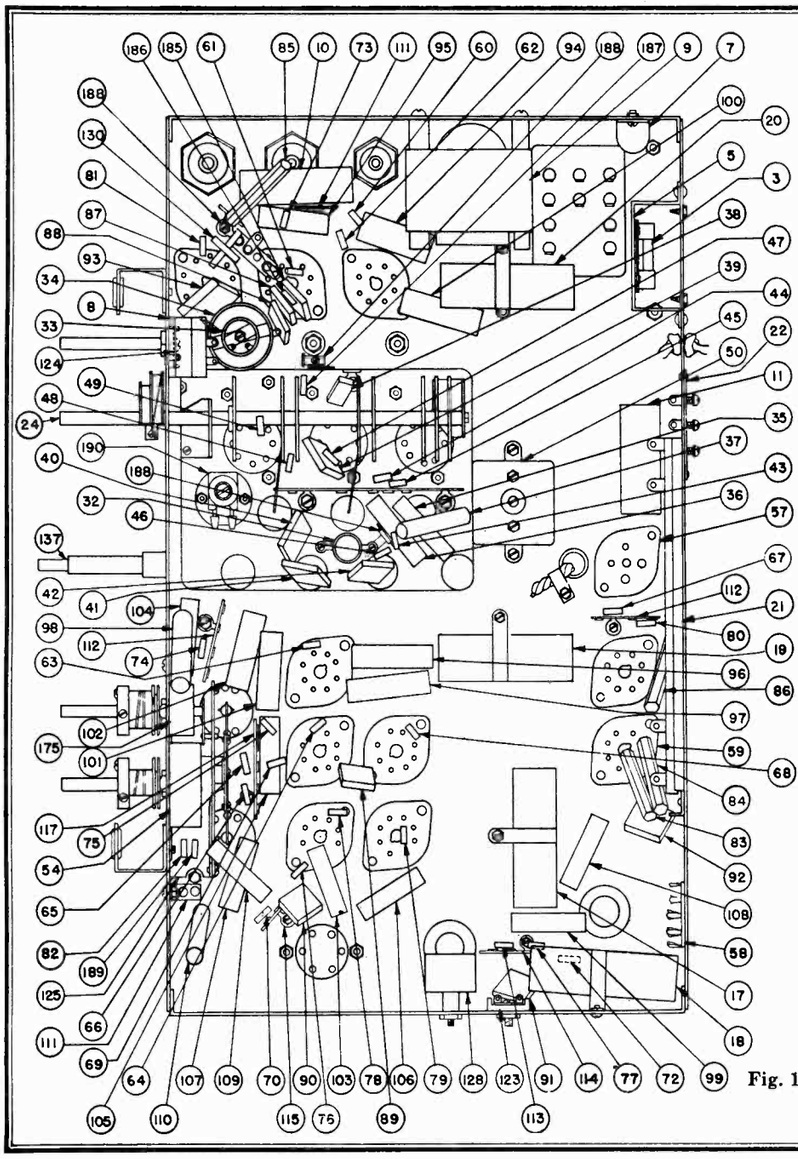


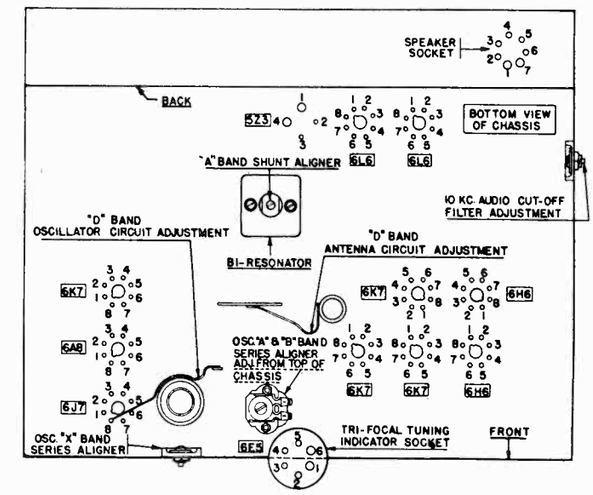
IF PEAK 465 KC

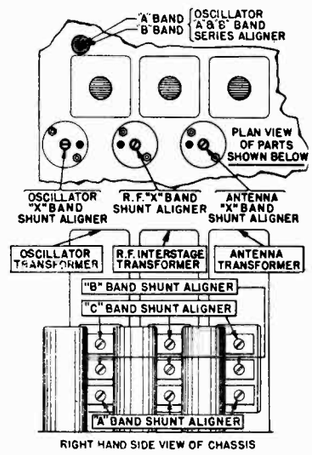
Item Number	Piece Number	Part
1	26685	Power Transformer (50 to 60 Cycles Chassis)
1	26686	Power Transformer (25 to 60 Cycles Chassis)
2	24268	Cord (Power Supply)
3	23234	Fuse, 2½ Amperes
7	21535	Capacitor Assembly (2—.01 Mf. Capacitors)
8	26061	Switch ("Off-On" and Bass Control)
9	26704	Choke Assembly (Filter of Rectifier)
10	25788	Electrolytic Capacitor, 1 Mf., 450 Volts
11	24207	Electrolytic Capacitor, 12 Mf., 25 Volts
12	22757	Electrolytic Capacitor, 8 Mf., 500 Volts
13	22757	Electrolytic Capacitor, 8 Mf., 500 Volts
14	26510	Electrolytic Capacitor, 16 Mf., 500 Volts
15	26510	Electrolytic Capacitor, 16 Mf., 500 Volts
16	26773	Electrolytic Capacitor, 16 Mf., 350 Volts
17	25498	Electrolytic Capacitor (2—10 Mf.), 25 Volts
18	24580	Electrolytic Capacitor, 4 Mf., 450 Volts
19	26693	Electrolytic Capacitor, 4 Mf., 350 Volts
20	26693	Electrolytic Capacitor, 4 Mf., 350 Volts
21	26736	Resistor, "B" Voltage Divider
24	26746	Range Switch Assembly
25	26444	Gang Tuning Capacitor Assembly
26	26446	Coil Assembly, Antenna ("A", "B" and "C" Ranges)
27	26447	Coil Assembly, R. F. ("A", "B" and "C" Ranges)
28	26448	Coil Assembly, Oscillator ("A", "B" and "C" Ranges)
29	26507	Coil Assembly, Antenna ("X" Range)
30	26508	Coil Assembly, R. F. ("X" Range)
31	26509	Coil Assembly, Oscillator ("X" Range)
32	26758	Coil Assembly, Antenna ("D" Range)
33	26787	Oscillator Primary Coil ("D" Range)
34	26765	Oscillator Secondary Coil ("D" Range)
35	24405	Capacitor Assembly, .04 Mf.
36	24405	Capacitor Assembly, .04 Mf.
37	24994	Capacitor Assembly, .05 Mf.
39	26513	Capacitor (2—200 Mmf.)
40	26944	Capacitor, .004 Mf.
41	24637	Capacitor, .0017 Mf.
42	24637	Capacitor, .0017 Mf.
43	26357	Resistor, Type "E", .1 Megohm
44	26357	Resistor, Type "E", .1 Megohm
45	26357	Resistor, Type "E", .1 Megohm
46	26333	Resistor, Type "E", 1000 Ohms
47	26353	Resistor, Type "E", 47,000 Ohms
48	26321	Resistor, Type "E", 100 Ohms
49	26321	Resistor, Type "E", 100 Ohms
50	26474	Coil Assembly (Bi-Resonator)
51	26481	1st I. F. Transformer
52	26482	2nd I. F. Transformer
53	26243	3rd I. F. Transformer
54	26077	Potentiometer (Volume Control)
55	26700	Transformer Assembly, Audio Input
56	26702	Transformer Assembly, Audio Output
57	22988	Socket, 4 Prong
58	23517	Socket, 7 Prong
59	25539	Socket, 8 Prong
60	26324	Resistor, Type "E", 180 Ohms
61	26326	Resistor, Type "E", 270 Ohms
62	26328	Resistor, Type "E", 390 Ohms
63	26330	Resistor, Type "E", 560 Ohms
64	26330	Resistor, Type "E", 560 Ohms
65	26330	Resistor, Type "E", 560 Ohms
66	26333	Resistor, Type "E", 1000 Ohms
67	26333	Resistor, Type "E", 1000 Ohms
68	26338	Resistor, Type "E", 2700 Ohms
69	26328	Resistor, Type "E", 390 Ohms
70	26345	Resistor, Type "E", 10,000 Ohms
71	26780	Resistor, Flexible, 3.5 Ohms (Pilot Lamp)
72	26353	Resistor, Type "E", 47,000 Ohms
73	26353	Resistor, Type "E", 47,000 Ohms
74	26357	Resistor, Type "E", .1 Megohm
75	26357	Resistor, Type "E", .1 Megohm
76	26357	Resistor, Type "E", .1 Megohm
77	26357	Resistor, Type "E", .1 Megohm
78	26369	Resistor, Type "E", 1 Megohm
79	26369	Resistor, Type "E", 1 Megohm
80	26369	Resistor, Type "E", 1 Megohm
81	26349	Resistor, Type "E", 22,000 Ohms
82	26341	Resistor, Type "E", 4700 Ohms
83	26775	Resistor, Type "F", 20,000 Ohms
84	26775	Resistor, Type "F", 20,000 Ohms
85	26776	Resistor, Type "F", 12,000 Ohms
86	25526	Resistor, Type "F", 15,000 Ohms
87	25487	Capacitor, Type "W", .001 Mf.
88	24560	Capacitor, Type "O", 50 Mmf.
89	24560	Capacitor, Type "O", 50 Mmf.
90	26512	Capacitor, Type "W", 2—100 Mmf.
91	26512	Capacitor, Type "W", 2—100 Mmf.
92	25535	Capacitor, Type 3L, .008 Mf.
93	25535	Capacitor, Type 3L, .008 Mf.
94	24402	Capacitor Assembly, .1 Mf.
95	24402	Capacitor Assembly, .1 Mf.
96	24402	Capacitor Assembly, .1 Mf.
97	24402	Capacitor Assembly, .1 Mf.
98	25149	Capacitor Assembly, .01 Mf.
99	25149	Capacitor Assembly, .01 Mf.
100	24994	Capacitor Assembly, .05 Mf.
101	24994	Capacitor Assembly, .05 Mf.
102	24994	Capacitor Assembly, .05 Mf.
103	24994	Capacitor Assembly, .05 Mf.
104	24405	Capacitor Assembly, .04 Mf.
105	24405	Capacitor Assembly, .04 Mf.
106	24405	Capacitor Assembly, .04 Mf.
107	24405	Capacitor Assembly, .04 Mf.
108	24405	Capacitor Assembly, .04 Mf.
109	24405	Capacitor Assembly, .04 Mf.
110	24405	Capacitor Assembly, .04 Mf.
113	26349	Resistor, Type "E", 22,000 Ohms
123	26568	Adjustable Capacitor (High Frequency Cut-Off Filter)
124	26569	Capacitor (Oscillator Series Aligner, "X" Range)
125	26485	Potentiometer and Bracket Assembly (Tone Control and High Fidelity)
128	26515	Coil Assembly (High Frequency Cut Off Filter)
130	25814	Choke Assembly, 5 Millihenrys
132	26519	Drive Disc Assembly
133	26570	Dial Bracket Assembly
134	26534	Bar Assembly (Pulley)
135	26211	Pulley
136	26518	Gear Assembly
137	26220	Drive Shaft Assembly
138	26520	Dial Assembly (Secondary)
139	26694	Dial Assembly (Main)
140	26672	Drive Cord Assembly (Volume Indicator Disc)
141	26683	Cord Assembly (Dial Elevator)
142	26226	Spring
143	26555	Volume Indicator Disc Assembly
144	26698	Fidelity Indicator Disc Assembly
145	26572	Bracket Assembly
146	26682	Reel Assembly (Range Switch)
147	26667	Reel Assembly (Tone-Fidelity Control)
148	26666	Reel Assembly (Volume Control)
149	26580	Front Dial Plate Assembly
150	26147	Lamp Socket
151	26257	Lamp Shades
152	26287	Pilot Lamp
155	26497	Cable Assembly, Tri-Focal Indicator
156	26692	Lamp Socket Assembly
175	26439	Potentiometer
176	26673	Drive Cord Assembly (Fidelity Indicator Disc)
185	24560	Capacitor, Type "O", 50 Mmf.
186	26357	Resistor, Type "E", .1 Megohm
187	26341	Resistor, Type "E", 4700 Ohms
189	26345	Resistor, Type "E", 10,000 Ohms
190	26564	Capacitor Assembly, Oscillator Series Aligners ("A" and "B" Ranges)
191	22775	Capacitor Assembly, .3 Mf.

MISCELLANEOUS PARTS

Piece Number	Part
26250	Cone Assembly (For P-26170 Speaker)
26043	Plug (For Loud Speaker Cable)
26369	Resistor, Type "E", 1 Megohm (Used at Socket of No. 6E5 Tube)
26302	Knob (For "Volume" Control)
26299	Knob (For "Tone-Fidelity" Control)
26305	Knob (For "Stations" Selector Control Shaft)
26306	Knob (For "Vernier" Stations Selector Control Shaft)
26301	Knob (For "Range" Switch)
26300	Knob (For "Off-On-Bass" Control)







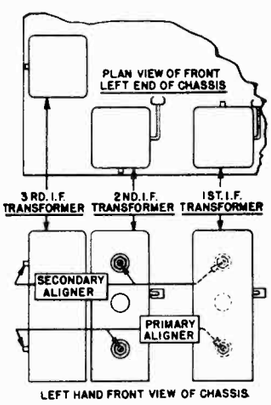


Fig. 1. Terminal Layout for Voltage Measurement Chart and Location of the Various Aligning Capacitors.

ALIGNMENT DATA FOR MODELS 150 AND 160

All alignment adjustments are accurately made at the factory on this receiver, and ordinarily no readjustments are necessary. However, should it become necessary to make any readjustments, this alignment procedure should be carefully followed.

In making any alignment adjustments always adjust the signal generator's output to the minimum value where a good alignment may still be obtained. Never attempt to make any alignment adjustments using a strong signal.

Figure 1 shows the location of all the aligning capacitors used in this receiver.

Intermediate Frequency Amplifier Adjustments

Because of the necessity of obtaining the proper shape of resonance curve of these stages in a high fidelity receiver, it is recommended that unless it is absolutely essential, these I. F. adjustments be untouched. In the factory these adjustments are made using a visual system which allows the operator to see the exact shape of the resonance curve. For this reason it is best to have these adjustments made at the factory. However, in the case where this cannot be done, the following procedure should be followed.

Operate the range switch of the receiver to the "A" range position. Set the tuning dial at its extreme low frequency position, and operate the "Tone-Fidelity" control knob so that the receiver is adjusted for the standard fidelity position as indicated by the fidelity indicator located on the front panel of the receiver. **Never attempt to align the I. F. circuits of this receiver with the "Tone-Fidelity" control set at any position other than the standard fidelity.** The I. F. circuits may then be checked for alignment by adjusting the aligning capacitors in the exact order as follows:

1. Secondary of 3rd I. F. Trans. (Capacitor C-18).
2. Primary of 3rd I. F. Trans. (Capacitor C-17).
3. Secondary of 2nd I. F. Trans. (Capacitor C-16).
4. Primary of 2nd I. F. Trans. (Capacitor C-15).
5. Secondary of 1st I. F. Trans. (Capacitor C-14).
6. Primary of 1st I. F. Trans. (Capacitor C-13).

Radio Frequency Adjustments

The alignment of the radio frequency circuits for the various ranges in this receiver should be very carefully made in the order and at the frequencies specified.

It will be noted that no instructions are given for aligning the receiver at other than two frequencies for any range. Each receiver is given an exacting check for "tracking" at various frequencies in each range before leaving the factory. It is felt by the manufacturers that should any receiver through accident require a check on the "tracking", it should be returned to the factory, where this may be easily and accurately done.

Alignment of Long-Wave-Weather Range (Also Referred to as "X" Band) Circuits

1. Oscillator's "X" Band Shunt Aligning Capacitor at 350 Kilocycles (Capacitor C-12).
2. R. F. Interstage "X" Band Shunt Aligning Capacitor at 350 Kilocycles (Capacitor C-8). *Item 133 in Model 160*
3. Antenna "X" Band Shunt Aligning Capacitor at 350 Kilocycles (Capacitor C-4).
4. Oscillator "X" Band Series Aligning Capacitor at 150 Kilocycles (Capacitor Item 124). When operation No. 4 has been completed repeat operations 1, 2, and 3 again and in the exact order given.

Alignment of Standard Broadcast Range (Also Referred to as "A" Band) Circuits

1. Oscillator's "A" Band Shunt Aligning Capacitor at 1500 Kilocycles (Capacitor C-11).
2. R. F. Interstage "A" Band Shunt Aligning Capacitor at 1500 Kilocycles (Capacitor C-7). *Item 200 in Model 160*
3. Antenna "A" Band Shunt Aligning Capacitor at 1500 Kilocycles (Capacitor C-3).
4. "A" Band, R. F. Bi-resonator Shunt Aligning Capacitor at 1500 Kilocycles (Capacitor C-19).
5. Oscillator "A" Band Series Aligning Capacitor at 600 Kilocycles (Capacitor with screw adjustment. Item 190). When operation No. 5 has been completed repeat operations 1, 2, 3, and 4 again and in the exact order given.

Alignment of Amateur, Police, and Aircraft Range (Also Referred to as "B" Band) Circuits

1. Oscillator's "B" Band Shunt Aligning Capacitor at 5 Megacycles (Capacitor C-10).
2. R. F. Interstage "B" Band Shunt Aligning Capacitor at 5 Megacycles (Capacitor C-6). *Item 200 in Model 160*
3. Antenna "B" Band Shunt Aligning Capacitor at 5 Megacycles (Capacitor C-2).
4. Oscillator "B" Band Series Aligning Capacitor at 1.8 Megacycles (Capacitor with nut adjustment. Item 190). When operation No. 4 has been completed repeat operations 1, 2, and 3 again and in the exact order given.

Alignment of Short-Wave-Foreign Range (Also Referred to as "C" Band) Circuits

1. Oscillator's "C" Band Shunt Aligning Capacitor at 16 Megacycles (Capacitor C-9).
2. R. F. Interstage "C" Band Shunt Aligning Capacitor at 16 Megacycles (Capacitor C-5).
3. Antenna "C" Band Shunt Aligning Capacitor at 16 Megacycles (Capacitor C-1).

Alignment of Ultra Short-Wave Range (Also Referred to as "D" Band) Circuits

1. The only adjustment which it is necessary to make for bringing the "D" Band Oscillator's circuit into alignment is accomplished by bending the ground loop (shown in Figure 1 as "D" Band Oscillator Circuit Adjustment) either closer to the coil or farther away from the coil. This adjustment should be made with the signal generator set to a frequency of 20 megacycles.
2. The only adjustment which it is necessary to make for bringing the "D" Band Antenna's Circuit into alignment is accomplished by bending the grid lead loop (shown in Figure 1 as "D" Band Antenna Circuit Adjustment) so as to form either a smaller or larger loop. This adjustment should also be made with the signal generator set to a frequency of 20 megacycles.

Adjustment of 10 Kilocycle Audio Cut-Off Filter

The adjustment of this filter is correctly made at the factory and no additional adjustment is required.

NORMAL VOLTAGE READINGS

The various values of voltages listed in the following table are obtained by measuring between the various tube socket contacts and the chassis base, with the tubes in their respective sockets. The receiver is, therefore, in operation when the measurements are made. Figure 1 shows the terminal layout of the sockets with the proper terminal numbers.

Voltages are given for a line voltage of 120 volts, and allowance should be made for differences when the line voltage is higher or lower. A meter having a resistance of 1000 ohms per volt should be used for measuring the D. C. voltages. Voltage values shown are those obtained on the lowest possible scale of a meter having the following ranges: O-2.5, O-10, O-100, O-250, O-500, O-1000 volts except when an asterisk appears after any given voltage value in which case the 1000 volt scale was used.

Tube	Circuit	Cap	Terminals of Sockets								Heater Voltages Between Heater Terminals	
			1	2	3	4	5	6	7	8	Socket Terminal Numbers	Volts
6K7	R. F. Amp.	0	0	0	+210	+ 95	+6.5	—	*6.3*	+6.5	2-7	*6.3*
6A8	Modulator	0	0	0	+210	+ 95	— 35	+ 95	*6.3*	+5.5	2-7	*6.3*
6J7	Oscillator	— 65	0	0	+200	+125	0	—	*6.3*	0	2-7	*6.3*
6K7	1st I. F. Amp.	0	0	0	+210	+ 95	+ 7	+ 4	*6.3*	+ 7	2-7	*6.3*
6K7	2nd I. F. Amp.	0	0	0	+210	+ 95	+ 6	+2.5	*6.3*	+ 6	2-7	*6.3*
6H6	Demodulator	—	0	0	— .3	0	— .3	+ 4	*6.3*	0	2-7	*6.3*
6H6	A. V. C.	—	0	0	0	+ 6	0	0	*6.3*	+ 6	2-7	*6.3*
6K7	Audio Amp.	0	0	0	+135*	+ .2	+ .7	—	*6.3*	+ .7	2-7	*6.3*
6L6's	Audio Output	—	0	0	+360	+235	0	—	*6.3*	+ 15	2-7	*6.3*
6E5	Tuning Ind.	—	*6.3*	+.6	+6.6	+215	+ 6	*0*	—	—	1-6	*6.3*
5Z3	Rectifier	—	+380	*390*	*390*	+380	—	—	—	—	1-4	*4.8*
Speaker		—	+365	0	0	+375	+375	—	+235	—		

Voltage across vernier dial pilot lamp—*5.3* volts
Receiver tuned to 1000 Kc., no signal. A. C. voltages are indicated by italics.

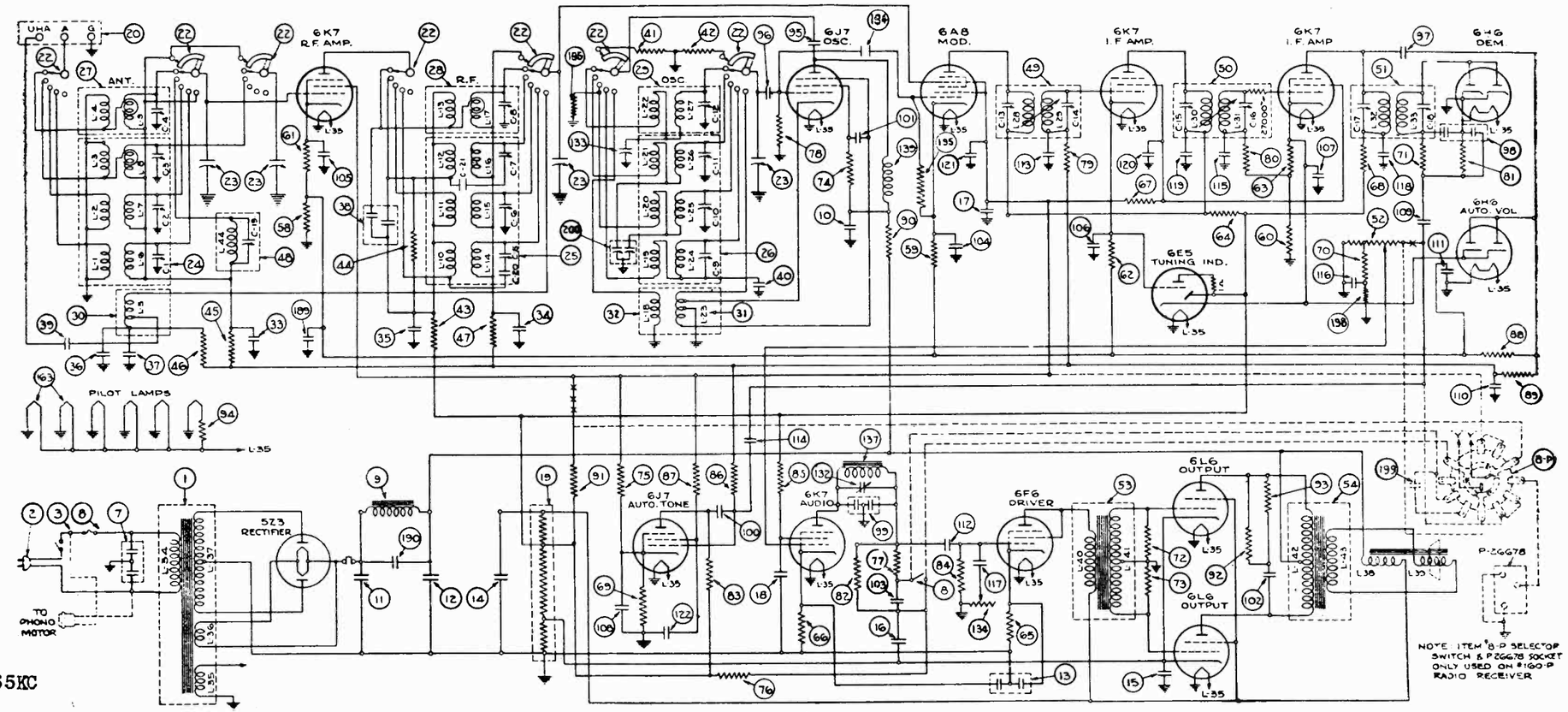
IMPORTANT—The knob marked "Stations" comes in two parts; the large knurled portion which is used for rapid tuning, and a small knob which is used for the vernier adjustment of the tuning system. The large knob marked "Stations" should be placed on the large portion of the tuning shaft so that when the "set" screw of this knob is tightened it will rest on the flat portion of the shaft. Also, do not place this large portion of the knob too tightly against the felt washer and cabinet; place it on the shaft so that there is some degree of freedom between the knob and felt washer and the cabinet. The small (or vernier) portion of this knob should then be pushed on the shaft in the same manner as the other four control knobs. Care should again be taken that this small knob is not forced too tightly against the large tuning knob, as this will cause improper action of the tuning mechanism.

Replacing Fuses—If at any time the radio receiver fails to operate (dial lamps fail to light when the "Off-On" switch is turned to the "On" position), first, make sure that the power supply cord has not been removed from the power outlet. Then, if the plug has not been removed, the fuse located in the chassis should be examined. The chassis fuse is located in the inside, rear portion of the base. It is readily accessible by simply removing the rectangular metal cover located on the outside rear of the base. **Caution: Before removing the "fuse cover" make sure that the "Power Supply Plug" is disconnected from the house current supply.** In replacing this fuse see that a fuse of the correct amperage rating is used. The No. 150 Receivers use the Stromberg-Carlson, Pc. 23234 fuse, having a rating of 2½ amperes.

FOR ALIGNMENT, SEE INDEX

MODELS 160L, 160LB
160P, 160PB
Schematic, Parts

STROMBERG-CARLSON TEL. MFG. CO.



IF PEAK 465KC

Item Number	Piece Number	Part
1	26687	Power Transformer (50 to 60 Cycles Chassis)
1	26688	Power Transformer (25 to 60 Cycles Chassis)
2	24268	Cord (Power Supply)
3	23234	Fuse, 2½ Amperes
7	21535	Capacitor Assembly (2—.01 Mf. Capacitors)
8	26061	Switch ("Off-On" and Bass Control)
9	26704	Choke Assembly (Filter of Rectifier)
10	25788	Electrolytic Capacitor, 1 Mf., 450 Volts
11	22757	Electrolytic Capacitor, 8Mf., 500 Volts (50 to 60 Cycles Chassis)
11	26510	Electrolytic Capacitor, 16 Mf., 500 Volts (25 to 60 Cycles Chassis)
12	22757	Electrolytic Capacitor, 8 Mf., 500 Volts (50 to 60 Cycles Chassis)
12	26510	Electrolytic Capacitor, 16 Mf., 500 Volts (25 to 60 Cycles Chassis)
13	25498	Electrolytic Capacitor, (2—10 Mf.) 25 Volts
14	26773	Electrolytic Capacitor, 16 Mf., 350 Volts
15	26772	Electrolytic Capacitor, 12 Mf., 35 Volts
16	24580	Electrolytic Capacitor, 4 Mf., 450 Volts
17	26693	Electrolyt'c Capacitor, 4 Mf., 350 Volts
18	26693	Electrolytic Capacitor, 4 Mf., 350 Volts
19	26737	Resistor, "B" Voltage Divider
22	26746	Range Switch Assembly
23	26444	Gang Tuning Capacitor Assembly
24	26446	Coil Assembly, Antenna ("A", "B" and "C" Ranges)
25	26447	Coil Assembly, R. F. ("A", "B" and "C" Ranges)
26	26448	Coil Assembly, Oscillator ("A", "B" and "C" Ranges)
27	26507	Coil Assembly, Antenna ("X" Range)
28	26508	Coil Assembly, R. F. ("X" Range)
29	26509	Coil Assembly, Oscillator ("X" Range)
30	26758	Coil Assembly, Antenna ("D" Range)
31	26765	Oscillator Secondary Coil ("D" Range)
32	26787	Oscillator Primary Coil ("D" Range)
33	24405	Capacitor Assembly, .04 Mf.
34	24405	Capacitor Assembly, .04 Mf.
35	24994	Capacitor Assembly, .05 Mf.
36	24637	Capacitor, Type "W", .0017 Mf.
37	24637	Capacitor, Type "W", .0017 Mf.
38	26518	Capacitor (2—200 Mmf.)
39	24559	Capacitor, Type "O", 100 Mmf.
40	26944	Capacitor, Type "W", .004 Mf.
41	26321	Resistor, Type "E", 100 Ohms
42	26321	Resistor, Type "E", 100 Ohms
43	26333	Resistor, Type "E", 1000 Ohms
44	26353	Resistor, Type "E", 47,000 Ohms
45	26357	Resistor, Type "E", .1 Megohm
46	26357	Resistor, Type "E", .1 Megohm
47	26357	Resistor, Type "E", .1 Megohm
48	26474	Coil Assembly (Bi-Resonator)
49	26481	1st I. F. Transformer
50	26482	2nd I. F. Transformer
51	26243	3rd I. F. Transformer
52	26077	Potentiometer (Volume Control)
53	26706	Transformer Assembly, Audio Input
54	26708	Transformer Assembly, Audio Output
55	22988	Socket, 4 Prong
56	23517	Socket, 5 Prong
57	25539	Socket, 8 Prong
58	26324	Resistor, Type "E", 180 Ohms
59	26326	Resistor, Type "E", 270 Ohms
60	26328	Resistor, Type "E", 390 Ohms
61	26328	Resistor, Type "E", 390 Ohms
62	26330	Resistor, Type "E", 560 Ohms
63	26330	Resistor, Type "E", 560 Ohms
64	26330	Resistor, Type "E", 560 Ohms
65	26333	Resistor, Type "E", 1000 Ohms
66	26338	Resistor, Type "E", 2700 Ohms
67	26333	Resistor, Type "E", 1000 Ohms
68	26333	Resistor, Type "E", 1000 Ohms
69	26331	Resistor, Type "E", 680 Ohms
70	26341	Resistor, Type "E", 4700 Ohms
71	26345	Resistor, Type "E", 10,000 Ohms
72	26345	Resistor, Type "E", 10,000 Ohms
73	26845	Resistor, Type "E", 10,000 Ohms
74	26349	Resistor, Type "E", 22,000 Ohms
75	26350	Resistor, Type "E", 27,000 Ohms
76	26353	Resistor, Type "E", 47,000 Ohms
77	26356	Resistor, Type "E", 82,000 Ohms
78	26353	Resistor, Type "E", 47,000 Ohms
79	26357	Resistor, Type "E", .1 Megohm
80	26357	Resistor, Type "E", .1 Megohm
81	26357	Resistor, Type "E", .1 Megohm
82	26362	Resistor, Type "E", .27 Megohm
83	26365	Resistor, Type "E", .47 Megohm
84	26365	Resistor, Type "E", .47 Megohm
85	26369	Resistor, Type "E", 1 Megohm
86	26369	Resistor, Type "E", 1 Megohm
87	26369	Resistor, Type "E", 1 Megohm
88	26369	Resistor, Type "E", 1 Megohm
89	26369	Resistor, Type "E", 1 Megohm
90	26776	Resistor, Type "F", 12,000 Ohms
91	25526	Resistor, Type "F", 15,000 Ohms
92	26775	Resistor, Type "F", 20,000 Ohms
93	26775	Resistor, Type "F", 20,000 Ohms
94	26780	Resistor, Flexible, 3.5 Ohms (Pilot Lamp)
95	25487	Capacitor, Type "W", .001 Mf.
96	24560	Capacitor, Type "O", 50 Mmf.
97	24560	Capacitor, Type "O", 50 Mmf.
98	26512	Capacitor, Type "W", 2—100 Mmf.
99	26512	Capacitor, Type "W", 2—100 Mmf.
100	24559	Capacitor, Type "O", 100 Mmf.
101	25535	Capacitor, Type 3L, .008 Mf.
102	26932	Capacitor Assembly, .008 Mf.
103	24461	Capacitor, Type "J", .004 Mf.
104	24402	Capacitor Assembly, .1 Mf.
105	24402	Capacitor Assembly, .1 Mf.
106	24402	Capacitor Assembly, .1 Mf.
107	24402	Capacitor Assembly, .1 Mf.
108	24402	Capacitor Assembly, .1 Mf.
109	24405	Capacitor Assembly, .04 Mf.
110	24405	Capacitor Assembly, .04 Mf.
111	24405	Capacitor Assembly, .04 Mf.
112	24405	Capacitor Assembly, .04 Mf.
113	24405	Capacitor Assembly, .04 Mf.
114	24405	Capacitor Assembly, .04 Mf.
115	24405	Capacitor Assembly, .04 Mf.
116	25149	Capacitor Assembly, .01 Mf.
117	25149	Capacitor Assembly, .01 Mf.
118	24994	Capacitor Assembly, .05 Mf.
119	24994	Capacitor Assembly, .05 Mf.
120	24994	Capacitor Assembly, .05 Mf.
121	24994	Capacitor Assembly, .05 Mf.
122	24994	Capacitor Assembly, .05 Mf.
132	26568	Adjustable Capacitor (High Frequency Cut-Off Filter)
133	26569	Capacitor (Oscillator Series Aligner, "X" Range)
134	26485	Potentiometer and Bracket Assembly (Tone Control and High Fidelity)
137	26515	Coil Assembly (High Frequency Cut-Off Filter)
138	26497	Cable Assembly, Tri-Focal Indicator
139	25814	Choke Assembly, 5 Millihenrys
140	26519	Drive Disc Assembly
141	26570	Dial Bracket Assembly
142	26534	Bar Assembly (Pulley)
143	26211	Pulley
144	26518	Gear Assembly
145	26220	Drive Shaft Assembly
146	26520	Dial Assembly (Vernier)
147	26694	Dial Assembly (Main)
148	26672	Drive Cord Assembly (Volume Indicator Disc)
149	26673	Drive Cord Assembly (Fidelity Indicator Disc)
150	26683	Cord Assembly (Dial Elevator)
151	26226	Spring
152	26555	Volume Indicator Disc Assembly
153	26698	Fidelity Indicator Disc Assembly
154	26572	Bracket Assembly
155	26682	Reel Assembly (Range Switch)
156	26667	Reel Assembly (Tone-Fidelity Control)
157	26666	Reel Assembly (Volume Control)
160	26580	Front Dial Plate Assembly
161	26147	Lamp Socket
162	26257	Lamp Shades
163	26287	Pilot Lamp
166	26692	Lamp Socket Assembly
189	24207	Electrolytic Capacitor, 12 Mf., 25 Volts
194	24560	Capacitor, Type "O", 50 Mmf.
195	26357	Resistor, Type "E", .1 Megohm
196	26341	Resistor, Type "E", 4700 Ohms
198	26345	Resistor, Type "E", 10,000 Ohms
199	27020	Capacitor Assembly, .015 Mf.
200	26564	Capacitor Assembly, Series Aligners ("A" and "B" Ranges)

MISCELLANEOUS PARTS

Piece Number	Part
26250	Cone Assembly (For P-26170 Speaker)
26043	Plug (For Loud Speaker Cable)
26369	Resistor, Type "E", 1 Megohm (Used at Socket of No. 6E5 Tube)
26302	Knob (For "Volume" Control)
26299	Knob (For "Tone Fidelity" Control)
26305	Knob (For "Stations" Selector Control Shaft)
26306	Knob (For "Vernier" Stations Selector Control Shaft)
26301	Knob (For "Range" Switch)
26300	Knob (For "Off-On-Bass" Control)
26391	Knob (For "Off-On-Bass-Phono" Control. Used only on No. 160-P Receivers)

Chassis

MODELS 160L, 160LB
160P, 160PB

STROMBERG-CARLSON TEL. MFG. CO.

Socket, Trimmers

No. 160-L ----------50 to 60 Cycles; P-26637 Chassis Assembly; P-26170 Loud Speaker
No. 160-LB----------25 to 60 Cycles; P-26638 Chassis Assembly; P-26170 Loud Speaker
No. 160-P --60 Cycles Only; P-26639 Chassis Assembly; P-26170 Loud Speaker; P-26728 Phonograph Unit
No. 160-PB -25 Cycles Only; P-26640 Chassis Assembly; P-26170 Loud Speaker; P-26729 Phonograph Unit

For Alignment, see Index

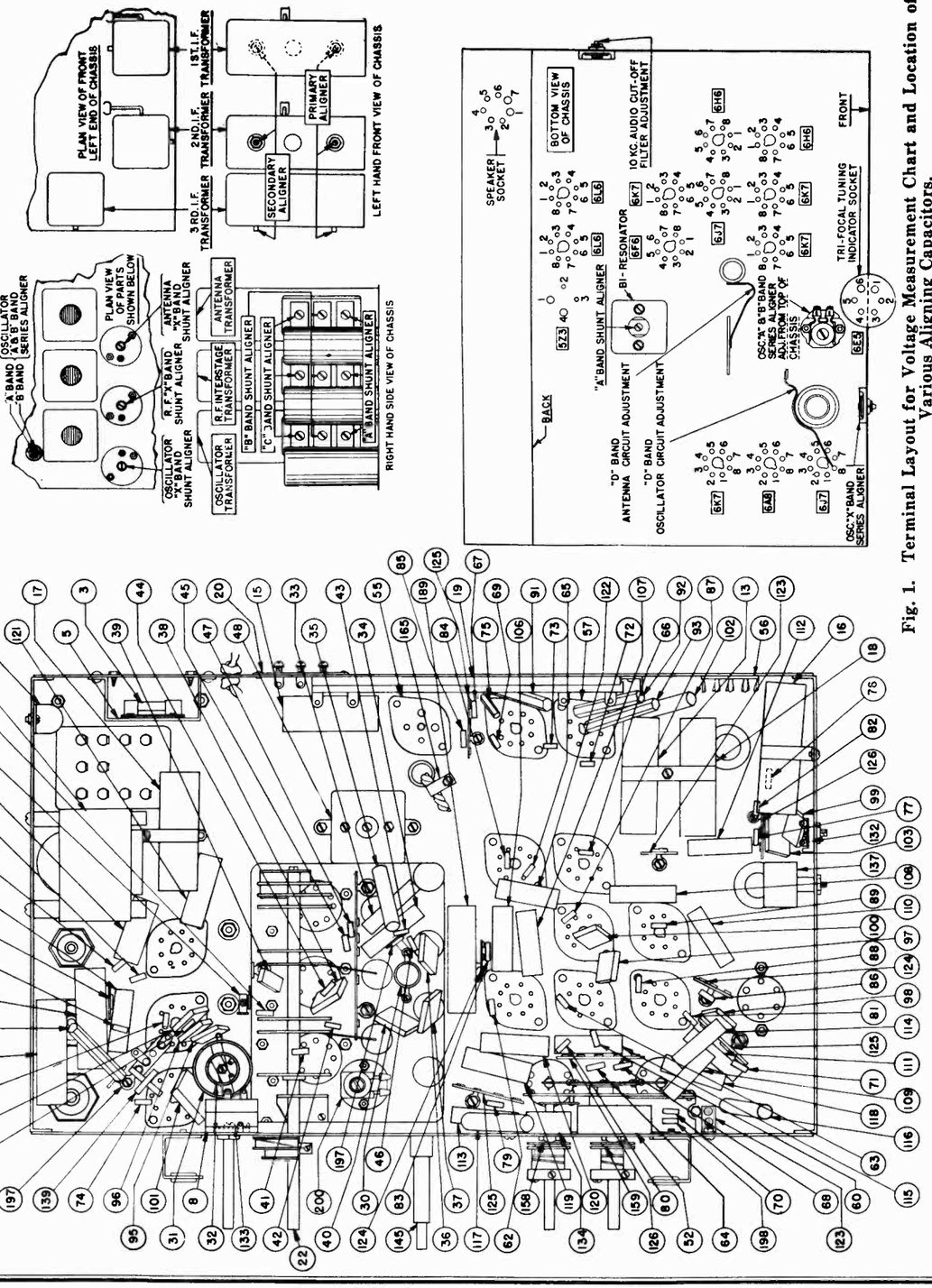
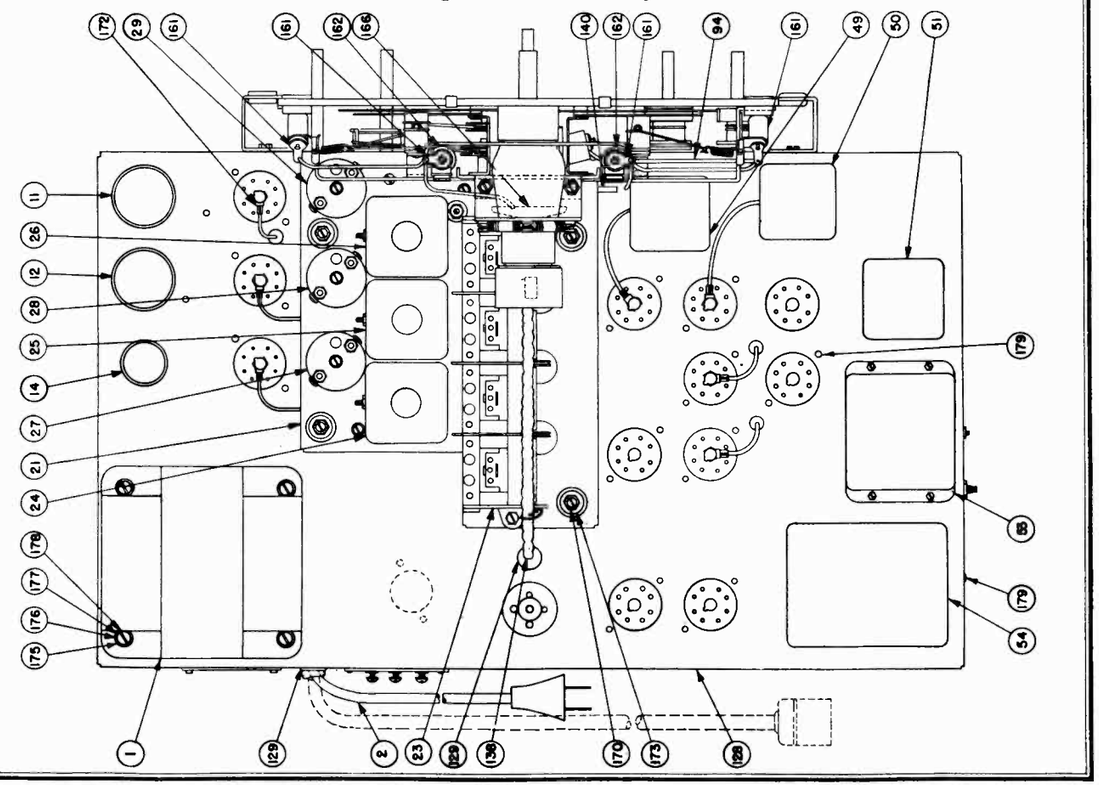


Fig. 1. Terminal Layout for Voltage Measurement Chart and Location of the Various Aligning Capacitors.

MODELS 160L, 160LB
160P, 160PB STROMBERG-CARLSON TEL. MFG. CO.
Voltage, Chassis

TUBE	CIRCUIT	CAP	TERMINALS OF SOCKETS 1	2	3	4	5	6	7	8	Heater Voltages Between Heater Terminals: Socket Terminal Numbers	Volts
6K7	R. F. Amp.	0	0	0	+230	+82	+5.2	—	*6.2*	+5.2	2-7	*6.2*
6A8	Modulator	0	0	0	+230	+82	—40	+80	*6.2*	0	2-7	*6.2*
6J7	Oscillator	—75	0	0	+225	+125	0	0	*6.2*	0	2-7	*6.2*
6K7	1st I. F. Amp.	0	0	0	+230	+76	+5.3	+3	*6.2*	+5.3	2-7	*6.2*
6K7	2nd I. F. Amp.	0	0	0	+230	+76	+5.2	+2.2	*6.2*	+5.2	2-7	*6.2*
6H6	Demodulator	—	0	0	—.25	0	—.25	+3	*6.2*	0	2-7	*6.2*
6H6	A. V. C.	—	0	0	0	+5	0	0	*6.2*	+5	2-7	*6.2*
6J7	Auto. Tone Cont.	0	0	0	+40*	+20	+2.3	0	*6.2*	+2.3	2-7	*6.2*
6K7	1st Audio Amp.	0	0	0	+170*	+15*	+0.6	+78	*6.2*	+0.6	2-7	*6.2*
6F6	2nd Audio Amp.	—	0	0	+235	+235	0	—	*6.2*	+19	2-7	*6.2*
6L6's	Audio Output	—	0	0	+400	+250	0	0	*6.2*	+20	2-7	*6.2*
6E5	Tuning Ind.	—	*6.2*	+10*	+5	+230	+4.8	0			1-6	*6.2*
5Z3	Rectifier	—	+410	*400*	*400*	+410					1-4	*4.8*

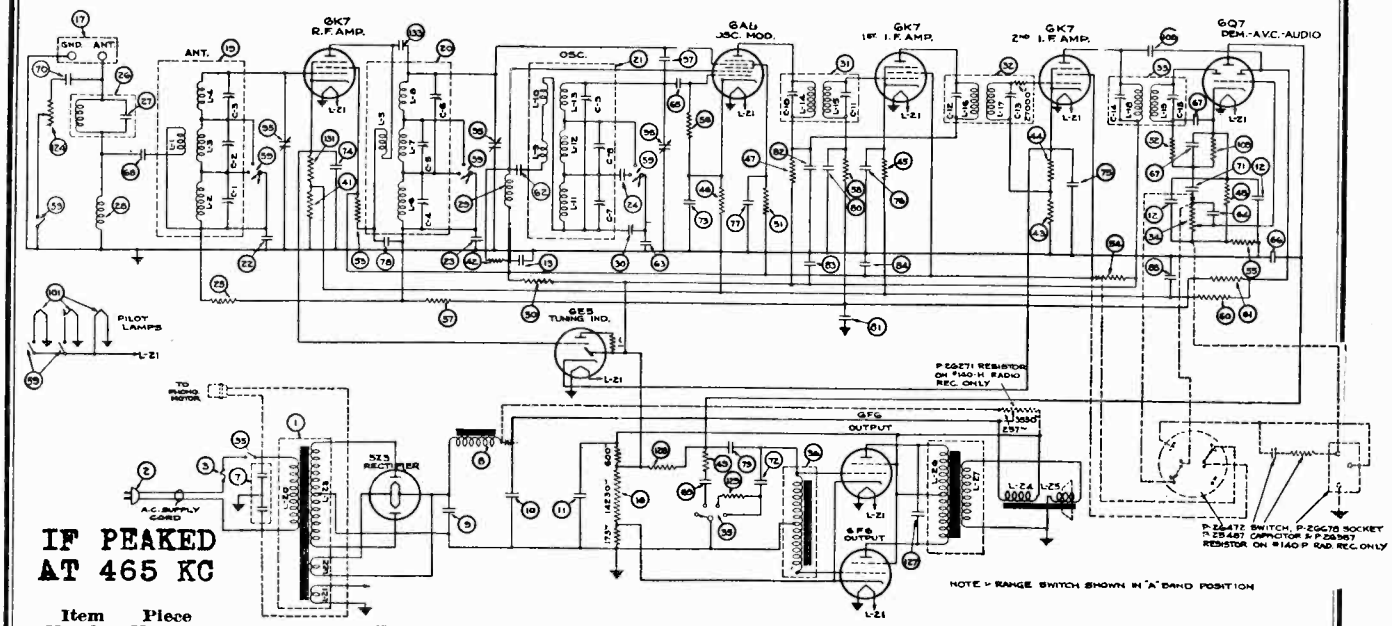
Voltage across vernier dial pilot lamp *5.3* volts. Receiver tuned to 1000 Kc., no signal.
A. C. voltages are indicated by italics.



140LB,140P,140PB
Schematic,Parts

STROMBERG-CARLSON TEL. MFG. CO.

MODELS 140H,140HB
140K,140L,140KB



IF PEAKED AT 465 KC

Item Number	Piece Number	Part
1	25434	Power Transformer (50 to 60 Cycles Chassis)
1	25435	Power Transformer (25 to 60 Cycles Chassis)
2	24268	Cord (A. C. Power Supply)
3	23150	Fuse (2 Amperes)
7	21535	Capacitor Assembly (2—.01 Capacitors)
8	26260	Choke Assembly (Rectifier Filter)
9	22757	Electrolytic Capacitor (50 to 60 Cycles Chassis)
9	26510	Electrolytic Capacitor (25 to 60 Cycles Chassis)
10	22789	Electrolytic Capacitor (50 to 60 Cycles Chassis)
10	26511	Electrolytic Capacitor (25 to 60 Cycles Chassis)
11	25458	Electrolytic Capacitor, 16 Mf.
12	26048	Electrolytic Capacitor, Dual, 10 Mf.
13	25788	Electrolytic Capacitor, 1 Mf.
14	26059	Bracket (Chassis Spacer)
16	25437	Resistor, "B" Voltage Divider
19	25510	Coil Assembly, Antenna
20	25511	Coil Assembly, R. F.
21	25512	Coil Assembly, Oscillator
22	25488	Capacitor, .002 Mf.
23	25527	Capacitor, .0027 Mf.
24	25490	Capacitor, .0038 Mf.
25	26383	Resistor, Type "EI", .1 Megohm
26	25513	Coil Assembly, Wave Trap
27	25488	Capacitor, .002 Mf.
28	25814	Coil Assembly, R. F. Choke Coil
29	25814	Coil Assembly, R. F. Choke Coil
30	26047	Oscillator Series Aligning Capacitor
31	26266	1st I. F. Transformer Assembly
32	26269	2nd I. F. Transformer Assembly
33	26270	3rd I. F. Transformer Assembly
34	26114	Potentiometer (Volume Control)
35	26404	Switch ("Off-On" and Tone Control)
36	26272	Transformer Assembly, Audio
37	26274	Transformer Assembly, Output
38	22988	Socket, 4 Prong
39	23517	Socket, 7 Prong
40	25539	Socket, 8 Prong
41	26324	Resistor, Type "E", 180 Ohms
42	26350	Resistor, Type "E", 27,000 Ohms
43	26328	Resistor, Type "E", 390 Ohms
44	26329	Resistor, Type "E", 470 Ohms
45	26329	Resistor, Type "E", 470 Ohms
46	26330	Resistor, Type "E", 560 Ohms
47	26330	Resistor, Type "E", 560 Ohms
48	26340	Resistor, Type "E", 3,900 Ohms
49	26350	Resistor, Type "E", 27,000 Ohms
50	26350	Resistor, Type "E", 27,000 Ohms
51	26345	Resistor, Type "E", 10,000 Ohms
52	26345	Resistor, Type "E", 10,000 Ohms
53	26345	Resistor, Type "E", 10,000 Ohms
54	25526	Resistor, Type "E", 15,000 Ohms
55	26353	Resistor, Type "E", 47,000 Ohms
56	26353	Resistor, Type "E", 47,000 Ohms
57	26357	Resistor, Type "E", .1 Megohm
58	26357	Resistor, Type "E", .1 Megohm
59	26264	Range Switch
60	26369	Resistor, Type "E", 1 Megohm
61	26369	Resistor, Type "E", 1 Megohm
62	25487	Capacitor, .001 Mf.
63	25489	Capacitor, .00125 Mf.
64	24166	Capacitor, 25 Mmf.
65	24559	Capacitor, 100 Mmf.
66	24559	Capacitor, 100 Mmf.
67	26512	Capacitor, 2—100 Mmf.
68	25150	Capacitor Assembly, .02 Mf.
69	25149	Capacitor Assembly, .01 Mf.
70	25149	Capacitor Assembly, .01 Mf.
71	25150	Capacitor Assembly, .02 Mf.
72	25150	Capacitor Assembly, .02 Mf.
73	25150	Capacitor Assembly, .02 Mf.
74	25150	Capacitor Assembly, .02 Mf.
75	25483	Capacitor Assembly, .1 Mf.
76	25483	Capacitor Assembly, .1 Mf.
77	25483	Capacitor Assembly, .1 Mf.
78	25481	Capacitor Assembly, .002 Mf.
79	24405	Capacitor Assembly, .04 Mf.
80	24405	Capacitor Assembly, .04 Mf.
81	24405	Capacitor Assembly, .04 Mf.
82	24994	Capacitor Assembly, .05 Mf.
83	24994	Capacitor Assembly, .05 Mf.
84	24994	Capacitor Assembly, .05 Mf.
85	24994	Capacitor Assembly, .05 Mf.
95	26276	Gang Tuning Capacitor
97	26417	Capacitor Assembly (Gimmick)
101	26287	Pilot Lamp
108	24560	Capacitor, 50 Mmf.
109	26362	Resistor, Type "E", 270,000 Ohms
124	26095	Potentiometer (Sensitivity Control)
126	26499	Knob (For Sensitivity Control)
127	24461	Capacitor, .004 Mf.
128	26357	Resistor, Type "E", .1 Megohm
129	26341	Resistor, Type "E", 4700 Ohms
131	26329	Resistor, Type "E", 470 Ohms

MISCELLANEOUS PARTS

Piece Number	Part
26250	Cone Assembly (For P-26170 Speaker)
25492	Cone Assembly (For P-26171 Speaker)
26043	Plug (For Loud Speaker Cable)
26369	Resistor, Type "E", 1 Megohm (Used at Socket of No. 6E5 Tube)

MODELS 140H, 140HB
140K, 140KB, 140L
140LB, 140P, 140PB

STROMBERG-CARLSON TEL. MFG. CO.

Voltage, Alignment Trimmers

Tube	Circuit	Cap	Terminals of Sockets 1	2	3	4	5	6	7	8	Heater Voltages Between Heater Terminals: Socket Terminal Numbers	Volts
6K7	R. F. Amp.	0	0	0	+ 52	+ 93	+ 6	—	*6.3*	+ 6	2-7	*6.3*
6A8	Mod.-Osc.	0	0	0	+242	+ 69	—0.7	+150	*6.3*	+6.9	2-7	*6.3*
6K7	1st I. F. Amp.	0	0	0	+242	+ 90	+6.2	+3.5	*6.3*	+6.2	2-7	*6.3*
6K7	2nd I. F. Amp.	0	0	0	+242	+ 90	+5.6	+2.6	*6.3*	+5.6	2-7	*6.3*
6Q7	Dem.—A. V. C.—Audio Amp.	0	0	0	+148	0	+20*	+3.5	*6.3*	+ 23	2-7	*6.3*
6F6	Audio Output		0	0	+258	+265	0	—	*6.3*	+ 17	2-7	*6.3*
5Z3	Rectifier		+445	*400*	*400*	+445	—	—	—	—	1-4	*4.8*
6E5	Tuning Indicator		*6.3*	+0.6	+ 6	+240	+5.6	0	—	—	1-6	*6.3*
Speaker Socket			+262	0	0	+445	+445	—	+425			

Receiver tuned to 1000 Kc., no signal. A. C. voltages are indicated by italics.

Intermediate Frequency Amplifier Adjustments

The intermediate frequency used in these receivers is 465 kilocycles. In making these I. F. circuit adjustments always align in the following order:

1. Secondary of 3rd I. F. Transformer (Capacitor C-15).
2. Primary of 3rd I. F. Transformer (Capacitor C-14).
3. Secondary of 2nd I. F. Transformer (Capacitor C-13).
4. Primary of 2nd I. F. Transformer (Capacitor C-12).
5. Secondary of 1st I. F. Transformer (Capacitor C-11).
6. Primary of 1st I. F. Transformer (Capacitor C-10).

Radio Frequency Adjustments

The adjustments of the aligning capacitors used in the radio frequency circuits in this receiver should be very carefully made in the following order and at the frequencies specified below:

1. Oscillator's "C" Band Shunt Aligner at 17 Megacycles (Capacitor C-9).
2. R. F. Interstage "C" Band Shunt Aligner at 17 Megacycles (Capacitor C-6).
3. Antenna "C" Band Shunt Aligner at 17 Megacycles (Capacitor C-3).
4. Oscillator's "B" Band Shunt Aligner at 3.4 Megacycles (Capacitor C-8).
5. R. F. Interstage "B" Band Shunt Aligner at 3.4 Megacycles (Capacitor C-5).
6. Antenna "B" Band Shunt Aligner at 3.4 Megacycles (Capacitor C-2).
7. Oscillator's "A" Band Shunt Aligner at 1.4 Megacycles (Capacitor C-7).
8. R. F. Interstage "A" Band Shunt Aligner at 1.4 Megacycles (Capacitor C-4).
9. Antenna "A" Band Shunt Aligner at 1.4 Megacycles (Capacitor C-1).
10. Oscillator's "A" Band Series Aligner at 0.6 Megacycles (Capacitor (30)).
11. Oscillator's "A" Band Shunt Aligner at 1.4 Megacycles (Capacitor C-7).
12. R. F. Interstage "A" Band Shunt Aligner at 1.4 Megacycles (Capacitor C-4).
13. Antenna "A" Band Shunt Aligner at 1.4 Megacycles (Capacitor C-1).

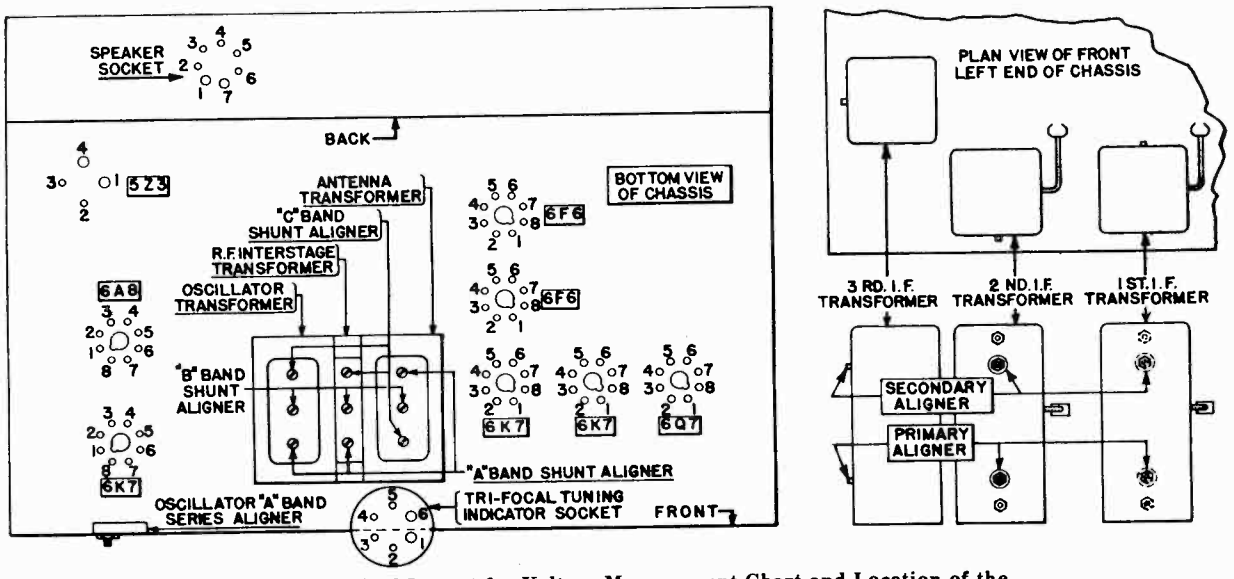


Fig. 2. Terminal Layout for Voltage Measurement Chart and Location of the Various Aligning Capacitors.

Socket, Trimmers
Chassis, Notes

STROMBERG-CARLSON TEL. MFG. CO.

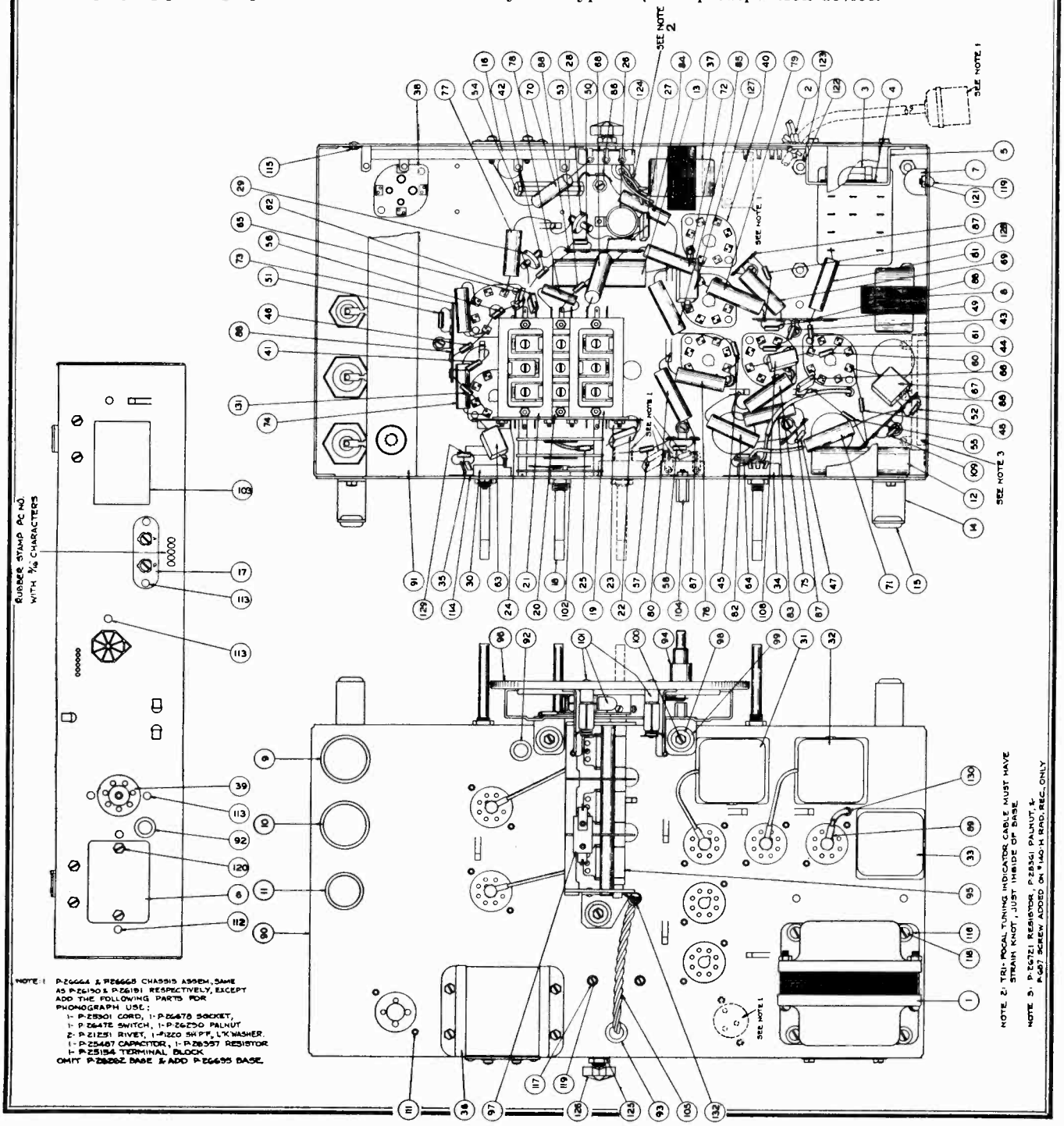
MODELS 140H, 140HB
140K, 140KB, 140L
140LB, 140P, 140PB

The No. 140-H Receiver is furnished with a highly efficient Stromberg-Carlson dynamic speaker and the exclusive "Patent Applied For" Stromberg-Carlson "Tri-Focal Tuning System."

The Nos. 140-K, 140-L, and 140-P Receivers differ from the No. 140-H Receiver in that they are of a fixed high fidelity type. In these receivers the same chassis is used as in the No. 140-H Receiver, including the "Tri-Focal Tuning System" and Selectorlite dial arrangement. In addition to these features the Nos. 140-K, 140-L, and 140-P Receivers are equipped with a Carpinchoe high fidelity dynamic speaker in place of the standard broadcast speaker which is furnished in the No. 140-H Receiver. Audio reproduction is further improved in these three models by employing sound diffusing vanes in front of the loud speaker opening, which distribute the higher pitched tones, thereby providing excellent reproduction in all parts of the room by spreading out these directional frequencies.

In the Nos. 140-L and 140-P Receivers inclusion is made of the exclusive Stromberg-Carlson Acoustical Laboratories' revolutionary new development, the Acoustical Labyrinth. This new device extends the bass response, provides reproduction only from the front of the cabinet, and eliminates all cabinet resonance.

In addition to all of the above features, the No. 140-P Receiver is equipped with a highly efficient single record playing phonograph unit which has an entirely new type of pick-up suspension device.



MODELS 180L,180LB
Socket,Trimmers
Chassis

STROMBERG-CARLSON TEL. MFG. CO.

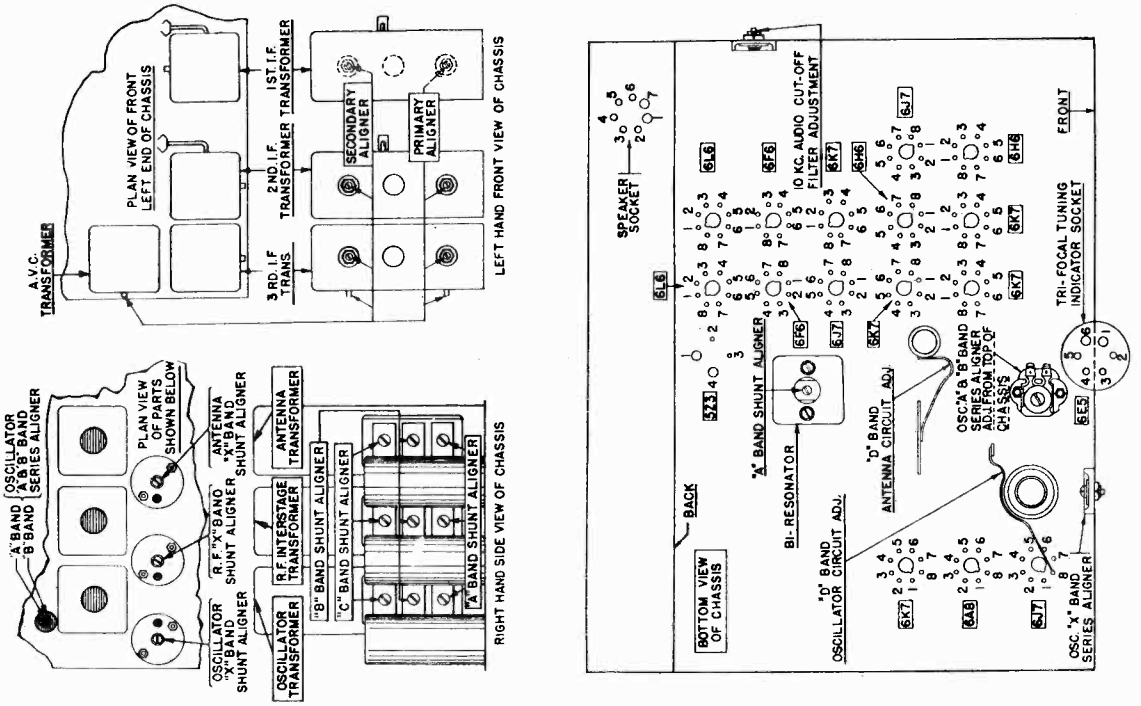
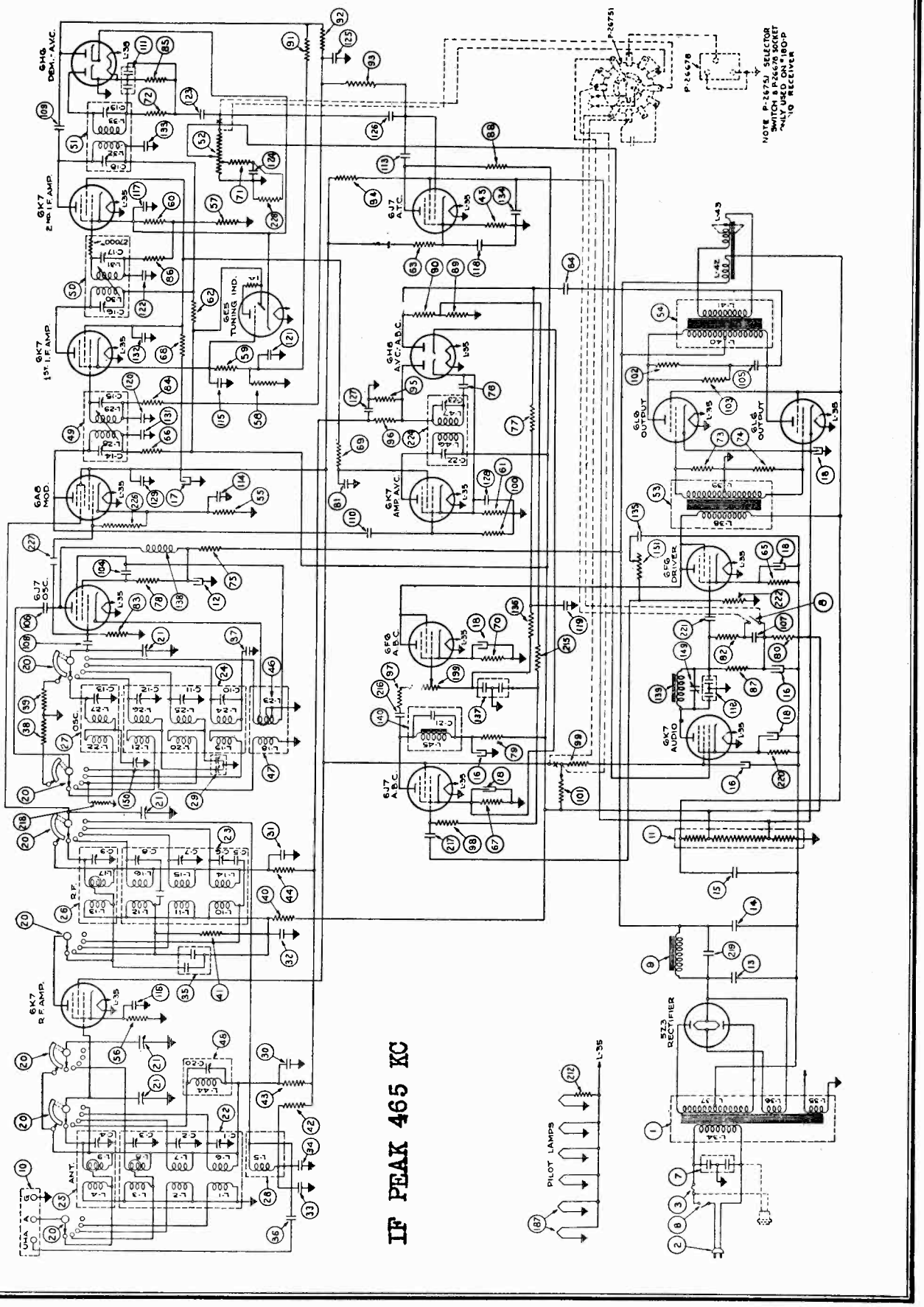


Fig. 2. Terminal Layout for Voltage Measurement Chart and Location of the Various Aligning Capacitors.

MODELS 180L, 180LB

STROMBERG-CARLSON TEL. MFG. CO. Schematic



ALIGNMENT DATA

All alignment adjustments are accurately made at the factory on this receiver, and ordinarily no readjustments are necessary. However, should it become necessary to make any readjustments, this alignment procedure should be carefully followed.

In making any alignment adjustments always adjust the signal generator's output to the minimum value where a good alignment may still be obtained. Never attempt to make any alignment adjustments using a strong signal.

Figure 2 shows the location of all the aligning capacitors used in this receiver.

Intermediate Frequency Amplifier Adjustments

Because of the necessity of obtaining the proper shape of resonance curve of these stages in a high fidelity receiver, it is recommended that unless it is absolutely essential, these I. F. adjustments be untouched. In the factory these adjustments are made using a visual system which allows the operator to see the exact shape of the resonance curve. For this reason it is best to have these adjustments made at the factory. However, in the case where this cannot be done, the following procedure should be followed.

Operate the range switch of the receiver to the "A" range position. Set the tuning dial at its extreme low frequency position, and operate the "Tone-Fidelity" control knob so that the receiver is adjusted for the standard fidelity position as indicated by the fidelity indicator located on the front panel of the receiver. **Never attempt to align the I. F. circuits of this receiver with the "Tone-Fidelity" control set at any position other than the standard fidelity.** The I. F. circuits may then be checked for alignment by adjusting the aligning capacitors in the exact order as follows:

1. Secondary of 3rd I. F. Trans. (Capacitor C-19).
2. Primary of 3rd I. F. Trans. (Capacitor C-18).
3. Secondary of 2nd I. F. Trans. (Capacitor C-17).
4. Primary of 2nd I. F. Trans. (Capacitor C-16).
5. Secondary of 1st I. F. Trans. (Capacitor C-15).
6. Primary of 1st I. F. Trans. (Capacitor C-14).

Radio Frequency Adjustments

The alignment of the radio frequency circuits for the various ranges in this receiver should be very carefully made in the order and at the frequencies specified.

It will be noted that no instructions are given for aligning the receiver at other than two frequencies for any range. Each receiver is given an exacting check for "tracking" at various frequencies in each range before leaving the factory. It is felt by the manufacturers that should any receiver through accident require a check on the "tracking", it should be returned to the factory, where this may be easily and accurately done.

Alignment of Long-Wave-Weather Range (Also Referred to as "X" Band) Circuits

1. Oscillator's "X" Band Shunt Aligning Capacitor at 350 Kilocycles (Capacitor C-13).
2. R. F. Interstage "X" Band Shunt Aligning Capacitor at 350 Kilocycles (Capacitor C-9).
3. Antenna "X" Band Shunt Aligning Capacitor at 350 Kilocycles (Capacitor C-4).
4. Oscillator "X" Band Series Aligning Capacitor at 150 Kilocycles (Capacitor Item 150). When operation No. 4 has been completed repeat operations 1, 2, and 3 again and in the exact order given.

Alignment of Standard Broadcast Range (Also Referred to as "A" Band) Circuits

1. Oscillator's "A" Band Shunt Aligning Capacitor at 1500 Kilocycles (Capacitor C-12).
2. R. F. Interstage "A" Band Shunt Aligning Capacitor at 1500 Kilocycles (Capacitor C-8).
3. Antenna "A" Band Shunt Aligning Capacitor at 1500 Kilocycles (Capacitor C-3).
4. "A" Band, R. F. Bi-resonator Shunt Aligning Capacitor at 1500 Kilocycles (Capacitor C-20).
5. Oscillator "A" Band Series Aligning Capacitor at 600 Kilocycles (Capacitor with screw adjustment. Item 29). When operation No. 5 has been completed repeat operations 1, 2, 3, and 4 again and in the exact order given.

Alignment of Amateur, Police, and Aircraft Range (Also Referred to as "B" Band) Circuits

1. Oscillator's "B" Band Shunt Aligning Capacitor at 5 Megacycles (Capacitor C-11).
2. R. F. Interstage "B" Band Shunt Aligning Capacitor at 5 Megacycles (Capacitor C-7).
3. Antenna "B" Band Shunt Aligning Capacitor at 5 Megacycles (Capacitor C-2).
4. Oscillator "B" Band Series Aligning Capacitor at 1.8 Megacycles (Capacitor with nut adjustment. Item 29). When operation No. 4 has been completed repeat operations 1, 2, and 3 again and in the exact order given.

Alignment of Short-Wave-Foreign Range (Also Referred to as "C" Band) Circuits

1. Oscillator's "C" Band Shunt Aligning Capacitor at 16 Megacycles (Capacitor C-10).
2. R. F. Interstage "C" Band Shunt Aligning Capacitor at 16 Megacycles (Capacitor C-6).
3. Antenna "C" Band Shunt Aligning Capacitor at 16 Megacycles (Capacitor C-1).

Alignment of Ultra Short-Wave Range (Also Referred to as "D" Band) Circuits

1. The only adjustment which it is necessary to make for bringing the "D" Band Oscillator's circuit into alignment is accomplished by bending the ground loop (shown in Figure 2 as "D" Band Oscillator Circuit Adjustment) either closer to the coil or farther away from the coil. This adjustment should be made with the signal generator set to a frequency of 20 megacycles.
2. The only adjustment which it is necessary to make for bringing the "D" Band Antenna's Circuit into alignment is accomplished by bending the grid lead loop (shown in Figure 2 as "D" Band Antenna Circuit Adjustment) so as to form either a smaller or larger loop. This adjustment should also be made with the signal generator set to a frequency of 20 megacycles.

Alignment of the Amplified Automatic Volume Control Circuit

The alignment adjustments for this circuit should only be made after the circuits of the intermediate and radio frequency amplifiers have been aligned. Never align the amplified automatic volume control circuits until the intermediate and radio frequency circuits have been aligned. In making the alignment adjustment of this circuit, a strong signal, preferably obtained from a standard signal generator, should be tuned in on the receiver. The strength of this signal should be on the order of approximately 2000 microvolts. When this signal is accurately tuned in, the aligning capacitor C-23 and C-22 should be adjusted to the position where a minimum value of signal is obtained from the output of the receiver. These two adjustments should be made in the order given.

Adjustment of 10 Kilocycle Audio Cut-Off Filter

The adjustment of this filter is correctly made at the factory and no additional adjustment is required.

NORMAL VOLTAGE READINGS

The various values of voltages listed in the following table are obtained by measuring between the various tube socket contacts and the chassis base, with the tubes in their respective sockets. The receiver is, therefore, in operation when the measurements are made. Figure 2 shows the terminal layouts of the sockets with the proper terminal numbers.

Voltages are given for a line voltage of 120 volts, and allowance should be made for differences when the line voltage is higher or lower. A meter having a resistance of 1000 ohms per volt should be used for measuring the D. C. voltages. Voltage values shown are those obtained on the lowest possible scale of a meter having the following ranges: O-2.5, O-10, O-100, O-250, O-500, O-1000 volts except when an asterisk appears after any given voltage value in which case the 1000 volt scale was used.

			Terminals of Sockets								*Heater Voltages Between Heater Terminals*	
Tube	*Circuit*	*Cap*	1	2	3	4	5	6	7	8	*Socket Terminal Numbers*	*Volts*
6K7	R. F. Amp.	0	0	0	+237	+96	+2.7	—	*6.2*	+2.7	2-7	*6.2*
6A8	Modulator	0	0	0	+242	+96	—42	+1.6	*6.2*	+1.6	2-7	*6.2*
6J7	Oscillator	—73	0	0	+212	+120	0	0	*6.2*	0	2-7	*6.2*
6K7	1st I. F. Amp.	0	0	0	+240	+90	+6.5	+4	*6.2*	+6.5	2-7	*6.2*
6K7	2nd I. F. Amp.	0	0	0	+237	+90	+5.5	+2.1	*6.2*	+5.5	2-7	*6.2*
6H6	Dem.—A. V. C.	—	0	0	0	0	0	0	*6.2*	+5.5	2-7	*6.2*
6H6	Amp. A. V. C. and Auto. Bass Control	—	0	0	0	+2.6	0	0	*6.2*	+2.8	2-7	*6.2*
6K7	Amp. A. V. C.	0	0	0	+242	+88	+2.8	+90	*6.2*	+2.8	2-7	*6.2*
6J7	Auto. Bass Control	0	0	0	+93	+93	+2.6	0	*6.2*	+2.6	2-7	*6.2*
6J7	Auto Tone Control	0	0	0	+65*	+15*	+2.3	0	*6.2*	+2.3	2-7	*6.2*
6F6	Auto Bass Control	—	0	0	+235	+235	0	—	*6.2*	+19	2-7	*6.2*
6K7	1st Audio Amp.	0	0	0	+130	+15*	+.7	—	*6.2*	+.7	2-7	*6.2*
6F6	Audio Driver	—	0	0	+232	+232	0	0	*6.2*	+22	2-7	*6.2*
6L6's	Audio Output	—	0	0	+405	+255	0	0	*6.2*	+21	2-7	*6.2*
6E5	Tuning Ind.	—	*6.2*	+.6	+6.5	+242	+5.5	0	—	—	1-6	*6.2*
5Z3	Rectifier	—	+415	*400*	*400*	+415	—	—	—	—	1-4	*4.7*
Speaker		—	+405	0	0	+415	+415	0	+255			

Voltage across vernier dial pilot lamp—*5.3 volts*.
Receiver tuned to 1000 Kc., no signal. A. C. voltages are indicated by italics.

MODELS 180L, 180LB

STROMBERG-CARLSON TEL. MFG. CO. Parts List

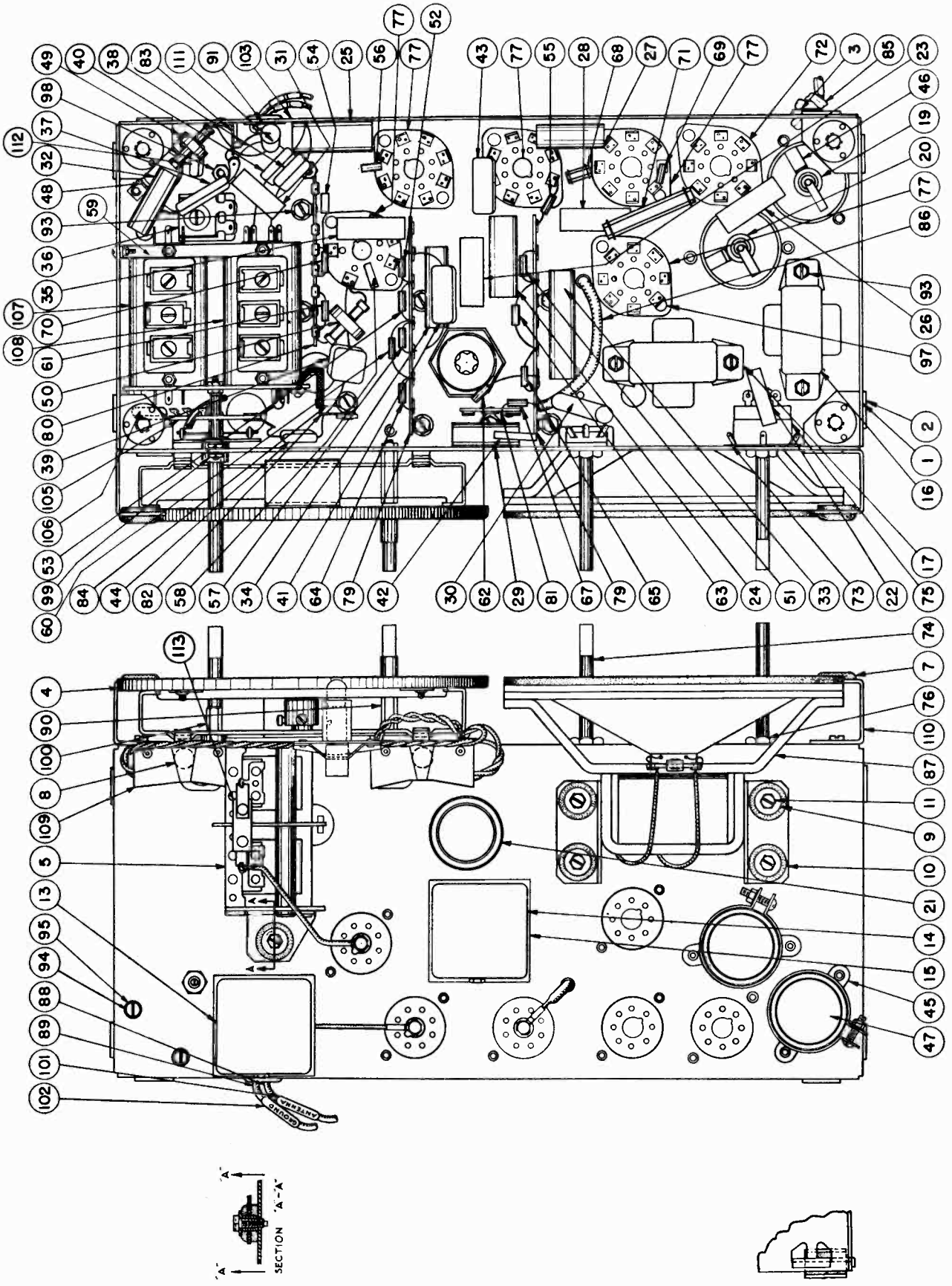
Item Number	Piece Number	Part
1	26782	Power Transformer (50 to 60 Cycles Chassis)
1	26783	Power Transformer (25 to 60 Cycles Chassis)
3	23234	Fuse, 2½ Amperes
4	21984	Fuse Block Assembly
7	21535	Capacitor Assembly (2—.01 Mf. Capacitors)
8	26061	Switch ("Off-On" and Bass Control)
9	26704	Choke Assembly (Filter of Rectifier)
11	26792	Resistor, "B" Voltage Divider
12	25788	Electrolytic Capacitor, 1 Mf., 450 Volts
13	22757	Electrolytic Capacitor, 8 Mf., 500 Volts (50 to 60 Cycles Chassis)
13	26510	Electrolytic Capacitor, 16 Mf., 500 Volts (25 to 60 Cycles Chassis)
14	22757	Electrolytic Capacitor, 8 Mf., 500 Volts (50 to 60 Cycles Chassis)
14	26510	Electrolytic Capacitor, 16 Mf., 500 Volts (25 to 60 Cycles Chassis)
15	26773	Electrolytic Capacitor, 16 Mf., 350 Volts
16	22759	Capacitor Assembly, (3—4 Mf.)
17	26693	Electrolytic Capacitor, 4 Mf., 350 Volts
18	26797	Capacitor Assembly, 2—12 Mf., 2—10 Mf. 1—30 Mf.
20	26746	Range Switch Assembly
21	26444	Gang Tuning Capacitor Assembly
22	26446	Coil Assembly, Antenna ("A", "B" and "C" Ranges)
23	26447	Coil Assembly, R. F. ("A", "B", and "C" Ranges)
24	26448	Coil Assembly, Oscillator ("A", "B" and "C" Ranges)
25	26507	Coil Assembly, Antenna ("X" Range)
26	26508	Coil Assembly, R. F. ("X" Range)
27	26509	Coil Assembly, Oscillator ("X" Range)
28	26758	Coil Assembly, Antenna ("D" Range)
29	26564	Capacitor Assembly, Series Aligners ("A" and "B" Ranges)
30	24405	Capacitor Assembly, .04 Mf.
31	24405	Capacitor Assembly, .04 Mf.
32	24994	Capacitor Assembly, .05 Mf.
33	24637	Capacitor, Type "W", .0017 Mf.
34	24637	Capacitor, Type "W", .0017 Mf.
35	26513	Capacitor Assembly, (2—200 Mmf.)
36	24559	Capacitor, Type "O", 100 Mmf.
37	26944	Capacitor, Type "W", .004 Mf.
38	26321	Resistor, Type "E", 100 Ohms
39	26321	Resistor, Type "E", 100 Ohms
40	26333	Resistor, Type "E", 1000 Ohms
41	26353	Resistor, Type "E", 47,000 Ohms
42	26357	Resistor, Type "E", .1 Megohm
43	26357	Resistor, Type "E", .1 Megohm
44	26357	Resistor, Type "E", .1 Megohm
45	26331	Resistor, Type "E", 680 Ohms
46	26765	Oscillator Secondary Coil ("D" Range)
47	26787	Oscillator Primary Coil ("D" Range)
48	26474	Coil Assembly (Bi-Resonator)
49	26481	1st I. F. Transformer
50	26482	2nd I. F. Transformer
51	26243	3rd I. F. Transformer
52	26077	Potentiometer (Volume Control)
53	26706	Transformer Assembly, Audio Input
54	26708	Transformer Assembly, Audio Output
55	26326	Resistor, Type "E", 270 Ohms
56	26328	Resistor, Type "E", 390 Ohms
57	26328	Resistor, Type "E", 390 Ohms
58	26332	Resistor, Type "E", 820 Ohms
59	26330	Resistor, Type "E", 560 Ohms
60	26330	Resistor, Type "E", 560 Ohms
61	26330	Resistor, Type "E", 560 Ohms
62	26330	Resistor, Type "E", 560 Ohms
63	21593	Resistor, Type "C", 20,000 Ohms
64	26932	Capacitor Assembly, .008 Mf.
65	26332	Resistor, Type "E", 820 Ohms
66	26333	Resistor, Type "E", 1000 Ohms
67	26333	Resistor, Type "E", 1000 Ohms
68	26333	Resistor, Type "E", 1000 Ohms
69	26333	Resistor, Type "E", 1000 Ohms
70	26337	Resistor, Type "E", 2200 Ohms
71	26341	Resistor, Type "E", 4700 Ohms
72	26345	Resistor, Type "E", 10,000 Ohms
73	26345	Resistor, Type "E", 10,000 Ohms
74	26345	Resistor, Type "E", 10,000 Ohms
75	26776	Resistor, Type "F", 12,000 Ohms
76	25150	Capacitor, .02 Mf.
77	26365	Resistor, Type "E", 470,000 Ohms
78	26349	Resistor, Type "E", 22,000 Ohms
79	26353	Resistor, Type "E", 47,000 Ohms
80	26353	Resistor, Type "E", 47,000 Ohms
81	24994	Capacitor Assembly, .05 Mf.
82	26356	Resistor, Type "E", 82,000 Ohms
83	26353	Resistor, Type "E", 47,000 Ohms
84	26357	Resistor, Type "E", .1 Megohm
85	26357	Resistor, Type "E", .1 Megohm
86	26357	Resistor, Type "E", .1 Megohm
87	26362	Resistor, Type "E", .27 Megohm
88	26365	Resistor, Type "E", .47 Megohm
89	26365	Resistor, Type "E", .47 Megohm
90	26365	Resistor, Type "E", .47 Megohm
91	26369	Resistor, Type "E", 1 Megohm
92	26369	Resistor, Type "E", 1 Megohm
93	26369	Resistor, Type "E", 1 Megohm
94	26369	Resistor, Type "E", 1 Megohm
95	26369	Resistor, Type "E", 1 Megohm
96	26369	Resistor, Type "E", 1 Megohm
97	26369	Resistor, Type "E", 1 Megohm
98	26369	Resistor, Type "E", 1 Megohm
99	26369	Resistor, Type "E", 1 Megohm
100	26373	Resistor, Type "E", 2.2 Megohm
101	26062	Resistor, Type "F", 10,000 Ohms
102	26775	Resistor, Type "F", 20,000 Ohms
103	26775	Resistor, Type "F", 20,000 Ohms
104	25535	Capacitor, Type 3L, .008 Mf.
105	26932	Capacitor Assembly, .008 Mf.
106	25487	Capacitor, Type "W", .001 Mf.
107	25487	Capacitor, Type "W", .001 Mf.
108	24560	Capacitor, Type "O", 50 Mmf.
109	24560	Capacitor, Type "O", 50 Mmf.
110	24560	Capacitor, Type "O", 50 Mmf.
111	26512	Capacitor, Type "W", 2—100 Mmf.
112	26512	Capacitor, Type "W", 2—100 Mmf.
113	24559	Capacitor, Type "O", 100 Mmf.
114	24402	Capacitor Assembly, .1 Mf.
115	24402	Capacitor Assembly, .1 Mf.
116	24402	Capacitor Assembly, .1 Mf.
117	24402	Capacitor Assembly, .1 Mf.
118	24402	Capacitor Assembly, .1 Mf.
119	24402	Capacitor Assembly, .1 Mf.
120	24405	Capacitor Assembly, .04 Mf.
121	24405	Capacitor Assembly, .04 Mf.
122	24405	Capacitor Assembly, .04 Mf.
123	24405	Capacitor Assembly, .04 Mf.
124	24405	Capacitor Assembly, .04 Mf.
125	24405	Capacitor Assembly, .04 Mf.
126	24405	Capacitor Assembly, .04 Mf.
127	24405	Capacitor Assembly, .04 Mf.
128	24405	Capacitor Assembly, .04 Mf.
129	24994	Capacitor Assembly, .05 Mf.
131	24994	Capacitor Assembly, .05 Mf.
132	24994	Capacitor Assembly, .05 Mf.
133	24994	Capacitor Assembly, .05 Mf.
134	24994	Capacitor Assembly, .05 Mf.
135	25149	Capacitor Assembly, .01 Mf.
136	26365	Resistor, Type "E", 470,000 Ohms
137	23101	Capacitor Assembly, 2—.5 Mf.
138	25814	Choke Assembly, 5 Millihenrys
139	26515	Coil Assembly (High Frequency Cut-Off Filter)
140	26794	Filter Assembly (Auto. Bass Control)
149	26568	Adjustable Capacitor (High Frequency Cut-Off Filter)
150	26569	Capacitor (Oscillator Series Aligner, "X" Range)
151	26485	Potentiometer and Bracket Assembly (Tone Control and High Fidelity)
154	26497	Cable Assembly, Tri-Focal Tuning Indicator
155	22988	Socket, 4 Prong
156	23517	Socket, 5 Prong
157	25539	Socket, 8 Prong
164	26519	Drive Disc Assembly
165	26570	Dial Bracket Assembly
167	26211	Pulley
168	26518	Gear Assembly
169	26220	Drive Shaft Assembly
170	26520	Dial Assembly (Vernier)
171	26694	Dial Assembly (Main)
172	26672	Drive Cord Assembly (Volume Indicator Disc)
173	26673	Drive Cord Assembly (Fidelity Indicator Disc)
174	26683	Cord Assembly (Dial Elevator)
175	26226	Spring
176	26555	Volume Indicator Disc Assembly
177	26698	Fidelity Indicator Disc Assembly
178	26572	Bracket Assembly (Tri-Focal Tuning Indicator)
179	26682	Reel Assembly (Range Switch)
180	26667	Reel Assembly (Tone-Fidelity Control)
181	26666	Reel Assembly (Volume Control)
185	26147	Lamp Socket
186	26257	Lamp Shades
187	26287	Pilot Lamp
190	26692	Lamp Socket Assembly
199	26798	Potentiometer (Automatic Bass Control)
200	26499	Knob (For Automatic Bass Control Potentiometer)
212	26780	Resistor, Flexible, 3.5 Ohms (Pilot Lamp)
215	26365	Resistor, Type "E", 470,000 Ohms
216	24405	Capacitor Assembly, .04 Mf.
217	24405	Capacitor Assembly, .04 Mf.
218	26341	Resistor, Type "E", 4700 Ohms
219	22775	Capacitor, .4 Mf.
220	26338	Resistor, Type "E", 2700 Ohms
221	24405	Capacitor Assembly, .04 Mf.
222	26365	Resistor, Type "E", 470,000 Ohms
224	26958	Amp. A. V. C. Transformer
226	26357	Resistor, Type "E", .1 Megohm
227	24560	Capacitor, Type "O", 50 Mmf.
228	26345	Resistor, Type "E", 10,000 Ohms

MISCELLANEOUS PARTS

Piece Number	Part
26250	Cone Assembly (For P-26170 Speaker)
26043	Plug (For Loud Speaker Cable)
26369	Resistor, Type "E", 1 Megohm (Used at Socket of No. 6E5 Tube)
26302	Knob (For "Volume" Control)
26299	Knob (For "Tone-Fidelity" Control)
26305	Knob (For "Stations" Selector Control Shaft)
26306	Knob (For "Vernier" Stations Selector Control Shaft)
26301	Knob (For "Range" Switch)
26300	Knob (For "Off-On" Switch and Bass Control)

MODEL 225 AC-DC
Socket, Chassis

STROMBERG-CARLSON TEL. MFG. CO.



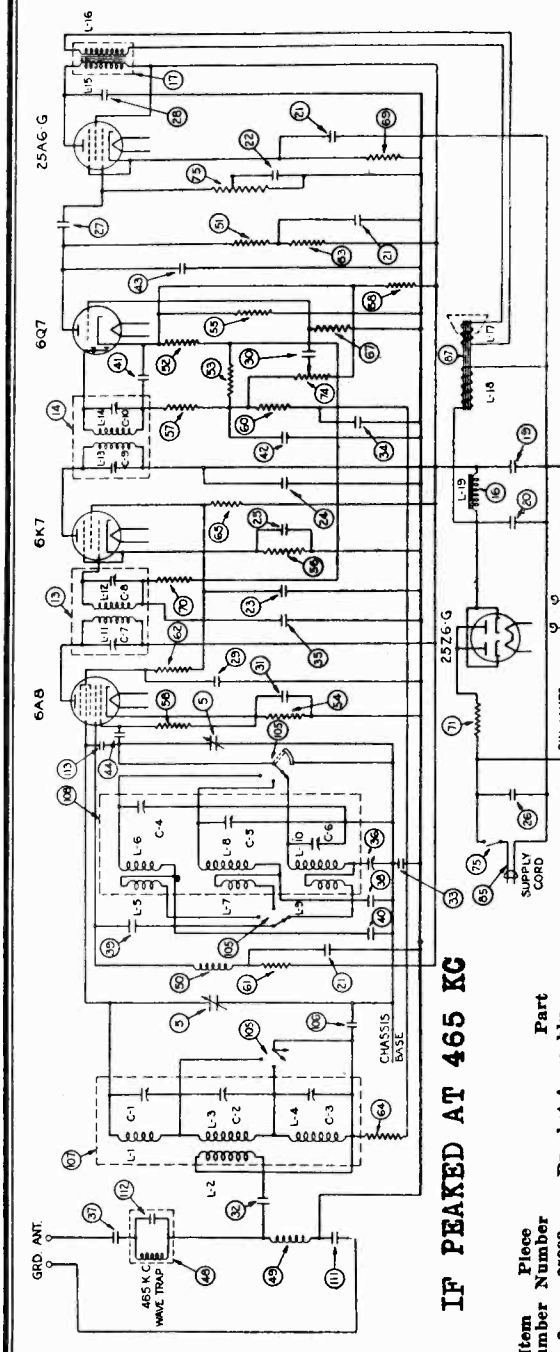
STROMBERG-CARLSON TEL. MFG. CO.

MODEL 225 AC-DC
Schematic, Parts

No. 225 Receiver——50 to 60 Cycles (For AC Operation)——P-27285 Chassis Assembly

CIRCUIT DESCRIPTION

This triple range, superheterodyne receiver has five tubes and may be operated on a power supply circuit of either alternating or direct current at the voltages and frequency (for A. C. operation) specified above.



Item Number	Piece Number	Part
2	25998	Bracket Assembly
5	26057	Gang Tuning Capacitor Assembly
6	27289	Dial Assembly
8	26287	Dial Lamp
13	26121	1st I. F. Transformer
14	25506	2nd I. F. Transformer
16	26133	Choke Assembly (Filter of Rectifier)
17	26135	Transformer, Audio Output
19	26162	Electrolytic Capacitor, 25 Mf.
20	27014	Electrolytic Capacitor, 40 Mf.
21	26164	Electrolytic Capacitor Assembly, 4 Mf., 150 Volts; 4 Mf., 150 Volts; 12 Mf., 25 Volts
22	26151	Capacitor Assembly, .005 Mf.
23	25483	Capacitor Assembly, .1 Mf.
24	25483	Capacitor Assembly, .1 Mf.
25	25483	Capacitor Assembly, .1 Mf.
26	25150	Capacitor Assembly, .02 Mf.
27	25150	Capacitor Assembly, .02 Mf.
28	25150	Capacitor Assembly, .02 Mf.
29	25150	Capacitor Assembly, .02 Mf.
30	25150	Capacitor Assembly, .02 Mf.
31	25150	Capacitor Assembly, .02 Mf.
32	25150	Capacitor Assembly, .02 Mf.
33	25389	Capacitor Assembly, .2 Mf.
34	24405	Capacitor Assembly, .04 Mf.
35	24405	Capacitor Assembly, .04 Mf.
36	26747	Capacitor, Oscillator Series Aligner
37	26778	Capacitor, Type "W", .005 Mf.
38	26727	Capacitor, Type "W", .001 Mf.
39	25487	Capacitor, Type "W", .001 Mf.
40	25489	Capacitor, Type "W", .00125 Mf.
41	25504	Capacitor, Type "2", 100 Mmf.
42	25504	Capacitor, Type "2", 100 Mmf.
43	25504	Capacitor, Type "2", 100 Mmf.
44	24559	Capacitor, Type "O", 100 Mmf.
87	26053	Speaker Assembly
105	26172	Range Switch
106	25488	Capacitor, .002 Mf.
107	26113	Coil Assembly, Antenna
108	26157	Coil Assembly, Oscillator
109	27310	Dial Lamp Socket Assembly
111	25149	Capacitor Assembly, .01 Mf.
112	25488	Capacitor, .002 Mf.
113	26417	Capacitor (Gimmick)
48	25513	Coil Assembly, Wave Trap
49	25814	Coil Assembly, R. F. Choke, 5 Milli-henrys
50	25814	Coil Assembly, R. F. Choke, 5 Milli-henrys
51	26362	Resistor, Type "E", .27 Megohm
52	26362	Resistor, Type "E", .27 Megohm
53	26362	Resistor, Type "E", .27 Megohm
54	26326	Resistor, Type "E", 270 Ohms
55	26327	Resistor, Type "E", 330 Ohms
56	26327	Resistor, Type "E", 330 Ohms
57	26353	Resistor, Type "E", 47,000 Ohms
58	26353	Resistor, Type "E", 47,000 Ohms
60	26369	Resistor, Type "E", 1 Megohm
61	26345	Resistor, Type "F", 10,000 Ohms
62	26345	Resistor, Type "E", 10,000 Ohms
63	26345	Resistor, Type "E", 10,000 Ohms
64	26357	Resistor, Type "E", .1 Megohm
65	26333	Resistor, Type "E", 1,000 Ohms
67	26373	Resistor, Type "E", 2.2 Megohms
68	26408	Resistor, Type "C", 27,000 Ohms
69	26330	Resistor, Type "E", 560 Ohms
70	26365	Resistor, Type "E", .47 Megohm
71	25911	Resistor, Type "B", 50 Ohms
72	27287	Resistor (Tube Type), 120 Plus 108 Ohms, Voltage Divider
74	26114	Potentiometer (Volume Control)
75	27311	Potentiometer (Off-On-Switch and Tone Control)
77	25539	Tube Socket, 8 Prong
85	24268	Cord, Power Supply

MISCELLANEOUS PARTS

Piece Number	Part
26096	Cone Assembly (For P-26053 Speaker)
26296	Knob (Used on Volume, "Off-on-Tone" and Station Selector Controls) 3 Required for Each Receiver
27351	Knob (For Range Switch) 1 Required

MODEL 225 AC-DC
Voltage, Alignment
Trimmers, Notes

STROMBERG-CARLSON TEL. MFG. CO.

Voltages are given for a line voltage of 120 volts, A. C. Allowance should be made for the difference when the line voltage is higher or lower.

IMPORTANT—If the receiver is operated from a direct current power supply circuit, the various voltages measured will be slightly lower than those listed in the table for A. C. operation. A meter having a resistance of 1000 ohms per volt should be used for measuring the D. C. voltages. Voltage values shown are those obtained on the lowest possible scale of a meter having the following ranges: O-2.5, O-10, O-100, O-250, O-500, O-1000 volts except when an asterisk appears after any given voltage value in which case the 1000 volt scale was used.

When the receiver is being operated from an alternating current power supply circuit, it will be necessary to have a high resistance A. C. voltmeter for checking the A. C. voltages.

			Terminals of Sockets								*Heater Voltages Between Heater Terminals*	
Tube	*Circuit*	*Cap*	1	2	3	4	5	6	7	8	*Socket Terminal Numbers*	*Volts*
6A8	Mod.—Osc.	0	0	*13*	+97	+65	—7	+59	*6*	+1.5	2-7	*6.4*
6K7	I. F. Amp.	0	0	*12.8*	+94	+85	+2.5	—	*19*	+2.5	2-7	*6.4*
6Q7	Dem.—A.V.C.—Audio	0	0	0	+40	0	0	—	*6*	+1	2-7	*6*
25A6-G	Audio Output	—	0	*45*	+93	+99	0	—	*19*	+14	2-7	*26*
25Z6-G	Rectifier	—	0	*73*	*115*	+105	*115*	—	*47*	+105	2-7	*26*
Resistor	Voltage Divider	—	—	—	*73*	*120*	—	—	*120*	*107*		
Voltage across pilot lamps—*13* volts												

A. C. voltages are indicated by italics; when the receiver is operated from a D. C. power supply, D. C. voltages will be obtained in place of the A. C. voltages.
Receiver tuned to 1000 kc., no signal.

Intermediate Frequency Adjustments

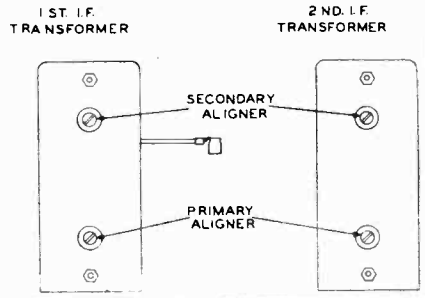
The intermediate frequency used in these receivers is 465 kilocycles. In making these I. F. circuit adjustments always align in the following order:

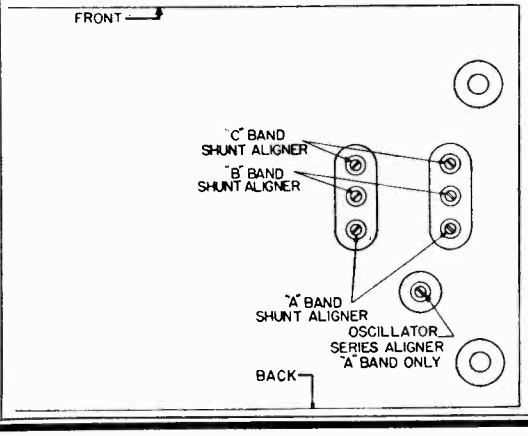
1. Secondary of 2nd I. F. Transformer (Capacitor C-10).
2. Primary of 2nd I. F. Transformer (Capacitor C-9).
3. Secondary of 1st I. F. Transformer (Capacitor C-8).
4. Primary of 1st I. F. Transformer (Capacitor C-7).

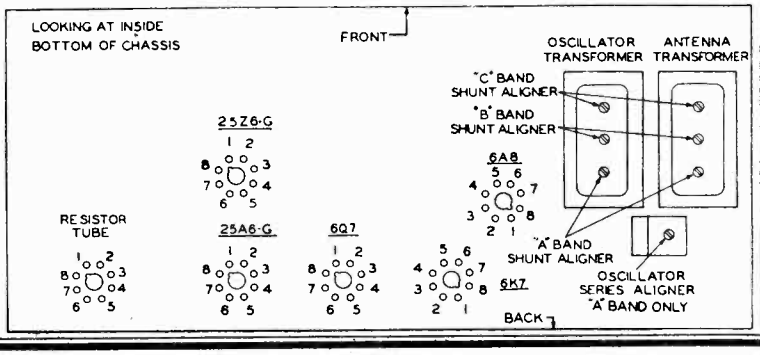
Radio Frequency Adjustments

The adjustments of the aligning capacitors used in the radio frequency circuits in this receiver should be very carefully made in the following order and at the frequencies specified below:

1. Oscillator's "C" Band Shunt Aligner at 17 Megacycles (Capacitor C-4).
2. Antenna "C" Band Shunt Aligner at 17 Megacycles (Capacitor C-1).
3. Oscillator's "B" Band Shunt Aligner at 3.4 Megacycles (Capacitor C-5).
4. Antenna "B" Band Shunt Aligner at 3.4 Megacycles (Capacitor C-2).
5. Oscillator's "A" Band Shunt Aligner at 1400 Kilocycles (Capacitor C-6).
6. Antenna "A" Band Shunt Aligner at 1400 Kilocycles (Capacitor C-3).
7. Oscillator's "A" Band Series Aligner at 600 Kilocycles (Capacitor (36)).
8. Oscillator's "A" Band Shunt Aligner at 1400 Kilocycles (Capacitor C-6).
9. Antenna "A" Band Shunt Aligner at 1400 Kilocycles (Capacitor C-3).







MODELS 228L, 228LB
228H, 228HB
Schematic, Socket
Trimmers

STROMBERG-CARLSON TEL. MFG. CO.

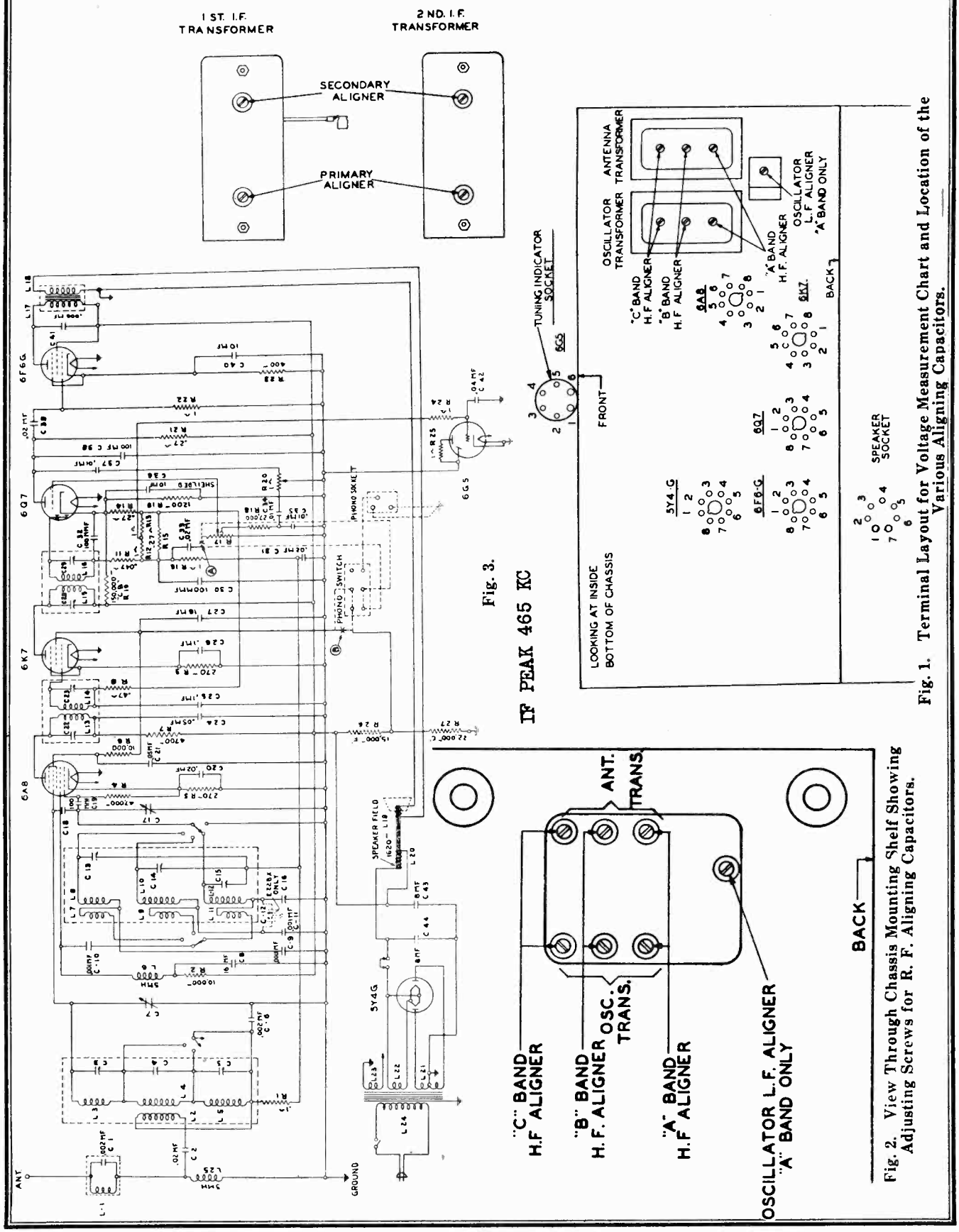


Fig. 3.

Fig. 1. Terminal Layout for Voltage Measurement Chart and Location of the Various Aligning Capacitors.

Fig. 2. View Through Chassis Mounting Shelf Showing Adjusting Screws for R. F. Aligning Capacitors.

MODELS 228L, 228LB 228H, 228HB STROMBERG-CARLSON TEL. MFG. CO.

Voltage, Alignment Parts

NORMAL VOLTAGE READINGS

The various values of voltages listed in the following table are obtained by measuring between the various tube socket contacts and the chassis base, with the tubes in their respective sockets. The receiver is, therefore, in operation when the measurements are made. Figure 1, shows the terminal layout of the sockets with the proper terminal numbers.

Voltages are given for a line voltage of 120 volts, and allowance should be made for differences when the line voltage is higher or lower. A meter having a resistance of 1000 ohms per volt should be used for measuring the D. C. voltages. Voltage values shown are those obtained on the lowest possible scale of a meter having the following ranges: 0-2.5, 0-10, 0-100, 0-250, 0-500, 0-1000 volts except when an asterisk appears after any given voltage value in which case the 250 volt scale was used.

			Terminals of Sockets								*Heater Voltages Between Heater Terminals*	
Tube	*Circuit*	*Cap*	1	2	3	4	5	6	7	8	*Socket Terminal Numbers*	*Volts*
6A8	Mod.—Osc.	0	0	0	+210	+65	—20	+180	*6.1*	+1.6	2-7	*6.1*
6K7	I. F. Amp.	0	0	0	+220	+90	+2.5	—	*6.1*	+2.5	2-7	*6.1*
6Q7	Dem.—A. V. C. —Audio	0	0	0	+100	0	0	+100	*6.1*	+1.6	2-7	*6.1*
6F6G	Audio Output	—	0	0	+210	+220	0	0	*6.1*	+13	2-7	*6.1*
6G5	Tuning Ind.	—	0	+2.4*	0	+220	—	*6.1*			1-6	*6.1*
5Y4G	Rectifier	—	0	0	*335*	—	*335*	—	+340	+344	7-8	*4.9*
Speaker Socket		—	+340	0	0	+340	+340	—	+220			

Receiver tuned to 1000 Kc., no signal. A. C. voltages are indicated by italics.

In making any alignment adjustments, always adjust the test oscillator's output voltage to the minimum value where a good alignment may still be obtained. Never attempt to make any alignment adjustments using a strong signal. Before proceeding with the alignment of any circuits in these receivers be sure that the "Off-On-Tone" control knob is set for maximum treble response (position where knob is rotated from its maximum counter-clockwise position, slightly clockwise to position where set turns "on"). Figure 1, shows the location of all the aligning capacitors in these receivers.

In making any alignment adjustments on these receivers, it will not be necessary to remove the chassis from the cabinet. The aligning capacitors for the intermediate frequency circuits of these receivers are easily accessible from the rear of the receiver, and the aligning capacitors for the radio frequency circuits are accessible through the aperture located in the bottom metal base plate of the chassis. These apertures are easily accessible either through the bottom of the cabinet or through the bottom of the cabinet shelf depending upon the style of cabinet. See Figure 2.

Dial Adjustment

Before aligning the circuits of any of these receivers, the tuning dial must be properly aligned to track with the gang tuning capacitors. To check whether the dial is set correctly with respect to the gang tuning capacitor, rotate the "Station Selector" knob in a clockwise direction so that the gang tuning capacitor is set to its maximum capacity position. Then, with the gang tuning capacitor in this position, the dial pointer should center over the middle vertical line of the three vertical lines located on the glass dial and the vertical lines located on the metal pan of the dial frame. Now, rotate the "Station Selector" knob so that the dial pointer lines up with the horizontal lines located on the metal pan of the dial frame; with the pointer in this position the two horizontal center marks of the glass dial (located at approximately 9.3 megacycles on the right hand scale and 2.16 megacycles on the left hand scale) should also be in alignment with the dial pointer. If the above conditions are not obtained, loosen the four clamps which hold the glass dial to the dial pan by slightly loosening the four screws, and shift the glass dial so that a good alignment between the dial pointer, the glass dial, and alignment marks located on the metal pan of the dial frame is obtained for both the horizontal and vertical position of the dial pointer.

Intermediate Frequency Adjustments

The intermediate frequency used in these receivers is 465 kilocycles. In making these circuit adjustments always align the circuits in the order given in these instructions.

1. Operate the "Range" switch of the receiver to the "A" range position. Set the receiver's tuning dial at its extreme low frequency position, and operate the Tone Control knob to the "Normal" position. Rotate the Volume Control knob to its maximum clockwise position (maximum volume).
2. Apply between the chassis base (or ground binding post) of the receiver and the grid of the No. 6A8 modulator-oscillator tube, a modulated signal of 465 kilocycles from the test oscillator, using a 0.1 microfarad capacitor in series with the connection between the output terminal of the test oscillator and the grid of the No. 6A8 tube. Do not remove the chassis grid lead connecting to this tube. The ground (or low side) terminal of the test oscillator should be connected to either the chassis base or the ground binding post terminal.
3. Now, noting from Figure 1, the aligning capacitors for the first and second I. F. transformers, align the I. F. circuits in the following manner:
   - Secondary of second I. F. transformer.
   - Primary of second I. F. transformer.
   - Secondary of first I. F. transformer.
   - Primary of first I. F. transformer.

   Adjusting the circuits to obtain maximum reading on the output meter, reducing the output of the test oscillator as required.

Radio Frequency Adjustments

The alignment of the radio frequency circuits of the various ranges in these receivers should be very carefully made and in the order specified.

Alignment of Short Wave Range (Also Referred to as "C" Band)

In aligning the radio frequency circuits for this range, replace the 0.1-microfarad capacitor which was placed in series with the test oscillator's output lead for the I. F. alignments, with a 400-ohm carbon type resistor. This lead should then be connected to the antenna binding post located on the rear of the receiver chassis. The ground terminal (or low side) of the test oscillator should be connected to the ground binding post on the receiver.

1. Operate the Range Switch on the receiver chassis to the "C" range position, and set the test oscillator's frequency and the receiver's tuning dial to 17 megacycles.
2. Adjust the oscillator's "C" band high frequency aligner for maximum output.
3. Adjust the antenna's "C" band high frequency aligner for maximum output, at the same time rotate the gang tuning capacitor back and forth through resonance until maximum output is obtained.

Alignment of Aircraft, Amateur, and Police Range (Also Referred to as "B" Band)

In aligning the radio frequency circuits for this range, use the same artificial antenna (400-ohm carbon type resistor) in series with the output terminal of the test oscillator as was used for aligning the short-wave range.

1. Operate the Range Switch on the receiver chassis to the "B" range position, and set the test oscillator's frequency and the receiver's tuning dial to 3.4 megacycles.
2. Adjust the oscillator's "B" band high frequency aligner for maximum output.
3. Adjust the antenna's "B" band high frequency aligner for maximum output, and at the same time rotate the gang tuning capacitor back and forth through resonance until maximum output is obtained.

Alignment of Standard Broadcast Range (Also Referred to as "A" band)

In aligning the radio frequency circuits for this range, replace the 400-ohm carbon type resistor in series with the test oscillator's output lead with a 200-micro-microfarad capacitor and align these circuits as follows:

1. Operate the Range Switch to the "A" range position and set the test oscillator's frequency and the receiver's tuning dial to 1.4 megacycles.
2. Adjust the oscillator's "A" band high frequency aligner for maximum output.
3. Adjust the antenna's "A" band high frequency aligner for maximum output.
4. Set the test oscillator's frequency and the receiver's tuning dial to 0.6 megacycles.
5. Adjust the oscillator's "A" band low frequency aligner (series aligner) for maximum output, and at the same time rotate the gang tuning capacitor slightly back and forth through resonance until maximum output is obtained.
6. Reset both the test oscillator's frequency and receiver's tuning dial to 1.4 megacycles and repeat operations Nos. 2 and 3.

REPLACEMENT PARTS

Piece Number	Schematic Circuit Designation	Part
25127	R27	Resistor, Type "CW", 25,000 Ohms
25117		Tube Shield
24502		Transformer, Power
24505		Cord, Power Supply
24405	C42	Capacitor, .1 Mfd.
24559	C30, C32	Capacitor, .04 Mfd.
25149	C29, C32	Capacitor, .05 Mfd.
25150	C34, C35, C37	Capacitor, .01 Mfd.
25151	C31, C36, C38, C39	Capacitor, .02 Mfd.
25471	C10	Capacitor, Type "CW", .001 Mfd.
25469	C9	Capacitor, Type "CW", .005 Mfd.
25470	C33, C40	Capacitor, Type "CW", .00125 Mfd.
25468		Resistor, Type "CW", 100,000 Ohms
25504		Capacitor, Type "CW", 180 Mmfd.
25505	R23	Resistor, Type "CW", 2,000 Ohms
25513	C19, C35	Capacitor, Type "CW", .005 Mfd.
25506	L15, L16	2nd I. F. Transformer
25512	L1	Coil Assembly, Wave Trap
25508	R39	Resistor, Type "CW", 15,000 Ohms
25503	C41	Capacitor, .006 Mfd.
25509		Tube Socket, 8 Prong
25514	L6, L26	Coil Assembly, R. F. Choke
25515	C22, C23, C24, C29	Aligning Capacitors, I. F. Transformers
25523	C7, C8, C9	Aligning Capacitors, Antenna Transformer Assembly
25507	C6, C20, C25	Gang Tuning Capacitors
25133	L13, L14, L5	1st I. F. Transformer
25121	L12, L14	Coil Assembly, Antenna Transformer
25157	L7, L8, L9, L10, L11, L18	Coil Assembly, Oscillator Transformer
25161	C18, C14, C15	Aligning Capacitors, Oscillator Transformer Assembly
25172		Range Switch
25087		Dial Lamp
25526	R5, R9	Resistor, Type "EW", 570 Ohms
25554	R10	Resistor, Type "EW", 1200 Ohms
25514		Resistor, Type "EW", 1700 Ohms
25541	R37	Resistor, Type "EW", 10,000 Ohms
25543	R4, R11	Resistor, Type "EW", 11,000 Ohms
25528	R14, R15, R31	Resistor, Type "EW", 15,000 Ohms
25530	R6	Resistor, Type "EW", 47 Megohm
25531	R7	Resistor, Type "EW", 1 Megohm
25540	R12, R13, R16, R22, R24, R25	Resistor, Type "EW", 1 Megohm
25417	C12	Capacitor, Neutralizing
25747	C11	Capacitor, Type "CW", .001 Mfd. Oscillator "B" Hange L. F. Padder
	C16	Capacitor, Oscillator "A" Range L. F. Aligner
25509		Pilot Lamp Socket
25508		Dial Assembly
25509	L17, L19	Transformer, Antenna Coupling Unit
25503	C42, C44	Electrolytic Capacitor, 8 Mfd., 500 Volts and 8 Mfd., 450 Volts
25504	C8	Electrolytic Capacitor, 16 Mfd., 500 Volts
25505	C37	Electrolytic Capacitor, 16 Mfd., 100 Volts
25506		Power Transformer (85 to 60 Cycles Chassis)
25507	L21, L22, L23, L24	Power Transformer (85 to 60 Cycles Chassis)
25510		Volume Control
25511	R17	Resistor, Type "EW", 27,000 Ohms
25515	R18	Electrolytic Capacitor, 10 Mfd., 25 Volts and 10 Mfd., 25 Volts
25516	C36, C40	Electrolytic Capacitor, 10 Mfd., 50 Volts
25517		Switch, Off-On-Switch and Tone Control
25518		Resistor, Type "CW", 150,000 Ohms
25519	R20	
25520	R10	

MODEL 229P

STROMBERG-CARLSON TEL. MFG. CO.

Schematic, Socket Trimmers

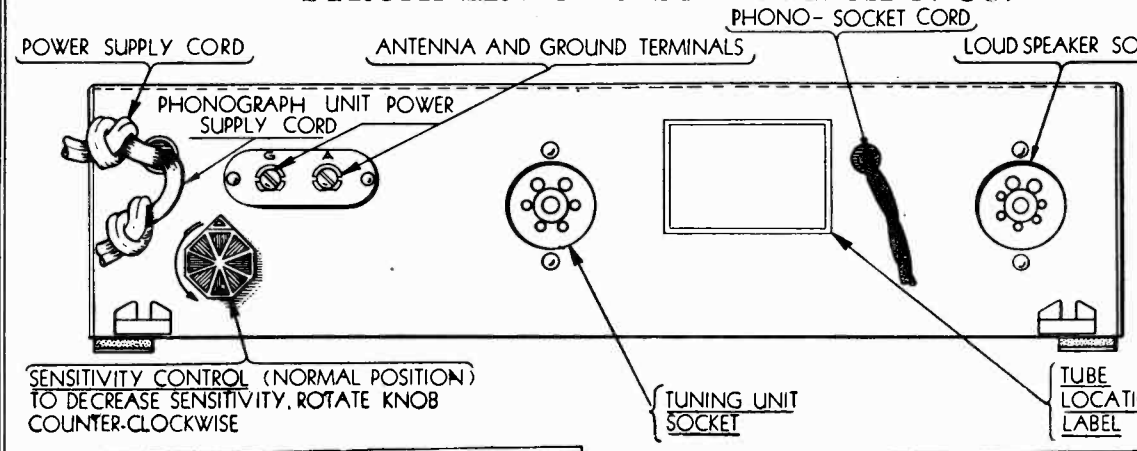


Fig. 1. Location and Operation of Sensitivity Control.

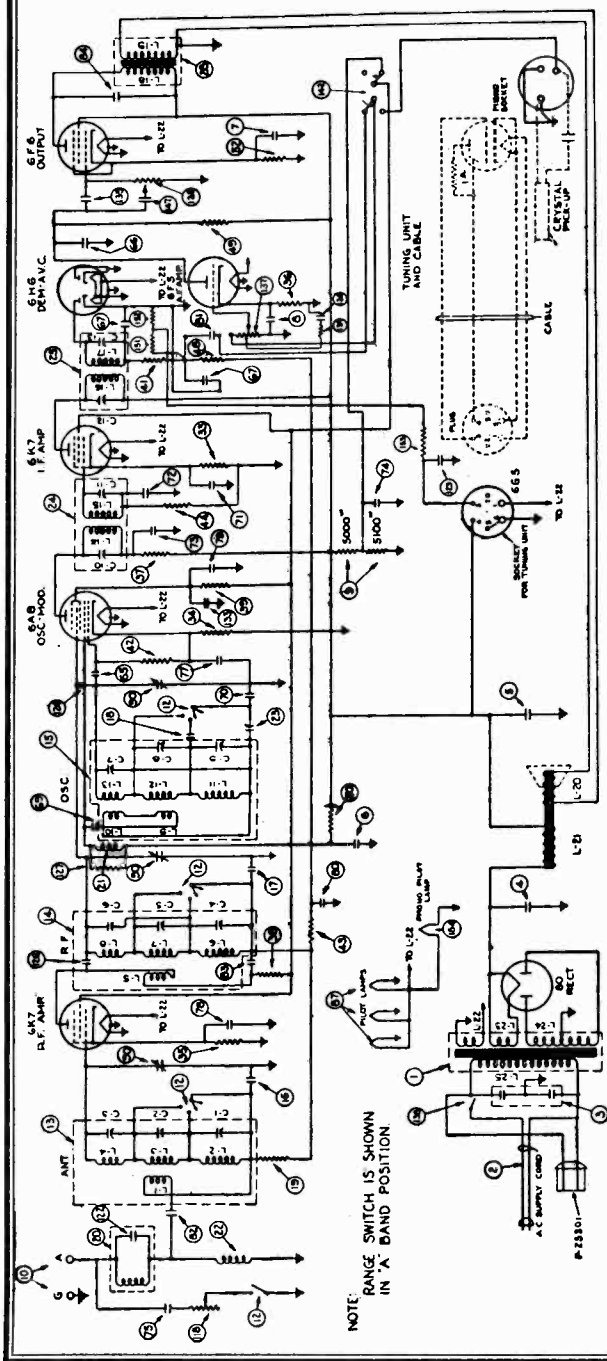
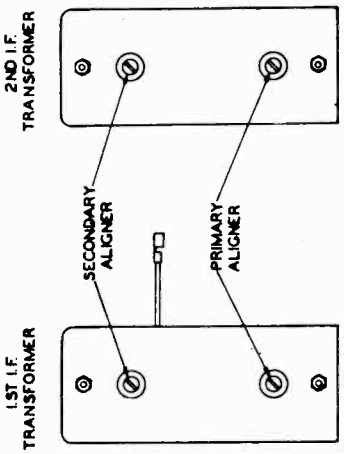


Fig. 3. Schematic Circuit of Receiver.

IF PEAK 465 KC



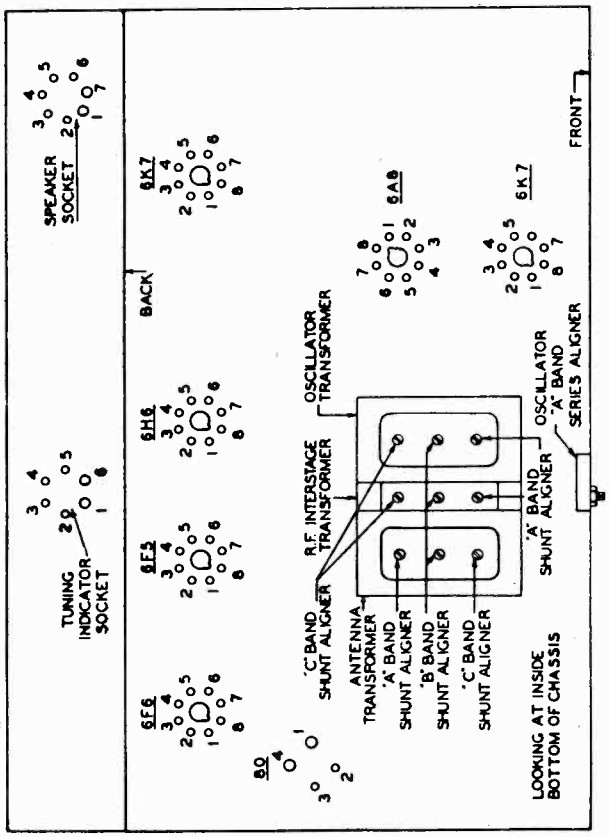


Fig. 2. Terminal Layout for Voltage Measurement Chart and Location of the Various Aligning Capacitors.

MODEL 229P
Voltage, Alignment

STROMBERG-CARLSON TEL. MFG. CO.

NORMAL VOLTAGE READINGS

The various values of voltages listed in the following table are obtained by measuring between the various tube socket contacts and the chassis base, with the tubes in their respective sockets. The receiver is, therefore, in operation when the measurements are made. Figure 2 shows the terminal layout of the sockets with the proper terminal numbers.

Voltages are given for a line voltage of 120 volts, and allowance should be made for differences when the line voltage is higher or lower. A meter having a resistance of 1000 ohms per volt should be used for measuring the D. C. voltages. Voltage values shown are those obtained on the lowest possible scale of a meter having the following ranges: O-2.5, O-10, O-100, O-250, O-500, O-1000 volts except when an asterisk appears after any given voltage value in which case the 1000 volt scale was used.

Tube	*Circuit*	*Cap*	*Terminals of Sockets*								*Heater Voltages Between Heater Terminals*	
			1	2	3	4	5	6	7	8	*Socket Terminal Numbers*	*Volts*
6K7	R. F. Amp.	0	0	0	+54	+96	+7.6	+4.5	*6.3*	+7.6	2–7	*6.3*
6A8	Osc.-Mod.	0	0	0	+222	+72	—1.0	+143	*6.3*	+6.1	2–7	*6.3*
6K7	I. F. Amp.	0	0	0	+240	+96	+7.4	+4.5	*6.3*	+7.4	2–7	*6.3*
6H6	Dem.—A.V.C.	—	0	0	0	0	0	—	*6.3*	+4.5	2–7	*6.3*
6F5	Audio Amp.	0	0	0	—	+122*	—	—	*6.3*	+.75	2–7	*6.3*
6F6	Audio Output	—	0	0	+226	+237	0	0	*6.3*	+15	2–7	*6.3*
80	Rectifier	—	+330	*325*	*325*	+330	—	—	—	—	1–4	*4.8*
Tuning Indicator Plug's Socket			*6.3*	0	+7.6	+235	+7.8	0	—	—	1–6	*6.3*
Speaker Socket			+327	0	0	+327	+327	0	+237	—	—	—

Receiver tuned to 1000 Kc., no signal. A. C. voltages are indicated by italics.

ALIGNMENT DATA

All alignment adjustments are accurately made at the factory on these receivers and ordinarily no readjustments are necessary. However, should it become necessary to make any readjustments, this alignment procedure should be carefully followed.

In making any alignment adjustments always adjust the signal generator's output to the minimum value where a good alignment may still be obtained. Never attempt to make any alignment adjustments using a strong signal.

Figure 2 shows the location of all the aligning capacitors used in this receiver.

Intermediate Frequency Amplifier Adjustments

The intermediate frequency used in these receivers is 465 kilocycles. In making these I. F. circuit adjustments always align in the following order:

1. Secondary of 2nd I. F. Transformer (Capacitor C-13).
2. Primary of 2nd I. F. Transformer (Capacitor C-12).
3. Secondary of 1st I. F. Transformer (Capacitor C-11).
4. Primary of 1st I. F. Transformer (Capacitor C-10).

Radio Frequency Adjustments

The adjustments of the aligning capacitors used in the radio frequency circuits in this receiver should be very carefully made in the following order and at the frequencies specified below:

1. Oscillator's "C" Band Shunt Aligner at 17 Megacycles (Capacitor C-7).
2. R. F. Interstage "C" Band Shunt Aligner at 17 Megacycles (Capacitor C-6).
3. Antenna "C" Band Shunt Aligner at 17 Megacycles (Capacitor C-3).
4. Oscillator's "B" Band Shunt Aligner at 3.4 Megacycles (Capacitor C-8).
5. R. F. Interstage "B" Band Shunt Aligner at 3.4 Megacycles (Capacitor C-5).
6. Antenna "B" Band Shunt Aligner at 3.4 Megacycles (Capacitor C-2).
7. Oscillator's "A" Band Shunt Aligner at 1.4 Megacycles (Capacitor C-9).
8. R. F. Interstage "A" Band Shunt Aligner at 1.4 Megacycles (Capacitor C-4).
9. Antenna "A" Band Shunt Aligner at 1.4 Megacycles (Capacitor C-1).
10. Oscillator's "A" Band Series Aligner at 0.6 Megacycles (Capacitor-23).
11. Oscillator's "A" Band Shunt Aligner at 1.4 Megacycles (Capacitor C-9).
12. R. F. Interstage "A" Band Shunt Aligner at 1.4 Megacycles (Capacitor C-4).
13. Antenna "A" Band Shunt Aligner at 1.4 Megacycles (Capacitor C-1).

MODEL 229P
Socket, Chassis
Notes

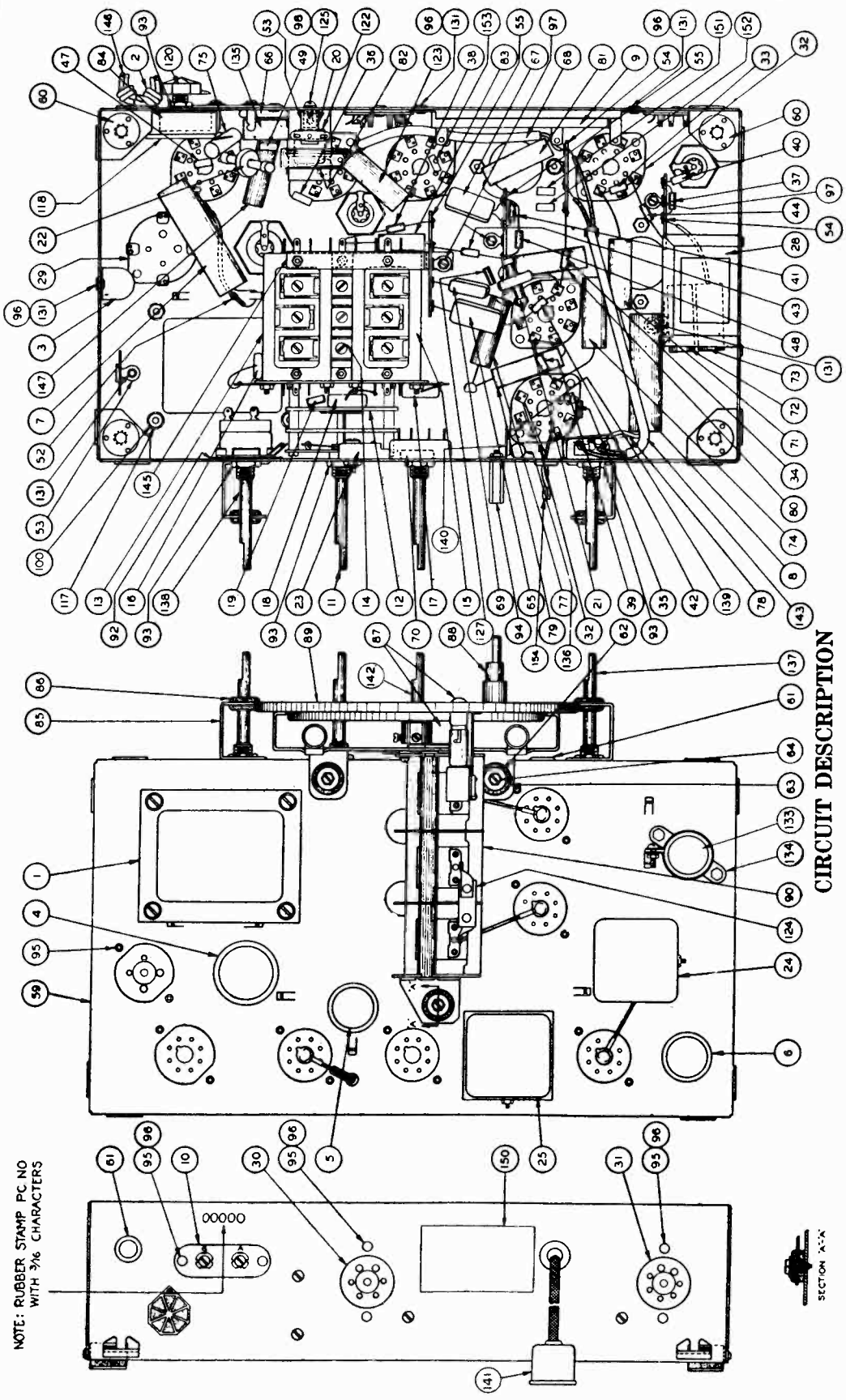


Fig. 5. Chassis Assembly.

CIRCUIT DESCRIPTION

The Stromberg-Carlson No. 229-P Radio Receivers are eight tube, superheterodyne receivers employing metal tubes and a highly efficient dynamic speaker. These receivers have three tuning ranges which are quickly interchangeable by means of a rotary switch, the control knob of which is located on the control panel. Ease and convenience of operation are assured by the vernier drive with its associated double knob. Resonance with a signal is indicated by means of the tuning indicator tube which operates on the cathode-ray principle. The strength of a received signal may be determined by observing the size of the aperture appearing on the target of the tuning indicator tube, the stronger a received signal the greater the reduction in the size of the aperture. A low level bass frequency compensating circuit is also provided in the volume control circuit of these receivers, which operates to give balanced reproduction at any setting of the volume control.

These receivers are also equipped with a single record playing phonograph unit which uses a crystal type pick-up in conjunction with a specially equalized circuit.

MODEL 229P
Parts

STROMBERG-CARLSON TEL. MFG. CO.

REPLACEMENT PARTS

Item Number	Piece Number	Part
1	26248	Power Transformer (50 to 60 Cycles)
1	26249	Power Transformer (25 to 60 Cycles)
2	24268	Cord, A. C. Supply
3	21535	Capacitor Assembly (2-.01 Mf. Capacitors)
4	26403	Capacitor, Electrolytic, 25 Mf.
5	25458	Capacitor, Electrolytic, 16 Mf.
6	26880	Capacitor, Electrolytic, 16 Mf.
7	24207	Capacitor, Electrolytic, 10 Mf., 25 Volts
8	24207	Capacitor, Electrolytic, 10 Mf., 25 Volts
9	26405	Resistor, "B" Voltage Divider
12	26402	Range Switch
13	25510	Coil Assembly, Antenna
14	25511	Coil Assembly, R. F.
15	25512	Coil Assembly, Oscillator
16	25488	Capacitor, .002 Mf.
17	25527	Capacitor, .0027 Mf.
18	25490	Capacitor, .0038 Mf.
19	26383	Resistor, Type "E1", .1 Megohm
20	25513	Coil Assembly, Wave Trap
21	25814	Coil Assembly, R. F. Choke
22	25814	Coil Assembly, R. F. Choke
23	26047	Capacitor, Osc. Series Aligner
24	26406	1st I. F. Transformer
25	25506	2nd I. F. Transformer
28	26411	Transformer, Audio Output
29	22988	Socket, 4 Prong
30	22974	Socket, 6 Prong
31	23517	Socket, 7 Prong
32	25539	Socket, 8 Prong
33	26327	Resistor, Type "E", 330 Ohms
34	26326	Resistor, Type "E", 270 Ohms
35	26331	Resistor, Type "E", 680 Ohms
36	26340	Resistor, Type "E", 3,900 Ohms
37	26341	Resistor, Type "E", 4,700 Ohms
38	26345	Resistor, Type "E", 10,000 Ohms
39	26345	Resistor, Type "E", 10,000 Ohms
40	26350	Resistor, Type "E", 27,000 Ohms
41	26353	Resistor, Type "E", 47,000 Ohms
42	26353	Resistor, Type "E", 47,000 Ohms
43	26357	Resistor, Type "E", .1 Megohm
44	26357	Resistor, Type "E", .1 Megohm
47	26365	Resistor, Type "E", .47 Megohm
48	26369	Resistor, Type "E", 1 Megohm
49	26362	Resistor, Type "E", .27 Megohm
52	25100	Resistor, 400 Ohms, 1 Watt
60	25998	Bracket Assembly
65	25504	Capacitor, 100 Mmf.
66	25504	Capacitor, 100 Mmf.
67	26512	Capacitor Assembly, 2—100 Mmf.
69	25487	Capacitor, .001 Mf.
70	25489	Capacitor, .00125 Mf.
71	24402	Capacitor Assembly, .1 Mf.
72	24402	Capacitor Assembly, .1 Mf.
73	25483	Capacitor Assembly, .1 Mf., 400 Volts
74	25483	Capacitor Assembly, .1 Mf., 400 Volts
75	25149	Capacitor Assembly, .01 Mf.
77	25150	Capacitor Assembly, .02 Mf.
78	25150	Capacitor Assembly, .02 Mf.
79	25150	Capacitor Assembly, .02 Mf.
80	25150	Capacitor Assembly, .02 Mf.
81	25150	Capacitor Assembly, .02 Mf.
82	25150	Capacitor Assembly, .02 Mf.
83	25481	Capacitor Assembly, .002 Mf.
84	25533	Capacitor Assembly, .006 Mf.
87	26287	Pilot Lamp
89	26285	Dial Assembly
90	26414	Gang Tuning Capacitor
118	26095	Potentiometer (Sensitivity Control)
120	26499	Knob (For Sensitivity Control)
122	25488	Capacitor, .002 Mf.
123	24402	Capacitor Assembly, .01 Mf.
124	26417	Capacitor, Gimmick
127	26350	Resistor, Type "E", 27,000 Ohms
133	27554	Electrolytic Capacitor, 16 Mfd., 100 Volts
135	25487	Capacitor, .001 Mfd.
136	27782	Capacitor, .03 Mfd.
137	27610	Potentiometer (Volume Control)
138	27311	Potentiometer, "Off-On" Switch and Tone Control
139	26350	Resistor, Type "E", 27,000 Ohms
141	27068	Shielded Cord and Receptacle Assembly, Phono. Pick-up Circuit
142	26472	Switch, Phono.
143	27060	Shielded Cable Assembly
144	27820	Lamp Socket Assembly
146	25301	Power Supply Cord Assembly for Phono. Unit
147	25149	Capacitor, .01 Mfd.
151	26362	Resistor, Type "E", .27 Megohm
152	26362	Resistor, Type "E", .27 Megohm
153	26369	Resistor, Type "E", 1 Megohm
154	28118	Lamp Socket Assembly for Phono. Unit Compartment

MISCELLANEOUS PARTS

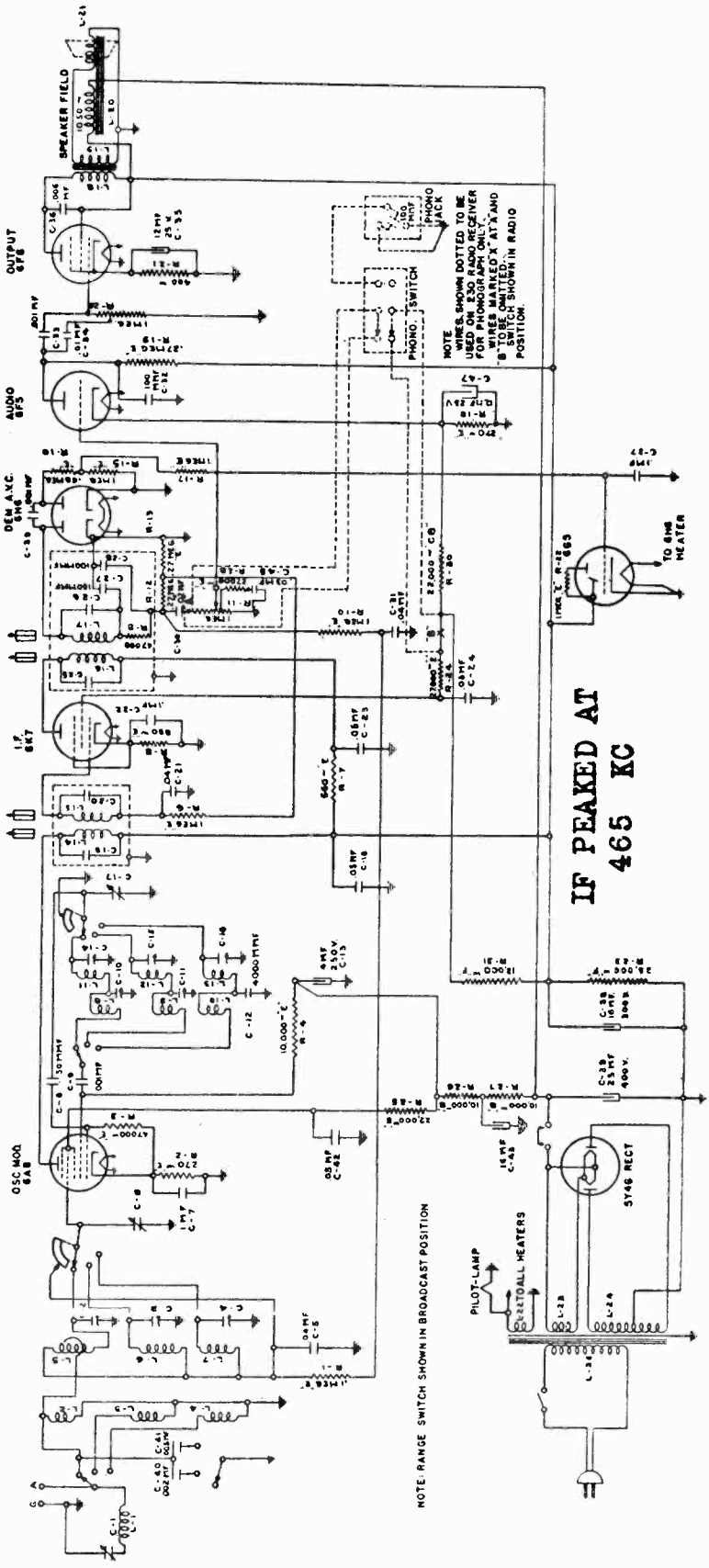
Piece Number	Part
26043	Plug (For Loud Speaker Cable)
26491	Plug (For Tuning Unit Cable)
26369	Resistor, Type "E", 1 Megohm (Used at Socket of No. 6G5 Tube)
26147	Pilot Lamp Socket
26302	Knob (For Volume Control)
26385	Knob (For Range Switch)
26384	Knob (For Off-On-Tone Control)
26305	Knob (For Large Portion of Tuning Shaft)
26306	Knob (For Vernier Portion of Tuning Shaft)
26697	Knob (For Radio-Phono. Control)
26071	Felt Washer (Used on "Volume", "Radio-Phono.," "Range Switch" and "Off-On-Tone" Controls' Shafts)
26073	Felt Washer (Used on "Station Selector" Control Shaft)

In order to obtain maximum performance from these receivers, a sensitivity control is provided for use on the standard broadcast range only. Its control knob is located on the rear of the chassis base. When either the "B" or "C" ranges are in operation, this sensitivity control is automatically cut out of the circuit so that the receiver will function at its maximum sensitivity on these two ranges. In some localities it will be found that without the use of this control, it will be impossible to eliminate adjacent channel interference. When this condition is obtained, the receiver should be tuned accurately to the desired station, and this sensitivity control adjusted so that minimum interference is obtained from the interfering station. See Figure 1.

The various tubes are used in these receivers as follows: One No. 6K7 tube is used in the R. F. Amplifier, and the other No. 6K7 tube is used in the I. F. Amplifier. The No. 6A8 tube functions as both Oscillator and Modulator tube. The No. 6H6 tube is used as a Demodulator and Automatic Volume Control tube. The No. 6F5 tube is used in the Audio Frequency Amplifier Stage (Driver), and the No. 6F6 tube is used in the Audio Power Output Stage. The No. 80 tube is the Rectifier tube of the power supply unit, and the No. 6G5 tube is used for indicating resonance in the Tuning Indicator System.

STROMBERG-CARLSON TEL. MFG. CO.

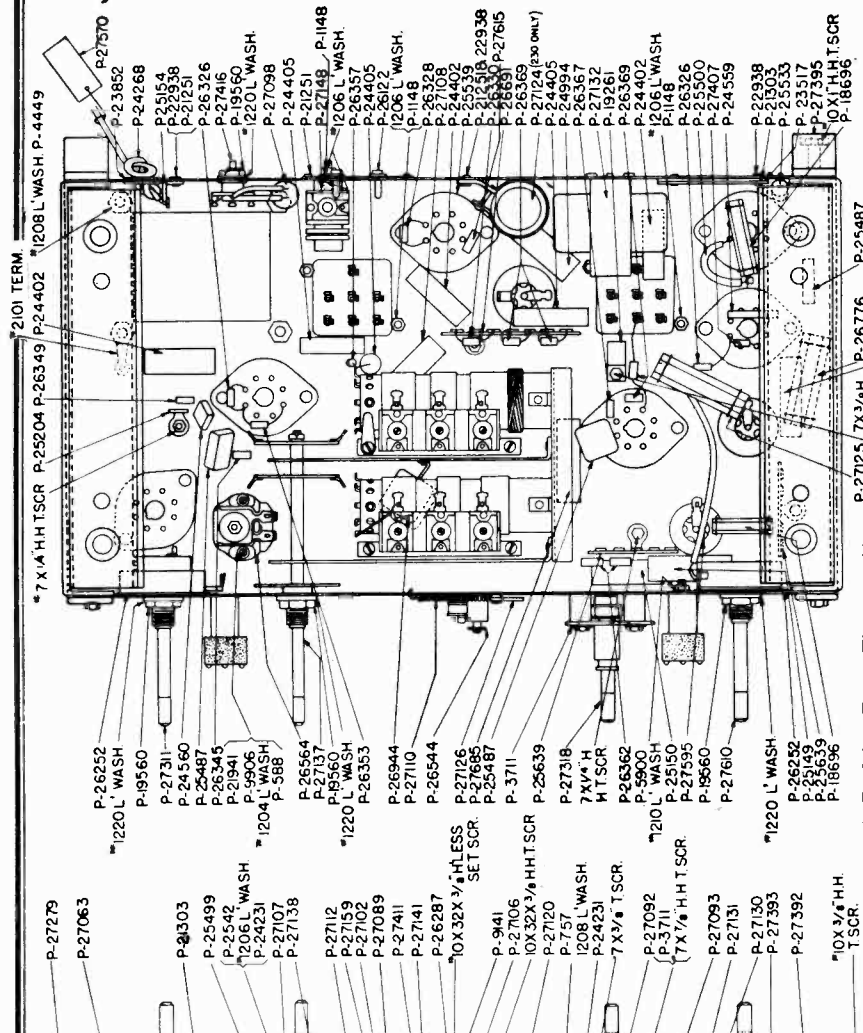
MODELS 230H, 230HB
230L, 230LB, 231F
231FB, 231R, 231RB
231P, 231PB
Schematic



MODELS 230H, 230HB
230L, 230LB, 231F
231FB, 231R, 231RB
231P, 231PB

STROMBERG-CARLSON TEL. MFG. CO.

Socket, Chassis Parts



Piece Number	Part
18696	Resistor, Type "B", 10,000 Ohms
23517	Socket, 7 Prong
24268	Cord (Power Supply)
24402	Capacitor, .1 Mf.
24405	Capacitor, .04 Mf.
24559	Capacitor, Type "O", 100 Mmf.
24560	Capacitor, Type "O", 50 Mmf.
24994	Capacitor, .05 Mf.
25149	Capacitor, .01 Mf.
25150	Capacitor, .02 Mf.
25487	Capacitor, Type "W", .001 Mf.
25500	Resistor, Flexible, 400 Ohms.
25533	Capacitor, .01 Mf.
25539	Socket, 8 Prong.
26114	Potentiometer (Volume Control)
26287	Pilot Lamp
26326	Resistor, Type "E", 270 Ohms
26328	Resistor, Type "E", 390 Ohms
26330	Resistor, Type "E", 560 Ohms
26345	Resistor, Type "E", 10,000 Ohms
26349	Resistor, Type "E", 22,000 Ohms
26350	Resistor, Type "E", 27,000 Ohms
26353	Resistor, Type "E", 47,000 Ohms
26357	Resistor, Type "E", .1 Megohm
26362	Resistor, Type "E", .27 Megohm
26367	Resistor, Type "E", .68 Megohm
26369	Resistor, Type "E", 1 Megohm
26544	Retainer
26564	Capacitor Assembly, I. F. Aligners ("A" and "B" Ranges)
26776	Resistor, Type "F", 12,000 Ohms
26944	Capacitor, Type "W", .004 Mf.
27067	Power Transformer (50 to 60 Cycles Chassis)
27068	Power Transformer (25 to 60 Cycles Chassis)
27069	1st I. F. Transformer
27070	2nd I. F. Transformer
27073	Capacitor, Fixed Tuning, 100 Mmf.
27081	Tuning Capacitor, Wave Trap
27090	Gang Tuning Capacitor
27098	Capacitor Assembly, 1—.002 Mf.; 1—.005 Mf., (Signal Control)
27102	Pulley Assembly, Gang Tuning Capacitor
27107	Dial (Tuning)
27108	Capacitor Assembly (2—.05 Mf.)
27110	Spring (Belt Tension Adjustment)
27112	Dial Indicator Frame
27120	Pilot Lamp Socket Assembly
27122	Electrolytic Capacitor, 25 Mf., 400 Volts (Used only on No. 230 Receivers' Chassis)
27123	Electrolytic Capacitor, 16 Mf., 300 Volts (Used only on No. 230 Receivers' Chassis)
27124	Electrolytic Capacitor Assembly, 4 Mf., 250 Volts; 12 Mf., 20 Volts (Used only on No. 230 Receivers' Chassis)
27125	Resistor, Type "F", 25,000 Ohms
27126	Arm Assembly (Belt Tension Adjustment)
27132	Transformer Assembly, Audio Output
27137	Range Switch
27144	Coil Assembly, Antenna
27145	Coil Assembly, Oscillator
27148	Coil Assembly, Wave Trap
27159	Belt (Tuning Drive)
27311	Switch, "Off-On" Switch and Tone Control
27318	Drive Shaft Assembly
27396	Thumb Screw
27398	Dry Electrolytic Capacitor, 4 Mf., and 16 Mf., 300 Volts (Used only on No. 231 Receivers' Chassis)
27399	Dry Electrolytic Capacitor, 12 Mf., 20 Volts, and 25 Mf., 400 Volts (Used only on No. 231 Receivers' Chassis)
27407	Resistor, Type "CB", 22,000 Ohms
27408	Tuning Indicator Socket and Cable
27409	Cable
27412	Clamp
27416	Switch (Signal Admission Control)
27595	Electrolytic Capacitor, 16 Mf., 250 Volts (Used only on No. 230 Receivers' Chassis)
27610	Volume Control
27611	Dry Electrolytic Capacitor, 16 Mf., 300 Volts (Used only on No. 231 Receivers' Chassis)
27615	Resistor, Type "EI", 27,000 Ohms
27685	Dry Electrolytic Capacitor, 12 Mf., 25 Volts
27789	Capacitor, .03 Mf.

MODELS 230H, 230HB
230L, 230LB

STROMBERG-CARLSON TEL. MFG. CO.

Chassis Wiring

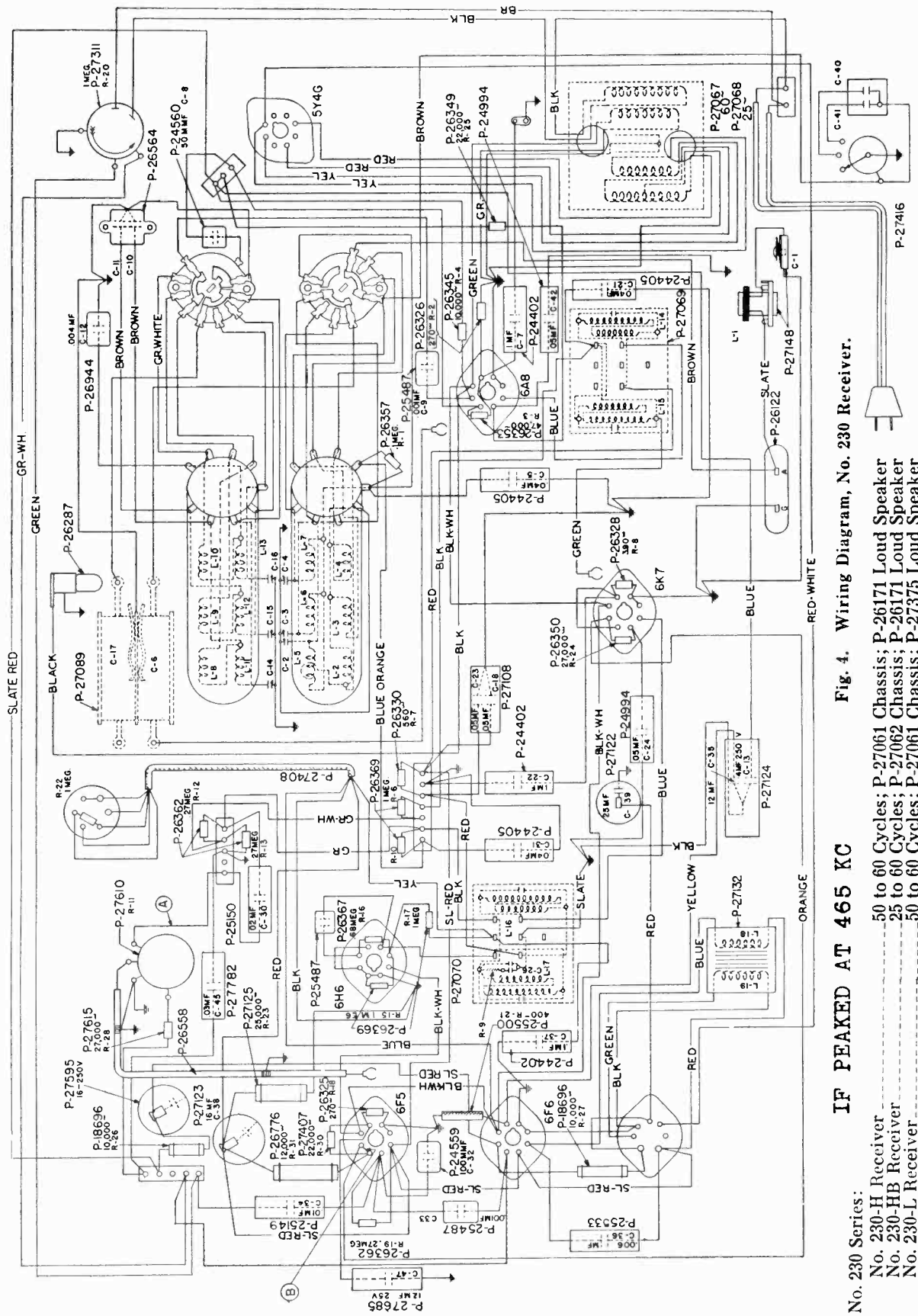


Fig. 4. Wiring Diagram, No. 230 Receiver.

MODELS 231F,231FB
231R,231RB,231P STROMBERG-CARLSON TEL. MFG. CO.
231PB,Chassis Wiring

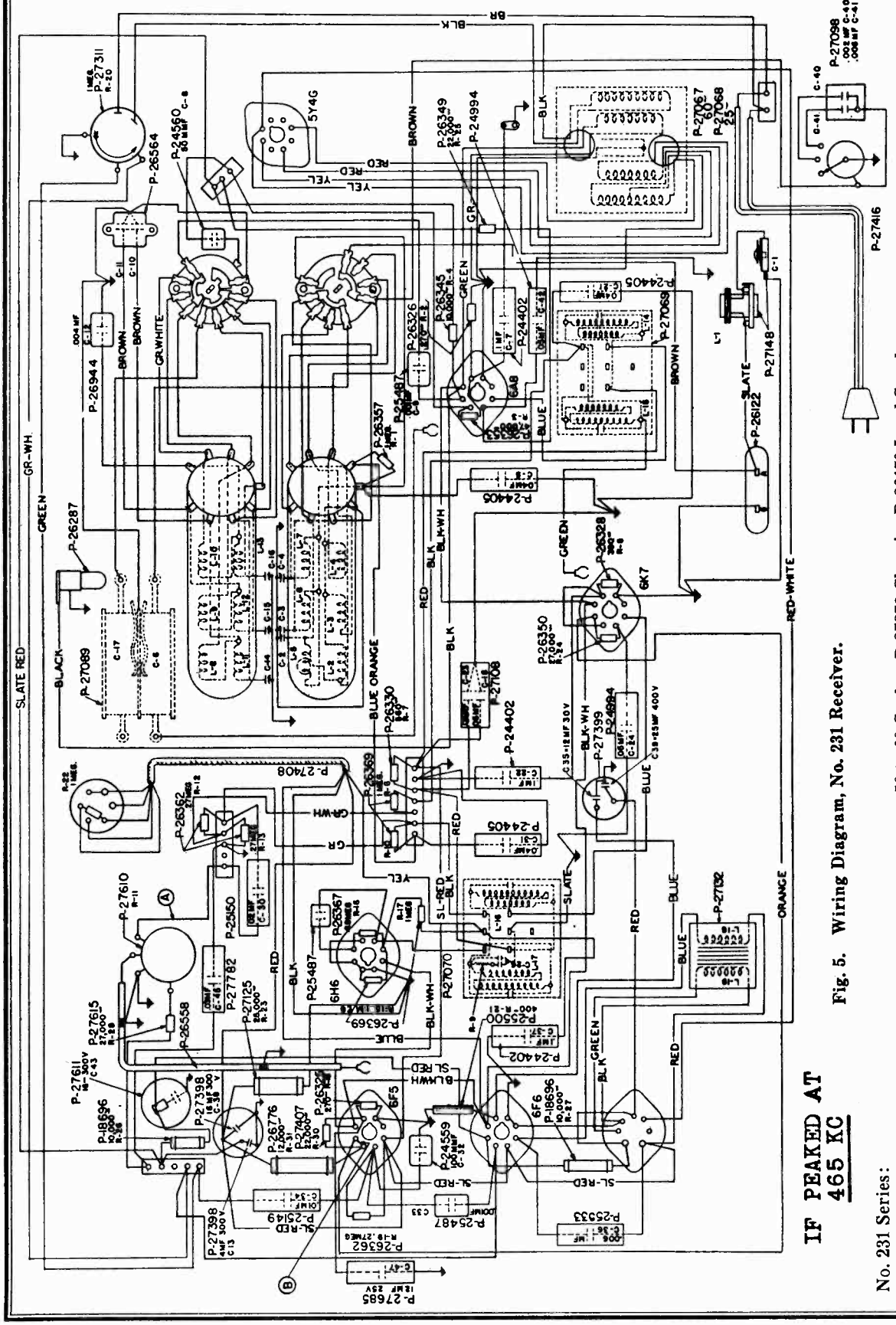


Fig. 5. Wiring Diagram, No. 231 Receiver.

No. 231 Series:
No. 231-F Receiver ..... 50 to 60 Cycles; P-27372 Chassis; P-26170 Loud Speaker
No. 231-FB Receiver ..... 25 to 60 Cycles; P-27373 Chassis; P-26170 Loud Speaker
No. 231-R Receiver ..... 50 to 60 Cycles; P-27372 Chassis; P-26170 Loud Speaker
No. 231-RB Receiver ..... 25 to 60 Cycles; P-27373 Chassis; P-26170 Loud Speaker

No. 231-P Receiver ..... 60 Cycles only; P-27829 Chassis; P-27375 Loud Speaker; P-27835 Phonograph Unit
No. 231-PB Receiver ..... 25 Cycles only; P-27830 Chassis; P-27375 Loud Speaker; P-27836 Phonograph Unit

STROMBERG-CARLSON TEL. MFG. CO.

MODELS 230H, 230HB
230L, 230LB, 231F
231FB, 231R, 231RB
231P, 231PB
Trimmers

ELECTRICAL SPECIFICATIONS

Type of Circuit	Superheterodyne
Tuning Ranges	A—530 to 1700 Kc.; B—1700 to 5600 Kc.; C—5600 to 18,000 Kc.
Number and Type of Tubes	1 No. 6A8, 1 No. 6K7, 1 No. 6H6, 1 No. 6F5, 1 No. 6F6, 1 No. 6G5, 1 No. 5Y4G
Voltage Rating	105 to 125 Volts
Frequency Rating	25 to 60 Cycles and 50 to 60 Cycles
Input Power Rating	65 Watts
Frequency of Intermediate Amplifier	465 Kilocycles

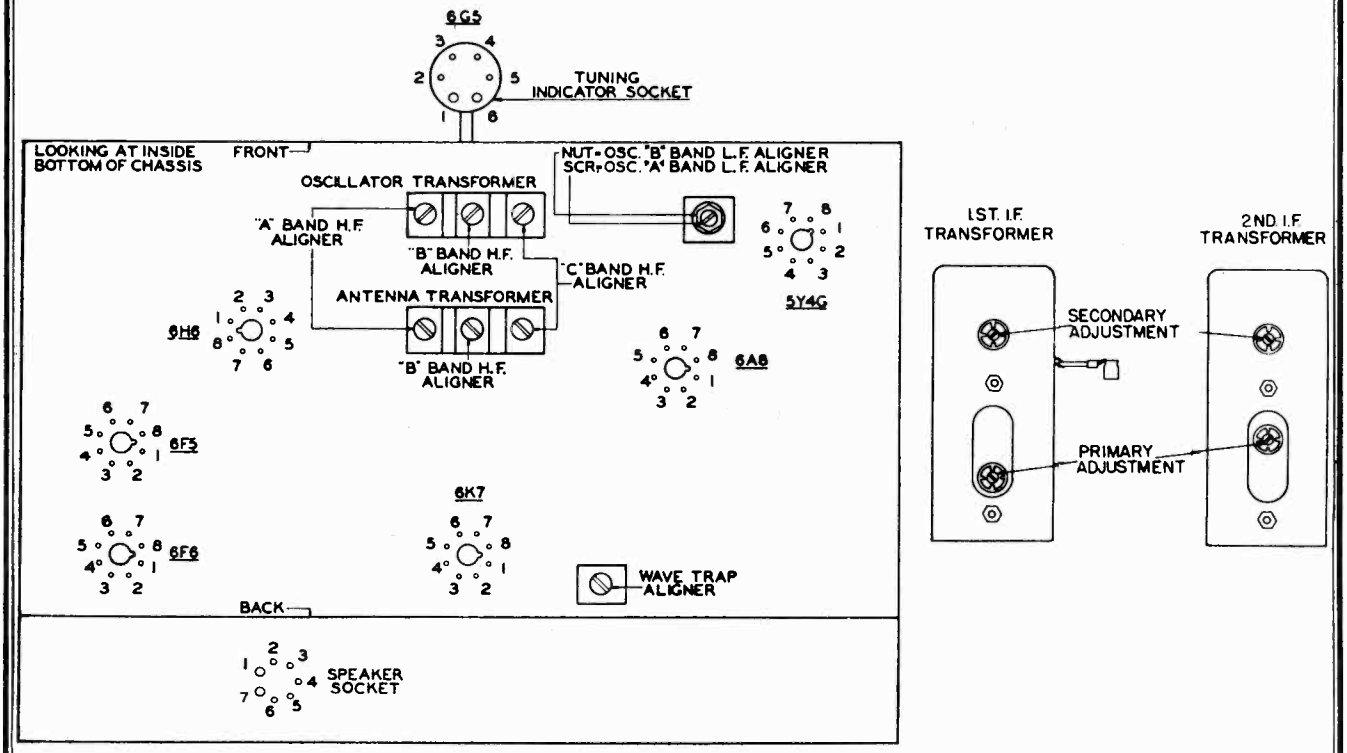


Fig. 1.—Terminal Layout for Voltage Measurement Chart and Location of the Various Aligning Capacitors.

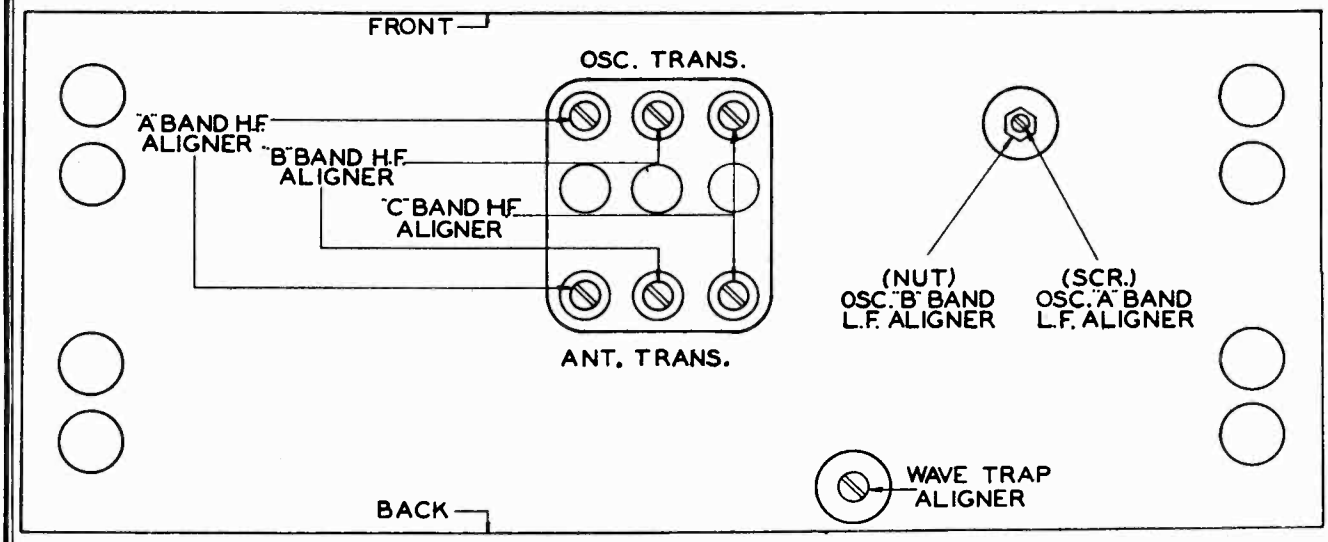


Fig. 2. View Through Chassis Mounting Shelf Showing Adjusting Screws for R. F. Aligning Capacitors.

In order to obtain maximum performance on the Standard Broadcast Range ("A" Range) of these receivers, a "signal admission control switch" is provided. This control is located on the inside rear flange of the chassis base, and has a slotted shaft which protrudes through the base so that it may be adjusted by the use of a screwdriver. When either the "B" or "C" ranges are in operation, this signal admission control is automatically cut out of the circuit, allowing the receiver to function at its maximum sensitivity on these two ranges. When operating in the Standard Broadcast Range, maximum sensitivity is obtained when the slotted shaft of this control is rotated to its maximum counter-clockwise position. To properly set this signal admission control, place the receiver in operation and then adjust this control so that clearest reception is obtained. The control should remain in this position. Do not readjust this control for each frequency. The above adjustment should be made in the evening if best results are to be obtained.

The volume control circuit in these receivers is arranged to give balanced reproduction at any setting of the volume control by means of a low level bass frequency compensating network.

A metal guard frame is furnished on these receivers to prevent damage to the chassis components and also to facilitate ease of servicing should this become necessary. Do not turn the chassis over on its guard frame without first removing the tuning indicator unit which is secured to the metal guard frame. To remove the tuning indicator unit from the guard frame, first unscrew the knurled screw which holds the tuning indicator's clamp to the metal guard frame, which will then allow the tuning indicator unit to be removed from the guard frame.

The chassis used in the No. 230 Receivers differ from the chassis used in the No. 231 Receivers only in the type of electrolytic filter capacitors which are used. Two wiring diagrams are, therefore, shown in this book, one for the No. 230 Receiver Chassis, and one for the No. 231 Receiver Chassis.

NORMAL VOLTAGE READINGS

The various values of voltages listed in the following table are obtained by measuring between the various tube socket contacts and the chassis base with the tubes in their respective sockets. The receiver is, therefore, in operation when the measurements are made. Figure 1 shows the terminal layouts of the sockets with the proper terminal numbers.

Voltages are given for a line voltage of 120 volts, and an allowance should be made for differences when the line voltage is higher or lower. A meter having a resistance of 1000 ohms per volt should be used for measuring the D. C. voltages. Voltage values shown are those obtained on the lowest scale of a meter having the following ranges: 0-2.5, 0-10, 0-100, 0-250, 0-500, 0-1000 volts.

			Terminals of Sockets								*Heater Voltages Between Heater Terminals*	
Tube	*Circuit*	*Cap*	1	2	3	4	5	6	7	8	*Socket Terminal Numbers*	*Volts*
6A8	Mod.—Osc.	0	0	0	+245	+100	—8	+155	*6.1*	+2.5	2–7	*6.1*
6K7	I. F. Amp.	0	0	0	+245	+100	+3	+160	*6.1*	+3	2–7	*6.1*
6H6	Dem.—A. V. C.	—	0	0	0	0	0	0	*6.1*	0	2–7	*6.1*
6F5	Audio Amp.	0	0	0	+250	+115	+150	+150	*6.1*	+1.7	2–7	*6.1*
6F6	Audio Output	—	0	0	+250	+255	0	0	*6.1*	+16	2–7	*6.1*
6G5	Tuning Ind.	—	0	+2.4	0	+250	0	*6.1*			1–6	*6.1*
5Y4G	Rectifier	—	0	0	*350*	0	*350*	0	+330	+330	7–8	*4.8*
Speaker Socket		—	+330	0	0	+330	+330	—	+255			

A. C. voltages are indicated by italics. Receiver tuned to 1000 kc., no signal.

In making any alignment adjustments, always adjust the test oscillator's output voltage to the minimum value where a good alignment may still be obtained. Never attempt to make any alignment adjustments using a strong signal. Before proceeding with the alignment of any circuits in these receivers be sure that the "Signal Admission Control" is set for the maximum sensitivity position and that the "Off-On-Tone" control knob is set for maximum treble response (position where knob is rotated from its maximum counter-clockwise position, slightly clockwise to position where set turns "on"). Figure 1 shows the location of all the aligning capacitors or adjustments for this receiver.

Except in the case of making any aligning adjustments of the radio frequency circuits in the No. 231-P Receivers, it will not be necessary to remove the chassis in these receivers from their cabinets in order to make any alignment adjustments. If it is necessary to make any alignment adjustments of the radio frequency circuits in the No. 231-P Receivers, it will be necessary to remove the chassis from the cabinet. To remove the chassis in these receivers, it is only necessary to remove the two bolts which hold the chassis shelf to the cabinet. In making any radio frequency circuit alignment adjustments in the No. 231-P Receivers, the chassis should be set at approximately the same position which it occupies when in the cabinet. With the exception of the Nos. 231-F and 231-R Receivers, the alignment adjustments for the intermediate frequency circuits are accessible from the rear of the receiver, and the adjustments for the radio frequency circuits are accessible through the apertures located in the bottom metal base plate of the chassis; these apertures are easily accessible either through the bottom of the cabinet or through the bottom of the cabinet shelf, depending upon the particular style of cabinet. In the Nos. 231-F and 231-R Receivers, the adjustments for the intermediate frequency circuits are accessible through the bottom of the cabinet, while the adjustments for the radio frequency circuits are not accessible until the backs of the cabinets are removed. See Figure 2. Never align any of these receivers without having the metal base plate fastened to the chassis base. In the Nos. 231-F and 231-R Receivers, it is important that the final alignment be made with the chassis mounted in the cabinet.

Dial Adjustment

Before aligning the circuits of these receivers, the tuning dial must be properly aligned to "track" with the gang tuning capacitor. To check whether the dial is set correctly with respect to the gang tuning capacitor, rotate the "Rapid Station Selector" knob in a clockwise direction so that the gang tuning capacitor is set to its maximum capacity position. Then, with the receiver turned "on", the illuminated dial indicator line should be exactly centered over the dial alignment lines (black lines) which are located at the extreme low frequency end of each scale on the dial. If these lines do not center over the illuminated dial indicator line, loosen the two set screws located on the hub of the dial. Then, rotate the dial so that these alignment lines are centered over the illuminated dial indicator line. The two set screws of the dial hub should then be securely tightened.

Intermediate Frequency Adjustments

The intermediate frequency used in these receivers is 465 kilocycles. In making these circuit adjustments always align the circuits in the order given in these instructions.

1. Operate the "Range" switch of the receiver to the "A" range position. Set the receiver's tuning dial at its extreme low frequency position, and operate the Tone Control knob to the "Normal" position. Rotate the Volume Control knob to its maximum clockwise position (maximum volume).
2. Apply between the chassis base (or ground binding post) of the receiver and the grid of the No. 6A8 modulator-oscillator tube, a modulated signal of 465 kilocycles from the test oscillator, using a 0.1-microfarad capacitor in series with the connection between the output terminal of the test oscillator and the grid of the No. 6A8 tube. Do not remove the chassis grid lead connecting to this tube. The ground (or low side) terminal of the test oscillator should be connected to either the chassis base or the ground binding post terminal.
3. Now, noting from Figure 1 the aligning adjustments for the first and second I. F. transformers, align the I. F. circuits in the following manner:
   Secondary of second I. F. transformer.
   Primary of second I. F. transformer.
   Secondary of first I. F. transformer.
   Primary of first I. F. transformer.
   Adjusting the circuits to obtain maximum reading on the output meter, reducing the output of the test oscillator as required.

Radio Frequency Adjustments

The alignment of the radio frequency circuits of the various ranges in these receivers should be very carefully made and in the order specified.

Alignment of Short Wave Range (Also Referred to as "C" Band)

In aligning the radio frequency circuits for this range, replace the 0.1-microfarad capacitor which was placed in series with the test oscillator's output lead for the I. F. alignments, with a 400-ohm carbon type resistor. This lead should then be connected to the antenna binding post located on the rear of the receiver chassis. The ground terminal (or low side) of the test oscillator should be connected to the ground binding post on the receiver.

1. Operate the Range Switch on the receiver chassis to the "C" range position, and set the test oscillator's frequency and the receiver's tuning dial to 17 megacycles.
2. Adjust the oscillator's "C" band high frequency aligner for maximum output.
3. Adjust the antenna's "C" band high frequency aligner for maximum output, at the same time rotate the gang tuning capacitor back and forth through resonance until maximum output is obtained.

Alignment of Aircraft, Amateur, and Police Range (Also Referred to as "B" Band)

In aligning the radio frequency circuits for this range, use the same artificial antenna (400-ohm carbon type resistor) in series with the output terminal of the test oscillator as was used for aligning the short-wave range.

1. Operate the Range Switch on the receiver chassis to the "B" range position, and set the test oscillator's frequency and the receiver's tuning dial to five megacycles.
2. Adjust the oscillator's "B" band high frequency aligner for maximum output.
3. Adjust the antenna's "B" band high frequency aligner for maximum output, and at the same time rotate the gang tuning capacitor back and forth through resonance until maximum output is obtained.
4. Set the test oscillator's frequency and the receiver's tuning dial to 1.8 megacycles.
5. Adjust the oscillator's "B" band low frequency aligner (series aligner), and at the same time rotate the gang tuning capacitor back and forth through resonance until maximum output is obtained.
6. Reset both the test oscillator's frequency and the receiver's tuning dial to 5 megacycles and repeat operations Nos. 2 and 3.

Alignment of Standard Broadcast Range (Also Referred to as "A" Band)

In aligning the radio frequency circuits for this range, replace the 400-ohm carbon type resistor in series with the test oscillator's output lead with a 200-micro-microfarad capacitor and align these circuits as follows:

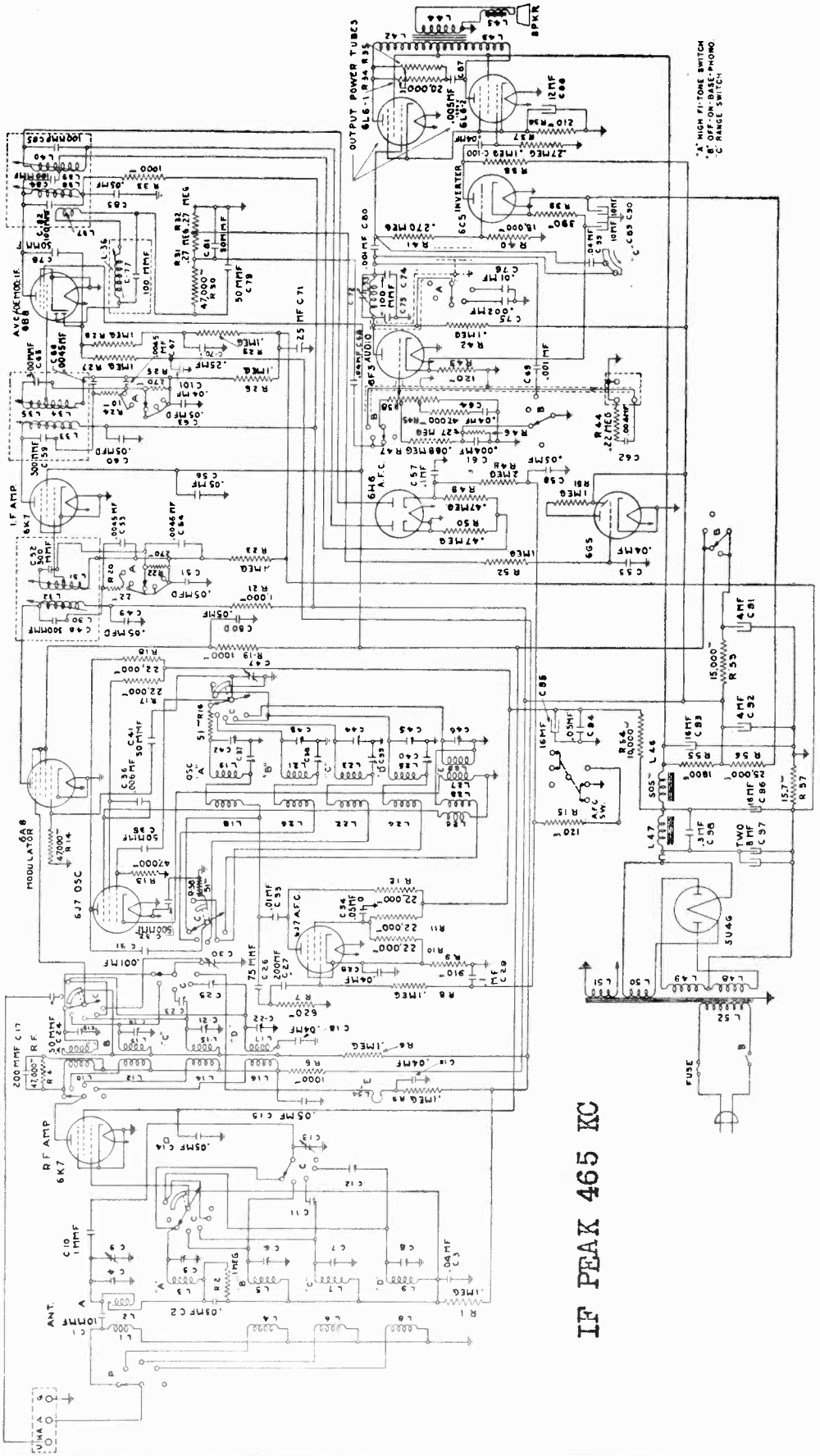
1. Operate the Range Switch to the "A" range position and set the test oscillator's frequency and the receiver's tuning dial to 1.4 megacycles.
2. Adjust the oscillator's "A" band high frequency aligner for maximum output.
3. Adjust the antenna's "A" band high frequency aligner for maximum output.
4. Set the test oscillator's frequency and the receiver's tuning dial to 0.6 megacycles.
5. Adjust the oscillator's "A" band low frequency aligner (series aligner) for maximum output, and at the same time rotate the gang tuning capacitor slightly back and forth through resonance until maximum output is obtained.
6. Reset both the test oscillator's frequency and receiver's tuning dial to 1.4 megacycles and repeat operations Nos. 2 and 3.

Wave Trap Adjustment

In adjusting the wave trap circuit, the "Signal Admission Control" should be set for the most sensitive position (shaft rotated in the most counter-clockwise direction). Set the Range Switch of the receiver to the "A" range position and the tuning dial to 1000 kilocycles. Connect a 200-micro-microfarad capacitor in series with the output terminal of the modulated test oscillator and the antenna binding post on the receiver, and the ground terminal of the test oscillator to the ground binding post on the receiver. Then, with the modulated test oscillator set at the frequency of the intermediate amplifier, 465 kilocycles, supply a fairly strong signal to the receiver and adjust the wave trap aligner until a minimum indication is obtained on the output meter.

MODELS 250L, 250LB

STROMBERG-CARLSON TEL. MFG. CO. Schematic



MODELS 250L, 250LB
Voltage, Trimmers
Phono. Data

STROMBERG-CARLSON TEL. MFG. CO.

NORMAL VOLTAGE READINGS

The various values of voltages listed in the following table are obtained by measuring between the various tube socket contacts and the chassis base, with the tubes in their respective sockets. The receiver is, therefore, in operation when the measurements are made. Figure 1, shows the terminal layout of the sockets with the proper terminal numbers.

Voltages are given for a line voltage of 120 volts, and allowance should be made for differences when the line voltage is higher or lower. A meter having a resistance of 1000 ohms per volt should be used for measuring the D. C. voltages. Voltage values shown are those obtained on the lowest possible scale of a meter having the following ranges: 0-2.5, 0-10, 0-100, 0-250, 0-500, 0-1000 volts except when an asterisk appears after any given voltage value in which case the 250 volt scale was used.

Tube	Circuit	Cap	Terminals of Sockets 1	2	3	4	5	6	7	8	Heater Voltages Between Heater Terminals: Socket Terminal Numbers	Volts
6K7	R. F. Amp.	0	0	0	+230	+90	0	+80	6.1	0	2-7	6.1
6A8	Modulator	0	0	0	+230	+80	—2.0	+80	6.1	0	2-7	6.1
6J7	Oscillator	0	0	6.1	+60	+180	0	0	0	0	2-7	6.1
6J7	Oscillator Control	0	0	0	+190	+110	+5.8	0	6.1	+5.8	2-7	6.1
6K7	I. F. Amp.	0	0	0	+235	+90	0	0	6.1	0	2-7	6.1
6B8	I. F. Amp.—Dem.—A. V. C.	0	0	6.1	+225	—0.1	—0.1	+90	0	0	2-7	6.1
6H6	A. F. C. Discriminator	—	0	0	—0.25	0	—0.2	—0.2	6.1	0	2-7	6.1
6F5	Audio Amp.	0	0	0	+135	+135	0	0	6.1	+1.3	2-7	6.1
6C5	Audio Amp.	—	0	0	+100	+135	0	+1.3	6.1	+5.2	2-7	6.1
6L6 No. 1	Audio Output	—	0	0	+300	+305	0	0	6.1	+22	2-7	6.1
6L6 No. 2	Audio Output	—	0	0	+300	+305	0	0	6.1	+22	2-7	6.1
6G5	Tuning Indicator	—	6.1	+0.5	—0.2*	+245	0	0	—	—	1-6	6.1
5U4G	Rectifier	—	0	+430	—	395	—	395	—	+430	2-8	4.8
Speaker Socket		—	+420	0	0	+430	+430	0	+320	—		

A. C. voltages are indicated by italics. Receiver tuned to 1000 kc., no signal.

PROCEDURE FOR OBTAINING REPRODUCTION FROM PHONOGRAPH RECORDS

A socket having three contacts is provided on the rear of the chassis base, and is wired to the "Off-On-Bass-Phonograph" switch assembly located on the front of the receiver. A three prong plug is also inserted in the socket so that if at any time it is desired to use an electric pick-up and phonograph unit in conjunction with this receiver, it may readily be accomplished.

In order to obtain the best quality of phonograph reproduction from this receiver, a Stromberg-Carlson No. 10 Record Player is recommended. This record player is equipped with a correctly designed single record playing motor unit, and uses a crystal type pick-up in conjunction with a specially equalized circuit. To attach this instrument to a No. 250 Receiver, it is only necessary to remove the three-prong plug furnished with the receiver and insert the three-prong plug which comes with the unit into the three-prong socket located on the rear of the chassis base. Then, the power supply lug of the phonograph unit should be inserted into a suitable power supply receptacle, and the unit will be ready for use.

If the Stromberg-Carlson No. 10 Record Player is not used and the electric pick-up to be used is of the high impedance type, it will be necessary to connect a low capacity shielded cable between the three-prong plug furnished with the receiver and the pick-up. This shielded cable should be of the low capacity type, in order to prevent the excessive cutting of high frequencies which is caused when a shielded cable having high capacity is used. The length of the shielded cable used should be kept as short as possible.

If a pick-up of the low impedance type is used, it will be necessary to connect a "matching transformer" between the three-prong plug and the pick-up. The transformer should be located as near to the receiver as possible, in which case it will not be necessary to use a shielded cable.

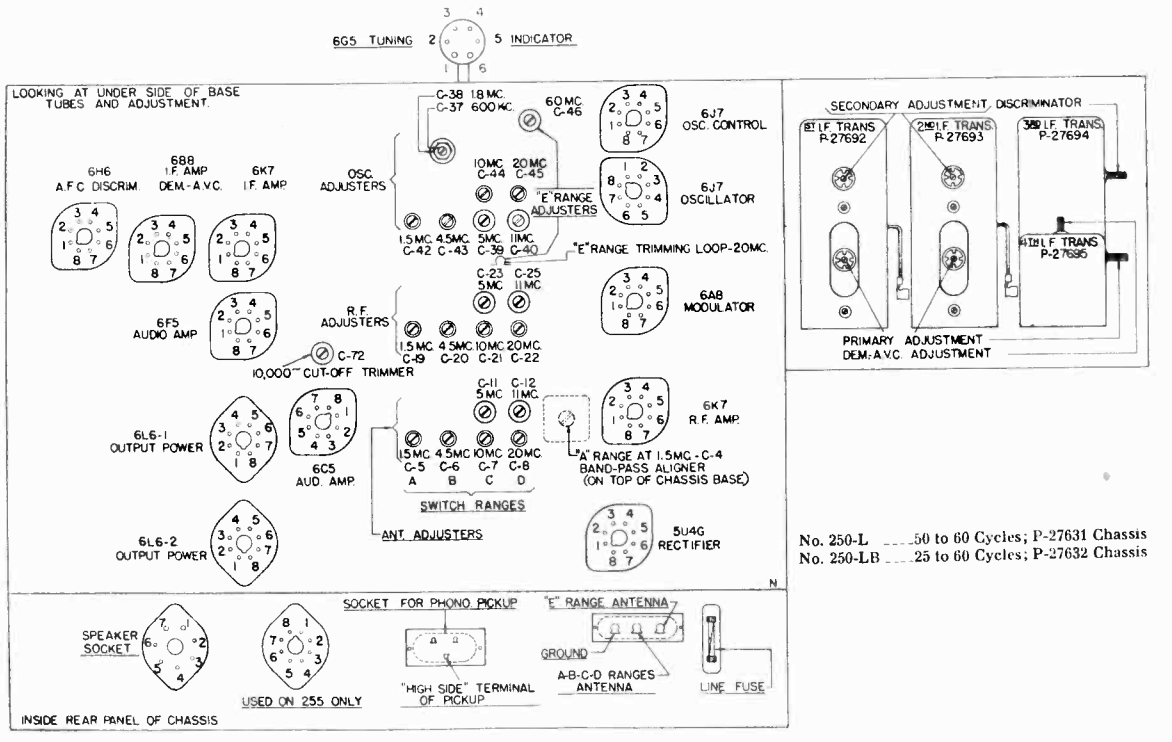


Fig. 1. Terminal Layout for Voltage Measurement Chart and Location of the Various Aligning Adjustments.

No. 250-L ....50 to 60 Cycles; P-27631 Chassis
No. 250-LB ....25 to 60 Cycles; P-27632 Chassis

Dial Adjustment

Before aligning the circuits of these receivers, the tuning dial must be properly aligned to "track" with the gang tuning capacitor. To check whether the dial is set correctly with respect to the gang tuning capacitor, rotate the "Rapid Station Selector" knob in a counter-clockwise direction so that the gang tuning capacitor is set to its maximum capacity position. Then, with the receiver turned "on", the illuminated dial indicator line should be exactly centered over the dial alignment lines (black lines) which are located at the extreme low frequency end of each scale on the dial. If these lines do not center over the illuminated dial indicator line, loosen the two set screws located on the hub of the dial. Then, rotate the dial so that these alignment lines are centered over the illuminated dial indicator line. The two set screws of the dial hub should then be securely tightened.

Intermediate Frequency and A. F. C. Circuit Adjustments

The intermediate frequency system employed in this receiver is a complex circuit. The first I. F. amplifier is coupled to the second I. F. amplifier through the No. 6K7 tube. The second and third I. F. transformers are coupled through the pentode section of the No. 6B8 tube. The third I. F. transformer is in effect a distributing network rather than a transformer only; it contains a primary winding coupled to two other networks. One of these networks links the diode stage (Demodulator-A. V. C.) with the I. F. signal, while the other network resembles the secondary of a push-pull transformer and constitutes the tuned "Discriminator" circuit. This "Discriminator" network operating into the No. 6H6 tube supplies the characteristic voltage demanded by the oscillator control tube. The fourth I. F. transformer feeds the diode plates of the No. 6B8 tube.

The intermediate frequency used in these receivers is 465 kilocycles. Because of the necessity of obtaining the proper shape of resonance curve of these stages in a high fidelity receiver, it is recommended that unless it is absolutely essential, these I. F. adjustments be untouched. In the factory these adjustments are made using a visual system which allows the operator to see the exact shape of the resonance curve. For this reason it is best to have these adjustments made at the factory. However, in the case where this cannot be done, the following procedure should be followed:

1. Operate the Range Switch of the receiver to the "A" range position, and set the tuning dial to its extreme low frequency position. Set the Fidelity Control to its "Normal" position, the Automatic Frequency Control knob to the "Off" position and the "Off-On-Bass" Control knob to its "Normal" position. **Never attempt to align the R. F. or I. F. circuits of this receiver with the Fidelity Control knob set at any position other than the "Normal Fidelity" position, and the Automatic Frequency Control knob set at the "On" position unless specifically directed in the following paragraphs.**
2. Apply between the chassis base (or ground binding post) of the receiver and the grid of the No. 6A8 modulator tube, a modulated signal of 465 kilocycyes from the signal generator, using a 0.1 Mfd. capacitor in series with the connection between the output terminal of the signal generator and the grid of the No. 6A8 tube. Do not remove the chassis grid lead connecting to this tube. The ground (or low side) terminal of the signal generator should be connected to either the chassis base or the ground binding post terminal.
3. Now noting from Figure 1, the alignment adjustments for the First, Second, Third, and Fourth I. F. Transformers, align the I. F. circuits in the following manner:

   Adjust the third I. F. transformer primary circuit for maximum output.

   Adjust the fourth I. F. transformer circuit for maximum output.

   Adjust the third I. F. transformer "Discriminator" circuit midway between the peaks where maximum output is obtained.

   Adjust the second I. F. transformer secondary circuit for maximum output.

   Adjust the second I. F. primary circuit for maximum output.

   Adjust the first I. F. secondary circuit for maximum output.

   Adjust the first I. F. primary circuit for maximum output.

Carefully make all the above adjustments, watching carefully the output meter and reduce the output of the test oscillator as required.

To make the final adjustment of the "Discriminator" circuit proceed as follows:

Check the position of the A. F. C. control knob which should be set to the "off" position. **Before making this circuit adjustment be sure that the I. F. Amplifier is tuned exactly to 465 kilocycles.** With the signal generator still set at a frequency of 465 kilocycles, adjust the signal generator's output control so that a signal of 50,000 to 100,000 microvolts is fed into the No. 6A8 Modulator tube. Now observe the reading of the milliammeter which is connected in series with the cathode of the No. 6J7 oscillator control tube. Rotate the A. F. C. Control knob to the "on" position, and observe whether there is any difference in the reading of the milliammeter. When this circuit is correctly adjusted, there should be no difference in the reading of the milliammeter when the A. F. C. Control knob is rotated from the "off" to the "on" position. If there is any difference in the milliammeter reading while rotating the Automatic Frequency Control knob to the "off" and "on" position, at a rate of about two cycles per second, adjust the "Discriminator" circuit by means of the screw adjustment located on the third I. F. transformer until the meter reading has the same value regardless of whether the A. F. C. Control knob is rotated to the "on" or "off" position. When this condition is obtained the "Discriminator" circuit of these receivers is properly adjusted.

Radio Frequency Adjustments

The alignment of the radio frequency circuits in these receivers should be very carefully made and in the order specified.

When making any aligning adjustments of these circuits, the A. F. C. Control knob should be rotated to the "off" position, the Fidelity Control knob should be set for "Normal" operation, and the "Off-On-Bass-Phonograph" Control knob should also be set for "Normal" operation.

Alignment of Ultra-Short Wave Range (Also referred to as "E" Band)

In order to align the circuits of this range, it is desirable to have a signal generator whose high frequency range will go to 60 megacycles. Such equipment, however, is rare and costly, and in most cases it will be necessary to make use of a signal generator whose high frequency range does not extend beyond 20 megacycles, using harmonics of 20 megacycles for aligning this range on 60 megacycles.

In aligning the radio frequency circuits for this range, replace the 0.1 mfd. capacitor which was placed in series with the signal generator's output lead for the I. F. alignment with a 400-ohm carbon type resistor. This lead should then be connected to the antenna binding post marked "U. H. A." located on the rear of the receiver chassis. The ground terminal (or low side) of the signal generator should be connected to the ground binding post on the receiver.

1. Operate the Range Switch on the receiver chassis to the "E" range position and set the signal generator's frequency and the receiver's tuning dial to 60 megacycles.
2. Adjust the aligning capacitor C-46 until maximum voltage output is obtained on the output meter.
3. Set the signal generator's frequency and the receiver's tuning dial to 20 megacycles and adjust the "E" range trimming loop, L-54, until maximum voltage output is obtained on the output meter. The adjustment of this loop is obtained by distorting its normally circular shape until it offers the correct inductive effect. If the oscillator does not track with the tuning dial scale at this frequency, it will be necessary to also adjust the oscillator's tuning loop.
4. Reset both the signal generator's frequency and the receiver's tuning dial to 60 megacycles and repeat operation No. 2.

Alignment of Short-Wave Range (Also referred to as "D" Band)

In aligning the radio frequency circuits for this range use the same artificial antenna (400-ohm carbon type resistor) in series with the output terminal of the signal generator as was used for aligning the Ultra-Short Wave Range. Connect this lead to the antenna binding post marked "A" located on the rear of the receiver chassis, and align as follows:

1. Operate the Range Switch on the receiver chassis to the "D" range position and set the signal generator's frequency and the receiver's tuning dial to 20 megacycles.
2. Adjust aligning capacitors C-45, C-22, and C-8 respectively; and at the same time rotate the gang tuning capacitor slightly back and forth through resonance until maximum voltage output is obtained on the output meter.
3. Set the signal generator's frequency and the receiver's tuning dial to 11 megacycles and adjust aligning capacitors C-40, C-25, and C-12 respectively; and at the same time rotate the gang tuning capacitor back and forth through resonance until maximum voltage output is obtained on the output meter.
4. Reset both the signal generator's frequency and the receiver's tuning dial to 20 megacycles and repeat operation No. 2.

Alignment of Short-Wave Range (Also referred to as "C" Band)

In aligning the radio frequency circuits for this range use the same artificial antenna and binding post on the receiver chassis as was used for aligning the "D" range.

1. Operate the Range Switch on the receiver chassis to the "C" range position and set the signal generator's frequency and the receiver's tuning dial to 10 megacycles.
2. Adjust the aligning capacitors C-44, C-21, and C-7 respectively; and at the same time rotate the gang tuning capacitor back and forth through resonance until maximum voltage output is obtained on the output meter.
3. Set the signal generator's frequency and the receiver's tuning dial to 5 megacycles and adjust the aligning capacitors C-39, C-23, and C-11 respectively; and at the same time rotate the gang tuning capacitor back and forth through resonance until maximum voltage output is obtained on the output meter.
4. Reset both the signal generator's frequency and the receiver's tuning dial to 10 megacycles and repeat operation No. 2.

Alignment of Aircraft Range (Also referred to as "B" Band)

In aligning the radio frequency circuits for this range, use the same artificial antenna and antenna binding post as was used for aligning the "C" range, and align this range as follows:

1. Operate the Range Switch on the receiver chassis to the "B" range position and set the signal generator's frequency and the receiver's tuning dial to 4.5 megacycles.
2. Adjust the aligning capacitors C-43, C-20, and C-6 respectively; and at the same time rotate the gang tuning capacitor back and forth through resonance until maximum voltage output is obtained on the output meter.
3. Set the signal generator's frequency and the receiver's tuning dial to 1.8 megacycles and adjust the aligning capacitor C-38 and at the same time rotate the gang tuning capacitor back and forth through resonance until maximum voltage output is obtained on the output meter.
4. Reset both the signal generator's frequency and the receiver's tuning dial to 4.5 megacycles and repeat operation No. 2.

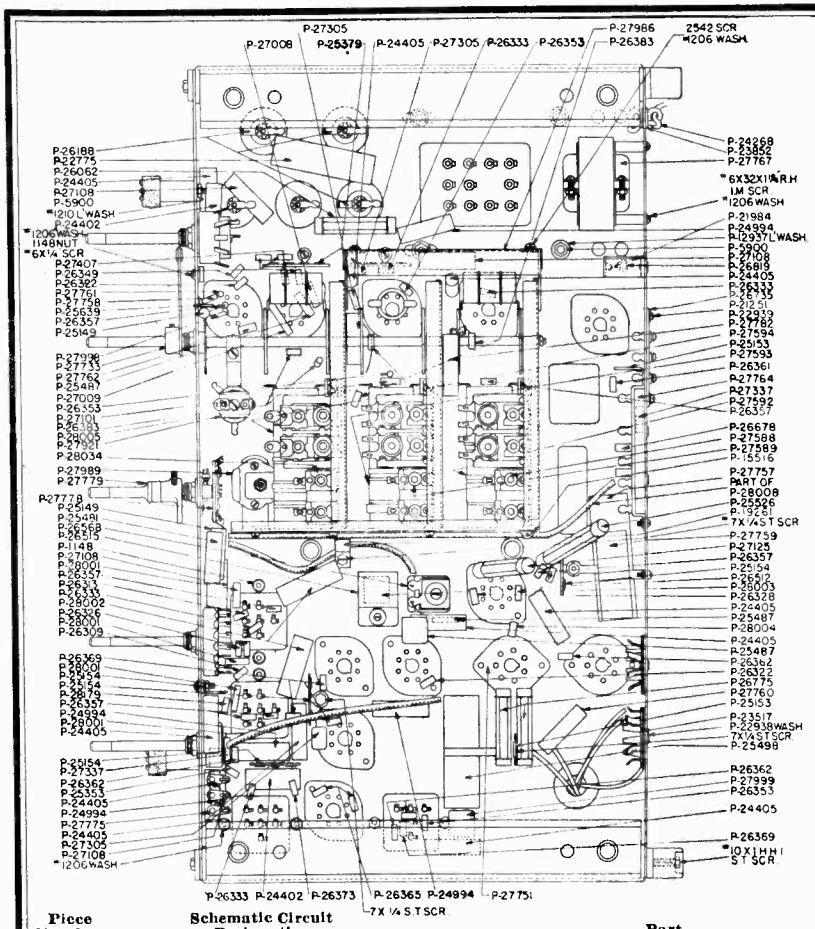
Alignment of Standard Broadcast Range (Also referred to as "A" Band)

In aligning the radio frequency circuits for this range, replace the 400-ohm resistor in series with the signal generator's output with a 200-micro-microfarad capacitor and align this range as follows:

1. Operate the Range Switch to the "A" range position and set the signal generator's frequency and the receiver's tuning dial to 1.5 megacycles (1500 kilocycles).
2. Adjust the aligning capacitors C-42, C-19, C4, and C-5 respectively; and at the same time rotate the gang tuning capacitor back and forth through resonance until maximum voltage output is obtained on the output meter.
3. Set the signal generator's frequency and the receiver's tuning dial to 0.6 megacycles (600 kilocycles) and adjust the aligning capacitor C-37; and at the same time rotate the gang tuning capacitor back and forth through resonance until maximum voltage output is obtained on the output meter.
4. Reset both the signal generator's frequency and the receiver's tuning dial to 1.5 megacycles and repeat operation No. 2.

Adjustment of 10 Kilocycle Audio Cut-Off Filter

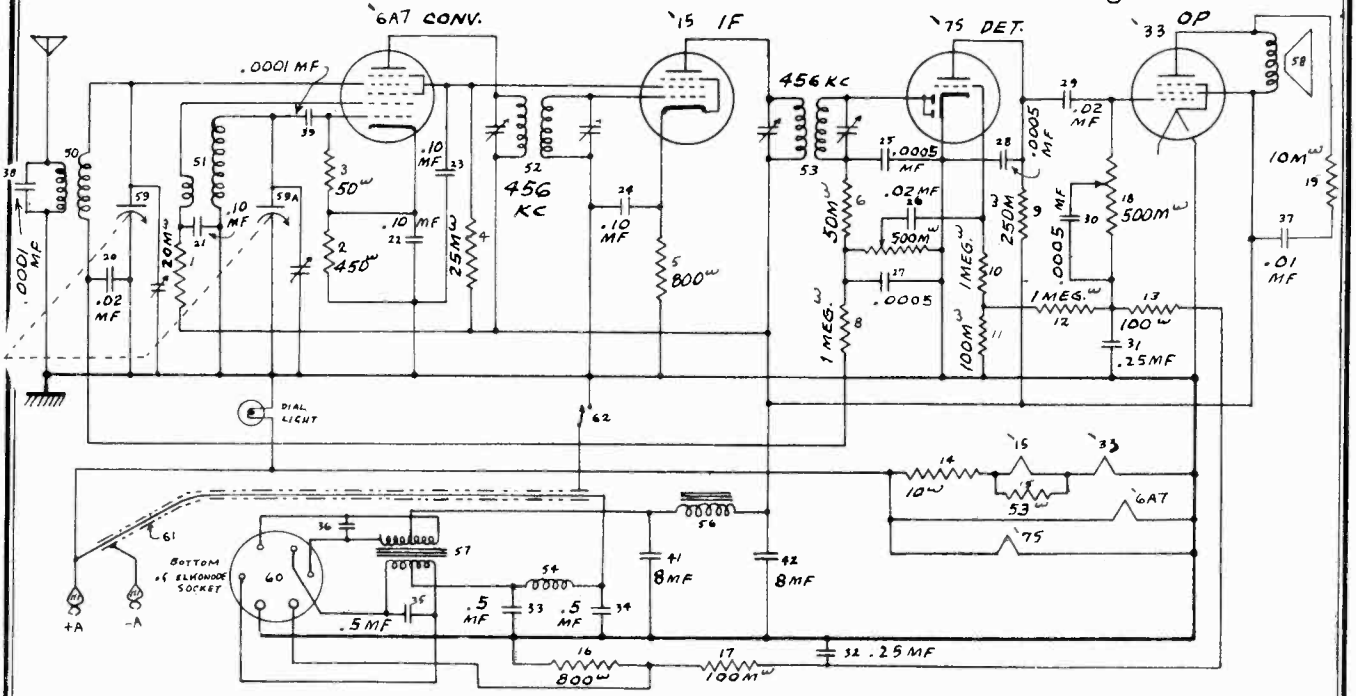
The adjustment of this filter is correctly made at the factory and no additional adjustment is required.



Piece Number	Schematic Circuit Designation	Part
21984		Fuse Block Assembly
22775	C98	Capacitor, .4 Mfd.
23517		Tube Socket, 7 Prong
24268		Cord, Power Supply
24814	C1	Capacitor, Type "O", 10 Mmfd.
24402	C29, C57	Capacitor, .1 Mfd.
24405	C3, C16, C18, C28, C55, C64, C68, C99, C100, C101	Capacitor, .04 Mfd.
24559	C84	Capacitor, Type "O", 100 Mmfd.
24094	C15, C56, C58, C83	Capacitor, .05 Mfd.
25149	C33, C76	Capacitor, .01 Mfd.
25481	C75	Capacitor, .002 Mfd.
25487	C31, C69, C80	Capacitor, Type "W", .001 Mfd.
25498	C89, C90	Electrolytic Capacitor, 10 Mfd., 25 Volts; 10 Mfd., 25 V
25526	R53	Resistor, Type "F", 15,000 Ohms
25539		Tube Socket, 8 Prong
26062	R54	Resistor, Type "F", 10,000 Ohms
26287		Pilot Lamp
26309	R24	Resistor, Type "E", 10 Ohms
26313	R20	Resistor, Type "E", 22 Ohms
26322	R15, R43	Resistor, Type "E", 120 Ohms
26326	R22, R25	Resistor, Type "E", 270 Ohms
26328	R39	Resistor, Type "E", 390 Ohms
26333	R5, R19, R21, R33	Resistor, Type "E", 1,000 Ohms
26319	R10, R11, R12, R17	Resistor, Type "E", 22,000 Ohms
26353	R4, R13, R14, R30, R45	Resistor, Type "E", 47,000 Ohms
26357	R2, R8, R23, R26, R29, R38 R42	Resistor, Type "E", .1 Megohm
26361	R44	Resistor, Type "E" .22 Megohm
26362	R31, R32, R37, R46	Resistor, Type "E", .27 Megohm
26365	R49, R50	Resistor, Type "E", .47 Megohm
26369	R27, R28, R51, R52	Resistor, Type "E", 1 Megohm
26373	R48	Resistor, Type "E", 2.2 Megohms
26383	R1, R3, R6	Resistor, Type "EI", .1 Megohm
26410		Grid Clip Assembly
26417	C10	Capacitor (Gimmick)
26512	C73, C74	Capacitor, Two, Type "W", 100 Mmfd.
26515	L53	Coil Assembly (High Frequency Cut-Off Filter)
26531		Socket (Tuning Indicator Tube)
26568	C72	Capacitor (High Frequency Cut-Off Filter)
26678		Socket, Phonograph Unit
26735		Antennas and Ground Binding Posts
26751		Switch Assembly, "Off-On-Bass-Phono" Control
26775	R34, R35	Resistor, Type "F", 20,000 Ohms
26819		Fuse, 5 Amperes
27008	C36	Capacitor, Type "W", .006 Mfd.
27009	C32	Capacitor, Type "2", 500 Mmfd.
27073	C77, C82, C85	Capacitor, 100 Mmfd.
27092		Rubber Bushing
27101	C17	Capacitor, Type "O", 200 Mmfd.
27105		Washer, Felt
27106		Washer, Dial Clamp
27108	C14, C34, C49, C50, C51, C60, C63, C94	Capacitor, Two, .05 Mfd.
27121		Insulating Tube
27125	R56	Resistor, Type "F", 25,000 Ohms
27305	C24, C35, C41, C78	Capacitor, Type "O", 50 Mmfd.
27309	C48, C52, C59, C65	Fixed Capacitor, First I. F. Transformer
27337	C61, C62	Capacitor, Type "W", .004 Mfd.
27407	R18	Resistor, Type "EB", 22,000 Ohms
27411		Clamp Assembly
27504	L45, L46	Loud Speaker
27569	R60	Potentiometer, Volume Control
27588	C5, C6, C7, C8, C11, C12	Capacitors, Aligning
27589	C19, C20, C21, C22, C23, C25	Capacitors, Aligning
27592	L3, L4, L5, L6, L7	Bi-Resonator Coil "A" Range, Antenna Transformer "B" and "C" Ranges
27593	L10, L11, L12, L13, L14, L15	R. F. Transformer, "A", "B", and "C" Ranges.
27594	L18, L19, L20, L21, L22, L23	Oscillator Transformer, "A", "B", and "C" Ranges
27608		Range Switch Assembly
27635	L48, L49, L50, L51, L52	Power Transformer (50 to 60 Cycles Chassis)
27636	L48, L49, L50, L51, L52	Power Transformer (25 to 60 Cycles Chassis)
27643	L8, L9	Antenna Transformer, "D" Range
27644	L16, L17	R. F. Transformer, "D" Range
27645	L24, L25	Oscillator Transformer, "D" Range
27692	L30, L31, L32	First I. F. Transformer
27693	L33, L34, L35	Second I. F. Transformer
27694	L37, L38, L39, L40	Third I. F. Transformer
27695	L36	Fourth I. F. Transformer
27710	C9, C13, C30, C47	Gang Tuning Capacitor
27753	C97	Electrolytic Capacitor, 8 Mfd., 500 Volts
27754	C96	Electrolytic Capacitor, 16 Mfd., 480 Volts
27755	C93	Electrolytic Capacitor, 16 Mfd., 350 Volts
27756	C95	Electrolytic Capacitor, 16 Mfd., 300 Volts
27757	C91, C92	Electrolytic Capacitor, 4 Mfd., 250 Volts; 4 Mfd., 100 Volts
27758	C26	Capacitor, Type "O", 75 Mmfd.
27759	C88	Capacitor, 12 Mfd., 30 Volts
27760	C87	Capacitor, .005 Mfd., 1,000 Volts
27761	R7	Resistor, Type "E", 620 Ohms
27762	R9	Resistor, Type "EB", 910 Ohms
27764	R36, R55, R57	Resistor, "B" Voltage Divider
27765	L42, L43, L44	Output Transformer
27767	L47	Choke Assembly
27769	L1, L2	Antenna Transformer, "A" Range
27773		Switch Assembly, High Fidelity-Tone Control
27778		Switch, A. F. C.
27779		Crank Arm
27782	C2	Capacitor, .03 Mfd.
27882	C4	Capacitor, H. F. Aligner for "A" Range Antenna Transformer
27916	L26, L27, L28, L29	Oscillator Transformer, "E" Range
27921	C46	Capacitor, Aligner, "E" Range
27986		Shield, "D" and "E" Range Coils
27988	L54	Antenna Transformer Tuning Loop, "E" Range
27989	C37, C38	L. F. Aligners for "A" and "B" Range Oscillators
27994		Pilot Lamp Socket Assembly
27996		Cable Assembly (Tuning Indicator Unit)
27998	C27	Capacitor, Type "O", 200 Mmfd.
27999	C79, C81	Capacitor, Type "WD", 50 Mmfd.
28001	C53, C54, C66, C67	Capacitor, Type "W", .0045 Mfd.
28002	C70, C71	Capacitor, .25 Mfd., 150 Volts
28003	R40	Resistor, Type "E", 15,000 Ohms
28004	R41	Resistor, Type "E", .27 Megohm
28005	R16, R58	Resistor, Type "E", 51 Ohms
28008		Cable Assembly, Phonograph Switch to Phonograph Socket
28034	C39, C40, C42, C43, C44, C45	Capacitors, Aligning
28179	R47	Resistor, Type "EB", 68,000 Ohms

L. TATRO PRODUCTS CO.

MODEL M-4616
Schematic, Voltage
Alignment



Normal voltage readings from points indicated to chassis:

TUBE	USE	(a) CATHODE	(b) SCREEN	(b) PLATE
6A7	Convertor	2.25 V.	60 V.	115 V. *80 V.
15	I.F. Ampl.	1.75 V.	60 V.	115 V.
75	Detector	0		52.5 V.
33	Output Tube		115 V.	110 V.

(a) Measured with a voltmeter having a resistance of 30M ohms.
(b) Measured with a voltmeter having a resistance of 300M ohms.
(*) 6A7 anode grid volts.

All readings taken with volume control full open and, zero signal input to receiver.

"L'TATRO" MODEL M-4616 ALIGNMENT PROCEDURE

ALIGNMENT MUST BE DONE WITH THE AID OF A CORRECTLY CALIBRATED SIGNAL GENERATOR OF RELIABLE MAKE USED IN CONJUNCTION WITH A HIGH RESISTANCE OUTPUT METER. THE LATTER IN SERIES WITH A LARGE PAPER DIELECTRIC CONDENSER SHALL BE CONNECTED FROM PLATE TO SCREEN OF THE OUTPUT TUBE.

I. F. ADJUSTMENT: Connect the ground side of the signal generator to the receiver chassis and the other side through a .005 mfd. condenser to the I.F. tube grid clip. Set the generator at 456 K.C. Using as low an input as possible adjust the trimmer screws on item 53 for maximum response. Next connect the .005 condenser to the 6A7 grid clip and adjust the trimmers on item 52 for maximum output. If double peaks or high output and overloading occur reduce the signal input. SLIGHTLY HIGHER GAIN MAY BE OBTAINED BY NOW READJUSTING THE TRIMMERS ON ITEM 53. THIS SHOULD NOT BE DONE UNLESS ABSOLUTELY NECESSARY AS SOME REGENERATION IS INTRODUCED AND MAY CAUSE EXCESSIVE HISS WHEN A CARRIER IS TUNED IN.

R.F. ADJUSTMENT: Connect the ground side of the signal generator to the receiver chassis and the other side through a .0002 mfd. condenser to the antenna lead. Set receiver dial and signal generator at 1400 K.C. and adjust the trimmer screws on item 59 and 59A for maximum response.

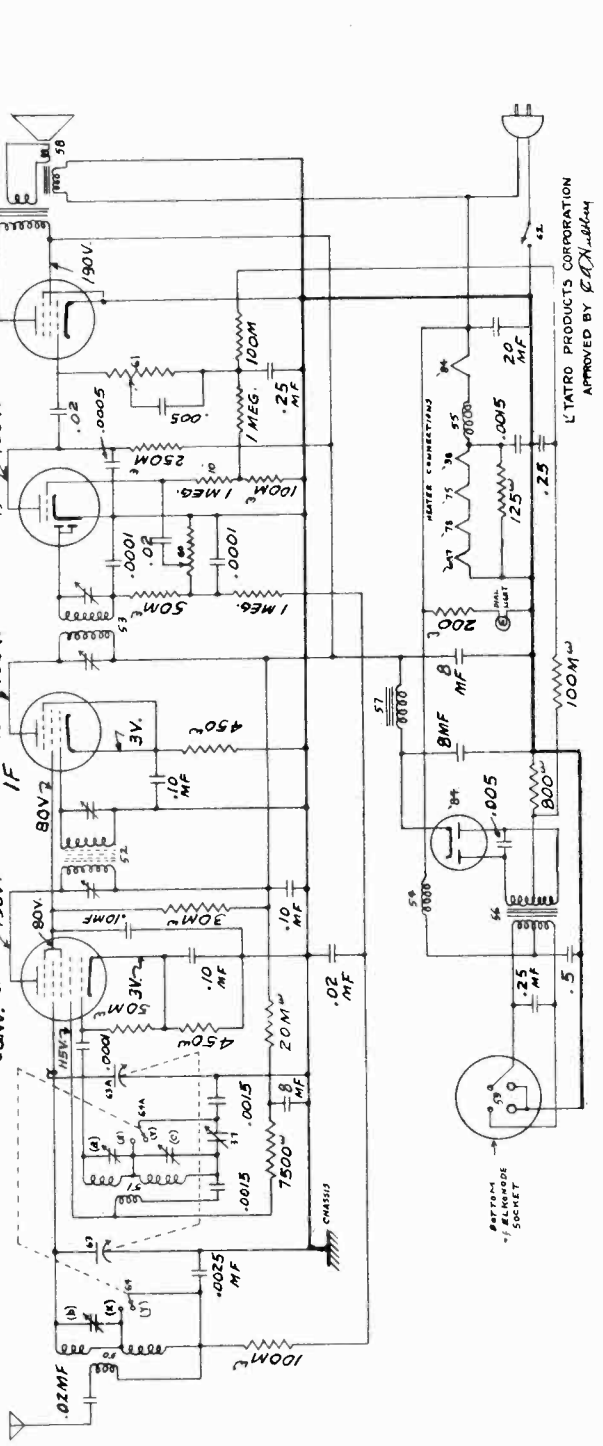
When the above procedure is completed the receiver is correctly aligned and should operate satisfactorily on the air.

Under normal circumstances the use of a single wire antenna 100 feet long, with lead-in at one end is recommended.

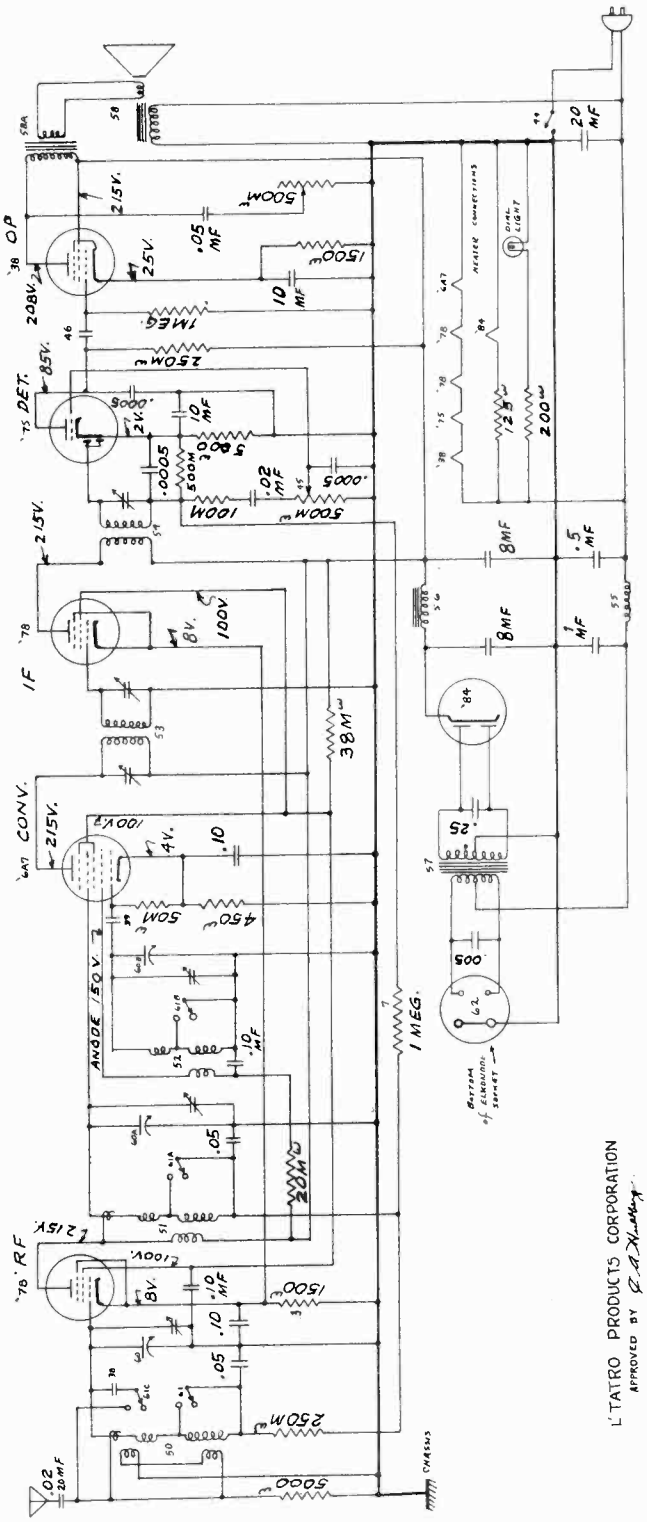
IN ALL ABOVE ALIGNMENT PROCEDURE THE VOLUME AND TONE CONTROLS MUST BE AT MAXIMUM POSITION.

MODELS U-5226,V-5226
MODEL T-6216
Schematics,Voltage

L. TATRO PRODUCTS CO.



MODELS U5226 & V5226

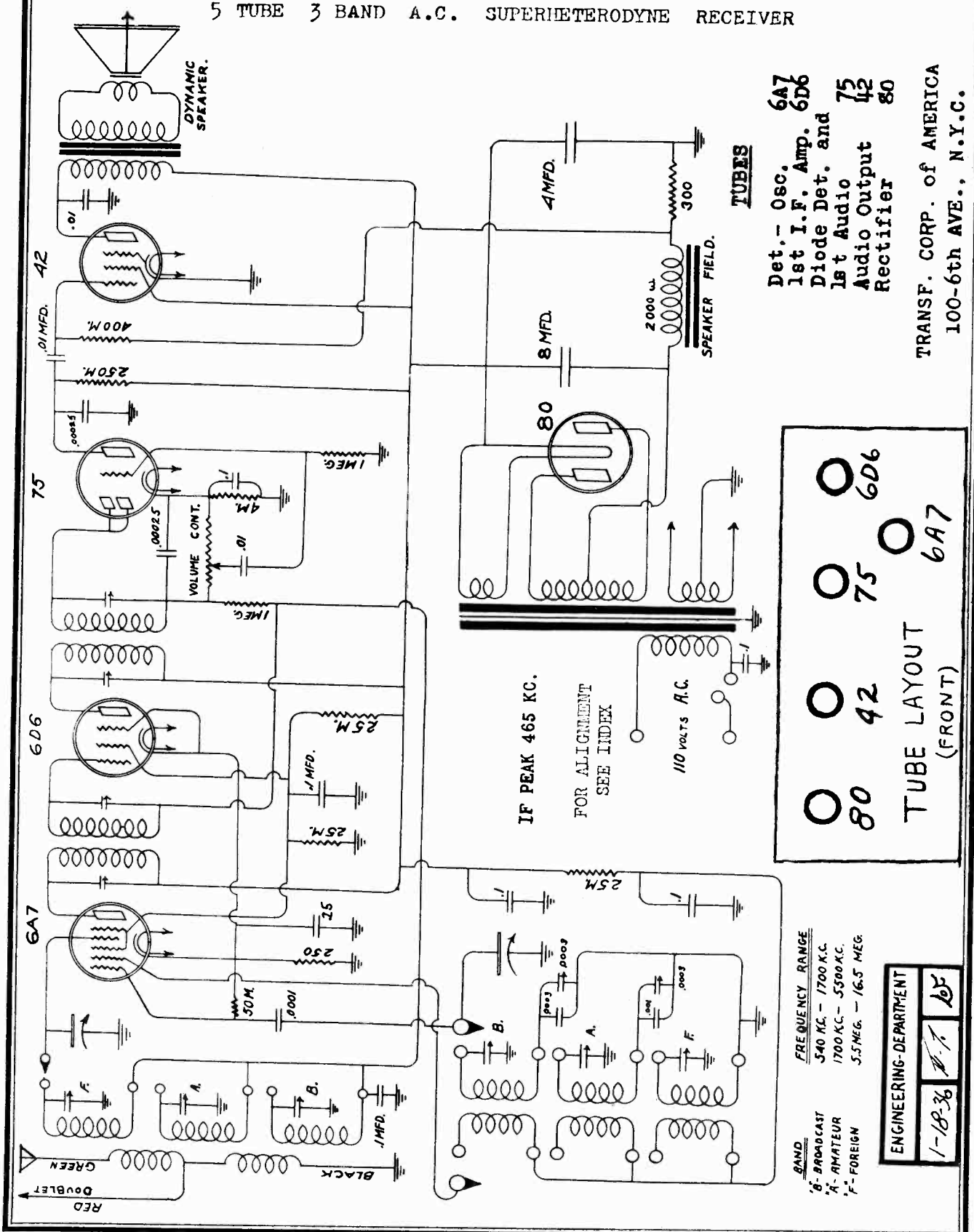


MODEL T6216

TRANSFORMER CORP. OF AMER.

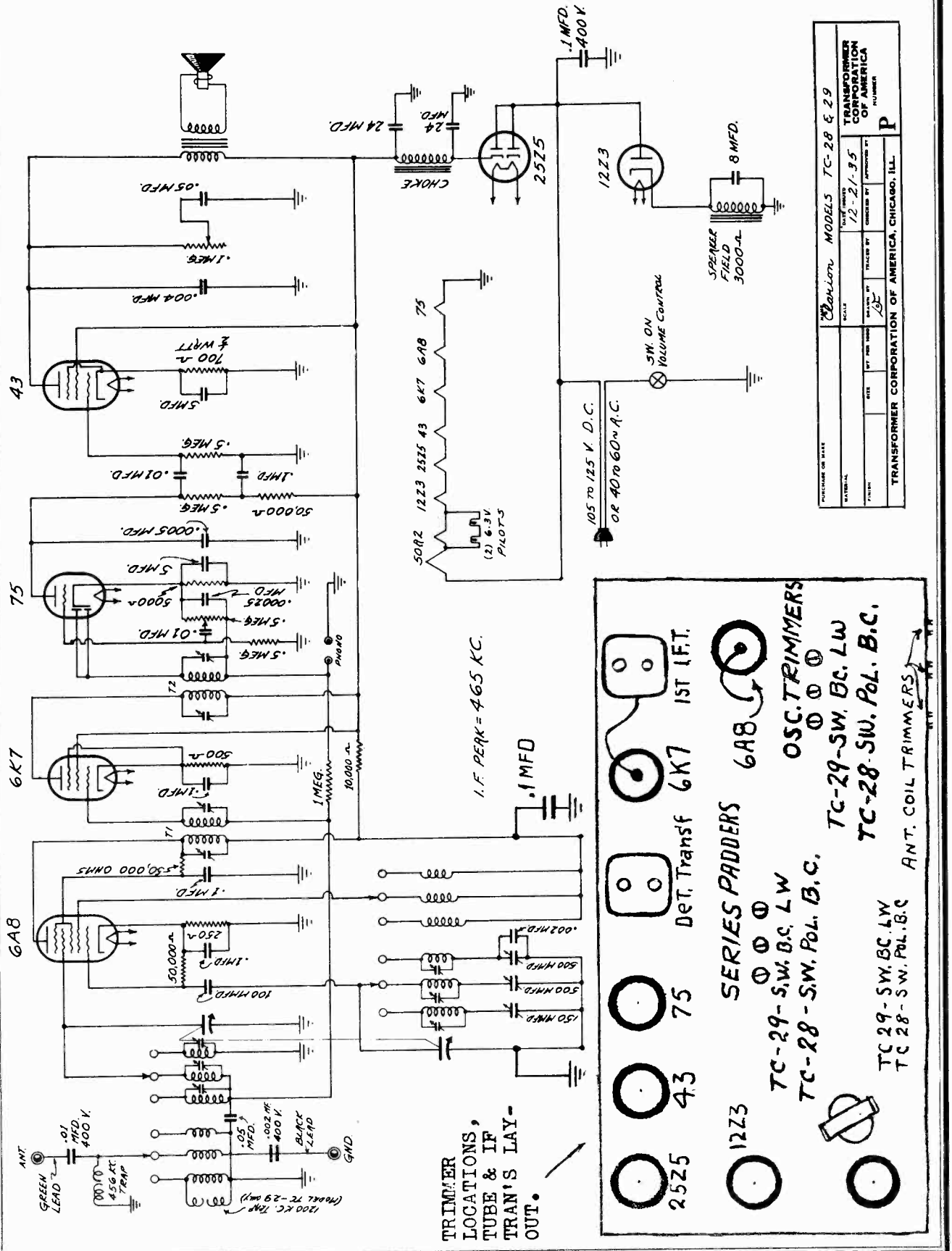
MODEL TC-6
Schematic, Socket

CLARION MODEL TC - 6
5 TUBE 3 BAND A.C. SUPERHETERODYNE RECEIVER



MODELS TC-28, TC-29
Schematic, Socket
Trimmers

TRANSFORMER CORP. OF AMER.



SERVICE NOTES FOR THE CLARION MODEL TC-6
FIVE TUBE THREE BAND A.C. SUPERHETERODYNE RECEIVER

ALIGNMENT PROCEDURE

Realignment of this receiver should not be attempted unless all other possible causes of faulty operation have been thoroughly investigated, and then only by an experienced service man. An accurately calibrated signal generator which will cover the necessary wave-bands and an output meter for indicating the effect of adjustments are required.

It is essential that in all the following tests the signal generator output be attenuated as much as possible at all times and that the receiver volume control be always set at maximum.

I.F. ALIGNMENT - The signal generator is set at 456 kc. and is connected to the grid of the first detector (6A7) tube. With the oscillator section of the tuning condenser short-circuited the i.f. trimmers are adjusted for maximum output. These may be found on top of the i.f. transformer shield cans in the right hand rear corner of the chassis.

FOREIGN BAND ADJUSTMENT - The high side of the signal generator is connected to the antenna post of the receiver and the low side of the signal generator is connected to the ground post. The receiver and the signal are both tuned to a frequency of 16 mc. with the selector switch in position for this band. The oscillator trimmer is adjusted for maximum receiver output. This trimmer is located on the oscillator coil on the under side of the chassis. It is the right hand one of the three trimmers found here. The antenna preselector for this band is then adjusted in the same manner. This is found on the preselector coil on the top side of the chassis and is the right hand one of the three found here.

AMATEUR BAND ADJUSTMENT - With the band selector switch in position for operation on this band, and the receiver and signal generator both set at 5.4 mc., the procedure outlined above is repeated. The oscillator trimmer for this band is found on the oscillator coil on the under side of the chassis and is the center one of the three. The preselector trimmer is found on the preselector coil on top of the chassis and is the center one of the three.

The signal generator should then be set at 1.7 mc. and the signal tuned in on thedial. The series padder for this band should be adjusted for maximum output while the receiver dial is rocked slightly back and forth. The 5.4 mc. setting should then be rechecked. The padder is located on the right side of the front chassis skirt and is the left hand one of the two located here.

BROADCAST BAND ADJUSTMENT - With the band selector switch in position for operation on this band and the receiver and signal generator both set at 1400 kc. the procedure outlined above is repeated. The oscillator and preselector trimmers are found on the tops of their respective coils and are on the extreme left in each case.

The signal generator should then be set at 600 kc. and the signal tuned in on the dial. The series padder for this band should be adjusted for maximum output while the receiver dial is rocked slightly back and forth. The 1400 kc. adjustment should then be rechecked as the subsequent adjustments have a detuning effect on this circuit. This padder is located on the right hand side of the front chassis skirt and is the right hand one of the two located here.

SERVICE NOTES FOR THE CLARION MODELS TC-28 & TC-29
SEVEN TUBE THREE BAND A.C.-D.C. SUPERHETERODYNE RECEIVERS

ALIGNMENT PROCEDURE

Realignment of this receiver should not be attempted except by an experienced service man, and then only after all possible causes of faulty operation have been thoroughly investigated. An accurately calibrayed signal generator which will cover the various bands and a suitable output meter for indicating the effects of adjustments are required.

I.F. ADJUSTMENT - The signal generator is set at 465 kc. and its output connected between the control grid of the first detector (6A8) tube and the ground post of the receiver. The oscillator (rear) section of the tuning condenser is short-circuited and the volume control set at maximum. The signal generator output is attenuated as much as possible and the i.f. trimmers adjusted for maximum gain. These trimmers are found in the right hand rear corner of the chassis, on top of the i.f.t. shield cans.

1400 KC. ADJUSTMENT - The signal generator is set at 1400 kc. and its output connected between the aerial and ground posts of the receiver. It is extrimely important that a weak signal be used in order to prevent the a.v.c. action from nullifying the effect of adjustments. The receiver dial is set at the same frequency and with the volume control at maximum, the 1400 kc. trimmer is adjusted for greatest gain. The series padder for this band should now be adjusted by setting the signal generator at 600 kc. and tuning the signal in on the receiver dial. This padder should be adjusted for maximum response while the tuning condenser is rocked slightly back and forth. The 1400 kc. adjustment should then be rechecked.

The location of all the r.f. trimmers are shown on the accompanying sketch.

SHORT WAVE BAND ADJUSTMENT - For this band the oscillator and antenna coil trimmers should be adjusted at 16 megacycles in the manner described above and the series padder adjustment made at 5.7 megacycles.

LONG WAVE BAND ADJUSTMENT - This adjustment is for the model TC-29 only. The oscillator and antenna coil trimmers should be adjusted at 375 kc. as outlined above, and the series padder at 150 kc.

POLICE BAND ADJUSTMENT - This adjustment is for the model TC-28 only. The oscillator and antenna coil trimmers should be adjusted at 3500 kc. and the series padders at 1600 kc.

VOLTAGE TABLE

All voltages are measured between socket terminals and chassis; set in operation; volume control "full on"; antenna disconnected. Voltmeter sensitivity - 1000-ohms-per-volt. Line voltage measured:- 115.0

TUBE	FUNCTION	H'T'R	PLATE	SCR.GR.	SUPPR.GR.	CATH.	OSC.PL.
6A8	det -osc.	5.0	90.8	50.0	----	1.0	98.0
6K7	i.f. amplif.	5.0	120.0	120.0	4.2	4.2	----
75	2nd det.	5.2	60.0	----	----	---	----
43	audio output	28.5	120.0	120.0	----	18.0	----
2525	rectifier	22.5	120.0	----	----	120.0	----
1223	spkr.rect.	10.1	120.0	----	----	120.0	----

MODELS TC-42,TC-43,TC-44
Alignment
MODEL TC-65
Voltage,Alignment

TRANSFORMER CORP. OF AMER.

SERVICE NOTES FOR THE CLARION MODEL TC-65
10 TUBE 4 BAND A.C.-D.C. SUPERHETERODYNE RECEIVER

ALIGNMENT PROCEDURE

I.F. ADJUSTMENT - The signal generator is set at 456 kc. and is connected to the grid of the first detector (6A8). With the oscillator section of the tuning condenser short-circuited and the receiver control at its maximum position, the i.f. trimmers are adjusted for maximum output. These trimmers may be found on the i.f. transformer shield cans in the rear of the chassis.

18 MEGACYCLE ADJUSTMENT - The high side of the signal generator is connected to the antenna post of the receiver and the low side to the ground post. The receiver and the signal are both tuned to a frequency of 18 mc. with the selector switch in position for band no.1. The oscillator trimmer condenser is adjusted for maximum receiver output, with the volume control on full and the signal generator adjusted for minimum input. The antenna preselector and first detector trimmers are then adjusted in the order named. These trimmers are located on the tops of the shield cans at the left side of the chassis; reading from front to back, these coils are as follows: - 1. antenna preselector; 2. first detector; 3. oscillator. It will be noted that there are four trimmers on each of these coils. The adjustment screw for the trimmer in the front left hand corner of each is painted red. This denote the trimmer for the no. 1 band.

5.2 MC. ADJUSTMENT - With the band selector switch in position for operation on band no. 2. and the receiver and signal generator both set at 5.2 mc. the procedure outlined above is repeated. The oscillator trimmer is found on the rear coil can, and is located to the right of the red painted trimmer. The antenna preselector and interstage coil trimmers are located in the same positions on the corresponding shield cans.

The signal generator is set at 1.7 mc. and the signal tuned in on the dial. The padder condenser is adjusted for maximum gain while the gang tuning condenser is rocked slightly to the right and left. The 5.2 mc. adjustment should then be rechecked. The 1.7 mc. padder is located on the sub-base on which the gang tuning condenser is mounted and is the left hand one of the group of three found here.

1400 KC. ADJUSTMENT - The band selector switch is set in position for operation on the no. 3 band. The receiver and signal generator are both set at 1400 kc. and the procedure outlined above is repeated. The oscillator trimmer is found on the rear coil can, and is located diagonally opposite the red painted trimmer. The other trimmers for this band are located similar positions on the corresponding coil cans.

The signal generator is set at 600 kc. and the signal tuned in on the dial. The padder condenser for this band is adjusted for maximum response while the gang tuning condenser is rocked slightly to the right and left. The 1400 kc. adjustment should then be rechecked. The 600 kc. padder is located on the sub-panel on which the gang tuning condenser is mounted and is the center of the three located at this point.

340 KC. ADJUSTMENT - The band selector switch is set in position for operation on band no. 4. The receiver and generator are both tuned to 340 kc. and the procedure outlined above is repeated. The oscillator trimmer is located on the rear coil can. It is the one directly behind the trimmer marked in red. The other trimmers for this band are located in similar positions on the corresponding shield cans.

The signal generator is set at 140 kc. and the signal is tuned in on the dial. The padder condenser for this band is adjusted for maximum response while the gang tuning condenser is rocked slightly to the right and left. The 340 kc. adjustment should then be rechecked. The 140 kc. padder is located on the sub-panel on which the tuning condenser is mounted and is the right hand one of this group.

SERVICE NOTES FOR THE CLARION MODEL TC-42,43,44
10 TUBE 4 BAND A.C. SUPERHETERODYNE RECEIVER

ALIGNMENT PROCEDURE

I.F. ADJUSTMENT - The signal generator is set at 456 kc. and is connected to the grid of the first detector (6A8). With the oscillator section of the tuning condenser short-circuited and the receiver volume control at its maximum position, the i.f. trimmers are adjusted for maximum output. These trimmers may be found on the i.f. transformer shield cans in the rear of the chassis.

18 MEGACYCLE ADJUSTMENT - The high side of the signal generator is connected to the antenna post of the receiver and the low side to the ground post. The receiver and the signal are both tuned to a frequency of 18 mc. with the selector switch in position for band no.1. The oscillator trimmer condenser is adjusted for maximum receiver output, with the volume control on full and the signal generator adjusted for minimum input. The antenna preselector and first detector trimmers are then adjusted in the order named. These trimmers are located on the tops of the shield cans at the left side of the chassis; reading from front to back, these coils are as follows: - 1. antenna preselector; 2. first detector; 3. oscillator. It will be noted that there are four trimmers on each of these coils. The adjustment screw for the trimmer in the front left hand corner of each is painted red. This denote the trimmer for the no. 1 band.

5.2 MC. ADJUSTMENT - With the band selector switch in position for operation on band no. 2. and the receiver and signal generator both set at 5.2 mc. the procedure outlined above is repeated. The oscillator trimmer is found on the rear coil can, and is located to the right of the red painted trimmer. The antenna preselector and interstage coil trimmers are located in the same positions on the corresponding shield cans.

The signal generator is set at 1.7 mc. and the signal tuned in on the dial. The padder condenser is adjusted for maximum gain while the gang tuning condenser is rocked slightly to the right and left. The 5.2 mc. adjustment should then be rechecked. The 1.7 mc. padder is located on the sub-base on which the gang tuning condenser is mounted and is the left hand one of the group of three found here.

1400 KC. ADJUSTMENT - The band selector switch is set in position for operation on the no. 3 band. The receiver and signal generator are both set at 1400 kc. and the procedure outlined above is repeated. The oscillator trimmer is found on the rear coil can, and is located diagonally opposite the red painted trimmer. The other trimmers for this band are located similar positions on the corresponding coil cans.

The signal generator is set at 600 kc. and the signal tuned in on the dial. The padder condenser for this band is adjusted for maximum response while the gang tuning condenser is rocked slightly to the right and left. The 1400 kc. adjustment should then be rechecked. The 600 kc. padder is located on the sub-panel on which the gang tuning condenser is mounted and is the center of the three located at this point.

340 KC. ADJUSTMENT - The band selector switch is set in position for operation on band no. 4. The receiver and generator are both tuned to 340 kc. and the procedure outlined above is repeated. The oscillator trimmer is located on the rear coil can. It is the one directly behind the trimmer marked in red. The other trimmers for this band are located in similar positions on the corresponding shield cans.

The signal generator is set at 140 kc. and the signal is tuned in on the dial. The padder condenser for this band is adjusted for maximum response while the gang tuning condenser is rocked slightly to the right and left. The 340 kc. adjustment should then be rechecked. The 140 kc. padder is located on the sub-panel on which the tuning condenser is mounted and is the right hand one of this group.

VOLTAGE TABLE OF MODEL TC-65

TUBE	FUNCTION	HEATER	SCR.	SUPPR.	OSC.PL.	CATH.	PLATE
6K7	Preselector	5.1	98.0	1.2		1.2	98.0
6A7	det.-osc.	4.8		100.0	78.0	1.2	196.0
6K7	1st. i.f.	5.0	187.0	8.0		8.0	187.0
85	det. audio	5.2				1.2	35.0
43 43 43	audio output	21.0	98.0	14.0		14.0	120.0
25Z5 25Z5	rectifiers	24.0					112.0

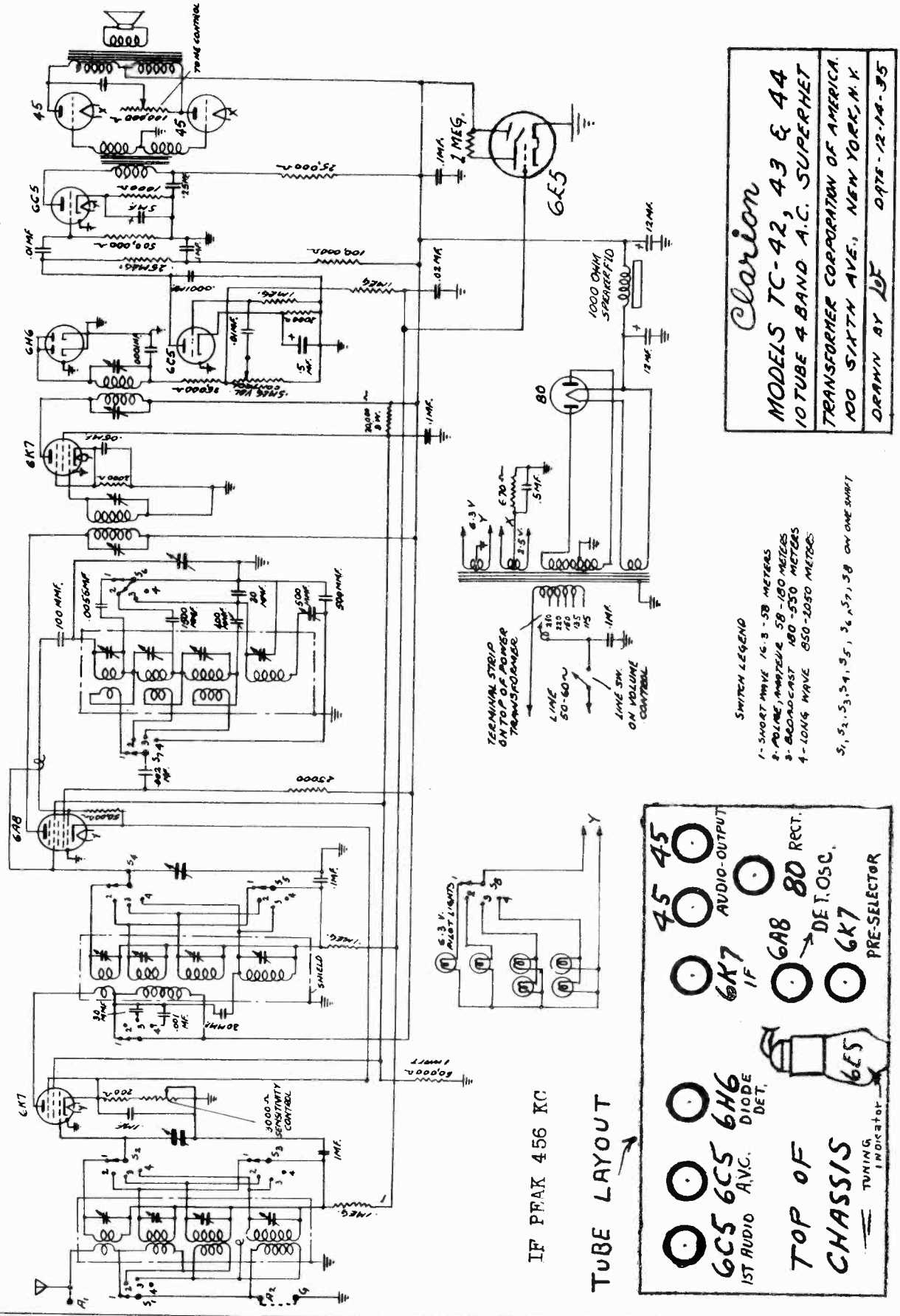
ALL VOLTAGES ARE MEASURED FROM THE SOCKET TERMINALS TO THE CHASSIS, WHILE SET IS IN OPERATION, AND WITH THE VOLUME CONTROL FULL ON.

FREQUENCY BANDS

BAND 1- SH.WAVE.AIRCRAFT	-5.2 to 18 MC
BAND 2- POLICE,AMATEUR, AIRCRAFT	-1.6 to 5.2 MC
BAND 3- BROADCAST	-540 to 1600 KC
BAND 4- LONG WAVE	-343 to 142 KC

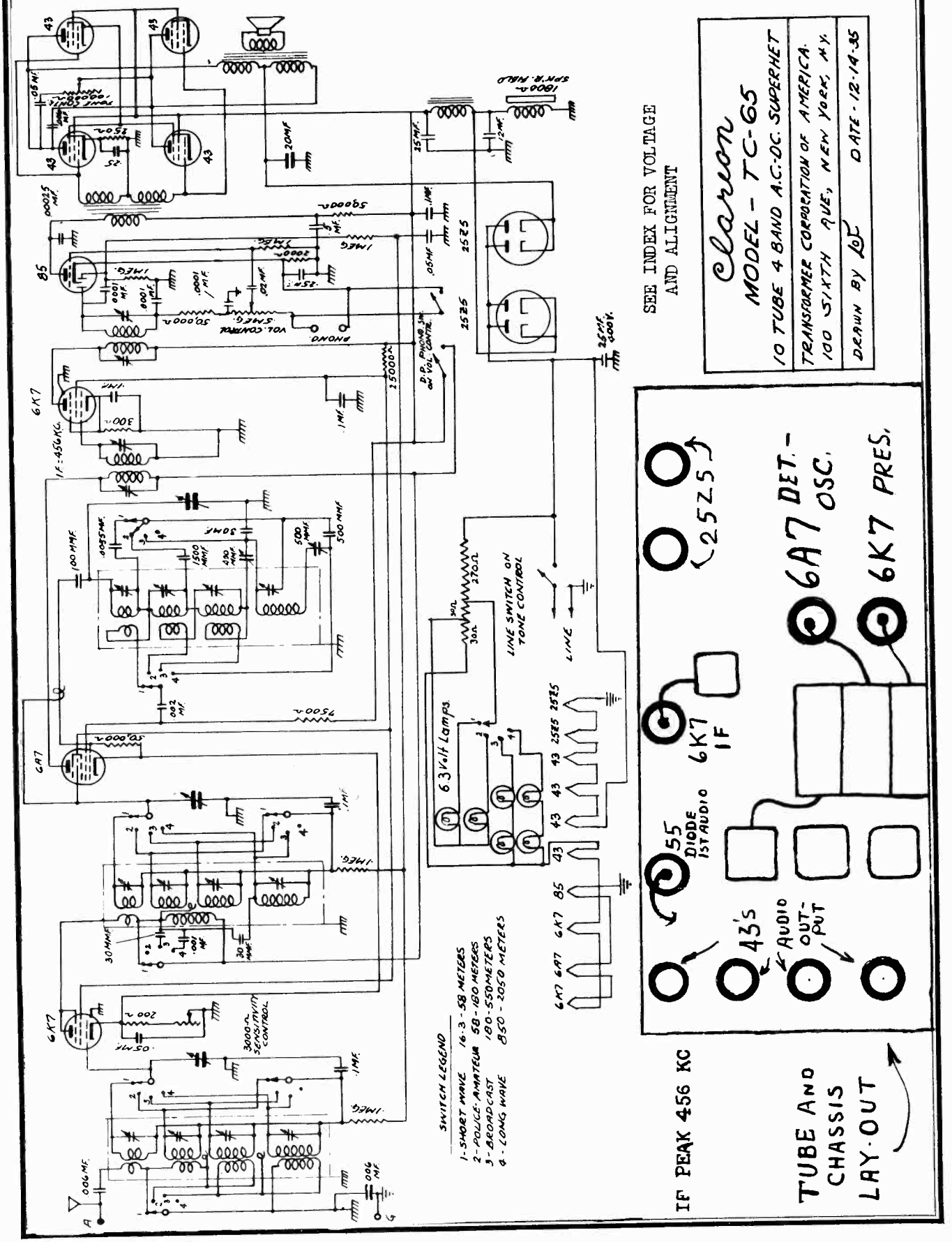
MODELS TC-42, TC-43, TC-44

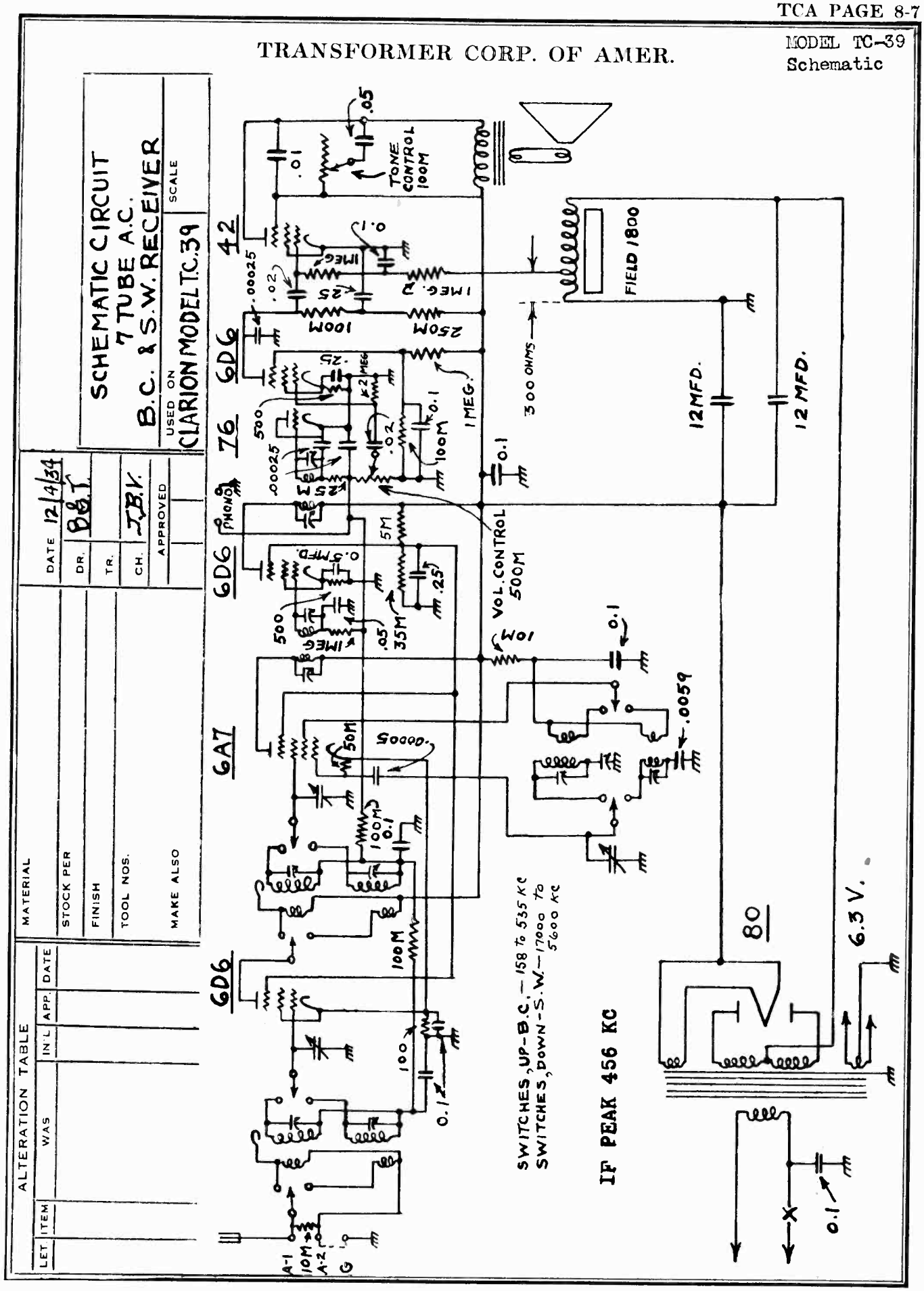
TRANSFORMER CORP. OF AMER. Schematic, Socket



MODEL TC-65
Schematic
Socket

TRANSFORMER CORP. OF AMER.





Clarion MODEL T C 39

Seven Tube Superheterodyne Receiver

A.C. 105 to 240 Volts, 40 to 60 Cycles *

Short Wave	Broadcast Wave
17.5 - 53 Meters	190 - 560 Meters
17000 - 5600 Kilocycles	1580 - 535 Kilocycles

DESCRIPTION:

The Clarion 7 Tube Short Wave and Broadcast A.C. Receiver is adapted for use on A.C. 105 to 240 Volts, 40 to 60 Cycles.

*THIS RECEIVER IS PROVIDED WITH A TAPPED-PRIMARY POWER TRANSFORMER FOR USE ON EITHER 105 to 125 OR 220 to 240 VOLTS. BEFORE OPERATING THIS RECEIVER MAKE CERTAIN THAT THE FLEXIBLE LEAD, EXTENDING FROM THE TOP OF THE POWER TRANSFORMER, IS CONNECTED TO THE CORRECT BINDING POST. IF THIS PRECAUTION IS NOT TAKEN POSSIBLE DAMAGE TO THE TRANSFORMER MAY RESULT.

The tube complement included: 1 - 6D6 as R.F. Amplifier, 1 - 6A7 as First Detector and Oscillator, 1 - 6D6 as I.F. Amplifier, 1 - 76 as Diode Detector and AVC, 1 - 6D6 as A.F. Amplifier, 1 - 42 as Power Output Tube and 1 - 80 Rectifier.

VOLTAGE READINGS:

Readings should be taken with the Volume Control fully on. Use a D.C. Voltmeter having a resistance of 1000 ohms per volt.

	Plate to Ground	Screen to Ground	Cathode to Ground	Suppressor to Ground
6D6 RF Amp.	235	155	3	3
6A7 Det. Osc.	230	155	3	
6D6 IF Amp.	250	155	6	6
76 Second Det.				
6D6 AF Amp.	50	12	0.2	0.2
42 Output	228	234	23	
80 Rectifier	Filament to Ground 250 volts.			

Power Drawn by Receiver 57 Watts.

ALIGNMENT OF T C 39

With the wave band switch in the broadcast position (right) connect the oscillator, set at 456 k.c. to the grid of the 6A7 tube (with the grid cap in place) and to the chassis. The volume control should be set at maximum and the oscillator output reduced so as to obtain about 15 volts reading on an output meter (4000 to 8000 ohms) connected across the loud speaker transformer primary (plate and screen prongs of the 42 tube).

Carefully rotate the screws on the tops of the IF transformers (square cans) until the maximum reading is obtained on the output meter. If the output is considerably in excess of 15 volts reduce the oscillator output further.

The object of this is to operate at such a low level that the automatic volume control; the purpose of which is to maintain the signal level constant, does not operate; otherwise this adjustment will appear very broad and it will be impossible to obtain a true alignment of the IF transformers.

Now, remove the oscillator clip from the 6A7 grid and connect it to the antenna terminal marked A_1. Terminals A_2 and G must be connected together by jumper. Set the oscillator to 1400 k.c. (Three tall round cans located to the right of the tuning condenser are as follows: antenna coil, interstage RF, and Oscillator coil looking from front to rear of chassis.) If the received signal does not come in exactly at this frequency adjust the broadcast oscillator trimmer (trimmer projects through the upper hole in the side of the oscillator can) so that it does. Next adjust the trimmers on the antenna coil and the interstage RF coil (trimmers project through upper hole on right hand side of the antenna and RF coil cans) for maximum output as before. Now set the oscillator to 600 k.c., and tune this in on the receiver. Check for alignment by rotating the padding condenser screw (screw projects through the chassis directly to the left of the oscillator coil can) at the same time rocking the tuning condenser so as to obtain maximum output. Leave this padder set for maximum signal.

SHORT WAVE BAND: Turn the wave band switch to the left. If a short wave oscillator is not available, set the regular broadcast oscillator to 1000 k.c. If the harmonics are sufficiently powerful it should be possible to pick up a signal at points all along the dial one megacycle apart, as for example 6 m.c., 7 m.c., 8 m.c. and 9 m.c.

Tune in signal at approximately 14 m.c. and very carefully adjust the short wave trimmers on the antenna and RF coils (lower openings on right side of front and middle cans) for maximum output. Carefully retune the signal as a re-adjustment of the trimmers may shift the signal slightly on the dial.

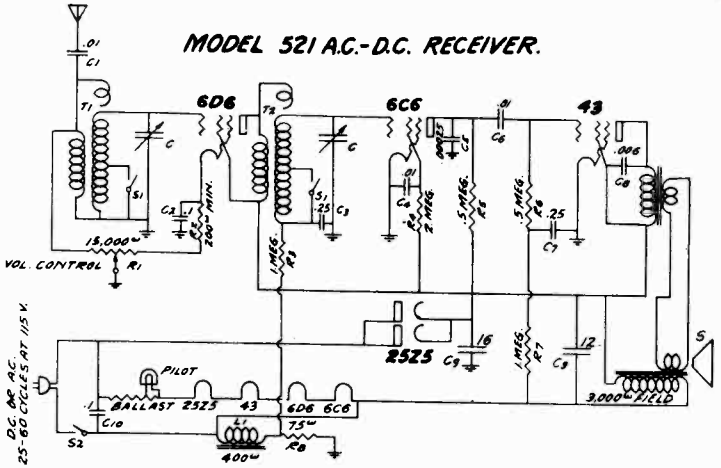
NOTE: In all the above adjustments it is imperative that the volume control be set near maximum and that the oscillator be reduced sufficiently so that no more than 15 volts output is obtained. If necessary set the oscillator some distance away and pick up the signal by means of a wire placed near it and connected to the receiver.

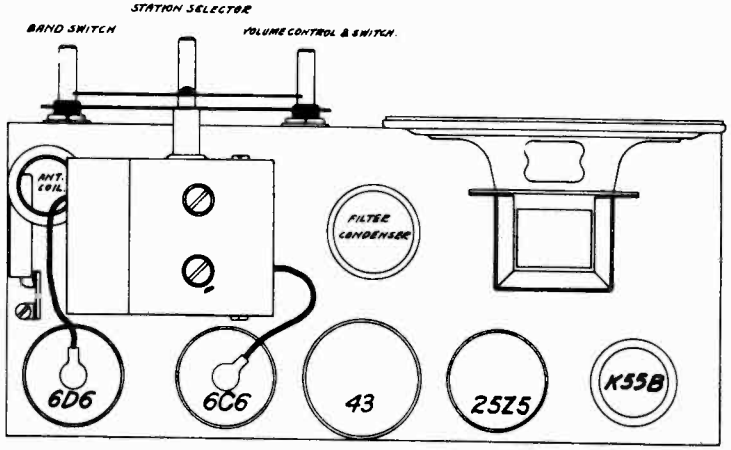
REPLACEMENT PART LIST

Description	Each List Price
Antenna Coupling Transformer	$2.12
RF Transformer	2.12
Oscillator	2.12
IF Transformer First or Second	2.08
12 Mfd. Wet Electrolytic Filter Condenser	1.52
Three Gang Tuning Condenser	4.28
Combination Volume Control and Switch	1.76
Tone Control	1.18
Power Transformer	7.52
Any Socket - Give tube Number	.10
Any Tubular Condenser - Give Value	.40
Any Moulded Condenser - Give Value	.18
Any Carbon Resistor - Give Value	.14
Band Selector Switch - Three gang	2.12
Dynamic Speaker	8.25
Padding Condenser - Single	.44

PRICES SUBJECT TO CHANGE WITHOUT NOTICE

MODEL 521 A.C.-D.C. RECEIVER.





TUBE LAYOUT.

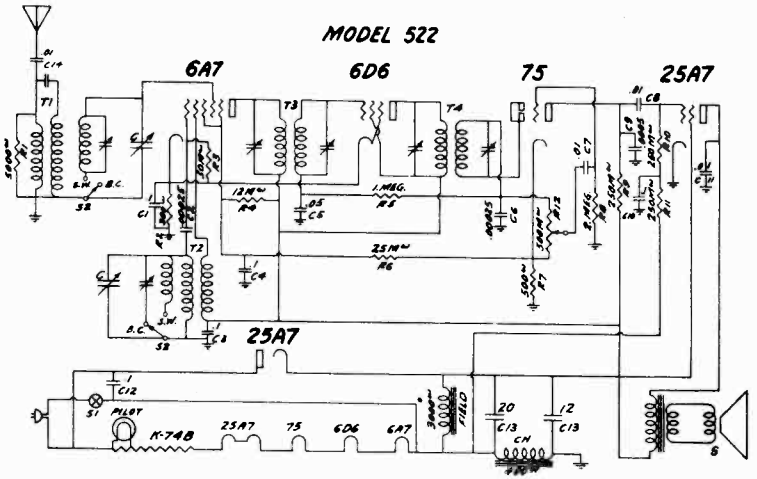
OPERATING INSTRUCTIONS

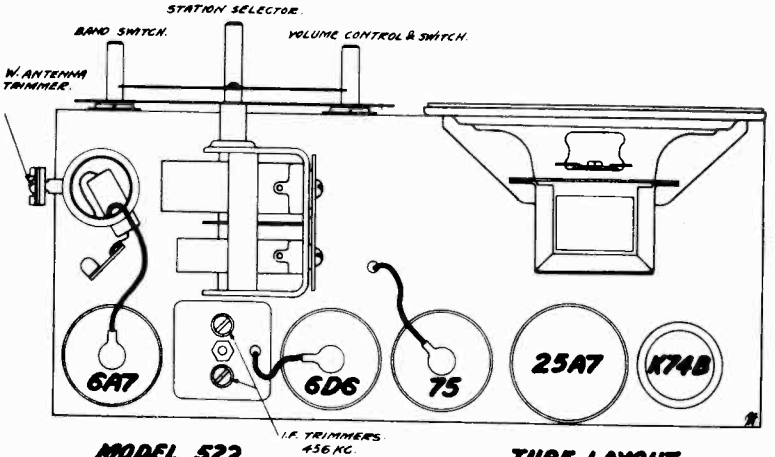
5-TUBE AC-DC RECEIVER

For Use on 110-115 Volts AC or DC Current Only

This receiver is a five tube tuned-radio-frequency type which operates on wither AC or DC current. It will provide very satisfactory entertainment for those who desire a small set.

MODEL 522





MODEL 522 TUBE LAYOUT

OPERATING INSTRUCTIONS

5-tube AC-DC Superheterodyne Receiver

This radio is a five-tube Superheterodyne type which operates on AC or DC at 110 volts. It covers two wave bands, as follows:

Standard broadcast and police band -- 540-1750 kc.
Police, Amateur, American and Foreign
short wave band ----------2400-6300 kc.

MODEL 635M
MODEL 5-Tube Batt. Schematics, Socket

TRAV-LER RADIO & TELEV. CORP.

6-Volt Storage Battery Receiver

This radio is designed to operate from a 6-volt storage battery. No "B" or "C" batteries are required.

It has two wave bands, having the following coverage:

Standard broadcast - 540 to 1750 kilocycles
Foreign short wave - 5.7 to 17 megacycles

OPERATING INSTRUCTIONS

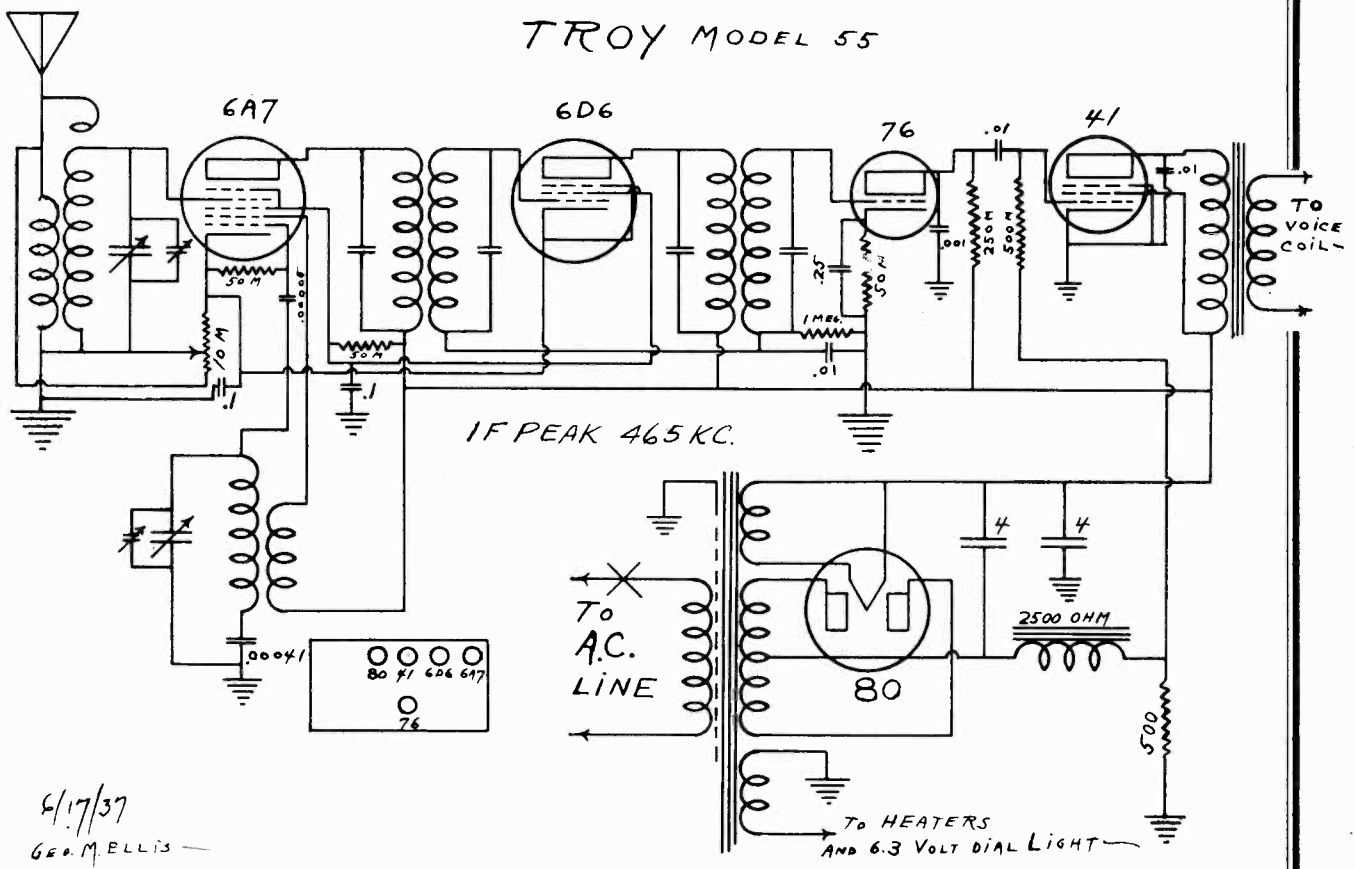
6-Tube Superheterodyne AC Receiver
For use on 110 volts AC only

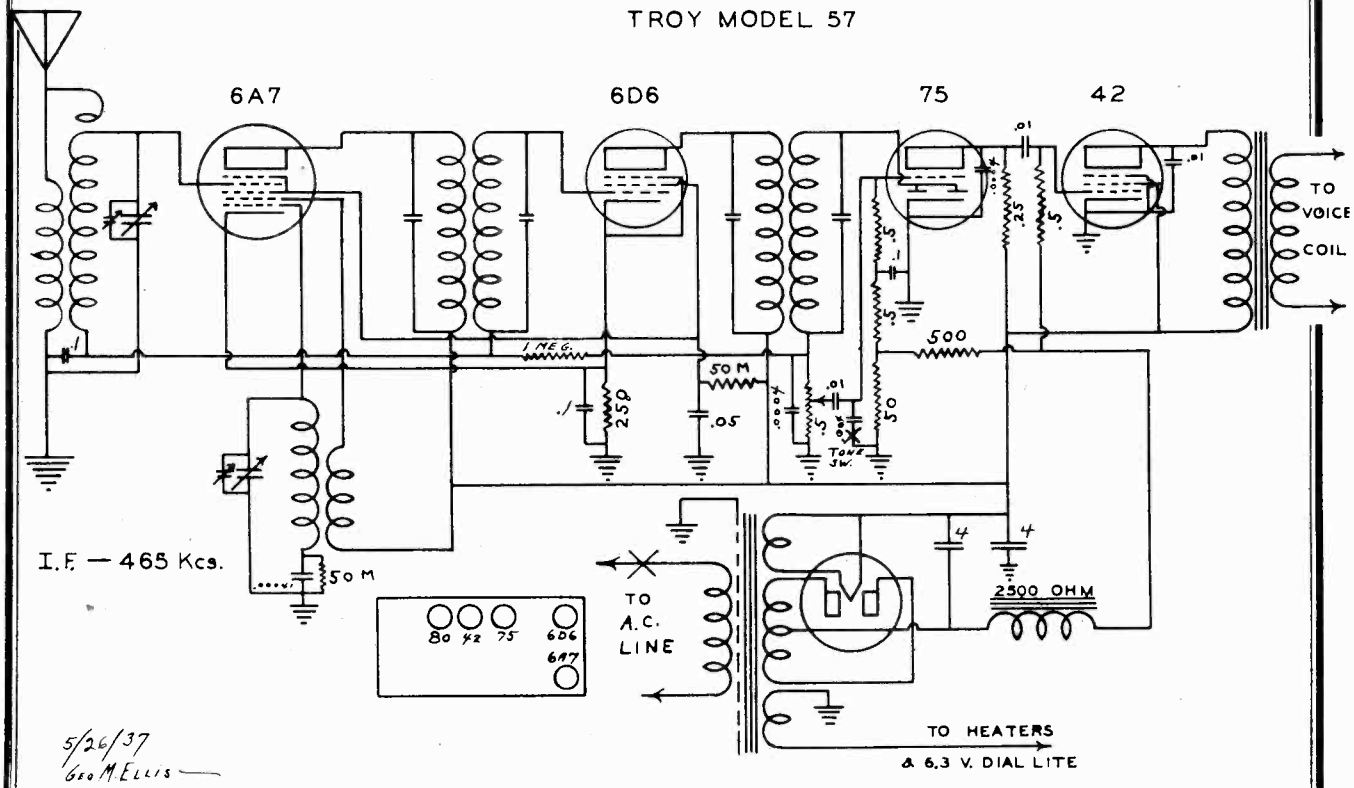
This radio is a six-tube Superheterodyne type which operates ON AC CURRENT ONLY at a frequency of 60 cycles and at 110 volts.
It covers three wave bands, as follows:

Standard Broadcast band - 540-1750 kc.
Police and Amateur band - 1650-5500 kc.
Short wave, American & Foreign - 18-5.5 meg.

MODEL 55
MODEL 57
Schematics, Socket

TROY RADIO & TELEV. CO.

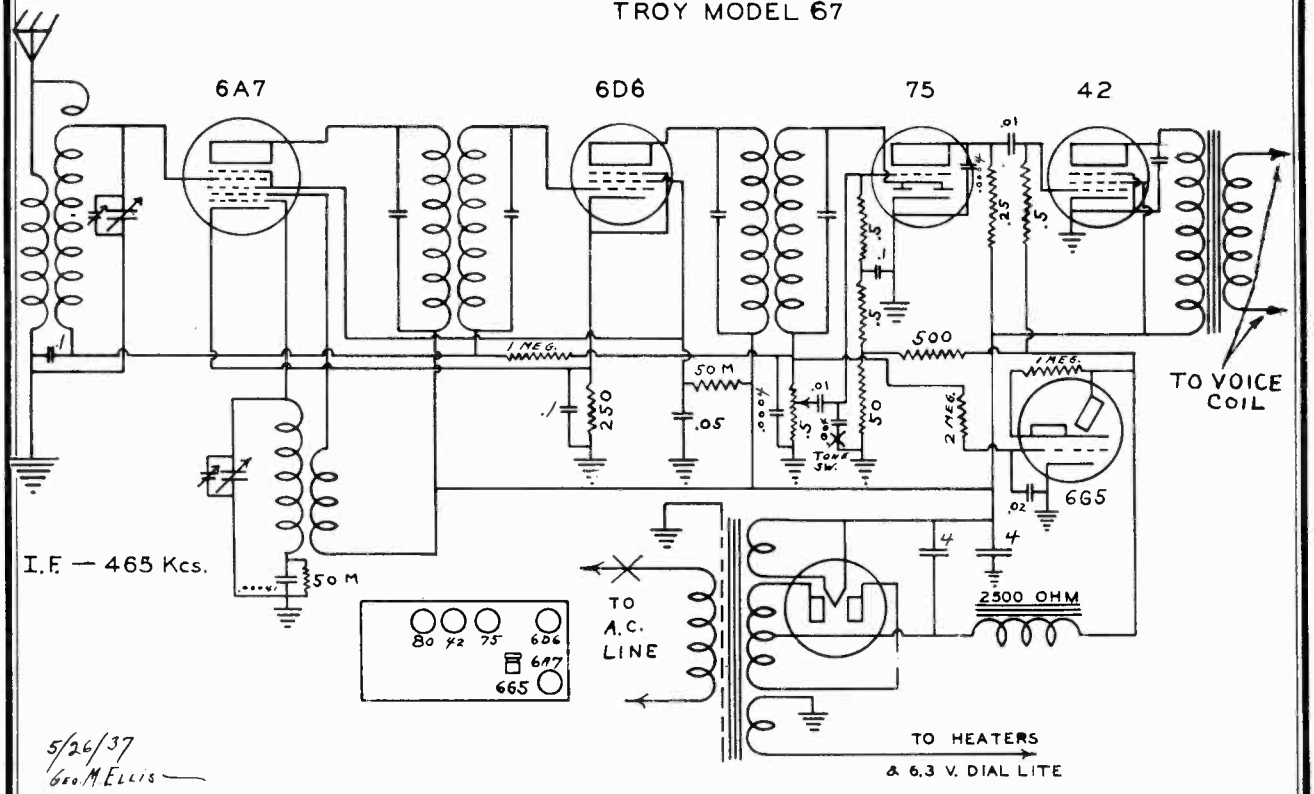




MODEL 67
MODEL 95
Schematics
Socket

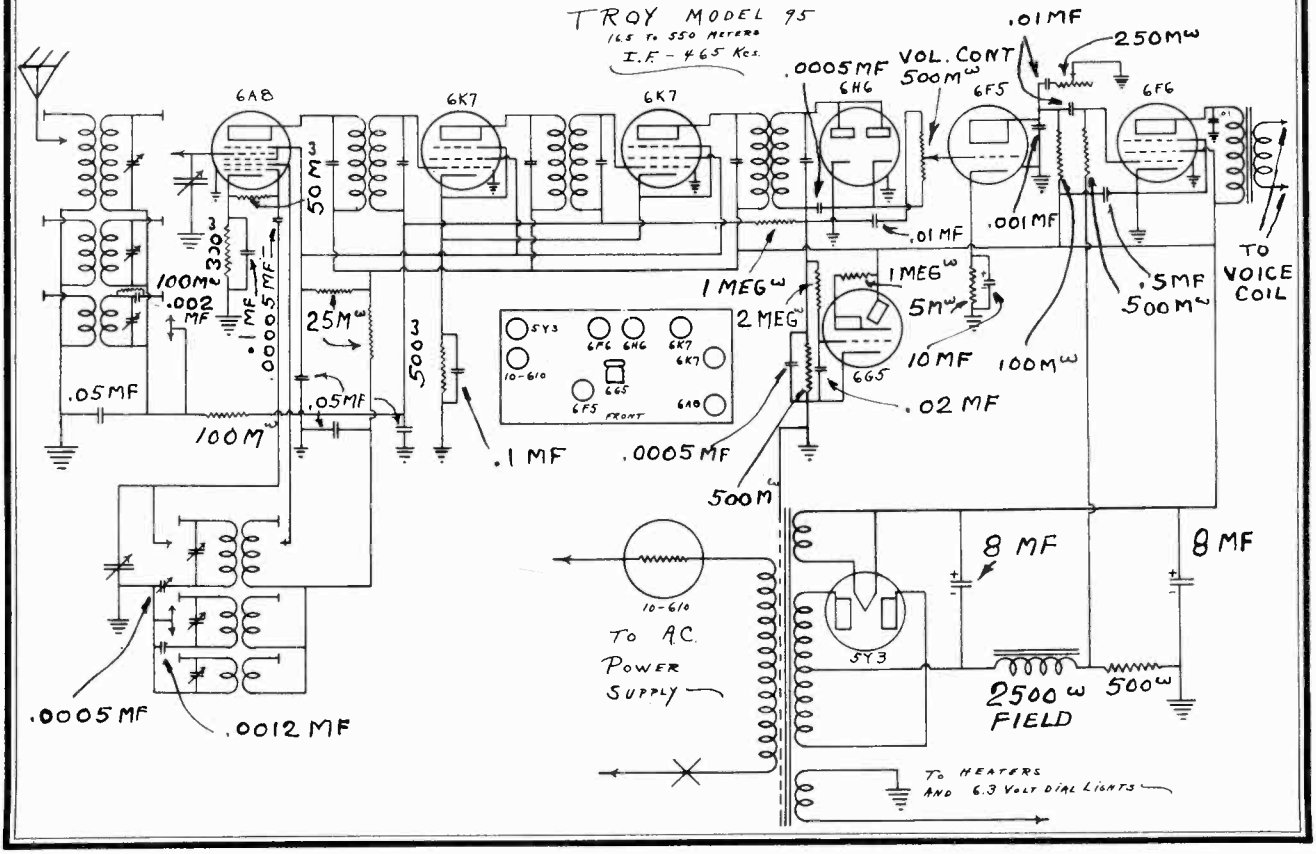
TROY RADIO & TELEV. CO.

TROY MODEL 67



TROY MODEL 95

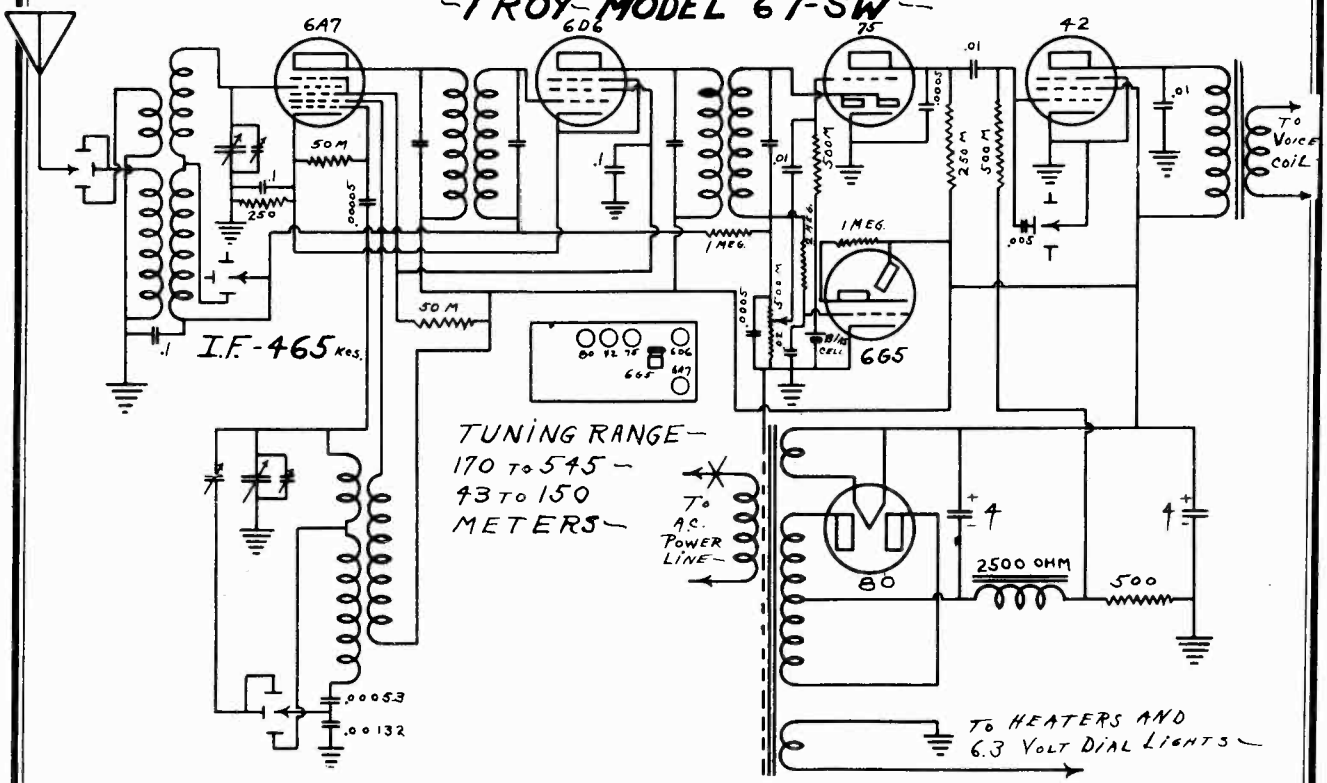
165 to 550 METERS
I.F. - 465 Kcs.



TROY RADIO & TELEV. CO.

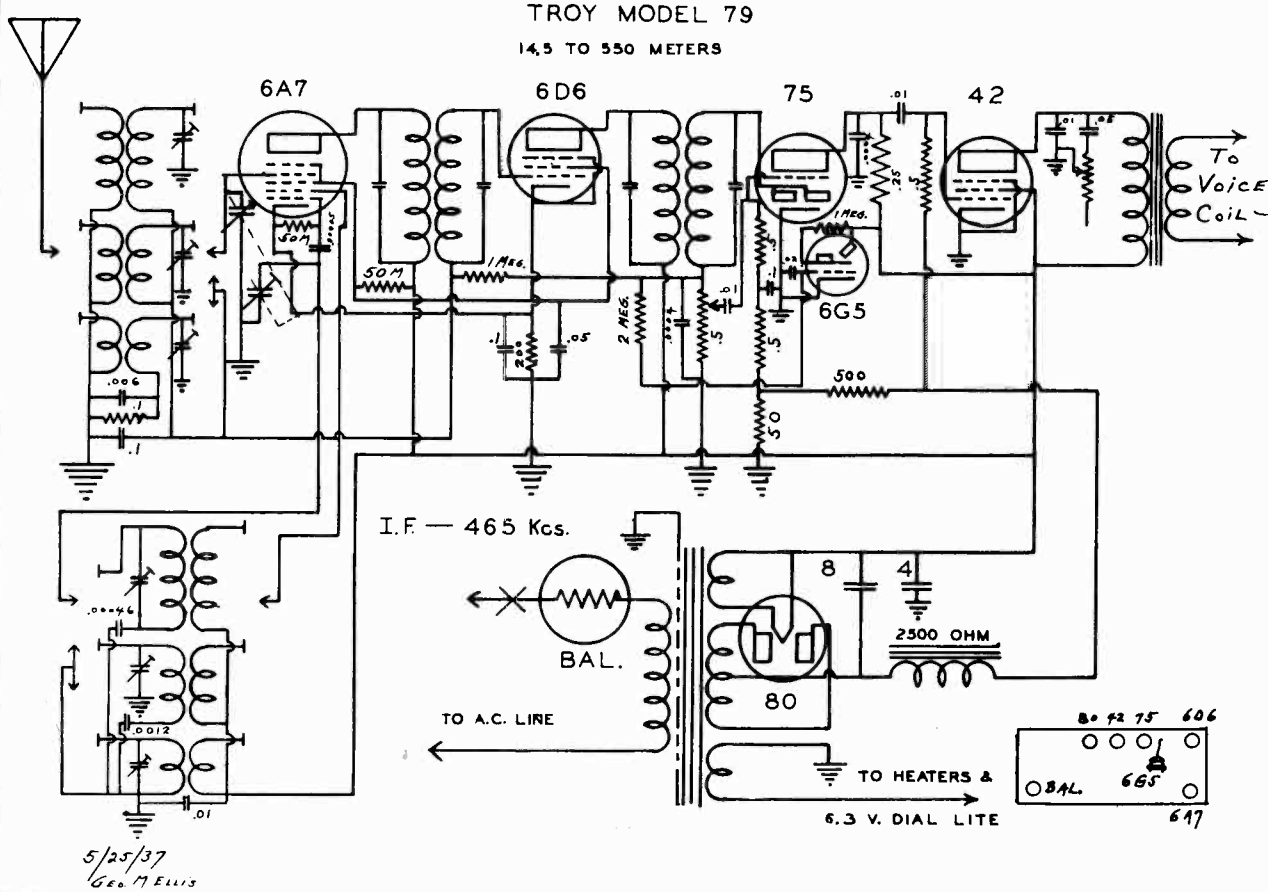
MODEL 67SW
MODEL 79
Schematics
Socket

TROY MODEL 67-SW



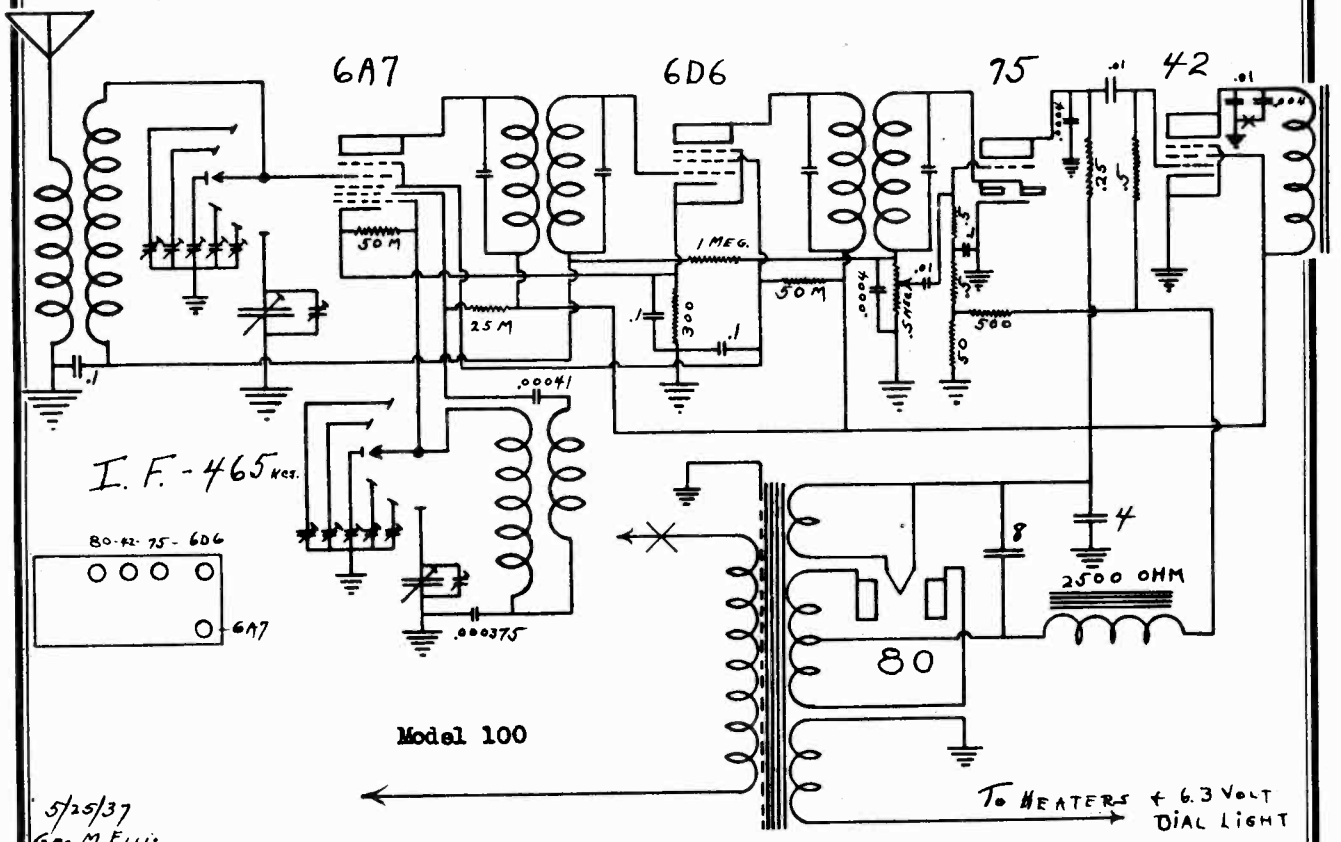
TROY MODEL 79

14,5 TO 550 METERS



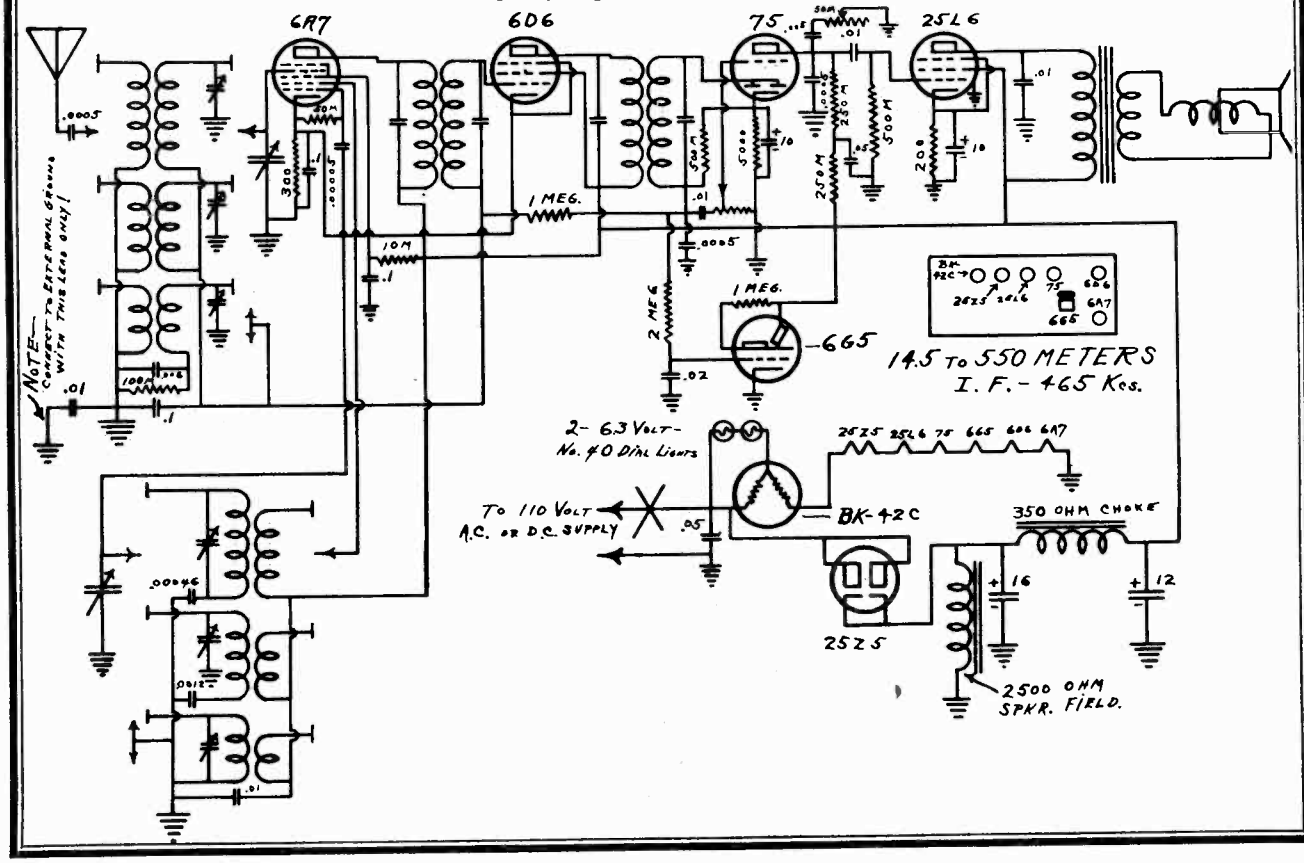
MODEL 100
MODEL 179
Schematics Socket

TROY RADIO & TELEV. CO.



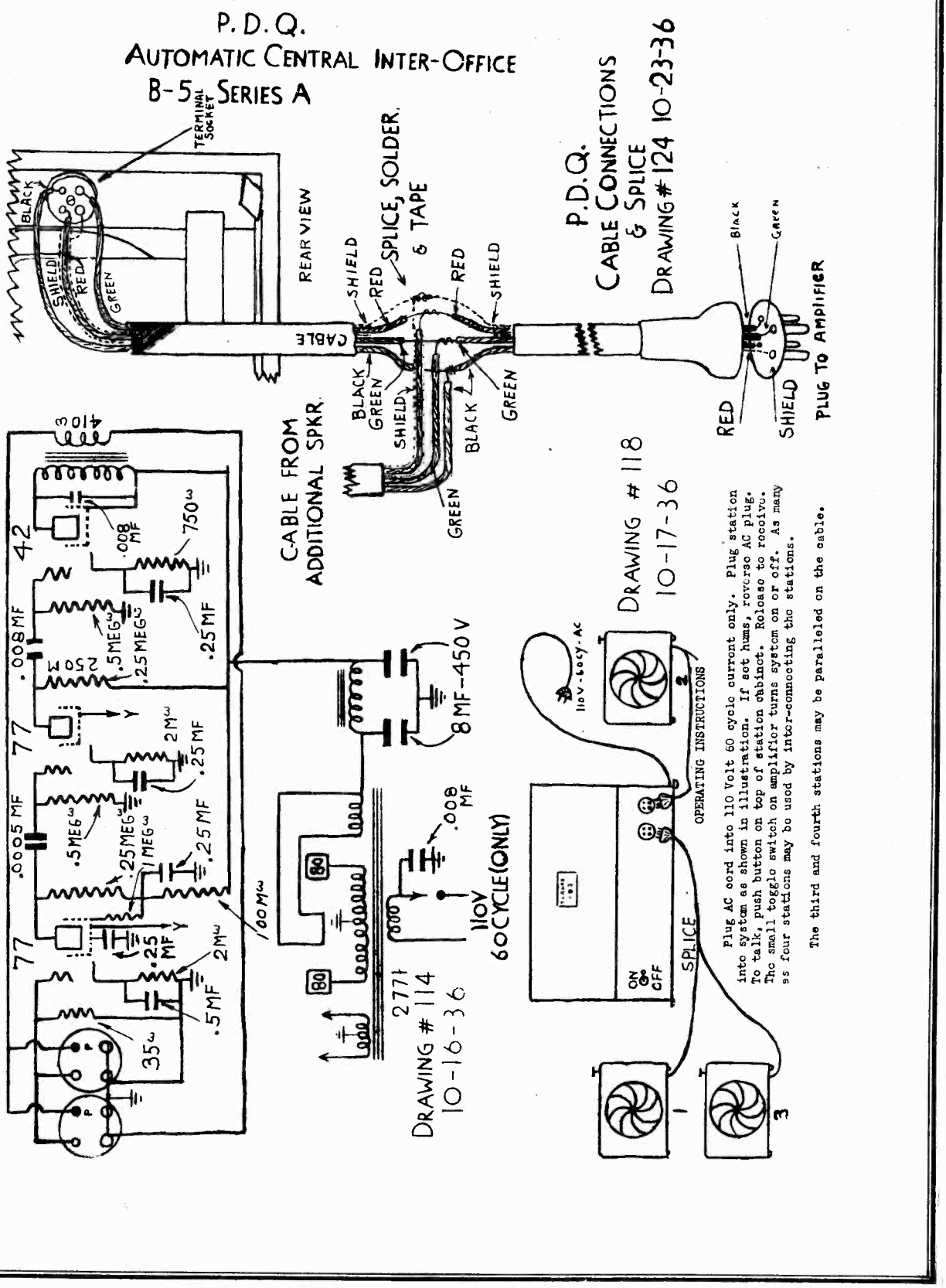
5/25/37
GEO. M. ELLIS

TROY MODEL 179



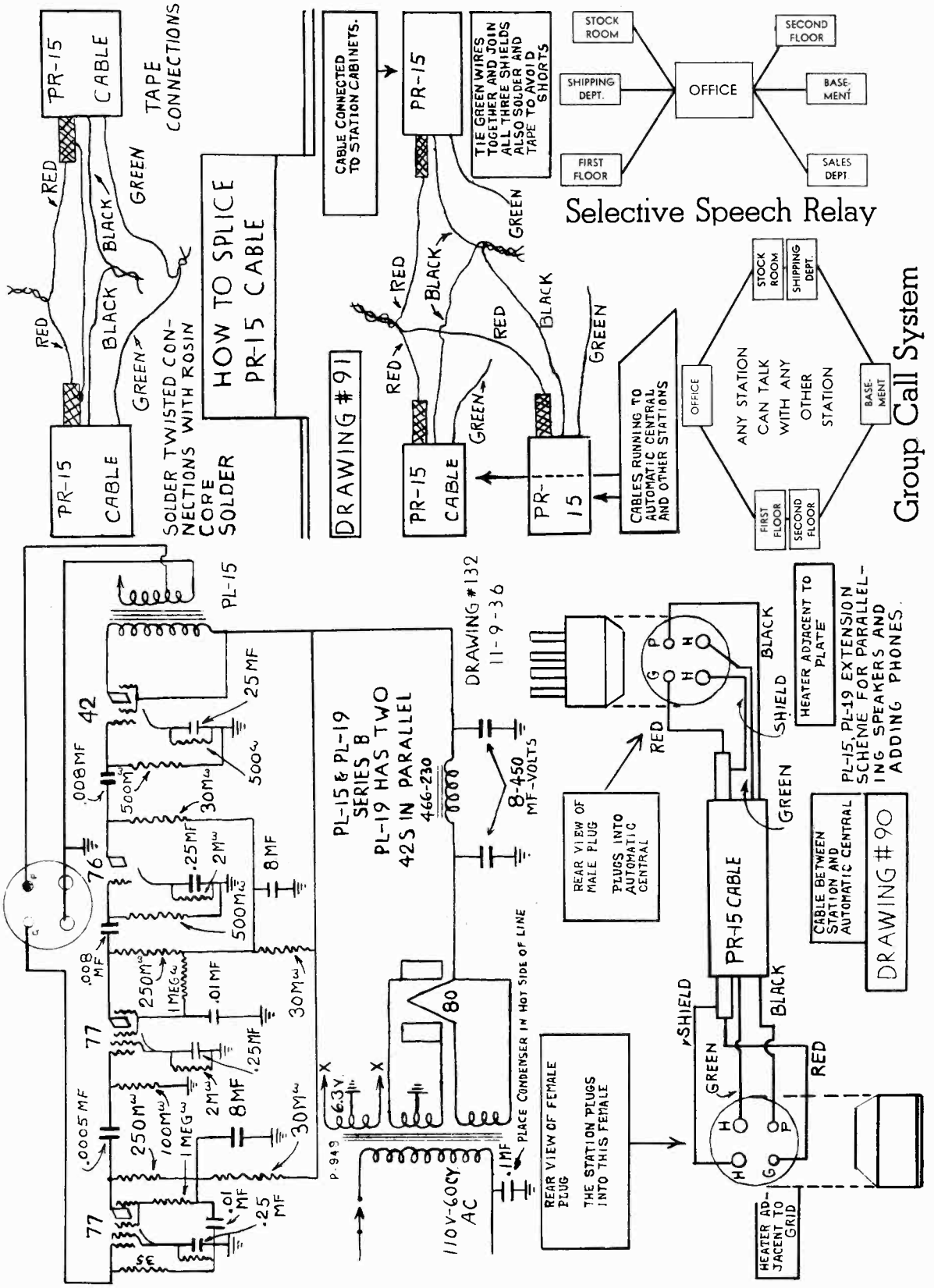
TURNER CO.

MODEL PDQ, B5-Series A
Schematic, Cable Conn.
Data



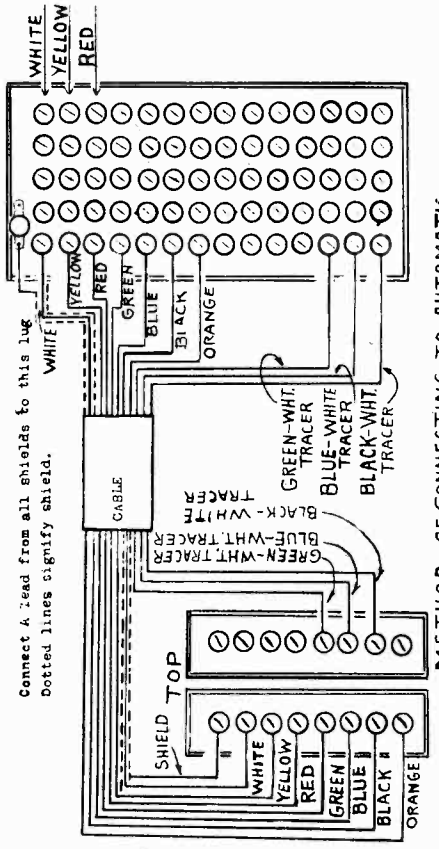
MODELS PR15,PR19
Schematic
Stations Conn.

TURNER CO.

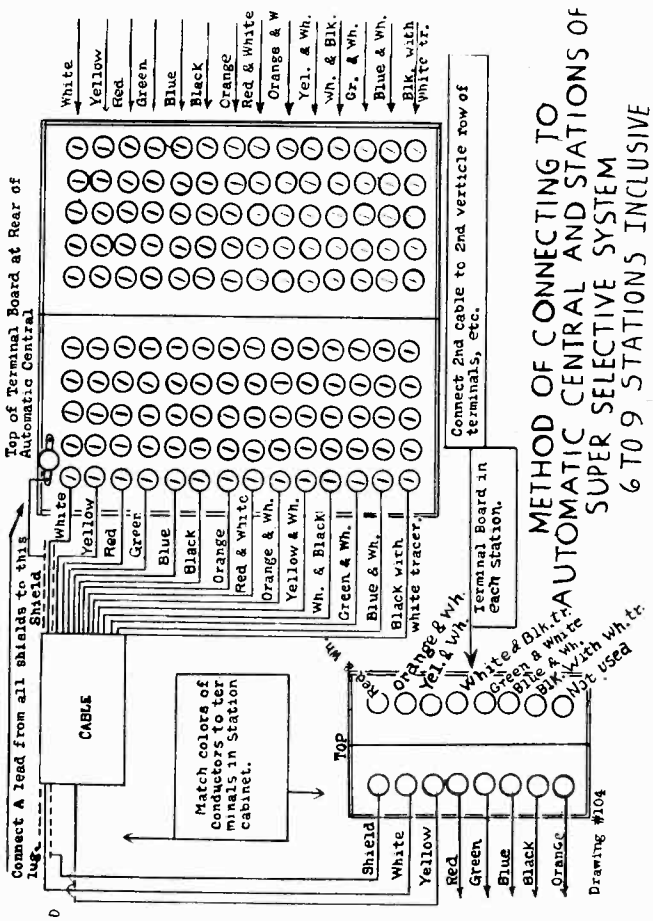


TURNER CO.

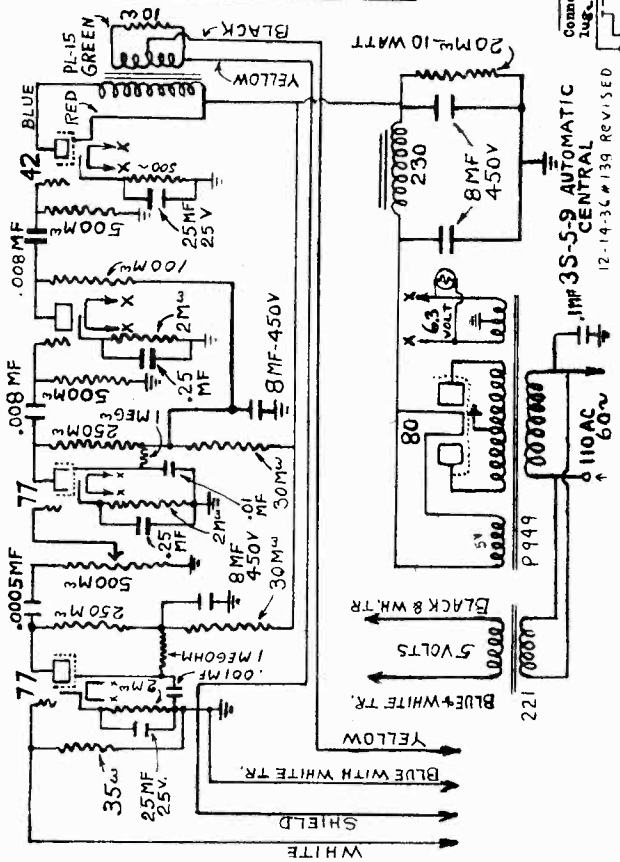
MODELS 3S5, 3S9 Automatic Central Connections, Schematic Installation Data



METHOD OF CONNECTING TO AUTOMATIC CENTRAL AND STATIONS OF SUPER SELECTIVE SYSTEM—2 TO 5 STATIONS INCLUSIVE



METHOD OF CONNECTING TO AUTOMATIC CENTRAL AND STATIONS OF SUPER SELECTIVE SYSTEM 6 TO 9 STATIONS INCLUSIVE



INSTRUCTIONS FOR INSTALLING THE TURNER 3S5 AND 3S9

On the automatic central, the top and the side that is partly open to view are of one piece. This piece is removable. This is to be taken off by removing the screws that hold it in place. Then it will be noted there is a terminal strip with fourteen different colors or color combinations on the screw heads with silver colored lugs at the top. The cable to the various stations is laid, and the Automatic Central ends of each cable are fastened to the terminal strip screws by soldering the ends of each individual wire to a lug that is furnished. The shields around the white wires are to be connected to the silver colored lugs at the top of the terminal strip. The other wires are connected to the screw (with a lug) such as white wire to white screw, yellow wire to yellow screw, etc. The wires with tracers or stripes in them are connected similarly, such as red wire with white tracer to red screw with white dot, etc. This is shown on one of the sheets enclosed.

The back of each station is to be taken off and the cable from the Automatic Central is to be attached to the terminal strip inside (with lugs) with like colored wire to like colored screw. (Shield goes to silver colored screw.)

The Automatic Central is then plugged into the socket and turned on. It will be noted that there is a volume (or gain) control on the Automatic Central which is to be turned on full first, and may be turned back later as the customer becomes acquainted with the system.

Each station has a volume control in the lower left hand corner and can be set to suit the individual listener by turning clockwise to lower the volume. In the upper left hand corner of the system is a pilot light which shows when on, that someone is using the system.

The buttons to the right hand edge of the station are to call the other stations on the system. Each station has a number painted on the bottom and the switches are numbered so that when a person wishes to call any one of the other stations he has but to push the correct button with the number corresponding to the number on the station being called, and pull the button out when he has finished speaking so that the other station may speak back to him, or with someone else. The buttons should always be in an "out" position when not in use.

If earphones are with the system a two way conversation may be had by leaving the button pushed in and speaking into the station itself, using the earphones to listen.

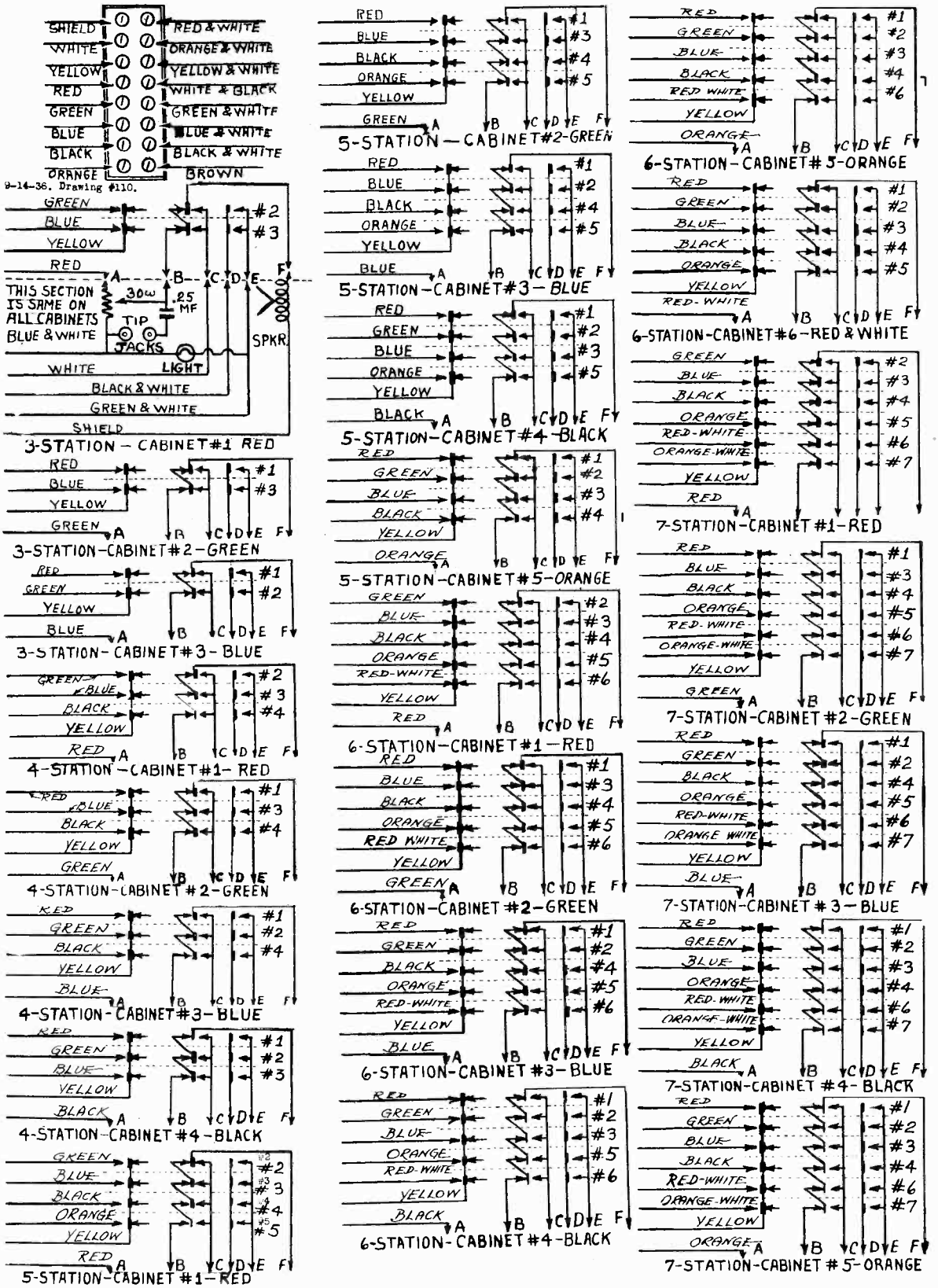
It must be remembered when installing the system that a station will not work properly without a separate line to the Automatic Central. If feedback or howl is encountered when one station is speaking to a very nearby station, it can be eliminated by turning down the volume on the listening station.

MODELS 3S5, 3S9
Automatic Central

TURNER CO.

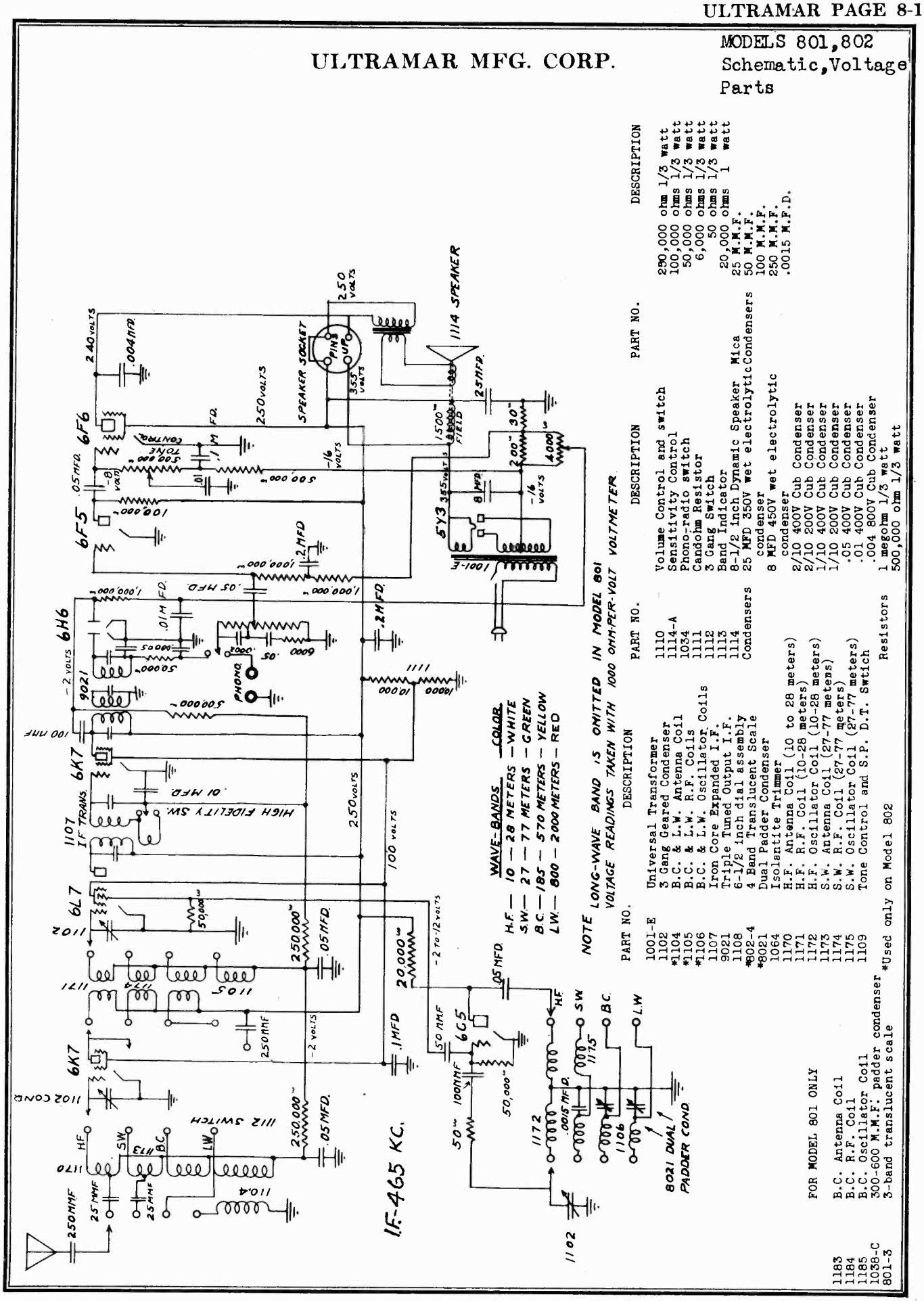
Station Cable & Switch
Connections & Color Code

CABLE & SWITCH CONNECTIONS



ULTRAMAR MFG. CORP.

MODELS 801,802
Schematic, Voltage
Parts



NOTE LONG-WAVE BAND IS OMITTED IN MODEL 801
VOLTAGE READINGS TAKEN WITH 1000 OHM-PER-VOLT VOLTMETER

PART NO.	DESCRIPTION
1001-E	Universal Transformer
1102	3 Gang Geared Condenser
*1104	B.C. & L.W. Antenna Coil
*1105	B.C. & L.W. R.F. Coils
*1106	B.C. & L.W. Oscillator Coils
1107	Iron Core Expanded I.F.
9021	Triple Tuned Output I.F.
1108	6-1/2 inch dial assembly
*802-4	4 Band Translucent Scale
*8021	Dual Padder Condenser
1064	Isolantite Trimmer
1170	H.F. Antenna Coil (10 to 28 meters)
1171	H.F. R.F. Coil (10-28 meters)
1172	H.F. Oscillator Coil (10-28 meters)
1173	S.W. Antenna Coil (27-77 metens)
1174	S.W. R.F. Coil (27-77 meters)
1175	S.W. Oscillator Coil (27-77 meters)
1109	Tone Control and S.P. D.T. Swtich

FOR MODEL 801 ONLY

1183	B.C. Antenna Coil
1184	B.C. R.F. Coil
1185	B.C. Oscillator Coil
1038-C	300-600 M.M.F. padder condenser
801-3	3-band translucent scale

PART NO.	DESCRIPTION
1110	Volume Control and switch
1114-A	Sensitivity Control
1034	Phono-radio switch
1111	Candohm Resistor
1112	3 Gang Switch
1113	Band Indicator
1114	8-1/2 inch Dynamic Speaker
Condensers	25 MFD 350V wet electrolytic condenser
	8 MFD 450V wet electrolytic condenser
	2/10 400V Cub Condenser
	2/10 200V Cub Condenser
	1/10 400V Cub Condenser
	1/10 200V Cub Condenser
	.05 400V Cub Condenser
	.01 400V Cub Condenser
	.004 800V Cub Condenser
Resistors	1 megohm 1/3 watt
	500,000 ohm 1/3 watt

PART NO.	DESCRIPTION
	250,000 ohm 1/3 watt
	100,000 ohms 1/3 watt
	50,000 ohms 1/3 watt
	6,000 ohms 1/3 watt
	50 ohms 1/3 watt
	20,000 ohms 1 watt
Mica	25 M.M.F.
	50 M.M.F.
	100 M.M.F.
	250 M.M.F.
	.0015 M.F.D.

*Used only on Model 802

MODELS 801,802
Socket, Trimmers
Alignment

ULTRAMAR MFG. CORP.

TOP VIEW
OF CHASSIS
MODELS 801-802

ALIGNMENT PROCEDURE

Realignment of this receiver should never be necessary unless one of the coils has been changed. Lack of sensitivity, selectivity, and poor tone quality may be due to defective tubes, speaker or condensers, insufficient or excessive antenna, open or grounded resistors, etc. If an I.F. tube is replaced, it is necessary to realign the I.F. transformers.

A calibrated oscillator such as Model 180, covering the ranges from 20 to 2,000 meters and an output meter (connected between plate and screen prongs of the 6F6 tube) will be required. Use low values of output to prevent false readings due to the operation of the automatic volume control while aligning.

The output meter may also be connected across the two small prongs of the speaker plug.

INTERMEDIATE STAGE ALIGNMENT

1. Connect the output of the test oscillator to the grid of the 6L7 converter tube and connect a 1 megohm resistor from this grid to the chassis. Connect the ground side of the oscillator (the shielding) to the receiver chassis.

2. Set the test oscillator to 465 K.C. Refer to Curve B on the Calibration Chart to obtain the proper setting of the test oscillator.

3. Set the tone control to the left. Align the output intermediate frequency transformer by turning the top screw at the rear of the output I.F. transformer until maximum response is obtained on the output meter. Adjust the other trimmer screws in the same manner.

4. Adjust the input intermediate frequecy transformer in the same manner.

ALIGNMENT OF TUNING CIRCUITS

5. Connect the output of the test oscillator to the antenna lead of the receiver through a .00025 M.F.D. condenser and connect the ground side (shielding) to the chassis.

6. Set the wave change switch to the long-wave position (Red). Set the dial and test oscillator to 900 meters. Adjust the long-wave oscillator trimmer until the signal is brought in. If no signal is heard, then adjust the long-wave padder. See diagram of chassis for location of trimmer and padder condensers.

7. Then adjust the long-wave antenna and R.F. trimmers for maximum response. Set the dial and test oscillator to 1800 meters and adjust the long-wave padder for maximum response while rocking the gang condenser. By rocking the gang is meant tuning to a point just above and just below the test oscillator frequency while making some other adjustment. Return to 900 meters and repeat the entire procedure.

8. Set the wave change switch to the broadcast position (Yellow). Set the dial and test oscillator to 214 meters (1400 K.C.) and adjust the B.C. oscillator, R.F. and antenna trimmers till maximum response is obtained. Set the dial and test oscillator to 600 K.C. and adjust the B.C. padder condenser while rocking the gang till maximum response is obtained.

9. Set the wave change switch to the high frequency band (Short-wave Green). Substitute a 400 ohm resistor for the .00025 M.F.D. condenser in the antenna circuit. Set the dial and test oscillator to 30 meters (10 megacycles). Stand the receiver on end and adjust the 30 meter oscillator coil (located to the right of switch when viewed from bottom) till the signal is brought in. Stop at the first peak. Screwing the trimmer down still more will give another peak which is the image and must not be used. To make certain the set is not tuned to the image, set the test oscillator to 11 megacycles and if another signal is received, then the set is correctly tuned. Reset the test oscillator to 30 meters and adjust the R.F. and antenna trimmers for maximum response, while rocking the gang. Set the dial and test oscillator to 75 meters and check for sensitivity.

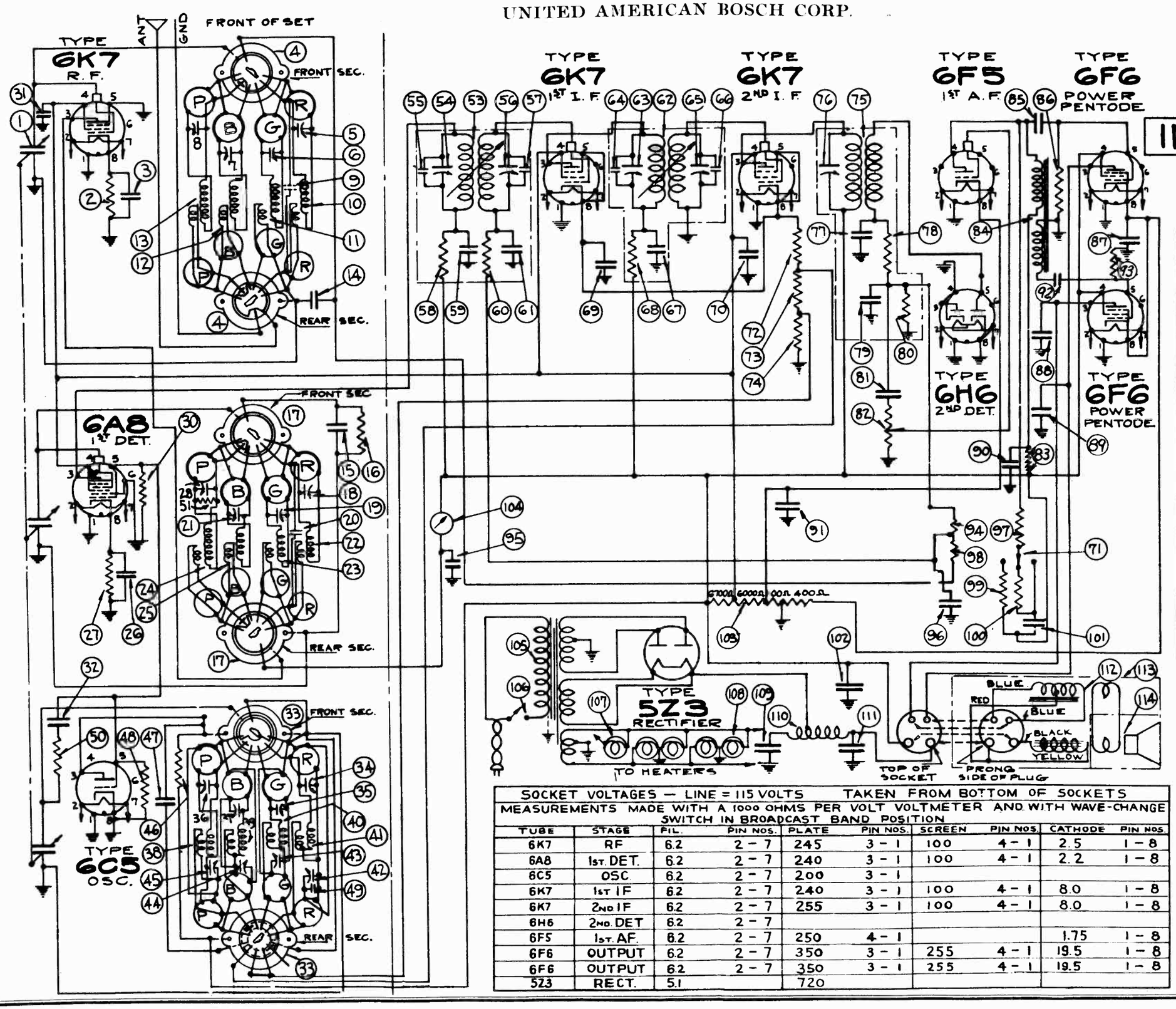
10. Set the wave-change switch to the ultra-high frequency band (White). Set the test oscillator and dial to 11 meters (27.3 megacycles). Adjust the oscillator trimmer till the signal is brought in. Continue on through to the second peak. The image signal will now be found at 26.3 megacycles if the oscillator trimmer adjustment is correct. Reset the dial to 11 meters and adjust the R.F. and antenna trimmers for maximum response while rocking the gang.

Set the dial and test oscillator to 26 meters and check for sensitivity.

UNITED AMERICAN BOSCH CORP.

MODEL 306
Schematic, Voltage
Resistance

INT. FREQ. 465 K.C.



D.C. RESISTANCE MEASURED WITH WAVE-CHANGE SWITCH IN CORRESPONDING BAND POSITION			
COIL	DIA.Nº	PRIM.	SEC.
P-ANT.	13	130 ohms	25 ohms
P-RF.	24	38 "	25 "
P-OSC.	38	8.0 "	13.5 "
B-ANT.	12	22 "	4 "
B-RF.	25	.5 "	4.5 "
B-OSC.	39	1.5 "	3 "
G-ANT.	11	3.2 "	1 "
G-RF.	23	1.5 "	1 "
G-OSC.	40	.5 "	1 "
R-ANT.	10	1 "	.4 "
R-RF.	22	2 "	.4 "
R-OSC.	41	.5 "	.4 "
1ST. IF	53	3.5 "	3.5 "
2ND. IF	82	3.5 "	3.5 "
3RD. IF	75	11.5 "	11.5 "
CHOKE	110	350 "	
1ST. AF. TRANS.	84	3200 "	3800 "
OUTPUT TRANS	112	312 "	.03 "
SPKR. FIELD		1900 "	
VOICE COIL	114	2.6 "	

SOCKET VOLTAGES — LINE = 115 VOLTS TAKEN FROM BOTTOM OF SOCKETS
MEASUREMENTS MADE WITH A 1000 OHMS PER VOLT VOLTMETER AND WITH WAVE-CHANGE SWITCH IN BROADCAST BAND POSITION

TUBE	STAGE	FIL.	PIN NOS.	PLATE	PIN NOS.	SCREEN	PIN NOS.	CATHODE	PIN NOS.
6K7	RF	6.2	2 - 7	245	3 - 1	100	4 - 1	2.5	1 - 8
6A8	1ST. DET.	6.2	2 - 7	240	3 - 1	100	4 - 1	2.2	1 - 8
6C5	OSC	6.2	2 - 7	200	3 - 1				
6K7	1ST IF	6.2	2 - 7	240	3 - 1	100	4 - 1	8.0	1 - 8
6K7	2ND IF	6.2	2 - 7	255	3 - 1	100	4 - 1	8.0	1 - 8
6H6	2ND. DET	6.2	2 - 7						
6F5	1ST. AF.	6.2	2 - 7	250	4 - 1			1.75	1 - 8
6F6	OUTPUT	6.2	2 - 7	350	3 - 1	255	4 - 1	19.5	1 - 8
6F6	OUTPUT	6.2	2 - 7	350	3 - 1	255	4 - 1	19.5	1 - 8
5Z3	RECT.	5.1		720					

UNITED AMERICAN BOSCH CORP.

MODEL 306
Circuit Data, Socket Trimmers Chassis

GENERAL DESCRIPTION

This model is a ten tube, four band superheterodyne receiver designed for world wide reception including the U.S. Weather Band and employs the new all-metal tubes.

The circuit employs a high frequency amplifier using the new type 6K7 tube. This is followed by the first detector circuit employing a 6A8 tube and a separate oscillator (type 6C5). These tubes with their associated circuits (coils, variable condensers, trim condensers for R.F. and detector stages, and trim and lag condensers for the oscillators) comprise a complete assembly in compact form separately cushioned from the main chassis. This assembly is known as the "Precision Tuner". In addition the set includes a new and novel development of intermediate frequency circuits which allows the adjustment of the band width of the amplifier to be varied over a wide range. At one end of the range is the most selective condition which allows single channel reception even under the influence of powerful nearby stations. At the other end the transmission characteristic of the amplifier is so changed as to allow transmission without attenuation of frequencies up to 7000 cycles on either side of the carrier. As a matter of fact, the amplifier is overcoupled to such a degree that frequencies in the neighborhood of five thousand cycles on either side of the carrier are transmitted at greater efficiency than frequencies close to the carrier. This design is necessary since radio frequency circuits give rise to some side band attenuation, which must be compensated for in the I.F. amplifier. The net result is a smooth transmission curve over the entire band.

From the oscillator the energy passes thru a variable selector I.F. transformer and to a 6K7 amplifier tube. Then thru another variable selector I.F. transformer and to an additional 6K7 amplifier tube. From here further selection takes place in the 3rd I.F. transformer where the energy is passed on to the 2nd detector and A.V.C. diode (type 6H6). After detection there follows a first audio amplifier (type 6F5) and by means of an audio transformer the energy is sent to the power output stage comprising two 6F6 pentode in push-pull. A 5Z3 rectifier supplies the necessary direct current for the tubes.

REMOVING INDIVIDUAL COIL AND SWITCH SECTIONS OF "PRECISION TUNER"

If a component part located underneath the switch and coil assemblies of the "Precision Tuner" has to be replaced or a section of the unit has to be removed for inspection, each section can easily be removed separately. To do this proceed with care as follows:

1. Remove the three coil shields.
2. Remove the two self-tapping screws which fasten the mounting plate of the wave-change switch shaft to the chassis frame. Pull switch shaft straight out.
3. Unsolder the stator and rotor leads from the gang condenser.
4. The fastening screws for the switch sections are located on top of the "Precision Tuner" and are indicated by X,Y, and Z in Figure #3. Remove the corresponding screw.
5. Each individual section can then be pulled out straight.

Note: On the R.F. section, the plate lead from the 6K7 socket will have to be unsoldered from the switch terminal before the section can be removed.

On the oscillator section, the plate lead will have to be unsoldered from the 6C5 socket.

6. After repairs have been made resolder the plate leads mentioned above and replace the section being careful to observe that the slotted holes in the switch bracket line up with the round guide pins on the base plate of the "Precision Tuner". This is IMPORTANT as the switch shaft cannot be inserted if the switch brackets do not line up.
7. Replace the section fastening screw.
8. Resolder the stator and rotor leads on gang condenser.
9. Replace the switch shaft and the mounting fastening screws. When inserting the switch shaft, be careful that all the switch discs are in the same position. Otherwise the switch shaft will not slide in. NEVER force the shaft into the switch discs. If shaft does not slide in freely, examine the position of the slot in each switch discs.
10. Before replacing the coil shields, it might be adviseable to bend the shields slightly to assure that positive contact is made. To do this hold the shield with your two hands using the thumbs and first two fingers as shown in figure #1. Pull out the ends of the shield slightly and at the same time apply a little pressure on the sides of the shield as indicated by the arrows in the drawing. Then replace the shields and observe that they fit tightly. In addition to assuring positive contacts, this will also prevent the shields from rattling.

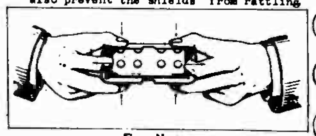
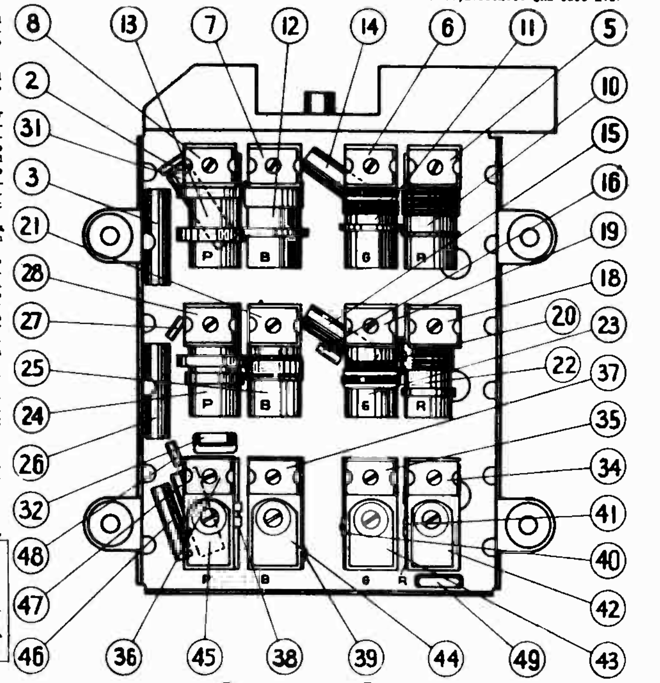
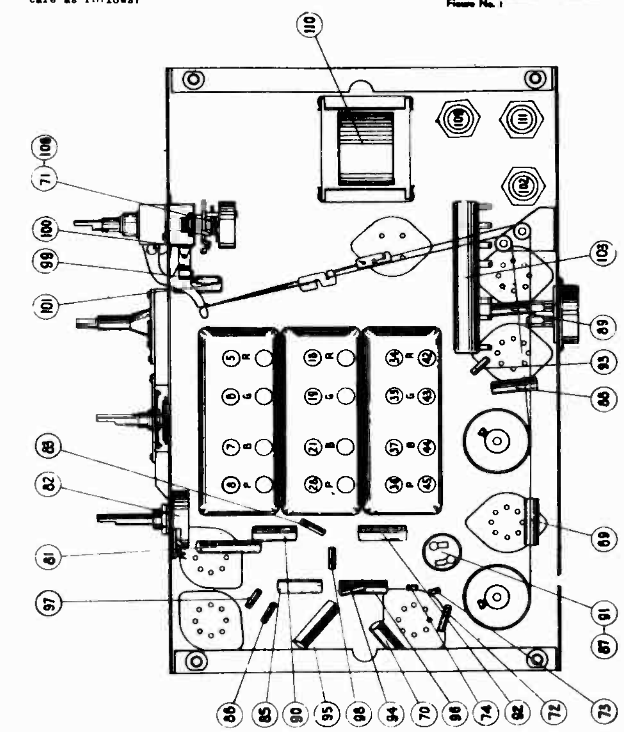


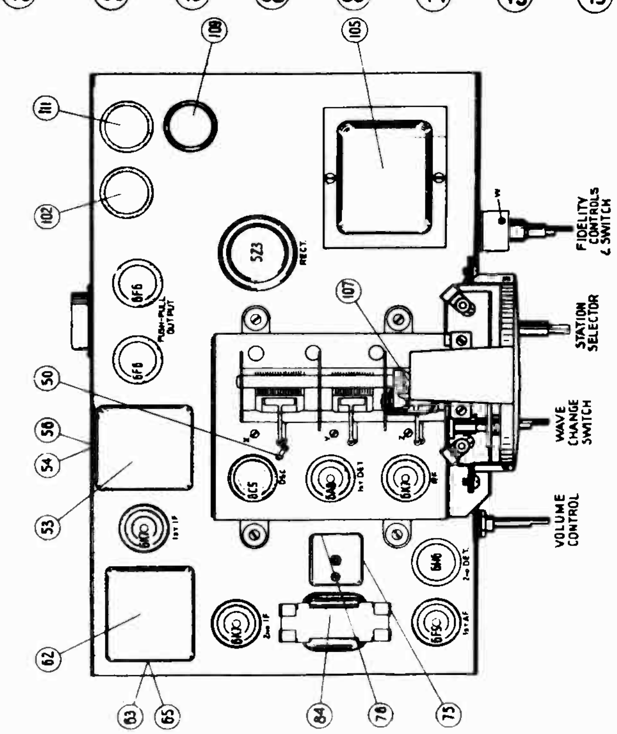
Figure No. 1

ELECTRICAL SPECIFICATIONS

Type and Number of Tubes --- 3#6K7, 1#6A8, 1#6C5, 1#6H6, 1#6F5, 2#6F6, 1#5Z3 - Total 10
Power Supply --- 105 to 125 volts, 50 to 60 cycles
Power Consumption --- 90 Watts
Maximum Undistorted Output --- 8 Watts
Maximum Output --- 10 Watts
Tuning Ranges --- (Purple Band 120 K.C. to 350 K.C. / (White Band 540 K.C. to 1800 K.C. / (Green Band 1800 K.C. to 6000 K.C. / (Red Band 6000 K.C. to 18500 K.C.
Line-Up Frequencies --- I.F. 465K.C., 350K.C., 130K.C., 1600K.C., 570K.C., 5500 K.C. 1900K.C., 17000K.C. and 6000 K.C.







MODEL 306
Alignment Parts

UNITED AMERICAN BOSCH CORP.

MODEL -306

LINE-UP CAPACITOR ADJUSTMENTS

CAUTION: DO NOT INTERFERE WITH THE I.F. ALIGNMENT OF THIS RECEIVER EXCEPT WHEN IT HAS BEEN ABSOLUTELY DETERMINED THAT THIS IS THE CAUSE OF THE TROUBLE AND ONLY WHEN HIGH GRADE TESTING EQUIPMENT IS TO BE USED.

To align the circuits of this receiver it is essential to use a high grade modulated test oscillator, the output of which can be continuously varied with absence from overload when the individual circuits of the receiver are brought into alignment. A conventional output meter can be connected across the terminals of the speaker voice coil to indicate when the circuits are aligned. The sensitivity of the output meter must be sufficient to give satisfactory reading with a low input signal.

Before attempting to align the receiver, the service man should familiarize himself with the general layout of the chassis, the location of the tubes and various alignment condensers. Top and bottom views of the chassis are shown in figures #2, #3, and #4 and should be carefully studied before the actual work is started.

ADJUSTMENT OF I.F. (465 K.C.)

NOTE: BECAUSE OF THE VARIABLE SELECTIVITY INCORPORATED IN THIS RECEIVER, IT IS IMPORTANT THAT THE PROCEDURE OUTLINED BELOW BE FOLLOWED IN ORDER TO OBTAIN ACCURATE ALIGNMENT.

THE I.F. TRIMMERS ARE ADJUSTED ONLY WHEN THE VARIABLE SELECTOR COILS ARE PLACED IN A PARTICULAR MECHANICAL POSITION.

TO PROPERLY SET THE I.F. TRANSFORMERS, TURN THE FIDELITY CONTROL TO THE EXTREME RIGHT OR CLOCKWISE POSITION. ADJUST THE PULLEY WHEELS ON THE BOTTOM OF THE TWO VARIABLE I.F. COILS IN A COUNTER-CLOCKWISE DIRECTION UNTIL THEY ARE AGAINST THE STOPS. THIS IS DONE BY TIGHTENING UP THE CORDS WHICH OPERATE THE PULLEYS.

THE CIRCUITS ARE SO DESIGNED THAT THE SENSITIVITY OF THE RECEIVER CHANGES VERY LITTLE FROM MAXIMUM SELECTIVITY TO MAXIMUM FIDELITY. IN ORDER TO ALIGN THE CIRCUITS PROPERLY, IT IS NECESSARY TO HAVE LESS COUPLING IN THE INDIVIDUAL I.F. TRANSFORMER THAN THAT PROVIDED BY THE MAXIMUM SELECTIVITY SETTING.

TO OBTAIN THIS LESSER COUPLING MERELY TURN THE SCREW (INDICATED BY "W" IN FIGURE #3), WHICH ACTS AS A STOP TO LIMIT SELECTIVITY, OUT ABOUT 1/4 INCH FROM ITS ORIGINAL SETTING. THIS ALLOWS A MOVEMENT OF THE VARIABLE COILS WHICH PUTS THE RECEIVER IN A VERY SELECTIVE BUT LESS SENSITIVE CONDITION. WITH THE CONTROL IN THIS POSITION ALIGN THE I.F. STAGES AS FOLLOWS:

1. Set volume control on full and connect output meter across voice coil of speaker.
2. Set test oscillator to 465 K.C. and adjust its output to produce a measurable reading on output meter when test signal is applied to the grid of the 2nd I.F. tube (6K7) thru a .5 mfd. blocking condenser.
3. Adjust trimmer #76 to maximum output, reducing output of test oscillator as required.
4. Apply test signal to grid of 1st I.F. tube (6K7) and adjust #63 and #65 to maximum output.
5. Apply test signal to grid of 1st detector (6A8) and adjust #64 and #56 to maximum output.
6. After the above I.F. adjustments have been made, replace the stop-screw to original position.

ADJUSTMENT OF PURPLE BAND

Note: During all of the subsequent adjustments, the selectivity control should be turned to the left or counter-clockwise direction.

1. Set wave-change switch to the purple band position.
2. Set test oscillator and dial indicator to 350 K.C. and apply test signal to antenna terminal of the chassis thru a .0002 mfd. series condenser and adjust #36, #28 and #8 to maximum output.
3. Set test oscillator and dial indicator to 130 K.C. and adjust #45 to maximum output.
4. Return to 350 K.C. setting with both test oscillator and dial indicator and repeat adjustment of #36, #28 and #8 for accuracy.

ADJUSTMENT OF BROADCAST BAND

1. Set wave-change switch to White or Broadcast Band position.
2. Set test oscillator and dial indicator to 1600 K.C. and adjust #37, #21 and #7 to maximum output.
3. Set test oscillator and dial indicator to 570 K.C. and adjust #44 to maximum output.
4. Return to 1600 K.C. setting and make readjustment of #37, #21 and #7.

ADJUSTMENT OF GREEN BAND

Note: In adjusting the Green and Red Bands, a .0002 mfd. condenser and a 400 ohms resistor connected in series should be inserted in the high side of the test oscillator leads. This condenser-resistor combination is the approximate equivalent of a short wave antenna.

1. Set wave-change switch to the Green Band position.
2. Set test oscillator and dial indicator to 5500 K.C. and adjust #35, #19 and #6 to maximum output.
3. Set test oscillator and dial indicator to 1900 K.C. and adjust #43 to maximum output.
4. Return to 5500 K.C. setting and make readjustment of #35, #19 and #6.

ADJUSTMENT OF RED BAND

1. Set wave-change switch to Red Band position.
2. Set test oscillator and dial indicator to 17000 K.C. and adjust #34, #18 and #5 to maximum output.
3. Set test oscillator and dial indicator to 6000 K.C. and adjust #42 to maximum output.
4. Return to 17000 K.C. setting and make readjustment of #34, #18 and #5.

Note: The adjustment of the two short-wave oscillator lag condensers (#42 and #43) is best made by the max-max. method. This is done as follows:

Tune the receiver with the left hand by means of the tuning knob and adjust the lag condenser in either direction and then without changing it, tune the receiver thru a maximum, noting reading of the output meter. Change the lag condenser further in the same direction, return receiver and note reading. If output drops with second adjustment, reverse direction of the adjustment of lag condenser. Continue this type of trial and error adjustment until no further improvement can be made when either the tuning control or the lag condenser are changed. While this procedure may appear difficult, facility can be easily acquired by practice and the operation requires only a few minutes.

IMPORTANT: WHILE TESTING OR MAKING REPAIRS ON THIS RECEIVER, THE CHASSIS SHOULD NOT BE TURNED UPSIDE DOWN OR ON ITS SIDE FOR ANY LONG PERIOD OF TIME WHILE THE SET IS TURNED ON AS THE CHEMICALS IN THE ELECTROLYTIC FILTER CONDENSER WILL COME OUT THRU THE AIR VENTS MAKING THE CONDENSER APPEAR TO BE DEFECTIVE. IF LEFT IN THIS POSITION TOO LONG THE CONDENSER MAY BE INJURED.

SERVICE PARTS LIST

Dia. #	Part #	Description of Parts	List Price
1	CO 9529	Variable condenser assembly	$ 4.25
2	RE 9529	300 ohms ½ W. resistor	.10
3	SA 106386	.05 mfd. 200 V. condenser	.25
4	SW 9524	Antenna section "Precision Tuner" assembly complete with switch, coils and trimmers	5.75
5	CS 9511	4 to 25 mmf. antenna trim condenser (Red Band)	.20
6	CS 9511	4 to 25 mmf. antenna trim condenser (Green Band)	.20
7	CS 9511	4 to 25 mmf. antenna trim condenser (White Band)	.20
8	CS 9511	4 to 25 mmf. antenna trim condenser (Purple Band)	.20
9		Twisted pair of wires-part of RC 9571	
10	RC 9571	Antenna coil assembly (Red Band)	.70
11	RC 9574	Antenna coil assembly (Green Band)	.65
12	RC 9577	Antenna coil assembly (White Band)	1.10
13	RC 9580	Antenna coil assembly (Purple Band)	1.25
14	CW 9513	.05 mfd. 200 V. condenser	.25
15	CW 9513	.05 mfd. 200 V. condenser	.25
16	RE 9527	5000 ohms ½ W. resistor	.10
17	SW 9525	R.F. section "Precision Tuner" assembly complete with switch, coils and trimmers	6.00
18	CS 9511	4. to 25 mmf. R.F. trim condenser (Red Band)	.20
19	CS 9512	1.5 to 10 mmf. R.F. trim condenser (Green Band)	.20
20	CM 9512	6. mmf. mica condenser	.15
21	CS 9512	1.5 to 10 mmf. R.F. trim condenser (White Band)	.20
22	RC 9572	R.F. coil assembly (Red Band)	.70
23	RC 9575	R.F. coil assembly (Green Band)	.95
24	RC 9581	R.F. coil assembly (Purple Band)	1.10
25	RC 9578	R.F. coil assembly (White Band)	1.15
26	SA 106386	.05 mfd. 200 V. condenser	.25
27	RE 9529	300 ohms 1/4 W. resistor	.10
28	CS 9512	1.5 to 10 mmf. R.F. trim condenser (Purple Band)	.20
30	RE 9534	100,000 ohms ½ W. resistor	.10
31	SA 106386	.05 mfd. 200 V. condenser	.25
32	CM 9511	.000065 mfd. mica condenser	.20
33	SW 9526	Oscillator section "Precision Tuner" assembly complete with switch, coils and trimmers	9.75
34		1.5 to 10 mmf. trim condenser (Red Band) part of CS 9519	
35		3. to 15. mmf. trim condenser-part of CS 9520 (Green Band)	
36		10 to 35 mmf. trim condenser-part of CS 9518 (Purple Band)	
37		5 to 25 mmf. trim condenser-part of CS 9517 (White Band)	
38	RC 9582	Oscillator coil assembly (Purple Band)	1.40
39	RC 9579	Oscillator coil assembly (White Band)	1.50
40	RC 9576	Oscillator coil assembly (Green Band)	1.50
41	RC 9573	Oscillator coil assembly (Red Band)	1.25
42		800 to 1600 mmf. lag condenser-part of CS 9519 (Red Band)	
43		800 to 1600 mmf. lag condenser-part of CS 9520 (Green Band)	
44		300 to 600 mmf. lag condenser-part of CS 9517 (White Band)	
45		60 to 150 mmf. lag condenser-part of CS 9518 (Purple Band)	
46	RE 9526	5000 ohms 1 W. resistor	.20
47	CW 9513	.05 mfd. 200 V. condenser	.25
48	RE 9524	50,000 ohms ½ W. resistor	.10
49	CM 969	.002 mfd. mica condenser	.25
50	RE 9537	50 ohms ½ W. resistor	.10
51	RE 9534	100,000 ohms ½ W. resistor	.10
53	IC 9529	1st I.F. transformer assembly	3.65
54		250 to 350 mmf. I.F. trim condenser-part of IC 9529	
55	SA 106417	.0001 mfd. mica condenser	
56		250 to 350 mmf. I.F. trim condenser-part of IC 9529	
57	SA 106417	.0001 mfd. mica condenser	.20
58	RE 9527	5000 ohms ½ W. resistor	.10
59	SA 103659	.005 mfd. 400 V. condenser	.30
60	RE 9534	100,000 ohms ½ W. resistor	.10
61	SA 103659	.005 mfd. 400 V. condenser	.30
62	IC 9530	2nd I.F. transformer assembly	3.45
63		250 to 350 mmf. I.F. trim condenser-part of IC 9530	
64	SA 106417	.0001 mfd. mica condenser	.20
65		250 to 350 mmf. I.F. trim condenser-part of IC 9530	
66	SA 106417	.0001 mfd. mica condenser	.20
67	SA 103659	.005 mfd. 400 V. condenser	.30
68	RE 9527	5000 ohms ½ W. resistor	.10
69	SA 106384	.05 mfd. 200 V. condenser	.25
70	SA 106384	.05 mfd. 200 V. condenser	.25
71	VR 9511	Tone control switch	1.25
72	SA 106267	1000 ohms ½ W. resistor	.20
73	RE 9528	1000 ohms ½ W. resistor	.10
74	RE 9536	4000 ohms ½ W. resistor	.10
75	IC 9526	3rd I.F. transformer	.90
76		25 to 100 mmf. I.F. trim condenser-part of IC 9526	
77		.00005 mfd. mica condenser-part of IC 9526	
78		100,000 ohms ½ W. resistor-part of IC 9526	
79		.0001 mfd. mica condenser-part of IC 9526	
80		250,000 ohms ½ W. resistor-part of IC 9526	
81	SA 102504	.02 mfd. 200 V. condenser	.20
82	VR 9510	Volume control (1 meg.)	1.00
83	SA 105249	5000 ohms ½ W. resistor	.20
84	TR 9516	Input transformer	3.25
85	CW 9512	.02 mfd. 400 V. condenser	.20
86	SA 105246	½ meg. ½ W. resistor	.20
87		10 mfd. 25 V. elect. condenser-part of SA 107913	
88	SA 103852	.002 mfd. 600 V. condenser	.25
89	SA 103852	.002 mfd. 600 V. condenser	.25
90	CW 9512	.02 mfd. 400 V. condenser	.20
91		10 mfd. 25 V. elect. condenser-part of SA 107913	
92	CW 9512	.02 mfd. 400 V. condenser	.20
93	SA 105246	½ meg. ½ W. resistor	.20
94	SA 105281	1 meg. ½ W. resistor	.20
95	SA 102492	.05 mfd. 400 V. condenser	.25
96	SA 106386	.05 mfd. 200 V. condenser	.25
97	SA 105274	20,000 ohms ½ W. resistor	.20
98	SA 105279	250,000 ohms ½ W. resistor	.20
99	SA 105277	75,000 ohms ½ W. resistor	.20
100	RE 9536	20,000 ohms ½ W. resistor	.10
101	CW 9512	.02 mfd. 400 V. condenser	.20
102	CE 9517	18. mfd. 300 V. electrolytic condenser	1.10
103	RE 9521	Voltage divider resistor 13,200 ohm tapped	1.00
104	SI 9539	Tuning meter assembly	2.20
105	TR 9517	Power transformer	6.25
106		Line switch-part of VR 9511	
107	LP 952	Tuning meter light (3.2 volts)	.15
108	LP 952	Dial lights (4 used) (3.2 volts)	.15
109	CE 9515	8. mfd. 450 V. electrolytic condenser	1.10
110	SA 101606	Choke coil assembly	2.25
111	CE 9516	8. mfd. 450 V. electrolytic condenser	1.10
112	TR 9513	Speaker output transformer	2.00
113	SK 959	Speaker	10.75
114	DM 956	Diaphragm and voice coil assembly	1.25

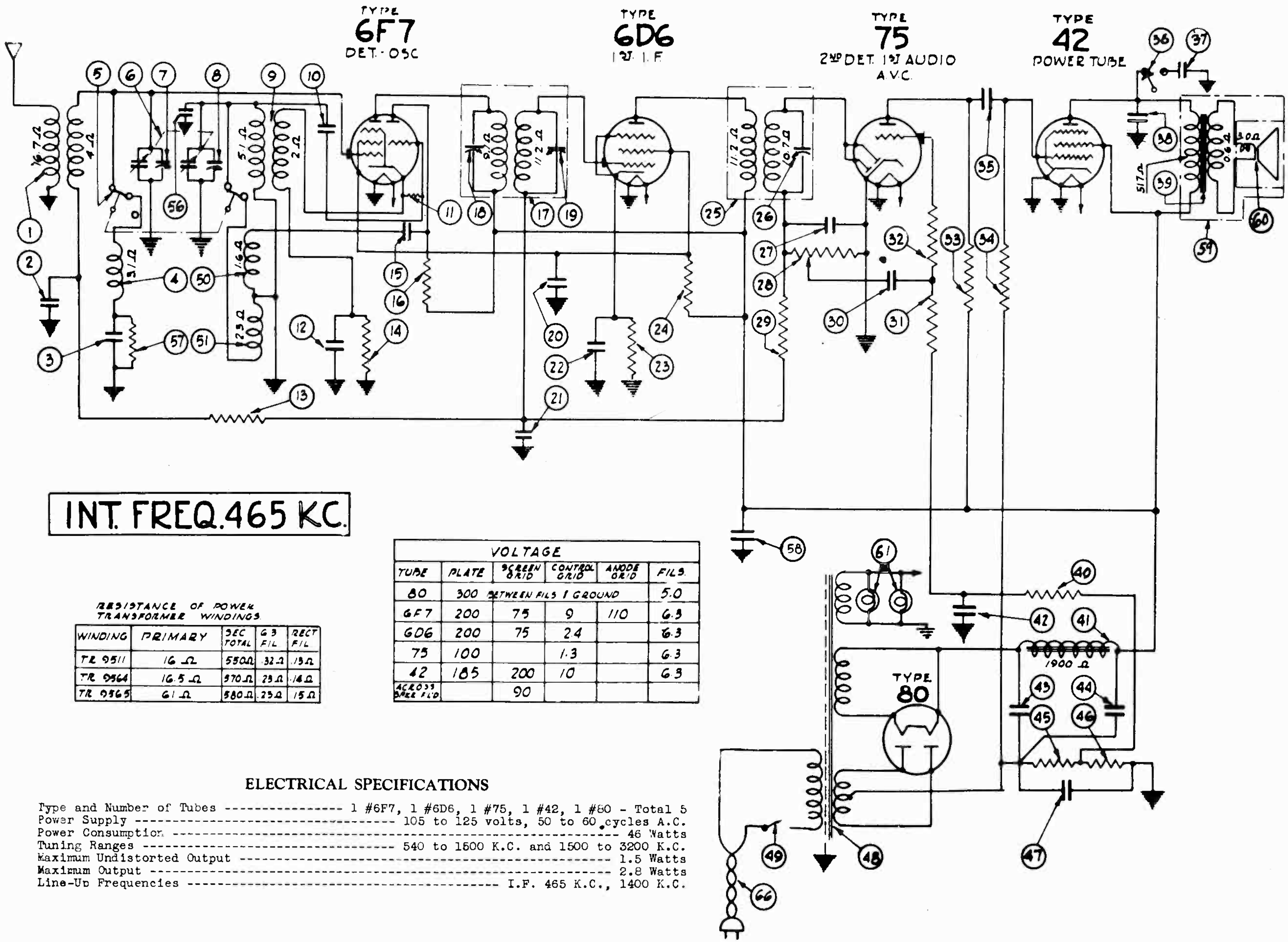
MAIN ASSEMBLIES

Part #	Description of Parts	List Price
CH 9540	Chassis assembly	
CH 9537	Chassis assembly - "Precision Tuner" unit	

Part #	Description of Parts	List Price
	MAIN ASSEMBLIES (cont'd)	
KA 9589	Cabinet	$
SK 959	Speaker	10.75
	BRACKETS AND CLIPS	
HP 956	Tension clip for expander cable	.05
BK 95123	Bracket and switch assembly (tone control)	.35
BK 95120	Bracket assembly dial scale	.20
	CABLE AND CABLE ASSEMBLIES	
CB 9512	Line cable with plug	.50
FR 97150	Expander and dial drive cord - 81" long	.05
	DUAL OSCILLATOR TRIM CONDENSERS	
CS 9517	Dual trim condenser (Black Band)	.85
CS 9518	Dual trim condenser (Purple Band)	.80
CS 9519	Dual trim condenser (Red Band)	.75
CS 9520	Dual trim condenser (Green Band)	.75
	TUBE SOCKETS	
SO 956	Tube socket - 8 prong	.20
SA 104615	Tube socket - 4 prong	.15
SA 107257	Speaker socket	.10
	SCREWS AND WASHERS	
SC 101766	Screws - chassis mounting	.05
SC 103709	Self tapping screws #10 x 3/8"	.03
SC 106642	Self tapping screws # 7 x 1/4"	.05
SC 1047CA	Self tapping screws # 4 x 1/4"	.05
WA 99740	Plain washer for chassis mounting screw	.05
WA 105919	Lock washer for chassis mounting screw	.05
	SPEAKER PARTS	
DM 956	Diaphragm and coil assembly	1.25
FP 101740	Copper ring	.20
FP 102270	Steel plate	.40
FP 101742	Paper washer	.05
CL 9557	Speaker field coil	1.65
SA 101733	Core and frame assembly	.85
SC 102152	Fastening screw - core and frame	.05
FP 79581	Cable clamp	.05
FP 101865	Diaphragm fastening screw	.05
TR 9513	Speaker output transformer	2.00
SC 101864	Fastening screw - output transformer	.05
SA 107276	Speaker plug - 4 prong	.10
SA 107279	Speaker plug cover	.10
RG 955	Baffle ring (metal)	1.25
RG 956	Steel ring	.45
	MISCELLANEOUS	
KN 9592	Knob - tuning large	.20
SA 107353	Knob - tuning small	.20
KN 9521	Knob - volume control and wave change switch	.20
GA 956	Rubber gasket for dial	.50
SI 9527	Celluloid for tuning meter	.05
IS 9593	Terminal strip - antenna and ground	.20
SH 9524	Vernier drive shaft assembly	.70
SH 9590	Wave change switch shaft assembly	.55
	MISCELLANEOUS (cont'd)	
SI W512	Dial indicator	$ .25
LP 952	Dial light	.15
FP 103164	Spring for dial cable	.05
CV 96100	Cover for dial scale	.50
DS 9553	Dial scale	.70
SI 9526	Band indicator assembly	.50
SO 954	Dial lamp socket	.10
SP 9530	Spring clip on I.F. coil assembly	.05
HP 957	Hook - expander cable (2 used)	.05
PU 9510	Large pulley for I.F. expander	.35
SP 9518	Spring hook for expander cable (1 used)	.10
HP 958	Clip for expander cable (2 used)	.05
GE 958	Celluloid gear and pinion assembly (second hand)	.55
SI 9533	Dial indicator (second hand)	.05
GE 955	Small pinion gear (second hand)	.20
IS 95103	Shield for dial lamp	.05
FP 65772	Spring ring used with GE 958	.05
TU 9553	Celluloid "Bull's eye" on cabinet	.05

MODEL 515
Schematic
Voltage

UNITED AMERICAN BOSCH CORP.



RESISTANCE OF POWER TRANSFORMER WINDINGS

WINDING	PRIMARY	SEC TOTAL	6.3 FIL	RECT FIL
TR 9511	16 Ω	550 Ω	.32 Ω	.13 Ω
TR 9564	16.5 Ω	570 Ω	.23 Ω	.14 Ω
TR 9565	61 Ω	580 Ω	.23 Ω	.15 Ω

VOLTAGE

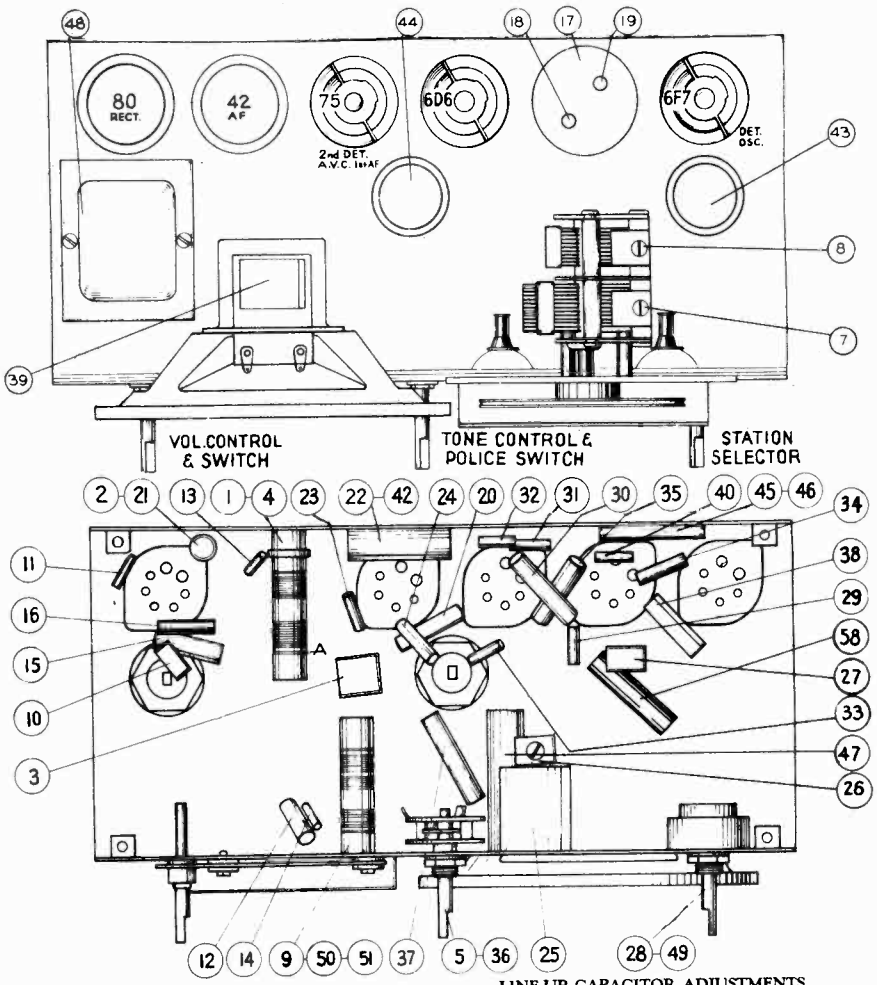
TUBE	PLATE	SCREEN GRID	CONTROL GRID	ANODE GRID	FILS.
80	300 BETWEEN FILS & GROUND				5.0
6F7	200	75	9	110	6.3
6D6	200	75	2.4		6.3
75	100		1.3		6.3
42	185	200	10		6.3
ACROSS SPKR FLD		90			

ELECTRICAL SPECIFICATIONS

Type and Number of Tubes ---------------- 1 #6F7, 1 #6D6, 1 #75, 1 #42, 1 #80 - Total 5
Power Supply ---------------------------------- 105 to 125 volts, 50 to 60 cycles A.C.
Power Consumption -- 46 Watts
Tuning Ranges ---------------------------------- 540 to 1500 K.C. and 1500 to 3200 K.C.
Maximum Undistorted Output -- 1.5 Watts
Maximum Output --- 2.8 Watts
Line-Up Frequencies -- I.F. 465 K.C., 1400 K.C.

MODEL 515 UNITED AMERICAN BOSCH CORP.

Socket, Trimmers
Chassis, Alignment
Notes, Parts



GENERAL DESCRIPTION

This model is a five-tube, A.C., two-band superheterodyne receiver whose circuit comprises a combined first detector-oscillator an intermediate frequency amplifier, a combined second detector, A.V.C. and first audio amplifier, a power pentode output stage and a rectifier with its associated filter circuit and power transformer.

This model is designed to work over two bands, the broadcast band extending from 540 to 1500 K.C. and a police band which extends from 1400 to 3200 K.C.

LINE-UP CAPACITOR ADJUSTMENTS

To align the circuits of this receiver it is essential to use a high grade modulated test oscillator, the output of which can be continuously varied with absence from overload when the individual circuits of the receiver are brought into alignment.

A conventional output meter can be connected across the terminals of the speaker voice coil to indicate when the circuits are aligned. The sensitivity of the output meter must be sufficient to give satisfactory reading with a low input signal.

Before attempting to align the receiver, the service man should familiarize himself with the general layout of the chassis, location of the tubes and various alignment condensers. Top and bottom views of the chassis are shown in Fig. #1 and #2 and should be carefully studied before the actual work is started.

ADJUSTMENT OF I.F. (465 K.C.)

1. Set volume control on full, turn tone control knob to the right hand position. Set wave-change switch on the broadcast position and the dial indicator at approximately 600 K.C.
2. Connect output meter across voice coil of speaker.
3. Set test oscillator to 465 K.C. and adjust its output to produce a measurable reading on output meter when test signal is applied to the grid of the 6D6 I.F. tube thru a .5 mfd. blocking condenser.
4. Adjust #26 (see Fig. #2) to maximum output reducing output of test oscillator as required.
5. Apply test signal to grid of 6F7 first detector-oscillator tube and adjust #18 and #19 (Fig. #1) to maximum output.
6. With test signal still on the grid of 6F7 tube, repeat the above adjustments for greatest sensitivity.

ADJUSTMENT OF BROADCAST BAND

1. Leave test signal on grid of 6F7 tube and set the test oscillator to 1400 K.C.
2. Turn the gang condenser to its maximum position. Adjust dial indicator until either end is directly over the long horizontal lines on the dial scale. Then set dial indicator to 1400 K.C.
3. Adjust trimmer #8 to maximum output.
4. Apply test signal to antenna of set thru a .0002 mfd. condenser and adjust trimmer #7 to maximum output.

ADJUSTMENT OF POLICE BAND

When adjustments as outlined under the broadcast band are completed, the police band requires no adjustment unless the coil had been changed. In this event, set test oscillator and station indicator to 1700 K.C. and apply test signal to antenna lead. The police band winding is indicated by "A" in Fig. #2. Adjust the position of this winding by sliding it back and forth on the core until maximum output is indicated on the output meter. This winding should then be secured in place by applying a thin coat of coil cement.

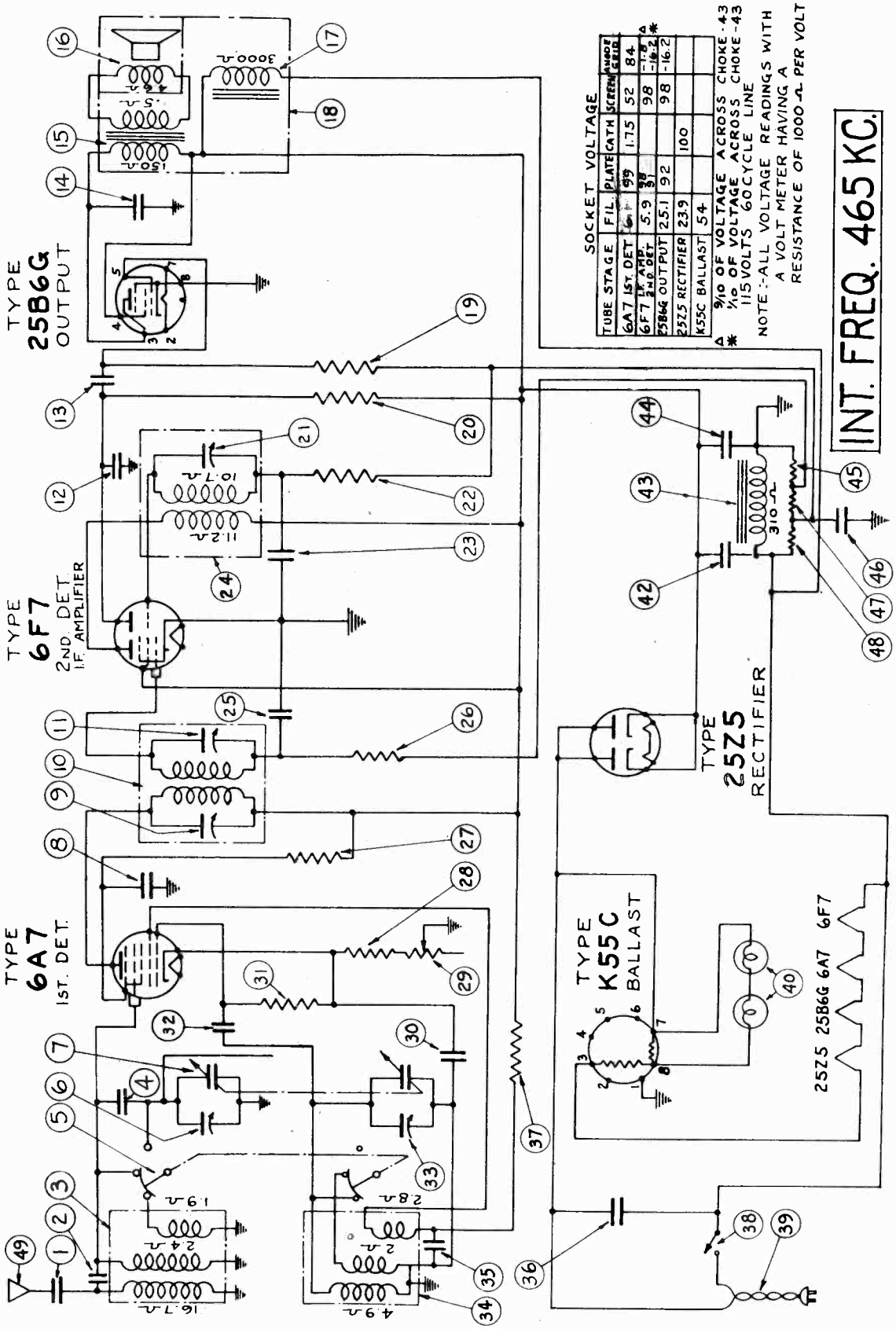
PRICES SUBJECT TO CHANGE WITHOUT NOTICE

Dia. #	Part #	Description of Parts	List Price
1	RC 9588	Antenna coil assembly	$ 1.10
2		.05 mfd., 200 V. condenser - part of SA 105327 (dual).	.30
3	CM 958	400 mmfd. mica condenser	.20
4		Police pre-selector coil - part of RC 9586	
5	SW 9519	Switch assembly	.85
6	CG 9522	Variable gang condenser	2.45
7		Trimmer condenser - part of CG 9522	
8		Trimmer condenser - part of CG 9522	
9	RC 9589	Oscillator coil assembly	.95
10	SA 106417	100 mmfd. mica condenser	.20
11	SA 105276	50,000 ohm, 1/4 W. resistor	.15
12	CW 2-05	.05 mfd., 200 V. condenser	.15
13	SA 105279	250,000 ohm, 1/4 W. resistor	.15
14	SA 105269	1800 ohm, 1/4 W. resistor	.15
15	CW 4-01	.01 mfd., 400 V. condenser	.15
16	SA 100197	25,000 ohm, 1/2 W. resistor	.15
17	IC 9532	1st I.F. transformer (465 KC.)	1.75
18		I.F. trimmer condenser - part of IC 9532	
19		I.F. trimmer condenser - part of IC 9532	
20	CW 4-10	.1 mfd., 400 V. condenser	.15
21		.05 mfd., 200 V. condenser - part of SA 105327 (dual).	.30
22		.05 mfd., 200 V. condenser - part of SA 105327 (dual).	.30
23	SA 105264	500 ohm, 1/4 W. resistor	.15
24	SA 101163	75,000 ohm, 1/2 W. resistor	.15
25	IC 9533	2nd I.F. transformer (465 KC.)	1.10
26		I.F. trimmer condenser - part of IC 9533	
27	SA 106417	100 mmfd. mica condenser	.20
28	VR 957	Volume control and line switch - (500,000 ohm)	1.25
29	SA 105281	1 meg., 1/4 W. resistor	.15
30	CW 4-02	.02 mfd. 400 V. condenser	.15
31	SA 105281	1 meg., 1/4 W. resistor	.15
32	SA 105278	100,000 ohm, 1/4 W. resistor	.15
33	SA 105279	250,000 ohm, 1/4 W. resistor	.15
34	SA 100195	250,000 ohm, 1/2 W. resistor	.15
35	CW 4-02	.02 mfd. 400 V. condenser	.15
36	SW 9519	Tone control switch	.95
37	CW 4-02	.02 mfd. 400 V. condenser	.15
38	CW 4-005	.005 mfd. 400 V. condenser	.15
39	SA 107357	Speaker output transformer	1.25
40	SA 105276	50,000 ohm, 1/4 W. resistor	.15
41	SA 107358	Speaker field coil - (1900 ohm)	1.75
42		.05 mfd. 200 V. condenser - part of 105327 (dual)	.30
43	CE 9512	12 mfd. electrolytic condenser (450 V.)	1.25
44	CE 9511	8 mfd. electrolytic condenser (300 V.)	.95
45	R. 9513	320 ohm resistor	.25
46		30 ohm resistor - part of RE 9513	
47	CE 958	10 mfd. electrolytic condenser	.65
48	TR 9511	Power transformer 105-125 V., 50-60 cycles	3.50
49		Line switch - part of VR 957	
50		Oscillator feed back coil - part of RC 9589	
51		Police oscillator coil - part of RC 9589	
56	SA 108043	.00001 mfd. mica condenser	.20
57	SA 105272	10,000 ohm, 1/4 W. resistor	.15
58	CW 4-05	.05 mfd., 400 V. condenser	.15
59	SK 9536	Speaker	6.00
60	SA 106617	Diaphragm and voice coil	1.15
61	LP 951	Dial lamp	.20
66	CB 9512	Line cable and plug	.50

UNITED AMERICAN BOSCH CORP.

MODEL 604B
Schematic
Voltage

AMERICAN-BOSCH RADIO MODEL 604B



MODEL 604B
Socket,Trimmers
Chassis,Parts
Alignment

UNITED AMERICAN BOSCH CORP.

ELECTRICAL SPECIFICATIONS

Power Supply Characteristics ---------- 105 to 125 volts, 50 to 60 cycle A.C. or D.C.
Power Consumption ---------- 48 Watts
Tuning Range ---------- 530 to 1525 KC., 1500 to 3000 KC.
Audio Output ---------- 1.5 Watts
Maximum Undistorted Output ---------- 1 Watt

GENERAL DESCRIPTION

This model is a five-tube, A.C.-D.C., superheterodyne receiver whose circuits consist of a combined first detector-oscillator, a stage of intermediate frequency amplification, a second detector, a power output stage and a rectifier.

LINEUP CAPACITOR ADJUSTMENTS

To align this model, it is essential to use a high grade modulated oscillator and sensitive output meter. The R.F. signal fed into the receiver must be very weak or it will cause the receiver to overload, making correct alignment impossible. The output meter must be sufficient to give satisfactory reading with a low signal.

Before attempting to align a receiver, the service man should familiarize himself with the general layout of the chassis, the location of the tubes and various adjustment condensers. The latter are shown in figures #1 and #2 and should be carefully studied before the actual work is started.

I.F. ADJUSTMENT (465 KC.)

NOTE: The signal generator or alignment oscillator should have no external ground connection of the low potential side of the output, either to the ground lead of the power line, and the low potential output terminal may be connected to the frame of the receiver. An external ground of the receiver frame will result in a loud hum making alignment impossible.

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

2. Set volume control at maximum.

3. Set the test oscillator to 465 KC., and apply test signal to the grid of the 6F7 tube through a 0.5 mfd. condenser.

4. Adjust second I.F. alignment condenser #21 to maximum output.

5. Apply the test signal to the grid of the 6A7 first detector-oscillator tube.

6. Adjust alignment condensers #9 and #11 to maximum output.

OSCILLATOR AND R.F. ADJUSTMENT

1. Set the test oscillator and dial indicator to 1500 KC., and apply the test signal to the antenna of the receiver through an 85 mmf. condenser.

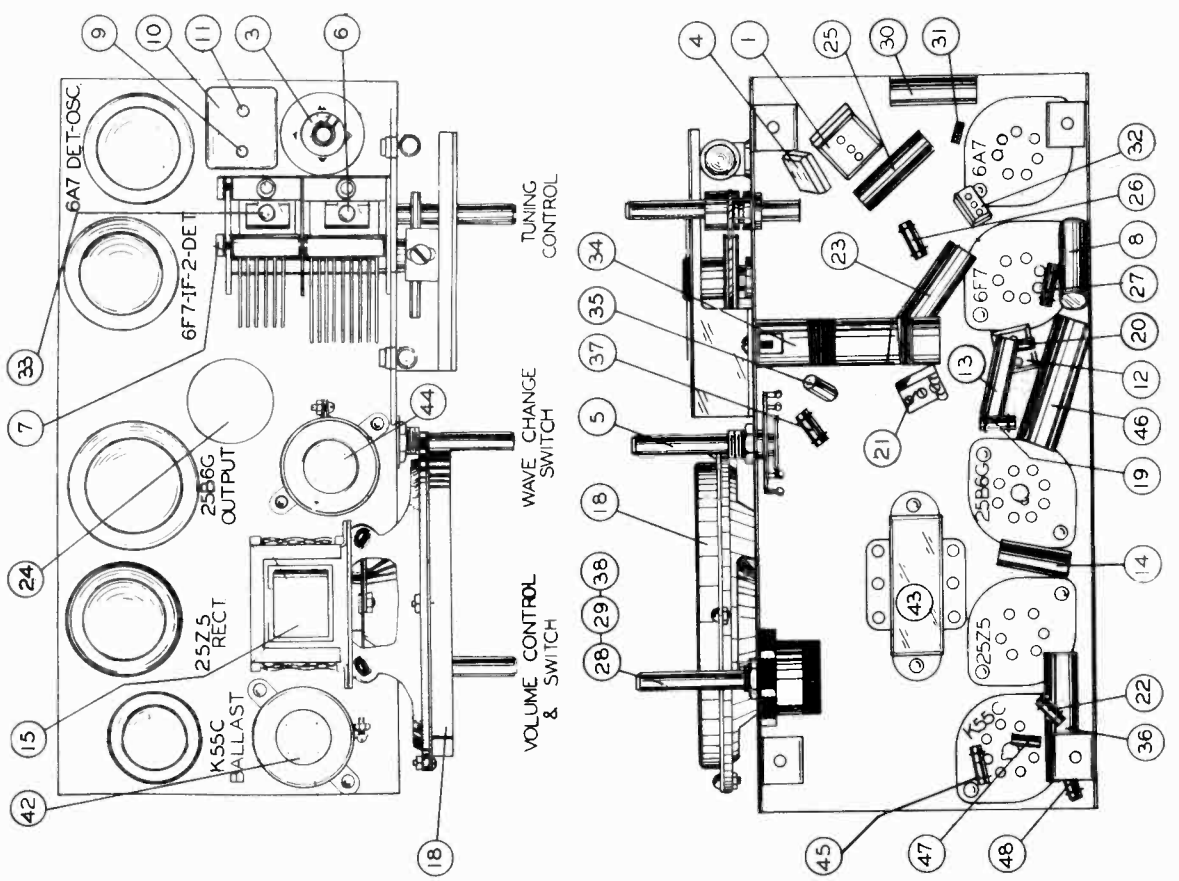
2. Adjust the oscillator and antenna alignment condensers #33 and #6 to maximum output.

3. Check sensitivity over scale.

4. Check sensitivity on short-wave band.

Ckt. #	Part #	Description of Parts	List Price
1	SA 3775	.001 mfd. mica condenser	$ .20
2	CS 9546	5 mmf. mica condenser	.20
3	RC 9519*	Preselector coil	1.50
4	CM 9522	.00048 mfd. mica condenser	.20
5	SW 9545	Way-change switch	.45
6		Trimrer condenser - part of CG 9547	
7	CG 9547	2-gang tuning condenser	2.50
8	CW 2-05	.05 mfd., 200 V. condenser	.15
9		15-150 mmf. trimmer condenser - part of IC 9596	
10	IC 9596	15-150 mmf. trimmer condenser - part of IC 9596	2.50
11		35-135 mmf. trimmer condenser - part of IC 9596	
12	SA 103775	.001 mfd. mica condenser	.20
13	CW 4-005	.005 mfd., 400 V. condenser	.15
14	CW 4-005	.005 mfd., 400 V. condenser	.15
15	TR 9588	Output transformer	1.00
16	DH 9512	Diaphragm and voice coil	1.50
17		Field coil - part of SK 9548	
18	SK 9548	Speaker	3.75
19	RE 9545	5,000 ohm, 1/8 W. resistor	.10
20	RE 9512	1/4 meg., 1/8 W. resistor	.10
21		30-60 mmf. trimmer condenser - part of IC 9568	
22	RE 9530	1 meg., 1/8 W. resistor	.10
23	CW 2-10	.1 mfd., 200 V. condenser	.15
24	IC 9568	2nd I.F. coil	1.25
25	CW 2-05	.05 mfd., 200 V. condenser	.15
26	RE 9572	1/2 meg., 1/4 W. resistor	.15
27	RE 9569	25,000 ohm, 1/8 W. resistor	.10
28		2,500 ohm volume control - part of VR 9531	
29	VR 9531	10,000 ohm volume control - part of VR 9531	.90
30	CW 4-005	.005 mfd. 400 V. condenser	.15
31	RE 9524	50,000 ohm, 1/8 W. resistor	.10
32	CM 9513	.0001 mfd. mica condenser	.10
33		Trimmer condenser - part of CG 9547	
34	RC 95186	Oscillator coil	.70
35	CW 4-005	.005 mfd., 400 V. condenser	.15
36	CW 2-20	.2 mfd., 200 V. condenser	.15
37	RE 9527	5,000 ohm, 1/8 W. resistor	.10
38		Switch, part of VR 9531	
39	CB 9512	Line cable	.50
40	LP 9516	Dial light - 6.3 V., .15 amp.	.20
41	CE 9553	40 mfd., 150 V., electrolytic condenser	.80
42	SA 105311	Choke coil assembly	.95
43	CE 9534	16 mfd., 150 V., electrolytic condenser	.70
44	RB 9545	1/2 meg., 1/8 W. resistor	.10
45	CW 2-10	.25 mfd., 200 V. condenser	.20
46	RW 95115	4,000 ohm, 2 W. resistor	.20
47	RE 9519	1/2 meg., 1/2 W. resistor	.10
48	RE 9545	1/2 meg., 1/8 W. resistor	.10
49	KL 105344	Antenna cable	.20

PRICES SUBJECT TO CHANGE WITHOUT NOTICE



UNITED MOTORS SERVICE

MODEL 66
Schematic, Voltage

Battery Terminal Volts	5.5	6.3	7.5
B+ to B- (Volts)	216	261	322
B+ to Ground (Volts)	184	218	257
Total Battery Drain (Amps)	6.15	7.25	8.50

* Measured with 300,000 ohm meter.

All voltages measured with no input signal.

All voltages to ground from socket unless otherwise stated.

CONDENSERS

C1 — .03	C16 — .25	R1 — 300,000	R10 — 10,000
C2 — .03	C17 — .02	R2 — 250	R11 — 200,000
C3 — .01	C18 — 8.0	R3 — 300,000	R12 — 250,000
C4 — .1	C19 — 8.0	R4 — 400	R13 — 250,000
C5 — .25	C20 — .0005	R5 — 300,000	R14 — 50,000
C6 — .25	C21 — .0005	R6 — 100,000	R15 — 300,000
C7 — .25	C22 — .00025	R7 — 200,000	R16 — 500,000 GLOBAR
C8 — .03	C23 — .005	R8 — 2,500	R17 — 50,000
C9 — .0005	C24 — .1	R9 — 10,000	R18 — 1,000,000
C10 — .03	C25 — .008		
C11 — .0005	C26 — .008		
C12 — 10.	C27 — .1		
C13 — .25	C28 — .5		
C14 — .25	C29 — .1		
C15 — .03	C30 — .5		

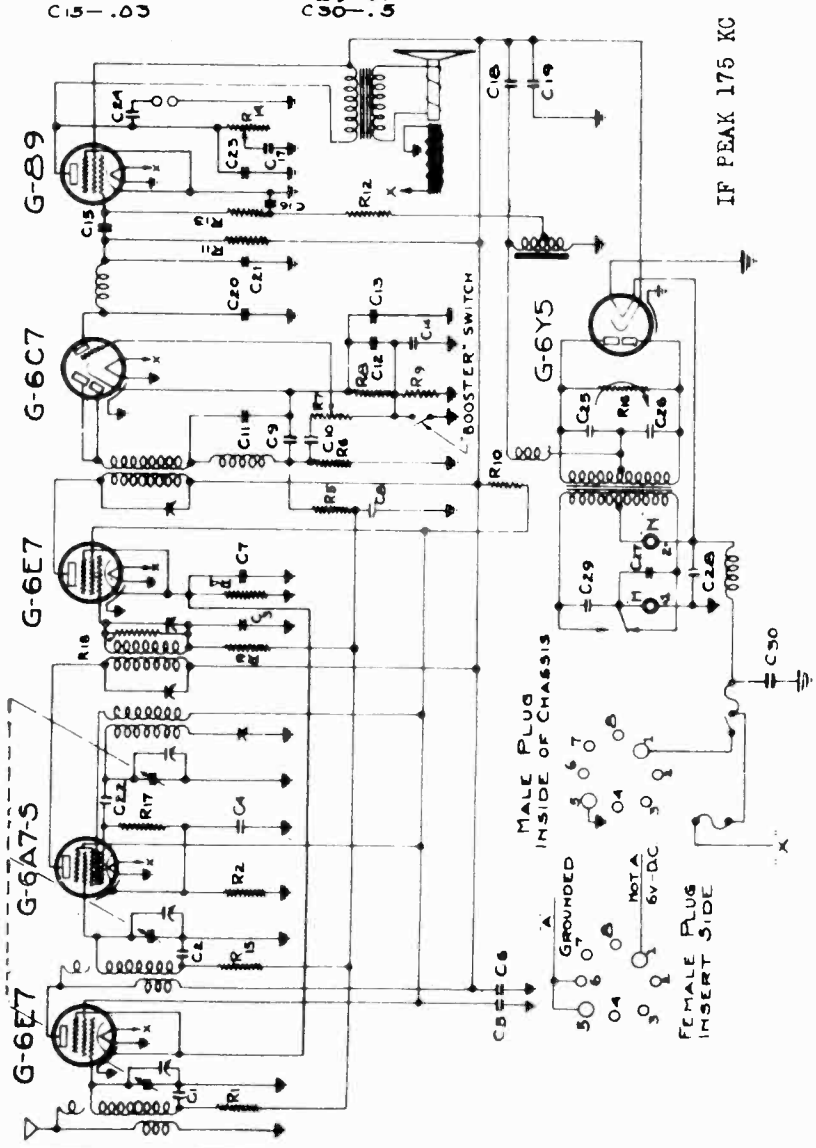
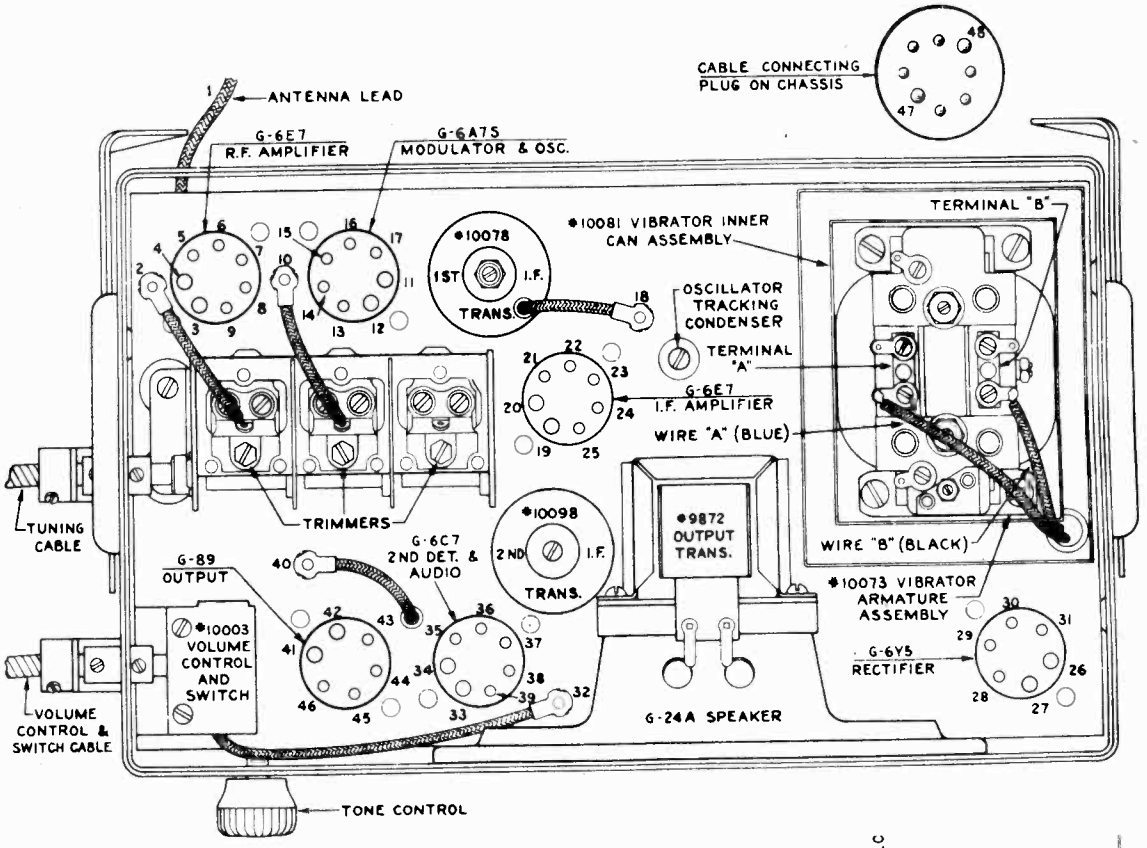


		PLATE VOLTS			SCREEN VOLTS			CATHODE VOLTS			GRID VOLTS		
Battery Terminal) Volts		5.5	6.3	7.5	5.5	6.3	7.5	5.5	6.3	7.5	5.5	6.3	7.5
R. F. (G-6E7)		182	217	256	88	99	109	8.0	9.3	12.5	8.0	9.3	12.5
G-6A7S	Det.	182	217	256	88	99	109	2.7	3.4	4.2	2.7	3.4	4.2
	Osc.	88	99	109	-	-	-	-	-	-	7.0*	8.0*	8.0*
I. F. (G-6E7)		182	217	256	88	99	109	8.0	9.3	12.5	8.0	9.3	12.5
Audio (G-6C7)		51	60	61	-	-	-	7.5	9.2	9.5	1.8	2.2	2.3
Output (G-89)		177	209	248	184	218	257	-	-	-	23.0	27.0	35.0

MODEL 66
Socket, Trimmers
Resistance

UNITED MOTORS SERVICE



MODEL 66 RESISTANCE CHART

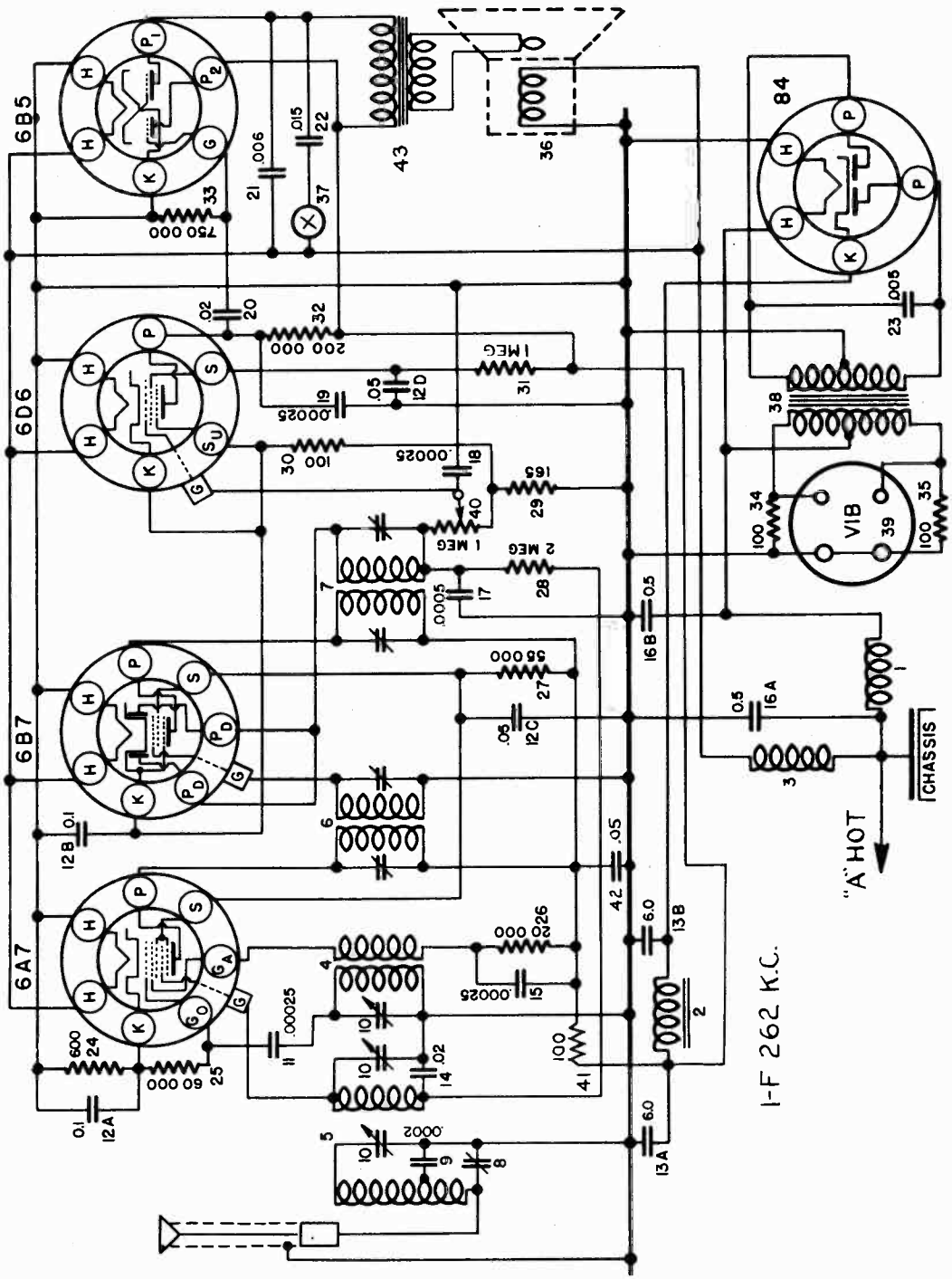
All readings are taken from designated points to ground except those marked with an asterisk (*) which are taken to terminal No. 29, with all tubes removed from their sockets, volume control turned to maximum clockwise position, and the speaker connected in the circuit.

TERMINAL NUMBER	RESISTANCE IN OHMS	IF RESISTANCE DIFFERS GREATLY FROM VALUE SHOWN, CHECK THE FOLLOWING:
1	21	Primary of antenna coil
2	700,000	Secondary of antenna coil, R-1, C-1, R-5, C-8 and R-6
3	0	Ground connection
4	.135	Primary of vibrator trans., Field Coil, C-30, C-28, C-27 and C-29
5	400	R-4 and C-7
6	0	Ground connection
7	Same as #5	
*8	10,000	R-10
9	112	Primary of R.F. transformer
10	700,000	Secondary of R.F. transformer, C-2 and R-15
11	Same as #4	
12	0	Ground connection
13	250	R-2 and C-4
14	50,250	R-17
*15	10,000	Secondary of oscillator coil and R-10
16	Same as #8	
*17	88	Primary of 1st I.F. transformer
18	700,000	Secondary of 1st I.F. transformer, C-3, and R-3
19	Same as #4	
20	0	Ground connection
21	Same as #5	
22	0	Ground connection
23	Same as #5	
24	Same as #8	
*25	165	Primary of 2nd I.F. transformer
26	Same as #4	
27	0	Ground connection
28	1250	Secondary of vibrator trans., C-26, C-25, R.F. buzzer choke, and "B" filter choke
29	0	C-18, C-19, C-5 and C-6
30	Same as #28	
31	0	Ground connection
32	210,000	C-10, R-7, R-9, C-14 and C-13
33	Same as #4	
34	0	Ground connection
35	12,500	R-8, R-9, C-12, C-13, C-14 and C-10
36	100,284	Secondary of 2nd I.F. trans., R.F.C., R-6, C-11, C-9 and C-1C
37	Same as #36	
38	0	Ground connection
*39	200,035	C-20, C-21, R.F.C., C-15 and R-11
40	500,450	R-13, R-12, C-16 and "B" filter choke
41	Same as #4	
42	0	Ground connection
43	0	Ground connection
44	Same as #43	
*45	0	Connections
46	43C	Primary of output transformer
47	0	Ground connection
48	Same as #4	

Due to manufacturing tolerances on carbon resistors, the values given above may be expected to differ plus or minus 15 per cent.

UNITED MOTORS SERVICE

MODEL 631
Schematic
Voltage



Delco Model 631

Date: 3-11-36

Above readings taken with a meter having a resistance of 1000 ohms per volt, using the scale on which the largest deflection could be obtained.

Ampere drain--6.5 amperes at 6 volts.

* A.C. voltage measured from plate to plate of 84 tube socket with tube removed should be 550 volts.

TUBE SOCKET VOLTAGES

Tube	Function	H	P	S	P2	GA	K
6A7	Osc.-Mod.	6	240	90	-	150	6.0
6B7	I-F Amp.	6	240	90	-	-	4.0
6D6	A-F Amp.	6	70	30	-	-	4.0
6B5	Output	6	240	-	220	-	0
84	Rectifier	6	*	-	-	-	240

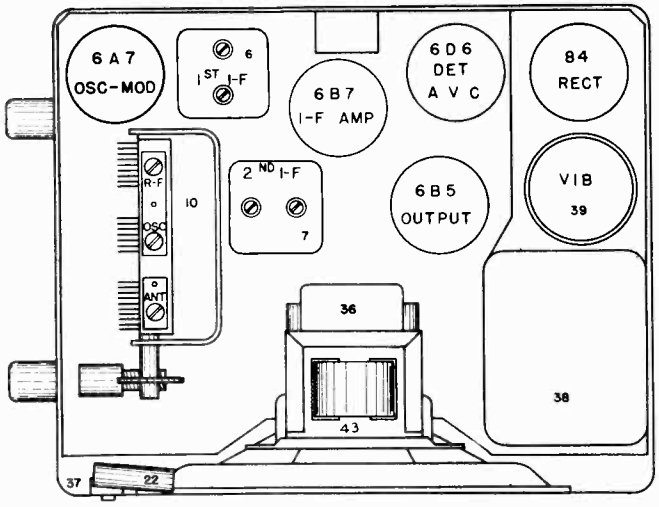


FIG. 3--PARTS LAYOUT--Top View

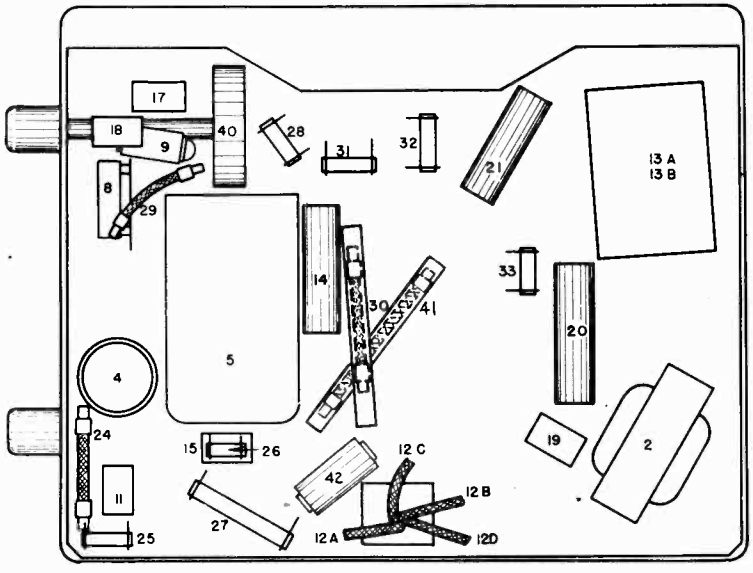


FIG. 4--PARTS LAYOUT--Bottom View

CIRCUIT ALIGNMENT

1. Aligning the I-F Stages at 262 K.C.

(a) Feed a test oscillator signal of 262 K.C. into the control grid of the 6B7 tube (leave grid clip in place) through a .25 mfd. condenser and adjust the I-F trimmers on the 2nd I-F coil (Illus. #7 on Fig. 3). Care should be taken to keep the test oscillator leads well away from the grid leads of other tubes in the receiver to avoid inaccurate adjustments.

(b) Remove the test oscillator lead from the grid of the 6B7 tube and connect it to the grid of the 6A7 tube (leaving grid clip in place) and adjust the trimmers on the 1st I-F coil (Illus. #6 Fig. 3) carefully for maximum output.

(c) The preceding adjustments should be repeated as given for best results. Do not align the two stages together by feeding a signal into the grid of the 6A7 tube.

2. Aligning the R-F Stages

(a) Change the test oscillator setting to 1560 K.C. and feed this signal into the antenna connection on the chassis through a .0002 mfd. condenser. Turn the condenser rotor plates until they are completely out of mesh and rest against the high frequency stop. Adjust the parallel trimmer for the oscillator section (middle) of the gang condenser.

(b) Change test oscillator setting to 1400 K.C. and turn condenser rotor plates until this signal is tuned in. Then adjust the trimmers for the other two sections of the condenser gang.

(c) Change test oscillator setting to 600 K.C. and turn condenser rotor plates until this signal is tuned in. Adjust the antenna compensating condenser (Illus. #8, Fig. 4), while rocking the condenser gang plates back and forth through the signal until maximum output is obtained. It will be necessary to readjust this trimmer to the car antenna upon installation.

(d) Recheck alignment of the antenna section of the gang condenser (Illus. #10, Fig. 3) for maximum output at 1400 K.C.

NOTE: Each of the trimmers on the gang condenser should be carefully sealed with Duco Household Cement to prevent any change in adjustment. In using this cement care should be taken to see that it is placed only between the top blade of the trimmer condenser and its adjusting screw.

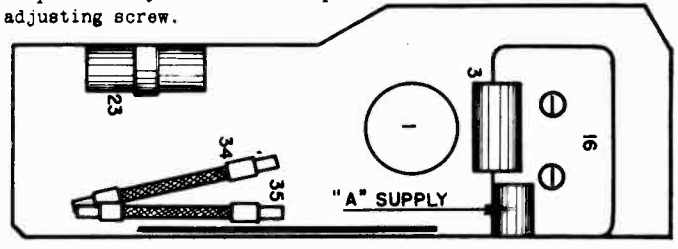
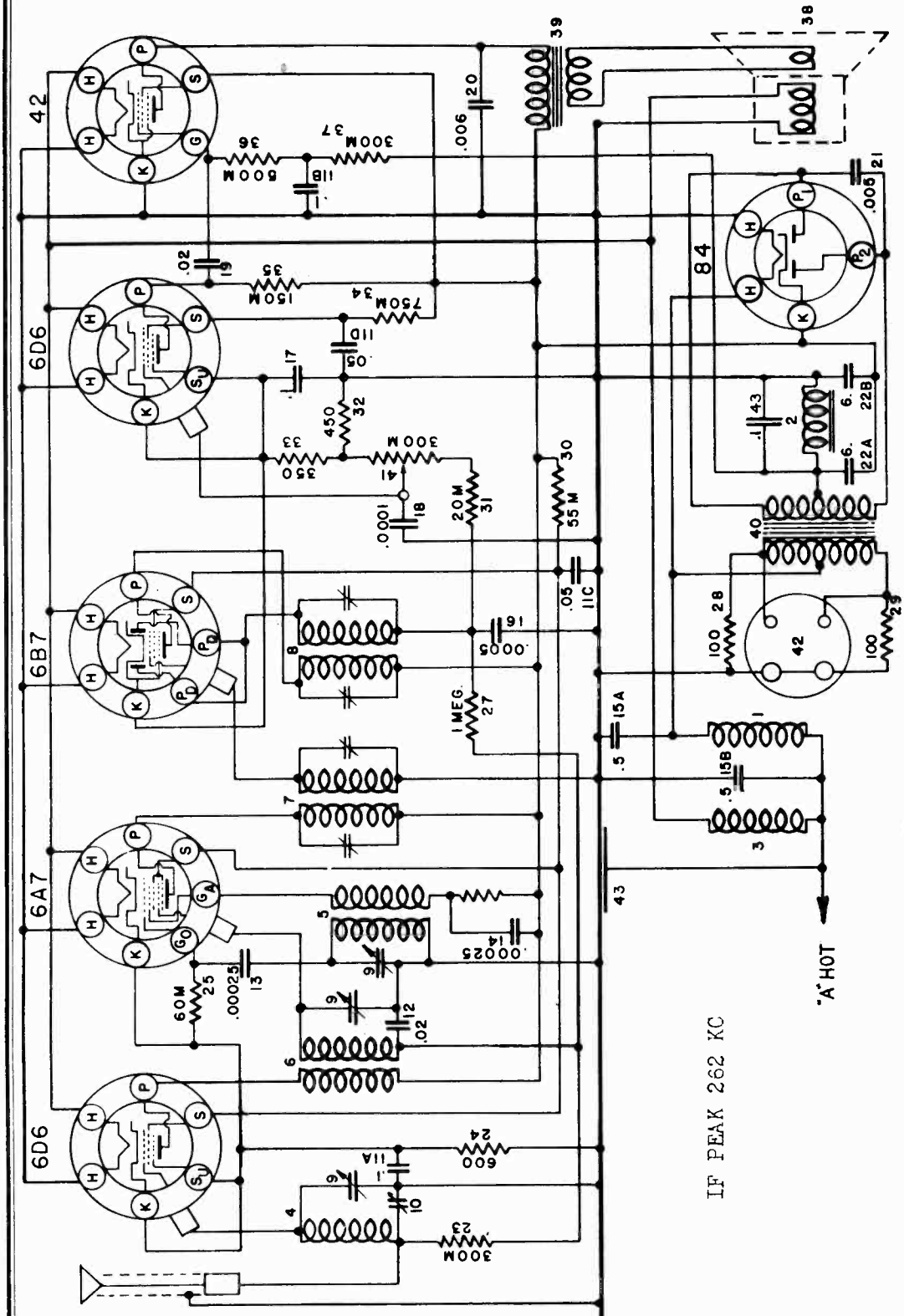


FIG. 1--PARTS LAYOUT--Vibrator Filter

UNITED MOTORS SERVICE

MODEL 631-A
Schematic, Voltage



Above readings made from tube socket contacts to ground, with a 1000 ohm-per-volt meter, volume control - on full. Ampere drain - - 7 amperes at 6 volts. *A.C. volts plate to plate 550 volts with tube removed. **15 volts measured across "B" filter choke.

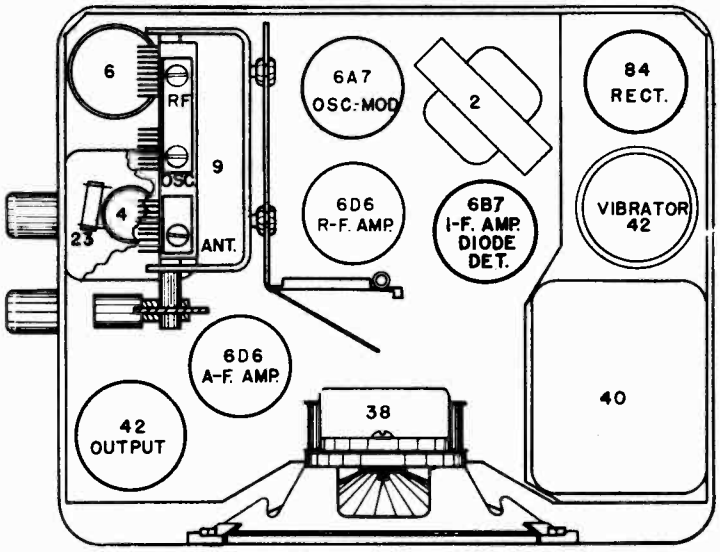


FIG. 3--PARTS LAYOUT--Top View

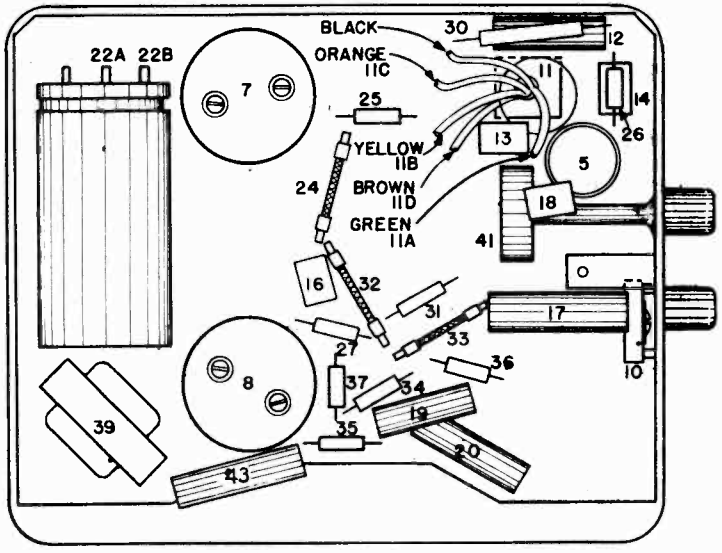


FIG. 4--PARTS LAYOUT--Bottom View

CIRCUIT ALIGNMENT

If alignment is found necessary--make all adjustments for maximum output with chassis in its case and use a calibrated test oscillator and output meter.

1. Aligning I-F Stages at 262 K.C.

Feed a test oscillator signal of 262 K.C. into the control grid of the 6A7 tube (leave grid clip in place) through a .25 mfd. condenser and adjust the trimmers on the I-F coils (Illus. 7 & 8, Fig. 4) for maximum output. (Case should be taken to keep the test oscillator leads well away from the grid leads of other tubes to avoid inaccurate adjustments.

2. Aligning R-F Stages

(a) Change the test oscillator setting to 1560 K.C. and feed this signal into the antenna connection on the chassis through a .0002 mfd. (mica) condenser. Turn the condenser rotor plates until they are completely out of mesh and rest against the high frequency stop. Adjust the parallel trimmer for the oscillator section (middle) of the gang condenser. (Illus. #9 Fig. 4)

(b) Change test oscillator setting to 1400 K.C. and turn condenser rotor plates until this signal is tuned in. Then adjust the trimmers for the other two sections of the condenser gang.

(c) Change test oscillator setting to 600 K.C. and turn condenser rotor plates until this signal is tuned in. Adjust the antenna compensating condenser, (Illus. #10 Fig. 3) while rocking the condenser plates back and forth through the signal until maximum output is obtained. It will be necessary to readjust this trimmer to the car antenna upon installation.

(d) Recheck Alignment of the antenna section of the gang condenser (Illus. 9, Fig. 3) for maximum output at 1400 K.C.

NOTE: Each of the trimmers on the gang condenser should be carefully sealed with Duco Household Cement to prevent any change in adjustment. In using this cement care should be taken to see that it is placed only between the top blade of the trimmer condenser and its adjusting screw.

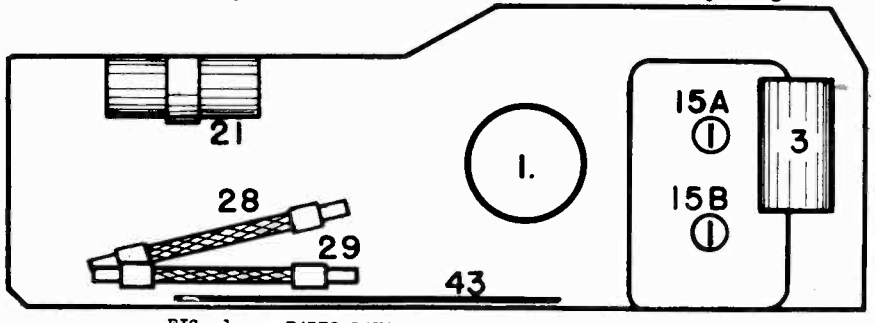
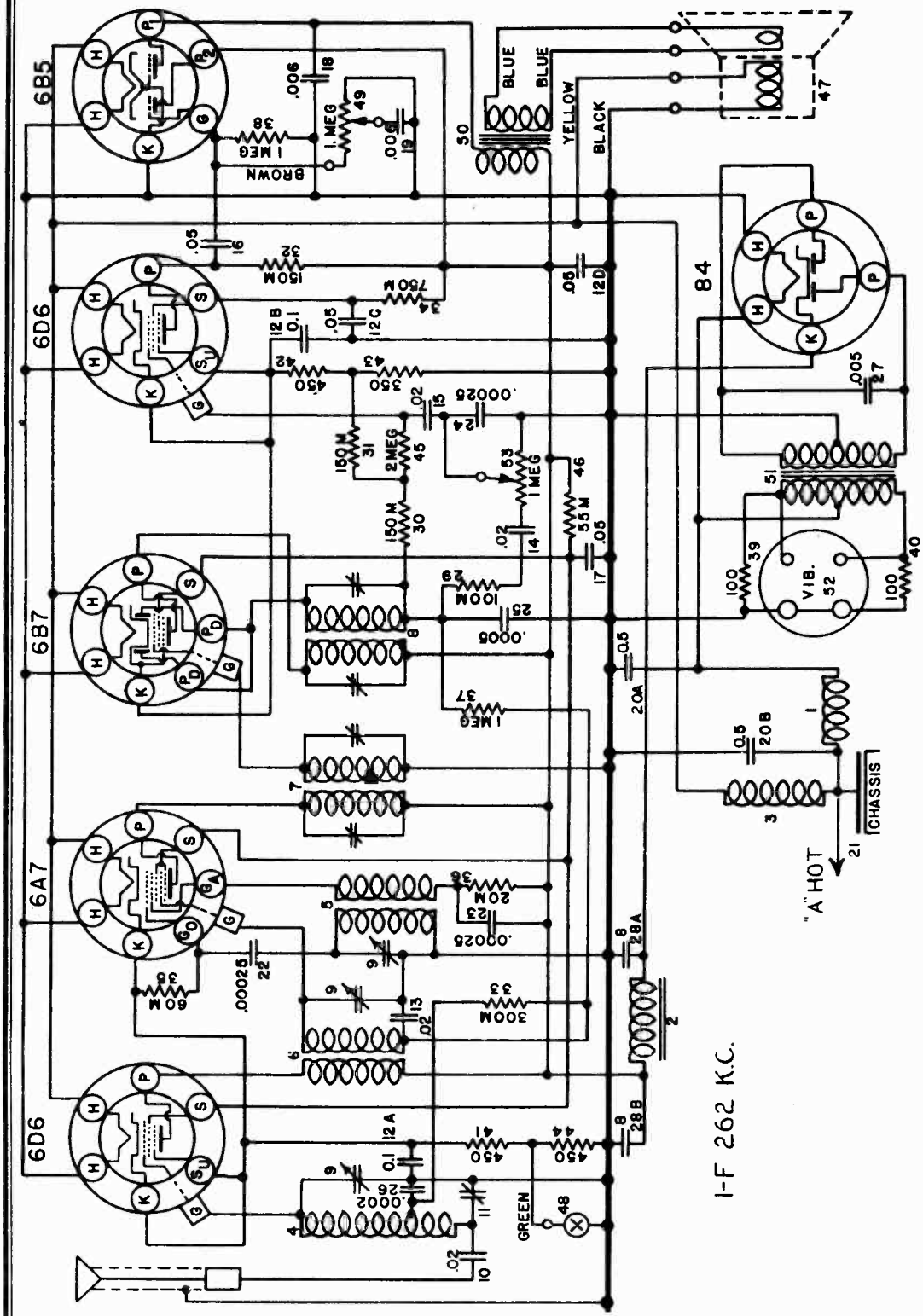


FIG. 1 - - PARTS LAYOUT - - Vibrator filter

UNITED MOTORS SERVICE

MODEL 632
Schematic
Voltage



TUBE SOCKET VOLTAGES	Tube	Function	H	P	S	Ga	P2	K
	6D6	R-F Amp.	6	240	80	-	-	5.5
	6A7	Osc.-Mod.	6	240	80	165	-	5.5
Delco Model 632	6B7	I-F Amp.	6	240	80	-	-	3.5
	6D6	A-F Amp.	6	50	35	-	-	3.5
Date: 3-2-36	6B5	Output	6	240	-	-	220	.0
	84	Rectifier	6	*	-	-	-	240

Above readings taken with a meter having a resistance of 1000 ohms per volt, using the scale on which the largest deflection could be obtained.

Ampere drain--7 amperes at 6 volts.

* A.C. voltage measured from plate to plate of 84 tube socket with tube removed should be 550 volts.

MODEL 632
Socket, Trimmers
Alignment

UNITED MOTORS SERVICE

GENERAL: The Delco Model 632 is a six tube, single unit auto radio with tone and sensitivity controls, dust-proof speaker and a primary type vibrator. This receiver is supplied with a wide variety of tuning controls and adapter packages making it possible to obtain "custom built" installation in most any make car.

CIRCUIT ALIGNMENT

If alignment is found necessary--make all adjustments for maximum output with chassis in its case and use a calibrated test oscillator and output meter.

1. Aligning the I-F Stages at 262 K.C.

Feed a test oscillator signal of 262 K.C. into the control grid of the 6A7 tube (leave grid clip in place) through a .25 mfd. condenser and adjust the trimmers on the I-F coils (Illus. 7 & 8, Fig. 4) for maximum output. (Care should be taken to keep the test oscillator leads well away from the grid leads of other tubes to avoid inaccurate adjustments)

2. Aligning the R-F Stages

(a) Change the test oscillator setting to 1560 K.C. and feed this signal into the antenna connection on the chassis through a .002 mfd. condenser. Turn the condenser rotor plates until they are completely out of mesh and rest against the high frequency stop. Adjust the parallel trimmer for the oscillator section (middle) of the gang condenser.

(b) Change test oscillator setting to 1400 K.C. and turn condenser rotor plates until this signal is tuned in. Then adjust the trimmers for the other two sections of the condenser gang.

(c) Change test oscillator setting to 600 K.C. and turn condenser rotor plates until this signal is tuned in. Adjust the antenna compensating condenser, while rocking the condenser plates back and forth through the signal until maximum output was obtained. It will be necessary to readjust this trimmer to the car antenna upon installation.

(d) Recheck alignment of the antenna section of the gang condenser (Illus. 10, Fig. 3) for maximum output at 1400 K.C.

NOTE: Each of the trimmers on the gang condenser should be carefully sealed with Duco Household Cement to prevent any change in adjustment. In using this cement care should be taken to see that it is placed only between the top blade of the trimmer condenser and its adjusting screw.

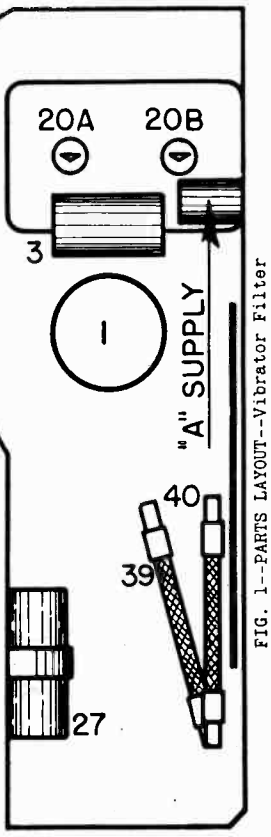


FIG. 1--PARTS LAYOUT--Vibrator Filter

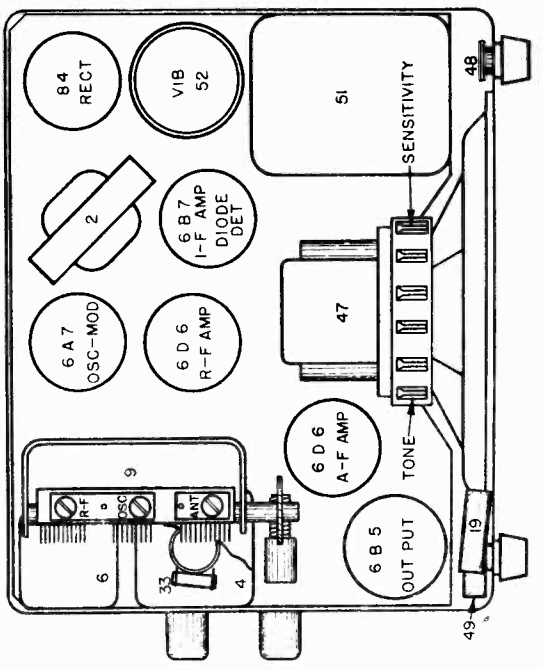


FIG. 3--PARTS LAYOUT--Top View

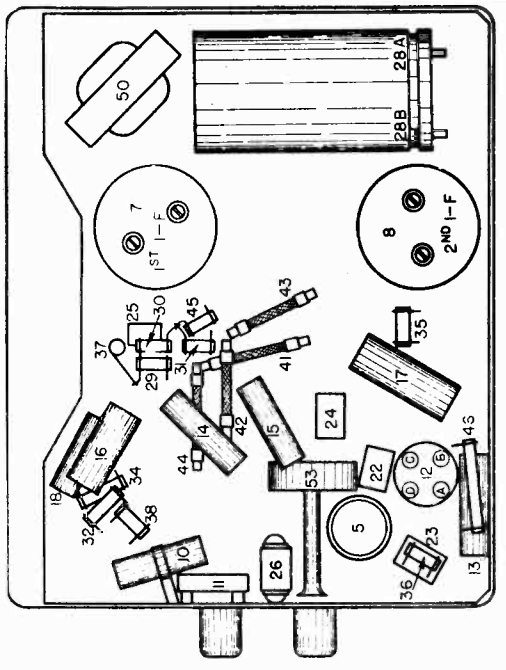
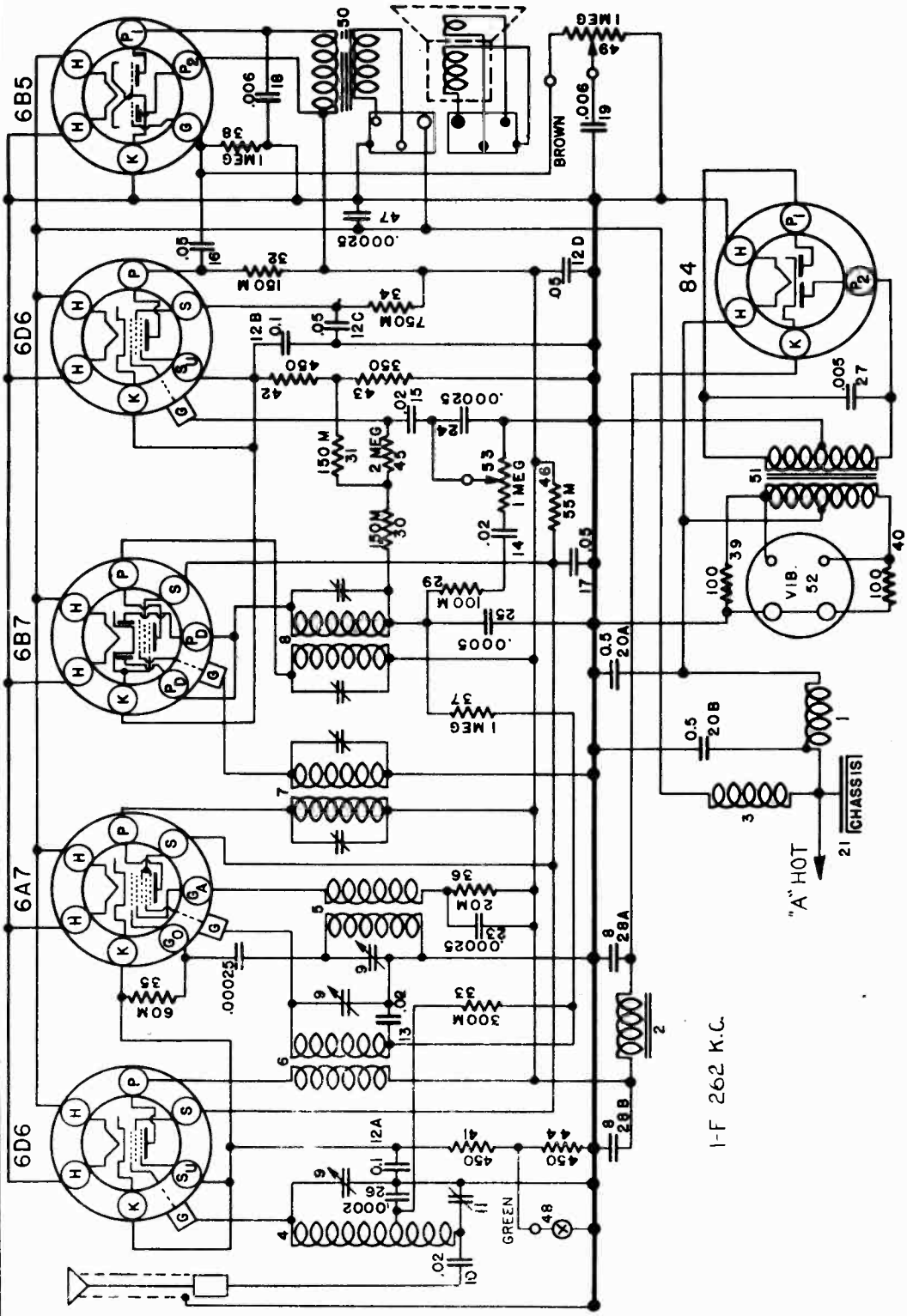


FIG. 4--PARTS LAYOUT--Bottom View

UNITED MOTORS SERVICE

MODEL 633
Schematic
Voltage



TUBE SOCKET VOLTAGES	Tube	Function	H	P	S	Ga	P2	Su	K
	6D6	R-F Amp.	6	240	80	-	-	5.5	5.5
Delco Model 633	6A7	Osc. Mod.	6	240	80	165	-	-	5.5
	6B7	I-F Amp.	6	240	80	-	-	-	3.5
Date: 3-12-36	6D6	A-F Amp.	6	50	35	-	-	3.5	3.5
	6B5	Output	6	220	-	-	240	-	.0
	84	Rectifier	6	*	-	-	-	-	240

Above readings taken with a meter having a resistance of 1000 ohms per volt, using the scale on which the largest deflection could be obtained.

Ampere drain--7 amperes at 6 volts.

* A.C. Voltage measured from plate to plate of 84 tube should be 550 volts.

MODEL 633
Socket, Trimmers
Alignment

UNITED MOTORS SERVICE

GENERAL: The Delco Model 633 is a six tube, header speaker auto radio, with tone and sensitivity controls, dust-proof speaker and a primary type vibrator. This receiver is supplied with a wide variety of tuning controls and adapter packages making it possible to obtain "custom built" installation in most any make car.

CIRCUIT ALIGNMENT

1. Aligning the I-F Stages at 262 K.C.

(a) Feed a test oscillator signal of 262 K.C. into the control grid of the 6A7 tube (have grid clip in place) through a .25 mfd. condenser and adjust the trimmers on the I-F coils (Illus. 7 & 8, Fig. 4) for maximum output. Care should be taken to keep the test oscillator leads well away from the grid loads of other tubes to avoid inaccurate adjustments.

(b) Repeat above adjustments until no further increase in output can be obtained.

2. Aligning the R-F Stages

(a) Change the test oscillator setting to 1560 K.C. and feed this signal into the antenna connection on the chassis through a .0002 mfd. condenser. Turn the condenser rotor plates until they are completely out of mesh and rest against the high frequency stop. Adjust the parallel trimmer for the oscillator section (middle) of the gang condenser.

(b) Change test oscillator setting to 1400 K.C. and turn condenser rotor plates until this signal is tuned in. Then adjust the trimmers for the other two sections of the condenser gang.

(c) Change test oscillator setting to 600 K.C. and turn condenser rotor plates until this signal is tuned in. Adjust the antenna compensating condenser, (Illus. #11, Fig. 4) while rocking the condenser plates back and forth through the signal until maximum output is obtained. It will be necessary to readjust this trimmer to the car antenna upon installation.

(d) Recheck alignment of the antenna section of the gang condenser (Illus. #9, Fig. 3).

NOTE: Each of the trimmers on the gang condenser should be carefully sealed with Duco Household Cement to prevent any change in adjustment. In using this cement care should be taken to see that it is placed only between the top blade of the trimmer condenser and its adjusting screw.

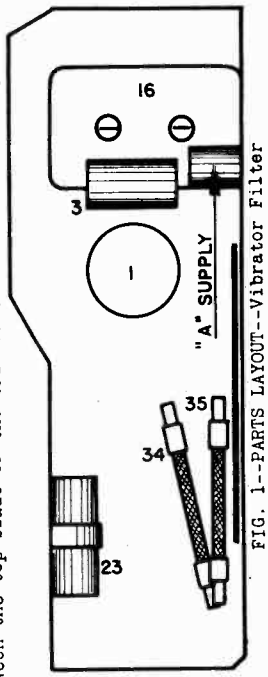


FIG. 1--PARTS LAYOUT--Vibrator Filter

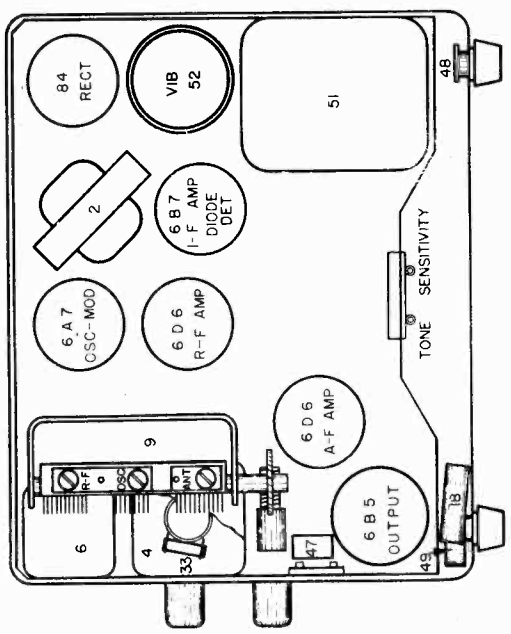


FIG. 3--PARTS LAYOUT--Top View

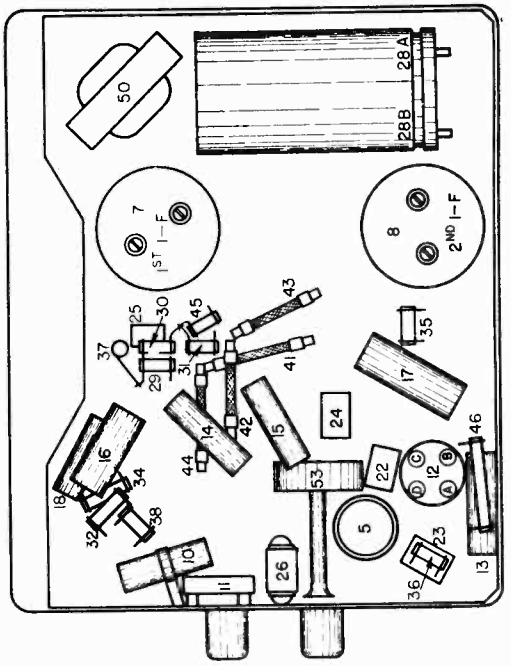
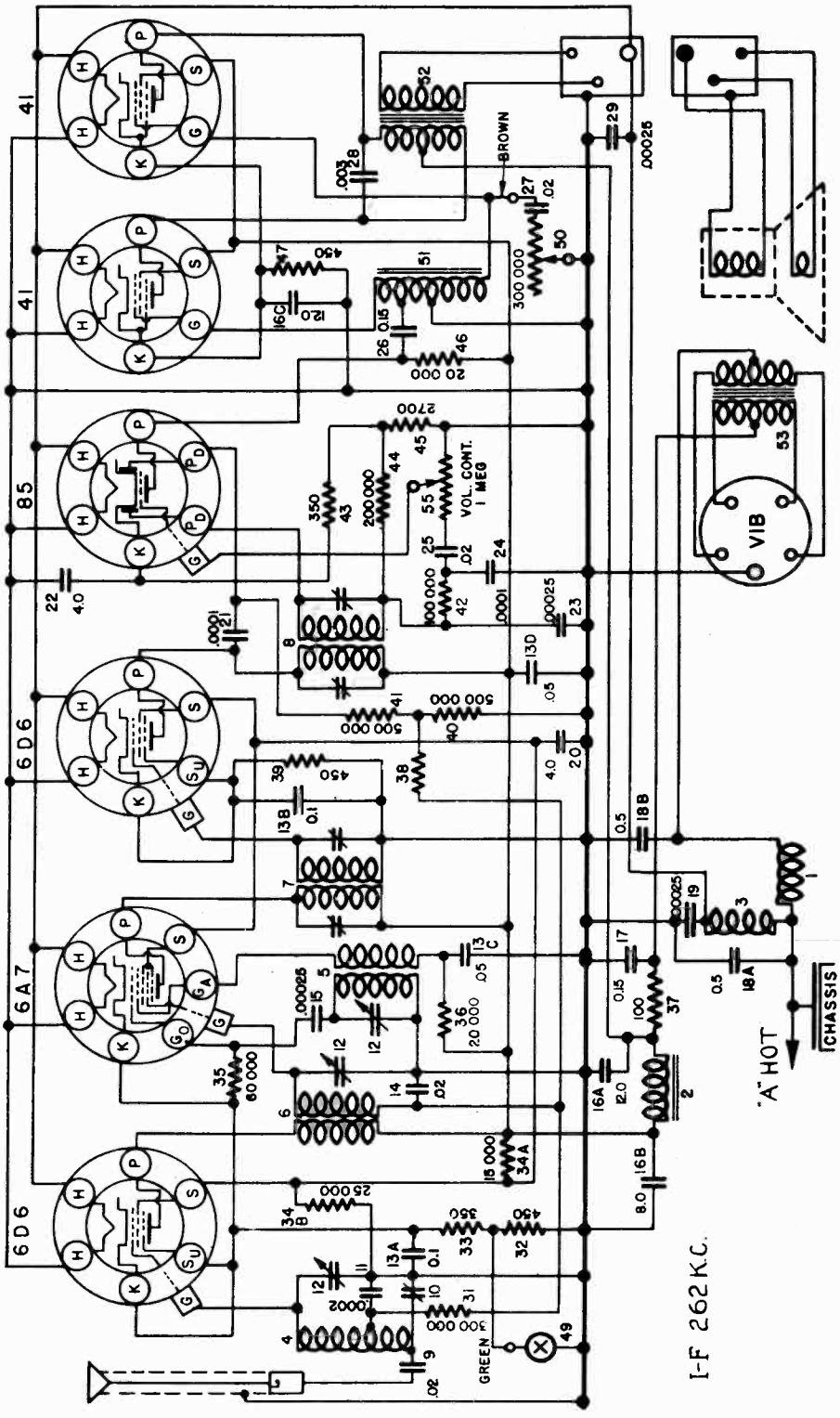


FIG. 4--PARTS LAYOUT--Bottom View

UNITED MOTORS SERVICE

MODEL 634
Schematic
Voltage



Deico Model 634

Date: 3-12-36

TUBE SOCKET VOLTAGES

Tube	Function	H	P	S	GA	SU	K
6D6	R-F Amp.	6	220	90	--	5.0	5.0
6A7	Osc. Mod.	6	220	90	140	--	5.0
6D6	I-F Amp.	6	220	90	--	5.0	3.5
85	Det. A-F	6	150	--	--	--	12
41	Output	6	230	220	--	--	20
41	Output	6	230	220	--	--	20

Above reading taken with a meter having a resistance of 1000 ohms per volt, using the scale on which the largest deflection could be obtained.

Ampere drain--7.25 amperes at 6 volts.

MODEL 634
Socket, Trimmers
Alignment

UNITED MOTORS SERVICE

1. Aligning the I-F Stages at 262 K.C.

(a) Feed a test oscillator signal of 262 K.C. into the control grid of the 6A7 tube (leave grid clip in place) through a .25 mfd. condenser and adjust the trimmers on the I-F coils (Illus. 7 & 8, Fig. 2) for maximum output. Care should be taken to keep the test oscillator leads well away from the grid leads of other tubes to avoid inaccurate adjustments.

(b) Repeat above adjustments until no further increase in output can be obtained.

2. Aligning the R-F Stages

(a) Change the test oscillator setting to 1560 K.C. and feed this signal into the antenna connection on the chassis through a .0002 mfd. condenser. Turn the condenser rotor plates until they are completely out of mesh and rest against the high frequency stop. Adjust the parallel trimmer for the oscillator section (middle) of the gang condenser.

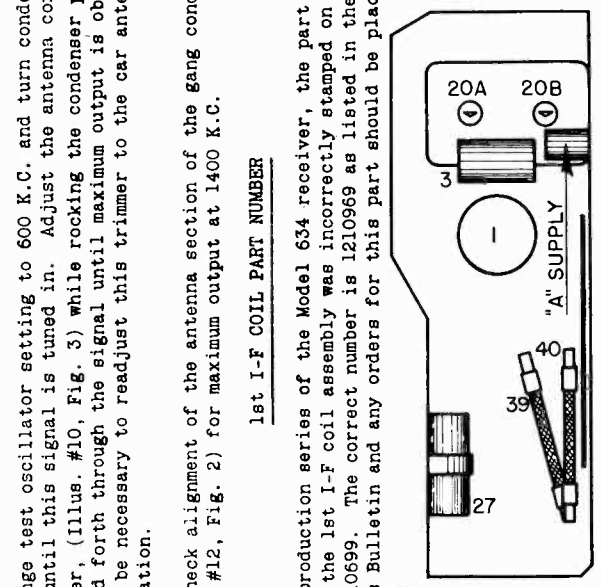
(b) Change test oscillator setting to 1400 K.C. and turn condenser rotor plates until this signal is tuned in. Then adjust the trimmers for the other two sections of the condenser gang.

(c) Change test oscillator setting to 600 K.C. and turn condenser rotor plates until this signal is tuned in. Adjust the antenna compensating condenser, (Illus. #10, Fig. 3) while rocking the condenser plates back and forth through the signal until maximum output is obtained. It will be necessary to readjust this trimmer to the car antenna upon installation.

(d) Recheck alignment of the antenna section of the gang condenser (Illus. #12, Fig. 2) for maximum output at 1400 K.C.

1st I-F COIL PART NUMBER

In certain production series of the Model 634 receiver, the part number applying to the 1st I-F coil assembly was incorrectly stamped on its shield case as #1210699. The correct number is 1210969 as listed in the parts list of this Bulletin and any orders for this part should be placed under this number.



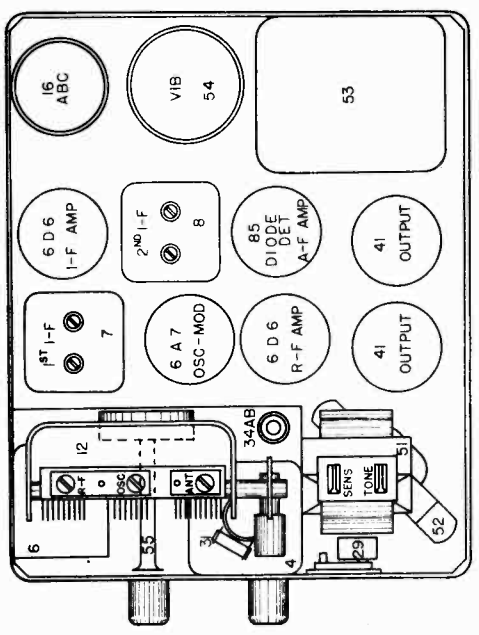


FIG. 2--PARTS LAYOUT--Top View

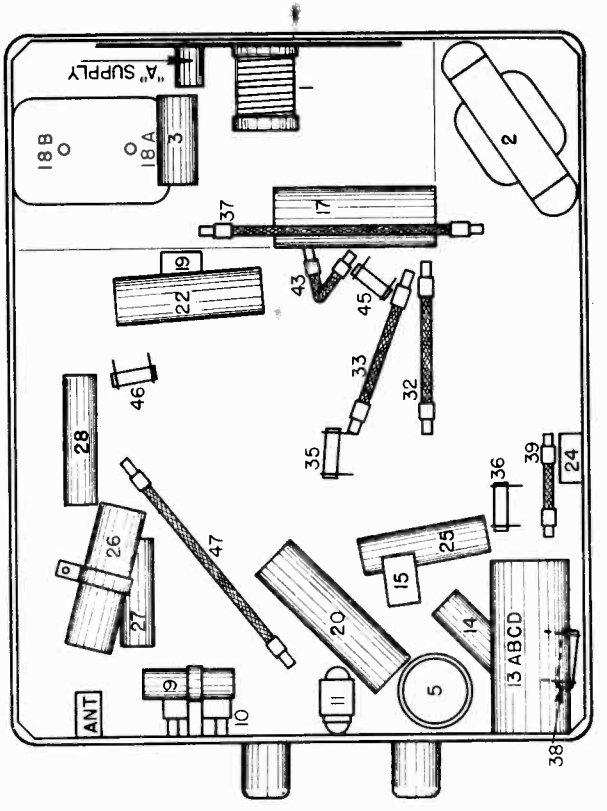
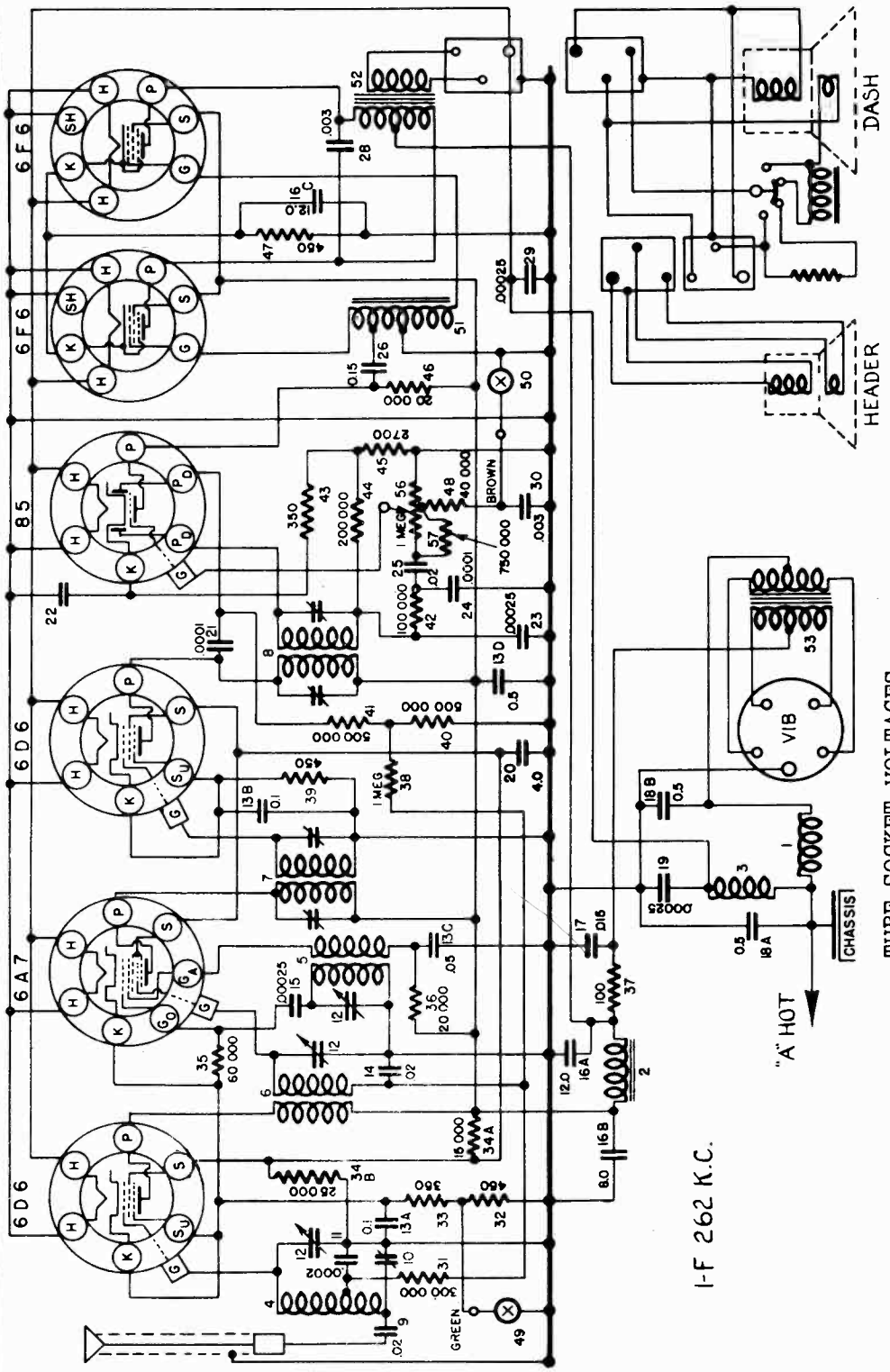


FIG. 3--PARTS LAYOUT--Bottom View

UNITED MOTORS SERVICE

MODEL 635
Schematic
Voltage



Delco Model 635

Date: 3-18-36

TUBE SOCKET VOLTAGES

Tube	Function	H	P	S	Su	Ga	K
6D6	R-F Amp.	6	220	90	5.0	--	5.0
6A7	Osc. Model	6	220	90	--	140	5.0
6D6	I-F Amp.	6	220	90	5.0	--	3.5
85	Det. A-F	6	150	--	--	--	12
6F6	Output	6	230	220	--	--	20
6F6	Output	6	230	220	--	--	20

Above readings taken with a meter having a resistance of 1000 ohms per volt, using the scale on which the largest deflection could be obtained.

Ampere drain 8.2 amperes at 6 volts.

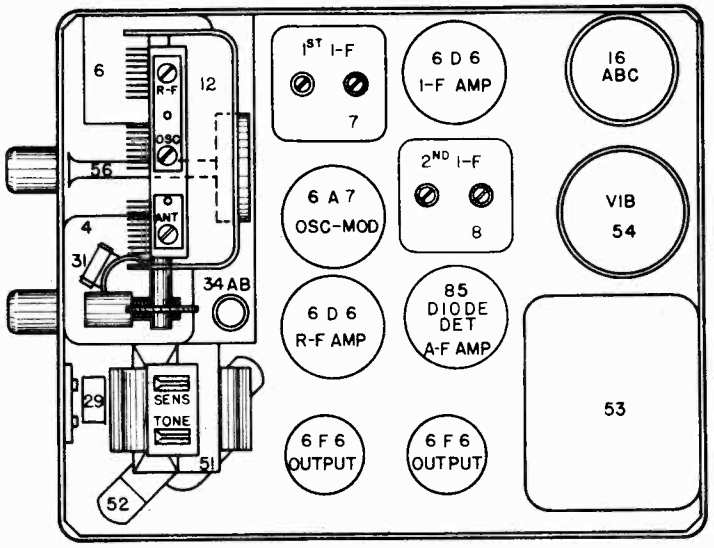


FIG. 2--PARTS LAYOUT--Top View

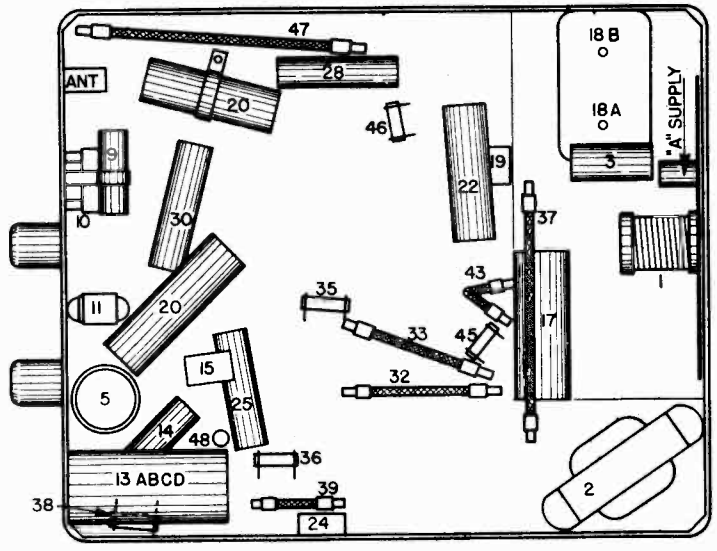


FIG. 3--PARTS LAYOUT--Bottom View

GENERAL: The Delco Model 635 is a six tube, combination "dash" and "header" speaker auto radio, with sensitivity control, bass compensation control, speaker selector switch, synchronous vibrator and metal type (6F6) power tubes. This receiver is supplied with a wide variety of tuning controls and header speaker adapters, making it possible to obtain "custom built" installation in most any car.

CIRCUIT ALIGNMENT

If re-alignment of the receiver circuits is found necessary--make all adjustments for maximum output with the receiver chassis in its case and use a calibrated test oscillator and output meter.

1. Aligning the I-F Stages at 262 K.C.

(a) Feed a test oscillator signal of 262 K.C. into the control grid of the 6A7 tube (leave grid clip in place) through a .25 mfd. condenser and adjust the trimmers on the I-F coils (Illus. #7 and 8, Fig. 2) for maximum output. Care should be taken to keep the test oscillator leads well away from the grid leads of other tubes to avoid inaccurate adjustments.

(b) Repeat above adjustments until no further increase in output can be obtained.

2. Aligning the R-F Stages

(a) Change the test oscillator setting to 1560 K.C. and feed this signal into the antenna connection on the chassis through a .0002 mfd. condenser. Turn the condenser rotor plates until they are completely out of mesh and rest against the high frequency stop. Adjust the parallel trimmer for the oscillator section (middle) of the gang condenser.
(b) Change test oscillator setting to 1400 K.C. and turn condenser rotor plates until this signal is tuned in. Then adjust the trimmers for the other two sections of the condenser gang.

(c) Change test oscillator setting to 600 K.C. and turn condenser rotor plates until this signal is tuned in. Adjust the antenna compensating condenser, (Illus. #10, Fig. 3) while rocking the condenser plates back and forth through the signal until maximum output is obtained. It will be necessary to readjust this trimmer to the car antenna upon installation.

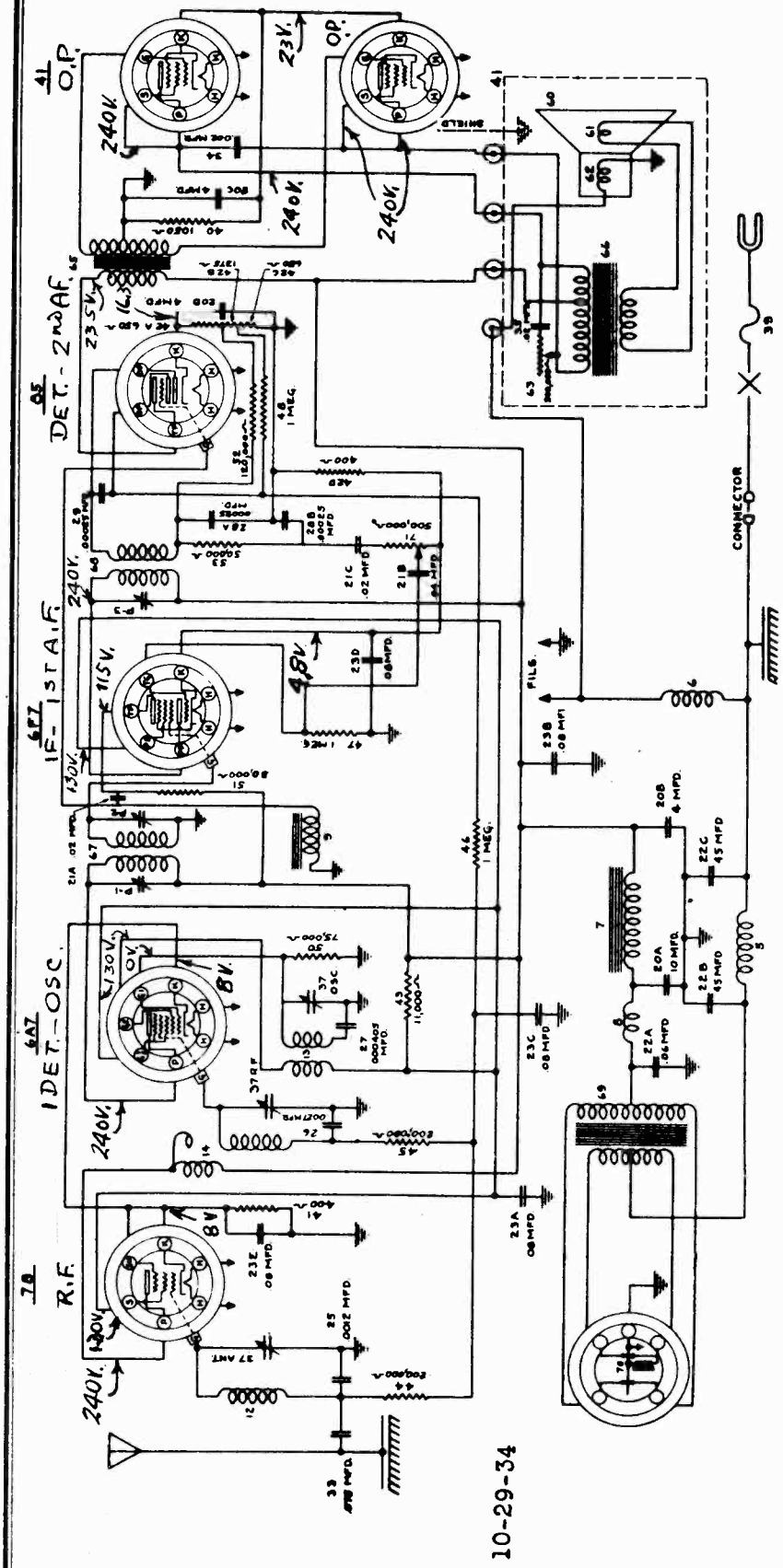
(d) Recheck alignment of the antenna section of the gang condenser (Illus. 12, Fig. 2) for maximum output at 1400 K.C.

NOTE: Each of the trimmers on the gang condenser should be carefully sealed with Duco Household Cement to prevent any change in adjustment. In using this cement care should be taken to see that it is placed only between the top blade of the trimmer condenser and its adjusting screw.

MODELS 544246 Buick-Pontiac
393885 Olds
1291344 Buick

UNITED MOTORS SERVICE

Schematic, Note Voltage



GENERAL: The Buick Model 1291344 is a six tube, two unit superheterodyne auto radio. The speaker used with this receiver is a full 8" dynamic housed in a separate case for dash mounting. A tuning control designed for mounting on the bottom flange of the instrument panel is used.

Buick Model 1291344

4-25-35

The Buick Model 1291344 is exactly the same as the Buick and Pontiac Model 544246. In the past, Buick and Pontiac receivers were carried under the same model numbers. However, it has since been found necessary to carry the Buick sets under separate numbers. In this case Buick receivers were previously carried under Buick and Pontiac Model 544246, and are now covered by Model #1291344.

Peaking I.F. Stages at 262 K.C.

(a) Connect the ground lead of the test oscillator to the chassis frame. Connect a 1 mfd. condenser in series with the other lead and connect this lead to the grid cap of the 6A7 tube leaving the grid clip in place. The 1 mfd. condenser is necessary to prevent the oscillator circuit of the receiver from affecting the I.F. adjustments.

(b) Set the test oscillator on 262 kilocycles.

(c) Turn the volume control of the receiver on full.

(d) Peak the I.F. trimmer P-3 located on the 2nd I.F. coil shown on Figure 2.

(e) Then peak trimmers P-2 and P-1 located on the first I.F. coil also shown on Figure 2.

(f) In order to insure accurate settings of the I.F. trimmers the above adjustments should be repeated using the lowest oscillator output that will give a reasonable deflection of the output meter pointer. Make all adjustments for maximum output.

Peaking Gang Condenser at 1530 and 1400 K.C.

(a) Connect the output of the test oscillator to the antenna connection of the receiver and to the chassis ground. Do not use the 1 mfd. condenser that was required in aligning the I.F. stages.

(b) Turn the rotor plates of the gang condenser until they are COMPLETELY OUT OF MESH.

(c) Set the test oscillator on 1530 kilocycles.

(d) Adjust the trimmer condenser for the oscillator section (middle section) of the gang condenser CAREFULLY for maximum output. Then adjust the trimmers for the "R.F." and "ANT" sections of the gang condenser.

(e) Set the test oscillator on 1400 kilocycles.

(f) Turn the condenser rotor plates until the 1400 K.C. signal from the test oscillator is turned in with maximum output. (No calibration blocks should be used as the oscillator circuit is adjusted at 1530 K.C. on this set.)

(g) Readjust the parallel trimmers for the "R.F." and "ANT" sections of the gang condenser for maximum output. DO NOT disturb the oscillator trimmer (middle section) as this is adjusted at 1530 K.C. only and any further adjustments at this point will affect both the tuning range of the receiver and the tracking of its circuits.

CAUTION: Always use the lowest possible test oscillator output that will give a reasonable deflection of the output meter pointer, in order to prevent the A.V.C. from leveling out the output as the adjustments are made.

CIRCUIT CHANGES

A number of the early receivers have a $\frac{1}{4}$ mfd. tubular condenser mounted above the candohm resistor, illustration #42 on Figure 2 and connected in parallel with the 85 tube cathode by-pass section 20D of the #1209144 electrolytic condenser block. The use of the tubular condenser was necessary in production to reduce the R.F. resistance of the 85 cathode by-pass. A change has been made in the design of the condenser block, making the use of the tubular condenser unnecessary. All of the service parts replacement stock of #1209144 electrolytics are of the new design and it is immaterial whether or not the tubular condenser is left in the receiver when replacing the electrolytic condenser block.

It may be noted on some of the earlier receivers that there is a small condenser in a metal case mounted below the candohm resistor, Illus. #42, Fig. 2, with two terminals that are not connected. This condenser was originally placed in the set to filter vibrator interference, but it was found after production started that two small condensers mounted in the vibrator unit were more effective and the external condenser was simply disconnected.

Fig. 2

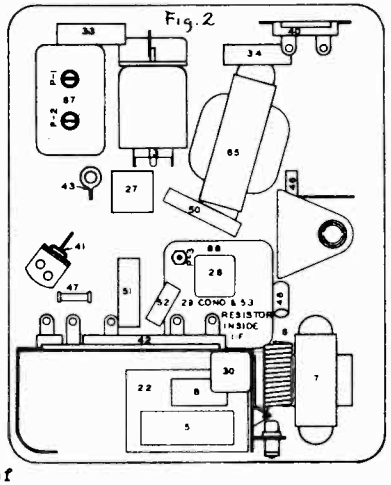
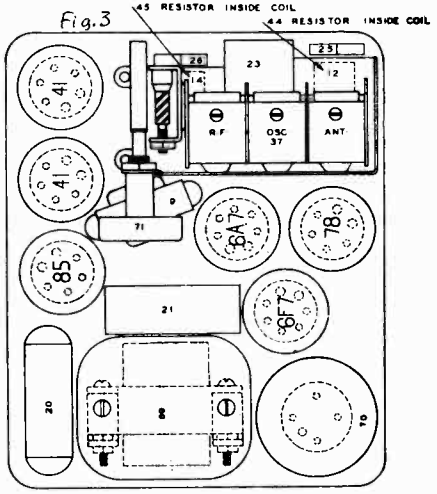
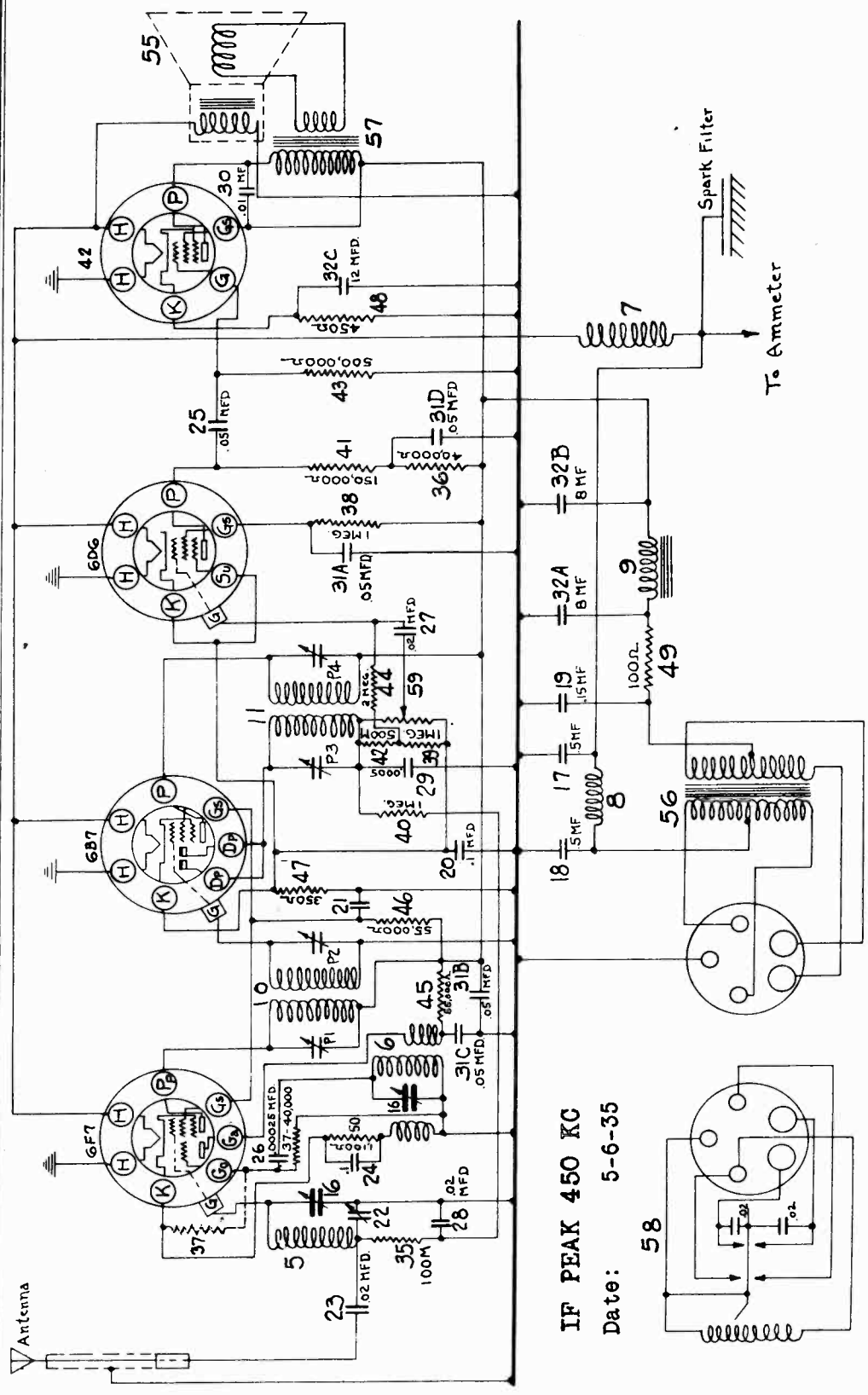


Fig. 3



UNITED MOTORS SERVICE

MODEL 629 Early
Below Ser.#40100
Schematic



GENERAL: The DELCO model 629 is a four tube, single unit, superheterodyne auto radio. The receiver embodies the "Syncro-Tuning" circuit feature, which results in the highest efficiency possible on any particular type of antenna. Tuning controls are used that can be adapted to any type of mounting making the receiver completely universal.

FIG. 1 DELCO MODEL 629 CIRCUIT DIAGRAM
(For sets below Serial #40100)

MODEL 629 Early
Below Ser.# 40100
Socket,Trimmers
Chassis,Voltage

UNITED MOTORS SERVICE

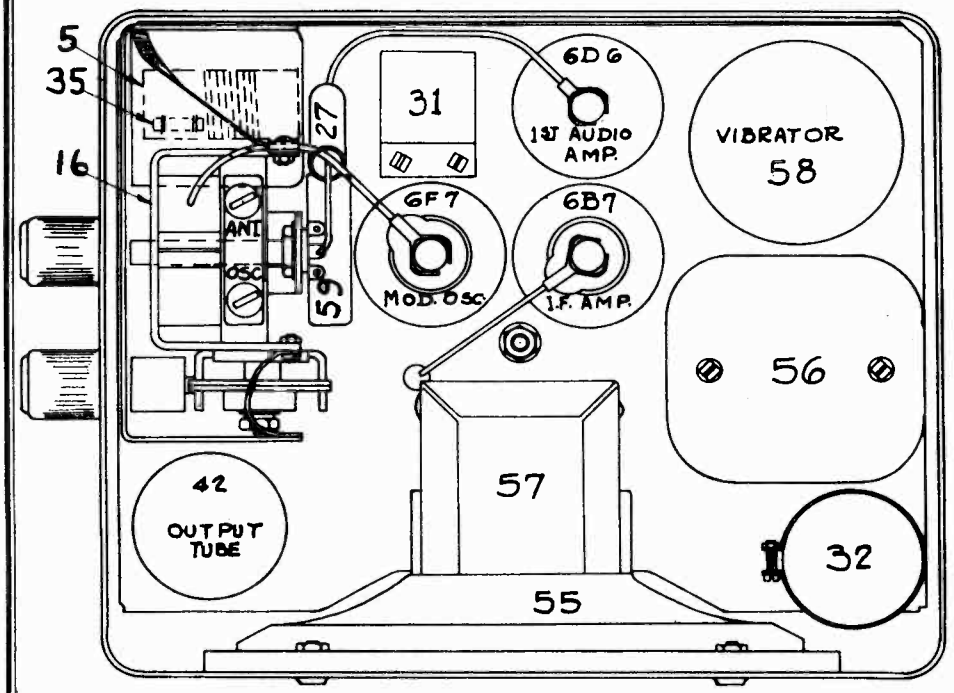


FIG.2 PARTS LAYOUT--Top View
(Below Ser. #40100)

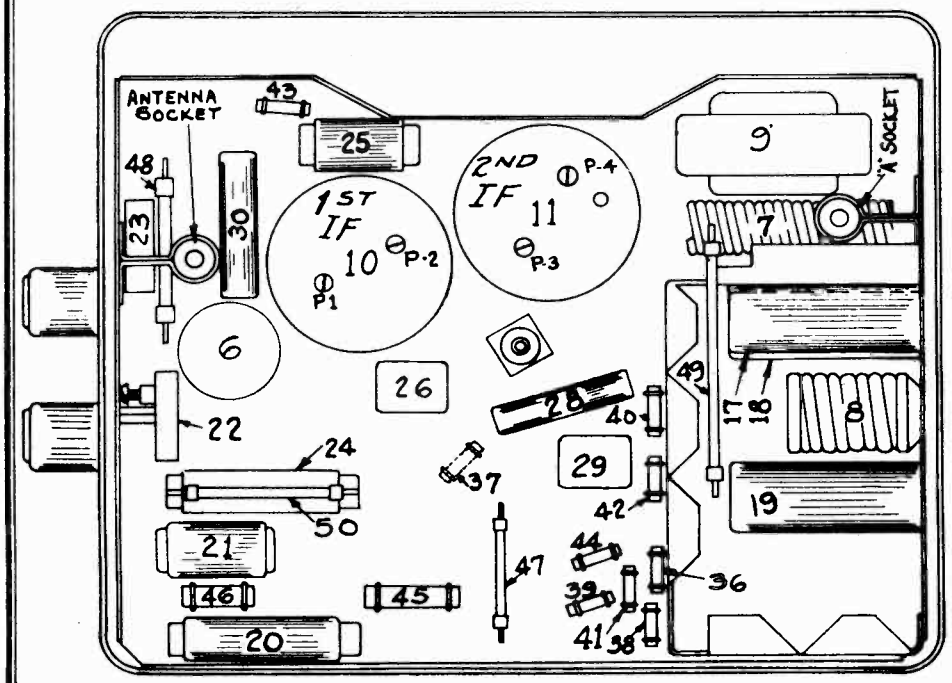


FIG. 3 PARTS LAYOUT--Bottom View
(Below Ser. #40100)

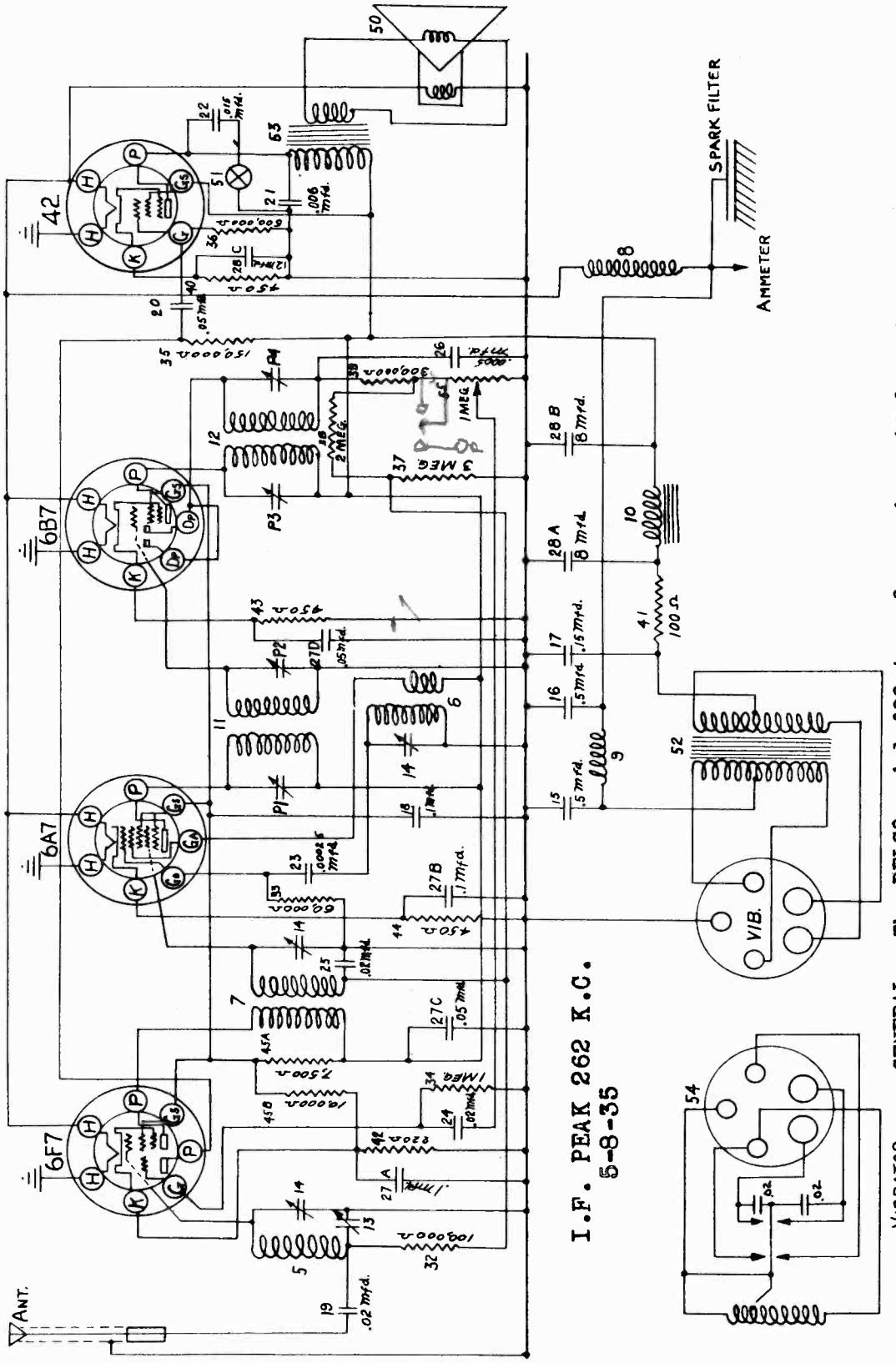
VOLTAGE CHART

Type	Function	H	P	Gs	Ga	Go	Su	K
6F7	Det.--Osc.	6	225	100	60	0	-	8
6B7	I.F. Amp.--Det.--AVC	6	225	100	-	-	-	3.5
6D6	1st Audio	6	55	20	-	-	3.5	3.5
42	Output	6	215	225	-	-	-	15

NOTE: Ampere drain of set at six volts is 5.8 amperes. Milliampere drain from B supply is 55 M. A.

UNITED MOTORS SERVICE

MODEL 629 Late
Above Ser.# 40100
Schematic

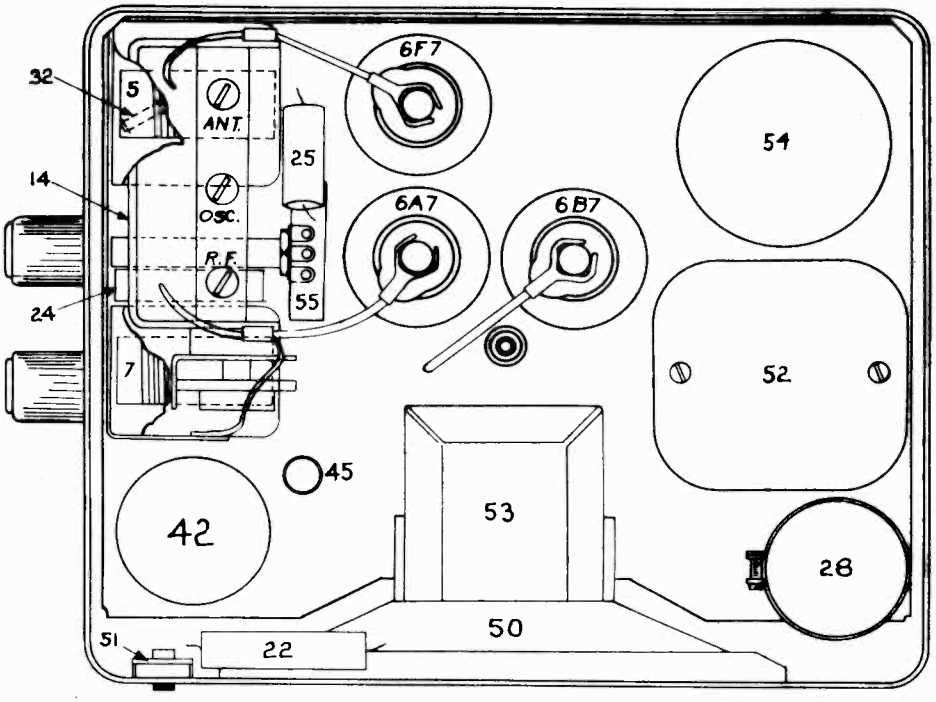


GENERAL: The DELCO model 629 is a four tube, single unit, superheterodyne auto radio with tone control. The receiver embodies the "Syncro-Tuning" circuit feature, which results in the highest efficiency possible on any particular type of antenna. Tuning controls are used that can be adapted to any type of mounting making the receiver completely universal.

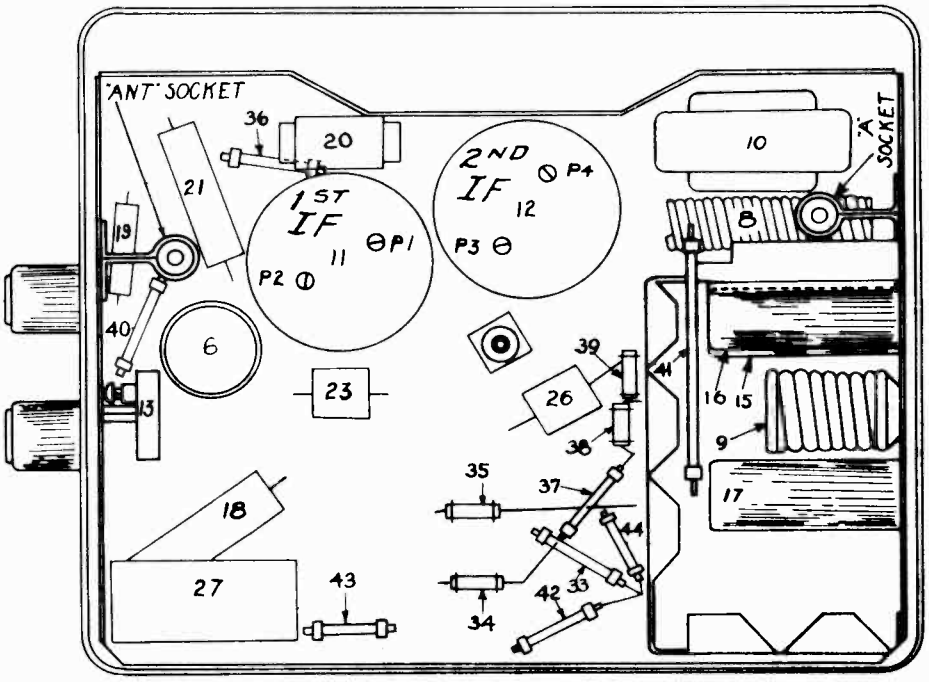
DELCO MODEL 629 CIRCUIT DIAGRAM--ABOVE SERIAL #40100

MODEL 629 Late
Above Ser.# 40100
Socket, Trimmers
Chassis, Voltage

UNITED MOTORS SERVICE



PARTS LAYOUT--Top View
(Above Ser. #40100)



PARTS LAYOUT--Bottom View
(Above Ser. #40100)

VOLTAGE CHART

Type	Function	H	P	Pt	Gs	Ga	Go	G	K
6F7	R.F.--1st Aud.	6	230	72	112	-	-	0	4.0
6A7	Det.--Osc.	6	228	-	112	228	0	0	4.8
6B7	I.F. Amp.--Det.	6	228	-	112	-	-	0	3.1
42	Output	6	226	-	235	-	-	0	15.5

NOTE: Ampere drain of set at six volts is 6.5 amperes.
Milliampere drain from B supply is 55 M. A.

Peaking I.F. Stages at 262 K.C.

(a) Connect the ground lead of the test oscillator to the chassis frame. Connect a .5 mfd. condenser in series with the other lead and connect this lead to the grid cap of the 6F7 tube, leaving the tube's grid clip in place. (The .5 mfd. condenser

Peaking I.F. Stages

is necessary to prevent the oscillator circuit of the receiver from affecting the I.F. adjustments.)

(b) Set the test oscillator

(c) Turn the volume control of the receiver on full.

(d) Peak each of the I.F. trimmers on the 2nd I.F. coil,

(e) Then peak each of the trimmers on the 1st I.F. coil,

(f) In order to insure accurate settings of the I.F. trimmers the above adjustments should be repeated using the lowest oscillator output that will give a reasonable output meter scale deflection. Make all adjustments for maximum output.

2. Peaking Oscillator Section of Gang Condenser at 1540 K.C.

(a) Connect the output of the test oscillator to the antenna connection of the receiver and to the chassis ground. (Do not use the .5 mfd. condenser that was required in aligning the I.F. stages.)

(b) Turn the rotor plates of the gang condenser until they are COMPLETELY OUT OF MESH.

(c) Set the test oscillator on exactly 1540 kilocycles.

(d) Adjust the parallel trimmer for the "OSC." section (middle section) CAREFULLY for maximum output. Then adjust the trimmers for the other two sections of the gang condenser also for maximum output.

3. Tracking "Syncro-Tuning" Circuit

(a) Set the test oscillator on 1400 kilocycles. (Leave test oscillator connected to ant. and gnd. of receiver.)

(b) Turn the condenser rotor plates until the 1400 K.C. signal from the test oscillator is tuned in with maximum output.

Tracking "Syncro-Tuning" Circuit--Cont'd.

(c) Readjust the parallel trimmers for the "ANT." and "R.F." sections of the gang condenser (shown on Fig. 2) for maximum output. DO NOT DISTURB the setting of the oscillator trimmer as this is adjusted at the 1540 K.C. only and adjustment at this point will affect both the tuning range of the receiver and the tracking of its circuits.

NOTE: In order to accurately set the "ANT." trimmer of the condenser gang at 1400 K.C. it will be necessary to make a preliminary adjustment of the "antenna compensating condenser" before installing the receiver on a car.

(d) Then set the test oscillator on 600 kilocycles.

(e) Turn the condenser rotor plates until the 600 K.C. signal from the test oscillator is tuned in with maximum output.

(f) Peak the antenna compensating condenser for maximum output. Re-tune the gang condenser for maximum output. Repeat these operations alternately until no further improvement in output can be obtained.

(g) Reset the test oscillator on 1400 kilocycles.

(h) Turn the condenser rotor plates until the 1400 K.C. signal is tuned in with maximum output.

(i) Adjust the trimmer for the "ANT." section of the gang condenser CAREFULLY for maximum output.

4. Adjusting Compensating Condenser to Car Antenna

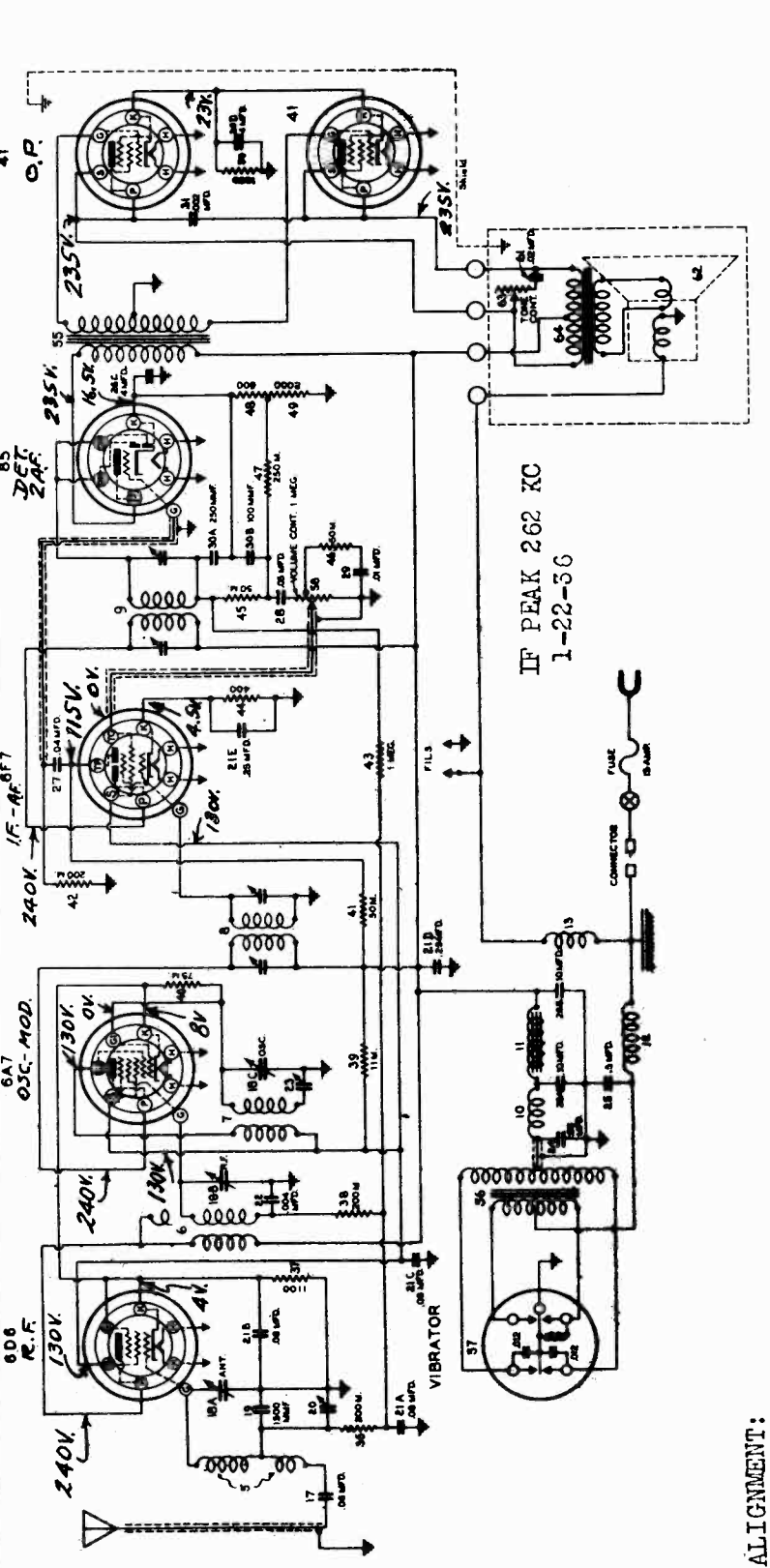
After the "ANT." trimmer of the gang condenser has been correctly set according to the preceding information, it will require no further adjustment. It will be necessary, however, to reset the "antenna capacity compensating condenser" to the car antenna when installing the receiver in a car in order to compensate for the wide range of antenna capacities being used. This is done in the following manner:

(a) Tune the receiver to a weak broadcast station between 570 to 640 K.C.

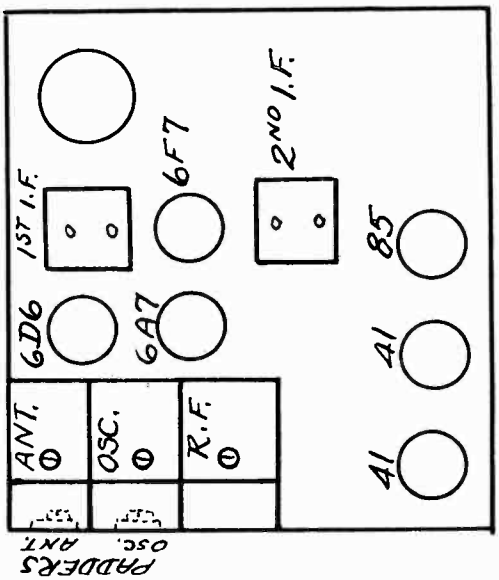
(b) Peak the compensating condenser for maximum output, rocking the receiver dial and adjusting the compensating condenser alternately until no further improvement in output can be obtained.
CAUTION: Do not touch the adjustment of the parallel trimmer for the "ANT." section of the gang condenser after the receiver is installed on a car.

MODEL 601814 Chevrolet
Schematic, Voltage
Socket, Trimmers
Alignment

UNITED MOTORS SERVICE



IF PEAK 262 KC
1-22-36



ALIGNMENT:

Set signal generator at 262 kc and connect through a dummy of .1 mf to grid cap of 6A7, leaving grid cap in place. Adjust i-f trimmers for maximum output.

Set signal generator to 1610 kc and connect to antenna post through a .00025 mf dummy. Gang condenser unmeshed. Adjust the trimmers on gang condensers in this order: Oscillator, R-F, and Antenna, for maximum output.

Set signal generator and dial to 1400 kc and adjust R-F and Ant. trimmers for maximum output. Do not disturb Oscillator trimmer adjustment.

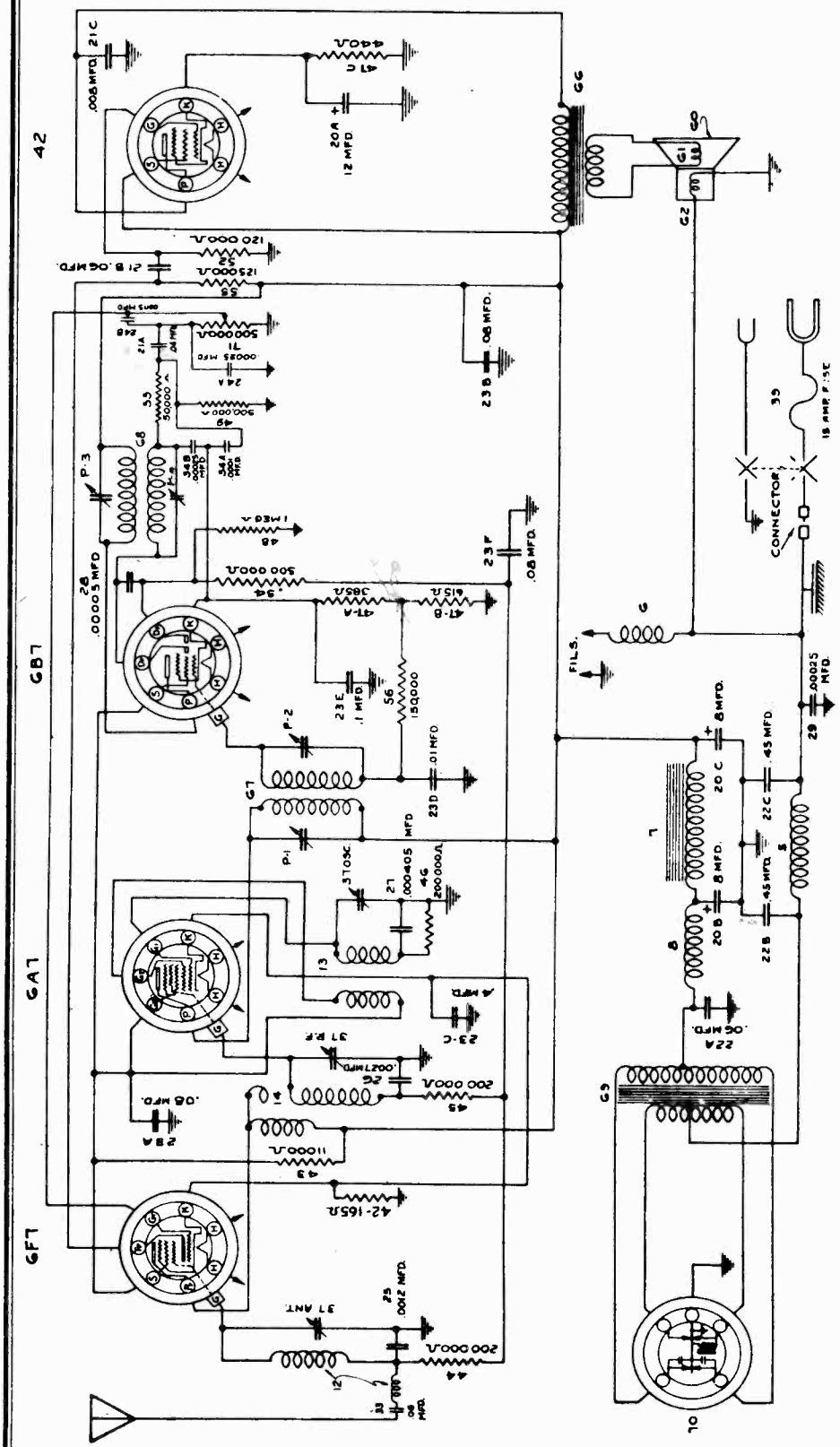
Set signal generator and dial to 600 kc and adjust Oscillator and Antenna padders (under side of chassis) for maximum output while rocking the gang condenser.

MODEL 601586 Chevrolet
Schematic, Voltage

MODEL 405046 Olds
MODELS 544267, 544289 Pontiac

UNITED MOTORS SERVICE, INC.

FIG. 1 CIRCUIT DIAGRAM--Pontiac Model #544267, Olds Model 405046
Note: These receivers are all above Serial #1791092.



VOLTAGE CHART

Pontiac Model 544289, above
Serial #1750000

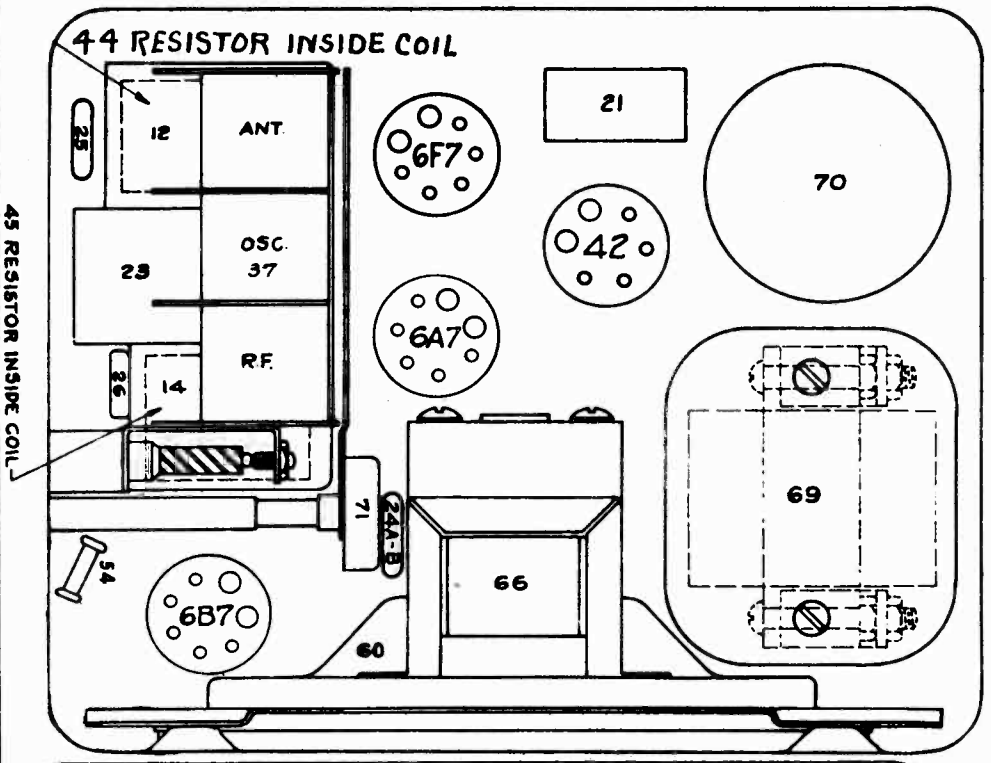
Type	Function	H	Pp	S	Tp	Gt	G	G1	G2	G3,5	K
6F7	R.F.	6	250	135	80	0	0	-	-	-	6.2
6A7	Det-Osc.	6	250	-	-	-	0	0	120	135	6.2
6B7	2nd Det-AVC	6	250	135	-	-	0	-	-	-	8.5
42	Output	6	240	250	-	-	0	-	-	-	16.0

NOTE: Ampere drain of set at 6 volts is 6.2 amperes
Milliampere drain from "B" supply is approximately 55 M.A.

MODEL 405046 Olds
MODELS 544267,544289
Pontiac

MODEL 601586 Chevrolet
Socket,Trimmers,Chassis
Alignment,Changes

UNITED MOTORS SERVICE, INC.



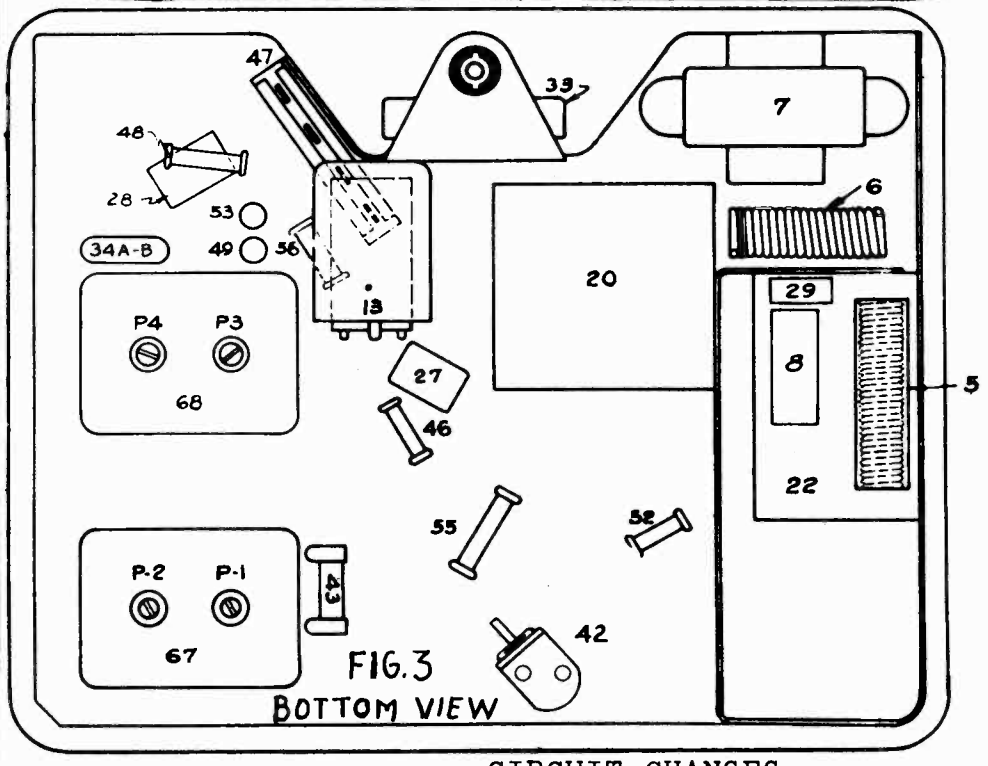


FIG. 3
BOTTOM VIEW

CONVENTIONAL ALIGNMENT-SEE SPECIAL SECTION

Generator at 262 KC, connected to grid of 6A7 tube thru .5 MF condenser, grid clip not disturbed. Generator also grounded to chassis. Peak trimmers P3, then P2 and P1.
Generator at 1530 KC, connected direct to antenna lead. Rotor plates completely out of mesh. Peak middle section of variable condenser (OSC) then front and rear sections. Generator then set to 1400 KC, then realign front and rear sections, after having tuned in the signal. Middle section of variable condenser should not be disturbed. No oscillator padding required.
Antenna trimmer should be peaked between 550 to 700 KC, after installation.

CIRCUIT CHANGES

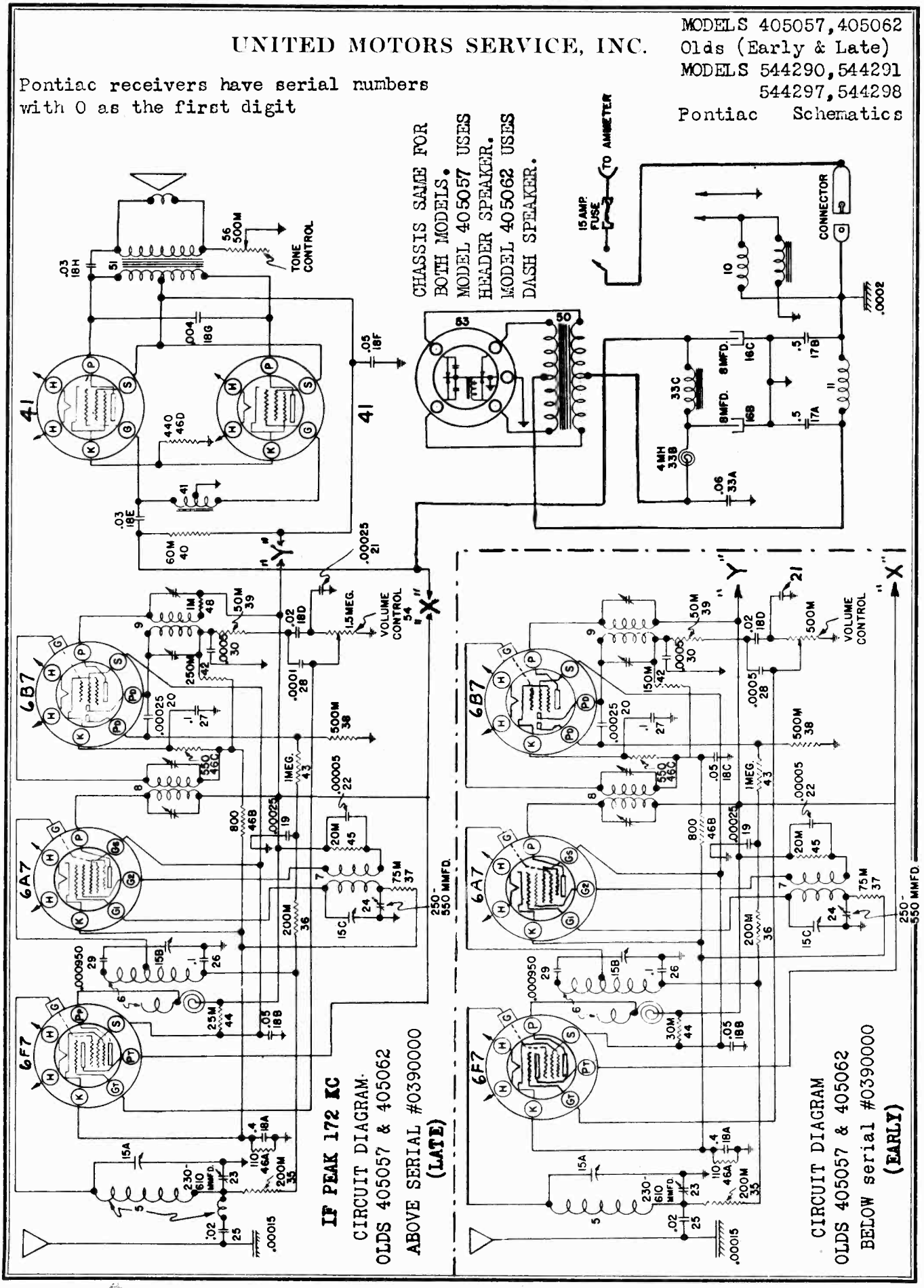
A number of .05 mfd. tubular condensers were used at the factory in place of the .06 mfd. condenser part #1209213 condenser shown on figure 2 as illustration #33. For Service Replacement purposes of any defective .05 mfd. condensers--use part #1209213 condenser.

UNITED MOTORS SERVICE, INC.

MODELS 405057, 405062
Olds (Early & Late)
MODELS 544290, 544291
544297, 544298
Pontiac Schematics

Pontiac receivers have serial numbers with 0 as the first digit

CHASSIS SAME FOR BOTH MODELS.
MODEL 405057 USES HEADER SPEAKER.
MODEL 405062 USES DASH SPEAKER.



MODELS 405057,405062
Olds (Early & Late)

UNITED MOTORS SERVICE, INC.

MODELS 544290,544291
Pontiac544297,544298
Socket,Trimmers
Voltage,Chassis
Alignment

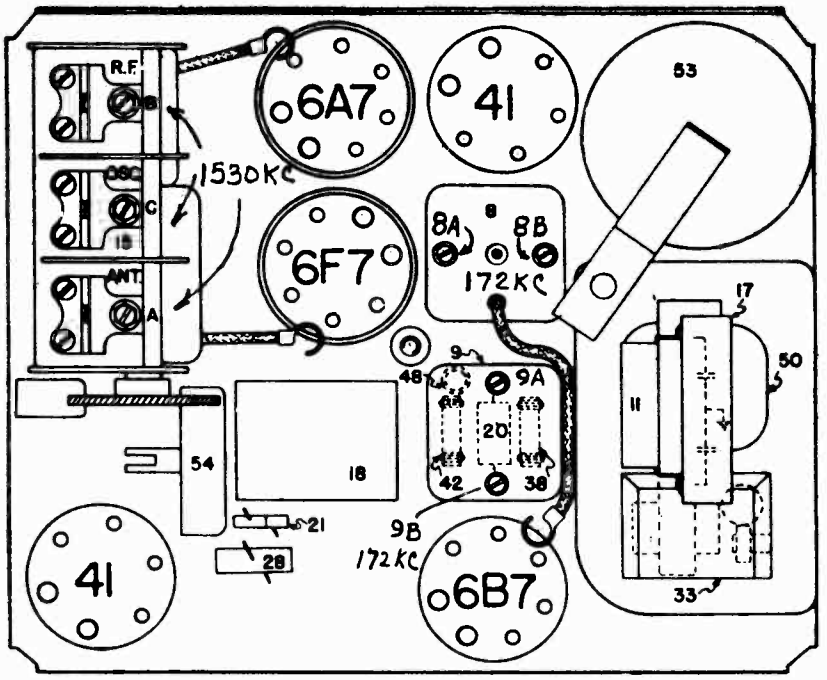


FIG. 2--PARTS LAYOUT--Top View

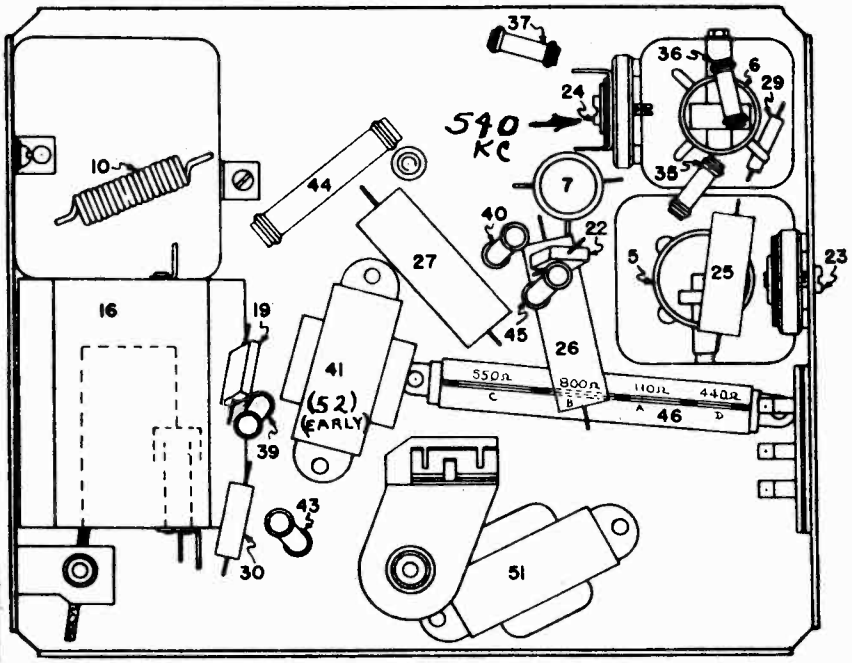


FIG. 3--PARTS LAYOUT-Bottom View

CONVENTIONAL ALIGNMENT
SEE SPECIAL SECTION

Generator at 172 KC, grounded to chassis, and connected thru .5 MF condenser to grid cap of 6A7, leaving grid clip on tube. Align trimmers 9A,9B,8A and 8B to a maximum peak.

Generator now connected direct to antenna lead, frequency to 1530 KC, rotor plates of variable condenser out of mesh, adjust trimmers 15C,15B & 15A to peak.

Generator at 540 KC, rotor of variable condenser completely in mesh, pad the oscillator circuit to maximum peak with trimmer 24 (Fig. 3)

Generator at 1400 KC, variable condenser rotated until signal is maximum, realign trimmers 15B and 15A to maximum peak.

After installation in car, tune in a station between 550 and 700 KC. Peak the antenna trimmer # 23 (Fig.3)

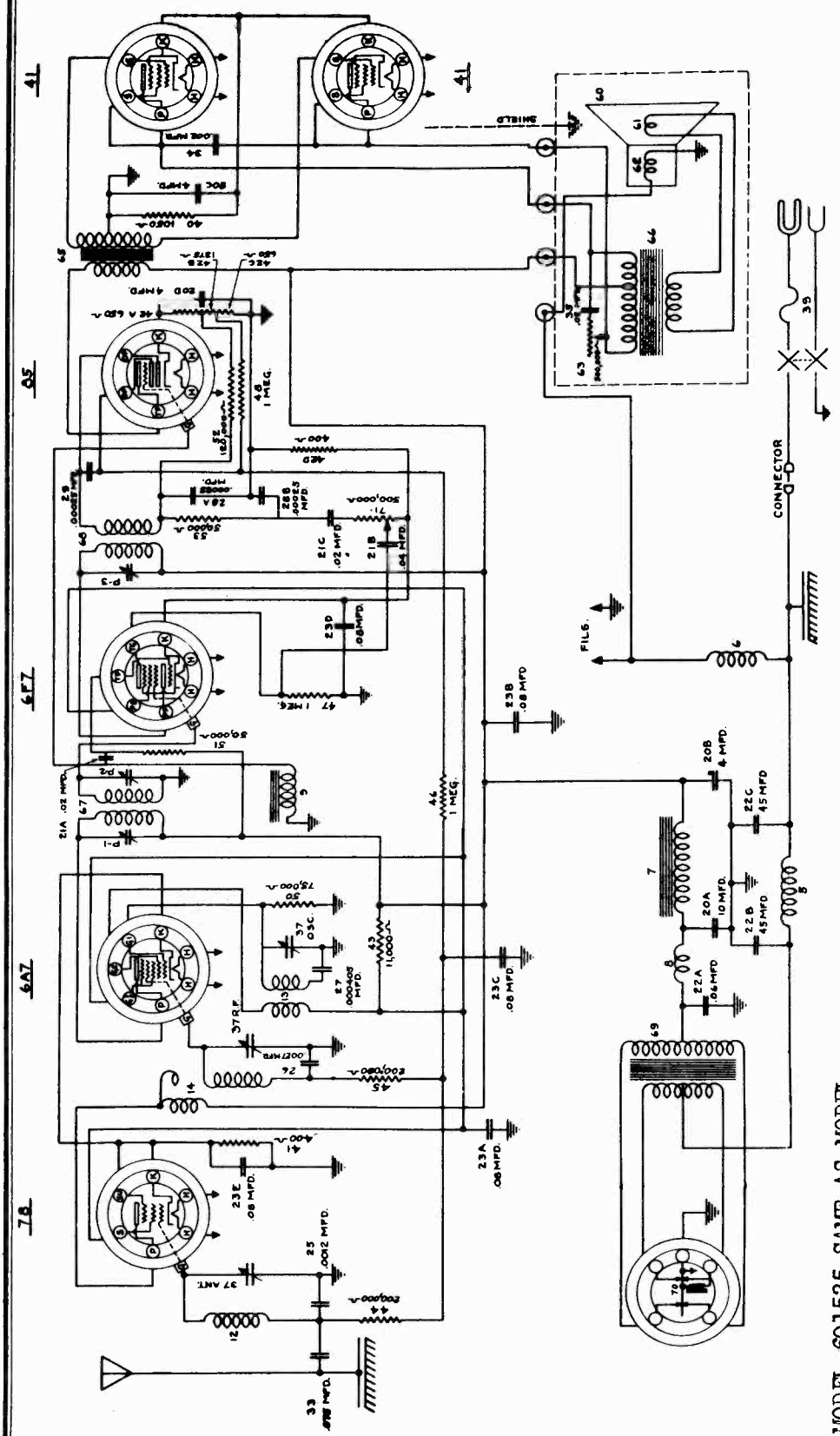
VOLTAGE TABLE

Type	Function	H	P	S	PT	GT	G1	G2	K
6F7	R.F.	6	225	90	85	0	-	-	2.5
6A7	Det-Osc.	6	225	90	-	-	-0	145	2.5
6B7	I.F.--2nd Det-AVC	6	225	90	-	-	-	-	10.0
41	Output	6	220	225	-	-	-	-	16.0
41	Output	6	220	225	-	-	-	-	16.0

NOTE: Ampere drain of set at 6 volts is 5.8 amperes
Milliampere drain from "B" supply is approximately 55 M.A.

UNITED MOTORS SERVICE, INC.

MODELS 601525, 601176
Chevrolet
Schematic, Voltage



MODEL 601525 SAME AS MODEL 601176, BUT HAS DIFFERENT TYPE OF VOLUME CONTROL AND VARIABLE GANG CONDENSER

IF PEAK 262 KC

VOLTAGE CHART

	TYPE	FUNCTION	H	Pp	S	Tp	Gt	G	G1	G2	G3,5	K
	78	R.F.	6	240	130	-	-	0	-	-	-	8.0
	6A7	Det-Osc.	6	240	130	-	-	0	0	130	130	8.0
	6F7	I.F.-AF	6	240	130	115	0	0	-	-	-	4.5
	85	Det-2nd AF	6	-	-	235	0	0	-	-	-	16.5
Date:	41	Output	6	240	240	-	-	-	-	-	-	23.0
10-29-34	41	Output	6	240	240	-	-	-	-	-	-	23.0

MODELS 601525, 601176
Chevrolet

UNITED MOTORS SERVICE, INC.

Socket, Trimmers, Chassis Alignment, Changes

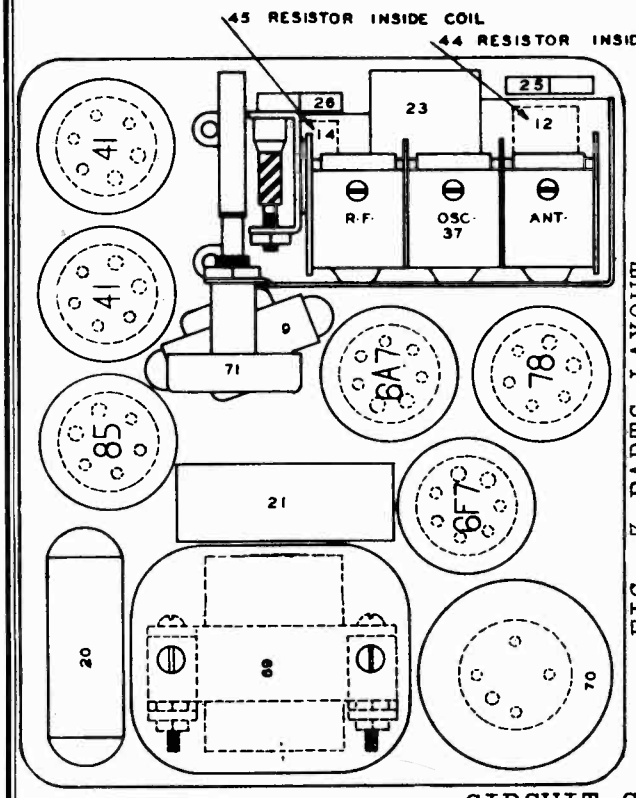


FIG. 3 PARTS LAYOUT (Top View)

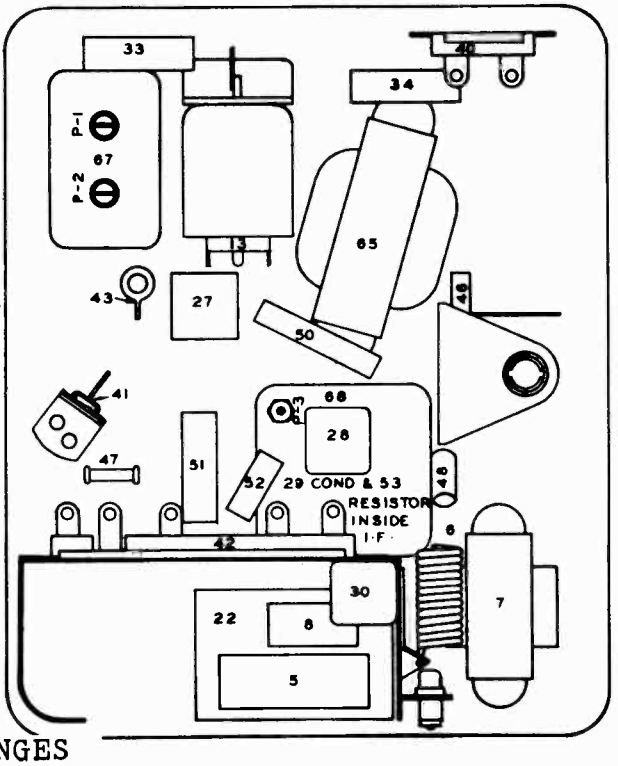


FIG. 2 PARTS LAYOUT (Bottom View)

CIRCUIT CHANGES

A number of the early receivers have $\frac{1}{4}$ mfd. tubular condenser mounted above the candohm resistor, illustration #42 on Figure 2 and connected in parallel with the 85 tube cathode by-pass section 20D of the #1209144 electrolytic condenser block. The use of the tubular condenser was necessary in production to reduce the R.F. resistance of the 85 cathode by-pass. A change has been made in the design of the condenser block, making the use of the tubular condenser unnecessary. All of the service parts replacement stock of #1209144 electrolytics are of the new design and it is immaterial whether or not the tubular condenser is left in the receiver when replacing the electrolytic condenser block.

It may be noted on some of the earlier receivers that there is a small condenser in a metal case mounted below the candohm resistor, Illus. #42, Fig. 2, with two terminals that are not connected. This condenser was originally placed in the set to filter vibrator interference, but it was found after production started that two small condensers mounted in the vibrator unit were more effective and the external condenser was simply disconnected.

CONVENTIONAL ALIGNMENT-SEE SPECIAL SECTION

Generator frequency at 262 KC, connected thru 1 MFD condenser to the grid of the 6A7 tube. Grid clip is not disturbed. Peak trimmers P3, then P2 and P1.

Generator connected direct to the antenna lead of receiver. Frequency set at 1530 KC. Rotor plates of gang condenser completely out of mesh. Adjust the OSC section parallel trimmer (middle section) to peak. Then adjust the parallel trimmers of the front and rear sections, to maximum peak. Generator then set to 1400 KC. The rotor of variable condenser adjusted until heard. Peak front and rear sections at this frequency. No oscillator padding required.

UNITED MOTORS SERVICE

MODEL 958200 Chevrolet
Schematic

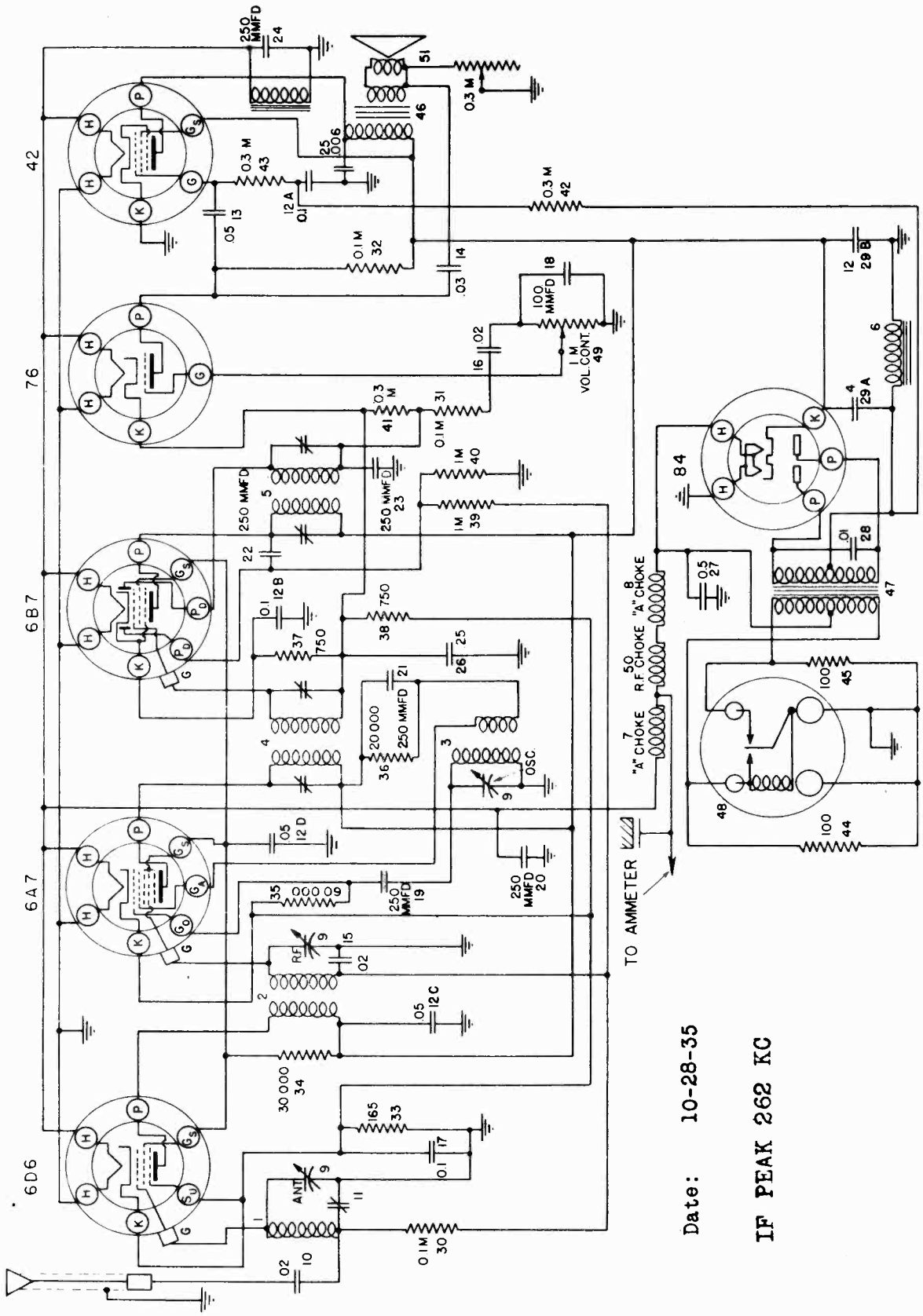


FIG. 1--Chevrolet Model 958200 Circuit Diagram

Date: 10-28-35

IF PEAK 262 KC

GENERAL: The Chevrolet Model 985200 is a six tube receiver with a "Dome" type speaker, instrument panel tuning control and tone control. This receiver was designed specifically for 1936 Model Chevrolets and for use on the under-car antenna system required.

Antenna System: The antenna system used with this receiver consists of an assembly of two rubberized metal strips for mounting below each running board with special brackets.

TUBE COMPLEMENT

The tubes used in this receiver are: 6D6 R-F Amplifier, 6A7 Oscillator-Modulator, 6B7 I-F Amplifier-Diode Detector-A.V.C., 76 1st A-F Amplifier, 42 Power Output and a type 84 Rectifier.

CIRCUIT ALIGNMENT

If Alignment is found necessary -- make all adjustments with chassis in its case and use a calibrated test oscillator and output meter. To align the I-F stages -- feed a test oscillator signal of 262 K.C. into the grid of the 6A7 tube (leave grid clip in place) through a .25 mfd. condenser and adjust the four trimmers located on top of the I-F coils. To align R-F stages -- change the test oscillator setting to 1560 K.C. and feed this signal into the antenna connection on the receiver through a .0002 mfd. condenser. Turn the condenser plates until they are completely out of mesh and adjust the oscillator parallel trimmer on the middle section of the condenser gang. Change test oscillator setting to 1400 K.C. and turn condenser plates until the signal is tuned in. Then adjust the trimmers for the other two sections of the condenser gang. Change the test oscillator setting to 600 K.C. and adjust the antenna compensating condenser, (located through a small hole in the tuning control side of the chassis case) while rocking the tuning condenser plates back and forth slightly. Recheck alignment of the antenna parallel trimmer on condenser gang at 1400 K.C.

TUBE SOCKET VOLTAGES

Tube	H	P	Gs	Ga	K
6D6	6	240	100	-	3.6
6A7	6	140	100	160	3.6
6B7	6	130	100	-	3.6
76	6	130	-	-	8.0
42	6	220	240	-	0
84	5.6	-	-	-	240

NOTE

Ken-Rad 6D6 tubes were used in the R-F Stage of some of these receivers -- in using National Union tubes for replacement the alignment of the "Ant" section of the condenser gang should be checked because of a possible difference in internal capacities of the two makes of tubes.

CHASSIS ELECTRICAL PARTS

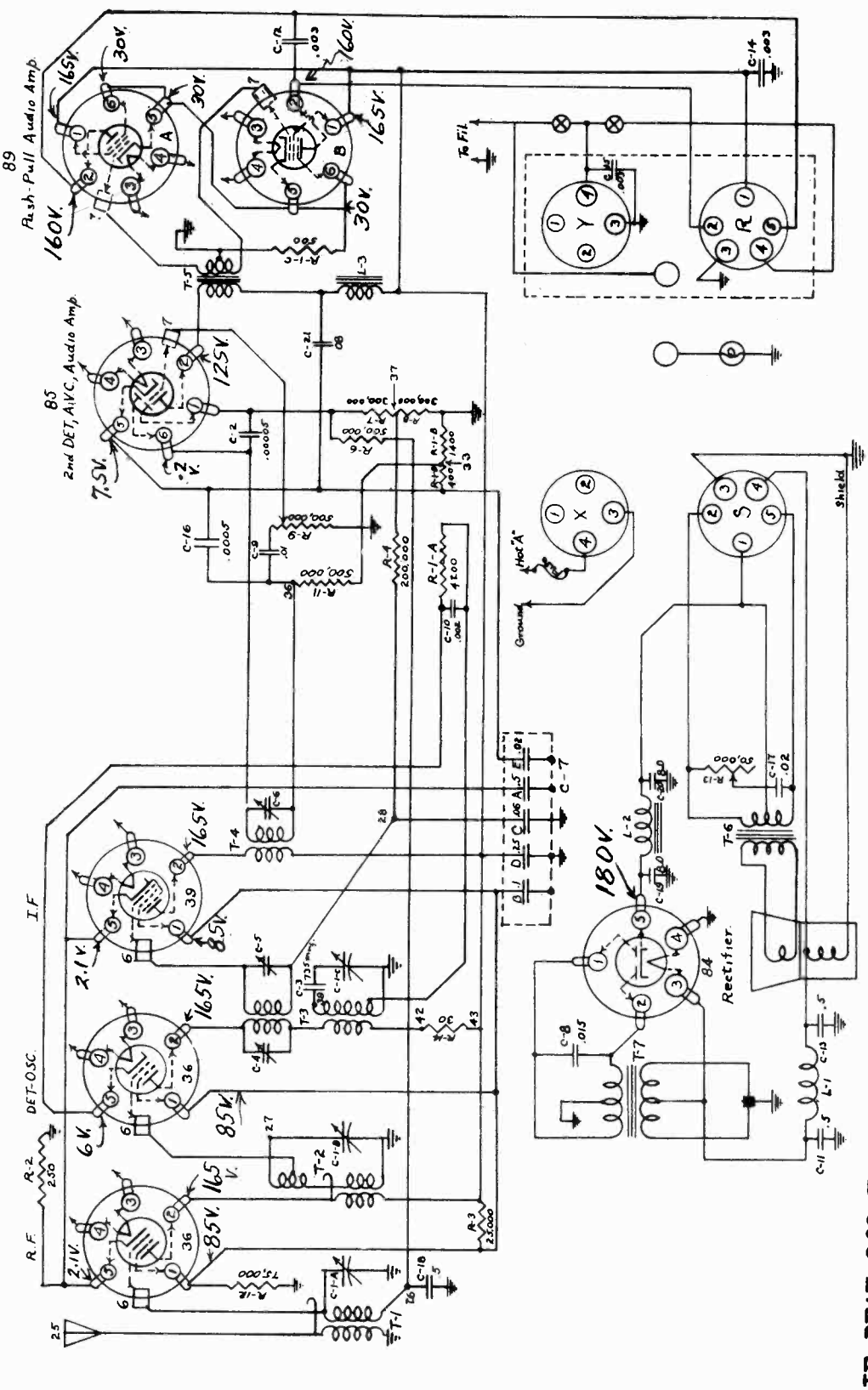
Illus. No.	Part No.	Part Name	Description
1	1210652	Coil	Antenna
2	1210653	Coil	R-F
3	1209345	Coil	Oscillator
4	1210654	Coil Assy.	1st I-F
5	1210655	Coil Assy.	2nd I-F
6	1209803	Coil	"B" filter choke
7,8	1210656	Coil	"A" filter choke
9	1210657	Condenser	3 gang variable
10	1210658	Condenser	Tubular .02 mfd. 200 V
11	1210659	Condenser	Antenna trimmer
12	1210660	Condenser	By-pass block
13	1209308	Condenser	Tubular .05 mfd. 400 V
14	1209625	Condenser	Tubular .03 mfd. 400 V
15	1209307	Condenser	Tubular .02 mfd. 200 V
16	1209307	Condenser	Tubular .02 mfd. 200 V
17	1209306	Condenser	Tubular .1 mfd. 200 V
18	1210275	Condenser	Molded .0001 mfd.
19,20,21	1209796	Condenser	Molded .00025 mfd.
22,23,24	1209796	Condenser	Molded .00025 mfd.
25	1209314	Condenser	Tubular .006 mfd. 400 V
26	1209817	Condenser	Tubular .25 mfd. 200 V
27	1210661	Condenser	Tubular .5 mfd. 160 V
28	1209805	Condenser	Oil filled .01 mfd. 1000 V
29	1210662	Condenser	Electrolytic block
30,31,32	1209883	Resistor	Carbon 100 M ohms 1/3 watt
33	1208140	Resistor	Flexible 165 ohms 1/2 watt
34	1208652	Resistor	Carbon 30,000 ohms 1 watt
35	1208320	Resistor	Carbon 60,000 ohms 1/3 watt
36	1209405	Resistor	Carbon 20,000 ohms 1/3 watt
37,38	1208800	Resistor	Flexible 750 ohms 1/2 watt
39,40	1209885	Resistor	Carbon 1 megohm 1/3 watt
41,42,43	1209884	Resistor	Carbon 300 M ohms 1/3 watt
44,45	1209015	Resistor	Flexible 100 ohms 1/2 watt
46	1209629	Transformer	Output
47	1210663	Transformer	Power
48	5040000	Vibrator	Non-syschronous
49	1210664	Volume Control	1 megohm
50	1210665	Coil	Motor noise choke

MISCELLANEOUS

Part No.	Part Name	Description
1210669	Cover	Tube lid
1210056	Screw	Chassis to case (P.K. #8x$\frac{1}{4}$")
1209558	Socket	Speaker

UNITED MOTORS SERVICE

MODEL 980393 B-O-P
Schematic, Voltage
Alignment



IF PEAK 262 KC

I.F. Stages: Set oscillator on 262 KC and impress signal on grid of 36 Detector-Oscillator tube.

R.F. & Osc. Stages: Set oscillator on 1400 KC and feed signal into antenna connection on chassis and adjust parallel trimmers.

Date: 9-13-34

1. Peaking I-F Stages at 262 Kilocycles

IMPORTANT: The "Local-Distance" switch on the tuning control used with this receiver is used to control the alignment of the first I-F coil windings. The capacity existing between the leads and the shielding of the cable connecting to the switch in the tuning control is part of the I-F tuned circuit and must be taken into consideration when aligning the I-F stages.

In order to duplicate this capacity and provide facilities for switching from "Local to Distance" a "TEST AND ALIGNMENT CABLE" (Part #1210201) has been made available. This cable eliminates the necessity of removing the tuning control from the car.

(a) Connect the signal lead of the test oscillator to the grid cap of the 6D6 Translator Tube through a .1 mfd. condenser, leaving the tube's grid clip in place. Connect the ground lead of the test oscillator to the chassis frame.

(b) Insert the four prong plug of the "TEST and ALIGNMENT CABLE" of the tuning control cable into the socket provided on the receiver chassis. Turn switch on test cable or tuning control to "DISTANCE" position. (If the receiver is aligned with the switch in the "local" position, the "Local-Distance" switch will operate backwards.)

(c) Set the test oscillator to exactly 262 K.C.

(d) Adjust the trimmers on the I-F coils (Illus. 5 and 6, Fig. 4) for maximum output. These adjustments should be repeated several times and during alignment the test oscillator output should be kept to as low a value as is consistent with obtaining a readable indication on the output meter.

2. Aligning at 1560 Kilocycles

Leave the test oscillator leads connected the same as for aligning the I-F circuits. Turn the rotor plates of the gang condenser all the way out and against the high frequency stop. Set the test oscillator to 1560 kilocycles. Adjust the parallel trimmer for the oscillator section of the condenser gang (Illus. 9, Fig. 3) for maximum output. (It is very important that this frequency be set accurately as a slight missetting will cause the receiver to be out of track over the entire high frequency end of the dial.

3. Aligning at 540 Kilocycles

Leave test oscillator leads connected the same as before. Turn the rotor plates of the gang condenser all the way into mesh so that they rest against the low frequency stop. Set the test oscillator to 540 K.C. Adjust the oscillator padding condenser (Illus. #4, Fig. 4) located on the under-side of the receiver sub-panel to maximum output. (This adjustment sets the low frequency tuning range of the receiver to 540 K.C.)

4. Aligning at 1400 Kilocycles

Remove the signal lead of the test oscillator from the grid of the 6D6 Translator tube and connect to the antenna terminal of the receiver THROUGH A .002 MICA CONDENSER connected in place of the .1 mfd. condenser previously used. (It is very important that a .002 mfd. mica condenser be used in aligning the antenna stage of these receivers in order that this circuit can be made to track properly. Some test oscillators have this condenser included and if the capacity is correct, it will not be necessary to use an external series condenser.) Set the test oscillator to 1400 K.C. Turn the condenser rotor plates until the frequency is tuned in with maximum output. Adjust the R-F parallel trimmer on the condenser gang (Illus. #9B, Fig. 3) and the antenna compensating condenser (Illus. #21, Fig. 4) located on the side of the receiver case for maximum output.

5. Aligning at 600 Kilocycles

The oscillator padding condenser was previously adjusted at 540 K.C., however, it is necessary in most cases to repeak the oscillator tracking condenser at 600 K.C. in order to make the receiver track properly and to secure full sensitivity.

Set the test oscillator on 600 K.C. Turn the condenser rotor plates until the signal from the test oscillator is tuned in with maximum output. Maintain a low output signal from the test oscillator and readjust the oscillator tracking condenser (Illus. #4, Fig. 4) while rocking the variable condenser gang tuning shaft back and forth through the signal. This operation should be continued until no further increase in output can be obtained.

SUBJECT--CHANGE IN "CIRCUIT ALIGNMENT" PROCEDURE
OLDS RADIO #982006 Date: 6-25-36

Oldsmobile radios #982006 were shipped from the factory with their oscillator circuits high frequency adjustment made at either 1560 or 1540 K.C.

ADJUSTING OSCILLATOR CIRCUIT

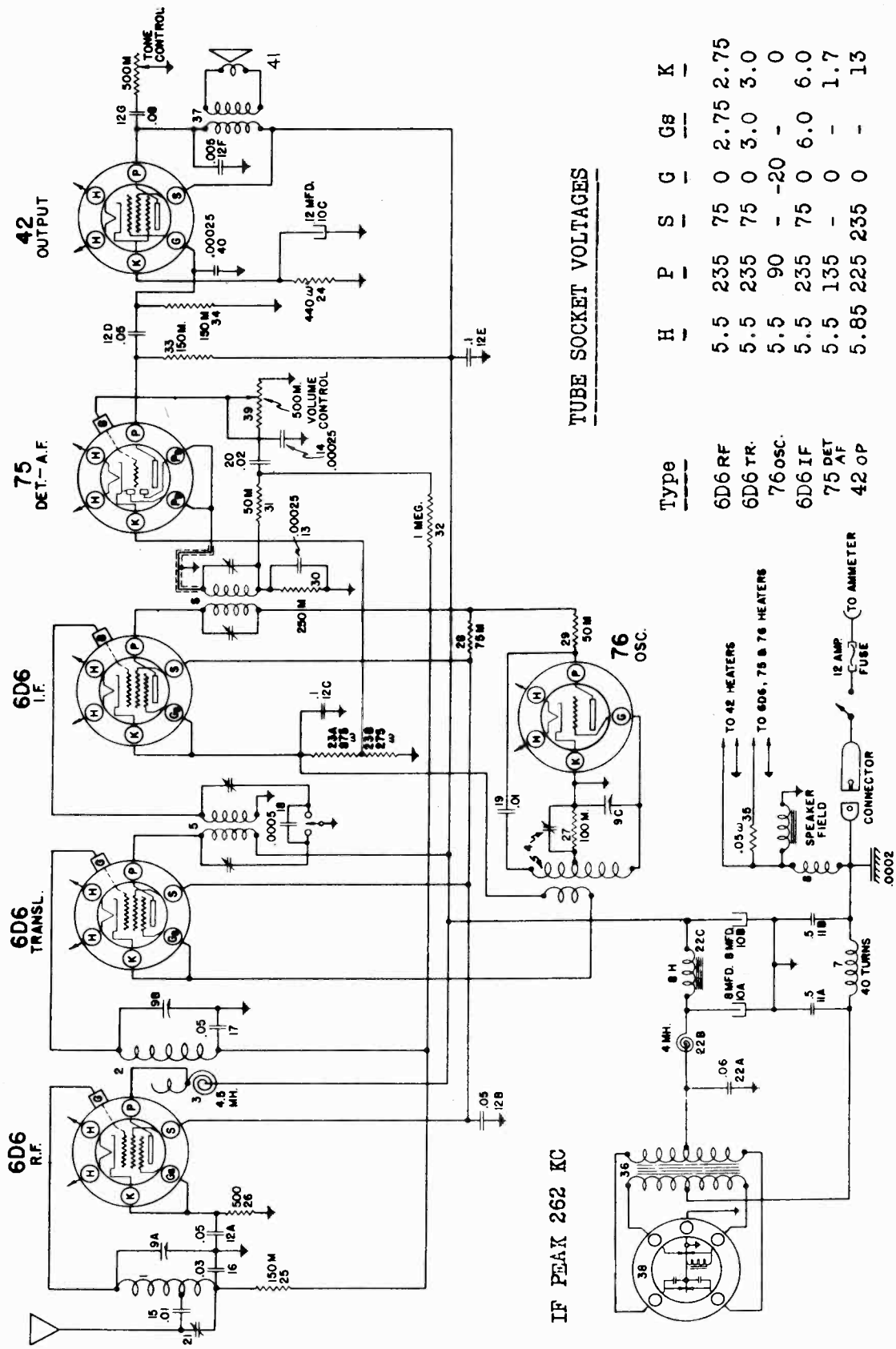
Sets adjusted at 1540 K.C. by the factory will not tune to 1560 K.C. unless the oscillator trimmer is screwed out too far. If re-alignment of any of these radios is found necessary, make the high frequency adjustment of the oscillator section of the condenser gang at 1540 instead of 1560 K.C. as indicated in the "CIRCUIT ALIGNMENT" procedure. All other adjustments of the receiver circuits should be made as indicated under "CIRCUIT ALIGNMENT".

CHECKING ALIGNMENT

If it is found in checking the receiver alignment with a test oscillator that the receiver will tune to 1560 K.C., it will not be necessary to reset the oscillator section of the condenser gang to 1540 K.C. That is, unless the oscillator coil has been replaced, in which case the adjustment should be made at 1540 K.C.

UNITED MOTORS SERVICE

MODEL 982006 Olds
Schematic, Voltage



TUBE SOCKET VOLTAGES

Type	H	P	S	G	Gs	K
6D6 RF	5.5	235	75	0	2.75	2.75
6D6 TR.	5.5	235	75	0	3.0	3.0
76 OSC.	5.5	90	-	-20	-	0
6D6 IF	5.5	235	75	0	6.0	6.0
75 DET AF	5.5	135	-	0	-	1.7
42 OP	5.85	225	235	0	-	13

NOTE: Readings taken from tube socket contacts to ground with a D.C. voltmeter having a resistance of 1000 ohms per volt.

Olds Model 982006

Date: 12-6-35

MODEL 982006 Olds
Socket, Trimmers
Chassis, Note

UNITED MOTORS SERVICE

Overall Oscillation:— On some of the first production of these receivers, overall oscillation was noticed in tuning to resonance on a station. On sets having this trouble--examine the receiver chassis to see if a .00025 mfd. condenser is connected between the 42 tube control grid and ground. (This condenser is shown as Illus. #40 on Fig. 4.) If this condenser is not used--connect a part #1209055 condenser from the 42 tube control grid to ground. This condenser was used in the later production of these receivers and should eliminate all trouble from this source.

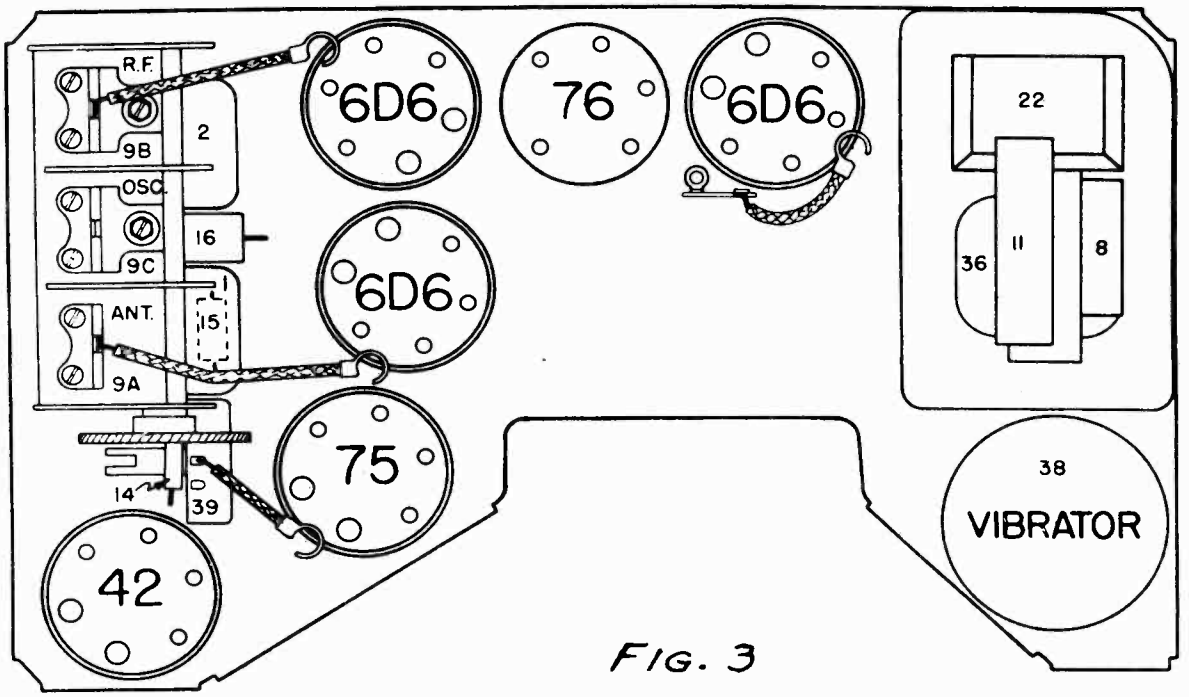


FIG. 3

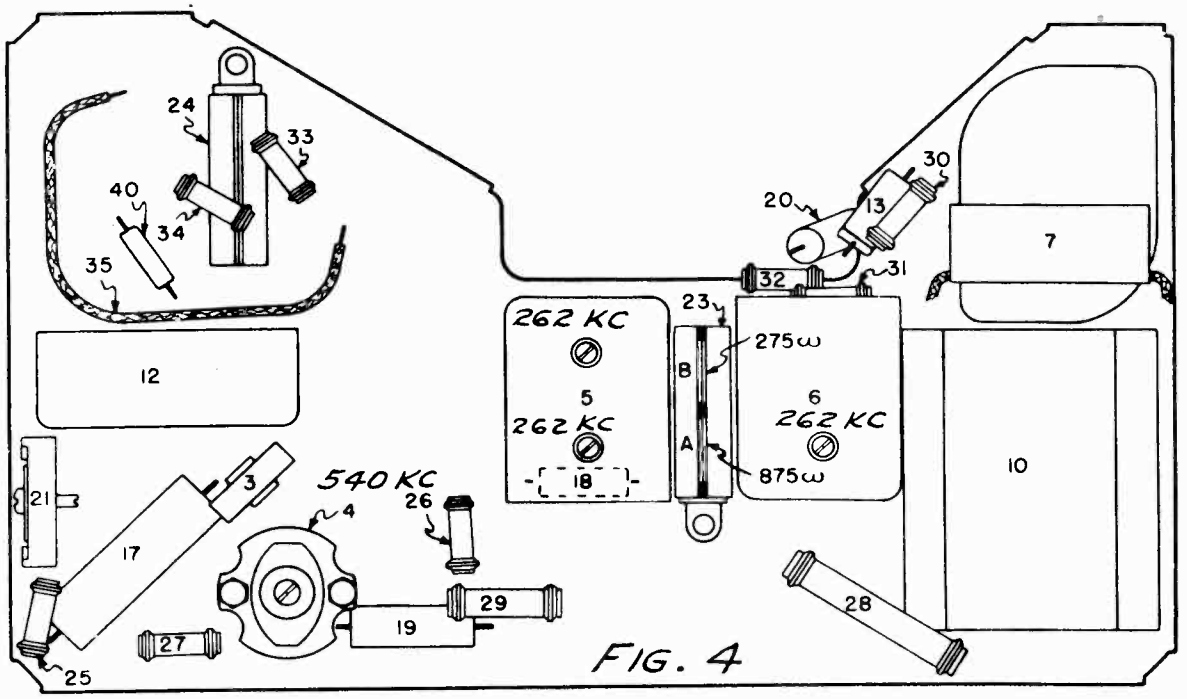
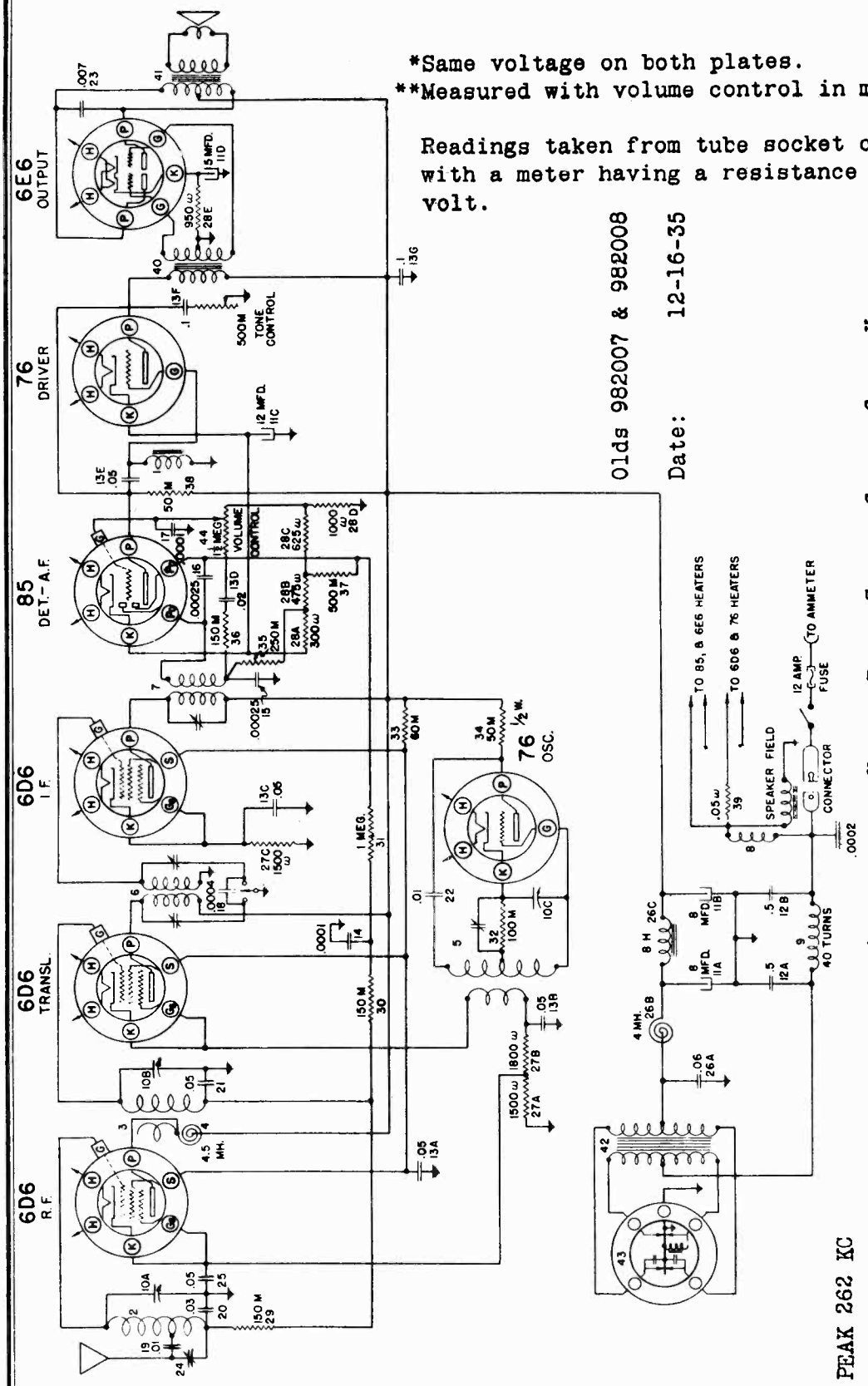


FIG. 4

MODELS 982007,982008
Schematic,Voltage

UNITED MOTORS SERVICE



*Same voltage on both plates.
**Measured with volume control in minimum position.

Readings taken from tube socket contacts to ground with a meter having a resistance of a 1000 ohms per volt.

Olds 982007 & 982008

Date: 12-16-35

IF PEAK 262 KC

TUBE SOCKET VOLTAGES

Type	Function	H	P	S	Gs	G	K
6D6	R-F Amplifier	5.5	235	90	11.5	0	11.5
6D6	Translator	5.5	235	90	16.0	0	16.0
76	Oscillator	5.5	90	-	0	-20	0
6D6	I-F Amplifier	5.5	235	90	5.25	0	5.25
85	Det. 1st A-F	5.85	115	-	-	**5.5	13.0
76	Driver	5.85	225	-	-	0	13.0
6E6	Output	5.85	*225	-	-	0	24.0

CIRCUIT ALIGNMENT

1. Peaking I-F Stages at 262 Kilocycles

IMPORTANT: The "Local-Distance" switch on the tuning control used with these receivers is used to control the alignment of the first I-F coil windings. The capacity existing between the leads and the shielding of the cable connecting to the switch in the tuning control is part of the I-F tuned circuit and must be taken into consideration when aligning the I-F stages.

In order to duplicate this capacity and provide facilities for switching from "Local to Distance" a "TEST AND ALIGNMENT CABLE" (Part #1210201) has been made available. This cable eliminates the necessity of removing the tuning control from the car.

(a) Connect the signal lead of the test oscillator to the grid cap of the 6D6 Translator Tube through a .1 mfd. condenser, leaving the tubes grid clip in place. Connect the ground lead of the test oscillator to the chassis frame.

(b) Insert the four prong plug of the "TEST AND ALIGNMENT CABLE" of the tuning control cable into the socket provided on the receiver chassis. Turn switch on test cable or tuning control to "DISTANCE" position. (If the receiver is aligned with the switch in the "Local" position, the "Local-Distance" switch will operate backwards.)

(c) Set the test oscillator to exactly 262 K.C.

(d) Adjust the trimmers on the I-F coils (Illus. 6 and 7, Fig. 3) for maximum output. These adjustments should be repeated several times and during alignment the test oscillator output should be kept to as low a value as is consistant with obtaining readable indication on the output.

2. Aligning at 1560 Kilocycles

Leave the test oscillator leads connected the same as for aligning the I-F circuits. Turn the rotor plates of the gang condenser all the way out and against the high frequency stop. Set the test oscillator to 1560 kilocycles. Adjust the parallel trimmer for the oscillator section of the condenser gang (Illus. 10C, Fig. 2) for maximum output. (It is very important that this frequency be set accurately as a slight missetting will cause the receiver to be out of track over the entire high frequency end of the dial.)

3. Aligning at 540 Kilocycles

Leave test oscillator leads connected the same as before. Turn the rotor plates of the gang condenser all the way into mesh so that they rest against the low frequency stop. Set the test oscillator to 540 K.C. Adjust the oscillator padding condenser (Illus. #5, Fig. 3) located on the under-side of the receiver sub-panel to maximum output. (This adjustment sets the low freqeuncy tuning range of the receiver to 540 K.C.)

4. Aligning at 1400 Kilocycles

Remove the signal lead of the test oscillator from the grid of the 6D6 Translator tube and connect to the antenna terminal of the receiver THROUGH A .0002 MICA CONDENSER connected in place of the .1 mfd. condenser previously used. It is very important that a .0002 mfd. mica condenser be used in aligning the antenna stage of these receivers in order that this circuit can be made to track properly. Some test oscillators have this condenser included and if the capacity is correct, it will not be necessary to use an external series condenser. Set the test oscillator to 1400 K.C. Turn the condenser rotor plates until the frequency is tuned in with maximum output. Adjust the R-F parallel trimmer on the condenser gang (Illus. #10B, Fig. 2) and the antenna compensating condenser (Illus. #24, Fig. 3) located on the side of the receiver case for maximum output.

5. Aligning at 600 Kilocycles

The oscillator padding condenser was previously adjusted at 540 K.C., however, it is necessary in most cases to repeak the oscillator tracking condenser at 600 K.C. in order to make the receiver track properly and to secure full sensitivity.

Set the test oscillator on 600 K.C. Turn the condenser rotor plates until the signal from the test oscillator is tuned in with maximum output. Maintain a low output signal from the test oscillator and readjust the oscillator tracking condenser (Illus. #5, Fig. 3) while rocking the variable condenser gang tuning shaft back and forth through the signal. This operation should be continued until no further increase in output can be obtained.

SUBJECT--CHANGE IN "CIRCUIT ALIGNMENT" PROCEDURE
OLDS RADIOS 982007 & 982008

Oldsmobile radios 982007 & 982008 were shipped from the factory with their oscillator circuits high frequency adjustment made at either 1560 or 1540 K.C.

ADJUSTING OSCILLATOR CIRCUIT

Sets adjusted at 1540 K.C. by the factory will not tune to 1560 K.C. unless the oscillator trimmer is screwed out too far. If re-alignment of any of these radios is found necessary, make the high frequency adjustment of the oscillator section of the condenser gang at 1540 instead of 1560 K.C. as indicated in the "CIRCUIT ALIGNMENT" procedure. All other adjustments of the receiver circuits should be made as indicated under "CIRCUIT ALIGNMENT".

CHECKING ALIGNMENT

If it is found in checking the receiver alignment with a test oscillator that the receiver will tune to 1560 K.C., it will not be necessary to reset the oscillator section of the condenser gang to 1540 K.C. That is, unless the oscillator coil has been replaced, in which case the adjustment should be made at 1540 K.C.

Be sure to check your test oscillator for correct calibration against known station frequencies before making any receiver adjustments.

UNITED MOTORS SERVICE

MODELS 982007, 982008
Olds
Socket, Trimmers
Chassis

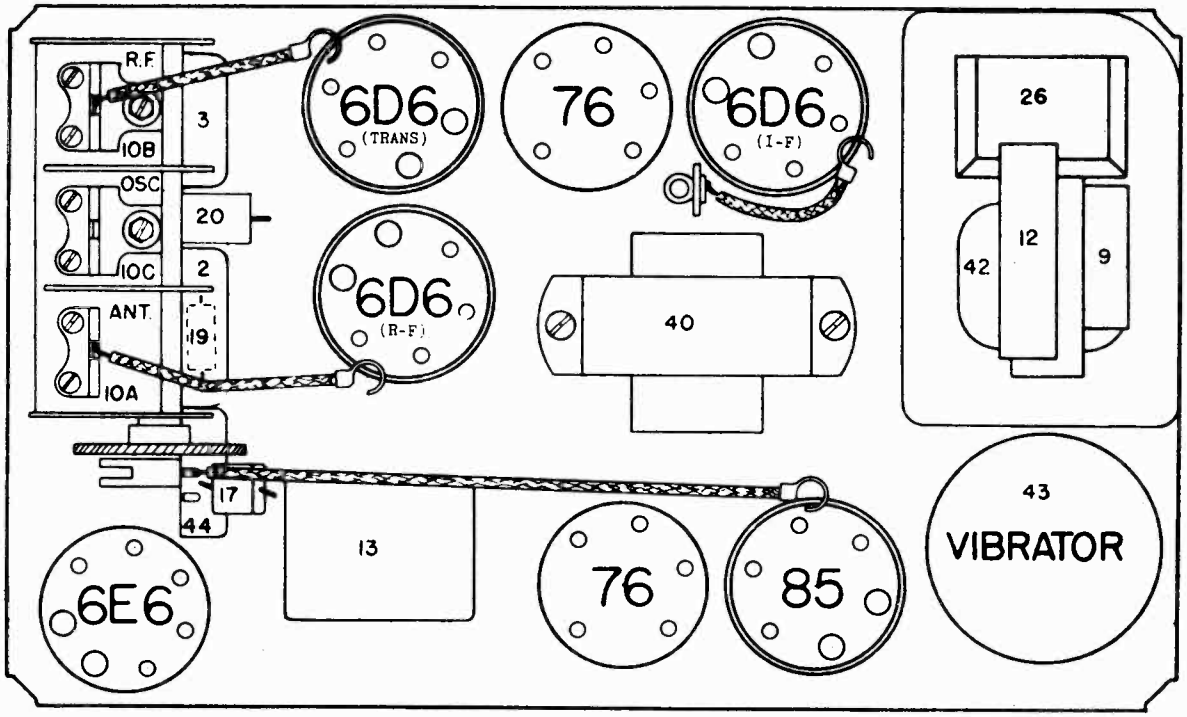
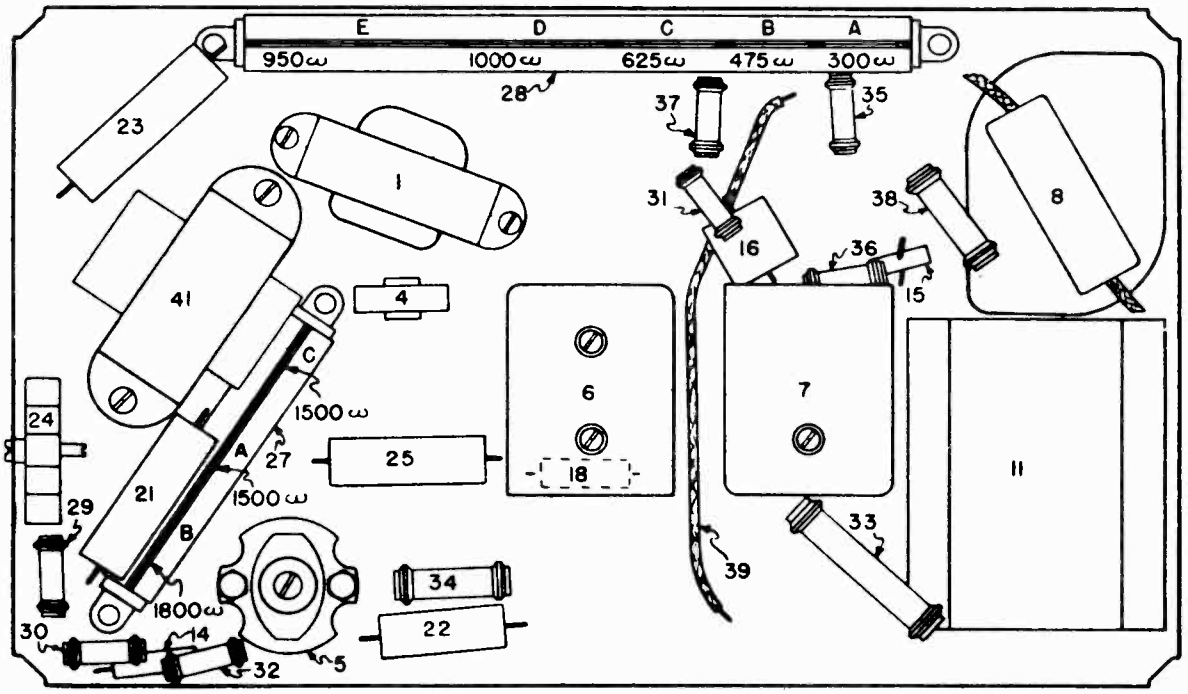
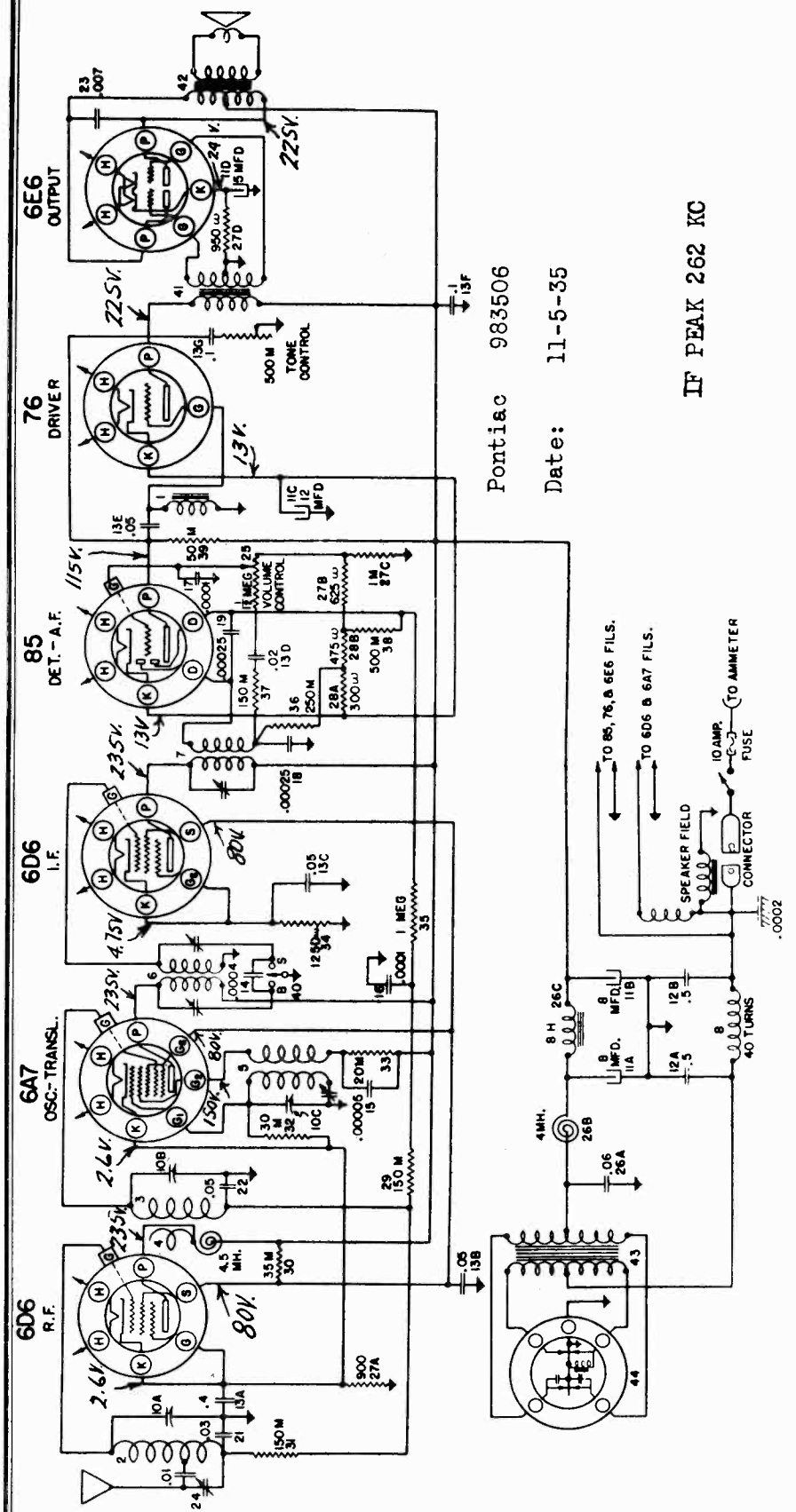


FIG. 2 PARTS LAYOUT--Top View



MODEL 983506 Pontiac
Schematic, Voltage
Alignment

UNITED MOTORS SERVICE



Pontiac 983506

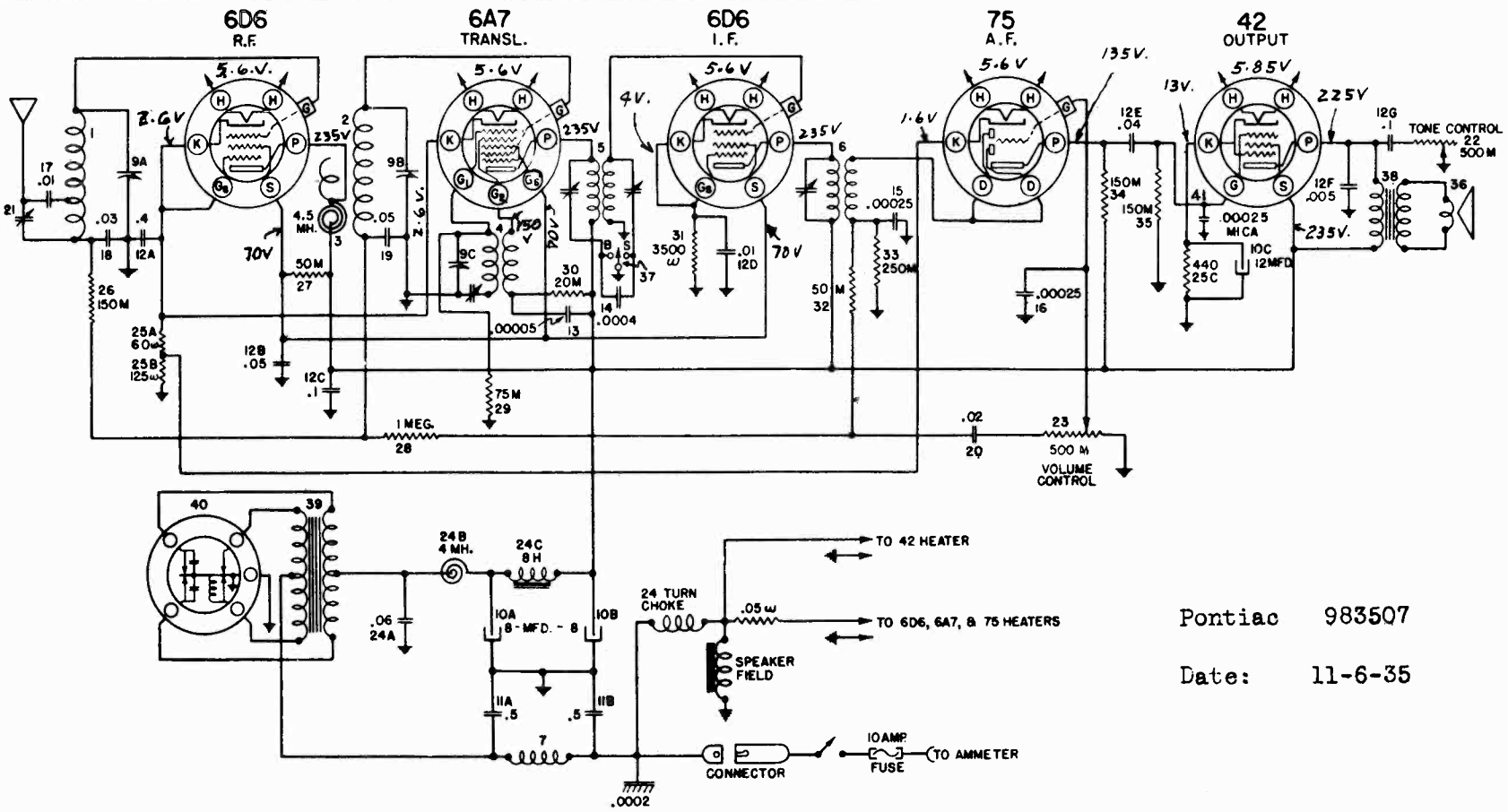
Date: 11-5-35

IF PEAK 262 KC

Feed 262-kc. signal to control grid of 6A7. Use 0.25-mf condenser as dummy antenna. Adjust the three trimmers on top of the i-f coils. (Be sure "Local-Distance" switch is in "Distance" position) Feed signal of 1560 kc to antenna post through a 0.002-mf. condenser dummy. Turn condenser plates completely out of mesh. Adjust Osc. trimmer-- middle section of condenser gang. Set signal generator and dial to 600 kc. Adjust Osc. tracking condenser (on bottom of chassis) while rocking the gang condenser plates. Set signal generator and dial to 1400 kc. Adjust the r-f trimmer on the condenser gang. Recheck Osc. trimmer of condenser gang at 1560 kc.

UNITED MOTORS SERVICE

MODEL 983507 Pontiac
Schematic, Voltage
Alignment



Pontiac 983507

Date: 11-6-35

ALIGNMENT - To align the I-F stages -- feed a test oscillator signal of 262 K.C. into the control grid of the 6A7 tube through a .25 mfd. condenser and adjust the three trimmers located on top of the I-F coils. (Make sure that the "Local-Distance" switch is in the "Distance" position). To align the R-F circuits - change the test oscillator frequency to 1560 K.C. into antenna connection on receiver through a .0002 mfd. condenser. Turn the condenser plates until they are completely out of mesh and against the high frequency stop. Adjust the oscillator trimmer on the middle section of the condenser gang. Change test oscillator frequency to 540 Kilocycles and turn condenser plates until this signal is tuned in (approximately 600 K.C. position of plates) and adjust the oscillator tracking condenser located on the bottom of the chassis while rocking the condenser gang plates back and forth slightly, until maximum output is obtained. Change test oscillator setting to 1400 K.C. and turn condenser plates until this signal is tuned in. Adjust the R-F trimmer on the condenser gang. Re-check the setting of the osc. trimmer of the condenser gang (middle section) at 1560 K.C.

MODELS 985100, 985300
985301, 985400
Chevrolet

UNITED MOTORS SERVICE

Alignments

CHEVROLET MODEL 985100 - ALIGNMENT

1. Aligning I-F Stages at 262 Kilocycles

(a) Connect the signal lead of the test oscillator to the grid cap of the 6A7 tube, through a .1 mfd. condenser, leaving the tube's grid clip in place.
(b) Connect the ground lead of the test oscillator to the chassis frame.

(c) Set the test oscillator to exactly 262 K.C.

(d) Adjust the trimmers on the I-F coils (Illus. 5 and 6) carefully for maximum output. These adjustments should be repeated several times and during alignment the test oscillator output should be kept to as low a value as is consistent with obtaining readable indication on the output meter.

2. Aligning at 1560 Kilocycles

(a) Leave the test oscillator leads connected the same as for aligning the I-F circuits.

(b) Turn the rotor plates of the gang condenser all the way out and against the high frequency stop.

(c) Set the test oscillator to 1560 kiocycles.

(d) Adjust the parallel trimmer for the oscillator section of the condenser gang (Illus. 9C, Fig. 2) for maximum output. It is very important that this frequency be set accurately as a slight missetting will cause the receiver to be out of track over the entire high frequency end of the dial.

3. Aligning at 540 Kilocycles

(a) Leave test oscillator leads connected the same as before.

(b) Turn the rotor plates of the gang condenser all the way into mesh so that they rest against the low frequency stop.

(c) Set the test oscillator to 540 K.C.

(d) Adjust the oscillator tracking condenser (Illus. #4, Fig. 3) located on the under-side of the receiver sub-panel to maximum output. (This adjustment sets the low frequency tuning range of the receiver to 540 K.C.)

4. Aligning at 1400 Kilocycles

(a) Remove the signal lead of the test oscillator from the grid of the 6A7 tube and connect to the antenna terminal of the receiver through a .0002 mica condenser connected in place of the .1 mfd. condenser previously used.
(b) Set the test oscillator to 1400 K.C.

(c) Turn the condenser rotor plates until this frequency is tuned in with maximum output.

(d) Adjust the R-F parallel trimmer on the condenser gang (Illus. #9B, Fig. 2) and the antenna compensating condenser (Illus. #16, Fig. 4) located on the side of the receiver case for maximum output.

5. Aligning at 600 Kilocycles

The oscillator padding condenser was previously adjusted at 540 K.C., however, it is necessary in most cases to repeak the oscillator tracking condenser at 600 K.C. in order to make the receiver track properly and to secure full sensitivity.

(a) Set the test oscillator on 600 K.C.

(b) Turn the condenser rotor plates until the signal from the test oscillator is tuned in with maximum output.

(c) Maintain a low output signal from the test oscillator and readjust the oscillator tracking condenser (Illus. #4, Fig. 3) while rocking the variable condenser gang tuning shaft back and forth through the signal. This operation should be continued until no further increase in output can be obtained.

NOTE: If the entire alignment procedure has been accomplished correctly, the receiver should be very nearly uniformly sensitive over the entire frequency range.

CHEVROLET MODEL 985300- ALIGNMENT

CIRCUIT ALIGNMENT

If alignment is found necessary -- make all adjustments with chassis in its case and use a calibrated test oscillator and output meter. To align the I-F stages -- feed a test oscillator signal of 262 K.C. into the grid of the 6A7 tube (leave grid clip in place) through a .25 mfd. condenser and adjust the four I-F trimmers located on top of the I-F coils. This operation should be repeated until no further increase in output can be obtained To align the R-F circuits -- change the test oscillator setting to 1560 K.C and feed this signal into the antenna connection of the receiver through a .0002 mfd. condenser. Turn the condenser gang plates until they are completely out of mesh. Then adjust the oscillator parallel trimmer on the middle section of the condenser gang. (The parallel trimmers for the condenser gang are accessible through the side of the chassis case by removing the "spring buttons"). Change test oscillator setting to 1400 K.C. and turn condenser plates until this signal is tuned in, then adjust the trimmers of the other two sections of the condenser gang. Change test oscillator setting to 600 K.C. and turn condenser plates until signal is tuned in having the greatest output (600 K.C. position of plates). Adjust the oscillator tracking condenser (accessible through a small hole in the chassis sub-panel between the condenser gang and the 6A7 tube) while rocking the condenser gang plates back and forth slightly until no further increase in output can be obtained. Recheck the alignment of the parallel trimmer for the middle section of the condenser gang at 1560 K.C.

CHEVROLET MODEL 985301-- ALIGNMENT

1. Aligning the I-F Stages at 260 K.C.

The I-F Coil assemblies used in this receiver are "iron core" types and adjustment is made by varying the inductance as the capacity tuning the coil windings is fixed. The inductance is varied by changing the relative positions of the iron cores with the adjusting screws provided on the top and bottom of each I-F coil assembly.

(a) Feed a test oscillator signal of 260 K.C. into the control grid of the 6A7 tube (leave grid clip in place) through a .25 mfd. condenser. Keep the test oscillator leads away from the grid leads of other tubes.

(b) Adjust the set screw provided on the top and bottom of each I-F coil assembly. (See Illustration 55 and 56, Figures 2 and 3.) Repeat these adjustments until maximum output is obtained.

2. Aligning the R-F Stages

The antenna coil used in this receiver is also an "iron core" type similar to the I-F's. Extreme care should be exercised in carrying out the following procedure to insure proper alignment of the antenna circuit.

(a) Change the test oscillator setting to 1560 K.C. and feed this signal into the control grid (cap) of the 6D6 R-F tube through a .25 mfd. condenser. Turn the condenser rotor plates until they are completely out of mesh and rest against the high frequency stop. Adjust the parallel trimmer for the oscillator section (center) of the gang condenser.

(b) Change the test oscillator setting to 600 K.C. and tune condenser gang to pick up this signal (at approximately 600 K.C.) and adjust the oscillator series condenser, (Illustration #2, Figure 3) simultaneously rocking the gang condenser back and forth through the signal until maximum output results.

(c) Re-check setting of parallel trimmer for oscillator section (center) of the gang condenser as covered in paragraph (a).

(d) Feed a test osoillator signal of 600 K.C. through a .0002 mfd. (mica) condenser into the antenna connection on the receiver. Tune gang condenser to pick up this signal and adjust the screw of the antenna coil (Illustration #31 on Fig. 3) simultaneously rocking the condenser gang plates back and forth until maximum output is obtained.

(e) Change test oscillator setting to 1400 K.C. and turn condenser gang plates until this signal is heard (at 1400 K.C.). Then adjust the parallel trimmers on the top and bottom sections of the gang condenser.

(f) Repeat paragraph (d) to see if further improvement can be made. If improvement results, repeat paragraph (e).

Bass Compensation--Tone Control: Bass Compensation is obtained at low audio outputs by by-passing some of the higher frequencies to ground, with a series condenser and resistor connected to a tap on the volume control. Tone control action is obtained by by-passing some of the higher frequencies present in the plate circuit of the 76 driver tube to ground, through a series condenser and rheostat. The audio signal voltage present in the 76 tube plate circuit is coupled to one of the voice coil leads in the speaker cable with a small condenser. The higher frequencies are by-passed to ground at the speaker with the tone control.

CHEVROLET MODEL 985400--ALIGNMENT

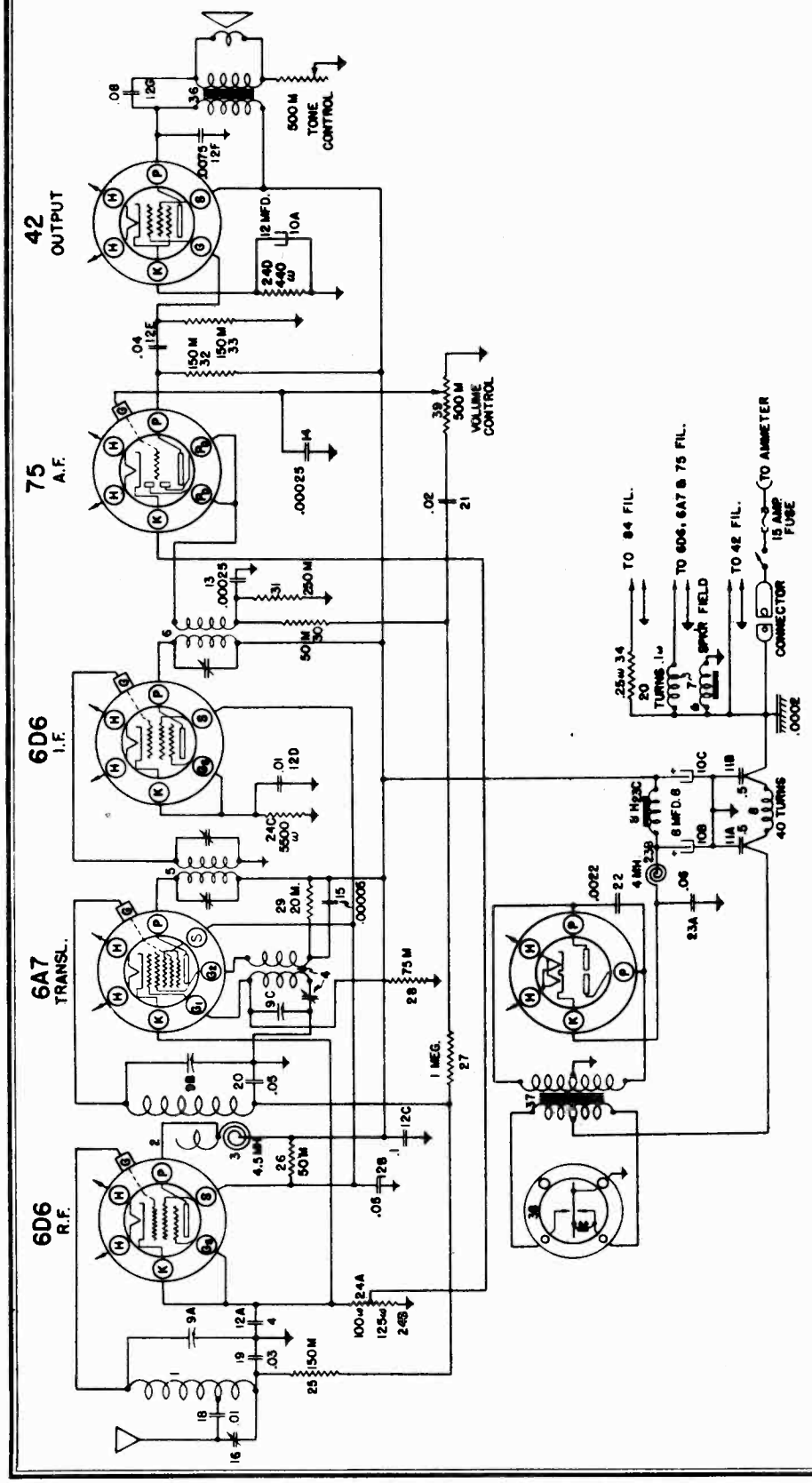
CIRCUIT ALIGNMENT

If alignment is found necessary--make all the adjustments with chassis in its case and use a calibrated test oscillator and output meter. To align the I-F Stages--feed a test oscillator signal of 262 K.C. into the control grid of the 6A7 tube (leave grid clip in place) through a .25 mfd. condenser and adjust the trimmers on the I-F coils for maximum output. Care should be taken to keep the test oscillator leads away from the grid leads of the other tubes in order to avoid inaccurate adjustments.

To align the R-F Stages--change the test oscillator setting to 1560 K.C. and feed this signal into the antenna connection on the chassis through a .0002 mfd. condenser. Turn the condenser rotor plates until they are completely out of mesh and adjust the parallel trimmer for the oscillator section (middle) of the condenser gang. Change the test oscillator setting to 1400 K.C. and turn condenser rotor plates until this signal is tuned in. Then adjust the trimmers for the other two sections of the condenser gang. Change test oscillator setting to 600 K.C. and adjust the antenna compensating condenser (located near the control shaft bushings) while rocking the tuning control plates back and forth slightly. Recheck alignment of the antenna section (see PARTS LAYOUT) of condenser gang for maximum output at 1400 K.C. It will also be necessary to readjust the antenna compensating condenser to the car antenna upon installation.

MODEL 985100 Chevrolet
Schematic, Voltage

UNITED MOTORS SERVICE



TUBE SOCKET VOLTAGES

IF PEAK 262 KC

CHEVROLET MODEL 985100

Date: 9-27-35

Type	Function	H	P	S	G8	G1	G2	K
6D6	R-F Amplifier	5.7	230	70	2.75	-	-	2.75
6A7	Translator	5.7	230	70	-	20	150	2.75
6D6	I-F Amplifier	5.7	230	70	2.75	-	-	6.6
75	Det.-1st A-F	5.7	135	-	-	-	-	1.6
42	Output	6.0	220	235	-	-	-	13.0
84	Rectifier	5.7	*AC	-	-	-	-	240

NOTE: Above readings taken from tube socket contacts to ground with a D.C. voltmeter having a resistance of 1000 ohms per volt.

MODEL 985100 Chevrolet
Socket, Trimmers, Notes
Chassis

UNITED MOTORS SERVICE

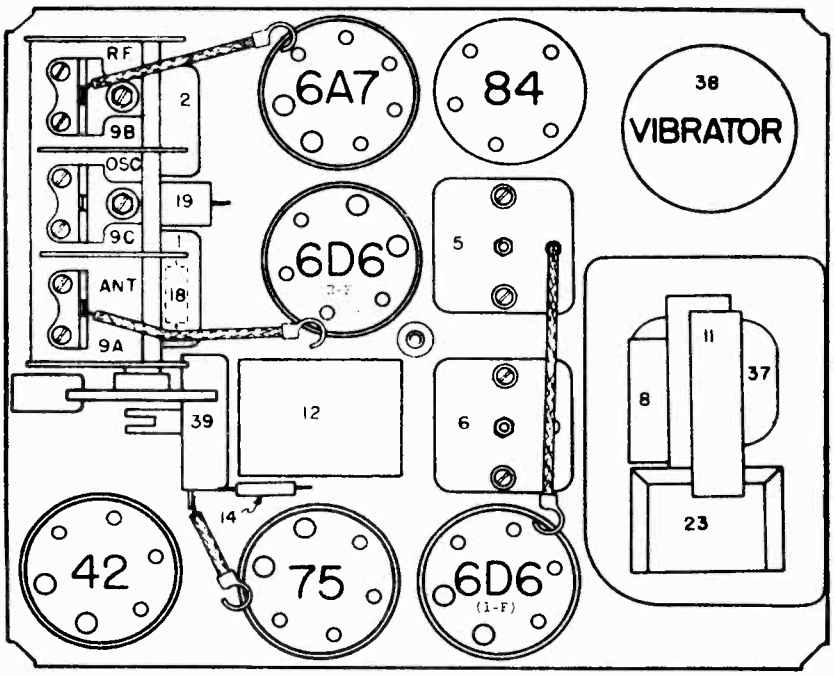


FIG. 2--PARTS LAYOUT--Top View

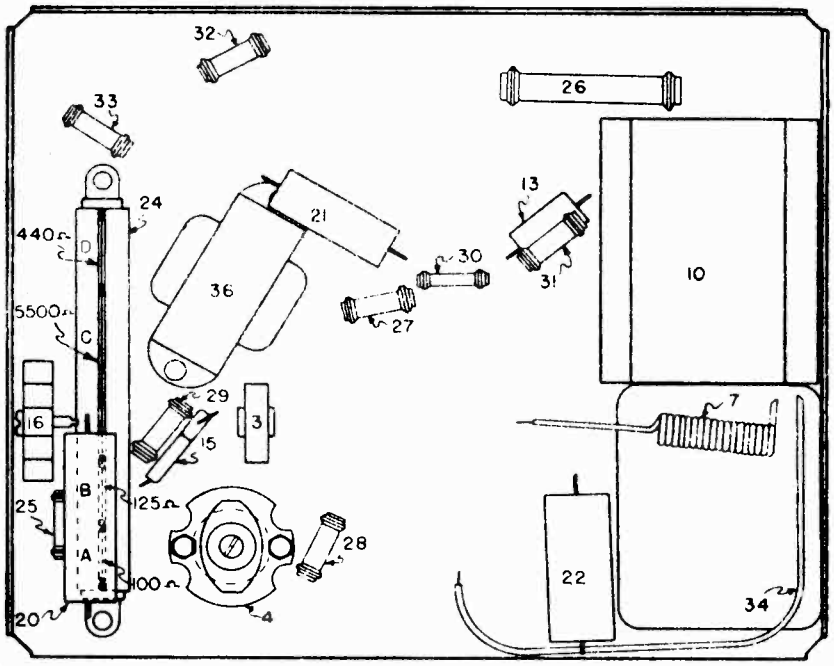


FIG. 3--PARTS LAYOUT--Bottom View

GENERAL: The Chevrolet Model 985100 is a six tube two unit receiver with an instrument panel tuning control, tone control and a "dome" type speaker. This receiver was designed specifically for 1936 Model Chevrolets.

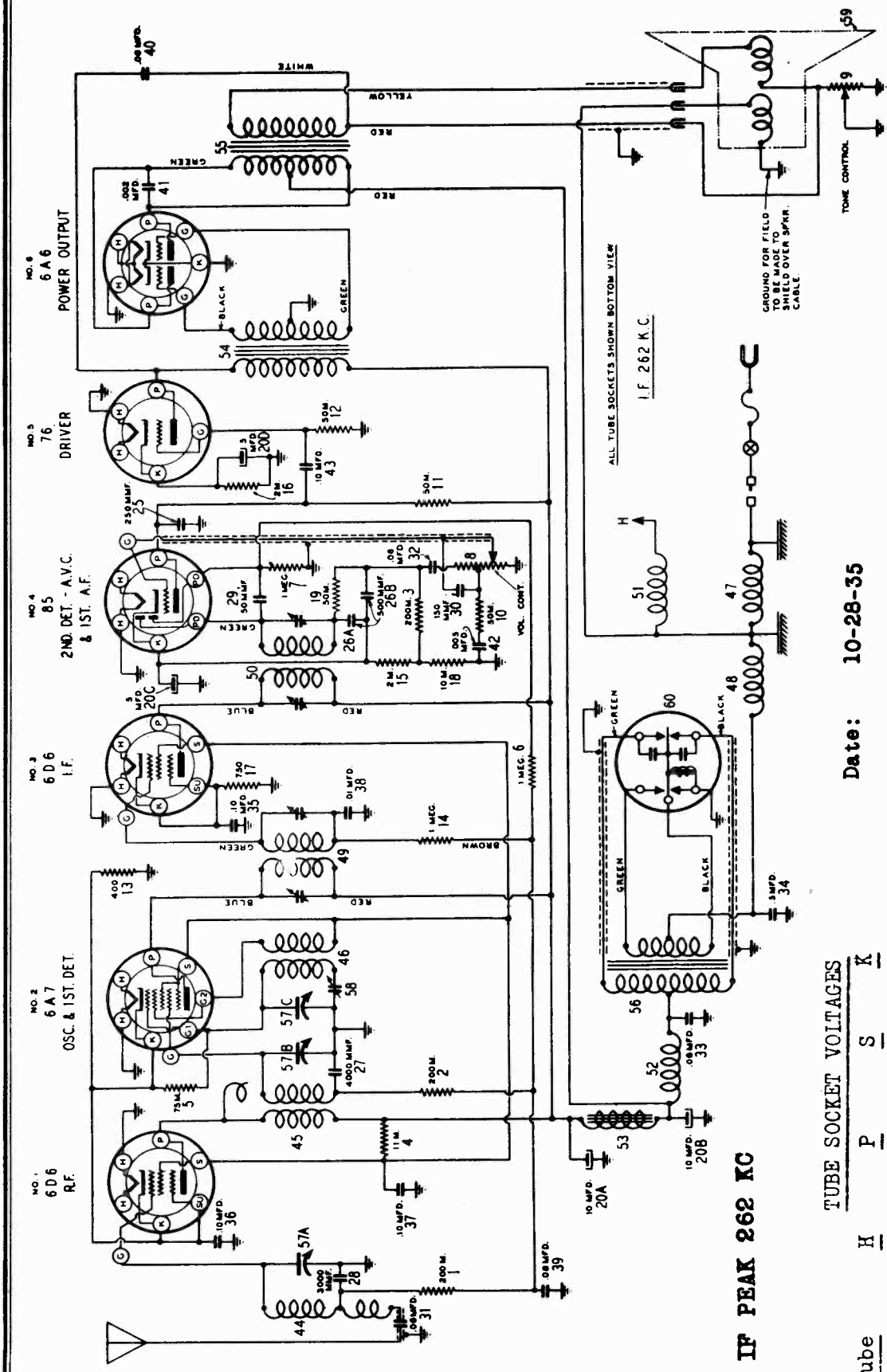
ANTENNA SYSTEM: The antenna system used with this receiver consists of an assembly of three rubberized metal strips mounted beneath each running board with special brackets. The strip assemblies are well insulated having no exposed metal connections thereby reducing the possibility of unsatisfactory reception due to leakage caused by mud, water, etc.

PART #1210760 FILTER ASSEMBLY

The part #1210760 Filter Assembly (Illus. #23) consists of an iron core choke, R-F choke and an .06 mfd. condenser sealed in a separate container. The component parts of this assembly are not serviceable and if any are found to be defective, it will be necessary to replace the complete unit.

UNITED MOTORS SERVICE

MODEL 985300 Chevrolet
Schematic, Voltage



IF PEAK 262 KC

Date: 10-28-35

TUBE SOCKET VOLTAGES

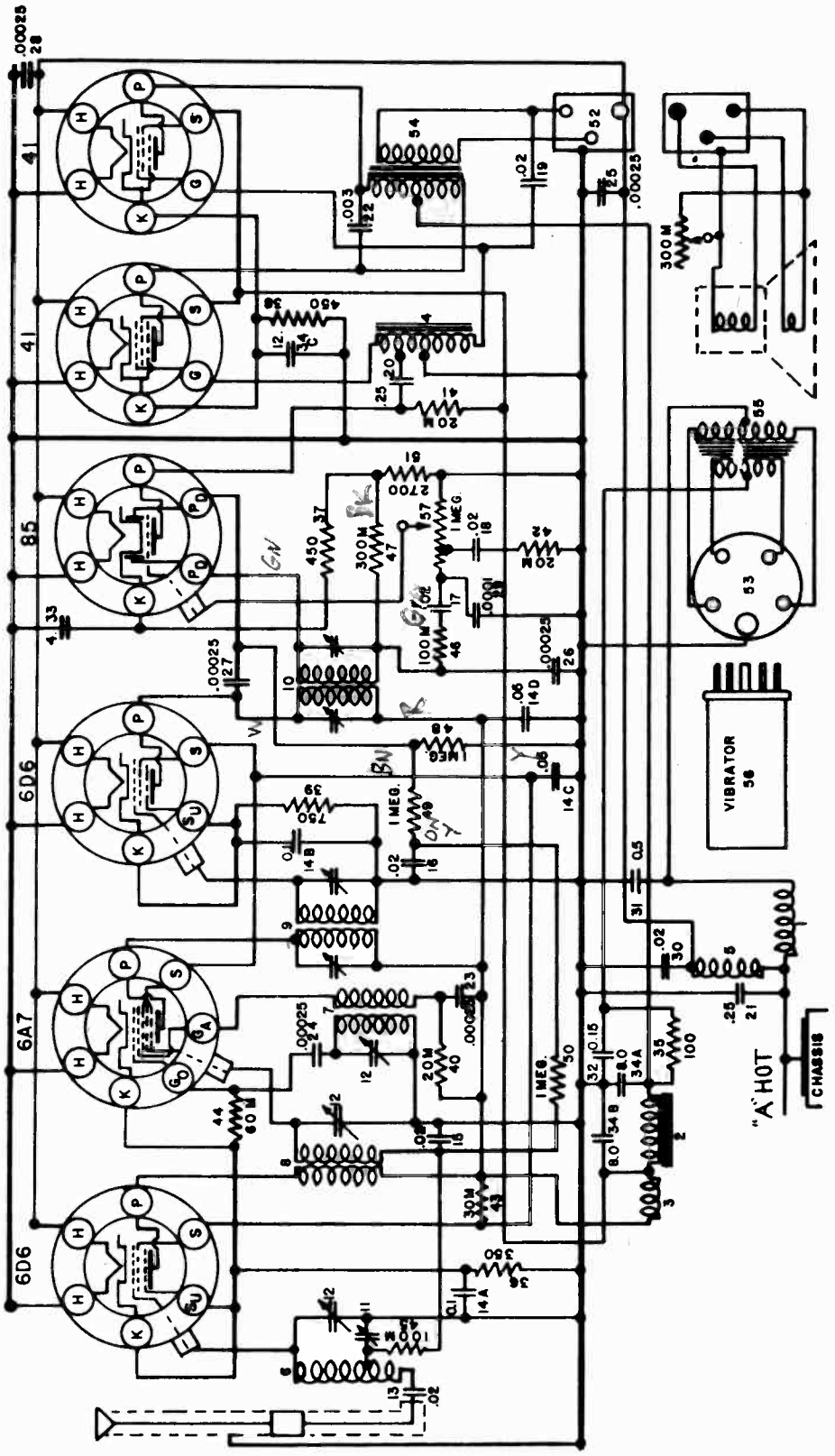
Tube	H	P	S	K
6D6 (R-F)	6	240	125	4.5
6A7	6	240	125	4.5
6D6 (I-F)	6	240	125	9.0
85	6	175	-	12.0
76	6	225	-	10.0
6A6	6	250	-	0

GENERAL: The Chevrolet Model 985300 is a six tube receiver with a full 8" Dash type speaker, instrument panel tuning control and tone control. This receiver was designed specifically for 1936 Model Chevrolets and for use on the under-car antenna system required. Antenna System. The antenna system used with this receiver consists of an assembly of two rubberized metal strips for mounting below each running board with special brackets

MODEL 985400 Chevrolet
Schematic, Voltage

UNITED MOTORS SERVICE

GENERAL: The Chevrolet Model 985400 is a six tube receiver with a full 8" dash type speaker and instrument panel tuning control.



IF PEAK 262 KC

CHEVROLET MODEL 985400

Date: 2-20-36

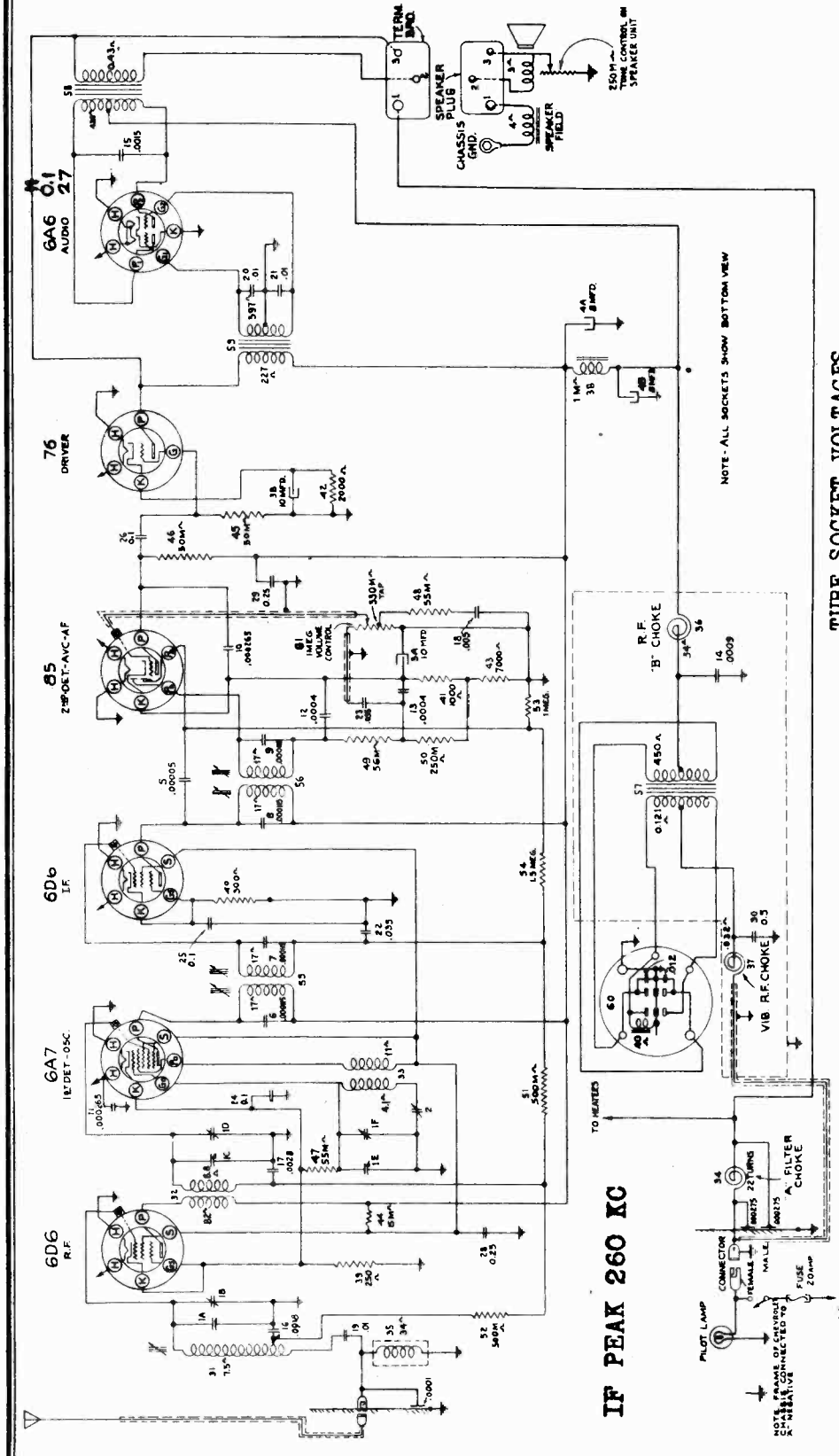
TUBE SOCKET VOLTAGES

Tube	Function	H	P	S	GA	GO	K
6D6	R-F Amp.	6	220	100	-	-	5.7
6A7	Osc.-Mod.	6	220	100	130	*	5.7
6B7	I-F Amp.	6	220	100	-	-	6.8
76	1st A-F	6	130	-	-	-	8.0
41	Output	6	210	220	-	-	18.0
41	Output	6	210	220	-	-	18.0

* Varies from -5 to -15 as tuning condenser is rotated.

UNITED MOTORS SERVICE

MODEL 985301 Chevrolet
Schematic, Voltage



IF PEAK 260 KC

TUBE SOCKET VOLTAGES

TUBE	FUNCTION	H	P	S	GS	PO	K
6D6	R-F Amp.	6	235	90	4	-	4
6A7	Det-Osc.	6	235	90	-	90	4
6D6	I-F Amp.	6	235	-	2.6	-	2.6
85	Det-1st A-F	6	145	-	-	-	13
76	Driver	6	230	-	-	-	11
6A6	Output	6	260	-	-	-	0

Above readings taken from tube socket contacts to ground with a 1000 ohm per volt meter, under "no signal" conditions. Volume control setting optional. Ampere drain 7.8 amperes at 6 volts.

CHEVROLET MODEL 985301

Date: 5-11

MODEL 985301 Chevrolet
Socket, Trimmers, Note Chassis

UNITED MOTORS SERVICE

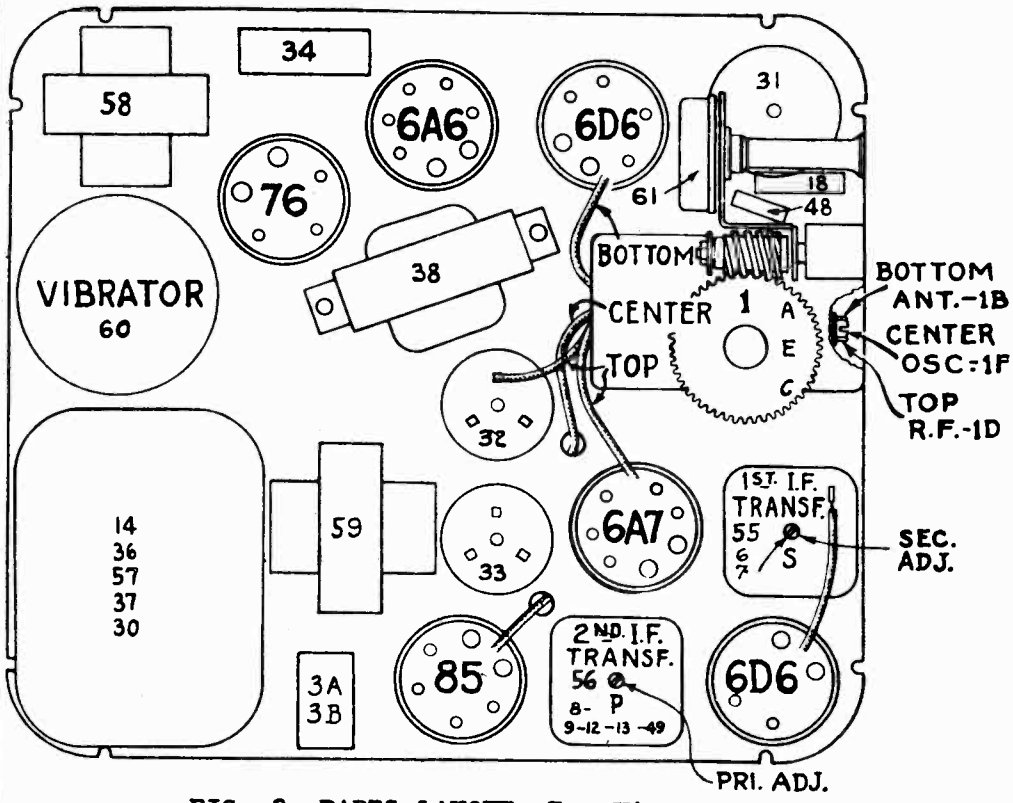


FIG. 2--PARTS LAYOUT--Top View

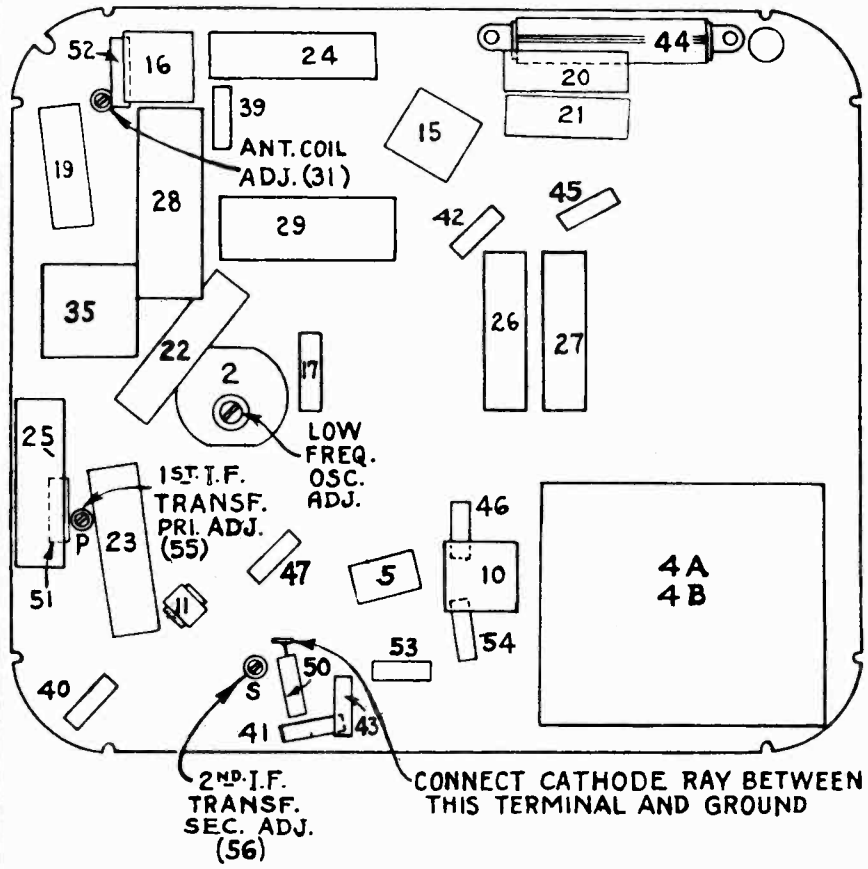


FIG. 3--PARTS LAYOUT--Bottom View

GENERAL: The Chevrolet Model 985301 is a six tube, two unit auto radio with a "dash" type speaker, instrument panel tuning control, bass compensation and tone control.

Antenna System: The antenna system used with this receiver, consists of an assembly of two rubberized metal strips for mounting beneath each running board with brackets provided.